

III. Waste Generation

Purpose

This section of the solid waste management plan provides a summary of the SWMD's historical and projected solid waste generation. The SWMD's policy committee must understand the waste the SWMD will generate before the policy committee can make decisions regarding how to manage the waste. To create that understanding, the policy committee analyzed the amounts and types of waste that were generated within the SWMD's jurisdiction in the past and those that will be generated in the future.

The SWMD's policy committee calculated solid waste generation for two types, or sectors, of generators – the residential/commercial sector and the industrial sector. Residential/commercial waste is essentially municipal solid waste and is the waste that is generated by a typical community. Industrial solid waste is generated by manufacturing operations.

The policy committee calculated how much waste each sector generated by adding together the quantities of solid waste disposed of in landfills and the quantities of materials reduced/recycled. The policy committee then added the quantities generated by both sectors to arrive at total waste generated within the SWMD.

The SWMD's policy committee obtained baseline waste reduction and recycling data by surveying communities, recycling service providers, collection and processing centers, commercial and industrial businesses, owners and operators of composting facilities, and other entities that recycle. Responding to a survey is voluntary meaning the policy committee relies upon an entity's ability and willingness to provide data. When entities do not respond to surveys, the policy committee gets only a partial picture of recycling activity. How much data the policy committee obtains has a direct effect on the SWMD's waste reduction and recycling and generation rates.

The policy committee obtained baseline disposal data from Ohio EPA. Owners/operators of solid waste facilities are required to submit annual reports to Ohio EPA. In these reports, owners/operators summarize the types, origins, and amounts of waste that were accepted at their facilities during the report year. Ohio EPA adjusts the reported disposal data by adding in waste disposed in out-of-state landfills.

The policy committee analyzed the baseline year data and historical generation data to project future waste generation. The details of this analysis are presented in Appendix F. The policy committee used the projections to make decisions on how best to manage waste and to ensure future access to adequate waste management capacity, including recycling infrastructure and disposal facilities.

The SWMD's comprehensive waste management strategies are presented in Chapter IV and Appendix H.

A. Solid Waste Generated in Reference Year

Table III-1 summarizes the generation data for the Erie SWMD in 2011:

Table III-1 Solid Waste Generated in Reference Year

Type of Waste	Generation Rate		Generation Quantity
	per person (lbs/day)	per employee (lbs/day)	tons (year)
Residential/Commercial	7.04 ¹		98,563
Industrial	8.78 ¹	113.85 ²	123,000
Excluded	N/A	N/A	N/A
Total	25.81 ¹		221,563

ppd = pounds per person per day

¹Calculated using the reference year population of 76,771 (see Appendix B)

²Calculated using the reference year manufacturing employment of 5,920 employees Number of employees from 2013 *Ohio County Indicators Report*, Table 22 (Manufacturing Employment, 2005-2011), July 2013, Office of Research, Ohio Development Services Agency, <http://www.development.ohio.gov/files/research/C1091.pdf>, 2/25/2014.

Of the total waste generated within the Erie SWMD, approximately 45 percent consisted of residential/commercial waste and 55 percent of industrial waste.

1. *Residential/Commercial Waste Generated in the Reference Year*

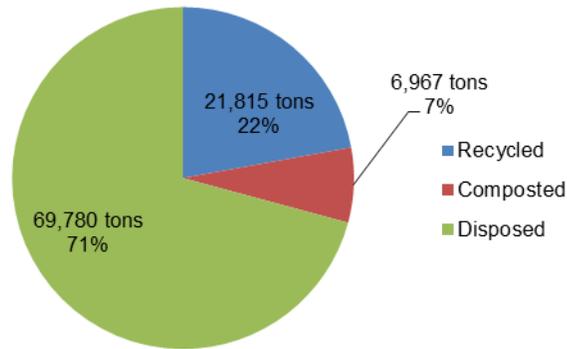
The Erie County SWMD’s residential/commercial sector generated 98,563 tons of solid waste at a per capita generation rate of 7.04 pounds/person/day (ppd) in the reference year. Table III-2 illustrates how that waste was managed:

Table III-2 How Residential/Commercial Waste Was Managed in 2011

Recycled	Composted	Disposed	Generated
21,815	6,967	69,780	98,563

As illustrated in Figure III-1 below, approximately 29 percent of the residential/commercial waste generated in Erie County was diverted from being disposed in landfills through recycling and composting programs.

