

## Executive Summary

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In 1988, Ohio's General Assembly passed House Bill 592, a watershed legislative package that dramatically changed Ohio's existing solid waste program. This legislation established a comprehensive planning and regulatory process to ensure that adequate and environmentally sound solid waste management capacity is available to manage the waste Ohio generates. To help preserve that capacity and to recognize the inherent value in waste materials, House Bill 592 also initiated requirements to reduce Ohio's generation of waste and increase the State's efforts to recycle.

The statutory provisions enacted by House Bill 592 require the director of the Ohio Environmental Protection Agency (Ohio EPA) working with the Solid Waste Management Advisory Council (SWAC) to prepare and adopt a state solid waste management plan (state plan). In addition to other purposes, the state plan establishes Ohio's recycling goals. The solid waste statute further requires Ohio EPA and SWAC to triennially evaluate Ohio's progress toward achieving the goals of the state plan. If the findings of this evaluation indicate that modifications to the goals in the state plan are necessary, then Ohio EPA and SWAC are directed to prepare and adopt a revised state plan.

This document, the 2009 State Solid Waste Management Plan, represents the third revision and fourth iteration of the state plan. The original state plan was adopted in 1989. The first and second revisions were adopted in 1995 and 2001, respectively. The 1995 revision introduced significant changes to the initial goals that were established in 1989. The revision adopted in 2001 made minor adjustments to the goals from the 1995 revision to refine and further define the goals.

In addition to establishing recycling and reduction goals for Ohio's solid waste management districts (SWMDs), the state plan also establishes recycling and reduction strategies to be implemented at the state government level. These strategies are focused on efforts that Ohio's state agencies can take to further recycling and waste reduction efforts within the State.

## Changes Introduced With This Revision

This version of the state plan contains a new chapter that addresses waste-to-energy technologies. These technologies have the potential to help Ohio further reduce its reliance on landfill facilities, reduce Ohio's emissions of methane, and provide alternative energy sources.

This state plan also recommends a number of new and changes to existing siting criteria for locating solid waste facilities. These new and changed siting criteria are explained in detail in Chapter 5 of this state plan.

This update to the state plan makes a number of changes to the goals that guide programming provided by the SWMDs. These changes include:

- Introduces a requirement for SWMDs to prepare and implement an outreach and marketing plan to guide the development of outreach programming to five target audiences.
- Requires all SWMDs to provide the following programs:
  - A web site,
  - An inventory of its recycling infrastructure,
  - A comprehensive resource guide; and,
  - A speaker/presenter.
- Introduces a new goal for SWMDs to measure the effects of their recycling and reduction programs on greenhouse gas emissions.
- Renames Goal 1 to the "Infrastructure Goal"
- Introduces the following new methodologies for calculating the population that has access to a drop-off recycling opportunity:
  - A tonnage model, and
  - A survey model.
- Introduces a number of other changes to the requirements that apply to demonstrating compliance with Goal 1 (the infrastructure goal).
- Recommends a number of new and changes to existing siting criteria for solid waste facilities.

## Summary of Chapters

This version of the state plan consists of 10 chapters. Each chapter of this state plan is summarized below.

### Chapter 1- Introduction

This chapter provides the context in which House Bill 592 was developed and adopted as well as the current state of solid waste management in Ohio. In the mid to late 1980s, Ohio faced a wide array of significant solid waste management issues. These issues were due in part to the lack of a comprehensive regulatory structure for overseeing solid waste disposal facilities and partly due to the lack of planning for how to manage Ohio's solid waste. These issues included decreasing landfill capacity, increasing amounts of imported waste, environmental degradation from landfill facilities, lack of solid waste management planning, and desire for local control over the flow of solid waste.

