B. Solid Waste Management Hierarchy

B.1. Source Reduction

Source Reduction is the first tier of the solid waste management hierarchy. The term source reduction is used to describe those activities that decrease the amount (weight or volume) or toxicity of waste entering the solid waste stream. It also encompasses those activities that increase product durability, reusability and reparability.

USEPA reports an average nationwide generation of Municipal Solid Waste (MSW) for 2000 to be 4.5 lb/person/day, down from 4.6 lb/person/day in 1999. Because solid waste generation is tallied differently in New Jersey than it is nationally by USEPA, a direct comparison of generation numbers is not possible. The Solid and Hazardous Waste Management Program estimates that municipal solid waste generation in 2003, totaled 9,741,117 tons, up slightly from 9,347,268 tons in 2002. (See Table A-4.) Given the 2000 census population of 8,414,350, citizens generated an average 1.16 tons/year (2,320 lbs/year), or 6.4 lb./day in 2003, also up slightly from the 6.08 lbs/person/day generated in 2002.

Citizens of New Jersey generate more waste than the average US citizen. Inasmuch as EPA and others have detailed that waste generation tracks economic activity, it is not hard to understand why New Jersey's waste generation would be much higher than the national average. According to demographic statistics for the United States, New Jersey has the highest per capita income in the nation. Since much of the municipal waste stream is dominated by single-use items, and attendant packaging, and given that two thirds of US economic activity is based on consumer spending, it's not surprising that New Jersey has such a relatively high per capita waste generation rate.

Between 1985 and 2003, the generation of total solid waste in New Jersey has risen by an annual average of approximately 4%. (See Table A-1.) During that period, the tonnage of material disposed has actually gone down by approximately 1.6 million tons, and the amount of MSW recycled has increased (according to reported recycling activity) by approximately 2.5 million tons. In spite of these two trends, however, the waste stream continues to grow faster than our ability to recycle it. If the total non-hazardous waste stream continues to increase at the historic rate, resulting in a 2015 waste stream of 33.0 million tons, we will have to recycle 72 percent of the stream to avoid growth in disposal. Currently, we are recycling 51.8 percent. We are not aware of any state that has approached an MSW recycling rate of seventy percent. Consequently, we should not look to recycling to solve all of our waste management problems; even if a revived program achieves and surpasses record highs in the recycling rate, we must also do more to prevent the generation of waste.

Impediments to Source Reduction

Notwithstanding that source reduction is at the top of the NJDEP's solid waste management strategy hierarchy, it is often overlooked due to the inherent difficulties associated with the quantification of such measures, and the lack of incentives. Indeed, significant source reduction of certain commodities such as paper, which are recycled, may actually lower total recycling rates, and appear to be a setback, particularly since municipalities are granted monies on the basis of tons recycled, not tons avoided. It is also more difficult to achieve, depending as it does upon the cessation of activities, rather than new activities-it is harder to convince consumers to make do with less than it is to teach them to separate their trash.

Although some successful pollution prevention programs exist for specific industry segments and for general business through USEPA's WasteWi$e program, there has not been a comprehensive source reduction program aimed at the general consumer. Existing educational efforts are mostly focused on the early grades, when children have little purchasing power. Related efforts to teach wise money management tend also to encourage source reduction; techniques such as buying in bulk do both. But these efforts are focused on adults in economic difficulty. The average or well-to-do consumer is not typically presented with engaging material directing one toward source reduction at work or at home.

Source reduction is also hampered by the fact that government has little control over the amounts and kinds of consumer goods put into the marketplace, nor over the packaging used for those goods, with the exception of certain toxic constituents. While government intervention in this aspect of commerce is naturally limited in a market-based economy, the proliferation of packaging, in particular, has made it difficult for source reduction gains to be achieved. Clearly, packaging plays an important role in terms of product integrity, promotion, safety and protection. However, the over-packaging of many products is one of the causes for the increase in solid waste generation in New Jersey. In general, manufacturers have opposed governmental attempts to make them even partly responsible for the packaging waste generated by their products. As a result, the solid waste management budget burden associated with packaging waste has fallen on local government. This situation has led to increased discussions about product (and packaging) stewardship.

Product stewardship is the term used to describe a system that addresses the environmental and economic impacts of a product through its life cycle, i.e., from cradle to grave. This approach entails everything from design and manufacturing to packaging and distribution to end-of-life management. Responsibility for end-of-life management shifts from the public sector alone, to a system where that responsibility is at least partly shared by the private sector. The goal is to encourage environmentally friendly design and recycling, and reduce the amount of waste in need of disposal. Policies that promote and implement product stewardship principles should create incentives for the manufacturer to design and produce "cleaner" products - ones made using less energy, materials, and toxics, and that result in less waste (through reduction, reuse, recycling, and composting) and use less energy to operate. These policies should also create incentives for the development of a sustainable and environmentally sound system to collect, reuse, and recycle products at the end of their lives. Until a system of product stewardship is established, either by legislation or voluntary industry agreements, it will continue to be difficult to slow down the growth in solid waste generation in New Jersey and throughout the country. Despite this fact, interest in source reduction has grown to the point where there is now a movement afoot that is dedicated to waste reduction with zero waste as the ideal long-term goal. While the establishment of such a lofty goal is noteworthy, it is clearly inconceivable in the absence of a system of product stewardship.

Existing DEP Initiatives

The Department's support for source reduction is evidenced by its membership in the WasteWi$e program administered by the United States Environmental Protection Agency. Unlike other waste minimization programs, which shunt waste to recycling, the WasteWi$e program aims primarily to prevent the generation of waste in the first place, secondly to recycle as much of the remaining waste stream as possible, and lastly to buy products containing recycled materials. As a WasteWi$e member, DEP has begun to pilot operational changes to minimize its two greatest waste streams: office paper and paper hand towels. One targeted method is the default setting of

all copiers to two-sided copies. As successful methods are identified, they can be transferred to all government offices, achieving significant purchase reduction in this major employment sector. Success at the state government level would give DEP expertise and authority to bring those changes to private industry.

Another example is the "Pay-as-You-Throw" system. In communities with Pay-as-You-Throw programs (also known as per container systems, unit pricing or variable-rate pricing), residents are charged for the collection of household waste based on the amount they throw away. This creates a direct economic incentive to recycle more and to generate less waste. While such systems for municipal solid waste collection and disposal are an effective means to encourage source reduction and recycling, Pay-as-You-Throw programs are not widespread in New Jersey. To address this, a publication entitled "Implementing Per Unit Pricing for Municipal Solid Waste Collection: Questions & Answers" was developed by the Department in 1995. The Department also held several informational seminars on Pay-as-You-Throw systems to assist local officials with implementing the program. Despite this effort, there has not been much interest in Pay-as-You-Throw systems in this state in recent years. As noted on the United States Environmental Protection Agency's Pay-as-You-Throw website found at http://www.epa.gov/epaoswer/non-hw/payt/index.htm, these programs promote environmental and economic sustainability, as well as equity. As such, the Department will continue to promote this strategy and has set forth a number of recommendations (see "Recommendations" section below) that will hopefully lead to an increase in the use of this source reduction approach.

Another effective source reduction program has been the "Grass - Cut It and Leave It" program. The objective of this program is to get residents to leave grass clippings on the lawn when they mow as grass clippings provide a natural and healthy fertilizer for a growing lawn. On-site management of grass clippings and other organic matter has proven to be not only a highly effective source reduction measure but also a popular yard waste management strategy. This is evidenced by the proliferation of "Grass - Cut It and Leave It" programs in New Jersey over the past decade. The Department helped promote these programs through the publication of two brochures on the benefits associated with this activity, as well as the support of grant programs by counties to provide educational and promotional support for the program. The benefits of “Grass-Cut It and Leave It” programs are significant; not only does leaving clippings on the lawn reduce water and nitrogen needs (and attendant runoff from increased water and nitrogen usage), but the waste generation savings can be enormous. It is estimated that as much as a ton of clippings is generated for every acre of turf in a single growing season. With nearly 900,000 acres in New Jersey covered in turf, one can easily see why this program can have such a big effect on the annual generation of MSW.

In regard to source reduction support for the business sector, the Department produced a publication in 1996 entitled "How to Reduce Waste and Save Money - Case Studies from the Private Sector." Among other things, this guide highlighted actual measures that New Jersey businesses have implemented to minimize waste generation and maximize their monetary savings. The guide was distributed to businesses throughout the state and still serves as a useful resource for the private sector. The Department's website also includes source reduction suggestions for the business sector, such as using bulletin boards or computers for interoffice communication rather than paper memos, at
http://www.state.nj.us/dep/dshw/recycle/whyrecycl/office.htm.

The Department has also been involved in several initiatives designed to reduce the toxicity of materials entering the waste stream. For example, the Department initiated a pilot program for the collection of mercury switches from automobiles as part of the Performance Partnership

Agreement (PPA) Appliance and Vehicle Mercury Switch Recovery Incentive Program. This agreement was signed January 3, 2002 by the NJDEP, USEPA Region II, the Automotive Recyclers of New Jersey, Association of Household Hazardous Waste Coordinators, the New Jersey Chapter of Scrap and Recycling Industries and Comus International. The agreement was designed to reduce mercury emissions from iron and steel melters while increasing the overall benefits of recycling. This was accomplished by collecting mercury containing switches from end-of-life vehicles, maximizing the amount of mercury removed from scrap prior to delivery to and further processing at a scrap recycling facility.

The Department has also worked with the Northeast Waste Management Officials' Association (NEWMOA) on the development of model legislation that would reduce or eliminate non-essential uses of mercury in household, institutional and industrial products and processes. The model legislation provides a comprehensive framework to help states develop more consistent approaches to managing mercury-containing wastes.

The Department's participation in the Toxics in Packaging Clearinghouse is another means by which source reduction is advanced in New Jersey. The Toxics in Packaging Clearinghouse, which is coordinated by the Northeast Recycling Council, assists the member states to implement the elements of the "Toxic Packaging Reduction Act", adopted by New Jersey first in 1991. The Act requires manufacturers of packaging and packaging materials to reduce the amounts of certain toxic substances added to packaging and packaging components.

DEP's education initiatives are hampered by the absence of good models, but new source reduction material has been inserted in the latest release of "Here Today, Here Tomorrow", DEP's solid waste curricular supplement. Additionally, DEP will be updating its website to provide more varied source reduction guidance. At present, examples of source reduction strategies for consumers, such as buying products in bulk so as to avoid excess packaging, can be found on the Department's website at http://www.state.nj.us/dep/dshw/recycle/whyrecycl/home.htm. Additional source reduction strategies for the home can be found at www.earth911.org.

