



# 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 <sup>1</sup>
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 <sup>2</sup>	54% <sup>2</sup>
Chatham, NJ	Suburban borough	8,300	8,010	65%
Clifton, NJ	Suburban, urban	75,000	110,930 <sup>2</sup>	56% <sup>2</sup>
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 <sup>2</sup>	50% <sup>2</sup>
Ramsey Co., MN	Urban, suburban, rural	496,100	673,300 <sup>2</sup>	47% <sup>2</sup>
San Jose, CA	Urban	873,300	1,315,440 <sup>2</sup>	43% <sup>2</sup>
Seattle, WA	Urban	534,700	768,020 <sup>2</sup>	44% <sup>2</sup>
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).

<sup>1</sup>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.

<sup>2</sup>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.

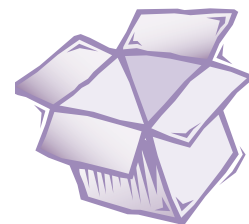
### Fitchburg, Wisconsin (Population: 17,300)

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 <sup>1</sup>	% Composted	Mandatory	PAYT
Ann Arbor, MI	31	23%	✓	
Bellevue, WA	29	34%		✓
Bergen Co., NJ	Varies	32%	✓	Some <sup>2</sup>
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% <sup>3</sup>	✓ <sup>4</sup>	✓
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.

<sup>1</sup>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.

<sup>2</sup>Four out of 70 communities within Bergen County have implemented PAYT trash fees.

<sup>3</sup>Represents percentage of municipal solid waste composted as Ramsey County does not track residential materials separately from other MSW.

<sup>4</sup>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.

**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.

### 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.



## 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.





# Ann Arbor, Michigan

52% Residential Waste Reduction



## Overview

Residential waste reduction in the City of Ann Arbor has come a long way since the creation of its first community-based non-profit drop-off station in 1970. Today the city contracts with the non-profit organization, Recycle Ann Arbor, for the collection — under mandatory ordinance — of recyclables from all city households and the operation of a drop-off facility for recyclables and yard debris.<sup>1</sup> In addition, city crews collect yard debris at curbside seasonally. In FY96 the city diverted 52% of its residential waste through recycling (30%) and composting (23%). Per household solid waste management costs have increased by less than 10% since FY89, even though per ton trash tip fees increased more than 70% in the same period.

## DEMOGRAPHICS

**POPULATION:** 112,000  
(1994)

**HOUSEHOLDS:** 22,000  
single-family and  
duplexes; 24,000 multi-  
family

## Keys to High Waste Reduction

Contributing factors to Ann Arbor's waste diversion level are a state ban on landfilling yard debris, curbside collection of 24 types of recyclables coupled with a mandatory ordinance, multi-family dwelling recycling service, and the bottle bill. The state ban spurred Ann Arbor to develop a compost site, draft an ordinance requiring residents to separate "compostables" from trash, and start curbside service for these materials. Nearly one-quarter of Ann Arbor's residential waste stream is diverted through the city's composting program. City ordinance requires residents to

source-separate recyclables and compostables from trash. The city enforces this requirement by not collecting improperly sorted and prepared materials. As 52% of households are multi-family, the city recognized the importance of providing this sector with waste reduction services. Multi-family buildings receive recycling carts and can divert the same materials as do single-family homes, with the exception of motor oil and batteries.

## RESIDENTIAL PROGRAM SUMMARY

	FY89	FY96
Tons Per Year	44,806	47,943
Percent Diverted	16%	52%
Recycled	16%	30%
Composted	0%	23%
Average lbs./HH/day	5.61	5.71
Net Program Costs/HH	\$72.96	77.61
Disposal Services	63.68	42.17
Diversion Services	9.29	35.44

Notes: 43,774 households served in FY89; 46,000 in FY96. 1989 dollars adjusted to 1996 dollars using the GDP deflator. Numbers may not add to total due to rounding.

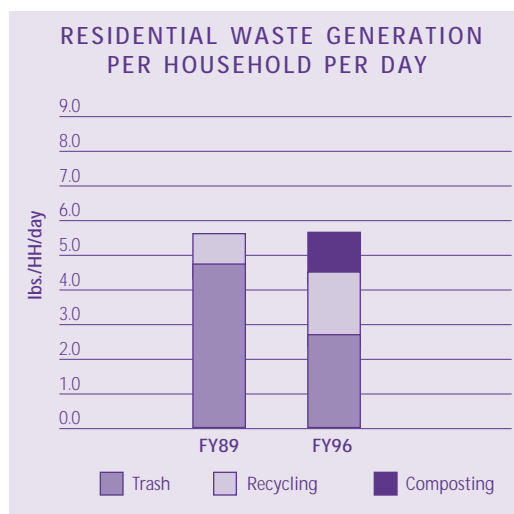
Source: Institute for Local Self-Reliance, 1999.

The bottle bill provides an incentive to recover designated containers. The city's waste reduction efforts are supported by city ownership of a material recovery facility and composting facility, and a comprehensive education program.



## Cost-Effectiveness

In FY96, after subtracting material revenues, the city spent \$78 per household served on trash, recycling, and yard debris services. This cost represents an increase of less than 10% over per household costs in FY89. In FY97, the average net per ton costs of waste reduction were \$71. In contrast, FY97 trash



Source: Institute for Local Self-Reliance, 1999.

collection and disposal costs averaged \$86 per ton. Contracting with a nonprofit for curbside recyclables collection and operation of the drop-off facility, reduced total disposal costs, and yard debris diversion are primarily responsible for keeping the increase to a minimum.



## MATERIALS RECOVERED

### CURBSIDE:

- newspaper, magazines, and corrugated cardboard
- mixed paper (including paperback and phone books, office paper, mail, and paperboard)
- milk cartons and juice boxes
- steel and aluminum cans
- scrap metal (including ferrous metal, aluminum foil and pie tins, white goods, and aerosol cans)
- glass containers, dishes, and heat-resistant glass
- ceramics
- #1-#3 plastic bottles
- textiles
- household batteries
- used motor oil and oil filters
- yard waste (including leaves, grass clippings, brush, and holiday trees)

### DROP-OFF:

- all materials collected in curbside recycling program plus
- hardcover books
- polystyrene
- packing peanuts
- foam egg
- cartons
- car batteries
- other materials can be (collected for a small fee)



Recyclables and yard debris set out for collection in Ann Arbor

## Tips for Replication

- Keep the program easy and user-friendly.
- Include public input.
- Look for ways to cooperate with other entities.
- Use conservative projections for tonnages and market prices.

### Notes:

<sup>1</sup>Residents in multi-family dwellings can recycle the same materials at curbside as residents in single-family dwellings with the exception of used motor oil and batteries.

## Contact

Tom McMurtrie  
Recycling Coordinator  
City of Ann Arbor Dept. of Solid Waste  
100 N. Fifth Avenue  
Ann Arbor, MI 48107  
**PHONE:** 734 -994 -6581  
**FAX:** 734 -994 -1816  
**WEB SITE:** <http://www.ci.ann-arbor.mi.us>







# Bellevue, Washington

60% Residential Waste Reduction



## Overview

Bellevue initiated its recycling program in 1989; by 1996 the city recovered 60% of its solid waste from single-family homes (26% through recycling and 34% through composting). Bellevue contracts with one local company to provide most of its residential waste services, including weekly trash collection, weekly curbside collection of 16 categories of recyclables, and twice monthly collection of yard debris from March through November.<sup>1</sup> Residents can also recycle materials at county-run drop-off facilities and twice yearly special collection days offered by the city and its solid waste contractor. Since the introduction of Bellevue's waste reduction program in 1989, average per household trash disposal has decreased from 6.52 pounds per day to only 3.69 pounds per day. The city has no mandatory recycling requirements for residents, but its pay-as-you-throw fee structure for trash provides an economic incentive for residents to reduce trash disposal.

## DEMOGRAPHICS

**POPULATION:** 103,700  
(1996)

**HOUSEHOLDS:** 44,387  
(1996); 26,026  
single-family  
households (1-10  
units), 18,361 multi-  
family units

## Keys to High Waste Reduction

Bellevue's pay-as-you-throw trash rate structure and ease and availability of waste reduction opportunities contribute to the city's high waste reduction level.

Residents pay a monthly fee for trash removal based upon the size of the trash container they use. For instance, in 1996, weekly collection of one 30-gallon trash can costs Bellevue residents \$12.91 per month while weekly collection of one 19-gallon can costs only \$7.13 per month. As part of its convenient waste reduction program, the city's contractor provides residents with three stackable recycling bins,

## RESIDENTIAL PROGRAM SUMMARY

	1989	1996
Tons Per Year	23,396	39,186
Percent Diverted	11%	60%
Recycled	6%	26%
Composted	5%	34%
Average lbs./HH/day	7.30	9.18
Net Program Costs/HH	NA	\$235.64
Disposal Services	NA	\$116.68
Diversion Services	NA	\$118.97

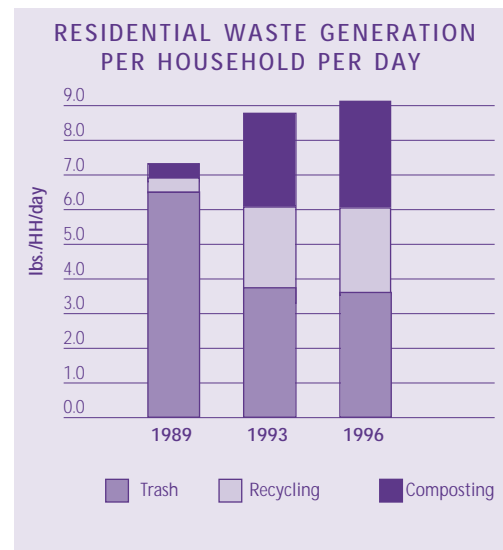
Notes: 17,556 households served in 1989; 23,372 in 1996. Numbers may not add to total due to rounding. 1989 program costs not available as they occurred in the private sector and are not public information.

Source: Institute for Local Self-Reliance, 1999.

weekly curbside pick-up of recyclables, and bi-weekly pick-up of yard debris. The city's yard debris program is especially effective, diverting more than one-third of the city's residential waste stream.

### Cost-Effectiveness

Bellevue's contractor collects service fees directly from customers. The rates charged are based on the level of trash collection requested by each customer. Direct city expenditures are limited to administration and education and publicity costs. Of total city and contractor waste management expenditures in 1996, about 50% was spent on trash collection and disposal, 25% was spent on recycling, and 25% was spent on yard



Source: Institute for Local Self-Reliance, 1999.

debris collection and composting. Overall, trash cost \$174 per ton, recycling \$139 per ton, and yard debris recovery \$102 per ton.

### Tips for Replication

- Collect mixed paper.
- Commit to and concentrate on high-quality customer service.
- Spend the extra money to make promotional material attractive.
- Continuously remind and educate the public about waste reduction.
- Raise overall environmental awareness.
- Implement a variable rate structure for trash.

Notes:

<sup>1</sup>Yard debris collection is once monthly from December through February.

### MATERIALS RECOVERED

#### CURBSIDE:

newspapers, magazines, corrugated cardboard  
mixed paper (mail, office paper, phone books, paperboard, and kraft bags)  
milk cartons and drink boxes  
cans  
aluminum foil and other non-ferrous scrap  
glass containers  
#1 and #2 plastic bottles  
white goods  
yard waste (leaves, brush, grass clippings, and other yard and garden debris)  
holiday trees

#### DROP-OFF:

all materials accepted in curbside program plus:  
oil filters  
household and lead-acid batteries  
tires  
household goods (textiles, working small appliances, and usable furniture)  
scrap metal  
#6 plastic food containers  
scrap lumber  
antifreeze  
fluorescent lamps and ballasts  
ceramic bathroom fixtures



*Yard debris prepared for collection in Bellevue*

### Contact

Tom Spille  
Solid Waste Program Administrator  
Resource Management and Technology  
Utilities Department  
City of Bellevue  
301 116th Avenue Southeast, Suite 230  
P.O. Box 90012

Bellevue, WA 98009-9012

**PHONE:** 425-452-6964

**FAX:** 425-452-7116

**WEB SITE:** <http://www.ci.bellevue.wa.us/bellevue/homemap.htm>





# Bergen County, New Jersey

## 54% Municipal Solid Waste Reduction

(49% Residential Solid Waste Reduction; 63% Institutional/Commercial Solid Waste Reduction)



### Overview

Bergen County provides solid waste management funding, technical assistance, education programs, and data management to its 70 municipalities. The county also owns a waste transfer station and a yard trimmings processing facility. The Bergen County Long-Term Solid Waste Management Plan mandates residential recycling of eight materials. All communities in Bergen County have passed their own mandatory recycling ordinances; some of these ordinances mandate recycling of materials in addition to those required by the county. All but seven of the municipalities provide residential trash services or hire and pay for a contractor to collect their residents' trash, residents of the other communities must contract directly with trash haulers. Sixty-nine of the 70 county communities offer curbside recycling services, and four have pay-as-you-throw trash systems. The County Solid Waste Management Plan requires commercial and institutional establishments to recycle corrugated cardboard, high-grade and mixed paper, glass food and beverage containers, aluminum cans, ferrous scrap, white goods, and construction and demolition debris and to track and report the amounts of materials recovered.