Ohio Revised Code (ORC) Section 3734.50, as established by House Bill 592, requires the state plan to:

- Reduce reliance on the use of landfills for management of solid waste;
- Establish objectives for solid waste reduction, recycling, reuse, and minimization and a schedule for implementing those objectives;
- Establish restrictions on the types of solid wastes disposed of by landfilling for which alternative management methods are available (such as yard waste);
- Establish general criteria for the location of solid waste facilities;
- Examine alternative methods for disposal of fly ash and bottom ash resulting from the burning of mixed municipal solid waste;
- Establish a statewide strategy for managing scrap tires;
- Establish a strategy for legislative and administrative actions that can be taken to promote markets for products containing recycling materials; and,
- Establish a program for the proper separation of household hazardous waste (HHW).

Each state plan contains chapters devoted to each of the bulleted topics above.

House Bill 592 also required all 88 counties in Ohio to form SWMDs either individually or in combination with one or more other counties. As of 2009, Ohio had 52 SWMDs. Each SWMD is required to prepare a solid waste management plan that demonstrates how the SWMD will achieve the goals of the state plan. Each SWMD is further required to obtain local approval of the plan through a ratification process, submit the plan to Ohio EPA for review and approval, and annually review implementation of the plan. SWMDs are required to revise their solid waste management plans on a regular schedule that is established in the statute.

Chapter I also contains information regarding the planning process at the local level, what constitutes solid waste, the generation and disposal of solid waste in Ohio, the affects of coal-fired power plants on generation and disposal, available capacity at and types of landfills for disposing of solid waste, and imports and exports of solid waste.

### Chapter 2- Implementing the 2001 State Solid Waste Management Plan (2001 State Plan)

Since the 2001 State Plan was adopted, all 52 of Ohio's SWMDs either obtained approval for a revised solid waste management plan or, in some cases, were issued an updated solid waste management plan prepared by Ohio EPA. 40 SWMDs are operating under solid waste management plans with Goal 1 (i.e. providing access to recycling infrastructure) as the primary goal. These SWMDs represent 70 of Ohio's 88 counties. The remaining 12 SWMDs have solid waste management plans that demonstrate compliance with Goal 2 (i.e. waste reduction and recycling percentages).

In order to demonstrate compliance with Goal 1, SWMDs implemented or will implement the following recycling opportunities:

- At least 214 new drop-off recycling locations;
- At least 21 new curbside recycling programs; and,
- At least 12 curbside recycling programs were upgraded to make participating in those programs easier.

In total, these new and upgraded programs provide/will provide at least 1,110,000 additional people with access to recycling opportunities

In 2007, Ohio achieved a statewide reduction and recycling rate of almost 41 percent. The State achieved its highest reduction and recycling rate in 2002 at almost 45 percent.

In 2007, individual SWMDs achieved waste reduction and recycling rates that were quite varied as is demonstrated in the following bullet points:

- For the residential/commercial sector, the waste reduction and recycling rates ranged from a low of a little more than three percent to a high of more than 40 percent.
- 23 SWMDs achieved residential/commercial sector waste reduction and recycling rates of 25 percent or greater.
- 36 SWMDs achieved industrial sector waste reduction and recycling rates of 66 percent or better.

The waste reduction and recycling rates for all 52 SWMDs are presented in Appendix B.

The 52 SWMDs implemented a wide variety of strategies, programs, and activities to achieve the goals of the 2001 State Plan. Some of these strategies, programs, and activities are described in Chapter 2.

### **Chapter 3 - Goals for Solid Waste Reduction, Recycling, Reuse, and Minimization**

This chapter establishes nine goals that SWMDs will be required to pursue in their solid waste management plans. These nine goals are as follows:

#### **Goal 1**

**Recycling Infrastructure** – The SWMD shall provide its residents and commercial businesses with access to opportunities to recycle solid waste. At a minimum, the SWMD must provide access to recycling opportunities to 90 percent of its residential population in each county and ensure that commercial generators have access to adequate recycling opportunities.

#### **Goal 2**

**Waste reduction and recycling rates** - The SWMD shall reduce and recycle at least 25 percent of the solid waste generated by the residential/commercial sector and at least 66 percent of the solid waste generated by the industrial sector.

