Chapter 3 Waste Generation

Purpose of Chapter 3

This chapter of the solid waste management plan provides a summary of the SWMD's historical and projected solid waste generation. The policy committee needs to understand the waste the SWMD will generate before it can make decisions regarding how to manage the waste. Thus, the policy committee analyzed the amounts and types of waste that were generated within the SWMD in the past and that could be generated in the future.

The SWMD's policy committee calculated how much solid waste was generated for the residential/commercial and industrial sectors. 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. To calculate how much waste was generated, the policy committee added the quantities of waste disposed of in landfills and reduced/recycled.

The SWMD's policy committee obtained 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 that 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 disposal data from Ohio EPA. Owners/operators of solid waste facilities 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. Ohio EPA adjusts the reported disposal data by adding in waste disposed in out-of-state landfills.

The policy committee analyzed historic quantities of waste generated to project future waste generation. The details of this analysis are presented in Appendix G. 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.

A. Solid Waste Generated in Reference Year

Table 3-1 Solid Waste Generated in the Reference Year 2018

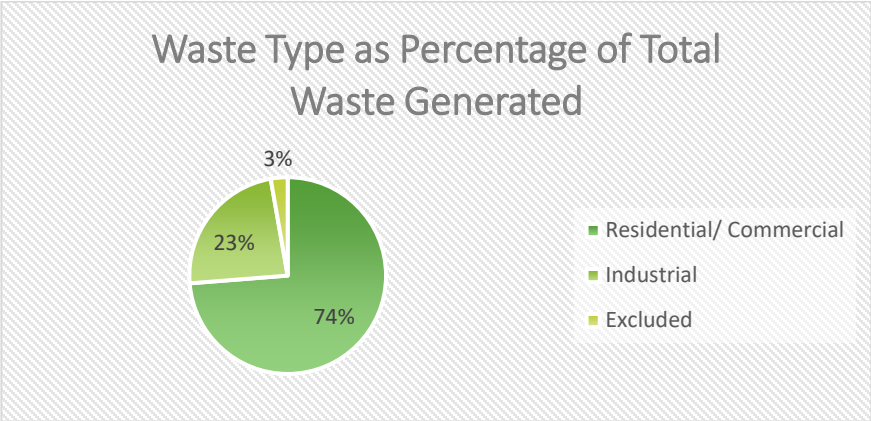
Type of Waste	Quantity Generated (tons)
Residential/ Commercial	53,299
Industrial	17,414
Excluded	2,013
R/C and Industrial Total (Excluded waste not included in this total)	70,714

Source(s) of Information:
Residential/Commercial: The amount reported above includes includes the total of waste disposal as reported to the District by OEPA in the *Disposal Recycling and Generation Summary* from the response to the District's Annual District Report (ADR) for 2018. The disposal amount is added to the amount of Res/Com recycling reported by the District for 2018. *Note*: The amount of Res/Com recycling for 2018 used here is less than that reported by the District in the 2018 ADR. In reviewing 2018 data for this plan errors were identified, so corrections were made. Additional information about the correction is included in Appendix E.

Industrial: 17,417 tons is the total of industrial waste disposal as reported by OEPA in the "Summary of the 2018 ADR" plus the amount of industrial recycling for 2018 as reported to the District by industries. *Note:* The amount of industrial waste reported as recycled in 2018 is a corrected amount. Additional information about the correction is included in Appendix F.

Excluded Waste: 2,013 tons were reported by OEPA as generated from the District in 2018. However, since the amount of excluded waste is less than 10% of the total amount of waste generated from the District, excluded waste is not included in the waste generation projections used in this plan.