The Department's Division of Parks and Forestry sponsors an educational program called Project Learning Tree, an educational tool for public school science teachers. The program has been expanded to include a challenging and provocative unit on municipal waste, with a focus on source reduction. The Department has also recently sponsored the printing of a "redistribution manual". Nine thousand copies of this guide, listing numerous local outlets for the reuse of a wide range of consumer goods in the central Jersey region were recently printed and distributed to local officials, civic groups, realtors, colleges and universities etc.

Recommendations

As noted above, Pay-as-You-Throw systems are effective but not widespread in New Jersey. In light of this fact, the Department recommends that this source reduction strategy be revisited and reemphasized. In support of such an effort, the Department recommends that a survey of existing Pay-as-You-Throw programs be undertaken in order to better determine those aspects of such systems that have worked, as well as those aspects that have been problematic. Upon completing this task, the Department envisions working with targeted communities on the potential implementation of such programs. In addition, the Department recommends that state funding offset the initial costs associated with such programs (administrative and promotional) should a dedicated source of funding be established for recycling in New Jersey. Results would be closely

monitored to determine whether such systems decrease waste generation or alter purchase patterns to favor recyclable materials.

As noted above, New Jersey has legislation in place that calls for manufacturers to reduce the amount of toxic substances added to packaging and packaging components. While this has been beneficial to the Department's source reduction efforts, the legislation needs to be amended in order to make it consistent with the updated and revised model legislation advocated by the Council of State Governments.

A statewide source reduction public education and awareness campaign is also recommended. While New Jersey's recycling program has been the focus of past efforts, insufficient public education and awareness campaigns on behalf of waste prevention have been undertaken in New Jersey. The inclusion of source reduction themes in state government procurement contracts is also recommended. Contracts for existing items may be altered to require greater recycled content, items that generate lesser amounts of disposable materials, and items with reduced toxic constituents.

The Department further recommends following up on the success of "Cut It and Leave It" with a home composting campaign, supplying or partially underwriting composting units through local government agencies. This should not only reduce the need to manage these materials in the first place (one can mulch, by way of a mower with a mulching blade, leaves onto the ground just as easily as grass clippings), but would also reduce the need to collect and centralize yard waste composting, as well as allow concomitant food composting.

Many states publish information to help citizens prevent receipt of junk mail, primarily credit offers and catalogs. The DEP recommends increasing efforts to publicize these programs, if a source of funding is secured for the effort.

Some governments fund materials exchanges, such as Minneapolis, MN. Materials exchanges are enterprises which can accept large volumes of business or home furnishings for sale at low prices. They are mostly used by established corporations who wish to avoid the cost of disposal of outdated material, and start-ups which need to avoid costs. The DEP supports these efforts, and recommends expanding existing exchanges in the state, or assisting in the institution of new exchanges where none are currently present if funding becomes available.

Project Learning Tree depends for its implementation on a body of trained teachers. At present, school systems are required to fund the training for their teachers. At such time as funding may be obtained, the Department could fund, partially or completely, the tuition of science and social studies teachers for this program, thereby increasing the attractiveness of this program in contrast to other training.

The redistribution manual, currently focusing on the counties of Mercer, Middlesex and Monmouth, should be expanded to cover all 21 counties in New Jersey.

Source reduction techniques should be introduced through the LEEDS program, which is already successfully promoting recycling, among other things, in building design and construction.

As noted above, municipal recycling grant monies are distributed on the basis of recycling tonnage. While this encourages separation and collection of recyclable materials, it does not discourage the generation of waste very much, and "punishes" source reduction when any material reduced was bound for recycling collection, such as glass and paper. The Department is

considering altering the calculation of reward to towns and counties in order to give credit for source reduction activities. This approach has been well received in Maryland. Counties' diversion rates are adjusted upward proportionally to their source reduction activities. Some activities can be more clearly linked to diminished handling and disposal, such as "Cut-It-and-Leave-It". Others, such as general promotional advertisements may not be as clearly linked to specific reduction in MSW tonnage. The Department proposes to work with local recycling coordinators to determine if a program can be created to offer credits for source reduction activities that works with the long-standing municipal recycling tonnage grant program.

B.2. Recycling

Introduction

The Department's statistics indicate that New Jersey recycled 32.7% of its municipal solid waste stream and 51.8% of its total solid waste stream in 2003. While these recycling rates are noteworthy they are significantly lower than the 1995 peak municipal solid waste recycling rate of 45% and the 1997 peak total solid waste recycling rate of 61%. Clearly, the continued downward trend in our state's recycling rates is troubling and cannot be overlooked. Among other factors, the loss of the program's dedicated state funding source in 1996, as well as the declining solid waste disposal fees that resulted from a landmark court decision that nullified New Jersey's waste flow system, have played major roles in this decline. The December 2002 signing of the "Clean Communities and Recycling Grant Act" was a significant step since the Act includes funds for recycling performance grants to municipalities and eligible counties. It does not, however, fully address the funding needs of our state's recycling program. As such, it is imperative that this issue be addressed and that a strategy be put in place that will help fully fund a comprehensive state recycling program. This, in turn, will lead to the development of stronger and more effective recycling programs and increasing recycling rates throughout the state. As will be more fully detailed later, recycling has proven to be an environmental and economic success story for New Jersey. However, without action to provide the means for a comprehensive program, the recycling success that New Jersey has achieved will continue to be jeopardized even with the recent enactment of the Clean Communities legislation.

Historical Background

Despite the recent decline in our state's recycling rates, New Jersey is still a nationally recognized leader in recycling. The passage of New Jersey's mandatory recycling legislation in 1987 was a major milestone in our state's solid waste management history and helped establish New Jersey as a leader in this field. The "New Jersey Statewide Mandatory Source Separation and Recycling Act" (Recycling Act), N.J.S.A. 13:1E-99.11 et seq., set forth an ambitious program that reshaped at least one aspect of the everyday lives of state residents, businesses and institutions. Among other things, the Recycling Act required New Jersey's twenty-one counties to develop recycling plans that mandated the recycling of at least three designated recyclable materials, in addition to leaves. County recycling plans were also required to designate the strategy to be utilized for the collection, marketing and disposition of designated recyclable materials. Other provisions of the Recycling Act required municipalities to adopt an ordinance based upon their county's recycling plan. The initial goal of the Recycling Act was to recycle 25% of the municipal solid waste stream. That goal was more than doubled through legislation enacted in 1992 (P.L. 1992, c.167), amending the 1987 Recycling Act with a new challenge to recycle 50% of the municipal solid waste stream and 60% of the overall waste stream by the end of 1995. The recycling goal for the total solid waste stream was eventually raised to 65% by the

end of 2000. This was done through a Departmental policy set forth in 1997. (As a point of clarification, the 65% total solid waste recycling goal that was adopted by the Department in 1997 shall no longer be considered the state's "official" recycling target as it was established pursuant to an administrative policy and has tended to divert attention away from the more significant goal of recycling at least 50% of the municipal solid waste stream.) Of course, the Department will continue to strive for recycling success beyond the legislatively prescribed goal, however, for program planning purposes the achievement of a 50% MSW and 60% total solid waste recycling rate are the state goals that are to be pursued.

Another important provision of New Jersey's landmark recycling legislation was the establishment of a tax of $1.50 per ton on solid waste disposed at landfills and transfer stations statewide. In accordance with the Recycling Act, revenue from this tax was credited to the State Recycling Fund and allocated and used for the following purposes:

40% - municipal and county recycling tonnage grants;
35% - low interest loans or loan guarantees to recycling businesses and industries and recycling market development research;
10% - public information and education;
8% - county recycling program grants; and
7% - state recycling program planning.

As mentioned above, this dedicated funding source for recycling expired at the conclusion of 1996. The expiration of this so-called "Recycling Tax" also put an end to the Department's low-interest business recycling loan program, which had been used by many companies to start or expand their recycling operations. Over the life of the program, the Department approved 48 loans valued at over $21 million. Recycling loans ranged from $90,000 to $3,000,000 and were used to finance recycling collection, processing and manufacturing equipment. Another important financial incentive that had been available to the private sector recycling industry was the recycling investment equipment tax credit. While this program also expired at the end of 1996, it was a demonstrated success in accelerating investments in recycling technology that diverted recyclable materials from landfills while creating new markets, new jobs, increasing manufacturing production and attracting additional investment. In fact, in the last year of the program, the Department approved 212 tax credit certifications for 38 corporations. Among those certifications, 142 were for the purpose of processing source-separated recyclable materials, 38 were for manufacturing purposes and 32 were for transporting source-separated recyclable materials.

Funds generated by the Recycling Tax were used at the local level to support recycling coordinator positions, education and promotion campaigns, business and school recycling programs and enforcement functions, among other things. Such efforts were greatly reduced or eliminated as a result of the loss of this dedicated funding source for recycling. Compounding this situation was the expiration of the Resource Recovery Investment Tax at the conclusion of 1995. While not initially designed to support recycling programs, funds generated by this tax were sometimes used by counties for recycling purposes. The Solid Waste Services Tax remains a viable tax and continues to support some county recycling efforts, however, this fund is also not sufficient, nor a replacement for a dedicated source of funding for a comprehensive recycling program.

The State Legislature authorized special appropriations for municipal and county recycling efforts in State Fiscal Years 2001 and 2002. While these measures helped local recycling efforts to some degree, the amount of funding provided was significantly less than the grant amounts

previously provided by the Recycling Tax and therefore incapable of fully addressing local recycling needs. Furthermore, as noted above, the recently enacted "Clean Communities and Recycling Grant Act" will provide some funding for local recycling efforts. While this is a positive development that will result in an annual allocation of up to $4 million (25% of the fund) of the Clean Communities Program Fund for limited municipal and county recycling grants, it too represents significantly less than the funding previously provided for this purpose by the Recycling Tax. On average, the Recycling Tax generated $11.5 million each year for New Jersey's comprehensive state recycling program. The Clean Communities legislation provides no funding for other components of a comprehensive state recycling program, such as local and statewide education programs, recycling business incentives and recycling market development activities. These often-overlooked components were integral to the initial rise and success of recycling in New Jersey.

As mentioned previously in this plan, source reduction and recycling have been designated as the preferred solid waste management strategies for New Jersey. As such, they have been placed at the top of the State's solid waste management strategy hierarchy. This reemphasis on recycling could not come at a better time. A renewed focus on recycling is warranted in order to make New Jersey the preeminent state for recycling and forward-thinking recycling policy.

