

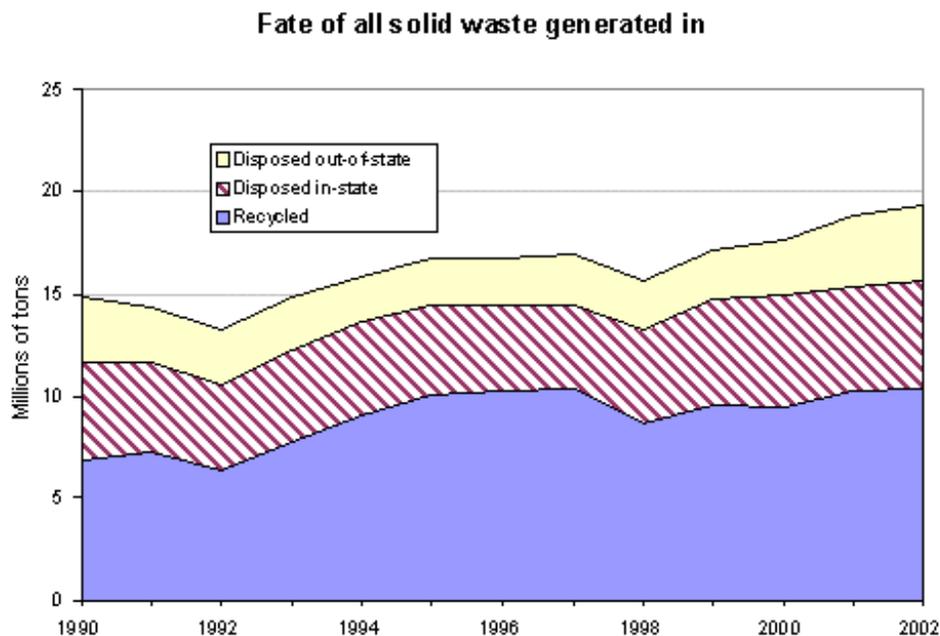
# HERE TODAY, HERE TOMORROW-RECYCLED!

## Section IV: Disposal – Landfills, Transfer Stations And Resource Recovery Facilities

Historically, solid waste disposal was not much of an issue. Over a century ago more land and open space were available, there were a lot less people residing in New Jersey, and fewer products were being made out of fewer materials. Today, land in New Jersey is at a premium, the population has greatly increased, and many new products are available for daily consumption and use. Solid waste disposal has become more costly, more challenging and more diverse, in terms of how it is being managed and handled.

The purpose of this section is to explore how New Jersey’s waste is being disposed of. Disposal facilities such as landfills, transfer stations and resource recover facilities, will be examined. Issues such as site construction, transportation of waste, quantities of waste being handled and regulations that pertain to them will be explored. By participating in the lessons students will have a better understanding of the purpose of these facilities and their basic operations.

New Jersey’s solid waste travels in one of three directions – it can be recycled, disposed of in the state, or disposed of out-of-state. As seen in the graph below, the gradual increase of waste for all three means of handling over the past decade is obvious.



Waste that must be disposed of is handled in three ways – through transfer stations, landfills or resource recovery facilities. These terms are described below and are explored in this section:

**Sanitary Landfill:** These are modern structures built with a clay foundation and several liners to keep any liquids from escaping the landfill and entering the groundwater. As each portion is filled, it is capped, or covered, to keep rainwater from entering the landfill. Garbage deposited in the landfill is covered each day with soil or dry waste to prevent fire and repel scavengers. Some are designed to hold hazardous waste.

**Resource Recovery Facility:** This type of facility is an incinerator. The term “Resource Recovery Facility” is used instead of incinerator to avoid peoples’ negative perceptions of the facilities that burned waste during the last century. Former incinerators released pollution because they lacked proper emissions controls. Today’s resource recovery facilities control emissions and generate electricity from the waste. As a result, they are often called co-generation plants or “co-gen’s.”

**Transfer Station:** This is a facility where solid waste is transferred from collection vehicles to larger trucks or rail cars for longer distance transport to another location for disposal.