#### **Goal 3**

**Outreach and Education – Minimum Required Programs** - The SWMD shall provide the following required programs:

- A web site;
- A comprehensive resource guide;
- An inventory of available infrastructure; and,
- A speaker or presenter.

#### **Goal 4**

**Outreach and Education** - The SWMD shall provide education, outreach, marketing, and technical assistance regarding reduction, recycling, composting, reuse, and other alternative waste management methods to identified target audiences using best practices.

#### **Goal 5**

**Restricted Solid Wastes, Household Hazardous Waste (HHW) and Electronics** - The SWMD shall provide strategies for managing scrap tires, yard waste, lead-acid batteries, HHW, and electronics.

#### **Goal 6**

**Economic Incentives** - The SWMD shall explore how to incorporate economic incentives into source reduction and recycling programs.

#### **Goal 7**

**Measure Greenhouse Gas Reduction** – The SWMD will use U.S. EPA's Waste Reduction Model (WARM) (or an equivalent model) to evaluate the impact of recycling programs on reducing greenhouse gas emissions.

#### **Goal 8**

**Market Development** - The SWMD has the option of providing programs to develop markets for recyclable materials and the use of recycled-content materials.

#### **Goal 9**

**Reporting** - The SWMD shall report annually to Ohio EPA regarding implementation of the SWMD's solid waste management plan.

This chapter also establishes a statewide recycling and reduction goal of 50 percent. In order to facilitate achieving Ohio's goals, this state plan establishes the following 11 strategies to be implemented by Ohio's government agencies:

**Strategy 1** - Continue to provide financial assistance through the Ohio Department of Natural Resources (ODNR).

**Strategy 2** - Explore means of obtaining improved reporting on the part of industrial generators.

**Strategy 3** - Study existing curbside recycling programs to determine factors that make curbside programs successful as well as define typical costs and potential participation rates.

**Strategy 4** - Publish the Facility Data Report every other year and Solid Waste Management in Ohio - Recycling, Reduction, Waste Generation & Disposal every three years. In years when full reports are not published, Ohio EPA will make the data used for both reports available.

**Strategy 5** - Ohio EPA and ODNR will work with the Ohio Department of Administrative Services to incorporate recycling services into the service contracts for Ohio's state government agency office buildings.

**Strategy 6** - Ohio EPA and ODNR will coordinate solid waste planning between both agencies.

**Strategy 7** - Ohio EPA will conduct an annual survey of material recovery facilities (MRFs) and distribute the results of the survey to appropriate SWMDs.

**Strategy 8** - ODNR and Ohio EPA will continue to investigate and support programs to divert organic materials from disposal in landfill facilities.

**Strategy 9** - To the extent possible, the State will support the development of and facilitate the implementation of technologies that use waste to produce energy. To fulfill this strategy, Ohio EPA will investigate developing rules to govern permitting and operating waste-to-energy facilities. Ohio EPA will further investigate ways of overcoming the environmental regulatory barriers that are discussed in Chapter 10.

**Strategy 10** - Ohio EPA will monitor and evaluate the impacts of landfills in Ohio on greenhouse gas emissions.

**Strategy 11** - Ohio EPA will continue to explore ways to reduce fugitive landfill gas emissions and increase Ohio's utilization of landfill gas for energy recovery.

## Chapter 4 - Restrictions on the Types of Solid Waste Disposed of in Landfills and Burned in incinerators

Restricting wastes from disposal avoids potential environmental problems by managing high volume, potentially harmful, and difficult to manage wastes through more appropriate options. Restrictions on how certain waste materials can be managed are also a means of preserving landfill capacity. Furthermore restrictions are a tool for recovering value from waste.

Ohio's solid waste regulations mandate the following restrictions:

- **Yard Waste:** Ohio's current yard waste restriction bans source-separated yard waste from being disposed of in solid waste landfill facilities and burned in incinerator facilities. Details regarding the yard waste restriction are provided in Appendix E.

- **Scrap tires:** Ohio's scrap tire restriction bans all whole and shredded scrap tires from being disposed of in landfill facilities (except for landfills or landfill units specifically designed to accept only scrap tires).
- **Lead-acid batteries.** With the adoption of legislation in 2008, Ohio's lead-acid battery restriction applies to disposing of batteries in both landfill and incinerator facilities.

