

SOLID WASTE



Solid Waste Management (SWM) activities in Pennsylvania can be evaluated under three separate categories: waste collection, waste diversion and disposal. The portion of the waste stream that is targeted for disposal is primarily collected by private haulers and disposed at private facilities, with oversight provided by municipal and county staff. In 2012, “garbage” or “trash” (which can be defined as things that are no longer useful or wanted and which have been discarded) collection services were adequate in all but the most rural areas, and disposal capacity was adequate for anticipated future needs. Recycling, which accounted for a large percentage of waste diversion, can be subdivided into two major aspects: collection and processing. On the collection side, recycling faced challenges due to recent decreases in State funding and recycled commodity value (i.e., municipalities don’t generate as much income from their recycled items as they have in the past). Additionally, recent court rulings have adversely affected the ability of local governments to fund programs. While recycling commodity processing is well established in urban areas, many rural areas continue to struggle with limited access to adequate processing facilities. (Limited accessibility to processing means that the cost of recycling increases dramatically, often to the point that it is considered uneconomical.)

BACKGROUND

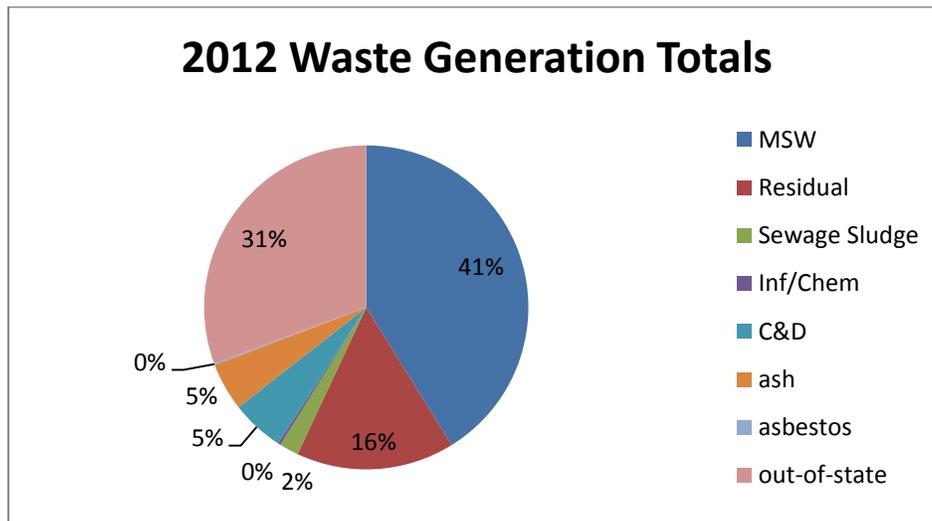
Everyone creates solid waste—residents, commercial entities, and industry. In general, municipal solid waste (MSW) can be seen as the collection, recycling and/or disposal of waste products. In Pennsylvania, MSW (which includes recyclables), is defined as: garbage, refuse, industrial lunchroom or office waste and other material, including solid, liquid, semisolid or contained gaseous materials. In short, MSW is all waste and sludge not meeting the definition of residual or hazardous waste according to the Solid Waste Management Act (SWMA). The Pennsylvania Department of Environmental Protection (PADEP) enforces regulations governing the handling and management of solid waste while responsibility for implementing municipal waste activities is vested in each of the 67 counties and more than 2,500 local governments in the Commonwealth.

Generally, residential and commercial waste is typically considered “municipal waste”, whereas large quantity industrial waste products are typically categorized as “residual waste”. Each of these entities may also generate “hazardous waste”, in large or small quantities. A fourth category is “construction & demolition waste”, which is frequently combined with municipal waste for disposal. Large volume residual waste materials generated by industrial entities are frequently disposed at the generation site (referred to as “captive facilities”), and are not included in the municipal waste disposal tonnage documentation. C&D waste can be disposed in designated C&D landfills, although a considerable tonnage of this material is routinely disposed in municipal landfills.