### Keys to High Waste Reduction

The keys to Bergen County's high waste diversion rate are mandatory recycling; historically high disposal fees; the existence of well-established markets for recovered materials; extensive education and outreach programs; technical assistance; and the availability of a

### DEMOGRAPHICS

**POPULATION:** 825,380  
(1995)

**HOUSEHOLDS:** 330,473  
(1996); 250,000  
single-family  
dwellings (estimate, 4  
or fewer units per  
building), 80,000  
multi-family  
dwellings (estimate, 5  
or more units)

**BUSINESSES:** 30,859  
(1998)

### PROGRAM SUMMARY

	1993	1995
Tons Per Year MSW <sup>1</sup>	1,086,055	1,086,055
Tons Per Year RSW	693,840	693,840
Tons Per Year ICW	392,215	392,215
Percent MSW Diverted <sup>1</sup>	52%	54%
Percent RSW Diverted	49%	49%
Percent ICW Diverted	57%	63%
Average lbs./HH/day <sup>2</sup>	15.21	15.21
Net Program Costs/HH	NA	NA
Disposal Services	NA	NA
Diversion Services	NA	NA

Key: MSW = municipal solid waste RSW = residential solid waste  
ICW = institutional and commercial waste  
NA = not available

Notes: Numbers may not add to total due to rounding.

<sup>1</sup>In order to account for waste bypassing the county transfer station in 1995, ILSR assumed 1995 MSW, RSW, and ICW to be equal to 1993 MSW, RSW, and ICW, respectively, and added an estimated tonnage to disposal.

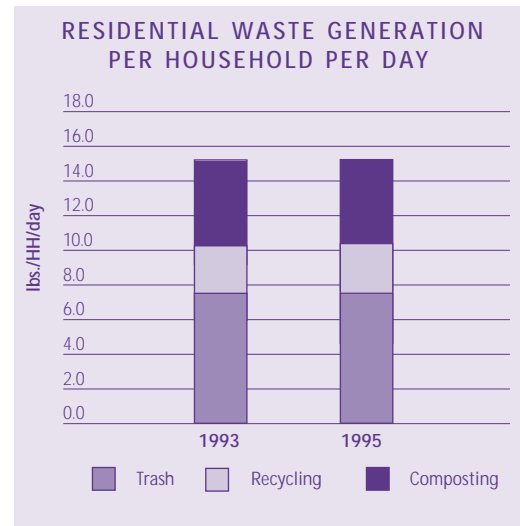
<sup>2</sup>Figures represent residential sector only. ILSR estimated households served in 1993 and 1995 as 250,000, the number of dwellings in buildings with four or fewer units.

Source: Institute for Local Self-Reliance, 1999.

yard debris management facility. Although trash tip fees dropped to \$54 per ton at the Bergen County Utilities Authority Transfer Station in 1998, from January 1990 until November 1997, tip fees at the facility were over \$100 per ton. Bergen County is home to two paper mills that create a constant demand for recovered paper. The county runs an education and outreach program that includes advertising, publications, promotions, education programs, a hotline, and a lending library. The county's 25-acre yard debris composting site composts grass clippings, leaves, and brush and sells the finished material.

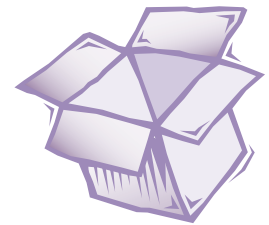
### Cost-Effectiveness

The Bergen County Utilities Authority's budget for solid waste management includes its transfer station costs, hauling costs, tip fees, landfill closure costs, recycling and source reduction financial assistance programs, education and publicity costs, staff and administration costs, and debt service. The Authority's expenditures represent only a portion of the costs of waste management in the county. Each county community operates a waste management program, which is for the most part financed by community funds. In a limited survey of community recycling coordinators from Bergen County, all six



Source: Institute for Local Self-Reliance, 1999.

respondents claimed their waste reduction programs saved money or cost no more than disposal. Reasons cited for the cost-effectiveness of the programs include reduced trash costs as a result of diversion, lower labor costs as a result of waste reduction, saving on compost for city projects, free hauling and no tip fees for recyclables, and revenues from sale of recovered materials off-setting program costs.



### Tips for Replication

Support community innovation with small grants.

Make waste reduction programs mandatory.

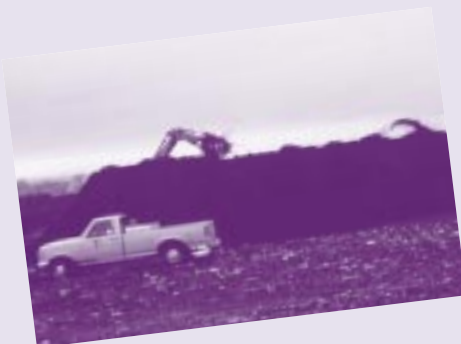
Design a user friendly program.

Provide bins for curbside recycling participants.

Be accessible.

### MATERIALS RECOVERED

The County requires each community to recycle newspaper, glass food and beverage containers, food and beverage cans, ferrous scrap, white goods, leaves, and grass clippings from residential waste. Some county communities recycle additional materials such as magazines, plastics, and other paper grades.



Compost piles at the Bergen County-owned compost facility

### Contact

Nina Herman Seiden  
 Recycling Program Manager  
 Bergen County Utilities Authority  
 Department of Solid Waste Planning and Development  
 P.O. Box 9  
 Foot of Mehrhof Road  
 Little Ferry, NJ 07643  
**PHONE:** 201-641-2552 x5822  
**FAX:** 201-641-3509







# Chatham, New Jersey

65% Residential Waste Reduction



## Overview

This wealthy, tree-lined suburban community diverts 65% of its residential waste from disposal (22% through recycling and 43% through composting). The borough instituted a pay-as-you-throw (PAYT) system for trash in 1992. Residents must place their trash in special bags or the city's contracted trash collection firm will leave it at curbside. Another contractor provides curbside collection twice a month for 21 types of recyclables. The borough collects fall leaves curbside and provides a drop-off location for brush and other yard trimmings. Chatham had a successful waste reduction program that diverted 63% of its residential waste in 1991, before the PAYT system was introduced. The current system is even more successful. In 1996, the average Chatham household produced 6% less waste than in 1991 and per household trash disposal dropped by more than 10%. Furthermore, average household costs for solid waste management decreased 50% within this same time period.

## DEMOGRAPHICS

**POPULATION:** 8,007  
(1990); 8,289 (1997)  
**HOUSEHOLDS:** 3,285  
(1996) 2,735  
dwellings of 3 units  
or less. 550 multi-  
family dwellings

## Keys to High Waste Reduction

Pay-as-you-throw trash fees, a curbside recycling program that collects many materials, and a convenient yard debris collection and composting program contribute to Chatham's waste reduction program success. Chatham's trash hauler only collects trash that residents place in special 30- and 15-gallon bags. The bags cost \$1.25 and \$0.65 respectively; the price was set so bag fees cover the cost of tip fees for trash disposal. The Advanced Recycling Technology Systems, Inc. (ARTS) recycling company provides twice monthly curbside recycling for 21 categories of materials and services the borough's drop-off site. Composting of yard debris accounts for nearly two-thirds of

## RESIDENTIAL PROGRAM SUMMARY

	1991	1996
Tons Per Year	8,581	8,007
Percent Diverted	63%	65%
Recycled	13%	22%
Composted	50%	43%
Average lbs./HH/day	16.85	15.81
Net Program Costs/HH	\$456.62	\$227.76
Disposal Services	\$392.81	\$158.02
Diversion Services	\$63.81	\$69.74

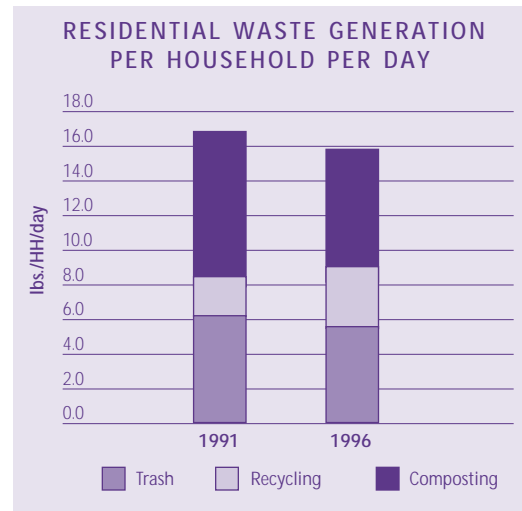
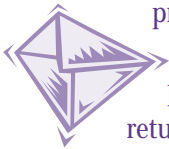
Notes: 2,750 households and 35-40 small businesses (2,790 total) served in 1991; 2,775 (2,735 households, 40 businesses) in 1996. 1991 dollars adjusted to 1996 dollars using the GDP deflator. Numbers may not add to total due to rounding.

Source: Institute for Local Self-Reliance, 1999.

residential waste reduction in Chatham. Fall leaf collection accounted for about 80% of all yard waste recovered in 1996. In order to encourage residents to participate, solid waste management calendars with recycling information and drop-off/pick-up times are mailed every year to Chatham households.

### Cost-Effectiveness

Before switching to the PAYT trash system in November 1992, each Chatham household paid the previous trash hauler a flat annual fee of \$350 for trash collection and disposal, equivalent to more than \$300 per ton. The trash bag costs are now set to cover tip fee disposal costs; total per ton trash costs were \$157 in 1996. Composting collection and processing costs average \$48 per ton; recycling collection and processing, \$39 per ton. Also, the recycling contractor returns half of materials revenues to the



Source: Institute for Local Self-Reliance, 1999.

community. In 1996, these revenues defrayed recycling collection costs by 60%. Chatham's recovery rate surpassed 60% under both the old private trash collection system and the new publically contracted system but per household costs dropped dramatically when the new system was implemented.



Funding for Chatham's residential waste management program is supplied by a \$75 per household fee paid by borough residents, the cost of trash bags, and county and state funds.

### Tips for Replication

Make program participation convenient. Chatham switched to commingled collection of containers because of residents' preferences.

Pay-as-you-throw systems encourage trash reduction.

### MATERIALS RECOVERED

#### CURBSIDE:

newspapers and inserts, magazines and catalogs, corrugated cardboard  
mixed paper ( paper bags, phone books, paperback books, paperboard,  
colored and white paper, envelopes, mail, computer paper, wrapping  
paper, and egg cartons)  
glass containers  
cans  
juice and milk cartons  
#1 - #3 plastic bottles  
scrap metals (including aluminum foil and metal clothes hangers)  
empty latex paint cans  
aerosol cans  
household batteries  
white goods  
leaves

#### DROP-OFF:

All materials accepted in curbside program (with the exceptions of household batteries and white goods) plus:  
brush  
grass clippings



Recyclables set out at curbside in Chatham

### Contact

Henry Underhill  
Town Administrator  
Borough of Chatham  
54 Fairmont Avenue  
Chatham, NJ 07928  
**PHONE:** 973-635-0674 x108  
**FAX:** 973-636-2417





# Clifton, New Jersey

## 56% Municipal Solid Waste Reduction

(44% Residential Solid Waste Reduction; 68% Institutional/Commercial Solid Waste Reduction)



### Overview

In 1996, Clifton diverted 56% of its municipal solid waste from disposal (38% through recycling; 18% through composting). Clifton diverted 44% of city-collected material and an impressive 68% of materials generated by businesses and institutions not served by city waste management programs. The city collects eleven categories of recyclables in its curbside program and its drop-off recycling center accepts thirteen categories of material (nine of which are also collected curbside). Residents are required by local ordinance to recycle other categories of materials, such as textiles, but must do so through private recyclers. The city also offers its residents and small businesses curbside collection of yard debris. Private trash haulers and recyclers primarily serve the city's businesses and institutions, which are required to recycle 22 types of materials.

### DEMOGRAPHICS

**POPULATION:** 75,000  
(1996)

**HOUSEHOLDS:** 31,000  
(1996) 25,500 single-family homes and duplexes, 5,500 in dwellings with 3 or more units

**BUSINESSES:** 3,100  
(1999)

### Keys to High Waste Reduction

Clifton's waste diversion success is driven by high waste disposal fees, state and local recycling mandates, strong local markets for recycling, composting yard debris, and an active recycling coordinator. Tip fees in New Jersey have traditionally been among the highest in the nation. Waste diversion

offers many New Jersey businesses and communities a less expensive alternative to disposal. Clifton's residential recycling ordinance requires every household served by the city-operated waste management program to source-separate and recycle 18 categories of materials. Another ordinance requires Clifton businesses and institutions to recycle 22 materials. Recycling-based manufacturing is prevalent in New Jersey and Clifton is near many companies that use recyclables as raw

### PROGRAM SUMMARY

	1987	1996
Tons Per Year MSW	110,172	110,925
Tons Per Year RSW	49,310	54,211
Tons Per Year ICW	60,862	56,714
Percent MSW Diverted	15%	56%
Percent RSW Diverted	12%	44%
Percent ICW Diverted	18%	68%
Average lbs./HH/day <sup>1</sup>	9.83	10.14
Net Program Costs/HH <sup>1</sup>	\$153.38	\$177.73
Disposal Services	\$144.98	\$147.64
Diversion Services	\$8.40	\$30.08

Key: MSW = municipal solid waste RSW = residential solid waste  
ICW = institutional and commercial waste

Notes: 1987 dollars adjusted to 1996 dollars using the GDP deflator.  
Numbers may not add to total due to rounding.

