

PORTLAND, OREGON

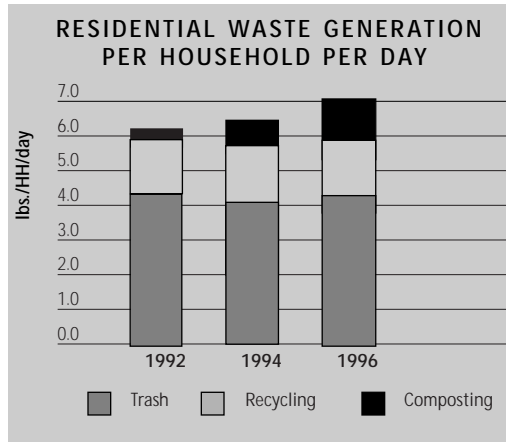
Municipal Solid Waste Reduction

50%

Portland's mandatory commercial recycling program, instituted in 1996, and its well-established residential waste diversion programs complement each other; the programs resulted in the city diverting nearly half its total municipal solid waste in 1996. Portland switched to a franchising system for residential waste management services in 1992.¹ Companies must offer customers volume-based pay-as-you-throw (PAYT) trash rates, weekly same-day collection of 18 recyclable materials and trash, and biweekly yard debris collection.² These service requirements, the state's bottle bill, and commercial recycling programs were key elements in Portland reaching 50% municipal solid waste reduction in 1996.

PAYT trash fees encourage residents to reduce their trash. Portland set the fee for the lowest weekly service level, the 20-gallon "mini-can," below the cost of providing the service. The Portland Bureau of Environmental Services (BES) reports the city's per household trash disposal amount is lowest among large American cities. In 1996, Portland diverted 40% of its residential waste; 21% through curbside recycling, 17% through yard debris programs, and 2% through the bottle bill.

Portland BES provided businesses assistance in meeting the city's 50% requirement for commercial recycling, instituted in 1996. BES helped businesses develop recycling plans. In the first year, businesses exceeded the goal; recovering 52% of their waste.³



Source: Institute for Local Self-Reliance, 1999.

DEMOGRAPHICS

POPULATION: 437,319 (1989), 503,000 (1996)
 HOUSEHOLDS: 198,368 (1996); 130,755 SFDs, 59,613 MFDs
 BUSINESSES: 50,000
 LAND AREA: 138 square miles
 HOUSEHOLD DENSITY: 1,437 households/sq. mile
 AVERAGE PER CAPITA INCOME: \$14,478 (1989)
 MEDIAN HOUSEHOLD INCOME: \$25,592 (1989)
 COMMUNITY CHARACTER: Urban city with manufacturing economy. Principle businesses include Fred Meyer, Inc., Tektronix, Inc., and lumber and wood manufacturing. The city has many parks and is nationally known for its location near numerous outdoor recreation areas.
 COUNTY: Multnomah

RESIDENTIAL PROGRAM SUMMARY

	1992	1996
Tons Per Year		
Disposal	136,929	172,830
Diversion	97,242	103,897
	39,687	68,933
Percent Diverted¹		
Recycled	29%	40%
Composted	24%	23%
	5%	17%
Average lbs./HH/day		
Disposal	6.14	7.10
Diversion	4.36	4.27
	1.78	2.83
Annual Disposal Fees		
Disposal	\$6,884,745	\$6,407,396
Net Program Costs/HH		
Disposal Services	\$240.55	\$210.83
Diversion Services	\$186.56	\$143.52
	\$54.00	\$67.30

Notes: Figures above represent single-family residential sector only and exclude self-haul recyclables. 122,245 households served in 1992; 129,698 in 1996. 1992 dollars adjusted to 1996 dollars using the GDP deflator. Numbers may not add to total due to rounding. Figures 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.

¹1992 generation and diversion may actually have been higher as yard debris delivered to drop-off sites was not tracked.

Source: Institute for Local Self-Reliance, 1999.

Cost-effectiveness of Portland's waste management program has been enhanced by reducing haulers' franchise fees (from 5% to 4% of gross receipts), decreasing operating costs for trash collection, limiting yard debris collection to biweekly rather than weekly, and decreasing average trash can weights at most service levels.

