Recycling and Economic Development in Washington, D.C.

A Report by the
Institute for Local Self-Reliance
2425 18th St., N.W.
Washington, D.C. 20009

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Institute for Local Self-Reliance
Washington, D.C.

The Institute for Local Self-Reliance (ILSR) is a non-profit research and educational organization, providing technical information and assistance to city and state government, citizen and neighborhood organizations, and industry.

Since 1974, ILSR has been fostering self-reliant communities by investigating examples of closed-loop manufacturing, materials policy, materials recovery, energy efficiency, and small-scale production. It teaches cities to consider solid waste and indeed the by-products of any one process as the feedstock for another. The Institute stresses a formula that stimulates local employment, provides skills training, and adds to the local tax base.

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Recycling and Economic Development in Washington, D.C., a report written by Neil Seldman, Roland Samimy, and David Morris is part of an ongoing series of technical reports prepared by ILSR. We wish to thank Matt Gallaway, Jane Buckley, Brenda Platt, and Cynthia Aldridge for their technical assistance in the preparation of this report. For more information on ILSR philosophy and practice, write:

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Introduction

In 1988, the District of Columbia experienced a vigorous and somewhat highly contentious referendum over a proposal to make D.C. the nation's eleventh jurisdiction to institute a container deposit ordinance.[1] The referendum lost. As a direct result, City Councilmember Nadine Winter, with the encouragement and assistance of the D.C. Citizen's Coalition for Recycling (now Urban Earth) and the Sierra Club, introduced, and the City Council enacted, The District of Columbia Solid Waste Management and Multi-Material Recycling Law (D.C. Law 7-226). The law established a goal of 45-percent recycling by 1994, the second most ambitious goal set by a large municipality. (Seattle has a goal of 60 percent by 1998, and Philadelphia a goal of 40 percent by the year 2000.)

The November 1990 election of D.C. Mayor Sharon Pratt Dixon offered promise that the Recycling Law would be aggressively implemented. With the advent of the new law and the new administration, the Institute for Local Self-Reliance (ILSR) and other grassroots, civic, and environmental organizations initiated a public dialogue among various constituencies (e.g., hauling firms, community development corporations, government agencies, environmental organizations, neighborhood associations, and private businesses). A task force was established, due primarily to the efforts of the District of Columbia Interracial Coalition for Environmental Equity (DICEE) and the National Business Alliance, to promote strategies that maximize the recovery and reuse of discarded materials and contribute to community economic development. DICEE formed another task force to assist in negotiating an out-of-court settlement of a pending lawsuit filed by the Sierra Club and Common Cause against D.C. The lawsuit cited the District's failure to fulfill its recycling schedule, its attempt to construct a new incinerator, and its failure to enforce D.C. Law 7-226.

These task forces will provide information to the Office of Recycling, the Department of Public Works (DPW), and, ultimately, Mayor Dixon, for their consideration in restructuring the way D.C. handles solid waste. These decisions will reflect a new way of thinking about discarded materials. Until very recently, sanitation was viewed as a one-way system with a single objective of eliminating

discarded materials safely and cheaply. A new solid waste management system should be based on the following three objectives: 1) to minimize the quantity of materials generated, 2) to maximize the recovery of used materials, and 3) to derive the greatest value from used materials.

Achieving these goals will require an unprecedented understanding of the way we use and discard materials. This includes a much better understanding of the composition of the solid waste stream and of potential markets for the recovered materials. Indeed, a number of communities throughout the country are working closely with manufacturing engineers to redesign products and production processes to reduce waste and enable recycling. Others are regulating the kinds of materials and products that can be sold within their borders.

Solid waste collection represents a significant business in the District. In 1990, D.C. households, businesses, and government spent about $120 million to collect and dispose of 755,760 tons of solid waste – about 8 cents a pound, 3.5 cents for collection and 4.5 cents for disposal. If the Lorton landfill, where most of D.C.'s solid waste is sent, closed, disposal costs could at least double.

Law 7-226 requires the District to almost triple its 1990 recycling rate of 18 percent. That means recovering an additional 200,000 tons of discarded materials a year. As the District fashions new collection systems, certain questions must be answered. Does the District want to build a system that relies on community-based organizations and existing haulers, and does it want to retain control of its recovered materials, using them to supply local manufacturing facilities? Los Angeles, for example, in awarding contracts for recycling, favors companies that work in partnership with community organizations. San Francisco directs that recovered materials be used whenever possible by local manufacturers.

This report was written for individuals and for the general public. It provides an overview of the current solid waste situation in the District and offers a variety of strategies to maximize recycling culled from the experience of other communities. We offer the report to stimulate public discussion. The best discussion, we have found, is a focused one. Therefore, the report proposes specific recommendations.

We are grateful to the many individuals who have shared their time and wisdom with us. We would specifically like to thank the following, who not only provided information and advice, but also coordinated meetings and forums so that the views of a wider audience could be gathered:

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The Present System

The 69-square-mile District of Columbia generates an estimated 755,760 tons of solid waste per year, about 1.2 tons per capita.[2] More than half of this waste is paper – a higher percentage than most cities – and is due mainly to the prevalence of government and private offices. **Table 1** provides an estimated breakdown of solid waste by material.[3]

Table 1

District Solid Waste Stream Composition (1987)

Material	Percent by Weight
Paper	52.7
Newspaper	15.5
Corrugated	5.6
Office	14.6
Other	17.0
Plastics	9.0
Glass	8.0
Ferrous Metal	11.0
Nonferrous Metal	1.0
Yard Waste	5.8
Other	12.4
Total	**100.0**

Source: D.C. Department of Public Works, Office of Recycling Annual Report, 1990.

The D.C. government is responsible for the collection and disposal of solid waste generated by single-family homes, townhouses, and apartment buildings with up to 3 units, representing only 25 percent, or about 189,000 tons, of the total solid waste generated annually within the District. Private haulers collect and dispose of the remaining 75 percent, about 567,000 tons, generated by commercial accounts and office buildings (42 percent) and larger apartment buildings (33 percent).

There are 72 small private haulers in the City, and several large national companies such as Waste Management, Inc. and Browning Ferris Industries. The national firms handle about 30 percent of the commercial waste stream. Most of the local haulers own 1 or 2 trucks, although there are a few moderate-sized companies with 15 to 50 trucks. About half of the 72 local haulers belong to the D.C. Haulers Association, a nonprofit trade association. Several local private haulers have begun pilot recycling operations. The national firms have invested in their own processing centers located in suburban areas.

Once collected, D.C.'s garbage goes in one of four directions. (See **Table 2** and **Chart A.**) Of the privately collected waste, approximately 68 percent (385,400 tons) goes to the Lorton landfill in Virginia; 20 percent (113,400 tons) is recycled; and 12 percent (68,000 tons) is burned at the Fairfax, Virginia incinerator. Of solid waste collected by City crews, approximately 73 percent (138,000 tons) goes to the Fort Totten transfer station, where it is transferred from 8- to 9-ton capacity compactor trucks to 20-ton capacity tractor trailers and hauled to the Lorton landfill and the Fairfax incinerator; roughly 15 percent (28,000 tons) is incinerated at the Benning Road facility; and 12 percent (23,000 tons) is recycled.

Table 2

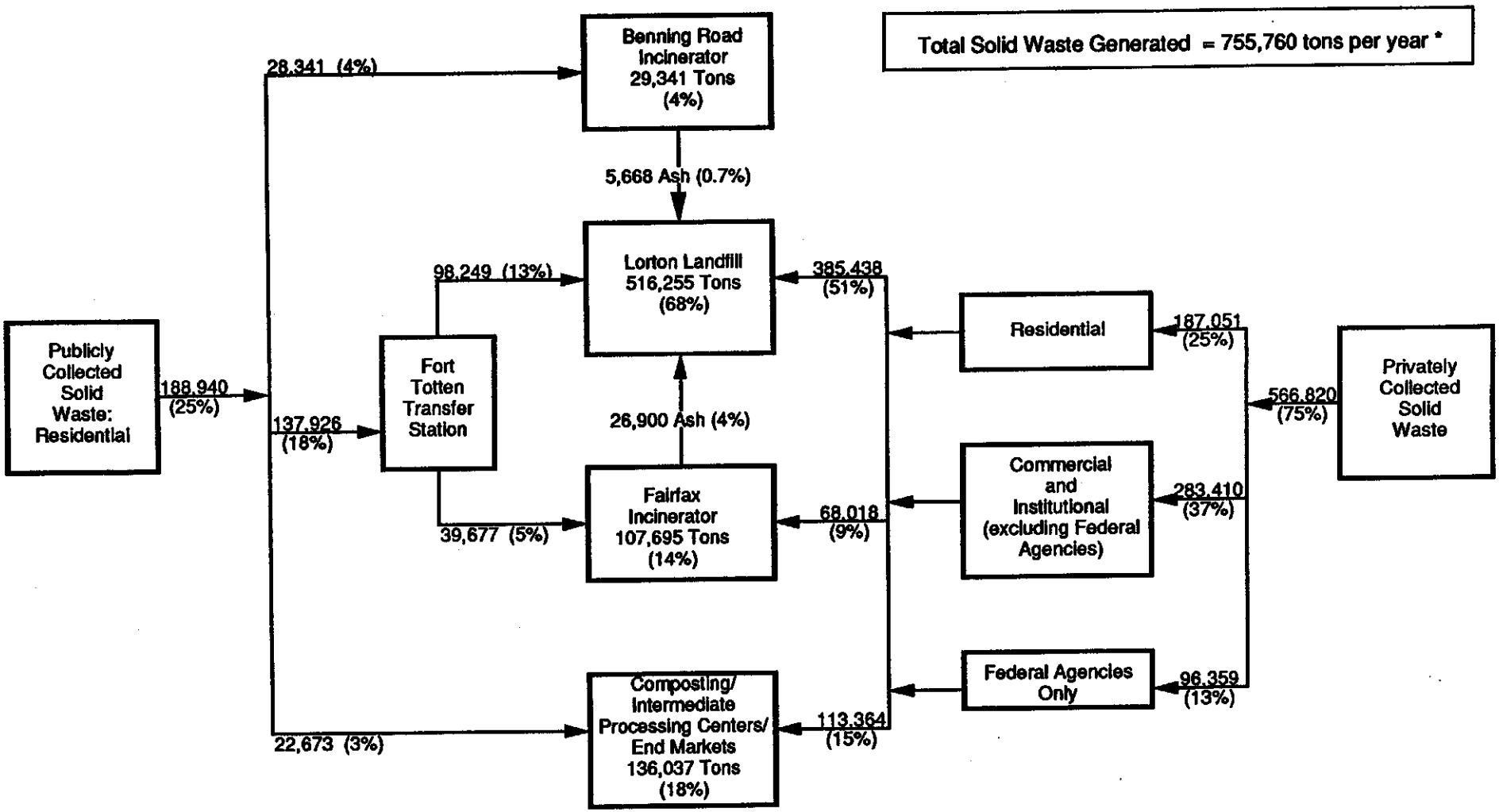
Estimated Disposition of D.C.'s Solid Waste

Private Sector Destination	%	Tons	Public Sector Destination	%	Tons
Lorton Landfill	68	385,400	Lorton Landfill	52	98,000*
Fairfax Incinerator	12	68,000	Fairfax Incinerator	21	40,000*
Recycled	20	113,400	Benning Road Incinerator	15	28,000
			Recycled	12	23,000

*These tonnages are first received at the Fort Totten Transfer Station.

Recycling is financed by a surcharge on solid waste dumped by private haulers at the Lorton landfill and at the Fairfax incinerator. The surcharge, which is ultimately added to DPW's recycling budget, has increased several times in the past 2 years and now stands at $19.29 per ton. In 1990, the surcharge generated $4.5 million. In 1991, an estimated $10.9 million will be generated.[4] The recycling surcharge goes to the DPW's budget.[5] The 1990 cost of recycling for the District government was about $59 per ton.[6]

Chart A
D.C. Solid Waste Flow (Tons Per Year)



* Waste generation is based on 1987 data;
tonnages recycled and disposed are based on 1990 data.

Note: All percentages are based on the total waste stream.

Source: Institute for Local Self-Reliance, 1991

In 1990 the District government spent $11.8 million collecting solid waste and $17.4 million disposing of it. On a per ton basis, this equalled $62 for collection and $91 for disposal. (These costs do not include capital costs.) The $91-per-ton cost of disposal includes the following: $40 for the 60-mile round trip to the Lorton landfill by trailer trucks; $26 tip fee at the Lorton landfill; and $25 for operating the Fort Totten transfer station. (D.C. crews pay no tip fee at either the Fort Totten transfer station or at the Benning Road incinerator.)

Private haulers spent about $40 million to collect and $50 million to dispose of solid waste in 1990, based on per ton costs of $70 for collection and $90 for disposal. The costs of collection and disposal by private haulers varies considerably, and much of the information is proprietary. Information from several small haulers indicates that the $90 disposal cost includes travel to the Lorton landfill ($40 to $45 per ton), the tip fee at Lorton ($26 per ton), and the surcharge imposed by the District to pay for recycling services ($19 per ton).

A major expense for small and medium-sized haulers is traffic tickets. Publicly collected garbage is transferred into tractor trailers at the Fort Totten transfer station. These vehicles have sufficient axles not to exceed weight limits on Virginia roads. Private haulers are prohibited from using the Fort Totten facility. Lack of capital for additional trucks confines the haulers to traveling to Lorton with their regular two axle compactor garbage collection vehicles, which often exceed weight limits. As a result, the drivers are regularly ticketed. During a week in May, one hauler received a total of $2,300 in fines (most fines are in the $800 range). One hauler estimated that tickets added $25 per ton to the cost of disposal.

About 36 percent of publicly collected garbage is incinerated at either the Fairfax County (21 percent) or the Benning Road facility (15 percent). While the Fairfax County incinerator is a new facility, the D.C. incinerator is almost 20 years old. Six combustion units are located on the 7.5-acre site of the D.C. incinerator at Benning Road. These were built in 1972, but have never operated at full capacity. They are equipped only with electrostatic precipitators, which no longer meet the Clean Air Act requirements for best available pollution control technology. For the past few years, five of the six units have been nonoperational. Residents adjacent to the incinerator site have complained for many years about the soot that falls on their homes and cars. In the past, residents and workers adjacent to the ash dumping facility near St. Elizabeth's Hospital complained of truck traffic, unprotected dump sites, and the leaching of ash residue onto streets and into the Anacostia River. In 1990, the ash facility was closed for receiving ash, and the ash piles were fenced off and covered.

About 12 percent of privately collected garbage is taken to the Fairfax incinerator. The per ton tipping fee at the incinerator is $41.65 ($20, plus a $19.29 recycling surcharge, plus a $2.36 per ton administrative fee). Ash from the incinerator, usually 20 to 30 percent by weight of incoming solid waste, is taken to a monofill at the Lorton landfill.

Recent Developments

Uncertainty surrounds the future of the Lorton landfill. In March of 1991 the Fairfax County Board of Supervisors took measures to expand the landfill, but in April they voted to close it by 1995 to all waste except ash from their own incinerator. In May 1991, Virginia Senator Charles Robb and Congressman James P. Moran proposed that a solid waste task force undertake a 9-month study of landfill options for the Washington metropolitan area.

Uncertainty also surrounds the future of incineration. The D.C. DPW requested $16.5 million in additional spending in fiscal year (FY) 1991 (to be added to $1.5 million in spending authority currently available in the FY 1990 budget) to rehabilitate four nonfunctioning units and one functioning unit at the Benning Road incineration facility. The money would also be used to demolish two remaining furnace units. These changes would allow the facility to incinerate 1,000 tons per day. The DPW also requested $4.56 million in FY 1992 for predesign and procurement planning for a new waste incineration plant of up to 2,000 tons per day of capacity.

In April 1991, the City Council rejected the DPW's request and allowed only $6.7 million for the renovation of pollution control equipment at the single operating burner and for expenses related to site improvement. The expenditures are contingent upon the City Council receiving an evaluation of current and projected air emissions at the plant. However, the disbursement of these funds remains in doubt, because, shortly after the budget was finally approved, the unit exploded, closing the incinerator temporarily. Meanwhile, the Center for Environment, Commerce, and Energy, a D.C. nonprofit group, is conducting a community health survey in the area as part of its overall national program to document the pollution impact on urban minority populations. The study, expected to be completed in December 1991, will be the first to document epidemiological data in the Benning Road area.

Recovering Recyclable and Compostable Materials

The Law

In January 1988, the District of Columbia Solid Waste Management and Multi-Material Recycling Law (D.C. Law 7-226) was passed. The key provisions of this law are as follows:

- Section 6. No investment can be made to construct or retrofit incinerators "until all of the provisions of this act are implemented or a 25 percent reduction in the solid waste stream is achieved through district-wide recycling, whichever comes first."
- Section 7. Target dates for recycling were established as follows: 1) 10 percent of the total commercial solid waste stream by October 1, 1990; 2) 15 percent of the total commercial and residential waste stream by October 1, 1990; 3) at least 35 percent of the total commercial and residential solid waste stream by October 1, 1992; and 4) recycling of at least 45 percent by October 1, 1994.
- Section 8. Target dates for source separation were established: 1) by October 1, 1989, occupants of commercial property shall separate and provide for recycling of all newspaper, and occupants of office buildings, including District government facilities, shall separate for collection and provide for recycling of "all paper"; 2) by October 1, 1989, residential occupants shall separate all yard waste and newspaper for recycling, and the City shall offer collection services of no less than twice a month; 3) by April 1, 1990, occupants of residential property shall separate out metals and glasses in one bin; and 4) by October 1, 1990, occupants of commercial property shall separate for collection and recycle glass and metal.
- Section 9. An Office of Recycling was established within the director's office of the DPW.
- Section 11. By October 1, 1989, the City shall have in place at least one multi-material buy-back center in the District. At least one intermediate processing facility in the District will receive recyclables. [Unlike the buy-back center, no time line is established for setting up the intermediate processing facility.]