According to the federal Environmental Protection Agency, about 30% of the nation’s municipal solid waste is recovered and recycled or composted; 15 – 18% is burned at resource recovery facilities; and, the remaining 56% is disposed of in landfills.

**In 2002 New Jersey residents, municipalities, businesses and industry collectively generated 19.3 million tons of solid waste, which included construction debris and scrap iron.**

- **Of that total, about 10 ½ tons (52%) was recycled with 9 ½ million tons being sent for disposal (this quantity includes municipal and non-municipal recyclable materials);**
- **Of the 9 ½ million tons disposed, 1 ½ million tons went to resource recovery facilities, 3.8 million tons was disposed at New Jersey landfills and 3.7 million tons went out-of-state; and**
- **The municipal recycling rate stood at 32%, down from a high of 45% in 1995.**

In the early 1990s the State of New Jersey had created a monopoly on waste disposal, which included disposing of all New Jersey waste within the state. This was challenged by private industry in the mid-1990s on the premise that garbage is a commodity and can be traded anywhere. In 1996 state policy was stricken down in court as being an impediment to interstate commerce. As a result, solid waste now travels in and out of New Jersey on a daily basis. Counties in New Jersey can now take advantage of low landfill rates in Pennsylvania as well as accept money to handle waste from New York. Because New Jersey disposal facilities now compete with other facilities out-of-state, tipping fees have dropped and the cost for waste disposal has gone down in recent years.

Currently, thirteen counties have solid waste landfills and five counties have resource recovery facilities (incinerators). Of the five counties with resource recovery facilities, three also have landfills to receive waste that cannot be burnt. Eight counties have awarded waste disposal contracts and require that all waste be sent to one facility for disposal. The remaining thirteen counties have a free market system and transporters may send waste out of the county or state.

The capacity of disposal facilities in New Jersey poses some concern to solid waste managers. For example, the maximum capacity of the state's resource recovery facilities totals about 2.4 million tons and in 2001 89% to 97% of available capacity was utilized. Transfer station capacity is approximately 10 million tons and collectively they operated at about 70%. Available landfill capacity in the state is also less than anticipated due to higher levels of waste acceptance, the fact that new landfills are difficult to cite and the expansion of existing facilities is limited. As a result, there is continued emphasis throughout *Here Today, Here Tomorrow – Recycled!* regarding the need to decrease the solid waste being disposed of by New Jersey residents.

### Close-up: Sanitary Landfill

A sanitary landfill is a specially designed depression in the ground for the disposal of solid waste. It is constructed so that it will reduce or prevent potential hazards to public health and safety, as well as the environment. These facilities have been re-designed in the last 30 years to prevent the contamination caused by older landfills, which were nothing more than big holes, usually dug in wetlands that were considered at that time to be worthless.

For example, when rain or snow come in contact with solid waste in the landfill it creates a liquid called "leachate." As water has more contact with waste it can become contaminated. If the landfill were to leak, this contaminated liquid could move through soil and rock beneath the landfill and pollute groundwater or nearby streams. To prevent this from occurring, landfill construction standards require that it has a clay foundation and that impermeable lower liners be installed to block the movement of leachate. (Think of a landfill as basically a "bathtub within a bathtub." The second bathtub provides double insurance that liquids won't be able to leak from the landfill.)

It is further required that a leachate collection system be constructed and that groundwater around the landfill be monitored with monitoring wells. Soil is used to cover the garbage daily. This helps to prevent problems with litter, odors, rodents and other pests. It also absorbs rainwater and helps reduce the amount of leachate that could form from rain or snowfall. Sometimes even granular waste, such as broken glass or oily soils, are used as daily cover.

Many landfills are also constructed with separate cells or compartments that help with maintenance and environmental protection.

