STRATEGIES TO INCREASE COMMERCIAL RECYCLING

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EXECUTIVE SUMMARY

In 1992, Montgomery County embarked on an ambitious effort to replace the County's reliance on landfills and disposal with recycling, source reduction, and a culture of environmental stewardship. The County committed to an overall recycling rate of 50% by 2000, later amended to 50% by the end of 2004.

To achieve this vision, in 1994, the County established a mandatory recycling program; the regulations for this program are currently under revision by the County Executive. The County also set-up a public education and outreach program. In FY 04, the Council appropriated $963,000 for the Division of Solid Waste Services' Commercial Recycling Program.

In FY 03, the Department of Public Works and Transportation's Division of Solid Waste Services reported the County's overall recycling rate at 37%; with a residential (single family) rate of 51%, a commercial rate of 30%, and a multi-family rate of 12%. These rates are unchanged since FY 00.

This study examines Montgomery County's waste stream and commercial recycling programs, identifies successful commercial recycling strategies in other jurisdictions, and provides an assessment of the feasibility of those strategies in Montgomery County. In sum:

- An analysis of Montgomery County's waste composition and recycling data indicates that the County would need to recycle an additional 153,000 tons in order to achieve a 50% recycling rate. Mixed paper and corrugated cardboard are the highest remaining recycling "targets of opportunity" in Montgomery County's waste stream with viable markets.

- A study of successful commercial recycling programs in other jurisdictions identified four key factors that contribute to a program's success: reliable commodity markets, education and technical assistance, enforcement, and using a cooperative approach to build support and influence participation.

- Commercial recycling stakeholders interviewed by OLO identified education and technical assistance, disposal bans, enforcement, and reduced fees or tax incentives as the most feasible strategies to increase commercial recycling in Montgomery County.

- Limited data and varied stakeholder observations make it difficult to develop a clear picture of the performance and effectiveness of the County's commercial recycling program activities. The stakeholders interviewed consistently voiced expanding and formalizing partnerships with business organizations as a necessary strategy to increase commercial recycling.

To improve the County's commercial recycling, OLO recommends that the Council:

- Adopt a resolution to ban the disposal of mixed paper and corrugated cardboard.
- Encourage the County Executive to invite the Chambers of Commerce and other interested parties to coordinate a public education and outreach campaign to improve commercial recycling in Montgomery County.
- Request that the County Executive forward the revised Executive Regulation on recycling to the Council by September 1st, 2004.
- Ask the County Executive to plan for future recycling initiatives and consider proposing a new recycling goal of 60% as part of the forthcoming Solid Waste Plan.

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A. Authority

Council Resolution Number 15-281, "Office of Legislative Oversight FY 2004 Work Program," adopted July 29, 2003. The Council's Transportation and Environment Committee approved a refined scope for the project on December 4, 2003.

B. Project Background and Purpose

The County is not on track to achieve its goal of an overall 50% recycling rate by the end of 2004. Instead the Department of Public Works and Transportation's (DPWT) Division of Solid Waste Services (DSWS) projects the current overall recycling rate of 37.1% will increase marginally to 38% in FY 05.

The County's recycling rate varies substantially by sector. Specifically, as of FY 03, DSWS estimates the individual recycling rates for each sector are:

- 51.4% for the residential sector;
- 11.6% for the multi-family sector; and
- 30.2% for the commercial, or nonresidential sector.[1]

Since the County established its 50% recycling goal, the residential sector made significant gains in recycling while the commercial and multifamily sectors progressed more slowly. However, all three sectors have remained steady since FY 00. Since FY 00, the residential rate decreased by 1%; the commercial rate increased by 1.2%; and the multifamily rate increased by 0.8%.

To reach its goal of a 50% recycling rate, the County must find ways to increase commercial recycling. Currently, the commercial sector generates 50% of the County's waste. Data from the most current Waste Composition Study, published in 1999, indicate that paper, organic materials, and wood are the most significant recyclable materials left in the commercial waste stream.

The significance of this project and the County's urgency to achieve its recycling goal intensified since the Council assigned OLO this project last summer. In January 2004, DPWT informed the Council that the County is receiving record tonnages at the Solid Waste Transfer Station at Shady Grove Road. To prevent the Resource Recovery Facility (RRF) in Dickerson from operating over the capacity of its permit limit, DPWT began

[1] For the purposes of this report, the residential sector includes single family detached and attached housing; the multi-family sector includes residential buildings with seven or more units; and the commercial sector includes businesses, institutions, and manufacturing industries. This report uses the terms "commercial" and "non-residential" interchangeably. The County's Solid Waste Plan for 1998-2007 reports that a 1992 study of the County's solid waste stream identified the distribution of non-residential waste generation to be 67.1% commercial, 26.2% industrial, and 6.7% institutional.

shipping overflow waste from the Solid Waste Transfer Station to a landfill in Brunswick, Virginia.

A recycling rate of 37.1% and the practice of shipping waste out-of-County conflict with adopted policies in the Montgomery County Comprehensive Solid Waste Management Plan. The County Council adopted the current plan in 1998 and expects to conduct public hearings and adopt a new Solid Waste Plan this summer.

C. Scope and Organization of this Report

The County Council asked the Office of Legislative Oversight (OLO) to identify commercial recycling strategies used successfully in other places that could increase commercial recycling in Montgomery County. Specifically, the Council asked OLO to:

- Research strategies used in other jurisdictions to encourage commercial recycling;
- Examine the reported effectiveness of these strategies; and
- Conduct a preliminary assessment of the feasibility of these strategies for Montgomery County.

This report summarizes the components of the County's solid waste management system, including the current commercial recycling program activities, and presents the results of OLO's research. The report is organized as follows:

Chapter II, Background, outlines the governance framework and briefly describes the components of the County's solid waste management system.

Chapter III, Montgomery County's Recycling Rate and Waste Stream Characteristics, presents the most current data about the waste generated and explains the calculation of the County's recycling rate.

Chapter IV, Montgomery County's Commercial Recycling Mandates and Program Activities, provides an overview of the commercial recycling program, including a description of the programs, funding, and studies conducted by the Division of Solid Waste Services.

Chapter V, Solid Waste Management and Recycling Programs – Research Highlights, presents the highlights of research studies of solid waste management practices and recycling programs.

Chapter VI, Strategies to Improve Commercial Recycling, presents strategies developed by other jurisdictions and experts in the solid waste field to increase recycling in the commercial sector, including the purpose, implementation, and effectiveness of each strategy.

Chapter VII, Stakeholder Themes and Observations, summarizes the results and themes from OLO's meetings with over 35 commercial recycling stakeholders.

Chapter VIII, Findings, summarizes the findings of this OLO report.

Chapter IX, Recommendations, presents OLO's recommendations to the Council.

D. Methodology

OLO staff members Sue Richards, Craig Howard, and Ben Stutz conducted this study. Additionally, OLO staff members Jennifer Kimball, Karen Yoskowitz, and Scott Brown provided substantial contributions to this report.

OLO collected information about the County's commercial recycling program from Department of Public Works and Transportation (DPWT) staff, the DPWT web site, *The Montgomery County Comprehensive Solid Waste Management Plan for the Years 1998 through 2007,* ("the Solid Waste Plan"), and "A Plan Update to Achieve 50 Percent Recycling in Montgomery County, Maryland."

OLO collected information about innovative strategies to increase commercial recycling from a combination of sources. OLO interviewed experts in the field, collected information from professional organizations that research and promote recycling, and reviewed recycling journals and research studies.

OLO collected information regarding the feasibility of implementing recycling strategies in Montgomery County through interviews with a variety of commercial recycling stakeholders: large and small businesses, waste haulers, recycling processors, business and environmental organizations, and property managers.

E. Acknowledgements

OLO received a high level of cooperation from everyone involved in this study. OLO appreciates the information and insights shared by both governmental staff and community members. The staff members are listed below and community members are listed on the next page.

In particular, OLO thanks Assistant Chief Administrative Officer Joe Beach; Al Genetti, Art Balmer, Eileen Kao, Bob Willson, Bill Davidson, Ray Wimbrough, Dave Wagaman, G.A. Corrick, Dan Locke, Alan Pultyniewicz, Godfrey Ampadu, Jeff Marks, Joe O'Donnell, Jackie Dennis, Chris Jones, Mike Mussman, Narjes Soliman and Sara Zavala from the Department of Public Works and Transportation; Deborah Snead from the Bethesda Chevy Chase Regional Services Center; Richard Hawes, Roy Higgins, Michael Allnutt, Randy Weddle, and Lynne Zarate from MCPS; and Aron Trombka and Suzanne Langevin from Council Staff.

OLO also thanks all of the stakeholders we interviewed for their time and insights:

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- Rick Levine of *Potomac Disposal*;
- Robert Drury, Greg DeSoto, Randy Huff, and Jeremy Roth of *Lockheed Martin*;
- Nathaniel Centeno of *Westfield Shoppingtown Montgomery Mall*;
- Michael Ensor, Chris Pilzer, and Maritza Figueroa-Mangene of *Waste Management*;
- Michael Taylor and Jim Marcinko of *Recycle America Alliance*;
- Kevin Stearman and Brian Ryerson of *Office Paper Systems*;
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- Gene Korth of the *Korth Companies*;
- Patricia Brown and Al Kolan of the *American Speech-Language-Hearing Association*;
- Jesse Wright of *International Environmental Management*;
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- Larry Cartano of *Pleasants Development*;
- Jim Stewart of *Environmental Alternatives Recycling*;
- Carl Hawkins of *Hawkins Floor Company*;
- Lewis Selis of *Georgetown Paper Stock of Rockville*;
- Jason Decker of *Hughes Network Systems*;
- Marion Julier of *Lakeforest Shopping Center*;
- Harvey Gershman of *Gershman, Brickner & Bratton*;
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- Mary Francis LeMat of *Social & Scientific Systems*;
- Tracie Quander of *Moore and Associates*;
- Anne Miller of *Copy Connection*;
- Charles Atwell of *Innovative Business Interiors*;
- Jim Suter and David Langas of *BFI*;
- Robert Millstone and David Caffee of *Montgomery Scrap*;
- Odell Hall of *Montgomery General Hospital*;
- Anne Ambler of the *Sierra Club*; and
- Rich Parsons, Georgette Godwin, and Barbara Ashe of the *Montgomery County Chamber of Commerce.*

CHAPTER II: Background

Montgomery County is a suburban community of nearly 914,900[1] people located adjacent to Washington, D.C. The County is home to 338,450[2] households and 34,450[3] businesses that employ 494,815[4] people. In FY 03, the County generated 1.2 million tons of refuse.

State law authorizes the Montgomery County Council to regulate and control the management of solid waste in the County. This chapter provides background information about the characteristics and components of the County's system. It is organized as follows:

- **Part A** – Solid Waste Management and Administration;
- **Part B** – Solid Waste Policy and Governance Framework;
- **Part C** – Refuse and Recycling Collection Services;
- **Part D** – Solid Waste Facilities; and
- **Part E** – Solid Waste Fees and Service Charges.

A. Solid Waste Management and Administration

The Montgomery County Department of Public Works and Transportation's (DPWT) Division of Solid Waste Services (DSWS) has responsibility for day to day management of the County's solid waste system and programs. DSWS oversees certain collection and leaf vacuuming services and manages the County's disposal, resource recovery, and recycling facilities and programs. DSWS also administers the County's solid waste laws and regulations, disseminates information to educate the public about the County's programs, and plans for facilities and programs with advice from citizen advisory groups.

B. Solid Waste Policy and Governance Framework

The policy and governance framework for the County's solid waste system is established in the Comprehensive Solid Waste Management Plan, various County Council resolutions, the Montgomery County Code, and several Executive Regulations.[5]

Comprehensive Solid Waste Management Plan. Maryland state law requires each County to adopt and submit a ten-year solid waste management plan to the Maryland Department of the Environment (MDE). This document establishes overall solid waste policies and provides a blueprint for subsequent budget, program, service and facility decisions.

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[1] 2003 Census Update Survey, MNCPPC, Research and Technology Center, November 2003
[2] 2003 Census Update Survey, MNCPPC, Research and Technology Center, November 2003
[3] Dunn and Bradstreet Business Database, October 2003
[4] Maryland Department of Labor, Licensing and Regulation
[5] Several federal and state laws also govern the disposal of solid waste within the County. These are described in detail in the Solid Waste Plan.

As required by state law, the Solid Waste Plan must estimate the amount of waste that will be generated over the next ten years; describe the disposal systems and acceptance facilities the County intends to use to collect and dispose of this waste; and find that the existing and planned programs, services and facilities are adequate to manage this waste.[6]

State law requires each County to review its solid waste management plan at least every three years. The County prepared and submitted its first plan to MDE in 1972 and submitted subsequent updates in 1978, 1982, 1993, 1996 and 1999.

The current Solid Waste Plan states that "Montgomery County has adopted a general goal of solid waste management that establishes waste reduction as the most preferred management technique followed by reuse and recycling, then incineration with energy recovery, and, least preferred, landfilling." The Solid Waste Plan also reports that "the County has adopted an integrated solid waste management system to achieve its goal of reducing and recycling solid waste to the maximum feasible extent."

This summer, the County Council will conduct public hearings and adopt a new solid waste plan. The draft plan, which DSWS expects to forward to the Council in May, will address the adequacy of the County's solid waste system through 2015.

County Council Resolutions. Through the years, the Montgomery County Council amended the Solid Waste Plan through the adoption of numerous Council Resolutions. For example:

- **Resolutions 12-944 and 12-945,** adopted in 1992, established a solid waste policy framework that:
  - Created a hierarchy of solid waste options that identified waste reduction at the source as the most preferred waste management option. Reuse and recycling was the second most preferred option, incineration with energy recovery was the third, and surface landfilling was the least preferred option.
  - Purposefully limited the size and operation of the Resource Recovery Facility (RRF) to maintain pressure to encourage waste reduction and recycling.
  - Established a County recycling goal of 50% by the year 2000, based on the implementation of a specific schedule of residential and commercial programs to achieve that goal.
- **Resolution 14-958,** adopted in July 2001, was an amendment to the Solid Waste Plan that established a goal of 45% recycling by the end of calendar year 2002 and 50% recycling by the end of calendar year 2004.

[6] Environmental Article of the Annotated Code of Maryland, Article 9, Subtitle 5

- **Resolution 11-2132 and 12-944** (Yard Waste Ban) amended the Solid Waste Plan so that, starting in January 1993, (deferred to January 1994 by Resolution 12-944) yard waste must not be delivered to or processed at the transfer station, the landfill, or the resource recovery facility.

Montgomery County Code, Chapter 48. Chapter 48 of the Montgomery County Code addresses solid waste management, including the licensing, permitting, collection, transportation, and disposal of solid waste. It authorizes the County to establish service and disposal facilities and provides for the establishment of residential refuse collection districts. County law provides the authority for the County's recycling program, including compliance and enforcement provisions. The law also authorizes the County Executive to enter into contracts to procure recycling services necessary for the collection, processing or marketing of recyclables.

Executive Regulations. Executive Regulations spell out several key details of the County's recycling program.

- **ER 58-92, Solid Waste Permits.** This regulation requires that all private haulers permitted to transport solid waste in the County must submit semi-annual reports to the County. A hauler must report the specific quantities of recyclables (by category of material), solid waste, and construction and demolition debris. A hauler must indicate whether the material is delivered to a destination inside or outside of the County.

- **ER 109-92, Residential, Multi-Family, and Commercial Recycling.** This regulation defines the requirements and recyclable materials for all sectors. For the commercial sector, the regulation establishes and defines the requirements for recycling plans and annual reporting, space requirements for recycling receptacles, and the County's authority to enforce the regulation. See Chapter IV (page 23) for a more detailed description of the commercial recycling program requirements.

- **ER 14-95, System Benefit Charge – Commercial.** This regulation establishes the method for calculating and collecting a commercial system benefit charge. It establishes five waste generation categories and authorizes DPWT to assign land use classes to each category based on a waste generation study conducted by DPWT or another jurisdiction. It requires DPWT to conduct an initial study by July 1997 (two years after the adoption of the regulation) and to conduct a new study at least every five years. The regulation also requires DPWT to publish a table annually that assigns a generator category for each land use type and recommend a rate for each generator category. The regulation also establishes a process for a property owner to appeal his/her generator category determination.

- **ER 9-03, System Benefit Charges – Residential Waste Estimates.** This regulation establishes the calculated amount of solid waste generated per dwelling unit for single family and multi-family units. The County estimates each single

family unit produces 2.0401 tons per year and each multi-family dwelling unit produces 1.5143 tons per year of solid waste.

- **ER 13-95, Leaf Vacuuming District.** This regulation creates a new recycling service area to provide for curbside collection of leaves by vacuuming and authorizes the collection of fees to pay for this service.

C. Refuse and Recycling Collection Services

County law establishes the entire County as a collection and disposal district and authorizes the County to enter into multi-year contracts for the collection of solid wastes.

Residential Collection Services. There are 19 incorporated municipalities in the County with responsibility for the collection of refuse and recyclables within their boundaries.

The County divides the unincorporated residential area into two solid waste collection subdistricts with different levels of service. In Subdistrict A, the County contracts with private collectors to provide refuse and recycling collection services.

In Subdistrict B, the County contracts with private collectors to provide recycling collection services similar to those provided in Subdistrict A. Refuse collection services in Subdistrict B, however, are provided by private collectors licensed with the County who contract directly with customers for collection services.

Multi-Family and Commercial Collection Services. Multi-family residences with seven or more units and all commercial, industrial and institutional properties must negotiate refuse and recycling contracts with private companies or self-haul their refuse and recyclables to the County's transfer station or other appropriate facilities.

Commercial contractors must have a Montgomery County solid waste hauling license. As of March 2004, there were 232 solid waste haulers (including municipalities) licensed to serve residential, multi-family, and commercial establishments in the County. The firms who serve commercial establishments and multi-family residences with seven or more units operate in an open, competitive market environment.

D. Solid Waste Facilities

Montgomery County owns and operates several facilities to manage the acceptance, disposal, and processing of its refuse and recyclables. In addition, several privately owned facilities that accept solid waste operate under state licensing and County zoning regulations.

PUBLIC FACILITIES

Montgomery County Solid Waste Transfer Station. The Transfer Station, located on a 40-acre site at Shady Grove Road, is owned by the County and leased to the Northeast Maryland Waste Disposal Authority. In operation since 1982, the Transfer Station is permitted to receive up to 821,250 tons of solid waste per year.

The Transfer Station accepts several types of waste:

- **Refuse**, which is compacted and transported by rail to the Resource Recovery Facility.
- **Yard waste**, which is transported to the Composting Facility.
- **Brush and branches**, which are chipped for distribution as mulch.
- **Concrete and aggregate**, which can be dropped off for recycling.
- **Scrap metal**, which can be dropped off for recycling.
- **Household quantities of appliances, usable building materials, electronics, batteries, motor oil, antifreeze, and textiles** can also be dropped off for recycling.

Some of the non-processible[7] materials are transported by rail and truck to an out-of-county landfill in Brunswick, VA. In the January 2004, the County Executive's Recommended CIP proposed a capital project for the "Transfer Station and Related Ancillary Facilities." A WSSC property on Gude Drive is a potential site under consideration to relocate certain solid waste operations.

Montgomery County Resource Recovery Facility (RRF). The RRF, located on a 34-acre site in Dickerson, is a mass burn waste-to-energy facility. Opened in August 1995, the RRF consists of three boiler units that produce steam to generate electricity. The RRF, which was purposefully undersized to encourage waste reduction and recycling, is permitted to burn up to 657,000 tons of solid waste per year. The disposal cost of refuse brought to the RRF averages approximately $67/ton, or $21/ton excluding debt service.

The County has a Waste Disposal Agreement with the Northeast Maryland Waste Disposal Authority for the disposal of non-recycled waste. The Authority owns the RRF and leases the facility site from the County. The Authority contracts out the operation of the RRF to Covanta, a private firm.

The RRF, which burns municipal solid waste transported by rail from the Transfer Station, generates enough electricity annually to provide power to approximately 40,000 homes. The County recovers ferrous metal from the RRF ash residue for sale to scrap metal dealers. The County disposes of the ash residue and non-processible waste in a landfill.

[7] The Solid Waste Plan defines non-processible waste as "a waste material which cannot be processed at the County's Resource Recovery Facility because of its size, bulkiness, composition, or regulatory restrictions as further defined in the Service Agreement between the Northeast Maryland Waste Disposal Authority and Ogden Martin Systems of Montgomery, Inc."

Landfills. The County currently contracts with an out-of-County landfill located in Brunswick, VA to dispose of non-processible waste and ash from the RRF. The County's agreement also allows for the disposal of bypass waste[8] from the Transfer Station. The current contract lasts until at least 2012.

DSWS reports that, under a pilot program, the County has transported 6,405 tons of bypass waste to the landfill for disposal since December 2003. The disposal cost of this waste averages approximately $56/ton.

Previously, the County operated two landfills, the Gude Sanitary Landfill in Rockville and the Oaks Sanitary Landfill in Laytonsville. Both of these landfills are closed.[9] The County also has a permit for a possible future landfill in Dickerson, known as "Site 2." The County also operated a rubble fill on Bonifant Road, which is now closed.

Materials Recovery Facility (MRF). The MRF, located on a 10-acre site adjacent to the Transfer Station, accepts commingled containers and mixed paper. The County contracts the operation of the MRF to Maryland Environmental Services (MES).

- **Commingled containers.** The MRF currently operates one 7.5-hour shift per day to sort and process commingled containers, sorting approximately 98 tons per day. If there was an increase in commingled material, the MRF has the capacity to operate a second 8-hour shift and was built with expansion capability for a second "light sort" processing line.

- **Mixed paper.** Office Paper Systems (OPS) conducts a transfer operation at the MRF where mixed paper is received. Currently OPS operates under a single shift, and has the capability of transferring over 300 tons per day.

The County has a 15-year contract with OPS to process mixed paper collected from the County's residential recycling district. Under this contract, OPS accepts mixed paper collected from the County's residential recycling district at the MRF. OPS loads its trailers and then transports the mixed paper to their facility on Airpark Drive. The County pays a flat rate for OPS to process up to 90,000 tons of mixed paper annually. In FY 03, OPS processed approximately 64,000 tons of residential mixed paper for the County. The terms of the County's contract with OPS state that the County *cannot* compete for the commercial sector's mixed paper. This means the County cannot accept mixed paper and corrugated cardboard from commercial businesses at the MRF. DSWS reports small exceptions have been made in agreement with OPS.

Yard Trim Composting Facility. The County owns a 118-acre open air composting facility in Dickerson that receives leaves and grass, which are dried and screened for

[8] The Solid Waste Plan defines bypass waste as "Waste that is not processed at the Resource Recovery Facility because of physical or contractual constraints as further defined in the Service Agreement between the Northeast Maryland Waste Disposal Authority and Ogden Martin Systems of Montgomery, Inc."
[9] The County still has maintenance and operational responsibilities for the previously operated landfills.

commercial bulk and bag markets. The County contracts the operation of the composting facility to Maryland Environmental Services (MES).

The facility, which operates under a court order signed in 1996 between the County and The Sugarloaf Citizens Association, is limited to a capacity of 77,000 tons per year. In FY 03, with the permission of the Sugarloaf Citizens Association, the facility processed 80,130 tons.

PRIVATE FACILITIES

In addition to the public facilities described above, the Solid Waste Plan identifies several private recycling facilities that operate in Montgomery County. These include:

- Three facilities that process paper, Georgetown Paper Stock, Office Paper Systems, and Southeast Recycling; and
- One facility that processes scrap metal, Montgomery Scrap.

County businesses must rely on privately owned, out-of-County facilities to recycle and process several different types of recyclables such as carpets, construction and demolition debris, or used tires. MDE has issued a permit for the operation of a construction and demolition debris recycling facility, which will be located in Clarksburg. Environmental Alternatives Reclamation will operate this facility, which is expected to open in December 2004 with a permitted capacity of 124,800 tons/year.

E. Solid Waste Fees and Service Charges

The County's solid waste management system operates as an enterprise fund and County law requires that the fund be maintained and managed so that revenues equal expenses. The County Council annually sets charges for solid waste services to cover the system's projected expenses. The system is primarily supported through five service charges and/or fees assessed against those who benefit from the system. These include:

Disposal Fees. These fees pay for the majority of the costs of solid waste disposal, including the resource recovery facility, transfer station, and rail transport system. These fees are paid at the transfer station as a tipping fee or as a service charge via tax bills.

In the approved FY 04 budget, the Council established a tip fee of $48 per ton for refuse and $29 per ton for yard trim material at the Transfer Station, and a tip fee of $0 for recyclables at the MRF.[10] In FY 04, DSWS estimated the tip fee would raise $27.5 million and fund approximately 29% of all solid waste management expenses.

Base System Benefit Charge. This charge pays for the basic programs and facilities provided by the County to fulfill its obligation to manage solid waste produced in the County that is not covered by the disposal fees noted above. These programs include administration (including enforcement activities, management personnel, and engineering

[10] The County charges municipalities $15 per ton for commingled material delivered to the MRF.

support), waste reduction programs, debt service on existing facilities (including the Transfer Station, Resource Recovery Facility, and the MRF), and the fixed cost of all solid waste disposal programs and facilities.

For commercial property, this charge is based on estimated waste generation by type of land use, billed on a per unit basis of 2,000 square feet of improved gross floor area. In April, DPWT recommended revised charges based on a new study (see Appendix © 1).

In a given year, the total base benefit charge may be reduced by revenues from disposal fees which are in excess of the amount needed to cover the variable costs of solid waste disposal programs and facilities.

Incremental System Benefit Charge. These charges are assessed to all sectors. Single family households in the County's unincorporated area pay their share of the cost to provide curbside recycling services. Properties that receive additional services, such as, yard trim and leaf collection, pay an additional amount. The multi-family and commercial properties pay a nominal fee for the cost of education, outreach, and enforcement.

Refuse Collection Charge. This charge pays for the cost of trash collection provided by County contractors in the Collection District. Approximately 85,000 households in Subdistrict A receive collection services. The contractors who collect this refuse do not pay a tip fee at the Transfer Station for solid waste because the County collects these fees from the property owner through this service charge on the tax bill.

Leaf Vacuuming Charge. This charge pays for leaf vacuuming services provided to residential and multifamily property owners within the leaf recycling service area.

TABLE 1: DSWS COLLECTION METHODS FOR SERVICE CHARGES BY SECTOR

<table>
<tr><th></th><th>Base Systems Benefit Charge</th><th>Incremental Systems Benefit Charge</th><th>Disposal Charge</th><th>Leaf Vacuuming Charge</th><th>Refuse Collection Charge</th></tr>
<tr><td>Unincorporated Single Family</td><td rowspan="7">Via tax bill</td><td>Via tax bill</td><td>Via tax bill for those serviced</td><td>Via tax bill for those serviced</td><td>Via tax bill for those serviced</td></tr>
<tr><td>Incorporated Single Family</td><td>Not applicable</td><td rowspan="5">Charged at Transfer Station</td><td>Not applicable</td><td rowspan="5">Not applicable</td></tr>
<tr><td>Unincorporated Multifamily</td><td rowspan="4">Via tax bill</td><td>Via tax bill for those serviced</td></tr>
<tr><td>Incorporated Multifamily</td><td rowspan="3">Not applicable</td></tr>
<tr><td>Unincorporated Commercial</td></tr>
<tr><td>Incorporated Commercial</td></tr>
</table>

Source: OLO and DSWS, April 2004.

CHAPTER III: Montgomery County's Recycling Rate and Waste Stream Characteristics

In FY 03, Montgomery County generated 1.2 million tons of waste; 50% was generated by the commercial sector, 41% by the residential sector, and 9% by the multi-family sector.

Of the 1.2 million tons of waste, 760,000 tons were disposed of through incineration and landfilling and 440,000 tons were recycled (37%). This chapter presents an overview of Montgomery County's waste stream and the basis for calculating its recycling rate.

A. Montgomery County's Recycling Rate Formula

Every jurisdiction uses a recycling rate formula that divides the amount of recyclable materials by the total amount of waste generated; however, each jurisdiction establishes its own definitions of what items count as recyclable materials and what items count as part of total waste generation. Table 2 lists and defines the data sources that Montgomery County includes in its recycling rate.

TABLE 2: DATA SOURCES FOR MONTGOMERY COUNTY RECYCLING RATE

Data Sources	Definition
Backyard Composting	Grass clippings and leaves left by County residents on their lawns for natural decomposition.
County Composting	Grass and leaves collected from the residential sector and composted at the County's facility in Dickerson.
Private Sector Recycling	Recyclables collected by haulers from the commercial and multi-family sector. By law, haulers are required to report their collections to the County.
Residential Recycling	Recyclables collected from County single family homes by haulers in collection Subdistricts A and B.
Ferrous Material at RRF	Recyclable metal material removed from waste at the County Resource Recovery Facility prior to incineration.
Road Construction Material	Concrete and road aggregate from County road construction projects that is source separated and recycled by the County.
Mulch	Yard trim and wood less than 4" in diameter tipped at the transfer station by businesses or haulers and ground into mulch.
Ferrous Material from RRF Ash	Metal materials removed from ash residue of incinerated material prior to landfilling.

Source: OLO, April 2004.

Montgomery County's recycling rate divides the amount of recycled goods by the amount of total waste generated minus "non-processible goods".

- Total waste generated is the composition of all recycled goods plus all solid waste produced in the County.

- "Non-processible goods" are items that cannot be incinerated by the RRF, such as rock, concrete, or brick.

B. Comparing Recycling Rates

Jurisdictions often use a recycling rate calculation as a measure of program effectiveness; however, assumptions used to calculate and report recycling rates vary widely. For example, Montgomery County's formula counts backyard composting as a recycling data source. The State of Maryland formula, on the other hand, does not and instead subtracts backyard composting from its estimate of total waste generated. As Table 3 illustrates, these approaches yield two different rates for the same set of circumstances.

TABLE 3: MONTGOMERY COUNTY RECYCLING RATE AS REPORTED TO COUNTY COUNCIL AND STATE OF MARYLAND

Reporting	Recycling Formula	Rate
County recycling rate reported to County Council	**Backyard Composting** + Private Sector Recycling + County Recycling + Ferrous Material from RRF + Road Construction Material + Metals from Ash Recycling + County Composting Facility + Mulch – Residue from Composting ——————— Total Waste Generation – Non-Processible Goods	37.05%
County recycling rate reported to State of Maryland	Private Sector Recycling + County Recycling + Ferrous Material from RRF + Road Construction Material + Metals from Ash Recycling + County Composting Facility + Mulch – Residue from Composting ——————— Total Waste Generation – Non-Processible Goods **– Backyard Composting**	36.27% (31.27% + 5.0% MD Source Reduction Credit[1])

Source: OLO, April 2004.

[1] See Appendix © 4 for State of MD Source Reduction Overview and Checklist.

C. Montgomery County's Recycling Rate Trends

The State's Maryland Recycling Act of 1988 set a recycling goal of 20 percent for counties with populations over 150,000. Montgomery County set a higher goal of recycling 50% of the County's solid waste stream by the end of Calendar Year 2000 in Council Resolution 12-945 (See page 6 for detailed description).

Table 4 shows the County's recycling rate estimates from FY 00 through FY 04. The data show that the County's overall recycling rate increased from 36.5% in FY 00 to 37.1% in FY 03.

The data also show the rates vary substantially across sectors. In FY 03:

- The residential rate is 51.4%;
- The commercial rate is 30.2%; and
- The multi-family rate is 11.6%.

TABLE 4: ESTIMATED MONTGOMERY COUNTY RECYCLING RATES – FY 00 TO FY 04

Fiscal Year	Total Tons Recycled	Overall Recycling Rate	Recycling Rate by Sector		
			Residential	Multi-Family	Commercial
FY 00	**411,854**	**36.5%**	52.4%	10.8%	29.0%
FY 01	**436,784**	**37.2%**	52.9%	11.0%	29.2%
FY 02	**428,918**	**37.4%**	53.6%	9.7%	31.2%
FY 03	**439,166**	**37.1%**	51.4%	11.6%	30.2%
Projected FY 04	**446,775**	**37.4%**	52.0%	12.6%	30.2%

Source: OLO and DSWS

Based on the County's current waste generation of 1.2 million tons and recycling rate of 37.1%, the County would need to recycle an additional 153,000 tons in order to achieve a 50% recycling rate.

D. Recycling Rate by Sector and Material

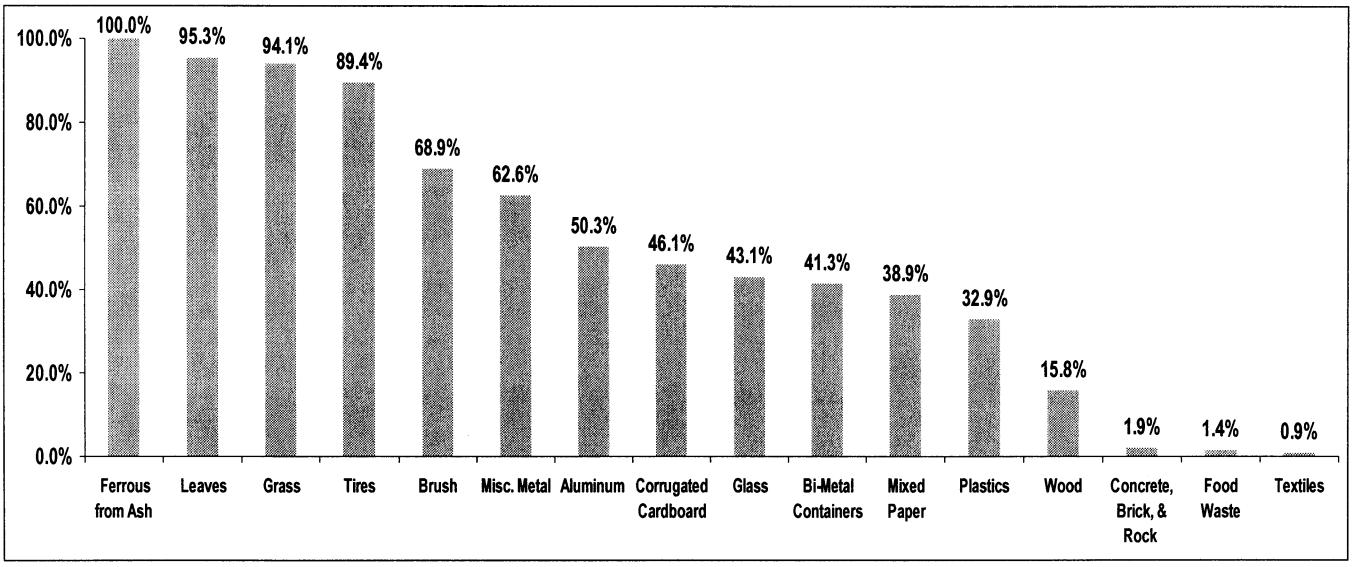
This section analyzes Montgomery County's waste composition based on a 1999 DSWS waste composition study and, as appropriate, FY 03 tonnage data. Waste composition studies help determine the materials in the waste stream that are already being recycled and the recyclable materials that remain. In May 2004, DSWS will begin a new solid waste composition study that is scheduled to be completed in May 2005. The results of the new composition study could alter some of the analysis presented in this section.

Recycled Materials. The exhibit below shows the recyclable materials in the County and their estimated recycling rate in FY 03. The exhibit shows County businesses and

residents are successfully recycling over 90% of leaves, grass, and just under 90% of tires. Of the other materials recycled:

- Metal, including hangers, household appliances, screws, and tire steel are at 63%;
- Aluminum Cans and Tinfoil are at 50%;
- Corrugated Cardboard is at 46%;
- Glass is at 43%;
- Bi-Metal Containers are at 41%;
- Mixed Paper is at 39%[2]; and
- Plastics are at 33%.

EXHIBIT 1: ESTIMATED MONTGOMERY COUNTY RECYCLING RATE BY MATERIAL - FY 03



N = 439,000 Tons
Source: OLO, April 2004.

[2] For the rates and estimates throughout this report the term mixed paper includes the following material categories from the 1999 DSWS Waste Composition Study; newspaper, magazines, brown paper bags (kraft), cereal boxes (paperboard), phone books, office paper and other mixed paper.

Materials Still Left to be Recycled by Sector. Table 5 presents the materials still left in the waste stream by sector, based on the results of the 1999 DSWS waste composition study. The table provides interesting insights into the characteristics of the waste stream and recycling practices in Montgomery County.

- Mixed paper, which includes newspaper, office paper, magazines, kraft, and paperboard, is the highest remaining recyclable good in the waste steam across all sectors. Mixed paper makes up 25% of the residential and multi-family waste stream, and 14% of the commercial waste stream.

- Food waste is the next highest recyclable good across all three sectors. It makes up 18% of the residential waste stream, 19% of the multi-family waste stream and 12% of the commercial waste stream.

- Corrugated cardboard makes up 10% of the commercial waste stream and approximately 5% of the residential and multi-family waste streams.

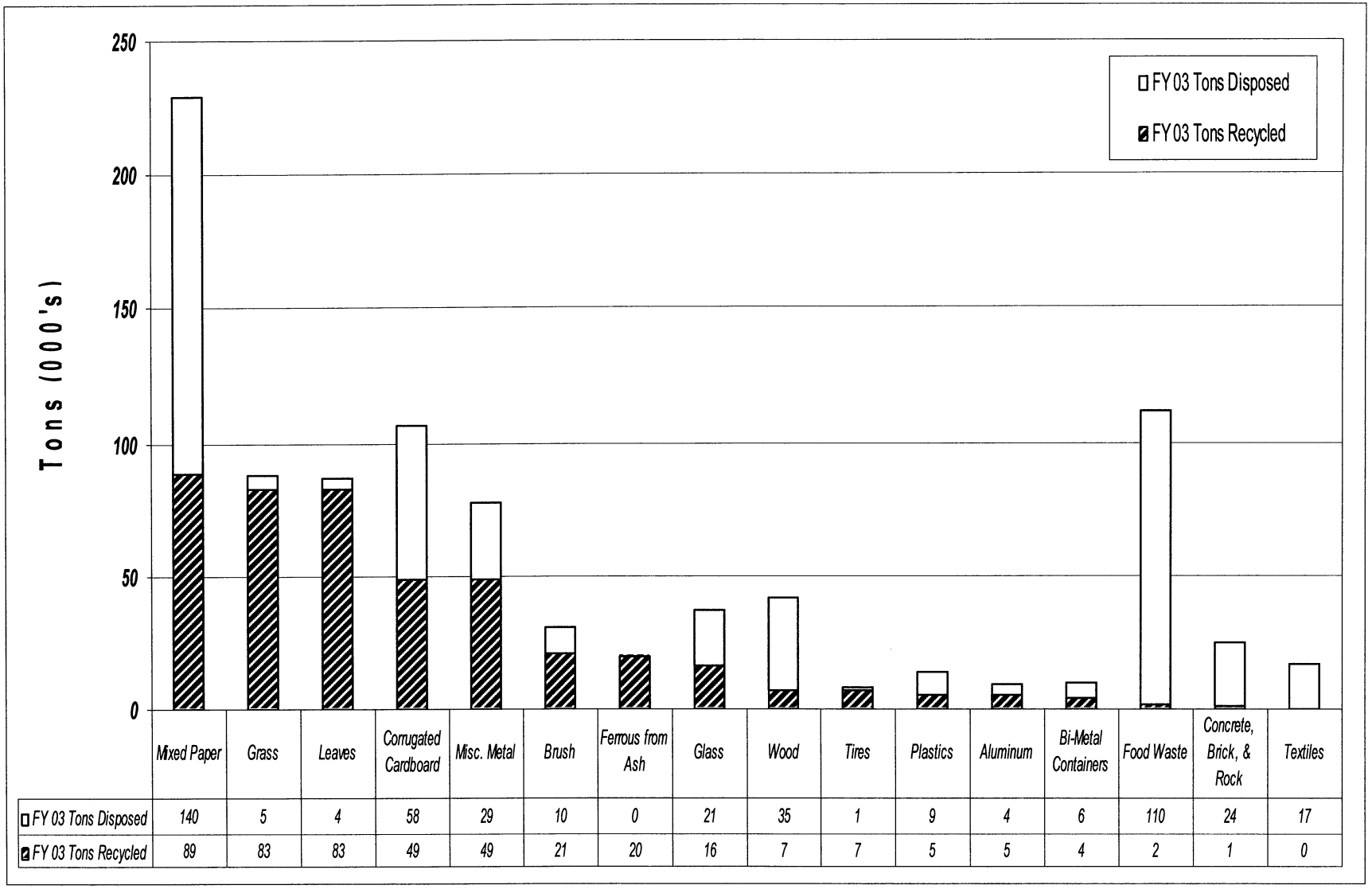
TABLE 5: 1999 WASTE COMPOSITION STUDY – HIGHEST PERCENT OF RECYCLABLE MATERIALS IN DISPOSED WASTE BY SECTOR

Residential		Multi-Family		Commercial	
Material	**% of Waste**	**Material**	**% of Waste**	**Material**	**% of Waste**
Mixed Paper*	25.0%	Mixed Paper*	25.4%	Mixed Paper*	14.3%
Food Waste	17.9%	Food Waste	18.7%	Food Waste	12.0%
Corrugated Cardboard	5.0%	Glass	5.7%	Corrugated Cardboard	10.1%
Glass	2.9%	Corrugated Cardboard	4.6%	Wood**	8.0%
Textiles	2.8%	Textiles	4.2%	Concrete, Brick, Sheet Rock	5.6%

Source: OLO, April 2004.
*Includes newspaper, office paper, magazines, kraft (e.g. paperbags), paperboard (e.g. cereal boxes), and phonebooks.
**Includes pallets and untreated lumber.

Material in the Overall Waste Stream. Using FY 03 tonnage for total waste, waste by sector, recycling by good, and the 1999 Waste Composition Study, OLO analyzed where the greatest potential for increasing the County's recycling rate exists. Exhibits 2 and 3 on the following pages show the amount recycled and the amount remaining in the waste stream by material and sector.

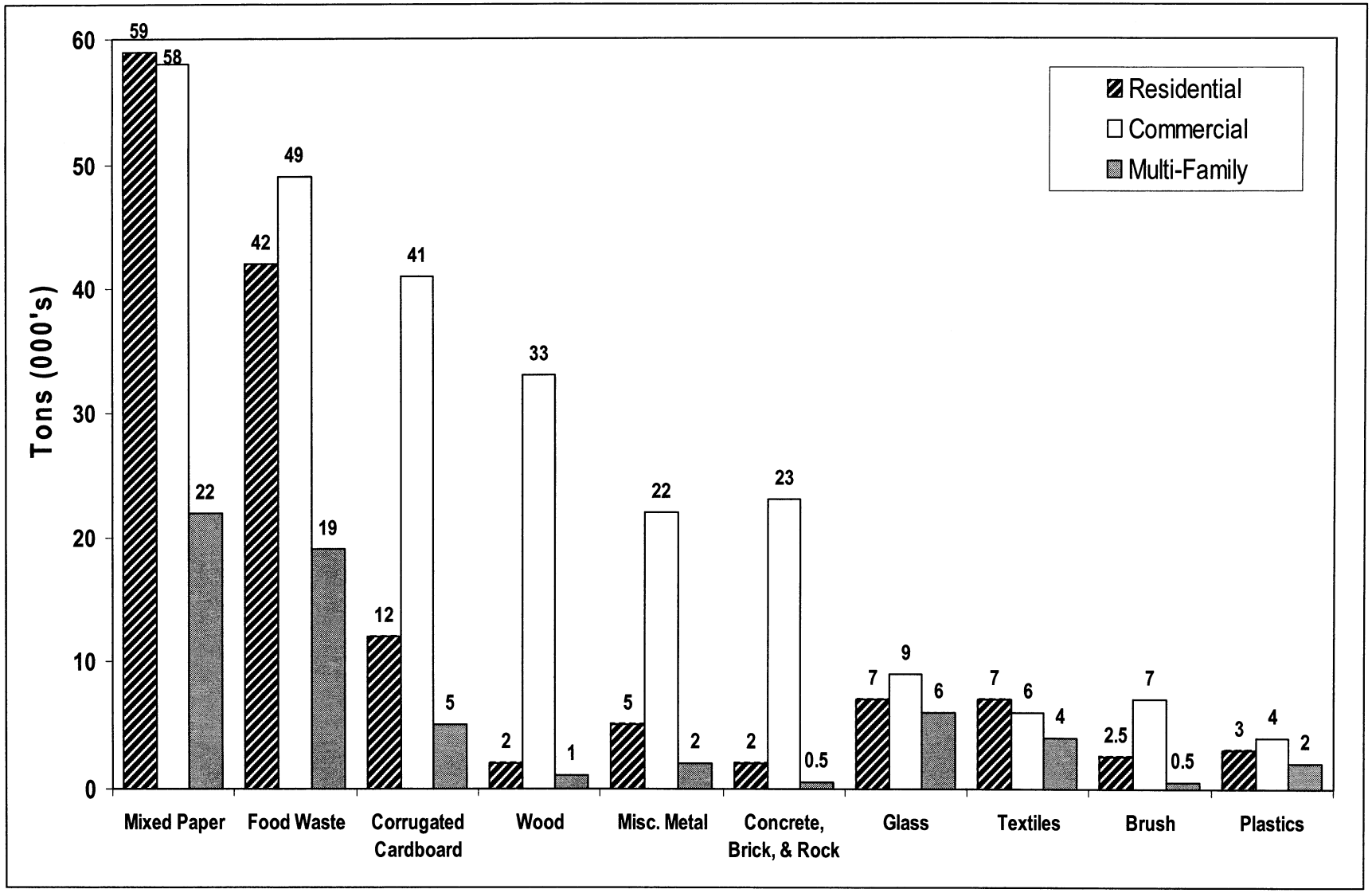
EXHIBIT 2: ESTIMATED MATERIAL RECYCLED AND DISPOSED IN MONTGOMERY COUNTY'S WASTE STREAM – FY 03



	Mixed Paper	Grass	Leaves	Corrugated Cardboard	Misc. Metal	Brush	Ferrous from Ash	Glass	Wood	Tires	Plastics	Aluminum	Bi-Metal Containers	Food Waste	Concrete, Brick, & Rock	Textiles
FY 03 Tons Disposed	140	5	4	58	29	10	0	21	35	1	9	4	6	110	24	17
FY 03 Tons Recycled	89	83	83	49	49	21	20	16	7	7	5	5	4	2	1	0

Source: OLO, April 2004

EXHIBIT 3: BREAKDOWN OF RECYCLABLE MATERIALS DISPOSED IN WASTE STREAM BY SECTOR – FY 03



Source: OLO, April 2004

Exhibit 2 on page 18 shows mixed paper, corrugated cardboard and food wastes present the greatest opportunities to increase recycling; however, whether a good can be cost-effectively recycled also depends on the availability of a processing market. Table 6 below presents the current availability of markets in the County by type of material. This analysis shows:

- Mixed paper and corrugated cardboard are the recyclable goods most prevalent in the waste stream that have an established market for collection and resale in the County.

- Concrete, brick, rock, and wood make up a relatively large amount of the recyclable goods left in the waste stream and a private processing market will open in the County in December 2004.

- Food and textiles make up a relatively large share of the recyclables left in the waste stream but cannot be recycled due to the lack of a processing market.

TABLE 6: RECYCLABLE MATERIALS REMAINING IN THE WASTE STREAM – FY 03 (MINIMUM 10,000 TONS)

Material	Public or Private Market in County	Tons Remaining in Waste Stream (in 000s)
Mixed Paper	Yes	139
Food Waste	No	110
Corrugated Cardboard	Yes	58
Wood	December 2004	35
Misc. Metal	Yes	29
Concrete, Brick, Rock	December 2004	25
Glass	Yes	21
Textiles	No	17
Brush	Yes	10
Plastics	Yes	9

Source: OLO, April 2004.

Mixed Paper and Corrugated Cardboard Analysis. Mixed paper and corrugated cardboard are the most prevalent recyclable goods in the waste stream with a viable local market for collection and resale. Table 7 shows a breakdown of the estimated 197,000 tons of mixed paper and corrugated cardboard remaining in the waste stream by sector.

TABLE 7: MIXED PAPER AND CORRUGATED CARDBOARD REMAINING IN THE WASTE STREAM BY SECTOR – FY 03 (000S TONS)

Material	Residential	Multi-Family	Commercial	Total
Mixed Paper	59	22	58	139
Corrugated Cardboard	12	5	41	58
Total	**71**	**27**	**99**	**197**

Source: OLO, April 2004.

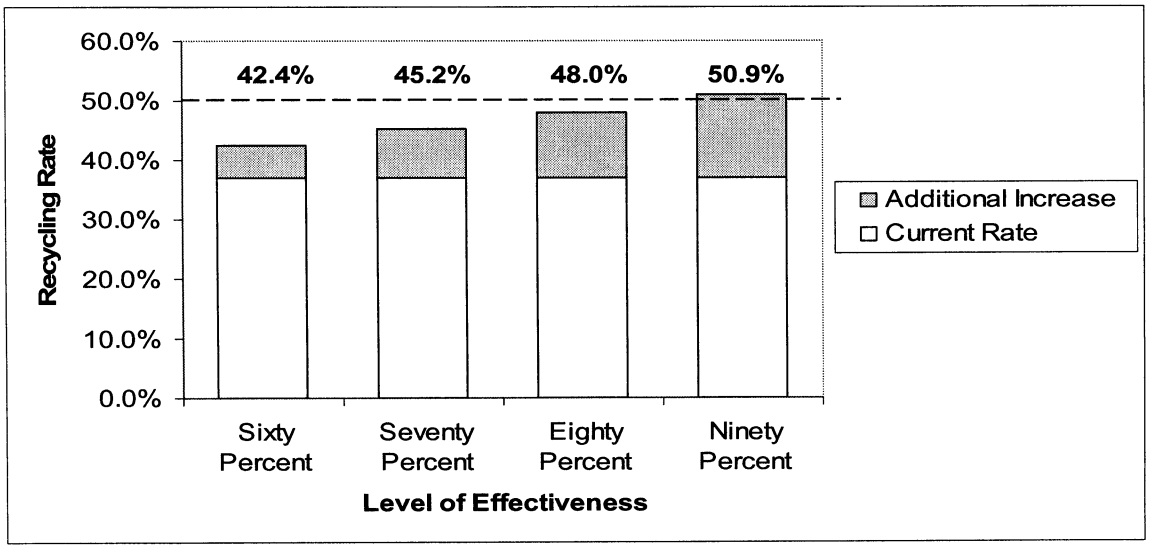
OLO examined how much the capture rate of these materials would have to increase to reach the County's 50% recycling goal. The analysis shows the County would have to capture 90% of the remaining corrugated cardboard and mixed paper in all three sectors to meet its overall 50% recycling goal. The analysis also shows:

- Capturing 90% of the remaining corrugated cardboard in all three sectors only would increase the County's overall recycling rate to 41%.

- Capturing 90% of the remaining mixed paper in all three sectors only would increase the County's overall recycling rate to 47%.

The exhibit below shows the increase in the County's overall recycling rate based on increasing levels of effectiveness in recycling corrugated cardboard and mixed paper.