Figure III-1: Management of Residential/Commercial Waste in 2011



In 2011, the Erie SWMD’s generation rate was significantly higher than both the national and Ohio generation rates of 4.43 ppd and 6.07 ppd, respectively. Furthermore, the SWMD’s generation rate is higher than the rates for the Cuyahoga, Franklin, Hamilton, Lucas, and Montgomery SWMDs, the SWMDs that host the five largest cities in Ohio. If it had generated waste at Ohio’s average rate, then the Erie SWMD would have generated 17,339 tons less waste than what was reported for the year. Furthermore, SWMDs with commensurate populations that are located in the same region of Ohio have generation rates that are much lower than Ohio’s average generation rate.

The likely cause of the high generation rate is Erie County’s large seasonal tourism industry. In a year, upwards of nine million tourists visit Erie County from May to October. Cedar Point alone accounts for an estimated 3.2 million tourists annually. The SWMD doesn’t have a means of tracking the waste generated by tourists separate from the waste generated by full-time residents. As a result, all waste generated in the county is included in the Erie SWMD’s generation rate. It is likely that the SWMD’s permanent residents generate waste at a lower rate than Ohio’s average.

Like the generation rate, the Erie SWMD’s disposal rate was also higher than Ohio’s average disposal rate and the rates for the SWMDs that host four of Ohio’s five largest cities. Had the SWMD disposed of waste at the Ohio average, then the SWMD would have sent 11,508 fewer tons of waste to landfills.

This analysis demonstrates that the SWMD’s waste management needs are strongly impacted by the tourism industry. It isn’t possible for the Erie SWMD to separate the waste generated by tourists from that generated by the county’s residents. This significantly complicates the Erie SWMD’s strategy for managing its solid waste and reducing the amount of solid waste being disposed in landfills.

2. Industrial Waste Generated in the Reference Year

In the reference year, the GJMV SWMD’s industrial sector generated almost 3,133,263 tons of solid waste. This results in a per capita industrial generation rate of 169.64 ppd. That was by far the highest industrial solid waste generation rate in Ohio in 2011.

The vast majority of the industrial waste, 3,057,144 tons, consisted of flue gas desulfurization waste (FGD waste) generated at two coal burning power plants located in Gallia County. The two plants are American Electric Power’s (AEP’s) General James M. Gavin Power Plant located in Cheshire and the Ohio River Valley Corporation’s Kyger Plant located in Gallipolis .

Utilities that burn coal to generate electricity generate sulfur dioxide gas which when released to the atmosphere can generate acid rain. Flue gas desulfurization is the process that is used to remove the sulfur dioxide from the power plant’s air emissions. That process generates FGD waste which is regulated as an industrial solid waste in Ohio. AEP disposes of most of the FGD waste it generates in its captive landfill facility.

Table III-3 illustrates how the GJMV SWMD’s waste was managed when FGD is included and excluded.

Table III-3 How Industrial Waste Was Managed in 2011

WITH FGD			WITHOUT FGD		
Recycled (tons)	Disposed (tons)	Generated (tons)	Recycled (tons)	Disposed (tons)	Generated (tons)
37,194	3,096,069	3,133,263	37,194	11,613	48,807

Looking at the generation data in another way, with the FGD included, the GJMV SWMD’s industrial sector generated waste at the rate of almost 3,787 pounds per employee per day. Without the FGD the generation rate is a little less than 59 pounds per employee per day¹. Because the companies that generate FGD typically also manage that waste, the FGD has little impact on the GJMV’s overall waste management strategy.