<sup>1</sup>Figures reflect public sector collection from 26,200 households and 1,300 businesses served in 1987; 28,000 households and 1,300 businesses in 1996.

Source: Institute for Local Self-Reliance, 1999.

materials. Clifton diverts 18% of its total municipal solid waste (28% of its city-collected waste) through composting. Residents and small businesses divert materials through the city's seasonal curbside collection programs for leaves and other yard debris and its year-round brush collection program.



Clifton's recycling coordinator has assisted local businesses in locating markets for materials, performed waste audits, and provided advice on ordinance compliance. The coordinator also gives talks to civic groups and schools on reuse, environmental purchasing, and recycling.

Participants in the city's curbside recycling program must sort glass containers, cans, and paper products into seven streams for collection. Collection of sorted materials allows the city to market materials directly, avoiding the cost of processing and allowing the city to retain all revenue from sales.

## MATERIALS RECOVERED IN PUBLIC SECTOR PROGRAM

### CURBSIDE:

newspapers, magazines  
mixed paper (phone books, paperboard, mail, paperback books, hardcover books without covers, office paper)  
glass containers  
cans  
white goods  
scrap metals  
leaves, brush, grass clippings, holiday trees, and other yard and garden debris  
corrugated cardboard (businesses only)

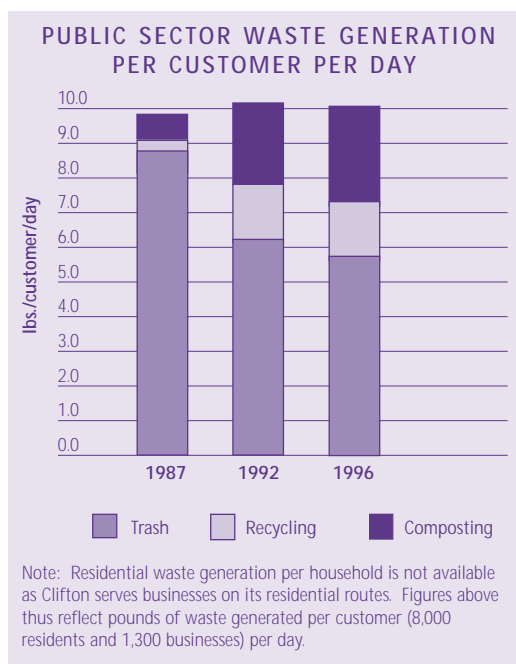
### DROP-OFF:

All materials accepted in curbside program (except white goods and scrap metal) plus:

corrugated cardboard (from residents)  
aluminum plates and trays  
#1 and #2  
plastic bottles  
residents can deliver car batteries for recycling to the City Garage at no cost



*Recyclables set out at curbside in Clifton*



Source: Institute for Local Self-Reliance, 1999.

## Cost-Effectiveness

The city's solid waste management costs increased from \$153 per household in 1987 to \$178 per household in 1996. During this same time period, per ton tip fees for trash more than tripled in constant dollar value from \$36 per ton to \$112 per ton. If the tip fee in 1996 had only been \$36 per ton and all other costs stayed the same, per household costs would have been \$99. Therefore, the increase in per household costs can wholly be accounted for through the increase in trash tip fees.

## Tips for Replication

Collect materials source-separated.

Enforce mandatory programs in order to boost both the quantity and quality of participation.

## Contact

Alfred DuBois  
Recycling Coordinator  
City of Clifton Dept. Of Public Works  
307 East 7th Street  
Clifton, NJ 07013  
**PHONE:** 973-470-2239  
**FAX:** 973-340-7049







# Crockett, Texas

52% Residential Waste Reduction



## Overview

Prior to 1992, Crockett contracted with a private company for waste collection and disposal, and no materials were recovered for recycling or composting. The city ended its contract with the private company in 1992 with the belief that city staff could provide trash, recycling, and composting services at a lower cost. City staff now provide all city residents with twice weekly trash collection and once weekly recycling and yard debris collection. City ordinance requires residents of the city to source-separate designated materials for recycling and composting. The ordinance also requires residents to use clear bags for trash, recycling, and yard debris; which allows collectors to easily identify improperly prepared materials. The city processes all recyclables and yard debris in its own facility, markets recyclables directly to end users and retains all revenue from material sales. In 1996, Crockett recycled 20% and composted 32% of its residential waste stream. The city achieved this high diversion rate at a cost similar to what it formerly paid its contractor. The net cost of solid waste services has slightly decreased from \$72 per household in 1991 to \$69 in 1996.

## DEMOGRAPHICS

POPULATION: 8300 (1996)

HOUSEHOLDS: 3,292

(1996): 2,834 in  
single-family  
dwellings and  
duplexes, 459 in  
multi-family  
dwellings

## Keys to High Waste Reduction

Crockett's mandatory, weekly curbside recycling and composting programs; the use of clear bags for trash, composting, and recycling; and continuous resident education have contributed to the city's high diversion level. Crockett's local recycling ordinance designates 20 categories of materials that residents must recycle and requires residents to separate yard debris for recovery. The clear bags allow collection staff to see contamination in bags of recyclables and yard debris and to see if designated materials are mixed in trash set out for collection. Crews refuse collection of improperly set out materials and tag them to

## RESIDENTIAL PROGRAM SUMMARY

	1991	1996
Tons Per Year	3,450	2,711
Percent Diverted	0%	52%
Recycled	0%	20%
Composted	0%	32%
Average lbs./HH/day	6.10	4.51
Net Program Costs/HH	\$71.94	\$68.71
Disposal Services	\$71.94	\$24.64
Diversion Services	\$0	\$44.07

Notes: 3,100 households served in 1991; 3,293 in 1996. 1991 dollars adjusted to 1996 dollars using the GDP deflator. Numbers may not add to total due to rounding.

Source: Institute for Local Self-Reliance, 1999.

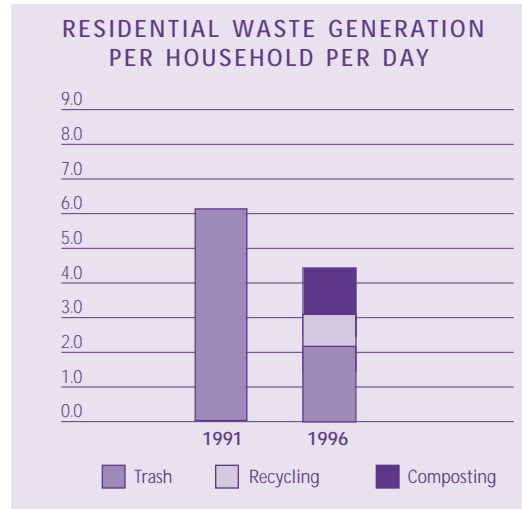
explain to residents why they were not collected. These tags provide city crews opportunities to provide residents education and feedback when it is most needed. The city also publicizes waste reduction and public participation strategies using radio, newspaper, and other written materials.

### Cost-Effectiveness

In 1991, the cost (in 1996 dollars) to the city to have a private company collect and dispose its trash was \$223,000 or \$72 per household. In 1996, total solid waste costs were \$250,254 but were offset by \$24,000 in



revenues so that net solid waste management costs were \$69 per household. In 1996, trash collection and disposal costs were \$62 per ton, net recycling costs were \$144 per ton, and composting costs were \$78 per ton. Crockett's program cost-effectiveness is enhanced by high diversion levels, the dual-collection of recyclables and yard debris, and the city



processing and marketing its own recyclables. High diversion reduces the need for hauling trash to the landfill 55 miles away, especially yard debris diversion as the material is composted and used locally. City crews collect recyclables and yard debris on the same truck, eliminating the need for separate truck fleets and collection crews. By processing and marketing its own materials, the city retains all revenue from the sale of recyclables.

### MATERIALS RECOVERED

#### CURBSIDE:

newspapers, magazines, corrugated cardboard  
mixed paper (phone books, paperboard, office paper, envelopes, mail)  
glass containers  
scrap metal  
aluminum foil and plates  
cans including empty aerosol cans  
all plastics  
white goods not containing freon  
used motor oil  
leaves, brush, grass clippings, and other yard debris

#### DROP-OFF:

all materials accepted in curbside  
program plus oil  
filters



*Yard trimmings  
composting in piles at  
the Crockett Recycling  
Center*

### Tips for Replication

Secure the best possible markets for recyclables.

Use clear bags to make contamination evident.

Be creative.

Allow commingling.

Build positive relationships with the public.



### Contact

Buddy Robinson  
Solid Waste Director  
City of Crockett  
200 North Fifth  
Crockett, TX 75835

**PHONE:** 409-544-5156 (office), 409-544-4025 (center)

**FAX:** 409-544-4976





# Dover, New Hampshire

*52% Residential Waste Reduction*



## Overview

In 1990, the city of Dover opened a drop-off center for recycling and a year later instituted a curbside recycling program and pay-as-you-throw trash fees. Since then the city has increased its waste recovery and reduced its production of waste. Average per household waste generation decreased from 6.2 pounds per day in 1990 to 4.7 pounds per day in 1996. In 1996 Dover diverted 52% of its residential waste (35% through recycling and 17% through composting) up from 3% in 1990. Dover residents receive weekly trash and recycling collection and seasonal yard debris collection services. The city operates a drop-off center where residents can deliver recyclables and yard debris. Dover's successful waste reduction program has reaped financial benefits as well; average per household costs for solid waste management have dropped from \$122 in 1990 to \$73 in 1996.

## DEMOGRAPHICS

**POPULATION:** 25,042

(1990); 26,094

(1996); 27,000 (1997)

**HOUSEHOLDS:** 11,315 (1996);

5,641 single family dwellings (4 units or less),  
5,674 multi-family dwellings

## Keys to High Waste Reduction

The keys to Dover's waste reduction are convenient curbside residential recycling service, the city's drop-off facility for recyclables and yard debris, and a pay-as-you-throw trash fee structure. The curbside recycling program collects 20 categories of materials on the same day as trash; all participating households are given free containers for storage

and set-out of materials. Materials collected include many paper grades, clear and colored glass containers, #1 and #2 plastic bottles, juice and milk containers, and aluminum foil. The city's drop-off center accepts five recyclable materials in addition to all those collected at curbside. The center also provides a free, regular outlet for brush and other yard debris, which is only collected seasonally at curbside.

The pay-as-you-throw trash program requires all municipal

## RESIDENTIAL PROGRAM SUMMARY

	1990	1996
Tons Per Year	10,838	9,462
Percent Diverted	3%	52%
Recycled	3%	35%
Composted	0%	17%
Average lbs./HH/day	6.18	4.71
Net Program Costs/HH	\$121.55	\$72.53
Disposal Services	\$121.28	\$43.78
Diversion Services	\$0.28	\$28.75

Notes: 9,611 households served in 1990; 11,000 in 1996. Dover also serves 210 small businesses in its residential waste programs. 1990 dollars adjusted to 1996 dollars using the GDP deflator. Numbers may not add to total due to rounding.

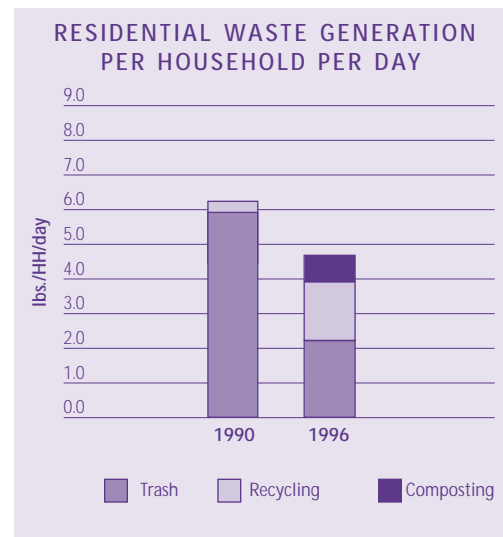
Source: Institute for Local Self-Reliance, 1999.

waste customers to place their trash into orange bags and tag oversized items. Untagged trash or trash set out in unauthorized containers is not collected. The trash fees provide a direct financial incentive for trash customers to divert materials through recycling or composting and to reduce their total waste generation.

### Cost-Effectiveness

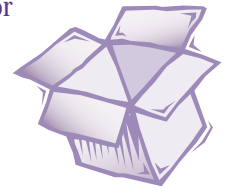
Dover's net residential solid waste management costs dropped from \$1.1 million in 1990 to \$798,000 in 1996 while adding more than 1,000 customers. Taking inflation into account, per household costs for solid waste management have been reduced from \$122 in 1990 to \$73 in 1996.