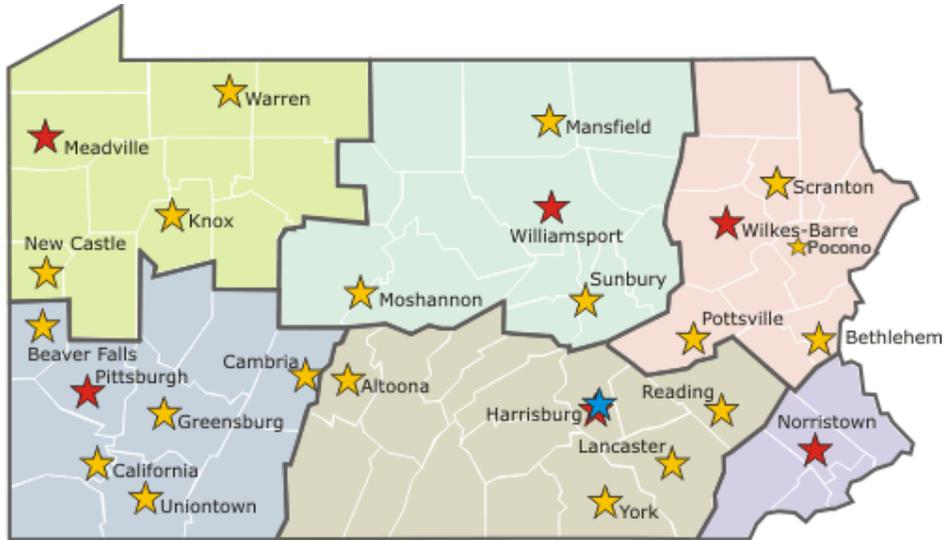
Infrastructure to handle solid waste includes on-site storage containers, collection/transportation vehicles and disposal facilities. Storage containers are supplied by the generating location, whether it is a residence, a commercial establishment or an industrial facility. Sufficient collection and transportation vehicles are supplied by either the public or the private sector. Critical elements of the infrastructure are disposal facilities, which include both landfills and incinerators, and material recycling facilities (MRFs), which separate recycled materials into specific material streams for distribution. Transfer stations may be utilized to reduce the cost of transportation to distant disposal or recycling facilities. Transfer stations are locations where the smaller trash trucks we see in our neighborhoods can drop off their loads and be picked up by large tractor-trailers for transport to the disposal facility. This is a more economical way to transport waste to the disposal facility. It also cuts down on the number of trucks going to the facilities, but is only cost-effective if there is a substantial haul distance to the disposal or processing facility.

CONDITION AND CAPACITY

In 2012, Pennsylvania generated and disposed 14.6 million tons of municipal waste within its borders. Of this total, 8.6 million tons was designated as MSW. The remainder consisted of residual waste (3.3 million tons), sewage sludge (0.4 million tons), infectious/chemotherapeutic waste (0.06 million tons), construction/demolition waste (1.1 million tons), ash (1.0 million tons), and asbestos (0.03 million tons). Another 6.4 million tons of municipal solid waste originated out-of-state, and was disposed in Pennsylvania. This resulted in a total of 21.0 million tons of municipal waste disposal (both landfilled and incinerated).

