

In The Works

Integrated Waste Management: The Mecklenburg County Experience

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In response to rising costs, legal barriers, environmental concerns, and public opposition to landfilling, Mecklenburg County has established an integrated solid waste management program. No comparable program exists in the southeastern United States, and few exist in the country. This article describes the Mecklenburg County program and the events leading up to its creation.

Cary Saul, former Deputy Director of Engineering and head of Mecklenburg County's solid waste group, describes integrated waste management as "handling solid waste in the best way possible using all available options and taking into account the environment, cost, and what seems most practical." The county's solid waste management program is founded on the philosophy that the generation of waste should be prevented or reduced whenever possible, and that materials in the waste stream should be:

- Reused if their generation cannot be prevented
- Recycled if they cannot be reused
- Processed for resource or energy recovery if they cannot be directly recycled
- Buried in a sanitary landfill only as a last resort

County staff, with the assistance of several consultants, developed estimates on how much waste could be managed by each method. These estimates were then adopted as the county's planning objectives. They are: recycle fifteen percent of the waste stream by 1994 and thirty percent by 2006; convert forty percent of the waste into energy for sale to businesses and institutions by 2006; and reduce the amount of waste landfilled from ninety-nine percent of the total to thirty percent.

Teamwork among county staff, elected officials, and citizen advisory boards was and will continue to be essential to the development and attainment of the county's solid waste management objectives. In 1977, a group of environmentally concerned citizens approached Mecklenburg County

officials to request that recycling centers be established at selected area high schools. The county established five such centers and created the Mecklenburg Citizens Committee for Recycling to work with staff in developing additional recycling programs. The fact that information was shared openly with this committee enabled citizen input to shape significantly the county's recycling plans.

The county formed a Solid Waste Management Advisory Board in 1983 to provide a vehicle for citizen input in all waste management areas. This board worked directly with staff to draft the Mecklenburg County solid waste management plan. The plan was submitted to each municipality for approval. Public meetings on the plan were held to obtain more citizen input. The city of Charlotte has approved the plan, and county officials are in the process of negotiating the plan details with the remaining six Mecklenburg towns.

A truly integrated waste management program must remain flexible to allow for changing conditions, such as technological advancements and fluctuating recyclables markets. Mecklenburg County's waste management plan provides for "continual evaluation of programs and facilities and reassessment of existing and projected needs." The Solid Waste Management Advisory Board is charged with annually reviewing the plan and providing recommendations to county officials on how it should be revised.

Recently, county staff and Solid Waste Management Board members recognized the need for more municipal involvement in the review process, particularly by the city of Charlotte, which generates approximately one-third of the county's waste. The structure of the Solid Waste Manage-

ment Board was modified to include five city council appointees. Moreover, a joint city-county staff technical advisory committee was established to assist with implementation of the waste management plan. This step was particularly critical with regard to recycling, because in Mecklenburg County, municipalities are responsible for solid waste collection, while the county is responsible for waste disposal. Recycling does not clearly fall under either category.

According to county staff, two of the county's biggest planning errors were the failure to involve all affected parties early in the planning process, and the failure to ensure integration in the transportation of solid waste in addition to providing integrated waste management facilities. Formation of the joint technical advisory committee helped to address needs in both of these areas. In addition, meetings with the major waste haulers have been held and on-going communication is now maintained.

Table 1. Curbside Recycling - Phase I Results

16,000	Households now on line
71%	Of households set out recyclables at least once a month
8.75%	Of residential wastes could be recovered if service was expanded county-wide

Of participating households:

92%	Set out newspapers
63%	Set out glass
52%	Set out PET (plastic containers)
48%	Set out cans

3	Collection vehicles
1-2	Full loads collected per day
1,200	Homes per route

Materials Recovery Rates

(Pounds per Household Served per Year)

Newspaper	260.78
Glass	46.60
Cans	3.05
PET	4.38

Critical to an integrated waste management program is the full commitment of elected officials, staff, and the public as exhibited by follow-through in the funding process. Funding mechanisms must be developed and public understanding and support concerning the costs must be obtained in order for program plans to become a reality.

In Mecklenburg County, the county manager's office and the Board of Commissioners have consistently ranked all

major solid waste projects as high-priority items. The county's fiscal year 1988-89 solid waste budget is over \$3.5 million. The combined capital and operating budget for the recycling program alone totals over \$1 million. Landfill tipping fees, now at \$18.50 per ton are set to cover operating expenses. The public overwhelmingly approved two separate bond referenda for solid waste management facilities totaling over \$98 million. Over \$5 million are earmarked for recycling facilities, and \$29 million for the 200-ton-per-day incinerator scheduled for start-up in June. Seventeen million dollars are for construction of a 575-acre lined landfill facility and \$47 million for future resource recovery projects.