Environmental Benefits

Undoubtedly, recycling is a well-documented environmental success story. In 2003, New Jersey recycled nearly 10.3 million tons of its total solid waste. Recycling not only saves resources and energy, but also reduces the need for landfills and resource recovery facilities. In regard to energy conservation, recycling is especially beneficial. According to a 2003 study by the Northeast Recycling Council (NERC), "In 2001, New Jersey's recycling efforts saved a total of 128 trillion BTU's of energy, equal to nearly 17.2% of all energy used by industry in the state, with a value of $570 million. This energy savings is also an amount equal to 22 million barrels of oil saved, and enough power for nearly 1.2 million homes for a year." For example, aluminum produced from used beverage cans requires 90-95% less energy than aluminum produced from bauxite ore. In addition, steel produced from recycled ferrous metals requires 74% less energy than steel produced from virgin ores, while recycled glass production requires 20% less energy than glass production from virgin materials. Recycled paper production also requires between 23% to 74% less energy than virgin paper production.

Recycling also results in reduced emissions of air and water pollutants. As also detailed in the NERC report, "In 2001, the recycling of paper, plastic, glass, aluminum cans and steel cans resulted in reductions of 8,000 metric tons of water pollutants and 120,972 metric tons of air pollutants (in addition to the 5.7 million metric tons of carbon equivalent (greenhouse gas) reductions per year). Recycling reduced overall emissions of sulfur oxides by approximately 7,200 metric tons and nitrous oxides by some 7,500 metric tons." More specifically, recycled paper production creates 74% less air pollution and 35% less water pollution than virgin paper production. In addition, the production of recycled steel creates 85% less air pollution and 40% less water pollution than the production of steel from virgin ore, while recycled glass production creates 20% less air pollution than does production with virgin materials.

As previously indicated, recycling also promotes our state's Greenhouse Gas Reduction goals. The USEPA calculated that on average, approximately 1.67 metric tons of CO2 equivalents are avoided for every ton of municipal solid waste (MSW) recycled. If the MSW recycling rate increases from 34% to 50%, a total of 7.7 million metric tons of CO2 equivalent in avoided Greenhouse Gas emissions would result.

The environmental benefits of recycling are not only significant because of their positive impact on the air, water and land of our state, but also because they result in monetary savings for manufacturers and society, in general. While the monetary benefits resulting from the energy savings achieved by using recycled aluminum and glass in manufacturing, for example, are easy to quantify, other savings, such as the economic benefit of reducing greenhouse gas emissions, for example, are much more difficult to quantify. Nevertheless, an economic benefit must be attributed to such activities as clean air, water and land which are far more valuable than polluted resources.

Economic Benefits

While the environmental benefits of recycling are well known, the economic benefits of recycling are also significant despite the fact that they are often overlooked. Simply stated, recycling has encouraged the growth of an industry and created jobs. On a national scale, the recycling industry continues to grow at a rate greater than that of the economy as a whole. In fact, according to the Institute for Local Self-Reliance, total employment in the recycling industry from 1967 to 2000 grew by 8.3% annually while total United States employment during the same period grew by only 2.1% annually. The recycling industry also outperformed several major industrial sectors in regard to gross annual sales as its sales rose by 12.7% annually during this period. Furthermore, the number of recycling industries in the United States increased from 8,000 in 1967 to 56,000 in 2000. These facilities employ 1.1 million people across the country.

On a more local scale, New Jersey's well-developed recycling industry, which includes manufacturers of various recycled products, specialized processing facilities and transporters, is an important segment of the state's economy. A recent study conducted by the Northeast Recycling Council and United States Environmental Protection Agency found that almost 27,000 people in New Jersey are employed in recycling and reuse establishments and that total receipts from these establishments are valued at over $5.9 billion annually. The Department estimates that nearly 9,000 additional jobs would be created in New Jersey should the 50% municipal solid waste recycling goal be met. New Jersey's recycling infrastructure includes 17 intermediate processing facilities for Class A recyclable materials (glass bottles, metal cans, plastic containers, paper grades), over 100 NJDEP-approved recycling centers for Class B recyclable materials (concrete rubble, asphalt debris, wood scrap, scrap tires), and dozens of industrial facilities including steel mills, foundries and paper mills.

The economic benefits of recycling are significant in other ways, as well. For example, recycling can save money on disposal costs for generators. A survey (see below) conducted by the Department in April 2004 showed that recycling asphalt debris, concrete rubble, used bricks and blocks, felled trees and stumps and wood scrap costs significantly less than disposing of these materials as solid waste.

Average Cost to Recycle:

A. Asphalt debris* - $5.70 per ton
B. Concrete rubble* - $4.85 per ton
C. Used bricks and blocks* - $5.49 per ton
   Trees and stumps - $37.69 per ton
D. Wood scrap - $46.43 per ton

Average Cost of Disposal:

Over $75.00 per ton and can be as high as $98.00 per ton.

* Several recycling centers did not charge any fee for the receipt of these recyclable waste materials.
Survey results based upon 63 respondents.

The sale of recycled products is also becoming an increasingly important component of the retail sector and commerce, in general. There are over 1,000 different types of recycled products on the market and due to changes in technology and increased demand, today's recycled products meet the highest quality standards. Recycled products are also more readily available than ever before. Such products can be found in major retail stores, supermarkets, garden centers, local shops, catalogs and on the Internet. Furthermore, recycled products are affordable. Many recycled products cost the same or less than comparable products made with virgin feedstock. Although some recycled products do cost more than their virgin counterparts, many are less expensive over the lifetime of the product. For example, the purchase of recycled plastic lumber makes economic sense when life cycle cost analysis is taken into consideration. By purchasing recycled products, consumers are helping to create long-term stable markets for the recyclable materials that are collected from New Jersey homes, businesses and institutions.

The Road to Goal Achievement

Notwithstanding the environmental and economic benefits of recycling, New Jersey has not met its total solid waste (TSW) recycling goal of 60% since 1997 and has never met its 50% municipal solid waste (MSW) recycling goal.

Based upon 2003 waste generation data, approximately 1,570,000 additional tons of waste would need to be recycled in order to reach the 60% TSW recycling goal. Furthermore, based upon the same waste generation data, slightly less than 1,700,000 additional tons of municipal solid waste would need to be recycled in order to reach the 50% MSW recycling goal. The latter goal, in particular, represents a major challenge for our state's many recycling programs, however, it is one that can be met. Due to the fact that such an increase in recycling tonnage will not only lead to the achievement of the 50% MSW recycling goal but also the 60% TSW recycling goal, the strategies presented herein will focus primarily on ways to recycle more municipal solid waste. A county-by-county look at MSW recycling in 2003 that includes data regarding attainment of the 50% MSW recycling goal can be found in Table B-1. Of course, another way to improve recycling rates is to slow down or halt the seemingly ever-growing amount of waste generated. A discussion of this problem, however, is contained within the Source Reduction section of this plan.

In order for recycling to grow, the collection of recyclable materials, processing of recyclable materials into raw materials or end products and manufacture of these raw materials into new products that are purchased by consumers (embodied in the three chasing arrows of the recycling logo) must continue to be nurtured. The Department's ongoing efforts to advance recycling have supported this "recycling loop" in many diverse ways. While the initiatives undertaken typically focus on one aspect of the recycling loop, it is imperative to remember that the different phases in the recycling system are all very much interconnected.

- **Milestones Reached**

Collection of Recyclable Materials

Many initiatives have been undertaken by the Department to support recyclable materials collection programs and the public's participation in these programs. Examples of such initiatives are as follows:

- A biennial "green" building conference and trade show has been held since 1994 for those in the building community. The recycling of construction and demolition debris is promoted at these events;
- The Department is participating in a working group of governmental and non-governmental officials whose goal is to promote the design and construction of "green" school buildings. The recycling of construction and demolition debris in these projects is advanced through this organization;
- The Department helped establish the New Jersey WasteWise Business Network in 2003. One of the aims of the Network is to help businesses, government entities and non-profit organizations recycle more waste;
- In 1999, the Department developed two promotional messages that were shown at movie theaters throughout New Jersey. The promotional messages were shown prior to the start of movies on approximately 435 screens across the state and were viewed by an estimated two million people. One of the messages congratulated New Jersey residents for their recycling achievements and encouraged more of the same;
- The Department provided financial support, most recently in 1999, for Environmental Defense/National Ad Council media campaigns that encourage recycling;
- The Department has procured and distributed numerous promotional items for county and state America Recycles Day (a national recycling awareness event held every November 15) programs;
- An educational and promotional display that supports recycling, as well as solid waste management, in general, was developed for use at conferences and fairs;
- A website (www.state.nj.us/recyclenj) containing information about the importance of recycling, local recycling coordinators and recycling data, among other things, was developed by the Department;
- "Practical Recycling Economics – Making the Numbers Work for Your Program," a publication developed by the Cook College Office of Continuing Professional Education in conjunction with the Department, was provided to all municipal and county recycling coordinators in 1999. It was designed to provide specific information, tools and strategies to make recycling more cost-effective for local recycling programs. An additional chapter that focuses on cost-effective promotional strategies that can be employed on behalf of local recycling programs will be added to the manual in 2004;
- The Department continues to fund and participate in the certified recycling coordinator training program that is administered by the Cook College Office of Continuing Professional Education. Until recently, this educational and training program was the only one of its kind in the United States and has resulted in the certification of over 200 recycling professionals;
- The Department helped establish the South Jersey Environmental Information Center in the West Deptford (Gloucester County) Public Library. This facility houses a vast array of recycling related educational resources;
- The annual recycling awards program that is coordinated in conjunction with the Association of New Jersey Recyclers (ANJR) continues to be another important avenue for promoting recycling. The awards recognize the outstanding recycling achievements of municipalities, counties, businesses and industry, as well as schools and other institutions;
- Recycling poetry contests have been held by the Department as a way to get the recycling message out to children in elementary schools. The winning entries were featured in calendars that were distributed to all schools with grades 4, 5 or 6; and

- The Department updated, revised and published a new brochure on used oil recycling. The brochure is targeted at those individuals who change their own automobile's oil and is entitled "Recycle Used Motor Oil – When You Do It Yourself, Do It Right."