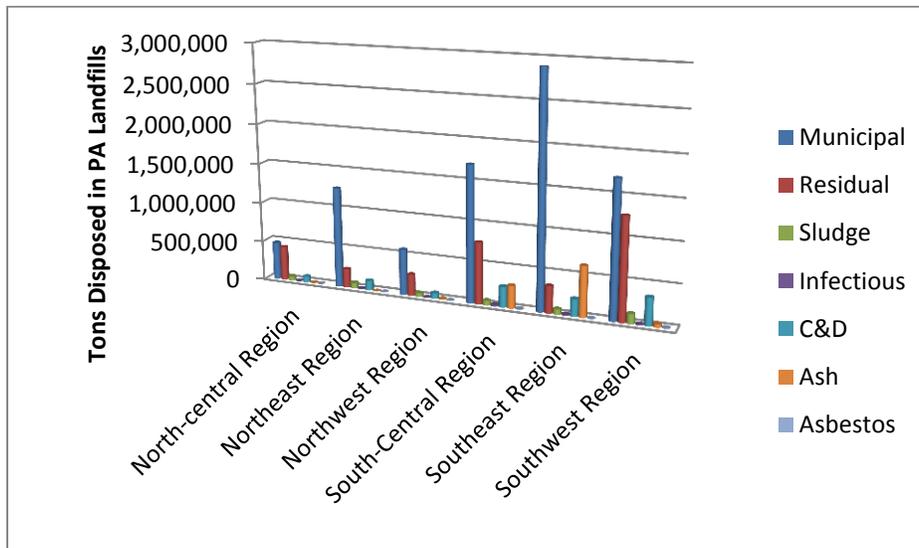


The 14.6 million tons of municipal waste generated and disposed in Pennsylvania in 2012 was generated regionally as follows:



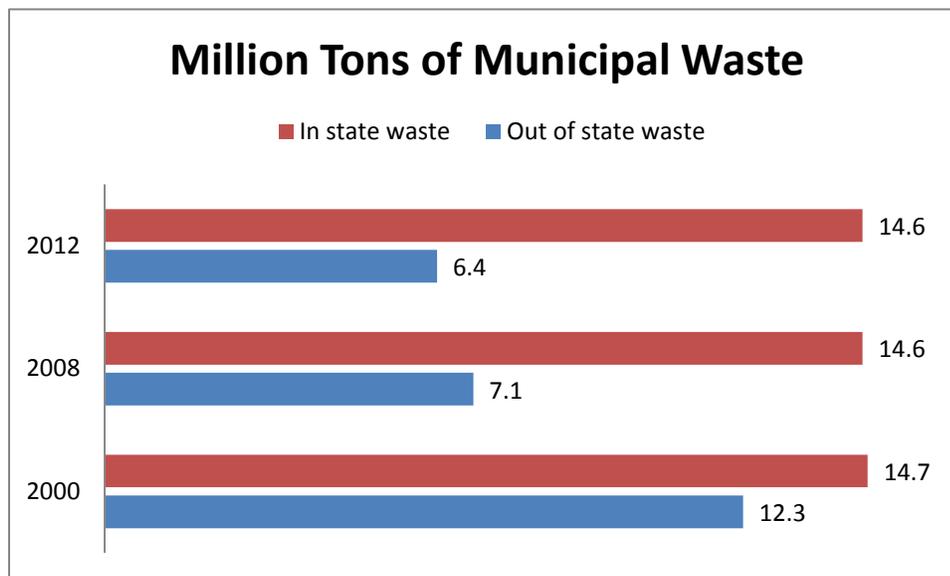
2012 Waste Tonnage Generated by Region

	Municipal	Residual	Sludge	Infectious	C&D	Ash	Asbestos	Total
North-central	473,350	426,195	49,064	1,292	71,471	3,524	2,127	1,027,021
Northeast	1,263,375	237,728	71,230	8,540	122,133	17	1,461	1,704,483
Northwest	575,304	269,488	45,286	0	71,322	10,976	1,779	974,155
South-Central	1,710,577	773,912	59,806	22,388	259,732	283,680	9,632	3,119,726
Southeast	2,897,202	338,909	65,249	15,673	219,474	632,892	3,409	4,172,808
Southwest	1,703,728	1,277,853	123,061	10,827	351,563	44,035	9,430	3,520,495
	8,623,535	3,324,083	413,695	58,719	1,095,694	975,124	27,839	14,518,688



Pennsylvania’s total waste generation per capita in 2012 was 1.14 tons/capita. Using only MSW as a base, generation was 0.68 tons/capita. Based on these estimates, it takes fewer than 9 people to fill a standard garbage truck every year.

By comparison, Pennsylvania generated and disposed of 14.6 million tons of municipal solid waste in 2008 (virtually the same as noted in 2012). Another 7.1 million tons of solid waste originated out-of-state and was disposed in Pennsylvania, for a total of 21.7 million tons (again, roughly the same as in 2012). The 2008 results represented a reduction in the totals documented in 2000 (14.7 million tons generated in-state, 12.3 from out-of-state, for a total of 27 million tons). Most of this drop was the result of a reduction in the amount of waste imported from out-of-state. This trend is based on the availability of cheap disposal capacity in other states, as well as the general reduction in waste generation in the US NorthEast.