- Section 13. The Mayor shall "to the maximum extent practicable and feasible, use compost materials in any land maintenance activity operated with public funds."
- Section 14. The Mayor shall modify all bid specifications relating to the purchase of paper to promote the maximum purchase of recycled paper and recycled paper products. The percentage of the total amount of paper or paper products comprised of recycled paper or paper products (defined as products that contain at least 40 percent wastepaper) should be not less than 15 percent by October 1, 1990; not less than 30 percent by October 1, 1991; and not less than 45 percent by October 1, 1992. City agencies can pay up to a 10-percent price premium for such products. A yearly written report on the percentage of recycled paper and recycled paper products purchased by the D.C. government should be prepared; the first will be due on January 1, 1990, and the second January 1, 1991.
- Section 16. A recycling surcharge shall be imposed on all private haulers "to offset the cost of developing new and additional methods of solid waste management."

The failure of the District to meet some of the schedules set forth in Law 7-226 prompted a lawsuit in 1990 by the Sierra Club and D.C. Common Cause. In late April 1991, the plaintiffs indicated a willingness to negotiate a settlement with the City whereby the City would commit to specific deadlines for implementing the recycling law.

One other recent law, the Paper and Paper Products Recycling Incentive Amendment of 1990, is important. In January 1991, D.C. became one of the nation's first jurisdictions to enact a law requiring the private sector to give preference to recycled paper. The new law imposes a fee on companies that sell virgin paper instead of "competitive" recycled paper. Competitive recycled paper is defined as paper priced at not more than 10 percent above the price of paper made from wood pulp. The law goes into effect in January 1992 for newsprint and January 1994 for other paper products.[7]

This law, which adopts U.S. Environmental Protection Agency (EPA) guidelines for Federal paper purchases, applies to companies that sell or distribute a publication of at least 30,000 circulation, sell or distribute at least 500 tons of a paper product per year, or generate at least $100,000 of annual gross receipts from a paper product. These firms must use recycled paper in specified percentages. Companies can apply for an exemption for particular grades of paper if the recycled paper costs over 10 percent more than wood-pulp-derived paper. The law applies to printing and writing paper (which must have 50-percent wastepaper), newsprint (which must contain 12-percent recycled content in 1992 up to 40-percent in 1998 and thereafter), toilet tissue (which must contain 20-percent post-consumer paper), paper napkins (which must contain 30-percent post-consumer), and paper towels (which must contain 40-percent post-consumer material).[8]

Current Recycling Activities

City crews are recycling about 12 percent of City-collected household wastes, which make up 25 percent of the total waste stream. The private sector, which collects 75 percent of the total waste stream, is recycling about 20 percent of the tonnage it handles. The overall recycling rate is 18 percent.

As of May 1991, all District households receiving municipal collection services were provided with weekly curbside collection service for newspapers only. As a result of this newspaper collection, 2 percent of the total waste stream was recycled in 1990.[9] In June 1991, collection of glass, aluminum, and high density polyethylene (HDPE) and polyethylene terephthalate (PET) plastic containers will be added to the current curbside service in parts of Ward 6 and all of Wards 7 and 8. Recyclables will be collected weekly, coinciding with regular garbage pickup. Yard debris collection is available to households receiving municipal collection services throughout the City on a scheduled basis.[10]

Recycling in the commercial sector is expanding at a much faster rate than in the residential sector. For example, in the first three quarters of 1990, 60,000 tons of materials were recovered from the commercial waste stream, and 60,000 tons were recovered in the last quarter. The collection in the fourth quarter alone represents almost three times the District crew's 1990 total of 22,700 tons.[11] It should be noted that the private sector collects three times more material than the public sector.[12]

Newspapers make up almost two-thirds of the materials collected for recycling by the District. The City pays a $10 per ton fee to Capital Fiber Inc., a subsidiary of *The Washington Post*. The 5-year contract with Capital Fiber covers all newspapers collected curbside by the City. The contract has a mechanism for revenue sharing with the City when the newsprint market improves. Those collected by private haulers are sold through private brokers. Currently, the brokers are charging haulers $15 to 25 per ton to receive the material.

Two recycling trucks and two recycling trailers, each with five compartments for source-separated materials, were delivered to the City in April 1991. One of these, the Timsco truck, will allow residents to commingle recyclables in one bin. Newsprint is the only material that must be kept segregated and put beside the bin for pickup. The crew is expected to collect commingled materials and sort them at curbside. These vehicles will serve only single-family homes and small apartment houses in designated areas. The recycling trailers will be utilized as back-up equipment to the trucks and also for the weekend drop-off collection program.

The Office of Recycling is considering establishing a mixed-waste processing facility, which could be located at the Fort Totten transfer station and process mixed waste from apartment buildings. See section on Mixed-Waste Mechanical Processing Systems, page 26, for a discussion of this type of technology and how it might be best applied in D.C. (Several private haulers and apartment building

managers have begun their own pilot source-separation recycling programs. A majority of apartment building owners have requested City pickup of recyclables, which is provided for under Law 7-226.) A final decision by the City as to the possible facility location is expected following an analysis by the City's consultants.

In March 1991, the Office of Recycling issued a request for proposals (RFP) for an intermediate processing center (IPC) to sort commingled recyclables that have been source separated. The selection, anticipated in fall 1991, must be approved by the City Council under new rules requiring such approval for all contracts in excess of $1 million. The Office of Recycling is prepared to contract with existing private processing/marketing firms for up to 2 years on a temporary basis. According to private sector sources, some 11 IPCs are open or under construction in the Maryland and Virginia suburbs, in addition to the publicly-operated facilities in Prince George's and Montgomery Counties.

The initial RFP allowed a facility to be built 40 miles outside the District. This appears to violate Section 11 of the Law, which requires an IPC to be located "in the District." A number of residents testified before the City Council regarding the need for the processing facility to be inside District lines. Anthony Saunders, of East of the River Community Development Corporation, pointed out that while the Office of Recycling would allow the processing center to be outside the City, the City's Office of Business and Economic Development is seeking industrial tenants for a "Flex Park" to be located at the 16-acre D.C. Village site. Further, Katherine Selathe, Program Analyst for Action to Rehabilitate Community Housing (ARCH), has identified sufficient industrial land within the District for recycling, processing, and/or manufacturing of new products from recovered materials. Dick Tynes, President of Eagle Recycling, has also identified land for a recycling processing center inside the District. The CWI Company has located a processing facility in the Brentwood area of D.C., although many residents oppose the plant and would prefer that it be located in industrial zones farther away from residential neighborhoods.[13]

As of mid-May 1991, the Office of Management Services of the DPW is considering changes in the RFP. Bidders will be informed that multi-material processing/marketing services must be located in the District within a designated time period.

Strategies for Successful Recycling

D.C.'s recycling goals are ambitious, but not unprecedented. A number of communities have recovered significant amounts of materials, in some cases exceeding D.C. goals. A 1990 study of the best recycling communities identified 10 that have recovered 40 percent or more of their total waste stream. (See Table 3.) It should be noted that D.C.'s program is in its infancy, whereas many of the programs identified have been in operation for several years.

Table 3

Record-Setting Recycling and Composting Programs

Community	Population	Materials Recovery Rate (%,1989)		
		Residential	Commercial/ Institutional	Overall*
Berlin Township, NJ	5,629	57	56	57
Lincoln Park, NJ	11,337	45	60	53
Longmeadow, MA	16,309	45	0	49 (a,b)
Haddonfield, NJ	12,151	51	27	49
Perkasie, PA	7,005	NA	NA	43
Rodman, NY	850	NA	NA	43 (a)
Wellesley, MA	26,590	NA	NA	41 (a,b)
West Linn, OR	14,030	NA	NA	40 (a)
Hamburg, NY	11,000	39	18	40 (a)
Wilton, WI	473	40	38	40
Seattle, WA	497,000	44	35	36

NA= Data not available

* The ratio of tonnage recycled and coomposted to the tonnage of municipal solid waste generated (residential, commercial, and institutional)

(a) includes estimated tonnage recovered through state bottle bill

(b) Includes yard waste composted by landscapers

Note: Bottle bill tonnage and yard waste composted by landscapers cannot be broken down into residential and commercial.

SOURCE: Brenda Platt, et al., *Beyond 40 Percent: Record-Setting Recycling and Composting Programs,* Institute for Local Self-Reliance, Washington, DC, August 1990.

Although many of the lead recyclers are small communities, large cities have been approaching high recovery levels as well. Seattle's recycling/composting rate was 36 percent in 1989, and Seattle officials are confident that they can achieve their 60-percent recycling/composting goal. Table 3 shows that cities can achieve very high materials recovery levels in both the residential and the commercial/institutional sectors. D.C. has a much denser population than any of the communities listed in Table 3. An important issue is whether or not, with its high proportion of apartment houses, D.C. can achieve high recovery levels. Information on apartment building recycling efforts is accumulating quickly. A pilot program at the Canterbury Greens complex, an apartment complex in Fort Wayne, Indiana, with 5,000 residents in 2,000 units, has achieved 50- to 55-percent recycling rates,[14] indicating that levels much higher than D.C.'s recycling goals are possible even in densely populated areas. Apartment house recycling must be an important component in D.C.'s solid waste management system since an estimated 400,000 residents live in apartment units.

D.C. can piggyback on the experience of successful recycling programs around the country. Lessons these offer include the following:

- Only those communities with comprehensive composting programs have achieved high levels of materials recovery. Comprehensive means year-round collection of many types of yard waste at curbside and incentives for landscapers to compost their yard waste.
- For a community to recover a high percentage of its total waste, it must target a variety of materials.
- Mandatory recycling ordinances (directed at both the residential and the commercial/institutional sectors) are necessary to ensure high participation rates.
- Recovery of materials from single- and multi-family households, and from commercial and institutional establishments (through both curbside and drop-off collection) are critical in order to maximize waste reduction.
- Frequent recycling/composting pickups increase participation and set-out rates, which in turn increase recovery rates. Weekly pickups have consistently higher participation rates.
- Providing adequate containers to households for storage and set-out of recyclable materials can increase both participation rates and recovery levels.
- Economic incentives for materials recovery are critical. These include volume- or weight-based refuse rates, reduced tipping fees for recyclable or compostable materials at drop-off sites, and higher tipping fees for disposal of non-source-separated refuse. Volume- or weight-based refuse rates not only increase recycling levels, but also encourage changes in consumer buying habits and reduce the overall amount of garbage generated.[15]

Designing a successful recycling program requires a comprehensive approach that involves a restructuring of the collection, processing, and materials marketing systems.

Collecting Source-Separated Recyclables

There are several different methods for collecting recyclable materials at curbside. While there are many variations on these, the following four are common collection methods:

- collecting all designated recyclable materials commingled, with sorting at a central processing center;
- collecting certain recyclable materials commingled and others segregated in different containers, with sorting en route (at curbside or on the truck);
- collecting certain recyclable materials commingled and others segregated, with sorting of the commingled materials at a central processing center while other materials are sorted directly en route; and
- collecting segregated recyclable materials, that is, materials that are set out in separate containers, bundles, or bags.

Only scant data are available on the comparative economics of collecting commingled versus segregated materials.[16] One survey concluded that commingled collection programs cost $121 per ton, while segregated collection systems cost $91 per ton. Commingled systems had, as one would expect, lower collection costs and higher processing costs.[17] Another survey of 12 New Jersey communities found a slightly more pronounced difference in costs. Commingled systems cost on average $132 per ton compared to $83 per ton for segregated systems.[18]

Commingling materials can lead to greater amounts of breakage and more contaminated materials. This can lead in turn to a lower market value for the collected material and to lower recovery levels. In Seattle, for example, a facility processing commingled recyclables experiences up to 3.5 percent rejects, whereas another facility processing segregated recyclables reports a reject rate of only 0.3 percent.[19]

The main advantages of commingled collection are the convenience to the household or commercial client, resulting in a greater participation rate, and the reduced time its takes collection crews to collect materials. In several timing studies conducted in three communities, two of the three averaged slightly more than 30 seconds per stop when recyclables were set out in five separate bags. The collection time was reduced to 10 seconds with commingled collection. This time savings resulted in substantially extending the routes covered by a given crew, as well as in providing more efficient collection and better utilization of capital intensive trucks.[20]

The main advantages of segregated material collection are avoiding the construction of capital intensive IPCs and recovering higher quality recyclables. (See Table 4.)

Table 4

Commingled Versus Segregated Collection

	Commingled	Segregated
Household	Less storage space needed, fewer containers to set out	More storage space needed, more containers to set out
At the Curb	Fewer containers to handle and empty	More containers to handle and empty
Quantity	More weight per container	Less weight per container
In Transit	Longer distances, further from depot or unloading	Shorter distances, closer to depot or unloading
Residue	High	Low
Capital Costs	High	Low
Operating Costs	High	Low
Material Contamination	High	Low

Source: Institute for Local Self-Reliance and Richard Bishop Consulting, Ltd.

The configuration of D.C.'s row housing and the extensive reliance on alley pickup of garbage poses a unique problem for recycling in the City. Because many of the alleys are too narrow for recycling vehicles, the City will collect multi-material recyclables from curbside, in front of homes. Curbside collection could increase collection time because crews must maneuver between parked cars. However, the Office of Recycling believes that curbside collection will increase participation based on peer pressure, since it will be apparent which households are not setting out containers for recycling.[21] Indeed, in Berlin Township, New Jersey, which may have the highest recycling rate in the United States, the recycling coordinator credits the peer pressure factor as a major reason for widespread participation in recycling.[22]

Other Forms of Collection for Source-Separated Materials

Although curbside collection in one form or another will handle the bulk of recyclable materials, other forms of collection have been used with success throughout the country.

Commodity Reuse Enterprises

Commodity reuse enterprises recover appliances, furniture, clothing, books, and building materials. Successful programs include The Loading Dock in Baltimore, Maryland; Urban Ore in Berkeley, California; and Garbage Reincarnation in Santa Rosa, California.

Recycling refers to the collection, processing, and reuse of raw materials in a waste stream such as glass, paper, metals, and plastic. Commodity recovery refers to the recovery and reuse of commodities such as furniture, appliances, books, clothing, and building materials (including doors, windows, fixtures, toilets, and bathtubs). Goodwill Industries is an example of a long-term national network to recover clothing and furniture for resale/reuse. Since the onset of the national solid waste disposal dilemma, newer companies have emerged with a wider application for solid waste management.

Commodities have a higher value than raw materials because they are usable products. Commodity recycling, therefore, has a high profitability. Three model programs--Urban Ore, Inc. in Berkeley, California; Garbage Reincarnation, Inc. in Santa Rosa, California; and The Loading Dock in Baltimore, Maryland--are available for replication in the District of Columbia. Used commodities are donated or sold to these enterprises. Commodities are resold to individuals, construction firms, and second-hand stores. Profitable operations can be established in communities that generate as little as 200 to 300 tons of solid waste per day. Programs are highly popular and generate loyal customers among computer "nuts," mechanical repair enthusiasts, and bicycle repair enthusiasts. In Santa Rosa, a mattress remanufacturing operation was set up as a result of the availability of old mattresses at the Garbage Reincarnation site located at a local landfill. (Old mattresses are stripped, stuffing materials are sterilized, frames are refurbished, and new mattresses are manufactured.)

In Berkeley, Urban Ore operates on two square blocks of city land. After appliances offered for sale for a given period of time do not sell, crews break down the commodities to recover high value metals (such as brass, copper, tin, and aluminum), freon, and plastic, all of which are sold, along with the scrap steel. Formerly unskilled workers are trained and can earn up to $75 per day in such "high grading" activities.

The Loading Dock in Baltimore operates a warehouse where construction materials are donated by local corporations. These are displayed and sold to nonprofit housing, youth, and community organizations.

Commodity reuse can play an important part in reducing the waste stream. Up to 20 percent of the waste stream by volume could be made up of bulky reusable commodities.

Buy-back Centers

These enterprises pay individuals on a per-pound basis for materials delivered to the site. Materials are processed and sold to markets. Buy-back centers allow individuals and groups (often informal cooperatives) to gather and deliver materials as an income supplement.

D.C. law requires that one buy-back center be opened in the City. October 1, 1989, was to be the start-up date. The Office of Recycling hopes that a community development corporation will be interested in operating such a center in concert with other recycling activities. The Office of Recycling states that it cannot involve community development corporations in its procurement process unless the corporations have grant status or follow a grant-type procedure.[23]

Drop-off Centers

These facilities receive materials, but do not pay for them and do not charge a drop-off fee. The Dupont Circle Neighborhood Ecology Center has operated a drop-off center since 1979. The First Rising Mount Zion Baptist Church coordinates a number of drop-off sites using igloos for glass collection. The Office of Recycling operates 10 drop-off sites at various locations in the City on a weekly basis. Compartmented trucks and trailers as well as open-bodied trucks and packers are used. Five of these sites were previously operated by the D.C. Citizen's Coalition for Recycling, which started and operated the centers for several years prior to implementation of the District's drop-off program. Drop-off centers could be a permanent part of the City's recycling system for educational, training, and convenience purposes. In Berlin Township, New Jersey, where about 60 percent of municipal solid waste is recycled, drop-off centers are a permanent component of the overall system, which includes curbside recycling. The centers receive "white goods" (appliances such as refrigerators, stoves, hot water heaters, clothes washers, and dryers) dropped off by households and businesses.

