ABSTRACT

The State of New Jersey has set a goal of recycling, through material recovery programs, 1.6 million metric tons of materials annually from the municipal solid waste stream by 1986. To achieve this goal, State legislation (P.L. 1981, c.278) was enacted to provide a $6,000,000 annual recycling fund for a five year period. The fund will be allocated as follows:

1. Grants to municipalities based on the tonnage of materials they recycle.
2. Funds to municipalities, counties and the State for education programs.
3. Funds to municipalities, counties, and the State for program planning and implementation.
4. Low interest loans and loan guarantees to recycling businesses and industries.

The effective date of the legislation was January 1, 1982 when a $0.12 per cubic yard surcharge was placed on all waste landfilled in New Jersey. Annual revenues from the surcharge are dedicated to the recycling fund.

BACKGROUND

In 1975, the New Jersey Legislature amended the State Solid Waste Management Act in recognition of the need to develop a comprehensive state solid waste management program.

The amended act required the 21 counties, the Hackensack Meadowlands Development District and the State to develop a ten year solid waste management program. A major goal set forth by the legislature was the development of resource recovery programs for material and energy recovery.

By the end of 1980 most of the counties had completed their ten year management plans, and the State Departments of Energy and Environmental Protection had consolidated their recycling programs in one office — the New Jersey Office of Recycling. The Office of Recycling with an advisory committee of environmentalists, government, and business and industry representatives drafted "Recycling in the 1980's," the state materials recovery plan.

The materials recovery program is an effort to develop a balanced solid waste management program in New Jersey. It is also a recognition by the State that no one waste management system will solve the problem, that programs must include source separation, energy and materials recovery systems, and landfills. Outlined in "Recycling in the 1980's" is a five year statewide program to increase recycling annually from 0.5 million tons (4.5 million t) to 1.8 million tons (1.6 million t) of the municipal solid waste stream.* Recycled materials included paper, metals, glass, plastics, oil, tires, food and yard wastes.

The tonnage goals of 1.8 million tons (1.6 million t) a year was limited by market capacity and the available materials supply. The

*Currently about 15 million tons (13.6 million t) of waste per year are landfilled in New Jersey; of this amount about 6 million tons (5.4 million t) is municipal waste.
achievement of this goal by 1986 required improved collection systems, an increase in public participation and an expansion of the secondary material markets.

The purpose of setting such a goal for 1986 was to:

1. Decrease materials flow to landfills.
2. Develop organized source separation programs that offer the potential to provide a stable source of raw materials supply to secondary material industries.
3. Reduce the design capacity of energy recovery systems by more than 3,000 tons (2,700 t) per day.
4. Reduce solid waste management collection and disposal costs which are rapidly increasing because of the closing of landfills near population centers and requirements for stringent environmental landfill controls.
5. Conserve energy in the manufacturing process by at least 2 million barrels of oil equivalent per year.

It was determined by the Advisory Committee that the following recycling goals for individual materials under the following conditions were achievable:

<table>
<thead>
<tr>
<th>MATERIAL</th>
<th>1986 PER ANNUM</th>
<th>CONDITION</th>
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</thead>
<tbody>
<tr>
<td>Aluminum</td>
<td>64,000 tons (58,000 t)</td>
<td>Present market conditions are unlimited.</td>
</tr>
<tr>
<td>Ferrous Cans</td>
<td>127,000 tons (115,200 t)</td>
<td>Present industrial detinning capacity in the State is about 60,600 tons (55,000 t) per year.</td>
</tr>
<tr>
<td>Glass</td>
<td>300,000 - 500,000 tons (272,000-454,000 t)</td>
<td>Current demands of New Jersey glass plants for cullet. One company has committed to 200,000 tons (181,400 t)</td>
</tr>
<tr>
<td>Newspaper</td>
<td>432,000 tons (392,000 t)</td>
<td>Present industrial capacity in the State is about 480,000 tons (435,000 t)</td>
</tr>
<tr>
<td>Corrugated</td>
<td>434,000 tons (394,000 t)</td>
<td>Present capacity is 104,000 tons (94,000 t) Market must be increased.</td>
</tr>
<tr>
<td>Mixed Paper</td>
<td>212,000 tons (192,000 t)</td>
<td>Present capacity is 160,000 tons (145,000 t) Market must be increased.</td>
</tr>
<tr>
<td>High-Grade</td>
<td>45,000 tons (41,000 t)</td>
<td>60,000 tons (54,000 t)</td>
</tr>
<tr>
<td>Food Waste</td>
<td>Tonnages not established</td>
<td>Increase in collection by farmers now processing food waste is required.</td>
</tr>
<tr>
<td>Plastics</td>
<td>Tonnages not established</td>
<td>Markets must be further developed and expanded.</td>
</tr>
<tr>
<td>Motor Oil</td>
<td>14,000,000 gal (53,000,000 l)</td>
<td>Cooperation of the public to use existing centers and development of re-processing and re-refining capacity.</td>
</tr>
<tr>
<td>Tires</td>
<td>Tonnages not established</td>
<td>Markets must be developed.</td>
</tr>
</tbody>
</table>

