Tackling Trash: A Comprehensive Overview of Municipal Solid Waste Issues and Recommendations for Massachusetts Communities

May 2024

Prepared For:
Ali DiMatteo & Josie Ahlberg
Massachusetts Municipal Association

Prepared By:
Abby Barnicle & Alexandra (Katie) Adee
Suffolk University Law School
Environmental Law & Policy Clinic

TABLE OF CONTENTS

I. EXECUTIVE SUMMARY

This report provides a comprehensive overview of issues related to current municipal solid waste (MSW) management systems and challenges facing municipalities in the Commonwealth of Massachusetts. The purpose of this report is to document the independent research conducted by the Suffolk University Environmental Law & Policy Clinic (Suffolk ELPC) to create an educational primer for municipalities, provided in Attachment A, and supply the Massachusetts Municipal Association (MMA) with recommendations for policy and advocacy, provided in Attachment B. In addition, this report can be used to brief new municipal officials on the state of MSW management in Massachusetts.

In 2021, the Massachusetts Department of Environmental Protection (MassDEP) published the Commonwealth's 2030 Solid Waste Master Plan (SWMP). The 2030 SWMP provides a blueprint for MSW management and sets ambitious targets for waste disposal reduction by 2030 and 2050. To achieve these goals, MassDEP aims to increase waste diversion to recycling, reuse and repair, and composting programs.

Currently, there are three main methods of MSW disposal for municipalities: in-state landfilling, in-state incineration, and transfers to other states. Municipalities with or near disposal facilities should take several environmental and economic considerations into account when planning and operating MSW management systems. For example, although disposal facilities can generate revenue for municipalities, landfills emit methane and provide one pathway for per- and polyflouroalkyl substances (PFAS) to contaminate drinking water. Similarly, MSW incineration and out-of-state transportation results in air pollution and other greenhouse gas (GHG) emissions. Moreover, disposal facilities implicate Environmental Justice (EJ) concerns related to siting and disproportionate health impacts on EJ communities in Massachusetts and other states. Due to the complex state regulatory scheme, no new MSW disposal facilities have been proposed and only one landfill expansion has been approved.

Current methods of MSW disposal are insufficient to achieve statewide disposal reduction goals. The combination of limited landfill capacity, limited number of Municipal Waste Combustors (MWCs), reliance on out-of-state MSW transfers, and lack of climate resilient infrastructure leave Massachusetts communities vulnerable to backups, overflows, and disruption. The implementation of China's National Sword policy restricting U.S. exports of recyclable materials and the coronavirus (COVID-19) pandemic demonstrate that global events and foreign policy can have a significant impact on local diversion efforts.

Despite the challenges associated with MSW, there are opportunities for education and advocacy to alleviate the stress on existing disposal systems. First, the Massachusetts Legislature is reviewing several bills that would establish extended producer responsibility (EPR) to shift disposal costs from municipalities to manufacturers for a variety of discarded materials, such as paint, mattresses, packaging materials, and single-use plastics. Second, municipalities can examine current funding and accounting methods to determine if an alternative approach fits a community's needs, such as moving monies to an Enterprise Fund or implementing a

Pay-as-You-Throw Program. Third, municipalities can play a role in the development of recycling markets for organics and other materials by investing in education and infrastructure and buying recyclable materials to generate demand. Fourth, increased enforcement of state waste bans through municipal fines or stickers can educate residents and encourage behavior modification to reduce waste disposal. Finally, education of municipal officials and residents on these topics and their intersections can help promote diversion away from disposal.

In conclusion, municipal leadership is critical to tackling the challenges posed by MSW management in Massachusetts. Continued advocacy for adequate financial assistance and EPR programs will be essential to reducing waste disposal across the Commonwealth and successfully transitioning to a circular economy.[1]

II. INTRODUCTION

A. MassDEP's 2030 Solid Waste Master Plan and Waste Reduction Goals

In October 2021, MassDEP published its 2030 SWMP.[2] The 2030 SWMP sets statewide goals and a policy agenda for MSW generation, management, and disposal.[3] The central focus of the 2030 SWMP is waste reduction.[4] MassDEP aims to reduce waste disposal to 4 million tons by 2030 and 570,000 tons by 2050.[5] By meeting these targets, Massachusetts can alleviate significant stress on existing disposal and management infrastructure, such as landfills, transfer and handling stations, and MWCs, and decrease GHG emissions to combat climate change.[6]

The 2030 SWMP identifies priority waste materials and accompanying action items.[7] In particular, the 2030 SWMP highlights seven initiatives to establish or expand upon over the next decade, including reducing organics, residential, and construction and demolition (C&D) wastes; reducing waste at its source and encouraging the reuse and repair of products; developing reuse, recycling, and compost markets; and managing capacity at in-state solid waste facilities.[8]

B. Background on Traditional Disposal and Diversion Methods

[1] *See* EPA, *What is a Circular Economy* (Dec. 14, 2023); Ellen MacArthur Found., *Circular Economy Introduction: What is a Circular Economy* (last visited Apr. 24, 2024). A circular economy "reduces material use, redesigns materials and products to be less resource intensive, and recaptures 'waste' as a resource to manufacture new materials and products." *See* EPA, *supra.*

[2] *See* MassDEP, 2030 Solid Waste Master Plan: Working Together Toward Zero Waste 1 (Oct. 2021) [hereinafter 2030 SWMP]. Pursuant to its authority under the Solid Waste Act of 1987, MassDEP issues an updated SWMP every decade. *See* Mass. Gen. Laws ch. 16, § 21 (2024); Peter Durning & Thomas Mackie, *Solid Waste Regulation in Massachusetts*, *in* Mass. Env't L. § 18.1.1 (Gregor McGregor ed., 2016) (2019 & 2021 supp.).

[3] *See* 2030 SWMP, *supra* note 2, at 8.

[4] *See id.* MassDEP's secondary goal is to reduce the level of toxicity in the waste streams by increasing access to hazardous waste collection programs and implementing EPR initiatives. *See id.* Eventually, MassDEP aims to phase out the use of hazardous products all together. *See id.*

[5] *See id.* In 2018, the Commonwealth disposed of 5.7 million tons of waste. *Id.* The 2030 goal constitutes a 30 percent reduction in waste disposal from the 2018 baseline. *Id.* The 2050 goal constitutes a 90 percent reduction. *Id.*

[6] *See id.* at 3-4, 8. MWCs are also referred to as waste-to-energy facilities.

[7] *See* 2030 SWMP, *supra* note 2, at 33-41.

[8] *See id.* at 16-32.

Traditional methods of solid waste management are not sufficient to meet MassDEP's 2030 or 2050 waste reduction goals. Massachusetts failed to meet the previous waste reduction goals set out in MassDEP's 2010-2020 SWMP, indicating the current rate of waste reduction will not be enough to achieve the ambitious targets set out in the 2030 SWMP.[9] While MassDEP sets the Commonwealth's blueprint for solid waste management, each of the 351 municipalities must choose how to deal with the variety of materials discarded by residents and small businesses, such as C&D and MSW (*see* Figure 1). [10]

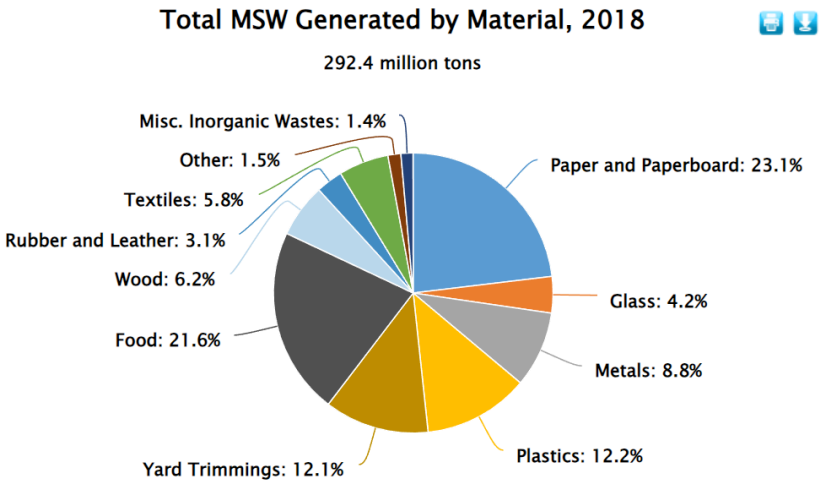

Figure 1*: Environmental Protection Agency (EPA) Breakdown of Types of MSW in United States as of 2018*[11]

Municipalities manage solid waste to maintain health and sanitation standards, prevent nuisances, such as odor or noise, and reduce air pollution in communities.[12] Although solid waste

---

[9] *See id.* at 2. For example, MassDEP's 2010-2020 SWMP set a goal to reduce solid waste by 30%, but in 2019 the state only reduced waste by 16%. *See id.* at 2; MassDEP, Massachusetts 2010-2020 Solid Waste Master Plan: Pathway to Zero Waste vi (2013) [hereinafter 2010-2020 SWMP]. There was a significant increase in the state gross domestic product and population during this time, making it more challenging to reduce waste overall. *See* 2030 SWMP, *supra* note 2, at 2; MassDEP, Overview: Solid Waste Management in Massachusetts 3 (2007) [hereinafter SWM Overview] (noting strong economy increases amount of solid waste generated). In 2022, Massachusetts discarded an average of 1,661 pounds of solid waste per household per year. *See* MassDEP, Maps: How Much Trash Did We Throw Out? 13 (2022) [hereinafter MassDEP Trash Maps] (providing data for households under different financing mechanisms); Thomas Mackie, *The Persistent Problem of Waste*, Legal Terrain (Feb. 2, 2024) (noting Massachusetts consumers "dispose of enough trash to fill up about 31 Fenway Parks" on an annual basis). Communities that adopted unit-based rate structures to fund MSW management discarded 1,104 pounds per household per year. *See* MassDEP Trash Maps, *supra,* at 13.

[10] *See* SWM Overview, *supra* note 9, at 2. MSW generally consists of organic materials, such as food scraps or yard trimmings, paper and paperboard products, plastics, metal, rubber, leather, textiles, wood, glass, and other materials. *See id.*; MassDEP, Massachusetts Waste Characterization Date Material Category Profiles 2-9 (2012).

[11] *See* EPA, *Guide to the Facts and Figures Report About Materials, Waste, and Recycling* (Apr. 21, 2023) (listing composition of U.S. solid waste material by percentage as of 2018).

[12] *See* 2010-2020 SWMP, *supra* note 9, at 2-3 (highlighting environmental benefits, such as statutorily mandated reductions in GHG, to proper waste management); Garrick E. Louis, *A Historical Context of Municipal Solid Waste*

management is an essential utility service, it largely operates behind the scenes.[13] Typically, a municipality either offers public disposal or contracts for private disposal services for each type of discarded material.[14] Some municipalities leave consumers to deal with disposal on their own.[15] The majority of municipalities pay for MSW services from their General Fund, which is primarily funded by residents' property taxes.[16] By contrast, 156 municipalities adopted a Pay-as-You-Throw (PAYT) program, charging residents a fee based on the amount of MSW they choose to discard for disposal.[17]

Depending on the type of discarded material and municipality, MSW could have several stops before its final disposal destination.[18] Once the MSW is collected from the consumer—either through curbside pickup or drop off location—it is hauled to the appropriate facility for handling, recycling, composting, or disposal (*see* Figure 2).[19] For example, the MSW may go to a transfer station before a landfill or recyclables may go directly to a Materials Recovery Facility (MRF) to be sorted and compressed into cubes.[20] Ultimately, discarded materials can either be diverted for recycling, reuse, or compost, or disposed of at a landfill or MWC.[21]

Management in the United States, 22 WASTE MGMT. RSCH. 306, 311-13, 321 (2004) (describing evolution of municipal waste management).

[13] *See* Louis, *supra* note 12, at 311 (noting initial goal of waste management was primarily to collect and remove refuse from one location to another and "away from human senses"). Waste management was initially designed to embody the mantra: "out of sight, out of mind." *See id.*; David C. Wilson, *Learning from the Past to Plan for the Future: An Historical Review of the Evolution of Waste and Resource Management*, 41 WASTE MGMT. & RSCH. 1754, 1754 (2023). Today, consumers are confused and lack confidence in recycling systems. *See* NAT'L CONVENTION OF STATE LEGIS., RECYCLING 101: A HISTORY OF RECYCLING, BENEFITS AND CHALLENGES, AND THE ROLE OF GOVERNMENT 1 (Oct. 2023) (noting while 85% of consumers recycle, 44% are skeptical it works).

[14] *See* SWM OVERVIEW, *supra* note 9, at 10. Municipalities are exempt from public procurement laws for contracting MSW services. *See* MASS. GEN. LAWS ch. 30B, § 1(b)(30). Municipalities are encouraged to conduct a competitive bid process to contract vendors for MSW services. *See* MASSDEP, BEST PRACTICES: A CHECKLIST FOR SUCCESSFUL RECYCLING PROCUREMENTS AND CONTRACTS FOR CURBSIDE RECYCLING SERVICES 2-4 (2020); *see also* TOWN OF BROOKLINE & CITY OF NEWTON, PURCHASING DIV., INVITATION TO BID OR REQUEST FOR PROPOSALS (2024) (soliciting bids for combined trash and recycling collection services across both municipalities).

[15] *See id.*; MassDEP, *Municipal Solid Waste & Recycling Data* (last visited Apr. 1, 2024) (providing links to municipalities' survey response data since 2009). About twenty municipalities reported they do not have a public trash program. *See* MassDEP, *supra*.

[16] *See* SWM OVERVIEW, *supra* note 9, at 10.

[17] *See id.*

[18] *See id.*

[19] *See id.* at 8.

[20] *See* SWM OVERVIEW, *supra* note 9, at 11.

[21] *See id.* at 8.