EXHIBIT 4: EFFECT OF INCREASING CORRUGATED CARDBOARD AND MIXED PAPER RECYCLING ON COUNTY'S OVERALL RECYCLING RATE



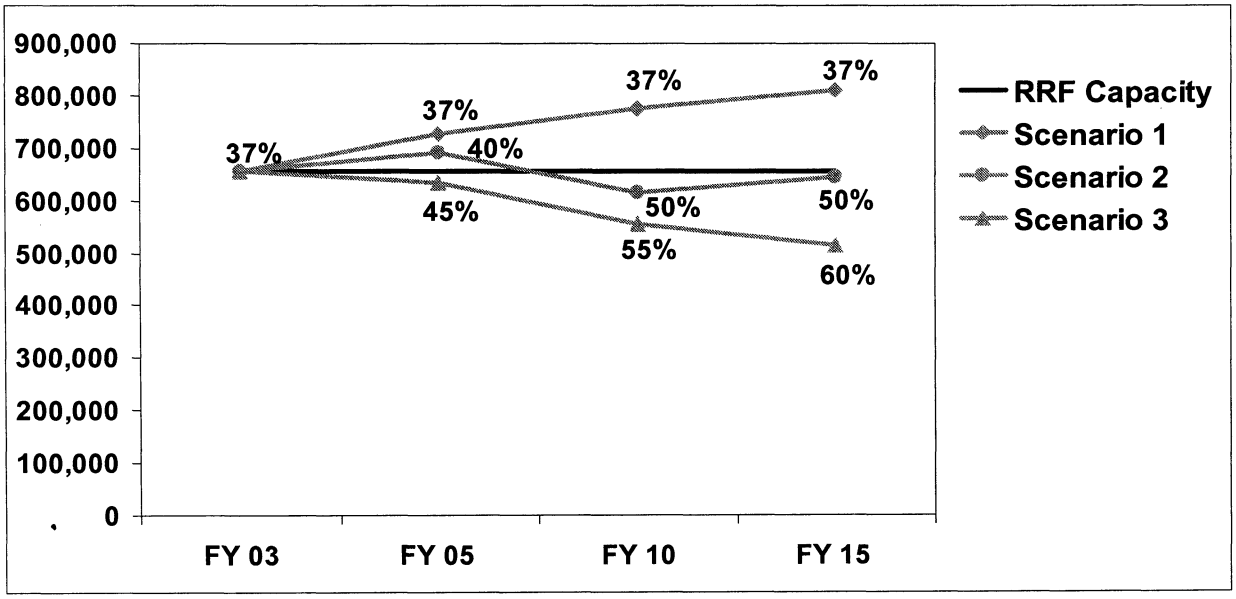
Source: OLO, April 2004.

Future Recycling Rate Scenarios, County Growth, and RRF Capacity. The County RRF is permitted to incinerate 657,000 tons of waste per year. Exhibit 5 illustrates the relationship between the County's future waste production and the RRF capacity under three different recycling scenarios. The waste forecast assumes current waste generation rates will stay constant. It multiplies these rates by population and employment growth forecast data, based on the M-NCPPC Round 6.3 and 6.4 Cooperative Forecasts. The analysis also assumes the current export rate of municipal solid waste remains the same.

- Scenario 1 assumes an overall recycling rate of 37%;
- Scenario 2 assumes an overall recycling rate of 50% in FY 10; and
- Scenario 3 an overall recycling rate of 60% in FY 15.

The exhibit shows that if the County achieves a 50% or greater recycling rate, it will extend the life of the RRF as the County's sole disposal facility for at least 10 years.

EXHIBIT 5: PROJECTED COUNTY WASTE TONNAGES AND DIFFERENT RECYCLING RATE SCENARIOS*



Source: OLO, April 2004.

*Based on FY 03 generation and waste export rates.

CHAPTER IV: Montgomery County's Commercial Recycling Mandates and Program Activities

The County maintains a comprehensive recycling program in the Division of Solid Waste Services (DSWS) to promote residential, multi-family, and commercial recycling. Program initiatives include:

- Educating all sectors about the County's recycling requirements;
- Promoting waste reduction, recycling and buy-recycled efforts;
- Supporting existing recycling programs; and
- Implementing efforts to increase the County's recycling rate.

This chapter provides an overview of the **commercial recycling program,** a component of the overall recycling program. It includes a description of the programs, funding, and studies conducted for the commercial sector by the Division of Solid Waste Services.

A. Montgomery County's Commercial Recycling Mandates

Executive Regulation 109-92, Executive Regulations for Residential and Commercial Recycling, establishes the recycling requirements for residential and multi-family dwellings as well as the recycling and reporting requirements for the commercial sector. The regulation went into effect in January 1994. The commercial and waste reduction requirements apply to all county businesses. The regulation establishes the following mandates:

- All County businesses must recycle corrugated cardboard, white office paper, newspaper, aluminum cans and foil products, steel/tin cans, glass and plastic containers, and yard trim.

- All property owners must provide recycling collection service and storage space for recyclable solid wastes for their tenants.

- Every business with 100 or more employees must prepare a recycling plan that shows how the business will reduce its disposal of solid waste. The regulation suggests a reduction goal of 50% by 2001. Businesses with fewer than 100 employees must prepare a recycling plan if requested by DSWS.

- Every business (or property owner) with 100 employees or more must file an annual report with DSWS. Businesses (or property owners) with less than 100 employees must file an annual report if requested by DSWS. In this report, a business must itemize the types and amounts of the eight materials recycled plus the amount of waste disposed of annually. (See Appendix © 8 for a sample reporting form.)

- The County can impose fines on businesses or property owners who do not come into compliance with the regulations in accordance with Section 48-49 or 48-30 of the Montgomery County Code.

DSWS reports that Executive Regulation 109-92 is currently under revision and will be released for public comment this summer.

B. Organization and Funding

The Division of Solid Waste Services, Recycling Section is responsible for residential recycling education and outreach, providing multi-family and commercial properties with recycling education and technical assistance, and supporting recycling volunteers.

Funding. The Council appropriated $963,000 for the Commercial Recycling Program in FY 04. Approximately $423,000 funds five full-time program specialists, a program manager and other activities, and $540,000 funds the program's outreach and education activities. Table 8 shows the funding for the commercial recycling program, the workyears for FY 01 through FY 04, and the County Executive's request for FY 05.

TABLE 8: COMMERCIAL RECYCLING PROGRAM FUNDING (IN 000'S) AND WORKYEARS

Fiscal Year	Workyears	Personnel & Other	Outreach & Education	Total Funding
FY 01	4.5	$378	$556	$934
FY 02	6.1	$460	$466	$926
FY 03	6.5	$419	$529	$948
FY 04	6.5	$423	$540	$963
FY 05 Requested	8.2	$575	$610	$1,185

Source: Total Funding, Personnel and Other Costs, and Workyears – Approved and Recommended Operating Budgets. Funds for Outreach and Education – Quarterly Solid Waste Briefing July, 2003

C. Program Activities

The County's nonresidential recycling program consists of several different types of activities which are briefly described below.

1. Outreach and Education

The Smart Organizations Reduce and Recycle Tons (SORRT) Program is the cornerstone of the commercial recycling program. SORRT provides outreach, educational materials, and technical assistance to help the commercial sector develop, maintain, and expand recycling and waste reduction programs.

DSWS initially focused the SORRT program activities on large and medium-sized organizations. The County considers a large business to have 250 or more on-site employees and a medium business to have between 100 and 249 on-site employees. DSWS staff report that most large and medium-sized organizations in the County have implemented recycling programs, but DSWS staff continue to track recycling efforts among those organizations through outreach and audits of annual recycling reports. Staff provide information and assistance as necessary.

DSWS recently shifted priority to smaller commercial organizations that typically lack the resources, training, and experience to set up on-site recycling. Specifically, DSWS focuses current SORRT program activities on multi-tenant facilities where one property owner/manager serves multiple small businesses.

Education Materials. DSWS develops and distributes educational materials to businesses, industries, and institutions through the SORRT program. Most of the educational materials are available on the DSWS web site; other materials can be ordered from the web site. Educational materials include:

- A business recycling regulation handbook;
- A recycling and waste reduction video;
- A guide to purchasing recycled products;
- Recycling and waste reduction kits for specific types of businesses;[2]
- Starter kits (recycling bin, recycling handbook, and brochure on contracting for recycling collection) for businesses just beginning their recycling programs;
- Cable television programs;
- Quarterly newsletters[3] and market pricing reports;
- Brochures and flyers;
- Labels for recycling containers; and,
- Information about regulatory requirements.

Site Visits. As part of the SORRT program, DSWS staff conduct site visits to offer recycling education, technical assistance, and specific recommendations to business owners, property managers, and employees. These visits have different purposes, such as checking in with large and medium-sized businesses three times per year, educating and helping janitorial staff understand recycling, and investigating complaints.

DSWS completed 5,751 site visits in FY 01, 8,256 in FY 02, and 9,300 in FY 03. Of the 9,300 visits in FY 03:

- 82.9% were for general education and technical assistance to businesses and janitorial services;
- 16.5% of these visits were to support large businesses; and
- 0.6% were complaints investigations.

Based on these visits, DSWS estimates that well over 90% of County businesses had recycling programs in FY 03.

[2] The kits include recycling information and case studies of successful recycling programs. DSWS has kits for medical offices, dental offices, restaurants, retailers, home-based businesses, construction/demolition businesses, grocery stores, schools, and the hospitality industry.

[3] DSWS sends newsletters to 5,500 commercial organizations annually, including all large and medium sized organizations, small organizations that generate a lot of recyclable material, and small organizations that can benefit from the topics covered in the newsletters.

Executive Regulation 109-92 Reminders and Follow Up. DSWS produces and mails reminders of Executive Regulation 109-92 to all large and medium-sized businesses annually. DSWS also sends information to small organizations that filed an annual report the previous year or are known by DSWS to generate large quantities of recyclable material and/or have a recycling program. Other businesses receive newsletters on a rotating basis.

The mailing includes a letter outlining specific recycling requirements for all businesses and organizations, an annual report form, and instructions for completing the form. DSWS also sends a reminder postcard with annual report due dates and uses print, cable television, and radio advertising to inform businesses about the County's recycling and reporting requirements.

County law requires DSWS to review the submitted annual reports for any indications of problems, such as a significant reduction in the amount of materials recycled compared to the previous year. DSWS reports that staff follow up with relevant organizations to see if they need any additional education or other assistance to improve their recycling program. Staff conducted follow-up visits with all businesses that filed recycling reports in FY 03.

Joint Recycling Program Coordination. DSWS helps design and implement joint or cooperative recycling programs for small businesses in proximity to each other in a central business district. DSWS estimates staff has coordinated this type of agreement for 50 to 100 businesses.

Partners in Recycling Program. The Partners in Recycling Program uses recycling mentors from organizations with successful recycling programs to provide first hand experience and guidance to others. Five organizations currently participate. They are "on-call" to provide advice and assistance to other organizations as needed. Three other partners have agreed to speak at DSWS seminars on recycling.

Demonstration Recycler Program. Under the Demonstration Recycler Program, DSWS works closely with selected businesses to set up model recycling programs. DSWS showcases those programs as examples for other businesses to emulate. In the 1990's, five businesses participated and DSWS hired an engineering firm to conduct a detailed study and produce a report. Fewer businesses are involved now, with three participating in 2001 and one in 2003.

Support for County Departments and Agencies. DSWS staff support the Montgomery County Government and Montgomery County Public Schools (MCPS) recycling programs. For the County Government, staff provide technical support, training, outreach, and educational materials. For MCPS, DSWS staff monitor compliance with Executive Regulation 109-92, periodically evaluate individual schools' recycling programs, provide technical support, and share outreach and educational materials.

Other. Additional outreach and education components of the commercial recycling program include:

- Sharing information at special events such as Earth Day, America Recycles Day, and Recycle at the Workplace week;
- Holding business recycling seminars;
- Presenting information to chambers of commerce and business associations; and
- Publishing a list of businesses that provide recycling collection and container services to the commercial sector.

2. Enforcement

Issuing citations and charging fines has not been a primary strategy to encourage compliance with recycling requirements in Montgomery County. DSWS typically encourages compliance by issuing notices of violation, then helping organizations to comply with County requirements. DSWS issued 21 notices of violation in 2002 and 29 in 2003 for failing to recycle and/or submit the required annual report. All the organizations that received a notice of violation cooperated with DSWS and came into compliance, and no citations were issued.

3. Other Activities

Cooperative Collection Project. In the spring of 2003, DSWS conducted a Cooperative Collection Project with five businesses in downtown Silver Spring. The purpose of the project was to encourage recycling and determine the feasibility of the businesses sharing the cost to procure a common recycling collection contract.

DSWS provided recycling containers and education for each business. Over a period of seven weeks, DSWS contracted with a firm to collect the recycled materials from the businesses and review the contents. They also conducted a one-day waste sort to extrapolate the percentage of the waste stream that was recyclable.

DSWS found that the businesses could save money if they worked together to acquire waste and recycling collection services, and recommended that the five businesses negotiate a cooperative mixed paper recycling program.

Feasibility Study on Franchised Recycling Collection. In February 2004, DSWS issued a request for proposal to study the feasibility of using franchised management of collection services to increase commercial and multi-family recycling in the County.

Awards Program. DSWS recognizes exemplary or innovative recycling programs in the commercial sector through an annual awards program. The goal is to recognize successful organizations and use them as examples for others to follow. In 2003, DSWS selected 30 businesses and institutions to receive the Excellence in Recycling Award and 20 individuals and businesses/institutions to receive the Outstanding Achievement Award.

County Executive's Recycling Task Force. The County Executive convened a task force of business leaders in 2001 to help identify barriers to recycling in the commercial sector and to develop strategies to improve recycling performance. The Task Force presented interim recommendations to the County Executive in January 2003. See Appendix © 11 for a summary of the Task Force's recommendations. DSWS reports that the Division is implementing the Task Force's recommendations.

The Task Force also documented issues that require further research, evaluation, and consideration, including:

- Offering tax and/or economic incentives if a commercial business recycles more than 50% of their waste;
- Utilizing franchising collection services;
- Looking at the availability of "accurate" measurements for recycling and solid waste generation;
- Evaluating issues related to resale markets for some recyclable materials; and
- Examining the effect of turnover in the business sector on recycling.

The Task Force continues to gather and discuss information on commercial recycling in FY 04.

Surveys. In August 2000, DSWS commissioned a research survey to evaluate the effectiveness of its past advertising and outreach efforts in the residential and commercial sectors. DSWS found that:

- 45% of the participants knew that the County's goal is to recycle 50% of the County's waste;
- 74% recalled at least one recycling advertisement; and
- 40% of those who recalled an advertisement said it made them more likely to recycle at home and 35% said it made them more likely to recycle at work.

Focus Groups. DSWS held five focus groups in February 2003 to obtain additional feedback on commercial recycling. Thirty-six individuals participated, primarily from small and medium-sized businesses . They included individuals from one of the chambers of commerce, property managers who manage multiple properties, and business owners or key staff involved in recycling. Attendees were familiar with the County's recycling requirements and regulations, had implemented a program at their facility, and had filed annual recycling reports. Through the focus groups, DSWS found that:

- Obstacles to recycling include non-compliance of employees, cleaning staff, and haulers; cost and space constraints; limited facility manager time to implement; and questions about what materials can be recycled;
- Multi-tenant facilities have unique obstacles related to large amounts of recycling contamination and space constraints;
- Recycling cost is a factor for smaller businesses that may not generate sufficient amounts of materials to contract cost-effectively for recycling;

- Holding on-site meetings to assist managers to implement recycling is one of the best ways to provide recycling information to businesses;
- E-mail, newsletters, and posters are effective vehicles to share information about recycling;
- Enforcement is needed; however, some businesses might feel it is more cost-effective to pay fines than to hire recycling contractors; and
- Some incentives are important (monetary, tax breaks, or other business awards) to encourage continued and/or expanded recycling activities.

Focus group participants were asked to share strategies that they felt would be most helpful for the County to implement. The most common responses were:

- Provide a tax or monetary incentive to reward businesses that recycle more than 50% of their waste;
- Require property managers to include recycling criteria as part of their janitorial services contract;
- Require janitorial services to educate their staff on recycling in multi-tenant buildings; and
- Have staff available to make personal visits to individual businesses to assist them in developing and implementing a recycling plan.

D. Business Reporting, Waste Generation, and Recycling Data

In addition to other program activities, DSWS staff collects and analyzes data to determine the source of waste and level of recycling in the commercial sector.

Commercial Waste Stream Analysis. Based on a Dunn and Bradstreet Business Database from October 2003, there are approximately 34,500 commercial businesses in Montgomery County. This sector accounts for approximately 47% of the County's waste annually. Nearly 6,000 businesses in the County account for approximately 80% of the total commercial waste stream. Specifically, the data show:

- 669 businesses, with over 100 employees, generate approximately 44% of the commercial waste stream,

- 5,269 businesses, with 11-99 employees, generate approximately 35% of the commercial waste stream, and

- 28,514 businesses with less than 10 employees generate approximately 21% of the commercial waste stream.

Commercial Recycling Rate by Business Type. The number of commercial businesses filing annual recycling reports was 126 in FY 01, 327 in FY 02, and 458 in FY 03. DSWS reports the 458 reports filed in FY 03 include all of the 650 businesses in the County with over 100 employees because there are 140 reports filed by property managers that account for more than one large business.

An OLO analysis of the 458 businesses that filed recycling reports in FY 03 show the average rate of recycling by business type.

TABLE 9: TYPE OF BUSINESS AND AVERAGE RECYCLING RATE

Business Type	Average Recycling Rate	Range	Number Reporting
Bank	87.0%	73.5-95.5%	3
Printing	79.1%	48.2-98.0%	5
Grocery	63.2%	23.5-92.2%	8
Retail	44.1%	0.0-87.7%	31
Restaurant	44.1%	0.0-81.4%	12
Office	43.7%	1.0-97.6%	66
Construction	43.2%	8.0-78.3%	3
Federal Government	34.5%	8.0-88.9%	16
Golf Course	32.5%	6.0-81.6%	8
Property Management	32.4%	1.0-95.2%	140
Medical/Dental/Nursing	32.1%	9.2-79.6%	26
Religious Organization	29.6%	0.0-57.3%	15
Hotel Management	29.3%	11.9-77.4%	11
Automotive	29.1%	1.7-60.4%	21
Education	29.0%	0.0-80.1%	54
Utility	27.0%	7.0-42.2%	4
Hospital	17.8%	6.6-48.0%	6

Source: OLO and 2002 Annual "Large" Business Recycling Reports, April 2004.

CHAPTER V: Solid Waste Management and Recycling Programs – Research Highlights

The research highlights in this chapter are intended to portray some national trends and identify many factors that shape local waste management practices. The research suggests many different approaches exist to encourage commercial recycling. The research also emphasizes that successful jurisdictions work closely with the businesses, haulers and processors in their community to determine which approaches will work best for their particular circumstances.

Limited empirical data exists about the effectiveness of commercial recycling programs. In some cases, recycling programs focus primarily on residential curbside collection services, with little or no emphasis on commercial recycling. In other cases, recycling programs are an integrated collection of residential and commercial strategies and it is difficult to attribute overall program success to one particular sector. Finally, it is difficult to develop comparable recycling data when each jurisdiction sets its own definitions and rules for calculating recycling rates.

Chapter VI, beginning on page 37, describes specific commercial recycling strategies and includes information about research effectiveness, if available.

This chapter presents summaries of two surveys and one study:

- The State of Garbage in America Survey;
- The EPA and Institute for Local Self-Reliance Record Setters Study; and
- The Portland METRO Required Recycling and Incentive Program Survey.

A. The State of Garbage in America

Each year, *Biocycle Magazine* and the Earth Institute at Columbia University produce *The State of Garbage in America*, a nationwide survey of solid waste management. The highlights below are from the most recent survey, published in January 2004. See Appendix © 12 for a copy of the full report.

- ***In 2002, Americans produced an average of 1.31 tons of garbage per person or 369 million tons total.*** Per capita waste generation rates vary by state from a low of 0.68 in South Dakota to a high of 1.73 tons in Kansas. Maryland's rate is 1.63 tons per person or 8.93 pounds/person/day.

- ***Nationally, landfill disposal continues to be the most prevalent solid waste management practice.*** In 2002, 65.6% of municipal solid waste (242 million tons) was disposed of in a landfill. Regionally, the New England region had the lowest landfill rate (39%) and the Rocky Mountain region had the highest landfill rate (90%). Compared to last year, 30 states had an increase in landfilled waste, 14 states had a decrease, and three did not report data.

- ***In 2002, the national recycling rate was 26.7%.*** The Western region had the highest rate (38%) and the Rocky Mountain region has the lowest rate (9%.) The recycling rate for the Mid-Atlantic region was 28%. Compared to last year, 28 states saw their recycling rates decline, 12 states saw their rates increase, and four states saw no change. Three states did not report rates.

- ***In 2002, the highest statewide recycling rates range from 40% to 50%. Maryland's recycling rate was 29.2%.*** The highest estimated recycling rates in the country were in Maine (49%) and Oregon (48.8%), followed by Minnesota (45.6%), Iowa (41.7%) and California (40.2%). Some states experienced decreases greater than 10% in their rates, due primarily to the adoption of a new methodology to calculate the rate.

- ***In 2002, the national rate for waste to energy (WTE) incineration was 7.7%.*** Regionally, New England had the highest WTE rate (34%) and the Midwest had the lowest rate (<1%). The WTE rate for the Mid-Atlantic region was 14%. Thirteen of 47 states do not have any WTE plants.

- ***Average landfill tip fees ranged from a low of $13.63/ton in California to a high of $72.60/ton in Massachusetts.*** The average landfill tip fee in Maryland was $50/ton. 1,767 MSW landfills, 1,931 C&D landfills, and 3,895 MSW transfer stations were in operation in 2002.

- ***Landfill disposal bans are in place in all of the 47 states that reported data for the survey.*** The most common bans prohibit whole tires (30 states), lead acid batteries (29 states), used oil (21 states), and yard trimmings (21 states). Maryland bans tires, used oil, yard trimmings and general batteries.

B. EPA and Institute for Local Self Reliance (ISLR) Record Setters Study

In the mid-nineties, the Institute for Local Self Reliance (ILSR) in Washington, DC, with a grant from the U.S. EPA, created the Waste Reduction Record Setters Project. The goal of the project was to identify successful waste reduction programs and encourage their replication.

Between 1996 and 1999, ILSR identified 100 communities with recycling rates of 50% or higher. *Cutting the Waste Stream in Half: Community Record Setters Show How,* published in 1999, profiles 18 of these communities which were chosen for their diversity and geographic balance in addition to their diversion rates. See Appendix © 23 for a fact sheet packet summary of this report and excerpts from the full report. Here are some of the key findings and recommendations:

- ***To achieve a high recycling rate, communities should target a wide range of materials and establish a composting program.*** The ILSR study reported the 18 communities in their sample recover 17-31 different types of materials and that paper and yard waste are especially important.

- ***Many of the 18 jurisdictions were influenced by state laws.*** Visalia, California began its program to meet the state's 50% recycling goal and Worcester, Massachusetts implemented its program following the state's landfill bans. The report also found state bottle bills have increased recovery levels.

- ***High levels of commercial recycling may be easier to achieve than residential recycling because commercial waste tends to be more homogenous and rich in recyclables.*** Six of the 18 communities had commercial recycling programs and reported the following institutional and commercial waste recovery rates: Bergen County, NJ (63%), Clifton, NJ (68%), Portland , OR (52%), San Jose, CA (42%), and Seattle WA (48%). (Note: These are 1999 data. ILSR refined the EPA Standard Recycling Rate methodology to calculate these rates.)

- ***The six commercial recycling programs use different strategies to achieve success.*** Bergen County, NJ and Portland, OR rely on recycling mandates. Other places use incentives such as reduced tip fees, reduced franchise fees, and tax incentives.

C. Required Recycling and Incentive Program Survey

METRO is a directly elected regional planning and governmental agency that serves three counties and 24 cities in the Portland, Oregon, metropolitan area. In April 2002, the Regional Environmental Management Department at METRO published a report, *Required Recycling and Incentive Program Survey Summary of Findings*. This report (the Portland METRO study) profiled 15 communities with mandatory or incentive recycling programs that targeted the commercial or construction and demolition waste stream.

The author selected the programs from an inventory of programs in North America, based, in part, on success with required recycling and incentive policies. The report was intended to provide information to establish policy and program approaches for increasing recycling rates in the METRO region. It includes a summary of key findings, an overview of the profiled programs, summary tables of the program characteristics and in-depth profiles of each program with details about implementation and results. This study is included in its entirety in Appendix © 33. Because this study is recent and addresses many of the specific questions the Council asked OLO to investigate, the key findings from this study are reproduced below.

KEY FINDINGS FROM THE REQUIRED RECYCLING AND INCENTIVE PROGRAM SURVEY

In communities throughout the United States and Canada, required recycling and incentive strategies for the commercial and construction and demolition waste streams have been successfully implemented. Key findings of the programs profiled in the report including critical elements, barriers and major lessons learned are detailed below.

- ***Required recycling programs have the potential to divert a significant portion of the waste stream and help communities meet recovery goals.*** Seven of the nine communities directly attribute their increase in recovery to required recycling programs. Since the implementation of required recycling in Dane County, the county's diversion rate for specific materials are more than 50 percent for corrugated cardboard, steel cans, plastic, glass, newspaper, and corrugated cardboard.

- ***Education and technical assistance are key factors to the implementation of mandatory recycling requirements.*** Virtually all of the program managers stressed the importance of education as a key element to a successful program. All of the surveyed programs provide the commercial sector with some level of technical assistance and education. Program managers noted it is important to have these components in place before the implementation of a required recycling program. Education and technical assistance provide incentives to participate, ensure that materials are separated properly and encourage public acceptance and willingness to participate. A strong education and technical assistance program will most likely require increased staff, budget and constant reinforcement.

- ***Using a cooperative approach to required recycling can build program support and influence participation.*** Program managers emphasized the importance of working with businesses, haulers and other stakeholder groups to develop the most attractive program.

- ***Strong commodity markets ultimately determine what is recyclable and influence participation.*** Nearly all of the communities noted the importance of reliable commodity markets. Program managers stressed that it is not practical to mandate materials unless the markets exist for the materials, and to only include recyclables with developed and stable markets to prevent having to change policies in the future. Identifying outlets for collected material is an important component in the planning process. A number of programs require the recycling of materials for which the cost of recycling is less than or equal to the costs of proper disposal at a solid waste facility.

- ***No required recycling or incentive program is identical.*** Each of the profiled programs is unique to their community and reflects the economics and infrastructure of their region. Nearly all of the communities implemented required recycling or incentive programs to help meet waste diversion or recycling goals.

- ***Enforcement is a key component of mandatory recycling requirements and disposal bans.*** All the communities with required recycling have some level of enforcement measures. The most common enforcement measures used in the profiled programs include random business inspections and landfill load inspections. Penalties for noncompliance include warnings and fines that range from $25 to $10,000. The majority of the programs offer an assistance period to help businesses meet the requirements.

- ***Adequate resources need to be budgeted to support required recycling programs.*** A major impediment for communities implementing effective mandatory recycling requirements or disposal bans is sufficient resources for enforcement measures. Five of the nine programs noted lack of resources for enforcement measures as an obstacle to the program's success. Program managers stressed businesses will not adhere to required recycling policies unless they fear repercussions of noncompliance. In contrast, programs that have full time enforcement officers stated that strong enforcement can boost both the quantity and quality of participation. Onondaga County's required recycling program has 4.0 FTE that provide business education, technical assistance and enforcement. The program has a business participation rate over 90 percent and the recycling rate was 68 percent in 2001.

- ***Enforcement measures have the ability to target a broad range of service providers from landfill operators to haulers to generators.*** Enforcement targets varied in the surveyed communities. The City of Portland's program focuses enforcement on the generator level with random business inspections. Including a generator requirement in the mandatory recycling requirement or disposal ban can emphasize business responsibility.

- ***Disposal bans are an effective means to reduce landfill waste and push recovery of selected items if markets or uses exist for the targeted materials.*** The majority of the bans targeted materials that are economically feasible to recycle in their community. Five of the profiled programs have material disposal bans that affect more than 14 materials. All five of the programs surveyed ban newspaper, aluminum and glass. Three ban yard debris, plastic, corrugated cardboard, whole tires, office paper, lead acid batteries, and white goods. A number of the communities gradually phased in the required recycling materials.

- ***Landfill bans can spur the market development for some materials.*** For example, landfill bans of yard debris have led to the development of composting infrastructure at the local and regional levels. In Vancouver, B.C., the ban on drywall has enabled recyclers and salvagers to competitively bid on the demolition buildings, which has led to an increase in construction and demolition diversion from the local landfill.

- ***Landfill bans can be used as a means of flow control to impact those waste streams not controlled or managed directly by a city or a county particularly self-hauled wastes.*** Program managers noted that landfill bans are more easily enacted when a public agency owns a transfer station or landfill.

- ***Disposal bans require extensive promotion and education campaigns targeting the affected parties.*** Durham, North Carolina conducted a two-year education period before the enforcement of the ban, although the city noted a concentrated campaign six months prior to enforcement would be sufficient.

- ***Local government can influence the marketplace by the way it structures its garbage collection rates, franchise fees, and permit fees.*** A number of the surveyed

communities utilize multiple incentives to reward recycling over disposal. Program managers indicated that one of the best voluntary incentives for businesses is an economic incentive.

- ***Infrastructure development grant programs are an effective means to increase processing capacity and waste reduction efforts.*** Program managers indicated that grant assistance was one of the most cost effective waste diversion strategies.

- ***Diversion deposits provide sufficient incentive to encourage businesses to recycle.*** A number of communities in California have adopted diversion or recycling deposit systems to encourage the recovery of construction and demolition materials. Program approaches vary and deposits range from a flat fee based on a project's total cost to fees based on square footage and the type of project.

- ***The largest barrier to a diversion deposit system is the administration of the transaction and refund process.*** Program managers commented that the refund turn-around process is slow and managing the financial components of the program requires additional resources and time. For example, San Jose's Construction and Demolition Diversion Deposit Program's refund process takes approximately three weeks, which is longer than the city originally anticipated.

CHAPTER VI: Strategies to Improve Commercial Recycling

This chapter presents strategies used across the country to improve commercial recycling. The strategies are organized as follows:

- **Part A** – Core Program Elements
- **Part B** – Mandates
- **Part C** – Collection Options
- **Part D** – Incentives
- **Part E** – Targeted Materials Programs

Each part summarizes how the strategies work, highlights certain jurisdictions that have implemented the strategies, and presents information on implementation issues and effectiveness based on available research.

A. Core Program Elements

Many local jurisdictions across the country administer programs to encourage residential and business recycling activities. The core services of these programs include:

- Education and outreach;
- Technical assistance; and
- Data analysis.

1. Education and Outreach

Education and outreach programs publicize recycling goals and requirements and educate businesses about how to set up effective recycling programs. Several arrangements exist to provide education and outreach:

- Some jurisdictions appropriate funding for in-house staff positions and advertising and marketing campaigns.

- Other jurisdictions work with haulers or processors to distribute informational materials. For example, staff in Portland prepare educational and marketing materials and require haulers to distribute this material to their business customers.

- Another model is for a jurisdiction to contract out these responsibilities to a non-profit organization. Seattle contracts with the Business and Industry Resource Venture, a program of the Greater Seattle Chamber of Commerce, to provide recycling education and outreach.

Research results. The research literature consistently identifies ongoing education and publicity efforts as a key component of successful programs. Regardless of whether a program is staffed publicly or privately, the components of an effective outreach program

consist of media campaigns, slogans, logos, instructional brochures, award programs, and workshops. Additionally, recycling program audits stress that effective public education and outreach programs must be comprehensive and sustained. Examples from the research include:

- The Portland METRO study of successful commercial recycling programs summarized in Chapter V reports all of the surveyed programs provided some degree of education and technical assistance.

- A 2002 audit of programs in Alameda County, California found "strong and ongoing public education efforts are key to developing and maintaining diversion programs directed at the public."[1]

- Program reviews of commercial recycling programs for several townships and boroughs in Pennsylvania recommend that program administrators identify every participant and provide information every six months at a minimum that is concise, direct, and easily understood.[2]

- A 1996 review of 29 city recycling programs in Oregon rated programs as highly effective, moderately effective or less effective, based on per capita recovery rates.[3] The review found highly effective programs:

  - Use a wider variety of education techniques and target their audiences. In comparison, less successful programs tend to focus most of their information on a general audience and schools only;

  - Attempt to reach their audiences more frequently, i.e. on a daily weekly or monthly basis, rather than quarterly or annually;

  - Take a more active role in implementing the education and promotion program, or establish a team approach with haulers to achieve higher per capita recovery rates.

2. Technical Assistance

In addition to outreach and education, many commercial recycling programs offer technical assistance to businesses. These programs may conduct free waste audits, provide recycling containers, identify recyclers and processors, or offer presentations to in-house staff and employees. Internet-based waste audit software is also available.

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[1] Alameda County Source Reduction and Recycling Board, *5 Year Audit: Programmatic Review and Evaluation*, April 2002.
[2] Stroud Township, PA, *Commercial Recycling Program Review*, January 2004.
[3] Oregon Department of Environmental Quality, *State of Oregon Local Government Recycling Programs Implemented Under the 1991 Recycling Act – A Review,* Spring 1996 www.deq.state.or.us/wmc/solwaste/1001recycact.html.

Technical assistance focuses more on the "how-to" aspect of recycling than the "why" aspect.

Research Results. Technical assistance has been identified as helping jurisdictions increase recycling and/or waste diversion rates, helping businesses identify what materials are in its waste stream, and helping businesses increase the cost effectiveness of recycling. Some examples include:

- The California Integrated Waste Management Board (CIWMB) has recognized San Jose, California for its technical assistance program. CIWMB reports the program has helped San Jose's commercial sector achieve a 49% diversion rate.[4]

- The CIWMB also reports that free waste assessments have helped businesses reduce disposal costs by decreasing collection frequency and container size.

- Technical assistance programs focusing on waste audits in the City of Carson, California demonstrated opportunities to reach a 50% diversion rate in a cost effective manner, predominately through source reduction.[5]

- The City of Columbus, Ohio recently implemented a web-based waste audit system for use by businesses that provides customized waste disposal and recycling options.

3. Data Collection, Analysis, and Program Measures

Effective solid waste management programs routinely collect and analyze data. In addition to recycling rates, some of the most widely used analytical tools are waste generation studies, waste composition studies, and data from hauler and business reports. Many of these data form the basis for program performance measures.

- A **waste generation study** weighs the refuse disposed of by businesses along a route. This data is analyzed to determine what business types generate the most waste. A waste generation study helps a program planner identify large generators and develop programs targeted to these businesses.

- A **waste composition study** collects samples of disposed refuse and sorts through the refuse to identify what materials are being disposed of as trash. A waste composition study helps a program administrator determine what recyclable materials are still being left in the waste stream and develop programs targeted to these materials.

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[4] California Integrated Waste Management Board, *2001 Trash Cutter Award Program Case Studies: San Jose Environmental Department*, 2001. www.ciwmb.ca.gov/trashcutters/Winners/2001/SanJose.htm.
[5] California Integrated Waste Management Board, *1998 Trash Cutter Award Program Case Studies: City of Carson*, 1998. www.ciwmb.ca.gov/trashcutters/Winners/1998/Carson.htm.

Research results. A review of program web sites indicates that solid waste programs routinely calculate and report data about waste generation rates, recycling rates, and the types and amounts of recyclables left in the trash. Programs rely on these measures combined with business participation rates to measure program effectiveness. The research literature suggests recycling rate goals can be useful to motivate counties to get programs up and running or to continue to make improvements. However, it also suggests that recycling rates have several limitations.

A report issued by the State of Minnesota Office of the Legislative Auditor summarizes the limitations of relying on recycling rates as a performance measure.[6] The report states:

- Recycling rates are generally not useful to manage day to day operations, and too much reliance on recycling rates can create an incentive to improve reporting instead of programs;

- Recycling rates by themselves do not provide the information needed to determine the factors that are influencing recycling volume or to identify the best targets of opportunity.

In terms of program measures, the Minnesota report found that many of the counties visited need additional information to manage recycling operations and assess performance. The report stated that waste composition data in particular is a more meaningful and useful performance measure than recycling rates.

B. Mandates

Jurisdictions use ordinances, licensing requirements, disposal bans, and fund enforcement activities to establish mandatory recycling programs.

1. Ordinances

A business recycling mandate requires a business to recycle or separate specific items or materials. Jurisdictions adopt recycling mandates to help achieve regional recycling goals and to create a market and a supporting infrastructure for recyclable items. Approaches to mandatory business recycling requirements can vary widely, from pre-set list of recyclables to allowing a business to choose items for recycling.

- Many jurisdictions, including Montgomery County, adopt regulations that require businesses to recycle a pre-set list of specific materials.

- Cambridge, Massachusetts requires a business to conduct a waste audit and develop a plan to recycle any material that makes up more than 5% of its waste stream.

[6] Minnesota Office of the Legislative Auditor, *Program Evaluation Report #02-01: Recycling and Waste Reduction*, January 2002.

- Portland, Oregon allows a business the option of choosing from a default list for their business type (based on an in-depth audit of the commercial waste stream) or independently identifying its targeted materials as long as they reach a 50% recycling rate.

The latter two approaches attempt to recognize that the components in commercial waste streams vary more than those in the residential waste stream and incorporate some flexibility into the recycling requirement.

Breadth of application. Jurisdictions vary in whether they apply recycling mandates to all business or a subset of businesses. Many jurisdictions apply regulations to all businesses, regardless of size or type. By comparison, the mandatory regulations in Portland apply to businesses and multi-family residences valued at over $50,000.

Planning and reporting activities. Many jurisdictions mandate planning and/or reporting activities in addition to requiring the recycling of specific items. Plans are generally tools that jurisdictions can use to ensure that a business has considered recycling and includes it as part of its waste disposal activities. Cambridge requires a business to develop and file a recycling plan. Chicago requires a business to prepare an education program and a written recycling plan.

Research results. The Portland METRO review of successful commercial recycling programs suggests that either mandatory or voluntary recycling programs can work well; however, there appears to be a growing trend towards mandatory programs. Some specific examples include:

- Seattle, which achieved a 48% commercial recycling rate by 1996 using a voluntary program, adopted a mandatory program in December 2003 after the commercial rate dropped to 42%.[7]

- Santa Barbara County, which has a 59 percent recycling rate, also implemented a mandatory recycling program for businesses in 2003.

The research suggests that more effective programs mandate a greater number of items for recycling and achieve higher diversion rates. The research also recommends that the mandated list of recyclables be tailored to the economics and infrastructure of the region. The research states it is not practical to mandate recycling unless a strong, stable commodity market exists for the recyclable materials.

2. Disposal Bans

A disposal or waste ban restricts the types of materials that can be disposed of at a solid waste transfer station, landfill, or incinerator. Jurisdictions establish bans to conserve capacity at existing facilities, to limit the need for the siting and construction of new facilities, to create a market for certain recyclables, and for public health/environmental

[7] City of Seattle, www.cityofseattle.net/news/detail.asp?ID=3637&Dept=40

reasons. Many jurisdictions use disposal bans because they not only reach all generators but also affect waste streams from self-haulers or private contractors that a jurisdiction does not directly control or manage. Disposal bans vary in the number and types of items they prohibit. Jurisdictions often phase in the number of prohibited materials over time or update bans as needed to address new issues.

Research Results. Several states and jurisdictions have disposal bans on specific items. Some banned items include yard waste, leaves, tires, batteries, hazardous materials, recyclable paper and corrugated cardboard, glass, metal and plastic containers, white goods, and organic (food) waste. The research indicates that a disposal ban can successfully increase diversion, especially if a market for the recyclable good already exists. However, disposal bans can often help to create markets, as occurred after tires and yard waste were banned from landfills and incinerators. The Portland METRO study details some specific examples and experiences of jurisdictions with disposal bans:

- Dane County, Wisconsin phased in disposal bans of different materials over time. Newspapers were banned in 1987, corrugated cardboard and commingled cans and bottles in 1991, and mixed paper in 1995. Estimated diversion rates for these materials in the commercial sector range between 75% and 85%.

- Durham, North Carolina enacted a disposal ban on glass bottles and jars, aluminum and steel cans, newspapers, and corrugated cardboard in 1998. The city conducted a two-year informational campaign and began enforcing the ban in the third year. Data indicate commercial recycling rates have not substantially increased since the implementation of the ban, although residential rates have.

- Halifax, Nova Scotia phased in a ban of specific materials from 1996 to 1998, including corrugated cardboard, newsprint, steel/tin cans, glass jars, and redeemable beverage containers. Halifax's commercial recycling rate was at 58% in 2001.

The research also indicates that the implementation of a disposal ban requires extensive promotion and participation with affected parties. In particular, local officials and program managers must address how the ban will be enforced and the potential for illegal dumping.

The City of Seattle recently enacted a comprehensive disposal ban on paper, corrugated cardboard, and yard waste for the commercial sector and on paper, corrugated cardboard and commingled cans and bottles for the residential sector. Seattle's disposal ban program is structured as follows:[8]

- The ban will be phased in over three years, with an educational program beginning in 2004; "tagging" of containers with significant amounts of recyclables beginning in 2005; and enforcement beginning in 2006.

[8] Seattle Public Utilities, www.cityofseattle.net/util/services/recycling/garbageban.htm.

- A significant amount of recyclables is defined as more than 10% of a container's volume based on visual inspection.
- Commercial and multi-family establishments can apply for an exemption from the disposal ban if they do not have adequate space for recycling.
- Enforcement for businesses and apartment buildings will consist of two warning notices followed by $50 civil fines assessed on the garbage susbscriber.

3. Enforcement Programs

Enforcement programs use employees and administrative or court-based enforcement procedures to achieve compliance with local recycling mandates and regulations.

Jurisdictions use business recycling specialists and/or code enforcement inspectors to conduct enforcement activities. A recycling specialist works in the field, conducting site visits to check the on-site operations of a business and ensure that a business is complying with local mandates. Frequently, a recycling specialist encourages voluntary compliance through education and technical assistance and uses enforcement as a last resort to achieve compliance.

Jurisdictions that own a transfer station or a landfill use inspectors to spot check loads for recyclables or other prohibited items. When an inspector finds an improper load, s/he fines the hauler and/or issues a citation against the business. Jurisdictions use escalating fee structures to achieve compliance. Although haulers pay the fine in some cases, they generally pass through the charge to their business customers.

Research Results. The Portland METRO study found that enforcement is a key component of mandatory recycling programs and disposal bans. The study also indicates that enforcement activities need to be done in conjunction with education and technical assistance. Some of the specific "lessons learned" related to enforcement that communities reported in the METRO study include:

- Effective enforcement is needed to back up the ordinance requirements. Businesses will not adhere to a new ordinance unless they fear the repercussions of non-compliance. *Durham, NC*

- A six-month education campaign is needed prior to enforcement. *Durham, NC*

- Mandating recycling is an effective means to increase recovery, but the program should focus on education rather than enforcement. *Onondaga County, NY*

- Constant evaluation and enforcement are necessary for major public behavioral and technological changes such as recycling. *San Diego County, CA*

In terms of how enforcement directly affects recycling rates, there are no data that specifically tie increased enforcement to increased business recycling.

4. Hauler Licensing Requirements

Hauler licensing requirements require haulers to conduct certain activities in order to obtain a license to operate. Some examples of commonly mandated activities include: distributing promotional materials, preparing recycling plans, and filing reports.

- **Distributing promotional materials.** Many jurisdictions partner with haulers or require haulers to distribute outreach literature. Typically, the jurisdiction prepares the materials and gives it to haulers to distribute when soliciting business or with their customer billings.

- **Preparing recycling plans**. Approaches that require a written plan vary in terms of who is required to complete the plan. Most places require businesses to prepare their own plans; however, Portland and some jurisdictions in California require haulers to develop written recycling plans for their business customers.

Research Results. The research does not contain any data on recycling rate increases directly related to hauler licensing requirements. However, those programs do provide another outlet to distribute information to the commercial sector. Additionally, many jurisdictions that have hauler licensing requirements have successful programs, such as Portland with a 59% recycling rate.

C. Collection Options

Jurisdictions face several choices about how to organize or structure how the recyclable materials generated at a commercial site are moved from their point of use to a processing site. This section looks at open markets versus commercial hauler franchises, and small business collection options.

1. Municipal Collections, Open Markets, and Commercial Hauler Franchises

The options for collection of commercial refuse and recyclables include municipal collection service, an open market system, or commercial hauler franchise agreements. As recycling requirements have become more prevalent, collection services for commercially generated recyclables have become more important.

- **Municipal Collection Systems.** Historically, some jurisdictions provided collection services to both residents and businesses. Today, municipalities collecting commercial waste and recycling provide a variety of collection containers, including roll-offs, compactors, metal bins, and plastic barrels for curbside collection. Fees are often based on container size and service frequency.

- **Open Market Systems.** Under the open market system, private haulers negotiate refuse disposal contracts with corporations and individual businesses. This arrangement succeeds because private haulers provide businesses with service quality and the flexibility to meet special needs, such as end of day collections for

restaurants. These distinctions carry over into waste management contracts and a business's interest or ability to negotiate an effective set of disposal and recycling service contracts.

- **Commercial Franchises.** As recycling programs mature, many jurisdictions are exploring the use of commercial franchise agreements as a tool to address many issues associated with the contract structure and service characteristics of the traditional open market system. Commercial franchises can either be exclusive (i.e. one vendor services a set area), or non-exclusive (i.e. any number of vendors can provide services as long as they meet pre-established conditions).

Research results. The research indicates that open market systems are most prevalent and tend to lead to the lowest prices, however with wide price variation found for similar levels of service. Municipal collection systems are the most expensive option for local jurisdictions. The research indicates that local governments consider establishing a commercial franchise for several reasons. The most common are to increase control of the waste stream, increase revenues, address business concerns about service availability and prices, and/or increase overall recycling rates. The research evidence about whether an open or closed market system produces higher recycling rates is inconclusive. Specific examples from the research include:

- A 1998 survey by R.W. Beck, a solid waste management consultant, reported more than 50% of the largest U.S. cities have open commercial collection systems.[9]

- A City of Sacramento study found that many businesses paid less in the open market than companies in nearby jurisdictions with municipal collection services or than cities with exclusive commercial franchises.[10]

- An audit of Alameda County, California programs reports 13 member agencies have an open market and four have exclusive service. The auditors found that there does not appear to be a strong correlation between open market and higher diversion but also stated that the lack of a correlation may be a data issue.[11]

- The town of Babylon, New York reports an increase in their commercial sector diversion rate from 0% to 38% since they established a commercial hauler franchise in 1996.[12]

2. Small Business Collection Programs

Small business owners frequently face high costs to meet recycling requirements. This happens because a hauler will charge relatively high fees for the low volume generated

[9] Miller, Debbie, "Going into Business," *MSW Management*, January/February 2002.
[10] Aquino, John T., "Competing for Commercial Waste," *MSW Management*, November/December 2002.
[11] Alameda County Source Reduction and Recycling Board, April 2002.
[12] Alameda County Source Reduction and Recycling Board, April 2002.

by a small business or a hauler may choose not to collect high volume, low value recyclable materials. Some jurisdictions provide special programs targeted at small businesses to address these issues. The most common options include free collection service and piggybacking on residential service routes.

- **Free collection service** provides free recycling collection to businesses of a certain size or businesses that generate a certain amount of materials.

- **Piggybacking on residential service routes** allows businesses of a certain size or that generate a certain amount of waste to participate in residential recycling collection routes.

Research results. The goal of small business collection programs is to increase the convenience and cost effectiveness of recycling. Although data on how much these programs increase the recycling rate is not available, several jurisdictions use them. Specific examples include:

- The California Integrated Waste Management Board reports that many communities offer free collection of recyclable materials from small business if a business generates a comparable amount of material as a residential customer.[13]

- In Seattle, a business that generates 96 gallons of trash per week or less is eligible for free pick up service through the City's residential collection services. To participate, a business must sign up for the service and must also have their own garbage collection service.[14]

- In Plano, Texas, the Small Business Recycling Program provides a recycling program for paper items only, which is the largest volume of a typical small business waste stream. The City provides this service free of charge for organizations with less than 100 employees that do not generate enough materials for a large size commercial container.[15]

- In San Jose, businesses that generate less than one cubic yard of refuse can apply for the City's residential garbage and recycling service and pay lower residential collection rates.[16]

D. Incentives

Local government plays a key role in establishing the economic framework for refuse collection and recycling by how it structures collection rates, franchise fees, license or

[13] California Integrated Waste Management Board, *Incentive Programs for Local Government Recycling and Waste Reduction*, 2003.
[14] Seattle Public Utilities, www.cityofseattle.net/util/services/recycling/sbusiness.htm
[15] Plano Environmental Waste Services Department. www.planoenvironmentalwaste.com/commercial_div.html
[16] United States Environmental Protection Agency, *Cutting the Waste Stream in Half: Community Record-Setters Show How*, June 1999.

permit fees, tipping fees, business taxes, and solid waste financing charges. A jurisdiction can use its fee setting activities to reward those who increase recycling or to increase the costs for those who instead continue to produce waste.

1. Tip Fee Incentives

The approaches jurisdictions use to create economic incentives for recycling vary, depending on the fees a jurisdiction charges as part of its solid waste management system. The research suggests jurisdictions typically adjust tipping fees and/or franchise fees.

- **Differential Tip Fees** are separate charges for different materials to encourage source separation or material segregation prior to delivery.

- **Reduced Tipping Fees** are lower tipping fees for recyclable materials than for solid waste.

- **Tipping Fee Surcharges** encourage compliance with source separation mandates by imposing a surcharge on the tipping fee if a business sends a mixed load to the transfer station.

- **Franchise Fee Discounts**, in areas with commercial hauler franchises, provide lower fees for haulers that meet certain recycling goals, such as lower than 50% recylcables in each load tipped at the transfer station.

Research Results. The Portland METRO study found that a number of communities with effective commercial programs use multiple incentives to reward recycling over disposal. The research literature also suggests that the effectiveness of fee-based strategies depend on the following factors:

- The availability of markets for recyclables;
- The ability of a jurisdiction to control collection and disposal costs through existing franchise or facility ownership of a transfer station, waste to energy facility, landfill or materials recovery facility; and
- A business's awareness of its refuse and recycling costs plus awareness of how these costs can be reduced.[17]

The City of Seattle implemented a system of tip fee incentives and education and saw commercial waste diversion increase from 44% in 1993 to 48% in 1996. In 2001, however, the rate dropped to 38%. This decline led the City Council to adopt new

[17] Classical economic theory assumes commercial customers would be aware of the relative costs of refuse and recycling services and make decisions that reduce their costs. A recycling study for Alameda County California reports that, in practice, businesses may not be aware that their refuse bill can be reduced or how to accomplish this. Without this awareness, rate structure strategies are largely ineffective. With this awareness, strategies that lower recycling costs and/or increase refuse disposal costs can increase business participation in diversion practices.

mandatory recycling rules in an effort to increase rates, especially for paper and corrugated cardboard.

2. System Benefit Charge Offset

Jurisdictions that use a system benefit charge to raise revenues, such as Montgomery County, can establish an offset to encourage recycling. For example, the Solid Waste Authority in Palm Beach County, Florida assesses 63% of total commercial disposal costs to commercial units in County through a system benefit charge. The rate for each business is determined by the business's size and whether it is considered a high, medium or low waste generator. The Solid Waste Authority periodically conducts waste generation studies and adjusts assessments to reflect changes in generation rates by business category. Business categories that reduce waste generation through recycling would therefore see a decline in assessments.

