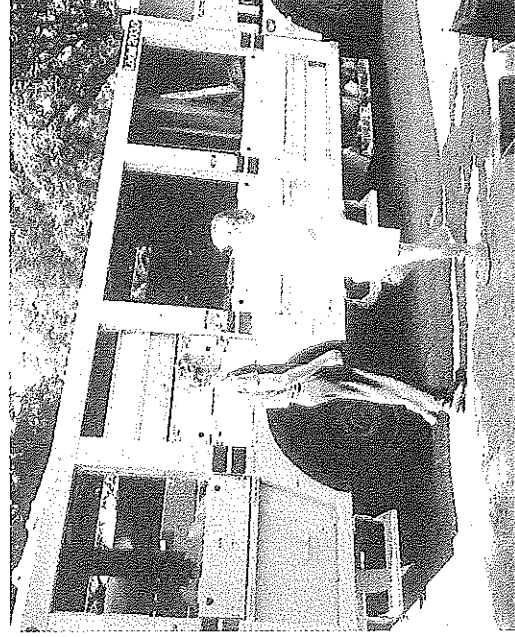
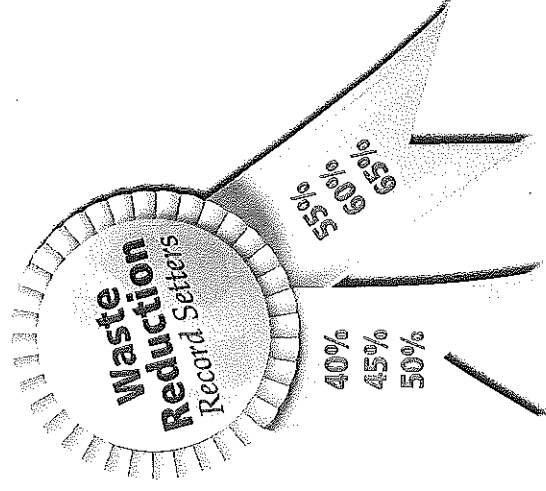
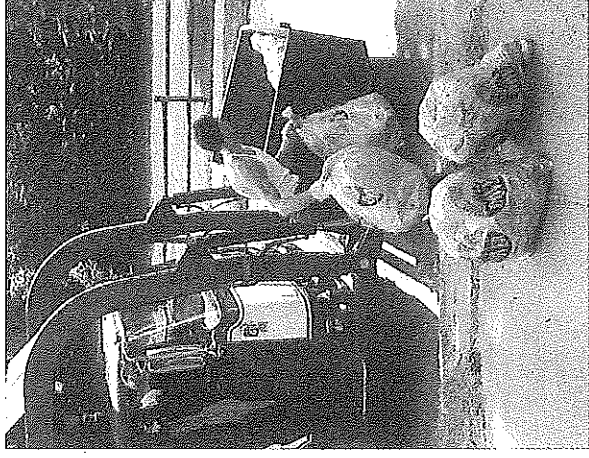
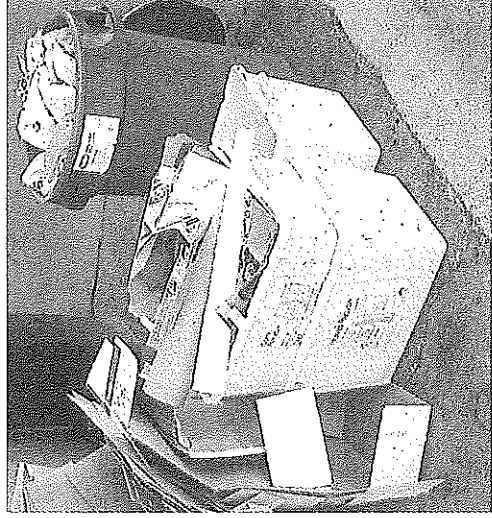




# Cutting the Waste Stream in Half:

## Community Record-Setters Show How



# CLIFTON, NEW JERSEY

## Municipal Solid Waste Reduction

# 56%

In 1996, Clifton diverted 56% of its municipal solid waste from disposal. 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.