Targeting Recyclables

High recovery levels cannot be achieved unless a substantial portion of the waste stream is targeted for recycling and composting. D.C. is, to date, targeting newsprint, yard waste, glass, PET and HDPE plastic, ferrous metals, and aluminum from the residential sector, and newsprint, office paper, yard waste, glass, PET and HDPE plastic, aluminum, and ferrous metals from the commercial sector. Targeting a wider range of materials for source-separation recycling will increase overall recovery levels. **Table 5** shows the potential recovery rates of different materials. With the exception of food waste and "other" paper, these rates are comparable to the recovery goals adopted by the state of New Jersey and/or the city of Seattle, Washington, which have set 60 percent recycling goals by 1995.[24]

Table 5

Potential Recycling in D.C.

Material	% of D.C. Waste Stream (1987)	Projected Recovery Rate (By Material)	% of D.C. Waste Stream Recovered
Paper	52.7		
Newspaper	15.5	85	13.2
Corrugated	5.6	85	4.8
Office	14.6	85	12.4
Other	17.0	40	6.8
Plastics	9.0	35	3.2
Glass	8.0	75	6.0
Ferrous Metals	11.0	85	9.4
Nonferrous Metals	1.0	75	0.8
Yard Waste	5.8	90	5.2
Food Waste	6.0	30	1.8
TOTAL	**93.5**		**63.6**

Achieving these rates would allow the District to recover almost 65 percent of its solid waste through its source-separation recycling and composting program alone. If D.C. reached 80 percent of this potential, it would still achieve a 51-percent overall source-separation recovery rate.

Mixed-waste mechanical processing systems could recover additional materials from the remaining non-source-separated waste (see section on mechanical processing, page 26). D.C. needs a strategy tailored to specific materials. What follows is a material-by-material evaluation of the potential for recycling and the markets for the recycled materials.

Yard Waste

A growing number of communities ban the incineration or landfilling of yard waste. The Twin Cities in Minnesota, with a population of 2.3 million people, required that yard debris be composted. Yard waste could be composted in backyards or lawn cuttings left on the lawn to reduce waste collection. Very high rates of source-separated yard waste composting are possible. Sufficient demand exists for finished compost products by residents, government agencies, and the private sector to handle all of D.C.'s composted yard waste, even at very high recovery rates. It should be noted that the composting process reduces the volume of yard debris by 50 percent.

Food Waste

Food waste recovery is occurring in New York City; Philadelphia; and Portland, Oregon. Food waste can be recovered for composting or for animal feed; the latter has a higher value. New Jersey hog farmers, under contract with the city of Philadelphia, collect over 50,000 tons of food waste annually for processing into feed. Doing so requires sterilization. One company in the Twin Cities is using a mobile cement mixer to sterilize commercial food waste that is then fed to hogs. The City could begin by targeting commercial routes (such as restaurants and large institutions). No firm figures are available, but these may generate 50 percent of the total food waste accumulated in the District. Markets for food waste, either as compost or as animal feed, can handle all of the District's food waste, even at very high recovery levels.

In Toronto, Canada, worm bins are distributed to encourage households to compost food waste on-site to avoid collection and disposal costs.

Glass

If D.C. were to recycle 80 percent of its glass, it would have to find markets for 48,000 tons per year. Markets for this glass seem readily available within the region. Glass furnaces have operated with up to 100-percent cullet or recycled glass. Current use of post-consumer glass scrap ranges from 25 to 45 percent. ILSR interviews with glass manufacturers indicate that they can readily increase their utilization of cullet

to 60 to 75 percent recycled materials, but they are having difficulty getting sufficient supplies. More than 40 glass plants are located in the Mid-Atlantic region. As of 1990, these plants could handle an additional 2 million tons of clear glass and over 700,000 tons of amber glass. The excess demand was only 850 tons of green glass, primarily because there is no significant wine industry in the area that uses green bottles.[25] However, through the year 2000, the Maryland Department of Environment projects an excess demand for green glass of 100,000 tons.

The economic recession has caused a downturn in the markets. Prices for colored glass have fallen from $50 per ton to $15 per ton. Clear glass, or flint, still can be sold for $50 per ton. The City has had no problems marketing glass recovered from its curbside and drop-off programs. The involvement of community development corporations could help in marketing glass. For example, in Chattanooga, Tennessee, the Orange Grove Center, a nonprofit organization that employs mentally-challenged workers, receives $70 per ton for all its glass as a result of assistance from large corporations that want to support the Center's work. The volatility of glass or other material markets underscores the importance of local product manufacturing. In Arcata, California, Margaret Gainer and Associates is establishing a small, pressed glass manufacturing plant that will use recycled glass.

Aluminum

Aluminum has traditionally been the most valuable component of the waste stream. The demand for scrap aluminum will remain sufficiently high over the next decade so that there will be ready markets for recycled aluminum even at the highest levels of recycling.

Steel and Bimetal Cans

Steel mills are the ultimate market for steel and bimetal cans. Processing is required to remove the tin coating prior to final remanufacturing into new products. Proler International operates a detinning plant in Pittsburgh, Pennsylvania, and establishes facilities to transport cans from major population centers. Closer to D.C., there are ready markets for scrap ferrous in Baltimore.

Wastepaper

New regulations, laws, and technologies are rapidly changing the markets for wastepaper.

Corrugated Paper

Old corrugated cardboard in the D.C. area is sold primarily to liner board mills in Virginia and to markets in the Far East. The average price in June 1991 was from $20 to $25 per ton in domestic markets and $10 to $15 per ton in the overseas markets, baled and loaded on trucks (40,000 pound minimum) or overseas containers (48,000 pound minimum). By 1992, a new paperboard mill with a capacity of 900 to 1,100 tons per day will open in Tennessee, and, in 1995, another

large mill will open in Kentucky. The market for old corrugated paper is reliable. It has one of the highest collection rates of any form of paper. The American Paper Institute has a goal to recycle 60 percent of old corrugated cardboard nationwide by the mid-1990s.

Newspaper

This material has been the mainstay of most residential recycling programs in the United States, including the D.C. area. In 1989-90, due to a lack of sufficient deinking capacity at paper mills, coupled with a dramatic increase in the supply of old newspapers, a glut on the market ensued, and cities without established markets had to actually pay brokers substantial sums to accept old newspapers or cancel their programs.

By late 1990, nine new newsprint deinking mills opened worldwide, and the North American capacity for handling inked paper in paper mills has increased by about 0.5 million tons per year. According to newsprint brokers, additional mill capacity will be built in the United States and worldwide each year from 1992 to 1996. Because of the oversupply of old newspapers available from curbside collection programs, these national and international developments have not yet resulted in increased market value for old newspapers, but the market should improve over the next few years. As of June 1991, haulers were paying D.C. processors $15 to $25 per ton to receive their old newspapers.

Alternative markets for old newspapers have also developed. One such alternative is the use of shredded newsprint as animal bedding. It is cheaper than straw, and the animal bedding market offers a higher price for newsprint than do paper mills. However, the animal bedding market tends to be seasonal, so storage facilities may be needed. Another alternative is to use the old newspaper as a construction material. Pan Terre America, Inc., located in Arlington, Virginia, is one such company. It is seeking to build a wallboard plant in the area that would use newsprint as a primary feedstock.

Office Paper

The Maryland Department of the Environment projected an oversupply of office paper of 1.6 million tons a year in the D.C. area because few mills in the region use it for making new products.[26] That means the material must be exported overseas or to other parts of the country. Yet office paper recycling is expanding rapidly in D.C. The Office of Recycling reports that 60,000 tons were recycled in the last quarter of 1990 alone, more than all the material recycled in the first three quarters by the private sector. This implies that haulers for D.C. office buildings (primarily the larger firms) have made adequate marketing arrangements.

Mixed-Grade Paper

Unless it is high-graded, this material is the least valuable of all paper grades. Demand is low because paper mills consider the quality of the material inconsistent and because of the increased availability of newsprint as a substitute. The downturn in the housing market has reduced demand for roofing felt, which is made from mixed-grade paper. Some paper mills are using coated paper for up to 30 percent of their recycled paper feedstock. The recently expanded Marcal tissue mill in northern New Jersey is now buying mixed paper from a 300-mile radius, which includes the D.C. area.

New York City recently began an intensive recycling pilot program to collect 70 percent of the waste generated by households in Park Slope, a Brooklyn neighborhood. The program includes collection of mixed-grade papers (junk mail, cereal boxes, detergent boxes, printing and writing paper, magazines, and newspapers). See **Appendix H** for a list of the wastepaper grades and other materials collected in this pilot program. The City pays a local broker $9 per ton to market the mixed paper.

New technology may also raise the value of mixed paper. A "steam explosion" process has been acquired by the Chesapeake Corporation of Richmond, Virginia, under a new partnership, Recoupe Recycling Technologies. The product is a paper pulp at a lower cost with good quality. This technology, coupled with numerous idle paper mills in the Mid-Atlantic region, offers an opportunity for D.C. or area entrepreneurs to reprocess wastepaper from D.C. and to market the end products to buyers in the City.

Mixed-grade papers can also be used in yard debris composting programs or in mixed-waste composting systems.

D.C. can improve the value of the mixed paper it collects, and thus its marketing options, by building a facility dedicated to sorting higher grades of paper from lower grades.

Plastics

Plastics are a growing percentage of the D.C. waste stream. D.C. plans to collect only PET and HDPE plastics at curbside. (Poly Source, Inc., in Baltimore, Maryland, is the market.) Other types of plastics including polyvinyl chloride (PVC) and low-density polyethylene (LDPE) can also be recycled. There are dozens of companies now recycling various polymers, including mixed plastics. Plastic lumber, made from mixed plastics, is used to make outdoor furniture, playground equipment, fencing, car stops, and docks. In a contract between the Chicago Parks Department and Hammer Plastics Company, Hammer receives a processing fee to take plastic and process it into outdoor park equipment.

American Recovery Company, based in the District, offers a plastic bag-making system that uses old garbage bags to make new ones. A plant in Rome, Italy, installed with this technology, manufactures 400,000 bags per day from scrap plastics.

Maximizing Materials Recovery With Mixed-Waste Mechanical Processing Systems

There will never be 100 percent citizen participation in source-separation recycling programs, in which recyclable materials are separated from mixed refuse and collected at curbside or drop-off sites. Nor will there be 100 percent recovery of those materials designated for collection in these programs. Thus, much of the non-source-separated waste stream can contain recyclable or compostable materials. Mixed-waste mechanical processing systems can recover these materials from non-source-separated waste. These systems, which are offered by a variety of vendors in a variety of configurations, typically combine mechanical equipment with hand-sorting to separate materials from mixed waste for recycling and composting. A number of systems also produce a refuse-derived-fuel product from the combustible fraction of the mixed-waste stream. **Appendix D** provides a review of commercially available systems. Compost produced from mechanical processing systems is called mixed waste or municipal solid waste compost. Those systems that focus on producing a compost product are often referred to as municipal solid waste composting systems. The best mechanical processing systems target a variety of materials for recovery, including different types of plastic, wastepaper, glass, and ferrous and nonferrous metals, in addition to organics for composting.

Mixed-waste compost should not be confused with compost produced from source-separated yard debris and other organic wastes. Because mixed-waste compost is produced from non-source-separated waste it is not contaminant free. Contaminants can range from heavy metals to other materials such as plastics. As a result, mixed-waste compost is often more difficult to market than compost produced from "clean" yard waste. Yet, end-uses exist, and range from landfill cover to soil amendments for golf courses.

There has been a dramatic increase in the number of municipal solid waste composting systems. *Biocycle Magazine* reported on 42 projects in 1988, 75 projects in 1989, and 82 projects in 1990.[27] Mixed-waste composting systems have capital costs of $20,000 to $40,000 per daily ton of capacity and operating costs of $20 to $30 per ton. They can be scaled from 100 to 400 tons per day with little effect on the per unit cost of construction and operation. In comparison, capital costs for waste incinerators are about $100,000 per daily ton of capacity, with operating costs for new facilities above $60 per ton.[28]

Municipal solid waste composting systems have two main components. The first is the up-front processing step, which consists of separating the organic fraction

for composting and other materials for recycling. The second is the actual composting stage. Some systems employ windrows (piles in rows), others use enclosed vessels for composting. There are variations on both of these. For instance, windrows can simply be static piles, or they can be mechanically aerated and watered. Scientists such as Melvin Finstein at Rutgers University and Harry Hoitink at the University of Cincinnati, have determined that the "tunnel reactors" used in the mushroom growing industry, which consumes compost, are the most advantageous in terms of materials handling, biological process control, exhaust air scrubbing to prevent odors, and finished compost monitoring.[29] Ocean County, New Jersey, has recently ordered a mixed-waste mechanical processing system that incorporates the "tunnel reactor."

Aside from recovering materials for recycling and composting, mechanical processing systems serve to reduce the volume and weight of the waste stream. Studies have indicated that when such systems are combined with comprehensive source-separation programs, the waste stream can be reduced more than 85 percent by weight.[30] With one or more mechanical processing systems sized to handle not more than 35 percent of the City's waste stream (750 tons per day of total capacity), D.C. could maximize waste reduction and avoid incurring high capital costs for new incineration capacity.

Retrofitting D.C.'s Existing Disposal Facilities to Recover Recyclables

In order to improve the efficiency of the City's solid-waste management system, the City's principal facilities, now dedicated to disposing of waste, must be renovated so that source-separated recyclables and compostables can be processed for markets, and so that the remaining mixed waste can be mechanically processed to recover additional materials.

Currently, 68 percent of D.C. garbage goes to the Lorton landfill, either directly or via the Fort Totten transfer station. In comparison to the Fairfax County transfer station, the Fort Totten facility is operated very inefficiently. (See **Table 6.**)

Table 6

Transfer Stations

	Fort Totten	Fairfax County
Hours Open	M-F: 7:00 am - 4:00 pm Sat & Sun: 8:30 am - 3:30 pm	M-F: 5:00 am - 4:00 pm Sat: 5:00 am - 2:00 pm
Tonnage Per Day	500 - 800	2,200 - 3,000
Trailer Loading Time	12 - 15 minutes	2.5 - 3 minutes
Calculation of Tonnage	Trucks over scales	Trucks over scales
Receiving Method	Tipping floor	Tipping floor
Trailer Loading	Compactor	Loose into trailer tops
Trailer Loads Per Day	25 - 45	125 - 180
Station Down Time	20% (mostly hydraulic repairs)	1% (pit repairs)
Facility Users	City vehicles, general public	City vehicles, general public, private haulers

Source: Leslie Downs, D.C. Haulers Association, prepared for the Institute for Local Self-Reliance.

The major differences between the two facilities are in trailer loading time and in downtime. Fort Totten trucks take four to six times longer for unloading than those using the Fairfax County facility and Fort Totten is down 20 times more than Fairfax County. There are two key factors influencing these differences. In D.C., City compactor trucks and citizens' vehicles intermingle at the tip face. In Fairfax, they are separate. In D.C., a dual hydraulic system, used to feed transfer trucks, has had mechanical problems. In Fairfax, a top-loading system is used with no hydraulics.

The 4.5-acre Fort Totten facility could be redesigned to increase capacity by replacing the hydraulic system with a gravity feed system, and, with other minor modifications, it could increase its capacity from 500 to 800 tons per day to 2,200 to 3,000 tons per day. At that time, close to 65 percent of the waste would be recycled or composted at other D.C. facilities and private recycling facilities through source

separation alone. (See Chart B.) A mechanical processing facility could be built at Fort Totten to handle the remaining 35 percent of the waste stream. Special emphasis during renovations must be given to noise barriers and truck routing to minimize impact on residential areas.

The 7.5-acre Benning Road incineration facility, where only one of six combustion units is operating (intermittently), could be used as a composting (for source-separated yard debris), paper high-grading, commodity reuse, and as an intermediate processing facility. Razing the combustion units would allow the facility to be dedicated to recycling and composting. ILSR estimates that from 1,000 to 1,400 tons per day of recyclables can be processed on this site.

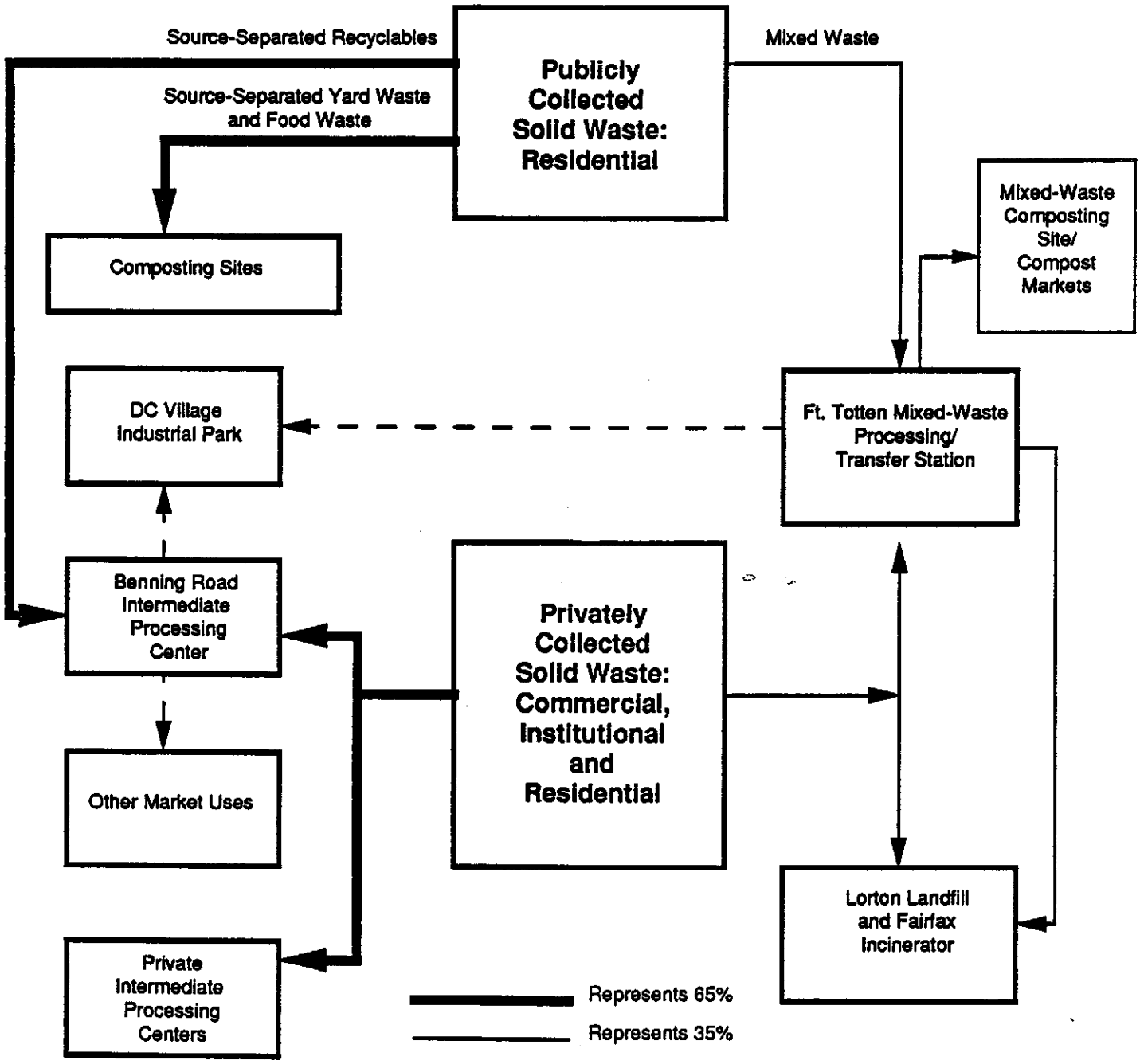
The cost of disposal for both public and private haulers is about $90 per ton. If garbage could be processed at Fort Totten or Benning Road, about $65 of this could be saved in travel time, depreciation of equipment, and tip fees at Lorton. For small haulers, avoiding weight violation tickets on Virginia highways could save another $25 per ton.

