

SOLID WASTE

2010 Report Card for Pennsylvania's Infrastructure

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Based on U.S. Department of Environmental Protection (EPA) figures, landfills in Pennsylvania collectively had a remaining average capacity life of 16 years as of January 2009 and few new permits are being granted for new landfill sites, due to changes made to the state approval process. While recycling programs in the state have greatly expanded in the last two decades, thereby reducing Pennsylvania's dependence on landfill disposal, various obstacles still exist to more efficient and widespread use of these programs to reach the EPA's national recycling rate goal of 35 percent. Some of the state's solid waste is being converted to energy in waste-to-energy facilities, but more research is needed to make this option more cost-effective and technologically feasible. In addition, electronics are becoming a growing proportion of the state's waste stream, posing environmental hazards as well as unique recycling challenges.

BACKGROUND

In Pennsylvania, municipal solid waste, which includes recyclables, is defined as "garbage, refuse, industrial or office waste and other material, including solid, liquid, semisolid or contained gaseous material resulting from operation of residential, municipal, commercial or institutional establishments and from community activities." While construction/demolition wastes and sludge from municipal sewage treatment plants are considered to be in the municipal waste category, they are listed as separate materials on the landfill reports submitted to the Department of Environmental Protection (DEP).

Enforcement of the regulations governing the handling and management of solid waste is vested in the DEP while responsibility for implementing municipal waste activities is vested in each of the more than 2,500 local governments in the commonwealth.

Infrastructure elements include on-site storage containers, collection/transportation vehicles and disposal facilities. Storage containers are supplied by the generating location, whether it be a residence, a commercial establishment or an industrial facility. Sufficient collection and transportation vehicles are supplied by either the public or the private sector. Critical elements of the infrastructure are disposal facilities (landfills or incinerators) and material recycling facilities (MRF) which separate recyclable materials for shipment to plants where they are processed into new materials for further fabrication or into final products. Transfer stations may be utilized to reduce the cost of transportation to distant disposal or recycling facilities.

CONDITIONS

In 2008, Pennsylvania generated and disposed of 14.6 million tons of solid waste within its borders. Of this total, more than 9.5 million tons were municipal solid waste. The remainder consisted of residual waste, construction and demolition waste, sewage sludge and asbestos. Another 7.1 million tons of solid waste originated out of state and were disposed in

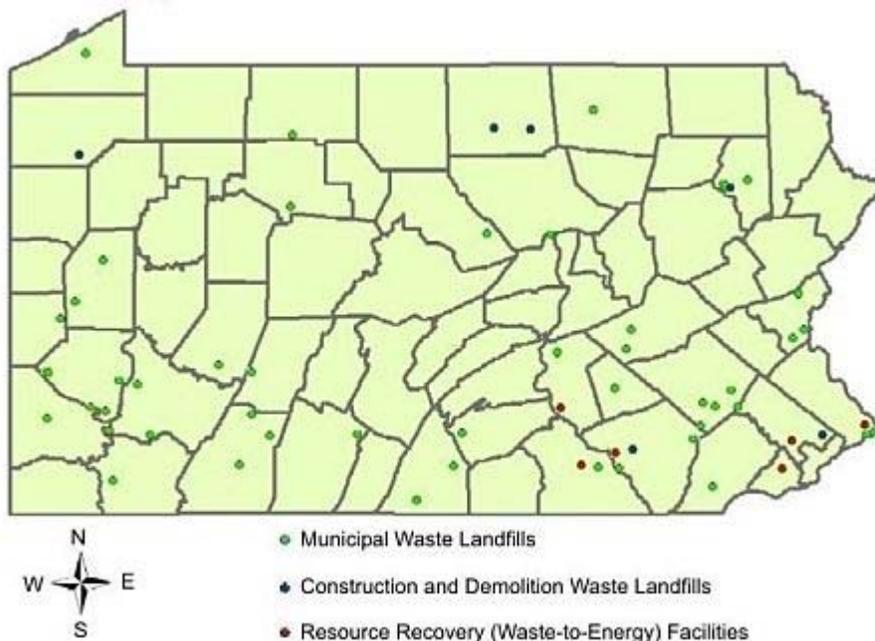
Pennsylvania for a total of 21.7 million tons. Eighteen and a half million tons were landfilled and 3.1 million tons were incinerated.