According to PADEP, Pennsylvania has 44 active municipal waste disposal landfills and six resource recovery (waste-to-energy) facilities. There are also four permitted C&D disposal facilities and three residual waste facilities, with the distribution of sites as shown in the following table.

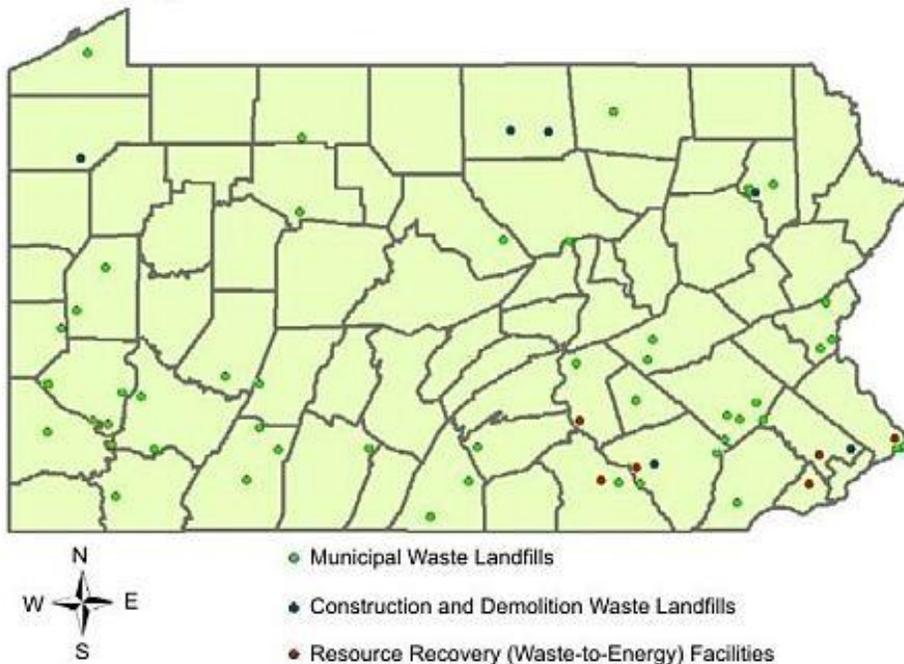
2013 PA Permitted Disposal Facilities

Region	Landfills	Waste-to-Energy	C&D	Residual	Transfer Stations
North-central	3		1	2	7
Northeast	6		1		11
Northwest	5		1		11
South-Central	12	3	1		14

Southeast	3	3			23
Southwest	15			1	10
Total	44	6	4	3	76

Note: totals do not include Captive Disposal Facilities

The map below from PADEP shows the location of municipal waste landfills and resource recovery facilities in Pennsylvania. In addition to these disposal facilities, there are 76 permitted transfer stations currently in operation.



Through July 2011, the PADEP listed 40 active operational methane gas-to-energy projects at Pennsylvania landfills and six candidate landfills under consideration. In gas-to-energy projects, the gas generated by natural waste breakdown processes is captured and used for power generation, either onsite or for distribution.

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



Of the 50 municipal landfill and waste-to-energy facilities permitted in Pennsylvania, only 12 are publicly owned and operated. The remainder are privately owned, with permits for expansion issued periodically by the PADEP.

As part of their Solid Waste Planning, each County is required to document that sufficient permitted disposal capacity is available for all of the waste generated in Pennsylvania for the next 10 year period. Based on current County Plans, it appears that sufficient capacity is currently available.

Although seriously discussed in 2011 by the State Legislature, Pennsylvania currently has no State-mandated requirement for trash collection. Many municipalities, however, require trash collection by ordinance. In most urban and suburban areas, trash collection service is viewed by residents as a required service.