Thus, if tip fees at Benning Road or Fort Totten were less than $65 per ton, the haulers would save money by dumping at those sites. For comparative purposes, the tip fee for mixed-waste composting operations throughout the United States ranges from $20 to $40 per ton, and the tip fee for intermediate processing ranges from $0 to $40 per ton. Pittsburgh, Pennsylvania, pays haulers $12 per ton for delivering recyclables.

The District could enact a "flow control" ordinance, which would require haulers to deliver recyclable and compostable materials to processing facilities.

Finally the 16-acre D.C. Village facility, which is currently not used, would provide an excellent location for processing recycled materials into end products. The District Economic Development Department is trying to locate a Flex Park (light industrial park) on the site. This location could be the center for new enterprises; other sites can be used, as well, for individual plants.

Chart B
Scenario for Future D.C. Solid Waste Flows



Source: Institute for Local Self-Reliance, 1991

Manufacturing Park

An industrial park for end-use manufacturing plants, using the recovered recyclable materials from the D.C. waste stream, could be the cornerstone of an economic development policy that would add value to the raw materials and retain this value in the form of entry-level and skilled jobs; create a low- or non-polluting manufacturing base; and increase tax revenues from increased employment earnings, investments, and profits.

Since the mid-1970s, government officials, community organizers, and solid waste management officials have increasingly recognized that municipal solid waste recycling can be an important economic development tool for urban areas.

While comprehensive recycling and composting systems can help stabilize and/or reduce the costs of solid waste management, manufacturing new products from scrap materials can increase the number of jobs and skill levels in the work force (hence higher salaries and increased consumer spending), and expand the manufacturing sector (hence increased tax revenues for local governments). Scrap-based manufacturing can be seen as the "pot of gold at the end of the garbage rainbow." It allows cities to transform an increasingly costly sector of the urban economy into a productive sector. Cities can create wealth from within their borders by adding value to the materials that are recovered from the waste stream. At each stage of the process, the more value added to the raw materials, the more wealth created and retained in the local economy. Thus, a ton of loose office paper could be marketed for $30. If baled, the paper is worth $150 per ton. Processed into pulp, the material is worth $570 per ton. As finished paper, the product is worth $920 per ton. The value added to glass products can be even more dramatic: a ton of furnace-ready (contaminant free) clear glass may be worth $30 to 50 per ton ($80 to 100 per ton on a spot market). Finished glass bottles are worth $450 per ton. By substituting products made from local resources, by local workers, for local markets, cities become more self-reliant and insulated from the vagaries of the cyclical national and worldwide market forces.

The City could use its regulatory powers over solid waste management and procurement and its control over City property to stimulate economic development. Chart B presents a scenario for the flow of materials and solid waste in the District of Columbia; **Appendix E** presents a description of the types of firms that can be attracted to the City.

To guarantee a sufficient supply of used materials to scrap-based manufacturing facilities, the City could direct its recyclables to local manufacturers, as San Francisco now does. The city of San Francisco includes in its contract with a private recycling company, a clause reserving the right of local manufacturers to receive recovered materials.[31]

Market Development

D.C. has not procured significant amounts of recycled products. Only 8 percent of the paper D.C. buys has significant recycled content. Some cities and states are doing much better. Maryland and New Jersey pioneered legislation to increase the procurement of paper products. In 1990, Maryland spent 56.6 percent of its paper budget on recycled paper, while New Jersey spent 50 percent. California, Colorado, and Michigan have mandated that 50 percent of their state agencies' total paper purchases be spent on recycled paper. Maryland tracks its recycled paper purchases by weight and dollar amount with a computerized documentation system. This is presently the best system in the United States, although several states, including California, Colorado, and Pennsylvania, are instituting similar programs. Other states, including New Jersey and New York, also document recycled purchases, but only by dollar amounts.

Despite having purchasing goals that are as progressive as the best states, the District has yet to meet its 1990 goal to procure 15 percent of its paper as recycled paper. The City has no record keeping apparatus to track recycled paper purchases.[32] However, the capacity does exist for the City to track recycled paper purchases via 440 forms and bills of lading.[33]

In addition to recycled paper, California will require that, by 1995, 40 percent of state agencies' relevant expenditures be on recycled products. Connecticut is considering legislation that will require 35 percent of all materials used for public construction to be scrap materials. **Table 7** summarizes recycled content laws in seven states. **Table 8** presents a summary of model state procurement laws.

The Federal Government is a major purchaser of materials. Although technically the Federal Government is not under the jurisdiction of D.C., the Resource Conservation and Recovery Act (RCRA) of 1976 directs Federal agencies "to procure items that contain the highest percentage of recovered materials practicable, and in the case of paper, post-consumer recovered materials, provided that reasonable levels of competition, cost, availability and technical performance are maintained." The law also directs the EPA to designate items for which the law applies and specifies that the procuring agency must spend a minimum of $10,000 in

Table 7
Recycled Content Laws

State	Product/Law	Recycled Content Definition	Recycled Content Percentage Goals
AZ	Newsprint * H.B. 2574 1990	"post-consumer paper... including discards from industrial or manufacturing processes"	10% by 7/1/91 12% by 1/1/94 14% by 1/1/96 16% by 1/1/98 20% by 1/1/00
CA	Glass A.B. 2622 1990	"percentage of post-filled glass in the manufacturing of new containers"	15% by 1/1/92 25% by 1/1/93 35% by 1/1/96 45% by 1/1/99 55% by 1/1/02 65% by 1/1/05
	Newsprint * A.B. 1305 1990	"post-consumer waste paper... including printing plant waste paper"	10% by 1/1/91 12% by 1/1/94 16% by 1/1/98 20% by 1/1/00
	Trash Bags S.B. 2092 1990	"post-consumer ... product... normally disposed of as solid waste"	10% by 1/1/93 (bags>1.0 mil) 30% by 1/1/95 (bags>0.75 mil)
CT	Newsprint H.B. 5812 1990	"fiber derived from post-consumer waste paper or...printing operations"	11% by 1/1/93 16% by 1/1/94 20% by 1/1/95 40% by 1/1/98 45% by 1/1/99 50% by 1/1/00
	Telephone Books H.B. 5999 1990	"fiber derived from post-consumer waste paper or...printing operations"	10% by 1/1/96 15% by 1/1/97 25% by 1/1/99 30% by 1/1/00 35% by 1/1/01 40% thereafter
DC	Newsprint * Act 8-283 1990	40 percent post-consumer (EPA definition)	5% for 1992 8% for 1994 10% for 1995 12% for 1996 14% for 1997 16% for 1998
IL	Newsprint H.B. 3183 1990	"including but not limited to printing waste paper "	22% by 1/1/91 25% by 1/1/92 28% by 1/1/93
MD	Newsprint H.B. 131 1990	"includes paper made from old newspapers that have been deinked"	12% for 1992 20% for 1994 30% for 1996 35% for 1997 40% for 1998
MO	Newsprint S.B. 530 1989	"the proportion of a fiber in a newspaper which is derived from post-consumer waste"	10% for 1993 20% for 1994 30% for 1995 40% for 1996 50% for 2000
WI	Newsprint S.B. 300 1989	"manufactured from waste or paper mill sludge"	10% for 1992 25% for 1994 45% for 2001
	Plastic Containers S.B. 300 1989	"proportion of an item... manufactured from waste"	10% by 1/1/95

*Arizona and California have established the following percentage goals for "recycled-content newsprint": 25 percent by 1991, 30 percent by 1994, 35 percent by 1996 (AZ only), 40 percent by 1998, and 50 percent by 2000. The District of Columbia has established recycled-content goals of 12 percent for 1992, 20 percent for 1994, 25 percent for 1995, 30 percent for 1996, 35 percent for 1997, and 40 percent for 1998. Recycled-content newsprint is defined as containing not less than 40-percent post-consumer waste paper. The recycled-content percentage goals given in the table for these states and the District of Columbia are based on multiplying this 40 percent by their recycled-content percentage goals. For example, Arizona's 1991 25-percent recycled-content newsprint goal multiplied by the 40-percent post-consumer waste content translates into a 10-percent actual recycled-content goal.

Table 8
Model State Procurement Laws

State/Law	Products Targeted	Price Preference	Recycled Paper Definition	Procurement Goals
California AB4 1989	Paper and Paper Products Compost and Co-compost Products Other Products*	5%	50% secondary 10% post-consumer	paper ($) 35% by 1992 40% by 1994 50% by 1996 all products ($) 10% by 1991 20% by 1993 40% by 1995
Colorado HB1140 1989 Ex. Order DO 11789 1989	Paper and Paper Products Plastic Other Products*	10%	50% secondary	paper ($) 10% by 1991 20% by 1992 30% by 1993 40% by 1994 50% by 1995
District of Columbia Law 7-226 1988	Paper and Paper Products Compost Materials	10%	40% secondary (EPA guidelines)	paper ($) 15% by 10/1/90 30% by 10/1/91 45% by 10/1/92
Illinois HB3389 1988	Paper and Paper Products Other Products*	10%	40% post-consumer	paper ($) 10% by 1989 25% by 1992 40% by 1996
Maryland HB714 1988	Paper and Paper Products Other Products*	5%	40% secondary (EPA guidelines)	paper (volume) 40% each year after 1995
Michigan PA412 1988	Paper and Paper Products	10%	50% secondary	paper ($) 40% for 1990 50% for 1991
Missouri SB530 1989	Paper and Paper Products Other Products*	10%	50% secondary 10% p-c for 1991/92 25% p-c for 1993/94 40% p-c for 1995 60% p-c for 2000	none
New Jersey PL102 1987	Paper and Paper Products Compost Materials Recycled Asphalt Pavement and Recycled Pavement Materials Fuel Oil	10%	50% secondary	paper ($) 45% each year after 1989
New York SFL C.849 1987	Paper and Paper Products	10%	50% secondary/no mill broke 10% p-c for 1993	none
Pennsylvania PA101 1988	Paper and Paper Products Other Products*	5%	50% secondary 10% p-c for 1996	paper (volume) 25% by 1991 40% by 1993

* The "Other Products" category refers to a general provision requiring the state to purchase recycled products, in addition to paper and paper products, whenever possible.

Table 9
Model Procurement Programs

Feature	State-of-the-Art
Recycled Paper	
Definition:	CA, MO
50% secondary/10% post-consumer	
Specifying Post-Consumer:	MO
10% in 1992 increasing to 60% by the year 2000	
Purchase Goal:	CA, CO, MI
50%	
Overall Purchase:	CA, NY
$8 million/$7 million	
Percentage Bought vs. Virgin Paper:	MD
57%	
Price Preference:	CT, DC, FL, IL, MI, MO, NJ, NY
10%	
Other Products	
Purchase Goal:	CA
40%	
Range of Products Purchased:	NY
lubricating oil, recapped tires, glass spheres for pavement markings, snow plow parts, aluminum sheets, polyethylene film, self-propelled pavement rollers, copying machine parts, cellulose insulation, automotive replacement parts	
Price Preference:	CT, FL, IL, MO, NJ
10%	
Other Features	
Regional Contacts:	MN, WI
Joint paper purchase	
Documentation:	NY, MD MO
Records of all recycled purchases	
Assisting Local Procurement:	CA
Computer network of local buyers/sellers	
Education:	CO
State implementation plan/newsletter	

order to fall under the jurisdiction of RCRA. Presently, EPA has designated five materials and issued guidelines. These materials include paper products, asphalt containing crumb rubber, engine lubricating oils, hydraulic fluids and gear oils containing re-refined oils, retread tires, and cement and concrete containing fly ash.

There are no formal means of enforcing the provisions of Section 6002 in RCRA. Agencies are not obligated to follow EPA guidelines. Agencies are also not required to keep records of recycled purchases; however, D.C.'s recycled content law for private sellers and distributors of paper does have authority over the Federal Government, which is required to follow local jurisdictional requirements under the RCRA of 1976.[34]

Besides expanding markets by buying goods, D.C. has ordered the private sector to do so as well. The District has joined a number of other jurisdictions in requiring

products sold to have a certain percentage of recycled material. For example, California recently passed laws regulating plastic trash bags and glass containers; Connecticut will require phone books to be printed on recycled paper beginning in 1995; and Wisconsin has a law mandating that all plastic containers contain 10 percent waste materials by 1995. **Table 9** lists seven states that have initiated some of the most progressive procurement programs.

Some states are now beginning to address source reduction (preventing the generation of waste) in addition to recycling. Connecticut, for example, is emphasizing reusable products, and has initiated a program to purchase reused and reusable products. Items include the following:

- Ballpoint pens with replaceable ink supplies and/or refills
- Typewriter ribbons with multistrike ribbons (these yield 6 to 10 times more useful life than single strike ribbons)
- Printer ribbons with multistrike ribbons
- Reusable envelopes
- Razors with reusable handles
- One gallon (or larger) food packaging containers (items will be repacked into smaller reusable dispenser-type containers)
- Retread automobile and truck tires
- Motor oil containing re-refined oil
- Pallets and 55-gallon drums (contractor providing products required to pick up or exchange on a one-for-one basis).

Small Business Issues

Implementation of the recommendations noted above would bring the District to high levels of materials recovery at a cost less than the present cost of garbage disposal. A comprehensive solid waste management policy should also examine the role of local haulers and community organizations. To date, D.C. policy has been silent on the question of favoring locally owned hauling firms or neighborhood organizations over other waste management firms.

For example, the RFP for the City's IPC calls for a processing capacity of over 100,000 tons per year, but only commits to providing 12,000 tons per year from City crews. And the RFP calls for a 60-day start-up from the time the contract is awarded. Both requirements would make it difficult for local haulers to capitalize such a facility. Adding recycling services, or separate yard waste, or hazardous waste collection services, to existing mixed-waste collection services will be a costly endeavor and may drive smaller firms out of business. The City should encourage a continued diversity of hauling firms and consider providing financing for such firms to purchase the equipment necessary to make the transition to a full service operation. The City could provide tax credits for purchase of equipment for recycling activities. For a summary of states that provide investment tax credits,

grants, loans, and sales tax exemptions to promote recycling and the use of scrap materials, see **Appendix G.**

Los Angeles has recently developed an RFP that requires bidders for recycling and processing facilities to enter into a joint venture with community organizations. (See **Appendix F.**)

The District currently prohibits private haulers from using the Fort Totten transfer station and the Benning Road incinerator. This is probably a result of the limited capacity of these facilities, but if these facilities were renovated, capacity would improve considerably, and the restriction on private hauler use should be overturned.

Recycling Education in D.C.

Recycling education includes in-school programs that integrate recycling into course curricula. Because of the extensive efforts by the environmental movement dating back to the late 1960s, there is an abundance of excellent resources for D.C. education officials and teachers. See **Appendix C.**

D.C. education officials and teachers can use recycling education resources to stimulate learning in basic skill categories such as math, geography, reading, and natural sciences. That is, do not teach "recycling," but instead use the general interest and growing experience with recycling in homes and neighborhoods to reinforce and improve basic skills in all education areas. Practical in-class learning units are ideal for creating a positive attitude for learning and skill development. At the same time, students become "recycling literate"; they know how, why, and where to recycle. By becoming recycling literate, D.C.'s students become better citizens because they will participate in the City's recycling programs.

The D.C. Litter and Solid Waste Reduction Commission, created by the City Council in The Litter and Solid Waste Reduction Act of 1985, is identified in Law 7-226 as the agency to carry out in-school recycling education programs. Funds in support of this effort are to come from a portion of the recycling surcharge.

In addition to recycling education, more general public awareness programs should be initiated. Outreach to church groups, civic associations, business groups, and government agencies will complement the educational programs conducted within the school system.

Recommendations

Reducing the Waste Stream

Emphasize Reuse in Recycling Procurement Policy. Reuse is preferable to recycling because it reduces the amount of solid waste generated. The District should develop policies and initiate programs to reduce the per capita waste generated. It could, for example, follow the procurement policies developed by Connecticut on reuse.