Figure 2: *Possible Destinations of MSW Before Final Disposal*[22]

Current disposal methods include incineration at a MWC or disposal at an in-state or out-of-state landfill.[23] At a MWC, discarded materials are burned at approximately 2,500°F to reduce waste volume and generate energy (*see* Figure 3).[24] After the solid waste is burned, new wastes—ash, wastewater, and air emissions—are generated and require disposal at a landfill.[25] There are five MWCs effectively operating at full capacity in Haverhill, Rochester, Millbury, North Andover, and Saugus, Massachusetts.[26] These MWC facilities currently accept between 1,500 and 1,650 tons of waste per day.[27] Despite MassDEP's air pollution controls, a MWC's emissions may still include pollutants that are adverse to human health.[28]

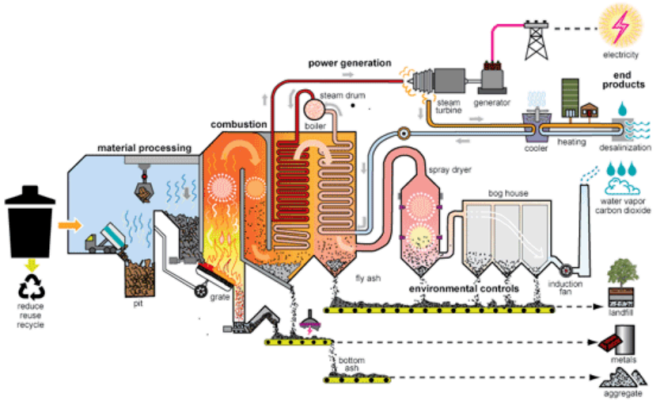

Figure 3: U.S. Energy Information Association's Overview of the MWC Process[29]

---

[22] *See id.*
[23] *See* MassDEP, *Massachusetts Landfills, Transfer Stations, Compost Sites, and Recycling Facilities* (last visited Mar. 31, 2024); MSW CONSULTANTS, MASSACHUSETTS MATERIALS MANAGEMENT CAPACITY STUDY 2-1 (Feb. 11, 2019).
[24] *See* MassDEP, *Municipal Waste Combustors* (last visited Mar. 31, 2024) [hereinafter MassDEP MWCs].
[25] *See id.*; *see also* EPA, *Energy Recovery From the Combustion of Municipal Solid Waste (MSW)* (Jan. 30, 2024) [hereinafter EPA Energy Recovery].
[26] *See* MassDEP MWCs, *supra* note 23. Between 2021 and 2022, 2.93 million tons of waste were combusted in Massachusetts. *See* MASSDEP, 2022 SOLID WASTE DATA UPDATE (Nov. 2023) [hereinafter 2022 SW DATA UPDATE], at 1.
[27] *See* MassDEP MWCs, *supra* note 23.
[28] *See id.*
[29] *See* U.S. Energy Info. Ass'n, *Biomass Explained: Waste-to-Energy (Municipal Solid Waste)* (Dec. 21, 2023).

In addition to MWCs, MSW is hauled to one of five remaining in-state sanitary landfills.[30] Massachusetts landfills must meet federal, state, and local requirements for siting, construction, operation, and monitoring.[31] In 2022, 410,000 tons of MSW were brought to in-state landfills for disposal.[32]

A significant portion of MSW generated in Massachusetts is transported to out-of-state landfills, including facilities located in New York, New Hampshire, Ohio, and South Carolina (*see* Figure 4).[33] Between 2021 and 2022, Massachusetts exported over 1.38 million tons of MSW to other states for disposal.[34] In recent years, industry has pushed toward building more or modifying transfer stations in Massachusetts to ship MSW to distant locations by rail or truck for final disposal.[35]

Municipal Solid Waste Export Disposal Data by State (tons)		
State	**2021**	**2022**
AL	85,775	226,611
CT	35,314	43,378
ME	224	1,709
MI	15,760	222,520
NH	401,746	365,272
NY	338,804	294,089
OH	53,765	118,541
SC	96,286	94,899
VA	26,242	17,906
TOTAL	**1,053,916**	**1,384,925**

Figure 4: MSW Export Data for 2021-2022[36]

III. CURRENT ISSUES WITH MUNICIPAL SOLID WASTE DISPOSAL METHODS

[30] *See generally* MassDEP, Active Landfills (June 2023) [hereinafter 2023 Active Landfills]. As of MassDEP's November 2023 update, the active MSW landfills are located in Bourne, Dartmouth, Nantucket, Middleborough, and Westminster. *See* 2022 SW Data Update, *supra* note 26, at 11; *see also* MassDEP, Master List of Solid Waste Facilities in Massachusetts (June 2023) [hereinafter 2023 SW Master List]. Other active landfills in Massachusetts collect ash or sludge wastes. *See* 2023 Active Landfills, *supra*.

[31] *See* SWM Overview, *supra* note 9, at 1. Since 1990, following MassDEP's first SWMP, most in-state landfills have the requisite liners and modern pollution controls for any gas, emissions, and leachate created by the decomposition of the discarded solid waste, such as methane, vinyl chloride, and hydrogen sulfide. *See id.* at 16-17; Durning & Mackie, *supra* note 2, at 18-18. For example, landfills are divided into double-lined cells to collect leachate, a liquid created by groundwater and stormwater percolating through the solid waste. *See id*. Operators fill and compact the cells with soil each day to protect the public from foul odors, fire, debris, insects, or rodents. *See id.* Once a landfill cell is full, the owner must receive MassDEP's approval to cap that section of the landfill. *See id.*

[32] *See* 2022 SW Data Update, *supra* note 26, at 2.

[33] *See* Durning & Mackie, *supra* note 2, at 18-14; 2022 SW Data Update, *supra* note 26, at 17.

[34] *See* 2022 SW Data Update, *supra* note 26, at 7. In total, Massachusetts exported a total of 2.89 million tons of waste. *Id.* at 1.

[35] *See* Durning & Mackie, *supra* note 2, at 18-17; Asad Jung, *Cape Cod, MA is Running out of Space for Trash. One Solution—Ship it to Another State by Train*, Cape Cod Times (Mar. 9, 2022); *see also* EPA, *Municipal Solid Waste Landfills* (Feb. 21, 2024) (describing transfer stations).

[36] 2022 SW Data Update, *supra* note 26, at 7.

A. In-State Landfills

1. Limited Landfill Capacity in Massachusetts

Landfill disposal capacity in Massachusetts continues to shrink overall.[37] In 2022, 64% of landfill capacity in Massachusetts was used.[38] According to MassDEP, landfill capacity for MSW is expected to drop close to zero by 2030.[39] Any remaining landfill capacity exists in the central or southeastern regions of the state, while landfills located in the western or northeastern parts of the state do not have capacity for MSW.[40] MassDEP anticipates the landfills in Dartmouth, Middleborough, Nantucket, and Westminster will shut down by or before 2031.[41]

In general, municipalities have not sought to expand or replace their in-state sanitary landfills.[42] In fact, municipalities have not proposed a new MSW landfill since 1995.[43] Although "development of landfill capacity is still allowable" under state plans and regulations, the decrease in landfill capacity is primarily driven by a lack of space to expand and the complex process for siting and permitting landfills.[44] In addition, many municipal landfills closed in response to regulatory compliance costs after 1990, despite having some available airspace.[45]

In August 2023, however, the Department of Integrated Solid Waste Management for the Town of Bourne (Bourne ISWM) received final approval from MassDEP and its local Board of Health to site and operate a vertical expansion of its landfill to accommodate continued intake of ash residue from a MWC in Ashland, Massachusetts, and MSW from Bourne and Falmouth, Massachusetts.[46] The 40-foot vertical expansion over lined cells will provide 1.26 million cubic yards of additional space and extend the landfill's life by five years.[47] Once the vertical

---

[37] *See* 2030 SWMP, *supra* note 2, at 1.
[38] *See* 2022 SW Data Update, *supra* note 26, at 11.
[39] *See* 2030 SWMP, *supra* note 2, at 3. The projected potential in-state landfill capacity is only 520,577 tons of waste in 2030. *See* 2022 SW Data Update, *supra* note 26, at 12.
[40] *See* Durning & Mackie, *supra* note 2, at 18-17.
[41] *See* 2022 SW Data Update, *supra* note 26, at 11 (projecting Dartmouth to close by 2026, Nantucket by 2029, Westminster by 2030, and Middleborough by 2031).
[42] *See* Megan Quinn, *With State Landfill Capacity Dwindling, MassRecycle Conference Explores Recycling Remedies*, WasteDive (Apr. 4, 2022) (noting only few expansion permits in New England); Brian Lee, *Landfill Gets State Approval to Expand*, Telegram & Gazette (Mar. 16, 2017) (explaining MassDEP characterized the recent Fitchburg-Westminster landfill permit change as a modification, not an expansion). *But see* Kristie Pecci, *4 Dangerous Southern New England Landfills to Keep an Eye On*, Conservation L. Found. (May 10, 2021) (attemting to thwart some municipalities from expanding landfills in Saugus, Bourne, and Westminster).
[43] *See* MassDEP, Response to Public Comments on Draft 2030 Massachusetts Solid Waste Master Plan 33 (Oct. 2021) [hereinafter 2030 SWMP Response to Comments].
[44] *See* Durning & Mackie, *supra* note 2, at 18-17; 2030 SWMP Response to Comments, *supra* note 43, at 35.
[45] *See* Durning & Mackie, *supra* note 2, at 18-17; *infra* Section V.A. (summarizing permit and siting procedures).
[46] *See* MassDEP, Approval with Conditions – Phase 9 Bourne Landfill Expansion, Authorization Nos. SW26-0000004, SW10-0000013 (Aug. 31, 2023), https://eeaonline.eea.state.ma.us/EEA/PublicApp/ [hereinafter Bourne Final Permit]; Town of Bourne, *ISWM Operations* (last visited Mar. 31, 2024) [hereinafter ISWM Operations]. About 85% of the waste brought to the Bourne Landfill is ash from the SEMASS MWC in Ashland, Massachusetts. *See* ISWM Operations, *supra*. The remaining capacity is filled by MSW from Bourne and Falmouth. *See id.*
[47] *See* Bourne Final Permit, *supra* note 46, at 4.

expansion reaches full capacity, Bourne ISWM seeks to expand the landfill southward.[48] In addition, Casella Waste Systems, a prominent waste management company in the region, recently proposed to reopen and expand a landfill in Hardwick, Massachusetts, with thirteen more years of operating capacity.[49] Casella asserts certain residents initiated the proposal, but the project faces substantial public pushback and distrust.[50] A public hearing on Casella's proposal to expand the landfill was held on April 9, 2024.[51]

2. Environmental Concerns for Municipalities Near Landfills

Although landfill capacity is declining, there are still several environmental health and justice concerns related to landfill disposal. Traditional environmental health considerations for landfill sites include odor mitigation, pest and rodent prevention, leachate collection, and air pollution control.[52] Recently, leachate collection garners more attention because it likely is one pathway for PFAS contamination in public drinking water supplies.[53] In addition, as organic material decompose, landfills not properly equipped with modern pollution control technologies emit GHGs, such as methane and carbon dioxide, into the atmosphere.[54] To compound these

---

[48] *See* ISWM Operations, *supra* note 46.

[49] *See* Megan Quinn, *Casella Aims to Drum Up Support for Possible 2028 Reopening of Massachusetts Landfill*, WasteDive (Aug. 2, 2023) (noting residents voted to halt landfill operations in 2007); Brian Oliver, Casella Waste Sys., Inc., Proposal for Town Meeting Action in Furtherance of Hardwick Landfill Project 1 (Feb. 20, 2024) (asking to amend Hardwick's bylaws to allow for landfill expansion).

[50] *Compare* Casella Waste Sys., Inc., *Reviving the Hardwick Landfill: A Sustainable Future* (last visited Mar. 25, 2024), *with* Richard Romano & Philip Landrigan, *Proposed Landfill Would Pose Threat to the Quabbin*, CommonWealth Beacon (Mar. 24, 2024) (expressing concern over industry handling of landfills and contaminated drinking water supplies).

[51] *See* Hardwick Planning Bd., *Public Hearing on Casella's Proposal for Hardwick Landfill* (last visited Apr. 12, 2024).

[52] *See* EPA, *What is a Municipal Solid Waste Landfill?* (Feb. 21, 2024); MassDEP, Control of Odorous Gas at Massachusetts Landfills 3-4 (2007) (describing odor complaints).

[53] *See* PFAS Interagency Task Force, PFAS in the Commonwealth of Massachusetts 17-19, 49 (2022); Cole Rosengren, *PFAS Destruction Solutions Advance as EPA Drinking Water Standard Looms*, WasteDive (Apr. 8, 2024) (explaining landfills are one source of PFAS contamination); David Abel, *Lowell Water Treatment Plant to Stop Accepting Toxic Water from N.H. Landfill*, Bos. Globe (Nov. 7, 2019) (describing how Lowell's wastewater treatment facility rejected PFAS-containing leachate from New Hampshire landfill). PFAS—the "forever chemical"—are a class of synthetic chemicals associated with serious adverse health effects and found in many consumer products, such as non-stick cookware and water-proof clothing, that are discarded into landfills. *See* PFAS Interagency Task Force, *supra*, at 2, 5.

[54] *See* Janet S. Domenitz & Cindy Luppi, *One of Our Major Climate Challenges is Our Own Trash*, CommonWealth Beacon (Mar. 1, 2024) (noting landfill methane emissions in Massachusetts equivalent to 39,000 gas-powered vehicles); EPA, *Basic Information About Landfill Gas* (last updated Feb. 12, 2024); Industrious Labs, Inc., *Waste Dashboard: Massachusetts* (last visited Mar. 25, 2024) (calling MSW landfill as top methane emitter in state); *see also* Megan Aki et al., A Step-by-Step Guide: Greenhouse Gas Inventories for Massachusetts Cities and Towns 24-25 (2020). Methane is twenty-eight times more potent than carbon dioxide over a twenty-year period. *See* EPA, *supra*. MSW landfills across the United States accounted for 14% of methane emissions in 2021. *See id. But see* Jacob Wallace, *Landfill Methane Survey Finds Significant 'Misalignment' Between Models and Real-World Conditions*, WasteDive (Mar. 29, 2024); Nicholas Groom, *Methane Menace: Aerial Survey Spots 'Super Emitter' Landfills*, Reuters (June 18, 2021) (noting NASA flyover technology has identified landfills leaking six times the amount of methane reported to EPA).

health concerns, four of the five remaining active MSW landfills in Massachusetts are sited in or near EJ communities (*see* Figure 5).[55]