Processing and Manufacturing with Recyclable Materials

Many initiatives have been undertaken by the Department to support processors of recyclable materials and manufacturing operations that utilize recyclable materials. Examples of such initiatives are as follows:

- The Department provided $75,000 for the development of a recycled plastic lumber bridge in Wharton State Forest. The bridge was constructed in the fall of 2002 and is unique in that it is the first one to use structural I-beams made of recycled plastic lumber. The plastic lumber used in this project was made from materials collected from New Jersey's curbside recycling programs by Polywood, Inc. of Edison, New Jersey. The Department collaborated on this project with Rutgers University and the Army Corp of Engineers. The bridge is open to the public, but will be used primarily by emergency vehicles;
- The Department continued to work with the Department of Transportation (DOT) on the development of specifications that would allow various recycled materials to be used in road construction and maintenance projects. Ultimately, a number of specifications were adopted by the DOT, including those for reclaimed asphalt pavement, recycled concrete aggregate and "glassphalt," i.e., glass aggregate mixed with asphalt. The use of these recycled materials and others in such projects greatly benefited New Jersey's many recycling centers by providing new markets for the end products generated by the processing of recyclable materials;
- Through the Northeast Recycling Council, the Department participated in recycling investment forums that were held as a way to introduce recycling businesses to venture capital firms, investment banks and individual investors;
- Recycling finance workshops for economic development officials, including one in New Jersey, were also coordinated in conjunction with the Northeast Recycling Council;
- In 1996, the Department incorporated the United States Environmental Protection Agency's used oil recycling rules at 40 CFR Part 279 which reclassify used oil as a solid waste and no longer as a hazardous waste. This regulatory change enables recycling facilities for this material to be established through the Class D recycling center approval process rather than the hazardous waste facility permitting process;
- In 2002, the Department incorporated the United States Environmental Protection Agency's Universal Waste rules which allows the recycling of certain hazardous wastes under a Class D recycling center approval rather than a hazardous waste Treatment, Storage and Disposal Facility (TSDF) permit. This regulatory change enables facilities to profitably recycle batteries, fluorescent bulbs, paints and finishes, thermostats and all other mercury-containing devices, and consumer electronics materials that would otherwise be disposed; and,
- The Department was actively engaged in a "dialogue" as part of the National Electronics Product Stewardship Initiative (NEPSI), a forum for stakeholders to identify and reduce environmental and health impacts from consumer electronic product manufacture, use, storage and end of life management.

Buy Recycled Measures

Many initiatives have been undertaken by the Department to promote and stimulate the procurement of recycled products. Examples of such initiatives are as follows:

- The Department's biennial "green" building conference and trade show, as noted above, also promotes the use of recycled building products and furnishings by those in the building community;
- As also indicated above, the Department is participating in a working group of government and non-government officials whose goal is to promote the design and construction of "green" school buildings. The use of recycled building products and furnishings in these projects is advanced through this organization;
- The Department produced a brochure about the high quality, availability, affordability and diversity of recycled building products and furnishings. The brochure was distributed to architects, builders, engineers and others across the state;
- In addition to promoting recycling, the New Jersey WasteWise Business Network, as mentioned above, advocates the purchase of recycled products, as well as waste reduction. One of the aims of the Network is to help businesses, government entities and non-profit organizations procure more recycled products for their day-to-day operations;
- Prior to the creation of the New Jersey WasteWise Business Network, the Department helped establish and coordinate the New Jersey Buy Recycled Business Network. The role of this organization, which was founded in 1993 and reorganized as the New Jersey WasteWise Business Network in 2003, was to bring the Buy Recycled message to as many companies as possible. Among other things, the Network produced two "Buy It Again!" newsletters each year and held two general membership meetings per year. In conjunction with the Department, the Network also participated in numerous special events such as the USEPA satellite teleconference on recycled product procurement, the New Jersey League of Municipalities trade show and a number of events hosted by the National Association of Purchasing Managers – New Jersey Chapter;
- As noted above, the Department developed two promotional messages that were shown at movie theaters throughout New Jersey in 1999. The promotional messages were shown prior to the start of movies on approximately 435 screens across the state. The Buy Recycled cause was the subject of one of the messages which also highlighted the Department's Buy Recycled website found at www.recyclenj.org;
- The Department coordinated a half-day seminar regarding the use of recycled products in road construction and maintenance for the road construction industry, as well as for NJDOT engineers. The event was well attended and helped raise the awareness of those in this field to the benefits of using recycled materials in such applications;
- The Department participated in the development of the Northeast Recycling Council's (NERC) voluntary industry agreements to buy recycled products and materials. Through the collaborative efforts of NERC and its member states, major industry groups such as the Newspaper Publishing Association and the Yellow Pages Publishing Association consented to voluntary agreements that called for their members to purchase paper with a specified minimum percentage of recycled content. According to a recent report, NERC has received commitments from newspaper publishers in the northeast that will ensure that 86% of the newsprint used in the northeast will have an average minimum recycled content rate of 27%; and
- The Department continues to advocate that state government must practice what it preaches and buy recycled products for its governmental operations. In an attempt to promote compliance with P.L. 1993, c. 109 and Executive Order #91, two measures that require state agency procurement of recycled products, the Department sponsored the development of an easy-to-use guide to the procurement of recycled and environmentally preferable products for state agencies.

Of course, the road to goal achievement is made of more than just milestones already reached. It is also made of the road ahead, which includes new directions along the way. By following new

routes, it will be possible for New Jersey's residents, business and institutions to recycle an additional 1,700,000 tons of municipal solid waste. As previously indicated, this would not only lead to the achievement of the 50% recycling goal for this waste stream but also the 60% total solid waste recycling goal. In addition to the environmental benefits associated with such an increase in recycling, this achievement would also result in the creation of thousands of new jobs and greatly enhance New Jersey's economy.

- **New Directions On the Road: (Specific recommendations follow this section)**

- The establishment of programs designed to encourage the increased recycling of "other paper," i.e., paper other than newspaper, corrugated and office paper, is recommended. Increased recycling of "other paper," which comprises slightly more than 9% of the total solid waste stream, also represents a great opportunity for achieving recycling gains since only 7.6% of this material was recycled in 2003. If new programs are developed to the extent where the recycling rate for "other paper" reaches 45%, New Jersey could realize the recycling of approximately an additional 700,000 tons of this material;
- The establishment of programs designed to encourage the increased recycling of food waste is recommended. Supermarkets, grocery stores, bakeries and institutions, such as hospitals and universities, generate large amounts of food waste. Residents also generate significant quantities of food waste in their homes. At this time, much of this waste is not recycled, but rather landfilled. In fact, 15.1% of the food waste generated in New Jersey was recycled in 2003. In light of the fact that the tonnage of food waste generated per year in New Jersey is greater than the combined tonnage of old newspapers, glass containers and aluminum cans (three of the most commonly recognized recyclable materials), food waste recycling represents a great opportunity for achieving recycling gains in this state. If new programs are developed to the extent where the tonnage of food waste recycled is twice the current rate, New Jersey would realize the recycling of nearly an additional 300,000 tons of food waste;
- The establishment of programs designed to encourage the increased recycling of corrugated is recommended. While corrugated is increasingly being generated in the residential sector due to catalogue and Internet shopping, the bulk of this material is generated at commercial establishments. As such, programs geared towards the business sector are essential for corrugated recycling to increase in New Jersey. If new programs were developed to the extent where the recycling rate for corrugated reaches 75%, New Jersey would realize the recycling of an additional 386,310 tons of this material. This goal is realistic and is based upon the fact that the national recovery rate for old corrugated containers approached 74% in 2002, according to the American Forest and Paper Association;
- The establishment of programs designed to encourage the increased recycling of newspaper is recommended. While newspaper recycling programs are well established in New Jersey, the recycling rate for this material declined to 43.4% in 2003. If new initiatives were employed to the extent where the recycling rate for newspaper reaches 70%, New Jersey would realize the recycling of an additional 253,535 tons of this material. This goal is realistic and is based upon the fact that the national recovery rate for old newspapers reached 71% in 2002, according to the American Forest and Paper Association;
- The establishment of programs designed to encourage the increased recycling of office paper is recommended. While this material is mandated for recycling throughout the state, there are still companies in New Jersey that do not have a recycling program in their office. As such, programs geared towards the office environment are essential. If new programs were developed to the extent where the recycling rate for office paper reaches 55%, New Jersey would realize the recycling of an additional 58,432 tons of this material. This goal is realistic and is based upon the fact that a 55% recycling rate for office paper was previously attained in New Jersey in 1995.; and,

- The establishment, through legislation, of a statewide program to increase the recycling of used consumer electronics, including computer monitors, central processing units, laptop computers, computer peripherals (keyboards, mice, printers, scanners, speakers and cables) and televisions. As indicated above, the Department was an active participant in the National Electronics Product Stewardship Initiative. This dialogue between the consumer electronic producers, government and other interested entities was intended to produce the establishment of a national consumer electronics recycling program by this date. Unfortunately, issues primarily regarding financing the collection and recycling infrastructure have frustrated efforts at achieving such a program. However, given the rapid growth in this segment of the municipal waste stream, the amount and types of toxic constituents of this waste stream (including lead, cadmium, mercury, copper, lithium, brominated flame retardants and phosphorus) and the costs for the proper management of these items which have thus far largely been borne by local governments, the Department supports the passage of legislation which would establish a system for the increased recycling of these items, in a system that would be financed other than through the use of public funds. More details on this preferred system follow in the Recommendations section.

Recommendations

1. As noted above, there has been no dedicated source of comprehensive funding for recycling in New Jersey since the expiration of the Recycling Tax in 1996. The recently enacted "Clean Communities and Recycling Grant Act" represents a significant step since it includes funding for recycling grants to municipalities and eligible counties, however, it does not fully address the funding needs of local recycling programs, nor does it provide any funding for a comprehensive state recycling program. In order to remedy this situation, the Department has advocated and continues to advocate the passage of legislation that would establish a stable and dedicated source of funding for recycling that does not rely on the fund generated by the "Clean Communities and Recycling Grant Act".

   As further noted above, historically New Jersey has funded various solid waste-related programs through the establishment of facility or solid waste company-based taxes or assessments. These include the "Recycling Tax", the Solid waste Services Tax, the Resource Recovery Investment Tax and the District Solid Waste Importation Tax. However, disbursement of the funds generated from these taxes has typically been on a statewide basis, based on various formulae. Naturally, these scenarios have been seen by some as unfair, and anti-competitive when applied to local solid waste disposal facilities. Therefore, the Department is supporting legislative efforts (A4075/S2615) that propose to levy a surcharge on all waste either originating in the state, regardless of where the waste may ultimately be disposed, and on waste originating out-of-state but either disposed of in-state, or transferred from in-state facilities for out-of-state disposal. This would not only eliminate the problem cited above, but would also capture a larger base of waste for the surcharge, as is done in other states that import waste for disposal or transfer. The current drafts of these legislative proposals call for a surcharge of a $3.00 per ton, to be disbursed pursuant to the following formula:

- Not less than 60% to be distributed to municipalities (and eligible counties) as recycling performance tonnage grants, and to assist in the implementation of "pay-as-you-throw" weight-based residential waste disposal systems, and other programs designed to increase local recycling efforts;

- Not less than 30% to be distributed to counties for recycling program funding, including household hazardous waste programs and recycling promotion and education, and for local enforcement of recycling mandates;
- Not more than 10% shall be used for state recycling administration, including statewide recycling promotion and recycling market development.