However, in many of 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. Although dumping may appear to be an inexpensive way to resolve a trash disposal problem, the cumulative effects of illegal disposal can result in uncontrolled fires, water pollution and tremendous expense for local governments for cleanup.

Recycling

According to the United States Environmental Protection Agency (USEPA), 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 populations greater than 10,000, and those with at least 5,000 residents and a population density greater than 300 people per square mile, implement programs for the curbside collection of residential, commercial and institutional recyclables. The Act also encourages non-mandated municipalities to provide recycling services to residents, through drop-off facilities or curbside collection. Municipalities were encouraged to initiate recycling programs with State grants coordinated through the PADEP. According to the PADEP, 440 of Pennsylvania's 2,700 municipalities are mandated to recycle and provide curbside collection programs, and nearly 1,500 non-mandated municipalities have access to voluntary curbside or drop-off collection services.

This Act has resulted in a huge growth of municipal recycling programs over the last 25 years, but efforts to make recycling programs self-sufficient and sustainable through sale of recycled and reclaimed materials have been less successful. Variations in the market for such materials, as well as the rising costs for collection and transportation of the materials, means most recycling programs continue to be dependent on government grants in order to function.

Although many municipalities and counties provide recycling collection services (either through curb-side collection or drop-off boxes), most of the processing of recyclable materials is handled by private enterprises.

During periods of high recycling commodity value, local governments are able to cover their collection costs, and in some cases, make a capital investment necessary for the sustainability of their programs. However, many of the collected commodities (e.g. glass) have a low value compared to the costs associated with collection, transportation and processing. As a result, when the return on sales is low, municipal recycling programs have required a local government subsidy. In order to remain profitable, private industries that process recyclables require large volumes of the high value commodities, to justify working with the lower value items.

In 2009, Pennsylvania's legislature reauthorized the \$2 per ton fee placed on all municipal waste disposed at landfills and incinerators, which has partially supported infrastructure capital investment at the local government level. This fee may be used to

fund a municipal grant program that complements the development of recycling infrastructure investment, although a significant percentage of the total has been used for other purposes. Grant funds are 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 provides 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 historically been provided by the local government and private entities involved.

Prior to 2005, half of Pennsylvania's counties utilized county administrative fees collected on each ton of municipal waste generated in the county and disposed of in Pennsylvania facilities. However, a 2005 Commonwealth Court decision ruled that counties could not institute an administrative fee, based on their interpretation of Act 101. Since then, the PADEP has not approved county solid waste plans that require payment of a fee in order to participate in the plan.

In addition, the State grant program established under Act 101, which had provided \$46 million in FY 2004-05 to initiate and sustain recycling programs, dropped to \$35 million for FY 2012-13, in part due to the downturn in municipal landfill disposal throughout the Commonwealth. To make matters worse, there has been a drop in recycled commodity value as a result of the economic downturn and reduced exports overseas.

The combination of these factors has had a detrimental impact throughout the Commonwealth's county and municipal recycling programs. In 2012 and 2013, several Pennsylvania counties eliminated their recycling programs, shifting the burden of recycling costs fully onto the mandated municipalities, and those who chose to provide recycling services voluntarily. In October 2013, Commonwealth Court ruled that the City of Reading had no authority to impose recycling fees on residents, thus throwing into doubt the continued operation of the city's \$2.7 million recycling program. The implication of this ruling on other municipalities throughout the Commonwealth is not currently known.

The PADEP collects recycling data from municipalities and counties on an annual basis, and publishes this information on their website. The PADEP website indicates that in 2011, Pennsylvanian's recycled over 5.85 million tons of resources, a 5.77% increase over 2010. However, the data received for the website comes from the individual municipalities, and is prone to typographic errors and incorrect data.

For instance, the PADEP recycling data shows that Adams County alone was responsible for recycling 908,865.3 tons of mixed metals in 2011. This is compared to a total of 1,495.7 tons by Adams County in 2010, for a 60,700% one-year increase in tonnage. It appears likely that this data was accidentally entered as "pounds" rather

than “tons”, and if that single change is made, the net result is a 10.64% decrease in state-wide recycling between 2010 and 2011.