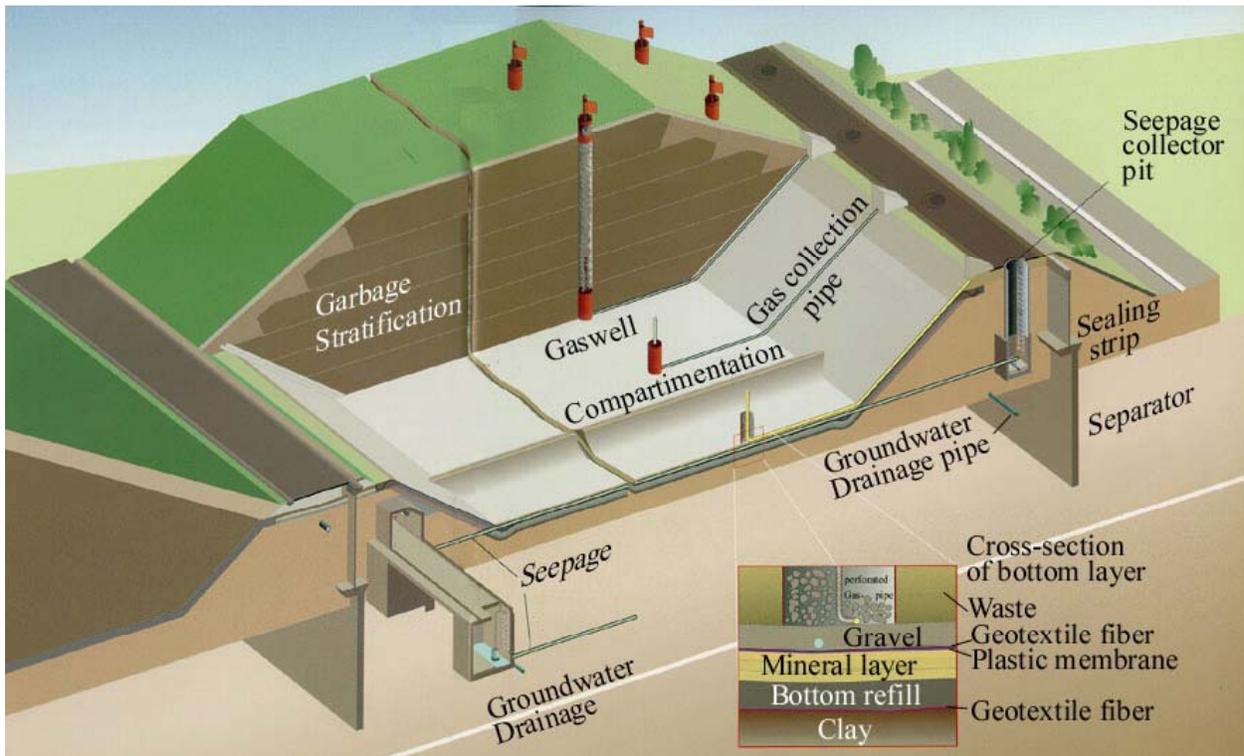
When solid waste in the landfill begins to "break down" or decompose a gas called methane gas is created. Gravel layers are added to the landfill to allow the gas to escape from the waste to the surface through plastic piping. In the past the gas was "flared" or burned to prevent odors and explosions. Currently the gas at most landfills is burned to heat boilers and to generate heat and light for certain landfill operations.

The average lifespan of a landfill is 20 – 30 years. When a landfill meets capacity it must be capped, which involves layering clay, a liner, soil and vegetation on top. Landfills are now designed with possible end uses in mind. Once closed they can be converted into golf courses, shopping centers, malls and parks.

Contrary to what many people believe, trash really does not break down in landfills. Because landfills are sealed from the rain and are not aerated, waste inside them cannot decompose as it would if it were outdoors and exposed to the weather. This prevents a reduction in trash volume as well as a subsequent settling and collapse.

Everything entombed in a landfill, whether it is biodegradable or not, represents a burden to the environment because it takes up space that cannot be used for other purposes, it consumed energy (in order to be produced) that cannot be recovered, and it contains non-renewable resources that are lost.

There are 578 landfills in New Jersey with twelve of them still in operation.



