

BANS AND BEYOND:

Designing and Implementing Organic Waste Bans and Mandatory Organics Recycling Laws



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and POLICY CLINIC
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About the Harvard Law School Food Law and Policy Clinic

The Harvard Law School Food Law and Policy Clinic (FLPC) serves partner organizations and communities by providing guidance on cutting-edge food system issues, while engaging law students in the practice of food law and policy. Specifically, FLPC focuses on increasing access to healthy foods, supporting sustainable production and regional food systems, and reducing waste of healthy, wholesome food. For more information, visit <http://www.chlpi.org/flpc/>.

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The Center for EcoTechnology helps people and businesses save energy and reduce waste. Our innovative non-profit works with partners throughout the country to address climate change by transforming the way we live and work - for a better community, economy, and environment. For over two decades, the Center for EcoTechnology has been an award-winning leader and pioneer in developing and implementing sustainable solutions to the problem of wasted food. For more information, visit wastedfood.cetonline.org/.

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- Introduction.....1**
- I. Organic Waste Bans: The Legal Landscape.....3**
 - A. State Waste Bans.....4
 - B. Municipal Waste Bans.....9
 - C. Zero Waste Plans and Other Food Waste Management Strategies.....14
- II. Costs and Benefits of Organic Waste Bans.....16**
 - A. Case Analyses.....17
 - B. Implications of Costs and Benefits to Stakeholders.....20
- III. Designing Organic Waste Bans and Mandatory Organics Recycling Laws.....24**
 - A. To Ban or Not to Ban.....24
 - B. Considerations for Structuring and Enacting an Organic Waste Ban.....25
- IV. Barriers, Challenges & Solutions.....32**
 - A. Political considerations.....32
 - B. Funding.....34
 - C. Infrastructure.....36
 - D. Enforcement Logistics.....38
 - E. Contamination.....40
- V. Beyond the Ban — Policies and Programs That Can Impact Waste Bans and Waste Reduction.....42**
 - A. Grants for Food Waste Reduction and Diversion.....42
 - B. Food Rescue Infrastructure.....45
 - C. Hauling Arrangements.....46
 - D. Renewable Portfolio Standards.....47
 - E. Creating Markets for Compost End-Products.....48
 - F. Zoning.....48
 - G. Permitting for Composting and AD Facilities.....49
 - H. Tipping Fees.....50
 - I. Pay As You Throw.....52
 - J. Flow Control and Gas Capture Contracts.....53
- VI. Technical Assistance and Public Awareness.....57**
 - A. Technical Assistance for Food Waste Generators and Service Providers.....57
 - B. Public Outreach and Education.....60



INTRODUCTION

Approximately forty percent of food in the United States goes uneaten.¹ Wasted food significantly impacts the environment, the economy, and food insecurity. Approximately twenty-one percent of the United States' fresh water supply² and 300 million barrels of oil are used to produce food that goes to waste.³ Most of this wasted food ends up in landfills, and food is the largest individual component of municipal solid waste in landfills.⁴ In 2012, more than twenty percent of municipal solid waste disposed of was food waste.⁵ Reliance on landfills as a central part of waste management systems presents challenges. Cities and states are running out of space to pile trash.⁶ Furthermore, organic materials in landfills decompose and release methane, a powerful greenhouse gas that contributes to climate change.⁷ Food waste is responsible for at least eleven percent of methane emissions generated from landfills, an amount equivalent to the emissions of about 3.4 million vehicles.⁸

In recent years, food waste has attracted increasing amounts of attention from food system and environmental advocates, government officials, and the general public. As awareness of this problem has grown, federal, state, and local governments have explored opportunities to implement policies that will reduce and divert food waste. Organic waste bans are emerging as a new and effective policy tool to address this issue at the state and local level. In this toolkit, the term "organic waste ban" is defined broadly to include all policies that restrict the amount of food waste or organic waste that food businesses or individuals can dispose of, as well as policies that require diversion of food waste or subscription to a collection service to send food scraps to a composting or anaerobic digestion (AD) facility. This toolkit specifically addresses organic waste bans that have a food waste component; it does not address bans or policies that apply only to yard waste. By placing restrictions on food waste disposal, organic waste bans can drive food waste generators to explore more sustainable practices, such as food waste prevention, donation, and recycling food waste through composting and AD. In addition to organic waste bans, some states and localities are also seeking to reduce food waste, and waste in general, through other diversion strategies such as zero waste plans and waste management strategies; unlike organic waste bans, these types of plans generally do not themselves create legally enforceable obligations. Although these strategies will not be discussed in detail in this toolkit, they are an important trend and another tool available to states and localities.

This toolkit analyzes the structure and implementation of organic waste bans and presents examples from states and cities with existing or proposed waste bans. The toolkit provides a resource to help state and local

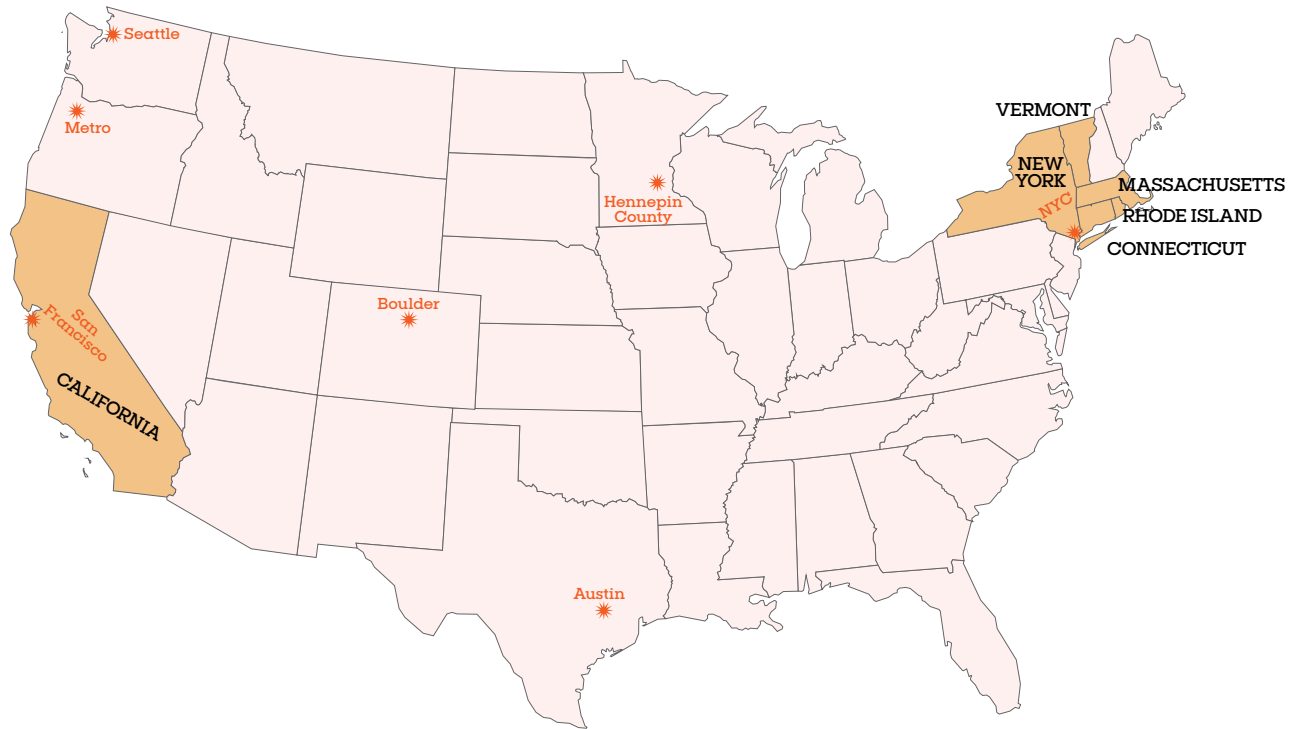
governments, advocates, and other stakeholders evaluate options for developing policies to address food waste and tailor approaches to state or local context. The toolkit analyzes organic waste bans from a holistic perspective, examining the structure of organic waste ban laws as well as other factors including funding, infrastructure, enforcement, and education. Together, these components can have a significant impact on how an organic waste ban policy will function in a given state or locality.

HOW TO USE THIS TOOLKIT

The utility of this toolkit will depend on the current state of organic waste management policies in a given state or locality. Some states and localities already have an organic waste ban or mandatory organics recycling law in place. Others may be looking to expand on existing zero waste goals or waste management strategies, while some may be starting largely from scratch. This toolkit is meant to be accessible to readers and need not be read cover to cover. Readers should feel free to jump to the sections that will be most useful to them. The toolkit makes frequent use of cross-references in order to refer readers to other sections of the toolkit that cover related information. Additionally, the checklists at the end of Sections III and V provide succinct summaries of the contents of these sections. These checklists are meant to be interactive and can be used by readers to apply the lessons of this toolkit to their own jurisdictions.

This toolkit comprises six sections as outlined below. Each section contains several parts.

- **Section I: Organic Waste Bans: The Legal Landscape:** This section provides an overview of state and local organic waste bans that have passed as of April 2019. For each policy, this section summarizes when it took effect, what kinds of entities are regulated, how those entities can comply, and how the policy can be enforced.
- **Section II: Costs and Benefits of Organic Waste Bans:** This section analyzes costs and benefits of organic waste bans, drawing on analyses conducted in Massachusetts and New York, as well as examples from other states, in order to evaluate the impacts of organic waste bans on stakeholders such as food waste generators, haulers, processors, and states and localities.
- **Section III: Designing Organic Waste Bans and Mandatory Organics Recycling Laws:** Each state or municipality that develops an organic waste ban must make decisions about how to structure its policy based on its geographic, economic, and cultural characteristics; desired outcomes; and resource constraints. This section outlines decisions that states and municipalities will need to consider when designing waste bans.
- **Section IV: Barriers, Challenges, and Solutions:** This section discusses common barriers that states and municipalities may face when designing, enacting, or implementing organic waste bans, including challenges with funding, enforcement, and infrastructure development. The section also proposes potential strategies for mitigating these challenges.
- **Section V: Beyond the Ban:** There are many other related policies that can impact the efficacy of an organic waste ban. For states and localities that are unable or choose not to implement an organic waste ban, the implementation of these policies can help reduce food waste and facilitate diversion in the absence of a ban. This section describes several of these policies and programs, including permitting requirements and zoning laws for organics processing facilities, tipping fees, policies to support food donation, and grant funding to support food waste reduction, food rescue, and organics recycling.
- **Section VI: Technical Assistance and Public Awareness:** Providing technical assistance to food waste generators, haulers, and processors can play an important role in supporting organic waste bans by increasing awareness of these policies and helping covered entities comply. Increasing public awareness is also important to facilitate compliance with organic waste bans that cover individual residents, and to encourage food waste reduction at the household level more broadly. This section explores best practices for providing technical assistance, outreach, and education to food waste generators, service providers, and the general public in support of organic waste reduction.



I. ORGANIC WASTE BANS: THE LEGAL LANDSCAPE

This section provides an overview of existing waste bans in six states and seven localities. Before discussing the existing policies, this section will set out several definitions for terms used throughout the report.

In this toolkit, the term **organic waste ban** is a generic term that refers to a category of laws and regulatory requirements that restrict the amount of organic waste or food waste that can be disposed of in landfills or require organic waste diversion. The toolkit focuses in greater detail on two types of waste bans.

- **Disposal bans** prohibit covered entities from sending organic waste or food waste to the landfill but do not specify what covered entities must do with that waste.
- **Mandatory organics recycling laws** typically require covered entities to take a particular action, such as subscribing to an organics collection service or sending food waste to a composting or anaerobic digestion (AD) facility.

Individual states and cities may also use other terms to describe their own policies, such as landfill bans, food scrap bans, and universal recycling ordinances.

This toolkit uses the terms “covered entities,” “waste generators,” and “regulated entities” interchangeably to refer to the entities, such as businesses, institutions, or residences, that are subject to the requirements of an organic waste ban.

Part A of this section provides an overview of the six existing state organic waste bans and mandatory recycling laws. A table that summarizes the main features of each state law is set forth at the end of Part A. Part B of this section provides an overview of the seven municipal organic waste bans and mandatory recycling laws, and a table summarizing these laws is set forth at the end of Part B. Part C of this section provides a handful of examples of zero waste plans and other non-binding waste management strategies that states and cities have used to address food waste.