E-Waste

Electronic waste (also known as e-waste) is a rapidly growing component of the solid waste stream. The growth of the 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. The Covered Device Recycling Act (CDRA, Act 108 of 2010) was implemented as an attempt to reduce the tonnage of e-waste being disposed in municipal landfills. This Act requires manufacturers of electronic devices to provide recycling programs for desktop computers, laptop computers, computer monitors, computer peripherals, and televisions (referred to as e-waste) sold to consumers in Pennsylvania beginning in January of 2012. However, collection of e-waste has far exceeded the ability of processing facilities to keep up with the expanding pace of e-waste discards. According to the USEPA, nationwide in 2009:

- 438 million new consumer electronics were sold;
- 5 million tons of electronics were in storage;
- 2.37 million tons of electronics were ready for end-of-life management; and
- 25% of these tons were collected for recycling

These statistics are bound to increase as the demand for electronics grows exponentially. Roughly half of the states (including Pennsylvania) currently have laws regarding e-waste recycling, but no program exists currently at a national level to deal with electronic wastes.

In an effort to deal with the growing electronic waste issue, localities have implemented e-waste recycling events for residents for disposal of unused products voluntarily. The PADEP reports that 44 of the 67 counties have implemented permanent e-waste drop-off locations, as well as periodic one-day events during the year. However, CDRA, Act 108 of 2010 did not provide increased funding for county and municipal governments to provide for collection and distribution of e-waste. In fact, the PADEP recently informed counties that they could not charge a fee for drop-off of e-waste if they were collecting revenue from disposal of the materials. This has led to a situation where the counties are forced to choose between a fee for drop-off and revenue from the collected materials, neither of which is sufficient to sustain the programs.

Composting

Leaf composting programs have been established in several counties, all mandated municipalities, and in a number of smaller non-mandated municipalities. Leaf composting sites are either county/municipally- or privately-owned and operated. In addition, the PADEP, and many of the counties, have 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.

With that in mind, the total recycling tonnage data presented by the PADEP, although useful, should not be accepted at face value.

FUNDING AND FUTURE NEEDS

Publicly-operated solid waste management groups have been struggling to become sustainable due to reduced grant funding, aging equipment, and recent lawsuits which have limited local government opportunities to generate revenue for recycling and education programs. It appears that there is sufficient capacity to meet the anticipated municipal waste disposal needs for the next 10 years. However, there is a future need for expanded waste collection services in rural areas of the Commonwealth. In addition, there is a considerable need for future funding sources to enable local governments to sustain recycling and solid waste education programs.

PUBLIC SAFETY

The reason that municipal waste collection programs were initiated by local and state governments was to protect the public from adverse conditions associated with dumping of trash. However, if the trend toward reductions in funding of recycling and solid waste education programs continues, there is a concern that illegal dumping of “hard to recycle” and household hazardous waste materials will increase. This will lead to numerous environmental problems for the State, and a general increase in public safety concerns.

RESILIENCE

The solid waste recycling system in use throughout the Commonwealth is a combination of publicly and privately operated facilities and programs. Since this is a rather complex cooperative operation, reductions in funding for the public segment of the system will tend to tip the balance toward private operations, which are focused on the more profitable components of the waste stream. As such, there is a danger that “hard to recycle” and household hazardous waste materials will be left out of the system, resulting in illegal dumping. The current public aspects of the system have taken many years to develop, and without the ability to become financially sustainable

through fees or funding contributions, it will be difficult to sustain. If these programs are removed, it will be very difficult to reestablish the momentum previously achieved.

INNOVATION AND TECHNOLOGY

There appears to be a resurgence of the use of “waste-to-energy” facilities across the Commonwealth. Although these facilities have received well-documented criticism in the past, state-of-the-art plants have the potential to significantly reduce the overall need for disposal tonnage, while generating electricity. Similarly, many locations across the State have been moving toward single-stream recycling methods, whereby a variety of recycled commodities can be combined into a single container, which is more attractive to residents. This method has been available for many years, but new technology is making this approach more viable for sorting at large, efficient consolidation centers, since single-stream tends to result in substantial increases in total recycling tonnages.