Ohio's past experiences with restricting materials from disposal led the State to focus on making sure alternative management options are available rather than outright bans. Thus, this revision of the state plan does not recommend new material restrictions. Instead, this state plan directs Ohio and the SWMDs to develop alternative strategies for waste streams that can be properly managed through a method other than disposal. Such a focus places a strong emphasis on educating residents regarding alternative management options for specific non-restricted waste streams (such as major appliances, electronic equipment and used oil).

## Chapter 5 - Revised General Criteria for the Location of Solid Waste Facilities

Prior to the passage of House Bill 592 and the first state plan, Ohio's solid waste regulatory system provided few, formally established requirements governing the appropriateness of a particular location for constructing and operating a solid waste facility. The 1989 State Plan recommended a relatively comprehensive set of criteria to guide siting solid waste facilities. Following adoption of the 1989 State Plan, Ohio promulgated regulations that made the recommendations requirements.

Because Ohio's siting criteria were considered to be comprehensive, past revisions of the state plan did not recommend significant changes to the criteria. Instead, the state plan recommended adjustments to refine the existing siting criteria. The existing siting criteria for all types of solid waste facilities are summarized in Appendix G.

This revision of the state plan recommends possible new and changes to existing siting criteria that Ohio EPA will evaluate during the rule development and adoption process for the siting criteria rules. The bullet points below list these proposed new and changes to siting criteria:

- **Streamway (new)** – If adopted, this criterion would require a setback from a streamway that takes into account the natural fluctuations in the stream's channel over time. This criterion is intended to protect both the solid waste facility and the stream from impacts resulting from channel fluctuations.

- **Easements (new)** – If adopted, this possible criterion would prohibit the limits of waste placement and all containment structures from being located in a utility easement, a right-of-way for a public road or a railroad, and a stream culvert.
- **Floodplain (change)** – If adopted, this change would extend the setback from floodplains to those floodplains that have not been mapped by the Federal Emergency Management Agency.
- **Sand and Gravel Pits and Limestone and Sandstone Quarries (change)** – If adopted, this change would define acceptable conditions for locating solid waste facilities in these areas.
- **Underground Mine (change)** – If adopted, this change would define what constitutes the angle of draw.
- **Isolation Distance (change)** – If adopted, this change would define a relationship between the amount of isolation distance between the bottom of a recompacted liner and top of the underlying aquifer and the required complexity of the liner system for a landfill facility.

## Chapter 6 - Management of Ash Resulting from the Burning of Mixed Municipal Solid Waste

When House Bill 592 was passed, Ohio's solid waste management community anticipated that incinerating solid waste would be an important component of Ohio's overall waste management system. As a result, the General Assembly wanted to foster diverting incinerator ash from disposal through uses for the ash. In 2009, there was only one operating incineration facility in Ohio that was licensed to burn solid waste. That facility burns primarily infectious waste with a very small quantity of solid waste. As a result, there is currently a very small quantity of ash from incinerator facilities that needs to be managed.

Given the absence of large, publicly-owned municipal solid waste incinerators in Ohio, the management of municipal solid waste combustion ash is not a pressing issue for Ohio at this time. Furthermore, Ohio EPA does not expect incineration to become a significant solid waste management option in the near future due to the expense of upgrading existing incinerator facilities to meet current air emission standards and the time required to issue a permit to install for a new facility. Consequently, this state plan version does not recommend developing alternative methods of disposing of municipal solid waste incineration ash.

This state plan does include, for the first time, a chapter that discusses potential waste-to-energy technologies being evaluated by the waste industry. See Chapter 10 for more information about this topic.