Clifton's public sector waste management system serves 28,000 residential customers and 1,300 small businesses in the city's downtown area. Eleven categories of recyclables are collected at curbside; the city recycling center accepts thirteen categories of material (nine of which are also collected curbside). Residents are required to recycle other categories of materials, such as textiles, but do so through private recyclers. Municipal trash customers also receive seasonal curbside collection of leaves and yard debris and year-round on-call collection of brush.

Clifton's private sector waste diversion success is driven by high waste disposal fees, state and local recycling mandates, and strong local markets and infrastructure for recycling. All Clifton businesses and institutions must recycle 22 materials and are eligible to receive technical assistance from the city. Tip fees in New Jersey have traditionally been among the highest in the nation. Waste diversion offers many businesses a less expensive alternative to disposal. Recycling-based manufacturing is prevalent in New Jersey, providing markets for materials the state and city require be recovered.

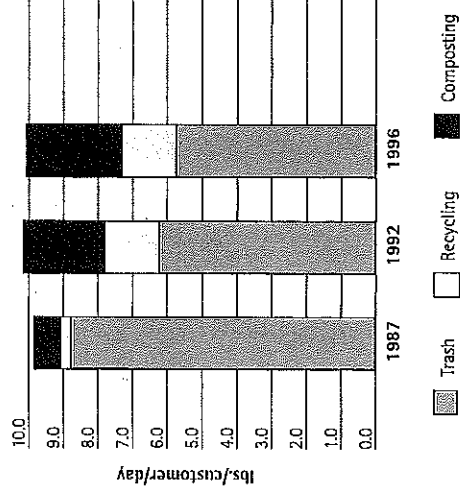
### PUBLIC SECTOR PROGRAM SUMMARY

	1987	1996
Tons Per Year	49,310	54,211
Disposal	43,540	30,363
Diversion	5,770	23,848
Percent Diverted	12%	44%
Recycled	4%	16%
Composted	8%	28%
Average lbs./HH/day	9.83	10.14
Disposal	8.68	5.68
Diversion	1.15	4.46
Annual Disposal Fees	\$1,532,786	\$3,387,052
Net Program Costs/HH	\$153.38	\$177.73
Disposal Services	\$144.98	\$147.64
Diversion Services	\$8.40	\$30.08

Notes: Figures above reflect public sector collection from 26,200 households and 1,300 businesses served in 1987; 28,000 households and 1,300 businesses in 1996. 1987 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.

### PUBLIC SECTOR WASTE GENERATION PER CUSTOMER PER DAY



Note: Residential waste generation per household is not available as Clifton serves businesses on its residential routes. Figures above thus reflect pounds of waste generated per customer (28,000 households and 1,300 businesses) per day.

Source: Institute for Local Self-Reliance, 1999.

### 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)  
 LAND AREA: 12 square mi.  
 HOUSEHOLD DENSITY: 2,583 per square mile  
 AVERAGE PER CAPITA INCOME: \$18,950 (1989)  
 MEDIAN HOUSEHOLD INCOME: \$39,905 (1989)  
 COMMUNITY CHARACTER: Urban, suburban. Major industries include Hoffman-La Roche pharmaceuticals, Public Service Electric & Gas, and Union Camp paper manufacturing.  
 COUNTY: Passaic

required counties to develop recycling plans for recovery of leaves and three additional materials, and to hire a recycling coordinator. In 1990, the state revised its recycling goals to 60% of total waste and 50% of municipal solid waste by 1995. The goal was again revised to 65% recycling of the state's total waste stream by December 31, 2000.

Clifton's local residential recycling ordinance requires every household in the public sector program to source-separate and recycle 18 categories of materials. Another ordinance requires commercial and institutional establishments in Clifton to "source separate, collect, transport, and market" materials for which markets are secured — currently 22 categories of materials, mostly materials targeted in the Passaic County waste plan. Both private contractors serving residents and commercial establishments are required to report to the city the quantities of material they recycle. The recycling ordinances allow levying of fines for non-compliance. As of December 1997, three businesses have been fined under these ordinances.