POLICY OPTIONS

With 67 counties, more than 2,500 local government units, and roughly 500 school districts existing in Pennsylvania, finding a one-size-fits-all approach to SWM and 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 material specifically.

Recycling collection efficiency of certain materials cannot be achieved with limited population and density, especially when processing facilities for those materials are not local. Fluctuating unit pricing for recyclable commodities makes it extremely difficult to sustain recycling collection programs. A change in regulatory expectations regarding recycling percentages or the specific list of materials to be collected 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 regionalization and intergovernmental cooperation to promote economies of scale.

Enforcement of the requirements established by local recycling ordinances adopted in accordance with county SWM plans differs from municipality to municipality across the state. 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. However, significant portions of

Pennsylvania utilize subscription trash collection, whereby each individual contracts separately with a trash hauler to provide services. This tends to work well in rural areas for trash collection, but is inefficient for urban areas, and is difficult to implement for recycling collection. Municipal collection by contract is typically more efficient, but many municipalities are hesitant to implement municipal contracts due to resistance from local haulers.

Since Pennsylvania's Act 101 was implemented in 1989, there have been several lawsuits which have adversely affected county and municipal efforts to create sustainable recycling and waste management education programs. This, coupled with an overall reduction in available grant funding from the PADEP, has resulted in many recycling programs being reduced in scope, or eliminated entirely. Modifications to Act 101 to address some of these issues have been proposed numerous times over the last few years, but substantial changes have not been implemented.

RECOMMENDATIONS

The four Pennsylvania sections of the American Society of Civil Engineers (ASCE) recommend the following measures be taken for the solid waste infrastructure of the Commonwealth:

- The PADEP 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. However, recent observations have been that available disposal capacity appears to exceed near-future demand in Pennsylvania.
- Consideration should be given to requiring mandatory waste collection (curbside or drop-off) in all but the most rural areas.
- PADEP 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.)
- PADEP should develop recommendations for regionalization of recycling efforts to accommodate those areas where collection does not take place and/or processing facilities are inadequate.
- PADEP should also reevaluate their method for collection of waste disposal and recycling data. It is recognized that staffing limitations (municipal, county and within the PADEP) make the data evaluation difficult, but it is also understood that the data is important for planning purposes.

- Legislation should be considered to modify Act 101 to permit county and/or local governments to establish various methods for generating revenue to sustain their solid waste management, recycling and education programs.
- The Commonwealth should reconsider the methods used to establish Grant Funding budgets, and subsequent grant request evaluation techniques. There is currently insufficient grant money available to create sustainable waste management programs throughout the State. In addition, the turn-around time between grant request submittal and receipt of notice of award is far too long.

SOURCES

- American Society of Civil Engineers (ASCE), *2010 Report Card for Pennsylvania's Infrastructure – Solid Waste Section*, May 2008. Available at: [2010 PA Solid Waste Section](#)
- Commonwealth of Pennsylvania, Department of Environmental Protection, *Municipal Waste Landfills & Resource Recovery Facilities*. Available at: [Municipal Waste Landfills & Resource Recovery Facilities](#)
- Commonwealth of Pennsylvania, Department of Environmental Protection, *Recycling Reports and Studies*. Available at: [Recycling Reports and Studies](#)
- Commonwealth of Pennsylvania, Department of Environmental Protection, *Pennsylvania's "Municipal Waste Planning, Recycling and Waste Reduction Act", Act of July 1988*. Available at: [Municipal Waste Planning, Recycling and Waste Reduction Act](#)
- US Environmental Protection Agency, *Statistics on the Management of Used and End-of-Life Electronics*. Available at: [End-of-Life Electronics](#)

ASCE POLICY STATEMENTS

- ASCE Policy Statement 516: [Municipal Solid Waste Management](#)
- ASCE Policy Statement 331: [Hazardous Waste Reduction and Management](#)
- ASCE Policy Statement 527: [Recycling of Electronic Wastes](#)