A. STATE WASTE BANS

California

Overview: In September 2014, California's Governor approved the California Mandatory Commercial Recycling Law, AB 1826, which requires certain businesses to subscribe to organic waste recycling services.⁹ The law took effect on January 1, 2015, though it did not impose any legal obligations on covered entities until April 1, 2016.¹⁰

Requirements: Broadly, the law requires businesses¹¹ that produce specified amounts of organic waste¹² to comply with organic waste recycling procedures in order to reduce the amount of organic waste in landfills. Specifically, covered businesses must do at least one of the following:

- Source-separate¹³ organic waste and subscribe to an organic waste recycling service;
- Recycle organic waste onsite or self-haul it to a recycling facility;
- Sell or donate surplus food; or
- Subscribe to a mixed-waste recycling service that recycles organic waste.¹⁴

The law is structured to phase in covered businesses over time based on the amount of waste they produce. Beginning April 1, 2016, the law covered businesses that produce eight or more cubic yards of organic waste per week.¹⁵ Beginning January 1, 2017, the law covered businesses that produce four or more cubic yards of organic waste per week.¹⁶ Beginning on January 1, 2019, the law applied to businesses that produce four or more cubic yards of all types of commercial solid waste per week.¹⁷ If by 2020 the amount of total statewide organic waste disposed of in landfills is still greater than fifty percent of the 2014 amount, then the law will phase in additional categories of businesses and residences.¹⁸

Under AB 1826, local jurisdictions are required to implement organic recycling programs to divert organic waste from covered businesses.¹⁹ These programs must identify existing organic recycling facilities within the jurisdiction; provide education and outreach to businesses within the jurisdiction; and monitor businesses and notify those that are not in compliance with the requirements outlined above.²⁰ The program may, but need not, include adopting a mandatory organic recycling ordinance at the local level.²¹ Local jurisdictions may implement requirements for businesses that are stricter than the state requirements, and businesses must comply with these local requirements.²²

Local governments in rural jurisdictions—those with a population of 70,000 or fewer—can exempt their jurisdictions from the requirements of the law by adopting a resolution and submitting it to the California Department of Resources Recycling and Recovery (CalRecycle) at least six months before the resolution takes effect.²³ However, if on or after January 1, 2020 CalRecycle determines that the amount of total statewide organic waste disposed of in landfills is still greater than fifty percent of the 2014 amount, then rural exemptions will terminate unless CalRecycle permits them to remain in place.²⁴

Enforcement: The law grants local jurisdictions discretion with respect to enforcement. The law permits, but does not require, local governments to establish enforcement mechanisms such as fines.²⁵ Similarly, the statute permits localities to grant exemptions to otherwise covered entities in certain scenarios, such as when businesses lack sufficient space for additional recycling bins or when businesses are already taking actions to recycle a significant amount of their organic waste.²⁶

Other notable features: AB 1826 is a part of a larger collection of laws and regulations in California that works toward reducing the environmental impacts of waste disposal. The first of these laws, AB 341, which passed in 2011, set a seventy-five percent recycling goal for the state by 2020.²⁷ Other California laws and regulations have established reporting requirements for counties and regions on organic waste generation

and processing capacity²⁸ and set targets to reduce short-lived climate pollutants, such as methane.²⁹ Most recently, AB 1383 established additional targets for reducing organic waste disposal and ordered the development of regulations requiring twenty percent of edible waste to be recovered for human consumption by 2025.³⁰ The rulemaking process for AB 1383 was ongoing as of the time of publication.³¹

Connecticut

Overview: Connecticut was the first state to pass a commercial organic waste law. The statute was first passed in 2011 and amended in 2012.³² The amended statute took effect on January 1, 2014.³³

Requirements: Effective January 2014, Connecticut requires covered food waste generators, including supermarkets, resorts, conference centers, commercial food wholesalers or distributors, and industrial food manufacturers or processors to source-separate and divert their food waste to an authorized organics processing facility with available capacity or treat the food waste on-site.³⁴ To be covered by the law, a food waste generator must be projected to generate 104 or more tons of food waste per year and be located within twenty miles of an authorized organics composting facility.³⁵ In January 2020, the law will expand to cover businesses projected to generate fifty-two or more tons of food waste per year.³⁶ Businesses can comply by donating surplus food, using food scraps for animal feed, processing food scraps on-site, or sending food scraps to a composting or AD facility, which need not be located in Connecticut.³⁷ Although K-12 schools and universities are not covered by the ban, school-owned standalone conference centers are covered.³⁸

Enforcement: There are no fines associated with violation of Connecticut's organic waste ban.³⁹ However, the Connecticut Department of Energy and Environmental Protection (DEEP) can pursue enforcement measures pursuant to the department's Enforcement Response Policy if a covered generator does not make a good-faith effort to comply with the law.⁴⁰

Massachusetts

Overview: Unlike other states with organic waste bans, Massachusetts established its disposal ban through regulation rather than legislation. In 2014, the Massachusetts Department of Environmental Protection (MassDEP) amended regulations on solid waste disposal by adding "commercial organic material" to a list of several materials already barred from entering solid waste disposal streams.⁴¹ The amended regulations took effect on October 1, 2014.⁴²

Requirements: Massachusetts defines "commercial organic material" as food and vegetative materials from an entity that is not a residence and that generates for disposal at least one ton of those materials in waste per week.⁴³ Because this definition specifically excludes material from residences, the ban applies only to commercial and institutional food waste generators.⁴⁴ Waste generators are covered only for weeks during which they meet the one-ton threshold.⁴⁵ MassDEP may grant covered waste generators a temporary exemption from the ban if (a) the waste is contaminated or unacceptable for composting or other use, and the person responsible takes steps to prevent the contamination from recurring; or (b) if a waste generator's usual composting or other processing service declines the waste and the generator cannot find an alternative "within a reasonable time."⁴⁶

Food scrap generators may comply by reducing their food scrap production below the one ton per week threshold, donating surplus food, processing food scraps onsite, or sending food scraps to an animal feed, composting, or AD facility.⁴⁷

Enforcement: The regulations give MassDEP authority to take enforcement actions against violators of the solid waste disposal regulations, including the ban on disposal of commercial organic material. If MassDEP

identifies a violation, it has the authority to order violators to comply with the regulations and issue orders of non-compliance or administrative penalties.⁴⁸

New York

Overview: New York State passed a food scraps recycling requirement in April 2019 as part of the Fiscal Year 2020 budget process.⁴⁹ Several versions of an organic waste ban had previously been proposed in recent years, both through the budget process and through separate legislation.⁵⁰ The law instructs all designated food scraps generators to donate surplus food for human consumption to the extent possible and requires certain designated food scraps generators to divert remaining food scraps for organics processing.⁵¹ The requirements will take effect January 1, 2022.⁵²

Requirements: New York defines designated food scraps generators as those that produce over two tons per week of food scraps, including entities such as supermarkets, food service establishments, universities, hotels, food processors, correctional facilities, and entertainment venues.⁵³ Healthcare facilities, such as hospitals and nursing homes, and elementary and secondary schools are excluded from the requirements of the law.⁵⁴ Starting January 1, 2022, New York's law instructs all designated food scraps generators to donate surplus edible food for human consumption to the extent possible.⁵⁵ Additionally, designated food scraps generators located within twenty-five miles of an organics recycler with available capacity will be required to separate food scraps and transport them to an organics recycling facility, such as a compost or AD facility or animal feed operation.⁵⁶ Food scraps generators may self-haul the material or contract with a service to transport the material.⁵⁷ Designated food scraps generators may apply for a temporary waiver from these requirements if they can demonstrate "undue hardship," including if the cost of recycling organic waste is not competitive with the cost of landfill disposal, nearby organics recyclers do not have sufficient capacity, or other unique circumstances apply.⁵⁸

All designated food scraps generators will be required to submit an annual report that includes the amount of food donated and recycled, as well as the organics recyclers and transporters used, beginning March 2023.⁵⁹

Enforcement: The New York Department of Environmental Conservation (DEC) is responsible for carrying out the food donation and food scraps recycling law, although specific enforcement mechanisms and penalties are not identified. DEC is required to develop rules and regulations to implement the law, including developing methodologies for determining which food scrap generators are covered, developing the waiver process, and compiling a list of covered generators, organics recyclers, and organics haulers.⁶⁰ By June 1, 2021, DEC is also required to evaluate the capacity of organics recycling facilities and notify food scrap generators about whether they are required to comply with the law.⁶¹

Rhode Island

Overview: Rhode Island first passed legislation in June 2014 requiring food waste diversion by certain commercial and institutional entities.⁶² The statute was amended in July 2016 to expand coverage to additional entities.⁶³

Requirements: Beginning January 1, 2016, Rhode Island's law required covered entities to divert organic waste to an authorized composting or AD facility, or a facility that uses any other authorized recycling method, including on-site treatment and animal feed.⁶⁴ Covered entities include businesses such as supermarkets, restaurants, resorts, conference centers, food wholesalers or distributors, and food manufacturers or processors, as well as institutions such as prisons, healthcare facilities, and certain covered educational facilities.⁶⁵ In order to be covered by the law, a business or institution must (a) generate at least 104 tons of

organic waste per year, and (b) be located within fifteen miles of an authorized composting or AD facility with capacity to accept the material.⁶⁶ As of January 1, 2018, the law applies to covered educational facilities that generate at least fifty-two tons of organic waste per year.⁶⁷ Individual businesses or institutions may receive a waiver from the Department of Environmental Management (DEM) if the available composting or AD facilities within fifteen miles charge a higher tipping fee than the fee charged for landfill disposal.⁶⁸

Enforcement: The law provides that violators of the organic waste ban, as well as other solid waste disposal laws, may be subject to a civil penalty up to a maximum of \$25,000,⁶⁹ although enforcement has been deferred until more processing capacity is developed in Rhode Island.⁷⁰

Vermont

Overview: Vermont's Universal Recycling Law bans disposal of food scraps in addition to "blue bin" recyclables and leaf and yard debris.⁷¹ The law passed in 2012, and the requirements related to food scrap disposal began to take effect on July 1, 2014.⁷²

Requirements: The key features of Vermont's Universal Recycling Law include a phased-in food scrap ban, described in more detail below, as well as:

- Parallel collection – waste haulers and drop-off centers for trash collection must also offer recycling and food scrap collection services;⁷³
- Unit-based pricing – all municipalities must combine costs of recycling and trash into one fee for residential customers;⁷⁴ and
- Public space recycling – public trash containers must also include recycling receptacles.⁷⁵

The food scrap provisions of the Universal Recycling Law require covered waste generators to source-separate their food scraps and send them to facilities that manage them in an approved manner. The law encourages covered generators to prioritize the management of food residuals according to the following order of priority: source reduction; donation of food for human consumption; diversion for agricultural use including animal feed; composting and AD; and energy recovery.⁷⁶

Unlike all other state organic waste bans, Vermont's food scrap ban was designed to eventually cover all individuals in addition to commercial food waste generators.⁷⁷ The law covers "persons," which includes individuals, businesses, corporations, and public entities,⁷⁸ and it phases in persons at lower and lower thresholds of food waste generation over time. The law first took effect on July 1, 2014, at which time it covered only persons generating more than 104 tons per year of food scraps.⁷⁹ The threshold amount of waste dropped to fifty-two tons per year on July 1, 2015, twenty-six tons per year on July 1, 2016, and eighteen tons per year on July 1, 2017.⁸⁰ Beginning July 1, 2020, all generators of food waste will be covered, regardless of the amount they generate or distance from an organics processing facility.⁸¹ Prior to 2020, businesses and households are exempt from the ban if they are not located within twenty miles of an organics processing facility that accepts food scraps.⁸²

Enforcement: The Vermont Department of Environmental Conservation (DEC), a department of the Agency of Natural Resources, can issue Notices of Alleged Violation (NOAV) and fines against haulers and businesses covered by the law; however, the DEC often resolves violations through letters or phone calls rather than pursuing NOAVs.⁸³

Table 1: State Organic Waste Bans & Mandatory Recycling Laws Passed as of April 2019