In 1996, trash collection cost \$115 per ton; and waste reduction averaged \$60 per ton



Source: Institute for Local Self-Reliance, 1999.

(recycling cost \$75 per ton and composting cost \$27 per ton). Per ton trash costs have remained relatively constant since Dover instituted its recycling and composting programs and switched to a pay-as-you-throw trash system; \$111 in 1990 and \$115 in 1996. Overall budget savings have resulted from significantly lower per ton costs for waste reduction and reduced generation both for the city as a whole and per household.



### Tips for Replication

Institute a user-fee based program.

Research the bags used in bag-and-tag system. It is important to have bags of the correct size, strength, and color.

Talk about waste reduction plans to all groups who will listen.

Include low-income residents in the program.

Establish a newsletter to remind and update residents on program changes.

Track data.

### MATERIALS RECOVERED

#### CURBSIDE:

newspaper, magazines and catalogs, corrugated cardboard, mixed paper (including paperboard, mail, office paper, glossy paper, and phone books)  
juice boxes and milk cartons  
glass containers  
cans  
#1 and #2 plastic bottles  
aluminum foil  
leaves, and other soft yard trimmings (including grass clippings, garden plants, and pine needles but excluding brush and woody debris)  
large appliances and scrap metal (collected separately by appointment)

#### DROP-OFF:

All materials collected at curbside (except milk and juice cartons) plus:  
brush and holiday trees  
tires  
automotive and other  
batteries  
textiles  
empty aerosol cans  
oil filters  
wood  
construction and demolition debris



Recyclables and trash set out at curbside in Dover

### Contact

Jeff Pratt  
Solid Waste Coordinator  
Dover Community Services Department  
Municipal Building  
288 Central Avenue  
**PHONE:** 603-743-6094  
**FAX:** 603-743-6096  
**WEB SITE:** <http://www.ci.dover.nh.us>







# Falls Church, Virginia

*65% Residential Waste Reduction*



## Overview

Falls Church made a commitment to recycling in 1989 when it hired its first Recycling Coordinator. A city code, effective since 1991, requires the city to provide curbside recycling and yard debris services to all residents receiving city trash service. The city provides weekly trash and curbside recycling services, and brush, fall leaves, and bagged yard debris collection. In addition, the city operates a drop-off facility for recyclables. Falls Church's waste reduction rate increased from 39% in FY90 to 65% in FY97 (25% through recycling and 40% through composting). The biggest gain was in recycling, which rose from 10% to 25%. During the same period, per household trash disposal was cut nearly in half.

## DEMOGRAPHICS

**POPULATION:** 9,578  
(1989); 10,000 (1996,  
estimate)  
**HOUSEHOLDS:** 4,637 (1996);  
2,194 single-family  
households, 1,441 multi-  
family units, 431  
townhomes, 571  
condominiums

## Keys to High Waste Reduction

Collection of a wide range of materials for recovery, year-round curbside yard debris collection, and community involvement and education programs contribute to Falls Church's waste reduction success. Falls Church accepts 14 types of recyclables in its curbside collection program and three additional categories at its drop-off facility. Materials accepted include paperboard, mail, aluminum foil and scrap, and some household batteries. Falls Church has many mature lawns and trees and yard debris is a significant component of the city's waste stream. Each household generates more than five pounds of yard debris per day. The city's fall leaf collection and processing program is alone responsible for 45% of the city's total waste diversion. Falls Church operates a multi-faceted education and outreach program that includes personal contact, volunteer participation, written materials, and school and community programs. One notable program, the city's

## RESIDENTIAL PROGRAM SUMMARY

	FY90	FY97
Tons Per Year	6,956	6,655
Percent Diverted	39%	65%
Recycled	10%	25%
Composted	29%	40%
Average lbs./HH/day	13.23	12.45
Net Program Costs/HH	\$372.21	\$215.21
Disposal Services	\$194.43	\$104.30
Diversion Services	\$177.78	\$110.91

Notes: 2,880 households served in 1990; 2,928 in 1997. 1990 dollars adjusted to 1997 dollars using the GDP deflator. Numbers may not add to total due to rounding.

Source: Institute for Local Self-Reliance, 1999.

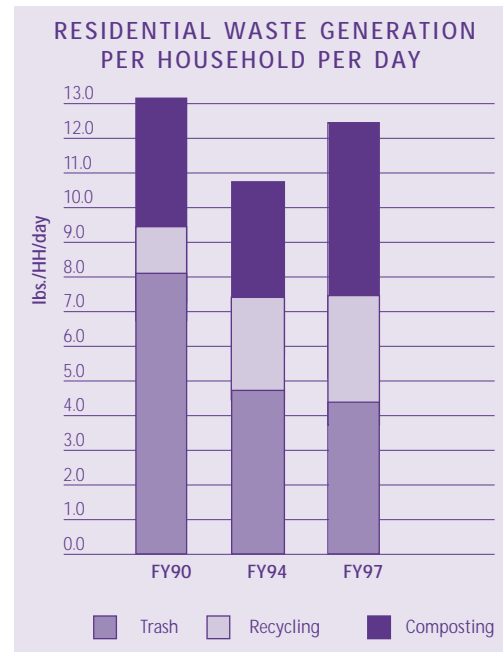
"Recycling Block Captain" program involves more than 100 community volunteers who distribute recycling information in their neighborhoods and serve as a liaison between residents and the city.

### Cost-Effectiveness

Falls Church experienced a \$420,000 decrease in its solid waste management budget from FY90 to FY97. In 1996, the city spent about \$215 per household served by city waste management programs (\$104 on trash collection and disposal, \$38 on recycling, and \$73 on yard debris collection and recovery). On a per-ton basis, trash cost \$139 and waste reduction cost \$73 (recycling cost \$62, and yard debris recovery \$80).



The city's waste reduction program is cost-effective due to a reduction in trash routes made possible by decreased trash generation, and a fee structure whereby increased recycling does not increase costs because the recycling contractor is paid per household



served. Falls Church reduced trash collection from twice to once weekly in 1991, less than one year after the city started multi-material curbside recycling. As a result, the city cut trash collection labor needs by one-third. Unlike recycling, trash, brush, and yard debris costs grow as these streams increase because of tonnage-based tip fees the city pays for their management. In the 1990s, the greatest increase in the city's diversion rate resulted from recycling.

### Tips for Replication

Community involvement and encouraging volunteers are critical to keeping residents motivated and participating.

Educate the community, especially children, because children can have a big effect on a household's behavior.

Recover yard debris.

Make program participation convenient.

### MATERIALS RECOVERED

#### CURBSIDE:

newspaper, magazines and catalogs, corrugated cardboard  
mixed paper (including mail, copier and computer paper, colored and glossy paper, envelopes, folders, note cards, paperboard, and phone books)  
glass containers  
metal cans  
#1 and #2 plastic bottles  
white goods  
brush, grass clippings, leaves, and other yard and garden debris

#### DROP-OFF:

all materials collected at curbside (excluding compostables)  
plus:  
aluminum foil  
and pie pans  
scrap metal  
some household  
batteries



*City workers vacuuming autumn leaves in Falls Church*

### Contact

Annette Mills  
Coordinator  
Recycling and Litter Prevention  
City of Falls Church, Dept. of Public Works  
Harry E. Wells Building, 300 Park Avenue  
Falls Church, VA 22046-3332  
**PHONE:** 703-241-5176  
**FAX:** 703-241-5184





# Fitchburg, Wisconsin

*50% Residential Waste Reduction*



## Overview

Fitchburg instituted the first mandatory recycling ordinance and the first multi-family recycling ordinance in Wisconsin and was the first city in the U.S. to implement curbside polystyrene collection. The city's Solid Waste and Recycling Ordinance requires all occupants of residential and commercial property to separate 16 recyclables from trash, details proper preparation methods, requires the implementation of multi-family recycling programs, and prohibits delivery of recyclables to any disposal facility. Fitchburg contracts with a private hauler to provide trash collection and disposal, weekly curbside recycling collection, and curbside collection of non-woody yard debris four times a year. City crews collect brush from the curb eight times a year. Residents pay an annual base rate for trash, recycling, and yard debris service and pay-as-you-throw (PAYT) rates for excess trash. From 1992 to 1996, total residential trash disposal dropped despite a 20% increase in households served. In 1996, the city diverted 50% of its residential waste from disposal (29% through recycling and 21% through composting).

## DEMOGRAPHICS

**POPULATION:** 16,254  
(1992); 17,266 (1996)  
**HOUSEHOLDS:** 6,685 (1990);  
3,057 single-family  
households and duplexes,  
3,628 multi-family units.  
7,500 (1996); 3,860 units  
in buildings with 1-4 units

## Keys to High Waste Reduction

Fitchburg achieved its high waste reduction through the recycling of many items, composting, and PAYT trash fees. Residents can recycle 21 types of materials: 17 through weekly curbside collection, two through monthly curbside collection, one at the drop-off, and one by special appointment. Yard debris collection and drop-off programs accept leaves, grass clippings, and other yard and garden trimmings. A separate program collects and processes brush. PAYT trash rates serve as an incentive for decreased disposal. In FY97 Fitchburg charged each household

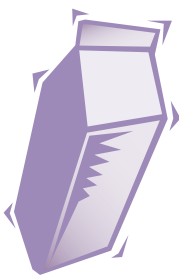
## RESIDENTIAL PROGRAM SUMMARY

	1992	1996
Tons Per Year	3,644	4,147
Percent Diverted	35%	50%
Recycled	24%	29%
Composted	11%	21%
Average lbs./HH/day	6.16	5.89
Net Program Costs/HH	\$126.48	\$108.12
Disposal Services	\$72.08	\$52.51
Diversion Services	\$54.40	\$55.61

Notes: 3,243 households served in 1992; 3,860 in 1996. 1992 dollars adjusted to 1996 dollars using the GDP deflator. Numbers may not add to total due to rounding.

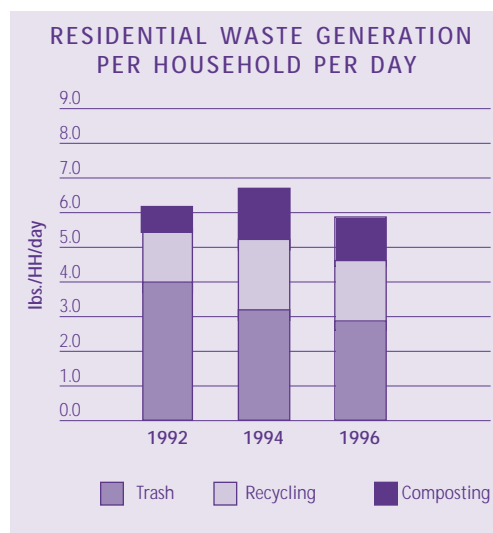
Source: Institute for Local Self-Reliance, 1999.

\$82 for recycling and yard debris services, and collection and disposal of one 32-gallon trash can per week. The city also provided each household with 10 tags which could be attached to extra containers of trash. The weekly collection cost of a 64-gallon container was an extra \$34.68 per year and a 95-gallon container was an additional \$60.96 annually. Additional tags for trash bags cost \$1.50 each at local retail stores.



### Cost-Effectiveness

Fitchburg's net solid waste management budget rose from 1992 to 1996, but so did the city's population and number of households served. When the cost of inflation is taken into account, average per household costs for waste management services have decreased from \$126 in 1992 to \$108 in 1996. During the same period, landfill tip fees increased by



Source: Institute for Local Self-Reliance, 1999.

17% in real dollars. On a per-ton basis, trash cost \$100 and waste reduction cost \$101 (recycling cost \$117 per ton and yard debris recovery \$78). Fitchburg's low-cost drop-off composting program helps the city contain costs. In 1996, residents delivered 534 tons of yard debris (13% of their waste stream) to the city drop-off site. City staff land spread the material over city land, avoiding higher cost processing of the material.



### MATERIALS RECOVERED

#### CURBSIDE:

- newspaper, magazines and catalogs, corrugated cardboard
- mixed paper (including mail, white paper, brown paper bags, paperboard, and phone books)
- cans
- glass containers
- all plastic containers and #4 plastic container lids
- rigid and foam polystyrene
- reusable household items (e.g., clothing, books, small appliances, housewares, and toys)
- white goods
- grass clippings, leaves, brush, holiday trees, and other yard and garden debris

#### DROP-OFF:

all materials accepted at curbside except:

- cans
- glass containers
- plastics
- reusable items
- white goods



Recycling collection truck in Fitchburg

### Tips for Replication

Listen to your line employees.

Workers know the system and its strengths and weaknesses.

Get your hands dirty.

Don't reinvent the wheel. Talk with other recyclers when faced with problems. Most likely someone else has encountered a similar problem and can offer advice.

Optimize. Never stop striving to improve; there's always room for improvement.