Of the 18.5 million tons landfilled in 2008, the regional breakdown was as follows (using the Pennsylvania Department of Environmental Protection regions): Southeast, 3.4 million tons; Northeast, 2.7 million tons; South-central, 6 million tons; North-central, 0.6 million tons; Southwest, 3.8 million tons; and Northwest, 2 million tons. Total waste generation per capita in Pennsylvania in 2008 was 1.2 tons. Using only municipal solid waste as a base, the per-capita generation was 0.8 tons.

In comparison, Pennsylvania generated and disposed of 14.7 million tons of solid waste in 2000. Of this, 9.4 million tons were municipal solid waste with the remainder consisting of residual waste, construction and demolition waste, sewage sludge and asbestos. Another 12.3 million tons of solid waste originated out of state and were disposed in Pennsylvania for a total of 26.9 million tons. Almost 24 million tons were landfilled and 3 million tons were incinerated.

Of the 23.9 million tons landfilled in 2000, the regional breakdown was as follows (using the Pennsylvania DEP regions): Southeast, 5.4 million tons; Northeast, 4.9 million tons; South-central, 6 million tons; North-central, 0.6 million tons; Southwest, 4.8 million tons; and Northwest, 2.2 million tons. Total waste generation per capita in Pennsylvania for 2000 was 1.2 tons. Using only municipal solid waste as a base, the per-capita generation was 0.8 tons.

According to DEP,² Pennsylvania has 46 active landfills and six resource-recovery (waste-to-energy) facilities. The map below from DEP shows the locations of municipal waste landfills and resource recovery facilities in Pennsylvania.



In addition to these disposal facilities, there are 92 permitted transfer stations currently in operation.

Statewide, based on DEP figures as of January 2009 for permitted capacity and average daily tonnage received in recent years, landfills in Pennsylvania collectively had a remaining average capacity life of 16 years. By region, the remaining average capacity life was as follows: Southeast, 5.5 years; Northeast, 18.5 years; South-central, 12 years; North-central, 3.2 years; Southwest, 31.2 years; and Northwest, 15.3 years. Additional disposal capacity is gained through incineration in the South-central region and the Southeast region, which incinerated 3,300 tons and 10,000 tons per day, respectively.

Since January 1, 2009, only one landfill permit modification has been issued for an increase in disposal capacity. Several other expansion applications are currently pending. Due to changes made to the state approval process in 2000, some of these applications have remained in that status for a number of years. These changes now require a subjective balancing of known and potential environmental harms against proven social, economic, and environmental benefits, while mandating increased public involvement and additional proof of conformity with county waste planning and local zoning requirements. The effect of these changes has been to lengthen the period of time required to obtain a decision on landfill capacity expansion applications. This delay could place in question the availability of adequate future landfill disposal capacity in various regions of the commonwealth and thus negate a county's ability to negotiate for landfill space when undertaking solid waste plan updates.

The DEP lists 32 active operational methane gas-to-energy projects at Pennsylvania landfills and six landfills with pending applications.

The map below from DEP shows operational gas-to-energy projects, pending projects, candidate landfills and landfills of undetermined status.



There is currently no requirement for mandatory trash collection in Pennsylvania. In most urban and suburban areas trash collection service is viewed by residents as a required service.

However, in the more rural parts of the state there are no ordinances addressing this matter. Without a requirement for mandatory trash collection the incidence of illegal disposal—dumping or burning—of trash increases.

RECYCLING

According to the U.S. EPA, solid waste that can be recycled or reclaimed can be considered a valuable commodity, but only under some conditions. The material must provide a useful contribution to the recycling process or to a product of the recycling process, must yield a valuable product or intermediate that is sold or used under specific conditions, and the product of the recycling process must not contain significant amounts of hazardous constituents.

Pennsylvania's Act 101 (1989) mandates that all municipalities with more than 5,000 residents and with a population density greater than 300 people per square mile implement programs for the curbside collection of residential, commercial and institutional recyclables.

This act has resulted in a huge growth of municipal recycling programs over the last 20 years, but efforts to make recycling programs pay for themselves through sales of recycled and reclaimed materials have been less successful. Variations in the market for such materials means most recycling programs continue to be dependent on government grants in order to function.

During periods of high return, local governments are able to cover their collection and processing costs and in some cases, make a capital investment necessary for the expansion of their programs. However, when the return on sales is low, municipal recycling programs have required a local government subsidy.

Pennsylvania's legislature has not reauthorized the municipal grant funding program that complemented the development of recycling infrastructure investment for more than 20 years. This grant program was initially funded by a \$2 per ton fee placed on all municipal waste disposed at landfills and incinerators and has supported infrastructure capital investment at the local government level. Grant funds were used to purchase storage and collection equipment as well as equipment used to agglomerate and separate recycled materials for sale to end users. The program also provided some capital financing to the private sector for the same purposes. However, no grant program was established to cover operating and maintenance costs and these expenses have been provided by the local government and private entities involved.