2. The Department's recommendations to increase the recycling of "other paper" are as follows:

- Counties should consider designating "other paper" as a mandatory recyclable item for the residential sector in their district recycling plans;
- Education and enforcement initiatives should be developed to increase recycling compliance in the residential sector, especially in multi-family housing. While "other paper" is mandated for recycling in the residential sector in a number of counties, there are many residents in New Jersey that are not complying with the requirements of the Recycling Act. This can be attributed in part to lack of education about recycling, as well as in part to the absence of enforcement. In fact, a 1995 Tellus Institute study on recycling in multi-family housing revealed that over 20% of the residents from one of the urban multi-family housing communities surveyed were unaware that recycling is required by law in New Jersey; and
- Informational sessions on markets for "other paper" should be held for recycling coordinators in northern, central and southern New Jersey. A segment of these programs, which would be coordinated and hosted by the Department, would focus on cost-effective promotional strategies that can be employed on behalf of local recycling programs. The findings of the newest chapter to the "Practical Recycling Economics – Making the Numbers Work for Your Program" manual, as noted above, would be featured.

3. The Department's recommendations to increase the recycling of food waste are as follows:

- Programs in support of compost derived from food waste should be developed in conjunction with the Department of Agriculture since this activity would also benefit the agricultural community. The production of containerized landscaping plants and trees has become one of the most significant components of New Jersey's agricultural base. In order to meet the demand for containerized plants and trees, farmers and nursery operators will need increasing quantities of compost;
- Compost derived from food waste should be purchased by state agencies when the need for this material arises. Such compost should be considered the first choice among compost derived from various waste materials;
- The DEP-funded course on composting coordinated by the Cook College Office of Continuing Professional Education should be revised to include instruction on food waste composting.
- The Department's compost manual entitled "New Jersey's Manual on Composting Leaves & Management of Other Yard Trimmings" should be updated and revised to include information on food waste composting;
- An education and awareness campaign designed to promote on-site food waste composting at colleges, universities, hospitals and other applicable institutions should be developed and implemented. The regulatory exemptions from permitting created for such activities should be highlighted in this campaign; and,
- Projects in support of methane-derived fuel products from digestion of organic material should be promoted. The technology for these projects is available, and is in place in a few locations nationally, as well as internationally. The Department will continue to work with those parties exploring the impediments to development of this technology in the state, addressing issues related to siting, financing and the sourcing of organic feedstock.

4. The Department's recommendations to increase the recycling of corrugated are as follows:

- Education and enforcement initiatives should be developed to increase recycling compliance in the business sector, especially in small businesses. While corrugated is mandated for recycling in the commercial sector in all twenty-one counties, there are many businesses in New Jersey that are not complying with the requirements of the Recycling Act. This can be attributed in part to lack of education about recycling, as well as in part to the absence of enforcement. In fact, a 1995 research project entitled "Recycling in Small Business," prepared by the Tellus Institute on behalf of the NJDEP, revealed that approximately 33% of the small businesses surveyed were unaware that any materials were required by law to be recycled. Furthermore, 25% of the businesses surveyed were not recycling any materials, whether required by law or not. In addition to the need for improved collection systems for small businesses, the report indicated that over 50% of the small businesses surveyed agreed that they needed more information about recycling;
- The New Jersey WasteWise Business Network, as previously described, should develop programs that promote recycling in small businesses;
- A step-by-step waste audit educational program should be developed for businesses and made available on the Department's website. A mailing to Chambers of Commerce and other business groups would alert the business community to the existence of this program;
- Tonnage grant applications which can document, that recycling tonnage data from 90% - 100% of the commercial entities in the municipality in question have been obtained and included therein could be eligible for a 10% bonus grant. By doing this, municipalities would help to ensure a more accurate measurement of the tonnage of material that is being recycled in New Jersey;
- Counties should designate corrugated as a mandatory recyclable item for the residential sector in their district recycling plans. As mentioned above, corrugated is increasingly being generated in the residential sector due to catalog and Internet shopping, therefore, the collection of this material from homes would result in considerable recycling gains; and
- Those municipalities that do not provide corrugated collection service to the residential or business sector should provide a recycling depot for this material.

5. The Department's recommendations to increase the recycling of newspaper are as follows:

- Education and enforcement initiatives should be developed to increase recycling compliance in the residential sector, especially in multi-family housing. While newspaper is mandated for recycling in the residential sector in all twenty-one counties, there are many residents in New Jersey that are not complying with the requirements of the Recycling Act. As was the case with "other paper", this can be attributed in part to lack of education about recycling, as well as in part to the absence of enforcement; and
- Bus and train poster advertisements should be developed that instruct users to either deposit their newspapers in the recycling bin at the train or bus station or to bring their newspapers home with them for recycling.

6. The Department's recommendations to increase the recycling of office paper are as follows:

- Education and enforcement initiatives should be developed to increase recycling compliance in the business sector, especially in small businesses. While office paper is mandated for recycling in the commercial sector in all twenty-one counties, there are many businesses in New Jersey that are not complying with the requirements of the Recycling Act. As was the

case with corrugated, this can be attributed in part to lack of education about recycling, as well as in part to the absence of enforcement;

- The New Jersey WasteWise Business Network, as previously described, should develop programs that promote recycling in small businesses;
- A waste audit educational program for businesses should be developed, as per #4 above;
- A tonnage grant incentive program should be developed, as per #4 above; and
- Print advertisements about office paper recycling and the purchase of recycled content paper should be developed and placed in New Jersey business publications.

7. The Department recognizes that recycling programs in colleges, universities and schools have been inadequate. These facilities generate a wide variety of waste materials since they include classrooms, offices, retail establishments, cafeterias and dormitories and other types of housing. By focusing on this sector, the amount of other paper, food waste, corrugated, newspaper and office paper, among other materials, recycled in New Jersey would increase dramatically. As such, the Department's recommendations are as follows:

- Education and enforcement initiatives should be developed to increase recycling compliance in these institutional settings;
- Training programs should be developed in conjunction with the New Jersey Higher Education Partnership for Sustainability (NJHEPS);
- Training programs should be developed in conjunction with the New Jersey Association of School Business Administrators; and
- A "Recycling Star" school program should be established to recognize those school recycling programs that have fully complied with the requirements of the Recycling Act.

8. As noted above in several instances, small businesses, multi-family housing and schools (including colleges and universities) are sectors that must be focused on in order for recycling gains to be realized in New Jersey. In order to improve recycling compliance in these sectors, the Department recommends that a multi-faceted statewide communications and outreach campaign be developed and implemented. The campaign should include strategies and materials to encourage recycling by residents who do not speak English. In recognition of the growing population of Hispanic residents in New Jersey, the development of outreach and communications programs in Spanish is especially recommended.

9. The Recycling Act requires municipal master plans to be revised to include provisions for the collection, disposition and recycling of designated recyclable materials within any development proposal for the construction of 50 or more units of single-family residential housing, 25 or more units of multi-family residential housing and any commercial or industrial development proposal for the utilization of 1,000 square feet or more of land. This requirement can be found at N.J.S.A. 13:1E-99.16c. While the Department has not conducted a survey to determine the exact degree of compliance with this section of the law, it is a widely held position that municipal governing bodies have largely ignored this requirement, or are unaware of it. As such, the Department recommends that a collaborative effort with the Department of Community Affairs (DCA) be initiated to address this situation. By working with the DCA and local planning boards on this requirement, the necessities for successful recycling will be incorporated into all future development proposals, which in turn will facilitate recycling at these locations. This can only help to strengthen our state's recycling program.

10. Pursuant to Executive Order #34 (adopted in 1991), as well as the Recycling Act, state agencies are required to recycle certain waste materials generated by their operations. While

recycling collection programs are believed to be in place at most locations, compliance with these programs is not known. As such, the Department recommends that all state agencies conduct a reassessment of their recycling programs as it pertains to Executive Order #34 and the Recycling Act to determine if modifications or improvements are needed. By conducting such a review, state government will ensure that it is doing its share to support New Jersey's recycling efforts.

11. The Department recommends that a new Executive Order that requires state agencies to purchase recycled products and other environmentally preferable products be adopted. While state law and Executive Order #91 (both adopted in 1993) require the procurement of recycled products by state agencies, these measures, while beneficial, are no longer reflective of current marketplace conditions. For example, the number of recycled products available today is significantly greater than that of a decade ago when Executive Order #91 was written and made effective. In addition, the percentage of recycled content in today's recycled products is typically much higher than that specified in the executive order. Furthermore, the ever-growing universe of environmentally preferable products is not addressed in Executive Order #91. In light of this situation, a new and revised executive order is needed. The proposed executive order would require state agencies to purchase a wide variety of recycled products and other environmentally preferable products. It is also recommended that the proposed executive order adopt the practice of life cycle cost analysis for those environmentally-friendly products that may cost more initially, but are less expensive over the life of the product due to reduced or non-existent maintenance costs. An example of a product that would benefit from a procurement system that utilizes life cycle cost analysis is recycled plastic lumber. In the absence of a new executive order, as described above, the Department recommends that state agencies be required to comply with Executive Order #91 as the existing executive order does advance the cause of recycled product procurement and recycling, in general.

12. A renewed focus on enforcement for recycling is needed. This must involve enforcement at all levels of government and at all stages in the recycling process. As such, the Department's recommendations are as follows:

- DEP or local enforcement staff will subject loads of solid waste received at disposal facilities to a higher degree of scrutiny during inspections to ensure that mandatory recyclable materials are not included in loads of solid waste;
- DEP compliance and enforcement initiatives, including those that focus on the regulated community in a particular municipality, i.e., "enforcement sweeps", should enforce the source separation and recycling requirements of the Recycling Act; and
- County and municipal recycling enforcement programs that focus on compliance with the source separation and recycling requirements in multi-family residential settings, the commercial sector and at academic institutions (schools, colleges and universities) must be established. The recycling enforcement program implemented in Middlesex County exemplifies the type of program that the Department would like to see implemented throughout the state. Furthermore, as noted elsewhere in this plan, all district solid waste management plans must be revised to include such a local recycling enforcement strategy.

  As was indicated in recommendation #1 above, in the event that a dedicated source of funding for recycling is established by the Legislature, the Department will ensure that some portion of the available funds support county and/or municipal recycling enforcement programs. In the absence of a dedicated source of funding for recycling, the Department expects counties to fund recycling related enforcement efforts by either including a small

recycling enforcement fee in their disposal fee (as is currently done by five counties), by using Solid Waste Services Tax funds for such purposes or through some other means. While the use of Solid Waste Services Tax funds for this purpose may make it difficult for counties to fund other recycling initiatives, such as electronics recycling programs, the Department considers recycling enforcement to be not only long neglected, but also a priority and essential for recycling to gain ground in New Jersey.