### Contact

Kevin Wunder  
Project Manager  
Public Works Dept., City of Fitchburg  
2377 South Fish Hatchery Road  
Fitchburg, WI 53711  
**PHONE:** 608-270-6343  
**FAX:** 608-275-7154







# Leverett, Massachusetts

*53% Residential Waste Reduction*



## Overview

Leverett's recycling system, like its trash program, operates on a drop-off basis. In 1988, the city enacted a mandatory recycling bylaw which banned recyclable paper, glass and cans from its landfill. In 1990, Leverett began shipping its recyclables to a state-developed materials recovery facility (MRF) in Springfield, Massachusetts, and in 1993 revised its recycling bylaw to ban all materials accepted at the MRF from disposal with trash. Recycling extended the life of the existing landfill by two years and reduced hauling and disposal costs after the landfill closed in 1993 and the city began disposing its trash in a landfill 27 miles from town. The town's Recycle/Transfer Station is located on the site of its former landfill. Residents can drop off recyclables at this facility for free but must pay a per-bag fee for their trash. The Recycle/Transfer Station is also the home of Leverett's extensive reuse program. The town has no organized program for the management of yard debris but it has banned these materials from disposal. In FY97, Leverett residents diverted 53% of their residential waste from disposal — 31% through recycling and 23% through yard debris diversion. The town's current waste management program is cost-effective compared to the costs of operating its own landfill and disposing of all the town's waste.

## DEMOGRAPHICS

POPULATION: 1,908  
(1996)

HOUSEHOLDS: 650 (1996);  
all single-family homes  
and duplexes

## Keys to High Waste Reduction

Leverett's yard debris disposal ban, the acceptance of 25 materials for recycling and reuse, and pay-as-you-throw (PAYT) trash fees have contributed to Leverett's 53% waste reduction level. The town's disposal ban forces residents to manage their own yard debris. In the past the city has sold reduced price compost bins (120 bins in 1996) and provided those residents who purchased them

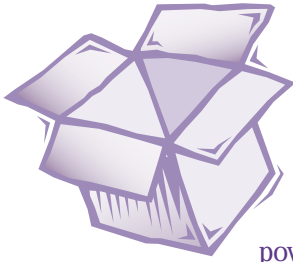
## RESIDENTIAL PROGRAM SUMMARY

	FY87	FY97
Tons Per Year	NA	652
Percent Diverted	0%	53%
Recycled	0%	31%
Composted	0%	23%
Average lbs./HH/day	NA	5.50
Net Program Costs/HH	\$84.46	\$50.81
Disposal Services	\$84.46	\$39.37
Diversion Services	\$0.00	\$11.44

Notes: 651 households served in FY89; 650 in FY97. 1986 dollars adjusted to 1996 dollars using the GDP deflator. Numbers may not add to total due to rounding.

Source: Institute for Local Self-Reliance, 1999.

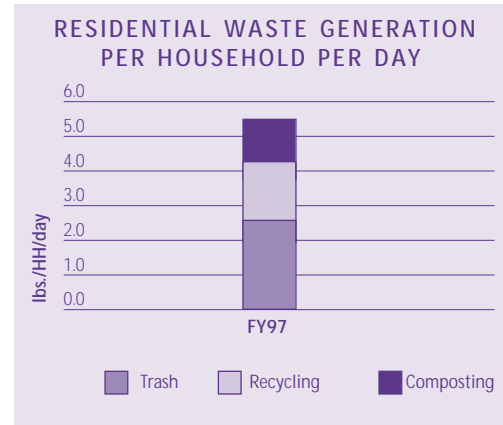
with instruction booklets. The Recycle/Transfer Station accepts all materials processed at the Springfield MRF and provides recycling and source reduction opportunities for other goods. Most of the structures at the town's Recycle/Transfer Station are devoted to reuse; the most active is the "Take it or Leave it." At this facility, residents have moved items such as hand and power tools, small and large appliances,



exercise equipment, toys, furniture, housewares, building materials, and even a snowblower into the reuse stream. The second most popular component of the town's reuse operations is its clothes bin where residents can deposit their own unwanted clothing or take items left by other residents. Residents must pay per-bag fees for the disposal of all waste. In FY97, disposal fees were \$1.50 per 30-gallon bag and \$0.75 for 15-gallon bags.

### Cost-Effectiveness

In FY97, Leverett's gross costs for residential waste management were \$37,600.



Source: Institute for Local Self-Reliance, 1999.

Of this, about 72% was spent on trash collection and disposal and 28% was spent on recycling. On a per-ton basis, trash cost \$91 and recycling cost \$51 (\$36 with material revenues). Leverett pays an average of \$58 per ton in landfill tip fees, while the town pays no tip fees for delivering recyclables to the MRF. The town's PAYT trash fees, lack of tip fees for recycled materials, and reuse programs have contributed to the cost effectiveness of its waste management program. In FY87, before the town expanded its waste reduction program, waste disposal cost \$84 per household. The town's current costs for waste management are only \$58 per household (\$53 per household when revenues from recyclables are included).

### Tips for Replication

Don't waste time reinventing the wheel.

People have to live with your recycling/reuse program. Make it as easy, and as *useful to them*, as possible.

Try not to get too caught up in the numbers game (recycling rates); focus on how to help your community deal with the waste issues that are or will be important to them. The recycling rate will take care of itself.

### MATERIALS RECOVERED

#### DROP-OFF:

- newspaper, magazines, corrugated cardboard
- mixed paper (including paperboard, mail, office paper, phone books and other books, and kraft paper bags)
- juice and milk boxes
- glass containers
- cans
- all plastic bottles, tubs, trays, and jars
- lead-acid batteries
- household batteries
- textiles
- reusable goods
- white goods
- paint
- scrap metal

*Leverett's "Take it or Leave it," a shed at the Transfer Station where residents can donate or pick up reusable goods.*



### Contact

Richard Drury  
Recycling Coordinator  
Town of Leverett, Town Hall  
Leverett, MA 01054  
**PHONE:** 413-367-9683  
**FAX:** 413-367-9611





# Loveland, Colorado

## 56% Residential Waste Reduction



### Overview

In the early 1990's, Loveland overhauled its waste management system in response to rising worker compensation insurance rates and aging trash trucks in need of replacement. The city instituted a dual-collection system for trash and recycling and a separate system for curbside collection of yard debris. In addition, the city instituted pay-as-you-throw (PAYT) trash fees to encourage waste reduction. In 1996, the city diverted 56% of its residential waste from disposal; 19% was recycled and 37% was composted. Average trash landfilled per household dropped from 6.6 pounds per day in 1989 to 2.6 pounds per day in 1996 — a 60% reduction. Residents pay a mandatory flat monthly fee for recycling and composting services plus a fee for each bag of trash disposed. They can also subscribe to weekly curbside pick-up of yard debris or take the material to a central drop-off site. A drop-off site for recyclables not collected at curbside is also available. The new waste management system, fully implemented citywide in 1993, results in fewer staff injuries, integrates recycling with trash collection, and contains costs.

### DEMOGRAPHICS

**POPULATION:** 37,352  
(1989); 44,300 (1996)  
**HOUSEHOLDS:** 17,476  
(1996); 15,220 single-family households, 2,256 multi-family units

### Keys to High Waste Reduction

Keys to Loveland's high diversion rate are PAYT trash rates, convenient collection of recyclables, and diversified yard debris recovery. PAYT trash fees encourage participation in curbside and drop-off waste reduction programs.

Residents must either buy a stamp (\$0.85 for 30 gallons or \$0.45 for 13 gallons) to place on their own trash can or bag, or they must purchase special trash bags printed with the city logo (\$1.00 for 32-gallon blue bags and \$0.55 for 15-gallon green bags). The city's weekly curbside recycling program accepts eleven different materials. The city provides recycling bins to participating households and requires minimal

### RESIDENTIAL PROGRAM SUMMARY

	1989	1996
Tons Per Year	15,680	17,973
Percent Diverted	0%	56%
Recycled	0%	19%
Composted	0%	37%
Average lbs./HH/day	6.63	5.86
Net Program Costs/HH	\$63.16	\$85.48
Disposal Services	\$63.16	\$40.36
Diversion Services	\$0	\$45.12

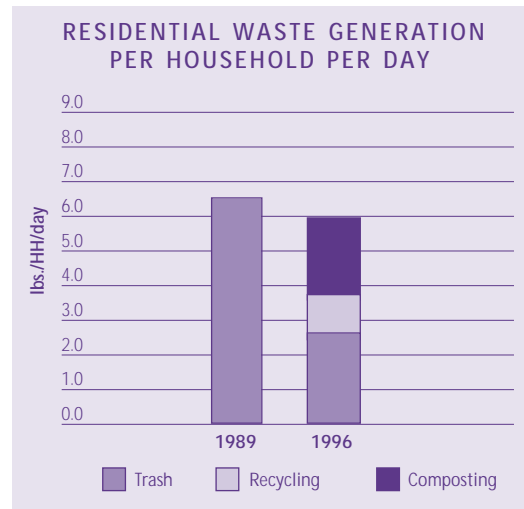
Notes: 2,880 households served in 1990 ;2,928 in 1997. 1990 dollars adjusted to 1997 dollars using the GDP deflator. Numbers may not add to total due to rounding.

Source: Institute for Local Self-Reliance, 1999.

sorting of materials by residents (two major segregations are required: paper and commingled containers). Loveland residents have a variety of options for diverting their yard debris from disposal. They can subscribe to the seasonal curbside collection service, which operates from April through November at a cost of \$4.25 per month; use the city's drop-off site; or handle their own materials through mulch mowing and home composting. In 1996, drop-off accounted for two-thirds of yard trimmings collected for composting in the city program.

### Cost-Effectiveness

In 1996, the city spent about \$1.45 million to provide trash, recycling, and yard debris services to 16,422 households — about \$90 per household served. Materials revenues reduced this by \$81,000 to \$1.40 million (or \$85 per household served). Per household costs are higher under Loveland's current waste management system than they were before the



Source: Institute for Local Self-Reliance, 1999.

changes (\$63 in 1989; \$85 in 1996). However, residents receive more services than before, and waste reduction may also ensure future cost-effectiveness for Loveland's waste management systems as it cushions Loveland against expected increases in landfill tip fees.<sup>1</sup> The city estimates it saves \$100,000 per year through its dual-collection system as compared to separate trash and recycling collection.

### MATERIALS RECOVERED

#### CURBSIDE:

newspapers, corrugated cardboard  
brown grocery sacks  
glass containers  
cans  
scrap metal (including aluminum foil, pie, food trays, white goods, and aerosol cans)  
narrow-necked #1 and #2 plastic bottles  
grass clippings, leaves, brush, and other yard and garden debris

#### DROP-OFF:

magazines and catalogs, mixed office paper, phone books  
motor oil, antifreeze, transmission fluid  
automotive batteries  
fluorescent tubes  
grass clippings, leaves, brush, and other yard and garden debris

*Loveland city staff use a unique dual-collection vehicle to collect trash and recyclables.*



### Tips for Replication

- Be prepared for resistance to change.
- Try to anticipate likely questions.
- Enact PAYT trash fees.
- Do your own homework to fit program to your community.
- Sell program to those active in the community.



Notes:

<sup>1</sup>At \$10 per ton, Loveland pays the lowest tip fee of the record-setters profiled (and among the lowest in the country). If tip fees had been just \$25 per ton in 1989, per household costs for solid waste management would have dropped between 1989 and 1996.

### Contact

Bruce Philbrick, Solid Waste Superintendent  
Mick Mercer, Manager of Streets & Solid Waste Services  
Solid Waste Management Utility  
City of Loveland  
105 West Fifth Street  
Loveland, CO 80537  
**PHONE:** 970-962-2529  
**FAX:** 970-962-2907







# Madison, Wisconsin

*50% Residential Waste Reduction*



## Overview

In 1968 Madison began the first curbside recycling program in the United States. This pioneering program collected only newspapers; now the city collects 13 types of recyclables weekly at the curb. The city also offers its residents seasonal curbside collection of yard debris and operates drop-off sites for yard debris and large items such as appliances. The city's diversion rate has grown as program participation has become mandatory and more materials have been targeted for recovery. The city's waste diversion rate jumped from 18% in 1988 to 34% in 1996, when the city mandated that all businesses and residents source-separate materials for composting. When cardboard and containers were added and recycling became mandatory in 1991, the tonnage of materials recycled more than doubled from the previous year. In 1996, the city diverted 50% of its residential waste; 16% through recycling and 34% through composting.

## DEMOGRAPHICS

**POPULATION:** 191,000  
(1989); 200,920  
(1996)

**HOUSEHOLDS:** 82,949  
(1996); 40,314 single-  
family households, 42,635  
multi-family units

## Keys to High Waste Reduction

Yard debris recovery, the collection of a wide range of materials through a convenient curbside program, and mandatory source-separation of designated materials are keys to Madison's waste reduction success. The city's yard debris recovery program is the heart of its waste reduction efforts, accounting for 67% of materials diverted from landfills in 1996. The city collected half of these materials through its

fall leaf program and a quarter in its seasonal curbside

brush collection program. Residents

delivered the remaining materials to

the city's drop-off sites. Madison collects all residential recyclables at the curb and operates two drop-off facilities that accept appliances and scrap metals. Residents commingle recyclable

containers in clear plastic bags and bundle paper products separately. In 1989, Madison enacted a recycling

ordinance mandating all businesses and residents of both single- and

## RESIDENTIAL PROGRAM SUMMARY

	1988	1996
Tons Per Year	71,640	88,583
Percent Diverted	18%	50%
Recycled	5%	16%
Composted	12%	34%
Average lbs./HH/day	8.19	8.38
Net Program Costs/HH	\$162.55	\$174.79
Disposal Services	\$132.97	\$103.20
Diversion Services	\$29.58	\$71.59

Notes: 47,945 households served in 1988; 57,949 in 1996. 1988 dollars adjusted to 1996 dollars using the GDP deflator. Numbers may not add to total due to rounding.