Net costs households pay for residential solid waste management services decreased from \$241 in 1992 to \$211 per household in 1996. Reduced franchise fees resulted in savings for all waste management services. Even though the amount of trash disposed increased, improved collection efficiency and a drop in average trash can weights produced a reduction in trash management costs from \$187 to \$144 per household. Diversion costs have increased from \$54 per household in 1992 to \$67 per household in 1996. Costs only rose 25% while diversion increased 74%.

MUNICIPAL WASTE REDUCTION (1996)			
	Residential Tons ¹	Commercial Tons ²	Total
Recycled	40,040	310,091	350,131
Newspaper	17,911		
High-Grade Paper	7,617		
Glass	4,360		
Corrugated Cardboard	4,138		
Aluminum	1,657		
Other Paper	1,452		
PET/HDPE	802		
Metal	6		
Deposit Containers ³	3,994	6,091	
MRF Rejects ⁴	-1,897		
Composted/Chipped	28,893	100,000	128,893
Curbside Collection	17,793		
Self-Haul ⁵	7,500	100,000+	
Fall Leaf Collection ⁶	3,600		
Total Waste Reduction	68,933	410,091	479,024
MSW Disposed	103,897	384,000	487,897
Trash	102,000		
MRF Rejects	1,897		
Total Generation	172,830	794,091	966,921
Percent Reduced	39.9%	51.6%	49.5%
Lbs. Waste/HH Served/Day	7.10		

Notes:
¹Represents dwellings with four units or less. Self-haul recyclables are not tracked and therefore not included.
²Commercial trash and recycling estimated based on information provided to Bureau of Environmental Services by commercial haulers, independent recyclers, and four MRFs serving Portland. Also included is an estimate of material delivered to self-haul disposal and recycling facilities. Commercial tonnage includes materials from MFD (five or more units) recycling programs.
³ILSR calculated tonnage based on Container Recycling Institute's reported average 40.1 pounds per capita recovery through Oregon's bottle bill. Tonnage was split 60:40 between residential and commercial sectors.
⁴ILSR calculated rejects as 5% of material collected in curbside program. Portland's Solid Waste and Program Specialist reported the average reject rate at facilities processing these materials to be 5% or less.
⁵Portland estimated self-haul tons from data reported by private composters.
⁶Portland's Bureau of Maintenance reports average annual collection of leaves to be 24,000 cubic yards. ILSR converted this to weight using one cubic yard of compacted leaves = 300 pounds.

Source: Institute for Local Self-Reliance, 1999.

State and Local Policies

Oregon's Bottle Bill, enacted in 1971, requires a 5¢ deposit on most carbonated beverage containers. Oregon's 1983 Recycling Opportunity Act, the first state law to mandate recycling, requires municipalities with populations of at least 4,000 to provide curbside collection of recyclable materials. Oregon's Recycling Act (1991) set a statewide recycling goal of 50% by 2000 and a 45% goal for the Portland metropolitan area by 1995. Portland City set its own goals of 10% reduction in per capita

waste generation by 1997 and 60% recycling of all solid waste by 1997.⁴

State law requires each jurisdiction to offer weekly yard debris collection unless it can demonstrate the existence of an alternative program that diverts a similar percent of materials as do those jurisdictions with weekly programs. Portland's biweekly program meets this requirement.

State law and Portland City Code require owners of rental property to subscribe to and pay for trash service for their tenants. Multi-family complexes (defined as those with five or more units) must recycle at least five materials; newspapers and scrap paper are two of these. The other three materials can be corrugated cardboard, magazines, tin cans, glass containers, or plastic bottles.

By ordinance effective January 1996, Portland requires its businesses to recycle 50% of their waste. The ordinance allows the city to levy civil fines of up to \$500 for non-compliance although BES staff report, as of December 1997, compliance has been high and no need to issue a fine has arisen.