Source: Dr. W. Herst, M. Yip and P. Madl

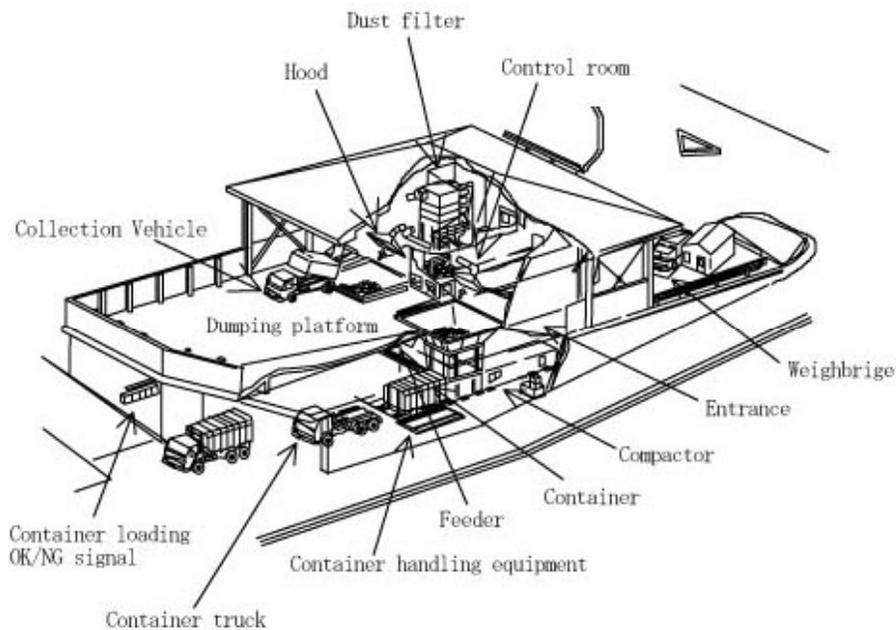
### Close-up: Transfer Station

Transfer stations are facilities where municipal solid waste is unloaded from collection vehicles and briefly held while it is reloaded onto larger long-distance transport vehicles for shipment to landfills or other treatment or disposal facilities. There are currently over 50 transfer stations in New Jersey.

By combining the loads of several individual waste collection trucks into a single shipment, communities can save money on the labor and operating costs of transporting the waste to a distant disposal site. They can also reduce the total number of vehicular trips traveling to and

from the disposal site. In general, this reduction of activity reduces air emissions and energy use and ultimately helps lower the cost of solid waste management services.

Station operators usually move waste off the site in a matter of minutes or hours. At many facilities workers screen incoming waste and remove any inappropriate or recyclable waste. The trash left is compacted and reloaded for shipment to a final disposal site. Although transfer stations help reduce the impacts of trucks traveling to and from the disposal site, they can cause an increase in traffic in the immediate area where they are located. If not properly sited, designed and operated they can cause problems for residents living near them.



Source: Mitsubishi Heavy Industries, Ltd. (MHI)

### Close-up: Resource Recovery Facility

Resource recovery facilities, also known as co-generation or waste-to-energy plants, are designed to burn solid waste (like incinerators) but also turn the heat to electricity and leave a much smaller volume of ash to be buried.