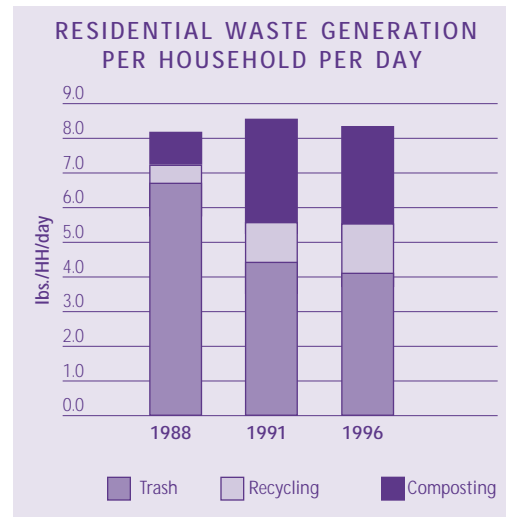
Source: Institute for Local Self-Reliance, 1999.

multi-family households source-separate designated materials. The city can issue tickets to residents that fail to recycle but has not done so although it has ticketed residents for scavenging recyclables and illegal trash dumping.



## Cost-Effectiveness

The cost-effectiveness of Madison's solid waste management program is enhanced by high diversion levels, low diversion costs for yard trimmings, the use of large capacity clear bags for recycling, and a revenue-sharing contract with the materials recovery facility. High diversion levels allowed the city to decrease the number of trash routes serving residents and helped to hold landfill tip fees in check. The city's yard debris management program diverts 34% of its residential waste stream at a lower per-ton cost than recycling or disposal. The large 30-gallon bags that residents use for recyclables avoid the cost of



Source: Institute for Local Self-Reliance, 1999.

purchasing bins and allow some residents to set out recyclables every other week. Under its MRF contract, the city receives 80% of revenues from the sale of recyclables. The city also reduced costs by closing its drop-off site for recyclables. In 1996, the city spent about \$10.7 million for trash, recycling, and yard debris services — about \$185 per household served. Material revenues from recycling reduced this by \$550,000 to \$10.1 million — \$175 per household served. Madison's per household waste management costs rose 8% from \$163 in 1988 to \$175 in 1996. The increase can wholly be explained by rising disposal fees, which more than doubled during the same period.

## Tips for Replication

Don't fudge numbers in order to sell your solid waste management program.

Know your markets.

Not collecting a material is better than collecting it for recycling and then landfilling it.

Build political support.

## MATERIALS RECOVERED

### CURBSIDE:

newspaper, magazines and catalogs, corrugated cardboard  
brown paper bags, phone books  
glass containers  
cans  
#1 and #2 plastic containers  
appliances  
scrap metal  
tires  
brush, holiday trees, grass clippings, leaves, and other organic yard and garden debris

### DROP-OFF:

leaves, brush, grass clippings, and other yard trimmings  
used oil  
appliances  
other large items



Brush collection in Madison using tow-behind brush chipper

## Contact

George Dreckmann  
Recycling Coordinator  
Street Division  
City of Madison Dept. of Public Works  
1501 West Badger Road  
Madison, WI 53713  
**PHONE:** 608-267-2626  
**FAX:** 608-267-1120





# Portland, Oregon

## 50% Municipal Solid Waste Reduction

(40% Residential Solid Waste Reduction; 52% Institutional/Commercial Solid Waste Reduction)



### Overview

In 1992, Portland switched to a franchising system for residential waste management. Waste management companies were required to institute pay-as-you-throw (PAYT) trash rates, weekly same-day collection of 18 recyclable materials and trash, and biweekly yard debris collection. In 1996, the city diverted 40% of its residential waste — 21% through curbside recycling, 17% through yard debris programs, and 3% through the state bottle bill. In addition to its residential waste diversion program, Portland requires each of its businesses to recycle 50% of their waste. The Portland Bureau of Environmental Services (BES) provides businesses assistance in meeting this requirement. In 1996, the first year the requirement was in effect, Portland businesses recovered 52% of their waste; only 7% of businesses reported they did not recycle. In 1996, Portland diverted 50% of its total municipal solid waste (36% through recycling and 13% through composting).

### DEMOGRAPHICS

**POPULATION:** 437,319  
(1989); 503,000  
(1996)

**HOUSEHOLDS:** 198,368  
(1996); 130,755 single-  
family households, 59,613  
multi-family units

**BUSINESSES:** 50,000

### Keys to High Waste Reduction

Key strategies contributing to Portland's high diversion rate are the city's yard debris management program, mandated recycling in multi-family and commercial sectors, PAYT residential trash fees, convenient curbside collection of recyclables, and Oregon's bottle bill. State Law requires each jurisdiction to offer weekly collection of yard debris or an approved alternative program. Portland's biweekly program meets this requirement. Portland residents divert 17% of their waste through this curbside program, private composters, and the city's fall leaf collection program. Multi-family complexes must recycle newspapers

### PROGRAM SUMMARY

	1992	1996
Tons Per Year MSW	NA	966,921
Tons Per Year RSW	136,929	172,830
Tons Per Year ICW	NA	794,091
Percent MSW Diverted	NA	50%
Percent RSW Diverted	29%	40%
Percent ICW Diverted	NA	52%
Average lbs./HH/day <sup>1</sup>	6.14	7.10
Net Program Costs/HH <sup>1</sup>	\$240.55	\$210.83
Disposal Services	\$186.56	\$143.52
Diversion Services	\$54.00	\$67.30

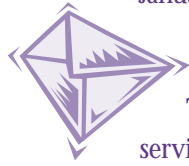
Key: MSW = municipal solid waste RSW = residential solid waste  
ICW = institutional and commercial waste  
NA = not available

Notes: 1992 dollars adjusted to 1996 dollars using the GDP deflator.  
Numbers may not add to total due to rounding.

<sup>1</sup>Figures represent single-family residential sector only and exclude self-haul recyclables. 122,245 households served in 1992; 129,698 in 1997. Costs represent fees paid to haulers by residents, not costs to the city of Portland. 1996 figures are actual expenditures, 1992 figures are based on costs assuming all households subscribed to weekly 32-gallon trash collection service.

Source: Institute for Local Self-Reliance, 1999.

and scrap paper along with three of the following additional materials: corrugated cardboard, magazines, tin cans, glass containers, or plastic bottles. A city ordinance effective

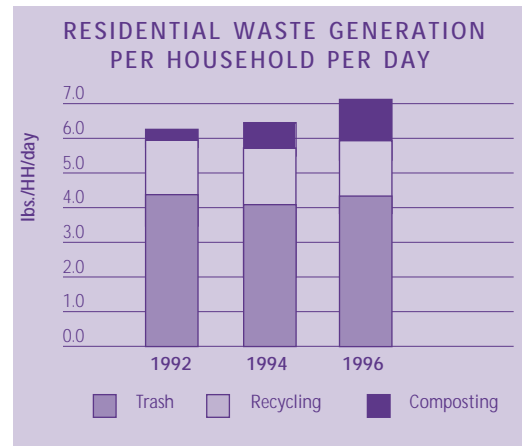


January 1996, requires all Portland businesses to recycle 50% of their waste. Portland instituted PAYT trash rates in 1992.

The city sets the rates charged for each service level. To encourage residents to reduce waste, a 20-gallon “mini-can” service, the lowest service available, is priced below the cost of service at \$14.80 per month and fees for service levels above 60-gallons of trash per week include a disincentive premium. Portland residents receive weekly curbside collection of 18 recyclable materials; the city requires haulers to collect residents’ recycling and trash on the same day. In 1971, the state enacted a 5¢ deposit on most carbonated beverage containers. In 1996, Portland diverted 2% of its waste through this deposit system.

### Cost-Effectiveness

Net costs households pay for residential solid waste management services decreased from



Source: Institute for Local Self-Reliance, 1999.

\$241 per household in 1992 to \$211 per household in 1996.<sup>1</sup> Improved collection efficiency and a drop in average trash can weights reduced trash management costs from \$187 per household to \$144 per household. Net diversion costs have increased from \$54 per household in 1992 to \$67 per household in 1996, representing a 25% cost increase while per household diversion increased 59%.

### Tips for Replication

Institute PAYT trash rates, which encourage customers to reduce waste and increase diversion.

Know the public and conditions in your jurisdiction and plan accordingly.

Be responsive to the public.

Focus on convenience.

Notes:

<sup>1</sup>Portland residents pay franchised haulers directly for services. Reported costs represent cumulative payments by customers to haulers for waste services.



### MATERIALS RECOVERED

#### CURBSIDE:

newspaper, magazines and catalogs, corrugated cardboard  
mixed paper (including mail, paperboard, kraft paper bags, paper egg cartons, and phone books)  
milk cartons and aseptic containers  
glass containers  
aluminum cans and other clean aluminum  
all plastic bottles  
ferrous cans and lids  
ferrous and non-ferrous scrap (limited amounts)  
used motor oil  
aerosol cans  
leaves, grass, brush, and other yard debris



Trash and recyclables set out at curbside in Portland

#### DROP-OFF:

(varies by site)

### Contact

Solid Waste and Recycling Specialist  
Portland Bureau of Environmental Services  
1120 SW 5th, Room 400  
Portland, OR 97204  
**PHONE:** 503-823-5545  
**FAX:** 503-823-4562  
**WEB SITE:** [www.europa.com/environmentalservices/gar.htm](http://www.europa.com/environmentalservices/gar.htm)







# Ramsey County, Minnesota

*47% Municipal Solid Waste Reduction*



## Overview

In 1996, Ramsey County diverted 47% of its municipal solid waste from disposal (39% through recycling and 8% through composting). The 17 communities reporting data to Ramsey County each operate their own municipal solid waste (MSW) management system. County MSW activities include providing grants, technical assistance, and educational resources; ownership of a material recovery facility and a network of yard trimmings drop-off and processing facilities; and tracking data about waste management activities. The county requires trash haulers to charge both residential and commercial customers pay-as-you-throw (PAYT) trash rates and directs municipalities to assure curbside recycling is available to all residents.

### RAMSEY COUNTY

**POPULATION:** 496,068  
(1996)

**HOUSEHOLDS:** 197,500  
(1996, est.); ~138,250  
single-family dwelling  
(three or fewer units per  
building), ~59,250 multi-  
family dwellings

**BUSINESSES:** 14,417  
(1996, est.)

### SAINT PAUL

**POPULATION:** 270,441  
(1996)

**HOUSEHOLDS:** 100,327,  
73,745 in 1-11 unit  
properties, 26,582 in  
apartment complexes with  
12 or more

**BUSINESSES:** 7,794  
(1996, est.)

## Keys to High Waste Reduction

Ramsey County's 47% waste reduction level is due to commercial sector recycling, PAYT trash fees, state disposal bans, and residential recycling requirements. The county supports business recycling through the Ramsey County Business Waste Assistance Program, which provides technical assistance to help reduce waste. Residential and business waste reduction is encouraged through PAYT trash fees. Haulers

must charge PAYT rates but these rates often vary among haulers and by neighborhood. In Saint Paul, the largest community in Ramsey County, trash haulers offer residents four levels of PAYT service ranging from low-volume/senior rates to unlimited/full service. A Minnesota Statute effectively bans leaves, grass clippings, garden debris, and tree and shrub waste from state landfills and incinerators. Recovery of this material accounted for 8% of Ramsey County's MSW in FY96.

The state also prohibits many other materials such as tires, and major appliances from disposal. Ramsey

### PROGRAM SUMMARY

	1991	1996
Tons Per Year	483,929	673,298
Percent Diverted	41%	47%
Recycled	32%	40%
Composted	9%	8%

Notes: Figures above cover Ramsey County total MSW. Numbers may not add due to rounding. Per household generation and cost data not available because the county does not track data according residential versus institutional/commercial origin.

Source: Institute for Local Self-Reliance, 1999.

County directs municipalities to ensure that curbside recycling is available to all residents. In Saint Paul, for instance, the city contracts with the Saint Paul Neighborhood Energy Consortium and the Macalester Groveland Community Council to provide residential recycling services.

Saint Paul's residential recycling program serving single-family homes includes a unique program for durable household goods. Residents simply bag reusable household durables (such as textiles, books, working small appliances, and toys) for donation and set them out with their recyclables. Recycling contractors collect these reusable items on the same truck as recyclables. Goodwill processes the goods for sale in its retail stores.

### Cost-Effectiveness

According to a study performed by the Saint Paul-Ramsey County Department of Public Health, Ramsey County's single-family households spent approximately \$237 in 1996

for regular municipal solid waste services. Trash collection and disposal was \$196 per household; yard debris management was \$3.70 per household; recycling collection and processing was \$28 per household; and administration and education was \$4.61 per household. PAYT trash rates and low-cost drop-off yard debris collection help residents keep costs in check.