Portland instituted PAYT trash rates in 1992. To encourage residents to reduce waste, a 20-gallon mini-can service, the lowest level of weekly service available, is priced below the cost of service at \$14.80 per month. Fees for 60- and 90-gallon roll cart service and multiple-can services include a disincentive premium to discourage high levels of disposal. The city sets all rates for the various levels.⁵ (See table on page 122.)

Source Reduction Initiatives

Portland uses information resources to encourage source reduction. Brochure topics include shopping smart and grasscycling. Waste prevention topics will also be addressed on the city's Web page, under development as of mid 1997.

Metro offers discounted price compost bins in its service area. Since 1993 it has distributed approximately 5,000 bins a year.

Residential Recycling Program

Portland requires franchised trash hauling companies to provide weekly recycling collection to all residences with four or fewer units. Thirty-four franchised trash hauling companies have formed two co-ops to provide recycling services to their trash customers, the remaining 13 trash franchisees provide their own recycling services. The co-ops

CURBSIDE COLLECTION OF RESIDENTIAL RECYCLABLES

Service Provider:	Geographically franchised private companies, currently 47 residential franchisees for trash; 34 companies have formed two co-ops serving their trash customers, remaining 13 trash franchisees provide their own recycling services, companies must have an approved recycling plan on file with the city
Start-up Date:	June 1987 for citywide program, franchising system began February 1992
Mandatory:	Provision of services mandatory but individual participation is not
Households Served:	129,698 in 1996; all SFDs and MFDs with four units or less are eligible
Materials Accepted:	Newspapers, glass bottles and jars, ferrous cans and lids, corrugated cardboard, kraft paper bags, aluminum cans, other clean aluminum, ferrous and non-ferrous scrap (less than 30 pounds and 30" in any dimension; no appliances, bicycles, or car parts), used motor oil, all plastic bottles, magazines, paperboard, mail, mixed paper, paper egg cartons, milk cartons, aseptic containers, aerosol cans, and phone books
Collection Frequency:	Weekly, same day as trash collection
Set-out Method:	Each recyclable material must be sorted into separate brown paper bags and placed in 14-gallon yellow city-provided recycling bin(s). ⁶ Cardboard must be flattened and multiple pieces bundled. Some haulers allow customers to combine certain materials but the city discourages this practice. Portland officials made the decision to require source-separation so the participation instructions would be consistent in all parts of the city and over time.
Collection Method:	Varies by contractor, city requires trucks used to have been originally manufactured for purpose of collecting recyclables and have capacity to serve 3,000 customers per week.
Participation Rate:	81%, set-outs counted and participation is defined as total monthly customer set-outs/customers in program/3 (in this way participation is counted as recycling three times per month out of a potential 4.33 opportunities), 65% of households set out something each week in 1996 study by Waste Matters Consulting for American Plastics Council
Participation Incentives:	Two free recycling containers to every household, reduced trash fees through increased recycling
Enforcement:	Improperly prepared materials are not collected and customer is given city-provided notice, log book records missed set-outs, recycler retains copy of notice

CURBSIDE COLLECTION OF YARD TRIMMINGS

Start-up Date:	1992
Service Provider:	47 trash haulers, Portland Bureau of Maintenance collects leaves
Households Served:	127,500 in 1996; all SFDs and MFDs with four units or less
Mandatory:	Provision of services mandatory but individual participation is not
Materials Collected:	Yard debris, including leaves, grass clippings, brush less than four inches in diameter and 36 inches long, and other yard debris
Collection Frequency:	Biweekly for hauler programs; usually during November and December for leaf collection, more often if needed to clear storm drains
Set-out Method:	Material must be placed in a 32-gallon can marked with city-provided "Yard Debris Only" sticker or in biodegradable bag. Brush can be bundled. Each extra container of yard debris collected costs \$1. Residents push leaves into street for city collection.
Collection Method:	Varies by contractor; the city uses various methods to collect leaves including vacuum trucks and manual loading into dump trucks. Crew size varies.
Participation Rate:	NA
Participation Incentives:	Reduced trash fees through increased waste diversion
Enforcement:	"We can't haul it" strip attached to improperly prepared materials and left at curb