	Food Waste Generators Covered	Waste Production Threshold Covered	Distance Exemptions	How to Comply
California Cal. Pub. Res. Code § 42649.81	Any business, e.g., commercial or public entity such as a firm, partnership, corp., or assoc. organized as a for-profit or nonprofit entity	2016: 8 cubic yards/week (cy/wk) organic waste 2017: 4 cy/wk organic waste 2019: 4 cy/wk solid waste 2020: Additional entities phased in if statewide organic waste disposal has not been reduced to 50% of the level in 2014	Local governments of rural jurisdictions (pop. 70,000 or fewer) can exempt their jurisdictions from law	Subscribing to organic waste recycling services, processing organic waste on-site, or selling or donating surplus food
Connecticut Conn. Gen. Stat. Ann. § 22a-226e	Commercial food wholesaler or distributor, industrial food manufacturer or processor, supermarket, resort or conference center. Universities and K-12 schools are not covered, but standalone university-owned conference centers are covered	2014: 104 tons/year (tpy) 2020: 52 tpy	20 miles	Sending food waste to a composting or AD facility or animal feed operation, donation for human consumption, on-site treatment, or reducing waste generated below threshold
Massachusetts 310 Mass. Code Regs. 19.017	Any entity, including a partnership, assoc., firm, company, corp., dept., agency, group, or public body (including city, town, district, county, state, federal, or other govt. unit), that produces commercial organic material	1 ton/week ⁸⁴	None	Sending food waste to a composting or AD facility or animal feed operation, donation for human consumption, on-site treatment, or reducing waste generated below the threshold ⁸⁵
New York State N.Y. Envntl. Conservation Law (2019)	Businesses, nonprofits, government entities, and other organizations, including supermarkets, food service businesses, higher education institutions, hotels, food processors, correctional facilities, and entertainment venues	2 tons/week	25 miles	Separating and transporting food scraps to an organics recycler or processing organics on-site. Generators must separate edible surplus food for donation to the extent possible ⁸⁶
Rhode Island R.I. Gen. Laws Ann. § 23-18.9-17	Commercial food wholesaler or distributor, industrial food manufacturer or processor, supermarket, resort or conference center, banquet hall, restaurant, religious institution, military installation, prison, hospital or other medical care institution, casino, or covered educational facility	2016: 104 tpy 2018: 52 tpy for covered educ. facilities	15 miles	Sending food waste to a composting, AD, or other authorized recycling facility, including an animal feed operation, or on-site treatment ⁸⁷
Vermont Vt. Stat. Ann. tit. 10, § 6605k	Any individual, partnership, company, corp., assoc., unincorporated assoc., joint venture, trust, municipality, the State of Vermont or any agency, dept., or subdivision of the State, federal agency, or any other legal or commercial entity	2014: 104 tpy 2015: 52 tpy 2016: 26 tpy 2017: 18 tpy 2020: Food scraps banned from landfill completely	20 miles (until 2020)	Source reduction, donation for human consumption, sending food waste for agricultural use, composting, AD, or energy recovery, or on-site treatment

B. MUNICIPAL WASTE BANS

Austin, Texas

Overview: Austin's City Council included a commercial organics recycling law as part of the Universal Recycling Ordinance, which the Council approved in 2010 and amended in 2013.⁸⁸ Although some elements of the ordinance, such as those related to recycling of paper and other materials, took effect as early as October 2012,⁸⁹ the organic waste requirements did not take effect until October 2016.⁹⁰

Requirements: Under Austin's Universal Recycling Ordinance, "food enterprises" that are required to hold a food permit, such as food or beverage distributors, restaurants and bars, grocers, caterers, and commercial kitchens, must provide organics diversion services.⁹¹ Covered food enterprises must ensure that employees have access to services to collect and divert surplus food and organic material by transporting it to a composting or materials recovery facility; contracting with a licensed service provider that transports it to a composting or materials recovery facility; or sending it to a food bank, processor, material broker, farm, ranch, community garden, or similar site.⁹²

Administrative rules require that covered food enterprises meet performance standards for either diversion capacity or diversion rates: covered food businesses must either ensure that the capacity of their organics and recycling diversion service is at least fifty percent of the total service capacity for materials collected from the business, or they must prove that they meet a minimum diversion rate, which increases over time.⁹³ Covered businesses must submit an annual diversion plan that includes information such as materials to be diverted, collection methods for these materials (including organics), and the capacity of their diversion services.⁹⁴

Implementation of Austin's commercial food waste ban occurred in three phases. Beginning in October 2016, food enterprises larger than 15,000 square feet were covered.⁹⁵ In October 2017, that threshold dropped to 5000 square feet.⁹⁶ Starting October 1, 2018, all food enterprises in the city are covered.⁹⁷

Enforcement: The Universal Recycling Ordinance Administrative Rules outline procedures for enforcement and compliance with the ordinance. City staff may inspect covered properties for compliance with the ordinance. If the property is not in compliance, the city can issue a first written notice of non-compliance, which gives the property at least thirty days to comply.⁹⁸ If the property fails to come into compliance, the city can issue a second written notice of non-compliance, which similarly provides at least thirty days to comply.⁹⁹ Upon issuing a second written notice, the city may also review relevant invoices for trash, recycling, and composting services, including hauling contracts, scale receipts, and programs and educational activities, in order to assess compliance.¹⁰⁰ If the property remains in violation, the city can issue a citation and a fine of up to \$2000.¹⁰¹ The city will not fine violators within the first year of the law taking effect, provided that the generator makes a good faith effort to comply.¹⁰²

Boulder, Colorado

Overview: In June 2015, the Boulder City Council adopted the Universal Zero Waste Ordinance,¹⁰³ which sought to expand recycling and composting in the city in support of Boulder's zero waste goals.¹⁰⁴ Some elements of the ordinance took effect in June 2016; the main provisions related to organic waste took effect in September 2016.¹⁰⁵

Requirements: Business owners, residential property owners, institutions (including educational and nonprofit organizations), and event permit holders in Boulder must provide separate and convenient compostable material containers and collection services.¹⁰⁶ Single family home-owners must subscribe to a waste hauling service that provides compost collection.¹⁰⁷ Property owners or managers for multi-family housing must

provide recycling and composting services to their tenants,¹⁰⁸ and they must provide annual training and information to tenants about compost and recycling collection.¹⁰⁹ Businesses must separate recyclable and compostable materials and must also provide employees and customers with separate containers for compost and recycling with proper signage.¹¹⁰ Business owners must provide annual training to employees on the use of the composting and recycling containers.¹¹¹ Property or business owners can apply for a one-year exemption and can reapply one time for a one-year extension of that exemption.¹¹² All applicants must demonstrate why compliance was not viable in their case.¹¹³

Enforcement: The city government has the authority to impose civil penalties on violators.¹¹⁴ Penalties for first-time violators are \$500; penalties for repeat violators are greater.¹¹⁵ Two notifications are required before fines are imposed.¹¹⁶ The city government postponed the imposition of penalties until June 2017.¹¹⁷

Hennepin County, Minnesota

Overview: On November 27, 2018, Hennepin County revised its recycling ordinance to adopt new commercial organics recycling requirements and new residential collection requirements.¹¹⁸

Requirements: With regard to businesses, the ordinance requires certain businesses to divert food scraps for beneficial use, including donation for human consumption and diversion of food scraps for composting, AD, or animal feed.¹¹⁹ Although the ordinance acknowledges that donation of surplus food is the highest priority, donation alone is not sufficient to comply with the ordinance unless a variance is granted; businesses must source-separate back-of-house food scraps and either self-haul or subscribe to a service to collect and deliver food scraps to a processing facility.¹²⁰ Covered businesses must also provide appropriate collection containers for back-of-house food scraps and provide employees with education and training annually.¹²¹ The requirements take effect January 1, 2020.¹²²

Covered entities are businesses that produce a significant amount of food waste, including but not limited to restaurants, grocery stores, food wholesalers and manufacturers, hotels, and event centers.¹²³ To be covered, a business must produce at least one ton of trash per week or contract for at least eight cubic yards of trash collection per week.¹²⁴ The county identified these large generators as likely to see cost savings from the implementation of food waste recycling solutions.¹²⁵

With regard to residential collection, the ordinance requires cities to provide residential organics collection services to households that already have access to curbside recycling collection by January 1, 2022.¹²⁶ Cities with populations under 10,000 can provide an organics drop-off site instead of providing collection services.¹²⁷

Enforcement: The ordinance gives the county the authority to enforce the requirements outlined above, including the authority to issue warnings or citations for non-compliance.¹²⁸

Metro¹²⁹

Overview: Metro is the regional government for the Portland, Oregon, metropolitan area.¹³⁰ In July 2018, the Metro Council voted to approve an ordinance that requires certain businesses to separate and divert food waste.¹³¹ Metro finalized administrative rules to implement the policy in October 2018.¹³² The first set of businesses will be required to comply in 2020.¹³³

Requirements: Metro's Business Food Waste Requirement defines covered businesses as those that cook, assemble, serve, process, or sell food, including but not limited to cafeterias, restaurants, retailers, hotels, correctional facilities, and colleges and universities.¹³⁴ Under the administrative rules finalized in October 2018, covered businesses are phased in over time. Business group 1, which includes covered businesses

that produce more than half a ton of food waste per week, must comply with the food waste requirements beginning in March 2020; business group 2, which includes covered businesses that produce more than a quarter ton per week, must comply beginning in March 2021; business group 3, which includes those that produce more than an eighth of a ton per week, must comply beginning September 2022.¹³⁵

The ordinance requires that local jurisdictions within the Metro region adopt policies requiring covered businesses in their jurisdiction to source-separate and collect food waste and send it to an authorized facility.¹³⁶ Local jurisdictions are required to adopt these policies by July 31, 2019.¹³⁷ Local jurisdictions must inform businesses of the ordinance, provide outreach and technical assistance, and develop a mechanism for enforcing the business food waste requirement.¹³⁸ Local jurisdictions may establish procedures for granting temporary waivers to covered businesses if the business produces less than 250 pounds of food waste per week, physical barriers to compliance exist, compliance would be unreasonably costly, or compliance would result in a violation of another local rule.¹³⁹

Enforcement: Local jurisdictions are responsible for enforcing the policies they develop under the Metro ordinance. If requested, Metro will enter an agreement to assist the local government with enforcement functions.¹⁴⁰

New York City, New York

Overview: New York City passed Local Law 146, the Commercial Organic Waste Law, in December 2013 as part of a broader effort to increase recycling and composting in the city. The law took effect in July 2015.¹⁴¹

Requirements: Covered food waste generators are required to source-separate their organic material and either arrange for the transportation of this material to a processing facility or process the food waste on-site.

The law defines a list of categories of “covered establishments” including:

- food manufacturers with a floor area of at least 25,000 square feet;
- food wholesalers with a floor area of at least 20,000 square feet;
- retail food stores with a floor area of at least 10,000 square feet, or chains of three or more stores with a combined area of at least 10,000 square feet;
- food service vendors in arenas or stadiums with seating capacity of at least 15,000 people;
- food service establishments with a floor area of at least 7000 square feet, or chains of two or more establishments with a combined area of at least 8000 square feet;
- food preparation establishments with a floor area of at least 6000 feet;
- catering establishments for events greater than 100 people;
- food service establishments in hotels with 100 or more rooms;
- and sponsors of public events.¹⁴²

The law requires the New York City Department of Sanitation (DSNY) commissioner to conduct annual assessments of organics processing capacity in the region, and to designate a subset of the “covered establishments” outlined above that must comply with the requirements of the ordinance, based on the amount of available capacity.¹⁴³

DSNY made its first designation in 2016, requiring the following entities to comply with the ordinance: food service establishments in hotels with 150 or more rooms; arenas and stadiums with a seating capacity of 15,000 or more people; food manufacturers with a floor area of 25,000 square feet or more; and food wholesalers with a floor area of 20,000 square feet or more.¹⁴⁴

In February 2018, DSNY published final rules that expand the coverage of the organics recycling mandate. Under the final rules, food service establishments with floor areas of at least 15,000 square feet, food service establishments that are part of chains with at least 100 locations, and food retailers with floor areas of at least 25,000 square feet will be covered.¹⁴⁵ DSNY estimates that the new rule will cover almost 1800 new generators.¹⁴⁶ The new rule took effect in August 2018, and enforcement was set to begin in February 2019.¹⁴⁷

Renewable twelve-month waivers are available to owners of two or fewer food service establishments if their establishments (1) each have a floor area of less than 7000 square feet; (2) are individual franchisees of a covered food waste generator; and (3) do not have a parent company that arranges for private waste hauling services for the establishments.¹⁴⁸

Enforcement: Enforcement authority is shared among multiple city agencies, including the Business Integrity Commission, the Department of Sanitation, the Department of Health and Mental Hygiene, and the Department of Consumer Affairs.¹⁴⁹ Violators who fail to come into compliance within one year may be subject to civil penalties from \$250 to \$1000 per violation.¹⁵⁰