One major advantage that Mecklenburg County has had thus far in implementing the waste management program is the low level of public opposition to waste-to-energy facilities. This high level of community support is largely attributable to the county's provision of approximately half a million dollars over the past five years to fund an extensive solid waste communications program. The purpose of the program is to develop public awareness and understanding of solid waste management issues; to develop support for the county's waste management plan; and to promote participation in recycling. The program also helped maintain the support of elected officials, since they, too, were exposed to the communication materials.

Table 2. Curbside Recycling - Phase I Costs

Cost Projections for Service to 94,000 Households:

Annual collection costs: \$932,961

Processing Costs if County Owned and Operated
(Includes Capital and Operating):

Year 1:	\$1,034,379
Year 2:	\$878,979
Projected Sales Revenue:	\$758,710

Annual Net Costs (Excluding Avoided
Collection and Disposal Costs)

Year 1:	\$1,321,133 (\$14.05/household/year)
Year 2:	\$1,165,733 (\$12.40/household/year)

The public's support for the program was enhanced by their confidence that the county was really committed to making things work. County commitment was evidenced in part by a major reorganization of the engineering department. To keep these three divisions operating in an "integrated" fashion, joint supervisory staff meetings are held every two weeks, joint meetings of field personnel are held once a month, and social events such as fish fries are held periodically throughout the year.

In summary, Mecklenburg County staff and officials have

developed an understanding that establishment of an integrated planning and management process provides for the most successful integrated waste management program. The following sections describe the county's solid waste management program components.

Landfilling

Currently, about ninety-nine percent of Mecklenburg County's solid waste is buried in unlined sanitary landfills. The state of North Carolina now requires "engineering



Collection trucks for the Curbside Recycling Program have compartments to keep recyclables separated.

devices" such as liners and leachate collection systems in all future landfills. The lack of clear guidelines for these requirements makes design work difficult and expensive.

The county's Solid Waste Management Plan states that when the resource recovery and recycling programs are fully implemented, landfills will be used only to dispose of non-combustible and non-recyclable materials. Ash from waste-to-energy facilities also will be buried in landfills unless ash recycling options become available. Still, nine hundred to twelve hundred acres will be needed for landfills over the next twenty years.

Resource Recovery

An incinerator that will burn trash to produce electricity (termed *resource recovery*) is now under construction. A second facility is under study for operation in 1993.

Recycling

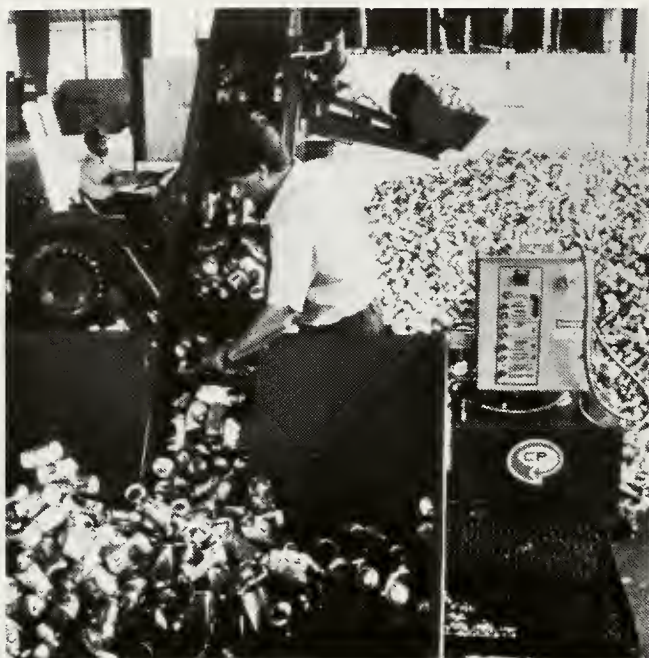
Mecklenburg County's recycling operations are integrally linked with its landfill and resource recovery operations. Tipping fees at the disposal facilities are set to cover recycling program expenses. Incentives are built into the fee structure to encourage recycling behavior; for example, private citizens handling household trash are exempt from paying the fee if they bring in a sufficient amount of recyclables separated from their trash. Recycling centers at all disposal sites will be incorporated in the design of future facilities. Incineration will be used to dispose of some waste, while recyclables will be removed from the waste stream by residents (termed *source separation*) prior to burning through curbside recycling programs.

Commercial and industrial waste recycling programs are also being initiated for as many materials as possible. City and county officials are considering making source separation mandatory and banning the disposal of high value materials like cardboard and aluminum cans. These measures will take effect if voluntary participation proves insufficient to meet the thirty percent recycling goal. Such measures place responsibility on waste generators to find outlets for recyclable materials which the county considers to be valuable products that do not belong in

the waste stream.