DROP-OFF COLLECTION

Number of sites:	Approximately 30
Staffing:	Varies
Service Provider:	Private companies or regional government. Metro runs two drop-off sites for recyclables at its transfer stations. All yard debris drop-off sites run by private companies. Deposit containers can be returned for refund to any merchant that sells the product.
Materials Accepted:	Varies by site
Participation Incentives:	Reduced trash fees through increased trash reduction
Sectors Served:	Residential and commercial/institutional

RESIDENTIAL RATE SCHEDULE			
Waste Can Volume	Collection Frequency	Monthly Charge	% Customer Enrollment
20-Gallon	Weekly	\$14.80	18.6
32-Gallon	Weekly	\$17.50	48.2
35-Gallon	Weekly	\$18.90	10.5
60-Gallon	Weekly	\$22.85	8.2
90-Gallon	Weekly	\$27.85	4.6
32-Gallon	Monthly	\$9.95	5.6
On-Call 32-Gallon ¹	Must be more than 35 days apart	--	1.2
Recycling Only	Weekly	\$4.00	0.4

Note: Rates effective July 1, 1996. Unless otherwise noted, customers receive the indicated trash service, weekly curbside recycling collection, and biweekly yard debris collection. Other levels of service are available to residents, for example, residents can subscribe to collection service for two, three, or four 32-gallon cans weekly. These service levels and charges are not listed here because these levels have very few subscribers.

¹Does not include recycling or yard debris collection. \$5.50 fee is charged per collection, not monthly.

Source: Institute for Local Self-Reliance, 1999.

allow the hauling companies, especially smaller companies, to share capital costs for recycling equipment, increase collection efficiency, and enjoy economies of scale in processing and marketing of collected materials. Each company must have an approved recycling plan on file with the city.

Recycling companies collect 18 materials in the weekly program. Haulers must ensure the materials they collect are processed and marketed, not disposed. Source-separation by residents allows some haulers to deliver material directly to markets without further processing. Portland diverted 21% of its residential waste through this program.

Portland ordinance requires multi-family complexes have recycling programs that collect scrap paper and newspaper as well as three additional materials. As of early 1997, the city had sent 5,000 letters to owners of rental properties. About 3,000 new trash and recycling subscriptions at rental properties resulted from this effort.⁷ BES studies revealed the proportion of complexes with no recycling program dropped from 10% in 1995 to 2% in 1996 as a result of the mandatory ordinance.

Most haulers collect materials source-separated and can deliver them directly to markets. EZ Recycling, Oregon Recycling Systems, Energy Reclamation, Inc., and Recycle America operate MRFs that process the majority of material that need to be processed. The facilities employ a variety of sorting techniques, both automated and manual.

The Metropolitan Service District (Metro), a regional government agency, owns and operates two solid waste transfer stations in the Portland area. Portland residents who self-haul recyclable materials to these facilities pay no tip fee and can receive up to a \$6 rebate.

Commercial Recycling Program

All Portland businesses must separate recyclable materials from mixed waste, recovering a minimum of 50% of their waste. Businesses may recycle any materials they choose. BES staff assisted companies in devising recycling programs to meet the 50% requirement.⁸ BES conducts unannounced inspections of businesses. If the recycling system does not meet requirements, staff specify needed improvements and offer free technical assistance. To date, no businesses contacted have refused to work toward compliance and no penalties have been issued. The program has been well received but is too new to have reliable, definitive data about its success. Surveys of businesses have shown 29% of businesses reported they did not recycle in 1993 as compared to only 7% in 1996.

Composting Program

According to Portland's franchising agreements, haulers must collect yard debris from residential customers biweekly (in FY94, collection service was monthly) and deliver material to a "City Approved Processor." Residents place material at the curb in reusable cans up to 32 gallons, in kraft paper bags, or in biodegradable Novon® bags. Residents can also opt to deliver their material to privately operated composting sites or to a Metro transfer station.

Portland's Bureau of Maintenance collects leaves from the streets in the autumn (about 24,000 cubic yards of leaves a year.) In 1996, Portland diverted 17% of its residential waste through curbside collection, fall leaf collection programs, and private composters.