Various methods to achieve the above goals were researched and analyzed by the Committee, a process that proved to be quite dynamic. The philosophies and viewpoints of the diverse constituencies that were represented often created much controversy before a final decision on an issue was reached. However, the democratic process and compromise strategies prevailed and the Committee remained intact to complete a final report. Two of the more controversial issues that should be mentioned and that were not adopted recommendations of the Committee include:

1. State Mandate to all Municipalities to Recycle. Some Committee members felt that the easiest way to achieve the recycling goals would be for the State to mandate recycling in all municipalities. This approach was voted down because it ignored the long tradition of home rule in New Jersey, the diverse geographic and socio-economic backgrounds of the 567 municipalities and regional market conditions. The Committee did recommend, however, that the municipalities which develop curbside collection recycling programs should adopt local ordinances mandating citizens to recycle to increase citizen participation and output of materials.

2. Beverage Container Deposit Legislation.
The Committee recognized that deposit legislation would assist in reducing the litter problem and increase the recycling of litter materials. They rejected it, however, for the following reasons:

1. Deposit legislation does not address the disposal of redeemable containers. Metal cans and plastic bottles are not refillable and their diversion from the landfill will not occur without an extensive statewide recycling system.

2. The container manufacturing industry in the State made a commitment to a total recycling program, not one limited to beverage containers.

3. New Jersey has a large concentration of container plants and there was much concern about the economic impact on those industries. However, the Committee did agree that a two year update of the plan should be made to assess progress in recycling and to make necessary changes in program planning. In particular, an assessment of efforts made to recycle beverage containers was recommended.

The following programs were recommendations that the Committee did vote to adopt:

1. Legislation that would impose a landfill disposal surcharge of $0.12 per cu yd for a period of four years to raise $6,000,000 annually for recycling activities. This surcharge will be dropped to $0.06/cu yd in the fifth year (1986) and terminated at the end of that year. The Recycling Fund is allocated for program planning and implementation, low interest loans for recycling businesses and education program grants.

2. Procurement of recycled products by government and state funded agencies. Specifically a 50% recycled products procurement rate for all state purchases of paper and oil should be achieved by 1986.

3. Restrictions on waste flow orders to prevent diverting recyclable and marketable materials to disposal facilities.

4. Implementation of tax incentives for the state's recycling industries.

5. Issuance of an Executive Order to require state agencies to recycle office paper.

6. Development of procurement practices by recycling businesses and industries that lend stability to recycling collection programs.

7. Leadership role by the container and beverage industries in the development and marketing of New Jersey's recyclable glass and metal containers.

8. A leadership role by business and industry for a public relations and advertising program to promote recycling and purchase of recycled products.

9. An education and training program that would include technical assistance, development of school curriculums, advertising campaigns, and other promotional and education techniques to reach a wide audience.

10. The placement of recycling coordinators in the State's 21 counties to assist in the development of municipal and regional recycling programs.

IMPLEMENTING THE RECYCLING PLAN

In September of 1980, the State Departments of Energy and Environmental Protection adopted Recycling in the 1980's as the official State recycling plan and incorporated it in the total waste management program for the State.

By December of 1980, the legislation recommended by the Advisory Committee was drafted and introduced in the State Assembly (Assembly Bill 2283). This bill established the twelve cents ($0.12/cu yd recycling surcharge at landfills. The December version of A2283 was to be a mere skeleton of the bill that would eventually be passed by the State Legislature in June 1981 and signed into law by the Governor in September.

During the legislative process once again negotiations and compromises became a necessary process for drafting the recycling bill, a bill that would not only pass in both houses of the legislature but that would also adequately address the concerns of various constituencies affected by the legislation without negating the intent of the recycling program. The negotiation process produced for New Jersey a bill that would significantly enhance recycling.

One such compromise was proposed by the New Jersey Paper Dealers, a group very much concerned with the economic impact on their industry of expanding municipal paper recycling programs and the anticipated increases in waste paper stock in the market place. A2283 provided a fund of approximately three million dollars ($3,000,000) a year as grant money to municipalities for their recycling activities. Municipalities would receive grants from the state based on the total tons of

materials that they recycled in the first grant year and increases in recycling tonnages in subsequent grant years.