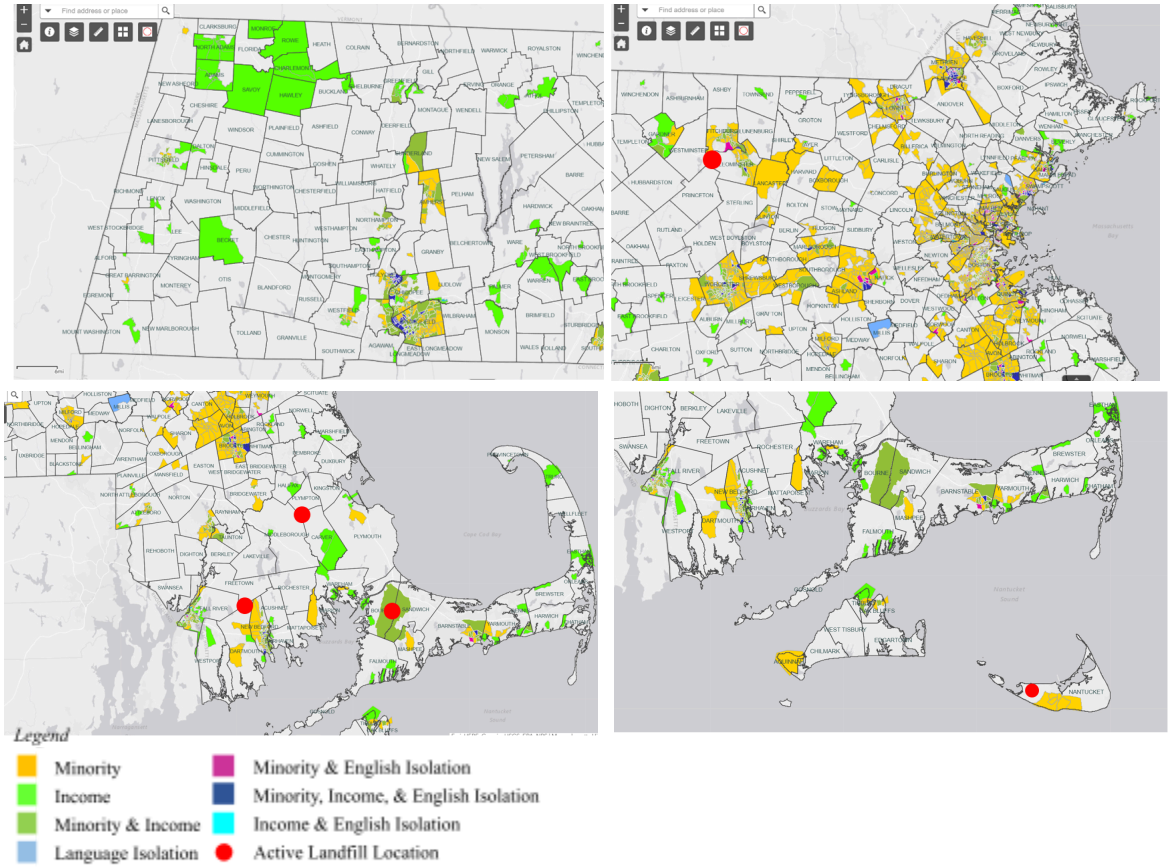

Figure 5: Comparison Overlay of Active MSW Landfills and EJ Communities[56]

3. Economic Considerations for Municipalities with Landfills

[55] *See* MassDEP, *Environmental Justice Communities and Active Landfills and Waste Combustion Facilities* (Jul. 14, 2020) [hereinafter EJ-LF Map 2010 Census] (providing map overlay of EJ communities from 2010 census data with locations of waste sites); Lily Nolan, *The Link Between Environmental Justice and Landfills* (providing interactive map to track EJ communities and landfills in Massachusetts). With the exception of Hull, Bourne, and Middleborough, all other MSW landfills are located within a five-mile radius of an EJ community. *See* Nolan, *supra*. Moreover, data shows that ash landfills, demolition landfills, illegal dump sites are more often sited in EJ communities. *See* Dana R. Faber & Eric J. Krieg, *Unequal Exposure to Ecological Hazards: Environmental Injustices in the Commonwealth of Massachusetts*, 110 ENV'T HEALTH PERSPECTIVES 277, 281 (2002).

[56] *Compare* EJ-LF Map 2010 Census, *supra* note 55, *with* MassDEP, *Environmental Justice Maps Viewer* (last visited Mar. 22, 2024) (providing EJ map based 2020 census block data). MassDEP developed a new mapping tool as part of its cumulative impact analysis guidance for certain air permits, which can be filtered to display MSW disposal facilities. *See* MassDEP, *Cumulative Impact Analysis Mapping Tool* (last visited May 1, 2024).

Depending on the ownership model of the landfill, municipalities should consider several economic costs and benefits.[57] Municipalities that own and operate landfills should consider up-front, operating, back-end, and remediation costs of management.[58] For instance, the municipality should plan to finance the costs to cap and close the landfill and conduct indefinite operations and maintenance of the closed landfill.[59] In this scenario, costs may be financed by a levy from property taxes or individualized disposal fees.[60] By contrast, if the landfill is under private ownership, the municipality may collect revenue from a host community agreement with the private party.[61] A host community agreement offers the municipality payments based on the amount of waste disposed at landfill.[62] Moreover, such an agreement could provide additional revenue related to the treatment of wastewater produced at the landfill.[63] For example, Casella is offering to pay the Town of Hardwick $6 per ton of waste disposed at the landfill via a Host Community Agreement, totaling about $2.1 million per year of revenue to the town and an additional $500,000 of revenue associated with the wastewater treatment.[64]

[57] *See* Juhohn Lee, *The Garbage Industry Has Outperformed the Market since 2015. Here's Why*, CNBC (July 22, 2021) (explaining trend to privatize U.S. waste management sectors).
[58] *See* EPA, FULL COST ACCOUNTING FOR MUNICIPAL SOLID WASTE MANAGEMENT: A HANDBOOK 7, 39 (1997) [hereinafter EPA MSW COST HANDBOOK] (providing list of all costs).
[59] *See id.* at 5.
[60] *See infra* Section IV.A.-C. (outlining various funding strategies for MSW).
[61] *See* MASS. GEN. LAWS ch. 16, § 24A (requiring host fee); MASS. GEN. LAWS ch. 111, § 150A (outlining requirements of solid waste facitlies); Casella Waste Sys., Inc., *supra* note 50.
[62] *See* Casella Waste Sys., Inc., *supra* note 50.
[63] *See id.*
[64] *See id.*

B. In-State Municipal Waste Combustion

1. Limited MWC Facilities and Landfill Capacity for Ash By-Product

MWCs remain an important part of the Commonwealth's waste management system, but there are no new facilities on the horizon and capacity for residue at ash landfills is on the decline. A significant portion—at least 44%—of the MSW generated in Massachusetts is burned at one of five in-state MWCs.[65] In 2013, MassDEP modified the Commonwealth's 1998 moratorium on the construction of new MWC facilities to allow for development of gasification and pyrolysis technologies, but there have been no applications to date.[66] The incineration of waste produces ash that is then transported to an ash landfill.[67] Although existing MWCs are expected to remain operational, close to half of the remaining ash landfills are expected to close by 2033.[68] Notably, WIN Waste—formerly Wheelabrator—recently proposed to expand the ash landfill operating in Saugus, Massachusetts.[69]

2. Environmental Concerns for Municipalities Near MWCs

Although MWCs dispose of nearly half of the MSW in Massachusetts, there are several environmental health and justice concerns related to the continued operation of existing MWC facilities driving public opposition. MWC facilities are highly regulated—requiring permits and emission control plans—to ensure air pollution remains under the legal limit.[70] But MWC emissions may still contain the following harmful pollutants: "acid gases; dioxins, furans, or other chlorine- containing organics; fly ash and soot; mercury, lead, or other heavy metals; and nitrogen oxides."[71] The ability to recover energy from MWC, however, helps to offset the use of fossil fuels and reduce methane emissions by diverting MSW away from landfills.[72]

---

[65] *See* MSW Consultants, *supra* note 23, at 2-1. Some reports assert as much as 55% of Massachusetts's waste is incinerated. *See* Durning & Mackie, *supra* note 2, at 18-23.

[66] *See* Durning & Mackie, *supra* note 2, at 18-22; 2010-2020 SWMP, *supra* note 9, at 47; Mass. Municipal Ass'n, *DEP Proposes to Modify Incinerator Moratorium* (Apr. 2, 2013). According to the 2030 SWMP, MassDEP aims to allow existing MWCs to replace "capacity with more advanced technologies to reduce emissions" and better separate materials. *See* 2030 SWMP, *supra* note 2, at 13; Durning & Mackie, *supra* note 2, at 18-22.

[67] *See* 2022 SW Data Update, *supra* note 26, at 1. Ash is brought to landfills in Agawam, Haverhill, Peabody, Saugus, Shrewsbury, Bourne, or Somerset. *See id.* at 7-8.

[68] *Compare* 2022 SW Data Update, *supra* note 26, at 8 (listing anticipated closure dates of four ash landfills), *with* MSW Consultants, *supra* note 23, at 2-2 (assuming waste-to-energy capacity remains operational "for the foreseeable future").

[69] *See* Erin Douglas, *Long Overdue: As Seas Rise on Massachusetts' North Shore, Advocates Call for Closure of Coastal Ash Landfill*, Bos. Globe (Jan 25, 2024); Paula Moura, *Inside The Fight to Expand a Burnt Trash Landfill In a Saugus Marsh*, WBUR (Mar. 1, 2023).

[70] *See generally* MassDEP, *Regulation of Municipal Solid Waste Combustors* (last visited Mar. 25, 2024); *see also* MassDEP MWCs, *supra* note 23.

[71] *See* MassDEP MWCs, *supra* note 23. Large and small MWC facilities in Massachusetts emitted 4,927 tons of nitrogen oxide emissions in 2018. *See* Ozone Transport Comm'n, Municipal Waste Combustor Workgroup Report 11-12 (May 2023). In January 2024, EPA announced it will propose stronger air pollution control standards for large MWC facilities. *See* EPA, *EPA Proposes Stronger Air Pollution Standards for Large Facilities That Burn Municipal Solid Waste* (Jan. 11, 2024) (noting stricter regulations would promote EJ initiatives).

[72] *See* EPA Energy Recovery, *supra* note 25; *supra* Section III.A.2. (listing environmental concerns of landfills).

In Massachusetts, the five remaining MWCs in operation are sited in EJ communities.[73] EJ communities "are often targeted by the waste industry and others as potential sites" for waste disposal because the "industries know that these communities lack the ability and capacity to fight back to protect themselves."[74] The continued operation of MWCs burdens EJ communities with air pollution that causes adverse health effects, such as asthma, respiratory disease, and cardiovascular disease.[75] There has been a long-term push from environmental groups and members of the public to close the MWC in Saugus, Massachusetts, including the filing of lawsuits.[76] In addition to air quality concerns, residents also report noise complaints.[77]

3. Economic Considerations for Municipalities with MWCs

The existing MWCs in Massachusetts are privately owned and operated.[78] The lack of appetite for new gasification and pyrolysis infrastructure is likely fueled by the high investment and operating costs of MWCs.[79] While MWCs can generate revenue from energy sales, metal recycling, and waste disposal, an increase in maintenance costs, costs related to ash landfills, recycling market strains, and liability costs pose challenges for companies running MWCs.[80]

Specifically, energy-related revenue does not offer enough incentive to invest in new MWCs.[81] Due to the low wholesale price of electricity, revenue from energy sales plummeted nearly 60% from 2014 to 2019.[82] MWCs are currently eligible to earn Class II Waste Energy

---

[73] *See* EJ-LF Map 2010 Census, *supra* note 55.
[74] Celine Yang, *Q&A: Addressing the Environmental Justice Implications of Waste*, Env't & Energy Study Inst. (May 14, 2021).
[75] Daniel Rosenberg et al., *Burned: Why Waste Incineration Is Harmful*, NRDC (July 19, 2021); Giselle Barahona, *Waste Incineration is an Environmental Justice Issue*, Conservation L. Found. (Aug. 20, 2020); Domenitz & Luppi, *supra* note 54; Yang, *supra* note 74.
[76] *See* Douglas, *supra* note 69; Moura, *supra* note 69; Joe Gentile, *Saugus Incinerator's Request for More Landfill Space Sparks Environmental Protests*, 22 News WWLP (July 26, 2016) (noting groups trying to shut down the MWC since early 2000s); Mike Gaffney, *Why Did the Appeals Court Side with WIN Waste Innovations in Ash Landfill Ruling?*, WickedLocal (Mar. 9, 2022) (reporting court upholding 1955 site assignment). Not only is the landfill sited in EJ areas, it is also sited on a protected wetland. *See* Douglas, *supra* note 69. Moreover, a study by Boston College estimates 13 people in Saugus die each year from cancer caused by air pollution—nearly double Boston's rate. *See* Boston College, *MassCleanAir* (last visited Mar. 25, 2024); Moura, *supra* note 69.
[77] Moura, *supra* note 69; Drew Karedes, *Nation's Oldest Incinerator Site Under Fire in Saugus After Turbine Mishap*, Bos. 25 News (Sept. 26, 2023).
[78] *See* MassDEP MWCs, *supra* note 23.
[79] *See supra* note 66 and accompanying text; Int'l Bank for Reconstruction & Dev., World Bank, Decision Maker's Guide to Municipal Solid Waste Incineration 1 (1999).
[80] *See* Env't Bus. Council of New England, EBC 7th Annual "Talking Trash" Conference: Southern New England: Future Look of the Solid Waste Management in the Region 55 (2020).
[81] *See id. at* 52-53 (2020).
[82] *See id.*

Certificates (WECs) under the Commonwealth's Renewable Portfolio Standard.[83] But the WEC market is experiencing an imbalance of supply and demand.[84]

C. Out-Of-State Municipal Solid Waste Disposal

1. Limited Disposal Capacity in Neighboring States

Due to in-state capacity restraints on MSW disposal, a significant percentage of MSW generated in Massachusetts is transported to other states.[85] Between 2014 and 2017, about "22.4% of the solid waste managed in Massachusetts" was exported to an out-of-state landfill or incinerator.[86] There are at least 220 small and large transfer stations across Massachusetts, but many do not yet have the ability to transfer MSW to other states.[87] Some transfer stations have begun to invest in rail infrastructure, but "facilities face logistical challenges arranging rail shipments and ensuring an adequate supply of the right type of railcars."[88]

Moreover, other states in the region are dealing with similar disposal capacity shortages and are looking to limit waste imports (*see* Figure 6).[89] For example, in 2019, 86% of the trash imported by New Hampshire was produced in Massachusetts.[90] Recently, the New Hampshire Legislature moved two bills forward that, if read broadly, could ban out-of-state trash all together, which could result in significant ramifications for Massachusetts.[91]

---

[83] Mass. Dep't of Energy Resources, *Program Summaries: Renewable and Alternative Energy Portfolio Standard Programs* (last visited Mar. 31, 2024). Eligible facilities must maintain a state-approved recycling program, comply with all applicable MassDEP regulations, and allocate at least 50% of WEC revenue to MassDEP recycling programs. *See* DSIRE, N.C. Clean Energy Tech. Center, *Renewable Portfolio Standard* (Jan 5, 2024).
[84] Env't Bus. Council of New England, *supra* note 80, at 54.
[85] *See* Durning & Mackie, *supra* note 2, at 18-28; MSW Consultants, *supra* note 23, at 3-2 (listing landfills in New Hampshire, New York, Ohio, Rhode island, and Connecticut); David Abel, *As Landfill Space Dwindles in Massachusetts, New Hampshire Has Become the State's Dumping Ground*, Bos. Globe (July 19, 2021) (reporting a 55% increase in trash exports from 2010 to 2019); Charlie Eichacker, *Maine's Landfill is Meant for In-state Waste. Here's How Mass. and N.H. are Filling It Up*, WBUR (Mar. 21, 2022) (showing Massachusetts shifted its burden to other states).
[86] *See* MSW Consultants, *supra* note 23, at 3-1.
[87] *See* 2030 SWMP, *supra* note 2, at 3-4; MassDEP, *Active Handling Facilities in Massachusetts* (June 2023); 2023 SW Master List, *supra* note 30(counting all small and large transfer stations).
[88] *See* 2030 SWMP, *supra* note 2, at 3-4.
[89] *See id.*; Abel, *supra* note 85 (noting "serious capacity restraints over the next two decades" in New Hampshire).
[90] *See* Abel, *supra* note 85.
[91] *See* H.B. 1145, 168 Gen. Ct., Exec. Sess. (N.H. 2024) (proposing to prohibit construction of new private, commercial landfills); H.B. 1632, 168 Gen. Ct., Exec. Sess. (N.H. 2024) (proposing to cap amount of imported trash at public landfills by 15%); Sruthi Gopalakrishnan, *Committee Advances Bills to Restrict Out-Of-State Trash*, N.H. Bus. Rev. (Mar. 21, 2024) (describing attempts to circumvent interstate commerce clause rules); *supra* table accompanying note 36 (demonstrating New Hampshire was Massachusetts's primary waste off-taker).