Research Results. Since the inception of this system in Palm Beach County, waste generation dropped 18% from 6.6 pounds per square foot to 5.4 pounds per square foot over five years, reflecting an increase in recycling and/or source reduction. For specific business sectors, the generation rates for department stores and transport terminals dropped and the generation rates for fast food outlets increased.[18]

The research indicates that a drawback of this specific system is that a business that establishes an aggressive recycling program cannot individually achieve savings on disposal costs unless other businesses in its group also recycle. Categories of businesses must work together to implement recycling if they want to reduce their disposal assessments.

E. Targeted Materials Program

Jurisdictions with effective recycling programs routinely identify recyclables left in the waste stream and work with the commercial sector to develop and test pilot programs to divert these materials. This discussion focuses on two areas, construction and demolition (C&D) debris programs, and organic or food wastes.

1. Construction and Demolition Material (C&D) Programs

Jurisdictions have adopted recognition programs, disposal bans, and diversion deposits to manage the disposal of construction and demolition debris. Recognition programs provide free assistance and publicity to construction companies or contractors that recycle a set amount of their C&D waste.

Diversion deposit programs require a recycling deposit, usually based on the value of the project and the types of materials it will produce, when a project permit is issued. The intent of the deposit is to equalize any different economic costs between recycling and disposing of C&D waste. Participants must verify that a set percentage of materials were

[18] Alameda County Source Reduction and Recycling Board, April 2002.

recycled to receive the deposit back. The concept of diversion deposits was derived from deposit programs on beverage containers, commonly referred to as bottle bills. A study by R.W. Beck shows that the 10 states with bottle bills recover 71.6% of deposit containers, compared to 27.9% in the 40 non-bottle bill states.[19]

Research Results. C&D recycling programs can be successful, but ultimately depend upon the availability of processors for the materials. The California Integrated Waste Management Board (CIWMB) has published a model studies report of C&D Recycling Plans and Policies that recommends jurisdictions reduce the disposal of C&D debris through the use of promotion, planning requirements, reporting requirements, diversion requirements, the identification of pre-approved sites for sorting materials, and the use of diversion deposits.[20] Some specific results highlighted in the Portland METRO study include:

- King County's Construction Works Recognition Program publicizes construction companies that recycle, reduce waste, and use recycled products. Contractors receive free assistance and recognition for successfully recycling at least 60% of their construction waste. The King County program has recognized 22 projects so far and reports that it has provided useful case study estimates on the amount of materials that can be diverted.

- Santa Monica, California requires projects that meet certain value or size requirements to recycle C&D waste. A permit applicant for a qualifying project must submit a Waste Management Plan to divert 60% or more of the waste. The applicant must submit a performance security deposit equal to 3% of the project cost. This deposit is refunded after the applicant provides documentation that materials were recycled. Santa Monica has seen an increase in the diversion of C&D and attributes 10-15% of the increased diversion to the C&D deposit program.

- San Jose, California has a diversion deposit program to encourage C&D recycling. The San Jose program has been effective at capturing projects that primarily generate self-haul, mixed C&D loads. The City has also created an infrastructure grant program to encourage processors to invest in C&D sorting capabilities to maximize quantities recovered. The grant program was developed as part of diversion deposit program so that unclaimed deposits could be infused into development of additional processing infrastructure. The City has certified 22 facilities that will recover at least 50% of C&D materials received. San Jose staff report that managing the financial aspects of the program has been more difficult and time consuming than anticipated.

[19] Businesses and Environmentalists Allied for Recycling, *Understanding Beverage Container Recycling*, January 2002, www.globalgreen.org/BEAR/Projects/FinalReport.pdf

[20] California Integrated Waste Management Board, *Construction and Demolition Recycling Plans and Policies: A Model for Local Government Recycling and Waste Reduction*, 2003.

2. Food Waste

Some jurisdictions have developed programs to recycle organics (food waste) through composting. Organic food waste comprises 10% of the total municipal waste stream in the United States, and can be a higher portion of commercial sector wastes.[21] Organics composting is modeled after leaf and yard waste composting, where materials are picked up separately and transported to a centralized composting facility.

Research Results. The research indicates that if adequate processing capacity is available, food waste composting programs can be successful. However, the research indicates that programs must be developed slowly and comprehensively. Some specific examples of organics composting include:[22]

- The Portland region has begun implementation of a three-year organic waste management plan. The program estimates it will recover 45,000 tons of organic waste annually by 2008, and will provide commercial generators a cost savings of $11 per ton compared to waste disposal after the program matures.

- The City of San Francisco has a voluntary program with over 1,600 businesses participating. The program diverts approximately 60,000 tons per year of organic wastes.

- The City and County of Honolulu passed a mandatory food waste recycling ordinance in 1997, and divert 40,000 tons of food waste annually from the waste stream.

[21] California Integrated Waste Management Board, *Food Waste Recovery: A Model for Local Government Recycling and Waste Reduction*, June 2002.
[22] Metro Regional Council, *White Paper: Metro's Organic Waste Management Program*, January 2004.

CHAPTER VII: Stakeholder Themes and Observations

Research on recycling strategies emphasizes the importance of working closely with businesses, property managers, waste haulers, processors and other stakeholders to develop successful recycling programs.

To assess the feasibility in Montgomery County of commercial recycling strategies described in Chapter VI, OLO met with 35 individual stakeholders as well as the Montgomery County, Greater Silver Spring, and Bethesda-Chevy Chase Chambers of Commerce to review the strategies and solicit their observations and insights. A list of the various stakeholders OLO met with can be found on page 4.

The list of strategies OLO distributed to and discussed with the stakeholders is reproduced on page 52, table 10. This chapter summarizes the results and themes from these meetings. This chapter is organized as follows:

- **Part A** presents general themes and observations; and
- **Part B** present specific stakeholder opinions about the feasibility and effectiveness of the strategies.

A. General Themes and Observations

The observations and comments of the stakeholders varied widely, often depending upon where they were positioned in the waste disposal and recycling process. However, several general themes and observations emerged and are discussed below:

- ***Convenience matters.*** Many stakeholders observed that the more convenient you can make recycling for commercial establishments, the more participation will increase, especially for small businesses. Many people acknowledged that the County's residential recycling program has maximized convenience and suggested that the County follow a similar path for commercial strategies. Some suggestions to increase convenience for commercial establishments included providing free recycling containers, providing free or low cost collection service, or creating common drop-off locations for small businesses in urban areas.

- ***The costs of recycling are variable.*** The recycling literature suggests that, in general, recycling is economically beneficial for businesses because: 1) recycling services can be obtained for a lower cost than waste services, and 2) taking recyclables out of the waste stream decreases trash produced and therefore decreases the number of trash pick-ups required. The stakeholders OLO spoke with indicated that this is not always the case. Some businesses reported saving money through recycling, some reported breaking even, and some reported losing money.

  Variables that stakeholders reported as influencing the cost-effectiveness of recycling include the amount, type, and consistency of recyclables and waste produced; the time and effort required to develop waste and recycling contracts; knowledge of

various disposal options; the amount of leverage a business has in waste contract negotiations; and the willingness of haulers to decrease waste services if less are needed. Recycling requirements were more likely to affect the bottom line for smaller companies because they produce a smaller volume of recyclable materials.

TABLE 10: OLO LIST OF COMMERCIAL RECYCLING STRATEGIES

LIST OF COMMERCIAL RECYCLING STRATEGIES

Education and Technical Assistance – Publicizes recycling goals and educates and informs businesses about the detailed logistics of establishing a recycling program on-site.

Business Recycling Mandates – Imposes requirements on businesses to recycle, to source separate, or to meet a specific recycling goal. The list of recyclable items can be pre-set by a jurisdiction, based on an individual business waste audit, or based on business or hauler judgment.

General Recycling Mandate – Montgomery County requires businesses to recycle aluminum and bi-metal cans, plastic, glass, corrugated cardboard, newspaper, office paper, and yard waste.

Targeted Recycling Mandate

- Chicago, IL requires each business to choose two or three items to recycle.
- Cambridge, MA requires a business to conduct a waste audit and recycle everything that makes up 5% or more of its waste stream.
- Portland, OR requires each business to recycle 50% of its waste stream and have a written plan that identifies the materials to be recycled.

Enforcement Programs – Uses random business inspections or landfill load inspections to enforce regulations. Can target businesses or haulers. Penalties include warnings and fines. Most programs allow time for voluntary compliance.

Hauler Licensing Requirements – Imposes requirements on haulers as a condition of licensing. Haulers required to prepare plans for business customers, distribute promotional material, direct materials to create new markets, or meet specific diversion goals.

Disposal Bans – Restricts the types of materials that can be disposed at a transfer station, landfill or incinerator. Effective disposal bans target materials with a strong market for recycling, are widely publicized in advance, and phase-in materials over time.

Reduced Fees or Tax Incentives – Uses pricing to reward businesses for recycling. Can be applied to tip fees, system benefit charges, or franchise fees. Palm Beach County FL periodically adjusts its system benefit charges based on an updated generation study.

Commercial Hauler Franchises – Establishes a contractual arrangement that grants contractors exclusive or nonexclusive rights to provide services in exchange for a fee. Can leverage prices for commercial businesses, provide structure to create economic incentives for recycling, increase flow control, and raise revenue.

Programs for Specific Recyclables – Targets specific materials, e.g., organics or electronics, for recycling with an emphasis on feasibility and market development. **C&D Diversion Deposit programs** require a deposit at time of building permit that is refunded when documentation shows materials were recycled.

Other Techniques – Loans and grants, waste reduction programs, recycling zones, free pickups for small businesses, product bans.

Source: OLO, April 2004.

- ***Large businesses can recycle more easily than smaller businesses.*** Several stakeholders observed that the ability of a business to comply with recycling requirements depends on several factors, such as business size, whether the business owner or property manager contracts for its refuse and recycling services, and the structure of the cleaning services contract.

  Generally, large companies can recycle more easily because they have access to resources and support systems, they can incorporate recycling into pre-existing management routines, and costs are not as critical. Stakeholders reported the keys to a successful program in a large business are communicating with employees, communicating with the janitorial staff, structuring and negotiating waste contracts, and ongoing monitoring.

- ***Recycling is about creating culture and champions.*** Several stakeholders mentioned that two key aspects of a successful recycling program are management support and "champions" throughout the organization. They note that first, recycling needs to be made part of a business's culture and must be supported at the top levels of the organization. All stakeholders with successful programs independently observed that recycling works because it comes from the top and is part of their corporate policy and culture.

  Second, successful recycling programs have "champions" throughout the organization who constantly remind and educate other staff about recycling. People said recycling "champions" not only help influence internal organizational change, but also help sustain momentum at the staff level. As one person observed, recycling is about the business of spreading behavioral change and if one person starts recycling, it catches on. In businesses where management embraces recycling as part of the corporate policy, employees "police" each other.

- ***Small businesses require incentives or support.*** People reported the key issues for small businesses are obtaining inside recycling containers, finding space for containers in the disposal area, contracting for collection services, collecting enough recyclables to make recycling cost effective, and dealing with different ownership arrangements. Among smaller businesses, it was reported recycling may be easier for tenants in an office building if the property manager or building owner supports recycling. Recycling may be more difficult for retail shops or restaurants in a strip mall, where space is limited and each operator is responsible for making their own individual arrangements for waste and recycling removal.

  People familiar with these issues stated that if the County is serious about recycling, it will be important to provide help to small businesses. As one person said, the County needs to give a small business every opportunity to do the right thing. Stakeholders suggested that there needs to be incentives for small businesses to bring in recyclables. People also said that if a business has less than 20% of a specific recyclable good it is not usually cost effective for them to pay for a recycling service. Suggested solutions included incorporating small businesses into the residential

collection system, offering a free collection service for businesses that would source separate corrugated cardboard, and setting up drop off centers in the urban districts or at schools.

- ***Recycling in the private system breaks down, in part, because the roles and responsibilities are not clearly defined.*** Recycling in the private sector depends on shared responsibilities among multiple actors, including tenants, property managers, building owners, cleaning services, haulers, and processors. For example, several stakeholders noted that when a business occupies a building it does not own, it is not always clear which party is responsible for recycling under Montgomery County's mandates. Stakeholders report that this confusion is often magnified because sometimes the property owner contracts for waste disposal and recycling services and sometimes tenants are responsible.

  Several stakeholders identified a disconnect between a business that is trying to recycle and the janitorial/cleaning service responsible for the separation and disposal of recycling and waste. Ideas included targeting education to those organizations directly, assisting the business to educate the janitorial/cleaning service, or adding specifications to contracts that address recycling and proper separation of waste.

- ***Stakeholders disagree about business awareness of county regulations.*** Stakeholders expressed conflicting opinions about the business community's awareness of the County's recycling requirements. Some believed that businesses generally know about the requirements but choose not to recycle because they think it will be a major cost, they are missing the convenience of the bins at home, or they do not know where to start. Others reported the awareness of the County's regulations is very uneven and observed that some businesses are more conscientious about complying with County laws. Still others thought most businesses do not know about the regulations. There was a widespread consensus that the County needs more outreach and education.

- ***Education and technical assistance is key.*** Stakeholders universally emphasized the importance of education and technical assistance as part of a commercial recycling program. To be effective, education must be continual. OLO heard mixed views about the County's current outreach and education efforts. People who were aware of the County efforts reported that the County has an impressive collection of videos, brochures and other materials; however, most were not familiar with the County's materials. Some people suggested they could be simplified to be more useful.

  People said that communication from the County needs to be provided through a variety of media, such as written materials, the internet, site visits/personal communications, etc. The County should also provide direct "how-to" technical assistance, such as what a business should be paying for their waste disposal service, along with more traditional items such as information displays. Small and medium-sized businesses tend to perceive a larger communication gap than large businesses.

Many people said the County needs to put more emphasis on the costs or savings of recycling because that is what gets a business's attention. Some people thought the private sector should be responsible for education and outreach because they are better positioned to discuss costs.

To reach 34,500 businesses, many suggested the County could easily partner with organizations such as the local chambers of commerce, property managers, industry and trade associations, merchant associations, and public/private County agencies such as the Bethesda Urban Partnership. A perception was that the County focuses most of its efforts on those businesses that are already recycling, instead of making efforts to find and help those businesses who are not recycling.

Businesses across the board expressed a willingness to help out and requested that the County ask the business community to participate in an outreach effort, particularly before it moves ahead with any enforcement efforts. Stakeholders stated it makes sense to use these organizations because they already exist, they include all sizes and types of businesses, and their mission is to reach out to businesses.

Some suggested another option would be to join forces with the people who are working with businesses to file transportation management plans and reports. Others suggested that the extensive amount of handholding the County provides for its transportation management plans is comparable to the support needed for this kind of effort.

- ***Education and enforcement go hand in hand.*** Stakeholders expressed the belief that education and enforcement go hand in hand. To have an effective enforcement program, the County needs to assemble a current database of property owners and landlords and use it to disseminate education and technical assistance. People have to know what the requirements are in order to comply; however, after the County has established a strong outreach and education system, the County needs enforcement for those people who are not willing to comply. As one person said, if you are constantly ignoring the rules, you deserve to be fined.

- ***Enforcement is a complicated but necessary part of an effective recycling program.*** OLO heard a general consensus that the County should enforce against the responsible party; however, there were differing opinions about whether the responsible party is the business owner, the property manager, the building owner, or the hauler.

  There was broad agreement that fines are the only things that work. People generally supported fines that were high enough to hurt. Some suggested that the size of the fine should be based on the size of the business.

  OLO heard mixed views about the wisdom of inspecting loads at the transfer station and fining haulers with the understanding that haulers would pass these fines back to their customers. Some people supported this approach; however, some businesses did

not approve of fines from a hauler being spread over an entire route when one business is most likely at fault. Most haulers observed that it is unrealistic for them to enforce against their customers because they are in the service business. Haulers explained that if they penalized a customer, the customer would find another hauler. Haulers and businesses agreed that fines passed along by haulers across all businesses would increase the overall cost of doing business in the County.

Many people acknowledged that because of its size, the County traditionally has relied on a complaint based enforcement system. While this makes sense from a budget point of view, complaint-based systems produce an uneven level of enforcement and do not create an impression of fairness. Some people stated that current enforcement activities are not well coordinated and adding more resources without addressing coordination issues would create more problems.

- ***A lack of processing markets exists for construction and demolition (C&D) materials.*** Some stakeholders raised concerns about the lack of processing markets for materials other than paper, commingled materials, and scrap metal in the County. They noted that markets for building materials such as drywall, carpet, or crushed concrete aggregate are not viable due to a lack of local processors. One person said a processor exists for wood but is very selective about the material it accepts.

  Several stakeholders indicated a desire to take C&D materials to a recycling facility instead of the transfer station, but stated a lack of such facilities in the region prevent them from doing so. Scrap metal is the one type of C&D material that was consistently cited as separated and recycled. Factors that stakeholders identified as preventing more recycling processors in the region include the difficulty of obtaining a permit and general citizen opposition to those types of facilities.

  A handful of people suggested that if the County is serious about recycling in the long term, it should take action to stimulate recycling processor businesses. These people noted that the proximity of the port in Baltimore is an asset because the market for materials is global. Other suggestions were to create sites and give start-up grants for recyclers and processors and to amend the County's capital project specifications to require or encourage the use of recycled materials.

- ***Plans, reports, data, recycling rates and the recycling goal.*** Most businesses that file a recycling report with the County rely on data from the waste hauler to complete the report[1]. Some report that some waste haulers charge to provide this data. Businesses and haulers both acknowledge that the numbers in the recycling reports are estimates, averages and extrapolations, not real measures. As one person noted, it is fairly easy for a business to commit to a 50% recycling rate but validating the rate is problematic. Some businesses observed that the reporting requirement is valuable whether the data is valid or not because it forces a business to report into the County and to check its numbers at least once a year.

[1] Executive Regulation 109-92 requires "Large" businesses with 100 or more employees or their property management company must report annually while small businesses must report at the County's request.

Some people expressed skepticism about the validity and methodology used to determine the commercial recycling rate. Others accepted the rate, but suggested the County should disaggregate rates for businesses and government institutions in the commercial sector. Some suggested that disaggregating and publishing the commercial data by sector or by individual business would motivate businesses to recycle.

With a few exceptions, most stakeholders believed the County could achieve an overall goal of 50%. For example, processors and stakeholders with effective programs stated that it is very feasible to achieve a recycling rate of 70% or 80% in an office building without a cafeteria.

B. Specific Comments about the Feasibility and Effectiveness of Commercial Recycling Strategies

After reviewing the strategies with the stakeholders, OLO also asked them to rank which strategies would be most feasible and effective. The strategies that received the highest rankings were education and technical assistance, disposal bans, enforcement, and reduced fees or tax incentives. The table below lists each strategy and indicates whether a majority of stakeholders felt it could be a feasible strategy in Montgomery County. Following the table, each strategy is discussed in more detail.

TABLE 11: STAKEHOLDER FEASIBILITY ASSESSMENT OF COMMERCIAL RECYCLING STRATEGIES IN MONTGOMERY COUNTY

Strategy	Feasible in Montgomery County?
Education and Technical Assistance	Yes
Business Recycling Mandates	
General Recycling Mandate	Yes
Targeted Recycling Mandate	No
Enforcement Programs	Yes
Hauler Licensing Requirements	Yes
Disposal Bans	Yes
Reduced Fees or Tax Incentives	Yes
Commercial Hauler Franchises	No
Programs for Specific Recyclables	
Organics Composting	No
Construction and Demolition Diversion Deposit	No

Source: OLO, April 2004.

EDUCATION AND TECHNICAL ASSISTANCE

The majority of stakeholders felt that education and technical assistance was a feasible strategy in Montgomery County and one that can be effective. Some of the specific suggestions received from stakeholders include:

- *Work in partnership with chambers of commerce and business associations to create education and marketing programs.*
- *Make detailed information/recycling plans available from successful programs, i.e. provide blueprints for other businesses to follow.*
- *Publicize compelling reasons for recycling in the educational information, i.e. RRF capacity, cost to ship excess waste to other jurisdictions, etc.*
- *Create mandatory recycling education/training program for each business and hauler as part of obtaining a business or hauling license.*
- *Address the education gap that exists in the recycling and disposal of bulk trash items.*
- *Create or help develop a web-based waste audit program that would help smaller businesses understand the materials that make up its waste stream and provide a list of recycling companies/options based on this information.*
- *Ensure businesses know what services to ask for when contacting waste companies.*
- *Shift outreach efforts to contacting businesses without recycling programs.*
- *Establish a business to business web site for recyclable materials.*
- *Provide businesses and property managers with a list of questions they should be asking their hauler when contracting for waste and recycling services.*

BUSINESS RECYCLING MANDATES

In general, OLO did not find much support for changing the structure of the business recycling mandate. Most stakeholders see the County's mandate, which specifies eight items, as the most feasible alternative. Stakeholders did suggest other changes to improve the mandate, such as clarifying the responsibilities for property managers and tenants. Some of the specific comments received from stakeholders include:

- *It is easier if the commercial sector knows the specific items it must recycle.*
- *Require a recycling plan from every business as part of acquiring a business license.*
- *Expand the mandates to require each commercial establishment to have recycling containers inside its property.*
- *It is important to get landlords on board with the law so they can share information with their tenants.*
- *There may be value in giving small businesses the flexibility to decide what they want to recycle.*
- *Recycling goals for the commercial sector should vary depending on the type of business.*

ENFORCEMENT PROGRAMS

Most stakeholders believe that enforcement is an effective and necessary tool to increase commercial recycling in the County. Opinions vary, however, on where enforcement would be most feasible.

Random business inspections. Some stakeholders feel that this is the most feasible option, because enforcement is most effective against the source. On the other hand, some feel that enforcing against more than 30,000 businesses is not feasible without an increase in staffing. Another concern is whether random business inspections can be done in a fair and consistent manner.

Hauler load inspections. Certain stakeholders feel that hauler load inspections are the most feasible enforcement mechanism because they occur at a central location (transfer station). Haulers supported these inspections, as long as County inspectors subsequently enforced against the business and not the hauler. The haulers stated they do not know what is in a trash dumpster and cannot feasibly have drivers get out and check at every location. They also said they should not be held responsible for what a business puts in its trash. Also, some stated that it would be virtually impossible to determine what trash came from what location so haulers would have to distribute fines across entire routes.

There was consensus that if fines are used, regardless of where enforcement occurs, they need to be large enough to create behavior change. Also, there was consensus that enforcement makes sense only after there has been a vigorous education and outreach effort. Specific comments include:

- *The County needs to enforce against the source to be effective.*
- *Property managers should enforce against janitorial/cleaning crews.*
- *The transfer station is the only reasonable place to enforce.*
- *Fines are a huge incentive to comply.*
- *Businesses and property managers will switch trash haulers if haulers fine them.*
- *Fines have to hurt.*
- *Haulers do not know what is in the trash dumpster.*
- *The County should enforce against the businesses; it would be more consistent.*
- *Haulers cannot be trash police.*
- *The County should allow for voluntary compliance, but provide a short deadline.*
- *A committee should be convened to decide how best to enforce.*
- *Publishing a list of businesses not in compliance with the recycling mandate would be an effective tool, especially if it reaches a wide audience.*
- *Enforcing at the transfer station would provide a bigger bang for the buck.*
- *Enforcement is best at the source because it can combine enforcement action with education to correct the problem.*
- *Enforcing on businesses would probably require an additional 3 or 4 staff.*
- *Enforcement would hurt the County's reputation with the business community.*

HAULER LICENSING REQUIREMENTS

Hauler licensing requirements were viewed as a feasible strategy, although some aspects more so than others. Stakeholders generally thought it would be feasible for haulers to inform businesses of recycling requirements, distribute educational materials, and help develop recycling plans. Haulers generally expressed a willingness to participate. Some stakeholders were less enthusiastic about this strategy. They thought it would only increase costs and questioned whether the haulers would provide accurate information. Stakeholders did not find it feasible for haulers to be required to create new markets or meet specific diversion goals. Some specific comments include:

- *Its important to ensure that all waste and recycling haulers play by the same rules.*
- *Haulers could be required to distribute blank recycling plans if soliciting business.*
- *Business recycling plans should be responsibility of the business with consultation and support from the hauler.*
- *Hauler licensing gives the County a good outlet to enforce against haulers.*
- *The County should require haulers to inform businesses of the County recycling program and distribute information packets from the County regarding recycling.*
- *License requirements on haulers would require additional County staff to make sure regulations are followed.*

DISPOSAL BANS

Many of the stakeholders felt that a disposal ban can be an effective option for reducing certain types of materials from the waste stream. Yard waste, tires, and hazardous waste were cited as examples of effective disposal bans. Three items identified as most feasible for a disposal ban were corrugated cardboard, mixed paper, and construction and demolition materials. Most stakeholders agreed there should not be a disposal ban on commingled materials (cans, bottles) because the market for those materials is poor.

Corrugated Cardboard. Feasibility of enforcement was the principal issue stakeholders identified concerning a ban on corrugated cardboard. Stakeholders raised concerns that enforcement at the transfer station could place an unfair burden on waste haulers and, if the County fined the haulers, it would be difficult for haulers to know what specific business or businesses to charge the fine to. Another concern was that a disposal ban would increase the amount of contaminated corrugated cardboard delivered to processors. Others felt that the extra useable corrugated cardboard the processors received would outweigh any increase in contaminated cardboard.

Most stakeholders commented that corrugated cardboard is a good candidate for a disposal ban because there is a strong market and it has become a common material for businesses to recycle. Many stakeholders observed that a transition period with significant education and outreach would be required before the ban was instituted and enforced.

Mixed Paper. Most stakeholders who thought a disposal ban on corrugated cardboard would be an effective strategy also felt the ban could be extended to mixed paper. Many agreed that this strategy could be feasible because most processors accept corrugated cardboard and mixed paper in a single container. Therefore, businesses with corrugated cardboard containers could recycle mixed paper without needing an additional container or pick-up. The same enforcement issues arose as with corrugated cardboard.

Construction and Demolition (C&D) Materials. Most stakeholders agreed that a ban on the disposal of C&D material at the transfer station would be an effective way to reduce the amount of C&D material in the County's waste stream; however, they felt that an immediate C&D ban would be unreasonable because the region currently lacks private or public locations that will take this material.

Some specific comments on disposal bans overall include:

- *Cardboard and mixed paper are probably the best targets of opportunity in a service based County.*
- *Education would be needed to inform businesses that they can put mixed paper into their cardboard receptacles.*
- *To make a cardboard/paper ban effective, it must be enforced at the source.*
- *Bans or similar measures have led to the creation of markets in the past.*
- *A cardboard ban could create storage problems, especially for small businesses.*
- *It would be impossible to track disposed cardboard back to generators.*
- *Banning cardboard is an excellent idea because it is a huge part of the waste stream.*
- *The County would need to address contamination issues and develop a list of exemptions based on an allowable percentage and/or type of material.*
- *A cardboard disposal ban would have a tough transition, but it would work eventually. The County should refer to its experience with the yard waste ban.*
- *A cardboard disposal ban would be a nightmare for haulers.*
- *The benefit of diverting more cardboard overshadows the extra contamination issues.*
- *A ban on C&D at the transfer station could be a short-term solution to address incinerator capacity issues.*

REDUCED FEES OR TAX INCENTIVES

Virtually all of the stakeholders supported the idea of lower system benefit charges as a reward for developing an effective recycling program. Concerns were expressed about its administrative feasibility, including whether a certified waste audit would be required for each business or the problems that might be associated with using self-reported figures. Another concern was that it may only provide an incentive to stay at the same level, not improve. Some specific comments include:

- *A reduced systems benefit charge would serve as good incentive for property owners.*
- *Those who generate more should pay more.*
- *It would work great, but it would probably require a certified audit.*
- *The County should consider lower tipping fees for haulers that recycle.*

COMMERCIAL HAULER FRANCHISES

Most stakeholders questioned whether commercial hauler franchises would have any impact on increasing recycling. A few stakeholders acknowledged that commercial hauler franchises would bring total convenience for the businesses and give the County more control.

Some stakeholders expressed concern about waste haulers being able to stay in business with commercial franchises. Others expressed concern about removing waste disposal choices from businesses. Some specific comments include:

- *Franchises would take business away from waste haulers.*
- *You cannot create a commercial franchise for recycling because recyclables are commodities, not solid waste, it is federal law.*
- *Franchises would have to be non-exclusive so as to not take away market share.*
- *Hold the commercial franchise option in abeyance in case other options and/or strategies do not work.*

PROGRAMS FOR SPECIFIC RECYCLABLES

The two programs for specific recyclables that were discussed most often were organics composting and a construction and demolition (C&D) diversion deposit program (see page 48 for a description of a C&D diversion deposit program). The consensus among stakeholders about organics composting was that it is an intriguing concept; however, there is no current infrastructure and resident disapproval of increasing the capacity at Dickerson or siting a new facility would make operation in this region difficult. The C&D diversion deposit program was supported by many of the stakeholders, but they generally thought it would not be feasible because of the current lack of C&D recycling facilities in the region. Some specific comments include:

- *A C&D deposit program would increase costs and space issues would be a problem.*
- *Primary source separation for C&D is most practicable.*
- *There cannot be a diversion deposit program unless there is a place to take the material. Source reduction may be a better idea.*
- *A diversion deposit program would be a paperwork nightmare.*
- *C&D recycling is in its infancy in the County. It would be great for the County to open a facility.*

CHAPTER VIII: Findings

In FY 03, Montgomery County generated approximately 1.2 million tons of garbage or an average of 1.3 tons for every resident. The County's solid waste/recycling facilities and programs:

- Incinerated 625,711 tons of municipal solid waste, generating electric power for 40,000 homes;
- Composted 187,000 tons of leaves, grass, and brush at County facilities or through backyard composting;
- Recycled 138,000 tons of mixed paper and corrugated cardboard; and
- Recycled 114,000 tons of miscellaneous metal, ferrous from ash, glass, tires, wood, aluminum, plastics, and bi-metal containers.

The County also disposed of 218,000 tons of ash and non-processible material from the incinerator in a landfill in Brunswick, VA. This reflects progress compared to ten years ago when the County buried approximately 500,000 tons of municipal solid waste at the Oaks Landfill. Landfilling 18% of the County's waste in 2003 contrasts sharply with practices across the country. Nationally, in 2002, 65.6% of municipal solid waste (242 million tons) was disposed of in a landfill in 2002.[1]

The County's commitment to environmental stewardship took a step forward in 1992 when public officials ambitiously promised to achieve an overall recycling rate of 50% by 2000. In the intervening years, the County (and 19 incorporated municipalities) invested in recycling facilities and initiated programs, focused largely on residential collection services. In 2001, the Council amended the recycling goal to 45% by the end of 2002 and 50% by the end of 2004.

In FY 03, the Department of Public Works and Transportation's Division of Solid Waste Services (DSWS) reported the County's overall recycling rate at 37%, with a residential rate of 51%, a commercial rate of 30%, and a multi-family rate of 12%.

Last summer, concerned that the County would not achieve its revised goal of 50% by the end of 2004 and that the commercial sector recycling rate had not changed significantly in five years, the Council requested an examination of County efforts to increase recycling in the commercial sector.

In December, the Transportation and Environment Committee approved a project scope that asked the Office of Legislative Oversight (OLO) to research strategies used elsewhere to encourage commercial recycling and conduct a preliminary assessment of the feasibility of these strategies in Montgomery County. This chapter summarizes the findings from OLO's research, including interviews with Montgomery County businesses, property managers, haulers, processors, and other stakeholders.

[1] *Biocycle Magazine* and the Earth Institute at Columbia University produce *The State of Garbage in America*, http://www.seas.columbia.edu/earth/SOGJan2004.pdf

MONTGOMERY COUNTY FINDINGS

FINDING #1. State law authorizes the Montgomery County Council to regulate and control the management of solid waste in the County.

The policy and governance framework for the County's solid waste system is established in the Comprehensive Solid Waste Management Plan, various County Council resolutions, the Montgomery County Code, and several Executive Regulations.[2]

- The Solid Waste Plan establishes overall solid waste policies and provides a blueprint for subsequent budget, program, service and facility decisions. State law requires each County to review its solid waste management plan at least every three years. This summer, the County Council will conduct public hearings and adopt a new solid waste plan. The draft plan, which DSWS expects to forward to the Council in May, will address the adequacy of the County's solid waste system through 2015.

- The Montgomery County Council has amended the Solid Waste Plan frequently through the adoption of numerous Council Resolutions. Two key resolutions, Resolutions 12-944 and 12-945, adopted in 1992, purposefully limited the size and operation of the Resource Recovery Facility to encourage waste reduction and recycling, and established a County recycling goal of 50% by the year 2000.

- Chapter 48 of the Montgomery County Code addresses solid waste management, including the licensing, permitting, collection, transportation and disposal of solid waste.

- Executive Regulations establish the administrative details of the County's recycling program, including the requirements for hauler waste permits, the system benefit charge, the mandatory recycling program, and the leaf vacuuming program.

FINDING #2. The private sector provides refuse and recycling collection services to Montgomery County's commercial, multi-family, and residential sectors. Nineteen municipalities have responsibility for residential collection services within their boundaries.

All business, industrial, and institutional properties and multi-family residences with seven or more units either negotiate refuse and recycling contracts with private companies or self-haul their refuse and recyclables to the County's transfer station. These services are provided in an open, competitive market environment.

[2] Several federal and state laws also govern the disposal of solid waste within the County. These are described in detail in the Comprehensive Solid Waste Management Plan.

The County divides the unincorporated residential area into two solid waste collection subdistricts with different levels of service. In Subdistrict A, the County contracts with private collectors to provide refuse and recycling collection services.

In Subdistrict B, the County contracts with private collectors to provide recycling collection services similar to those provided in Subdistrict A. Refuse collection services in Subdistrict B, however, are provided by private collectors licensed with the County who contract directly with customers for collection services.

The 19 municipalities use various arrangements to provide collection services to the households in the incorporated areas of the County. As of March 2004, there were 232 solid waste haulers (including municipalities) licensed to serve single family, multi-family, and commercial establishments in the County.

FINDING #3. Montgomery County owns and operates several facilities to manage the acceptance, disposal, and processing of its refuse and recyclables.

Montgomery County's public facilities are:

- The ***Solid Waste Transfer Station*** located at Shady Grove Road. The Transfer Station accepts refuse, yard waste, brush and branches, household appliances, computers and electronics, batteries, clothing and textiles, used motor oil and antifreeze, reusable building material, concrete and aggregate and scrap metal[3].

- The ***Resource Recovery Facility (RRF)*** located in Dickerson. Under a permit from the State, the RRF can burn up to 657,000 tons of solid waste per year.

- The ***Materials Recovery Facility (MRF)*** located adjacent to the Transfer Station. The MRF accepts commingled containers and mixed paper. The County contracts the operation of the MRF to Maryland Environmental Services (MES). The County has a 15-year contract with Office Paper Systems (OPS) to process mixed paper collected at the MRF from the County's *residential* recycling district. Under the terms of the contract, mixed paper from the commercial sector *cannot* be delivered to the MRF.

- A ***Yard Trim Composting Facility*** located in Dickerson. The composting facility composts leaves and grass for commercial bulk and bag markets. The County contracts the operation of the composting facility to Maryland Environmental Services (MES).

In addition to these facilities, the County currently contracts with an out-of-County landfill located in Brunswick, VA to dispose of non-processible waste and ash from the

[3] Some of the materials accepted are limited to the residential sector.

RRF. The County's agreement also allows for the disposal of bypass waste[4] from the Transfer Station. The current contract lasts until at least 2012.

FINDING #4. In addition, several privately owned facilities operate under state licensing and County zoning regulations to recycle and process different types of recyclables.

In addition to the publicly-owned facilities listed above, the Solid Waste Plan identifies four private recycling facilities that operate in Montgomery County. These include:

- Three facilities that process paper, Georgetown Paper Stock, Office Paper Systems, and Southeast Recycling; and
- One facility that processes scrap metal, Montgomery Scrap.

In December 2004, Environmental Alternatives Reclamation is scheduled to open a construction and demolition debris recycling facility in Clarksburg. Businesses rely on out-of-County facilities to process other recyclables.

FINDING #5. The County's solid waste management system operates as an enterprise fund and the Council annually sets charges for solid waste services to cover the system's projected expenses.

The system is primarily supported through five service charges and/or fees paid by those who benefit from the system. These include:

- Disposal fees;
- A base system benefit charge;
- An incremental system benefit charge;
- A refuse collection charge; and
- A leaf vacuuming charge.

The County collects the disposal fee at the transfer station and collects other charges through the property tax bill. Because residents, businesses, and institutions throughout the County receive their services through different arrangements, not all of the charges are billed to all of the sectors.

[4] The 1998 Solid Waste Plan defines "bypass waste" as "waste that is not processed at the Resource Recovery Facility because of physical or contractual constraints as further defined in the Service Agreement between the Northeast Maryland Waste Disposal Authority and Ogden Martin Systems of Montgomery, Inc."

FINDING #6. In 1994, the County established mandatory recycling requirements for the residential, multi-family, and commercial sectors in the County.

Executive Regulation 109-92, Residential and Commercial Recycling, requires all County residents and businesses to recycle corrugated cardboard, white office paper, newspaper, aluminum cans and foil products, steel/tin cans, glass and plastic containers, and yard trim.

Businesses (or property owners) with 100 or more employees must prepare a recycling plan and file an annual report that itemizes the types and amounts of the eight materials recycled plus the amount of waste disposed of annually. Businesses (or property owners) with fewer than 100 employees must file an annual report if the Division of Solid Waste Services (DSWS) requests one. All property owners must provide recycling collection service and storage space for recyclable solid wastes for their tenants. The County can impose fines on businesses or property owners who do not comply with the regulations.

DSWS reports that Executive Regulation 109-92 is currently under revision and will be released for public comment this summer.

FINDING #7. In FY 04, the Council appropriated $963,000 for the Division of Solid Waste Services' Commercial Recycling Program.

The Recycling Section in the Department of Public Works and Transportation's Division of Solid Waste Services provides outreach and education for residential recycling, provides education and technical assistance for multi-family and commercial properties, and supports recycling volunteers.

In FY 04, the Council appropriated $963,000 for the Commercial Recycling Program. Of this amount, approximately $423,000 pays for five full-time program specialists, a program manager position and other activities. Another $540,000 pays for the program's outreach and education activities.

FINDING #8. The Division of Solid Waste Services provides an array of public education, outreach, and technical assistance activities to support commercial sector recycling. DSWS also reports that it encourages partnerships and coordination among businesses.

Through the Smart Organizations Reduce and Recycle Tons (SORRT) Program, DSWS provides outreach, educational materials, and technical assistance to help the commercial sector develop, maintain, and expand recycling and waste reduction programs. DSWS conducts site visits and develops and distributes educational materials. DSWS conducted approximately 9,300 site visits in FY 03.

DSWS also administers an awards program to recognize successful recycling programs. In 2003, DSWS selected 30 businesses and institutions to receive the Excellence in Recycling Award and 20 individuals and businesses/institutions to receive the Outstanding Achievement Award. DSWS provides technical support, training, outreach, and educational materials for County Government departments, and monitors MCPS' compliance with Executive Regulation 109-92.

DSWS also works with businesses to develop business partnerships and model programs:

- The Partners in Recycling Program uses organizations with successful recycling programs to provide first hand experience and guidance to others.

- The Demonstration Recycler Program sets up model recycling programs. The program worked with five businesses in the nineties, three businesses in 2001, and one business in 2003.

DSWS sets up cooperative recycling programs for businesses near each other in a central business district. In 2003, DSWS worked with five businesses in downtown Silver Spring to determine the feasibility of the businesses sharing the cost of a common recycling collection contract. DSWS found that the businesses could save money if they collectively contracted for waste and recycling services, and recommended that the five businesses negotiate a cooperative mixed paper recycling program. DSWS estimates that it has coordinated these agreements for 50 to 100 businesses.

FINDING #9. Since 2001, the Division of Solid Waste Services initiated two separate efforts with businesses to identify strategies to improve commercial recycling.

- ***In January 2003, a Recycling Task Force of business leaders presented interim recommendations to the County Executive to improve recycling performance.*** This task force, which began in 2001, recommended further consideration of incentives for a business that recycles more than 50% of its waste; franchise collection services; the availability of "accurate" measurements for recycling and solid waste generation; resale markets for some recyclable materials; and the effect of turnover in the business sector on recycling.

- ***In February 2003, DSWS held a series of five focus groups with 36 businesses to assess obstacles to recycling and identify helpful strategies.*** The participants in the focus groups were familiar with the County's recycling requirements, had implemented a program, and filed annual recycling reports. The obstacles they identified included non-compliance of employees, cleaning staff, and haulers; cost and space constraints – especially for small businesses and multi-tenant facilities; limited time; and questions about what to recycle.

The recommended strategies included developing tax or monetary incentives, incorporating recycling criteria into janitorial services contracts, requiring education for janitorial services staff; and conducting personal site visits to individual businesses to help them develop and implement a recycling plan.

FINDING #10. The use of enforcement to encourage compliance with the County's recycling requirements has been limited.

As noted in Finding #6, Executive Regulation 109-92 allows the County to impose fines on businesses or property owners who do not come into compliance with the mandatory recycling regulations.

DSWS issued 21 notices of violation in 2002 and 29 notices in 2003 for failing to recycle and/or submit the required annual report. DSWS reports that all the organizations that received a notice of violation cooperated with DSWS to come into compliance; and, as a result, no citations were issued.

FINDING #11. An analysis of Montgomery County's waste composition and recycling data shows that the County needs to recycle an additional 153,000 tons to achieve a 50% recycling rate.

OLO analyzed Montgomery County's waste composition based on a 1999 DSWS waste composition study and FY 03 tonnage data. In May 2004, DSWS will begin a new solid waste composition study that is scheduled to be completed in May 2005. Based on the County's current waste generation of 1.2 million tons and current recycling rate of 37.1%, the County needs to recycle an additional 153,000 tons to achieve a 50% recycling rate.

Additionally, estimated FY 03 recycling rates indicate that County businesses and residents are successfully recycling 439,000 tons, including over 90% of leaves and grass and just under 90% of all tires disposed of in the County's waste stream. Of the other materials the County generates, the County currently recycles:

- 63% of all metal, including hangers, household appliances, screws, and tire steel;
- 50% of all aluminum cans and tinfoil;
- 46% of all corrugated cardboard;
- 43% of all glass;
- 41% of all bi-metal containers;
- 39% of all mixed paper; and
- 33% of all plastics.

FINDING #12. Mixed paper, food waste, and corrugated cardboard are the highest remaining recycling "targets of opportunity" in Montgomery County's waste stream. Currently, markets exist for mixed paper and corrugated cardboard.

OLO analyzed the waste composition and tonnage data to estimate what recyclable materials remain in Montgomery County's waste stream. However, whether a material can be cost-effectively recycled also depends on the availability of a processing market.

- Mixed paper and cardboard are the recyclable materials most prevalent in the waste stream that have an established market for collection and resale in the County. Mixed paper makes up 25% of the residential and multi-family waste stream and 14% of the commercial waste stream. Cardboard makes up 10% of the commercial waste stream and approximately 5% of the residential and multi-family waste streams.

- Food waste makes up a relatively large share of the recyclables left in the waste stream but cannot be recycled due to the lack of a processing market. Food waste makes up 18% of the residential waste stream, 19% of the multi-family waste stream, and 12% of the commercial waste stream.

FINDING #13. To reach an overall recycling goal of 50% with mixed paper and corrugated cardboard alone, the County would need to recycle 90% of the corrugated cardboard and mixed paper left in the waste stream for all three sectors. Achieving an overall recycling rate of 50% could extend the life of the RRF as the County's sole disposal facility for at least 10 years.

OLO examined how much the capture rate of mixed paper and corrugated cardboard would have to increase to meet the County's 50% recycling goal. The results of the analysis show:

- The County would have to capture 90% of the corrugated cardboard and mixed paper currently left in the waste stream in all three sectors to meet its overall 50% recycling goal.

- Recycling 90% of only the remaining corrugated cardboard in all three sectors would increase the County's overall recycling rate to 41%.

- Recycling 90% of only the remaining mixed paper in all three sectors would increase the County's overall recycling rate to 47%.

Additionally, given the RRF's permitted capacity and estimated future waste generation rates, achieving a 50% or greater recycling rate could extend the life of the RRF as the County's sole disposal facility for at least 10 years.

COMMERCIAL RECYCLING STRATEGIES

FINDING #14. A study of 15 communities with successful commercial recycling programs identified four key factors that contribute to a program's success: reliable commodity markets, education and technical assistance, enforcement, and using a cooperative approach to build support and influence participation.

In April 2002, METRO, a regional planning and governmental agency for the Portland, Oregon metropolitan area, published a report, *Required Recycling and Incentive Program Survey Summary of Findings*. This study profiled 15 communities with mandatory or incentive recycling programs that targeted the commercial or construction and demolition waste stream, and identified factors that contribute to a successful program. In part, the study found:

- ***Strong commodity markets ultimately determine what is recyclable and influence participation.*** Program managers stressed that it is not practical to mandate materials unless the markets exist for the materials, and to only include recyclables with developed and stable markets to prevent having to change policies in the future. Identifying outlets for collected material is an important component in the planning process. A number of programs require the recycling of materials for which the cost of recycling is less than or equal to the costs of proper disposal at a solid waste facility.

- ***Education and technical assistance are key factors to the implementation of mandatory recycling requirements.*** Education and technical assistance provide incentives to participate, ensure that materials are separated properly and encourage public acceptance and willingness to participate. A strong education and technical assistance program will most likely require increased staff, budget and constant reinforcement.

- ***Enforcement is a key component of mandatory recycling requirements and disposal bans.*** The most common enforcement measures used in the profiled programs include random business inspections and landfill load inspections. Penalties for noncompliance include warnings and fines that range from $25 to $10,000. The majority of the programs offers an assistance period to help businesses meet the requirements.

- ***Using a cooperative approach to required recycling can build program support and influence participation.*** Program managers emphasized the importance of working with businesses, haulers and other stakeholder groups to develop the most attractive program.

FINDING #15. OLO's review of recycling programs across the country shows that there is no single strategy that works. Instead, many strategies exist and each recycling program is unique.

The strategies used by successful programs include education and technical assistance, recycling mandates, disposal bans, enforcement programs, hauler licensing requirements, franchises, small business collection programs, and tax and fee incentives.

A review of the research and programs across the country shows there are no "off the shelf" recycling programs. Programs are characterized by their diversity and the strategies a jurisdiction chooses are data driven, customized, and unique. Each program is unique to its community and reflects the economics and infrastructure of the region.

FINDING #16. Limited empirical data exist about the effectiveness of individual strategies to improve commercial recycling. The research that does exist shows the effectiveness varies by strategy.

In some cases, recycling programs focus primarily on residential curbside collection services, with little or no emphasis on commercial recycling. In other cases, recycling programs are an integrated collection of residential and commercial strategies and it is difficult to attribute overall program success to one particular sector. Finally, it is difficult to develop comparable recycling data when each jurisdiction sets its own definitions and rules for calculating recycling rates. Research about the effectiveness of each strategy is summarized below.

- ***Education and outreach.*** The research consistently identifies education and outreach as a key component, whether a program is staffed publicly or privately. An effective outreach program consists of media campaigns, slogans, logos, instructional brochures, award programs, and workshops. Additionally, effective programs must be comprehensive and sustained.

- ***Technical assistance.*** The research finds technical assistance helps jurisdictions increase recycling and/or waste diversion rates, helps businesses identify what materials are in its waste stream, and helps businesses increase the cost effectiveness of recycling.

- ***Ordinances.*** The research reports jurisdictions use ordinances to establish mandatory recycling requirements and that there appears to be a growing trend towards mandatory programs. The research suggests that more effective programs mandate a greater number of items for recycling and achieve higher diversion rates. The research also recommends that the mandated list of recyclables be tailored to the economics and infrastructure of the region because it is not practical to mandate recycling unless a strong, stable commodity market exists for the recyclable materials.

- ***Disposal bans.*** The research indicates that a disposal ban can successfully increase diversion, especially if a market for the recyclable good already exists. Disposal bans can also help to create markets, as occurred after tires and yard waste were banned from landfills and incinerators. The implementation of a ban requires extensive promotion and participation with affected parties. Managers must address enforcement and the potential for illegal dumping in particular.

- ***Enforcement.*** The research identifies enforcement as a key component of mandatory recycling programs and disposal bans. However, no data exist that specifically tie increased enforcement to increased business recycling.

- ***Hauler Licensing Requirements.*** No data exist that directly relate hauler licensing requirements to increased recycling rates. However, many jurisdictions with hauler licensing requirements have successful programs, such as Portland which has a 59% recycling rate.

- ***Collection Systems.*** Open market systems are most prevalent and tend to lead to the lowest prices; however, wide price variation exists for similar levels of service. Local governments establish commercial franchises for several reasons, i.e., to increase control of the waste stream, increase revenues, address business concerns about service availability and prices, and/or increase overall recycling rates. The research evidence about whether an open or closed market system produces higher recycling rates is inconclusive.

- ***Small Business Programs.*** The goal of small business collection programs is to increase the convenience and cost effectiveness of recycling. Although data on how much these programs increase the recycling rate are not available, several jurisdictions use them.

- ***Fee Incentives.*** The research states that many communities with effective commercial programs use multiple incentives to reward recycling over disposal. The research suggests that the effectiveness of fee-based strategies depends on the availability of markets for recyclables; the ability of a jurisdiction to control collection and disposal costs; and a business's awareness of its refuse and recycling costs plus awareness of how these costs can be reduced.

- ***System Benefit Charge Incentives.*** The research indicates that one jurisdiction that periodically adjusts its system benefit charge to reward increased recycling found waste generation dropped 18% over five years. A drawback of this specific system is that a business that establishes an aggressive recycling program cannot individually achieve savings on disposal costs unless other businesses in its group also recycle. Categories of businesses must work together to implement recycling if they want to reduce their disposal assessments.

FEASIBILITY OF STRATEGIES IN MONTGOMERY COUNTY

FINDING #17. Commercial recycling stakeholders interviewed by OLO identified several general themes and observations about the feasibility of the recycling strategies below.

To assess the feasibility in Montgomery County of the commercial recycling strategies, OLO met with over 35 individual stakeholders as well as the Montgomery County, Greater Silver Spring, and Bethesda-Chevy Chase Chambers of Commerce. In these meetings, OLO reviewed the strategies summarized in Finding #15 and solicited stakeholders' observations and insights.[5]

The observations and comments of the stakeholders varied widely, often depending upon where they were positioned in the waste disposal and recycling process. However, several general themes and observations emerged, which are listed below and discussed in greater detail in Chapter VII:

- Convenience matters;
- The costs of recycling are variable;
- Large businesses can recycle more easily than small businesses;
- Commercial recycling is about creating culture and champions;
- Small businesses require incentives or support;
- Recycling in the private system breaks down, in part, because the roles and responsibilities are not clearly defined;
- Stakeholders disagree about business awareness of County regulations;
- Education and technical assistance is key;
- Education and enforcement go hand in hand;
- Enforcement is a complicated but necessary part of an effective recycling program; and
- A lack of processing markets exists for construction and demolition materials.

FINDING #18. Stakeholders identified Education and Technical Assistance, Disposal Bans, Enforcement, and Reduced Fees or Tax Incentives as the most feasible strategies to increase commercial recycling in Montgomery County.

After reviewing the strategies, OLO also asked them to rank which strategies would be most feasible and effective. The strategies that received the highest rankings were Education and Technical Assistance, Disposal Bans, Enforcement, and Reduced Fees or Tax Incentives. Table 12 on the next page lists each strategy and indicates whether a majority of stakeholders felt it could be a feasible strategy in Montgomery County. See Chapter VII for a detailed review of the stakeholders' comments.