Mecklenburg County's current recycling program includes a variety of interrelated services and facilities. Seven unstaffed drop-off centers collect newspapers, aluminum and bimetal beverage cans, plastic soft drink and liquor bottles and, at selected centers, glass and corrugated cardboard. A staffed center for disposal of household waste and recyclables serves rural north Mecklenburg residents. Instead of paying a waste disposal fee, users of this center must bring in a designated amount of recyclables in order to dump their garbage. The county plans to add several more centers for use by rural residents and multi-family dwellers who will not receive curbside recycling service.

At the county landfill, a staffed drop-off center accepts newspapers, glass, aluminum cans, plastic bottles, cardboard, scrap metals, used motor oil, and lead acid batteries. Recyclables can be donated in lieu of paying the landfill



Bottles and cans, glass and plastic, and steel and aluminum are separated by workers at a central processing center.

tipping fee.

Additionally, the county has established a cooperative arrangement with the city of Charlotte, Goodwill Industries, and the Salvation Army to segregate scrap metal obtained through bulky item collections. This metal, along with that brought to the landfill from other sources, is separated by grade to maximize sales revenues.

To increase recovery of corrugated cardboard, vehicles containing a large proportion of corrugated boxes are directed to dump at a designated site on the edge of the active area of the landfill. Two laborers separate the cardboard, throw it into a rear packer truck, and haul it to a local waste paper dealer. This program is a pilot for a larger recovery operation to be conducted at the county's Materials Recovery Facility (MRF) scheduled for operation this winter. The MRF will accept loads containing over seventy percent corrugated boxes in return for a reduced dumping fee and a disposal site more convenient than the landfill. The material will be fed onto a sorting conveyor where contaminants will be removed and the clean cardboard baled. The MRF will also house processing equipment for materials recovered through the county's curbside collection program and drop-off centers.

County staff estimate that approximately one-fourth to one-third of all residential waste is yard waste--leaves, brush, and grass clippings--making this material the single largest component in the waste stream and the most important to recover and recycle. In August 1987, the county hired consultants to design a separate collection, process-

ing, and marketing system for yard wastes and selected other vegetative products. Once implemented, this project will involve the separate collection of yard wastes by Charlotte and other municipalities in the county, with processing performed by Mecklenburg County. Plans are to operate one small composting site to serve the three north Mecklenburg towns and a twenty-two acre site to serve Charlotte and the remaining municipalities. Both facilities are expected to be operational by 1991.

The county currently owns a tub grinder, also at the grinder, which shreds waste brush and tree limbs brought in by landscapers and others. The shredded product, called "metro mulch", is sold to the public and is used by city and county departments to landscape public facilities. A magnetic separator enables the production of mulch from the shredding of wooden shipping pallets by removing nails and other metal fasteners.

In addition to these programs, Mecklenburg County collects white office paper and computer printout from all major county buildings. This service, named "Paper Chase," has recently been extended to the new city-county government center, which houses one thousand employees. Plans are for this building to serve as a model for instituting office paper recovery throughout the central business district. The county will provide promotional materials, technical and marketing assistance, and staff help to participating businesses during start-up.

Table 3. Statistics for Mecklenburg County

County Population:	470,000
Charlotte Population:	385,000
Population Range	
Of Six Remaining Municipalities:	1,378-12,600
Population of Unincorporated Area:	51,454
Population per Square Mile:	
Inside Charlotte:	2,315
Outside Charlotte:	229
Tons of Solid Waste Generated Per Day	
County Total:	1,800
From Charlotte:	85%
From Six Other Municipalities:	5-10%

In February 1987, Mecklenburg County launched the first phase of a weekly curbside collection program for newspapers, glass containers, aluminum and bimetal beverage cans, and plastic drink bottles. Service recipients receive a red plastic container for storage and placement of their recyclables at the curb. The recyclables are sorted into three compartments in specialized collection trucks. The



Newspapers, yard waste, and bottles and cans are some of the materials now separated from the waste stream by consumers at home, thus reducing Mecklenburg County's landfill needs. Special recycling containers are provided by the city.

material is further sorted and prepared for sale at a twelve thousand square foot processing center.

Currently, sixteen thousand households receive this service. County-wide expansion of the program is dependent on the future opening of the Materials Recovery Facility. At that point Charlotte will expand curbside recycling service to include ninety-four thousand households.

Evaluation

During Phase I of the curbside service implementation, an extensive evaluation was performed. The results are being used to fine-tune the design of the county-wide collection, processing, and marketing system. The evaluation

report is available from the Mecklenburg County Engineering Department for a nominal fee. Selected county statistics and evaluation results are provided in the accompanying tables.

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