Figure 6: Projected Drop in Out-of-State Landfill Capacity for Massachusetts Solid Waste[92]

2. Environmental Concerns of Transferring Waste for Out-of-State Disposal

In addition to similar environmental health and justice concerns of in-state landfilling and incineration, MSW must travel long distances to get to their out-of-state disposal destinations.[93] In fact, about 32.7% of the total waste exported travels more than 100 miles from the state border.[94] Transportation of waste results in increased air emissions from truck and freight trains traveling by rail.[95] Moving waste by rail, however, could reduce "emissions by about 2,000 metric tons of carbon dioxide" per year relative to trucking.[96] This also results in increased truck traffic for communities in neighboring states.[97]

3. Economic Considerations of Transferring Waste for Out-of-State Disposal

There are two main economic concerns associated with relying on out-of-state disposal: increase disposal prices and a lack of independence for municipalities. First, transportation to another location beyond Massachusetts increases the overall cost of solid waste disposal.[98]

---

[92] MSW CONSULTANTS, *supra* note 23, at 3-3. There are additional disposal destinations outside of Massachusetts, such as handling and processing facilities. *See id.* at 3-10 (summary chart).
[93] *See* MSW CONSULTANTS, *supra* note 23, at 3-3; Timothy Black & John A. Stewart, *Burning and Burying in Connecticut: Are Regional Solutions to Solid Waste Disposal Equitable?*, 16 New England J. of Pub. Pol'y 15, 17-18 (2001) (finding disposal facilities primarily located in minority and low-income communities in Connecticut); Sarah Whites-Koditschek, *Alabama Has Become the Nation's Toxic Waste Disposal*, GOVERNING (Oct. 20, 2023) (describing how toxic waste and trash from other states impact landfills sited in Black and brown communities).
[94] *See id.*
[95] *See* Jung, *supra* note 35.
[96] *Id.*
[97] *See id.*
[98] *See* Jim Hand, Piling Up: *As Landfills and Incinerators Close or Reach Capacity, Massachusetts is Running Out of Places to Process Trash, Which Could Put Upward Pressure on Disposal Prices*, SUN CHRONICLE (Sept. 24, 2019).

Disposal costs become the sum of facility tip fees, transportation costs, material aggregation costs—and for waste-by-rail—costs of redundant railcars and timely returns to reload (*see* Figure 7 and Figure 8).[99] Investments in waste-by-rail infrastructure to bring MSW to further states with lower disposal charges can help to offset the overall increase in disposal costs.[100] Second, reliance on MSW transfers to other states leaves municipalities vulnerable to systemic shutdowns and disruptions due to increased logistical planning needed to ensure transporters even have a disposal outlet.[101]

		Transport Costs ($/ton)		
Distance (miles)	Drive Time (hours)	MSW	Single Stream	Organics
30	1.25	$6.10	$13.72	$9.15
60	2.08	$12.20	$27.45	$18.30
90	2.75	$18.20	$41.17	$27.45
120	4.08	$24.40	$54.90	$36.60
150	5.42	$30.50	$68.62	$45.75

Source: MSW Consultants

Figure 7: MSW Consultant's Estimated Truck Transportation Costs[102]

Distance (miles)	Average Class I Railroad Freight Cost ($/ton-mile)	Transport Costs ($/ton)
300	$0.0395	$11.85
350	$0.0395	$13.83
400	$0.0395	$15.80
450	$0.0395	$17.78
500	$0.0395	$19.75

Source: US Department of Transportation

Figure 8: MSW Consultant's Estimated Rail Transportation Costs (2016)[103]

[99] *See* MSW Consultants, *supra* note 23, at 3-14.
[100] *See id.*; Hand, *supra* note 98. The rail would need to travel over 250 miles one way before making economic sense. *See* MSW Consultants, *supra* note 23, at 3-15.
[101] *See* 2030 SWMP, *supra* note 2, at 4.
[102] *See* MSW Consultants, *supra* note 23, at 3-15. Single stream is a recycling system that allows for a variety of discarded materials, such as cardboard, paper, plastic, metal, and glass, to be collected together for processing. *See* RecyclingWorks Mass., *Single Stream Recycling* (last visited Apr. 23, 2024).
[103] *See id.* at 3-16. Actual cost data for waste-by-rail could not be found. *Id.* at 3-15.

D. Changes to Global Recycling Markets Impact Waste Diversion and Costs

1. China's National Sword Policy

The diversion of discarded materials for recycling, reuse, or compost is key to reducing the amount of MSW disposal in landfills or MWCs.[104] Historically, China was one of the largest importers of U.S. plastic waste.[105] In 2013, however, China began to set increasingly stricter policies related to its acceptance of plastics for recycling.[106] In 2018, China implemented its National Sword policy, which reduced the acceptable rate of trash contamination from 5% to 0.5%.[107] This new contamination rate is effectively impossible for MRFs to meet, resulting in an imbalance of plastic supply and demand for recyclable materials.[108] Other international markets, such as Vietnam and India, have begun to implement similar policies.[109] Due to restrictions like the National Sword, MRFs have a difficult time selling recyclable materials at reasonable prices.[110] In addition, MRFs experience increased operating costs, such as increased staffing and slower sorting, more transportation costs from finding new buyers, and new capital expenditures, such as purchasing new equipment, to satisfy the requirements.[111]

Consequently—in order to stay in business—MRFs have increased the fees charged to accept and process recyclable materials from municipal customers.[112] Recycling used to be profitable for municipalities, but China's National Sword has made it more expensive for municipalities to recycle plastic materials.[113] Moreover, the National Sword created an indirect

---

[104] *See* 2030 SWMP, *supra* note 2, at 8-9; Vedantam et al., *Impact of China's National Sword Policy on the U.S. Landfill and Plastics Recycling Industry*, 14 MDPI Sustainability 1, 1 (2022) (analyzing impacts of China's policies on recycling market in the United States).

[105] *See* Vedantam et al., *supra* note 104, at 3. Before the National Sword, between 80% and 90% of recyclable material in Greater Boston was shipped to China. *See* Bruce Gellerman, *How a New Policy in China Has Led to a Recycling Crisis in Mass.*, WBUR (Mar. 21, 2019).

[106] *See* Vedantam et al., *supra* note 104, at 1; *China's National Sword and Recycling Import Ban: Responding to Market Changes*, Solus Grp. (Mar. 19, 2018). For example, in 2013, China initiated its "Green Fence" policy, which increased its inspections of plastic imports. *See* Vedantam et al., *supra* note 104, at 1. In 2016, China restricted imports of secondary material from the United States. *See id.*

[107] *See* MassRecycle, Managing Recycling Market Impacts in these Challenging Times for Municipalities 1 (last visited Mar. 31, 2024); Jason Margolis, *As China Gets Tough on Recycling, Will America Get Cleaner*, The World (July 18, 2018) (featuring City of Lynn).

[108] *See* MassRecycle, *supra* note 107. Communities across the United States "produce contamination levels between 10% and 20%" because they place trash in their recycling bins. *See* Margolis, *supra* note 107. Petrochemical production in the United States has compounded the supply and demand issues because virgin plastics have been cheaper than recyclable plastics. *See* Vedantam et al., *supra* note 104, at 2.

[109] *See* Nat'l Convention of State Legis., *supra* note 13, at 5.

[110] *See* Vedantam et al., *supra* note 104, at 9 (providing summary of industry impacts).

[111] *See id.* at 9-10; MassRecycle, *supra* note 107, at 1 (summarizing cost increases and revenue reductions).

[112] *See* MassRecycle, *supra* note 107, at 2. China's National Sword Policy has driven some industry members out of business, such as a large glass bottle recycling plant in Milford, MA. *See* MassDEP, *Massachusetts Recycling Market Update: Global Markets, Local Impacts* (last visited Mar. 31, 2024); *see also* MassDEP, MassDEP Policy: Extended Storage of Recyclable Glass by Municipalities (June 2018) (allowing municipalities to store unprocessed glass).

[113] *See* Gellerman, *supra* note 105. Municipalities have had to renegotiate their contracts. *See id.* (giving example of Lowell's contract going from $0 to $500,000 per year); MassRecycle, *supra* note 107, at 2.

incentive to pursue less costly disposal options, such as landfilling, incineration, or transporting waste to other states.[114] Accordingly, the National Sword policy has had significant impacts on municipal budgets for MSW management services and increased the need for educational awareness among residents using single stream recycling services.[115]

2. The COVID-19 Global Pandemic

The onset of the COVID-19 Pandemic presented a number of challenges to MSW management facilities and workers in 2020.[116] Due to heightened safety precautions to prevent the spread of disease, facilities saw a significant increase in single-use plastics, including personal protective equipment, restaurant packaging for takeout, and solid medical waste.[117] For recycling facilities, the influx of single-use plastics further complicated the supply and demand problem created by China's National Sword.[118] But most commodities have since recovered.[119] In addition, disposal workers were more likely to be exposed to disease because—as essential workers—they were unable to isolate and dealt directly with discarded, infectious materials.[120]

MassDEP posits the 2020 increase in MSW disposal was due to people staying home for longer periods of time, resulting in "changes in consumption patterns, increased cleanouts, renovation and construction projects, and disruptions to business and institutional operations."[121] In addition, COVID-19 led some communities to temporarily close drop-off programs and suspend waste ban inspections by MassDEP.[122] Accordingly, COVID-19 further disrupted already strained MSW systems, and its total impact on the system and residents' lifestyle changes are still not clear.[123]

E. Emergency Management of Disaster Debris

Lack of in-state landfill capacity for MSW, dependency on out-of-state waste exports, and reliance on MWCs makes Massachusetts communities vulnerable disruptions to MSW

---

[114] *See* Vedantam et al., *supra* note 104, at 9-10; *See* MassRecycle, *supra* note 107, at 2; Gellerman, *supra* note 105. *But see* Secions III.A.-C. (describing limited disposal capacity).
[115] *See* MassRecycle, *supra* note 107, at 2 (noting advocacy points for municipalities).
[116] *See* Roy et al., *Impacts of COVID-19 Outbreak on the Municipal Solid Waste Management: Now and Beyond the Pandemic*, 1 ACD Env't 32, 32-33 (2021).
[117] *See id.* The scope of this paper does not include an analysis of solid medical waste.
[118] *See* Brian J. Love & Julie Richard, *COVID-19 is Laying Waste to Many U.S. Recycling Programs*, The Conversation (June 23, 2020); Nat'l Convention of State Legis., *supra* note 13, at 1; *supra* Section III.D.1.
[119] *See* Nat'l Convention of State Legis., *supra* note 13, at 5.
[120] *See id.* at 32, 39; *See* Env't Bus. Council of New England, Inc., Impact of COVID-19 on the Solid Waste Industry in New England 7-9 (2020) [hereinafter EBC COVID-19 Impacts].
[121] *See* MassDEP, 2020 Solid Waste Data Update 5 (Oct. 2022) [hereinafter 2020 SW Data Update]. In 2020, the total solid waste disposal increased by 260,000 tons, about 4.4%, compared to the 2018 baseline. *Id.* Disposal of MSW in Massachusetts decreased by 90,000 tons in 2021, but increased by 160,000 in 2022. *See* 2022 SW Data Update, *supra* note 26, at 3.
[122] *See* EBC COVID-19 Impacts, *supra* note 120, at 47; 2030 SWMP, *supra* note 2, at 14.
[123] *See* 2020 SW Data Update, *supra* note 121 (noting impacts have not been fully assessed).

management systems caused by climate change.[124] A natural disaster, such as a severe storm, flooding, or fire, can create unexpectedly large amounts of solid waste and easily overwhelm the system.[125] For example, in 2012, a former landfill in New York provided critical relief to the state's solid waste management after Hurricane Sandy.[126] More recently, after a fire destroyed the town of Lahaina, Hawaii, in 2023, debris and soil was placed in a controversial, temporary storage site as county officials contemplated a permanent disposal site.[127] In Vermont, state officials waived landfill and transfer station capacity limits to accept waste and debris after a major flood event in 2023.[128] Other climate-related consequences of a natural disaster include increased GHG emissions from more transportation and treatment of disaster debris.[129]

Municipalities should establish a Disaster Debris Plans that clearly articulates which local leaders are responsible in case of a natural disaster, identifies debris sites and transportation routes, and prioritizes diverting disaster debris from landfills or MWCs.[130] Despite increasing threats from climate change, the statewide Disaster Debris Management Planning guidance for municipalities has not been updated since July 2014.[131]

IV. ACCOUNTING & FUNDING OPTIONS FOR MUNICIPALITIES

A. General Funds

---

[124] *See* Eastern Rsch. Grp., Inc., ResilientMass Plan: 2023 MA State Hazard Mitigation and Climate Adaptation Plan 7-62 (2023) [hereinafter ResilientMass Plan] (noting need for increased local capacity and infrastructure to reduce climate-related vulnerabilities); *see also* Jonathan Sharp, *Climate Change and Waste Management: Preparing for Natural Disasters*, Waste Advantage (June 30, 2022) (noting most hazardous waste facilities ill prepared for climate-related disasters like sea level rise, flooding, extreme heat, and major storms). Even without a natural disaster, even the smallest disruption to the solid waste management system causes overflows and backups. *See* ResilientMass Plan, *supra*, at 7-62; *see also* Jack Lepiarz & Lyn Jolicoeur, *'We're in A Very Serious Crisis': Mass. Trash Processors Face Garbage Overflow*, WBUR (June 14, 2019).

[125] *See* World Health Org., Solid Waste Management in Emergencies: Technical Notes on Drinking-Water, Sanitation, and Hygiene in Emergencies 7.2 (July 2013).

[126] *See* Eric Lipton & Kirk Semple, *At Landfill, Storm Cleanup is Military-Style Effort*, N.Y. Times (Nov. 16, 2012); Michael Kimmelman, *Former Landfill, a Park to Be, Proves a Savior in the Hurricane*, N.Y. Times (Dec. 17, 2012). The same landfill was also critical in the aftermath of the 9/11 terrorist attacks. *See* Lipton & Semple, *supra*.