The New Jersey paper dealers proposed an amendment to this section of the bill which divided the municipal grant fund into thirds, allowing only one third of the money to be allocated for paper recycling. The amendment also required municipalities to enter into multi-material recycling programs to be eligible for grants in the second, third, fourth and fifth funding years.

The above amendment was agreed to and adopted, as it not only helped the paper dealers to live with the recycling law but also served to stimulate more recycling by providing financial incentives to municipalities to involve themselves in recycling programs that include more than newspaper collection.

Some other amendments in the bill which not only made it more palatable to certain constituencies but also improved its effectiveness were the following sections:

1. Section 7(b) allowed the Board of Public Utilities to increase solid waste collection tariffs to include the landfill surcharge for recycling without the need to hold rate hearings for each solid waste hauler in the State.

2. Section 8 removed the increased cost of the landfill/recycling fee from the 5 percent cap imposed on annual municipal spending by State law (P.L. 1970, c.68), thus allowing municipalities to meet the increase cost without reducing other local program expenditures.

Regulations were drafted to carry forth the program outlined in A2283 (P.L.1981, c.278), the New Jersey Recycling Act and to meet the effective date of the Act, January 1, 1982.

MEETING THE CHALLENGE

Recycling in New Jersey holds great promise. The adoption of a statewide plan and the establishment of the State Office of Recycling gave many avid recyclers the incentive to expand and develop more stabilized local programs. It also brought about a recognition that recycling made "cents" in New Jersey as a way to address some of the rising costs of solid waste management.

As of 1978, New Jersey had listed more than 200 recycling programs. Most of these programs received little municipal support and were generally volunteer citizen organized activities rising out of the environmental movement of the early 1970's. The percentage of material recovered compared to the population served in most towns was minimal, often reflecting a very low participation rate.

Local programs that are now evolving appear to have that municipal support. Municipalities are enacting ordinances mandating recycling, developing curbside collection programs to increase public participation, and economically integrating solid waste collection with collection of recyclables.

Since January 1, 1981 20 new municipal programs have been established. Municipalities are beginning to compete for their share of the New Jersey recycling markets.

Two of the major weak links, however, in developing statewide recycling systems is the lack of private collectors offering curbside collection service of recyclables and the need to expand the consuming markets for recovered materials.

COLLECTION OF RECYCLABLES

The development of privately run collection routes requires new equipment purchases by industry as well as a recognition by municipalities that collection of recyclables will require contracts that not only benefit the community but also provide a reasonable profit for the collection industry. Municipalities must also accept recycling as a solid waste management system that will vary in costs and profits depending on local market conditions, availability of materials, volume of materials collected relative to road miles of collection routes, and trash collection and disposal costs. Municipalities must view recycling not as a money-maker but as a method to contain solid waste costs and to reduce waste to landfills.

RECYCLING - A COST AVOIDANCE MECHANISM

New Jersey municipalities annually spend more than $100 million to collect and dispose of solid waste, a price tag that is rapidly rising because of landfill closures and environmental standards imposed on the operation of landfills. Two landfill operators that received environmental engineering design approval from the State DEP in 1981 raised their rates an average of 220 percent to meet the...
increase cost of proper disposal. One town, the Town of Woodbury in Gloucester County, affected by this increase in landfill fees implemented a mandatory multi-material recycling program and reduced by 50 percent its trips to the landfill. The 50 percent volume reduction, however, could not be attributed to the recycling rate which was only 26 percent by weight of the municipal waste stream. Woodbury found that the type of materials collected for landfiling had a greater compaction ratio with cans, bottles and dry paper goods removed. Thus, recycling netted for Woodbury a 50 percent reduction in disposal costs. In terms of dollars this meant a savings of almost $1,200.00 per month in tipping fees for the town.

The savings achieved by each municipality as well as the investment required to begin a recycling program will vary depending on existing solid waste management systems in the community. The 567 towns in New Jersey also vary in population density. A small densely populated suburban town with its own equipment that collects trash at least two days a week can anticipate less expenditures for recycling than an expansive community with one day a week trash collection. There is no formula that can be set forth for every town to follow with the expectation that all towns will receive equal benefits and incur equal costs. The attached appendix outlines the various cost and revenues associated with three programs in New Jersey.

Successful recycling programs will require a commitment of some local resources; the benefits and savings derived for a community will depend on the expenditures necessary to start up a program. Municipalities must realize that it will not be a free ride.