San Francisco, California

Overview: San Francisco enacted the Mandatory Recycling and Composting Ordinance in 2009, and the ordinance became effective later that year.¹⁵¹ The ordinance is part of San Francisco's zero waste goals.¹⁵²

Requirements: The ordinance covers businesses, governmental entities, multi-family or commercial residences, and individuals.¹⁵³ All covered persons must sort their waste into separate bins and subscribe to collection services.¹⁵⁴ Owners or managers of multifamily or commercial properties, food vendors, and event sites are required to provide the proper containers and collection services for disposing of compostable materials.¹⁵⁵ Property owners or managers can seek waivers if they can demonstrate that there is not sufficient room on-site for the different waste containers.¹⁵⁶

Enforcement: The ordinance authorizes the Department of the Environment to inspect collection containers, transport vehicles, and processing facilities and authorizes three different city departments to impose civil penalties.¹⁵⁷

Seattle, Washington

Overview: Seattle's food waste ban took effect in January 2015.¹⁵⁸ This policy was an extension of the city's previous efforts to target food waste. For example, Seattle began to offer curbside food waste collection in 2005.¹⁵⁹ In 2009, Seattle required all residential properties to either subscribe to food waste collection or to engage in backyard composting; in 2011, multi-family buildings were required to provide compost collection; and in 2015, food waste was banned from the garbage.¹⁶⁰

Requirements: Seattle requires businesses and households to sort their waste and place separated organic waste into a compost bin for collection.¹⁶¹ No food waste may be discarded in the garbage.¹⁶² All property owners, including owners of multi-family dwellings, must provide separate compost, recycling, and trash bins and collection services for their tenants.¹⁶³ All businesses that generate food waste must subscribe to composting services, self-haul their food waste, or process food waste on-site.¹⁶⁴

Enforcement: Commercial waste producers may be fined if their trash is more than ten percent compostable or recyclable material.¹⁶⁵ After the waste ban took effect in early 2015, curbside trash collectors were instructed to monitor residential trash containers for food waste and mark offenders' bins with a red sticker.¹⁶⁶ The law also authorized fines of \$1 for single-family homes and \$50 for businesses and multi-family homes for violations following a six-month implementation period.¹⁶⁷ As discussed in Section IV, Part D: Enforcement Logistics,

however, the Superior Court of Washington ruled in 2016 that state inspection of residential garbage bins was a violation of the Washington constitution.¹⁶⁸ The law has since been amended to remove the enforcement provisions, including the use of tags to mark violators' bins, for both residential and commercial entities.¹⁶⁹ The law still allows for the use of fines, although it is unclear how violations would be identified given the ban on inspecting residential bins.

Municipal Organic Waste Bans & Mandatory Recycling Laws Passed as of April 2019

City	Food Waste Generators Covered	How to Comply
Austin, TX Austin Code of Ordinances § 15-6-91	"Food enterprises" that require a food permit, including but not limited to food or beverage distributors, grocers, restaurants or bars, caterers, and commercial kitchens ¹⁷⁰	Covered businesses must provide diversion services to send organics to a composting or materials recovery facility, or send surplus food to a food bank, processor, material broker, farm, ranch, community garden, or similar site
Boulder, CO Boulder Mun. Code 6-3-13-18	Any business (including educ. institutions and charitable or nonprofit orgs), residential property owner or manager, or special event permit holder	Businesses and residential property owners must provide separate compostable material containers and collection services ¹⁷¹
Hennepin County, MN Hennepin County Ordinance 13	Businesses that produce a significant amount of food waste, including but not limited to restaurants, grocery stores, food wholesalers and manufacturers, hotels, and event centers ¹⁷²	Covered businesses must have a food scraps recycling service, source separate back-of-house food waste, and provide appropriate collection containers for food scraps in the back-of-house; cities must provide residential organics collection services to households that already have access to curbside recycling collection
Metro, OR Metro Code Ch. 5.10.410-470	Businesses that cook, assemble, serve, or sell food, including but not limited to cafeterias, restaurants, retailers, hotels, correctional facilities, and colleges and universities ¹⁷³	Local jurisdictions within the Metro region must adopt policies requiring covered businesses to source-separate food waste and send it to an authorized facility ¹⁷⁴
New York City, NY N.Y.C. Admin. Code § 16-306.1	Food service establishments in hotels with 150 or more rooms; arenas and stadiums with a seating capacity of 15,000 or more people; food manufacturers with a floor area of 25,000 sq. ft. or more; food wholesalers with a floor area of 20,000 sq. ft. or more; food service establishments with floor areas of at least 15,000 sq. ft.; food service establishments that are part of chains with at least 100 locations; and food retailers with floor areas of at least 25,000 sq. ft.	Covered entities must separate their organic material and either send to a composting, AD, or other processing facility, or process it on-site ¹⁷⁵
San Francisco, CA S.F. Env't Code §§ 1901-1912	Businesses, governmental entities, multi-family or commercial residences, and individuals	All persons must separate food scraps and subscribe to composting collection services. Owners of multi-family or commercial properties, food vendors, and events must provide organics bins and collection services ¹⁷⁶
Seattle, WA Seattle Mun. Code 21.36.082- 21.36.083	All single-family and multi-family residences and commercial businesses	Businesses and individuals must separate food waste and subscribe to compost collection services. Property owners must provide organics bins and collection services to their tenants

C. Zero Waste Plans and Other Food Waste Management Strategies

Many states and localities are working to reduce and manage food waste without enacting organic waste bans or mandatory organics recycling laws, often through the development of zero waste plans or other waste management strategies. Zero waste plans typically set goals and articulate strategies for reducing waste generation and disposal in landfills. Unlike organic waste bans or mandatory organics recycling laws, zero waste plans typically do not create legally enforceable obligations, although plans sometimes express the intent to work towards new enforceable policies. Several states and localities across the country have created zero waste plans. Other states have adopted other waste prevention or management policies or strategies. This Part will present just three examples of the many cities and states that are making significant progress to address food waste through zero waste plans or other strategies.

City of San Diego, California

The San Diego City Council unanimously passed its Zero Waste Plan in July 2015.¹⁷⁷ The city defines “zero waste” as a principle that prioritizes reusing materials where possible and conserving materials through waste prevention, composting, and recycling.¹⁷⁸ The plan includes a three-tier waste reduction target: seventy-five percent waste diversion by 2020; ninety percent waste diversion by 2035; and “zero waste” by 2040.¹⁷⁹ In order to reach the first target of seventy-five percent reduction, the city will have to divert or reduce 332,000 tons of waste per year from landfill disposal.¹⁸⁰

The city’s plan lays out twenty-one waste reduction strategies to help reach the 2020 target. Some of these strategies include:

- including diversion requirements in franchise hauling agreements;¹⁸¹
- supporting the development of private organics recycling facilities;¹⁸²
- creating a Resource Recovery Park and additional composting infrastructure at Miramar Landfill;¹⁸³ and
- revising the city’s recycling requirements to reduce exemptions for commercial and multi-family properties and phase in organics diversion requirements for such properties.¹⁸⁴

Oregon

The Oregon Department of Environmental Quality (DEQ) has developed a waste prevention strategy that emphasizes educating consumers and businesses on ways to reduce waste generation.¹⁸⁵ In 2012, DEQ released a vision document that announced a shift in the agency’s thinking away from the framework of “solid waste management” and toward “materials management.”¹⁸⁶ The latter framework seeks to reduce the environmental impact of all stages of materials’ lifecycles, including extraction, manufacturing and production, transportation, use, reuse, recycling, and disposal.¹⁸⁷ With respect to food waste specifically, DEQ released a Strategic Plan for Preventing the Wasting of Food in March 2017 that emphasizes source reduction and the upstream impacts of food loss.¹⁸⁸

The plan identified three goals for preventing the wasting of food: developing knowledge to help reduce wasted food in “the most cost-effective and environmentally beneficial manner”; increasing actions by businesses and consumers to prevent food waste; and reducing the generation of “wasted uneaten food” by fifteen percent by 2025 and by forty percent by 2050.¹⁸⁹

The plan also named nine priority activities for the next five years:

1. conducting a study of food waste quantities and characterization, and drivers of food waste;
2. researching and developing messaging around food waste;

3. developing consumer outreach campaigns;
4. providing education on wasted food in schools and promoting operational changes in school kitchens;
5. promoting operational change in the commercial sector;
6. researching the impacts of edible food rescue;
7. researching and assessing the impacts of date labeling;
8. convening a coalition of regional stakeholders; and,
9. filling other research gaps.¹⁹⁰

Tennessee

Tennessee has identified increasing organics diversion through source reduction, reuse, and composting as one of the objectives in its 2015–2025 solid waste strategic plan.¹⁹¹ The plan identifies several strategies for achieving this objective, including:

- disseminating information to businesses and residents about reducing food waste disposal;
- supporting the development of organics collection and processing infrastructure;
- increasing organics recovery from state government facilities;
- increasing on-site processing through financial, technical, and regulatory support; and
- updating organics policies, including composting regulations.¹⁹²

Since the release of the plan, Tennessee has taken several actions to support increased organics diversion. In 2016, Tennessee updated its composting regulations based on the U.S. Composting Council's Model Rule Template.¹⁹³ The new regulations allow small-scale composting sites, such as community gardens and urban farms, to accept food scraps without a permit.¹⁹⁴ Such sites are exempt from permitting requirements as long as they generate no more than fifty cubic yards of compost per year or one hundred cubic yards if they use an in-vessel system.¹⁹⁵ Tennessee also funds organics management grants; the 2019 grants prioritize projects involving public-private partnerships, the provision of organics management services, and other projects that address organic waste through education, donation, animal feed, AD, composting, and other uses.¹⁹⁶





II. COSTS AND BENEFITS OF ORGANIC WASTE BANS

The decision to implement an organic waste ban or other diversion law necessarily involves balancing financial, environmental, and social costs and benefits. Two states, Massachusetts and New York, have conducted analyses of their organic waste bans (the Governor's fiscal year 2018 proposed ban, in the case of New York). These cost-benefit analyses, described in more detail below, differ in several important ways. First, the Massachusetts report looked at the impacts of an organic waste ban several years after its effective date and evaluated both actual impacts and projected trends for future years. The New York study, on the other hand, evaluated the projected impacts of a proposed ban, and also analyzed how structuring the ban differently – for example, changing the distance exemptions – would affect costs and benefits. Second, the Massachusetts report focused primarily on the economic impacts of the organic waste ban on particular sectors, such as organic waste processors, haulers, and food recovery organizations. In contrast, the New York analysis primarily focused on societal costs and benefits more broadly, including environmental impacts. Neither study provided a comprehensive analysis of the precise distribution of costs and benefits across the entire set of relevant sectors, such as the public sector, food waste generators, and the waste management sector, and this section will not attempt to do so. Instead it will briefly share the results of these two existing studies.

Despite the differences in methodology, these analyses identified several common sources of revenue and other benefits stemming from organic waste bans, as well as some important expenses for the state and for individual stakeholders. Overall, the analyses generally found that the potential economic, social, and environmental benefits of the organic waste bans outweighed the costs, but that costs rose in scenarios where processing infrastructure was limited and hauling distances were large.

Part A of this section will summarize the findings of these analyses and highlight key takeaways. Part B will

draw on these analyses, as well as data, examples, and case studies from other states, to analyze some of the costs and benefits of waste bans for a variety of stakeholders, including food waste generators, food waste processors and haulers, food recovery organizations, and state and local governments. Our analysis in Part B is limited in that it does not attempt to provide a complete analysis of all of the possible costs and benefits to all stakeholders impacted by organic waste bans. Instead it seeks to highlight a key subset of stakeholders, including food businesses, organics haulers and processors, and food rescue organizations, who may be particularly impacted, based on existing cost-benefit analyses.