[127] *See* Tom Hays, *Fight Brews in Lahaina Over Where to Dump Toxic Maui Wildfire Waste*, Wash. Post (Jan. 11, 2024); Mike Baker & Lisa L. Schell, *Fire Blanketed Lahaina in Toxic Debris. Where Can They Put It?*, N.Y. Times (Jan. 25, 2024); JD Pells, *Council Greenlights Eminent Domain for Central Maui Landfill Expansion*, MauiNow (Apr. 6, 2024).

[128] *See* Shaun Robinson, *After the Flooding, Trash is Piling Up*, VTDigger (July 21, 2023); Rachel Mann, *Mountains of Flood Garbage Destined for Landfill*, WCAX3 (July 14, 2024) (noting "[w]e're fortunate in Vermont to have a landfill in the state that has ample capacity").

[129] *See* EPA, *Waste Management Planning to Mitigate the Impact of Climate Change* (Oct. 25, 2023).

[130] *See* EPA, *supra* note 129; MassDEP, Disaster Debris Management Planning: An Introduction for Local Government Officials 1-2 (2014) [hereinafter 2014 Disaster Debris Guide].

[131] *See id.* The Massachusetts Emergency Management Agency (MEMA) is in the process of updating the plan. *See* ResilientMass Plan, *supra* 124, at 7-62; *see also* MEMA, *Debris Management Plan* (last visited Mar. 31, 2024). The EPA updated its Planning for Natural Disaster Debris guidance for local officials in 2019, which includes sample state and local plans. *See generally* EPA, 530-F-19-003, Planning for Natural Disaster Debris (2019).

One way to account for MSW management is through the municipality's General Fund. Any revenue received by a municipality is allocated to a municipality's General Fund.[132] Money from the General Fund "can be spent for any lawful purpose only after appropriation by the legislative body."[133] Many public services, such as education and safety, are budgeted for via a municipality's General Fund.[134] The primary source of revenue for a General Fund is a property tax levy.[135] Additionally, a General Fund receives revenue from state aid and local receipts.[136] About 56% of communities account for MSW services, such as trash collection, as a line item in their General Budget.[137] Public works services tend to make up a sliver of a the total expenditures by a municipality in a given fiscal year.[138]

B. Enterprise Funds

In addition to the traditional approach to accounting a municipality's MSW services, municipalities may also establish an Enterprise Fund.[139] Under Massachusetts law, a municipality can adopt a special revenue fund called an Enterprise Fund to account for financial activities associated with a particular public utility facility.[140] Monies in an Enterprise Fund are kept separate and distinct from monies in the General Fund.[141] A municipality can use an Enterprise Fund for business-type services, including trash disposal.[142] All activities covered under an

---

[132] *See* Bureau of Municipal Fin. L., Div. of Local Servs., MassDOR, Overview of Statutory Treatment of Municipal Revenues 1 (2016) [hereinafter Municipal Revenues Overview].
[133] *See id.*
[134] *See* Sean Cronin & Zack Blake, MassDOR, Financing Local Governments & Best Budget Practices 13 (Feb. 6, 2024).
[135] *See* Div. of Local Servs., MassDOR, Levy Limits: A Primer on Proposition 2½ 4 (2007). State law limits the amount a municipality can levy from residents via a property tax. *See id.*; Mass. Gen. Laws ch. 59, § 21C. The levy is not to exceed 2.5% of "the total fair cash value of all taxable real and personal property in that community." *See* MassDOR, *supra*, at 3. The mechanics of this property tax limit—known as Proposition 2½—can be challenging to understand. *See* MassDOR, *Proposition 2½ and Tax Rate Process* (last visited Mar. 27, 2024) (providing video explanations to simplify application of Proposition 2½).
[136] *See* Cronin & Blake, *supra* note 134, at 8, 10; Bureau of Municipal Fin. L., *supra* note 132, at 1. Local receipts are defined as "locally generated revenues other than real and personal property taxes," such as vehicle excises, investment income, hotel taxes, fees, rentals, and other local charges. *See* Div. of Local Servs., MassDOR, Municipal Glossary 11 (2020).
[137] *See* MassDEP, Pay-As-You-Throw: An Implementation Guide for Solid Waste Unit-Based Pricing Options 29 (2004) [hereinafter PAYT Implementation Guide]; Town of Shrewsbury, Draft Report: PAY-T Analysis & Recommendations 5 (2019) (noting many communities either fund waste programs via property tax levy or fixed bill).
[138] *See* Div. of Local Servs., MassDOR, *General Fund Expenditures* (last visited Mar. 29, 2024) (providing data on total expenditures out of General Funds by municipality).
[139] *See generally* Bureau of Accounts, Div. of Local Servs., MassDOR, IGR No. 21-11, Enterprise Funds (2021) [hereinafter Enterprise Fund Guidelines].
[140] *See* Mass. Gen. Laws ch. 44, § 53F½ (authorizing municipalities to establish Enterprise Funds for broad range of public services); Enterprise Fund Guidelines, *supra* note 139, at 2; Municipal Revenues Overview, *supra* note 132, at 1 (listing enterprise fund as an "annual revenue fund," which is a type of "special revenue fund").
[141] *See* Enterprise Fund Guidelines, *supra* note 139, at 2.
[142] *See* Cronin & Blake, *supra* note 134, at 20; PAYT Implementation Guide, *supra* note 137, at 30.

Enterprise Fund must be approved on an annual basis.[143] A municipality may decide to recover costs through rates, tax levy subsidy, or appropriation from other funds.[144]

Enterprise Funds are advantageous because, unlike the General Fund, they promote transparency through full cost accounting.[145] For example, Enterprise Funds allow municipalities to identify for the public the total service costs, including operating, capital, and indirect costs.[146] In addition, any investment income or operating surplus is retained in the Enterprise Fund instead of reverting back into the General Fund at the end of a fiscal year.[147] As of March 2024, 77 municipalities adopted an Enterprise Fund for trash disposal services.[148]

C. Departmental Revolving Funds

A third alternative means of accounting for MSW services is a Departmental Revolving Fund.[149] Under Massachusetts law, a municipality may establish a Revolving Fund by enacting a by-law or ordinance.[150] For example, the Town of Natick established a Revolving Fund to account for its curbside compost collection program.[151] Similarly, the City of Revere established a Revolving Fund to manage costs associated with trash and recycling barrels.[152] The Town of West Tisbury established a Revolving Fund to manage fees and costs associated with operating its refuse district drop-off location.[153] While a Departmental Revolving Fund is similar to an Enterprise Fund because it is separate from the General Fund, it provides flexibility because it does not need to be approved on an annual basis.[154] Unlike an Enterprise Fund, any interest earned by the Revolving Fund reverts back to General Fund.[155]

D. Fee Collection: Unit-Based Pricing, Fixed Fees, or Tax Levies

There are three main approaches to collecting revenue to fund MSW services: tax-based fees, flat fees, and unit-based fees.[156] Tax-based fees are collected via the municipality's property tax and placed in the General Fund with other public services.[157] Under the tax-based fee model,

---

[143] *See* PAYT Implementation Guide, *supra* note 137, at 30.
[144] *See* Cronin & Blake, *supra* note 134, at 20; Div. of Local Servs., MassDOR, Enterprise Funds 1 (2020).
[145] *See* Enterprise Fund Guidelines, *supra* note 139, at 2; *see also* EPA MSW Cost Handbook, *supra* note 58, at 4 (calling enterprise funds complimentary of full cost accounting).
[146] *See id.*
[147] *See id.*; PAYT Implementation Guide, *supra* note 137, at 30.
[148] *See* MassDOR, *Enterprise Fund Free Cash Retained Earnings* (Mar. 29, 2024) (updating data analytics on types of Enterprise Funds adopted by municipalities).
[149] *See generally* Div. of Local Servs., MassDOR, Revolving Funds for Non-School Department Programs 2 (Nov. 7, 2016) (listing all non-school related revolving funds).
[150] *See id.* at 2; Mass. Gen. Laws ch. 44, § 53E½; Municipal Revenues Overview, *supra* note 132, at 2.
[151] *See* Natick, Mass., Natick Town By-Laws art. 41A, § 13 (2017) (allowing annual expenditure up to $20,000 on compost program through a Revolving Fund).
[152] *See* Revere, Mass., Rev. Ordinances, Table VII – Departmental Revolving Funds.
[153] *See* West Tisbury, Mass., Bylaws, Departmental Revolving Funds.
[154] *See* PAYT Implementation Guide, *supra* note 137, at 31.
[155] *See id.*
[156] *See* PAYT Implementation Guide, *supra* note 137, at 5.
[157] *See id.*; *supra* Section IV.A. (summarizing General Funds).

residents may lack awareness of how they pay for MSW services because the resident is not directly charged them.[158] Alternatively, a municipality could charge all residents a flat fee—a fixed amount ranging between $1 and $300—on an annual or semi-annual basis.[159] For example, under this model, a municipality either sends a bill directly to residents or charges residents for an annual pass to drop waste off at a landfill or transfer station.[160] The flat fee is the same amount for every resident, regardless of how much trash each resident discards.[161]

Finally, a municipality may charge a unit-based fee, which is otherwise known as variable rate pricing, a PAYT program, or a Save Money and Reduce Trash (SMART) program.[162] Under a PAYT program, the amount of each resident's fee is primarily determined by the volume of trash that resident discards in a week.[163] Unlike the tax-levy model, the unit-based fee provides residents with a more accurate price signal of the actual costs of MSW management.[164] The unit-based fee model provides a financial incentive for residents to reduce waste: the more trash a resident throws away, the more they pay for the service.[165] Consequently, PAYT programs encourage residents to divert some of their waste from trash to recycling and compost.[166] Some municipalities "require residents to buy special bags, stickers, wheeled carts, or trash barrels for their waste."[167] To date, 156 municipalities have adopted a PAYT program to fund their MSW services.[168]

While unit-based pricing offers several benefits, such as reduced costs and trash tonnage, municipalities may face challenges when establishing a PAYT program.[169] Not only does a PAYT program help residents reduce trash disposal costs, it also promotes fairness, reduces the overall amount of trash discarded by the community, and increases recycling and composting efforts.[170] In 2020, for example, communities with a PAYT program discarded 29% less pounds of trash per household compared to those without a PAYT program.[171] Moreover, by reducing the amount of

---

[158] *See* PAYT Implementation Guide, *supra* note 137, at 5.
[159] *See id.*
[160] *See id.*
[161] *See id.*
[162] *See* PAYT Implementation Guide, *supra* note 137, at 5; MassDEP, *Fact Sheet: PAYT/SMART Basics for Municipalities* (May 2021) [hereinafter PAYT Basics].
[163] *See* PAYT Implementation Guide, *supra* note 137, at 4-5. Rate structures may vary by municipality. *See id.* at 22. MassDEP recommends municipalities use a hybrid rate structure to ensure revenue stability, which would include a flat fee for fixed costs of the program and a volumetric charge based on the amount of waste discarded by the household. *See id.* at 26-27.
[164] *See* Rachel Smith, MassDEP, Spring into PAYT: How to Make it Work for You 4 (2022).
[165] *See id.* at 5.
[166] *See* PAYT Basics, *supra* note 162, at 1.
[167] *See* PAYT Implementation Guide, *supra* note 137, at 6, 13-23 (explaining pros and cons of various PAYT program structures); PAYT Basics, *supra* note 162, at 1-2 (explaining various types of PAYT programs).
[168] *See* MassDEP, *Massachusetts Municipalities with PAYT/SMART Programs* (Dec. 2023) (listing 156 cities and towns that have adopted a PAYT program); MassDEP, *Map of Massachusetts Municipalities with PAYT/SMART Programs* (Oct. 2023).
[169] *See generally* PAYT Basics, *supra* note 162; PAYT Implementation Guide, *supra* note 137, at 32-34 (describing possible challenges to PAYT program implementation).
[170] *See id.* at 1; PAYT Implementation Guide, *supra* note 137, at 10-11.
[171] *See* MassDEP, *Fact Sheet: Pay-as-You-Throw (PAYT) / Save-Money-and-Reduce-Trash (SMART)* (Sept. 2021) [hereinafter PAYT Quick Facts]; MassDEP Trash Maps, *supra* note 9, at 13 (comparing average trash disposal

waste disposed, a PAYT program can help alleviate capacity concerns at landfills, reduce air pollution at MWCs, and limit waste exports to other states.[172]

By contrast, PAYT program implementation without subsequent community education may give rise to strong public opposition to change. For example, residents may mistake the unit-based fee as a new tax.[173] In addition, PAYT programs have the potential to disproportionately burden low-income residents if appropriate rate structures are not established.[174] Although PAYT programs may initially increase administrative costs associated with the program's launch, MassDEP offers a Technical Assistance Grant to provide 80 hours of help from a Municipal Assistance Coordinator.[175] Municipalities switching to a PAYT program may be concerned about increased illegal dumping, but studies show that there has been no difference in illegal dumping in PAYT communities compared to non-PAYT communities.[176] Accordingly, when transitioning to a PAYT program, it is vital for municipalities to have succinct, clear messaging and educational materials on the economic and environmental benefits of a PAYT program.

Due to varying characteristics of Massachusetts communities, a municipality may find one funding strategy more appropriate for their residents than another.[177] For example, the Town of Shrewsbury launched its PAYT program in 2008.[178] Shrewsbury's transition to a PAYT program increased recycling rates and reduced its tax levy burden by 50%.[179] Recently, Shrewsbury increased its PAYT rates for the first time since the program's inception due to the execution of new collection and recycling contracts and changes in the recycling market.[180] Similarly, the City of Worcester adopted a PAYT program nearly 20 years ago, requiring residents to purchase specific trash bags and resulted in increased recycling rates and saved Worcester millions of dollars.[181] By contrast, the City of Cambridge declined to adopt a PAYT program in 2019 primarily because of its high number of multifamily homes, large apartment

---

tonnage of PAYT and Non-PAYT communities in 2022). PAYT programs can help communities reduce their overall trash tonnage by 25-50%. *See* PAYT Quick Facts, *supra*, at 1.

[172] *See* PAYT Basics, *supra* note 162, at 1.; *supra* Sections III.A.-C.

[173] PAYT Basics, *supra* note 162, at 2.

[174] *See id.*

[175] *See id.*; SMITH, *supra* note 164, at 16 (highlighting technical assistance grant); MassDEP, *Apply for SMRP Municipal Technical Assistance* (last visited Mar. 30, 2024) (accepting grant applications on a rolling basis).

[176] *See id.*

[177] *See* PAYT IMPLEMENTATION GUIDE, *supra* note 137, at 5.

[178] *See* TOWN OF SHREWSBURY, *supra* note 137, at 5.