### Source Reduction & Reuse Initiatives

Clifton's recycling coordinator gives talks to civic groups and schools on reuse, environmental purchasing, and recycling. He also offers an annual home composting class (lowest class attendance has been 35 people; highest was 200 people) and has often tied these courses to promotions by private companies. These companies have offered mulching mowers and home compost bins for reduced rates and as prizes in contests they sponsor.

In 1996 Clifton gave away 800 reusable coffee mugs in small coffee shops and at community events. A brochure detailing the benefits of source reduction accompanied each mug. The Environmental Endowment for New Jersey, Inc. funded this program with a \$2,000 grant.

### Residential/Public Sector Recycling Program

In 1996, Clifton recycled 16% of its public sector waste. Residents must source-separate recyclables into seven streams, each in its own bin or bundle. A local company going out of business donated 15,000 four-gallon pails, which the city distributed to residents for use as recycling bins. City crews collect recyclables at curbside and service the drop-off site. Materials are stored at the DPW yard.

#### 1996 WASTE REDUCTION

	Public Sector <sup>1</sup> tons	Private Sector tons	Total tons
Recycled <sup>2</sup>	8,449	33,366	41,815
Corrugated Cardboard	685	16,235	16,920
Mixed Paper	12	10,735	10,747
Newspaper	4,903	4,386	9,289
Glass Containers	1,386	813	2,199
Textiles <sup>3</sup>	833	0	833
White Goods	172	219	390
Steel/Tin Cans	217	138	355
Tires <sup>4</sup>	20	302	323
Scrap Aluminum	1	306	307
Plastic Containers	79	103	182
Aluminum Cans	69	58	127
Lead-acid Batteries	2	56	58
Scrap Metal	51	0	51
Anti-freeze	0	16	16
Pallets	14	0	14
Computers/Copiers	3	0	3
Oil Filters	1	0	1
<b>Composted/Chipped</b>	<b>15,399</b>	<b>5,195</b>	<b>20,594</b>
Grass Clippings	5,535	718	6,253
Brush/Trees	2,128	1,519	3,647
Leaves <sup>5</sup>	7,256	33	7,289
Food Discards	0	661	661
Wood Debris	480	2,265	2,745
<b>Total Waste Reduction</b>	<b>23,848</b>	<b>38,561</b>	<b>62,409</b>
<b>MSW Disposed<sup>6</sup></b>	<b>30,363</b>	<b>18,152</b>	<b>48,516</b>
<b>Total Generation</b>	<b>54,211</b>	<b>56,714</b>	<b>110,925</b>
<b>Percent Reduced</b>	<b>44.0%</b>	<b>68.0%</b>	<b>56.3%</b>
<b>Lbs. Waste/Customer/Day<sup>7</sup></b>	<b>10.1</b>		

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

<sup>1</sup>Public sector figures include 1,300 small businesses in downtown area.

These businesses generate an estimated one-third of the waste stream.

<sup>2</sup>Tons represent material actually marketed to end users and therefore there is no associated reject rate.

<sup>3</sup>Textile tons reported by Clifton Goodwill.

<sup>4</sup>Tires are marketed to a variety of companies. Clifton's recycling coordinator estimates half are burned as fuel and half are re-treaded.

This figure is half of tire collection for the year.

<sup>5</sup>Clifton estimated leaf tonnages from actual volume figures using the following conversion factors: leaves collected in open-bodied trucks, five cubic yards per ton; leaves vacuumed, 2.86 cubic yards per ton; and compacted leaves, two cubic yards per ton.

<sup>6</sup>ILSR estimated disposal figures for commercial sector based on past disposal data provided by Clifton: 1991, 19,357; 1992, 23,543; 1993, 21,683; 1994, 17,858; 1995, 10,760; 1996, 8,289 tons. Bypassing of flow control system evident in 1995 and 1996; waste reduction tonnages did not simultaneously increase. 1992 and 1993 figures include CRD materials. Thus ILSR has used 1994 commercial disposal level for 1996. Based on the trend for decreasing disposal from 1992 to 1994, Clifton's recycling coordinator believes true disposal nearer to 16,500 tons but ILSR retained the conservative higher number.

<sup>7</sup>Represents 28,000 households and 1,300 small businesses.