Establish Economic Incentives for Citizens to Reduce Their Waste. See Volume-based Fees below.

Begin a Backyard Composting Program. Directly encouraging citizens to compost their organic wastes in their backyards can avoid collection of more than 15 percent of the residential waste stream. The City should begin a Master Composting Program modeled after Seattle's, in which citizens volunteer to train other citizens how to compost in their backyards.

Start a Pilot Vermicomposting Program. Similar to backyard composting, the City can avoid collection of organic wastes (in this case, food wastes) by encouraging vermicomposting or worm composting at the household level. A pilot program could be modeled after that implemented in Toronto, Canada.

Collection

Target a Wide Variety of Materials. The City should phase in, over the next 2 years, the collection, not only of newspaper, yard waste, aluminum, ferrous metals, HDPE and PET plastic, and glass, but also of food waste, corrugated cardboard, mixed paper, other plastics, used motor oil, white goods, and other salvageable items.

Mandatory Recycling for Yard Waste. D.C. should follow the lead of other jurisdictions and require that yard waste be set out separately for composting. Weekly pickups should be established for yard waste in season, with collection at other times of the year occurring on a regular basis.

Recycling Requirements for Large Food Waste Generators. Large generators of food waste (e.g., restaurants, cafeterias) should be required to separate their food waste for composting or for processing into animal feed.

Volume-based Fees. Garbage pickup for D.C. households is paid from monies appropriated from D.C.'s general funds. Moreover, it is a flat rate, meaning that there is no incentive for reducing the amount of garbage. Commercial users, on the other hand, see the real price for garbage pickup and disposal because they pay on a volume basis. D.C. could charge households for garbage collection and institute volume- or weight-based pricing. This provides an incentive for recycling as well as for a change in buying habits that reduces the overall amount of garbage generated. A volume- or weight-based system can allow no-charge collection of one garbage can or bag of recyclables, but charge for subsequent cans or bags of garbage set out.

Pilot Projects for Collection Systems. Establish commingled collection systems in which mixed recyclables are set out and separated in intermediate processing centers, in areas where participation rates are expected to be very low (for example, apartment houses). Establish a more segregated material set-out system in a comparable residential area where participation rates are expected to be higher, and compare recovery rates. The City should further set up a pilot program for intensive recycling modeled after the program now underway in Brooklyn. See **Appendix H** for a list of materials targeted for recovery. In this pilot program, food waste is collected with yard waste.

Establish a pilot route for alley pickup of recyclables to compare with the effectiveness of curbside pickup.

Establish a model apartment house pickup program to determine the operation and cost data to be used as a basis for fee-based service provided to apartment house management.

Encouragement and Enforcement of Private Sector Recycling. The City should approach commercial sector recycling proactively, with a strong emphasis on working with private haulers, businesses, private homes, and apartment houses to increase the level of participation in commercial recycling. Increasing participation in this sector is critical, since 75 percent of the City's waste stream is privately collected. About 76 percent of the residential sector served by the City is participating in the newsprint recycling program.

Permanent Drop-Off Centers. D.C. should establish a series of permanent drop-off centers, preferably affiliated with schools and/or civic associations.

Flow Control for Compostables and Recyclables. D.C. should explore a policy of banning recyclables and compostables from incineration. This policy should also

disqualify recyclables and compostables from any tonnage guaranteed to an incinerator.

Processing Facilities

Cancel Current RFP Processing/Marketing Services. D.C. should cancel the current, oft-delayed RFP for processing/marketing services. These are not needed due to excess capacity at existing facilities in the short run. In the longterm, it is better for the City and/or community development corporations to undertake these activities in the context of an overall economic development program. The RFP would be made unnecessary based on the recommendations below for processing facilities.

Upgrade Fort Totten to Become Transfer Point for Private and Public Haulers. If Fort Totten were as efficient as the Fairfax transfer station, it could handle all D.C. generated solid waste. The prohibition on private haulers using Fort Totten should be lifted.

Raze Combustion Units at Benning Road Incinerator. The Benning Road facility could then be converted to a composting and intermediate processing center for both privately and publicly collected solid waste.

Install a Mixed-Waste Processing Unit at Fort Totten. As more and more garbage goes directly to Benning Road to be recycled, there will be excess capacity and available space at Fort Totten. A mixed-waste processing unit (sized no larger than 35 percent of the waste stream) could be installed by 1995 in Fort Totten, which could raise overall material recovery rates above 65 percent. This technology could be installed earlier should an emergency arise such as sudden closure or restrictions at the Lorton landfill.

The City could use the Fort Totten, Benning Road, and D.C. Village facilities for commodity reuse enterprises, which could be undertaken by local community development corporations.

Market Development and Scrap-Based Manufacturing

Establish a Scrap-based Manufacturing Industry at D.C. Village. Working with the Office of Economic and Business Development, the City could identify possible candidates for scrap-based manufacturing (see **Appendix E**) and develop a strategy for attracting firms to this facility.

The City should begin negotiations with end-use manufacturers to locate in the city to create markets for recyclables and stimulate the economy. Negotiations can be conducted with individual firms or one overall industrial park development firm. Conditions for favorable treatment should include: shared equity with community development corporations, work site education programs for workers

to complete high school (see Cities In Schools in **Appendix B**). In turn, the City can offer a supply of recyclables, procurement of end products, and industrial park development sites such as D.C. Village.

Develop an Accurate and Up-to-Date Tracking System for Product Purchases by D.C. Government. D.C. could use the system developed by New Jersey or Maryland to monitor purchases and recycled content.

Expand the Kinds of Materials That Come Under the Recycled-Content Preference. Products from tires and oil to car mats and construction material can come under a recycled-content preference procurement policy. D.C.'s paper procurement law is a model.

Infrastructure

Establish Economic Incentives. The City should establish economic incentives to businesses and hauling companies to encourage investment in recycling equipment, in addition to actual collection of recyclables and compostables. Such incentives include tax credits on equipment and reduced tipping fees for haulers and businesses delivering recyclables or compostables to processing sites.

Create an Ongoing Interagency, Public/Private Sector Working Task Force. A two-way solid waste system requires close coordination among the educational sector, public works, economic development departments, private sector, and community-based organizations for outreach.

Education

Create a D.C. Recycling Literacy Task Force. This could comprise representatives of the Board of Education, teachers, students, and environmental education organizations (such as the D.C. Environmental Education Coalition and the national environmental organizations located in the City). ILSR recommends that special attention be given to internship programs that link in-school students with job placement and on-the-job training in the recycling industry. ILSR recommends that the Office of Recycling and the University of the District of Columbia (UDC) develop a recycling coordinator training program to qualify students for job openings in the field throughout the United States.

Cities In Schools, Inc. has established model programs for high school students who complete schooling in special classes located at the work site. As new recycling businesses and City facilities are implemented, a Cities In Schools program should be integrated into these operations. A UDC program, as mentioned above, could develop internships for students with local recycling firms.

NOTES

[1]Nine states and the city of Columbia, Missouri, now have container deposit laws.

[2]Information is based on 1987 data. See 1990 Annual Report, Office of Recycling.

[3]The Department of Public Works is in the process of awarding a contract to conduct a more precise waste stream analysis.

[4]Approximately $10.9 million will be generated from the $19 surcharge on an estimated 567,000 tons of commercial waste delivered to the Lorton landfill.

[5]Personal communication with George Jenkins, Office of Recycling, Washington, D.C., May 1991.

[6]In 1990, the District collected $4.5 million from the recycling surcharge, which went to the Department of Public Works. According to the Office of Recycling, $2 million was spent on recycling, of which $887,000 was spent on the acquisition of new equipment and the renovation of existing equipment. Amortizing the $887,000 capital cost over 5 years and dividing this and the remaining $1.11 million for operating expenses by the 22,673 tons recycled by the District equals $59 per ton. We could not ascertain on what the remaining $2.5 million was spent, i.e., whether or not it should be added to recycling expenses. Thus, the $59 figure for the municipal recycling program should be considered a minimum estimate. Approximately $1.7 million will be generated from sales of collected recyclable materials.

[7]*The Washington Post*, which would be affected by this law, contends that the law is unnecessary because the City is now recycling and marketing its old newspapers under a 5-year contract with a *Washington Post* subsidiary. Moreover, *The Washington Post* states that the measure could actually impair recycling efforts, citing the case of the Bear Island Paper Company in Ashland, Virginia, which manufactures newsprint for *The Washington Post*. Bear Island is considering adding a $30 million deinking facility to produce newsprint with 20-percent recycled content. Before D.C.'s law was passed, Bear Island had planned to go ahead with the deinking project, but since its recycled newsprint would not meet the law's fiber requirements, the decision is being reconsidered. Memorandum from Carol Melamed, *The Washington Post*, June 4, 1991; and conversation with B. Jones, *The Washington Post*, December 1990.

[8]Memo to D.C. City Council from Nadine Winter, Oct. 4, 1990.

[9] Based on 1987 waste generation figures.

[10]Office of Recycling, June 1991.

[11]Office of Recycling, April 1991.

[12]See Solid Waste Composition section in 1990 Annual Report, Office of Recycling.

[13]The D.C. zoning regulations have no category for recycling/processing centers, making it difficult for community organizations to control the location of these industrial facilities.

[14]Personal communication with John Leeuw, Grounds Supervisor, Canterbury Greens, June 10, 1991.

[15]Farmington, Minnesota, is the first city in the United States to implement a weight-based collection system for households. Their initial program will run from June through December 1991. Full-scale implementation is scheduled for January 1992. Two refuse trucks have been retrofitted with a hydraulic weighing system to calculate the amount of waste set out. Seattle, Washington, and Perkasie, Pennsylvania, use volume-based (per container/bag) systems, which have led to reduced amounts of waste set out by each household.

[16]Under a grant from the U.S. EPA, ILSR is currently researching and comparing data from communities employing different collection methods.

[17]*Resource Recycling*, April 1991.

[18]Richard Bishop Consulting, Ltd., "Cost Reduction Opportunities in New Jersey's Curbside Recycling Programs," New Jersey Office of Recycling, Trenton, New Jersey, 1990.

[19]Brenda A. Platt, et al., *Beyond 40 Percent: Record-Setting Recycling and Composting Programs*, ILSR, August 1990.

[20]*Resource Recycling*, April 1991.

[21]Personal communication with George Jenkins, Office of Recycling, June 1991.

[22]Statement by Mike McGee, Recycling Coordinator, Berlin Township, New Jersey, Renew America "Searching for Success" Conference, Washington, D.C., June 1991.

[23]Correspondence with George Jenkins, June 1991.

[24]*Emergency Solid Waste Assessment Task Force, Preliminary Report*, July 1990; and correspondence with Ray Hoffman, Seattle Solid Waste Utility, Seattle, Washington, June 19, 1991. Seattle is not targeting food waste; New Jersey is already recovering 7 percent of its food waste and targets 10 percent for recovery statewide within 5 years. If D.C. were to implement programs to recover food waste, based on the experience of those operating around the country, ILSR staff believe that 30 percent of the City's food waste could be recovered within 5 years. Seattle targets 34 percent of its "other paper" for recovery by 1995, New Jersey targets 20 percent. With a high-grading facility for mixed paper, the District could recover 40 percent of its "other paper."

[25]*Maryland Recyclable Materials Market Study*, Department of the Environment, Annapolis, Maryland, 1990.

[26]*Maryland Recyclable Materials Market Study.*

[27]*Biocycle*, April 1990.

[28]Tipping fees at four incinerators operating in New Jersey range from $65 to $98 per ton. See *Getting the Most from Our Materials: Making New Jersey the State of the Art*, ILSR, June 1991.

[29]See Finstein, "Comparative Evaluation of Composting Systems Offered in the Waste and Mushroom Industries," Rutgers University, New Brunswick, New Jersey, November 1990.

[30]See *Waste Reduction, Recycling, and Composting for Camden County, New Jersey: A Common-Sense Approach*, Self-Reliance, Inc., Washington, DC, January 1990.

[31]Amy Perlmutter, Office of Recycling, City of San Francisco.

[32]Conversations with Mike Castillo, D.C. Department of Administrative Services, June 1991.

[33]Correspondence with George Jenkins, Office of Recycling, June 1991.

[34]Personal communication with Stan Ismart, Chief, Waste Management Unit and Recycling Coordinator, General Services Administration, June 1991.

APPENDIX A

CONTACT LIST
(LOCATED IN D.C. UNLESS OTHERWISE NOTED)

Government

Yvonne Allmond	District of Columbia Economic, Development, and Finance Corporation
Harry Benson	Maryland Office of Recycling, Annapolis
Judith R. Brunton	ANC I-D
Olga Corey	U.S. EPA
Walter Downey	Dept. of Public Works
Clarence Gaylord	U.S. EPA
Anne Goode	Northern Virginia Planning District Commission
Eric Jones	City Council Staff
Adam Maier	City Council/Committee on Public Works
Joe O'Donnell	Dept. of Public Works
Brigid Quinn	City Council Staff
Joan Rolphs	Regional Recycling Coordinator/ Council of Governments
Nancy Skinner	City Council Berkeley, CA
Dick Smith	Dept. of Public Works
Laurie Stozzasaza	Maryland Office of Recycling, Annapolis
Flo Wilder	Solid Waste Advisory Committee, Brookline, MA
Barbara Vilchik	Office of Recycling

Environmental Groups

Thomas Atkins	Environmental Action
Linda du Buclet	Metropolitan D.C. Environmental Network
George E. Gurley	Deputy Director, Far Southeast Community Organization
Harolyn Jubar	Friends of the Earth
Julian Keniry	National Wildlife Federation
John Kostyack	Sierra Club -- Rock Creek Group
Joe Libertelli	Metropolitan D.C. Environmental Network
Jodean Marks	Potomac Valley Green Network
Larry Martin	Urban Earth
Norris McDonald	Center for Environment, Commerce, and Energy
Lisa Mosczynski	Metropolitan D.C. Environmental Network

Kelly Reineke	Center for Environment, Commerce, and Energy
Brenda Richardson	--
Dick Saul	Safe Jobs for a Clean Environment
Damu Smith	Greenpeace
Greg Smith	D.C. Environmental Education Coalition
John Thompson	Central States Environmental Center
Peter Williams	D.C. Common Cause

Community Development Agencies

Peter Bankson	Cities In Schools, Washington D.C.
Bill Barrow	H Street Community Development Corporation
Hope Cucini	The Loading Dock, Baltimore, MD
Bryan Duncan	DICEE
Rick Gilmore	D.C. Cares
Tony Jackson	Foundation for Economic Development/EnviroTech
Clark Jones	Cities In Schools, Washington D.C.
Larry Kehrer	SunShares Inc., Durham, NC
Dr. Stanley King	Liberation of Ex-Offenders through Employment Opportunities
Dennis Livingston	Baltimore Jobs in Energy, Baltimore, MD
Joe Louis	Witness For Peace, South Africa Project
Adam Mitchell	Earthworm Inc., Boston, MA
Clarence Murray	National Caucus and Center on Black Aged
Nathan Saunders	East of the River Community Development
Katherine Selathe	Action to Rehabilitate Community Housing
Lloyd Smith	Marshall Heights Community Development Corporation
Charles Tate	National Business League/Economic Development Committee, Mayor Sharon Pratt Dixon's Transition Team
Mjenzi Traylor	National Temple Recycling Co., Philadelphia, PA
John Tyson	Booker T. Washington Foundation, Washington D.C.

Press

Bob Asher	Washington Post
Sharon A. Grove	K Street Press, Fairfax, VA
Derek McGinty	WAMU-FM
Vincent Reed	Washington Post
Clint Schemmer	Potomac News, Woodbridge, Virginia
Kathy Thomas	WPFW-Pacifica Radio

Business

–	Georgetown Junk
Margaret Abbott	Capitol Fiber, Inc.
Gary Allanson	Pepsi Cola Company of Washington D.C.
Drew Andrews	Browning Ferris Industries
Jack Cameron	ARCA Inc.
Dave Case	Recycling Manager, Waste Management, Inc.
Jack Casey	Integrated Biological Farming Company
Bill Coon	Coon Manufacturing
B.K. Wesley Copland	President, International Science and Technology Institute
Leslie Downs	Versatile System Inc.
Margaret Downs	Daneco Inc., New York, NY
Bill Eidson	Western Community Industries
Warren Flicker	Executive Vice President, Homerso
David Fox	Inland Container Corp., Indianapolis, IN
Bill Franklin	Franklin Associates
Duane Gauthier	PEPCO
David Gilmore	D.A.G., Multi-service company
Jack Gloster	Economic Development Consultant
Bill Greggs	Proctor and Gamble Inc., Cincinnati, OH
Barry Guss	Planet Earth Recycling
Dan Ingold	Envirologic, Inc., Brattleboro, VT
Ralph Izzo	Concord Resources Group, Pittsburgh, PA
Joseph Kane	Dominion Ventures, Inc.
Richard Kattar	New England CRInc.
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Mike Phillips	New England CRInc
John Reilly	Chambers Development Co., Parsippany, NJ
Vernon Russell	Simkins Industries
James Taylor	Taylor Hauling Co.
Richard Tynes	Eagle Maintenance Inc./Eagle Recycling Co.
Les Ulanow	ABC Salvage
Charles Wilburn	President, D.C. Haulers Association
James Yerkey	Hershman Recycling Inc., Catonsville, MD

Academic

Mel Finstein	Rutgers University, New Brunswick, NJ
Harry Hoitink	University of Cincinatti
Howard Kaplan	University of the District of Columbia, Life Sciences Dept.
Ethelbert Miller	Howard University, African American Studies Professor
Toussaint Parker	University of the District of Columbia, Plant Maintenance
Jeni Preer	University of the District of Columbia, Life Sciences Dept.