13. The Department recommends requiring county solid waste and recycling staff to develop spending plans that promote the goals identified herein for the Solid Waste Services Tax funds they receive on an annual basis. Prior to the development of such plans, county solid waste and recycling staff must meet with Department staff to discuss the county proposals under consideration. Moreover, the Department will, at its discretion, use its statutory authority to withhold Solid Waste Services Tax funding from non-performing counties, with the exception of those Solid Waste Services Tax funds used exclusively for recycling enforcement activities. In addition, the Department will consider withholding a wide range of environmental funding programs, including Green Acres funding, from non-performing counties.

14. The Department recommends that as a condition for being eligible for bonus recycling grants, if available, municipalities and counties must first document that no less than 50% of their previous year's tonnage grant funds were used for recycling program purposes. Documentation of such expenditures shall be submitted with the subsequent year's tonnage grant application. Furthermore, the Department recommends that bonus recycling grants be made available solely for the municipal or county collection of other paper, corrugated, newspaper, office paper and containers collected from commercial establishments.

15. The Department recommends that a targeted education and enforcement campaign be developed in order to make convenience stores aware of their obligation to provide containers for recyclable materials that are generated by purchases made within these stores. While there had been some debate about this issue, a February 2004 opinion issued by the New Jersey Department of Law and Public Safety resolved this matter by finding that convenience stores are commercial premises and subject to this requirement. The Department will not only reach out to the owners and operators of convenience stores, but shall also enlist the help of both county and municipal recycling coordinators in regard to this undertaking.

16. The Department recommends passage of legislation mandating consumer electronics manufacturer responsibility for the recycling of these items. Therefore, the Department is supportive of the introduction of S-1861/A-3057, the "Electronic Waste Producer Responsibility Act" in the State Legislature. This proposed Act, as currently written, would require each manufacturer of covered electronic equipment (generally, those items covered in the Department's Universal Waste regulations for electronics) to "prepare and submit an electronic waste management plan, in writing, to the department for implementing a program for financing the environmentally-sound management of discarded and obsolete electronic equipment." This proposal would also cover so–called "orphan" waste (meaning the manufacturer is no longer in business) and "historic" waste (those electronic waste items whose manufacturer is still in business).

B.3. Beneficial Use Determinations

Beneficial Use Project (BUD) Approval Process

The Department issues Certificate of Authority to Operate (CAO) for a beneficial use project determination (BUD), pursuant to N.J.A.C. 7:26-1.7(g). The Department is very interested in supporting and encouraging the beneficial use of materials that would otherwise be waste, in environmentally sound applications. This preserves valuable landfill space for essential disposal uses and helps conserve natural resources by using valuable existing materials.

The term "BUD", an acronym for the term "beneficial use determination," has been adopted by many states and the public as a general reference to regulatory beneficial use approvals. In New Jersey, the use of the term BUD may reference the process of an applicant obtaining a CAO for a beneficial use project, and can also mean the actual approval or project. The CAOs for beneficial use projects are issued under the exemptions to the solid waste regulations as specified at N.J.A.C. 7:26-1.1(a)1 and N.J.A.C. 7:26-1.7(g), allowing non-putrescible material separated at the point of generation to be sent to an approved facility for beneficial use or for on-site beneficial use at the site of generation.

To date, the Department has issued 371 CAOs authorizing beneficial use of different materials for more than approximately 6.3 million cubic yards of these materials. The Department estimates that by beneficially using these materials businesses and the general public have saved approximately two hundred million dollars versus the cost of purchasing primary products and raw materials.

An electronic copy of the Application Form and Instructions for Completing the Certificate of Authority to Operate (CAO) a Beneficial Use Project can be found at www.state.nj.us/dep/dshw/rrtp/benuseap.htm. To ensure all of the necessary information needed to complete the application review is included on the CAO application, a CAO-Approval Application Review Checklist is provided at the following web link: www.state.nj.us/dep/dshw/rrtp/budchkls.pdf . A list of authorized New Jersey beneficial use projects is available at http://www.state.nj.us/dep/dshw/rrtp/abenusep.htm .

Technology Acceptance Reciprocity Partnership Tier II Beneficial Use Determination Protocol

The DEP through the Office of Innovative Technology and Market Development (OITMD) assumed the lead role for developing the Technology Acceptance Reciprocity Partnership (TARP) Tier II Beneficial Use Determination (BUD) Protocol. TARP, which is made up of individuals from the environmental agencies of IL, MA, MD, NJ, NY, PA, and VA, is a workgroup of the Environmental Council of States (ECOS). In addition to the OITMD, the staff from the Solid and Hazardous Waste Program was consulted to include overall technical, procedural and administrative information to develop and finalize this document.

Beneficial uses of non-hazardous RCRA solid wastes can provide an environmentally preferable source of raw materials, save energy, reduce greenhouse gas emissions, reduce emissions of air and water pollutants, and conserve natural resources. Therefore, the goal of this Tier II BUD Protocol is to encourage the use of certain non-hazardous RCRA solid wastes as raw materials. Also, as described within the Tier II BUD Protocol, the uses of the materials must maintain specified State's acceptable level of risk, protect human health and the environment, and be managed in accordance with the conditions of the determination.

The first final draft of the BUD Protocol was accepted in January 2002 by the NJDEP. Recently, the TARP States decided to revise the original document to make it more "user-friendly". Therefore, the TIER II BUD Protocol was revised into two separate documents, one for regulators, and, the other for vendors. Presently, the two documents are being finalized, after which they will be submitted for the NJDEP's acceptance, and made available to the respective regulatory programs and the public.

B.4. Mercury Reduction

The Department convened its first Mercury Task Force in 1993. This Task Force recommended a stringent reduction in mercury emissions from municipal solid waste (MSW) resource recovery facilities, which were subsequently implemented by NJDEP and resulted in a 90 percent reduction from this source. The second Task Force convened in 1998, triggered by a concern that additional significant sources existed and that energy deregulation would increase the output from Midwestern power plants.

The 1998 Mercury Task Force advocated an overall goal of the virtual elimination of anthropogenic sources of mercury. Towards this goal, a two step milestone of a 75% reduction in air emissions below estimated 1990 levels by 2006 and an 85% reduction below 1990 levels by 2011 was recommended. The Task Force reviewed all local and regional mercury sources and New Jersey is looking for reductions in all sources as practicable. New Jersey expects this effort to result in the attainment of water quality standards, given the scientific and quantitative basis of the current recommendations combined with the successful track record of the implementation of the primary recommendation of the first Mercury Task Force.

The Report of the Mercury Task Force contained seventeen recommendations including both enforceable and voluntary actions. New Jersey has either implemented or is working on the implementation of twelve of the seventeen recommendations. Of enforceable actions, New Jersey is in the process of implementing Task Force emission reduction recommendations for new emission rules adopted on December 6, 2004 for iron and steel manufacturing, coal combustion, medical waste incineration and additional controls on municipal solid waste incineration. New Jersey is also reviewing its enforcement policy regarding emission limits already in effect pursuant to permits for individual iron and steel manufacturing facilities.

In addition, the Governor signed into legislation the Mercury Switch Removal Act of 2005. Under the provision of this legislation, vehicle manufacturers are required to develop a mercury minimization plan for the removal and disposal of mercury switches from end-of-life vehicles. Also, a vehicle recycler who transfers an end-of-life vehicle to a scrap recycling facility for recycling shall remove all mercury switches from an end-of-life vehicle prior to delivery to a scrap recycling facility.

The Report of the Mercury Task Force can be viewed on the web at
http://www.state.nj.us/dep/dsr/mercury_task_force.htm

Mercury Switch Data Collection Project

As part of the New Jersey State effort to reduce the extent of mercury entering the environment, the Department initiated a pilot project to collect data to facilitate the development of a cost-effective program to collect mercury-containing switches from end-of-life vehicles (EOLV), for maximizing the amount of mercury that can be removed prior to their delivery to a scrap recycling facility for processing.

USEPA has estimated that approximately 10 tons of mercury are contained in autos recycled in the US annually. The primary source of mercury is convenience lighting switches, such as those found in the trunks and hoods of most vehicles. This mercury can be released to the environment by scrap auto shredders and by melters that use this scrap metal. It should be noted that emissions from secondary iron and steel melters are estimated to be the greatest single source category from work conducted by NJDEP staff for the NJ Mercury Task Force.

Using guidance and lessons learned from other state and regional efforts, New Jersey conducted a pilot switch removal program to determine the feasibility of removing mercury-containing switches from EOLVs and the potential effectiveness of such removal in preventing the release of this mercury to the environment. The study found that a typical EOLV contains 0.8 mercury convenience lighting switches and each switch contains an average of 1.2 grams of mercury. While removal of a mercury-containing convenience switch takes less than a minute, it may take several minutes to inspect a vehicle to determine the presence of a switch. Approximately one minute is required to document the vehicle and switch removal data, resulting in a total time to remove a mercury switch of less than five minutes.

The total cost of mercury switch removal, handling, transportation, and proper disposal is estimated to be $3.00 per switch. On this basis, a switch removal program in New Jersey would have an estimated cost of $1.5 million annually, based on the assumption that approximately 500,000 vehicles are shredded in the state annually. Such a program, if effective statewide, could lead to the collection and proper management of approximately 1,000 pounds per year of mercury that might otherwise be released to the environment. Mercury convenience light switches will be present in end-of-life vehicles for at least the next 15 years.

As part of an associated effort, the scrap generated through the pilot project was melted at a steel mill, and a voluntary stack test was performed. Preliminary data suggest that removal of mercury switches prior to shredding resulted in a reduction in mercury emissions of approximately 50 percent. The report recommended that a switch removal program be implemented on a regional basis due to the significant amount of interstate commerce involved in the handling and processing of EOLVs, as well as the marketing of shredded scrap.

Legislative Recommendation

On July 23, 2002, the Department issued advisories warning people about unsafe mercury levels found in 21 species of freshwater fish from water bodies around NJ. Mercury found in products is a significant contributor to the mercury emissions that result in fish contamination.

During 1998 and 1999, the Department worked with the Northeast Waste Management Officials' Association (NEWMOA) to develop model legislation designed to eliminate or reduce non-essential uses of mercury in household, institutional, and industrial products and processes. The model legislation provides a comprehensive framework to help states develop more consistent approaches to managing mercury-containing wastes.

Most of the Northeast states have either proposed or adopted portions of the model legislation. The Department is drafting legislation based on NEWMOA's model to be introduced into the legislature.

B.5. Landfill Gas/Recovery and Greenhouse Gas Emissions Reductions/Emission Trading

Methane, a naturally occurring byproduct of anaerobic decomposition of organic matter, is a powerful greenhouse gas with a global warming potential 21 times greater than equivalents. Solid waste landfills are by far the largest anthropogenic source of methane emissions in the State, representing 72% (13.3 million tons) of methane emissions.