Sample Calculations: Res/Com = Disposal + Recycling 42,784+ 10,515 = 53,299 tons
Industrial = Disposal + Recycling 2,719 + 14,695 = 17,414 tons

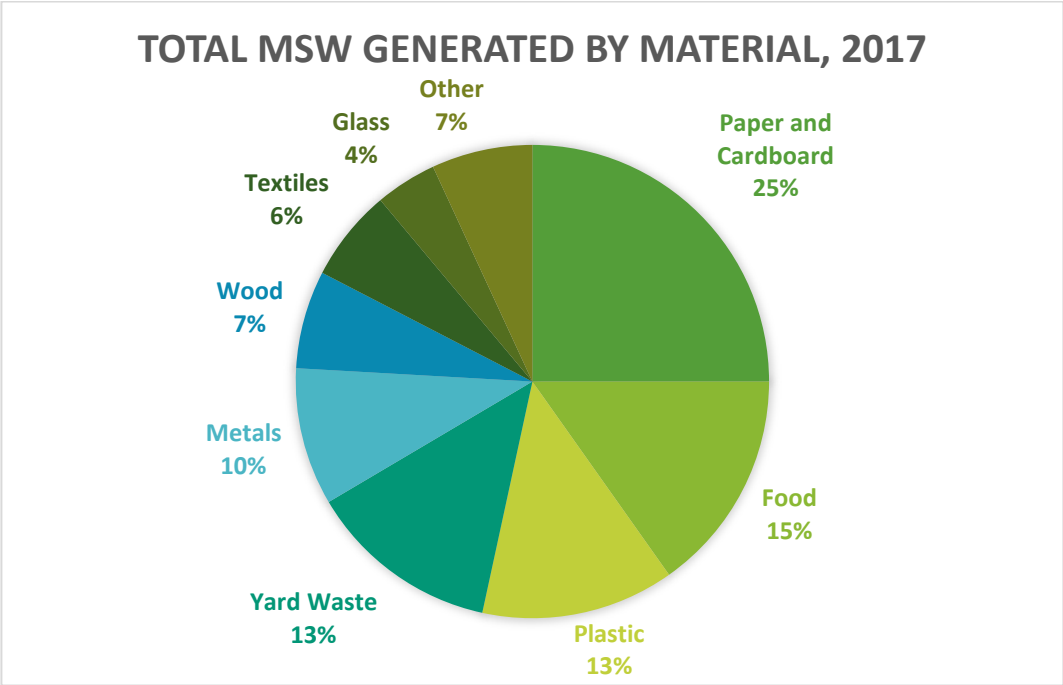


The pie chart was generated by the OEPA plan format. It is included to give a visual demonstration of the fact that residential/commercial waste generation is by far the greatest portion of waste generated in the District.

1. Residential/Commercial Waste Generated in Reference Year

In the reference year, 2018, the amount of residential/commercial waste generated was 5.79 pounds per person per day. Disposal accounted for 80.3% of waste generation. Reported recycling recovered the other 19.7%. For comparison, the average for Ohio in 2018 for residential/commercial waste was 6.85 pounds per person per day. The statewide recycling rate was 29.7%.

Although the District has not done a formal waste sort to identify the proportions of material in the waste stream, observation suggests that the waste generated in the District is similar to that generated in the nation as a whole. In 2017 the U.S. EPA published research findings that described the materials in the municipal solid waste stream. Two of the most prevalent materials in the waste stream, paper/cardboard, and yard waste are materials for which there are easily accessible recycling and composting opportunities. Plastic, which is also available in large amounts is more difficult to recycle because there are so many different kinds of materials and products in the plastics family.



More detailed information about the components of residential/commercial waste is found in Appendices G and H. Information about the materials diverted from disposal by recycling is found in Appendix E.

2. Industrial Waste Generated in Reference Year

In contrast to the residential/commercial waste stream, industrial waste reduction and recycling make up a large share of total industrial waste generation. In 2018, 84% of the industrial waste generated was reported as recycled. That left only 16% or 2,729 tons to be sent to landfills. In 2018, the statewide industrial recycling rate was 50.24%. Because most Darke County industries cooperate with the District by reporting the materials that are recycled, the District has a clear picture of the materials in the 80 plus percent that is managed by recycling. Much less in known about the 16% that is sent for disposal. More information about the components of industrial waste is found in Appendices G and H. Information about the industrial materials recycled is found in Appendix F.