APPENDIX B

RESOURCE ORGANIZATIONS IN THE DISTRICT OF COLUMBIA

The City has government, community, and private sector resource groups that can contribute to transforming solid waste management into a highly effective recycling and economic development network.

Action to Rehabilitate Community Housing (ARCH): ARCH is a long-standing community housing organization that has also pioneered market development research for end-use manufacturing in the District of Columbia. In 1989, ARCH sponsored a market research study, which identified the existing market for plastic products that could be made in the City. ARCH's approach is based on the assumption that the demand for products made from recycled materials will attract a steady supply of plastic waste material. ARCH wants to facilitate the location of a variety of manufacturing plants in the District. See ARCH's memorandum "Anacostia Recycling and Manufacturing Plant," dated April 1991. Also see "Strategic Program and Business Plan for the ARCH Family of Corporations, 1991-93," dated November 1990. ARCH is supported in this effort by the Potomac Electric Power Company (PEPCO) and the DC Private Industry Council (DC PIC).

Center for Environment, Commerce, and Energy: The Center is a national minority environment organization that focuses on integrating the environmental movement. The Center also focuses on specific environmental problems facing minority groups in the District of Columbia. Currently, this organization is conducting a risk assessment prototype in the communities immediately surrounding the Benning Road solid waste incinerator operated by the City. Results are expected in the summer of 1991.

Cities In Schools, Inc. (CIS): CIS is the most comprehensive national nonprofit organization devoted to dropout prevention. There are now 262 CIS projects throughout the country, serving over 33,000 students and their families in 53 communities. CIS' answer to the problem of school dropouts is straightforward. Troubled youth need help; however teachers aren't usually equipped to provide that kind of help: health care, drug rehabilitation, counseling for emotional problems, and career planning. To access these services, students must leave school and find help on their own. It's always a difficult process and often impossible. Through the combined power of public/private partnerships, CIS leverages the repositioning of service providers into the schools, to serve alongside teachers as a coordinated "family" team in the battle to keep children in school.

Clean Water Action: Clean Water Action is a national coalition of state-based grass roots organizations. In D.C., Clean Water Action helps coordinate the Potomac Waste Prevention Coalition and the Montgomery County Solid Waste Prevention Coalition. The Montgomery County Coalition has recently prepared a county solid waste prevention paper.

Concern, Inc.: Founded in 1970, Concern is a nonprofit organization that provides environmental information to individuals; community groups; educational institutions; public officials; and others involved with the environment, public

education; and policy departments. Concern's primary activity is the development, publication, and broad distribution of community action guidelines. Each guide provides a comprehensive explanation of a specific environmental issue, extensive resources, guidelines for action, and pertinent legislation. The issues are presented in clear, nontechnical language.

Council of Governments (COG): COG was founded in 1957, when a group of elected officials from various cities and counties in the D.C. area met to discuss regional problems. The group continued to evolve into the Metropolitan Washington Council of Governments. COG is an independent organization supported by financial contributions from its participating local governments and from Federal and State grants and contracts. In its more than 30 years, COG has undertaken numerous projects. COG started a cooperative purchasing program that has saved local governments and agencies more than $20 million. The COG plays a pivotal role in providing information to and in sharing recycling and market information with the District.

D.C. Economic Development Finance Corporation (EDFC): This corporation is a quasi-public economic development agency that provides assistance to private firms in D.C. as well as to community development corporations. EDFC, a venture capital firm, has a mission to foster the growth of small businesses in the District, which could stimulate job creation for District residents. Recently, the corporation compiled bid documents for Community Development Block Grant funds from the Federal Government. Up to $7 million are being sought on behalf of the East of the River Community Development Corporation, which wants to build and operate an intermediate processing plant. This plant would serve as a marketing agent for recyclables received from the District and private hauler recycling programs, as well as materials received from private citizens and individual enterprises.

D.C. Environmental Education Consortium: The Consortium is a group of individuals and organizations that provides environmental education resources or services to the D.C. Public School System and is interested in becoming involved with the schools. The Consortium serves as an arena for exchanging information and resources to better serve the City's youths. Their main goal is to work as a team to aid the school system in planning and carrying out formal and informal environmental education programs.

D.C. Haulers Association: This association is a unique formation of 72 small, minority haulers who operate in the District. They have been at the forefront of promoting recycling in the commercial sector. Individual haulers have started pilot processing plants and pilot apartment recycling programs. They have presented plans to the City for renovating the Fort Totten transfer station in order to expand the capacity for recycling.

D.C. Interracial Coalition for Environmental Equity (DICEE): This coalition of individuals and community groups was formed in September 1990 by the Howard

University African American Studies Program and the Institute for Local Self-Reliance. It provides a forum for D.C. residents and national environmental organizations to discuss environmental and community development issues of mutual interest. Their goal is to present to the new administration workable ideas and projects that support a cleaner environment and economic opportunities for the District. Three members of DICEE served on Mayor-elect Dixon's transition teams. DICEE has committees focused on transportation, solid waste, air pollution, and hazardous substances. DICEE meetings have attracted the staff of Federal agencies and national consulting firms, who are concerned about the local environment and are seeking ways to participate in D.C. environmental projects.

D.C. Litter and Solid Waste Reduction Committee: This 13-member commission, appointed by the Mayor and City Council, was created in 1986 to implement litter education, community cleanup, and related beautification and recycling activities.

Eagle Maintenance/Eagle Recycling: These companies are minority-owned enterprises who have established paper high grading facilities that serve haulers in the District and surrounding jurisdictions. Eagle Recycling is planning a major expansion of its recycling capabilities in the City.

East of the River Community Development Corporation: This community development corporation is located in Ward 8 (Anacostia), one of the most economically deprived areas of the District of Columbia. The corporation has sought for 2 years to use the land and human capital available in Anacostia to develop a recycling enterprise to be owned and operated by local residents. Under a grant from the Ford Foundation and the Local Initiative Support Corporation, the corporation has completed designs and financial plans for a comprehensive intermediate processing center. The project director testified before City Council hearings on small business development explaining why the request for proposal (RFP) issued by the City for such a processing center discriminated against community development organizations. According to Nathan Saunders' remarks, the RFP allows the center to be located outside the City, making it impossible for District applicants to compete against the low cost of land outside the city. It also allows jobs to go to the suburbs at the expense of District residents. Finally, the RFP is inconsistent with other government agencies. While the Department of Public Works allows a center to be located outside the City, the City is looking for business tenants to locate on the 15.6 acres site located at D.C. Village in Anacostia.

The Environmental Exchange: Environmental Exchange is a private/nonprofit group dedicated to building grassroots action through the promotion of outstanding environmental accomplishments and of the people behind them. It identifies effective strategies through research and analysis and through communication with a network of hundreds of state and local environmental groups. The Exchange's objective of building an understanding of environmental issues at a local and national level is achieved by identifying national trends in problem solving on a variety of environmental issues and articulating the common features of methods

to address these issues. The group examines the political, social, and economic factors surrounding effective strategies to help policy makers, advocates, and the public better understand which strategies work in situations similar to theirs. Further, the group analyzes which problems are being solved at the local and regional levels and which are not and articulates why.

Foundation for Economic Development: The foundation is a nonprofit organization attempting to establish the Capital Region Environmental Technology Development Center (EnviroTech) as a public/private partnership. The Center would act as a point of transfer for research and development information in the environmental enterprise field with a goal of expediting commercial applications in the metropolitan D.C. area. This organization draws support from the International Science and Technology Institute located in Washington, D.C.

First Rising Mount Zion Church: This church has pioneered glass recycling in the City. It administers a series of drop-off recycling sites throughout the City in conjunction with either church or nonprofit organizations. Igloos for receiving clear, green, and brown glass are located on sites. The materials are collected by a specialized vehicle and delivered to markets in Baltimore. The church, in conjunction with Wilburn Hauling Company, is establishing a pilot apartment house recycling project in church-owned apartment houses.

The Government Procurement Project (GPP): The GPP was formed by Ralph Nader with the goal of using the power of government purchasing--which amounts to nearly a trillion dollars a year--to promote safe, energy-efficient and environmentally sound technology. The GPP works to overcome the numerous barriers that hinder governments from effectively using their powers as consumers by acting as a clearinghouse to collect and disseminate information on energy-efficient technologies, cost-effective solar applications and recycled products; advocating life cycle accounting, which considers the long-term societal and environmental costs of purchases; identifying effective procurement strategies being used by other government entities; and advocating changes in procurement policies, which encourage cost-effective purchasing decisions.

Institute for Local Self-Reliance (ILSR): ILSR is a 17-year-old research and technical assistance organization that has specialized in energy, recycling, and community-based economic development. ILSR reviews technology, markets, and new enterprises for a network of grassroots environmental and economic development groups throughout the United States. ILSR is currently undertaking research on the best recycling practices in the United States under a grant from the U.S. Environmental Protection Agency. ILSR is also working with community development groups in Baltimore, Los Angeles, Cleveland, and Jersey City to build industrial parks for manufacturers that use recycled materials and share equity with community organizations.

Liberation of Ex-Offenders Through Employment Opportunities (LEEO): This nonprofit agency provides comprehensive job training and placement services to ex-offenders living in the District of Columbia. Since 1977, over 3,000 individuals have been been placed in jobs and training opportunities. In 1990, LEEO placed 600 ex-offenders in these programs. Through its subsidiary, LEEO Industries, Inc., ex-offenders are trained and employed in remanufacturing laser toner cartridges and copier machines, as well as in printing, computer, and typewriter repair. The program saves these pieces of equipment from being sent to the landfill. The refurbished machines offer D.C. businesses low-cost access to sophisticated technology. Laser toner cartridges, for example, which can provide 3,000 additional copies, are repaired 5 times; then the drums are repaired and can be used another 5 times.

Metropolitan D.C. Environmental Network (MetNet): The purpose of MetNet is to enhance the effectiveness of organizations and activists striving to better our living, working, and natural environments. MetNet takes no stands on particular issues. People and organizations address our complex web of social and environmental problems with varied strategies. MetNet offers this spectrum of strategies, environmental activists, and group tools to help publicize and coordinate activities.

National Business Alliance/Booker T. Washington Foundation: These are long-standing agencies that have provided business start-up assistance and research to minority businesses in the District of Columbia. The finance and business development staff of these groups have been very active in advising the new administration of the need for comprehensive planning for recycling and enterprise development in the City.

National Wildlife Federation, COOL IT Program: COOL IT's mission is to effectively address global warming by strengthening the ability of college students to think critically and create positive, lasting environmental change in their campus community. These actions are only possible through the deliberate involvement of students from multiple academic disciplines and cultural groups. Serving as an information exchange center, COOL IT provides factual resources, organizing tools, and regional field staff as part of the National Wildlife Federation's vision to empower future leaders.

ReClaim, Inc.: ReClaim became the first company in the United States to receive state certification as a recycler when the New Jersey Department of Enviromental Protection granted its final approval in September 1989. They are the nation's only state-certified recycler of asphalt roofing debris and recently expanded operations in New Jersey with a new facility in Camden. Founded in 1987, ReClaim has recycled 85,000 tons of asphalt roofing material into Econo-Pav, a low-cost paving alternative to rock or gravel. They have also developed a second recycled product, RePave-Cold Patch, which can be used as a cold-patching material for potholes and chuckholes.

Urban Earth: (formerly D.C. Citizen's Coalition for Recycling) Urban Earth is a coalition of grassroots environmental organizations in the District of Columbia. The organization conducts forums, issues position papers, and publishes a newsletter, "The Recycle Paper."

APPENDIX C

EDUCATIONAL MATERIALS BIBLIOGRAPHY

Institute for
Local
Self-Reliance

Release #10 FACTS TO ACT ON *September 29, 1990*

A Guide to Recycling and Environmental Education Materials

As you might imagine, we frequently receive requests for a bibliography of curricula and student-related materials encompassing recycling and other environmental topics. In updating our list we note a host of new publications to develop children's recycling and environmental awareness. What follows here is a sampling of (mostly) more-recent publications, of which many are themselves reference guides.

Recycling: Curricula and Teaching Materials

A-Way With Waste: A Waste Management Curriculum for Schools, 1989. Washington State Dept. of Ecology, 4350 150th Ave., NE, Redmond, WA 98052, (206) 867-7000. Curriculum, extensive interdisciplinary activity guide and teacher training workshops. Grades K-12.

The Conserving Classroom. Metro Regional Environmental Education Council, Minnesota Environmental Education Board, Box 5, DNR Bldg, 500 Lafayette Rd., St. Paul, MN 55155-4005, (612) 296-2368. Curriculum ideas and activities that introduce waste reduction and resource conservation concepts and practices. Grades 3-6.

Directory of Resources: An Educator's Guide to Solid Waste Management Education, Midwest Recycling Coalition, P.O. Box 80729, Lincoln, NE 68501, (402) 475-3637. List of literature and curricula from national trade associations and states.

Environmental Education Materials for Teachers and Young People, Grades K-12. Office of Community and Intergovernmental Relations, U.S. EPA, 401 M St., SW, Washington, DC 20460 (202) 382-4454. List of materials available from public and private sources.

Garbage Reincarnation: Interdisciplinary Approach to Materials Conservation and Recycling, 1980. Sonoma County Environmental Center, P.O. Box 704, Cotati, CA 94928. Curriculum for understanding solid waste problems and possible solutions. Activities, key words, glossary. Grades 4-8.

A Guide to Curriculum Planning and Environmental Education, David Engelson, 1985. Dept. of Public Instruction, P.O. Box 7841, Madison, WI 53707-7841, (608) 266-3390.

Let's Recycle: A Curriculum for Solid Waste Awareness, 1989/1990. RCRA Information Center (OS-305), U.S. EPA, 401 M St., SW, Washington, DC 20460, (202) 382-4454. (Document # EPA/530-SW-90-005) One of four publications in EPA's *Recycle Today!* program. Lessons and interdisciplinary activities to introduce solid waste issues. Key words, glossary, and reference sources. Grades K-12.

Ohio Science Workbook: Litter Prevention and Recycling, 1987. The Ohio Academy of Science, 445 King Ave., Columbus, OH 43201, (614) 424-6045. Science workbook of student research project ideas on litter prevention and recycling. Lists references, resources. Extensive bibliography. Grades 9-12.

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"Recycling Education: Developing a Curriculum," Parts 1 and 2, July/August '85 and Sept/Oct '85, *Resource Recycling*, P.O. Box 10540, Portland, OR 97210, (503) 227-1319, (800) 227-1424. Discusses preparing an educational program on recycling. (Also available from Solid Waste Alternatives Project, Environmental Action Foundation, 1525 New Hampshire Ave., NW, Washington, DC 20036, (202) 745-4879.)

Recycling Study Guide, 1988. Bureau of Information and Education, Wisconsin Dept. of Natural Resources, Box 7921, Madison, WI, 53708, (608) 267-5239. Activities to help students and teachers understand solid waste and recycling issues. Grades 4-12.

Recyculum, A Resource Conservation Curriculum for Grades K-6, 1980. *Resource Recycling*, P.O. Box 10540, Portland, OR, 97210, (503) 227-1319, (800) 227-1424. Aims to increase awareness of wasteful use of resources and promote responsible alternatives.

Re: Thinking Recycling. Dept. of Environmental Quality, P.O. Box 1760, 811 Southwest 6th Ave., Portland, OR, 97204, (503) 229-6046, [(800) 452-0401 from Oregon].

San Diego County Solid Waste Management Education Program, Ecology Curriculum K-6. County of San Diego, Dept. of Public Works, San Diego County Office of Education, 5555 Overland, Bldg 2, Rm 190, San Diego, CA 92123, (614) 694-2162. Lesson plans and activities, including background information and key words. Lengthy and comprehensive. Grades K-6.

Teacher's Guide: Educational Materials in Resource Recovery, Grades K-12, Cathy Berg, 1984. Minnesota Pollution Control Agency, Div. of Solid & Hazardous Waste, 520 Lafayette Rd., St. Paul, MN 55755, (612) 296-8439. Comprehensive lists of curricula, books, audio-visuals, newsletters, etc.

Teacher's Guide to Spike and His Friends Recycle. Pennsylvania Resources Council, P.O. Box 88, Media, PA 19063, (215) 565-9131. Suggests classroom activities and programs using "Spike," a dog. (16-page coloring book, *Spike and His Friends Recycle*, also available.)

Waste Away: Information and Activities for Investigating Trash Problems and Solutions, 1989. Vermont Institute of Natural Science, P.O. Box 86, Woodstock, VT 05091, (802) 457-2779. Information and interdisciplinary activities to investigate solid waste issues, causes, and solutions. Background information, how-tos in organizing school recycling programs, trash festivals. Grades 4-8.

Waste Web, 1990. Ventura Regional Sanitation District, Education Programs, 1001 Partridge Dr. #150, Ventura, CA 93003-5562. Curriculum developing and promoting responsible attitudes and behaviors in the use and disposal of natural resources. Grades K-12.

Activity/Coloring Books

Adventures of the Garbage Gremlin: Recycle and Combat a Life of Grime, Information Center (OS-305), U.S. EPA, 401 M St., SW, Washington, DC 20460, (202) 382-4454. (Document # EPA/530-SW-90-024) One of four publications in EPA's *Recycle Today!* program. Comic book introduces recycling and its benefits. Grades 4-7.

The California Containers, 1989. Cartoon characters introduce recycling in an 11-page booklet. Grades K-3; and *Recycle Now!* 1989. Games, puzzles, and other activities introduce recycling, recycling facts, and how to recycle in a 16-page booklet. Grades 4-6. California Dept. of Conservation, Dept. of Recycling, Southwest Regional Laboratory, 4909 Murphy Canyon Rd., #542, San Diego, CA 92123.

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Mr. Rumple Recycles, 1989. Barbara Anne Coltharpe, Hyacinth House Publishers, P.O. Box 14603, Baton Rouge, LA 70898. Story book about recycling and source reduction. Grades K-6.