Greenhouse gas savings could be realized through the installation of methane collection and combustion systems at certain landfills that are currently undergoing closure, or other structurally related construction.

Forty seven landfills, some open, but most closed, account for about 35% (1.9 million tons) of methane emissions. Utilizing this methane for energy recovery further reduces greenhouse gases from the current fossil fuel usage and is defined as a renewable energy source. Cost-effective methods to recover methane from these landfills are available. In instances where the collected methane gas is resold, or utilized to generate electricity, additional revenue stream is afforded the landfill owner.

The Electric Discount and Energy Competition Act (EDECA) N.J.S.A. 48:3-49 et. seq. includes methane gas from landfills as a feedstock qualifying for Class 1 renewable energy support. There are already a handful of landfill gas to energy projects operating at large landfills in New Jersey. In one instance, revenue is being derived not only from the electricity sales, but also from sale of the carbon dioxide emission credits which result from the project. But other, smaller-sized landfills could be suitable for such landfill methane to energy projects. As a strategy to help fund proper landfill closure, and subsequent post-closure monitoring, this landfill gas to energy projects at all suitable landfill facilities within New Jersey should be developed.

Regional Greenhouse Gas Initiative (RGGI)

The Regional Greenhouse Gas Initiative is a nine-state cooperative process to develop a regional cap-and-trade program addressing carbon dioxide (CO2) emissions from power plants. New Jersey has played a leadership role in the effort since its inception. RGGI was initiated in April 2003, when Governor Pataki of New York invited the governors of the Northeast and Mid-Atlantic States to participate in the development of a regional CO2 cap-and-trade program. The effort currently consists of the New England states, New Jersey, New York, and Delaware. The goal is to agree on program design by the end of 2005 and implement a program by 2009. The program would be applicable to fossil fuel-fired electric generating units 25 megawatts and larger and would be implemented through state regulation and/or legislation. Participating states would promulgate individual implementing regulations, with reciprocity provisions allowing the interstate trading of CO2 allowances. Key components of these state regulations would be materially uniform, with a Model Rule serving as a template. The current working proposal would cap regional emissions from applicable units at approximately 150 million short tons of CO2 through 2015, and achieve a reduction of 10% below this level by 2020.

New Jersey has played a leadership role in the effort since its inception. DEP is taking the lead on RGGI in New Jersey, in consultation with the Board of Public Utilities. RGGI has engaged a formal regional stakeholder process from the outset, including key stakeholders from New Jersey. The hoped for outcome of the development process would be a Memorandum of Understanding (MOU) among the participating states and the finalization of a Model Rule that would guide the development of state implementing regulations. The MOU would specify the agreement among the states to move forward with state-level implementation of the program based on the Model Rule, and coordinate in the administration of the program once implemented.

A Technical Support Document (TSD) would also be finalized at this time to explain the provisions of the Model Rule, including elaboration of SWG and agency head discussions that led to agreement on the specific provisions of the Model Rule. The TSD will also include detailed supporting documentation of the projected environmental and economic impacts of the proposed program. Once the MOU is signed and the Model Rule finalized, RGGI would move into an implementation phase.

B.6. Household Hazardous Waste Collection Programs

Many jobs around the home require the use of products containing hazardous components. Certain paints, cleaners, stains and varnishes, car batteries, motor oil, and pesticides are some of these products. The unused portions of these products that require disposal are known as "household hazardous waste." The types of materials that actually constitute a household hazardous waste (HHW) range from more obvious materials like bleach, oil-based paint, paint thinner, gasoline, and lighter fluid, to some less ones like hair coloring products, floor wax, and air fresheners. Americans generate approximately 1.6 million tons of household hazardous waste per year. An average home can accumulate as much as 100 pounds of household hazardous waste in the basement or garage and in storage closets.

According to the United States Environmental Protection Agency's hazardous waste regulation at 40 CFR 261.4(b)(1), that have been adopted by the New Jersey Department of Environmental Protection (Department), household hazardous waste is excluded from regulations as hazardous waste, and is considered solid waste that the households can dispose of with the regular trash. However, the disposal of these materials in a municipal solid waste landfill is not the most environmentally acceptable disposal option. Household hazardous wastes are sometimes disposed of improperly by individuals pouring wastes down the drain, on the ground, into storm sewers and into septic systems. The improper disposal, or the putting of HHW out with the regular trash can pose a potential risk to people and the environment. Certain types of household hazardous waste have potential to cause physical injury to the sanitation workers during collection, could react with other waste in the garbage collection vehicles causing fire, could emit dangerous fumes from chemical reactions at the waste handling facility, contaminate septic systems or wastewater treatment systems, and present hazards to children and pets while accumulated in the homes.

To discourage residents from disposing of HHW in their garbage and to avoid other improper disposal, all counties in New Jersey have developed and set up HHW collection programs. The Department has provided technical assistance in design of these programs and facilities. Each county has designated HHW collection days when residents can bring their HHW to the county collection site. Three counties, namely Burlington, Monmouth and Morris operate household hazardous waste collection facilities. The collected HHW is characterized by county personnel and shipped to an appropriate facility for recycling or disposal. Over the years the counties have collected materials such as aerosol products, antifreeze, batteries, household driveway sealer, fire extinguishers, gasoline, mercury devices and liquid mercury, motor oil, oil filters, muriatic (hydrochloric) acid, paint and paint stains, pesticides, photo chemicals, pool chemicals, thinners and solvents.

Each county in New Jersey has a designated Household Hazardous Waste Coordinator. The coordinators have the option to join the Association of New Jersey Household Hazardous Waste Coordinators (ANJHHWC) as members. The ANJHHWC produces a yearly newsletter that

covers issues pertaining to HHW collection programs. The yearly newsletter features achievements of various counties.

The HHW collection programs have been very popular with the general public and an enormous amount of hazardous waste has been removed from the environment, from the municipal solid waste stream and from people's homes. The Department does not require the counties to report data on the amounts of HHW collected. A listing of the New Jersey county household hazardous waste coordinators and program summaries can be found at http://www.state.nj.us/dep/dshw/rrtp/hhwcps.htm.

B.7. Recycling Centers for Class D Recyclable Materials

Used Oil

Until October 21, 1996, the Department regulated used oil as hazardous waste and existing facilities were operating under the Hazardous Waste Facility permits. On this date, the Department reclassified used oil as a Class D recyclable material and it became subject to the Recycling Regulations at N.J.A.C. 7:26A. The Department's used oil recycling regulations are based on the United States Environmental Protection Agency's used oil regulations codified at 40 CFR 279.

A Recycling Center for Class D Recyclable Material (used oil) is a facility that receives used oil from various generators and registered transporters for storage and processing and is subject to the provisions of N.J.A.C. 7:26A, known as the Recycling Regulations. A typical used oil recycling center operator collects used oil from generators utilizing a fleet of tank trucks, registered with the Department, ranging in nominal capacity approximately from 1,000 to 10,000 gallons. Upon arrival at a recycling center, all the bulk shipments of used oil are analyzed for parameters required by the regulations. Once the analysis is complete and the operator has determined that the material is acceptable, the oil is unloaded into storage or processing units. The material is then processed by utilizing techniques such as sedimentation, filtration, heat treatment, chemical treatment and blending to produce an on-specification oil product for sale. All residues generated from the processing of used oil are disposed of at authorized facilities.

There are five used oil storage/processing facilities currently operating in the State and have been issued General Approvals by the Department's Solid and Hazardous Waste Management Program. These five approved facilities have a combined daily storage/processing capacity of 5,254,020 gallons. According to the data reported to the Department, during the years 2002, 2001 and 2000, 21,687,699, 18,123,425 and 14,716,628 gallons, respectively, of used oil were processed by these used oil storage/processing facilities.

Used oil recycling centers are required to have adequate spill control mechanisms in place to prevent and contain releases from material handling. The used oil storage and processing tanks are equipped with overfill control devices such as high level alarm, feed cut off etc. to prevent overfilling and spillage during facility operations. All used oil storage and processing units must have an adequate secondary containment system. The secondary containment system must be sufficiently impervious to used oil. The secondary containment system is sloped and operated to drain and remove liquid resulting from leaks, spills or precipitation. The secondary containment system, in addition to the volume displaced by containers, tanks, or equipment, must have a capacity to contain precipitation from a 25-year, 24-hour rainfall event.

Used oil facilities must also have an acceptance/inspection plan for all incoming shipments of used oil. The plan includes a checklist for the use of the facility personnel and contains sufficient details to ascertain that the center does not accept unauthorized materials at the center. The used oil processing centers shall have an on-site laboratory to analyze incoming shipments of off-specification oil and processed on-specification used oil.

The currently operating facilities have a sufficient storage and processing capacity to meet the needs of New Jersey used oil generators. In addition to the used oil processing facilities, there are several used oil transfer facilities operating in the State. The used oil transfer facilities are transportation related facilities that collect used oil from various generators and bring it to their centralized facility for storage for not longer than thirty-five (35) days and for consolidation of different loads of oil. The used oil transfer facilities can also accept used oil for consolidation from other registered transporters. The transfer facilities cannot process used oil to make an on-specification used oil product. The transfer facilities are required to ship all consolidated used oil to a used oil processing facility with thirty-five (35) days of its receipt at their used oil transfer facility. Most of the used oil from transfer facilities is shipped to out-of-state used oil processing facilities. Used oil transfer facilities are not required to obtain an approval from the Department but are subject to periodic inspection by the Department's Enforcement personnel.

Two used oil recycling facilities have also been collecting antifreeze (ethylene glycol) and shipping it to antifreeze recycling operators. During the years 2000, 2001 and 2002, approximately 400,000, 500,000 and 700,000 gallons respectively of antifreeze have been collected by New Jersey used oil processing facilities and shipped for recycling. The amount of antifreeze to be collected in the future is expected to increase.

Universal Waste Recycling

In 1996, the Department also incorporated the USEPA's Universal Waste Rule into the NJ Recycling Regulations. This allows the recycling of certain hazardous wastes under a Class D recycling center approval rather than a hazardous waste Treatment, Storage, and Disposal Facility (TSDF) permit. This will enable facilities to profitably recycle materials that would otherwise be disposed. The readoption of the Department's recycling regulations in 2002 amended the Universal Waste Rule to include additional materials. The rule applies to the following materials: batteries, hazardous waste lamps, hazardous waste finishes, thermostats and all other mercury-containing devices, and consumer electronics. Additional text and recommendations regarding the management of consumer electronics can be reviewed above, in Section B.2.

B.8. Composting

Organic material is estimated to account for approximately 15% of the total solid waste stream in New Jersey. This organic stream consists of leaves, grass clippings, brush and other yard wastes, tree trimmings, food waste from residential, commercial and institutional sources and food processing wastes from commercial food processors.