[179] *See id.* at 6-7 (showing impact on tax levy). Clear messaging to residents about new costs or cost increases associated with a PAYT program is imperative. *Compare* Town of Shrewsbury, *PAYT Fee Increase 2020* (last visited Mar. 30, 2024) [hereinafter Shrewsbury Fee Increase] (reviewing impact of increased levels of contaminated recycling materials), *with* Marc Larocque, *Brockton Residents Surprised by Extra Cost for Green Trash Bags*, ENTERPRISE (June 28, 2018) (reporting requirement to purchase trash bags for overflow shocked and angered residents), *and* Jo C. Goode, *Fall River's Fees for Trash Pickup Not Uncommon Among Nearby Towns, Similar Cities*, HERALD NEWS (Aug. 7, 2015) (noting cost increases among southeastern communities).

[180] *See* Shrewsbury Fee Increase, *supra* note 179; TOWN OF SHREWSBURY, *supra* note 137, at 28 (providing pubic roll out plan for fee increase messaging); *supra* Section III.D. (summarizing changes to global recycling markets).

[181] *See* Nick Kotsopoulos, *$1.50 Trash Bags Reduce Worcester's Waste*, TELEGRAM & GAZETTE (Nov. 28, 2013).

buildings, and short-term renter populations.[182] Cambridge also found the PAYT rate would likely disproportionately burden its low-income residents relative to other trash disincentive strategies.[183] Instead, Cambridge provided residents with standard size trash containers based on the number of households per building.[184] While MassDEP encourages all municipalities to adopt a PAYT program, each municipality should assess its individual needs and consider taking smaller steps prior to a full PAYT transition in order to ease residents into the new structure.[185]

E. Financial Assistance Programs

In addition to fees collected from residents, monies allocated to municipalities from grant or other financial assistance programs may serve as a potential revenue stream to fund MSW management activities.[186] MassDEP grant awards are conditional and often determined on a point-based system as a way to incentivize municipalities to implement "best practices for waste reduction, reuse, and recycling."[187] For example, communities with full PAYT programs receive more points than communities with standard container sizes.[188] The following table summarizes state grant and loan programs available to municipalities for MSW management (*see* Figure 9).

[182] *See* Dep't of Pub. Works, City of Cambridge, Zero Waste Master Plan14 (2019).
[183] *See id.* at 22.
[184] *See id.* at 14.
[185] *See* 2030 SWMP, *supra* note 2, at 21-22 (projecting trash disposal reductions of 400,000 annual tons if all municipalities switched to PAYT); MassDEP, *Why Consider PAYT/SMART?* (last visited Mar. 30, 2024) (providing additional case studies from cities and towns that adopted PAYT programs). *But see* MassDEP, *Spring 24 Sustainable Materials Recovery Program Details: Recycling Dividends Program (RDP) Grant Application* 1 (Apr. 1, 2024) (noting communities with PAYT programs get most points for grants) [hereinafter Spring 24 RDP Grant].
[186] *See* MassDEP, *Recycling & Waste Grants & Loans* (last visited Mar. 30, 2024).
[187] *See* Rachel Smith, *What's New with RDP? Updates for Spring 2024*, MassDEP (Dec. 12, 2023).
[188] *See id.*; Spring 24 RDP Grant, *supra* note 185, at 1; MassDEP, Sustainable Materials Recovery Program Minimum Eligibility Criteria 1-2 (2024) [hereinafter SMRP Eligibility Criteria] (conditioning grant eligibility on waste ban compliance, survey participation, and buy recycle policies).

FINANCIAL ASSISTANCE PROGRAMS RELATED TO MSW DISPOSAL				
Program Name	**Beneficiary**	**Type**	**Application Cycle**	**Brief Decription**
Reduce, Reuse, Repair Micro-Grant Program	Municipal & Commercial	Grant	Apr.-May 2024 Oct.-Nov. 2024	Provides up to $10,000 for short-term waste reduction projects (e.g. donation, rescue, reuse, and repair).
Sustainable Materials Recovery Program (SMRP) Program Municipal Grant	Municipal	Grant	Apr.-June 2024	Supports local recycling, composting/organics, reuse, source reduction, program development, and enforcement activities that increase diversion and reduce disposal.
SMRP Recycling Dividends Program	Municipal	Grant	Apr.-June 2024	The Recycling Dividends Program (RDP) provides payments to qualifying municipalities that have implemented specific waste reduction, reuse, and recycling programs and policies. In 2019, eligibility was expanded to swap shops, repair events, reuse events, and tool libraries. RDP also includes compensation for related to mattress recycling (e.g. Mattress Recycling Initiative Grant Program).
SMRP Municipal Technical Assistance	Municipal	Grant	Rolling basis	Provides up to 80 hours of a Municipal Assistance Coordinator's technical asssistance in launching a recycling or waste reduction project, such as PAYT.
Closed Loop Infrastructure Fund	Municipal & Commercial	Loan	Unspecified	Catalytic Capital provides low-interest loans to assist in circular economy and recycling infrastructure projects across the country.

Figure 9: Summary of Financial Assistance Programs for Municipalities[189]

F. Social Costs of Not Providing Public Disposal Services

Depending on a municipality's funding and accounting structure, if any, residents may not understand the private and social costs of solid waste management.[190] Private costs, such as land rent, capital costs, and operating costs, are normally compensated by tipping fees that trickle down to residents.[191] In addition, social costs can include odors, groundwater contamination, greenhouse gases, truck traffic, and vermin.[192] Inadequate solid waste management increases adverse human health risks.[193] If waste is not properly sealed, "flies, rats, snakes, and other

[189] *See* MassDEP, *Apply for a Sustainable Materials Recovery Program (SMRP) Municipal Grant* (last visited Mar. 30, 2024); MassDEP, *Apply for SMRP Recycling Dividends Program Funds* (last visited Mar. 30, 2024); MassDEP, *Apply for SMRP Municipal Technical Assistance* (last visited Mar. 30, 2024); MassDEP, *MassDEP Reduce, Reuse, Repair Micro-Grant* (last visited Mar. 30, 2024); Closed Loop Partners, *Closed Loop Infrastructure Fund*, CATALYTIC CAP. (last visited Mar. 30, 2024); *see also* MassDEP, *Sustainable Materials Recovery Program Details: Recycling Dividends Program (RDP)* (last visited Mar. 30, 2024); MassDEP, *Approved Spending Categories for Recycling Dividends Program and Regional Small Scale Initiatives Fund* (Mar. 10, 2023). In addition, there are related offerings for private companies, such as the Massachusetts Recycling Loan Fund. *See* MassDEP, *MassDEP Waste & Recycling Grants & Assistance: Relating Offerings* (last visited Apr. 12, 2024).

[190] *See* THORNTON MATHESON, WP/19/283, INT'L MONETARY FUND, DISPOSAL IS NOT FREE: FISCAL INSTRUMENTS TO INTERNALIZE THE ENVIRONMENTAL COSTS OF SOLID WASTE 10-11 (2019) (highlighting General Fund approach leaves consumers with impression disposal is free); *supra* Section IV.A. (discussing General Funds).

[191] *See* MATHESON, *supra* note 190 at 16.

[192] *See id.* at 17.

[193] *See* WORLD HEALTH ORG. *supra* note 125, at 7.1.

scavengers" will get into garbage.[194] Waste pile ups pose a fire hazard, allowing fungi to grow, or sharp objects to be present.[195] Rainwater may percolate through the waste, leading to contaminated water supplies or pooling that attracts disease-carrying mosquitoes.[196] Finally, "indiscriminate dumping" can cause floods and is aesthetically unpleasing.[197]

V. COMPLEX REGULATIONS, PERMITTING & SITING

A. State Regulatory Landscape

Massachusetts solid waste management and procedures, permitting, and siting is controlled by several MassDEP regulations.[198] MassDEP solid waste management procedures broadly apply to all solid waste management, activities, and facilities in Massachusetts without limitation.[199] Similarly, the site assignment regulations for solid waste facilities broadly apply to all Massachusetts facilities that process, store, transfer, treat, or dispose of solid waste.[200] However, the siting regulation carves out an exemption for hazardous waste facilities, waste water treatment facilities, small combustion facilities, and beneficial reuse of solid waste.[201]

1. Siting Procedure

The first step of MSW management in Massachusetts is the siting of new or existing facilities, requiring municipalities to file a site application with the local Board of Health, MassDEP, the Department of Public Health, and any other specified agencies or governing bodies.[202] The siting application requires a registered professional engineer knowledgeable in solid waste facility design, construction, and operation, professionals experienced in soils, geology, and groundwater. Similarly, a registered surveyor is required to adequately address all

---

[194] *See id.*
[195] *See id.*
[196] *See id.*
[197] *See* World Health Org. *supra* note 125, at 7.1.
[198] *See* MassDEP Site Assignment Regulations for Solid Waste Facilities, 310 CMR § 16.00 (2019) (enumerating general requirements, definitions, exemptions from site assignment, site assignment application submission requirements, and other procedures); MassDEP Solid Waste Management, 310 CMR § 19.000 (2022) (articulating general requirements, procedures, and permits, landfill design and operational standards, transfer station design and operation standards, and recycling program procedures).
[199] *See* 310 CMR § 19.000 (outlining applicability of regulation). The procedures and standards articulated in 310 CMR § 19.000 apply to all solid waste facilities without limitation. The regulation specific enumerates landfills, dumping grounds, transfer stations, solid waste combustion facilities, solid waste processing and handling facilities, recycling facilities, refuse composting facilities, and other sites for the storage, treatment, transfer, processing, or disposal of solid waste and the beneficial use of solid waste. 310 CMR § 19.003(1). Additionally, the prohibition on open dumps and dumping grounds for the illegal disposal of solid waste and waste bands also apply to "any person disposing or contracting for disposal or treatment" of solid waste or designated restricted materials. 310 CMR § 19.003(2).
[200] *See* 310 CMR § 16.01(4) (designating applicability of site assessment regulations).
[201] *See* 310 CMR § 16.01(4)(a)-(d) (enumerating exceptions to regulation application).
[202] *See* Peter Durning & Thomas Mackie, *Solid Waste Regulation in Massachusetts*, MASS. ENV'T L. §18.3.2(b) (Gregor McGregor ed., 2016); 310 CMR § 16.08(2).

relevant environmental, structural, and geological concerns regarding the site.[203] Proponents must ensure that their application complies with the Massachusetts Environmental Policy Act (MEPA) requirements. The primary requirements ensure that all new or expanded landfill facilities require an environmental impact report (EIR) be conducted and show a complete analysis of the proposed project, all alternatives, an assessment of the project's environmental and public health impacts, and proposed mitigation measures to reduce these impacts.[204]

Once the EIR and application are filed, the proponent must notify all involved parties and property abutters that the siting application has been filed, allowing the public to comment on the proposed facility while the Department of Health reviews all application materials.[205] The Department of Health will then review the application materials, all public comments received, application responses to comments, and any modifications made to the application.[206] Within sixty days of the public notice, the Department will issue a report stating whether the application is accepted or denied.[207]

2. Solid Waste Management Procedures and Permits

Massachusetts' solid waste regulations apply to all solid waste management facilities, including landfills, waste handling facilities, solid waste combustion facilities, and any other site that stores, transfers, treats, processes, or disposes of solid waste.[208] However, some materials are specifically exempt from these regulations, including sludge, wastewater treatment plant residue, sewage, coal ash, recycled or composted materials, and others.[209] After completing the site assignment process provided in 310 CMR § 16.00, an applicant must obtain a solid waste management facility permit from MassDEP to begin construction and, once construction is complete, authorization to begin operating.[210] Permits are supplied to applicants who demonstrate previous compliance and competence in solid waste management, provide a public health report

---

[203] *See* 310 CMR § 16.08(5)(b). The level of analysis required in the completion of application forms is directly measured by the nature and complexity of the proposed facility. *Id.* § 16.08(5)(a).
[204] *See* MassDEP MEPA Regulations, 301 CMR § 11.07(4). Once applications are filed, the proponent will file a draft EIR. Once the draft EIR is reviewed, the Secretary of Energy and Environmental Affairs will determine its adequacy and, if the environmental impact does not require further investigation, the applicant will file a final EIR. *See* 301 CMR § 11.07(4).
[205] *See* 310 CMR § 16.10(4) (providing public notice requirements). Applicants must publish a notice of the proposed facility in at least one newspaper within the municipality in which the facility is proposed, including a description of the site, details of how members of the public can review the application, and the time period for which the Department of Health is accepting public comment. If the municipality has a population greater than 15% of residents who do not speak English as their primary language, the applicant must publish an additional notice written in the primary languages of the residents. *See id.* at § 16.10(4).
[206] *See* 310 CMR § 16.11.
[207] *See id.* §§ 16.13, 16.40 (outlining site suitability criteria).
[208] *See* 310 CMR § 19.003.
[209] *See id.* § 19.006.
[210] *See id.* §19.020(1). MassDEP only provides authorization for operation to facilities that are fully constructed, staffed, and equipped according to the approved application, have approved applicable federal, state, and local approval, have submitted plans to MassDEP, comply with recycling requirements, and have established financial assurance for facility closure and post-closure procedures. *See id.* § 19.042(3).

detailing the impact of the proposed facility, comply with MEPA requirements, and provide proof of a valid site assignment and wetland compliance.[211]

[211] *See id.* § 19.030(3).