RecycleSaurus Coloring and Activity Funbook, 1990. Creative Printing and Publishing, 712 North Hwy. 17-92, Longwood, FL 32750, (407) 830-4747, (800) 780-4447. 16-page booklet of games and educational information to introduce recycling, key words, and facts. Other educational and promotional recycling products available. See catalog. Grades K-6.

Recycling Soap Bits (with solar energy) and *Recycling the Organic Way* (composting). The Garden Club of America, 598 Madison Ave., New York, NY 10022. Two instructional booklets.

Recyclopedia: Games, Science Equipment & Crafts from Recycled Materials, 1976. Robin Simons, Houghton Mifflin Co., Boston, MA. Developed at the Boston's Children's Museum, this how-to book provides numerous creative ideas for reusing everyday materials. Grades 4-8.

Spike and His Friends Recycle. Pennsylvania Resources Council, P.O. Box 88, Media, PA 19063, (215) 565-9131. 16-page coloring book. (Also available: *Teacher's Guide to Spike and His Friends Recycle.*) Grades K-4.

Teaching Science with Garbage: An Interdisciplinary Approach to Environmental Education, 1971. Albert Schatz and Vivian Schatz, Rodale Press, Emmaus, PA 18049. A series of articles that provide background information for teachers. Activity design is left to them.

"Trash Can Dan," 1984. The Delaware Solid Waste Authority, P.O. Box 455, Dover, DE 19903, (302) 736-5361. Traces the journey of refuse from the home through a recycling/processing center. Grades K-6.

The Trash Monster, 1980, and *The Wizard of Waste*, 1980. California Solid Waste Management Board, Cal. State Dept. of Education, Publication Sales, P.O. Box 271, Sacramento, CA 95802, (916) 445-4688. Grades 2-6.

Use These Sources with Caution

4th R Recycling Curriculum, K-5. Recycling Coordinator, Solid Waste Management Program, City Hall - Room 271, San Francisco, CA 94102, (415) 558-2361. Interdisciplinary introduction to waste reduction, reuse, and recycling. However, it considers incineration, with its volume reduction, a viable disposal method.

Here Today, Her Tomorrow...Revisited (A Teacher's Guide to Solid Waste Management) New Jersey Dept. of Environmental Protection, Division of Solid Waste Management, CN 414, 401 East State St., Trenton, NJ 08625. Designed to increase awareness of SWM issues and solutions via interdisciplinary activities and projects. Resource list, glossary, how to start a school recycling program. However, it considers incineration, with its "resource recovery," and volume reduction, a viable solution. Grades 4-8. Note: *Here Today, Here To Stay* (primary edition) is being published as of our press date here. It light of changing policy, it remains to be seen whether this update of *Here Today, Here Tomorrow* will exclude reference to incineration.

Oscar's Options, Books I and II, 1987. Carol Bell and Martha Schwartz, Ocean State Cleanup and Recycling, Dept. of Environmental Management, Providence, RI 02908. Comprehensive SW education curriculum. Includes activities and key words. However, it promotes incineration as an energy source and safe environmental practice. Grades 4-8.

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Environmental:
General/Related Reading

The Big Stretch, 1985. Ada Graham and Frank Graham, Jr., Alfred A. Knopf, New York. Grades 4-8.

Blueprint for a Green Planet: Your Practical Guide to Restoring the World's Environment, 1987. John Seymour and Herbert Girardet, Prentice Hall. Grades 6-12.

The CLASS Project (Conservation Learning Activities in Science and Social Studies), 1982. National Wildlife Federation, 1412 16th St., NW, Washington, DC 20036-2266, (800) 432-6564. Program designed to encourage junior high classes to initiate environmental projects in their communities.

Earth Book for Kids, 1990. The Learning Works, P.O. Box 6187, Santa Barbara, CA 93160. Earth-friendly activities for children, parents, and teachers. Lists resources, glossary. Grades 2 and up.

50 Simple Things Kids Can Do to Save the Earth, 1990. The Earthworks Group, 1400 Shattuck Ave., Berkeley, CA 94704, (415) 548-2220. Booklet of eco-experiments for children. Includes background information and the how-tos of community involvement. Grades 2 and up.

First Steps in Ecology, 1975. ECO-KIDS Environmental Education Program, The Ecology Center, 2179 Allston Way, Berkeley, CA 94704, (415) 548-2220. Environmental education curriculum, including interdisciplinary activities, background information, key words. Grades K-6.

Good Planets Are Hard to Find, 1989. Roma Dehr and Ronald Bazar, Namchi United Enterprises, P.O. Box 33852, Station D, Vancouver, B.C. V6J 4L6, Canada. Environmental information guide and activity book. Grades 5-8.

The Lorax, 1971. Dr. Suess, Random House, New York. Via a cartoon character, a look at the human impact on the environment and reminder that children can make a difference. Grades 2 and up.

The Planet of Trash: An Environmental Fable, 1987. George Poppel, National Press, Bethesda, MD. Grades K-6.

"Recycle for the Birds," "The ABC's About Beverage Containers," and "Recycling," reprints from *Ranger Rick's Nature Magazine*, National Wildlife Federation, 1412 16th St., NW, Washington, DC 20036-2266, (800) 432-6564. Describes how to recycle such throwaways as empty plastic bleach bottles into bird feeders. Reviews the refillable vs. the throwaway controversy. Discusses everyday materials that are recyclable and how to start a recycling project.

Trash! 1988. Charlotte, Wilcox, Carolrhoda Books, Minneapolis, MN. Grades 3-7.

Wastes, 1986. Christina G. Miller and Louise A. Berry, Franklin Watts, New York. Grades 4-9.

Other

Garbage: A Practical Journal for the Environment. Old House Journal Corp., 435 9th St., Brooklyn, NY 11215, (718) 788-1700, (800) 274-9909. Covers a variety of environmental and waste issues in an easy-to-read, non-technical layout.

The Great Glass Caper, 1987. N.J. Glass Recycling Association, 2399 Rte 10, Morris Plains, NJ 07950, (201) 898-9123 (or The Great Glass Caper, Box 1400K, Dayton, OH 45414). Educational program illustrating the benefits of recycling via a cartoon friend.

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Plastics in the Ocean: More Than a Litter Problem, Marine Debris Information Office, 1725 DeSales St., NW, Washington, DC 20036, (202) 429-5609. With reference to the Great Lakes and various marine environs in the U.S., discusses types of plastic debris, their sources, environmental impact, and solutions.

Visual Aids Sources

Audio Visual Services, 2145 McKinnon, San Francisco, CA 94124, (415) 695-2420. *(The Drowning Bay, Recycling Waste)*

Encyclopaedia Britannica Educational Corp., 310 South Michigan Ave., Chicago, IL 60604, (312) 347-7400 x6512, (800) 554-9862. *(The Garbage Explosion)*

Stuart Finley, Inc., 3428 Mansfield Rd., Falls Church, VA 22041, (703) 820-7700. *(A Day at the Dump, The Third Pollution)* May be outdated.

The University of Illinois Film/Video Center, 1325 South Oak St., Champaign, IL 61820, (800) 367-3456. (*Recycling*, 1986)

Miscellaneous

Environmental Resource Compendium, 1990. Elementary/Secondary Service, 1320 Braddock Place, Alexandria, VA 22314, (703) 739-5038. Comprehensive listing of videos/programming materials, books, periodicals, teaching resources, organizations.

Coloring and activity fun books, (recycled plastic) frisbees, rulers, book covers, bookmarks, etc. featuring RecycleSaurus. Catalog from: Creative Printing and Publishing, 712 North Hwy. 17-92, Longwood, FL 32750, (407) 830-4747, (800) 780-4447.

Poster: *Ride the Wave of the Future: Recycle Today!* Information Center (OS-305) U.S. EPA, 401 M St., SW, Washington, DC 20460, (202) 382-4454 Document # EPA/530-SW-90-010) One of four publications in EPA's *Recycle Today!* program. Promotes recycling. All age levels.

School Recycling Programs: A Handbook for Educators, 1989/1990. Information Center (OS-305), U.S. EPA, 401 M St., SW, Washington, DC 20460, (202) 382-4454. (Document # EPA/SW-90-023) One of four publications in EPA's *Recycle Today!* program. Describes several school recycling program options and how to set up a program. Introduces the President's Environmental Youth Awards. Reference sources.

Hazardous Waste Wheel. Environmental Hazards Management Institute, P.O. Box 932, 10 Newmarket Rd., Durham, NH 03824, (603) 868-1496. Easy-to-use wheel that segments toxics by type, explains how to dispose of them responsibly, and describes non-toxic or less toxic alternatives.

Nature discovery kits, book, videos, games, puzzles, activity kits, gifts. Catalog from: National Wildlife Federation, 1412 16th St., NW, Washington, DC 20036-2266, (800) 432-6564.

This article is part of an ongoing series of releases on materials policy as it relates to economic development. We encourage you to disseminate this information to community advocates across the country. Please credit the Institute for Local Self-Reliance when you use ILSR's FACTS TO ACT ON. If you wish to receive future FACTS TO ACT ON, please contact ILSR.

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APPENDIX D

MECHANICAL PROCESSING TECHNOLOGY SURVEY

Mechanical Processing Technologies Evaluated

Composting

Bedminster Bioconversion Corp.
Agripost, Inc.
BioComp, Inc.
Daneco (also included with RDF)
Harbert/Triga
Lundell
Reidel Environmental Systems (Dano)
Sorain Cecchini
Waste Recovery Resources, Inc.

Biogas/Pyrolysis

Total Energy Systems
Integrated Waste Management
Valorga
Organic Waste Systems

Lightweight Aggregate

Neutralysis
Catrel (also included with RDF)

Refuse-derived Fuel (RDF) and RDF Gasification

Catrel
Daneco
Waste Service Technologies
PLM Sellbergs

Level of Demonstration

Technology	Commercially Operational		Developmental	Experimental
	U.S.	Non-U.S.		
Agripost			X (1)	
Bedminster	X			
Biocomp				X
Buhler-Miag	X			
Catrel		X		
Daneco		X		
Harbert/Triga		X		
Integrated Waste Manag.			X	
Lundell	X			
Neutralysis				X
Organic Waste Systems			X	
PLM Sellbergs		X		
Reidel (Dano)		X		
Sorain Cecchini		X		
Total Energy Sys.			X	
Valorga		X		
Waste Recovery Resources	X			
Waste Service Tech.			X	

(1) First Plant in Start-up

Costs, Waste Reduction, and Materials/Products Recovered for Commercially Available Mechanical Processing Systems

Vendor	Capital Costs ($ per TPD)	O&M Costs (a) ($ per ton)	% Weight Reduction	Materials/Products Recovered
Bedminster	$50,000	$30	75	Compost, Aluminum, Corrugated Cardboard, Ferrous, Plastics
Catrel	$35,000	$65	100	Lightweight Aggregate, Glass, Aluminum, Plastics, Corrugated, Other Paper
Daneco	$30,000 (b)	$18.20	70	Compost, Ferrous, Corrugated Cardboard, Other Paper, PET, HDPE, Film Plastics, Aluminum, Wood, Glass, RDF for Gasification
Harbert/Triga	$12,500	$30 (c)	25-70 (d)	Compost, Corrugated Cardboard, Mixed Paper, High-Grade Paper, Ferrous, Aluminum, HDPE, PET, Film Plastics, Glass
Lundell	$15,000	$30	70	Compost, Ferrous, Aluminum, Plastics, Corrugated Cardboard, Paper Fiber
PLM Sellbergs	$25,000	NA	40 (e)	Compost, Ferrous, RDF or Paper Fiber
Reidel	$40,000	$51	65+	Compost, Ferrous, Aluminum, Glass, Plastics, Corrugated Cardboard
Sorain Cecchini	$50,000	$25	50	Compost, Ferrous, 2-3 Grades of Paper, Aluminum, HDPE, PET, Film Plastics
Valorga	$48,000	$45	70	Compost, Biogas, Ferrous
Waste Recovery Resources	$35,000	$49	70	Composts, Aluminum, Ferrous, Corrugated Cardboard, Other Paper, Plastic

(a) Based on O&M costs provided by vendors and on tipping fees at operating plants.
(b) This capital cost per ton-per-day of installed capacity is estimated for a plant incorporating materials recovery and composting. A Daneco plant with RDF production and gasification is estimated to cost $66,000 per TPD of installed capacity.
(c) Tipping fee depends on local conditions such as markets
(d) Guarantees minimum of 25 percent without composting. Forty percent is typical for commercial waste processing. With composting, 60 to 70 percent waste reduction can be expected.
(e) Excludes 50 percent processed into RDF.

APPENDIX E

MODEL MANUFACTURING ENTERPRISES

PAPER

Capitol Fiber, Inc., Baltimore-based and owned by The Washington Post Company and Canusa Corporation, has waste-paper processing plants in Dundalk, Maryland, and Springfield, Virginia. It was created to recycle old newspapers collected by the D.C. government and is handling Anne Arundel County, Maryland's old newspapers as well. Capitol Fiber was formed to deal with the glut in the old newspaper market that stood as a hurdle to curbside collection programs and to provide a market for such programs.

PanTerre America, Inc. , is the licensee in the United States for the manufacture and sale of a building panel called PanTerre. The parent organization, Terre, is a 45-year-old cooperative based in the Wallonie region of Belgium. The panel is produced from a mixture of wastepaper and vegetable fiber. Although similar to drywall, the panels have better acoustic and thermal properties. They can be used as underlayment, sheathing, or in furniture, and can be finished with plastic laminates, cardboard, wood veneers, and similar surfaces. Wastepaper is shredded and mixed into water in a hydro-pulper. Fibrous vegetable material, as well as additives such as fire retardant, are introduced into the paste while it is still in the pulper. Once it is thoroughly mixed, the paste is rolled out into sheets, pressed to remove excess water, and cooked in industrial ovens. PanTerre America is located in Arlington, Virginia.

Second Chance Chesapeake Company: This enterprise, started by Envirologic, Inc., collects and high grades office building wastepaper and markets materials to brokers and mills. The company is servicing hospitals and insurance companies in downtown Baltimore and is recovering 150 tons of paper per month.

Simkins Industries, located in Ellicott City, Maryland, produces paperboard. Simkins accepts all grades of paper, except heavily waxed paper and carbon paper. It receives scrap paper baled and only buys by the trailer load. All paper is shredded and then pulped in a hydro-pulper. Once turned into a paste, it is processed into paperboard.

Western Community Industries (WCI) supplies goods and services to the housing industry. On the manufacturing side, WCI uses collected newsprint to produce a type of cellulose insulation. Ninety-five percent of the feedstock WCI uses is newsprint, 5 percent is a mix of other papers, e.g. bond paper or computer paper. Up to 3 percent of the paper utilized can be undesirables such as coated papers or waxed papers. To assure themselves of a steady feedstock supply, WCI establishes long-term contracts with local communities. In some cases, WCI establishes recycling programs where none existed before. WCI is located in Fresno, California.

PLASTIC

American Recovery Inc., is a joint venture between Potomac Capital Investment and Sorain Cecchini (an industrial manufacturing operation located in Rome, Italy, which produces plastic bags from film). American Recovery is interested in establishing plants capable of extracting plastic, including film, from the waste stream and baling it for sale to reprocessors. Another possibility is to incorporate a pelletizing line into the baling operation and then selling plastic pellet to scrap-based manufacturers.

Coon Manufacturing, based in Spikard, Montana, purchases clean HDPE industrial scrap and reprocesses the plastic into a variety of products ranging from plastic sheets to hog feeders and mailboxes. They use rotational, compression, and injection molding processes to produce the end product. Coon Manufacturing is not limited to the production of farm products. The technology used is broadly applicable to the production of a wide range of products.

Eaglebrook Plastics processes recycled high-density polyethylene (HDPE). It grinds the plastic for use in a variety of manufacturing processes that produce a wide range of plastic products. Eaglebrook Plastics developed a patented decontamination process that is applicable to PE and PP only. The decontamination process allows Eaglebrook to capture the post-consumer market as well as manufacturing scrap. Eaglebrook Plastics is located in Chicago, Illinois.

Hammer's Plastic Recycling Corporation, based in Iowa Falls, Iowa, has a patented process for making dimensional "lumber" from commingled recycled plastic. The composite plastic is molded and can be nailed and sawed like wood. The plastic lumber can be used to make park benches, picnic tables, speed bumps, pilings for waterfront construction, landscape timber, trash receptacles, and car stops. Hammer plans to build 16 more plants, 8 of which will be joint ventures with Research Contrell.

Poly-Source, located in Houston, Texas, recycles industrial plastic waste. They are specifically in the materials business. They clean and segregate like kinds of as well as like color plastic. Poly-Source produces a clean, reprocessed plastic, which is then sold to manufacturers. They handle primarily polyethylene (PE) and polypropylene (PP). Poly-Source also accepts post-consumer plastic. A Poly-Source plant has been built in Anne Arundel County, Maryland.

GLASS

Advance Cullet, headquartered in Chicago, Illinois, buys glass from nearby communities as well as from industry. Advance Cullet receives approximately 1,500 to 2,000 tons of glass per month. The glass, which is separated by color, is then processed and crushed. The clean cullet is resold to the glass container industry.

PROVEN COMPOSTING TECHNOLOGY FOR HANDLING ORGANIC WASTE

Integrated Biological Farming Company (IBF) has introduced a formula of tropical microflora for commercial composting use. The innoculum that IBF has developed is added to aerobic compost piles to energize and control odor of yard wastes, sewage sludge, food process wastes, and manure by way of aiding microbial digestion, humus control, and cationic exchange capacity. IBF is located in San Francisco, California.