Since 1987, Saint Paul Public Works has coordinated a neighborhood clean-up program for hard-to-handle household discards (such as tires, furniture, appliances, concrete, and brush). The program offers an inexpensive disposal option for citizens and maximizes recovery of the materials dropped off. The city's 1996 expenditure of \$108,700 was a fraction of what residents would otherwise have paid for disposal of items accepted at clean-ups. The program recovered over 1,800 tons of materials in 1996, saving an additional \$75,000 in disposal fees.

### Tips for Replication

Talk to your customers and give the public feedback.

Keep promotion simple and targeted to your audience. Repeat messages in a variety of media.

Offer consistent, dependable, and cost-effective recycling service.



#### MATERIALS RECOVERED

##### CURBSIDE COLLECTION IN SAINT PAUL:

newspaper, magazines and catalogs, corrugated cardboard  
mixed paper (mail, office paper, paperboard, and phone books)  
cans  
glass bottles and jars  
durable household goods (including textiles, books, working small appliances, hardware and tools, unbreakable kitchen goods, games, toys)  
yard debris collection (for an extra fee)

##### DROP-OFF COLLECTION IN SAINT PAUL:

plastic containers  
hard-to-handle materials at annual neighborhood clean-up events (such as tires, furniture, appliances, concrete, brush)

##### DROP-OFF COLLECTION IN RAMSEY COUNTY:

grass clippings, leaves, and other soft-bodied yard debris

*Recyclables set out at curbside in Saint Paul*



### Contacts

Cathi Lyman-Onka  
Program Analyst, Environmental Health Section  
St. Paul-Ramsey County Dept. of Public Health  
1670 Bean Avenue, Suite A  
Maplewood, MN 55109  
**PHONE:** 651-773-4444  
**FAX:** 651-773-4454

Hatti Koth  
Recycling Outreach Coordinator  
The St. Paul Neighborhood Energy Consortium  
623 Selby Ave.  
Saint Paul, MN 55104  
**PHONE:** 651-222-7678  
**FAX:** 651-221-9831

Rick Person  
Solid Waste and Recycling  
800 City Hall Annex  
Saint Paul, MN 55102  
**PHONE:** 651-266-6122  
**FAX:** 651-298-4559



# San Jose, California

## 43% Municipal Solid Waste Reduction

(45% Residential Solid Waste Reduction; 42% Institutional/Commercial Solid Waste Reduction)



### Overview

Prior to implementation of the Recycle Plus Program in 1993 — part of San Jose's Integrated Waste Management (IWM) Program — residents set out unlimited trash for a flat monthly fee and recycled only five material categories. Now they can set out more types of recyclables (including mixed paper, corrugated cardboard, mixed plastics, scrap metals, and textiles), multi-family dwellings (MFDs) are offered recycling and yard debris collection services, and recycling contractors are paid per household *and* per ton recycled.<sup>1</sup> As a result, from 1992 to 1996, the single-family household participation rate increased from 66% to 83% and the single-family waste reduction level increased from 33% to 55%. In FY97, San Jose diverted 45% of its residential waste and 42% of its commercial waste. Overall diversion was 43% (34% was recycled and 9% was composted).

### DEMOGRAPHICS

**POPULATION:** 849,363  
(1996), 873,300  
(1997)

**HOUSEHOLDS:** 259,365  
(1993), 269,340 (1996);  
188,900 single-family  
households, 80,440 multi-  
family units

**BUSINESSES:** 27,000

### Keys to High Waste Reduction

Key elements of the IWM Program are weekly residential curbside collection of 19 categories of recyclables (available to all MFDs too),<sup>2</sup> pay-as-you-throw (PAYT) fees for single-family household trash pick-up, weekly year-round residential yard trimmings collection, and financial incentives for businesses to recycle and reduce waste. To encourage participation, the city provides three yellow stacking bins to single-family households and sets of three 96-gallon recycling carts to MFDs. PAYT trash fees are an economic incentive to divert materials from the trash through recycling and composting. Yard trimmings account for about two-thirds of material recovered. The city's unique "loose-in-the-street" collection system allows residents to set out more yard debris than would fit in a typical cart. (MFDs also have curbside yard trimmings pick-up.) In order

### PROGRAM SUMMARY

	FY93	FY97
Tons Per Year MSW	NA	1,315,436
Tons Per Year RSW	283,000	433,576
Tons Per Year ICW	NA	881,860
Percent MSW Diverted	NA	43%
Percent RSW Diverted	33%	45%
Percent ICW Diverted	NA	42%
Average lbs./HH/day <sup>1</sup>	8.61	8.82
Net Program Costs/HH <sup>1</sup>	\$206.85	\$187.03
Disposal Services	\$142.78	\$81.95
Diversion Services	\$64.07	\$105.09

Key: MSW = municipal solid waste RSW = residential solid waste  
ICW = institutional and commercial waste  
NA = not available

Notes: 1992 dollars adjusted to 1996 dollars using the GDP deflator.

<sup>1</sup>Figures reflect residential sector only. FY93 tonnage data represents 180,000 single-family dwellings only; multi-family dwellings were included in commercial service at that time. In FY97, 269,340 single-family dwellings and multi-family dwellings were served.

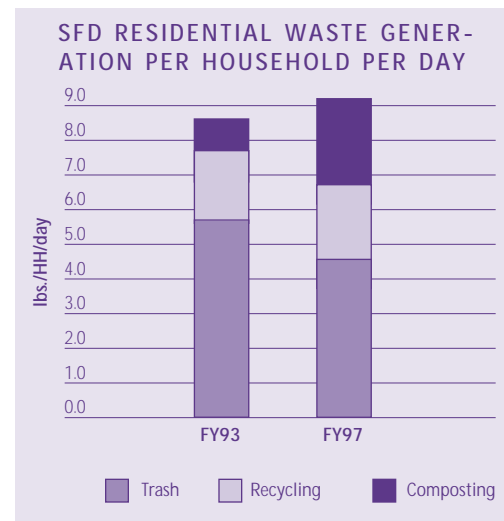
Source: Institute for Local Self-Reliance, 1999.



to encourage waste reduction among businesses, San Jose charges trash haulers serving businesses fees of more than \$3 per cubic yard for trash; in contrast, recycling collection firms pay no fees for commercial recyclables hauled.

### Cost-Effectiveness

The financial elements of the IWM Program are varied and complex. There are numerous funding sources, multiple programs serving a variety of customers, and oversight of more than 25 residential and commercial contracts. All of the city's fees encourage maximum waste reduction. Its recycling contractors, for instance, receive additional payments for each ton they actually market to an end user. As a result, recycling costs were \$206 per ton in FY97, more than twice as high as per ton trash or yard trimmings management costs.<sup>3</sup> However, the net cost of single-family residential waste services has remained relatively stable (\$207 per household



Source: Institute for Local Self-Reliance, 1999.

in FY93 compared to \$210 in FY97). The city spends less per household for the provision of trash services to MFDs compared to single-family dwellings so that net program costs per household for all 270,000 San Jose households averaged \$187 in FY97.

### Tips for Replication

Set up a cost structure that encourages recycling and waste reduction (for households, for businesses, and for contractors).

Know customers and implement a program that balances needs of city and customers.

Create a relationship with haulers that is conducive to continuous improvement.

Pilot programs and collect data (put reporting requirements in contracts).

Notes:

<sup>1</sup>The contractor serving MFDs is paid per ton only, not per household.

<sup>2</sup>Residents in multi-family dwellings can recycle the same materials at curbside as residents in single-family dwellings with the exception of used oil.

<sup>3</sup>The city has since renegotiated its contracts with its haulers to reduce recycling costs.

### MATERIALS RECOVERED

#### CURBSIDE:

- newspaper, magazines and catalogs, corrugated cardboard
- mixed paper (including mail, colored and white paper, envelopes, bags, egg cartons, paperboard, and phone books)
- glass containers
- cans
- juice and milk cartons
- plastic bottles/jugs and polystyrene packaging
- scrap metals (e.g., aluminum foil and plates, small metal appliances, hub caps, metal pots)
- textiles
- used motor oil
- grass clippings, leaves, brush, and other yard and garden debris
- holiday trees
- bulky goods (collected for a small fee)



*Recyclables set out at curbside in San Jose*

#### DROP-OFF:

the city operates no public drop-off facilities

### Contact

Ellen Ryan  
Program Manager  
City of San Jose Environmental Services Department  
Integrated Waste Management Program  
777 North First Street, Suite 450  
San Jose, California 95112  
**PHONE:** 408-277-5533  
**FAX:** 408-277-3606  
**RESIDENTIAL WEB SITE:** [www.recycleplus.org](http://www.recycleplus.org)  
**COMMERCIAL WEB SITE:** [www.sjrecycles.org/business/](http://www.sjrecycles.org/business/)







# Seattle, Washington

## 44% Municipal Solid Waste Reduction

(49% Residential Solid Waste Reduction; 48% Institutional/Commercial Solid Waste Reduction, 18% Self-haul Waste Reduction)



### Overview

Seattle faced a trash disposal crisis in the late 1980's after two city-operated landfills closed. Because of citizen opposition to incineration, the city opted to pursue an aggressive waste reduction program. In 1988, the city set a goal to recycle 60% of its residential and commercial waste by 1998. Curbside recycling service for single-family homes began in 1988, and an apartment recycling program and curbside collection of source-separated yard debris began 1989. The city has charged pay-as-you-throw (PAYT) rates for trash disposal since 1981. In 1996, Seattle diverted 49% of its residential waste stream, 48% of its commercial waste stream, and 18% of the materials delivered to its drop-off sites. Overall, Seattle diverted 44% of its waste stream (34% through recycling and 11% through composting). Private companies provide residential waste management services under city contracts and compete on the open market for commercial customers. City waste management staff functions include operating two transfer stations, providing education and publicity, and overseeing contractors.

### DEMOGRAPHICS

**POPULATION:** 534,700  
(1996)

**HOUSEHOLDS:** 248,970 total  
units: 149,500 SFDs (4 or  
fewer units in building),  
99,470 MFDs

**BUSINESSES:** 45,000

### Keys to High Waste Reduction

Comprehensive curbside recycling and yard debris programs, PAYT trash rates, strong private sector recycling, and multi-family recycling service contribute to the effectiveness of Seattle's waste reduction program. Seattle's single-family curbside recycling program accepts 16 categories of materials; its apartment program accepts 13. In 1996, Seattle residents diverted 14% of their waste through the city's curbside yard debris collection program. The city's PAYT trash rates have been so successful, the city added two small-volume subscription

### PROGRAM SUMMARY

	1987	1996
Tons Per Year MSW	NA	767,144
Tons Per Year RSW	233,230	288,106
Tons Per Year ICW	NA	379,166
Tons Per Year Self-Haul	NA	99,843
Percent MSW Diverted	NA	44%
Percent RSW Diverted	19%	49%
Percent ICW Diverted	NA	48%
Percent Self-Haul Diverted	NA	18%
Average lbs./HH/day <sup>1</sup>	5.61	6.34
Net Program Costs/HH <sup>1</sup>	\$155.33	\$154.93
Disposal Services	\$155.33	\$101.14
Diversion Services	\$0.00 <sup>2</sup>	\$53.79

Key: MSW = municipal solid waste RSW = residential solid waste  
ICW = institutional and commercial waste  
NA = not available

Notes: 1987 dollars adjusted to 1996 dollars using the GDP deflator. Numbers may not add due to rounding.

<sup>1</sup>Figures above reflect residential sector collection only. 227,890 households served in 1987, 248,970 in 1996.

<sup>2</sup>Reported recycling in private sector. The city incurred no costs for this recycling.

Source: Institute for Local Self-Reliance, 1999.

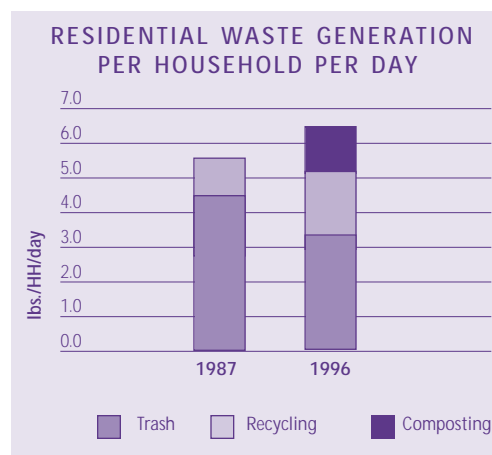


levels (the 12-gallon “micro-can” and the 19-gallon “mini-can”) in response to public requests. Strong local markets for recyclable materials and a city tax incentive provide support for recycling in the private sector. Since more than 40% of Seattle households are located in multi-family units, providing recycling to these households is a critical element in the success of Seattle’s waste reduction program.

Seattle involves its citizens in its comprehensive education programs. The city’s Master Composter and Friends of Recycling programs provide free training to residents who then perform outreach.

