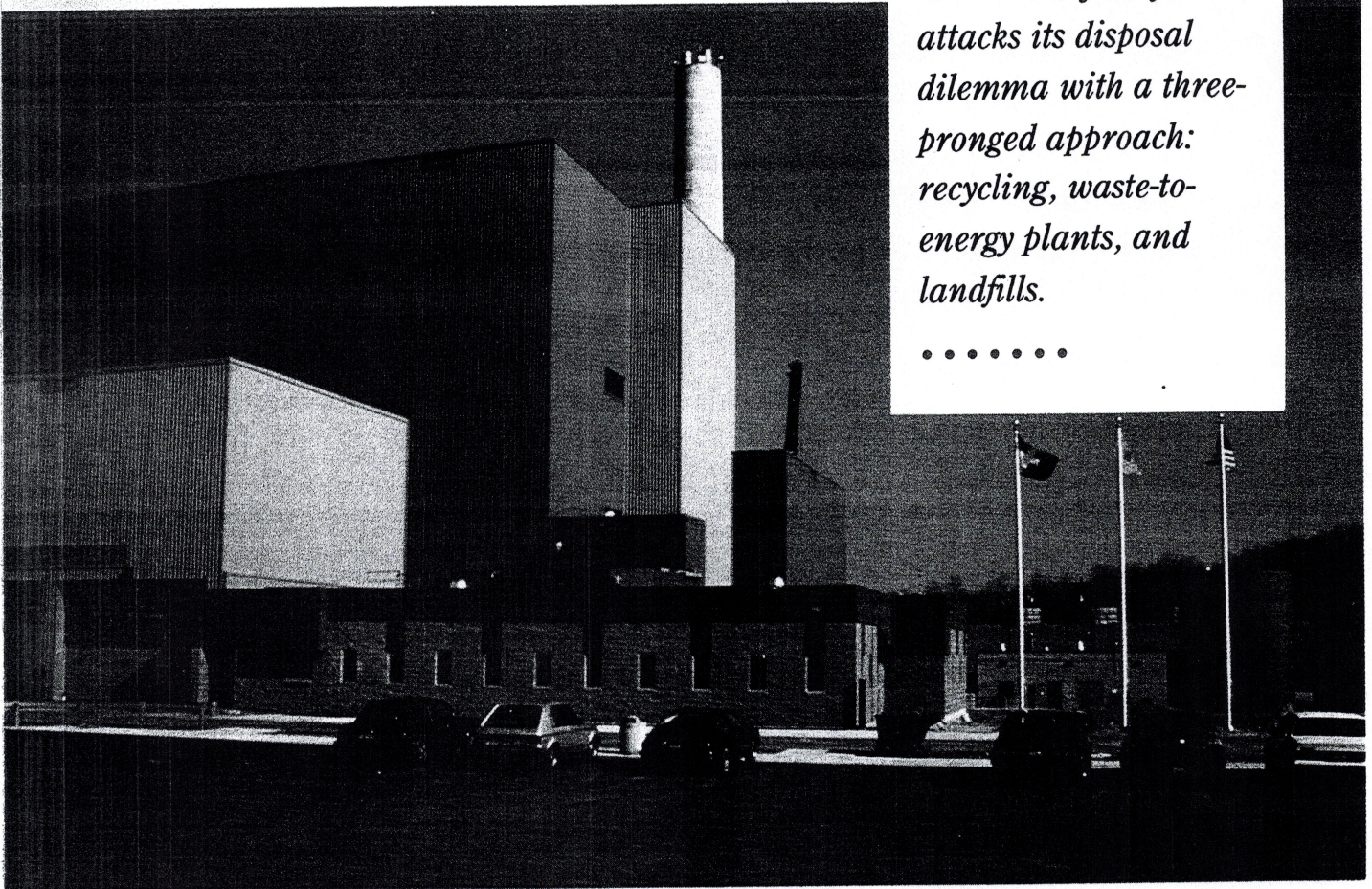


**N***ew Jersey attacks its disposal dilemma with a three-pronged approach: recycling, waste-to-energy plants, and landfills.*

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## *Waste-To-Energy And Recycling:* **A Compatible Solution**

NO WHERE IS THE COUNTRY'S SOLID WASTE management crisis more evident than in New Jersey. Landfill space, particularly in the northern region, is dwindling quickly, and many of the state's counties are contracting to have their waste transported out of state. Already, more than 40% of New Jersey's solid waste is being disposed of in Pennsylvania, according to Donald Deieso, assistant commissioner at the New Jersey Department of Environmental Protection (DEP). This leaves the state in the uncomfortable position of being dependent on a neighboring state and vulnerable to

landfill operators over whom New Jersey has no price control, he says.