B. Waste Bans

Massachusetts implements waste bans as a strategy to reduce disposal and promote recycling with the goal of saving energy, reducing greenhouse emissions, and minimizing reliance on landfills and incinerators in the wake of limited capacity.[212] Traditionally imposed waste bans include restricting the disposal in landfill or solid waste combustion facilities of automobile batteries, appliances, tires, yard waste, recyclable metal and glass, single polymer plastics, and cathode ray tubes.[213] Subsequent bans apply to wood, asphalt, brick, concrete, commercial organic substances such as food, mattresses, single-use plastic bags, textiles, and other materials.[214]

The regulations contain exemptions for specific facilities and materials. Specifically, facilities that receive waste loads of less than or equal to five cubic yards of materials must comply with restricted materials, but are not required to conduct record keeping or comprehensive load inspections.[215] Whole tires may be disposed of at solid waste combustion facilities while shredded tires must be disposed of at landfills.[216] Wood, however, may only be disposed of at solid waste combustion facilities.[217] Additionally, bans on commercial organic material specifically excludes residential food waste, which means that disposal facilities are not required to monitor received loads from residential areas for commercial organic waste.[218]

Solid waste bans are currently enforced by MassDEP through a variety of guidance and regulation mechanisms. Under the current regulations, waste bans must be observed by solid waste landfills, solid waste combustion facilities, solid waste transfer stations, construction and demolition handling facilities.[219] The primary mechanisms of enforcement are self-reporting and unannounced inspections.[220] Facilities are required to conduct and maintain digital records of routing, lead inspections detailing the size of the load, a description of the materials within the load, determination of whether the load complies with the applicable regulations, and, in instances of load failure, anticipated follow-up with the haulers and/or generators.[221] Additionally, MassDEP conducts random facility inspections to ensure that regulations are adequately followed and records are maintained.[222] Penalties for facilities that fail inspection

---

[212] *See* MassDEP, *MassDEP Waste Disposal Bans* (last visited Apr. 12, 2024).
[213] *See* Durning & Mackie, *supra* note 2, at 46-47; *see also* 310 CMR § 19.017.
[214] *See* Durning & Mackie, *supra* note 2, 47; Mattress Recycling, MassDEP; Commercial Food Material Disposal Ban, MassDEP; MassDEP Mattress and Textile Waste Bans Communications Toolkit, Recycle Smart.
[215] *See Guidance for Solid Waste Handling and Disposal Facilities on Compliance with MassDEP's Waste Bans*, MassDEP at 7 (Oct. 2021). These facilities may consolidate loads of restricted materials, such as brick, concrete, metal, and wood, measuring less than or equal five cubic yards may aggregate these loads in one single vehicle for transport to a facility permitted to dispose of these materials. *See id.*
[216] *See id.*
[217] *See id.*
[218] *See id.*
[219] *See* MassDEP, supra note 214, at 6-7 (Revised Oct. 2021).
[220] *See id.* at 14.
[221] *See id.*
[222] *See id.* at 16.

include written notices of compliance, consent orders, unilateral orders, administrative penalties or referral to the Attorney General, and fines.[223]

VI. LOOKING AHEAD TO A CHANGING MSW LANDSCAPE

A. Tracking Municipal Solid Waste Legislation

A variety of legislation is proposed by Massachusetts legislators to address solid waste management issues, such as establishing or expanding preexisting extended producer responsibility (EPR).[224] EPR legislation requires the manufacturers and producers to provide funding or services associated with safely disposing of certain waste materials, reducing the burden on municipal facilities and the financial cost to taxpayers.[225] One proposed bill, *An Act to Save Recycling Costs in the Commonwealth*, would establish the sustainable packaging trust for the administration of packing and paper product collection programs to increase convenient and cost-effective statewide collection while holding producers of packaging financially responsible for their disposal.[226] The goals of the bill are to minimize the cost of disposal for municipalities and local taxpayers and incentivize packaging producers to develop more sustainable production and manufacturing.[227] Producers would be charged with ensuring their compliance with the proposed bill, tracking production and disposal, and subsequently reimbursing municipalities for costs associated with disposing of packaging materials.[228]

The proposed bill, *An Act to Assess the Future of Mattress Recycling in the Commonwealth* would establish a mattress recycling council comprised of producers to establish a state-wide mattress stewardship program.[229] The goal of the mattress stewardship program is to provide free, accessible receipt of mattresses, provide free collection of discarded mattresses from qualifying transfer stations, and conduct research to improve mattress collection, recycling, and disposal.[230] Each producer would be required to submit a plan to the commission for the stewardship program, describing the structure, procedure, and implementation of the proposed

---

[223] *See id.* at 17. Repeated violations will be considered more severe, leading to larger penalties and higher fines. *See id.*

[224] *See* MASS RECYCLE, *Initiatives & Events* (2024) (providing overview of EPR legislation and highlighting current and proposed EPR legislation in Massachusetts). The Massachusetts Product Stewardship Council is a committee established with the goal of "shifting the costs of material management and recycling from taxpayers to the companies that design and market products through product stewardship and extended producer responsibility." *Id.*

[225] *See id.*

[226] *See* An Act to Save Recycling Costs in the Commonwealth, H. 4263, 193rd Gen. Ct. § 1(a) (Mass. 2024) (establishing expendable trust and dictating the operation, maintenance, and collection of funding). The bill, filed by the Joint Committee on the Environment and Natural Resources designates non-profit entities contracted by the department to act as an agent for producers and develop producer responsibility plans as "producer responsibility organizations." *See id.*

[227] *See* Alyssa Rayman-Read, *Bills to Watch as Massachusetts Kicks off Legislative Session*, CONSERVATION L. FOUND. (Feb. 6, 2019) (summarizing text of various bills and detailing Conservation Law Foundation (CLF) support).

[228] *See* H. 4263 at 16. The bill requires all of this information be compiled and published within a report to the department. *See id.* at 29-31.

[229] *See* An Act to Assess the Future of Mattress Recycling in the Commonwealth, H. 916, 193 Gen. Ct. § 2(a) (2023). The bill was filed by Representatives Vargas and Domb.

[230] *See* H. 916 § 2(a) (outlining goals and process of proposed bill).

plan.[231] Additionally, *An Act to Establish a Mattress Recycling Program in the Commonwealth* would require every mattress producer, renovator, or retailer to register with a stewardship organization and make available to consumers information pertaining to collection procedures and opportunities upon sale of the mattress.[232] Mattress stewardship programs aim to outline environmentally conscious mattress disposal practices—primarily recycling—and educate the public on the negative impacts of improperly disposed waste.[233]

An Act to Reduce Plastics was proposed to reduce the amount of waste created from single-use plastic bags provided by commercial establishments to customers.[234] The bill would restrict retail establishments from providing customers with plastic bags, unless the bags are recycled plastic or paper.[235] Additionally, retailers would be required to charge customers no less than an additional ten cents for each carry-out bag they use.[236] Retailers in violation of this bill could be subject to a verbal warning. If violations continue, a civil penalty not exceeding five hundred dollars for a second violation, and a civil penalty not exceeding one thousand dollars for a third or each subsequent violation.[237] Subsequent sections of the bill would further restrict the amount of commercially provided plastic waste in the food industry, childcare products, and liquor retailers.[238] The bill would also establish the Environmental Protection Trust Fund to improve air, water, soil, and other conditions for EJ communities.[239]

Several bills are proposed to modify the existing bottle bill law, allowing residents to deposit plastic bottles for financial gain. For example, an *Act to Update the Bottle Bill* would

---

[231] *See* H. 916 § 2(b). Each plan must (1) identify each producer participating in the program, (2) describe proposed funding, budget, and applicable fees, (3) establish performance goals for the program, (4) identify proposed facilities for participation,(5) offer participation to mattress recycling facilities, (6) meet minimum convenience goals established by the DEP, (7) describe how the program will work to promote the recycling of discarded mattresses, (8) detail a program to educate the public on mattress disposal, and (9) propose a mechanism to mitigate the cost of illegally discarded mattresses. *See* H. 916 § 2(b).

[232] *See* An Act to Establish a Mattress Recycling Program in the Commonwealth, H. 881, 193rd Gen. Ct. § 3 (2023). This bill was filed by Representative Philips. Renovators include any person who renovates discarded mattresses. *See* H. 881 § 2(xvii). Under the proposed bill, "stewardship organizations" are classified as non-profit organizations designated to a specific mattress producer to aid in developing a mattress stewardship program. *See* H. 811 § 2(xxiii).

[233] *See* H. 811 § 4(1) (providing requirements of mattress stewardship programs). Mattress stewardship program plans must include a description of how the non-profit will manage and enact the stewardship program, describe how mattresses outside of the program are received and discarded, identify all registered producers and renovators, and describe how the entity will ensure that mattresses are discarded using environmentally sound practices. *See* H. 811 § 4(1)(a)-(e).

[234] *See* An Act to Reduce Plastics, S. 570, 193rd Gen. Ct. § 2(a) (Mass. 2023) (introducing bill and outlining major restrictions). This bill was filed by Senator Rausch.

[235] *See* S. 570 § 2(a).

[236] *See id*.

[237] *See id.*

[238] *See id.* The legislation requires food establishments to provide customers with compostable food service ware, and implements penalties for violators. *See* S. 570 § 3. The bill also proposes a program for the recycling of child passenger restraints. *See* S. 570 § 4. Liquor retailers are prohibited from selling alcoholic beverages in plastic containers less than or equal to one hundred milliliters. *See* S. 570 § 5. Retail establishments are prohibited from selling bottles containing one liter or less or non-carbonated, non-flavor water beverages. *See* S. 570 § 6(a).

[239] *See* S. 570 § 2RRRRR(a).

ensure that every beverage container sold in Massachusetts is able to be deposited for no less than ten cents per bottle.[240] This bill would require that three years after enactment, MassDEP increase the minimum refund value by five cents.[241] This bill would also require the standardized deposit value be included on the label of every beverage container sold in the Commonwealth to ensure transparency and accessibility.[242] In addition, both the Senate and House versions of *An Act to Expand the Bottle Bill* were introduced to similarly increase the beverage deposit value from five cents to ten.[243] These bills would expand the types of beverage bottles covered by the bottle bill and ensure that funds from unredeemed containers are allocated towards improving solid waste management and environmental protection.[244]

Several proposed bills aim to shift the cost and responsibility of paint disposal onto commercial producers, retailers, and manufacturers.[245] Both Senate and House versions of *An Act Relative to Paint Recycling* would establish the Paint Care Program to lower disposal costs to taxpayers, prevent oil contamination in public water systems, and reduce the amount of hazardous paint materials entering landfill and MWCs.[246] Under the paint EPR program, retailers would be required to establish collection sites, fund the transportation of paint for processing and disposal, and distribute education materials to residents on proper management.[247]

B. Municipalities' Role in Furthering Statewide Diversion Goals

1. Recycling Market Development

To increase diversion of certain discarded materials from disposal, MassDEP aims to develop in-state markets for reusable, recyclable, and compostable materials that will need participation from and promotion by municipalities.[248] For example, following the commercial organics ban, Massachusetts increased diversion of food scraps from landfills and incineration.[249] MassDEP provides loans for recycling companies to expand operations to process organic

---

[240] *See* An Act Updating the Bottle Bill, H. 3676, 193rd Gen. Ct. § 322(a) (Mass. 2023). This bill was filed by Representative Ciccolo.
[241] *See* H. 3676 § 322(b).
[242] *See* H. 3767 § 2.
[243] *See* An Act to Expand the Bottle Bill, H. 3690, 193rd Gen. Ct. § 2 (Mass. 2023). This bill was filed by Representative Decker. An Act to expand the bottle bill, S. 2104, 193rd Gen. Ct. § 2 (Mass. 2023). This bill was filed by Senator Creem.
[244] *See* *Update the Bottle Bill, Mass!*, SURFRIDE FOUND., (last visited Apr. 12, 2024) (summarizing proposed bottle bill legislation).
[245] *See* An Act Relative to Paint Recycling, H. 823, 193rd Gen. Ct. (Mass. 2023); An Act Relative to Paint Recycling, S. 551, 193rd Gen. Ct. (Mass. 2023); An Act Establishing Safe Paint Stewardship, S. 542, 193rd Gen. Ct. (Mass. 2023); An Act to Save Recycling Costs in the Commonwealth, H. 4263, 193rd Gen. Ct. (Mass. 2024). These bills were filed by Representative Haddad, Senator O'Connor, Senator Moran, and the Joint Committee on Environment and Natural Resources, respectively.
[246] *See* *Paint Fact Sheet*, MASSRECYCLE (last visited Apr. 19, 2024).
[247] *See id.*; *see also* H. 823, 193rd Gen. Ct. (Mass. 2023); S. 551, 193rd Gen. Ct. (Mass. 2023); S. 542, 193rd Gen. Ct. (Mass. 2023); H. 4263, 193rd Gen. Ct. (Mass. 2024).
[248] *See* 2030 SWMP, *supra* note 2, at 28-29.
[249] *See* MASSDEP, ORGANICS ACTION PLAN 1 (Nov. 2023) [hereinafter ORGANICS ACTION PLAN].

materials.[250] Food scraps remain a top priority, so MassDEP plans to continue investing in infrastructure and market development as part of its action plan.[251]

Municipalities, however, play a critical role in reaching statewide organics diversion goals by establishing food rescue or composting programs at public facilities.[252] The Green Team, an educational program, provides ample resources for public schools to incorporate food scrap diversion into their operation and curriculum.[253] For example, the Town of Franklin, Massachusetts, implemented a successful composting program in their public schools.[254] Similarly, municipalities can implement curbside pickup or drop-off for residential composting to increase diversion, control rodents, and reduce GHG emissions.[255]

Market development for organic materials is working, but more action is needed develop recycling markets for mattresses and textiles.[256] While mattresses and textiles are mentioned in the 2030 SWMP for market development, neither is mentioned in the latest Recycling Market Development Action Plan.[257] Since the mattress waste ban, five recycling vendors were approved through the state contract.[258] MassDEP offers a Mattress Recycling Incentive as part of its Sustainable Materials Recovery Grant Program to assist municipalities in implementing pickup or drop-off programs.[259] Municipalities have retained mattress collection programs even after

---

[250] *See id.* at 1; ICF, Inc., Massachusetts Commercial Food Waste Ban Economic Impact Analysis, MassDEP 20 (Dec. 2016) (concluding commercial organics ban has been successful); Katherine Butler, *Massachusetts Sees Continued Growth in Commercial Organics Diversion*, RecyclingWorks Mass. (Jan. 30, 2019); Lauren Potter, *Massachusetts Awards Funding to Local Recycling & Organics Processors*, RecyclingWorks Mass. (Feb. 28, 2018).

[251] *See* Organics Action Plan, *supra* note 249, at 3, 8; MassDEP, Recycling Market Development Action Plan 3 (Feb. 2024) (noting RecycleWorks Massachusetts will continue to drive materials to in-state facilities) [hereinafter RMD Action Plan]. Organics have been a priority for MassDEP for over a decade. *See generally* MassDEP, Organics Study and Action Plan (June 2013). Anaerobic digestors are one example of organics-to-energy infrastructure accepting food scraps. *See* MassDEP, *Anaerobic Digestion & Organics Diversion* (last visited Apr. 12, 2024); MassDEP, Sites Accepting Diverted Food Material (2023).

[252] *See generally* Mass. Food Sys. Collaborative, Municipal Approaches to Reduce Food Waste in MA (2021).

[253] *See* The Green Team, *Food Waste Reduction* (last visited Apr. 13, 2024).

[254] *See Franklin Schools Hope to Make a Difference with Composting*, NBC 10 Bos. (Dec. 30, 2022); Eve Zuckoff, *Falmouth Schools Ramp Up Efforts to Compost Food Waste*, WBUR (Apr. 18, 2024). The Franklin school program resulted in a notable decrease in solid waste tonnage taken from schools. *See* E-mail from Melanie Hamblen, Economic Development Coordinator for Town of Franklin (Apr. 12, 2024, 01:23 EST) (on file with author) (providing table comparing tonnage by fiscal year).

[255] *See* City of Cambridge, *Curbside Composting* (last visited Apr. 13, 2024); Town of Hamilton, *Organic Waste Program* (last visiting Apr. 13, 2024).

[256] *See* RMD Action Plan, *supra* note 251, at 1.

[257] *Compare* 2030 SWMP, *supra* note 2, at 28-29, *with* RMD Action Plan, *supra* note 251, at 1-11.