Education, Publicity, and Outreach

Portland uses a multi-media approach to promote its waste reduction programs including a Web page (under development), a recycling hotline, and a quarterly newsletter for single-family households with recycling service. The Complex Recycler quarterly newsletter is distributed to 1,200 multi-family dwelling owners and managers.

Portland contracts with a private company, Master Recyclers, to do presentations and information booths about the city's waste management programs.

Costs

Portland BES only incurs costs to administer the city's waste management programs. The tables below reflect a breakdown of fees paid by residents to haulers. The city employs nine full-time and one part-time staff.

Haulers must charge variable rates for trash services as set by the BES.⁹ BES determines rate

structures to allow haulers to recover collection, handling, and disposal costs for trash, recycling costs after revenues are received, yard debris collection and handling costs, general and administrative costs, and costs for depreciation, interest, and repairs and maintenance on capital equipment. Service levels above weekly 32-gallon trash collection include a disincentive premium to discourage disposal and the 20-gallon mini-can service rates include an incentive discount. After setting costs to cover actual expected hauler expenditures, an operating margin of 9.5%

WASTE REDUCTION FEES PAID BY RESIDENTS (1996)			
	Cost	Tons	Cost/HH/YR
Recycling Gross Costs	\$7,445,649	37,943	\$55.84
Recycling Collection and Processing ¹	\$4,705,374	37,943	
Hauler Admin./Overhead/Operating Margin ²	\$2,317,154	37,943	
City Administration/Overhead/Education ³	\$423,121	37,943	
Composting Gross Costs⁴	\$2,343,537	17,793	\$17.58
Yard Trimmings Collection/Processing	\$1,486,253	17,793	
Hauler Admin./Overhead/Operating Margin ⁵	\$731,903	17,793	
City Administration/Overhead/Education ³	\$125,381	17,793	
Waste Reduction Gross Costs	\$9,789,186	55,736	\$73.42
Materials Revenues⁶	(\$815,980)	55,736	(\$6.12)
Net Waste Reduction Costs	\$8,973,206	55,736	\$67.30

Note: Portland does not measure program effectiveness on a cost per ton basis. Instead the city analyzes cost on a per household basis. Figures may not total due to rounding. Composting tonnage above differs from figure in table on page 120 as above figure excludes fall leaves. All figures above represent cumulative payments by customers to haulers for waste services during 1996.

¹Recycling charges for 1996 included credit of \$0.70 per household for projected recycling revenues. This cost figure represents actual payments to haulers plus the credit.

²ILSR calculated hauler administration and overhead costs by pro-rating total overhead and administration, fees paid by customers by the proportion of service fees paid for recycling.

³ILSR calculated city costs by pro-rating total franchise fees paid to the city by the proportion of tons recycled, composted, and disposed.

⁴Leaf collection costs not included in cost figures. Leaf collection performed by Bureau of Maintenance and cost figures are not available.

⁵ILSR calculated hauler administration and overhead costs by pro-rating total overhead and administration fees paid by customers by the proportion of service fees paid for yard debris services.

⁶Represents actual revenues haulers earned from the sale of residential recyclables during 1996.

TOTAL SOLID WASTE MANAGEMENT FEES PAID BY RESIDENTS (1996)			
	Cost	Tons	Cost/HH/YR
Disposal Gross Costs	\$19,136,148	102,000	\$143.52
Trash Collection	\$5,932,992	102,000	
Trash Disposal	\$6,407,396	102,000	
Hauler Administration/Overhead ¹	\$6,077,004	102,000	
City Administration/Overhead/Education ²	\$718,757	102,000	
Waste Reduction Gross Costs	\$9,789,186	55,736	\$73.42
SWM Gross Costs	\$28,925,334	157,736	\$216.95
Materials Revenues	(\$815,980)	55,736	(\$6.12)
Total SWM Net Costs	\$28,109,354	157,736	\$210.83

Note: Portland does not measure program effectiveness on a cost per ton basis. Instead the city analyzes cost on a per household basis. Figures may not total due to rounding. All figures above represent cumulative payments by customers to haulers for waste services during 1996.