The days when northern New Jersey counties paid less than \$30 per ton to dispose of their waste in regional landfills are gone. Essex County now pays \$102 per ton to have its solid waste hauled to Pennsylvania via a transfer station. Neighboring Morris County pays around \$116 per ton, Somerset County pays \$98 per ton, and Bergen County pays between \$92 and \$95 per ton. Although the situation is not so severe in central and southern New Jersey, effective solid waste management is still a critical issue.

New Jersey, however, is actively working to address this problem. In 1976, the state legislature amended the 1970 New Jersey Solid Waste Management Act, and established a state-wide solid waste management plan. The plan called for all 22 solid waste districts within the

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state (21 counties and the Hackensack Meadowsland district) to phase out their dependence on landfills through the creation of waste disposal alternatives.

The DEP must approve all plans. Typical plans include, a solid waste recycling program, a waste-to-energy facility, and a DEP-approved landfill to handle non-recyclables and ash residues generated by the waste-to-energy facilities.

### First mandatory recycling law

On April 20, 1987, Governor Thomas Kean signed the state's first mandatory recycling bill into law. The law mandated that all New Jersey communities submit a recycling plan to the DEP as an integral part of their solid waste management plan. Following DEP approval, each community must begin a recycling program that recovers a minimum of 15% of recyclable materials in the first year, and a minimum of 25% after two years.

Ray Ching, president of the Association of New Jersey Recyclers, says six of the state's 22 solid waste districts (Camden, Middlesex, Monmouth, Morris, Somerset, and Union) have had their recycling plans approved by the DEP. Fourteen districts have submitted their plans and are waiting for DEP approval. The remaining two districts are in the process of finalizing their plans.

Some confusion has surfaced over which materials are eligible toward meeting the state's recycling goal under the new law. The DEP's Office of Recycling, which has administered state-wide recycling efforts since 1982, has clarified that while vegetative waste (i.e., farm and yard wastes) does not count toward the 25% level, leaves are specifically mandated to be composted and do count toward tonnage grant rebates.

Effective September 1, 1988, leaves will be banned from all landfills within the state. As a result, composting projects have become a top priority throughout New Jersey. White goods such as refrigerators and other major appliances also count toward the recycling goals, provided they are collected through a municipally-managed program, according to the Department of Recycling.

Three materials at a minimum must be recycled, according to the state law. These materials usually include newspaper, aluminum cans, and glass containers, says Ching.

### Recycling program results

The level of recycling activity in New Jersey has been

**Table 1 Documented Recycling Tonnage In New Jersey**

	1982	1983	1984	1985	1986
Tons Of Solid Waste Recycled	252,000	492,000	652,000	889,900	1,100,000
Number Of Participating Communities	240	313	339	405	424

Source: New Jersey DEP Office of Recycling.

documented by the Office of Recycling since 1982 through the Tonnage Grant Program. The program provides grant monies to eligible communities in exchange for documentation of active recycling efforts. A state-wide landfill surcharge funds the program. The level of recycling achieved through the program from 1982 to 1986 is presented in Table 1. Also shown is the number of municipalities participating each year. There are 567 municipalities in New Jersey.

The tonnage numbers reflect the minimum amount of recycling that took place during each respective year, according to Joe Rogers, recycling specialist in the Office of Recycling.

Not all of the state's municipalities have been reporting their recycling activities; however, under the mandatory law, all municipalities in the state must report their recycling efforts to the DEP starting in July 1988.