[258] *See* MassDEP, Fact Sheet: MassDEP's Mattress Recycling Incentive (MRI) Grant Program 1 (2023). Municipalities are not required to select a vendor from the statewide contract. *See* MassDEP, Mattress Waste Disposal Ban & Recycling Guidance for Municipalities 7 (2022) [hereinafter Mattress Recycling Guidance]. MassDEP intends to phase out the Mattress Recycling Incentive once proper infrastructure is in place, but municipalities can seek alternative funding through the Recycling Dividends Program. *See* MassDEP, Waste Ban on Mattresses and Textiles Frequently Asked Questions (FAQ) 4 (last visited Apr. 13, 2024).

[259] *See id.*; Mattress Recycling Guidance, *supra* note 258, at 2-4 (listing various models for collection); MassDEP, Guidance Brief: Municipalities & Compliance with Mattress Waste Ban 1-2 (2022); *supra* Section IV.E. (reviewing state grant program offerings).

their grant funding expired.[260] Similarly, following the textile waste ban, some municipalities established curbside pickup and drop-off locations for textile recycling.[261] Common challenges for municipalities with drop-off locations include residents dropping non-textile items or confusion over the entity maintaining drop-off boxes.[262] In addition, there are manufacturer and retailer take-back programs for consumers.[263] Municipalities should increase educational efforts to equip residents with knowledge they need to properly donate textiles or recycle a mattress.[264]

Moreover, municipalities can help increase demand for recyclable materials by purchasing products that contain recycled content.[265] For example, municipalities can modify or adopt updated local procurement policies that prioritize recycled products.[266] On a regional scale, the Northeast Recycling Council and Association of Plastic Recyclers offer a program for municipalities, called Government Recycling Demand Champions, to generate "[c]onsistent, reliable demand for postconsumer recycled plastics."[267]

2. Increased Enforcement of Regulations

Even though waste bans for particular materials have been established throughout Massachusetts for years, approximately 40% of total waste- or more than two million tons per year- disposed of in the Commonwealth is comprised of restricted materials.[268] Improperly disposed of waste materials result in increased pollution, threats to human and environmental

---

[260] *See* MassDEP, *Municipal & Regional Mattress Recycling Case Studies* (last visited Apr. 13, 2024). Regional programs help smaller municipalities save money on transportation and collection charges by having a contracted hauler pick up at one location, such as a transfer station. *See generally* MassDEP, *Case Study: City of Greenfield's Regional Program* (last visited Apr. 13, 2024). While municipalities pay between $10 and $20 per unit to recycle mattresses, they would otherwise pay $20 to $60 per unit to dispose of the mattress. *See id.* at 2.
[261] *See* City of Boston, *Clothing and Textile Recycling* (Feb. 23, 2024).
[262] *See* MassDEP, *Municipal Regulation of Textile Drop-off Boxes* (last visited Apr. 13, 2024).
[263] *See* MassDEP, *Clothing and Textile Recovery* (last visited Apr. 13, 2024).
[264] *See* MassDEP, *Mattress and Textile Waste Bans Communications Toolkit* (last visited Apr. 13, 2024).
[265] Lynn Rubinstein, *Introduction to Government Recycling Demand Champions*, N.E. Recycling Council (last visited Apr. 13, 2024) (calling public demand for recyclables "essential to support the industry").
[266] *See* Mass. Operational Servs. Div., *EPP Program Overview* (last visited Apr. 13, 2024); Mass. Operational Servs. Div., Model Recycled Product Procurement Policy (last visited Apr. 13, 2024); *see also* Natural Res. Def. Council, IP: 21-07-B, *Model Compost Procurement Policy with Commentaries* (July 2021). Buy recycle policies are encouraged by MassDEP via their grant program eligibility criteria. *See* SMRP Eligibility Criteria, *supra* note 188, at 1. In September 2023, Governor Maura Healy issued Executive Order (EO) 619 to eliminate the purchase and sale of single-use plastic bottles by state agencies. *See generally* Exec. Order No. 619 (Sept. 21, 2023). While not required to comply with the EO, municipalities are encouraged to develop their own plans to eliminate the procurement of single-use plastic bottles. *See* Mass. Operational Servs. Div., *Frequently Asked Questions: Eliminating the Purchase by the Executive Department of Single-Use Plastic Bottles* (Sept. 21, 2023).
[267] *See* N.E. Recycling Council, *Government Recycling Demand Champions* (last visited Apr. 13, 2024); N.E. Recycling Council, Fact Sheet: Demand Creates Value. Value Drives Recycling. Become a NERC-APR Government Recycling Demand Champion 1 (last visited Apr. 13, 2024).
[268] *See* Ryan Proulx, Need to Enforce: Waste Bans in Massachusetts 3 (Elizabeth Saunders et al. eds. 2022) (emphasizing the amount of banned waste that is still disposed of improperly). Examples of frequently disposed restricted materials include glass and metal containers, leaves and yard waste, recyclable paper, cardboard and paperboard, wood, and tires, all of which have been subject to waste bans under MassDEP regulations for years. *See id.* at 4.

health, and increased burden on an already strained waste management system.[269] Although many waste bans are in place, without effective enforcement strategies, the regulations are futile. While MassDEP conducts inspections of waste disposal facilities, these are often infrequent and irregular, leaving a majority of waste ban enforcement to municipalities.[270] However, towns and states that have effectively lowered their improper disposal of restricted materials have done so through pairing three strategies together: education, monitoring, and accountability.[271]

Municipalities with successful waste ban enforcement programs often focus on educating community members to minimize local resistance and ensure that residents know how to comply with the regulations.[272] Providing educational resources in a variety of accessible spaces, as well as different languages and mediums increases resident understanding of and participation in proper disposal of restricted materials.[273] In addition to educating residents, many municipalities also provide educational resources to contracted haulers collecting residential waste.[274] Educating both local residents and contracted haulers provides a connection between community members and waste removal services, and allows for residential concerns and questions to be effectively addressed to ensure maximized compliance with waste ban regulations.[275]

In addition, municipalities establish systems to monitor resident and hauler compliance with regulations restricting traditional disposal of certain materials.[276] Many municipalities engage the contracted haulers in waste monitoring, training and instructing them to inspect residential waste bins they collect, and tag bins that do not comply with the regulations.[277]

---

[269] *See id.* at 4. Many of the improperly disposed of restricted materials are buried or burned, releasing harmful chemicals and substances into the air and soil. *See id.*

[270] *See* MassDEP, Municipality and Waste Ban Compliance Fact Sheet, at 1 (outlining MassDEP's waste ban compliance strategy). MassDEP reviews waste facility ban compliance plans, and inspects waste facilities to ensure that they comply with monitoring, disposal, inspection, record-keeping, and signage requirements. *Id.* MassDEP pursue enforcement actions against non-complying disposal facilities. *Id.*

[271] *See id.* at 5-11 (detailing enforcement strategies through case studies of Nantucket, Massachusetts, Seattle, Washington, San Francisco, California, and the state of Vermont). Each of these jurisdictions have implemented waste ban enforcement strategies, and seen varying rates of success in reducing the amount of improperly disposed of restricted materials. *Id.*

[272] *See id.* The Nantucket Department of Public Works (DPW) increased resident education of their waste bans through distribution of infographics. Additionally, both San Francisco and Vermont provided multi-lingual visual resources in areas in which residents speak several languages, and there is little English proficiency. *Id.* at 7-9.

[273] *See id.* at 5-11.

[274] *See id.* (highlighting municipal efforts to educate contracted haulers on proper waste disposal and restricted materials). The Nantucket DPW also focused on educating hauler companies on the changes to waste disposal regulations to recognize when residents are in violation. Additionally, in Vermont, haulers are directly involved in educating residents. *Id.*

[275] *Id.* Involving contracted haulers in Vermont in public education of new regulations and the proper way to dispose of restricted materials allows them to better address residential concerns and answer frequently asked questions. *Id.*

[276] *See id.* at 5-11.

[277] *Id.* at 6-9. In San Francisco, contracted haulers are required to inspect residential waste that is set for collection to make sure it does not include improperly disposed of restricted waste. If the waste violates a waste bans, the haulers must tag the bad and issue the residence a warning. After four warnings, the haulers report the violating parties to city officials. *Id.* at 7. Additionally, haulers in Seattle perform visual inspections and audits of residential waste bags. If more than 10% of the waste for collection violates a waste ban, the hauler will flag the container, refused to collect it, and repeat offenders are reported to city officials. *Id.* at 10. Nantucket waste disposal facility staff are

Monitoring strategies also include limiting the amount of waste that can be disposed of at a time, the way in which waste may be disposed of, or the packaging in which the waste must be contained for collection and disposal. Some municipalities require residents to buy a certain size of waste container, and charge fees for waste exceeding that container to be collected.[278] Other municipalities require all waste to be contained in clear plastic bags to allow for easier and efficient visual inspection.[279]

The final strategy municipalities use to enforce waste bans is holding violating residents and contracted waste haulers accountable through fines and other penalties.[280] Contracted haulers in certain municipalities are required to obtain an updated permit and adjust their policies to complies with new regulations regarding disposal methods of restricted waste products.[281] Additionally, waste haulers that violate disposal regulations or dispose of contaminated waste may face enforcement actions and other penalties, including fines and the suspension of their disposal permits until their compliance can be verified.[282]

Residents that violate disposal regulations by improperly disposing of restricted materials also face penalties.[283] In some municipalities, a residence found to violate waste bans will simply not have the contaminated waste collected.[284] Many municipalities provide a number of warnings to violating residents and offer an opportunity to become compliant before further action is taken.[285] However, residents who receive several warnings of non-compliance are subject to penalties, such as fines and suspended waste collection services.[286] While many of these enforcement strategies impact the success of waste bans in reducing MSW, the most effective enforcement incorporates a combination of several, or all, of these mechanisms.[287] The following table summarizes state and municipal waste ban enforcement strategies (*see* Figure 10).

---

required to inspect residential trash bags upon receipt of them at a registered facility to ensure that they follow regulations, particularly the requirement that all trash must be disposed of in plastic bags. *Id.* at 6.

[278] *See id*. at 10 (detailing Seattle's waste ban enforcement mechanisms). Seattle provides standardized bins for food and yard waste, and implement additional charges on residences for each additional bag collected. *Id.*

[279] *See id.* at 6. Contracted haulers in Nantucket are instructed to only collect waste contained in clear plastic bags. Waste that is received in anything other than a clear plastic bag is refused collection and disposal. *Id.*

[280] *See id.* at 5-11.

[281] *See id.* at 6. Contracted waste haulers in Nantucket must comply with DPW regulations in order to renew their contracts and permits for waste disposal. *Id.*

[282] *See id.* at 8. Waste haulers throughout Vermont are subject to enforcement actions and penalties from the Vermont Agency of Natural Resources. *Id.*

[283] *See id.* at 5-11.

[284] *See id.* at 6. Nantucket haulers will refuse to collect waste that is not contained in clear plastic bags, leaving it to the residents to repackage and properly dispose of the waste. *Id.*

[285] *See id.* at 7-9. San Francisco waste haulers issue warnings to residents who violate waste bans. *Id.* at 7. The city of Seattle authorizes several warnings to residents whose waste is tagged as non-compliant. *Id.* at 10.

[286] *See id.* at 6-11. The Nantucket DPW suspends waste collection for residents who continually violate waste ban regulations. *Id.* at 6. Waste haulers in San Francisco report non-compliant residents to city officials after issuing four warnings, and the San Francisco Department of Public Health issues fines. *Id.* at 7. Residents who have received several warnings from the city of Seattle for non-compliance will then be issues fines. *See id.* at 10.

[287] *See id.* at 11-12. The most successful municipal enforcement campaigns incorporate public education programs, provides infrastructure to incentivize residents to reduce their own waste production, and penalize those who do not comply with regulations. *Id.*

Location	Education Campaign	Monitoring Programs	Accountability	Efficacy
Nantucket, MA	- City officials distribute infographics about waste streams to residents. - Instruct haulers and disposal facility staff on updated regulations.	- Haulers conduct visual inspections of collected waste. - Residents must put waste into clear trash bags to facilitate visual inspections. - Staff conduct visual inspections of waste as it enters the facility.	- Haulers do not collect waste that is not in clear trash bags.	- In 2018, 12% of waste in Nantucket landfills was mandated recycled or banned materials.
San Francisco, CA	- Visual and other resources about mandatory separated materials are provided to residents in several languages.	- Haulers tag residential waste that contains prohibited waste.	- Haulers may refuse to collect trash containers that contain banned waste. - After four violations, residents are reported to city officials.	- In 2022, more than 50% of waste in San Francisco landfills contains recyclable materials.
Seattle, WA	- Seattle disseminates visual aids online, in multiple languages detailing different waste streams.	- Haulers perform visual audits of residential waste and tag waste with prohibited materials. - If over 10% of waste contains prohibited materials, container is flagged and not emptied.	- After a certain number of warnings, the city issues fines to violating residents.	- In 2020, 49% of waste in Seattle landfills contains mandated recyclable or compostable materials.
Vermont	- Haulers educate residents on waste disposal mandates and prohibited materials through multilingual fact sheets and FAQs.	- State officials conduct inspections of disposal facilities - Haulers tag residential waste bins that contain prohibited materials.	- Haulers face fines and other penalties for non-compliance.	- In 2018, 35% of waste in Vermont landfills contained mandated recycled materials.

Figure 10: Summary of Case Study Waste Ban Enforcement Strategies and Efficacy[288]

VII. CONCLUSION

A business-as-usual approach to MSW management is no longer viable for municipalities. Landfills, incineration, and out-of-state transfers—even waste-by-rail to more distant locations—do not solve the MSW problem. Despite some economic benefits to municipalities, disposal facilities are harmful to EJ communities across the nation, exacerbate climate change by causing GHG emissions, and can lead to PFAS contamination. Limited landfill capacity, incineration, reliance on other states, and lack of climate resiliency make

[288] *See generally* RYAN PROULX, *supra* note 267.

municipalities vulnerable to disruption, backups, and extreme weather. Moreover, global events and foreign policies can have a substantial impact on a municipality's ability to efficiently and cost-effectively shift MSW from disposal to diversion programs, like recycling, reuse and repair, and composting. Accordingly, municipalities should promote and strengthen diversion programs in order to reach MassDEP's statewide waste disposal reduction goals by 2030 and 2050.

Municipalities play a critical role in tackling MSW challenges in Massachusetts. For example, municipalities should continue to advocate for EPR legislation to shift costs to product manufacturers. Additionally, municipalities should assess their existing funding and accounting mechanisms to ensure they are adequately measuring the cost of MSW management services, promoting transparency, and incentivizing residents to reduce waste disposal. MassDEP and offers financial assistance programs, such as grants and loans, to help municipalities transition their MSW programs. Finally, municipalities can assist MassDEP in the creation of in-state recycling markets by ensuring there is proper infrastructure in their communities and by purchasing recycled materials to create demand for those markets. While EPR legislation is likely to have a major, positive effect on MSW management, there is not just one solution to these challenges. Every action—large or small—is one step closer to a circular, zero-waste economy for the Commonwealth of Massachusetts.

VIII. ENDNOTES