A. CASE ANALYSES

Massachusetts

The Massachusetts Department of Environmental Protection (MassDEP) contracted with ICF, a management consulting company, to conduct an analysis of the impacts of Massachusetts' commercial organic waste ban and broader trends in the state's organic waste industry.¹ To accomplish this, MassDEP and ICF developed a survey targeting three primary sectors: organic waste haulers; processors and composters; and food rescue and recovery organizations.² Other relevant sectors, such as food businesses, were not surveyed. MassDEP collected responses from June 16, 2016 to August 22, 2016, and ICF published its analysis of the survey findings in December 2016.³ The survey included questions about revenue, expenditures, future business plans, and their overall experiences with the ban.⁴

ICF used IMPLAN, an economic input-output model, to calculate the direct, indirect, and induced economic impacts of the organic waste industry activity.⁵ Direct impacts are those that affect the primary industries that engage directly with organic waste hauling, processing, and food rescue, and indirect impacts are those that affect industries that supply or interact with primary industries.⁶ ICF describes induced impacts as economic activity made possible by employment in the organic waste sector (for example, a compost facility employee spending her wages in a store).⁷ The inputs that were captured by the survey were:

- industry activity (i.e., sales);
- employment (i.e., jobs created by the industry);
- labor income (including employee compensation and proprietor income);
- value added (i.e., the difference between an industry's total output and the cost of its inputs); and
- tax impact (measured by collection of federal, state, and local taxes).⁸

The most significant takeaway from the study was the positive economic impact of the organic waste ban for a range of stakeholders. The study found that the three primary sectors together supported over 900 total jobs in 2016 and that all three sectors reported significant growth in employment in recent years, with over 500 jobs added across the three sectors from 2010 to 2016.⁹ In 2016, the jobs supported by all of the sectors combined generated over \$46 million in labor income, and the industries contributed nearly \$77 million to the gross state product and produced almost \$175 million in industry activity.¹⁰ The average revenue per year was \$749,166 across survey respondents in all three sectors, with respondents in the food waste hauling industry generally reporting the highest revenues.¹¹ Finally, the organic waste industry contributed over \$5 million in state and local tax revenue in 2016.¹²

The analysis projected that growth would continue in 2017. Processors were planning the highest average capital investment for 2017, followed by haulers.¹³ ICF estimated that job growth in the sector would continue in Massachusetts, increasing from over 900 jobs to roughly 1370 by the end of 2017.¹⁴

Table 3: ICF Analysis Summary Results by Segment, 2016¹⁵

	Haulers	Processors	Rescue Organizations	Total Impact
Employment	500	290	130	910
Labor Income (\$ millions)	\$25.6	\$15.8	\$5.4	\$46.8
Value Added (\$ millions)	\$42.9	\$25.8	\$8.1	\$76.8
Industry Activity (\$ millions)	\$101.5	\$58.0	\$15.1	\$174.6
State & Local Taxes (\$ millions)	\$3.1	\$1.8	\$0.5	\$5.4

In addition to highlighting indicators of economic growth, the ICF report showed that in 2015, organic waste haulers and processors handled 6 to 8 times more food tonnage than in 2010.¹⁶ Food rescue organizations also reported increases between 2010 and 2016, although the number of food rescue organizations responding to the ICF survey was small.¹⁷ More recently, RecyclingWorks Massachusetts reported that the amount of food donated or rescued has increased twenty-two percent since the organic waste ban went into effect, from 21,300 tons in 2014 to 25,900 tons in 2017.¹⁸ This data indicates that the organic waste ban is driving increased diversion to both organic waste processors and food rescue organizations.

New York

The New York State Energy Research and Development Authority (NYSERDA) solicited a cost-benefit analysis of the proposed organic waste ban from Governor Cuomo's 2018 Budget from Industrial Economics (IEc) Incorporated.¹⁹ The results of the cost-benefit analysis were published in 2017.²⁰ Although the food scrap recycling law that ultimately passed in April 2019 differed slightly from the proposed ban on which the analysis was based, this analysis still provides useful insight into the impact such a policy would have in the state of New York.

To establish a baseline, IEc first identified potential food waste generators in the state, estimated the amount of waste they produce, and analyzed established capacity for food rescue and food waste processing. IEc categorized generators into three sectors: (1) institutions; (2) retail; and (3) service and hospitality.²¹ The data set estimated that across the three sectors, generators would produce a total of 416,625 tons of food waste that could be diverted per year.²² IEc also looked at all available excess food and food waste management entities and identified a total of 1417 entities: 1377 food donation centers; 44 composting facilities; 13 anaerobic digestion (AD) facilities; 10 waste-to-energy (WTE) facilities; and 27 landfills.²³

The analysis first determined baseline scenario costs, meaning the costs to society of operating in the absence of an organic waste ban. These costs included hauling costs of transporting food to landfills and WTE facilities, tipping costs, greenhouse gas emissions associated with transporting and disposing of food waste, and sulfur dioxide emissions damage from food waste hauling.²⁴ The estimated baseline costs were a total of \$41,002,907.²⁵

The report then analyzed the costs and benefits of implementing an organic waste ban, taking into consideration the following cost and benefit categories:

- hauling costs from transporting food waste from generators to compost or AD (based on the distance between each generator and the nearest processing facility under each scenario, "multiplied by a standard hauling cost of \$4 per mile and the estimated number of truckloads of food waste generated per year");
- tipping costs at those facilities (based on the estimated food waste tonnage of each generator and

the average tipping fees at compost and AD facilities in New York);

- one-time costs of collection equipment and staff training;
- ongoing equipment costs;
- greenhouse gas emissions damages or benefits associated with transporting and disposing of food waste;
- sulfur dioxide emissions from food hauling; and
- revenue from production of compost or electricity.²⁶

Because New York State does not yet have sufficient facilities to process the food waste that would be diverted as a result of legislation, IEC evaluated costs and benefits under two scenarios.

- The first was a “primary policy scenario,” which calculated costs and benefits in a scenario in which one new food waste recycling facility was added at a central location between each county outside New York City.²⁷ IEC evaluated costs assuming each new facility was a composting facility and then performed another evaluation assuming each new facility was an AD facility.²⁸
- The second scenario was a highest cost scenario in which each generator transports its food waste the maximum distance required to comply with legislation, considering both a twenty- and fifty-mile threshold.²⁹ With the fifty-mile threshold, only eighty-four large generators out of 1694 were exempted from compliance with the ban, resulting in 319 tons/week not collected.³⁰ With the twenty-mile threshold, there were 475 generators not captured, resulting in 2033 tons/week uncaptured.³¹

The New York study revealed that an organic waste ban has the potential to generate significant societal benefits. The primary policy scenario analysis revealed total net benefits of \$15,210,485 for the all-compost scenario and \$22,567,152 for the all-AD scenario.³² The calculation of net benefits for the first year takes into account benefits such as reduced greenhouse gas emissions damage³³ and projected revenues from compost products (all-compost scenario) or electricity (all-AD scenario).³⁴ These benefits are balanced against projected costs for the first year, including initial equipment and training costs to food waste generators required to comply with the ban as well as hauling and tipping costs.³⁵ The net benefits are expected to increase in subsequent years, as costs are projected to decrease thirteen to nineteen percent in the absence of initial capital equipment costs.³⁶ Moreover, the report notes that there are likely additional benefits associated with an organic waste ban that are not included in the cost-benefit analysis, including societal benefits of increased food donation and potential cost savings to food businesses from food waste diversion efforts.³⁷

The analysis found that in the scenario in which generators were required to transport their food waste twenty miles, the societal net benefits outweighed the costs, with net benefits of \$7,911,00 for the all-compost scenario and \$15,267,668 for the all-AD scenario.³⁸ The organic waste ban that passed in New York in 2019 is likely to align most closely with this scenario, and therefore with these projected net benefits, because it requires generators to comply only when they are located within twenty-five miles of a processing facility. In contrast, the highest cost scenario, in which each generator has to travel fifty miles to dispose of food waste, produced net losses of \$13,433,525 in the all-compost scenario and \$6,076,858 for all-AD.³⁹ However, the report acknowledged that the costs are likely overstated because in reality many generators are located closer than fifty miles from a food waste recycling facility;⁴⁰ it is also possible that this calculation would change over time as new facilities develop, reducing travel distances for more generators.

The difference in outcomes between the primary policy scenario and highest cost scenario demonstrates how policy decisions can have drastic impacts on effectiveness and costs. For example, the decision to invest in or promote AD versus composting comes with different benefits: this analysis indicates that there is more economic and environmental benefit from investing in AD over composting if the two are mutually exclusive, but it does not speak to the potential of an optimal combination of the two. Similarly, the location

of processing centers, the choice of whether to allow exemptions, and what size to make those exemptions have a significant impact on the economic viability of a ban. For example, in the scenario in which each generator had to travel the maximum distance of fifty miles, the costs of the ban were projected to outweigh the benefits.⁴¹

B. IMPLICATIONS OF COSTS AND BENEFITS TO STAKEHOLDERS

The analyses conducted in Massachusetts and New York highlight several benefits and costs of implementing an organic waste ban. Benefits included job creation, growth of the organics industry, reduction in landfill hauling and tipping costs, and reductions in harmful gas emissions.⁴² Implementation costs largely stem from equipment costs, staff training, hauling costs from transporting food waste to processing facilities, and tipping costs at those facilities.⁴³ Many of these costs, such as training and equipment costs, are borne primarily by food waste generators. However, many training and equipment costs will decrease over time, and other costs may be offset by corresponding savings on landfill hauling and disposal costs.⁴⁴

Drawing on the findings of these reports and additional examples from other states, this Part will evaluate the costs and benefits that different stakeholder groups may experience as a result of the implementation of an organic waste ban. While the impacts of these policies are not a zero sum game, it is likely that the benefits accrue to different sectors than those that are burdened by the costs. However, as noted previously, this Part does not provide a comprehensive analysis of how costs and benefits are distributed across sectors. Instead, it seeks to identify some of the potential costs and benefits to a handful of key stakeholders, focusing on stakeholders for whom the existing cost-benefit analyses identified particular impacts.

Waste Generators

Waste generators that must comply with a ban may be burdened by the required changes to their disposal practices. In particular, waste generators may express concerns about cost increases associated with food waste diversion practices, as well as space limitations.⁴⁵ Increased costs may include organic waste hauling fees, equipment purchasing or leasing, waste tracking software, and training or labor expenses. It is beyond the scope of this analysis to quantify those costs fully, and further, as demonstrated by the New York cost-benefit analysis, these costs are likely to vary based on state and local context and the details of a particular state or local policy.

However, food waste generators can often offset some of these costs through reductions in purchasing costs, tax incentives for food donation, and decreased disposal costs. In a 2017 report, researchers from the World Resources Institute (WRI) and Waste and Resources Action Programme (WRAP) found that ninety-nine percent of business sites in seventeen countries, including the U.S., achieved a positive return on investment related to food waste reduction measures.⁴⁶ In fact, half of the locations included in the study realized more than a fourteen-fold return on investment, meaning that every one dollar spent to prevent or divert food waste ultimately saved the company more than fourteen dollars.⁴⁷ The New York State cost benefit analysis estimated that retail sector generators could see cost savings ranging from \$1654 to \$4602 in the first year of an organic waste ban, depending on the scenario, and institutional sector generators could see cost savings ranging from \$2320 to \$4740.⁴⁸ These cost savings were projected to stem primarily from savings in hauling and tipping costs, as well as cost savings from reducing the frequency of non-food waste collection services.⁴⁹ Additionally, operations and labor costs associated with food scrap diversion may decrease over time. For example, the staff report analyzing Metro's food scrap policy considered the experience of the 1500 businesses in the Metro region that have changed their operations voluntarily to divert food scraps and concluded that impacts on operations and labor were minimal after an initial adjustment period.⁵⁰

Beyond the potential economic benefits described above, businesses may also benefit from the positive recognition they receive from investors, partners, and customers when they cut down on waste.⁵¹ State and

local governments can enhance this benefit to businesses by creating avenues for businesses that reduce their food waste to receive public recognition or distinction, such as by instituting certification programs that acknowledge waste reduction practices.⁵²

By providing generators with information about the potential cost savings associated with waste diversion and steps to realize these benefits, states and localities can help overcome negative perceptions and reduce burdens on food waste generators.