[5] See page 4 for a list of the stakeholders OLO met with and see Chapter VI for a description of the strategies.

TABLE 12: STAKEHOLDER FEASIBILITY ASSESSMENT OF COMMERCIAL RECYCLING STRATEGIES IN MONTGOMERY COUNTY

Strategy	Feasible in Montgomery County?
Education and Technical Assistance	Yes
Business Recycling Mandates	
General Recycling Mandate	Yes
Targeted Recycling Mandate	No
Enforcement Programs	Yes
Hauler Licensing Requirements	Yes
Disposal Bans	Yes
Reduced Fees or Tax Incentives	Yes
Commercial Hauler Franchises	No
Programs for Specific Recyclables	
Organics Composting	No
Construction and Demolition Diversion Deposit	No

Source: OLO, April 2004.

FINDING #19. Limited data and varied stakeholder observations make it difficult to develop a clear picture of the performance and effectiveness of the County's commercial recycling program activities.

OLO believes that County businesses are willing to recycle and that the Division of Solid Waste Services (DSWS) has worked hard to encourage commercial recycling, however, an unclear picture exists about:

- Who is and is not recycling;
- Where the service gaps are; and
- Who is best positioned to fix them.

Stakeholders expressed conflicting opinions about the business community's awareness of the County's recycling requirements. Some believed that businesses generally know about the requirements, others reported the awareness of the County's regulations is very uneven, and still others thought most businesses do not know about the regulations.

OLO also heard mixed views about the County's current outreach and education efforts. People who were aware of the County's efforts reported that the County has an impressive collection of videos, brochures and other materials; however, most were not familiar with the County's materials. Small and medium-sized businesses tend to perceive a larger communication gap than large businesses.

FINDING #20. The stakeholders viewed expanding and formalizing partnerships with business organizations as a necessary strategy to increase commercial recycling.

To reach 34,500 businesses with its education, outreach, and technical assistance, many suggested the County could easily partner with organizations such as the local chambers of commerce, property managers, industry and trade associations, merchant associations, and public/private County agencies such as the Bethesda Urban Partnership. A perception was that the County focuses most of its efforts on those businesses that are already recycling, instead of making efforts to find and help those businesses who are not recycling.

Businesses across the board expressed a willingness to help out and requested that the County ask the business community to participate in an outreach effort, particularly before it moves ahead with any enforcement efforts. Stakeholders stated it makes sense to use these organizations because they already exist, they include all sizes and types of businesses, and their mission is to reach out to businesses.

CHAPTER IX: Recommendations

Montgomery County has a longstanding tradition of progressive, visionary government and nowhere has this been more evident than in solid waste management issues. In 1992, the County embarked on an ambitious effort to replace the County's reliance on landfills and disposal with recycling, source reduction, and a culture of environmental stewardship. To make this vision a reality, the County set an ambitious 50% recycling goal and sized the capacity of the Resource Recovery Facility (RRF) to match.

Today, the RRF is operating at full capacity, the recycling rate is 37%, and the County must determine what mid-course corrections are needed to manage its solid waste and sustain its commitment to environmental stewardship. In the public discussion so far, the County Executive has proposed funding for additional residential toters and enforcement staff; and the Council President has proposed a disposal ban on corrugated cardboard and funding full rollout of the residential toters.

To improve the County's commercial recycling, OLO recommends that the Council pursue the following priority tasks.

RECOMMENDATION #1. Adopt a resolution to amend the Solid Waste Plan to ban the disposal of mixed paper and corrugated cardboard at the Transfer Station.

Montgomery County's waste composition data indicate that mixed paper and corrugated cardboard are the most prevalent recyclable goods in the waste stream with an established local market for collection and resale. The research shows that many jurisdictions with successful recycling programs use disposal bans, and the results of OLO's interviews indicate that County stakeholders consider a disposal ban to be a feasible strategy.

A fully phased-in disposal ban on corrugated cardboard and mixed paper would significantly improve the County's current overall recycling rate of 37%. Research about the effectiveness of disposal bans elsewhere suggests they can divert 75% to 85% of those materials in the waste stream. The County's own disposal ban on yard waste captures 91% of the leaves, grass and brush in the waste stream; the disposal ban on tires captures 89%.

Applying data from the County's 1999 waste composition study to 2003 disposal tonnages, OLO estimates there are 197,000 tons of mixed paper and corrugated cardboard in the waste stream; approximately 99,000 tons are in the commercial sector, 71,000 tons are in the residential sector, and 27,000 tons are in the multi-family sector.

- If a disposal ban were to capture 85% of the corrugated cardboard and mixed paper in the *residential* and *commercial* sectors, the County would recycle an additional 124,500 tons and achieve an overall recycling rate of 47.6%.

- If a disposal ban were to capture 85% of the corrugated cardboard and mixed paper across all three sectors, the County would recycle an additional 147,000 tons and achieve an overall recycling rate of 49.4%.

OLO recommends that the Council request the Chief Administrative Officer to forward, by September 1, 2004, a work plan and schedule for implementing a disposal ban, including a proposed date for the disposal ban to take effect. OLO recommends that the implementation of the disposal ban consist of the following three tasks:

Task A – Preparation and Start-Up Phase. A preparation and start-up phase (lasting a minimum of six months) that establishes the support system for a disposal ban to work effectively. Specifically, this phase should include:

- Full rollout of the residential wheeled toters to households in the County's recycling district;

- Coordination of recycling initiatives with municipal collection districts and multi-family properties, including encouraging municipalities to purchase wheeled toters;

- Development and testing of options for a small business incentive/collection program to provide mixed paper and corrugated cardboard collection service to small businesses. Possible collection options to review could include the extension of residential routes, the use of conveniently located drop off centers, or small business cooperatives. (Note: If the extension of residential routes becomes a viable option, the County may have to renegotiate its current contract with OPS.);

- A public education and outreach campaign to publicize the ban, the milestone dates, and the steps residents and businesses will need to take to comply; and

- Completion of the 2004 waste composition study to serve as a baseline for future initiatives.

Task B – Technical Assistance, Inspection, and Monitoring Phase. A 12-month technical assistance, inspection and monitoring phase that provides for County staff to inspect loads at the transfer station, monitor for contamination levels, conduct follow-up visits to businesses to address noncompliance and exemption issues, and implement targeted small business incentive/collection programs. This phase should include development and implementation of a training and technical assistance program focused by business sector.

Task C – Implementation Review and Progress Report. An implementation review and progress report at the end of the 12-month technical assistance phase that reports the mixed paper/corrugated cardboard recycling rate, based on the results of a waste

composition study. If the results of the waste composition study show a significant amount of corrugated cardboard and mixed paper left in the waste stream, a plan and funding for enforcement will be necessary. If an enforcement plan is needed, it should be developed in consultation with a working group of stakeholders that includes businesses, building owners, property managers, waste haulers, and paper processors.

RECOMMENDATION #2. Encourage the County Executive to invite the Montgomery County Chamber of Commerce, the local Chambers of Commerce, and other interested parties to coordinate a public education and outreach campaign to improve commercial recycling in Montgomery County.

Jurisdictions with successful commercial recycling programs develop collaborative communication networks, effective working partnerships, and integrated data and reporting systems to support, monitor, and manage program activities.

OLO believes that County businesses are willing to recycle and that the Division of Solid Waste Services (DSWS) has worked hard to encourage commercial recycling. However, an unclear picture exists about:

- Who is and is not recycling;
- Where the service gaps are; and
- Who is best positioned to fix them.

The stakeholders interviewed by OLO expressed mixed views about the business community's awareness of the County's recycling requirements and about the County's current outreach and education efforts. Businesses across the board expressed a willingness to help out and requested that the County ask the business community to participate in an outreach effort, particularly before moving ahead with new enforcement efforts.

To develop a more comprehensive public-private partnership, OLO recommends that the Council encourage the County Executive to invite the Montgomery County Chamber of Commerce, the local Chambers of Commerce, and other parties to develop a clearer picture of the current situation and coordinate a public education and outreach campaign to improve commercial recycling in Montgomery County.

RECOMMENDATION #3. Request that the County Executive forward the revised Executive Regulation on recycling to the Council by September 1, 2004.

Executive Regulation 109-92, Executive Regulations for Residential and Commercial Recycling, establishes the recycling requirements for single family and multi-family dwellings and the commercial sector. The Division of Solid Waste Services reports that

Executive Regulation 109-92 is currently under revision and will be published for public comment this summer.

During OLO's interviews with businesses, property owners, haulers, processors and others, stakeholders identified a few issues with the current regulations and offered some helpful suggestions. Several stakeholders noted that when a business occupies a building it does not own, it is not always clear which party is responsible for recycling under Montgomery County's mandates. Others identified a disconnect between a business that is trying to recycle and the janitorial/cleaning service responsible for the separation and disposal of recycling and waste. Finally, both businesses and haulers acknowledged that the numbers in the recycling reports are estimates and extrapolations.

Specific stakeholder suggestions for amending the regulations included: rewording the regulations to take enforcement action against the party responsible for arranging the refuse and recycling contracts; requiring a recycling plan from every business, requiring recycling containers; setting recycling goals by business type; and, structuring fines based on business size.

OLO recommends the revised regulations address the issues and suggestions identified by the stakeholders. When the County Executive forwards the revised regulations, the Council should look for:

- How the regulations clarify the responsibilities for recycling among property managers/landlords, tenants, and janitorial/cleaning companies;
- How the regulations address the requirements for developing recycling plans;
- Whether the regulations provide different requirements based on the size and/or type of businesses;
- Whether the regulations change the requirements for filing reports or the standards for calculating recycling rates; and
- Whether the regulations address infrastructure/container requirements.

RECOMMENDATION #4. Ask the County Executive to plan for future recycling initiatives and consider proposing a new overall recycling goal of 60%, as part of the forthcoming Solid Waste Plan.

Jurisdictions with successful recycling programs use long-range plans to set ambitious goals that inspire strategic thinking and creative problem solving. Many jurisdictions, ranging from Oregon to New Jersey to Canada, that currently recycle 50% or more of their waste are working on programs that will increase the rate to 60% or higher. To reach these goals, jurisdictions are continually developing new and innovative strategies that target various waste streams.

The research identifies several promising strategies that work effectively in other places to increase recycling beyond traditional materials. To be implemented successfully, these strategies require a significant amount of advanced planning. OLO suggests that, as part of the forthcoming Solid Waste Plan, the Council ask County Executive to propose a conceptual plan for each of the following strategies:

- ***Wood and construction and demolition (C&D) waste recycling*** – OLO recommends the Solid Waste Plan consider the feasibility of developing a county recycling facility for C&D material or permitting/assisting similar private sector facilities to locate in the County or the region. With more outlets for C&D material, the County could consider implementing a disposal ban on C&D or a C&D diversion deposit program.

- ***Food/Organic waste composting*** – Organic waste is the largest non-paper material remaining in the waste stream. OLO recommends the Solid Waste Plan consider the feasibility of developing a County facility for organics composting or permitting/assisting private sector facilities to locate in the County or the region.

- ***Expand other recycling markets and encouraging recycling processors to locate in the area*** – OLO recommends the Solid Waste Plan examine attracting recycling processors to the County and/or the region to help sustain or create markets. OLO also recommends the Solid Waste Plan examine changing the County's capital project specifications to require the use of recyclable materials as a way to stimulate the market for recycled goods.

- ***Implementing a disposal ban on commingled containers or consider advocating for a bottle bill at the State level*** – Although stakeholders expressed concern over the market for recyclable commingled containers, other jurisdictions (especially in states with a bottle bill) have higher capture rates and the County has additional processing capacity at the Materials Recovery Facility.

OLO also recommends that the County Council use its review of the forthcoming Solid Waste Plan to consider setting a future overall recycling goal of 60%. The County has been well served by the 50% goal the Council set twelve years ago. To envision and commit to a similarly bold plan would support the development of new recycling strategies and continue the County's tradition of environmental stewardship.

STRATEGIES TO INCREASE COMMERCIAL RECYCLING

OLO REPORT 2004-6

APPENDIX

OFFICE OF THE COUNTY EXECUTIVE
ROCKVILLE, MARYLAND 20850

Douglas M. Duncan
County Executive

MEMORANDUM

008714

April 12, 2004

RECEIVED
MONTGOMERY COUNTY
COUNCIL
2004 APR 12 AM 10:15

TO: Steven Silverman, President
Montgomery County Council

FROM: Douglas M. Duncan, County Executive

SUBJECT: Non-Residential Solid Waste System Benefit Charge Rates

This is to revise my recommended Non-Residential Solid Waste System Benefit Charges for FY05. The changes are necessary under Section 2(C)(3) of Executive Regulation 9-99 which requires that the Department of Public Works and Transportation "must conduct periodic solid waste generation studies at least every five years to determine in which Generator category a particular Land Use falls." Land Use types, as assigned by the State Department of Assessments and Taxation, are used in this way to estimate a property's waste generation rate. Having completed the required study specific to Montgomery County properties, the assignment of Land Uses into each Generator Category must change from that previously published, and this reassignment has an effect on rates as illustrated in the exhibit "FY 2005 Solid Waste Management System Land Use Codes and Generation Classes" (attached).

Although we are not required to publish the land use reassignments until June 1, I felt it important not to transmit the results of that reassignment on FY05 rates to you until we had an opportunity to first inform the most affected property owners and afford them an opportunity for input and to have all questions answered, which we have now done. Specifically, the Director of the Department of Public Works and Transportation invited, by individual letter, all 219 property owners having their property reclassified upward (e.g. into a higher Generator Category) to a special public forum on April 1, 2004. Twenty-eight owners called for information and five owners came to the meeting. All had their questions answered and none took issue with the action.

Please substitute the attached exhibit labeled "RECOMMENDED FY05 TAX BILL CHARGES FOR SOLILD WASTE" for that appearing on page 48-14 in my Recommended FY05 Operating Budget and Public Services Program transmitted March 15, 2005.

Cc: Beverley Swaim-Staley, Director, OMB

Bold indicates land uses that must be re-classed upward to conform to the study results.
Shading indicates those that must be decreased.
All other classifications are unchanged.

FY 2005 Solid Waste Management System
Land Use Codes and Generation Classes

SDAT Land Use Code	Description	Previous Generation Classification	Study Results (lb/sf)	FY05 Generation Classification*	FY05 Rate Base (GFAU)	FY04 Charge $/GFAU	FY05 Charge $/GFAU	% Increase (Decrease)
431	Airports and Flying Fields	Medium-Low	**	Low	1	$ 202.37	$ 72.85	-64.00%
460-464	Automobile Parking Lot	Low	**	Low	2,175	$ 67.46	$ 72.85	7.99%
641	Automobile Repair	Medium	5.17	Medium	510	$ 337.29	$ 364.24	7.99%
611	Bank	Medium-Low	1.87	Low	316	$ 202.37	$ 72.85	-64.00%
692	Cemeteries	Low	1.11	Low	20	$ 67.46	$ 72.85	7.99%
470	Communication (Non-Office)	Medium-Low	**	Low	18	$ 202.37	$ 72.85	-64.00%
740	Community/Homeowner Associations	Low	**	Low	2	$ 67.46	$ 72.85	7.99%
503	Convenience Center (grocery or drug anchor)	Medium	5.93	Medium	3,677	$ 337.29	$ 364.24	7.99%
674	Correctional Institution	Medium-Low	**	Low	32	$ 202.37	$ 72.85	-64.00%
711	Cultural Activities	Medium-Low	2.14	Medium-Low	197	$ 202.37	$ 218.54	7.99%
531	Department Store	Medium	3.52	Medium-Low	1,416	$ 337.29	$ 218.54	-35.21%
581	Eating and Drinking (Non Fast-Food)	High	13.67	High	488	$ 607.12	$ 655.63	7.99%
681-682	Education/Day Care (through Univ.)	Medium-Low	1.40	Low	1,163	$ 202.37	$ 72.85	-64.00%
721	Entertainment Assembly/Theatre	Medium	2.14	Medium-Low	265	$ 337.29	$ 218.54	-35.21%
731	Fairgrounds and Amusement Parks	Medium-Low	2.42	Medium-Low	5	$ 202.37	$ 218.54	7.99%
812-818, 839	**Farms & Forestry**	**Medium-Low**	**5.71**	**Medium**	**297**	**$ 202.37**	**$ 364.24**	**79.99%**
580	Fast Food Restaurant	High	14.42	High	229	$ 607.12	$ 655.63	7.99%
553	Gasoline Service Station	High	15.78	High	279	$ 607.12	$ 655.63	7.99%
671-673	Government (General, Police and Fire, Postal)	Medium-Low	1.68	Low	1,519	$ 202.37	$ 72.85	-64.00%
541	**Grocery or Covenience Store**	**Medium-High**	**11.80**	**High**	**707**	**$ 472.20**	**$ 655.63**	**38.85%**
127	**Hospital**	**Medium-Low**	**4.62**	**Medium**	**541**	**$ 202.37**	**$ 364.24**	**79.99%**
651-653	Medical & Health Services	Medium-Low	1.86	Low	2,436	$ 202.37	$ 72.85	-64.00%
151	Hotel/Motels	Medium	1.38	Low	2,560	$ 337.29	$ 72.85	-78.40%
200-204, 890	Industrial Production & Resource Extraction	Medium	2.87	Medium-Low	1,340	$ 337.29	$ 218.54	-35.21%
521	**Lumber and Building Materials**	**Medium**	**11.99**	**High**	**294**	**$ 337.29**	**$ 655.63**	**94.38%**
675	Military Bases and Reservations	Medium-Low	1.68	Low	1	$ 202.37	$ 72.85	-64.00%
205-207	Mixed Industrial/Commercial R&D	Medium-High	3.32	Medium	1,798	$ 472.20	$ 364.24	-22.86%
604-605	Mixed Office & Retail	Medium-High	**	Medium	1,709	$ 472.20	$ 364.24	-22.86%
551	**Motor Vehicles - Retail**	**Medium-Low**	**4.54**	**Medium**	**1,050**	**$ 202.37**	**$ 364.24**	**79.99%**
559	**Other Automotive - Retail Trade**	**Medium-Low**	**5.11**	**Medium**	**293**	**$ 202.37**	**$ 364.24**	**79.99%**
126	Nursing Home	Medium-Low	2.81	Medium-Low	1,515	$ 202.37	$ 218.54	7.99%
600-603	Office	Medium-Low	1.82	Low	31,420	$ 202.37	$ 72.85	-64.00%
739	Other Amusements/Mini. Golf/Driving Range	Medium-Low	1.80	Low	14	$ 202.37	$ 72.85	-64.00%
790	Other Cultural, Entertainment, and Recreation	Medium-Low	2.14	Medium-Low	52	$ 202.37	$ 218.54	7.99%
761	**Parks**	**Low**	**2.42**	**Medium-Low**	**5**	**$ 67.46**	**$ 218.54**	**223.96%**
742	Playgrounds and Athletic Areas	Low	1.80	Low	140	$ 67.46	$ 72.85	7.99%
723	Public Assembly/Auditorium	Medium-Low	2.14	Medium-Low	23	$ 202.37	$ 218.54	7.99%
691	Religious Activities	Low	1.33	Low	2,858	$ 202.37	$ 218.54	7.99%
599	Retail Trade and Services	Medium	3.52	Medium-Low	4,392	$ 337.29	$ 218.54	-35.21%
124	Retirement Home and Orphanage	Medium-Low	2.81	Medium-Low	1,233	$ 202.37	$ 218.54	7.99%
121, 123, 125	Rooming House, Lodge, Dorm., Res. Hall	Medium	1.38	Low	110	$ 337.29	$ 72.85	-78.40%
501, 502, 504	Shopping Centers	Medium-High	0.84	Low	3,986	$ 472.20	$ 72.85	-84.57%
741	Sports Activities, Golf Course	Medium	1.80	Low	434	$ 337.29	$ 72.85	-78.40%
743	Swimming Areas	Medium-Low	1.80	Low	14	$ 202.37	$ 72.85	-64.00%
400	Transit Right-of-Ways	Low	**	Low	4	$ 67.46	$ 72.85	7.99%
990	Undeveloped Land	Low	**	Low	17	$ 67.46	$ 72.85	7.99%
480	Utilities (Non Office)	Low	**	Low	106	$ 67.46	$ 72.85	7.99%
910	Vacant and Unused Land Available	Low	**	Low	773	$ 67.46	$ 72.85	7.99%
637	Warehouse (Non-Ministorage)	Medium-Low	3.58	Medium-Low	6,527	$ 202.37	$ 218.54	7.99%
639	Warehouse as Mini Storage	Medium-Low	0.64	Low	1,280	$ 202.37	$ 72.85	-64.00%
519	Wholesale (Non-Warehouse)	Medium-Low	3.58	Medium-Low	278	$ 202.37	$ 218.54	7.99%

** DSWS Non-Residential Waste Generation Study, SCS Consulting Engineers, Dec. 2000, Rev. May 2001 and EnviroStat, March 15, 2004.*

*** Categories not measured, representing 5.5% of total GFAUs other than parking lots, in which cases, the next lower category is assigned.*

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FY05 SOLID WASTE SERVICE CHARGES TO BE COLLECTED VIA REAL PROPERTY ACCOUNT BILLING

	Base Charge ($/ton)	x	Billing Rate (tons/HH)	=	Disposal Charge	+	Base Systems Benefit Charge	+	Incremental Systems Benefit Charge	+	Refuse Collection Charge	+	Leaf Vacuuming Charge	=	Total Bill
Code Reference	48-32(a)(1)				48-32(c)(2)		48-8A(b)(2)(A)		48-8A(b)(2)(B)		48-29		48-47		
SUBDISTRICT A (Refuse Collection District)*															
Inside Leaf Vacuuming District	$56.00		1.01288		$56.72		$40.99		$89.14		$ 66.00		$67.79		$320.64
Outside Leaf Vacuuming District	$56.00		1.01288		$56.72		$40.99		$89.14		$66.00				$252.85
Incorporated							$40.99								$40.99
SUBDISTRICT B SINGLE-FAMILY**															
Incorporated							$40.99								$40.99
Inside Leaf Vacuuming District															
Unincorporated	$56.00		1.01288		$56.72		$40.99		$89.14				$67.79		$254.64
Outside Leaf Vacuuming District															
Unincorporated	$56.00		1.01288		$56.72		$40.99		$89.14						$186.85
MULTI-FAMILY RESIDENTIAL**															
Incorporated							$8.14		$12.10						$20.24
Unincorporated															
Outside Leaf Vacuuming District							$8.14		$12.10						$20.24
Inside Leaf Vacuuming District							$8.14		$12.10				$7.08		$27.32

NONRESIDENTIAL - $/2,000 SQ. FT. ***				
Code Reference	48-8A(b)(3)(E)			
Waste Generation Categories				
Low	57.12	15.73		$72.85
Medium Low	171.35	47.19		$218.54
Medium	285.58	78.66		$364.24
Medium High	399.81	110.12		$509.93
High	514.05	141.58		$655.63

OTHER PROPOSED FY 05 SOLID WASTE FEES

Base Solid Waste Charge under Section 48-32(a)(1):		Recyclable Materials Acceptance Fees (Section 48-32(a)(2)):	
(This is known as the "Tipping Fee")	$56.00 /disposal ton	Paper received at the paper acceptance facility	$0.00 /ton
Waste delivered for disposal <500 lb loads in privately owned and operated vehicles or trailers <1,000 capacity per Section 48-32(c)(2):	$0.00 /disposal ton	Commingled containers from municipalities	$15.00 /ton
		Commingled containers from other sources	$0.00 /ton
		Yard Trim	$33.00 /ton
Miscellaneous (48-31(f)):		Compost Bins	$0.00 each

* Net of Disposal Fees which acts as an offset for county base costs otherwise collectable as Base System Benefit Charges.

** With respect to Base and Incremental System Benefit Charges, this category includes dwellings in buildings of six or fewer households.

*** The Nonresidential rate multiplied by the total number of 2,000 square foot units of enclosed area equals the nonresidential charge.

MARYLAND'S SOURCE REDUCTION CREDIT REPORTING SYSTEM OVERVIEW

Maryland Department of the Environment

Background

The Governor's Solid Waste Management Task Force (Task Force), affirming the recommendations of the Maryland Recycling Advisory Group (Advisory Group), recommended that Maryland establish a voluntary statewide goal of 40% diversion by the year 2005. For purposes of this new diversion goal, the Task Force recommended defining each county's diversion rate as the sum of its recycling rate, as calculated under the Maryland Recycling Act of 1988, plus up to 5% for counties which qualify for a source reduction (SR) credit.

Consistent with the Task Force's recommendations, the Maryland Department of the Environment (MDE) has established qualifications for the SR credit (maximum = 5%). To achieve this, MDE convened a seven-member Source Reduction Work Group, which submitted its recommendations for implementing a SR credit system, including a county reporting form.

Definitions of "Source Reduction" and "County"

For purposes of Maryland's SR credit system, SR is defined as "preventing waste from occurring which in turn prevents the need to manage it by recycling or disposal. SR means the design, manufacture, purchase, or use of materials or products to reduce the amount of waste and includes reuse, waste elimination, package reduction and substitution" (Advisory Group, 1995). The term "county" means any entity, whether a county or regional reporting group, that submitted its required Maryland Recycling Act solid waste/recycling accounting forms for the applicable calendar year.

Why is Source Reduction Important?

SR is at the top of the solid waste management hierarchy because it is generally superior to both recycling and disposal from an environmental and economic perspective. For example, moving trash and recyclables from one place to another means dirtier air in Maryland residents' lungs and less money in their wallets. SR is a proactive, practical way to preempt the need to collect, process, and/or dispose of trash and recyclables by preventing their generation up front.

Why is a Source Reduction Credit System Needed?

Maryland needs a SR credit system to spur greater attention to the important benefits SR offers. As the Advisory Group recognized in 1997, "little focus, planning or funding has been dedicated to this technique in Maryland." One reason for this is that SR activities can reduce recycling tonnages and therefore recycling rates. For example, yard waste grasscycled or home composted does not count as recycling tonnage, while yard waste collected, weighed, and composted at a central location does. The SR credit checklist system MDE established helps to offset this disincentive for SR.

This SR credit system also reflects a realization that it is better to give credit for a wide range of worthwhile SR activities than to confine recognition to the very few SR activities where tonnage diversion can be assessed reliably. Similarly inclined, Minnesota and Oregon developed SR credit systems during the 1990's. The Source Reduction Work Group carefully considered these states' SR credit systems before recommending a SR credit system for Maryland.

Taking a Closer Look at the Source Reduction Credit Checklists

Each county seeking SR credit may choose the action options best suited for that county, and adjust each year. The SR credit system also encourages regional cooperation and partnering with businesses, non-profits, etc. A county may receive credit for a listed SR activity that is conducted in association with another partner or partners, whether inside or outside the county. However, to maintain a reasonable level of rigor to the checklists, a county may not receive SR credit unless there is at least some involvement by the county government seeking credit. Additionally, many of the checklist items require source reduction activity of an ongoing nature.

The SR credit checklists are designed to encourage counties with less advanced SR programs to build momentum, and to inspire counties with more advanced SR programs to pursue continuous improvement. Accordingly, the SR credit checklists feature clusters of two to three questions relating to certain SR activities (e.g., materials exchanges and SR site visits to major businesses). The number of "Yes" responses by counties to each cluster of questions will depend largely on the intensity of effort put forward or degree of difficulty overcome. Overall, the SR checklists are intended to offer opportunities and challenges to every county in Maryland, regardless of size or resources.

Counties submitting SR Credit Report forms must document their SR activities as outlined on the SR Credit Report form. Counties are encouraged to provide MDE with lists of any SR activities they believe should be considered for inclusion in future SR checklists.

Mandatory Recycling Rates Unaffected by New Source Reduction Credit System

Important: This SR credit system does not apply to the mandatory recycling rates (15% and 20% levels) established in the Maryland Recycling Act of 1988, and which the Task Force recommended should be retained. Counties must continue to provide MDE with Maryland Recycling Act solid waste/recycling accounting forms on an annual basis. While counties are encouraged to provide MDE with SR Credit Reports on an annual basis, this is voluntary.

For Further Information

Please contact Virginia Lipscomb, Chief of the Recycling Division in the Recycling, Marketing and Operations Program for MDE.

Telephone: (410) 537-3314 FAX: (410) 537-3321
E-mail: vlipscomb@mde.state.md.us

MARYLAND DEPARTMENT OF THE ENVIRONMENT

1800 Washington Blvd. STE 610 • Baltimore Maryland 21230-1719

410-537-3314 • 1-800-633-6101 x3314 (within Maryland) • http://www.mde.state.md.us

Waste Management Administration
Recycling, Marketing and Operations Program

COUNTY SOURCE REDUCTION (SR) CREDIT REPORT

County:_____ **Reporting Period:**_____

Only respond "yes" for source reduction activities occurring in the reporting calendar year, unless a three-year time period is specified. A county may respond "yes" for an activity that is conducted in association with another partner.

Because SR of yard trimmings has the greatest SR potential of all materials, counties may receive a SR credit of up to 2% in Part 1 (Yard Trimmings SR Credit Checklist). For Part 1 a 1% credit will be awarded for each of the two Yard Trimmings SR boxes checked. For Part 2 (General SR Credit Checklist), SR credit will be awarded using the following ranges: 5 - 9 "Yes" = 1%, 10 – 15 "Yes" = 2%, and 16 or more "Yes" = 3%. Maximum combined SR credit for Part 1 and Part 2 is 5%.

PART 1 – YARD TRIMMINGS SOURCE REDUCTION CREDIT CHECKLIST

SR CREDIT OF 1% WILL BE AWARDED FOR EACH YES RESPONSE. (CHECK ALL THAT APPLY.)		
1. Conducted an ongoing, multi-faceted, public education program promoting grasscycling and/or home composting of yard trimmings.	☐ Yes	☐ No
2. **Within the past three years,** distributed publications exclusively promoting and describing how to utilize grasscycling and/or home composting of yard trimmings to at least 30% of single family households in the county.	☐ Yes	☐ No

PART 2 - GENERAL SR CREDIT CHECKLIST –Nothing Related to Yard Trimmings Here!!!

PROMOTION/GENERAL EDUCATION (CHECK ALL THAT APPLY.)		
1. Staffed a SR display at a county fair or similar event.	☐ Yes	☐ No
2. Hosted a SR event for the general public.	☐ Yes	☐ No
3. Incorporated SR information into a county web site.	☐ Yes	☐ No
4. Promoted SR in schools on an ongoing basis.	☐ Yes	☐ No
5. Implemented a SR curriculum or ongoing activity in schools.	☐ Yes	☐ No
6. Advertised residential SR success through a county awards program or through local newspapers, radio, television or other media.	☐ Yes	☐ No
7. Advertised business SR success through a county awards program or through local newspapers, radio, television or other media.	☐ Yes	☐ No
8. Integrated SR into ongoing county employee training and education programs.	☐ Yes	☐ No
9. Established/maintained ongoing SR recognition program for county employees.	☐ Yes	☐ No
10. Promoted SR through television or radio appearance or advertisement.	☐ Yes	☐ No
11. **Within the past three years,** distributed SR materials (brochures, flyers, fact sheets, posters, etc.) to at least 30% of county residents through events, mailings or publications.	☐ Yes	☐ No
12. **Within the past three years,** distributed SR materials (brochures, flyers, fact sheets, posters, etc.) to at least 30% of county businesses through events, mailings or publications.	☐ Yes	☐ No
13. **Within the past three years,** developed/updated a solid waste reuse directory for county residents and/or businesses.	☐ Yes	☐ No
14. **Within the past three years**, conducted a focus group or a survey of residents about SR activities and assistance needs.	☐ Yes	☐ No
15. **Within the past three years**, conducted a focus group or a survey of businesses and institutions about SR activities and assistance needs.	☐ Yes	☐ No

PART 2 - GENERAL SOURCE REDUCTION CREDIT CHECKLIST cont.

TECHNICAL ASSISTANCE (CHECK ALL THAT APPLY.)		
16. Developed/maintained a system for referring citizens, businesses and organizations to a materials exchange program.	☐ Yes	☐ No
17. Developed/maintained a system for providing reusable materials to a reuse center.	☐ Yes	☐ No
18. Developed/maintained a swap shop or other materials exchange.	☐ Yes	☐ No
19. Coordinated a textile reuse project.	☐ Yes	☐ No
20. Worked with a targeted sector of business community, e.g., restaurants, to achieve SR.	☐ Yes	☐ No
21. Conducted a SR training session, workshop, or presentation at a business, institutional or community event.	☐ Yes	☐ No
22. Developed/maintained a home food* composting bin distribution program for county residents.	☐ Yes	☐ No
23. Conducted workshops demonstrating proper food* composting techniques.	☐ Yes	☐ No
24. Developed/maintained permanent food* composting demonstration sites.	☐ Yes	☐ No
25. Operated a program to promote pallet reuse.	☐ Yes	☐ No
26. **Within the past three years**, conducted SR site visits to 3 or more of the businesses in the county with the most employees or the highest waste generation.	☐Yes	☐ No
27. **Within the past three years**, conducted SR site visits to 15 or more of the businesses in the county with the most employees or the highest waste generation.	☐ Yes	☐ No
28. **Within the past three years**, conducted SR site visits to 30 or more of the businesses in the county with the most employees or the highest waste generation.	☐ Yes	☐ No
29. **Within the past three years**, conducted a SR waste audit or survey of county facilities where at least 10 percent of county employees worked.	☐ Yes	☐ No
OTHER INITIATIVES (CHECK ALL THAT APPLY.)		
30. Collaborated on a multi-county SR event or program.	☐ Yes	☐ No
31. Established/maintained a county procurement policy advancing the purchase of materials that result in reduced waste generation.	☐ Yes	☐ No
32. Incorporated green building goals/requirements in county construction, remodeling, and maintenance bid specs and contracts.	☐ Yes	☐ No
33. Held team meetings, at least quarterly, that included representatives from major county departments, in which SR was discussed as a formal part of the agenda.	☐ Yes	☐ No
34. Implemented a variable rate pricing system designed to promote SR.	☐ Yes	☐ No

***Refers to food waste composting activities only.**

Documentation:
In order to promote information sharing around the state and to document SR efforts, please provide copies of materials (promotional materials, policy guidelines, etc.) associated with any "yes" responses on the SR checklists. If your county provided materials in a previous year that are the same or essentially unchanged, simply identify them as such and do not provide them.

I certify, to the best of my knowledge, that the information provided on this form is accurate and that the documentation requested has been provided. Additional documentation will be made available to MDE for auditing purposes, if requested.

_____ _____

Signature Title

_____ _____

Print Name County Date

ANNUAL BUSINESS RECYCLING AND WASTE REDUCTION REPORT

Refer to the *Montgomery County Business Recycling Regulation Handbook* for guidance on completing this Report.
Send completed Report to: Division of Solid Waste Services, Attn: SORRT, 101 Monroe Street, 6th Floor, Rockville, Maryland 20850

Business filing this Annual Report, provide:

Business Name: _____

Mailing Address: _____

Phone Number: _____

Contact Person Name and Title: _____

What is your relationship to the business(es) for whom this Annual Report is being filed?
(Check the box that corresponds to appropriate description.)

☐ I'm filing for my business at the above address only.

☐ **Property Manager** filing for one or more tenant(s) leasing property at a single site.

If address of the building occupied by your tenant(s) is different from the address provided above, provide address of building occupied by your tenant(s) covered by this Report:

☐ Business **Headquarters** filing for multiple business locations in the County.

☐ I'm a **Hauler** filing for my customer. (NOTE: One Annual Report per customer)

☐ Other. Explain relationship:

LIST BUSINESS(ES) COVERED BY THIS ANNUAL REPORT, IF APPLICABLE.

BUSINESS NAME & ON-SITE CONTACT PERSON	PHONE NUMBER and ADDRESS	EMPLOYEE NUMBER	SQUARE FEET

(Attach a separate page for additional business(es).)

If Government Agency, check applicable: County ☐ State ☐ Federal ☐ Other _____

Total number of employees covered by this Report: _____ (Employee means person working 20 or more hours per week for more than 6 months in a calendar year.)

Total square feet of building space covered by this Report: _____ **Square Feet**

Total acreage of green area (landscaped and grassy area) covered by this Report, if applicable: _____ **Acres**

FOR DSWS USE ONLY - DO NOT WRITE BELOW THIS LINE

DIVISION OF SOLID WASTE SERVICES APPROVAL BY: Date:

EXEMPTION STATUS:

ANNUAL REPORT FOR PREVIOUS CALENDAR YEAR PROVIDE YEAR:_____

MATERIAL (Circle type where applicable)	QUANTITY COLLECTED IN PREVIOUS CALENDAR YEAR -- Report in Pounds/Yr. (Refer to *Volume-Weight Conversion Chart* in your Handbook if needed)	Number and Size of central collection containers and number of pick-ups per month, if different from previous submission	Name and Phone Number of company hauling/handling materials	WASTE REDUCTION PROGRAM (Check if applicable & attach separate page to describe)	Check Box if Exemption Request Form is required **
REQUIRED MATERIALS FOR RECYCLING, REUSE, OR BEING SOURCE REDUCED					
OFFICE PAPER: White Colored Both	Pounds/Yr.				☐
CORRUGATED CARDBOARD	Pounds/Yr.				☐
NEWSPAPER	Pounds/Yr.				☐
ALUMINUM CANS	Pounds/Yr.				☐
STEEL/TIN CANS	Pounds/Yr.				☐
PLASTIC BOTTLES (HDPE AND PETE)	Pounds/Yr.				☐
GLASS BOTTLES & JARS	Pounds/Yr.				☐
COMMINGLED CONTAINERS: *	Pounds/Yr.				N/A
YARD WASTE: Leaves Grass Brush	Pounds/Yr.				☐
VOLUNTARY MATERIALS FOR RECYCLING, REUSE OR BEING SOURCE REDUCED (Attach list of other materials as needed)					
					N/A
					N/A
SOLID WASTE FOR DISPOSAL ONLY - BELOW THIS LINE					
SOLID WASTE FOR DISPOSAL (Trash)	Pounds/Yr.				N/A

* List Container Types. ** DSWS will contact you to schedule a site inspection and provide you an Exemption Request Form.

Signature of Person Completing Form _____ Date _____ Print Name of Signatory and Company Name _____

I hereby certify that as the Corporate Officer, I am responsible for ensuring compliance with applicable County Recycling Regulation 109-92, which requires recycling and reporting by my business, and confirm that the above information is accurate.

Signature of Responsible Corporate Officer _____ Date _____ Print Name of Signatory _____

Montgomery County SORRT Program
101 Monroe Street ■ 6th floor ■ Rockville, MD ■ 20850 ■ (240)777-6400 ■ www.MCRecycles.org

OPTIONAL SUBMITTAL
WITH BUSINESS RECYCLING PLAN AND ANNUAL REPORT

Does your Company buy or use any products that contain recycled content or material (such as recycled toner cartridges, recycled hand towels or tissue, copy paper)? If so, please specify products below:

(Refer to Recycled Product Supplier List and Recycled Products Guide in the Business Recycling Regulation Handbook.)

SUMMARY OF RECYCLING TASK FORCE RECOMMENDATIONS

- Enforcement

  - Increase dedicated ~~Code Enforcement~~ Investigator staff **(~~Not yet budgeted~~)**
  - Draft formal internal DSWS agreement for issuance of NOV's and tickets **(FY03)**

- Changes in Regulatory Requirements

  - Modify ER 109-92 to reinforce property owners' role in requiring tenants to recycle **(FY03)**
  - Modify ER 109-92 to further require property owners to manage recycling programs **(FY03)**
  - Modify ER 109-02 to require property owners to file annual reports **(FY03)**

- Staffing

  - Maintain current non-residential and multi-family staffing positions **(FY03 and FY04)**
  - Add 1-Program Specialist position to the non-residential recycling program **(Not yet budgeted)**

- Awareness and Education

  - Modify ER 109-92 to require property owners to provide recycling education and communication **(FY03)**
  - Evaluate requiring contract for recycling services prior to issuance of Use and Occupancy permit **(FY03)**
  - Develop recognition program, identify businesses that recycle with "We Recycle" decals **(FY03 and FY04)**
  - Evaluate and grade business recycling programs, offer decal signs to those earning A's or B's **(FY03 and FY04)**
  - Perform waste audits **(FY03 and FY04)**
  - Identify and promote companies, vendors, suppliers that take back materials **(FY03 and FY04)**
  - Develop and use short and simplified annual report form for businesses in multi-tenant facilities **(FY03 and FY04)**
  - Request annual report from small, stand-alone businesses **(FY03 and FY04)**
  - Provide postcard reminder of recycling requirements **(FY03 and FY04)**
  - Provide videos in English and Spanish, and on CD-ROMs **(FY03)**
  - Place information kiosks in multi-tenant facilities, County buildings, malls, public places, etc. **(FY04)**
  - Advertise "good recycler" businesses in newsprint ads **(FY03 and FY04)**
  - Request all businesses that have orientation programs for new employees include recycling **(FY03 and FY04)**
  - Mail information to janitorial services; ask property owners to make recycling part of these service contracts **(FY03)**
  - Provide posters with "Recycling—It's the Law" message **(FY03)**

- Issues for Further Evaluation & Future Consideration

  - Study franchising collection services for multi-family and/or non-residential sector **(FY04)**

THE STATE OF GARBAGE IN AMERICA

A joint study with the Earth Engineering Center of Columbia University

Collaboration leads to new methodology for the 2003 survey. And the numbers are ... 26.7% of MSW recycled, 7.7% combusted in waste-to-energy plants and 65.6% landfilled.

Scott M. Kaufman, Nora Goldstein, Karsten Millrath, and Nickolas J. Themelis

IT IS GENERALLY agreed that there are two main sources of national data on how solid waste is managed in the United States. The first is *BioCycle*'s "State of Garbage in America" survey, started in 1989 and done annually since then, with the exception of 2002. The other is an annual survey that Franklin Associates conducts for the U.S. Environmental Protection Agency, known as "Municipal Solid Waste In The U.S.: Facts and Figures." State of Garbage In America has always collected tonnage data on municipal solid waste (MSW) generation, and asked states to estimate — by percent — the amounts recycled and composted, combusted, and landfilled. Conversely, Franklin Associates has always used economic and population data to estimate MSW generation on a per capita basis, and then extrapolated data to estimate tonnages recycled and composted, combusted and landfilled.

An article by Professor Nickolas Themelis of Columbia University's Earth Engineering Center in the January 2003 issue of *BioCycle*, "Analyzing Data In State of Garbage In America, EPA Reports," shed light on the differences in the data from these two approaches to tracking solid waste management in the U.S. Themelis used findings from *BioCycle*'s 2001 "State of Garbage In America" report (based on 2000 data and published in the December 2001 issue) and EPA's "Municipal Solid Waste in the United States: 2000 Facts and Figures" (also based on 2000 data) to do his comparison. The analysis highlighted where the significant differences lie. For example, *BioCycle* reported 409 million tons of MSW generated in 2000, while Franklin data reported 232 million tons. Similarly, *BioCycle* reported 131 million tons of MSW recycled while Franklin reported close to 70 million tons.

After some thought and discussion, it was decided that the best way to identify the reasons for the data differences — and to test data gathering alternatives — was to have *BioCycle* and the Earth Engineering Center collaborate on the 2003 State of Garbage In America report. The information in this article is the culmination of that collaboration, which was conducted by the authors of this report. The contributions of the state solid waste and recycling officials who provided the data for this survey (see sidebar) are most appreciated.

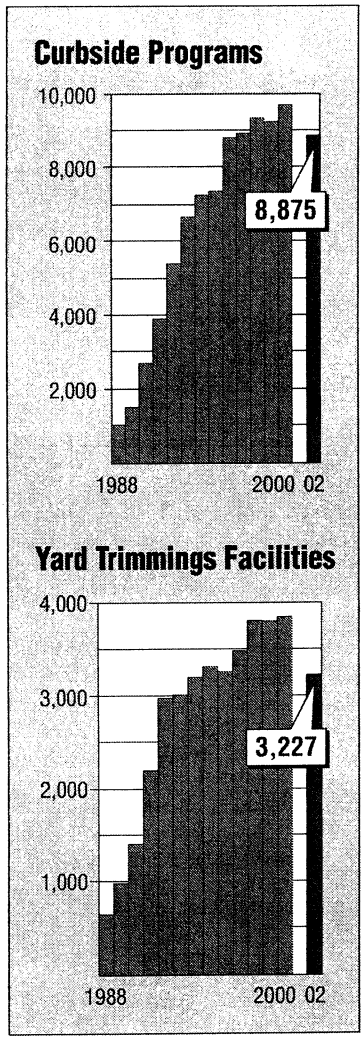
ORIGINAL METHODS

The fundamental approach to the 2003 State of Garbage In America survey was to request all data in actual tonnages. In previous surveys, *BioCycle* asked states to provide the annual tons of MSW generated and a percent breakdown of tons recycled, composted, combusted, and landfilled. The 2001 State of Garbage In America survey questionnaire did ask states to provide the actual tonnages used to generate the percentages, but few states supplied that data. The tonnages of MSW recycled, combusted and landfilled were calculated using the percentage breakdowns and MSW generation tons for each state. Those tonnages (based on weighted averages) were used to calculate the national rates for recycling, combustion and landfilling (see years 1988-2000 in Table 1 on page 33).

The old approach worked for several reasons: a) It was used every year, so the year-to-year data could be compared to show trends; b) The incineration and landfill data provided by the states (and used to tally generation and percents incinerated and landfilled) typically included fairly accurate tonnages because of permit requirements for landfills and combustion plants. Therefore, the balance they calculated and attributed to recycling was fairly consistent from year to year (about one-third to half the states also provided specific recycling tonnages, similar to those shown in this year's Table 10); and c) The tonnage-based approach — combined with information from the states on what categories of waste and recycled materials were included — allowed for some state-to-state comparisons.

The primary disadvantage of the "old" approach is that even though we requested data on *municipal solid waste* — i.e., only the residential and commercial/institutional streams — most states only had aggregate tons for *solid waste*, which may include construction and demolition debris, industrial waste, biosolids, etc. The same was true of

The fundamental approach to the 2003 State of Garbage In America survey was to request all data in actual tonnages.



the recycling percentages, e.g. some states include C&D debris recycled, which technically is not municipal solid waste. This reality made it difficult to get a statistically accurate reading as to how much municipal solid waste was being recycled, combusted or landfilled.

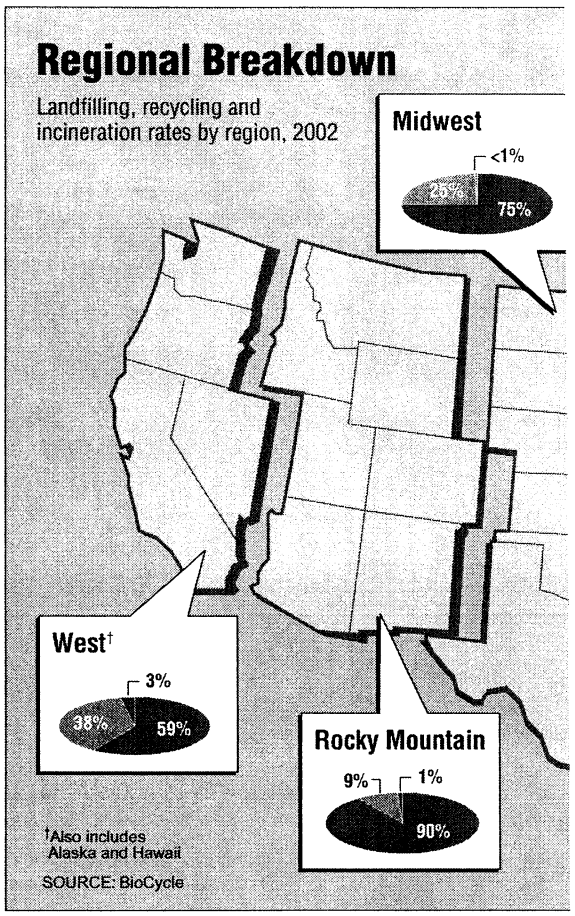
TONNAGE ONLY METHODOLOGY

To address that situation, we decided to move to a more objective, numbers-based analysis of solid waste management in the U.S. In the 2003 State of Garbage in America survey, therefore, all data was requested in actual tonnages. For instance, instead of asking states what percent of the total MSW generated was landfilled, the survey questionnaire asked for the tons landfilled in each category listed (e.g. residential, commercial, industrial, C&D, organics, tires, etc.). If a breakdown was not available, we asked for total tons landfilled. The same was done with recycling data: Instead of asking approximately what rate of recycling was being performed in a state, we requested specific tonnages recycled, broken down by categories, e.g., glass, metal, paper, etc.

In order to maximize the opportunity for direct comparisons (state by state and nationally), the next step was to calculate only the MSW portions of total solid waste generated, recycled, combusted and landfilled. That was accomplished by only including MSW stream tonnages. With landfilling, for example, that included the residential and commercial waste streams, organics, tires and "other." Not included were C&D, industrial, agricultural and imported waste. Recyclables included tons reported for glass, steel, aluminum, other metals, paper, plastic, tires, organics, wood and "other." C&D materials were not included. The tons combusted in waste-to-energy (WTE) facilities made up the third component of the estimated MSW generated (tons/year).

A primary goal of the methodology was to start leveling the playing field so that when the rates for each state are compared, the same categories of materials in the MSW stream are included. In this way, we have approximated a "true" MSW recycling rate, with similar parameters in place for all states. With a few exceptions (see footnotes for Table 3), all percentages/rates reported in the 2003 State of Garbage survey are calculated from tonnage numbers that the states (or other sources, including state websites) provided. Obviously, the better the information reported by each individual state, the "truer" the results. But we can say with a fair bit of confidence that what follows in these pages is a generally accurate picture of the State of Garbage in America in 2003.

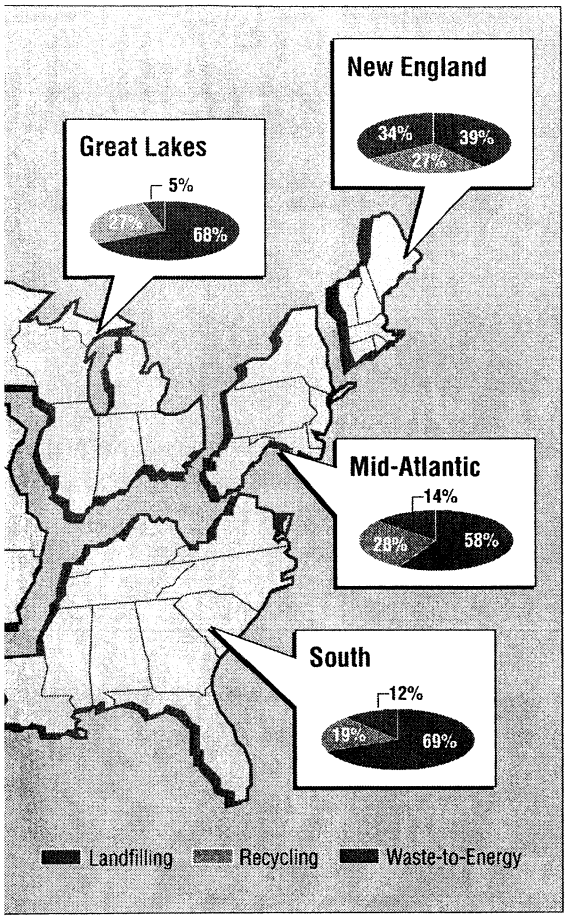
One final note on the methodology. The first question on the 2003 survey asked states to provide the total tons of nonhazardous solid waste generated in 2002 (or for the most recent year that data were available). This national total (483 million tons) is more statistically similar to the generation tonnages reported in earlier *BioCycle*



State of Garbage In America surveys, starting with 1989 (see Table 1). As in past years, the 2003 questionnaire asked states to indicate all categories of waste included in that total solid waste generation number. Boxes to check off included residential, commercial, C&D, industrial, agricultural, imported waste, tires and other (states were asked to specify what was included in "other"). In a few cases, states only checked off categories that are in the definition of municipal solid waste used in the 2003 State of Garbage In America methodology. In those cases, the number reported for solid waste generation is the same as the one used for "estimated" MSW generation. There are a handful of states in Table 3 where the estimated MSW generated is greater than the reported solid waste generated tons. This is usually because these states did not include recycling tonnages in the nonhazardous solid waste tons generated. Table 2 has a state-by-state breakdown (where provided) of the waste stream categories included in the reported solid waste generation tons.