Source: *Institute for Local Self-Reliance, 1999.*

### State and Local Policies

New Jersey's "Statewide Source Separation and Recycling Act," signed into law on April 20, 1987, set a mandatory state recycling goal of 25% by 1990,

**CURBSIDE COLLECTION OF RECYCLABLES**

<b>Service Provider:</b>	City of Clifton DPW
<b>Start-up Date:</b>	1988, for glass, aluminum, and paper. Additional materials were added during the years 1991 to 1993.
<b>Mandatory:</b>	Yes, for all materials
<b>Households Served:</b>	28,000 households (23,000 in SFDs and duplexes, 5,000 in MFDs), 1,300 businesses. All residents in buildings/complexes with fewer than 10 units served. Businesses can use city trash and recycling service if trash totals less than eight bags per week.
<b>Materials Accepted:</b>	Glass bottles and jars, aluminum cans, food cans, newspapers, magazines, telephone books, mail, paperback books, hardcover books without covers, other mixed paper, white goods, scrap metal. Businesses have weekly cardboard collection.
<b>Collection Frequency:</b>	Containers and paper collected every three weeks; white goods (with freon removed if applicable) and scrap metal collected weekly by appointment
<b>Set-out Method:</b>	Glass sorted by color and set out in reusable containers, aluminum cans in separate container, food cans in reusable container with labels removed, newspapers in brown paper bags or bundled, other paper products in separate bags or bundles, white goods and scrap metal placed at curb.
<b>Collection Method:</b>	Three-person crews collect source-separated recyclables in a five compartment (one compartment each for green glass, brown glass, clear glass, aluminum cans, and food cans) Eager Beaver truck. Three-person crews collect paper in a packer truck. Two-person crews collect appliances and metals in a packer truck. Two-person crews collect OCC from businesses in a packer truck.
<b>Participation Rate:</b>	80-85% based on an educated guess of recycling coordinator
<b>Participation Incentives:</b>	Mandatory ordinance
<b>Enforcement:</b>	City ordinance provides for two warnings for failure to comply with recycling ordinance. After warnings penalties of \$25 for first offense, \$100 for second offense, \$250 and/or 90 days community service for the third offense, and \$1000 fine and/or up to 90 days community service for each subsequent offense. During 1997, waste enforcement staff issued 750 warnings. Ten summonses were issued resulting in seven fines; the other three cases are pending in court.

**CURBSIDE COLLECTION OF YARD TRIMMINGS**

<b>Start-up Date:</b>	Leaf collection began in 1987, grass clippings and other yard debris collection began in 1992
<b>Service Provider:</b>	City of Clifton DPW for leaves, brush, and holiday trees; private vendor for other materials (the contract changes yearly, 1996 contractor was Straight and Narrow)
<b>Households Served:</b>	28,000
<b>Mandatory:</b>	Yes, for all materials
<b>Materials Collected:</b>	Grass clippings, leaves, brush, other yard and garden debris, holiday trees
<b>Collection Frequency:</b>	Weekly, late March to early December for yard debris; leaf collection middle October to mid-December, cover city two-three times during collection period, brush collection on-call year-round; holiday trees collected January to mid-February
<b>Set-out Method:</b>	Yard debris and grass clippings in biodegradable paper bags or reusable open containers; leaves raked to curb or bagged in biodegradable paper bags; brush piled at curb; holiday trees set out at curb (pick-up on on-call basis after mid-January)
<b>Collection Method:</b>	Two-person crews collect brush and holiday trees in open-body trucks, two-person crews vacuum leaves into open-body trucks, also use bucket-loader into open-body or compactor trucks
<b>Participation Rate:</b>	NA
<b>Participation Incentives:</b>	Mandatory ordinance
<b>Enforcement:</b>	Same as recycling program

**DROP-OFF COLLECTION**

<b>Number of sites:</b>	One (start-up in 1988)
<b>Staffing:</b>	One part-time employee
<b>Service Provider:</b>	City of Clifton DPW
<b>Materials Accepted:</b>	Newspapers, magazines, telephone books, mail, paperback books, hardcover books without covers, other mixed paper, glass bottles and jars, aluminum beverage cans, cardboard boxes, food cans, aluminum plates and trays, #1 and #2 plastic bottles. Residents can deliver car batteries for recycling to the City Garage at no cost.
<b>Participation Incentives:</b>	Mandatory recycling with enforcement
<b>Sectors Served:</b>	Residential, commercial, institutional, and Industrial (Recycling coordinator estimates 95% of material collected originates in the residential sector)