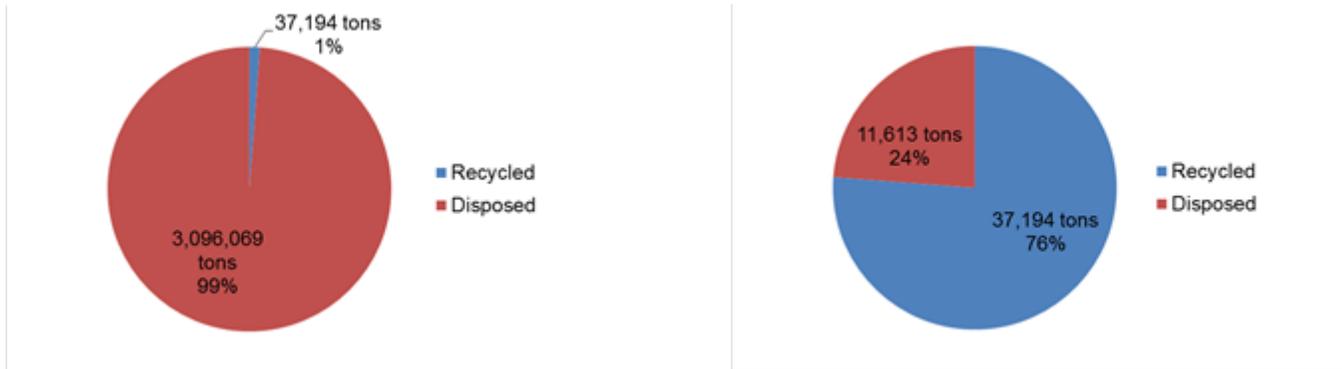
However, as illustrated in Figure III-2, FGD does have a major impact on the GJMV SWMD’s ability to achieve the industrial waste reduction and recycling goal from the 2009 State Plan. In fact, with the FGD, the GJMV SWMD’s industrial waste reduction and recycling rate was 1.2 percent in 2011. Without the FGD, the waste reduction and recycling rate increases to 76 percent.

¹ Calculated using the reference year manufacturing employment of 4,534 employees Number of employees from 2013 Ohio County Indicators Report, Table 22 (Manufacturing Employment, 2005-2011)

Figure III-2 Industrial Waste Management With and Without FGD

Industrial Waste (with FGD)

Industrial Waste (without FGD)



3. *Excluded Waste Generated in Reference Year*

In addition to generating large quantities of FGD waste, the two coal burning electric utilities located within the GJMV SWMD generate large quantities of excluded ashes. Together, these two facilities generated almost 593,000 tons of ash in 2011. That ash accounted for almost 16 percent of all waste generated that year.

The ash generated by these plants is regulated differently from solid waste in Ohio, and is, therefore, tracked separately from solid waste. This is a result of how Ohio’s law classifies what is solid waste and what is not. Ash from coal burning operations is referred to as “excluded” waste because the law specifically states that the ash is not solid waste. Therefore, how excluded ash must be managed is regulated by a different environmental law administered by Ohio EPA.

All of the ash that each utility generates is disposed in the respective utility’s corporately owned and operated landfill.

B. Historical Waste Generated

1. *Historical Residential/Commercial Waste Generated*

As can be seen in Figure III-3 on the next page, the Erie SWMD’s residential/commercial sector generated incremental annual increases of waste from 2007 to 2011. Overall, however, the Erie SWMD’s residential/commercial waste generation rate was relatively flat during that period, ranging from 5.89 pounds/person/day to 6.19 ppd. The residential/commercial sector did generate significantly more waste in 2011 than in 2010. The majority of that increase consisted of waste that was disposed at the Erie County Landfill. A smaller portion of the increase was material recovered for recycling.