THE NATIONAL PICTURE

Where is the United States when it comes to solid waste management? Data in the 2003 State of Garbage report clearly indicate that we are a nation that continues to generate increasing volumes of solid waste — most of which are landfilled. In 2002, 483 million tons of solid waste were generated, based on data from 47 states. (Alabama, Alaska and Montana are not included in this total as no



information was provided from those states.) In 2000, 409 million tons of solid waste were generated. Over this two-year period, the U.S. population increased from 281 million to 288 million. On a per capita basis, this represents an increase from 1.46 tons in 2000 to 1.68 tons in 2002.

The more relevant number in the 2003 State of Garbage In America report is the estimated tons of municipal solid waste generated in the U.S. According to our calculations, the U.S. generated 369 million tons of MSW in 2002. That results in an average per capita generation of 1.31 tons/person in 2002 (see Table 3). Per capita rates calculated for individual states range from a low of 0.68 in South Dakota to a high of 1.73 tons in Kansas. Generally, it seems that more commercialized/industrialized states have higher per capita rates of MSW generation than those that are more agricultural. A more detailed data analysis to be published in the March issue of *BioCycle* will try to correlate per capita generation to the ratio of urban to rural population and tourism.

Of the 369 million tons of MSW generated in 2002, 98.7 million tons were recycled or composted, 28.5 million tons were combusted in waste-to-energy (WTE) plants, and 242 million tons were landfilled (see Table 4). That yields the following national rates — MSW Recycling: 26.7 percent; MSW to WTE: 7.7 percent; MSW Landfilled: 65.6 percent. For comparison, in the 2001 State of Garbage in America report, the national rates were 32 percent recycled, 7 percent combusted and 61 percent landfilled.

Overall, because this is the first time an estimated MSW generation number has been calculated based on actual tonnages recycled, combusted and landfilled, there is not any historical data to compare with. For example, the 2001 State of Garbage in America survey reported that 61 percent, or 249 million tons of the 409 million tons of solid waste generated in 2000, were landfilled. In 2002, 65.7 percent, or 242 million tons, of MSW were landfilled. One could attempt to compare landfill tonnages for 2000 and 2002 by using that same 65.7 percent landfilled rate in 2002 and the total solid waste generation number of 483 million tons. That yields an amount of 317 million tons of nonhazardous solid waste landfilled in 2002 (or about a 74.5 million tons differential). It seems safe to assume that this number reflects hefty tonnages of industrial and C&D waste streams.

Comparing states' recycling, combustion, and landfilling rates between the 2001 and 2003 State of Garbage in America surveys yields the following information:

Recycled: Using the recycling rates calculated for the 47 states that provided data, the 2003 State of Garbage in America survey found that 28 states had a decrease in their recycling rate from the 2001 survey, 12 states had an increase, and four stayed the same; three states did not report recycling rates in the 2001 survey.

Combusted: In terms of WTE/incineration rates (the 2001 survey did not specifically ask for waste-to-energy data, thus some states may have included data on incinerators as well as WTE plants), 16 states had a decrease in the combustion rate, 11 had an increase, four stayed the same and three states did not report WTE data in 2001. In addition, 13 of the 47 states do not have any WTE plants.

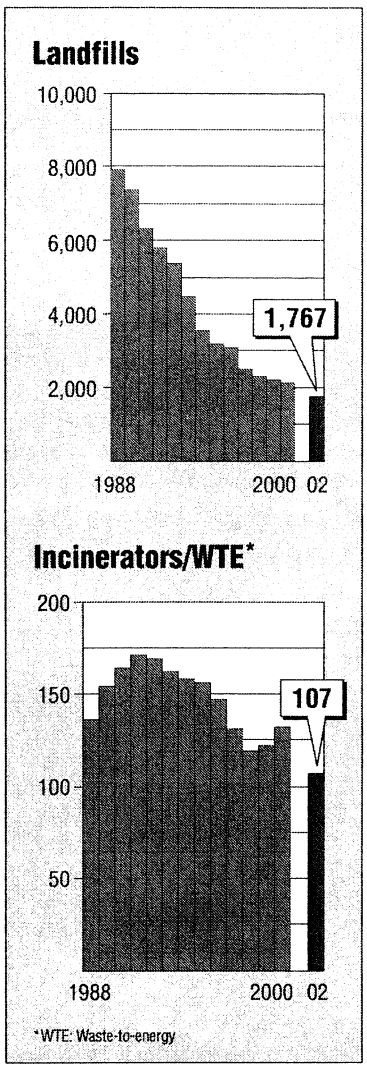


Table 1. State of Garbage in America survey data 1989–2002: Reported generation and estimated MSW generated, and rates of MSW recycling, incineration/waste-to-energy and landfilling[1]

Year Of Data	Reported Generation (tons/yr)[2]	Estimated[3] MSW Generated (tons/yr)	MSW Recycled (%)	MSW Incineration/[4] Waste-To-Energy (%)	MSW Landfilled (%)
1989	269,000,000	–	8	8	84
1990	293,613,000	–	11.5	11.5	77
1991	280,675,000	–	14	10	76
1992	291,742,000	–	17	11	72
1993	306,866,000	–	19	10	71
1994	322,879,000	–	23	10	67
1995	326,709,000	–	27	10	63
1996	327,460,000	–	28	10	62
1997	340,466,000	–	30	9	61
1998	374,631,000	–	31.5	7.5	61
1999	382,594,000	–	33	7	60
2000	409,029,000	–	32	7	61
2002	482,770,983	**369,381,411**	**26.7**	**7.7**	**65.6**

[1]Alabama, Alaska, and Montana did not report for this survey. The combined population of these three states is 6,039,747 (or two percent of total US population); [2]Data for 1989-2000 was provided to BioCycle as "MSW generation." Data for 2002 was provided as solid waste generation; [3]MSW generated is computed from reported tonnages of: [Landfill + Exported Landfill + WTE + Exported WTE + MSW Recycled] - [C&D Landfill + Industrial Landfill + Imported Landfill + Imported WTE]; [4]The 2003 "State Of Garbage In America" survey only collected data on waste-to-energy combustion. Previous surveys (1990-2000) asked more generally about "incineration."

According to our calculations, the U.S. generated 369 million tons of MSW in 2002. That results in an average per capita generation of 1.31 tons/person.

Landfilled: Based on the landfilling rates calculated for the 47 states providing data, 30 states had an increase in MSW landfilled, 14 had a decrease, and three did not have a rate reported in the 2001 report.

The breakdown on a regional basis (see map on pages 32-33 to identify states in each region) is as follows. The percentage rates from the 2001 State of Garbage report are in parentheses and are in the order of recycled, WTE/incineration, landfilled:

–New England: Recycled-27%; WTE-34%; Landfilled-39% (33%-36%-31%)

–Mid-Atlantic: Recycled-28%; WTE-14%; Landfilled-58% (39%-15%-46%)

–South: Recycled-19%; WTE-12%; Landfilled-69% (27%-8%-65%)

–Great Lakes: Recycled-27%; WTE-5%; Landfilled-68% (27%-5%-68%)

–Midwest: Recycled-25%; WTE-<1%; Landfilled-75% (32%-1%-67%)

–Rocky Mountain: Recycled-9%; WTE-1%; Landfilled-90% (11%-1%-88%)

–West: Recycled 38%; WTE-3%; Landfilled-59% (39%-3%-58%)

Finally, in terms of the big picture, significant tonnages of solid waste are crossing state borders, a trend that began a number of years ago as thousands of landfills closed across the country and super-sized landfills

Table 2. Tons of solid waste (nonhazardous) generated by state and waste stream categories included (2002 data unless noted)[1]

State	Reported Solid Waste Generated (tons/yr)	Residential	Commercial	C&D	Industrial	Agricultural	Imported Waste	Tires
Arizona	4,962,000	x	x					x
Arkansas	4,061,128	x	x		x			x
California	72,000,000	x	x	x	x	x	x	x
Colorado	7,673,778	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Connecticut	3,474,981	x	x		x			
Delaware	2,747,205	x	x	x	x			x
Florida[2]	25,726,175	x	x	x	x			x
Georgia	12,302,534	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Hawaii	1,275,913	x	x	x	x			
Idaho	1,090,000	x	x	x				
Illinois	15,428,491	x	x	x				
Indiana	16,228,824	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Iowa	3,828,808	x	x	x	x	x	x	
Kansas	7,846,080	x	x	x	x		x	x
Kentucky	6,529,846	x	x				x	
Louisiana	3,272,331	x	x					
Maine[3]	1,844,059	x	x	x				x
Maryland	10,678,596	x	x	x	x			x
Massachusetts[3]	12,779,688	x	x	x			x	
Michigan	19,041,775	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Minnesota	5,881,543	x	x					
Mississippi	3,909,508	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Missouri	10,935,989	x	x	x	x	x		
Nebraska[3]	2,395,101	x	x		x		x	
Nevada	5,313,203	x	x	x	x			x
New Hampshire	1,327,598	x	x		x			
New Jersey[3]	18,865,390	x	x	x	x	x		x
New Mexico	2,968,729	x	x	x	x			x
New York[4]	24,775,000	x	x	x	x		x	x
North Carolina	13,500,000	x	x	x	x			x
North Dakota	4,270,000	x	x		x			x
Ohio[3]	32,184,841	x	x	x	x	x		x
Oklahoma	4,489,028	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Oregon	4,772,536	x	x	x				x
Pennsylvania	10,881,798	x	x					
Rhode Island	1,497,240	x	x	x	x	x		x
South Carolina	11,464,547	x	x	x	x			x
South Dakota	688,000	x	x	x	x		x	
Tennessee	9,852,194	x	x	x	x	x	x	x
Texas	45,300,000	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Utah	3,949,096	x	x	x	x	x		
Vermont[5]	700,000	x	x	x	x		x	
Virginia	17,499,022	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Washington[3,6]	10,470,805	x	x	x	x	x		x
West Virginia	1,963,791	x	x	x	x		x	x
Wisconsin	13,542,140	x	x	x	x			x
Wyoming	682,000	x						
Total	**482,770,983**							

[1]The following states did not report a solid waste (nonhazardous) generation amount: Alabama, Alaska and Montana; [2]2000 data; [3]2001 data; [4]1999 and 2002 data; [5]Includes wastewater treatment plant biosolids; [6]Includes petroleum contaminated soil and biosolids.

Table 3. Reported solid waste generated, estimated MSW generated, estimated MSW generated per capita, and percents of MSW recycled, combusted via waste-to-energy (WTE) and landfilled (2002 data unless noted)[1]

State	Population (2002)	Reported Solid Waste Generated (tons/yr)	Estimated[2] MSW Generated (tons/yr)	Estimated MSW Generated Per Capita[3] (tons/person)	MSW Recycled (%)	MSW To Waste-To-Energy (%)	MSW Landfilled (%)
Alabama	4,486,508	n/a	n/a	n/a	n/a	n/a	n/a
Alaska	643,786	n/a	n/a	n/a	n/a	n/a	n/a
Arizona	5,456,453	4,962,000	6,012,359	1.10	17.5	0	82.5
Arkansas	2,710,079	4,061,128	3,838,217	1.42	36.3	1.5	62.3
California[4]	35,116,033	72,000,000	54,429,851	1.55	40.2	1.6	58.1
Colorado	4,506,542	7,673,778	5,051,132	1.12	2.8	0	97.2
Connecticut	3,460,503	3,474,981	4,734,132	1.37	18.8	45	36.2
Delaware	807,385	2,747,205	1,069,042	1.32	20.4	0	79.6
Florida[5]	16,713,149	25,726,175	19,706,584	1.18	24	28.2	47.8
Georgia[6]	8,560,310	12,302,534	11,214,006	1.31	8.3	0.5	91.3
Hawaii	1,244,898	1,275,913	1,706,018	1.37	25.2	24.4	50.4
Idaho[7]	1,341,131	1,090,000	1,090,000	0.81	8.4	0	91.6
Illinois	12,600,620	15,428,491	15,951,037	1.27	32.5	0	67.5
Indiana[8]	6,159,068	16,228,824	9,542,378	1.55	35	7	58
Iowa	2,936,760	3,828,808	3,416,268	1.16	41.7	1	57.3
Kansas	2,715,884	7,846,080	4,698,338	1.73	11.5	0	88.5
Kentucky	4,092,891	6,529,846	5,465,608	1.34	11.4	0	88.5
Louisiana	4,482,646	3,272,331	4,952,900	1.10	8.1	0	91.9
Maine[9]	1,294,464	1,844,059	1,327,164	1.03	49	33.8	17.2
Maryland	5,458,137	11,172,882	8,904,464	1.63	29.2	16	54.8
Massachusetts[9]	6,427,801	12,779,688	8,307,387	1.29	31.1	37.6	31.3
Michigan	10,050,446	19,041,775	16,916,076	1.68	15.1	7	77.9
Minnesota	5,019,720	5,881,543	5,043,752	1.00	45.6	25.1	29.3
Mississippi	2,871,782	3,909,508	2,918,407	1.02	0.3	0	99.7
Missouri	5,672,579	10,935,989	7,256,744	1.28	38.9	0.3	60.8
Montana	909,453	n/a	n/a	n/a	n/a	n/a	n/a
Nebraska[9]	1,729,180	2,395,101	2,395,100	1.39	15.4	0	84.6
Nevada	2,173,491	5,313,203	3,365,570	1.55	15.8	0	84.2
New Hampshire	1,275,056	1,327,598	1,214,777	0.95	23.7	17	59.4
New Jersey[9]	8,590,300	18,865,390	10,606,326	1.23	37.9	9.1	53.1
New Mexico	1,855,059	2,968,729	2,095,052	1.13	6.5	0	93.5
New York[10]	19,157,532	24,784,000	24,775,000	1.29	29.8	17.1	53.1
North Carolina	8,320,146	13,500,000	8,981,349	1.08	11	1.3	87.6
North Dakota	634,110	4,270,000	638,804	1.01	9.4	0	90.6
Ohio[9,11]	11,421,267	13,748,996	16,211,198	1.42	23.5	0	76.5
Oklahoma	3,493,714	4,489,028	4,489,028	1.28	1	0	99
Oregon	3,521,515	4,772,536	4,074,945	1.16	48.8	4.9	46.3
Pennsylvania	12,335,091	10,881,798	12,675,854	1.03	26.8	16.5	56.7
Rhode Island	1,069,725	1,497,240	1,248,745	1.17	12.8	0	87.2
South Carolina	4,107,183	11,464,547	5,973,059	1.45	28.4	3.9	67.7
South Dakota	761,063	688,000	518,493	0.68	3	0	97
Tennessee	5,797,289	9,852,194	7,365,920	1.27	26.4	2	71.6
Texas[12]	21,779,893	45,300,000	28,531,660	1.31	24.9	0	75.1
Utah	2,316,256	3,949,096	2,471,404	1.07	4.8	4.9	90.4
Vermont	616,592	700,000	611,617	0.99	29.8	9.2	60.9
Virginia	7,293,542	21,331,253	10,877,723	1.49	29.1	19.8	51.2
Washington[9]	6,068,996	10,470,805	8,666,755	1.43	34.1	5.6	60.2
West Virginia	1,801,873	1,963,791	1,754,523	0.97	6.9	0	93.1
Wisconsin	5,441,196	13,542,140	5,592,862	1.03	24.6	3.4	72
Wyoming	498,703	682,000	693,783	1.39	1.7	0	98.3
Totals	**287,797,800**	**482,770,983**	**369,381,411**	**1.31**	**26.7**	**7.7**	**65.6**

[1]Alabama, Alaska and Montana did not report any data for the 2003 "State of Garbage in America" survey; [2]Unless otherwise noted, MSW generated is computed from reported tonnages of: [Landfill + Exported Landfill + WTE + Exported WTE + MSW Recycled] - [C&D Landfill + Industrial Landfill + Imported Landfill + Imported WTE]; [3]U.S. per capita generation excludes Alabama, Alaska and Montana; [4]MSW generation calculated using state population multiplied by 1.55 tons per capita (Nevada's per capita generation rate, chosen because highest rate in neighboring state). State provided tons landfilled and combusted via WTE; [5]2000 data; [6]MSW generation calculated using state population multiplied by 1.31 tons per capita (national rate). State provided tons landfilled and combusted via WTE; [7]State reported MSW generation and no WTE facilities. 2002 landfill tonnage provided by Chartwell Information (www.wasteinfo.com); [8]MSW generation assumed to be equal to reported tons landfilled + recycled, at same recycling rate as in 2000 (35%); [9]2001 data; [10]Detailed data for the state provided in New York State Assembly Report, "Where Will the Garbage Go?", 2002; [11]Tons of industrial wastes (10,502,763) were subtracted from reported total tons recycled; [12]MSW generation calculated using state population multiplied by 1.31 tons per capita (national rate). State provided tons landfilled and there are no WTE plants.

The 5.3 percentage points decrease in the national recycling rate between the 2000 and 2002 surveys can be attributed in part to the different approach to calculating the national rates in the 2003 State of Garbage in America report.

opened in some states. As in 2000, Pennsylvania leads in the MSW importing category, receiving 10 million tons of solid waste in 2002 (the bulk of which was landfilled). Illinois is second with 5.8 million tons and Virginia is third with 4.5 million tons imported. Michigan is fourth with 3.8 million tons imported. As with Pennsylvania, almost all imported waste is landfilled in these four states.

Table 4. Estimated MSW tonnage generated and MSW tons recycled, combusted via waste-to-energy (WTE) and landfilled (by state, 2002 data unless noted)

State	Estimated[1] MSW Generated (tons/yr)	MSW Recycled (tons/yr)	MSW To WTE (tons/yr)	MSW Landfilled (tons/yr)
Arizona	6,012,359	1,050,359	0	4,962,000
Arkansas	3,838,217	1,391,978	56,048	2,390,191
California[2]	54,429,851	21,902,181	887,270	31,640,400
Colorado	5,051,132	142,352	0	4,908,779
Connecticut	4,734,132	888,207	2,130,125	1,715,800
Delaware	1,069,042	217,842	0	851,200
Florida[3]	19,706,584	4,721,972	5,563,565	9,421,047
Georgia[4]	11,214,006	928,678	51,707	10,233,621
Hawaii	1,706,018	430,106	416,668	859,244
Idaho[5]	1,090,000	92,000	0	998,000
Illinois	15,951,037	5,191,388	0	10,759,649
Indiana[5]	9,542,378	3,339,832	647,546	5,555,000
Iowa	3,416,268	1,425,624	34,407	1,956,237
Kansas	4,698,338	539,887	0	4,158,451
Kentucky	5,465,608	625,083	2,250	4,838,275
Louisiana	4,952,900	402,200	0	4,550,700
Maine[7]	1,327,164	650,037	448,368	228,759
Maryland	8,904,464	2,599,675	1,425,915	4,878,874
Massachusetts[7]	8,307,387	2,583,736	3,127,582	2,596,069
Michigan	16,916,076	2,550,246	1,183,382	13,182,448
Minnesota	5,043,752	2,301,455	1,265,563	1,476,734
Mississippi	2,918,407	10,000	0	2,908,407
Missouri	7,256,744	2,823,100	20,350	4,413,294
Nebraska[7]	2,395,100	368,867	0	2,026,233
Nevada	3,365,570	531,804	0	2,833,766
New Hampshire	1,214,777	287,612	206,143	721,022
New Jersey	10,606,326	4,014,960	961,508	5,629,858
New Mexico	2,095,052	135,496	0	1,959,556
New York	24,775,000	7,384,000	4,247,600	13,143,400
North Carolina	8,981,349	992,009	120,751	7,868,589
North Dakota	638,804	60,000	0	578,804
Ohio[7]	16,211,198	3,808,058	0	12,403,140
Oklahoma	4,489,028	44,667	0	4,444,361
Oregon	4,074,945	1,987,246	201,161	1,886,538
Pennsylvania	12,675,854	3,399,002	2,094,778	7,182,074
Rhode Island	1,248,745	159,863	0	1,088,882
South Carolina	5,973,059	1,697,706	231,357	4,043,996
South Dakota	518,493	15,493	0	503,000
Tennessee	7,365,920	1,942,512	150,343	5,273,065
Texas[8]	28,531,660	7,106,747	0	21,424,913
Utah	2,471,404	117,686	120,146	2,233,572
Vermont	611,617	182,562	56,320	372,735
Virginia	10,877,723	3,160,931	2,151,778	5,565,011
Washington[7]	8,666,755	2,959,534	489,180	5,218,041
West Virginia	1,754,523	120,276	0	1,634,247
Wisconsin	5,592,862	1,378,470	187,824	4,026,568
Wyoming	693,783	11,783	0	682,000
Totals	**369,381,411**	**98,675,222**	**28,479,635**	**242,226,551**

[1]Unless otherwise noted, MSW generated is computed from reported tonnages of: [Landfill + Exported Landfill + WTE + Exported WTE + MSW Recycled] - [C&D Landfill + Industrial Landfill + Imported Landfill + Imported WTE]; [2]In absence of information on C&D and other non-MSW materials, the MSW generation was assumed to be 1.55 tons per capita (same as Nevada, which is in the same region); [3]2000 data; [4]MSW generation calculated using state population multiplied by 1.31 tons per capita (national rate). State provided tons landfilled and combusted via WTE; [5]State reported MSW generation and no WTE facilities. 2002 landfill tonnage provided by Chartwell Information (www.wasteinfo.com); [6]MSW generation assumed to be equal to reported tons landfilled+recycled, at same recycling rate as in 2000 (35%); [7]2001 data; [8]MSW generation calculated using state population multiplied by 1.31 tons per capita (national rate). State provided tons landfilled and there are no WTE plants.

On the export side, New York is the highest with 5.4 million tons exported in 2002 (slightly down from the 5.6 million tons exported in 2000, when New York also was the leader in this category). New Jersey is in second place, with 3.5 million tons. Third and fourth places are a close tie between Missouri (1,993,136 tons) and Maryland (1,943,124 tons). Fifth place goes to Massachusetts, with 1.7 million tons. Washington is the only other state exporting over a million tons of solid waste (1,146,331 tons). In all cases, most of the tonnages exported were landfilled in the receiving states.

THE RECYCLING SCENE

The recycling numbers in this report include organic materials composted. The 5.3 percentage points decrease (from 32% to 26.7%) in the national recycling rate, between the 2000 and 2002 surveys, can be attributed in part to the different approach to calculating the national rates in the 2003 State of Garbage in America report (i.e., using actual tonnage data versus estimated percentages). California is a case in point. The state reported that its diversion rate (i.e., materials that were not combusted or landfilled) in 2002 was 48 percent of total solid waste generated (72 million tons). This corresponds to about 35 million tons diverted. However, when we divided the 72 million tons of solid wastes by the population of California, the per capita generation was 2.05 tons, considerably higher than any other state. This indicated to us that the 72 million tons included non-MSW materials, such as C&D and industrial wastes.

Given the lack of adequate information on MSW generation in California, we assumed that the per capita generation in California was the same as in the neighboring state of Nevada (1.55 tons/person). This number is 0.24 tons higher than the U.S. average of 1.31 tons/person. At that rate, the 2002 MSW generation in California was estimated at 54.4 million tons. Then, by subtracting from 54.4 million the known tonnages of MSW combusted and landfilled, we arrived at about 22 million tons of MSW recycled. In the following months we will examine the validity of this estimate, by determining the actual tonnages of the recycled streams in California — organics composted, and wood, paper, plastic, metal, and glass recycled.

As shown in Table 3, Maine and Oregon had the highest estimated recycling rates in the U.S. (49 percent and 48.8 percent, respectively), followed by Minnesota (45.6 percent), Iowa (41.7 percent) and California (40.2 percent). In the case of Maine and Oregon, the estimated rates increased significantly since the 2000 survey (by 9% and 9.8%, respectively).

Because of the differentiation between MSW and total solid wastes generation in the 2002 survey, some states had decreases greater than 10 percent, including Delaware (59% to 20.4%), Louisiana (17% to 8.1%), Mississippi (16% to 0.3%), New York (42% to 29.8%), Rhode Island (24% to 12.8%), West

Virginia (25% to 6.9%) and Wisconsin (36% to 24.6%). It is most likely that the primary explanation for the decrease has to do with the new methodology employed this year.

Table 5 highlights the contribution of organics to the overall recycling rate. Thirty-five of the 47 states reporting had tonnage data for recycled organics (including yard trimmings and food residuals) and/or wood (non-C&D). (Note that tonnages of C&D recycled, where provided by states, is reported in Table 10.) The last column of Table 5 calculates the percentage that organics and wood represent in the MSW recycling rate. Based on data from those 35 states, organics and wood contributed an average of 28 percent of all materials recycled.

CURBSIDE COLLECTION PROGRAMS

Since the State of Garbage In America survey began in 1989, *BioCycle* has tracked the number of residential curbside collection programs in the U.S. In 1988, there were 1,042 curbside collection programs. That number quickly doubled within two years, and grew rapidly thereafter. A total of 9,709 programs were reported in the 2001 survey.

According to our data, the number of curbside collection programs in the U.S. dropped between 2000 and 2002 to 8,875 (Table 6). This is the second time a decrease has been reported. There is no way to assess whether there actually are fewer programs or if states have refined their data collection capabilities from reporting jurisdictions. Comparing data

Table 5. Organics and wood recycled (tons/year); Contribution to state MSW recycling rate (2002 data unless noted)

State	Organics[1] (tons)	Wood (tons)	Total MSW Recycled (tons)	MSW Recycling Rate (%)	Organics/Wood Contribution To Recycling[2] (%)
Arizona	316,124	44,530	1,050,359	17.5	34
Arkansas	–	145,106	1,391,978	36.3	10
Colorado	15,871	36,530	142,352	2.8	37
Connecticut	235,816	–	888,207	18.8	27
Delaware	32,360	–	217,842	20.4	15
Florida	–	1,471,782	4,721,972	24	31
Hawaii	79,401	–	430,106	25.2	18
Indiana	424,053	–	3,339,832	35	13
Iowa	294,978	103,194	1,425,624	41.7	28
Kansas	154,100	–	539,887	11.5	29
Kentucky	16,645	–	625,083	11.4	3
Louisiana	83,444	–	402,200	8.1	21
Maine	50,084	40,443	650,037	49	14
Maryland	645,230	122,101	2,599,675	29.2	30
Massachusetts	443,147	–	2,583,736	31.1	17
Michigan	739,904	–	2,550,246	15.1	29
Minnesota	167,529	–	2,301,455	45.6	7
Missouri	394,966	–	2,823,100	38.9	14
Nevada	12,675	26,433	531,804	15.8	7
New Hampshire	37,114	–	287,612	23.7	13
New Jersey	1,720,069	105,476	4,014,960	37.9	45
New Mexico	12,122	8,266	135,496	6.5	15
North Carolina	468,901	–	992,009	11	47
Ohio	1,012,951	1,346,511	3,808,058	23.5	62
Oregon	443,966	386,053	1,987,246	48.8	42
Pennsylvania	498,391	141,628	3,399,002	26.6	19
Rhode Island	72,500	–	159,863	12.8	45
South Carolina	134,712	251,042	1,697,706	28.4	23
South Dakota	13,000	–	15,493	3	84
Tennessee	162,347	30,600	1,942,512	26.4	10
Vermont	29,626	225	182,562	29.8	16
Virginia	540,282	361,565	3,160,931	29.1	29
Washington	539,717	689,706	2,959,534	34.1	42
West Virginia	680	–	120,276	6.9	1
Wisconsin	225,240	23,630	1,378,470	24.6	18

"–" = tonnages not provided; [1]Organics include yard trimmings and food residuals; [2]Represents percent contribution of organics and wood recycled to MSW recycling rate.

Table 6. Number of residential curbside recycling programs, population served, and yard trimmings composting sites by state (2002 data unless noted)

State	Curbside Programs	Population With Access To Curbside Collection	Yard Trimmings Composting Sites
Arizona	27	2,570,000	n/a
Arkansas	67	n/a	24
California	396	31,146,000[1]	100
Colorado	22[2]	618,848	5[7]
Connecticut	169	3,460,503	92
Delaware	2	4,000	0
Florida[3]	333	9,100,000	0[4]
Georgia	184	n/a	63
Hawaii	4	41,000	5
Idaho	12	n/a	n/a
Illinois	n/a	n/a	40
Indiana	79	4,170,000[1]	107
Iowa	627	1,862,314	80
Kansas	113	1,100,000	105
Kentucky	54	1,211,085	30
Louisiana	20	n/a	3
Maine[6]	40	500,000	<25
Maryland	99[1]	4,000,000	37
Massachusetts[5]	160	4,862,806	223
Michigan[6]	347	3,670,072	163
Minnesota	733	3,750,000	n/a
Mississippi	14[1]	325,000[1]	6
Missouri	216	n/a	152[7]
Nebraska[6]	8	500,000	n/a
Nevada	3	1,963,924	1
New Hampshire	42	>518,000	192
New Jersey[5]	510	7,500,000[1]	170
New Mexico	10	400,000[1]	8
New York	1,500[8]	17,230,000[8]	32
North Carolina	256	3,200,000	120
North Dakota	4	100,000[1]	40
Ohio[5]	459	6,459,072	534
Oklahoma	7	905,790	4
Oregon	133	2,641,136	41
Pennsylvania	945	9,310,252	>300
Rhode Island	26	897,000	15
South Carolina	135[1]	564,552	128
South Dakota	3	60,000	120
Tennessee	58	n/a	n/a
Texas	160[1]	5,000,000[1]	160
Utah	n/a	n/a	20
Vermont[5]	93[1]	545,000	12
Virginia	60	1,144,000[9]	14[1]
Washington[5]	150	4,923,318	41
West Virginia	51[1]	425,134	0[10]
Wisconsin	544	2,695,958	n/a
Wyoming	0	0	15
Totals	**8,875**	**139,374,764**	**3,227**

[1]2001 BioCycle, "The State of Garbage In America" data; [2]Based only on data from 12 cities and/or counties; [3]2000 data; [4]State reports 140 sites only grinding (i.e., not composting) collected yard trimmings for mulch; [5]2001 data; [6]1999 data; [7]May include yard trimmings grinding (only) facilities; [8]1998 data; [9]Based on conversion of 2.86 people/household; [10]State reports 22 sites only grinding (i.e., not composting) collected yard trimmings for mulch

from the 2001 and 2003 surveys, however, the following can be noted:

–Illinois did not report any curbside data for 2002, but noted 474 programs in 2000.

–Five states had hefty declines in curbside programs. These include Georgia (-275), California (-150), Washington (-133), Indiana (-89) and Wisconsin (-87).

–Ohio reported an increase in curbside programs (+227). Other states with increases since 2000 include Pennsylvania (+53), Missouri (+39) and Florida (+34).

Interestingly, despite the drop in curbside collection programs between 2000 and 2002 (a decrease of 834), the total population with access to curbside collection only decreased slightly (from 139,766,000 to 139,374,764). This may indicate that there has been a consolidation of some collection programs.

Table 7. Number of municipal solid waste landfills and waste to energy plants, average tip fees, and capacity by state for 2002

State	Number of MSW Landfills	Average Landfill Tip Fee ($/ton)	Total Landfill Capacity Remaining (tons)	Number Of WTE Plants	Average WTE Tip Fee ($/ton)
Arizona	41	n/a	n/a	0	–
Arkansas	24	28.45	n/a	2	n/a
California	161	13.63	410,501,190	3	n/a
Colorado	65	n/a	n/a	0	–
Connecticut	2	n/a	n/a	6	65
Delaware	3	58.50	20,000,000	0	–
Florida	100	42.47	n/a	13	59
Georgia	60	33.50	135,349,274[1]	1	45
Hawaii	9	n/a	n/a	1	n/a
Idaho	29	n/a	n/a	0	–
Illinois	51	n/a	212,393,636[1]	0	–
Indiana	35	n/a	52,231,795[1]	1	n/a
Iowa	59	33.25	40,182,628	1	53
Kansas	51	28	n/a	0	–
Kentucky	25	27.57	36,363,636[1]	1	n/a
Louisiana	24	25	n/a	0	–
Maine	8	55	3,030,303[1]	4	65
Maryland	20	50	n/a[2]	3	49
Massachusetts	19	72.60	n/a	7	71
Michigan	52	n/a	143,939,394[1]	4	76
Minnesota	21	50	18,700,000	15	50
Mississippi	17	26	n/a	0	–
Missouri	24	33.54	41,432,836[1]	0[3]	–
Montana[4]	30	32	32,727,273	0	–
Nebraska	24	25	n/a	0	–
Nevada	23	30	60,742,056[1]	0	–
New Hampshire	10	68	15,000,000	2	81
New Jersey	12	60	40,000,000	5	60
New Mexico	35	n/a	190,966,142[1]	0	–
New York	26	50	90,000,000	10	65
North Carolina	41	30	100,000,000	1	50
North Dakota	14	26.56	n/a	0	–
Ohio	44	32.20	124,079,624[1]	0	–
Oklahoma	40	20	n/a	1	n/a
Oregon	30	34.50	n/a	1	68
Pennsylvania	49	48	298,585,524	6	74
Rhode Island	2	41.50	n/a	0	–
South Carolina	19	27	109,534,023	4	n/a
South Dakota	15	30	16,757,576[1]	0	–
Tennessee	34	28.38	n/a	1	n/a
Texas	175	27	970,000,000	2	n/a
Utah	38	n/a	n/a	1	n/a
Vermont	5	80	1,453,778	0	–
Virginia	67	n/a	251,810,045	5	n/a
Washington	21	46.48	180,002,767	4	n/a
West Virginia	18	43	>5,674,330	0	–
Wisconsin	42	36.43	30,440,024[1]	2	n/a
Wyoming	53	n/a	n/a	0	–
Totals	**1,767**			**107**	

[1]Tonnage based on conversion from cubic yards reported (conversion of 3.3 cubic yards/ton); [2]Landfill capacity remaining exceeds ten years; [3]Waste-to-energy plant burns tires for fuel; [4]2001 data from MSW Management

YARD TRIMMINGS COMPOSTING

As in the case with curbside programs, data have been collected on the number of yard trimmings composting sites since the first State of Garbage survey in 1989. According to that first report, there were 651 yard trimmings composting sites in 1988. Due to both rapid growth and better data tracking, that number more than doubled to 1,407 by 1990, and doubled again to 2,981 by 1992. Growth between 1992 and 2000 was more steady, increasing to 3,846 yard trimmings composting sites in the U.S. by 2000.

In 2002, the reported number of yard

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trimmings composting sites was 3,227, a decrease of 619 from the 2000 data. It is believed the primary reason for the drop was that five states providing numbers for 2000 were not able to do so for 2002 (e.g., Minnesota reported 454 in 2000 and Wisconsin reported 140).

Florida, which in 2000 noted it had 26 yard trimmings composting sites, reported no composting sites in 2002. Instead, the state explained there are 140 sites only grinding (i.e., not composting) yard trimmings for mulch. West Virginia, which noted that it had 23 composting sites in 2000, also reported none in 2002. Like Florida, this state reported that there are 22 sites grinding collected yard trimmings into mulch.

Some states reported a significant increase in the number of yard trimming composting sites between 2000 and 2002. These include Georgia (+48), Indiana (+21), Iowa (+37) and Missouri (+52) — although Missouri explained that some of its 152 sites may only be producing mulch. The only state reporting a sizable decrease is New York (-73).

Table 8. C&D landfills and MSW transfer stations by state for 2002 (unless noted)

State	C&D Landfills	MSW Transfer Stations
Arizona	11	120
Arkansas	35	87
California	154	458
Connecticut	27	120
Delaware	1	1
Florida	185	98
Georgia	46	70
Hawaii	2	11
Illinois	n/a	86
Indiana	9	59
Iowa	4	35
Kansas	129	65
Kentucky	128	50
Maine[1]	24	242
Maryland	5	11
Massachusetts[1]	9	194
Michigan	3	69
Minnesota	79	80
Mississippi	72	41
Missouri	4	47
Nebraska[1]	19	46
Nevada	11	9
New Hampshire	n/a	201
New Jersey[1]	1	43
New Mexico	5	130
New York	30	476
North Carolina	56	80
North Dakota	182	28
Ohio	75	59
Oklahoma	7	38
Oregon	5	135
Pennsylvania	6	73
Rhode Island	0	26
South Carolina	138	38
South Dakota	170	15
Tennessee	71	29
Texas	45	150
Utah	47	11
Vermont	1	90
Virginia	22	61
Washington	53	95
West Virginia	17	17
Wisconsin	41	81
Wyoming	2	20
Total	1,931	3,895

[1]2001 data; n/a = not available

LANDFILLING AND WASTE-TO-ENERGY STATISTICS

Based on data from 47 states, the total number of landfills in operation in 2002 is 1,767, a decrease of 375 from the total of 2,142 reported in 2000 (Table 7). A major reason for the decrease is not including landfills in Alabama and Alaska (which accounted for 304 landfills in 2000). Texas had 52 fewer landfills in 2002, which may be explained by the fact that, in 2000, the state noted that only 183 of its 227 landfills were active. In 2002, Texas reported 175 landfills (which is more in line with the 183 landfills in 2000). Tennessee reports a decrease of 14 landfills between 2000 and 2002. The only state reporting a significant increase of landfills in 2002 was Florida — from 61 in 2000 to 100 in 2002.

Table 7 also shows that average landfill tip fees ranged from a low of $13.63/ton in California to a high of $72.60/ton in Massachusetts.

The states also were asked to provide the amount of total landfill capacity remaining

Table 9. Waste imports and exports by state for 2002 (unless noted)

State	Imported (tons/yr)	Exported (tons/yr)
Arizona	383,000	10,000
Arkansas	168,352	370
California	26,477	616,639
Connecticut	63,396	366,003
Georgia	963,419	n/a
Illinois	5,800,977	n/a
Indiana	1,573,726	n/a
Iowa	402,780	127,785
Kansas	663,103	n/a
Kentucky	n/a	246,702
Maine	218,941	77,765
Maryland	456,663	1,943,124
Massachusetts	186,356	1,687,084
Michigan	3,831,481	n/a
Minnesota	n/a	636,225
Mississippi	537,504	n/a
Missouri	10,700	1,993,136
Nevada	534,018	0
New Hampshire	745,853	33,000
New Jersey	576,012	3,500,000
New Mexico	377,880	0
New York	567,500	5,400,000
North Carolina	n/a	882,247
North Dakota	101,196	10,000
Ohio	1,977,833	986,693
Oregon	1,625,962	18,668
Pennsylvania	9,999,557	300,000
South Carolina	954,854	507,661
Tennessee	n/a	549,053
Texas	65,603	n/a
Utah	138,700	n/a
Vermont	6,900	124,320
Virginia	4,508,839	n/a
Washington	172,708	1,146,331
West Virginia	203,869	431,956
Wisconsin	1,407,052	n/a

Tarr. *Iowa*: Becky Jolly and Jeff Geerts, Dewayne Johnson, Iowa Recycling Association, Shelly Codner (*BioCycle* contributor), and Jennifer Gitlitz (Container Recycling Institute). *Kansas*: Kent Foerster and Jami Iott and Chiquita Cornelius (Kansas BIRP). *Kentucky*: Sara Evans, Billy Hill and Bob Bickner. *Louisiana*: John Rogers. *Maine*: George MacDonald and Hank Tyler. *Maryland*: Hilary Miller, Virginia Lipscomb, Dave Mrgich, Edward Dexter and Frank Diller. *Massachusetts*: John Fischer and Amy Roth. *Michigan*: Matthew Flechter, Lucy Doroshko and Lynn Dumroese. *Minnesota*: Mark Rust, Don Kyser and Ginny Black. *Mississippi*: Mark Williams and Pradip Bhowal. *Missouri*: Rob Hargis.

Nebraska: Steve Danahy. *Nevada*: Dave Friedman and Les Gould. *New Hampshire*: Christopher Way and Marc Morgan. *New Jersey*: Ray Worob, Guy Watson, Joe Lomerson and Steve Rinaldi. *New Mexico*: E. Gifford Stack and John O'Connell. *New York*: Michael Munson, Sally Rowland, Peter Pettit, Scott Menrath and David Vitale. *North Carolina*: Scott Mouw and NC Division of Waste Management. *North Dakota*: Steve Tillotson. *Ohio*: Michelle Kenton, Andrew Booker and Patricia Raynek. *Oklahoma*: R. Fenton Rood. *Oregon*: Peter Spendelow, Marti Roberts-Pillon and Mary Sue Gilliland. *Pennsylvania*: Carl Hursh, Larry Holley, Sally Lohman, Patti Olenick, Linda Polk and Steve Socash. *Rhode Island*: Mike McGonagle and John Trevor. *South Carolina*: Celeste Duckett and Bill Culler.

South Dakota: Steven Kropp and Carrie Jacobson. *Tennessee*: Louis Bordenave and Larry Christley. *Texas*: Donna Huff, G. Michael Lindner and Scott McCoy. *Utah*: Ralph Bohn. *Vermont*: Vicky Viens and Julie Hackbarth. *Virginia*: G. Stephen Coe. *Washington*: Gretchen Newman. *West Virginia*: Carol Throckmorton and Phil Mann. *Wisconsin*: Cynthia Moore and Kurt Byfield. *Wyoming*: Bob Doctor.

measured in total tons or cubic yards. (Previous State of Garbage surveys requested total landfill capacity remaining in years.) The remaining capacity varies greatly among states providing that data (see Table 7). For example, Texas reports 970 million tons of landfill capacity remaining which, based on its 2002 MSW landfilling of about 21 million tons, corresponds to 46 years of landfill space. California, with 410 million tons of remaining capacity, has 13 years of landfill space, at current MSW landfilling rates. Other states with over 200 million tons of capacity include Illinois (212.4 million tons), Pennsylvania (299 million tons), and Washington (252 million tons).

As a final note on landfill data, in the current survey we asked states if landfill capacity is being added. Of the 47 states responding, only six replied "no" (Arizona, Nebraska, New Jersey, Oklahoma, Oregon and Virginia). Colorado, Connecticut and Texas did not answer the question.

Table 7 also includes data on waste-to-energy plants in the U.S. As noted earlier in this article, previous State of Garbage in America surveys did not specifically ask states for data on waste-to-energy combustion, but instead only asked about incineration (which may or may not include energy recovery). There were 107 WTE facilities reported for 2002, in comparison to the 132 WTE/incineration plants reported for 2000. Tipping fees at waste-to-energy plants ranged from $45/ton in Georgia (with only one WTE plant) to $81/ton in New Hampshire (with two WTE plants).

The average landfill tip fees ranged from a low of $13.63/ton in California to a high of $72.60/ton in Massachusetts.

Table 8 provides data on C&D landfills and MSW transfer stations. In 2002, there were a total of 1,931 C&D landfills, as compared to 1,825 reported for 2000. The total number of MSW transfer stations reported for 2002 is 3,895, versus 3,970 for 2000. Table 9 provides data on waste imports and exports, most of which flow through the nation's infrastructure of transfer stations.

Table 10 includes recycling tonnages reported by the states. Of the 47 states participating in the 2003 survey, only 32 provided a breakdown of the tonnages of various materials recycled. Finally, Table 11 show materials that are banned from MSW landfills in various states. For example, 21 states have bans on the landfill disposal of leaves, grass clippings and/or all yard trimmings.

Table 10. Quantity of materials recovered via recycling in 2002 (tons/year); unless noted, 32 states reporting

State	Glass	Steel	Aluminum	Other Metals	C&D	Wood	Paper	Plastic	Tires	Organics	Other
Arizona	13,521	54,933	8,857	28,038	n/a	44,530	317,015	10,205	29,608	316,124	227,528
Arkansas	2,712	430,687	4,179	73,355	n/a	145,106	317,444	35,107	9,650	n/a	373,738
Colorado[1]	12,054	2,405	775	590	50,000	36,530	63,383	1,713	250	15,871	8,781
Connecticut	33,406	n/a	n/a	101,917[2]	n/a	n/a	499,406	11,377	n/a	235,816	6,285
Delaware	4,694	17,744	5,408	0	768,172	0	88,841	37,388	22,629	32,360	9,778
Florida[3]	166,475	87,581	32,096	1,514,047	515,571	1,471,782[4]	1,341,399	54,729	53,863	n/a	n/a
Hawaii	6,559	118,634	6,560	4,325	n/a	n/a	33,012	n/a	n/a	79,401	181,615
Iowa[5]	47,409	601,569	7,058	n/a	n/a	103,194	341,691	29,724	n/a	294,978	n/a
Kentucky	6,898	171,287	14,009	n/a	n/a	n/a	410,912	3,431	1,901	16,645	n/a
Louisiana	30,596	13,391	30,000	n/a	n/a	n/a	205,829	38,940	n/a	83,444	n/a
Maine[6]	31,226	–[7]	–[7]	153,564	38,848	40,443	333,784	13,791	19,631	50,084	7,514
Maryland[8]	55,481	–[7]	4,451	251,703	2,895,499	122,101	909,447	35,930	17,282	645,230	558,050
Massachusetts[6]	412,016	–[7]	–[7]	240,144	3,146,394	n/a	1,443,453	44,976	n/a	443,147	n/a
Michigan[9]	167,447	–[7]	–[7]	869,837	n/a	n/a	712,526	40,624	n/a	739,904	19,908
Minnesota	106,877	41,982[10]	29,673	311,278[11]	n/a	n/a	841,911	45,148	n/a	167,529[12]	757,057
Missouri	170,462	224,116	91,916	61,972	n/a	–[13]	1,726,088	84,649	42,750	394,966	26,181[14]
Nebraska[5]	7,894	41,974[15]	12,957	n/a	n/a	n/a	301,708	4,334	n/a	n/a	n/a
Nevada	8,433	181,678	1,536	5,324	25,682	26,433	179,512	3,751	1,032	12,675	111,430[16]
New Hampshire	6,382	25,040	686	n/a	n/a	n/a	20,139	11,246	n/a	37,114	187,005
New Jersey[6]	259,723	–[7]	59,791	520,329	5,774,993	105,476	1,215,665	42,762	46,188	1,720,069	44,958
New Mexico	1,473	62,431	3,997	1,776	n/a	8,266	39,414	656	1,229	12,122	4,132
North Carolina[17]	49,891	83,886[15]	5,311	25,589	17,648	–[18]	267,840	17,269	62,000	468,901	11,322
Oregon	94,833	–[7]	n/a	262,390	37,151	386,053	679,971	23,647	23,327	443,966	73,059
Pennsylvania	64,890	393,317	18,732	226,934	690,019	141,628	1,184,181	36,098	31,067	498,391	803,765
Rhode Island	16,839	6,146	1,013	3,755	n/a	n/a	54,623	4,987	n/a	72,500	n/a
South Carolina	9,848	–	–	333,073	732,679	251,042[19]	438,804	25,588	49,621	134,712	455,018
Tennessee	34,214	711,688	81,035	63,584	1,332,090	30,600	511,025	33,082	61,582	162,347	253,355
Vermont	19,202	35,240	1,840	1,705	15,023	225	85,788	3,258	n/a	29,626	5,678
Virginia	72,579	–[7]	–[7]	570,871	280,608	361,565	872,044	134,447	55,888	540,282	553,255[20]
Washington	81,632	293,284	12,540	50,663	1,304,838	689,706	957,462	20,172	11,315	539,717	303,043
West Virginia	5,707	36,444	10,799	14,789	n/a	n/a	46,112	3,780	n/a	680	1,965
Wisconsin	109,470	29,890	18,220	n/a	n/a	23,630	896,170	30,980	6,150	225,240	38,720

[1]Based on data from 13 cities and/or counties; [2]Includes 11,852 tons of metal containers and 90,065 tons of scrap metal; [3]2000 data; [4]In 2002, 3,283,173 tons of wood waste generated by natural disasters and/or forest thinning, of which 1,471,782 tons diverted to wood-fired biomass plants; [5]All recycled tonnages except organics are 1999 data from "Economic Impacts of Recycling In Iowa," by R.W. Beck for Recycle Iowa (organics tonnages from 2003 "State of Garbage In America" survey response); [6]2001 data; [7]Included in "other metals"; [8]Based on data reported in 2003 "State of Garbage In America" survey response and in Maryland Dept. of Environment summary table, "County Recyclables By Commodity In tons for 2002"; [9]1999 data; [10]Steel cans only; [11]Includes mixed metals and ferrous scrap metals; [12]Food scraps only; [13]Included in organics tonnage; [14]Lead-acid batteries; [15]Steel cans and white goods; [16]Includes reported 177,317 tons of commercial recyclables and 9,688 miscellaneous tons; [17]Data from local government programs only — tonnages recycled by private businesses not available; [18]Included in C&D and organics tonnages; [19]Includes wood from yard trimmings and land clearing debris; [20]Includes commingled recyclables, textiles, used oil and oil filters, antifreeze, batteries, electronics and miscellaneous "other."

Table 11. MSW landfill disposal bans for selected materials

State	Yard Trimmings	Whole Tires	Used Oil	Lead-Acid Batteries	Batteries (General)	White Goods	Electronics	Others
Arizona		x	x	x				
Arkansas	x[1]				x			
California		x					x	
Connecticut	x[2]			x				
Delaware		x						
Florida	x		x			x		
Georgia	x	x		x				
Hawaii		x						
Idaho					x			
Illinois	x	x	x	x		x		
Indiana	x[3]	x		x				
Iowa	x	x	x	x				
Kansas		x						
Kentucky		x		x				x[4]
Louisiana		x	x	x		x		
Maine		x		x		x		
Maryland	x[5]	x	x		x			
Massachusetts	x	x		x		x	x[6]	x[7]
Michigan	x		x	x		x[8]		
Minnesota	x	x	x	x		x	x[6]	x[9]
Missouri	x	x		x		x		
Nebraska	x[1]	x	x	x		x		
New Hampshire	x		x	x				x[10]
New Jersey	x[11]							x[12]
New Mexico					x			
New York			x	x				
North Carolina	x	x	x	x		x		x[13]
North Dakota			x	x		x		
Ohio		x		x				x[14]
Oregon		x	x	x		x		x[15]
Pennsylvania	x[16]	x		x				
Rhode Island		x				x		
S. Carolina	x[17]	x	x	x		x		
S. Dakota	x		x	x		x		
Tennessee		x	x	x			x	x[18]
Texas		x	x	x				
Utah		x	x		x			
Vermont		x	x	x	x	x		x[19]
Virginia		x		x				
W. Virginia	x	x			x			
Wisconsin	x	x	x	x		x		x[12]
Wyoming				x				

[1]Leaves and grass; [2]Grass clippings; [3]Leaves, brush and woody vegetative matter >3 feet; [4]Yard trimmings are banned from a few landfills; [5]Separately collected loads of yard trimmings are banned from disposal; [6]Cathode ray tubes; [7]Glass, metal and plastic containers and recyclable paper; [8]Containing refrigerants; [9]Source separated recyclables; [10]Ni-Cad batteries; [11]Leaves only; [12]All recyclables in MSW stream; [13]Aluminum cans; [14]Yard trimmings are not banned but disposal is restricted; [15]Cars and other vehicles; [16]Truckloads comprised primarily of leaves; [17]Includes landclearing debris; [18]Oil-based paints and mercury bulbs; [19]Oil-based paint.