**EQUIPMENT COSTS**

Item	Costs	Use	Year Incurred
2 Chippers	\$46,990	Composting	1996
8 Street Vacuums <sup>1</sup>	\$162,400	Composting	1996
5 Roll-off Containers (40-cubic-yard) <sup>2</sup>	\$12,500	Recycling/Composting	1994-6
Leach Compactor Truck <sup>1,3</sup>	\$76,000	Recycling Collection	1995
Tub Grinder <sup>1</sup>	\$75,000	Composting	1995
Wildcat Windrow Turner <sup>1</sup>	\$150,000	Composting	1992
Royer Screen <sup>1</sup>	\$75,000	Composting	1991
Eager Beaver Trailer <sup>4</sup>	\$15,000	Recycling Collection	1988
Eager Beaver Truck <sup>1</sup>	\$26,000	Recycling Collection	1988
Leach Compactor Truck <sup>3,4</sup>	\$72,000	White Goods/Brush Collection	1988
8 Open-Body Trucks <sup>1,2</sup>	\$88,000	Composting	1985

<sup>1</sup>Purchased using capital funds

<sup>2</sup>Equipment also used for other DPW functions such as snow removal and salt and sand storage and road application

<sup>3</sup>26-cubic-yard packer

<sup>4</sup>Purchased from state recycling grant funds

Source: Institute for Local Self-Reliance, 1999.

Marketing agreements have been forged with local businesses for the sale of the materials. As per these agreements, the companies provide roll-off containers. They collect full containers and leave empty ones. This arrangement avoids the extra expense of MRF processing.

The city employs nine people who collect recyclables from the curb, multi-family dwellings, and the drop-off center. They also load recyclables into dumpsters for delivery to market.

### Commercial Recycling Program

In 1996, Clifton recycled 68% of municipal solid waste generated in the private sector. The city's mandatory recycling ordinance, a strong recycling infrastructure in New Jersey coupled with high disposal costs, and assistance Clifton's recycling

coordinator provided to businesses contributed to this success. The city mandates businesses to recycle newspapers, glass bottles and jars, window glass, steel and aluminum cans, high-grade and mixed paper, corrugated cardboard, plastic containers and film, motor oil, scrap metal, textiles, lumber, tires, lead-acid batter-

ies, yard debris, food discards, white goods, tires, and antifreeze.

Clifton is near many companies that use recyclables as raw materials.

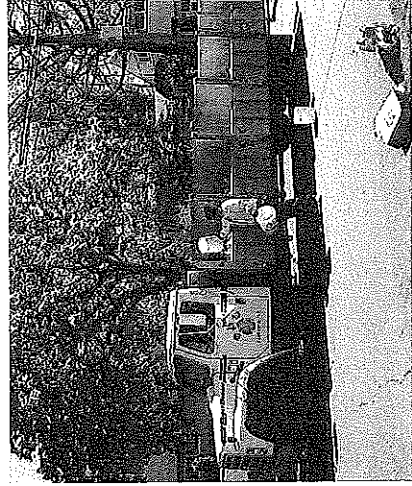
When mandatory recycling began, many businesses and institutions turned to the city for help. The recycling coordinator helped many businesses meet or exceed city requirements by locating markets for materials, performing informal waste audits to help reduce waste, and providing advice on complying with the recycling ordinance. Passaic County mandated businesses with over 100 employees perform waste audits and made staff available to assist companies in performing them.<sup>2</sup>

### Composting Program

Clifton offers its residents curbside collection of grass clippings, leaves, brush, other yard and garden debris, and holiday trees. These programs divert 28% of the public sector waste stream.

Clifton shares a compost site for leaves and brush with the neighboring City of Rutherford. The site is located on Rutherford-owned land, about two miles from the center of Clifton. Leaves are composted in turned windrows and brush and wood are chipped. Clifton provides the equipment and labor to process the materials. Finished compost and mulch are free to residents.