## Chapter 7 - A Statewide Strategy for Managing Scrap Tires

When House Bill 592 was passed, Ohio lacked a regulatory program to ensure that scrap tires were managed properly. The result was large accumulations of illegally disposed scrap tires. In 1993, Ohio's General Assembly adopted legislation establishing Ohio's scrap tire law. As a result of that legislation, Ohio's scrap tire program has made tremendous progress toward resolving most of Ohio's scrap tire management problems. In fact, Ohio's scrap tire program is so successful that in 2006 it was recognized by both environmental professionals and the tire industry for outstanding achievement. The Rubber Manufacturers' Association ranked Ohio's scrap tire program as the seventh best program out of the 50 states.

Ohio's scrap tire regulatory program governs the management of scrap tires from the time a tire becomes a scrap tire until the scrap tire is recycled, converted into energy, or properly disposed of. Thus, with minor exceptions, anyone wanting to transport scrap tires or operate a scrap tire facility in Ohio must first obtain all of the necessary authorizations.

Ohio's scrap tire law provides a source of revenue to fund Ohio EPA's scrap tire program, to provide funding for scrap tire abatement efforts, and to allow the Ohio Department of Natural Resources (ODNR) to award grants to encourage recycling and other uses of scrap tires. The source of revenue is a \$1.00 dollar per tire fee that is assessed on the first sale (i.e. wholesale) of new tires.

In addition to Ohio EPA's program, Ohio's SWMDs provide programs for ensuring that scrap tires are managed properly. These programs typically consist of residential collection events, education and technical assistance, abatement activities, and funding for local scrap tire enforcement.

## Chapter 8 - A Program for Managing Household Hazardous Waste

Household hazardous waste (HHW) is any material discarded from the home that may, because of its nature, pose a threat to human health or the environment when handled improperly. Although HHW can have many of the same properties as industrial hazardous waste, because of the low percentage of waste stream generated from each household, it is specifically excluded from regulation as a hazardous waste by both the federal and Ohio's hazardous waste programs.

SWMDs are required, in their solid waste management plans, to provide a strategy to address HHW. The specific strategy chosen is left to SWMD's discretion. Thus, as would be expected, there is a wide range of strategies being implemented by Ohio's SWMDs. Some SWMDs focus their attention on preparing and distributing literature regarding alternatives to hazardous materials and proper ways of managing HHW. Other SWMDs provide technical assistance to home owners via telephone hotlines. Still other SWMDs host collection programs for collecting HHW from residents.

In 2008, 32 SWMDs representing 58 counties provided collection programs for their residents. Of those 32 SWMDs:

- 23 SWMDs offered temporary collection events (typically one or two day events);
- One SWMD offered a year-round, permanent collection program;
- Seven SWMDs offered semi-permanent collection programs (i.e. available less than year-round but longer than temporary events);
- Two SWMDs provided both semi-permanent and temporary collection programs; and
- Six SWMDs offer collection programs at SWMD-owned/operated facilities.

Managing end-of-life electronic equipment continues to be a topic of concern on both state and national levels. Electronic waste (or e-waste) is one of the fastest growing sources of waste in the United States. This is largely driven by the rapidly increasing rate of obsolescence for consumer electronics. According to U.S. EPA electronics represent the largest contributors of heavy metals to the waste stream. Furthermore, the volume of obsolete electronics being disposed of consumes significant disposal capacity.

At this time, the burden for collecting end-of-life consumer electronics from residents for recycling falls primarily on the public sector. More than half of Ohio's SWMDs provide recycling opportunities for end-of-life electronics. In 2008, 39 of Ohio's SWMDs offered collection programs for end-of-life electronics. Of those 39 SWMDs:

- 23 SWMDs offered temporary collection events;
- Six SWMDs offered permanent collection programs; and,
- 10 SWMDs offered semi-permanent collection programs.

In 2009, complications associated with managing e-waste were compounded due to the switch from analog broadcasting of television programming to strictly digital signals. The Consumer Electronics Association estimated that as many as 15 million television sets could become unwanted by 2010. Because there was no organized management program for unwanted televisions, solid waste professionals were concerned that most of those televisions would be disposed of in landfill facilities. Some of Ohio's SWMDs do provide collection programs for televisions. However, collecting and managing televisions can be a costly endeavor, and there are few outlets for recycling televisions.