Maximizing Benefits from Food Waste Diversion



Food waste generators can implement several strategies and best practices to reduce the costs of complying with organic waste bans and even produce financial benefits. Businesses that start at the top of the EPA food recovery hierarchy—source reduction—are most likely to see a positive impact on their bottom line.⁵³ Effective source reduction practices can decrease both waste disposal costs and food purchasing costs.⁵⁴ Developing effective relationships and contracts with haulers can also make compliance with an organic waste ban more efficient and cost-effective.⁵⁵ Businesses can work with their waste hauler to “right size” their collection containers and frequency to increase diversion, maximize efficiency, and minimize costs.⁵⁶

Landfills

A potential cost to landfills stemming from an organic waste ban is that they may lose business as waste is diverted to other uses. For example, San Diego’s Zero Waste Plan notes that tipping fee revenues at the Miramar landfill have decreased as recycling increases.⁵⁷ Landfill operators with methane gas capture operations may be particularly concerned about loss of revenue.⁵⁸

However, the diminution in waste disposal may also extend the lifespan of landfills, allowing them to remain in operation longer.⁵⁹ Landfills may also benefit from new economic activity. For example, the city of San Diego operates the Miramar Greenery, an organics processing facility, at the Miramar Landfill.⁶⁰ The facility turns organic material into compost, mulch, and woodchips, and in 2011, sales of these products were estimated to bring in \$500,000 per year, with revenues expected to increase.⁶¹

Haulers

Organic waste bans can create increased demand for food waste collection services, which can create opportunities for both organics haulers and full-service or traditional haulers. For example, in Massachusetts, food waste collection increased by 70 percent from 2014, when the organic waste ban took effect, to 2018.⁶² The impacts of an organic waste ban on haulers may vary depending on the residential and commercial hauling arrangements of a particular jurisdiction, as discussed further in Section V, Part C: Hauling Arrangements.

Organics haulers are likely to benefit from increased business stemming from an organic waste ban.⁶³ Following the implementation of the Massachusetts organic waste ban, organic waste haulers saw an increase in the tonnage they received,⁶⁴ and as a result, the sector experienced significant growth in employment, labor income, and total value added.⁶⁵ However, organic waste haulers may not see a significant change in their customer base if many businesses are already diverting organics voluntarily.⁶⁶ Organic waste haulers may also experience challenges due to limited processing capacity. For example, organic waste haulers in Boston reported having to transport organic waste over long distances because there were not sufficient processing sites nearby.⁶⁷

The traditional hauling sector may also benefit from new business streams and opportunities to expand into the organic waste hauling space, since an organic waste ban can create a larger market for organics collection services. However, where traditional waste haulers are required to provide additional services in order to comply with an organic waste ban, they may need to bear the costs of additional equipment or other expenses. For example, in Vermont, the Universal Recycling Law requires haulers that collect trash to begin providing recycling and food scrap collection services as well.⁶⁸ Small haulers have voiced concerns that they lack sufficient capital to upgrade their trucks with separate compartments for organic waste, in order to comply with this requirement.⁶⁹ In response to this pushback, Vermont has postponed the effective date for this requirement.⁷⁰

Organic Waste Processors

Organic waste bans drive demand for organics processing services and, in combination with other factors such as regional tipping fees and policies to support energy markets, can create an environment that is attractive for developers looking to build new facilities.⁷¹ In Massachusetts, the organic waste processing sector has seen job growth and an increase in materials received following the implementation of the state's commercial organic waste ban.⁷²

Organic waste processors may face some challenges in starting and expanding operations. First, composting and anaerobic digestion facilities may face challenges with siting due to concerns about odor, leaching, pests, and noise.⁷³ Compliance with operational best management practices and use of technologies and design features can help both composting and AD facilities manage odors and other challenges.⁷⁴ Second, many composting and AD facilities do not accept food scraps, and these facilities may face technical and economic challenges in expanding their operations to accept these materials.⁷⁵ Finally, contamination may pose a greater issue as more generators are required to divert their food scraps.

Food Recovery Organizations

Food recovery organizations may also see benefits from waste bans. Both Vermont and Massachusetts have seen significant increases in donations since the implementation of their organic waste bans.⁷⁶ Still, food recovery organizations may struggle to benefit from organic waste bans to the fullest extent. The Massachusetts ICF analysis notes that generally speaking, some food waste generators may prefer composting over donation due to perceived convenience,⁷⁷ and some food rescue organizations indicated that the structure of the Massachusetts organic waste ban may exacerbate this problem by treating composting and donation as equal.⁷⁸



A number of states are exploring solutions to ensure that food recovery organizations benefit from these bans and that surplus food goes to feed people where possible. For example, the California state legislature passed SB 1383, requiring twenty percent of edible surplus food to be recovered by 2025.⁷⁹ Such a requirement has the potential to facilitate increased food donations to food rescue organizations, but because many of these organizations have limited resources and infrastructure, they may struggle to increase their capacity to take in this additional surplus food without support.⁸⁰ More information on how California and other states have sought to promote food donation through organic waste bans can be found in Section V, Part B: Food Rescue Infrastructure.

State & Local Governments

Finally, states and localities themselves may see significant economic and environmental benefits stemming from the implementation of an organic waste ban. The ICF analysis of Massachusetts' organic waste ban demonstrates that waste bans can serve as economic engines in a state.⁸¹ Massachusetts' ban had overwhelmingly positive impacts on employment, revenue to the organics hauling and processing sectors, and state and local tax revenue.⁸² Although the potential economic benefits are significant, there are costs associated with implementing an organic waste ban. In particular, state and local governments will need to devote staff time to outreach, technical assistance, and enforcement, all of which may require additional funding.⁸³



Environmental Impacts

Beyond the benefits to specific stakeholder groups, organic waste bans can have broader societal benefits, including environmental benefits such as reduced greenhouse gas emissions. New York's cost-benefit analysis identified reduction in greenhouse gas emissions as one of the largest societal benefits stemming from the proposed organic waste ban. In the primary policy scenario, the value of reduced greenhouse gas emissions was estimated at \$3,221,688 for the all-compost scenario and nearly \$999,990 for the all-AD scenario.⁸⁴ Given the substantial methane emissions produced by food waste in landfills across the country,⁸⁵ organic waste bans that successfully divert food waste from landfills are likely to produce similar reductions in greenhouse gas emissions, although the scale may differ for each state or municipality.



III. DESIGNING ORGANIC WASTE BANS AND MANDATORY ORGANICS RECYCLING LAWS

Organic waste bans are not one-size-fits-all. Each state or municipality that develops such a policy must make decisions based on its geographic, economic, and cultural characteristics, desired outcomes, and resource constraints. This section aims to provide state and local governments a starting point for navigating the decision-making processes necessary to design organic waste bans or mandatory organics recycling laws.

A. TO BAN OR NOT TO BAN

The first decision that a state or city must make is whether to pursue a disposal ban or mandatory organics recycling laws as opposed to alternative solutions such as a zero waste plan or other organic waste management strategy. Several considerations might affect this decision, and this Part provides just a few examples.

First, it is important to consider the overarching goal of the policy. An organic waste ban may be an appropriate tool for a state or locality looking to hone in on food waste or organic waste specifically, whereas a state or locality seeking to address broader challenges with recycling and other materials management may benefit from a more general waste management strategy or zero waste plan.

Second, a state or locality must determine whether it has, or plans to develop, the necessary infrastructure to process the organic waste that a ban would divert from landfills. Such infrastructure may include composting and anaerobic digestion (AD) facilities that accept food scraps, organics collection services, and food rescue organizations. In order to evaluate infrastructure capacity, a state or locality could conduct an analysis of existing facilities and their capacity as well as the costs of building new infrastructure. For example,

Washington, DC, hired a consulting firm to produce a report on the feasibility of composting in the District. The report found limited processing capacity and recommended the development of a facility within the District.¹ Based on this finding, the report recommended that the District roll out compost collection over a five-year period in order to provide sufficient time to develop infrastructure.²

Third, a state or city must determine whether implementing an organic waste ban would be politically and financially feasible, since bans require political will as well as financial resources to both support the development of infrastructure and provide for the costs of education and enforcement. In the absence of a plan to develop sufficient infrastructure, or without political support or financial resources, a state or locality may wish to focus on a non-binding strategy such as a zero waste plan or waste management strategy, or on more targeted policies to support infrastructure development, before pursuing an enforceable organic waste ban or mandate.

B. CONSIDERATIONS FOR STRUCTURING AND ENACTING AN ORGANIC WASTE BAN

If a state or locality determines that an organic waste ban is an appropriate policy to pursue given its particular goals, political and financial context, and infrastructure landscape, it will be faced with the following decisions in structuring and enacting a proposed waste ban.

Legislation versus regulation

Beyond the structure and content of an organic waste ban, it is important to consider the process for introducing and passing an organic waste ban in a particular state or locality. Although five of the six states with organic waste bans in place passed these policies through legislation, Massachusetts enacted its policy through regulation,³ under general authority granted by statute.⁴ Enacting an organic waste ban by regulation offers potential benefits. For example, the process may be better insulated from political pressure and will be led by an agency with subject matter expertise. However, enacting an organic waste ban by regulation may not be an option in all states, depending on the authority granted to relevant agencies.

Disposal ban versus mandatory organics recycling law

One decision that states or localities will need to make is whether to structure their policy as a disposal ban or as a mandatory organics recycling law. A disposal ban prohibits covered entities from disposing of organic waste or food waste in landfills, whereas a mandatory organics recycling law requires covered entities to take specific actions to recycle their organic waste, such as subscribing to a collection service or processing food waste on-site. The impacts of structuring a policy as a disposal ban versus a mandatory organics recycling law vary depending on state or local context, but this section will outline some relevant considerations.

One consideration for this decision is ease and method of enforcement, because disposal bans and mandatory organics recycling laws may lend themselves to different enforcement strategies. A mandatory organics recycling law may allow for enforcing agencies to assess compliance by checking whether covered entities have subscribed to an organic waste collection service or provided proper organic waste bins as required by the law. For example, under Austin's Universal Recycling Ordinance, City of Austin staff can perform inspections at a food business to determine compliance, and, in some cases, they can examine a business' hauling and recycling contracts and other records as one way of assessing compliance.⁵ In contrast, disposal bans generally do not require covered generators to comply by using any specific diversion method; because the indicator of a violation is whether there is food waste from covered generators in landfills, states may enforce disposal bans by performing inspections at tipping floors of transfer stations and landfills,⁶ which may require different staff training and resources. For more details on enforcement methods and challenges, see Section IV, Part D: Enforcement Logistics.

Another consideration is how disposal bans and mandatory recycling laws impact diversion across the EPA's Food Recovery Hierarchy, which prioritizes uses of surplus food in the following order: source reduction; rescue for human consumption; animal feed; industrial uses (including AD); and composting.⁷ Disposal bans generally allow covered entities to comply by any diversion method so long as they do not dispose of the banned material in landfills. However, states and localities can include language in their disposal bans that promote diversion by preferred methods. Vermont's Universal Recycling Law, for example, encourages but does not require diversion according to an order of priority similar to the EPA's Food Recovery Hierarchy.⁸ In contrast, mandatory organics recycling laws often require generators to comply by a specific action, such as subscribing to organics recycling services. In isolation, this requirement could cause waste generators to prioritize recycling over food waste reduction and food rescue. However, many states and localities have sought to promote source reduction and donation by including language in their mandatory recycling laws that encourages these practices, or through supporting policies and programs that incentivize or even require source reduction or donation. For example, Hennepin County, Minnesota requires covered businesses to subscribe to food scraps collection services but includes language in its ordinance encouraging the donation of edible food as the highest priority use.⁹ California has gone a step further by passing legislation that requires that twenty percent of edible food be recovered for human consumption by 2025.¹⁰ The City of Austin offers a "Reduction or Reuse Credit" to encourage covered businesses to adopt source reduction practices, even though Austin's Universal Recycling Ordinance only requires businesses to divert through organics recycling.¹¹ Businesses that receive a "Reduction or Reuse Credit" can use the credit to offset the performance standards for organics recycling that they must meet to comply with the Universal Recycling Ordinance.¹²

Ultimately, the impact of the decision to structure a policy as a disposal ban or a mandatory organics recycling law is dependent on the structure of the specific policy, the existence of other ancillary policies and incentives, and the infrastructure of the city or state.

Types of covered generators

Most organic waste bans cover only large commercial food waste generators, such as wholesalers, distributors, manufacturers, processors, and retailers.¹³ Some also cover institutional generators such as



educational facilities, correctional facilities, and hospitals,¹⁴ whereas others expressly exempt certain institutional generators.¹⁵ Exempting institutional waste generators could relieve burdens on institutions with tight budgets, but it may also risk exempting generators that have often been leaders and innovators in this field, such as universities.¹⁶ Some laws explicitly cover government entities,¹⁷ which can allow government to serve as an example and to develop best practices.

Beyond commercial and institutional generators, some cities and states, such as Vermont,¹⁸ Seattle,¹⁹ and San Francisco,²⁰ have structured their bans to cover individual residences. Residential generators represent a significant portion of overall food waste generation,²¹ so covering the residential sector could lead to an increase in diversion. Additionally, extending the requirements of the law to individuals could help shift social norms towards valuing food waste prevention and diversion. However, extending bans to cover individual residences may present additional challenges in the following areas.