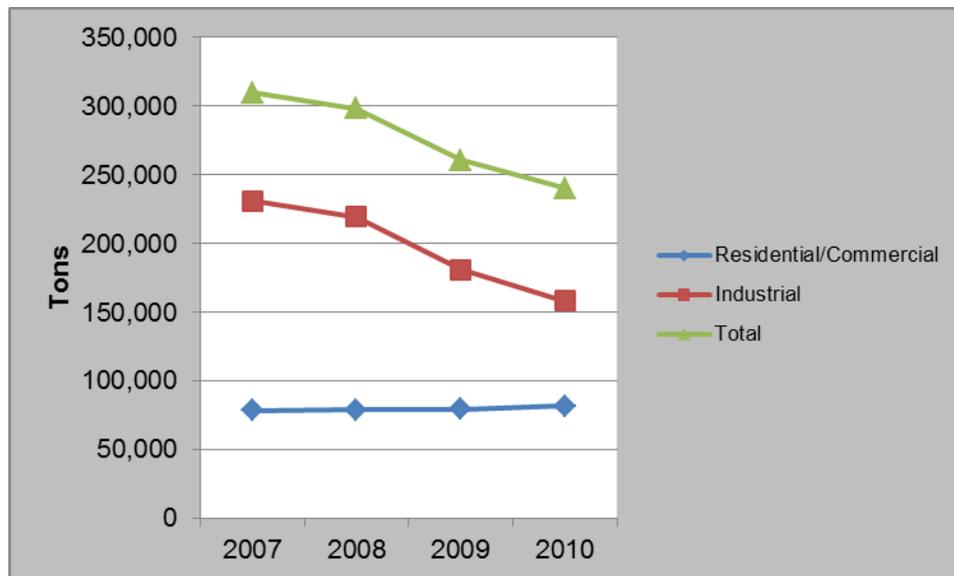
In contrast to the Erie SWMD, Ohio’s residential/commercial sector generated decreasing amounts of waste from 2007 to 2010. The increases experienced in Erie County are likely attributable to the continual growth in the Erie County’s tourism base. This growth is reflected in

the number of jobs in the leisure and hospitality sectors. In 2001, those sectors employed about 10,000 people. By summer of 2011, the number of employees in those sectors had increased to between 15,000 and 16,000. It is possible that tourism in Erie County was insulated from or possibly even bolstered by the downturn in the economy that occurred after 2008. This would be true if people chose to vacation closer to home or to take less expensive vacations than they might otherwise take if economic conditions were better.

2. *Historical Industrial Waste Generated*

Unlike residential/commercial waste, the amount of industrial solid waste generated in the Erie SWMD decreased steadily and significantly from 2007 to 2011 as did the rate at which industrial waste was generated. During that period, the amount of industrial waste generated decreased by more than 108,000 tons. This isn't surprising given that two of the largest industrial companies in Erie County manufacture automobile components. Since the production in the automotive industry is strongly impacted by economic conditions, the decrease was likely the result of the poor economic conditions during that period.

Figure III-3 Historical Waste Generated



C. Waste Generation Projections

Table III-4 and Figure III-4 below display the STW SWMD’s waste generation projections for the first year of the planning period, and years 5, 10 and 15 of the planning period.

Table III-4 – Waste Generation Projections

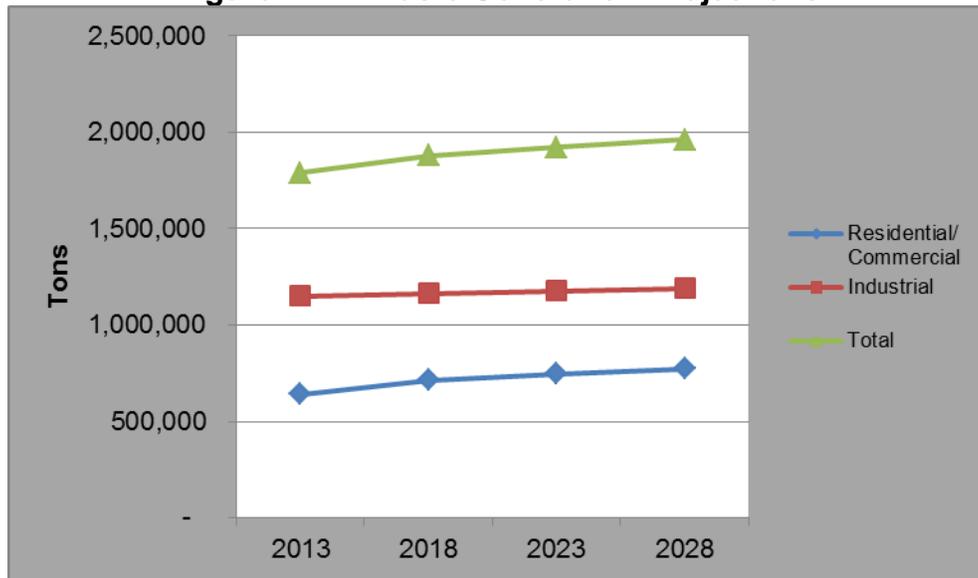
Year	Residential Commercial Waste		Industrial Waste		Excluded Waste		Total Waste	
	Rate (ppd)	Waste (tons)	Rate (ped)	Waste (tons)	Rate (ppd)	Waste (tons)	Rate (ppd)	Waste (tons)
2013	5.94	640,708	141.21	1,149,587	N/A ¹	N/A	16.58	1,915,108
2018	6.47	714,482	141.21	1,162,868	N/A	N/A	17.01	1,977,038
2023	6.58	746,701	141.21	1,176,303	N/A	N/A	16.95	2,032,435
2028	6.58	771,855	141.21	1,189,892	N/A	N/A	16.72	2,100,899