## Chapter 9 - Recycling Market Development

Ensuring that there are outlets for recyclable materials is essential to the success of recycling programs. Thus, it is critical that Ohio focus attention on creating markets that can use recyclable materials to produce new products. The price for a recyclable commodity is a strong driving force for influencing the amount of that commodity that is recycled. Furthermore, the value of potentially recyclable materials is dependent upon the demand for the materials. Demand is affected by the number and types of manufacturing operations that use recycled materials, and so on.

Prices for recovered materials have fluctuated widely since the 2001 State Plan was adopted. Prices began rising in 2006 to all-time highs in 2008. In late 2008, prices plunged sharply in the fallout from global economic problems. These price fluctuations result in significant effects to the stability of recovered material commodity markets.

ODNR, DRLP continued to administer the Market Development Grant program. In 2008, ODNR distributed a total of more than \$2.2 million to eight recipients. Appendix J contains lists of grant recipients from the 2007 and 2008 grant rounds.

This state plan update recommends that future grant funding be targeted to establishing infrastructure and markets for the following materials:

- Construction and Demolition Debris (C&DD)
- End-of-Life Consumer Electronics
- Glass
- Organic Material (i.e. Food Scraps)
- Paper and Fiber-based Materials
- Plastics
- Scrap Tires

The 2001 State Plan contained six state strategies for market development. These strategies were to be implemented by state of Ohio government agencies to help further developing Ohio's markets for recovered materials. As is explained in Appendix K, Ohio made progress toward implementing all six strategies.

Chapter 9 establishes six state market development strategies to be implemented with this state plan update.

Although Goal 7 is an optional goal, many SWMDs do provide programs geared toward market development. Many of these programs focus on raising awareness of the “Buy Recycled” message. A few SWMDs provide funding for projects that directly create opportunities to use recovered materials. A few of these funding programs, including the Adams-Browning Recycling Station’s Glass reFactory, the Solid Waste Authority of Central Ohio’s Columbus Transformation Center, and the Lorain County SWMD’s Recycling Revolving Loan Fund are explained in Chapter 9.

## Chapter 10 - Waste-to-Energy

Recently, there has been a resurgence of interest in technologies that use waste to produce energy and reduce the amount of waste being disposed of in landfill facilities. A number of factors brought about this renewed interest. These factors include:

- Increasing costs for fossil fuels;
- Search for renewable and sustainable alternatives for fossil fuels; and,
- Interest in minimizing the production of greenhouse gases.

In response to this interest, ODNR, working with a number of partners and sponsors, offered the *First Annual Partnerships in Emerging Technology Conference* in October 2008. This conference provided attendees with an overview of various emerging technologies. Many of these technologies are discussed in this new chapter of the state plan.

U.S. EPA recognizes, in its waste management hierarchy, that technologies for recovering energy from waste are preferable to simply incinerating waste or disposing of waste in landfills. This is due to the benefits associated with waste-to-energy technologies. Chief among these benefits are lower pollution emissions, creation of alternatives to fossil fuels, and reduced reliance on landfills.

The following technologies are discussed in Chapter 10:

- Bioreactors:
  - Anaerobic digestion; and
  - Converting biomass to energy;
- Production of Syngas:
  - Pyrolysis;
  - Starved oxygen gasifiers; and
  - Conversion of syngas to biofuel;
- Use of syngas to produce energy;
- Collection and utilization of landfill gas;
- Co-firing of coal and municipal solid waste; and
- Incineration with energy recovery.

Ohio’s environmental laws and regulations were not designed with the recent advancements in waste management technologies in mind. As a result, there are a number of obstacles that these laws and regulations potentially pose for implementing new waste-to-energy technologies. In particular, the following regulatory programs have the potential to affect the use of waste-to-energy technologies:

- Solid waste program
- Air pollution control program
- Water pollution control program
- Hazardous waste program

Streamlining the permitting process is something that Ohio EPA is working toward in order to make regulatory obstacles less of an issue.