Management of these wastes presents a unique opportunity for New Jersey to utilize a varied mix of technologies and policies. Generally speaking, the less reliant the preferred management policy is on mechanical processing technologies, the more reliant its success is on adequate public education. For example, the most appropriate strategy for proper handling of grass clippings is to simply leave them on the lawn after cutting. For this to succeed, however, an intensive, sustained public education campaign is required statewide. Conversely,

technologically advanced municipal waste composting systems are more forgiving in terms of material feedstock (i.e. allowable "contaminant" levels), and require much less material segregation for successful operation.

The State's objective for the management of yard wastes is through a hierarchy of practices as follows:

1) Natural decomposition at the point of generation (i.e., Cut-it-and-Leave-It, on-site degeneration and composting);
2) Diversion to farmers; Composting using a combination of composting technologies; and Biomass Conversion.

The framework for achieving the state's policy indicated above is currently in place. Regulations were adopted that allow for the mulching of leaves on farmland; a manual that details various leaf composting methods for use by New Jersey municipalities was developed in 1994; brochures explaining the benefits of backyard composting of homeowner generated yard waste and of leaving grass clippings on the lawn were also developed; many counties adopted solid waste management plan amendments that provide for automatic inclusion of vegetative waste composting sites; and a ban on the disposal of leaves as solid waste was established by statute in 1987. These activities, in addition to new strategies, will be continued, as discussed below.

The most cost-effective method of yard waste management is simply to allow organic materials to decompose naturally at the site of generation. The Department's Cut-It-and-Leave-It policy to promote the on-site management of the State's grass clippings is an example of this policy in action. On-site management also prevents off-site dissemination of pesticides and herbicides in organic matter to which it was applied, which has become an issue of concern in recent years especially concerning the broadleaf (dicotyledonous) herbicide Clopyralid. Grass clippings from sites where this chemical was used have been banned from compost facilities in the State of Washington. New Jersey's Pesticide Control Program is investigating the contamination of compost in New Jersey. Future incorporation of grass clippings into off-site composting will be evaluated in view of that Office's report. If the product from the composting process is not safe, it should not be produced according to the New Jersey Advisory Council on Solid Waste Management.

Following the statutory ban on the disposal of leaves as solid waste, effective in 1988, and an amendment to that ban in 1989 which allowed for the mulching of leaves on farmland, the Department, with strong technical and regulatory support from the Department of Agriculture, adopted regulations in 1989 which greatly expanded the options available to municipalities in proper management of their leaves, by allowing for the mulching of up to a six-inch layer of leaves directly onto farmland. These regulations were expanded in 2002 to allow exemptions from permitting for composting on farms and mine reclamation lands when the finished compost is used on site. By providing these alternatives, the Department made available to farmers large quantities of organic material for incorporation into the soil. This organic addition to farmland is beneficial to much of the soil in New Jersey, and the Department will continue to support this option for New Jersey municipalities and farmers.

To promote the composting of yard trimmings, the Department adopted rules in 1996 that classified yard trimmings as recyclable materials and the facilities that accepted and processed them as recycling centers. Removing the solid waste facility definition removed many onerous requirements that the Department no longer believed were necessary for these types of operations. The rule change also added an exemption from approval for sites accepting less than

10,000 cubic yards of yard trimmings. Several new yard trimmings compost facilities have been developed as a result of the rule changes of 1996. To maintain this trend, the Department adopted additional rules in 2002 that exempt additional types of compost facilities from approval.

In the rule changes of 1996, the Department also attempted to promote composting of organic material other than yard trimmings by redefining source-separated organic material as recyclable material such that facilities developed to compost this material would be considered to be recycling centers. Rules for the design and operation of these compost facilities are less stringent than those for the design and operation of solid waste facilities. To continue efforts to promote food waste composting, the Department also added a provision to the rules of 2002 that allows the composting of food waste at the site of generation with distribution of product off site without the need for approval. The Department expects many food processors and other institutions in the state to take advantage of this new provision.

The Department is considering further changes to the recycling rules including a reduction in the 1,000-foot buffer requirement for the receipt and processing of grass clippings and food waste in outdoor operations where neighboring property owners agree to a lesser distance. Also being considered generally is addition of flexibility in other design requirements. One example is the requirement for an impervious surface for the composting of vegetative food waste where the Department is studying the possibility of allowing environmental monitoring in lieu of strict adherence to the pad design requirement.

To date, most organic waste recycling has been accomplished through composting. Currently, over 175 facilities for the composting of yard trimmings, including leaves, exist within the State and many of the citizens of the State have come to expect municipal collection and composting of their vegetative yard waste. However, if we expect to attain the 50% MSW recycling goal set by the State in 1993, recycling options for the food waste fraction of organic waste must also be investigated.

Food waste includes uneaten food, food preparation wastes, and biodegradable wastes associated with the consumption and packaging of foods, such as paper plates, napkins, and waxy cardboard. Current estimates by the NJDEP show that in 2000, food waste was 7.4% by weight of the Municipal Solid Waste (MSW) generated within New Jersey. Food waste consists almost exclusively of organic materials. Its chemical (relatively low lignin content) and physical compositions (high moisture content) make it the most readily degradable fraction of MSW. This fact makes food waste an obvious candidate for keeping out of landfills and thus saving diminishing landfill capacity.

Despite having what would seem to be an optimal set of conditions (high population density, an abundance of supermarkets and a high demand for soil amendments) for the development of a highly successful food waste recycling program, New Jersey currently only recycles 24.7% of its food waste. Even though New Jersey ranks number two in percentage of food waste recycled by state (Goldstein, 2001), it is obvious that much more can be done within the State to increase the recycling rate of food waste and thus MSW. The Department must begin looking at other processing technologies for organic wastes such as digestion, worm composting, and animal feed production and amending the rules to ensure that these methodologies are clearly covered as recycling activities and not solid waste processing; however, obstacles exist.

Obstacles to Food Waste Recycling

The nature of the material; although the optimal moisture content of material for composting is approximately 50-60%, the typical moisture content of food waste can be up to 70%. This relatively high moisture content makes collections more difficult than for the more traditional dry components of MSW. Moist materials are more likely to develop odors and thus collection systems employed would have to be designated to minimize this potential problem. In addition, dry materials, such as leaves and/or cardboard, must be added to food waste prior to composting to decrease the potential odor problems associated with high moisture content and zones of anaerobic degradation. The carbon to nitrogen (C/N) ratio, another important parameter for composting, of food waste is generally less than the optimal ratio of 25:1 and thus materials with a higher C/N ratio, such as paper, cardboard, and/or leaves must be added to food waste prior to composting.

Lack of available facilities and cost: in order to locate a successful food waste recycling facility, several factors must be considered including, but not limited to, positive sentiment by local, County and public organizations, haul distance from the generators to the facility and distance from the facility to the nearest residences. Currently, the capacity to accommodate food waste recycling on a large scale is not in place. Only one large-scale facility for composting of food waste exists in New Jersey. In addition, New Jersey with a very high population density and lack of available land of sufficient size makes siting an outdoor windrow facility very difficult, especially in the northeastern portion of the state. As a result, the feasibility of using large indoor in-vessel composting facilities or digesters would most likely have to be assessed if food waste recycling on a Statewide basis was to be pursued. These facilities minimize the odors and environmental impacts of windrow composting, produce similar quality compost in a reduced time span, and require less land area; however, they have significantly higher capital costs associated with their operation. These costs vary significantly, based on design and operating criteria. Digesters offer the added benefit of producing methane, which can be used in power generating operations. However, taking on costs associated with siting and constructing any type of new facility will most likely not happen any time soon due to debt repayment obligations that most counties are still under and a reluctance to divert any new solid waste types from their current disposal facilities.

Another problem with food waste compost is the lack of confidence the public or other end users have in the quality of the material. Many investigations in Europe indicate that quality and marketing of the end product is the most crucial composting issue. In order to increase the confidence and thus demand for organic waste compost, clear and uniform regulations with regard to what is suitable to be composted and how the end product should be managed and controlled need to be developed and supported on a state and national scale.

The US Composting Council (USCC) has initiated a Seal of Testing Assurance (STA) Program, which intends to improve customer confidence in compost quality by encouraging compost producers to employ standardized analytical methods to test the chemical, physical and biological quality of their products. If the compost is sent to approved laboratories and meets all state and federal regulations concerning heavy metals and pathogens, the USCC will approve the compost as "STA certified" permitting the use of the STA logo on the bagged product. This program closely resembles the successful programs followed in Europe in providing consistent quality compost products. However, the program is still in its infancy and until the demand for a certified product increases, the number of participants in the STA program will be limited. In addition, each state has different regulations and standards for certain types of compost and it's difficult to satisfy a national customer base.

Overall, food waste recycling is an idea that the State wants to promote. This Plan update does not propose specific solutions to the problem, but emphasizes that the State needs to seek the input of all stakeholders, including generators, haulers, composters and markets in an attempt to determine how best to proceed in moving food waste recycling forward in New Jersey.

Table B-1

Recycling and Disposal Data

County	2003 MSW Disposal (actual tons)	2003 MSW Recycling Tonnage/Rate (actual)	MSW Recycling Tonnage @50% recycling rate	MSW Recycling Tonnage Increase Needed to Reach 0% MSW Recycling Goal
Atlantic	255,501	86,093 (25.2%)	170,797	84,704
Bergen	674,728	489,718 (42.1%)	582,223	92,505
Burlington	343,555	234,437 (40.6%)	288,996	54,559
Camden	362,301	160,819 (30.7%)	261,560	100,741
Cape May	93,463	64,325 (40.8%)	78,894	14,569
Cumberland	125,329	101,201(44.7%)	113,265	12,064
Essex	639,537	280,140 (30.5%)	459,839	179,699
Gloucester	203,347	150,440 (42.5%)	176,894	26,454
Hudson	435,393	88,332 (16.9%)	261,863	173,531
Hunterdon	87,099	20,939 (19.4%)	54,019	33,080
Mercer	260,385	108,033 (29.3%)	184,209	76,176

Middlesex	593,459	315,847 (34.7%)	454,653	138,806
Monmouth	439,586	259,876 (37.2%)	349,731	89,855
Morris	355,758	202,916 (36.3%)	279,337	76,421
Ocean	462,800	179,013 (27.9%)	320,907	141,894
Passaic	387,182	171,948 (30.8%)	279,565	107,617
Salem	36,670	19,287 (34.5%)	27,979	8,692
Somerset	220,702	85,613 (27.9%)	153,158	67,545
Sussex	91,337	25,294 (21.7%)	58,316	33,022
Union	408,380	126,454 (23.6%)	267,417	140,963
Warren	75,766	18,116 (19.3%)	46,941	28,825
Total:	6,552,275	3,188,842	4,870,563	1,681,722