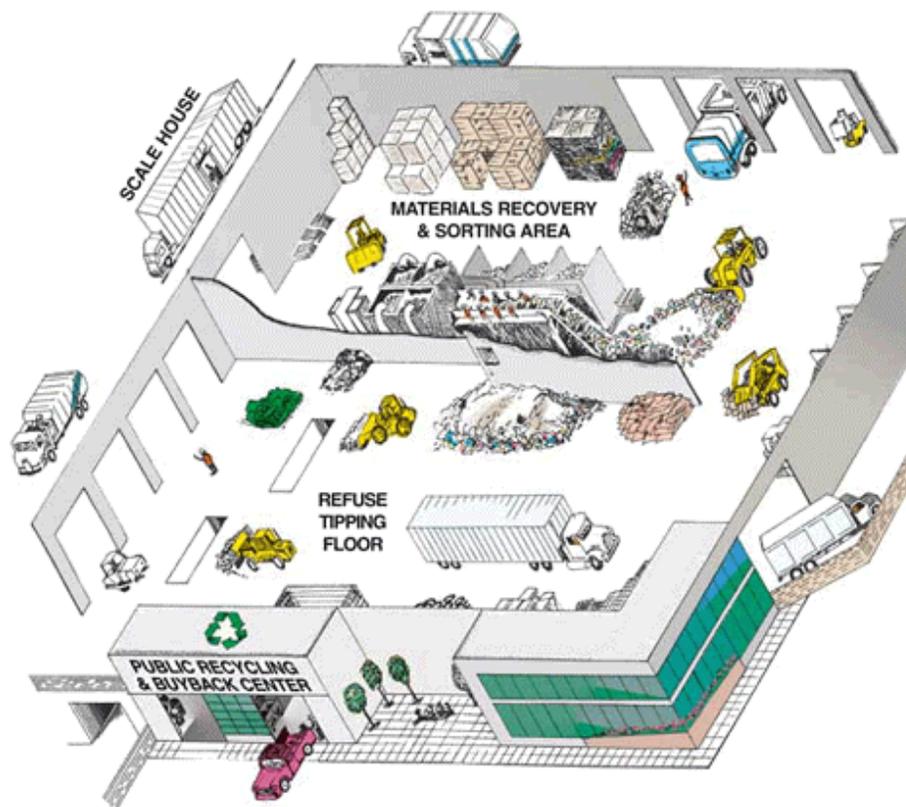
These facilities are not the incinerators used prior to the 1970s. Cleaner than many industrial facilities and under the scrutiny of the New Jersey Department of Environmental Protection, resource recovery facilities pose low threats to human health and minimize the impact of trash generation. There are currently five operating in the state and almost 100 in the United States.

The procedures in these facilities resemble this description. Trucks loaded with solid waste enter a tipping area and unload the trash into a large pit. A crane is used to lift and sort through the waste, removing any inappropriate material. The crane also moves the trash into a combustion chamber where it is burned. A boiler recovers the heat generated from combustion of the waste.

Steam from the boiler can be used for electric power generation. Two types of ash are produced – bottom ash and fly ash. Bottom ash is the heavier glass and metal pieces that do not burn and it accounts for about 75 – 90% of the ash created. Fly ash rises with hot gases and is captured by emission control equipment in the stacks.

In addition to energy generation, this burning process reduces the toxicity of organic compounds in the waste and reduces its volume by 70 to 90%, which makes the material safer to dispose of than untreated hazardous waste and helps use landfill space more efficiently.

Resource recovery facilities continue to face challenges. Although technologies to control air pollution have improved significantly, burning certain materials still produces chemicals that form air pollution. As a result, many people do not want these facilities located near their homes or in their communities and rigorous public participation processes are used to site new facilities.



Source: City of Oxnard, California

## Additional Resources

### **County Solid Waste Officials**

New Jersey Department of Environmental Protection

<http://www.nj.gov/dep/dshw/recycle/swmoff.htm>

### **New Jersey Municipalities Solid Waste Collection Report - Explanation of Municipal Solid Waste Collection Methods (by County)**

New Jersey Department of Environmental Protection

<http://www.nj.gov/dep/dshw/swr/swservey.htm>

### **List of NJDEP Approved Commercial Operating Landfills in New Jersey**

New Jersey Department of Environmental Protection

<http://www.nj.gov/dep/dshw/lrm/aocslf.htm>

### **Map of NJDEP Approved Commercial Operating Landfills in New Jersey**

New Jersey Department of Environmental Protection

<http://www.nj.gov/dep/dshw/lrm/ocslfmap.htm>

### **NJDEP Approved Operating Private Sanitary Landfills**

New Jersey Department of Environmental Protection

<http://www.nj.gov/dep/dshw/lrm/aopsl.htm>

### **NJDEP Authorized New Jersey Incinerators**

New Jersey Department of Environmental Protection

<http://www.nj.gov/dep/dshw/rrtp/njaincin.htm>

### **Transfer Stations and Material Recovery Facilities in New Jersey**

New Jersey Department of Environmental Protection

<http://www.nj.gov/dep/dshw/hwtf/tsicmrfd.htm>

### **Waste Transfer Stations**

Environmental Protection Agency

<http://www.epa.gov/epaoswer/non-hw/transfer.htm>