Texas reports 970 million tons of landfill capacity remaining which, based on its 2002 MSW landfilling of about 21 million tons, corresponds to 46 years of landfill space.

As noted throughout this report, a follow-up article will explore the 2003 State of Garbage In America findings in more depth. What seems to be evident (and thus safe to conclude), is that to truly understand solid waste management practices and trends — and the progress being made with source reduction, recycling and recovery —actual tonnages need to be recorded. We firmly believe the 2003 State of Garbage in America report is an excellent step in that direction. ■

Scott Kaufman is a graduate student in Earth and Environmental Engineering and a Junior Research Associate in the Earth Engineering Center (EEC) of Columbia University. Previously, he was an operating engineer and office manager at Vermont Compost Company in Montpelier, VT, then manager of the Manhattan Compost Project sponsored by the New York City Department of Sanitation at the NY Botanical Garden. *The support by Pratt Industries (Visy Paper) of Mr. Kaufman's studies at Columbia is gratefully acknowledged. Nora Goldstein is Executive Editor of BioCycle, and has been involved with the magazine's State of Garbage In America surveys since their inception.*

Karsten Millrath is a research scientist in the EEC of Columbia University, where he received his Ph.D. in Civil Engineering. Dr. Millrath is conducting research related to integrated waste management, in particular waste-to-energy (WTE) processes, and leads a project on beneficial uses of WTE residues. Nickolas J. Themelis is Director of the EEC and Stanley-Thompson Professor, Earth and Environmental Engineering, at Columbia University. EEC is the engineering unit of the Earth Institute at Columbia University, headed by Prof. Jeffrey Sachs. Prof. Themelis was the first Chair of the new Department of Earth and Environmental Engineering (1997-2000).

United States
Environmental Protection
Agency

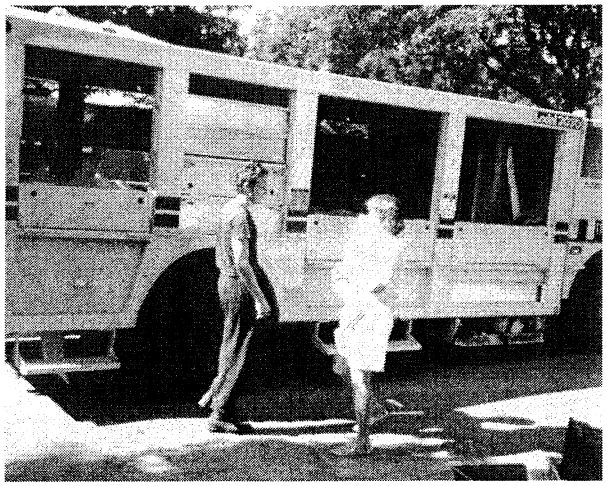
Solid Waste and
Emergency Response
(5306W)

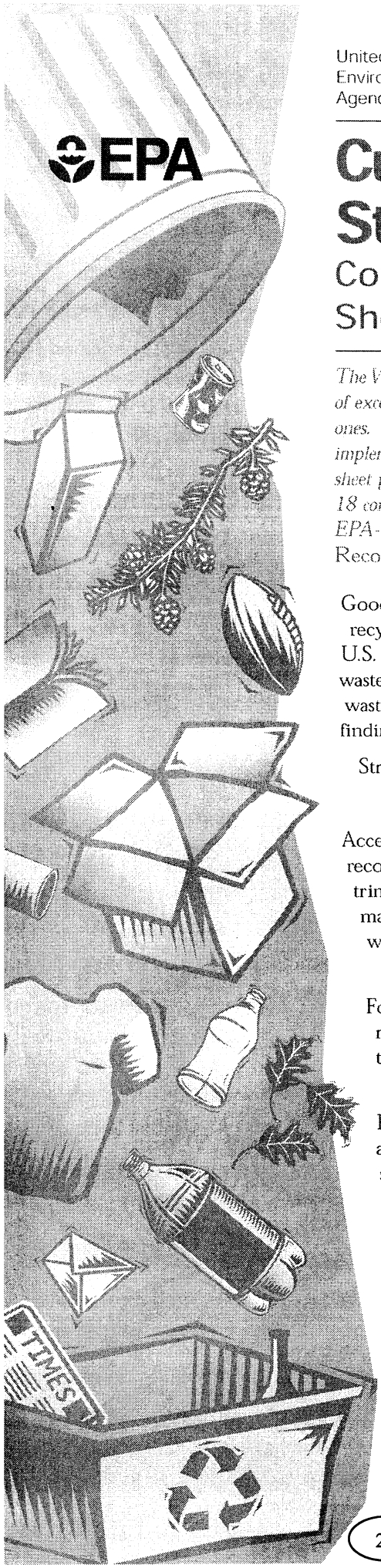
EPA-530-R-99-013
June 1999

EPA

Cutting the Waste Stream in Half:

Community Record-Setters Show How





United States Environmental Protection Agency | Solid Waste and Emergency Response (5306W) | EPA-530-F-99-017 October 1999 www.epa.gov/osw

Cutting the Waste Stream in Half

Community Record-Setters Show How

The Waste Reduction Record-Setters Project fosters development of exceptional waste reduction programs by documenting successful ones. These programs can be used as models for others implementing their own programs to reduce waste. This fact sheet packet highlights record-setting waste reduction programs in 18 communities and summarizes information presented in the EPA report EPA-530-R-99-013, Cutting the Waste Stream in Half: Community Record-Setters Show How.

Good news for communities hoping to reduce dependence on disposal — reuse and recycling (including composting) can cut their waste stream in half. The 18 diverse U.S. communities featured in this fact sheet are recovering 40 to 65% of their residential waste. Most report 50% and higher levels. Some are also reducing their municipal solid waste (residential, institutional, and commercial waste) at high levels. One encouraging finding is these high waste reduction levels are largely being achieved cost-effectively.

Strategies driving record-setting waste reduction levels include:

Targeting a wide range of materials

Accepting a wide range of materials increases the proportion of recoverable waste. These record-setting communities recover 17 to 31 different types of materials. Paper and yard trimmings are especially important. Paper recovery contributes 12 to 45% of residential materials diverted. Composting of yard debris diverts 17 to 43% of total residential waste in these communities.

Composting

For ten of the 18 record-setters, composting accounts for more than half of all residential waste reduction. Fall leaf collection may be the single largest contributor to waste reduction in communities with fall seasons.

Designing for convenience

Residents are more likely to participate if set-out requirements are uncomplicated and recyclables collection is frequent. Providing adequate containers for material storage and set-out also improves convenience. Providing both curbside collection and drop-off sites for materials gives residents more recycling options. On-site recycling at multi-family buildings makes recycling convenient to more residents.

Using "pay-as-you-throw" trash fees

Under pay-as-you-throw (PAYT) systems, residents pay by volume or weight for trash they set out at the curb. Such fees are a direct economic incentive to reduce trash and recover as much as possible. Eleven of the record-setters use PAYT fees.

Requiring resident participation

Local requirements and mandates encourage program participation. Eleven of the record-setters have some type of local ordinance requiring residents to source-separate or banning set-out of designated materials with their trash.

WASTE REDUCTION RECORD-SETTERS

Community	Character	Population	Residential Waste Generated (tons)	Residential Waste Reduction Level[1]
Ann Arbor, MI	Urban, college town	112,000	47,900	52%
Bellevue, WA	Suburban, urban	103,700	39,190	60%
Bergen Co., NJ	Suburban (70 towns)	825,400	1,086,060[2]	54%[2]
Chatham, NJ	Suburban borough	8,300	8,010	65%
Clifton, NJ	Suburban, urban	75,000	110,930[2]	56%[2]
Crockett, TX	Small rural city	8,300	2,710	52%
Dover, NH	Small rural city	26,100	9,460	52%
Falls Church, VA	Suburban	10,000	6,660	65%
Fitchburg, WI	Small rural city	17,300	4,150	50%
Leverett, MA	Rural town	1,900	650	53%
Loveland, CO	Small residential city	44,300	17,970	56%
Madison, WI	Urban, college town	200,900	88,580	50%
Portland, OR	Urban	503,000	966,920[2]	50%[2]
Ramsey Co., MN	Urban, suburban, rural	496,100	673,300[2]	47%[2]
San Jose, CA	Urban	873,300	1,315,440[2]	43%[2]
Seattle, WA	Urban	534,700	768,020[2]	44%[2]
Visalia, CA	City in rural area	91,300	50,810	50%
Worcester, MA	Urban	169,800	57,570	54%

Key: HHs = households NA = not available

Note: Waste generation and reduction levels represent the 1996 calendar year except for Ann Arbor (fiscal year 1996); Bergen County (1995), and Falls Church, Leverett, San Jose, and Visalia (all fiscal year 1997 data).

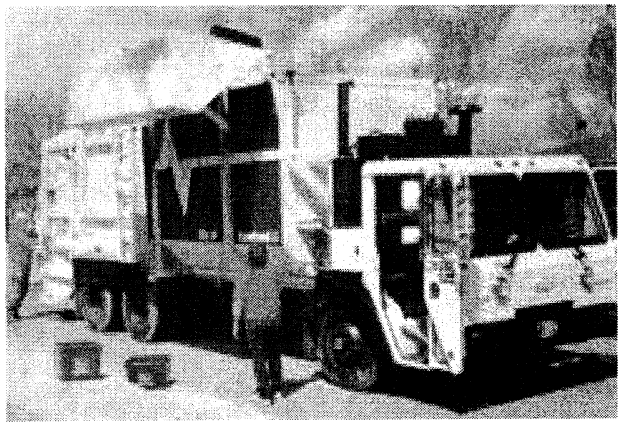
[1]Waste reduction levels may differ from the EPA Standard Recycling Rate as defined in *Measuring Recycling: A Guide for State and Local Governments*. The Institute for Local Self-Reliance excluded MRF rejects from recycling tonnages and included estimates of materials collected through container deposit systems for communities in bottle bill states. Furthermore, materials recovered for reuse are included in both recycling and generation figures and backyard composting tonnage was included in the composting and generation figures for those communities that provided creditable data on the amounts of materials handled this way.

[2]Represents municipal solid waste (residential, commercial and institutional waste streams).

Source: Institute for Local Self-Reliance, Washington, DC, 1999.

Please Note.

This fact sheet packet is based on the 171-page report, *Cutting the Waste Stream in Half: Record-Setting Communities Show How* (EPA-530-R-99-013). The report and this fact sheet were prepared under U.S. EPA grant number X825213-01-2 by staff of the Institute for Local Self-Reliance (ILSR). Please refer to the full report for detailed community profiles, specific cost information, waste reduction calculations and methodology, and a list of definitions.



Loveland's semi-automated dual-collection vehicle. Crews put recyclables into the split side-loading compartment and trash into the rear-loading packer compartment.

The methodology used in this research for calculating recycling rates refines the EPA Standard Recycling Rate as defined in the document *Measuring Recycling: A Guide for State and Local Governments* (EPA-530-R-97-011). For example, ILSR included tonnage diverted via state bottle bills, and subtracted material rejected at processing facilities from waste reduction levels. While ILSR recognizes that composting is a form of recycling, they treat it separately in this fact sheet packet so that the costs and diversion levels of recycling materials such as paper, bottles, and cans may be compared to the recycling of yard trimmings. ILSR includes both recycling and composting under the term "waste reduction."

Cost data are not meant to be comparable among communities. Rather, cost data are useful for comparing each community's program over time and within a particular year.

Contact

The Waste Reduction Record-Setters Project was developed by the Institute for Local Self-Reliance (ILSR) through a grant from the U.S. EPA. For more information on the project contact: ILSR, 2425 18th Street, NW, Washington, DC 20009, phone (202) 232-4108, fax (202) 332-0463, Web site <http://www.ilsr.org>

Highlights from Select Record-Setters

Ann Arbor, Michigan (Population: 112,000)

City programs recover 47% of household waste. The state's bottle return law diverts another 5%. The non-profit Recycle Ann Arbor (RAA) picks up 24 different recyclables weekly and also runs a drop-off station. From April through November, city crews collect grass clippings, leaves, and brush at curbside (which are banned from the landfill). The city earns $38,000 per year from compost and mulch sales.

Bellevue, Washington (Population: 103,700)

Bellevue's residential waste reduction climbed from 11% in 1989 to 60% in 1996. Its PAYT system, combined with comprehensive curbside collection, is the heart of the program. Almost two-thirds of customers subscribe to one 30-gallon can or 19-gallon mini-can per week trash service.

Dover, New Hampshire (Population: 27,000)

A PAYT system is responsible for Dover's residential recovery level increasing from 3% in 1990 to 52% in 1996. During the same period, per household costs for solid waste management dropped from $122 to $73.

Falls Church, Virginia (Population: 10,000)

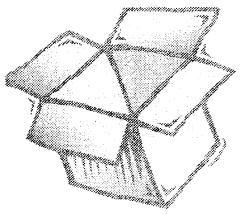
After implementing multi-material curbside collection, Falls Church reduced trash collection from twice to once weekly and cut the number of trash crew members from ten to seven. The solid waste management budget dropped from $1.05 million in FY90 to $630,000 in FY97. Falls Church recovers 65% of its residential waste.

Fitchburg, Wisconsin (Population: 17,300)

Fitchburg's mandatory recycling ordinance and multi-family recycling ordinance were the first in Wisconsin. It is also one of the few communities collecting clothing, toys, books, small appliances, and housewares at curbside monthly. The town disposed less waste in 1996 than in 1992 despite a nearly 20% growth in households. Per household waste handling costs dropped from $126 in 1992 to $108 in 1996.

Loveland, Colorado (Population: 44,300)

In the early 1990s, Loveland overhauled its waste management system in response to rising worker compensation insurance rates and aging trash trucks needing replacement. Specially designed dual-collection vehicles now pick up recyclables and trash each week. This system along with PAYT trash fees and several options for yard trimmings recovery result in a 56% residential recovery level. The city estimates it saves $100,000 per year through dual-collection as compared to separate trash and recycling collection.



San Jose, California (Population: 873,300)

This culturally diverse urban city diverts 43% of its municipal solid waste. Single-family household diversion levels reach 55%. Residential curbside recycling service to all single-family and multi-family households, PAYT trash fees, weekly year-round residential yard trimmings collection, and financial incentives for businesses to reduce waste drive San Jose's high recovery levels.

RESIDENTIAL PROGRAM CHARACTERISTICS

Community	# Materials[1]	% Composted	Mandatory	PAYT
Ann Arbor, MI	31	23%	✓	
Bellevue, WA	29	34%		✓
Bergen Co., NJ	Varies	32%	✓	Some[2]
Chatham, NJ	24	43%	✓	✓
Clifton, NJ	20	28%	✓	
Crockett, TX	25	32%	✓	
Dover, NH	28	17%		✓
Falls Church, VA	21	40%		
Fitchburg, WI	25	21%	✓	✓
Leverett, MA	25	23%	✓	✓
Loveland, CO	19	37%		✓
Madison, WI	17	34%	✓	
Portland, OR	22	17%		✓
Ramsey Co., MN	Varies	8%[3]	✓[4]	✓
San Jose, CA	23	26%		✓
Seattle, WA	23	21%	YT only	✓
Visalia, CA	20	33%		
Worcester, MA	24	27%	✓	✓

Key: PAYT = pay-as-you-throw YT = yard trimmings

Note: Most of the communities operate drop-off sites for recyclables and yard trimmings. Bergen County does not operate any drop-off facilities but 45 out of 70 communities in the county operate drop-offs for their residents. Madison and Worcester accept yard trimmings only at their drop-off facilities. San Jose does not operate any drop-off facilities but residents can deliver materials to the numerous private drop-offs located in the city.

[1]Represents the number of types of recyclable and compostable materials recovered through residential curbside and drop-off programs. For instance, old newspapers is one type. Juice and milk boxes are another type.

[2]Four out of 70 communities within Bergen County have implemented PAYT trash fees.

[3]Represents percentage of municipal solid waste composted as Ramsey County does not track residential materials separately from other MSW..

[4]Saint Paul and three other county municipalities have enacted mandatory recycling ordinances. More than half the county residents live in these communities. State law also bans leaves, grass, brush, and yard debris from state landfills and incinerators.

Source: Institute for Local Self-Reliance, Washington, DC. 1999.

Reaching Record-Setting Levels

Some Questions and Answers

Q Which record-setting program is the model?

A There is no one model. No two record-setting programs are exactly alike. For example, rural programs differ from urban ones. However, you can integrate the best features of the best programs to design a record-setting program that meets your community's needs.

Q Can big cities achieve high waste reduction levels?

A Yes. San Jose, California (pop. 873,300), recovers 55% of single-family household waste. The city targets multi-family and institutional and commercial waste (ICW), too. Its overall residential waste reduction level is 45%; ICW reduction is 41%. Seattle, Washington (pop. 534,700), diverts 49% of its residential waste. Its ICW reduction level is not far behind at 48%.

Q How essential is curbside collection?

A Program convenience is essential for high participation and thus high waste reduction. Weekly collection of recyclables and yard trimmings puts recovery programs on par with weekly trash pick-up. In Worcester, Massachusetts, residential recovery increased from 41% to 52% when pick-up switched from biweekly to weekly. Only one of our record-setters, Leverett, Massachusetts, offers no curbside service. However, residents in this rural town must also self-haul trash.

Q What role do state laws and goals play?

A State waste reduction goals, requirements, and policies influence many of our record-setters. Visalia, California, began its program in order to meet the state's 50% recycling goal. Worcester, Massachusetts' program was implemented on the heels of the state's landfill bans. Clifton, New Jersey, began its mandatory curbside program in response to the 1987 Statewide Source Separation and Recycling Act. Bottle bills have increased recovery levels in states with these policies.

Q Can high institutional and commercial waste (ICW) reduction levels be achieved?

A Yes. High ICW reduction may be easier to achieve than residential waste reduction as ICW tends to be more homogeneous and rich in recyclables. Bergen County, New Jersey (63% ICW reduction level), requires businesses and institutions to recycle a wide range of materials including mixed paper. Portland, Oregon, requires businesses to achieve 50% waste recovery by separating recyclables from mixed waste. Economic incentives, such as reduced tip fees for delivering recyclables to drop-off sites, tax incentives, and reduced franchise fees, also encourage businesses to recycle and haulers to offer recyclables collection. For example, in San Jose, California, haulers pay the city fees of more than $3 per cubic yard for trash; in contrast, recycling collection firms pay no fees for recyclables hauled.

COMMERCIAL PROGRAMS

Community	% ICW Recovered
Bergen Co., NJ	63%
Clifton, NJ	68%
Portland, OR	52%
San Jose, CA	42%
Seattle, WA	48%

Key:
ICW = institutional and commercial waste

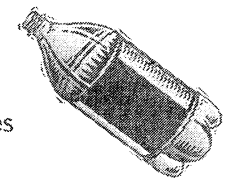
Source: Institute for Local Self-Reliance, 1999.

Q Is it better to contract out for service providers?

A Not necessarily. Service providers vary greatly among record-setters. Some systems are entirely publicly operated. Other record-setters contract or franchise out to for-profit or non-profit companies. And others use a combination.

Q What if no market for mixed paper exists?

A Much of waste is paper, making its recovery critical to record-setting waste reduction. If no market for mixed paper exists, take heart, recovery can still increase. Consider adding individual paper grades for which markets do exist such as corrugated cardboard or high-grade paper. Explore other opportunities such as expanding yard debris recovery, collecting textiles at curbside, and ensuring that reuse opportunities exist.



Q Won't costs increase as more types of materials are added?

A Not if new materials recovered offset trash collection and disposal so that the cost of trash crews, routes, and tip fees can be cut. The higher waste reduction levels are, the higher the avoided costs of disposal. The curbside collection of 20 types of materials in Seattle, Washington, have not raised net solid waste costs per household.

Q Does high waste reduction require big capital investments?

A No. Some record-setters (such as Bellevue, Washington) avoid equipment costs altogether with contracts. Others use existing equipment to minimize start-up costs. In Ann Arbor, Michigan, for instance, trash trucks double as yard trimmings collection vehicles. Fitchburg, Wisconsin, uses a tractor, which previously gathered dust in storage, to landspread recovered organics.

Cutting Costs

Most of the record-setters have reduced or stabilized solid waste management costs. Many factors contribute to cost-effective programs. One common thread is these communities consider waste reduction a primary waste management strategy. Recycling and composting are not treated as add-ons; rather, they form an integral part of overall waste management.

Specific techniques for cutting costs include:

Maximize diversion levels

High diversion levels can reduce costs in two major ways: (1) by significantly reducing landfill or other disposal costs, and (2) by eliminating some trash routes and their associated costs.

High waste diversion allows Madison, Wisconsin, to serve 10,000 more households with fewer and smaller trash trucks. The smaller trucks cost less and have lower maintenance costs. Since Worcester, Massachusetts, began recycling, the city decreased trash crew size from 3 to 2 and the number of routes from 11 to 9.

Compost

Yard trimmings collection costs vary among our record-setters, but tend to be lower than recycling collection costs because the material is homogeneous and needs less expensive, low-tech processing.

In Bellevue, Washington, one-third of residential waste is composted. Bellevue residents spend about $102 per ton for composting compared to $139 per ton for recycling. Chatham, New Jersey, keeps its composting program costs low by hosting a regional compost facility in return for free tipping of its grass clippings. Chatham also avoids capital outlays for yard debris recovery by leasing county equipment as-needed.

Implement PAYT trash programs

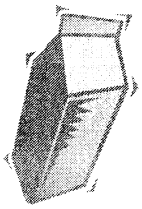
In communities with pay-as-you-throw (PAYT) trash fees, trash disposal per household decreases.

Dover, New Hampshire, instituted its PAYT system in 1991, the same year it began weekly curbside recycling. Between 1990 and 1996, per household trash disposal fell from 6 to 2.3 pounds per day. Dover's net residential solid waste management costs dropped from $1.1 million in 1990 to $798,000 while adding more than 1,000 customers. Per household costs have decreased from $122 in 1990 to $73 in 1996.

Augment curbside with drop-off sites

While curbside collection is critical to maximizing participation and therefore recovery levels, drop-off collection is generally cheaper for the community.

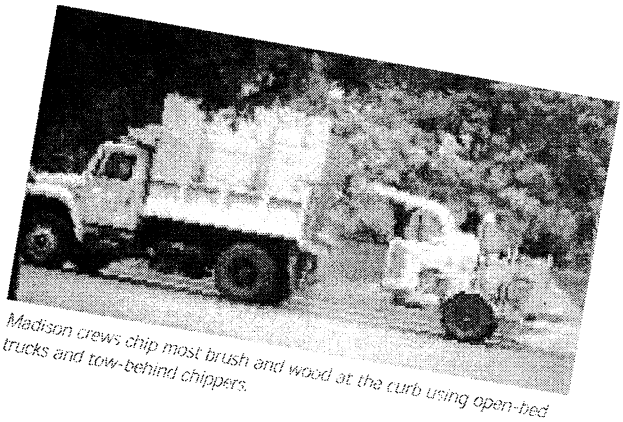
In 1996, St. Paul, Minnesota, avoided $75,000 in disposal fees and diverted 1,800 tons of material by offering residents drop-off opportunities for bulky goods from sofas and computers to skis. In Ann Arbor, Michigan, a comprehensive drop-off center accepts materials not collected at curbside (such as building materials, hardcover books, and appliances). Their costs to collect materials through drop-off are $14 per ton cheaper than through curbside collection, and drop-off increased the city's waste reduction level by 3%.



PAYT systems may also encourage the use of drop-off sites. In Dover, New Hampshire, drop-off collection accounted for 19% of all materials recovered. Their costs to collect and process drop-off materials average $14 per ton, compared to $77 per ton for curbside collection and processing of recyclables and yard debris.

Consider dual-collection

One way that Loveland, Colorado, and Visalia, California, have integrated recycling completely into their solid waste management systems is through use of dual-collection vehicles, which collect recyclables and trash in separate compartments on one truck. Dual-collection systems can save money by avoiding the need for two separate fleets of trucks and by increasing productivity of collection crews.



Madison crews chip most brush and wood at the curb using open-bed trucks and tow-behind chippers.

Tips from Record-Setters

Collection

Collect as wide a variety of materials as possible.

Collect yard trimmings for composting.

Use drop-off sites to augment curbside collection.

Distribute bins to all participants.

Education

Educate, educate, educate.

Target education at new residents and at all ethnicities.

Repeat messages in a variety of media.

Program Planning

Build broad program support during the planning stages by seeking public input, selling the program to those active in community (such as service and civic clubs), and building political support.

Make program participation as convenient as possible. Keep the program easy and user-friendly.

Investigate dual-collection, especially when faced with an aging trash fleet.

Learn from others' experiences. Find out what other communities have accomplished and how they did it.

Policies

Implement a pay-as-you-throw trash system (and include small container options).

Encourage source reduction and reuse.

Pass a local ordinance requiring residents, businesses, and institutions to participate in waste reduction activities or requiring haulers to offer their customers (residential and commercial) a minimal level of recycling service.

Enforce mandatory programs to boost both the quantity and quality of participation.

Offer recycling services to multi-family households, require haulers to provide these services, or require that multi-family building owners/managers provide recycling services to their tenants.

Ongoing Programs

Be prepared for resistance to change. Try to anticipate likely questions.

Seek out committed staff and administration to ensure program success.

Secure stable markets for reusable items and recyclables.

Avoid adding a material to the recycling program and then taking it away, especially if the trash system is pay-as-you-throw.

Track data to document success.

Be conservative when reporting recycling and composting tonnages and program costs.

Talk to your customers. Solicit input and give feedback on program progress.

Recruit and reward citizen volunteers, who have many skills and can help maintain community motivation

Be creative.

RESOURCES

Waste Reduction Record-Setters

- *Cutting the Waste Stream in Half: Community Record-Setters Show How* (EPA-530-R-99-013). Available from the RCRA hotline 1-800-424-9346 and at <http://www.epa.gov/epaoswer/osw/non-hw.htm#reduce>.
- The Waste Reduction Record-Setters Project Web pages: <http://www.ilsr.org/recycling>
- *On the Path to Sustainability* (Seattle's solid waste plan for reaching 60% diversion). Call (206) 684-7644 or download from the Web: <http://www.ci.seattle.wa.us/util/swplan/docs.htm>
- State waste reduction awards programs (e.g., California recognizes outstanding businesses; visit its Web page: <http://www.ciwmb.ca.gov/WRAP>. Wisconsin's Governor's Waste Reduction and Recycling Awards honor individuals, businesses, schools, and communities; its Web page is located at: <http://www.dnr.state.wi.us/org/caer/cea/award/govawrra/govawra.htm>.)

Composting

- *Compost, New Applications For an Age-Old Technology* (EPA530-F-97-047). Call 1-800-400-9198.
- U.S. EPA Compost Web Page: <http://www.epa.gov/epaoswer/non-hw/compost>
- *BioCycle: Journal of Composting & Recycling* published by JG Press, Inc., (610) 967-4135, Web: <http://www.jgpress.com>
- The U.S. Composting Council, (301) 913-2885, Web site: <http://www.CompostingCouncil.org>
- The Composting Resource Page Web site: <http://www.oldgrowth.org/compost>

Pay As You Throw

- U.S. EPA has produced a video, guide book, fact sheets, and a quarterly newsletter. Call 1-800-EPA-PAYT or visit the Web site: <http://www.epa.gov/epaoswer/non-hw/payt/index.htm>

Recycling in Multi-Family Dwellings

- *Multi-Residence Recycling Guide*, by the New York Department of Environmental Conservation and the Cornell Cooperative Extension. Call (518) 457-7337.

KEYS TO INSTITUTIONAL/COMMERCIAL PROGRAM SUCCESS

Institutional and commercial waste (ICW) is often a significant portion of municipal solid waste, even in small cities and suburbs. The U.S. EPA estimates ICW comprises between 35 to 45% of total MSW generated in the country.[1] Six of our communities — Bergen County, Clifton, Portland, Ramsey County/Saint Paul, San Jose, and Seattle — include ICW in their reported waste reduction levels. In these communities, recovered ICW represents 23% to 42% of all municipal solid waste generated.[2] Unlike most residential waste, ICW is usually not collected as part of community-operated or community-contracted waste management programs. In most communities, businesses and institutions directly pay private companies to collect ICW. Municipalities have been slower to target this waste stream for recovery compared to residential waste but cannot reach high recovery of the total MSW stream unless they do.

Figure 2 shows the importance of ICW recovery in reaching high MSW reduction levels. High recovery levels can be achieved both in communities that provide trash and recycling services to commercial and institutional customers and those where private companies provide commercial and institutional waste services. Table 13, page 30, presents data for ICW generated and recovered for our six ICW record-setters and summarizes their ICW recovery programs. Many of our residential waste reduction record-setters also target ICW for recovery, but their programs are not recovering close to or above 50% of ICW.

Our ICW record-setters are using the following strategies to spur the development of private sector waste reduction programs:

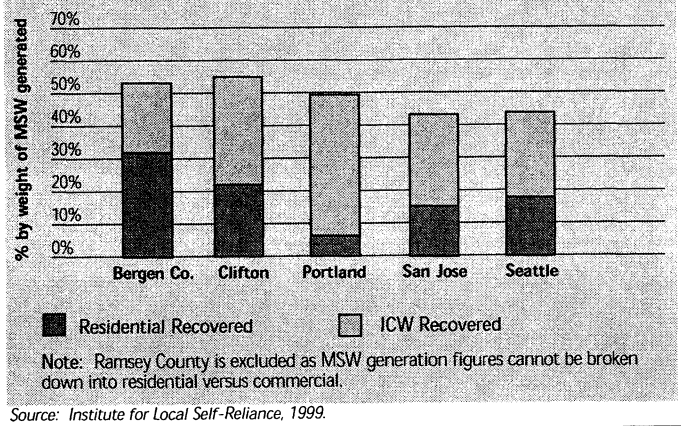
- mandating that businesses and institutions recover a wide range of recyclable and compostable materials, prohibiting disposal of specific materials such as yard trimmings, requiring businesses to submit reports on amount of materials recovered, and/or enforcing program requirements by inspecting businesses to see if they are meeting requirements or employing other enforcement mechanisms;
- requiring haulers to provide a minimal level of recycling services for a wide range of materials and/or requiring them to charge volume-based trash fees;
- instituting economic incentives targeted at businesses and private haulers, such as charging reduced or no tipping fees at recycling drop-off sites, charging lower franchise fees, and offering tax relief for haulers who recycle ICW;
- providing technical assistance, such as waste audits, disseminating listings of drop-off sites and private recycling services, and assisting businesses and haulers with marketing recovered materials by informing them of different marketing options or allowing them to bring materials to public processing centers; and
- providing municipal pick-up of a wide range of commercial/institutional recyclables and/or convenient drop-off depots that accept materials generated by the commercial and institutional sector.

State and Local Mandates

By requiring businesses and institutions to recycle, communities can encourage the establishment of a private sector recycling infrastructure. Of the six ICW record-setters, four require businesses to recycle.

In Bergen County, the county's Long-Term Solid Waste Management Plan requires commercial and institutional establishments to recycle corrugated cardboard, high-grade paper, mixed paper (newspapers, magazines, phone books,

FIGURE 2: THE CONTRIBUTION OF INSTITUTIONAL/ COMMERCIAL WASTE RECOVERY TO MSW REDUCTION



Note: Ramsey County is excluded as MSW generation figures cannot be broken down into residential versus commercial.

Source: Institute for Local Self-Reliance, 1999.

TABLE 13: INSTITUTIONAL/COMMERCIAL SECTOR RECOVERY ACTIVITIES

	Year	ICW Generated (tons)	ICW Recovered (tons)	ICW Waste Reduction (%)	Total Businesses	Mandatory	Economic Incentives
Bergen Co., NJ	1995	392,215	245,195	63%	30,900	yes	High tip fees ($103/ton)
Clifton, NJ	1996	56,714	38,561	68%	3,100	yes	High tip fees ($112/ton)
Portland, OR	1996	794,091	410,091	52%	50,000	yes	High tip fees ($63/ton)
St. Paul, MN[1]	1996	NA	NA	NA	7,800	yes	
San Jose, CA	1996	881,860	367,871	42%	27,000	no	Haulers charged reduced franchise and other fees for recyclables
Seattle, WA	1996	379,166	181,562	48%	45,000	no	Tax incentives for recycling haulers. Reduced tip fees charged for recyclables (including yard debris) at city facilities

Key: ICW = institutional and commercial waste NA = not available

Note: All of these communities offer waste reduction and recovery technical assistance, such as waste audits, consultations, workshops, and marketing assistance, to the institutional/commercial sector.

[1]ICW waste generated and recovered in St. Paul is not available as private haulers operating in the city also operate in the county and elsewhere. Neither the county nor St. Paul track ICW separately from other MSW generated.

Source: Institute for Local Self-Reliance, 1999.

paperboard, books, kraft paper bags, and mail), glass beverage containers, aluminum cans, ferrous scrap, and white goods. The county requires businesses to document and report the amounts of materials recovered.

The institution of economic incentives that reward recovery over disposal, such as reduced tipping fees for delivering recyclable and compostable materials to drop-off sites, tax incentives, and reduced franchise and other fees, encourage businesses to recycle and haulers to offer collection of recyclable materials.

Clifton, another New Jersey community, has passed an ordinance requiring commercial and institutional establishments in Clifton to "source separate, collect, transport, and market" materials for which markets are secured — currently 22 categories. Private contractors serving both residents and commercial establishments are required to report to the city the quantities of material they recycle. The recycling ordinance allows levying fines for non-compliance.

Effective January 1996, Portland required its businesses to source-separate recyclable materials in order to achieve a recovery level of at least 50% of their waste. The businesses are free to recycle whichever materials they choose. City staff began enforcing the ordinance in June 1996 by conducting unannounced business inspections. If warranted, staff make recommendations on improvements and offer free technical assistance. To date, no business contacted has refused to work toward compliance and no penalties have been issued. Surveys of Portland businesses have shown 29% of businesses reported they did not recycle in 1993 as compared to only 7% in 1996.

Saint Paul, where more than half of Ramsey County's population resides, requires commercial establishments to recycle at least three materials. The ordinance is enforced on a complaint basis only.

State policies have also helped spur recycling in the commercial and institutional sectors. For example, Minnesota prohibits all waste generators and handlers, including those in the business and institutional sectors, from placing leaves, grass clippings, garden debris, and tree and shrub waste with mixed MSW and disposing these in a landfill or incinerator. The state also prohibits tires, lead-acid batteries, used oil, major appliances, and rechargeable batteries from placement in mixed MSW.

Economic Incentives

Instituting economic incentives that reward recovery over disposal, such as reduced tipping fees

for delivering recyclable and compostable materials to drop-off sites, tax incentives, and reduced franchise and other fees, encourage businesses to recycle and haulers to offer collection of recyclable materials. High tipping fees for trash can also act as an economic incentive for recovery, although no communities have artificially raised tip fees for this purpose.

Seattle uses both reduced tipping fees and tax incentives to encourage commercial recycling. The city charges no tip fee for loads of recyclables delivered to its transfer stations. The per ton tip fee for a load of yard debris is 25% lower than the tip fee charged for trash delivered to these facilities. In addition, the city charges trash haulers a tax on collection revenues, but excludes collection of commercial recyclables from this tax.

In San Jose, financial incentives encourage waste reduction in the commercial and institutional sectors. Trash haulers pay the city fees for trash collected (in fiscal year 1997, $1.64 per cubic yard of trash in franchise fees and $1.77 per cubic yard of trash in source reduction and recycling fees). In contrast, recycling collection companies do not pay per ton fees for recyclables. The trash fees are a direct incentive for businesses to recycle and reduce their solid waste. City staff manage the franchises, ensure that franchised haulers remit proper fees, periodically audit haulers, and tabulate monthly data from haulers and recyclers on the amount of materials collected.

In Bergen County and Clifton, New Jersey, local mandates encourage businesses to recycle, but trash disposal fees, which at times have been above $100 per ton, may be a greater incentive. By recycling, local businesses not only comply with local laws but also achieve substantial savings on avoided disposal costs.

Technical Assistance and Outreach

All of our six ICW record-setters provide their commercial and institutional sector with some form of technical assistance.

Bergen County developed a waste audit manual for businesses and sent a copy to companies with more than 100 employees. Businesses were asked to complete the audit and return it to county staff. The staff used the audits to determine where its efforts were most needed. County staff provide on-site visits to businesses that request them.

Clifton's recycling coordinator has helped many businesses develop programs that meet or exceed the city requirements. When mandatory recycling first began, the recycling coordinator helped locate markets for materials, performed informal waste audits to help reduce waste, and provided advice on complying with the recycling ordinance.

All of our six ICW record-setters provide their commercial and institutional sector with some form of technical assistance.

In Portland, staff also help companies devise recycling programs to meet local recycling requirements. City staff have identified businesses needing assistance through inspections of business facilities.

San Jose staff likewise provide technical assistance to businesses by helping them implement in-house recycling programs, performing "waste assessments," and identifying end users for recycled materials. Businesses receive a packet that includes information on how to start recycling, waste reduction ideas, waste characterization analysis tools, a directory of recyclers, and a list of commercial solid waste services.

The Seattle Public Utilities and the Greater Seattle Chamber of Commerce sponsor the Business and Industry Recycling Venture (BIRV). This program encourages waste prevention, recycling, and purchasing of recycled-content products within Seattle's business community. BIRV offers businesses a hotline, informational materials, and technical assistance; and conducts presentations and seminars.

Notes:

[1]U.S. Environmental Protection Agency. *Characterization of Municipal Solid Waste in the United States: 1996 Update.* EPA/530-R-97-015. May 1997.

[2]The recovery level for ICW in Ramsey County/Saint Paul can not be calculated as ICW is not tracked separately from residential waste or total MSW.

Required Recycling and Incentive Program Survey
Summary of Findings

April 2002

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Terminology

Commercial/ Institutional Waste: municipal solid waste from the commercial sector. The commercial sector includes theaters, offices, retail establishments, hotels, and restaurants. The institutional sector includes establishments such as government agencies, hospitals, and schools.

Composting: recovering and processing discarded organic materials into a soil amendment, fertilizer and/or mulch. Composting is a form of recycling.

Construction and Demolition Debris: any recyclable or non-recyclable waste that results from construction, remodeling, repair, or demolition of buildings, roads, or other structures or from land clearing for development and requires the removal from the site of construction, demolition or land clearing.

Corrugated Paper: paper or cardboard manufactured in a series of wrinkles or folds or into alternating ridges and grooves.

Disposal Facility: a facility where any final treatment, utilization, processing or disposition of sold waste occurs.

Diversion: source reduction, reuse, recycling, and composting. Used interchangeably with "waste reduction."

Diversion Level: the sum of materials recovered divided by the total waste generated equals the waste reduction level.

Ferrous Metals: ferrous and alloyed ferrous scrap materials derived from iron including household, industrial, and commercial products including other cans and containers.

Flow Controls: legal authority used by state and local governments to designate where municipal solid waste must be taken for processing, treatment or disposal.

Franchise System: an arrangement whereby municipal government grants contractors exclusive rights to provide services in all or part of the municipality in return for a fee.

Free Market : an economic market in which supply and demand are not regulated or are regulated with only minor restrictions.

Generator: a person, business, and/or residence that generates materials that must be handled for recovery or disposal.

Hauler: a company that offers solid waste handling services including curbside collection of solid waste and recyclable materials, solid waste transfer and solid waste disposal.

HDPE Bottles: all bottles made of high-density polyethylene (HDPE), such as milk, juice, detergent, and other bottles.

Landfill: a disposal facility or part of a facility at which solid waste is permanently placed in or on land and which is not a land spreading disposal facility.

Level of Service: the level and degree of service provided at facilities including hours of operation, classes of customers served and recyclables collection available.

Mandatory Recycling: programs that, by law, require consumers to separate solid waste so that some or all recyclable materials are not burned or dumped in landfills.

Materials Recovery Facility (MRF): facility where recyclables are sorted, baled or otherwise processed so as to prepare them for end users.

Nonexclusive Franchise System: an arrangement whereby municipal government grants contractors nonexclusive rights to provide services in all or part of the municipality in return for a fee.

Participation Rate: the portion of households or businesses that take part in a program.

PET Containers: all bottles made from polyethylene terephthalate (PET), such as pop, oil, liquor, and other types of bottles.

Primary/Principal Recyclables: recyclable materials that are commonly collected and are included under the minimum service levels for recycling programs. These may include paper, cardboard, glass, tin and aluminum beverage containers, and plastic bottles.

Putrescible Waste: solid waste that contains material capable of being rapidly decomposed by micro-organisms.

Recyclables: materials separated from the solid waste stream and transported to a processor for end user recycling.

Recycling: the series of activities by which discarded materials are collected, sorted, processed, and converted into raw materials and used in the production of new products.

Recycling Rate: the tonnage of source-separated materials collected for recycling divided by the tonnage of waste generated.

Residential Waste: municipal solid waste from single-family and multi-unit residences and their yards.

Reuse: the repair, refurbishing, washing, or just the simple recovering of discarded products, appliances, furniture, and textiles for use again as originally intended.

Solid Waste: all putrescible and nonputrescible solid and semisolid wastes, including garbage, rubbish, ashes, industrial wastes, biomedial waste, swill and landclearing waste.

Source Reduction: the design, manufacture, purchase, or use of materials, such as products and packaging, to reduce the amount of materials before they enter the municipal solid waste management system.

Source-separated: divided by consumers into different fractions for disposal, recycling and composting.

Tip Fees: the fees charged to haulers for delivering materials at recovery or disposal facilities. Typically the price paid per ton, cubic yard, or other measurement to dispose of waste at a transfer station, composting, facility, incinerator, or landfill.

Transfer Station: a permanent fixed, supplemental collection and transportation facility, used by persons and route collection vehicles to deposit collected solid waste from off-site into a larger transfer station vehicle for transport to a solid waste handling facility.

Waste Reduction: source reduction, reuse, recycling, and composting; diversion.

Waste Stream: the total flow of solid waste from homes, businesses, institutions, and manufacturing plants that must be recycled, or disposed in landfills, or any segment thereof.

Yard Debris: leaves, grass clippings, brush, and/or plant clippings; yard trimmings.

Introduction

The Regional Solid Waste Management Plan (RSWMP) provides the region with the direction on how to meet its solid waste needs through 2005. RSWMP establishes goals and objectives, including a commitment to a 62 percent recovery rate by 2000 and 64 percent by 2005. In 2001, the recovery rate for the region was 55 percent. The region's overall progress in waste reduction has failed to keep pace with growing waste generation rates. Strong economic growth, particularly in the construction and demolition and commercial sectors, has fueled the growth in waste generation. Commercial waste makes the largest contribution to the region's total waste, and the construction and demolition sector is responsible for generating approximately a quarter of the region's waste. According to revised recovery rates, the region must recover an additional 50,000 tons of construction and demolition debris and 120,000 tons of source-separated business recyclables in order to meet the established goals. As a part of the next planning stages, a survey of North America was conducted of programs that focus on required recycling or incentives for materials generated by the commercial and construction and demolition waste streams.

This report profiles 15 communities with required recycling or incentive programs targeting materials in the commercial and construction and demolition waste streams. The resulting information may be used to establish policy and program approaches for increased recovery in the Metro region. Main components of this report include:

- a summary of key findings that highlights the critical elements, barriers and major lessons learned from the surveyed programs;
- an overview of the profiled programs and their required recycling and incentive strategies;
- summary tables of the profiled programs that include general characteristics and major elements of each program;
- in-depth profiles on each surveyed program that details the program's development, implementation and results to date;
- copies of available policies and rules for the surveyed programs; and
- a contact listing that includes contact name, phone, address, and web site for the surveyed programs.

Methodology

This report is based on document research and interviews with agencies involved with required recycling and incentive programs for materials in the commercial and construction and demolition waste streams. Required recycling is defined in this report as local or statewide material disposal bans and mandatory recycling requirements. Economic incentives for generators, haulers, material recovery facilities and landfills to increase recovery examined in this report include diversion or recycling deposits, tax incentives, reduced fees, recognition or assistance programs, and grants for recycling infrastructure development.

The programs featured in this report were selected from an inventory of commercial and construction and demolition required recycling and incentive programs in North America. The programs profiled were selected based on information available, survey response and program success with required recycling and incentive policies. A survey instrument was designed to help track contact information and program details (See Appendix Q). The purpose of the survey was to obtain basic information on how the communities developed and implemented commercial and

construction and demolition required recycling and incentive policies. Information was gathered through telephone interviews and e-mails from program managers as well as document research. Main sources include *Recycling Laws Update 2000*, *Biocycle*, *Resource Recycling*, and reports published by municipalities on individual policies and programs. Based on the information gathered in the survey and document research, individual summaries were written about each program and matrices developed on general program characteristics.

Key Findings

In communities throughout the United States and Canada, required recycling and incentive strategies for the commercial and construction and demolition debris waste streams have been successfully implemented. Key findings of the programs profiled in this report including critical elements, barriers and major lessons learned are detailed below.

- ***Required recycling programs have the potential to divert a significant portion of the waste stream and help communities meet recovery goals.*** Seven of the nine communities directly attribute their increase in recovery to required recycling programs. Since the implementation of required recycling in Dane County, the county's diversion rates for specific materials are more than 50 percent for cardboard, steel cans, plastic, glass, newspaper, and cardboard.

- ***Education and technical assistance are key factors to the implementation of mandatory recycling requirements.*** Virtually all of the program managers stressed the importance of education as a key element to a successful program. All of the surveyed programs provide the commercial sector with some level of technical assistance and education. Program managers noted it is important to have these components in place before the implementation of a required recycling program. Education and technical assistance provide incentives to participate, ensure that materials are separated properly and encourage public acceptance and willingness to participate. A strong education and technical assistance program will most likely require increased staff, budget and constant reinforcement.

- ***Using a cooperative approach to required recycling can build program support and influence participation.*** Program managers emphasized the importance of working with businesses, haulers and other stakeholder groups to develop the most attractive program.

- ***Strong commodity markets ultimately determine what is recyclable and influence participation.*** Nearly all of the communities noted the importance of reliable commodity markets. Program managers stressed that it is not practical to mandate materials unless the markets exist for the materials, and to only include recyclables with developed and stable markets to prevent having to change policies in the future. Identifying outlets for collected material is an important component in the planning process. A number of programs require the recycling of materials for which the cost of recycling is less than or equal to the costs of proper disposal at a solid waste facility.

- ***No required recycling or incentive program is identical.*** Each of the profiled programs is unique to their community and reflects the economics and infrastructure of their region. Nearly all of the communities implemented required recycling or incentive programs to help meet waste diversion or recycling goals.

- ***Enforcement is a key component of mandatory recycling requirements and disposal bans.*** All the communities with required recycling have some level of enforcement measures. The most common enforcement measures used in the profiled programs include random business inspections and landfill load inspections. Penalties for noncompliance include warnings and

fines that range from $25 to $10,000. The majority of the programs offer an assistance period to help businesses meet the requirements.

- ***Adequate resources need to be budgeted to support required recycling programs.*** A major impediment for communities implementing effective mandatory recycling requirements or disposal bans is sufficient resources for enforcement measures. Five of the nine programs noted lack of resources for enforcement measures as an obstacle to the program's success. Program managers stressed businesses will not adhere to required recycling policies unless they fear repercussions of noncompliance. In contrast, programs that have full-time enforcement officers stated that strong enforcement can boost both the quantity and quality of participation. Onondaga County's required recycling program has 4.0 FTE that provide business education, technical assistance and enforcement. The program has a business participation rate over 90 percent and the recycling rate was 68 percent in 2001.

- ***Enforcement measures have the ability to target a broad range of service providers from landfill operators to haulers to generators.*** Enforcement targets varied in the surveyed communities. The City of Portland's program focuses enforcement on the generator level with random business inspections. Including a generator requirement in the mandatory recycling requirement or disposal ban can emphasize business responsibility.

- ***Disposal bans are an effective means to reduce landfill waste and push recovery of selected items if markets or uses exist for the targeted materials.*** The majority of the bans targeted materials that are economically feasible to recycle in their community. Five of the profiled programs have material disposal bans that affect more than 14 materials. All five of the programs surveyed ban newspaper, aluminum and glass. Three ban yard debris, plastic, corrugated cardboard, whole tires, office paper, lead-acid batteries, and white goods. A number of the communities gradually phased-in the required recycling materials.

- ***Landfill bans can spur the market development for some materials.*** For example, landfill bans of yard debris have led to the development of composting infrastructure at the local and regional levels. In Vancouver, B.C. the ban on drywall has enabled recyclers and salvagers to competitively bid on the demolition of buildings, which has led to an increase in construction and demolition diversion from the local landfill[1].

- ***Landfill bans can be used as a means of flow control to impact those waste streams not controlled or managed directly by a city or a county particularly self-hauled wastes.*** Program managers noted that landfill bans are more easily enacted when a public agency owns a transfer station or landfill.

- ***Disposal bans require extensive promotion and education campaigns targeting the affected parties.*** Durham, North Carolina conducted a two-year education period before enforcement of the ban, although the city noted a concentrated campaign six-months prior to enforcement would be sufficient.

- ***Local government can influence the marketplace by the way it structures its garbage collection rates, franchise fees, and permit fees.*** A number of the surveyed communities utilize multiple incentives to reward recycling over disposal. Program managers indicated that one of the best voluntary incentives for businesses to recycle is an economic incentive.

[1]Mosher, Carl W. Memorandum to the Transportation and Environment Committee. 25 May 2000.

- ***Infrastructure development grant programs are an effective means to increase processing capacity and waste reduction efforts.*** Program managers indicated that grant assistance was one of the most cost effective waste diversion strategies.

- ***Diversion deposits provide sufficient incentive to encourage businesses to recycle.*** A number of communities in California have adopted diversion or recycling deposit systems to encourage the recovery of construction and demolition materials. Program approaches vary and deposits range from a flat fee based on the a project's total cost to fees based on square footage and the type of project.

- ***The largest barrier to a diversion deposit system is the administration of the transaction and refund process.*** Program managers commented that the refund turn-around process is slow and managing the financial components of the program requires additional resources and time. For example, San Jose's Construction and Demolition Diversion Deposit Program's refund process takes approximately 3 weeks, which is longer than the city originally anticipated.

Overview of Program Profiles

The 15 communities profiled in this report were selected from an inventory of commercial and construction and demolition required recycling and incentive programs in North America. The programs profiled were selected based on information available and program success with required recycling and incentive policies. Five of the communities profiled are counties. Chicago, Illinois is the largest city with a population of 2,896,016 people; Santa Monica, California is the smallest with 84,084. Nine are jurisdictions with more than 400,000 residents. Ten states in the United States and one regional municipality in Nova Scotia, Canada are represented.

The communities surveyed are using the following required recycling and incentive strategies to encourage the recovery of materials in the commercial and construction and demolition waste streams:

- mandating businesses and institutions to recover a wide range of recyclables, prohibiting the disposal of specific materials, requiring business to submit reports on the amount of material recovered, enforcing program requirements by inspections and fines;
- requiring haulers to provide a minimal level of recycling services for a wide range of materials;
- instituting economic incentives for businesses and private haulers including charging reduced or no tipping fees at recycling drop-off centers, instituting a diversion or recycling deposit system, charging reduced franchise fees, and providing tax incentives on commercial source-separated recyclables; and
- providing technical assistance such as waste audits, disseminating listings of drop-off sites and providing educational materials.