ANTI-FREEZE, WHITE GOODS, AND CONSTRUCTION DEBRIS

Appliance Recycling Centers of America, Inc. (ARCA) collects and recycles white goods and consumer appliances. MAPS, the original firm and now the wholly-owned subsidiary of ARCA, has established a system for picking up appliances curbside and handles all collection services. ARCA either reconditions old appliances that can then be reused or decontaminates them by removing any PCB-laden capacitors, insulation, copper parts, or mercury-containing electric switches. Once decontaminated, appliances are sold as scrap metal. ARCA services private haulers, municipalities, landfills, and scrap dealers. ARCA is headquartered in Minneapolis, Minnesota.

Envirologic, Inc., has started a medical equipment recovery project. This project recovers used but viable hospital equipment, which is sold at low cost to Third World medical facilities. A 600-bed hospital generates 3,000 square feet of used equipment each year. Recovery and reuse can provide $250,000 annually in revenues, while hospitals save storage and disposal costs. Envirologic has established a pilot project in conjunction with Mercy Hospital in Baltimore, Maryland.

The Loading Dock, in Baltimore, Maryland, started in 1990 as a nonprofit enterprise charged with receiving surplus building materials from over 200 manufacturers in the Baltimore area. The Loading Dock then makes these materials available to low-income residents and community organizations at low prices (donations are tax deductible). The break-even point ranges from $22,000 to $25,000 in sales per month. In addition to employing 13 full-time workers, the Loading Dock allows low-income people to get high-quality supplies for home and apartment repairs at low prices. The Loading Dock is now providing technical assistance to nonprofit groups in other cities. A key success factor for the Loading Dock has been participation by leading donor company chief executive officers on the nonprofit's board of directors. The Loading Dock has developed model brochures for potential donors, or nonprofits which use their services.

Planet Earth Recycling (PER) has developed a patented method for the collection and recycling of used anti-freeze. Participants in the recycling program collect their used antifreeze in 55-gallon drums provided by PER. When the drums are full, PER

sends out a truck onto which drums are loaded one at a time. The used anti-freeze is then run through a 30-minute, on-site purification process. Spent antifreeze, after being recycled, is as clean as the newly purchased product. PER is based in Jenkintown, Pennsylvania, and services surrounding areas with a fleet of trucks.

Urban Ore, Inc. is organized under the principle that reuse is a disposal method. Items that are frequently salvaged out of the municipal solid waste stream are doors, windows, sinks, tubs, toilets, cabinets, lumber, lighting fixtures, plumbing, bricks, tiles, and heaters. Urban Ore's suppliers usually consist of haulers, small contractors that specialize in remodeling, large contractors that have materials left over from a job, and householders or landlords that are beginning or ending a remodeling project. All the above-mentioned items and many others would end up in a landfill if they were not diverted by Urban Ore. The organization salvages at two different locations. At the discard management center, they salvage from the tipping floor at the city's transfer station. At the building materials yard, they receive materials that would have been dumped. Urban Ore is located in Berkeley. California.

REMANUFACTURING COMPANY	FEEDSTOCK TONS PER YEAR	PRODUCTS	CAPITALIZATION (In $)	EMPLOYEES Prof.	EMPLOYEES Skill	EMPLOYEES Entry	TOTAL EMPLOYEES
Envirologic, Inc. Baltimore, MD	Used Hospital equip	Hospital equipment	150,000	2	1 to 2	6	10
Second Chance Chesapeake Company	1700 tons paper	Baled Paper	75,000	2	6	-	8
The Loading Dock	C and D debris	resell C&D debris	35,000	-	-	-	13
Planet Earth Recycling	Anti-freeze	Recycled anti-freeze	50,000	1	2	2/truck	10
Pan - Terre America	Low grade paper and straw	Soundproofing, wall board	2-3 million	5	5	10	20
Hammer Plastics	Plastics 20000	Assorted plastic products	1 million	10	10	5	25
Coon Manufacturing	Plastics 20000	Road signs, railings playground equipment storage containers	1.5 million	5	5	10	20
Poly-Source	Plastic	Prepared plastics for remanufacturing	Would not Disclose	Wnd	Wnd	Wnd	Wnd
ARCA Inc.	White goods	Decontaminated scrap metal prepared for remanufacturing	N/A	3	70% of employees	1 to 2	-
Simkins	Paper 48000	Paperboard	N/A	10	20	40	70
Advance Cullet	Glass	Cullet	Would not disclose	Wnd	Wnd	Wnd	Wnd
Western Communities Industries	Newsprint	Cellulose insulation	500-600,000	3	13	12	28
Urban Ore	Scrap building materials	Sell salvaged building scrap	100,000	-	-	-	-
Eagle Brook Plastics	Plastic	Regrind	300-400,000	30	45	45	120
Integrated Biological Farming	Degraded organics	innoculum	N/A	2	3	2	7 to 15
American Recovery Inc.	Plastic film	Plastic pellet	N/A	1	3	2	5 to 6

APPENDIX F

FACTS TO ACT ON:
LOS ANGELES REQUEST FOR PROPOSALS

Institute for
Local
Self-Reliance

Release #14 FACTS TO ACT ON November 30, 1990

Struggling to Keep the "Community" In Community Recycling

A decade ago recycling was an afterthought of solid waste management officials. At that time recycling was a project of community environmental groups, minority self-help groups, and civic organizations. These agencies did the spade work in education programs, collection, and buy back operations. They met industry specifications, found markets for their materials, and even developed compartmented vehicles and rotating-head fork lifts to move materials efficiently.

The National Temple Recycling Center in Philadelphia is among these pioneers. The Recycling Center is the offspring of National Temple's larger community presence. The organization has also been a pioneer in developing affordable housing for low-income residents in the North Philadelphia corridor. In the early 1980s, National Temple invested in solar equipped residential units and successfully financed multi-family rental and home-ownership projects. National Temple's recycling company saw environmental issues as opportunities to create jobs, forging a vital link between ecology and economics for minority residents long before the environment became a fashionable issue in the mainstream. National Temple set up recycling enterprises under the ownership and control of community and church groups throughout the city. The company created 16 jobs in the processing plant and an additional 20 jobs in the community, where individual entrepreneurs established routes to collect materials at National Temple's North Philadelphia buy-back center.

National Temple was operating this center and processing yard for glass, paper, aluminum, and corrugated paper when, in the mid-1980s, Philadelphia's solid waste management went through a major transformation. In 1986, the City Council adopted a comprehensive recycling plan drafted by a group of private citizens in cooperation with the Institute for Local Self-Reliance (ILSR). ILSR was hired by the City Council for its expertise in the field and history of assistance to community groups and church networks.

The plan called for implementation of a citywide recycling program to reach 50 percent materials recovery by 1991. Two existing incincrators, long identified as sources of air and ash pollution, were to be closed, and they were, in fact, shut down in 1988. The Philadelphia Recycling Advisory Committee, a planning/advisory committee made up of representatives of labor, citizen groups, and private sector firms, was constituted to assist the new Office of Recycling, which was located in the City manager's office. Mjenzi Traylor, Director of National Temple Recycling, was selected as chairman of the committee, which ensured that community economic development became part of recycling program development in the city. National Temple won a competitive bid to process and market the recyclable materials collected from the first phase of the city's curbside recycling collection program serving 23,000 households. Since the adoption of the plan in June 1987, the recycling program has been expanded to serve 200,000 households.

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National Temple and the community had hopes of setting up recycling enterprises. They envisioned a cooperative network of community-based enterprises and city collection crews. Beyond mere collection and processing, however, they saw the mountains of recovered materials as primary feedstock for a new manufacturing base. In this vision, Philadelphia's citizens were to have equity in the "urban ore" -- that is, the materials in the city's waste stream, and in factories that would re-manufacture them into saleable products. Such hopes were dashed when the rising popularity of recycling hit Philadelphia.

As recycling gained momentum across the country, the waste hauling industry swung into action to keep any new players out of "its" domain. As late as 1980, notwithstanding a decade of success by community and small recycling companies, the hauling industry was ridiculing recycling. However, as soon as recyclers, supported by anti-mass burn incineration activists, became a powerful coalition in local politics, the industry could not stand by idly. They moved to co-opt recycling. (See FACT TO ACT ON #2: "Fighting for Control of Local Garbage Resources.") Garbage giants moved into recycling collection as well as materials brokering and manufacturing. As their first move, multi-national corporations used their access to capital to set up recycling programs as a way to privatize public sector departments. They then established contracts with other multi-national corporations to supply plastics, paper, and aluminum to primary production corporations. This eliminated the opportunity for local economic benefits that might have come from enlarging a local manufacturing tax base and increasing opportunities for skilled jobs within cities. Finally, the hauling firms began to buy up even manufacturing capacity such as paper mills for processing recovered materials. The country is actually witnessing the building up of a centralized system -- a solid waste oligopoly -- that will control collection, landfilling, incineration, and recycling.

The impact of these developments on National Temple was devastating. The company needed capital to upgrade equipment in order to process the increasing amount of materials it received through the city's highly successful curbside program more efficiently. A long term contract with the city would have been sufficient to capture investment dollars from local banks, foundations, and industries using the recovered plastics, glass, paper, and metals. However, Waste Management, Inc. (WMI) approached the city with a bid to handle the city's recyclables below the bid entered by National Temple. WMI got the contract. Many city officials, displeased to see the pioneer community group squeezed out of the market, devised a compromise under which no additional areas of the city will be contracted out to firms like WMI. The current plan is to build a city-owned facility run by the regular, unionized, solid waste workers. Explorations are now underway to establish a sheltered market for community based recycling enterprises.

In the meantime, developments in Los Angeles may have established a helpful precedent. In that city, as in Philadelphia, recycling became city policy after a multi-year struggle against waste incineration led by grassroots activists. However, 2 years after the victory that forced Mayor Bradley to step back from a massive incineration plan, consultants presented the community with a plan for which they charged $2 million, that called for recycling to be carried out by the multi-national waste hauling firms. The bulk of the waste was to be railhauled into the desert. This precluded any benefits in terms of community economic development. A new round of protest ensued. In late July, ILSR and Natural Resources Defense Council (NRDC) held a conference in Los Angeles to focus on these issues. Shortly thereafter, Dennis Nishakawa, Public Works Commissioner, articulated a new policy. Henceforth, the city would give preference to firms seeking a contract for processing Los Angeles' recyclables at transfer stations, intermediate processing centers, or yard debris composting facilities when such firms grant equity to a community development group.[1] In the ensuing flurry of phone calls, private processing firms rushed to make offers of equity to established community development groups such as the Los Angeles Conservation

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Corps and Welfare Action, Inc. Negotiations are currently underway, and contracts are being drawn up for submission to the city. Further, the City contracted with non-profit groups to undertake recycling information education and outreach projects. Traditionally, such contracts have gone to glitzy public relations firms. Sue Nelson of California Alliance in Defense of Residential Environments (CADRE) sums up these new developments:

> Dennis Nishakawa has demonstrated forceful leadership, but only organized citizens can apply the pressure to make new policy meaningful for community development. The same type of organizing defeated the LANCER plan for six mass burn incinerators, defeated the oil pipeline planned to go through South Central L.A., and created the Santa Monica Recreation Park.

Los Angeles may have come up with the formula that Philadelphia city officials and others have been looking for: a way to ensure that local community development groups get a chance to share in the growing economic pie made possible by the switch from waste disposal and destruction to materials recovery.

Certainly questions remain. Will Los Angeles commit to comprehensive recycling or just the minimal 25 percent that it now calls for? Is new policy merely an attempt to buy off community groups so that they might serve as "fronts" for large corporations? What resources will be made available to community development groups to prepare them for participation in enterprises? Finally, will the policy that initiated community group involvement in the processing of recyclables be extended to the manufacturing arena, where the real profits are? That is, will the city retain ownership of the materials it contracts out for processing and thereby assure that local manufacturers can keep the profits, jobs, and tax base in Los Angeles, or will it export an unending supply of raw materials at bargain basement prices dictated by waste giants?

Karen Adam, Director of Welfare Action, Inc., which is already operating recycling services for commercial hotels and restaurants in East Los Angeles, is concerned about the availability of legal and technical assistance for community development groups. She notes, "Community non-profits can run successful businesses, as has been pointed out in recent research[2], but we have to grow slowly and smartly." Comments Steve Bradford of the Los Angeles Conservation Corps, "This is a great opportunity for growth in the non-profit sector. The real prize is manufacturing new products from the raw materials we recover and process." At the same time, community activists continue to fight the City's plans for massive landfill development, its program to haul waste by rail to the desert, and the City's resistance to working with LA's small, independent haulers.

These are the challenges community leaders must address now that recycling has become a significant sector of the solid waste management industry. "How we settle these issues," asserts Sebe Brown of L.A.'s Upper Room Christian Church, "will determine whether recycling reaches out to solve community problems of unemployment, crime, illiteracy, drugs and homelessness, or whether recycling is simply integrated into the traditional industry, which is loyal to its profit structure and nothing else."

References

1. "The City is committed to using the implementation of its recycling program as a catalyst to provide opportunities for local community groups to become active principals in the ownership of facilities developed

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through the Request for Proposal process." See amendments #3 and #4 to Request For Proposals, Los Angeles Dept. of Public Works, August and September 1990, respectively.

2. M. K. Sanyika, *Report on Community Based Recycling Companies*, National Economic Development Law Center, Berkeley, CA, 1990.

This article is part of an ongoing series of releases on materials policy as it relates to economic development. We encourage you to disseminate this information to community advocates across the country. Please credit the Institute for Local Self-Reliance when you use ILSR's FACTS TO ACT ON. If you wish to receive future FACTS TO ACT ON, please contact ILSR.

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APPENDIX G

STATE FINANCIAL INCENTIVES TO PROMOTE USE OF SCRAP MATERIALS

State	Investment Tax Credits (ITC's)	Loans	Amount	Grants	Amount	Tax Exemption
California	Equipment-40%	Recycling Market Development Zones	to $1,000,000			
Colorado	Plastics Recycling					
Florida						Sales
Illinois		Business Development	by case	Business Development	by case	Sales
Indiana						Property
Iowa						Sales
Kentucky						Property
Maine	Equipment-30%					
Michigan		Fixed Assets-Processors Fixed Assets-Manufactures Product Marketing Market R&D	to $1,000,000 to $5,000,000 to $100,000 to $500,000	Manufacturers Processors and Collectors Marketing Market R&D	to $5,000,000 to $500,000 to $50,000 to $250,000	
Minnesota		Fixed Assets	to $2,000,000	Feasibility Study (Tires) Feasibility Study (General)	to $30,000 to $50,000	
New Jersey	Equipment-50%	Fixed Assets	$50,000 to $3,000,000			Sales
New York		Fixed Assets	to $500,000	Feasibility Study	to $100,000	
North Carolina	Income Tax Deduction					Property
Oregon	Business Energy Tax Credit-35% Pollution Control Facilities Tax Credit-35% Plastics Recycling Tax Credit-50%					
Pennsylvania		Equipment	to $100,000			
Rhode Island						Property
Vermont		Recycling Businesses	by case	Recycling Businesses	by case	
Virginia	Equipment-10%					
Wisconsin		Manufacturers or Cloth Diaper Service	to $750,000	Feasibility Study R&D or Pilot Program (Tires)	to $75,000 to $50,000	Property

APPENDIX H

KEEP THIS POSTER PRINTED ON RECYCLED PAPER

WHERE THINGS GO:
Park Slope Intensive Recycling Program

Glass, Metal, Plastic

Rinse fully & place in blue recycling can

Clear, green & amber glass bottles
- juice bottles
- wine/liquor bottles
- spaghetti sauce jars

food and juice cans
coffee/pet food cans
metal/plastic jar lids
aluminum foil/trays

Rigid plastics
- laundry detergent and shampoo bottles
- bleach bottles
- salad oil bottles
- ketchup bottles
- peanut butter jars
- medicine bottles
- milk and cider jugs
- bottled water jugs
- yogurt, sour cream and tofu containers
- salad bar containers
- cutlery & combs
- plastic cups/straws
- 100%-plastic toys

"styrofoam"
- clamshells and cups
- "peanuts"(bagged)
- egg cartons
- produce/meat trays
- stereo packing

plastic bags
- grocery, bread & dry cleaning bags
- "saran" wrap

Mixed Paper

Put loose in green can* or heavy duty paper sack**

Newspapers
magazines
white/or colored paper
junk mail
file cards/folders
brochures/catalogs
gift wrap
computer paper
all envelopes

Gray cardboard
- cereal/tissue boxes
- shoe/toy boxes
- cake mix boxes
- pasta boxes
- paper towel tubes
- laundry soap boxes

paper bags

* **Wednesday pickup**
** **Tuesday Pickup**

Bundle corrugated cardboard (with "wafer-like" center) separately. Examples include unwaxed boxes from stereos, applicances and grocery stores, clean pizza boxes

Household Hazardous Waste

Please hold onto your batteries, cleansers, unwanted paint and pesticides for the upcoming household hazardous waste collection day: June 1, 1991 • 9-4pm • PS 282 parking lot (6th Ave. X Berkeley Pl.)

Food Scraps and Yard Waste

Compost

Food scraps
- vegetable peelings
- tea bags
- coffee grounds/filters

Soiled paper
- tissues/napkins

Yard waste
- leaves and flowers
- untreated wood
- grass clippings
- small brush
- fireplace ash

Brooklyn Center for the Urban Environment will help you set up a backyard composting system for your food and yard wastes. Please contact Gail Day at (718) 788-8500.

Not-yet-recyclable (all the rest)

Throw away in your regular garbage can:

disposable diapers
soiled plastics
plastic pens & razors
drink boxes
toys with metal parts
broken radios
milk and juice cartons
waxed boxes, fax paper
books & phone books
aerosol cans
window glass/light bulbs
ceramic mugs & plates
kitty litter

This information is made available by the Park Slope Community Recycling Campaign, a local network of neighborhood volunteers. For more information, call 965-9506