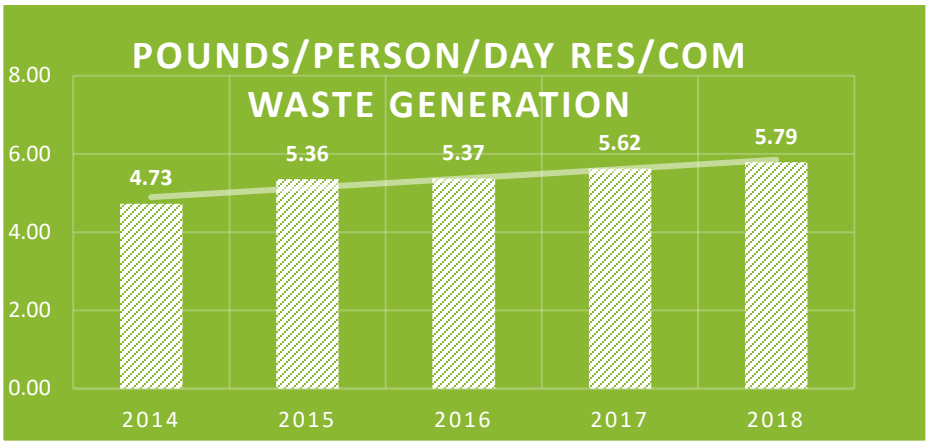
3. Excluded Waste Generated in Reference Year

Excluded waste is solid waste specifically excluded from the definition of solid waste. These wastes include slag, uncontaminated earth, non-toxic foundry sand, fly-ash, materials from mining, and construction and demolition debris. Excluded waste is a small percentage of the waste generated in the District. In the reference year it was 2.8%. Since excluded waste was historically less than 10% of total waste generation, projections for future generation of excluded waste are not included in this Plan.

B. Historical Waste Generated

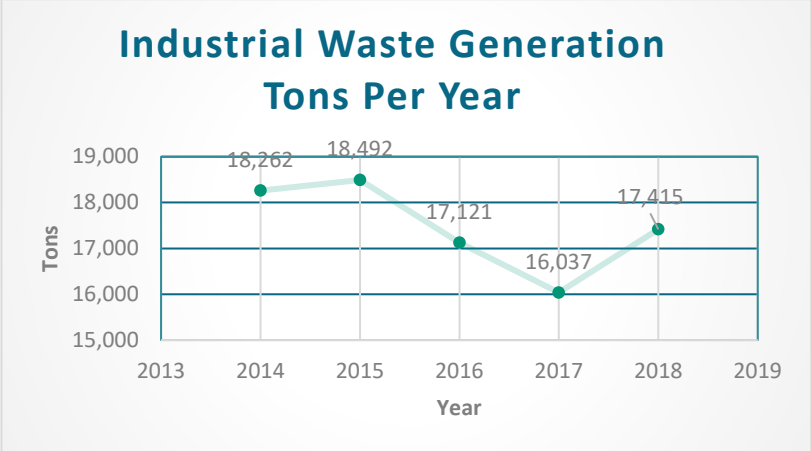
1. Historical Residential/Commercial Waste Generated

From 2014 to 2018, the amount of residential commercial waste that was generated increased by 15.25% from 4.73 to 5.79 pounds per person per day. This follows the trend in Ohio. According to Ohio EPA there has recently been a gradual upward trend in the state, "R/C waste generation saw a slight decrease between 2008 and 2011. Since then, Ohio has seen a gradual increase in the amount of R/C waste generated, reaching over 14.54 million tons in 2018."[1]



2. Historical Industrial Waste Generated

Unlike residential/commercial waste, the amount of industrial waste declined in the period between 2014 and 2018. The change from year to year was erratic as shown in the chart below. Industrial waste is affected by many factors including the amount of industrial production or changes in product lines in a specific year. The overall trend is encouraging because manufacturing was strong during this period. Some of the downward trend may be due to increased efficiency in materials management instead of a decrease in production.