- **Capacity of organic recycling infrastructure:** Many states are already struggling with insufficient infrastructure,²² so they might lack the capacity to handle the additional stream of food waste from residences.
- **Contamination and compliance:** Extending coverage of a ban to individual residences greatly increases the number of covered generators, which in turn increases the opportunities for generators to contaminate their organic waste with non-compostable materials. Contamination issues can be mitigated with proper education and outreach, but this outreach requires funding that some states or localities may not have available. Educating the public about how to avoid contamination requires reaching a much larger audience than conducting outreach only to businesses and institutions. In Minnesota, the state legislature appropriated funding for education and outreach efforts to support the city of Minneapolis's curbside organics collection program, and these educational efforts were essential to achieving low rates of contamination.²³
- **Enforcement:** Covering individual residences can create unique challenges with regard to enforcement. A common approach to monitoring compliance for residences is to inspect bins at individual residences; both San Francisco and Seattle have each employed this strategy.²⁴ However, inspecting the trash bins of private residents raises greater privacy concerns than inspecting the bins of commercial generators, and this strategy has been invalidated in Seattle, as discussed further in Section IV, Part D: Enforcement Logistics.²⁵
- **Buy-in from Residents:** Another important factor in evaluating the feasibility of covering individual residents is the cultural context of a city or state, which may impact the likelihood of securing both political support and resident buy-in. For example, both San Francisco and Seattle have progressive environmental policies in general,²⁶ and residents have largely embraced a culture of recycling and sustainability.²⁷ This setting might make it easier to expand organics recycling requirements to individuals. For more information about increasing awareness and buy-in among the general public, see Section VI, Part B: Public Outreach and Education.



Distance exemptions

Another decision that states and cities will need to make is whether to exempt food waste generators from the requirements of an organic waste ban if they are not located within a certain distance of a facility that can process organic waste, such as a composting facility or digester that accepts food waste. Several states have included distance exemptions in their organic waste bans.

- Connecticut and Vermont both exempt generators not located within twenty miles of a permitted or certified organics processing facility.²⁸
- Rhode Island exempts generators not located within fifteen miles of an authorized composting or AD facility with capacity to accept the organic waste.²⁹
- New York's food scraps recycling law exempts generators not located within twenty-five miles of an organics recycling facility.³⁰
- Although California does not have a distance exemption in its mandatory commercial organics recycling law, the law provides a process for rural jurisdictions—defined by population size—to seek an exemption, subject to approval by the state.³¹

The three New England states with distance exemptions all set their exemptions within the fifteen- to twenty-mile range. New York originally considered much larger distances of forty³² to fifty miles³³, which may reflect the state's larger geographic area; however, the policy that ultimately passed includes a radius of twenty-five miles, which is comparable to the New England states. California, the largest of the states, tied its rural jurisdiction exemption to population size as a proxy for distance. In contrast, Massachusetts has no exemptions based on distance or geography at all.

Distance exemptions can make organic waste bans more feasible to both pass and to implement by (1) lessening the burden on food waste generators located far from a processing facility and (2) reducing the burden on organics processing facilities, which may be limited in number and lack sufficient capacity to serve the entire state. At the same time, distance exemptions can limit the efficacy of organic waste bans by leaving many generators outside the coverage of the law. In states such as Connecticut and Rhode Island, for example, the distance exemptions have had the effect of exempting covered waste generators in some larger population centers, meaning that significant sources of organic waste are not being captured by the bans.³⁴ For example, covered waste generators in Bridgeport, Connecticut, a city of nearly 150,000 people,³⁵ fall just outside the twenty-mile radius of the nearest facility³⁶ and are thus exempt, although generators in this city are expected to be covered by the law following the construction of two permitted facilities.³⁷

One compromise may be for states to include distance exemptions in their waste bans initially to provide time for infrastructure to develop and businesses to adapt, but to phase these exemptions out or increase the radius within which generators are covered, over time. For example, Vermont's food scraps ban includes a twenty-mile distance exemption that will sunset in 2020.³⁸

Waste Production Threshold to Be Covered

A final consideration relates to how much waste a generator must produce in order to be subject to the law. States and cities have determined their coverage threshold in several different ways, including by weight or volume of waste generated or square footage of the food establishment.

- Massachusetts, Vermont, Rhode Island, and Connecticut have quantified the threshold by weight of organic waste generated either per year or per week.³⁹
- California, in contrast, has quantified the threshold by volume of organic waste generated per week.⁴⁰

Within the states that have quantified the threshold by weight, the weight thresholds vary. Some states also lower the waste generation threshold over time, which might reduce regulatory burdens on generators and increase political buy-in at the start.

- Connecticut, Vermont, and Rhode Island implemented a gradual phase-in of lower thresholds. Each state began by covering only entities that produce over 104 tons generated per year.⁴¹ This number breaks down to two tons per week, making it a relatively easy target for generators to estimate. Connecticut will eventually phase in generators that produce fifty-two tons per year or more,⁴² whereas Vermont gradually reduces its coverage threshold before eventually phasing in all generators that produce any amount of food waste, including residences, by 2020, effectively banning all food scraps from the landfill.⁴³
- Massachusetts decided to operate on a weekly rather than yearly system, requiring all generators that produce one ton or more of organic waste per week to comply.⁴⁴ Generators must comply only for the weeks in which they produce more than one ton of food waste.⁴⁵

Alternatively, several cities, including New York City and Austin, Texas, have chosen to determine which food waste generators are covered based on the square footage of the establishment, essentially using facility size as a proxy for waste generation.⁴⁶ Using facility size to determine the coverage threshold may simplify enforcement by using a metric that is more easily accessible, since many generators may not be actively separating and tracking their weekly or annual food waste. However, facility size may not always be an accurate proxy for waste generation.

DESIGNING ORGANIC WASTE BANS

Below are two checklists intended to help readers to consider whether and how to develop an organic waste ban. The first checklist includes several questions to ask when evaluating whether an organic waste ban is an appropriate policy for your state or locality. The second checklist on the next page outlines questions to consider when designing an organic waste ban.



To Ban or Not to Ban: Is an Organic Waste Ban the Right Choice for Your State or Locality? (Page 24)

This is a list of questions to help determine whether an organic waste ban is the right choice for your state or locality:

- How would an organic waste ban fit with the state's or locality's broader waste reduction and diversion goals?
- Does existing infrastructure (hauling, processing, etc.) exist to capture the organic waste that would be diverted?
 - If not, how does the state/locality plan to develop sufficient infrastructure?
- Is there political will to pass an organic waste ban?
- Does the state or locality have financial resources to cover the costs of an organic waste ban (including planning, education, and enforcement)?

DESIGNING ORGANIC WASTE BANS



Considerations for Structuring an Organic Waste Ban (Page 25)

If your state or locality chooses to move forward with an organic waste ban, this is a checklist of decisions you will need to make:

- Should the organic waste ban be enacted through legislation or regulation? (Page 25)
 - Is there authority to enact an organic waste ban through regulation?
 - Or will legislation be necessary?
- Should the policy be structured as a disposal ban or a mandatory organics recycling law? (Page 25)
 - Disposal bans prohibit covered entities from sending organic waste or food waste to the landfill.
 - Mandatory organics recycling laws typically require covered entities to take a particular action, such as subscribing to an organics collection service.
 - Considerations include whether the state or locality wants to promote particular diversion methods and whether it plans to use a particular enforcement mechanism.
- Which food waste generators should the organic waste ban cover? (Page 26)
 - Food businesses?
 - Institutions (hospitals, correctional facilities, etc.)?
 - Government entities?
 - Individuals?
- Should generators be exempted if they are not located within a certain distance of an organics processing facility? (Page 28)
 - If so, how far?
 - Should the distance exemption be phased out over time?
- Should food waste generators only be covered if they are a certain size or if they produce a certain amount of food waste? (Page 28)
 - If so, how should the threshold be measured?
 - By weight or volume of organic waste produced?
 - If so, measured annually?
 - Or measured on a weekly basis?
 - By square footage of the establishment or another proxy for organic waste production?
- How will the organic waste ban be enforced? (Page 28)
 - Inspections at transfer stations or landfill tipping floors?
 - Inspections on-site at the food waste generator?



IV. BARRIERS, CHALLENGES & SOLUTIONS

States and municipalities are likely to face challenges in the process of developing, passing, implementing, and enforcing organic waste bans. This section describes some common barriers, including political concerns, funding, infrastructure development, enforcement logistics, regional market dynamics, and contamination. It also discusses strategies that states and localities have used to confront these challenges.

A. POLITICAL CONSIDERATIONS

Challenge

Like most policies, organic waste bans can raise political concerns and generate pushback. Several states and cities have reported that political compromises were necessary to pass their laws or have found that political challenges halted plans to pass, implement, or expand an organic waste ban.

New York State, for example, attempted to pass an organic waste ban for several years in a row and each draft came closer to passage through strategic compromises,¹ culminating in the inclusion of a food scraps recycling requirement in the Fiscal Year 2020 Governor's budget.² The food scraps recycling law addresses concerns raised by stakeholders about previous versions of the proposed law. For example, responding to food safety concerns, the policy specifies that its requirements do not apply to recalled food.³ Additionally, due to concerns about financial burdens on particular sectors, elementary and secondary schools and healthcare facilities such as hospitals and nursing homes are exempted from the requirements.⁴ Moreover, only food waste generators located within twenty-five miles of an organics recycling facility are required to comply;⁵ this distance radius has been reduced from fifty miles⁶ and forty miles⁷ in previous proposals, meaning that fewer food waste generators will be covered. Finally, to address concerns about undue burdens on

certain entities, the food scraps recycling requirement includes a waiver for generators that can demonstrate financial hardship from compliance with the ban, and it outlines several situations in which a generator may be able to demonstrate sufficient hardship to receive a waiver.⁸

In addition to challenges in passing an organic waste ban, states and cities have faced political pushback when they seek to amend existing bans or when existing bans are expanded to phase in additional generators. Industries, including the hauling sector and food businesses, have pushed back against existing organic waste bans as their requirements become more cumbersome, seeking to delay or stop these expansions.

- In New York City, the Department of Sanitation (DSNY) proposed an amendment to the city's organics diversion rule that would broaden the types of generators required to comply with the rule.⁹ Haulers and food service companies pushed back and asked DSNY to withdraw the proposed rule, citing concerns about cost, regional processing capacity, insufficient consultation with stakeholders, and other factors.¹⁰ Despite this opposition, New York published a final rule in February 2018 expanding the scope of the law.¹¹
- Vermont has seen similar political pushback from hauling companies in response to a scheduled expansion of its waste ban. Under Vermont's Universal Recycling Law, all Vermont haulers were required to offer curbside food scrap pickup beginning in July 2017.¹² However, some haulers objected, saying that they could not afford to provide food scrap collection services while having to compete for customers.¹³ Some opponents also argued that in rural areas the population is not dense enough to support these more expensive services.¹⁴ Because residences are so distant from one another, they argued that it would be inefficient and costly for haulers to expand pickup in these areas, especially since the smaller haulers would need an additional truck dedicated to organics to comply with the law.¹⁵ Other haulers, who had already invested in equipment in order to comply with the law, argued in turn that they would be at a competitive disadvantage if the implementation date of the law were postponed.¹⁶ As a result of this debate, the Vermont state legislature has twice postponed the rule's effective date,¹⁷ most recently in May 2018, when the legislature passed an amendment postponing the rule's effective date to July 2020.¹⁸ In response to a survey of haulers and other stakeholders, the Vermont Agency of Natural Resources (ANR) issued a recommendation in January 2019 that the legislature amend the law to eliminate the requirement that haulers provide food scrap collection to single-family residences and require haulers to offer food scrap collection only for commercial or multi-family residential customers.¹⁹
- Vermont has also seen pushback to the statewide residential organics recycling mandate, which is scheduled to take effect in 2020.²⁰ In January 2018, legislation was introduced that included provisions to remove the requirement that individuals separate and properly dispose of organic waste; however, these provisions were eliminated before the legislation passed, meaning that the residential mandate remains in place.²¹

Potential Solutions

States have identified several approaches to mitigating these political challenges. First, economic analyses of proposed policies, like those discussed in Section II, Part A: Case Analyses, can be commissioned to address opposition by quantifying a ban's benefits in terms of jobs created, state and local taxes collected, and industry activity across a variety of sectors. An economic study could precede the enactment of an organic waste ban to garner support for or legitimize the proposed policy,²² or it could follow the ban's adoption to understand resulting industry trends.²³ Studies or analyses of existing food waste generation and processing capacity can also mitigate concerns from policymakers and stakeholders by demonstrating the existence of sufficient processing capacity or informing a plan to develop such capacity.