An overview of these strategies and the surveyed programs is described in the following pages.

State and Local Mandates

Policies at the state level encourage governments at the local level to implement waste reduction programs. Recycling goals set at the state level provided stimulus for a number of the profiled communities to implement mandatory recycling requirements. Table 1 summarizes the recycling or diversion goals of the profiled communities.

Mandatory recycling requirements can assist communities in meeting recycling goals and encourage the development of private recycling infrastructure. These programs can include waste diversion requirements that require businesses to achieve a certain waste diversion goal, to participate in a specific recycling program, or to source-separate designated recyclable materials. Of the surveyed programs, nine have mandatory recycling requirements for commercial recyclables including four communities that have additional requirements for construction and demolition materials.

Disposal bans have been another impetus for communities to develop alternative methods to deal with specific materials. Disposal bans can be utilized to push the recovery of target materials and may also be used as a de facto alternative to flow control for some state and local governments. Five of the profiled programs have material disposal bans.

Cambridge, Massachusetts

Massachusetts prohibits the disposal of lead-acid batteries, white goods, whole tires, leaves, yard waste, glass, metal and plastic containers, recyclable paper, and cathode ray tubes in landfills or combustion facilities. There is no statewide mandatory recycling law, but 168 of 351 municipalities have mandatory recycling ordinances, bylaws or regulations as of March 2000. Cambridge, Massachusetts adopted a mandatory recycling ordinance in 1991. The ordinance requires businesses and institutions to conduct a waste audit and source-separate for recycling any material that constitutes more than 5 percent of their refuse. Businesses must develop and file a recycling plan for those items in excess of 5 percent.

Chicago, Illinois

Chicago's City Council adopted the Workplace and Residential Recycling Ordinance in 1994, requiring all property mangers and building owners to implement an effective recycling program. Businesses are required to source-separate three recyclable materials, or source-separate two recyclable materials and conduct two source reduction measures. Source reduction measures include double-side copying, reducing packaging, energy efficient light bulbs, and reusing supplies. Businesses must also develop an education program and a written recycling plan.

Dane County, Wisconsin

Under the state's comprehensive recycling law, SB 300 enacted in 1990, the state bans lead-acid batteries, tires, yard waste, major appliances, motor oil, newspaper, magazines, corrugated, office paper, glass, aluminum cans, bimetal cans, plastic containers, and polystyrene (PS) foam from landfill disposal. The ban required cities, towns and villages to adopt a mandatory recycling ordinance that requires the recycling of specific materials. Counties were allowed to take over the implementation of recycling systems if given approval by their cities, villages and towns. Dane County dictates that in order to use the county-owned landfill municipalities must implement source separation and mandatory recycling of specific items for all generators. Since 1987, the county gradually added specific materials that are required to be recycled including newspapers, yard waste, corrugated cardboard, steel cans, aluminum cans, glass bottles and jars, plastic bottles, used oil, lead-acid batteries, appliances, magazines, office paper, and tires.

Durham, North Carolina

In order to reach recovery goals set forth in the Solid Waste Management Plan, Durham City Council directed solid waste staff to develop an ordinance that bans the disposal of target materials. Durham implemented a disposal ban on target recyclables including glass bottles, aluminum cans, steel cans, newspapers and corrugated cardboard in January 1998. The state bans the landfill disposal of lead-acid batteries, used oil, whole tires, white goods, aluminum cans, anti-freeze and yard waste.

Halifax Regional Municipality, Nova Scotia

The provincial disposal ban on specific materials was implemented between 1996-1998, banned materials were gradually increased over the three-year period. The municipal integrated waste management plan and recycling requirements for the Halifax region were adopted in 1996 and implemented in 1998. Additional requirements for construction and demolition debris processing were added in July 2001. Materials that are banned from landfill disposal include corrugated cardboard, newsprint, automotive lead-acid batteries, yard debris, steel/tin cans, glass jars, waste paint, used tires, antifreeze, #2 HDPE non-hazardous plastic containers, stretch wrap, and compostable organic material.

Monomouth County, New Jersey

Monmouth County formally adopted its initial District Recycling Plan in February 1987, two months before the Statewide Mandatory Source Separation and Recycling Act was signed into law. The statewide act requires each municipality to source-separate and recycle at least three materials in addition to leaves. The county's program goes beyond the basic requirements of the state's mandate and requires the recycling of additional materials. The county evaluated the waste stream to determine what materials would be mandated. Required recycling materials include newspaper, glass, aluminum, leaves, bimetal food and beverage cans, high-grade paper corrugated cardboard, asphalt, concrete, and certain wood wastes.

Onondaga County, New York

New York State's Solid Waste and Management Act of 1988 required municipalities to adopt ordinances that require source separation for residential and commercial waste streams by September 1, 1992. The act mandates municipalities require the separation of those materials for which the cost of recycling is less than or equal to the costs of proper disposal at a solid waste facility. Ononodaga County implemented a Source Separation Law in 1990 that requires households and businesses to recycle corrugated cardboard and paper, glass, metal, newspapers, magazines, plastics, beverage cartons, and paperboard if the quantity generated economically justifies a separate collection. Waste audits are conducted at businesses to determine which materials they will be required to recycle.

Portland, Oregon

The City of Portland implemented mandatory recycling requirements in 1996 for materials in the commercial and construction and demolition waste streams. Portland requires businesses, multi-family residents and construction projects valued at $50,000 or more to source-separate recyclable materials in order to achieve a recovery level of at least 50 percent of their waste. Businesses may select which material to recycle.

San Diego County, California

In 1991, the San Diego County Board of Supervisors adopted a mandatory recycling ordinance (MRO). The MRO requires designated recyclables be source-separated. Each city was required to adopt an MRO of its own. The county introduced surcharges in phases to a maximum of $100 per load of solid waste to a county landfill. The MRO includes enforcement by disposal bans on specific materials at county-owned landfills. Required recycling materials include newspaper, metals, glass, bimetal cans aluminum, corrugated cardboard, tin, magazines, high-grade office paper, yard debris, white goods, asphalt, concrete, land-clearing debris, sand, and rock.

Economic Incentives

In contrast to mandatory recycling requirements, some communities encourage the development of waste reduction programs through incentives. Of the profiled programs, seven utilize incentives to encourage waste reduction and diversion. An incentive-based approach to commercial recycling may include the adoption of policies and the structuring of the marketplace for commercial generators, haulers, material recovery facilities and landfill operators to reward recovery over disposal. Economic incentives used by the communities highlighted in this report include reduced tipping fees for delivering recyclable materials to drop-off sites, grants for infrastructure development, advanced recycling fees or diversion deposits, tax incentives and reduced franchise fees. The surveyed communities with incentive programs are highlighted below.

Iowa

Iowa's Solid Waste Alternative Program is a $3.2 million annual statewide financial assistance program, which funds the development and expansion of waste reduction and recycling projects to help increase diversion. Any entity that is interested in or responsible for reducing the amount of waste going to Iowa's landfills is eligible. Proposals are accepted year round. Awards are announced quarterly after a competitive review.

King County, Washington

King County uses a recognition program and free technical assistance to aid with green building certification as incentive for contractors to increase construction and demolition project recovery. The Construction Works Recognition Program publicizes construction companies that recycle, reduce waste and use recycled products on the construction job site. Contractors can receive free assistance and recognition for successfully recycling at least 60 percent of their construction waste, purchasing recycled content building materials for the project and practicing several waste prevention strategies.

San Jose, California

In San Jose, diversion deposit and infrastructure grant programs are used as financial incentives to increase construction and demolition project waste diversion. The Construction and Demolition Diversion Deposit Program (CDDD) requires a clearance document and recycling deposit (based on project square footage) before a building permit is issued for construction, demolition or remodeling projects that fall under specified thresholds. The deposit is returned when applicants provide receipts or records that materials from the project have been diverted. The Construction and Demolition Infrastructure Program was developed and adopted as a component of the CDDD to infuse any unclaimed deposits into the development of additional construction and demolition processing infrastructure. Grants are used to encourage processors to invest in construction and demolition sorting capabilities to maximize the quantities recovered.

Santa Clara, California

In Santa Clara, financial incentives are used to encourage haulers to collect recyclables from the institutional sector. All nonexclusive franchised haulers collecting waste from the industrial area (heavy industry, office buildings and high tech) of Santa Clara must pay the city a franchise fee of 25 percent of their total gross billings (including bin and rental charges). The city charges a reduced franchise fee to haulers on businesses that they collect at least 50 percent of recyclable materials. Haulers file quarterly reports to the city documenting the amount of recyclable materials collected by weight and type.

Santa Monica, California

Santa Monica's Construction and Material Waste Recycling Ordinance requires all construction and demolition projects that fall under specified thresholds to divert at least 60 percent of their construction and demolition waste. Applicants are required to submit a Waste Management Plan and a deposit of three percent of the total project cost. The deposit is refunded with documentation that materials have been recycled.

Seattle, Washington

Seattle uses both reduced tipping fees and tax incentives to encourage commercial recycling. At city transfer stations, the per ton tip fee for solid waste is $96.25 per ton. Businesses that self-haul recyclabes to city transfer stations can tip them for free and tip fee for yard debris is 25 percent lower than solid waste. In addition, the city excludes revenues from collection of commercial recyclables from the city's Business and Occupation Tax (SMC 5.48.055) of $12.05 per ton that haulers must pay on solid waste collection revenues.

The following section includes in-depth profiles on each surveyed program that details the program's development, implementation and results to date. Summary data tables highlight the profiled program characteristics.

Table 1. General Characteristics of Profiled Communities

Jurisdiction	Population	# of Businesses	Recycling Goal	Recycling Rate	Commercial Recycling & Garbage Collection	Mandatory recycling requirement	Disposal ban	Processing requirement	Reduced fees and/or tax incentives	Grant/loan program	Diversion Deposit	Recognition/assistance	Targeted Waste Stream
Cambridge, MA	101,355	/	45% by 2000	/	Private (recycling); Municipal (garbage)	X	X						Commercial.
Chicago, IL	2,896,016	/	40% by 2000	44.89%, 2000	Free market	X							Commercial, Multi-family residences.
Dane County, WI	426,526	12,000	/	**	Free market	X	X						Commercial, Residential.
Durham, NC	187,035	/	25% by 2001; 40% by 2006	38%, 1998	Contract		X						Commercial, Residential.
Iowa	2,926,324	/	50% by 2000*	34.37%, 2000*	Varies per municipality					X			Commercial, Construction and Demolition.
King County, WA	1,737,034	/	/	/	Varies per municipality							X	Construction and Demolition.
Monmouth County , NJ	615,301	/	65% by 2001	55%, 2000	Varies per municipality	X							Commercial, Construction and Demolition.
Onondaga County, NY	458, 336	15,000	50% by 1997	68%, 2001	Varies per municipality	X							Commercial.
Halifax Regional Municipality, Nova Scotia	358,000	/	65% by 2004*	58%, 2001*	Free market		X	X					Construction and Demolition.
Portland, Oregon	531,600	15,500	60% by 2005	54%, 2000	Free market	X							Commercial, Multi-family residences, Construction and Demolition.
San Diego County, CA	2,813,833	/	50% by 2000*	44%, 2000*	Nonexclusive franchise	X	X						Commercial, Construction and Demolition and Residential.
San Jose, CA	894,973	27,000	50% by 2000*	53%, 2000*	Nonexclusive franchise					X	X		Construction and Demolition.
Santa Clara, CA	102,361	5,592	50% by 2000*	40%, 1998*	Franchise				X				Commercial.
Santa Monica, CA	84,084	99,771	50% by 2000*	55%, 2000*	Municipal and Contract						X		Construction and Demolition.
Seattle, WA	563,374	/	60% by 2008 (city); 63% by 2008 (commercial)	44%, 1998 (city); 48%,1998 (commercial)	Free market (recycling); Contract (garbage)				X				Commercial, Residential.

* = Diversion goal or rate.

/ = No data available or not applicable.

** = See Dane County Program Profile for diversion rates by material.

All the recycling or diversion rates include construction and demolition debris in their calculations with the exception of Dane County, WI.

Table 2. Commercial Required Recycling Programs

Jurisdiction	Start Date	Mandatory recycling requirement	Disposal ban	Target Materials	Target Generators	Education & Technical Assistance	Enforcement Measures	Results to Date
Cambridge, MA	July 1992	X	X	Corrugated cardboard, newspaper, glass, aluminum, plastic bottles, white office paper, steel or tin cans, used oil, vehicle batteries, yard debris, scrap metal, and wood waste.	Businesses, institutions and multi-family residences with <1 resident.	Yes	Yes	No data.
Chicago, IL	January 1995	X		Principal recyclables including newspaper, glass, plastic bottles, aluminum, tin, and paper.	Businesses, institutions and multi-family residences.	Yes	Yes	44.89% recycling rate in 2000.
Dane County, WI	1978	X	X	Corrugated cardboard, newspaper, magazines, steel, office paper, glass, plastic bottles (PETE and HDPE), yard debris, used oil, aluminum, tires, appliances and lead-acid batteries.	All generators.	Yes	Yes	Diversion rate increase of more than 50% for cardboard, newspaper, steel, plastic, and glass.
Durham, NC	January 1998		X	Corrugated cardboard, newspaper, glass bottles and jars, aluminum, and steel cans.	All generators.	Yes	Yes	Commercial tonnage remained relatively unchanged.
Monmouth County , NJ	April 1998	X		Newspaper, glass containers, aluminum cans, high-grade paper, corrugated paper, bi-metal food and beverage cans, leaves, asphalt, concrete, and certain wood wastes (paluminum iets, clean lumber, stumps).	All generators.	Yes	Yes	25% recycling rate in 1988 to 55% in 2000.
Onondaga County, NY	July 1990	X		High-grade office paper, mixed paper, corrugated cardboard, paperboard, plastic bottles (HDPE and PET), metal (non-ferrous and ferrous), newspaper, magazines, beverage containers, and Kraft paper.	All generators.	Yes	Yes	90% business participation rate.
Halifax Regional Municipality, Nova Scotia	April 1996	X	X	Corrugated cardboard, newspaper, redeemable beverage containers, steel/tin cans, glass jars, plastic bottles (#2 HDPE), leaves, yard waste, compostable organic material, used tires, waste paint, stretch wrap, antifreeze, lead-acid batteries, asphalt pavin	All generators.	Yes	Yes	90% participation rate and 58% diversion rate in 2001.
Portland, OR	January 1996	X		Recyclables including newspaper, metals, glass, aluminum, corrugated cardboard, steel, tin cans, high-grade office paper, magazines, mixed waste paper, plastic bottles, rubble, land-clearing debris, and wood.	All businesses, multi-family residences and building projects valued at $50K or more.	Yes	Yes	Recovery rate in commercial sector went from 46.2% in 1996 to 54% in 2000.
San Diego County, CA	1991	X	X	Newspaper, bi-metal cans, glass bottles, aluminum, corrugated cardboard, office paper, plastic bottles, yard debris, white goods, asphalt, concrete, land-clearing debris, sand, and rock.	Multi-family residences, businesses and institutions with office buildings <20K square feet.	Yes	Yes	Achieved diversion goal of 50% 3 years early in 1997.

Note: Enforcement measures include random business and landfill load inspections. Penalties for noncompliance include warning and fines that range from $25 to $10,000.
Education and techical assistance elements include outreach programs and on-site assistance.

Table 3. Construction and Demolition Required Recycling Programs

Jurisdiction	Start Date	Mandatory recycling requirement	Disposal ban	Processing requirement	Target Materials	Target	Education & Technical Assistance	Enforcement Measures	Results to Date
Halifax Regional Municipality, Nova Scotia	July 2001		X	X	Asphalt paving, aggregate and soil, brush and leaves, concrete, milled wood free of adhesives coatings and preservatives, porcelain, ceramic, root balls and stumps, scrap metal, window glass.	All generators and processors.	Yes	Yes	TBD
Monmouth County , NJ	October 1998	X			Certain wood waste (pallets, clean lumber, stumps), asphalt and concrete.	All generators	Yes	Yes	25% recycling rate in 1988 to 55% in 2000.
Portland, OR	January 1996	X			Rubble (concrete/asphalt), land-clearing debris, corrugated cardboard, metals, plastic, glass, and wood.	Building projects valued at $50K.	Yes	Yes	Recovery rate in commercial sector went from 46.2% in 1996 to 54% in 2000.
San Diego County, CA	1991	X	X		Asphalt, concrete, dirt, land-clearing brush, sand, and rock.	Industrial loads consisting of 90% or more of the target materials.	Yes	Yes	Achieved diversion goal of 50% 3 years early in 1997.

Note: Enforcement measures include random business and landfill load inspections. Penalties for noncompliance include warning and fines that range from $25 to $10,000.

Education and techical assistance elements include outreach programs and on-site assistance.

Table 4. Economic Incentive Programs

Jurisdiction	Start Date	Reduced fee/tax incentives	Grant/loan program	Diversion Deposit	Recognition/assistance	Description	Waste Stream	Target	Results to Date
Iowa	July 1999		X			The Solid Waste Alternatives Program (SWAP) provides financial assistance in grants and loans to expand waste reduction and recycling projects.	Commerical, Construction & Demolition Debris	All generators.	$42 million funds dispersed to date to more than 350 recycling and waste reduction projects.
King County, WA	1997				X	The Construction Works Program publicizes C&D companies that recycle and provide them with free assistance and aid them in getting point towards green building certification.	Construction & Demolition Debris	All construction projects.	22 projects.
San Jose, CA	July 2001			X		The Construction and Demolition Diversion Deposit Program (CDDD) is based on a system in which the city collects a recycling deposit (based on square footage of project) when a building permit is issued for construction, demolition or remodeling projects.	Construction & Demolition Debris	Construction, demolition and remodeling projects. Certain exemptions based on project value and square footage.	22 certified facilities. Data indicates the CDDD program has been effective at capturing self-haul mixed C&D loads.
San Jose, CA	1999		X			Construction and Demolition Debris Infrastructure Grant Program provides funding to facilities to expand processing capacity.	Construction & Demolition Debris	All C&D processors.	FY 99-00 $250,000 dispersed and FY 00-01 $500,000 dispersed.
Santa Clara, CA	1980	X				The city reduces the franchise fee on businesses that haulers collect at least 50 percent of recyclable materials.	Commerical	Industrial sector and haulers.	15 haulers have been certified to obtain the reduced hauling fee.
Santa Monica, CA	May 2001			X		The Construction and Material Waste Recycling Ordinance requires all construction and demolition projects that fall under specified thresholds to divert at least 60% of their C&D project related material. Applicants are required to submit a Waste Management Plan.	Construction & Demolition Debris	Construction and demolition projects that are +$50k or are <1,000 square feet.	To date, 10% to 15% increase in diversion.
Seattle, WA	1994	X				Seattle excludes revenues from collection of commercial recyclables from the city's Business and Occupation Tax (SMC 5.48.055) of $12.05 that haulers must pay on trash collection revenues. Seattle also uses reduced tipping fees for self-haul recyclables.	Commerical	All generators.	48% recovery rate in 1996 up from 44% in 1989.

Profiles of Required Recycling and Incentive Programs

The program profiles, pages 14 to 51, provide comprehensive information about each program's development, implementation and results to date. Each profile lists a primary contact for the information that is provided in the summary. The profiles follow a similar structure and format. Copies of the relevant program policies and rules are included based on availability in the Appendices. Summary data tables highlight the general characteristics of each surveyed program (See Tables 1, 2, 3, and 4).

The profiles are organized in alphabetical order as follows:

- Cambridge, Massachusetts
- Chicago, Illinois
- Dane County, Wisconsin
- Durham, North Carolina
- Halifax Regional Municipality, Nova Scotia
- Iowa
- King County, Washington
- Monmouth County , New Jersey
- Onondaga County, New York
- Portland, Oregon
- San Diego County, California
- San Jose, California
- Santa Clara, California
- Santa Monica, California
- Seattle, Washington

Cambridge, MA

General Information

Location: Cambridge, Massachusetts
Program Type: Mandatory recycling requirements and statewide disposal ban on designated materials
Population: 101,355 (U.S. Census, 2000)

Contact Information

Contact: Rick Leandro, Recycling Program Manager
Agency: City of Cambridge
Address: 147 Hampshire Street, Cambridge, MA 02139
Phone: (617) 349-4836
E-mail: RLeandro@ci.cambridge.ma.us
Web site: www.ci.cambridge.ma.us

Commercial Recycling Program

Recycling Goal: No current data.

Current Recycling Rate: No current data.

Collection System: The city sponsors a commercial curbside recycling program for small to medium size businesses. The price for this is set in the city's contract. The city-owned recycling drop-off center is free to businesses with less than 50 employees. The city also provides businesses with a list of private haulers who they can call and negotiate rates and services.

Program:
- Mandatory Recycling Ordinance
- Massachusetts Waste Bans

Start Date: The City of Cambridge Mandatory Commercial Recycling Program was adopted in March 1991 and implemented in July 1992.

Target Generators: All businesses, institutions and multi-family residences with more than one tenant.

Target Materials:
- Corrugated cardboard
- Newspapers
- Glass
- White office paper
- Plastic
- Steel or tin cans
- Waste oil (kitchen/car)
- Vehicle batteries
- Leaves & yard waste
- Scrap metal
- Wood waste
- Aluminum

General Description: The mandatory recycling ordinance requires generators to separate certain recyclable materials from refuse. Businesses and institutions are required to conduct a waste audit and source-separate for recycling any material that constitutes more than five percent of their trash. A recycling plan must then be developed and filed for those items in excess of five percent. Landlords/management companies that coordinate garbage service for more

than one tenant in a building must file a recycling plan on behalf of the building.

Adoption Process: The State of Massachusetts prohibits the disposal of lead-acid batteries, white goods, whole tires, leaves and yard waste, glass, metal and plastic containers, recyclable paper and cathode ray tubes in landfill or combustion facilities. There is no statewide mandatory recycling law, but nearly half of the municipalities have elected to adopt mandatory recycling requirements.

Recycling was mandated by the Cambridge City Council in March of 1991 and implemented in July 1992. The rules and regulations governing the commercial requirements were put into effect by the Commissioner of the Department of Public Works.

Implementation: The mandatory recycling requirements were implemented all at once. Commercial recycling staff provide businesses and multi-family residences with technical assistance. A Commercial Recycling Guide was provided to every business in Cambridge. The guide includes the instructions on establishing a recycling program, instructions on how to fill out the recycling plan, a resource list of haulers, a matrix of waste composition by business type, a conversion table of volume to weight of recyclables, sample recycling announcement memo, sample office recycling instructions, commercial recycling regulations, recipients of business recycling awards, business recycling award nomination procedure, and schedules for commercial recycling workshops.

Enforcement: Public Works Department staff randomly inspect businesses. A $25 fine is issued for noncompliance. During the implementation of the ordinance in July 1992, there was one full-time city employee with a part-time assistant. By July 1994 there were two full-time city employees working on commercial recycling. There are now no city employees whose jobs are dedicated to commercial recycling. Currently, there is no active enforcement due to staff resources.

At the state-level, facilities are required to submit Waste Ban Compliance Plans to the Department of Environmental Protection (DEP). Waste loads with unacceptable amounts of banned materials may be fined by the facility. Facilities are also inspected by the DEP and may be issued fines up to $10,000 for violations.

Evaluation: No current waste compositions studies have been conducted.

Results to date: During initial roll out of the program the majority of the large businesses became participants, and by most indications, are still recycling.

Problems: The main problem with the program is lack of staff to stay on top of recruitment, enforcement and data collection.

Lessons learned:
- A database is an effective method to track compliance and rates.
- Without full-time commercial recycling staff it is impossible to track program progress.

Next steps: The next steps of the program involve working to get the city to approve dedicated commercial recycling staff of at least two full-time persons.

Chicago, IL

General Information

Location: Chicago, Illinois
Program Type: City-level mandatory recycling requirements
Population: 2,896,016 (U.S. Census, 2000)

Contact Information

Contact: Erin Keane, Waste Reduction Specialist
Agency: Department of Environment
Address: 30 N. LaSalle Street Chicago, IL 60602
Phone: (312) 744-5918
E-mail: Ekeane@cityofchicago.org
Web site: www.ci.chi.il.us

Commercial Recycling Program

Recycling Goal: 40 percent by 2000

Current Recycling Rate: 44.89 percent, 2000

Collection System: The commercial sector has an open and competitive garbage and recycling collection system. Haulers process, set their own fees competitively and set service levels.

Program: Workplace and Residential Recycling Ordinance.

Start Date: 1994, adopted.
January 1995, implemented.

Target Generators: All businesses and multi-family residences.

Target Materials: Principal recyclables including newspaper, glass, plastic, tin, aluminum, and paper.

General Description: Chicago's City Council adopted the Workplace and Residential Recycling Ordinance in 1994, requiring all property managers and building owners to implement an effective recycling program. Businesses are required to source-separate three recyclable materials, or source-separate two recyclable materials and conduct two source reduction measures. Source reduction measures include double-side copying, reducing packaging, energy efficient light bulbs and reusable materials. Businesses must also develop an education program and a written recycling plan.

Adoption: A work group comprised of business and property owners, haulers and local government representatives went through a one-year process that lead to the recommendation that businesses would be required to recycle. The details and requirements of the ordinance were developed in this work group.

Implementation: Public notices and education materials were distributed the year before the ordinance went into effect. The ordinance was implemented in two phases. During the first year businesses only had to recycle two materials, thereafter the businesses had to recycle three materials or two materials and conduct two source reduction measures. Limited enforcement was implemented prior to 1997.

Enforcement: The Department of Environment inspects businesses and apartments buildings to ensure compliance and issues citations for noncompliance. Fines for noncompliance violations range from $25 to $100. Each day the violation continues constitutes a separate distinct violation. The city offers technical assistance for businesses not in compliance.

Evaluation: The city conducts participation studies to evaluate programs.

Results to date: The city's recycling rate is attributed to the mandatory recycling program. It is difficult to determine the success of commercial program because commercial and residential solid waste and recycling are collected together.

Problems:
- Hard to measure effectiveness of public education.
- Lack of resources and staff for enforcement measures.

Lessons learned:
- Valuable to include stakeholder in the policy development process.

Next steps:
- Working on additional education materials to promote recycling programs.

Dane County, WI

General Information

Location:	Dane County, Wisconsin
Program Type:	County-level mandatory recycling ordinance State-level disposal ban and mandatory recycling requirements
Population:	426,526 (U.S. Census, 2000)
Number of businesses:	Approximately 12,000

Contact Information

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Commercial Recycling Program

Recycling Goal: Not applicable.

Current Recycling Rate: Communities report their recycling rates to the state – with the county average at 40 percent, and some communities at over 50 percent -- but there is no requirement for the reporting of data from the commercial sector, nor from the private recycling drop-off centers or buy-back centers. The county has conducted waste composition studies before and after its last expansion of mandatory recycling to estimate diversion rates for specific materials, which generally fall in the range of 75-85 percent for paper and containers, and nearly 100 percent for yard materials, tires, appliances and automotive batteries.

Collection System: Most communities in Dane County contract with a hauler for the collection of solid waste and recyclables from households; for commercial generators, it is a free market system. There are two large haulers, one medium size hauler and several small haulers who handle solid waste. Recyclables are collected by the three largest solid waste haulers as well as several of the traditional scrap dealers. There are two material recovery facilities in the county and several traditional scrap dealers who process the recyclables. The service providers set the rates. Service requirements are established by both state statute, county ordinance and ultimately, by city, village and town ordinance.

Program: Dane County Mandatory Recycling Ordinance (Ord. 41.12) and Wisconsin Mandatory Recycling Law, Chapter 287, state statutes, and Wisconsin Administrative Codes 540 to 590.

Start Date: Landfill bans were first enacted in the late 1970's. Materials were gradually added over the next thirteen years. The materials and their implementation date are listed below:

- Brush and tires, approximately 1978
- Newspapers, 1987
- Yard material, 1989
- Corrugated cardboard, steel cans, aluminum cans, glass bottles and jars and plastic bottles (PETE and HDPE), used oil, lead-acid batteries and appliances, 1991
- Magazines and office paper, 1995

Target Generators: All generators.

Target Materials: Newspaper, corrugated cardboard, magazines, office paper, yard materials, tires, used oil, appliances, lead-acid batteries, steel cans, aluminum cans, bimetal cans, glass bottles and jars and plastic bottles (PETE and HDPE) are included in the mandatory program. In addition, computers, mercury containing products, construction and demolition debris and food residues are being targeted for voluntary programs. The county has adopted an ordinance banning the sale of mercury fever thermometers as a measure for the reduction of toxic waste.

General Description: Dane County includes 61 municipalities. The county dictates that in order to use the county-owned landfill, municipalities must implement source separation and mandatory recycling of specific items for all generators. Over time, the county gradually added specific materials that were required to be recycled. The state adopted mandatory recycling subsequent to the county program.

Adoption Process: Under the state's comprehensive recycling law, SB 300 enacted in 1990, the state bans lead-acid batteries, tires, yard waste, major appliances, motor oil, newspaper, magazines, corrugated, office paper, glass, aluminum cans, bimetal cans, plastic containers, and polystyrene (PS) foam from landfill disposal. The ban requires cities, towns and villages to adopt a mandatory recycling ordinance that requires the recycling of specific materials. Counties were allowed to take over the implementation of recycling systems if given approval by their cities, villages and towns. The ban for plastic containers has been limited to HDPE and PET containers and the ban on PS foam has been granted a waiver.

Implementation: The required recycling of specific materials was phased in over a thirteen-year period in which the county gradually increased required recycling materials.

Enforcement: The county only has enforcement powers at the landfill. It is up to the individual municipalities to enforce. Warnings and fines may be issued for noncompliance.

Evaluation: Waste composition studies have been done by the county pre- and post-law. Municipalities also conduct waste composition studies and participation surveys.

Results to date: There has been a dramatic change in the materials removed from waste stream. However, the county cannot determine the recovery rate because they do not have data of how much was previously recycled. Neither the county nor local units of government collect this information from the commercial sector. However, waste composition studies conducted in 1990 and 1994 showed that the commercial sector had diversion rates similar or better than residential diversion rates, as shown here:

Material	Residential	Commercial
Cardboard	62%	93%
Newspaper	67%	78%
Steel cans	80%	66%
Aluminum cans	45%	46%
Plastic bottles	78%	66%
Glass bottles	77%	76%

Note that these percentages are measurements of what was in the waste in 1994 as compared to 1990. For items already being recycled in 1990 (aluminum cans, newspapers, etc), the diversion rates are much higher. The above rates only show the changes in diversion.

Problems:

- Enforcement is not an active part of the program. Dane County does limited enforcement at its own landfill, but does not have jurisdiction to enforce elsewhere. Local municipalities do not have the resources to enforce.
- Business sector participation is unknown, but according to the data from the waste composition studies, the diversion rate is similar to or exceeding the rate for the residential sector.
- An incidental amount of recyclable material ends up in the landfill.

Lessons learned:

- Residential compliance has been very high; an active enforcement program is not needed.
- Commercial participation (as determined by waste composition studies) has resulted in diversion rates similar to or exceeding residential diversion rates.
- A phased-in approach works well with public acceptance (i.e. gradually increasing required recycling materials).
- It is important to work to use a cooperative approach and work with haulers and facilities to determine the best collection and processing system.
- Education is a key factor to the implementation of recycling requirements.

Next steps:

- Encourage food waste diversion from both residential and commercial sources.
- Promote the recovery of construction and demolition materials, including both the reuse of materials at Habitat for Humanity's ReStore, waste reduction and recycling as part of Green Building, and expanding markets for specific materials, with a focus on drywall.
- Require retailers of mercury thermostats and fluorescent bulbs to take them back from the public for recycling.
- Work with the dentists within the county to improve their management of mercury amalgam waste and other products.

Durham, NC

General Information

Location: Durham, North Carolina
Program Type: City-level disposal ban on target recyclables
Population: 187,035 (U.S. Census Bureau, 2000)

Contact Information

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Commercial Recycling Program

Recycling Goal: 25 percent by 2001, 40 percent by 2006

Current Recycling Rate: 38 percent, 1998

Collection System: The City of Durham provides solid waste collection services to residential, multi-family and some commercial establishments. The city collects cardboard from commercial establishments and yard debris from residential customers who purchase carts from the city. The city contracts out its recycling collection services through a competitive bid process that is renewed every four years for a maximum of 20 years.

Program: Disposal ban on target recyclables (Ord. Sec. 10-72).

Dates: November 20, 1997, adopted.
January 1, 1998, implemented.

Target Generators: Residential, institutional and commercial sectors.

Target Materials:
- Glass bottles and jars
- Aluminum cans
- Steel cans
- Newspapers
- Corrugated cardboard

Adoption Process: In order to reach recovery goals set forth in the Solid Waste Management Plan, Durham City Council directed solid waste staff to develop an ordinance that bans the disposal of target materials. Since there are recycling programs available, which include curbside collection for residents, drop-off sites for residents and small businesses, and commercial firms to perform the services for large businesses, there are reasonable alternatives to disposal of target recyclables for the community. The alternative to the disposal ban was to educate the public, but omit any enforcement that requires participation in recycling programs.

Implementation: Durham passed the disposal ban in 1997, and it became effective on a voluntary basis on January 1, 1998. Throughout the next two years, the city's Environmental Resource Department conducted an educational campaign to inform residents of the ban. After passing three previous dates

to initiate enforcement due to resistance and lack of knowledge, Durham finally began to enforce the ordinance on January 1, 2000.

Enforcement: Enforcement of the ban was phased in gradually, with specially targeted education efforts as the initial step. Violations are subject to fees. The penalty on trucks bringing target recyclables is double the tipping fee. The current tip fee for refuse is $39.50 per ton.

Evaluation: Participation surveys and annual recycling tonnage are used in program evaluation.

Results to date: Per capita residential recycling increased 27 percent as of 2000. Commercial tonnage remained relatively unchanged.

Problems: The ordinance did not seem to have a strong impact on commercial recycling participation. City sanitation employees inspect residential containers, but until an enforcement officer is hired, the city has limited ability to regulate commercial compliance.

Lessons learned:

- Effective enforcement is needed to back up the ordinance requirements. Businesses will not adhere to a new ordinance unless they fear the repercussions of noncompliance.
- Only include recyclables with reliable markets to prevent having to change the ordinance in the future.
- Education is the most important aspect of the program, requiring increased staff and budget. A six-month campaign prior to enforcement would be sufficient.
- Have infrastructure in place before beginning the program. Conduct in-depth planning that considers staffing, equipment, education, and costs.

Next steps:

- Hire an enforcement officer.

Halifax Regional Municipality, Nova Scotia

General Information

Location:	Halifax Regional Municipality, Nova Scotia, Canada
Program Type:	Mandatory recycling requirements Province-level and municipal-level disposal ban
Population:	358,000

Contact Information

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*Throughout profile currency is measured in Canadian dollars and volume is measured in metric tons.

Commercial Recycling Program

Recycling Goal: 65 percent by 2004 (diversion goal)

Current Recycling Rate: 58 percent, 2001 (diversion rate)

Collection System: All waste generated by any industrial, commercial or institutional premise is not eligible for municipal collection. Commercial and institutional sector businesses are required to hire private haulers to collect recyclables. Halifax Regional Municipality provides collection for the residential sector.

Program: Commercial Recycling and Composting Program.

Start Date: The provincial disposal ban on specific materials was implemented between 1996-1998. The municipal integrated waste management plan and recycling requirements were adopted in 1996 and implemented in 1998. Additional requirements for construction and demolition debris processing were added in July 2001.

Target Generators: All generators.

Target Materials: The Province of Nova Scotia has disposal bans on the following materials, which are listed with their ban implementation date:

- Redeemable beverage containers, 1996
- Corrugated cardboard, 1996
- Newsprint, 1996
- Automotive lead-acid batteries, 1996
- Leaf and yard waste, 1996
- Steel/tin cans, 1998
- Glass jars, 1998
- Waste paint, 1997
- Used tires, 1996
- Antifreeze, 1997
- #2 HDPE non-hazardous plastic containers, 1998
- Stretch wrap, 1998
- Compostable organic material, 1998

In addition to the above items Halifax Regional Municipality bans the landfill disposal of specific construction and demolition debris materials.

General Description: Halifax Regional Municipality (HRM) developed its community-based waste management strategy through a year-long consultation process with residents and businesses that was adopted in 1996. Fully operational since 1999, the Waste Resources Collection System includes the composting and recycling through the on-site separation of wet, dry and recyclable waste in home and businesses. HRM's waste management system also complies with Nova Scotia's Solid Waste Resource Management Strategy that bans the disposal specific materials that can be recycled or composted.

Adoption Process: Four municipalities merged and formed Halifax Regional Municipality in 1996. Prior to the formation of the regional government, a Community Stakeholders Committee (CSC) was formed to address the siting of a new landfill. The CSC, a consensus-based committee, developed criteria for the new landfill that banned any raw materials in the new landfill. The CSC strategy specified that waste be separated into four streams: recyclables, compostables, trash, and household hazardous waste. The plan also called for the development of a household hazardous waste facility, a state of the art landfill, front-end mixed waste processing and back-end stabilization facility and composting plants.

After 13 months and more than 50 meetings that included more than 500 individuals, the CSC strategy was presented and approved by the four municipalities. When the municipalities merged into HRM and a regional council was elected, the council approved the strategy in 1996. The HRM staff and council were responsible for carrying out the strategy and the CSC members became watchdogs to ensure that the strategy was implemented correctly.

Implementation: The fully integrated waste management strategy became fully operational in 1999. Pilot projects were conducted the previous two years to determine the appropriate collection method for residential and commercial sectors. The final solid waste management system includes the following:

- Source separation of organics, recyclables and trash, with biweekly collection of organics and trash; weekly collection of recyclables (biweekly in the rural areas of the county);
- Creation of eight collection zones (from 25 before amalgamation) with six haulers;
- Use of aerated carts for organics collection;
- One site that includes a mixed waste processing facility designed to handle 119,000 metric tons/year of MSW; a 13-channel agitated bed composting system to process the mixed waste after recyclables are removed; and a landfill for stabilized waste. HRM owns these facilities, with design/build/operation given to Mirror Nova Scotia;
- Two separate composting facilities with total processing capacity of 61,000 metric tons/year. Both facilities are privately owned and operated, each with put or pay guarantees ($68.60/metric ton to one compost facility and $65.50 to the other) by HRM of 20,000 metric tons/year;
- Expansion of an existing materials recovery facility; and
- Household Hazardous Waste Public Drop-Off Depot that is open two Saturdays a month.

HRM decided to adopt biweekly collection of organics and recyclables alternating each week. Due to the change in curbside collection frequency in the new system, HRM decided to no longer provide service to the commercial and institutional sector. A notice was sent out to the businesses to inform them of the service change. The Halifax Businesses Commission that has more than 800 member businesses helped inform local businesses and set up a new collection program with private haulers to collect organics, recyclables and trash.

Enforcement: All loads are subject to landfill inspection for unacceptable materials. Enforcement officers conduct random inspections and fines are issued for noncompliance.

Evaluation: Waste compositions studies, participation surveys and reports from the HRM facilities are used to evaluate the program.

Results to date: The program has achieved a 90 percent participation rate and 58 percent diversion rate in 2001.

Problems:
- Contamination has not really been an issue for organics collection.
- Facility and collection odor was the biggest concern among residents when the new program was implemented.

Lessons learned:
- Community-based strategies are effective.
- Education is a key component.

Next steps:
- Constant monitoring and evaluation.

Construction and Demolition Program

Collection System: Commercial and institutional sectors are required to arrange collection of construction and demolition materials through private haulers. The majority of construction and demolition waste goes to private processors for processing. A number of the materials are banned from the region's landfill.

Program: Construction and demolition recycling requirements (By-law L 200 and Administrative Order 27).

Start date: July 2001

Target Generators: Commercial sector and construction and demolition processors.

Target Materials: The following materials are not allowed to be disposed of in a construction and demolition disposal site:

- Asphalt paving
- Aggregate and soil
- Brush and leaves
- Concrete
- Milled wood free of adhesives, coatings and preservatives
- Porcelain, ceramic
- Root balls and stumps
- Scrap metal
- Window glass

General Description: Construction and demolition recovery components such as standards of operation and zoning designations for processing facilities were not fully integrated into Halifax Regional Municipality's waste management strategy. HRM developed standards of operation and recycling requirements for processing facilities. In addition, zoning designations are currently being developed for construction and demolition processing facilities.

Adoption Process: In 1999, the HRM Council agreed that additional strategies were needed to manage construction and demolition materials. Through a public involvement process, HRM has developed a two-prong approach to revise the standards of operation and zoning designations for processing facilities. By-Law L-200 was adopted in July 2001 to set licensing requirements for construction and demolition recycling and disposal operations. Administrative Order 27 was also adopted, which outlines recycling requirements for the processing of construction and demolition debris and operators must comply with these laws to get licensed. See Appendix F. HRM is currently going through a public process to amend by-laws to create zoning designations for construction and demolition facilities.

Implementation: The construction and demolition processing facilities were notified of the new requirements and assistance is provided by HRM.

Enforcement: There is 1.0 FTE enforcement officer assigned to the construction and demolition bylaw. HRM currently has three licensed facilities and anticipates the addition of three more facilities. Noncompliance to landfill bans or the by-laws results in a violation that is subject to fine or license revocation.

Evaluation: Construction and demolition processing facilities are required to submit a monthly report. Waste compositions studies will also be used to evaluate progress.

Results to date: To date, the facilities are in compliance.

Problems:
- Illegal dumping.
- Establishing zoning requirements has been a lengthy process.

Lessons learned: The construction and demolition waste stream is a critical component of diversion and solid waste planning.

Next steps:
- Public involvement process.
- Constant monitoring and evaluation.

Iowa

General Information

Location: Iowa
Program Type: Financial assistance program
Population: 2,926,324 (U.S. Census, 2000)

Contact Information

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Commercial Recycling Program

Recycling Goal: The State of Iowa has waste diversion goals instead of recycling goals. The most recent goal is 50 percent by 2000.

Current Recycling Rate: 34.37 percent, 2000 (diversion rate)

Program: Solid Waste Alternatives Program (SWAP)

Start Date: July 1999

Eligibility: Local governments, public or private groups, businesses, and individuals interested in or responsible for Iowa's solid waste management are eligible. There is a preference for projects involving regionalization. Projects involving two or more units of local government or public or private groups are examples of regionalization.

Beginning in July 2002, the Department of Natural Resources (DNR) will target certain waste streams and/or generators. These entities will receive special consideration through the review and selection process. In addition, a financial incentive in the form of an increased forgivable loan portion may be offered.

Target Materials: Previously, no specific materials were targeted. However, beginning with fiscal year 2003 (July 2002 – June 2003), DNR will be targeting electronics, organics and construction and demolition debris. These targeted materials and/or generators will be given preference during the selection and review process. They may also be chosen to receive an increase in the forgivable loan portion of any award offered.

General Description: SWAP is a $3.2 million annual statewide financial assistance program that funds the development and expansion of waste reduction and recycling projects. Any entity that is interested in or responsible for reducing the amount of waste going to Iowa's landfills is eligible. Proposals are accepted year round and reviewed quarterly. Awards are announced quarterly after a competitive review.

SWAP is designed to reduce the amount of solid waste generated and landfilled in Iowa and to alter people's attitudes about generating, managing and disposing of solid waste. Financial assistance aids in the implementation

of various pollution prevention and solid waste management projects in three targeted areas:

1. BEST PRACTICES- Assists in implementing practices and programs that will move Iowa toward long-term pollution prevention waste reduction and recycling sustainability.

2. EDUCATION- Facilitates the coordination of consistent statewide pollution prevention, waste reduction and recycling messages to ensure ongoing support of these activities.

3. MARKET DEVELOPMENT- Develops a demand for value-added recyclables sufficient to provide increased and stable commodity market prices.

Program Development Process: In 1987, the Groundwater Protection Act established a solid waste policy that included a hierarchy of solid waste management options. The solid waste hierarchy placed waste reduction at the source as the most preferred method of solid waste management. Recycling and reuse were the next most preferred methods followed by other approved techniques of solid waste management including, but not limited to, combustion with energy recovery, combustion for waste disposal, and disposal in sanitary landfills.

In 1989, the Waste Reduction and Recycling Act established a goal of reducing the amount of solid waste being landfilled by 25 percent by 1994 and 50 percent by the year 2000 through implementation of waste reduction at the source and recycling/reuse initiatives. To that end, several state programs were established, including the Landfill Alternatives Grant Program (LAG), one of SWAP's predecessors.

In December of 1994, LAG was re-named the Landfill Alternatives Financial Assistance Program (LAFA) to better reflect the fact that loans as well as grants would be offered to applicants.

In July of 1999, the SWAP replaced the LAFA. SWAP was developed in response to the evolution of waste reduction, recycling, and other landfill diversion activities currently in place across the state. An advisory committee with members representing the Environmental Protection Commission, counties, municipalities, business and industry, regional councils, and solid waste associations gave valuable input to the DNR. The advisory committee offered contributions on how the former LAFA program could be modified to best reflect current and future solid waste management issues and market development for recycled materials through landfill alternatives projects.

Key Elements: Depending on revenue from the state's tonnage fee and loan repayments from contracts, SWAP's annual budget ranges from $2 to $4 million.

Three individuals are key in the administration of SWAP, although only 2.0 FTE is assigned. The third person is not a State of Iowa employee and works through a temporary agency.

Evaluation: DNR evaluates the program based on individual project success.

Results to date: DNR assesses that SWAP and its predecessors have been very successful. The department estimates that the program has had the single largest impact on tonnage reduction to date. In addition, the program has a 96 percent success rate, with success meaning that a project fulfilled its contractual obligations and continues to operate.

Cumulatively, SWAP and its predecessors have awarded more than $42 million in financial assistance to more than 350 recycling, waste reduction, pollution prevention, market development, education and other projects designed to reduce the amount of solid waste entering Iowa's landfills. The breakdown for financial assistance is as follows:

- Since its first round in July of 1999, SWAP has awarded over $9.2 million for 104 projects.
- From December 1994 to February 1999, LAFA awarded $15,320,917 to 107 projects as grants or zero-interest loans or a combination thereof.
- From 1988 to June 1994, LAG awarded $18,205,400 in grants to 157 projects.

Problems: SWAP's revenue source has come under attack in the last few legislative sessions. As a result, the funding source has continually been reduced. Also, some projects have discontinued operations or failed and as a result, defaulted on contractual obligations.

Lessons learned:
- Financial assistance programs are a successful means to increase diversion.
- It is important to require businesses and/or marketing plans from specific applicants to ensure they have the expertise and know-how required for the proposed project.
- Use outreach and promotion to encourage additional applicants from targeted areas.

Next steps: SWAP will continue to award financial assistance to applicants on a quarterly basis. DNR will begin to target specific waste streams. To address the program's decreasing source of revenue, DNR is examining the importance of issuing more loans than grants to ensure short-term viability. In the long-term, Iowa is looking at other funding mechanisms besides the tonnage fee for this and other waste management programs.

King County, WA

General Information

Location: King County, Washington
Program Type: Construction and demolition incentive program
Population: 1,737,034 (U.S. Census, 2000)

Contact Information

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Construction and Demolition Recycling

Recycling Goal: Not applicable.

Current Recycling Rate: Not applicable.

Program: King County Construction Works Recognition Program.

Start Date: 1997

Eligibility: All businesses and organizations in King County are eligible to apply.

Target Materials:
- Rubble (concrete/asphalt)
- Drywall
- Land-clearing debris
- Corrugated cardboard
- Metals
- Wood
- Roofing
- Plastic

General Description: The Construction Works Recognition Program publicizes construction companies that recycle, reduce waste and use recycled products on the construction job site and can apply for multiple awards. Contractors receive free assistance and recognition for successfully recycling at least 60 percent of their construction waste, purchasing recycled content building materials for the project, and practicing several waste prevention strategies.

Key Elements:
- Technical assistance
- One-on-one recruitment
- Publications

Program Development Process: The Construction Works program evolved from the business recognition program, Green Works. The construction program was developed based on the framework of the business program. The Solid Waste Division held a focus group with construction industry representatives to discuss what recognition would be useful and to establish criteria.

Implementation: Approximately ten percent of builders are responsible for the majority of the construction in the county. The division focused on recruiting the top 15 to 20 companies though one-on-one personal recruitment, providing free

15 to 20 companies though one-on-one personal recruitment, providing free technical assistance and attending industry meetings. Several publications are also available to assist builders with construction and demolition waste diversion.

Evaluation: The program is evaluated based on membership. Individual case studies are developed that provide estimates on the amount of material that can be diverted from different projects. Also, the county conducts waste composition studies and surveys the construction and demolition industry every few years.

Results to date: Six new members joined in 2000-2001. To date, there have been 22 projects.

Problems:
- It is a challenge to get construction and demolition companies to join because waste management is such a small portion of the project.
- It is labor intensive to recruit members.

Lessons learned:
- In order to get participation, programs need to be extremely convenient and easy for industry people.
- Need to provide assistance in completing paperwork and membership forms.

Next steps:
- Hired new 1.0 FTE this year to focus on CDL Recycling and Green Building issues.
- Work to make program more compatible with the LEED and Built Green Certification
- Revisit original members and ask them to requalify based on new projects
- Develop additional publications and promotional materials including banners for job sites.

Monmouth County, NJ

General Information

Location: Mounmouth County, New Jersey
Program Type: State level mandatory recycling requirements
Population: 615,301 (U.S. Census, 2000)

Contact Information

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Commercial Recycling Program

Recycling Goal: 65 percent by 2001

Current Recycling Rate: 55 percent, 2000

Collection System: Monmouth is a flow-controlled county where waste generated by the 53 municipalities within its borders is consistently directed to a single, county-owned and operated landfill.

Program: District Recycling Plan.

Start Date: Commercial, April 1988
Construction and Demolition Debris, October 1988

Target Generators: Commercial, institutional and residential sectors.

Target Materials:
- Newspaper
- Glass containers
- Aluminum cans
- Leaves
- Bimetal food and beverage cans
- High-grade paper
- Corrugated paper
- Asphalt
- Concrete
- Certain wood wastes (pallets, clean lumber, stumps)

General Description: In New Jersey, the state mandates the source separation and recycling in the residential, commercial and institutional sectors. Counties adopt recycling plans mandating specific materials and direct cities and towns to enact ordinances. Monmouth County mandates the recycling of specific materials in the residential, commercial and construction and demolition waste streams.

Adoption Process: Monmouth County formally adopted its initial District Recycling Plan in February 1987, two months before the Statewide Mandatory Source Separation and Recycling Act was signed into law. The statewide act requires each municipality to recycle at least three materials plus leaves. The county's program goes beyond the basic requirements of the state's mandate and requires the recycling of additional materials. The county evaluated the waste stream to determine what materials would be mandated.

Implementation: The program was implemented in a phased approach for the residential, commercial and construction and demolition debris waste streams.

- The residential requirements, in effect since October 1987, include newspaper, glass containers, aluminum cans and leaves. Phase 2 residential requirements, as of April 1, 1988 includes bimetal food and beverage cans.
- The commercial requirements, in effect since 1988, include newspaper, glass containers, aluminum cans, leaves, bimetal food and beverage cans, high-grade paper, and corrugated paper.
- The construction and demolition debris requirements as of October 1988, include required recycling of asphalt, concrete, and certain wood wastes (pallets, clean lumber, stumps).