[1] Ohio EPA, Division of Materials and Waste Management, March 2020, Guidance/Fact Sheet 1017

3. Historical Excluded Waste Generated

The amount of excluded waste can vary from year to year depending upon many factors. For instance, the demolition of a large building can generate a spike in construction and demolition waste. In spite of fluctuations, the amount of excluded waste has historically been a small percentage of the overall waste generated in the District.

C. Waste Generation Projections

Table 3-2: Waste Generation Projections

Year	Residential/Commercial Waste (tons)	Industrial Waste (tons)	Total (tons)
2022	54,699	16,743	71,442
2023	55,226	16,947	72,173
2024	55,066	17,172	72,238
2025	52,409	17,419	69,828
2026	52,305	17,691	69,996
2027	52,040	17,990	70,030

1. Residential/Commercial Projections

Source(s) of Information: In Appendix D, historic disposal data was compiled and waste disposal projections for the planning period were calculated and are shown in Table D-6. Based on an evaluation of historic waste disposal, the District used 4.93 pounds per person per (ppd) day to project future residential/commercial waste disposal for 2020 through 2024. The District believes that waste reduction measures included in this plan will be successful in reducing waste for disposal from 2025 on, 4.65 ppd was used from 2025 to the end of the planning period.

Calculation formula: ((4.11 ppd x 365 days) x population)/2000 lbs.= projected tons disposed. Tons disposed was added to the projected amount recycled. The projected recycling calculation is explained in Appendix E, Table E-8. The projections are based on historic data. The data was used to make projections about the amount of material that is expected to be diverted in each year of the planning period through planned recycling and composting programs, and through commercial sector recycling. The District population is projected to decrease slowly over the planning period which will contribute to the decrease in waste generation.

Assumptions: *Residential/Commercial Waste Projections:* Reported Residential/commercial recycling is expected to increase slowly during the planning period. Disposal is expected to decrease as the percent of waste generation through increased recycling participation.

2. Industrial Waste Projections

Industrial waste generation for each year of the planning period is the total of projected waste disposal and projected recycling. It was assumed that industrial waste for disposal will increase by 10% per year for the first 7 years of the planning period and that industrial recycling will remain constant at the amount recovered in 2018. This projection assumes that there will be no major growth in the industrial sector, and that new industries will be more efficient and generate even less waste than the established industries.

Table 3-3 GENERATION+ DISPOSAL + RECYCLING

Waste Generation Projections in the Reference Year and First 7 Years of the Planning Period

Year	Pop.	Residential/ Commercial				Industrial			Total (tons)
		Disposal (tons)	Recycle (tons)	Generation (tons)	Per Capita Generation (ppd)	Disposal (tons)	Recycle (tons)	Generation (tons)	
2018	***50,469***	***42,784***	***10,515***	***53,299***	**5.79**	***2,719***	***14,695***	***17,414***	***70,714***
2022	49,793	44,800	9,899	54,699	6.02	2,043	14,700	16,743	71,442
2023	49,478	44,517	10,709	55,226	6.12	2,247	14,700	16,947	72,173
2024	49,163	44,233	10,833	55,066	6.14	2,472	14,700	17,172	72,238
2025	48,848	41,454	10,955	52,409	5.88	2,719	14,700	17,419	69,828
2026	48,575	41,222	11,083	52,305	5.90	2,991	14,700	17,691	69,996
2027	48,301	40,989	11,051	52,040	5.90	3,290	14,700	17,990	70,030
2028	48,028	40,758	11,022	51,780	5.91	3,619	14,700	18,319	70,099

This Page is intentionally blank.