Grass clippings are stored at the compost site and picked up by Nature's Choice, a local private composter, who sells compost commercially.



Three-person DPW crews collect recyclables in a five compartmented Eager Beaver truck. Paper is collected separately in a packer truck.

## Education, Publicity, and Outreach

Every resident receives an annual recycling guide, which includes collection schedules, drop-off hours and accepted materials, and options for materials not accepted by the city. Local sponsors print and distribute the recycling guide at no cost to the city. Newspaper advertisements publicize

program changes and the start of spring yard debris collection. Brochures on source reduction, grasscycling, and backyard composting are available. Clifton's recycling coordinator appears on a cable show every six months and gives free home composting classes once a year.

### PUBLIC SECTOR WASTE-REDUCTION COSTS (1996)

	Cost	Tons	Cost/Ton	Cost/Customer/YR
Recycling Gross Costs	\$461,397	8,449	\$54.61	\$15.75
Curbside and Drop-off Collection <sup>1</sup>	\$388,003	8,449	\$45.92	
Marketing	\$1,647	8,449	\$0.19	
Administration/Depreciation <sup>2</sup>	\$49,661	8,449	\$5.88	
Education/Publicity <sup>3</sup>	\$22,087	8,449	\$2.61	
Composting Gross Costs	\$534,657	15,399	\$34.72	\$18.25
Collection	\$327,680	15,399	\$21.28	
Grass Clippings Processing	\$61,000	5,535	\$11.02	
Leaf/Brush/Wood Processing	\$15,550	9,864	\$1.58	
Administration/Depreciation <sup>2</sup>	\$107,514	15,399	\$6.98	
Education/Publicity <sup>3</sup>	\$22,913	15,399	\$1.49	
Waste Reduction Gross Costs	\$996,054	23,848	\$41.77	\$34.00
Materials Revenues	(\$114,619)	23,848	(\$4.81)	(\$3.91)
Recyclables	(\$112,369)	8,449	(\$13.30)	
Leaf Mulch	(\$2,250)	15,399	(\$0.15)	
Net Waste Reduction Costs	\$881,436	23,848	\$36.96	\$30.08

Note: Figures may not total due to rounding. No overhead costs are included. These costs are paid by the Department of Public Works and are not separable for recycling or composting. All collection and processing costs represent labor, vehicle repair, and office expenses only.

<sup>1</sup>Tons collected at curbside not separable from drop-off center tons. Collection costs include Christmas tree and large item costs. Costs for servicing drop-off center included in curbside costs. Salary of part-time staff member at the drop-off center is \$13,000.

<sup>2</sup>Administration costs are salaries only for recycling coordinator and one clerical staff member. Recycling coordinator estimated one-third of his time is spent each on recycling, composting, and trash. ILSR estimated annualized costs for capital equipment used in the program.

<sup>3</sup>Clifton's education and publicity budget for 1996 was \$45,000. It is impossible to calculate exact expenditures for recycling and composting as separate programs. ILSR estimated cost for each item based on collection and processing expenditures for each program. Source reduction education is also included in the \$45,000.

### TOTAL PUBLIC SECTOR WASTE-MANAGEMENT COSTS (1996)

	Cost	Tons	Cost/Ton	Cost/Customer/YR
Disposal Gross Costs	\$4,325,967	30,363	\$142.47	\$147.64
Trash Collection <sup>1</sup>	\$916,915	30,343	\$30.22	
Transfer Station Tip Fees <sup>2</sup>	\$3,385,859	30,343	\$111.59	
Tire Marketing Costs	\$1,193	20	\$58.34	
Administration <sup>3</sup>	\$22,000	30,363	\$0.72	
Education/Publicity <sup>4</sup>	\$0	30,363	\$0	
Waste Reduction Gross Costs	\$996,054	23,848	\$41.77	\$34.00
SWM Gross Costs	\$5,322,021	54,191	\$98.21	\$181.64
Materials Revenues	(\$114,711)	54,191	(\$2.12)	(\$3.92)
Waste Reduction Revenues	(\$114,619)	23,848	(\$4.81)	
Tire Revenue	(\$92)	30,363	(\$0.00)	
Total SWM Net Costs	\$5,207,310	54,191	\$96.09	\$177.72

Note: Figures may not total due to rounding.