ppd= pounds per person per day

ped= pounds per employee per day

¹The STW SWMD is not required to account for excluded waste because the waste comprised less than five percent of total waste generated in the reference year.

Figure III-4 Waste Generation Projections



1. Residential/Commercial Waste Projections

As was shown earlier, until 2011 the STW SWMD’s residential/commercial sector had been generating less waste annually at a steadily decreasing rate since 2008. From 2010 to 2011, both the generation rate and the quantity of waste generated increased. The generation rate increased from 5.38 ppd to 5.72 ppd and the amount of waste generated increased from 579,060 tons to 608,600 tons. This reversed trend is in line with projections made available by the Ohio Development Services Agency. Those projections show that economic output in Ohio will increase through 2020.

Even though the STW SWMD's residential/commercial sector generated more waste from 2010 to 2011, both the generation rate and the quantity generated were still far below those experienced in 2008. However, it isn't clear how quickly or to what level generation will increase. Given these factors, this plan update projects that the residential/commercial sector's generation rate will slowly return to the pre-economic downtown rate of 6.58 ppd experienced in 2008.

Given all of the uncertainty regarding generation, The STW SWMD's policy committee did not believe that projecting the generation rate to exceed the 2008 rate was justified at the time this plan was prepared. Therefore, beginning in 2019, this plan update holds the generation rate constant at 6.58 ppd for the remainder of the planning period. The policy committee anticipates that it will obtain approval for an amended solid waste management plan by 2019. At that time, the policy committee will provide updated generation projections. All increases in the amounts of waste to be generated from 2019 through 2028 are strictly a function of projected population increases.

2. *Industrial Waste Projections*

To project industrial waste generation for the planning period, the policy committee considered both recent generation trends in its industrial sector as well as projections for manufacturing output and employment.

As was demonstrated earlier in "Historical Waste Generated", following a sharp decline that occurred from 2008 to 2009 the STW SWMD's industrial sector generated increasing amounts of waste annually after 2009. In fact, the quantity of industrial waste generated in 2011 was close to the historical high that occurred in 2007. These increases are consistent with both industrial waste generated statewide which increased annually after 2009 and reports published by the Ohio Department of Development Services that demonstrate Ohio's economic output improved.

According to projections made available by the Ohio Bureau of Labor Market Information, manufacturing employment in the STW District's region of Ohio will increase by 2.3 percent from 2010 to 2020. Further, the Ohio Department of Development Services projects that Ohio's manufacturing output will continue to increase.

For the planning period, the policy committee projected that the industrial sector would generate incremental annual increases of waste. These increases will occur as a result of increases in industrial employment but not increases in the amount of waste generated per employee. The STW SWMD's 2011 per employee generation rate was much higher than the 2010 rate primarily due to an increase in ferrous metal recycled. That metal resulted from an industrial generator recycling a large stockpile of scrap metal in 2011. The metal artificially inflated the industrial sector's generation rate. Thus, despite the projections for growth in the manufacturing sector, the policy committee did not believe the District's industrial sector would continue to generate waste at the 2011 rate.

This plan update projects industrial waste generation based on increasing employment but a flat employee generation rate. The policy committee held the per employee generation rate

constant using the average generation rate from 2007 to 2011. Thus, all increases in the quantities of industrial waste to be generated occur as the result of increases in employment. Based on these projections, the STW SWMD's industrial sector will generate a little less than 1.2 million tons of waste by 2028, the last year of the planning period.