MARKET EXPANSION AND DEVELOPMENT

As previously mentioned, stronger markets in some areas are necessary to achieve the goals of the State plan. The markets for recyclable glass and aluminum are excellent in New Jersey. Paper, ferrous metals, plastics and rubber require expansion or development to achieve the State recycling goal. Existing paper markets are substantial but a greater commitment to the utilization of New Jersey generated material is required. It is expected that the evolution of organized mandated municipal programs will help stabilize supply of materials and thereby encourage consuming markets to contract for domestic materials and expand processing capacity.

In an effort to stimulate the demand for recycled products, the State Division of Purchase and Property is working with the Office of Recycling to review procurement regulations to provide for State purchase of recycled materials. As stated earlier, by 1986 50 percent of all state purchases of paper products and motor oil should be recycled products. In addition, a tax package is being considered to encourage the State's businesses and industries to purchase recycled products and to expand the use of recycled materials in manufacturing new products.

EDUCATION — THE KEY TO SUCCESS

The successful development of recycling in New Jersey will require a massive statewide education program. The program is planned to essentially affect almost every citizen in the State by gaining their cooperation to participate and to change their habits of throwing everything away.

Education is critical to achieving the goals of the program. The “Recycling Act” (P.L. 1981, c.278) provides for $900,000 a year for education programs. The following programs are included:

1. A noncredit seven session evening course on recycling was held at Rutgers, the State University this past fall. The program addressed all aspects of recycling and was attended by 100 people. A second course is scheduled for Glassboro College in the Spring.

2. A technical education program for recycling coordinators is planned for the summer of 1982. This will be a one week intensive training program for coordinators responsible for implementing various programs.

3. Implementation of K thru 12 recycling and litter abatement curriculum.

4. A media, promotional, and advertising campaign.

5. Workshops and conferences for industry, local governmental officials and the citizens of the State.

6. The expansion and development of brochures, how to guides, and other education materials for public distribution.

A TOTAL EFFORT

New Jersey has the largest secondary materials industry in the nation and many of the resources

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* This was from an average of $0.95/cu yd to $2.10/cu yd.
required to feed this industry must be imported from sources outside the State. There are large amounts of recoverable materials landfilled every day in the State. An effective statewide materials recovery program requires the close cooperation of the general public, industry, and government. The public's role is to make a social commitment to participate in source separation programs. Whereas, private industry must not only participate but also expand markets for recycled materials. Finally, the government's responsibility is to create a favorable environment for recycling by removing the institutional and regulatory barriers that inhibit progress in the recycling efforts.*

The State recycling plan is an ambitious undertaking that, if successful, will impact on almost all citizens in the State. It is a program that encourages municipalities to restructure their solid waste management programs from collection and dumping to collection, recycling, and only residual waste dumping. The quality and quantity of recyclable materials collected are contingent on active citizen participation through the source separation of materials.

The successful development of the recycling program will require an expansive and continuous education program. Recycling is, however, an opportunity for all New Jerseyans to individually and collectively affect change in their State.

For New Jersey to meet the energy, environmental and economic challenges of the 1980's, recycling and conservation of resources must be practiced on a much wider scale and at more practical levels than is now occurring in the State.

APPENDIX: PROGRAM PROFILES OF THREE LOCAL RECYCLING PROGRAMS

I. PROGRAM A. — MUNICIPAL CURBSIDE COLLECTION WITH A DROP-OFF CENTER

Municipal Profile:

area = 6 sq mi
population = 40,000
municipal waste generated = 25,000 tons (23,000 t) per year

Program — Recycling program is mandatory

for separation of newspaper and glass. Newspaper and glass containers are collected at curbside from residents twice a month. A centrally located drop-off center is also used for collection of newspapers, glass and aluminum containers from the general public. In this program the municipality purchased equipment for implementation of the program.

A. COST ESTIMATES

1. Start-Up Costs

a. Equipment

Construction of a concrete and masonry storage area with 4 bins: $18,000.00
Front end loader: 10,000.00
Used 25 cu yd packer truck to store and transport newspaper to market: 5,000.00
(2) collection vans: 20,000.00
(2) glass collection trailers: 7,000.00
(2) 20 cu yd roll-off containers: 5,000.00
TOTAL EQUIPMENT COSTS: $65,000.00

b. Publicity

postage, printing, brochures, calendars, etc.: $5,550.00

2. Annual Recurring Costs

a. Labor

(1) supervisor: $16,000.00
(4) driver/collectors: 50,000.00
(2) laborers: 20,000.00
Fringe Benefits at 25 percent: 21,500.00
TOTAL LABOR COSTS: $107,500.00

b. Overhead (Fuel, maintenance, insurance, tires, spare parts, leasing charges): $10,500.00