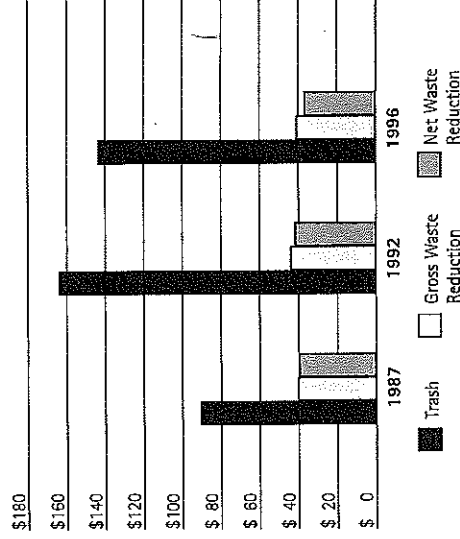
<sup>1</sup>Public sector trash collection performed twice weekly by contractor. Costs include bulky waste collection. Figure represents payment to contractor.

<sup>2</sup>Clifton's trash is delivered to the Pen-Pac transfer station six miles from Clifton.

<sup>3</sup>Administration costs include salaries of Clifton staff only.

<sup>4</sup>Clifton operates no education or publicity efforts aimed specifically at trash collection. The annual recycling guide includes information about the city's trash program but it is printed at no cost to the DPW.

### PER TON OPERATING COSTS FOR PUBLIC SECTOR WASTE MANAGEMENT



Source: *Institute for Local Self-Reliance, 1999.*

The recycling coordinator gives presentations to school groups about recycling and related environmental projects and distributes educational materials to classes upon request.

Clifton's "Clean Communities Program" is a broad-based program. It includes recycling education in schools and recycling litter.

### Costs

Solid waste management costs cover: (1) contracts for trash services; (2) recycling collection and marketing; (3) yard debris collection and processing; (4) education and publicity; and (5) administration. Trash services accounted for 81% of the \$5.3 million spent on SWM in 1996. Per ton costs for these services in the public sector are \$142, largely due to high transfer station fees.

Clifton's waste reduction efforts cost much less than disposal; on average \$55 per ton for recycling and \$35 per ton for composting. In 1996, revenues from the sale of materials generated nearly \$115,000, resulting in net solid waste management costs of \$5.2 million dollars (\$178 per household or business served).

Clifton employs approximately 15 FTE employees in its waste management programs; these employees earn an average of \$32,000 per year.

### Funding & Accounting Systems

Funding for city-provided trash services for both residences and eligible businesses is generated through the tax base and paid from the general fund.

Recycling and composting programs are operated as a self-liquidating utility. The city transfers funds from the general fund and state grant revenues into a dedicated utility fund, which is used to finance the programs. This fund, tracked using cash-flow accounting, pays salaries of recycling and composting staff, vehicle repairs and maintenance, staff training, office supplies and equipment. Vehicle capital costs are paid out of city bond funds and fuel is supplied to vehicles by the DPW.

### Future Plans and Obstacles to Increasing Diversion

Recycling contamination has decreased due to recently stepped up enforcement; most contamination still occurs among materials from multi-family dwellings. Enforcement is difficult in this sector because individual offenders cannot be identified.

Clifton's recycling coordinator believes the city's trash disposal figures may be inflated by several hundred tons by waste from surrounding communities, especially those with pay-as-you-throw trash systems, and contractors' waste. He plans to address this problem by aggressively identifying and prosecuting offenders for "theft of service."

Clifton has consulted with private contractors about processing trash to recover more materials. Currently New Jersey's lack of a clear flow control policy would make this difficult to implement.

### Tips for Replication

- ▶ Collect materials source-separated.
- ▶ Enforcement of mandatory programs can boost both the quantity and quality of participation.

#### Notes:

<sup>1</sup>Costs per household in 1987 were converted to 1996 dollars using the GDP deflator.

<sup>2</sup>The County requirements were effective 1992 for businesses with >500 employees, 1993 for those with >250 employees, and 1994 for those with >100 employees.

#### CONTACT

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