### Cost-Effectiveness

Cost-effectiveness of Seattle’s waste reduction efforts is due to the city’s PAYT trash fees and lower per ton costs for recycling



Source: Institute for Local Self-Reliance, 1999.

and composting as compared to trash disposal. On a per-ton basis, total waste management cost \$154 per ton; trash cost \$173 per ton; recycling; \$121 per ton; and composting; \$142 per ton. The city’s PAYT trash fee structure encourages residents to recover rather than dispose of materials. Doing so also saves the city money as fees paid to its contractors are based on per-ton fees. In 1996, per household waste management costs averaged \$155, the same as in 1987.

### Tips for Replication

- Recover mixed paper for recycling.
- Distribute bins to all participants.
- Institute PAYT rates for trash service.
- Invest in education programs, support the programs with market research, and target messages to people of all ethnicities.

Accept some or all the risk of secondary materials prices.

Pay trash haulers partly based on tons collected so as recycling increases, savings result.

## MATERIALS RECOVERED

### CURBSIDE (SFDs):

- newspaper, magazines and catalogs, corrugated cardboard
- mixed paper (mail, colored and white paper, bags, paperboard, and phone books)
- glass containers
- cans
- juice and milk cartons
- #1 and #2 bottles
- ferrous metals and white goods
- leaves, grass clippings, brush, holiday trees, and other yard debris

### CURBSIDE (MFDs):

- aluminum and tin cans, glass bottles and jars, newspaper, mixed paper, white goods (two of the four private haulers that service apartment buildings also collect plastics)

### DROP-OFF:

- all items collected curbside plus:
- lead-acid batteries
- used motor oil
- oil filters
- clean wood scrap and lumber



Seattle’s micro-can and 32-gallon trash can sizes

## Contact

Jenny Bagby  
Resource Management Branch  
The Seattle Public Utilities  
710 Second Avenue #505  
Seattle, WA 98104  
**PHONE:** 206-684-7808  
**FAX:** 206-684-8529  
**WEB SITE:** <http://www.ci.seattle.wa.us/util>





# Visalia, California

## 50% Residential Waste Reduction



### Overview

In 1991, Visalia began its waste reduction program in order to meet California's state mandated recycling goals. The city tried several curbside recycling pilot programs involving bins and bags and manual collection. However none of the programs were implemented due to poor productivity and high worker compensation rates as compared to the city's existing automated trash collection system. Instead the city, in partnership with a local trash equipment distributor, designed a special 110-gallon split container for trash and recyclables and a dual-compartmented automated truck that allows crews to collect trash and recyclables simultaneously. The city implemented this innovative automated dual-collection system citywide in 1996. At the same time, it reduced trash collection frequency to once a week (from twice a week) and added a weekly "green waste" collection program. In FY97, Visalia diverted 50% of its residential waste from disposal — 33% through composting and 16% through recycling.

### DEMOGRAPHICS

**POPULATION:** 91,314  
(1996), 92,677 (1997)  
**HOUSEHOLDS:** 28,869  
(1996), 25,346 single-  
family households, 3,523  
multi-family units

### Keys to High Waste Reduction

Recycling program convenience, collection of 15 categories of recyclable materials, the replacement of the city's previous second-day trash pick-up with a green waste collection day, the state bottle bill, and an extensive outreach campaign contribute to the success of Visalia's waste reduction

program. Residents can commingle virtually all paper products, and metal, plastic, and glass containers for recycling in one side of their wheeled, split containers. Visalia diverts 33% of the city's residential waste through its yard debris program. All green waste is taken to a local compost facility. Visalia diverts nearly 3% of its residential waste through the state container deposit and redemption program.

The city undertook an extensive outreach campaign to teach residents

### RESIDENTIAL PROGRAM SUMMARY

	FY94	FY97
Tons Per Year	45,395	50,806
Percent Diverted	2%	50%
Recycled	2%	16%
Composted	0%	33%
Average lbs./HH/day	10.58	10.71
Net Program Costs/HH	\$190.33	\$202.20
Disposal Services	\$190.33	\$108.77
Diversion Services <sup>1</sup>	\$0	\$93.43

Notes: 23,500 households served in 1994; 26,000 in 1996 and 1997.

1994 dollars adjusted to 1996 dollars using GDP deflator.

Numbers may not add to total due to rounding.

<sup>1</sup>Diversion represents deposit container recovery only in FY94, therefore; there were no direct costs to the city.

Source: Institute for Local Self-Reliance, 1999.

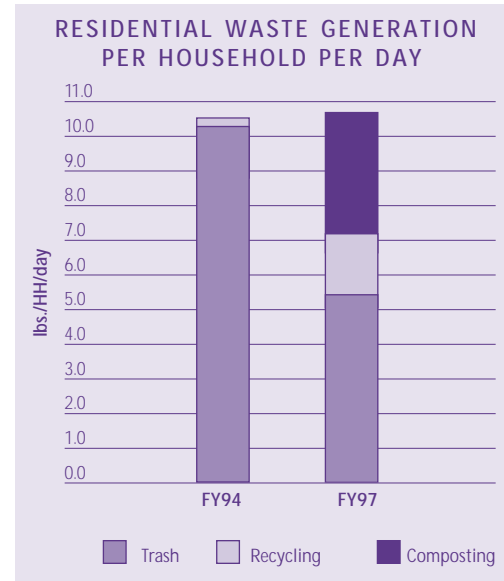
how to use the new system and emphasize the importance of recycling.

### Cost-Effectiveness

In 1996, the city spent about \$5.26 million for trash, recycling, and yard debris management services — about \$202 per household served. Of this, about 54% was spent on trash collection and disposal, 18% was spent on recycling, and 28% was spent on yard debris collection and processing. On a per-ton basis, trash cost \$117 and waste reduction programs cost \$96 —



recycling, \$114 and green waste recovery, \$87.<sup>1</sup> Overall, net solid waste management costs per household served have increased from \$190 in FY94 to \$202 in FY97. During this same time period, per ton trash tip fees increased 10%. If these fees had not risen, per household waste management costs in FY97 would have been within 5% of per household costs in FY94. In FY94, per ton trash costs were \$101 per ton, now waste reduction and trash services



cost \$106 per ton. Recyclables processing and composting costs are less expensive per ton than landfill tip fees, helping to contain costs.

### Tips for Replication

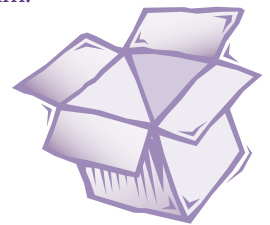
Investigate the dual-collection split-container system and automated collection.

Focus on education to teach residents how to use the system.

Seek out committed staff and administration to ensure program.

Find processor willing to receive commingled recyclables.

Put together a Citizen Advisory Group or find other ways to obtain resident input.



Note:

<sup>1</sup>The differences in the per-ton costs in these figures are largely reflections of the per-ton costs for recycling and composting processing and trash disposal. Visalia does not track curbside collection costs for recyclables, yard debris, and trash separately and reports per-ton collection costs for all materials as the total system average curbside collection cost.

### MATERIALS RECOVERED

#### CURBSIDE:

newspaper, magazines, corrugated cardboard  
mixed paper (including mail, paperboard, and office paper)  
glass containers  
cans  
all plastic containers  
milk and juice cartons  
scrap wood and lumber (except creosote or treated wood)  
grass clippings, brush, leaves, and other yard and garden debris

#### DROP-OFF:

same materials as curbside plus holiday trees



Fully automated dual collection truck used to collect trash and recyclables in Visalia

### Contact

Kathy Onsurez, Conservation Coordinator  
Tom Baffa, Solid Waste Services Manager  
City of Visalia Public Works Department  
336 N. Ben Maddox Way  
Visalia, California 93292-6631  
**PHONE:** 209-738-3531 or 209-738-3569  
**FAX:** 209-738-3576







# Worcester, Massachusetts

*54% Residential Waste Reduction*



## Overview

In the early 1990s, Worcester faced looming state landfill bans for recoverable materials, and the city needed to transfer trash costs from its tax base to user fees. In 1993, the city implemented curbside recycling and a pay-as-you-throw (PAYT) trash system. The per-bag trash fees offer financial incentives for residents to reduce trash disposal, recycle at curbside, and deliver their yard trimmings to one the city's three yard debris drop-off sites. Per-bag trash fees combined with a city ordinance that prohibits the disposal of recyclables and yard debris with trash resulted in the city nearly tripling its residential waste reduction rate from 15% in 1992 to 44% in 1994. In 1996, Worcester switched from biweekly to weekly recycling collection and the residential waste reduction rate further increased to 54% (27% through recycling and 27% through composting).

## DEMOGRAPHICS

**POPULATION:** 171,226  
(1995), 169,759  
(1996)

**HOUSEHOLDS:** 63,588  
(1996); 22,500 single-family households (one unit per building), 41,088 multi-family units

## Keys to High Waste Reduction

The variety of materials collected at curbside, pay-as-you-throw trash fees, a state bottle bill, and diversion of yard debris all contribute to the city's high diversion rate. Worcester's weekly curbside recycling program collects up to 18 types of recyclables (including mixed paper, all plastic containers, and milk and juice cartons). Residents can also recycle large items,

such as appliances, through a special bulky items collection program. Residents must place trash in special yellow bags or city trash crews will not collect it. A 30-gallon bag costs 50¢ and a 15-gallon bag costs 25¢.

Massachusetts' container deposit law requires consumers to pay a 5¢ deposit on many beverage containers. In 1996, approximately 4% of Worcester's residential waste stream was recovered through the deposit system.

Worcester provides fall leaf collection and operates drop-off sites

## RESIDENTIAL PROGRAM SUMMARY

	1992	1996
Tons Per Year	53,087	57,573
Percent Diverted	15%	54%
Recycled	7%	27%
Composted	8%	27%
Average lbs./HH/day	5.84	6.20
Net Program Costs/HH	NA	\$75.34
Disposal Services	NA	\$48.15
Diversion Services	NA	\$27.19

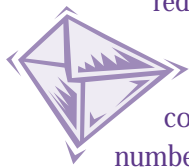
Notes: 49,824 households served in 1992; 50,868 in 1996. 1992 dollars adjusted to 1996 dollars using the GDP deflator. Numbers may not add to total due to rounding.

Source: Institute for Local Self-Reliance, 1999.

for other yard debris from April through November. Residents can deliver their yard debris to these facilities at no charge. In 1996, more than one-quarter of the city's residential waste was composted in the city's yard debris collection and processing program.

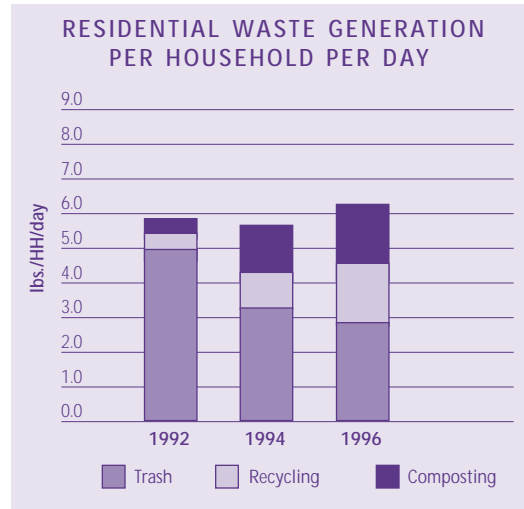
### Cost-Effectiveness

In 1996, the city spent \$3.8 million for trash, recycling, and yard debris services — about \$75 per household served. Of this, 64% was spent on trash collection and disposal, 20% was spent on recycling, and 16% was spent on yard debris collection and recovery. On a per-ton basis, trash cost \$96, while waste



reduction cost \$47 (\$54 for recycling and \$40 for yard debris recovery). The city has

contained costs by reducing the number of trash crews and the number of workers on the crews in response to decreasing trash disposal. Since recycling began, trash crews service the same number of houses but do so for one-third less labor costs. The number of city Solid Waste Management program employees dropped from 58 in 1993 to 46 in 1996.



Source: Institute for Local Self-Reliance, 1999.

### Tips for Replication

Implement a pay-as-you-throw trash system.

Collect as wide a variety of materials as possible.

Make program participation convenient.

Avoid adding a material to the recycling program and then taking it away, especially in a pay-as-you-throw system. Residents do not like to be told they have to pay to dispose of something that had been free.

### MATERIALS RECOVERED

#### CURBSIDE:

newspaper, magazines and catalogs, corrugated cardboard  
mixed paper (mail, office paper, paperboard, paper bags, and phonebooks)  
milk and juice cartons and boxes  
glass containers  
scrap metal  
aluminum cans, trays, and tins  
steel food and beverage containers  
all plastic containers (except motor oil and antifreeze containers and pails or buckets)  
white goods  
leaves

#### DROP-OFF:

leaves, grass clippings, brush, Christmas trees, and other yard and garden debris



### Contact

Robert Fiore  
Assistant to the Commissioner  
Department of Public Works  
20 E. Worcester Street  
Worcester, MA 01604  
**PHONE:** 508-799-1430  
**FAX:** 508-799-1448  
**WEB SITE:** <http://www.ci.worcester.ma.us/services/dpw/index.html>