TOTAL PROGRAM COSTS (1st Year): $188,550.00

B. REVENUES

1. Newspapers = 1,500 T (1,364 t) per year [Municipality has contract with mill at an average price of $40/T ]: $60,000.00

2. Glass - 580 T (520 t) per year (sold at an average price of $30/T): $17,400.00

3. Aluminum = 5.8 T (5.4 t) per year (sold at an average price of $500.00 T): $2,700.00

4. Magazines, office paper and other scrap = 260 T (236 t) (average price = $30/T): $7,800.00

TOTAL REVENUES: $87,900.00

C. COLLECTION & DISPOSAL SAVINGS PER YEAR

Landfill costs: 2,346 tons (2,128 t) x $5.45/ton: $12,800.00

Diverted mixed waste collection costs: 26,400.*

TOTAL AVOIDED COSTS: $39,200.00

D. TOTAL REVENUES AND SAVINGS $127,100.00

II. PROGRAM B – MUNICIPAL CURBSIDE COLLECTION

Program Description:

Citizens are mandated to source separate all clean paper products, glass, aluminum and other metals. Municipal trash collection twice a week was changed to the collection of recyclables once a week and trash once a week. No new investment was made for the recycling program and existing municipal facilities are used for storage of recyclables (when necessary) prior to marketing materials.

This program was primarily developed to decrease solid waste collection and disposal costs.

A. ANNUAL COSTS OF TRASH COLLECTION AND DISPOSAL

1. Labor: $55,282.00

2. Fuel & Maintenance: 11,587.00

3. Disposal fees [3,744 T (3,400 t) per year x $11.40/T]: 42,670.00

TOTAL COSTS: $109,539.00

B. ANNUAL COSTS OF COLLECTION OF RECYCLABLES

1. Labor: $39,944.00

2. Fuel & Maintenance: 7,810.00

3. Publicity: 2,000.00

TOTAL RECYCLING COSTS: $49,754.00

C. REVENUES FROM RECYCLABLES

1. Mixed Paper - 750 tons (680 metric tons) per year (average price = $10/ton): $7,480.00

2. Glass - 385 tons (349 t) per year (average price = $30/ton): $11,517.00

3. Aluminum - 2.7 tons (2.5 t) per year (average price = $400/ton): $1,100.00

* This represents 10 to 12 percent of the waste stream not collected for disposal.
4. Ferrous Metals = 115 tons (104 t) per year (average price = $25/ton): $2,860.00

TOTAL REVENUES: $22,957.00

D. SAVINGS ON LANDFILL FEES
1,228 tons (1,114 t) x $11.40/ton: $13,990.00

E. TOTAL ANNUAL REVENUES AND SAVINGS ON LANDFILL FEES $36,947.00

F. TOTAL ANNUAL COST OF RECYCLING PROGRAM (Cost - revenues and landfill savings) $12,827.00

G. TOTAL ANNUAL COST OF TRASH COLLECTION PROGRAM $109,539.00

III. PROGRAM C – DROP-OFF CENTERS IN URBANIZED/SURBURBAN REGIONAL AREA PROGRAM

Voluntary program serving 75,000 population within 30 sq mi area. Citizens must deliver materials to center. Investment is minimal and some volunteer labor is used.

A. COSTS OF RECYCLING DROP-OFF CENTER

1. Equipment

Center includes: Wooden newspaper shed, 10-15 drums (55 gal each) for glass and metal storage, fencing around center, dedicated municipal space.

15 centers ($800.00 per center): $12,000.00

1 used collection vehicle: 2,000.00

TOTAL: $14,000.00

2. Operating Expenses

Labor (volunteer labor also provided assistance): $12,000.00

Fuel and Maintenance: 4,800.00

TOTAL COSTS: $30,800.00

B. REVENUES FROM SALE OF RECYCLABLES

1. Newspaper - 444 tons (403 t) per year (@ $25.00/ton): $11,100.00

2. Glass - 392 tons (356 t) per year (@ $30.00/ton): 11,750.00

3. Aluminum - 1.6 tons (1.5 t) per year (@ $400/ton): 640.00

4. Steel & Bi-Metal Cans - 48 tons (44 t) per year (@ $25.00/ton): $24,690.00

C. SAVINGS ON LANDFILL FEES

886 tons (804 t) per year (recycled) x $5.60 per ton tipping fee: $4,962.00

D. TOTAL LANDFILL FEE SAVINGS & REVENUES FROM RECYCLABLES $29,652.00

Key Words
Legislation
Materials Recovery
Planning
Recycling
Source Separation

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