¹ILSR calculated hauler administration and overhead costs by pro-rating total overhead and administration fees paid by customers by the proportion of service fees paid for trash collection and disposal.

²ILSR calculated city costs by pro-rating total franchise fees paid to the city by the proportion of tons recycled, composted, and disposed.

Source: Institute for Local Self-Reliance, 1999.

SOLID WASTE SERVICES RATE STRUCTURE		
32-Gallon Weekly Trash Service	FY92 ¹	FY97
Collection Charge	\$5.31	\$4.05
Disposal Charge	\$4.27	\$3.89
Recycling Charge	\$2.20	\$2.36
Yard Debris Charge	\$0.55	\$0.97
General and Administrative Costs	\$2.63	\$3.87
Operating Margin	\$1.66	\$1.66
Franchise Fee	\$0.88	\$0.70
Total	\$17.50	\$17.50

¹Represents rates in effect for the second half of 1992 after rates were adjusted to reflect costs of added yard debris service.

Source: Institute for Local Self-Reliance, 1999.

and the franchise fee are added to arrive at the final monthly charge to customers at each service level.

Since 1992, yard debris collection frequency has increased and additional materials have been added to the recycling program. Rates have fluctuated slightly because of volatile material markets but the prices for the various service levels are currently near to the prices set in 1992. Average trash can weights have dropped, inflation has been low, and tip fees for trash and yard debris have remained constant for the previous few years. Collection efficiencies for trash have increased while costs for recycling and yard debris services have grown at less than the rate of inflation. The net result has been that operating costs for haulers have remained relatively stable.

Funding & Accounting Systems

Haulers pay the city franchise fees (4% of their gross receipts in FY97). These funds finance the city's residential trash, recycling, and composting program administration, education programs, publicity, and franchise oversight.



Source: Institute for Local Self-Reliance, 1999.

A \$2.80 per ton tax on tip fees charged for commercial waste disposal is returned to the city. This tax funds the city's cost to promote, administer, and enforce business recycling programs.

Future Plans and Obstacles to Increasing Diversion

The BES is considering a number of changes such as switching to commingled collection of recyclables in order to increase convenience, participation, and collection efficiency. The challenge for city planners is to ensure changes will not add costs or reduce waste diversion.

According to residential waste stream analysis, paper is still the most predominant material in trash. Maximizing paper recycling could significantly increase the city's waste reduction rate.

Tips for Replication

PAYT trash rates 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, striving to continuously make participation easier over time.

Notes:

- ¹Under this system, waste management companies receive exclusive rights to provide services within specified areas. Before 1992, waste services providers operated in an open market and set their own fees. City and state regulations required haulers to offer collection of eight recyclable materials but not yard debris.
- ²The Metropolitan Service District (Metro, a regional government agency) offers drop-off recycling and yard debris recovery opportunities. Materials recovered by it are not included in the reported recovery rates.
- ³Portland did not track commercial recycling levels prior to 1996.
- ⁴The city recycling goal will probably not be reached, in part due to the failure of a mixed organic waste composting facility in which the city planned to recover 10% or more of its waste.
- ⁵Rates for most service levels increased in fiscal year 1997 to offset a drop in market prices paid for recyclable materials.
- ⁶The City of Portland and Metro split the \$3.50 each purchase cost for 350,000 of these bins in 1992. Portland has purchased an additional 95,000 bins, using franchise fee funds, in the intervening years.
- ⁷The remaining buildings were either vacant or being referred to the city agency responsible for the enforcement process.
- ⁸BES allowed businesses a grace period to implement their programs, then began enforcement in June 1996.
- ⁹The fee for trash, recycling, and yard debris collection of a weekly 32-gallon trash can service is \$17.50 per month, the same rate households paid in 1992 when the franchise system began. In the intervening years, this rate has dropped as low as \$17.20 and risen as high as \$17.60.

CONTACT

Solid Waste and Recycling Specialist
 Portland Bureau of Environmental Services
 1120 SW 5th, Room 400
 Portland, OR 97204
PHONE: 503-823-7202
FAX: 503-823-4562