The county relied on the municipalities to provide notice and inform businesses and residents of the mandate. The county also required each municipality to designate a recycling coordinator to provide technical assistance and education.

Enforcement: Monmouth County has a Solid Waste Enforcement Team, part of the Monmouth County Health Department, stationed at the landfill to monitor compliance with all state and county requirements. Fines are issued for noncompliance.

Evaluation: In 1987, Monmouth County retained a consulting firm to plan and implement a waste composition and characterization study that would be used to help guide planning efforts. The study had multiple goals including: the assessment of the impact of a three-phase recycling program initiated in Monmouth County; use of the data in planning for landfill use, residue or reject disposal; and the identification of trends in the waste stream. Waste composition studies were conducted pre and post mandatory recycling. The last waste composition study was done in 1993. The county relies on annual reports from the municipalities to evaluate the program's progress.

Results to date: Over the five-year study period 1987-1992 recycling rates in Monmunth County increased from approximately 25 percent in 1988 to 43.5 percent in 1991. While recycling rates increased throughout the study period, tonnage of waste generated dropped only slightly by 3.7 percent. The most recent recycling rate of 55 percent in 2000 is attributed to mandatory recycling.

Problems:
- Weak markets for recyclables hinders participation.
- Lack of resources for enforcement.

Lessons learned:
- Education is the a key element to a required recycling program.
- Commodity markets determine participation.

Next steps:
- Increasing enforcement.
- Providing more education to encourage residents and businesses to recycle.

Onondaga County, NY

General Information

Location: Onondaga County, New York (including the City of Syracuse)
Program: County-level generator-based recycling requirements
Population: 458,336 (U.S. Census, 2000)
Number of businesses: 15,000

Contact Information

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Commercial Recycling Program

Recycling Goal: 50 percent by 1997
40 percent by 1997 (processible waste)

Current Recycling Rate: 68 percent, 2001
42.8 percent, 2000 (processible waste)

Collection System: Onondaga County Resource Recovery Agency (OCRRA) manages the solid waste and recycling program for 33 municipalities in the county. Some municipalities provide solid waste and recycling collection through their own public employees, some contract with one or more private waste hauling firms to provide services for their residents and still others require residents to arrange for disposal and recycling by contracting with a private hauler or bring their MSW and recyclables to one of the two OCCRA transfer stations. OCRRA maintains two drop-off centers for waste and recyclables where recyclables are accepted at no cost.

Recyclables collected at the curbside are taken for processing and marketing to a material recovery facility (MRF). The OCRRA/MRF contract provides for a variable payment to the privately owned MRF, which receives curbside recyclables collected by the 13 private haulers, 6 municipal haulers and 8 municipalities with private hauling contracts. The MRF accepts residential recyclables at no charge to the waste hauler, and then sorts, bales and markets the recyclables.

Program: Source Separation Law (Local Law No. 12) as known as Operation Separation.

Start Date: July 1, 1990, implemented

Target Generators: All commercial and residential generators.

Target Materials: Office paper, corrugated cardboard, paperboard, plastic (HDPE AND PET) bottles, metal (all ferrous and non-ferrous), newspaper, magazines, beverage cartons, mixed paper, and Kraft paper.

General Description: Onondaga County's Source Separation Law requires households and businesses to recycle corrugated cardboard and paper as well as other mandatory recyclables if the quantity generated economically justifies a

separate collection. Waste audits are conducted at businesses to determine which materials they will be required to recycle.

Adoption Process: New York State's Solid Waste and Management Act of 1988 required municipalities to adopt ordinances that require source separation for residential and commercial waste streams by September 1, 1992. The act mandates municipalities require the separation of those materials for which the cost of recycling is less than or equal to the costs of proper disposal at a solid waste facility. Municipalities may require the separation of other materials to preserve landfill space, conserve natural resources or create new jobs. Onondaga County's Source Separation Law was adopted to comply with the state's mandate.

Implementation: The recycling requirements of specific materials was phased-in over time. Initially, the county mandated the recycling of paper and corrugated cardboard. Additional materials were gradually mandated based on the existing markets. Public notice, education and technical assistance were used throughout the implementation of the recycling law.

Enforcement: OCCRA enforces the source separation law through a system of public education and surveillance. Fines are issued for noncompliance. The first violation is $15.00; $30.00 for the second violation; $50.00 for the third; and $100 for each subsequent violation. The fines collected for enforcement are retained by the municipality to support enforcement and recycling education programs.

There is 1.0 FTE business-recycling specialist and 1.0 FTE apartment recycling specialist that follows through on complaints and inquiries about business and apartment recycling. The specialists are on the road five days a week calling on businesses and apartments. During 2001, OCCRA continued to employ the services of a former VISTA member to supplement the work of the recycling business specialist by calling on smaller businesses. In 2001, OCRRA's business recycling specialist visited hundreds of businesses.

When needed an enforcement officer supplements the efforts of the business and apartment recycling specialists. An enforcement officer calls on businesses and apartment buildings where it is determined other venues have not resulted in cooperation. The enforcement officer also spends a portion of the week inspecting loads of solid waste at the waste-to-energy plants and issues warning and/or violations.

Education and outreach is also a large part of enforcement. OCCRA also has 1.0 FTE certified teacher that educates students throughout the county. In 2001, the teacher spoke to 12,000 students in 537 classrooms.

Evaluation: The Operation Separation program efficiency is measured in participation, separation and processing efficiencies against the original program definition projections, which were developed in 1987 in the recycling program design.

- The participation rate is the percent of waste generators who are recycling.
- The separation/efficiency is the percent of accuracy the waste generators have in correctly recycling.
- The processing rate/efficiency is the percent of recyclable material collected that is available for markets after handling and sorting the recyclables for the ultimate markets, processing which usually takes place at the MRF.

Program effectiveness is documented in the recyclables recovery rate of 68 percent. It is a result of the participation rate and affected by the separation and processing efficiency. The residue fraction is a combination of material placed incorrectly by the generator, non-recyclables placed in the bin which are separation factors and processing efficiency, losses caused as a result of sorting and processing the material for sale. The residue quantity has no impact on the reported recycling rate. However, the residue quantity is a measure of the separation efficiency and the processing efficiency.

OCRRA examines trucks delivering recyclables, bin set outs and MRF processing to calculate the separation efficiency and the processing efficiency.

Results to date: OCRRA calculates the separation efficiency at 97 percent and the processing efficiency at 95.1 percent. Through visual inspection and survey, Operation Separation has documented a participation rate of 98 percent in most neighborhoods and determined that over 95 percent of the 177,898 households and over 90 percent of the estimated 15,000 businesses are participating in the program.

Problems: The main challenge is the need for constant education.

Lessons learned:

- It is not practical to mandate materials unless developed and stable markets exist for the materials.
- Education needs to be constantly reinforced.
- Focus education on schools. Kids are the best ambassadors.
- Mandating recycling is an effective means to increase recovery, but the program should focus on education rather than enforcement.

Next steps: The next steps for the recycling program in Onondaga County include additional efforts in businesses, targeting additional recovery of paper from the residential sector by adding a second recycling bin, computer recycling programs, and targeting the inner city for increased recovery.

Portland, OR

General Information

Location:	Portland, Oregon
Program Type:	City-level mandatory recycling requirements
Population:	531,600 (U.S. Census, 2000)
Number of businesses:	15,500

Contact Information

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Commercial Recycling Program

Recycling Goal: 60 percent by 2005

Current Recycling Rate: 54 percent, 2000

Collection System: The commercial sector has an open and competitive garbage and recycling collection system allowing commercial customers to choose between 64 permitted haulers in the city and negotiate rates for service.

Program: Administrative Rules for Commercial Solid Waste and Recycling 17.102, Section 17.102.180.

Start Date: January 1996

Target Generators: All commercial businesses including multi-family complexes as well as construction projects with a permit value of $50,000 or more.

Target Materials: Target materials vary by generator but may include various paper grades for offices, glass and tin from restaurants and wood, corrugated cardboard, metal, rubble and land clearing debris from construction sites.

General Description: All businesses, multi-family complexes and construction projects valued at $50,000 or more must separate recyclable materials from mixed waste and set out a minimum amount of their recyclable materials. The following general principles apply:

- Businesses must separate recyclable materials from mixed waste and set out for recycling a minimum of 50 percent of their waste, given practical limitations.
- Multi-family complexes must set up recycling systems that are convenient to tenants, for a least five recyclable materials and to notify tenants about recycling.
- Where a building project is valued at $50,000 or more, including both construction and demolition phases, the general contractor is required to ensure that materials produced on the job site are recycled. Where no

general contractor is named on an affected building permit, then this requirement is applicable to the property owner.

Adoption Process: A "Commercial Workgroup" was put together in 1993 (15 members) with representation from businesses, haulers, multi-family sector, and the public. The group went through a two-year process that ultimately led to the recommendation that businesses be required to recycle. After that determination, another group the "Commercial Implementation Team" was formed to flesh out the specific requirements of the program. That group contained some members of the "Commercial Workgroup" with the addition of recycling managers from selected businesses and some additional haulers.

Implementation: Notices went out to every business in November of 1995. The ordinance implementation date was January 1, 1996. Haulers distributed Recycling Plan Forms to their commercial customers late in 1995. Enforcement began in July of 1996.

Enforcement: To ensure compliance with the ordinance, the Office of Sustainable Development (OSD) may ask a permittee to produce a copy of their Recycling Plan Forms or may initiate an inquiry upon receiving a complaint or on its own. In cases where a business, multi-family complex or construction project is not in compliance, the city must offer an assistance period of at least 30 days. If compliance is not achieved after 30 days, a penalty of up to $500 may be imposed.

Evaluation: Results are measured through generator surveys, annual waste composition studies and data reported by haulers and independent commercial recyclers.

Results to date: In 1999, a generator survey found that 82 percent of all businesses reported recycling four or more materials, an increase from 55 percent in 1996. The recovery rate in the commercial sector went from 46.2 percent in 1996 to 54 percent in 2000.

Problems: The city encountered no opposition when the ordinance was brought before Council for approval. A cost of service study conducted in 1994 showed that a required recycling system would not increase the system cost of collecting refuse and recycling.

Lessons learned:

- In order to change the behavior of a group, provide an forum to ask them what it will take to make the desired change.

Next steps:

- Develop program to collect and process food waste.
- Educate contractors about existing construction and demolition requirements and inform them of recycling opportunities.
- Improve technical assistance program and outreach to businesses and create a comprehensive waste prevention program.
- Educate multi-family tenants on recycling and provide them with more opportunities to recycle.

San Diego County, CA

General Information

Location: San Diego County, California
Program Type: County-level mandatory recycling requirements
Population: 2,813,833 (U.S. Census, 2000)

Contact Information

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Commercial Recycling Program

Recycling Goal: 50 percent by 2000 (diversion goal)

Current Recycling Rate: 44 percent, 2000 (diversion rate)

Collection System: Nonexclusive franchise collections are provided by 29 permitted haulers. The franchise fee is $2.35/ton, which goes to diversion programs, solid waste enforcement and household hazardous waste programs. Haulers process, set their own fees competitively and meet service requirements established by code and by the franchise agreement.

Program: Mandatory Recycling Ordinance (MRO).

Start Date: The ordinance was adopted in 1991 and phased-in over a three-year period.

Target Generators: The program targets residential, commercial and industrial sectors. The residential program includes all residences (single and multi-family). The commercial includes all hospitality (restaurants, bars, hotels) and office buildings above 20,000 square feet. The industrial includes generators of certain types of loads.

Target Materials:

- Residential recyclables including newspaper, glass bottles and jars, plastic beverage bottles, aluminum cans, tins cans, bimetal cans, white goods and yard waste.
- Commercial recyclables including office paper, aluminum, cardboard, glass jars and bottles, plastic beverage bottles, tin and bimetal cans, and white goods from hospitality facilities.
- Industrial loads consisting of 90 percent or more of any one of the following: asphalt, concrete, dirt, land clearing brush, sand or rock.

General Description: In 1991, the San Diego County Board of Supervisors adopted a mandatory recycling ordinance (MRO). The MRO required designated recyclables be source-separated. Each city was required to adopt an MRO of its own. The county introduced surcharges in phases to a maximum of $100 per load of solid waste to a county landfill. The MRO includes enforcement by disposal bans on specific materials in county-owned landfills.

Adoption Process: There was an extensive public involvement process to gather input from businesses, residents and haulers. The ordinance was developed as a waste reduction strategy and component of the Countywide Integrated Waste Management Plan. The state-mandated advisory bodies, the Technical Advisory Committee (jurisdictions) and the Citizens Advisory are consulted when the drafts of the countywide CIWMP elements are ready for approval. Formal comments and public hearings are required in this process, until County Board of Supervisors adopts, and a majority of cities with a majority of the population pass the countywide elements.

Implementation: The program was implemented in phases as follows:

1. The residential program was phased in by geographical areas and by single and multi-family housing.
2. The commercial and industrial came in at once.
3. The disposal bans were phased in over a three-year period.

The county allocated $250,000 for an aggressive promotional and educational campaign during the implementation of the ordinance. The campaign included public briefings, workshops on recycling education and enforcement techniques for cities, recycling collectors and haulers. A public relations handbook also helped cities implement their local MROs. In addition, the county provided recycling tonnage grants to cities to stimulate residential recycling programs. The county also introduced Technical Assistance Program (TAP) grants for public and private entities to expand recycling opportunities in the county.

Enforcement: Hauler fines were phased in through increasing dollar amounts over time. Enforcement has never been severe, although notices were sent to violating generators. Commercial enforcement is done by county officers. Enforcement has been light in the last few years due to lack of resources. A new effort will be implemented in 2002-2003. Administrative citations may be used, along with incentive programs for voluntary compliance.

Currently, much of the county is collected single-stream for recyclables, so drivers do not get out to inspect. The county will probably institute a spot check system using county staff.

Evaluation: Evaluation has been done primarily through the state diversion rate calculations.

Results to date: In March 1992, the county outreach contractor conducted a residential survey. The survey found that 88 percent of the county residents supported the adoption of an MRO in their community. The county met its diversion goal of 50 percent three years early, in 1997, however it has fallen since then.

Problems: The county lost flow control in the mid-1990's, resulting in a large failure to send tonnage to MRF. The financial losses caused the county to sell the entire solid waste system including landfills, and the diversion program lost a lot of its control and funding. Landfill bans are no longer in effect because the county no longer owns the landfills. Countywide approaches have since been hard to achieve.

Lessons learned: Constant evaluation and enforcement are necessary for major public behavioral and technological changes such as recycling. A continuous commitment at all levels is needed for program adjustments.

Next steps:
- Focus more on commercial and industrial to increase participation.
- Increase market development efforts.

San Jose, CA

General Information

Location:	San Jose, California
ProgramType:	Diversion deposit and grant program
Population:	894,973 (U.S. Census, 2000)
Number of businesses:	27,000

Contact Information

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Commercial Recycling Program

Recycling Goal: 50 percent by 2000 (diversion goal)

Current Recycling Rate: 53 percent, 2000 (diversion rate)

Collection System: San Jose has an exclusive franchise system for residential wastes and a nonexclusive franchised solid waste collection system for commercially-generated wastes. Businesses can select any franchised or permitted hauler for refuse and recycling collection. The city does not operate or set tip fees for the landfill. The city also waives franchise fees on the collection of source-separated recyclables as an incentive for businesses to recycle.

Program: Construction and Demolition Diversion Deposit Program (CDDD).

Key Elements:

- Clearance document
- Diversion deposit
- Certified facilities
- Infrastructure grant program

Start Date:

- November 7, 2000, CDDD ordinance adopted
- March 1, 2001, clearance document requirement implemented
- July 1, 2001, diversion deposit implemented

Target Generators: Any residential and non-residential new construction, alteration and demolition project and roofing tear-off.

Target Materials: Construction and demolition materials including rubble (concrete/asphalt), land-clearing debris, corrugated cardboard, metals, and wood.

General Description: The Environmental Services Department (ESD) of Integrated Waste Management Division developed the Construction and Demolition Diversion Deposit Program to divert construction and demolition material from landfills in order to meet the state-mandated 50 percent diversion target.

The CDDD is based on a system in which the city collects a recycling deposit for a construction, demolition or remodeling project when the project permit is issued. The intent of the deposit is to at least equalize any differential economic costs to contractors and developers between diverting and landfilling materials.

All residential and non-residential new construction, alteration and demolition projects require a CDDD clearance document and diversion deposit before a building permit is issued unless the project is specified as exempt. Exemptions include: new residential construction projects less than $135,000 in value; residential alteration and non-residential alterations less than $2,000 and $5,000 in value respectively; and work for which only a plumbing, electrical or mechanical permit is required. Roofing projects with tear-offs are exempt until July 2002.

A clearance document is created prior to issuance of the permit. The deposit rate is based on the project square footage and the type and quantity of material generated by the project, in conjunction with the costs of recycling or processing the material. See Appendix M.

In order for a permit applicant to have their deposit returned, they must provide receipts or records demonstrating that the material from the project has been sufficiently diverted via a city-certified facility or other approved diversion methods such as on-site use. Non-diversion of the materials generated from the project or lack of records satisfactorily demonstrating diversion of the materials may result in no refund of the deposit amount.

Adoption Process: The city conducted a waste composition study and two landfill gate surveys in 1998 and 1999 that indicated the amount of construction and demolition debris landfilled from San Jose projects each year was more than an estimated 160,000 tons. Further analysis showed the majority of the material came from non-franchised self-haul activities. Self-haul construction and demolition debris escapes the general requirement that all non-residential solid waste generated in San Jose be hauled for disposal by a city franchised hauler, since most of it is hauled incidentally to the generator's primary activity of construction and demolition. Therefore, construction and demolition contractors and the self-haul community are not influenced to divert waste by the commercial solid waste fee system.

In November 1998, the IWM presented to City Council an updated diversion strategy with numerous program and activities to boost the city's diversion rate. One of the proposed programs included the use of an "advanced recycling fee." The concept, while relatively new, had been implemented elsewhere in the Bay Area and was being considered by other cities. Council accepted this strategy and directed staff to continue developing the new solid waste diversion strategy.

The program's development included the following components: an economic study, certification of facilities, deposit and transaction process, and infrastructure grants. The economic study was commissioned by ESD to develop a model to analyze the effects of the deposit program would have on the building and housing industry, other costs and impacts associated with the transportation of wastes to processing facilities, and analysis of diversion levels at various deposit rates. The primary objective of the model was to determine how much to charge for a deposit to provide sufficient incentive for generators to recycle. The study focused on determining what amount was needed to assess on a square foot basis for a particular type of job to provide an incentive to make the costs of recycling competitive with disposal. The study results and recommendations are described in detail in the CDDD Memorandum to the Transportation and Environment Committee (See Appendix M).

Since May 1999, extensive public outreach was conducted to gather input and support for the development of the CDDD program. From conducing formal focus groups, meetings with haulers, landfills, processors, contractors, and associations, to participation in the San Jose's Green Building program, ESD

attempted to reach the stakeholder groups of the CDDD program.

ESD considered several alternatives to implementing the CDDD program. The alternatives evaluated included additional fees at the landfill for construction and demolition materials, bans at the landfill on construction and demolition materials and mandates for construction and demolition recycling. Material bans and mandates on specific materials were presented to the City Council in November 1998. Neither was approved and ESD was directed to explore an incentive approach to achieve additional diversion, which led to the development of the CDDD program.

The implementation of the CDDD program required Council approval of an ordinance to establish a clearance document process for the program and adoption of a resolution setting the deposit rates. The rate resolution was adopted on October 24, 2000 and ordinance for the clearance document was adopted on November 7, 2000.

Implementation: Through the outreach and public involvement process industry representatives and other stakeholders were informed of the program's development. A test version of the program was initiated from March 1 to June 30, 2001. The test phase had a moneyless transaction that enabled staff to distribute information on reuse and recycling and on the transaction process. The test period allowed for staff to collect data, coordinate with the Building's Permit Center and get feedback from the facilities to better prepare for the actual start of the program. The full program was phased in with the first phase requiring the clearance document prior to issuance of a permit. Five months later the diversion deposit requirement was implemented. The full program became effective on July 1, 2001.

After six months of taking deposits the ESD found that a number of project types were missed in their initial research that generate very little excess materials, i.e., seismic tie-downs and pre-manufactured accessories such as signs and patio covers. Additional exemptions were added and the code was changed to reduce the administrative workload. ESD anticipates the program will be updated as it evolves.

Resources: Approximately $144,000 was included in the FY 99-00 budget for the development of the CDDD program, which included the consultant contracts for the gate survey, facility certification, and economic study. The management of the CDDD program is included in the existing allocated staff time.

Evaluation: Success of the program is measured by how much money is returned to permit applicants. The city also tracks recovery through the state's reporting system from landfills and reports they receive from the processing facilities.

Results to date: San Jose's recovery goal for the program is 80,000 tons. San Jose has calculated the following data for the first six months:

- Total project value — $432,454,000, with the average project value at $247,000 (median at $25,317);
- Total square feet – 5,126,000, with the average of 2,900 sq. ft. (median at 400 sq.ft.); and
- Total deposit value — $1,430,000, with the average deposit of $815 (median at $350).

Though several very large projects have skewed the averages upward, the data so far indicates that the CDDD program has been effective at capturing the projects that generate the majority of the self-haul mixed construction and demolition loads.

To date, San Jose has certified 22 facilities that will recover at least 50 percent of the construction and demolition materials received. At least seven of the 22 accept mixed loads of construction and demolition.

Problems: Two main issues have developed as a result of the program regarding the refund process and administration. To date, ESD has not refused any refund requests but has had to make extra efforts with some customers to see that they get their refund, mainly because they initially neglected to provide receipts or adequate documentation that materials were recycled. Additionally, permit applicants often forget the requirements of the refund process. The refund process takes approximately 3 weeks, which is longer than ESD originally anticipated. Managing the financial aspects of the program has also proven to be more difficult and time consuming than ESD originally expected. There is a larger burden on the department to absorb the refund process and the depositing and distribution of funds.

Lessons learned:

- The main motivation for the construction and demolition processing facilities to get certified is competition.
- Based on discussions with other jurisdictions, bans and mandates appear to be more easily implemented in cities where there is local government management or ownership of the facility.

Next steps:

- Develop San Jose's construction and demolition web site.
- Develop construction and demolition case studies for outreach and education.
- Expand grant program and enhance processing infrastructure in the region especially for drywall and roofing materials.
- Better integrate deposit system with permit center.

Construction and Demolition Infrastructure Grant Program

Program Type: Incentive program

Start date: December 1, 1999

Target: Construction and demolition processors

Target Materials: Construction and demolition debris including rubble (concrete/asphalt), land-clearing debris, corrugated cardboard, metals, and wood.

General Description: San Jose created a Construction and Demolition Infrastructure Grant program to encourage processors to invest in construction and demolition sorting capabilities to maximize the quantities recovered. The grant program was developed and adopted as a component of the Construction and Demolition Diversion Deposit Program (CDDD) to infuse any unclaimed deposits into the development of additional construction and demolition processing infrastructure.

Adoption Process: The grant program was adopted as a component of the CDDD program.

Implementation: The grant program was initiated prior to the implementation of the CDDD transaction and diversion process. The grant program was allocated funds in the city's budget for FY 99-00 and FY 00-01. ESD solicited proposals from all interested businesses wishing to compete for funding to increase construction and demolition processing infrastructure in San Jose. Unclaimed deposits will provide subsequent year funding.

Evaluation: Cost-benefit analysis based on funds dispersed and tons recovered are used to evaluate the effectiveness of the program.

Results to date: Based on staff's analysis, the construction and demolition infrastructure grants have proven to be one of the most cost-effective methods to achieve higher diversion, primarily because of the high density of construction and demolition debris. In FY 99-00, the grant program distributed $250,000 and in FY 00-01 the program was funded at $500,000. Examples of grant recipients include, the Zanker Materials Processing Facility in San Jose received a total of $193,000 in funding — $64,000 for its "Rocket" water separation system, and $129,000 to install an air knife. The Guadalupe Landfill, owned by Waste Management, received $140,000 for the mixed debris sorting line. No funds were allocated for FY 01-02.

Problems: ESD has no clear estimate how much money would be left in unclaimed deposits from year to year.

Lessons learned: The grant program is one of the most cost-effective methods to achieve higher diversion.

Next steps: ESD plans to continue the program contingent on funds provided by unclaimed deposits.

Santa Clara, CA

General Information

Location:	Santa Clara, California
Program Type:	Franchise fee incentives
Population:	102,361 (2000)
Number of businesses:	5,592 (1995)

Contact Information

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Commercial Recycling Program

Recycling Goal: 50 percent by 2000

Current Recycling Rate: 40 percent, 1998

Collection System: Private collectors, franchised with the city, collect a total of approximately 65 percent of the volume from commercially zoned areas (22 percent), industrially zoned areas (38 percent), and residentially zoned areas (5 percent). Self-hauling by private businesses, the public and institutionally zoned organizations account for the remaining 29 percent. Only 520 tons per day is deposited at the city's all purpose landfill; the remainder is either recycled or disposed of at other landfill sites outside the city limits.

Program: City of Santa Clara Municipal Code Chapter 6.6.5 Solid Waste

Start Date: 1980

Target Group: Nonexclusive franchise haulers.

Target Materials: All recyclable materials.

General Description: The City of Santa Clara charges a differential franchise fee to haulers based on whether or not they have a city-approved recycling program. All nonexclusive franchised haulers collecting waste from the industrial area (heavy industry, office buildings and high tech) of Santa Clara must pay the city a franchise fee of 25 percent of their total gross billings (including bin and rental charges). To obtain a reduction of the franchise fee to 10 percent, haulers must meet at least two of the following conditions:

1. Provide a waste audit and containers, and collect 50 percent by weight of customer's recyclable materials for industrial customers who regularly set out more than nine cubic yards of refuse per week for collection.

2. Provide a recycling service program and a designated recycling representative to perform specified tasks including:

    - Contact each of the industrial customers at least once every year to discuss the various types of recycling possibilities available to the customers.

- Work with each new customer concerning new recycling options.
- Keep written documentation of customer contact and any recycling option implemented.
- Submit quarterly report to the city documenting the amount of recycled materials collected by weight and type, and the number of recycling customers in the city.
- Maintain a list of customers serviced by name and service address for the city's review.

3. Provide another certified and documentable recycling or resource recovery program that reduces the amount of waste collected by at least 50 percent. Hauler needs to document waste flow for processing and disposal to all facilities and landfills. Certified quarterly reports must be submitted to the city with specific waste flow detail and documentation.

Haulers must pay the 25 percent franchise fee each quarter for all generators with greater than a 50 percent recoverable waste in their refuse set out for collection and disposal until less than 50 percent is achieved. The hauler may submit a new waste audit to the city at any time, to reduce the franchise fees paid for those customers that achieve less than 50 percent recoverable wastes.

The waste audit must be performed and certified by a qualified individual. The city reviews and determines the adequacy and completeness of the waste audit reports. Comments are submitted to the contractor for response, revision, update, and re-submittal of the report until it is approved by the city.

Adoption: Prior to presenting the incentive rate structure to city council, staff had a roundtable discussion with haulers to discuss ideas, provide notice and develop the incentive system.

Implementation: Notice to haulers was provided at the stakeholder meeting. The rate structure is reviewed and updated every three years.

Enforcement: Voluntary participation.

Evaluation: The program is evaluated based on the participation of haulers and businesses that report to the city. Haulers also conduct individual waste audit at businesses and report results to the city.

Results to date: Santa Clara has authorized fifteen haulers under its nonexclusive franchise system to collect waste from the industrial areas of Santa Clara. All of the haulers have been certified to obtain the reduced franchise fee. The city has noted an increase in recovery from the businesses served by these haulers.

Problems: The main problem with the incentive program is getting the haulers to report properly.

Lessons learned:
- With good market conditions, reduced franchise fees can be successful in increasing diversion.
- Some haulers will choose to pay the franchise fee if it requires too many resources to implement recycling programs.

Next steps: Evaluate and update the program every three years.

Santa Monica, CA

General Information

Location:	Santa Monica, California
Program Type:	Construction and demolition requirements
Population:	84,084 (U.S. Census, 2000)
Number of businesses:	9,771 (1995)

Contact Information

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Commercial Recycling Program

Recycling Goal: 50 percent by 2000

Current Recycling Rate: 55 percent, 2000

Collection System: Santa Monica's Environmental and Public Works Management Department Solid Waste Management Division collects approximately 50 percent of the waste generated by commercial and industrial operations within Santa Monica. The remainder of the commercial and industrial waste is collected by private waste haulers under contract with the city. Waste collected by the city is taken to a city-owned transfer station. Private haulers dispose of waste they collect in Santa Monica at several landfills located throughout the Los Angeles area. The city collects approximately 14 percent of the recyclable material generated by the commercial sector. The remaining 86 percent of commercial recyclables are collected by private recyclers.

Program: Construction and Material Waste Recycling Ordinance (895 CCS).

Start Date:
- December 2000, adopted
- May 2001, implemented

Target Generators: Private projects including all construction and demolition projects with total costs that are $50,000 or greater, or are 1,000 square feet and all city-sponsored construction, demolition and renovation projects.

Target Materials: Construction and demolition debris including rubble (concrete/asphalt), land-clearing debris, corrugated cardboard, metals, and wood.

Program Description: Applicants for construction or demolition permits involving a private or city project must complete and submit a Waste Management Plan (WMP), as part of the application packet for the construction or demolition permit. The WMP includes the following:

- The estimated volume or weight of the project construction and demolition material, by material type, to be generated;
- The maximum volume or weight of such materials that can feasibly be diverted via reuse or recycling. No more than 20 percent of the 60 percent

diversion rate can be achieved through the recycling or reuse of inert materials unless applicant can demonstrate to the satisfaction of the WMP Compliance Official that sufficient structural materials do not exist for recycling or that 40 percent diversion of total waste through non-inert materials is not feasible.

- The vendor or facility where the applicant proposes to use to collect or receive that material; and
- The estimated volume or weight of construction and demolition materials that will be landfilled in Class III landfills and inert disposal facilities.

Project applicants are required to submit a performance security deposit with the WMP. The amount of the performance security is calculated 3 percent of the total project's cost. The WMP Compliance Official may waive deposit if the total deposit required is $50 or less. Within 30 days after the completion of the project, the applicant must submit documentation that it has met the diversion requirement for the project. Documentation includes:

- Receipts from the vendor or facility that collected or received each material showing the actual weight or volume of that material.
- Weight slips/count of material salvaged or reused in current project.
- A copy of the previously approved WMP for the project adding the actual volume or weight of each material diverted and landfilled.

If the applicant has fully complied with diversion requirement, the performance security deposit is returned. Non-diversion of the materials generated from the project or lack of records satisfactorily demonstrating diversion of the materials may result in no refund or partial refund of the deposit amount

Adoption Process: The ordinance was modeled after the City of San Mateo's ordinance and other cities in California.

Implementation: The diversion requirements of the ordinance were phased-in over a 6-month period. Over-the-counter projects required a deposit starting May 2001 and more extensive projects required the deposit in October 2001.

Enforcement: Failure to comply with the program results in forfeiture of the security deposit.

Evaluation: Success of the program is measured by how much money is returned to applicants and tonnage diverted to the landfills.

Results to date: Santa Monica has noted an increase in diversion. To date, the city estimates approximately 10 percent to 15 percent increase in diversion as a result of the program.

Problems:
- Some projects do not fall under the project thresholds, but still generate a large amount of tonnage.
- Applicant's dissatisfaction of turn-around time of deposit refund.
- Hired additional 1.0 FTE to handle additional administration of program.

Next steps:
- Explore potential of expanding program to include all construction and demolition projects.
- Explore option of paying interest on deposits.
- Hire an inspector to inspect projects and ensure compliance as well as audit facilities.

Seattle, WA

General Information

Location: Seattle, WA
ProgramType: Reduced fees and tax incentives
Population: 563,374 (U.S. Census, 2000)

Contact Information

Contact: Chris Luboff, Supervisor of Waste Planning
Agency: Seattle Public Utilities Resource Planning Division
Address: 710 Second Avenue, 11th floor Seattle, WA 98104
Phone: (206) 684-7644
E-mail: chris.luboff@ci.seattle.wa.us
Web site: www.ci.seattle.wa.us

Commercial Recycling Program

Recycling Goal: City-wide goal of 60 percent by 2008
Commercial recycling goal of 63 percent by 2008

Current Recycling Rate: City-wide rate of 44 percent, 1998
Commercial rate of 48 percent, 1998

Collection System: The city contracts commercial garbage collection with two private haulers. The city defines collection routes and set rates, and owns and operates two of the four transfer stations in Seattle. Commercial recyclables are collected by private companies in a free-market environment and set their own rates. Five firms predominately provide recycling service.

Commercial garbage collection is not mandatory. Commercial and institutional waste generators can self-haul their trash and recyclables to a transfer station or contract privately. Businesses that generate 96 gallons or less of garbage per week may be able to receive free recycling collection with the Small Business Curbside Recycling Program.

Program: Seattle Municipal Code 5.48.055

Start Date: 1994

Target: Haulers.

Target Materials: Recyclable materials including newspaper, plastic, bottles, aluminum, tin, corrugated cardboard and office paper.

General Description: Reduced tipping fees and tax incentives are used to encourage businesses to recycle. At city transfer stations, the per ton tip fee for solid waste is $96.25 per ton. Businesses that self-haul recyclabes to city transfer stations can tip them for free and tip fee for yard debris is 25 percent lower than solid waste.

Seattle excludes revenues from collection of commercial recyclables from the city's Business and Occupation Tax (SMC 5.48.055) of $12.05 that haulers must pay on trash collection revenues. See Appendix P.

Private solid waste haulers offer their customers separate recycling service for source-separated materials. A number of private recycling companies provide collection service. These companies range from local paper companies collecting only high-grade paper to companies collection a broad range of materials. The rate schedule for recycling is generally lower than for solid waste service. In addition, solid waste haulers and recycling companies sometimes pay businesses for high-value recovered materials.

Adoption Process: Cost was identified as a barrier to recycling by businesses. The city removed the Business and Occupation Tax on recyclables to create an incentive to recycling in the private sector. Haulers pass the savings on to the customer.

Implementation: The tax removal coincided with the development of their commercial technical assistance program, the Business and Industry Recycling Venture (BIRV), with the major message being recycling saves money. The program encourages waste prevention, recycling and purchasing of recycled-content products within Seattle's business community. BIRV offers businesses a hotline, informational materials, technical assistance and conducts presentations and seminars.

Evaluation: The city conducts waste composition studies and participation surveys to measure their progress.

Results to date: In 1996, Seattle diverted 48 percent of its commercial and institutional waste through private recyclers, up from 44 percent in 1989 and 1993. In Seattle, it costs less to recycle than to landfill waste. Between 1988 and 1995 Seattle residents saved over $12 million by recycling and composting rather than sending waste to the landfill.

Problems: There were no problems associated with the incentive program. The tax incentives were received with a positive response by both haulers and businesses.

Lessons learned:

- Major barrier for business recycling is cost.
- Commodity markets can impact the recycling and participation rate.

Next steps:

- Develop options to ensure on-site space for recycling containers in new and remodeled multi-family dwellings.
- Provide a voluntary food waste collection program for residents if it can be done safely and economically.
- Provide collection for small businesses through the residential curbside program.
- Promote more recycling of mixed paper, plastic film and clean wood waste.
- Build a recycling center at the South Recycling and Disposal Station, and provide for increased recycling of construction materials.
- Create incentives for contractors and residents to use the recycling center.
- Expand the City's own "Green Procurement" program and promoting buy-recycled by residents and businesses.

Metro Region Solid Waste and Recycling Collection

Overview of the Regional Solid Waste System

Metro is responsible for planning and managing the recycling and disposal of solid waste generated in the region. Metro is the wasteshed representative to the state and is responsible for ensuring that the region meets its designated recovery goals of 62 percent by the end of 2005 and 64 percent by the end 2009. The Regional Solid Waste Management Plan (RSWMP) guides Metro's solid waste planning and recycling efforts. Local governments work cooperatively with Metro to implement the RSWMP and to plan the region's waste reduction and recycling programs with the goal of maximizing recovery and regional program continuity.

Metro is also responsible for ensuring proper disposal of solid waste collected and delivered to the region's solid waste facilities and provides hazardous wastes facilities and services for Metro area households. Part of the tipping fee paid to dispose of garbage is used to fund recycling programs, recycling education and provide household hazardous waste services.

Local governments are responsible for regulating and managing solid waste and recycling collection within their jurisdictional boundaries- including setting franchise boundaries, reviewing and collection rates and service standards. Local governments are also responsible for implementing waste reduction and recycling programs for residents and businesses in compliance with the state "Opportunity to Recycle" law as set forth in OAR Chapter 340, Division 90. With the exception of Portland, which requires businesses to recycle, local governments follow the "opportunity" model for business recycling collection service. Under the opportunity model local jurisdictions require haulers to offer recycling services to businesses for the collection of principal recyclable materials; it is up to the generators to participate. All jurisdictions require haulers to provide appropriate outdoor containers to all businesses that want to recycle.

Metro Region Collection Services

Solid Waste

Solid waste collection in the Metro region is provided solely by private haulers; however, jurisdictions handle collection differently. With the exception of the City of Portland's commercial sector, all of the Metro region jurisdictions have a franchised collection system, which means that the jurisdiction is divided into zones, with one hauler serving all residences, multi-family properties and businesses in each zone. The jurisdiction is responsible for setting rates, franchise boundaries, service levels and implementing waste reduction and recycling programs.

Recycling

All jurisdictions have weekly curbside collection of recyclables on the same day as garbage service. Haulers are required to offer recycling services to households and businesses and provide appropriate outdoor containers to all generators that want to recycle. With the exception of Portland, which requires businesses to recycle 50 percent of their waste, it is up to the generator to participate. In almost all the jurisdictions rates include the collection of recyclables.
The solid waste and recycling collection services for residential and commercial sectors are detailed on the following page.

Residential

Residential garbage and recycling service is franchised in all jurisdictions in the Metro region. Each city is responsible for their own hauler franchising, while the counties administer franchises in the unincorporated areas.

Commercial

Except for the City of Portland, commercial garbage and recycling service is franchised in all jurisdictions in the Metro region.

Portland's commercial recycling collection system is not franchised. The commercial sector has an 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.

Rates

Rates include collection of recyclables in all of the jurisdictions with the exception of Washington County. According to 1995 program rules, haulers in unincorporated Washington County will collect up to four recyclable materials from commercial businesses. If generators want to recycle additional materials, rates are negotiated with the hauler and additional fees may be imposed.

A selection of Metro region jurisdictions rates and collection services are highlighted in Table 5 and 6.

Table 5.

Metro Region Summary of Comparative Rates 2001 for Selected Jurisdictions

Service	Portland	Gresham	Clackamas County	Beaverton	Washington County
COMMERCIAL WEEKLY					
1 can 32 Gal.	NOT	14.3	16.2		17.3
2 Cans 32 Gal.	REGULATED	25.9	30.2		34.6
35 Gal. Cart		15.4		16.5	
60 Gal. Cart		21.85	25.1		26.01
90 Gal. Cart		25.1	27.3		31.12
1-1/2 Yd.Container		95.38	103.13	110.21	
2 Yd. Container		121.3	128.87	145.88	98.27
3 Yd. Container		160	170.29	203.1	118.08
					157.48
Drop Box + Disposal					
20 Yard		110	80.55	93.94	95.76
30 Yard		126.5	98.1	130.12	132.06
40 Yard		126.5	113.35	159.41	158.27
Franchise Fee		5% +2%	5%	4%	3%
Free Service/Clean-up		CU			
Full Recycling		Yes	Yes	Yes	Yes
Principal Recyclables					
Milk Jugs + Plastic Bottles (neck)+Magazines + Scrap Paer +Aerosol Cans					

Table 6.

Metro Region Commercial Recycling Collection Services for Selected Jurisdictions

Jurisdiction	Population	Collection System	RECYCLABLE MATERIALS COLLECTED: FE	NF	UO	ONP	GL	AL	OCC	TC	HI	YD	OMG	MWP	PH	WW	PB	MP	ASP	HB	Level of Service
Portland, OR	531,800	Free market (unfranchised dropbox)	X	X		X	X	X	X	X	X	X	X	X	X		X		X		Required recycling of recyclables, rates negotiated with hauler.
Gresham, OR	90,205	Franchised (unfranchised dropbox)	X	X		X	X	X	X	X	X	X	X	X	X		X				Rates include collection of recyclables.
Clackamas County, OR	338,391	Franchised	X	X	X	X	X	X	X	X	X		X	X	X		X		X		Rates include collection of recyclables.
Beaverton, OR	76,129	Franchised	X	X		X	X	X	X	X	X	X	X	X	X		X				Rates include collection of recyclables.
Washington County, OR	445,342	Franchised	X	X		X	X	X	X	X	X	X	X	X	X		X				According to 1995 program rules, haulers in unincorporated Washington County will collect up to 4 recyclable materials from commercial businesses which is included in the rate. If generators want to recycle additional materials, rates are negotiated with the hauler and additional fees may be imposed.

FE	FERROUS METALS	YD	YARD DEBRIS
NF	NON-FERROUS METALS	OMG	MAGAZINE
UO	USED OIL	MWP	MIXED WASTE PAPER
ONP	NEWSPAPER	PH	PHONE BOOKS
GL	GLASS	WW	WOOD WASTE
AL	ALUMINUM	PB	PLASTIC BOTTLES
OCC	CORRGATED CONTAINERS	MP	MIXED PLASTICS
TC	TIN CANS	ASP	ANTISEPTIC PACKAGING
HI	HIGH GRADE OFFICE PAPER	HB	HARDBACK BOOKS

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Transfer, Processing and Recovery

A number of facilities make up the region's solid waste and recycling system. Some handle mixed waste, while others act as processors for specific kinds of materials that can be recycled.

Most solid waste and recycling facilities are privately owned. Only Metro South and Metro Central transfer stations are publicly owned. The facilities that transfer and process solid waste and recycling are detailed below.

Transfer Station Services

Transfer stations accept the waste from haulers and transfer the waste to tractor trailers for delivery to landfills. Waste that is delivered to the transfer stations is sorted by employees to remove recyclable material. Materials are sorted by type and marketed as individual commodities locally, nationally and internationally. Waste is transferred from the Metro transfer stations to the Columbia Ridge Landfill, which is a general-purpose landfill located in Arlington, Oregon, owned and operated by Waste Management.

Material Recovery Facilities

Material Recovery Facilities (or MRFs) are sorting facilities that receive household and business source-separated recyclables. Materials are sorted by type and marketed as individual commodities locally, nationally and internationally. Approximately 95 percent of a load taken to a MRF is recovered for recycling.

Mixed Dry-Waste Processing Facilities

Mixed dry-waste facilities accept loads of mixed dry waste (paper, wood, metal, glass) for processing. Dry waste does not include food or other putrescible waste. Mixed construction and demolition debris is accepted at mixed dry-waste processing facilities that sort materials for recycling. On average, 25 to 30 percent of mixed dry waste loads are recovered for recycling. There are four facilities in the region that accept mixed dry waste. Some facilities accept both source-separated recyclables and dry waste.

Household Hazardous Waste Facilities

There are currently two permanent household hazardous waste facilities in the Metro region, located at the Metro South and Metro Central transfer stations. Residents can bring unwanted hazardous household products such as such as pesticides, leftover paint, solvents and automotive fluids to one of Metro's hazardous waste facilities. Call Metro at (503) 234-3000 for information on the disposal of business-generated hazardous waste.

Conclusion

The survey of required recycling and incentive programs indicates that implementing these types of strategies may serve as an effective means to achieve the region's recovery goals. Economic incentives continue to be one of the most effective incentives for businesses to voluntarily recycle. Local governments in the Metro region currently offer education materials and technical assistance to businesses. To complement these programs, economic incentives may encourage businesses to reduce waste and recycle. Local governments can influence the marketplace by the way it structures its garbage collection rates, franchise fees and permit fees.

Seattle's reduced fees and taxes to reward recovery over disposal has been successful in encouraging business participation. Santa Clara uses reduced franchise fees to encourage haulers and businesses to recycle. Other incentives the surveyed programs use to encourage businesses to recycle include grant assistance, recognition and recycling deposit programs. Program managers indicated that infrastructure development grant programs are one of the most effective methods to increasing processing capacity and waste reduction efforts. Iowa's and San Jose's grant programs have been successful in expanding processing capacity and recovery. King County's recognition program is an alternative incentive program that publicly acknowledges construction companies that recycle and helps develop community norms. The diversion or recycling deposit system is a relatively new incentive strategy being used by a number of communities in California. Data on the success of these programs is still being collected and evaluated. The largest barrier is the administration of the transaction and refund process that requires additional resources and time.

If providing information, technical assistance and incentives do not produce adequate waste diversion, required recycling programs are additional measures that may help the region meet its recovery goals. Required recycling and incentive programs enacted by the surveyed communities are diverse. Each profiled program is unique to their community and reflects the economics and infrastructure of their region. Targeted materials vary by community and are directly tied to commodity markets. However, the programs share some common elements.

All of the surveyed programs provide the commercial and institutional sector with some level of technical assistance and education. A number of the programs provide on-site assistance including waste audits to determine where waste reduction efforts are most needed. Education is a key factor in all of the programs. Nearly all the program managers stressed the importance of constant education throughout a program's development and implementation.

In addition, all the communities with required recycling have some level of enforcement. The most common enforcement measures being used in the profiled programs include random business inspections and landfill load inspections. Penalties for noncompliance include warnings and fines that range from $25 to $10,000. The majority of the programs offer an assistance period to help businesses meet the requirements. Five of the nine programs noted lack of resources for enforcement measures as an obstacle to a program's success.

High diversion and participation rates in communities with strong education and technical assistance for required recycling programs indicates people are willing to separate recyclables and programs can be designed to efficiently collect these materials. The major elements to developing and implementing a successful required recycling program include:

- An evaluation of the waste stream to determine the recyclables that economically justifies a separate collection.
- A cooperative approach to the program design to help build program support and create the most incentives for participation.
- Extensive public outreach and education that is ongoing throughout the design and implementation of the program.
- Technical assistance that is available to help businesses comply with requirements.
- Enforcement measures supported by adequate resources to ensure business participation.

The development of required recycling and incentive programs for commercial and construction and demolition materials has the potential to divert a significant portion of the waste stream. An evaluation of the commercial and construction and demolition waste streams coupled with an

examination of commodity markets will help determine priorities for collection and the design of programs using required recycling and incentive strategies. Metro's role in the solid waste system provides the opportunity to implement disposal bans and/or processing requirements at Metro transfer stations or designated facilities. Based on the information provided in this report, Metro, in cooperation with local governments, may continue to explore the potential for developing required recycling and incentive strategies in the region.

Appendix A: Program Profile Contact Listing

Jurisdiction	Contact	Agency	Address	Phone	E-mail	Website	Publications
Cambridge, Massachusetts	Rick Leandro, Recycling Manager	Department of Public Works	147 Hampshire Street, Cambridge, MA 02139	(617) 349-4879	Rleandro@ci.cambridge.ma.us	www.ci.cambridge.ma.us	
Chicago, Illinois	Erin Keane, Waste Reduction Specialist	City of Chicago Department of Environment	30 N. LaSalle Street Chicago, IL 60602	(312) 774-1614 (312) 744-7806	ekeane@cityofchicago.org	www.ci.chi.il.us	
Dane County, Wisconsin	John Roindl, Recycling Manager	Dane County Department of Public Works	1919 Alliant Energy Center Way Madison, WI 53713	(608) 267-8815	Reindl@co.dane.wi.us	www.co.dane.wi.us	http://www.co.dane.wi.us/ord/ordJ41.pdf
Durham, North Carolina	Alison Fiori, Waste Reduction Specialist	Environmental Resource Department	1833 Camden Avenue, Durham, NC 27704	(919) 560-4186	afiori@ci.durham.nc.us	www.ci.durham.nc.us	www.ci.durham.nc.us/departments/solid/ordinance.pdf
Halifax Regional Municipality, Nova Scotia	Jim Bauld, Diversion Planning Coordinator	Halifax Regional Municipality	P.O. Box 1749 Halifax, N.S. Canada B3J 3A5	(902) 490-7176	bauldj@region.halifax.ns.ca	www.region.halifax.ns.ca/wms	www.on.ec.gc.ca/epb/fpd/encpb/compro00.html
Iowa	Valerie Drew, Environmental Specialist	Iowa Department of Natural Resources	502 E. 9th Street Wallace State Offices Des Moines, IA 50319	(515) 281-0072	valerie.drew@dnr.state.ia.us	www.iowadnr.wmad.org	www.iowadnr.org/wmabureau/solidwaste/swap/index.htm
King County, Washington	Theresa Koppan	King County Solid Waste Division	201 S. Jackson Street, Suite 701 Seattle, WA 98104	(206) 296-8480	Theresa.Koppany@metrokc.gov	www.co.king.wa.us	
Monmouth County , New Jersey	Fran Metzger, District Recycling Coordinator	Monmouth County Health Department	3435 Hwy. 9 Freehold, NJ 07728	(732) 431-7460	fmetzger@shore.co.monmouth.nj.us	www.monmouthplanning.com	www.visitmonmouth.com/03230planboard/solid.htm
Onondaga County, New York	Andy Brigham	Onondaga County Resource Recovery Agency	100 Elwood Davis Road R d North Syracuse, NY 13212	(315) 453-2866	ocrra@ocrra.org	www.ocrra.org	www.ocrra.org/Annual%20Recycling%20Report%202001.PDF
Portland, Oregon	Bruce Walker, Recycling Program Manager	City of Portland Office of Sustainability	721 NW 9th Ave., Ste. 350 Portland, OR 97209	(503) 823-7772	bwalker@ci.portland.or.us	www.sustainableportland.org	www.sustainableportland.org/recycle_com_breq.html
San Diego County, California	J Taylor, Recycling Specialist	San Diego County	5469 Kearny Villa Rd. Suite 305 San Diego, CA 92123	(858) 694-2794	J.Taylor@sdcounty.ca.gov	www.co.san-diego.ca.us	www.ciwmb.ca.gov/LGLibrary/Innovations/DizRecycle/
San Jose, California	Stephen Bantillo, Recycling Coordinator	City of San Jose	777 N. 1st St. Suite 450 San Jose, CA 95112	(408) 277-5533	Stephen.Bantillo@ci.sj.ca.us	www.sjrecycles.org/business/cddd.htm	
Santa Clara, California	Rick Mauck, Director of Streets and Auto Services	City of Santa Clara	1500 Warburton Ave Santa Clara, CA 95050	(408) 615 2051		www.ci.santa-clara.ca.us	www.ci.wmb.ca.gov/LGLibrary/Innovations/Incentive/SantaClara.htm
Santa Monica, California	Gus Cuzzzetti, Superintendent	City of Santa Monica	2500 Michigan Ave Santa Monica, CA 90404	(310) 458-8511 (310) 458-2223	gus-guzzetti@santa-monica.org	www.greenbuildings-santamonica.org	greenbuildings.santa-monica.org/whatsnew/waste.ordinance.html
Seattle, Washington	Chris Luboff, Supervisor of Waste Planning	Resource Planning Division Seattle Public Utilities	710 Second Avenue 11th floor Seattle, WA 98104	(206) 684-7644	chris.luboff@ci.seattle.wa.us	www.ci.seattle.wa.us	www.cityofseattle.net/util/solidwaste/SWPlan/documents.htm