Rogers estimates that 11% of New Jersey's total solid waste stream is being recycled. Reaching the state recycling goal of 25% will not be a problem, he predicts. Guy Watson, supervising recycling specialist in the Office of Recycling, agrees, saying that many businesses recycle already because it makes sound business sense to do so in light of New Jersey's increasingly costly solid waste disposal fees. Market demand for New Jersey's recyclable materials also is not a problem, Watson says. There is more local demand for newsprint now than is being supplied, and aluminum cans are being purchased at market for about \$1,200 per ton. These trends are due in part to contracts with foreign countries that have made supplies of certain recyclables relatively scarce for local markets, Watson says.

### Recycling and waste-to-energy are compatible

With the mandatory recycling law targeting one-quarter of New Jersey's solid waste stream, and the siting of new landfills being primarily limited to the state's southern region, the need for another management al-



ternative is apparent. The option of choice for a majority of the state's solid waste districts is waste-to-energy.

Only a few small waste-to-energy facilities currently operate, but at least 11 large-scale projects are now in various stages of development. The projected combined capacity of the state's waste-to-energy facilities is shown in Table 2.

A 400-ton per day (tpd) facility is now under construction in Warren County and is scheduled to be on-line by November 1988. Essex County recently broke ground on a 2,250-tpd project, and DEP construction permits have been issued for projects in Bergen, Gloucester, and Camden counties. Progress also has been made on projects in Pennsauken, Passaic, Union, Hudson, Mercer,

ing recycling equipment, and requires state agencies to purchase more recycled paper.

The consensus among state and local environmental officials is that recycling and waste-to-energy activities compliment one another. A state-funded investigation in Essex County examined the potential impact of comprehensive recycling on the design and operation of the county's waste-to-energy project. The study concluded that removing significant quantities of recyclable materials such as newspaper, corrugated paper, glass, tin, and aluminum cans could increase the heat content of the remaining waste and reduce the quantity of ash produced. Recycling could also cut an estimated \$22 million in capital costs by reducing the size requirement of the county's waste-to-energy facility 15%, the study found.

Gilbert Mueller, a supervising planner for DEP's Bureau of Solid Waste Planning, says most of the waste-to-energy projects now in the permitting process have been down-sized to accommodate the state's 25% recycling goal.

The final permit applications for Gloucester and Camden counties' projects were required to incorporate recycling plans consistent with the goals of the mandatory law.

### **First large-scale waste-to-energy project due to open in Warren County**

Warren County, located in New Jersey's northeast corner, which is predominately rural, may have more open space than other northern counties, but still has a solid waste disposal problem. County officials worked out a solid waste management plan for state approval. Two components of the plan approved by the DEP, a 400-tpd waste-to-energy facility and a nearby landfill, will soon be in place.

During the early stages of project development, feasibility analyses were conducted by Metcalf & Eddy, the county's engineer. These analyses also considered the effect an efficient recycling program would have on the operation of a county-wide waste-to-energy facility. A series of facility life-cycle forecasts were undertaken to determine what the economic impact of the project would be under different scenarios.

The permitting process for the facility started in 1984. The Pollution Control Financing Authority was formed in December 1984, and, backed by a Swiss bank letter of credit, issued \$45 million in bonds. In June 1985, Blount Energy Resource Corp. was selected as the project's full-service contractor.

Once the permit requirements were met, the funds were taken out of escrow, and construction commenced in the summer of 1986. Additional bonds totalling \$20

**Table 2** Projected Waste-To-Energy Facility Processing Capacity 1988 - 1993

Year Ending	Waste-to-Energy Facility Processing Capacity (tpd)
Currently	60
1988	460
1989	460
1990	3,085
1991	12,195
1992	16,695
1993	21,945

Source: New Jersey DEP Division of Solid Waste Management, Bureau of Resource Recovery.

and Ocean counties. Deieso notes that these facilities exceed \$3 billion in capital investment and will provide the backbone for New Jersey's solid waste security.

DEP's Bureau of Resource Recovery estimates that as of 1986, the 7,620,000 residents of New Jersey generated 30,600 tpd of solid waste. Even with no population growth or increase in economic activities in the state through 1993, waste-to-energy facilities would process 72% of the waste stream, (based on 21,945 tpd, shown in Table 2). This would leave more than 28% of the waste stream for recycling and landfilling.