Today, 91 public or privately owned facilities exist that are capable of processing more than 4 million tons of residential and commercial glass, metal, plastic and paper (ACT 101 materials) from the more than 2,500 recycling programs statewide. Although slightly less than 5 million tons of materials have been recycled annually since 2005, for calendar year 2008, less than 500,000 tons of ACT 101 material was collected and processed with 52 of Pennsylvania's 67 counties reporting. This points to an overwhelming amount of unused MRF capacity available for additional material to be collected and processed. The locations of these facilities, however, are not equally distributed geographically throughout the state. Therefore, the need may exist to develop either additional facilities or recycling material transfer stations in areas where there are currently no MRFs.

Electronic waste is a rapidly growing component of the solid waste stream. The growth of electronics industry has multiplied the quantities of waste electrical and electronic equipment that will only increase. Most of this is discarded in landfills, though many electronic products contain toxic materials such as lead, mercury and cadmium that may be hazardous when

disposed of improperly. No program exists currently at a national level to deal with electronic wastes. National strategies for dealing with this growing problem must be developed.

In an effort to deal with the growing electronic waste issue, localities have implemented electronic waste recycling events for residents to dispose of unused products voluntarily. For 2010, more than 50 electronics recycling activities have been scheduled across the state. Some are one-day events, some several days in duration and others have drop-off locations that are available for several months during the year.

Leaf composting programs have been established in all mandated municipalities and in a number of smaller non-mandated municipalities. Leaf composting sites are either municipally or privately owned and operated.

In addition, DEP has developed a number of educational documents relating to backyard composting. Both the state and several educational/environmental entities offer seminars for residents anxious to pursue this type of activity.

POLICY OPTIONS

With more than 2,500 local government units and an equal number of school and special districts existing in Pennsylvania, attempting to find a one-size-fits-all approach to recycling is very difficult. Forty-two percent of Pennsylvania's population lives in townships where lack of population density per square mile is one of the single most critical issues affecting the cost of governance in general and collection of recyclable materials specifically.

Recycling collection efficiency of certain materials cannot be achieved with program elements of population and density as required by the Pennsylvania Code. A change in regulatory control or less stringent exemption from these requirements to satisfy profit margins per unit of collection may be necessary to support collection in these more rural locations. Because of the need for larger quantities of marketable material to sustain recycling efforts, it is appropriate that local governments consider joining with their neighbors or in countywide programs to promote economies of scale.

Enforcement of the requirements established by local recycling ordinances adopted in accordance with county solid waste management plans differs from municipality to municipality across the state. Enforcement of recycling requirements in state-owned facilities differs based on the type of facility (i.e., state office building, school district, state prison) and the plan of the county in which the facility is located. Many of the smaller municipalities in Pennsylvania that offer curbside or drop-off recycling programs do so voluntarily and establish the requirements of these programs internally or by private sector collection contract.

The curbside collection of recyclable materials becomes easier to implement if the curbside collection of trash already exists.

RECOMMENDATIONS

The Pennsylvania sections of ASCE recommend the following measures be taken for Solid Waste infrastructure by the state:

- The Department of Environmental Protection (DEP) process for reviewing and acting on landfill expansion permits should be reviewed with an eye toward assuring that timely action will be taken so that counties will be able to negotiate for landfill space when undertaking plan updates
- Consideration should be given to requiring mandatory waste collection (curbside or drop-off) in all but the most rural areas
- DEP should promote the establishment of rural trash transfer stations to accommodate trash drop-off containers
- Pennsylvania should establish mandatory recycling requirements in all facilities receiving state funds (prisons, schools, governmental office buildings, etc.)
- DEP should develop recommendations for regionalization of recycling efforts to accommodate those areas where collection does not take place and/or processing facilities are nonexistent
- Legislation should be considered that would address the proliferation of electronic waste in our solid waste stream

SOURCES

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- ASCE Policy Statement 331: [Hazardous Waste Reduction and Management \(PS 331\)](#)
- ASCE Policy Statement 516: [Municipal Solid Waste Management \(PS 516\)](#)
- ASCE Policy Statement 523: [Interstate Transport of Municipal Solid Waste \(523\)](#)
- ASCE Policy Statement 527: [Recycling of Electronic Waste](#)