More solid waste will be available for recycling, however, since New Jersey's population is estimated to grow by approximately 3% through 1990, and 4% through 1995, according to the State Office of Demographic and Economic Analysis.

Additional activities are now underway to help ensure the minimum recycling goals are met. For example, the Office of Recycling offers low-interest loans to new or expanding recycling firms, gives tax credit for purchas-



million were issued in November 1987 to cover the cost of additional items.

Russel Miles, county planning director, says construction on the facility is nearly complete. Acceptance testing of the facility begins in May 1988, and Blount is contractually obligated to have the facility operating by the end of November 1988. Blount officials expect the facility to be fully operational by this summer.

### **State-of-the-art landfill operation**

Warren County's new landfill facility, located within a mile of the waste-to-energy plant, has been under construction since November 1987. It should open by late 1988 or early 1989, says Miles.

The landfill complies with all DEP standards, and will have four liners (two clay, and two synthetic), leachate collection, and a continuous monitoring system. Ash residue from the waste-to-energy facility and by-pass waste will be the primary materials disposed of in the landfill.

The landfill is expected to be used in three phases over a 20-year period. The total facility cost is estimated at \$49 million, \$27 million of which has been financed through bonds.

### **Recycling plan gears up**

Warren County's recycling plan calls for a two-phase program. Phase one involves using a temporary storage facility equipped with a baler for recyclables. In the second phase, the county plans to build an intermediate processing facility to handle the county's recyclables. DEP has approved a draft of the recycling plan, which is now being considered by the County Freeholders. A public hearing will be held, after which the plan will be sent back to the DEP for a 90-day final review period.

Jack Conklin, Warren County recycling coordinator, expects the recycling plan to be approved by July 1988.

### **Warren County solid waste costs**

Warren County currently pays \$70 per ton to have its waste hauled to Pennsylvania. When its waste-to-energy facility and landfill go on-line, the county estimates the tipping fee will be \$86 per ton (\$52 per ton for the waste-to-energy plant and \$34 per ton for landfilling).

This assumes a worst-case scenario, with the waste-to-energy facility operating at only 85% capacity. However, Warren Energy Resource Co., a subsidiary of Blount, has an incentive to operate the facility at a higher capacity since it is entitled to 10% of the energy revenues generated.

Warren County intends to "reinvest" its 90% revenue

share back into the tipping formula. The more revenues that are generated, the lower the tipping fee will likely be. Another advantage of operating at higher capacity is that less solid waste will be disposed of at the landfill, extending its operating life.

### **Will there be enough refuse?**

Warren County has 93,672 citizens, who generate between 270 and 280 tons of refuse, says Conklin. By 1990, the county's population should grow to more than 108,000. While this growth rate is higher than projections used to size the waste-to-energy facility, waste generated still may not be enough to initially operate at full capacity. Warren County, therefore, has signed a 14-year disposal contract with Hunderdon County for 100 tpd.

### **Meeting the state's recycling goals**

The latest Tonnage Grant Program data show that Warren County recycled 3.5% of its total solid waste stream in 1986. Only four of the county's 23 townships participated in the program at that time.

Since then, the county has become more actively involved, providing assistance on a regional level and targeting more township participation. A strong public education program coupled with active township involvement is the key to the county's ultimate success in meeting the state's minimum goal of 25%.

The county is targeting glass containers, aluminum, tin, and plastic beverage bottles for recycling. Unlike other New Jersey counties, Warren County is not requiring newspaper recycling. This move has been greeted with mixed feeling by the public and elected officials, says Conklin. The county will remain neutral on the issue, and not interfere with township efforts to recycle paper, or direct the flow of paper to the waste-to-energy facility, he adds.

According to Conklin, incentive programs are in the works to help townships and the county meet the recycling goal. For example, revenues to be generated by the intermediate processing facility will be distributed to townships who meet their reduction targets.

Warren County also is considering working with the Board of Public Utilities, the state regulatory agency responsible for controlling hauling and disposal rates, to change the fees charged by haulers to a per container basis.

Solid waste haulers currently charge county residents for services on a per household basis. This does not encourage recycling since a household that generates one bag of garbage pays the same price as a household that generates five. ■