Second, states and localities can engage stakeholders in the process of developing a proposed ban over a long timeframe to obtain feedback and buy-in. Policies that are implemented or enacted too quickly may

meet resistance from affected industries who feel that they are subjected to too many requirements too quickly. Devoting time and resources to developing the ban with stakeholder input before implementation can help mitigate these effects.²⁴

- For example, Massachusetts developed its ban over more than a decade. In the 2000 Solid Waste Master Plan, MassDEP noted that it would consider an organic waste ban as part of a long-term strategy to reduce food waste.²⁵ The commercial food waste ban did not take effect until 2014.²⁶ In the years leading up to the ban, MassDEP was able to gain the support of a range of stakeholders, including commercial food waste generators.²⁷ During this time period, MassDEP also commissioned a report identifying a list of the major food waste generators in the state and estimating the amount of food waste generated in order to inform decisions about how to best increase diversion.²⁸
- One of the statutes supporting California's organic waste ban requires CalRecycle to publish regulations requiring twenty percent of edible waste to be recovered for human consumption by 2025.²⁹ CalRecycle has taken a deliberative approach to creating regulations regarding the mandatory food donation targets, hosting multiple informal workshops with stakeholders as it writes the regulations.³⁰
- Metro began exploring the possibility of a mandatory organics recycling requirement in 2016.³¹ Staff drafted the policy with a team alongside local government partners over a period of eighteen months.³² Metro staff consulted members of the restaurant and lodging, grocery, and food processor associations, including commissioning a survey of large businesses that generate food scraps to assess barriers and incentives to collecting food scraps.³³ Additionally, staff presented at city and county commission meetings and sought public input on draft proposals.³⁴

B. FUNDING

Challenge

Many states and cities with organic waste bans or zero waste plans struggle with a lack of resources and dedicated funding for operations and enforcement. Insufficient funding can hinder the efficacy of organic waste bans by limiting the capacity of states and cities to implement, enforce, and conduct outreach around these laws.



Several states with existing waste bans note that they have limited resources to support them.

- In Vermont, the Universal Recycling Law passed the state legislature with unanimous approval,³⁵ but without any funding to support increasing collection and processing capacity for organics, such as composting or anaerobic digestion (AD).³⁶
- Rhode Island's legislation also passed without any additional dedicated funding, and as a result, the state is able to devote only a small amount of staff time to implementing the law.³⁷
- Under California's commercial mandatory organics recycling law, municipalities are required to implement the mandate but do not receive state funding to do so.³⁸ Local governments must implement an organics recycling program that at minimum identifies covered businesses and informs them about the requirements of the law and how to comply.³⁹ CalRecycle, the state recycling agency, may take legal action against municipalities that do not implement the diversion mandate.⁴⁰ Without funding, however, many municipalities may find it difficult to comply.

In addition to the challenge of funding for policy implementation and supporting programs, states and municipalities must also grapple with the challenge of securing funding and support for private actors, including organic waste processors. Composting and AD facilities have large start-up costs⁴¹ and therefore require access to capital, often through public grants or cost-sharing programs, federal loan guarantees, state industrial bond financing, or private debt or equity financing.⁴² Should a processor seek private financing, it will have to demonstrate that it will consistently receive sufficient feedstock to generate revenue.⁴³

Potential Solutions

States and localities can raise funds to support the implementation of organic waste bans and recycling laws, as well as waste reduction or zero waste initiatives more broadly, through solid waste revenues.

- Austin Resource Recovery uses funding from its Clean Community fee, an \$8.95 monthly fee charged to residents on their utility bills, to fund programs and services, including zero waste programs.⁴⁴
- The City of Boulder uses a trash tax on haulers to fund waste reduction programs, including curbside compost collection.⁴⁵ Although the tax is on haulers, haulers generally pass the tax on to their customers, meaning that residents may feel the impact just as with a tax on residents.
- Funding for Metro's recycling, processing, and disposal system, including funding that supports some aspects of the food scrap collection programs, comes from the Regional System fee, which is a fee collected on every ton of solid waste generated in the region bound for disposal.⁴⁶
- In the City of San Diego, most of the funding for zero waste programming comes from tipping fees.⁴⁷ Although the tipping fees provide an important source of revenue, as the city diverts more waste and generates less revenue from waste disposal over time, funding for waste reduction and diversion programs may become even more difficult.⁴⁸

Private philanthropy can also play a role in helping public and private entities address funding challenges. From 2012 to 2014, private foundations awarded \$14.5 million in grants to initiatives related to reducing food waste.⁴⁹ Most of this funding went to food recovery efforts, including supporting the creation of donation infrastructure such as community kitchens, but a portion provided funding for AD and composting facilities.⁵⁰ Philanthropic support of food waste has continued to increase since 2014.⁵¹ This funding could support the development of private infrastructure, including organics processing facilities. Additionally, public-private partnerships may represent an opportunity to help states and localities that struggle with funding to support the implementation of organic waste bans and programs.

State and local grant programs can also play an important role in funding the development of the processing, collection, and food rescue infrastructure necessary to support organic waste bans. Grant funding to support

infrastructure development is discussed further in Section V, Part A: Grants for Food Waste Reduction and Diversion.

C. INFRASTRUCTURE

Challenge

Many states and localities struggle with a lack of sufficient infrastructure to support their organic waste bans. When considering the infrastructure necessary for an organic waste ban, it is important to consider all of the components of materials management, including processing facilities, haulers, transfer stations, food rescue, animal feed, and on-site processing.

Many states and localities do not have sufficient infrastructure to process food scraps through composting and AD. The capital investment necessary to build these facilities is quite high. For example, a large composting facility that processes up to 40,000 tons per year costs around \$5 to \$9 million to build and \$17 to \$28 per incoming ton to operate.⁵² A large digester that processes around 50,000 tons per year can cost over \$20 million.⁵³ This can lead to a “chicken and egg problem.” Private developers will not invest unless they feel confident there will be the demand for their processing services. Organic waste bans and mandatory recycling laws—alongside other economic drivers, such as policies that support the development of energy markets for AD—can help create this demand, but these laws are difficult to pass or implement without sufficient processing infrastructure already in place. For example, advocates in New York have heard from haulers and waste management facilities that although they are interested in expanding capacity, it has been difficult for them to invest the resources without a law to require diversion and thus guarantee demand for their facilities.⁵⁴ Once states and cities begin to implement and enforce their organic waste bans, processing facilities often respond with significant growth.⁵⁵

Several of the New England states have experienced significant processing infrastructure growth stemming from the passage of their organic waste bans, although each state continues to face challenges with respect to organics processing infrastructure as well.

- Massachusetts has seen significant growth in the hauling and processing sectors in recent years, with organic waste haulers and processors handling six to eight times as much food tonnage in 2015 as they did in 2010.⁵⁶ Organic waste processors also planned almost \$45 million in facility and equipment capital investments from October 2016 to October 2017.⁵⁷ When the organic waste ban took effect, Massachusetts was processing 220,000 tons of food waste per year; in 2017, the state’s permitted capacity had grown to 617,000 tons per year, including both composting and AD.⁵⁸ Massachusetts has seen particular growth in the AD sector. In this time period, the number of AD facilities in Massachusetts doubled from four to eight, and there were four additional facilities permitted and in development as of 2017.⁵⁹ Composting infrastructure, however, has struggled to develop.⁶⁰ Though Massachusetts had thirty-four composting facilities that accepted food scraps operating when its disposal ban went into effect, it had only twenty-seven as of 2017.⁶¹ Processors have faced challenges siting larger facilities due to concerns about odor and other nuisances, particularly in highly-populated areas.⁶²
- Like Massachusetts, Vermont has seen overall growth in processing infrastructure since the Universal Recycling Law took effect.⁶³ According to the January 2019 Biennial Report on Solid Waste, there are sixteen large food scrap processing operations in Vermont, including two AD facilities.⁶⁴ In addition to large processing facilities, Vermont had eighteen permitted food scrap haulers – nearly double the amount when the law passed in 2012 – and seventeen on-farm anaerobic digesters, many of which accept food processing residuals (such as liquid dairy and brewery wastewater), as of 2018.⁶⁵ The Biennial Solid Waste Report also noted that home composting, community composting, and small farm composting are underestimated but growing sources of processing infrastructure.⁶⁶ The Agency of Natural Resources (ANR) is issuing grant funding to support the development of additional processing

capacity, and ANR believes that this will create the processing capacity needed in 2020, when the Universal Recycling Law requires all food scraps to be diverted.⁶⁷

- Unlike Vermont and Massachusetts, Rhode Island had very limited food waste processing infrastructure at the time its food scraps law took effect; only one compost facility in the state processed food scraps at that time.⁶⁸ Rhode Island has since seen some growth, including the construction of a new AD facility and the expansion of an existing compost facility.⁶⁹ However, food waste processing infrastructure remains limited, and barriers particular to Rhode Island may contribute to the state's continuing challenges. For example, Rhode Island is the second-most densely populated state in the nation⁷⁰ and has the smallest land area.⁷¹ The state's density and lack of physical space make siting new composting or AD facilities difficult, especially within a fifteen-mile radius of population centers like Providence and Pawtucket, where the bulk of waste generators are located.⁷²

Many localities have also struggled with a lack of organics processing infrastructure. The Portland metropolitan area, for example, has faced challenges in developing sufficient local processing and collection infrastructure. Food scraps collected from businesses in the Portland area are sent to processing facilities eighty to one hundred miles away.⁷³ To address these challenges, Metro issued a request for proposals for the development of a regional processing option. Despite six months of good-faith negotiations with the top scoring firm, Metro was unable to reach an agreement that was in the public's best interest.⁷⁴ Metro is now exploring alternative approaches and evaluating how its existing transfer facilities can be used for processing or preprocessing of food waste.⁷⁵

In addition to processing infrastructure, collection and transfer station infrastructure can also present challenges.

- As discussed in Section IV, Part A: Political Considerations, Vermont delayed the deadline for haulers to offer curbside food scrap pickup⁷⁶ because small haulers were struggling with the costs of equipment and because population density in rural areas may not be sufficient to support the service.⁷⁷
- Vermont's Universal Recycling Law also includes a requirement for transfer stations to accept food scraps beginning in July 2017.⁷⁸ A transfer station is a location between collection sites and the final disposal site where haulers unload waste and transfer it to larger vehicles that then go on to the final disposal site.⁷⁹ Although all transfer stations are in compliance with Vermont's food scrap requirement,⁸⁰ there is variation in the demand for this service, and some facilities have raised their fees to cover the costs.⁸¹ For example, a transfer station in Wilmington, Vermont, initially offered separate permits for customers who wanted to drop off food scraps; however, sales of these permits were very low, and as a result, the facility ultimately determined that it could pay for its food scrap program only by increasing the fees for all customers.⁸²

States and localities must also address capacity to preprocess food scraps destined for composting and AD facilities. Food scraps are often contaminated with plastics, packaging, and other trash.⁸³ To remove contaminants and packaging, preprocessors can treat the scraps to separate out the organic material.⁸⁴ Preprocessing can take place at a transfer station, at a separate facility, or at the processor's site.⁸⁵ Without capacity for preprocessing to decontaminate organic materials, AD and composting facilities may not be able to obtain sufficient feedstock.

Potential Solutions

State and local governments are taking a variety of approaches to developing comprehensive processing, preprocessing, collection, and food rescue infrastructure. Many of these strategies are discussed further in Section V: Beyond the Ban; a few examples include permitting and zoning laws to support the siting of compost and AD facilities, energy policies to better support AD, and grants for food rescue and food waste recycling.

One important consideration in developing both processing and hauling infrastructure is the geographic distribution of processing facilities. Where long distances to a processing facility result in high hauling costs, that facility may not receive sufficient material to be profitable.⁸⁶ Siting more, smaller processing facilities in geographically dispersed locations may help to reduce the costs of hauling. Zoning regulations, discussed further in Section VI, Part F: Zoning, may determine the feasibility of siting processing facilities in different areas.

State and local governments may also support the development of organic waste hauling infrastructure through payments to offset the costs of hauling food scraps long distances. For example, Metro's Business Food Waste Requirement includes temporary payments for franchised waste haulers that must travel long distances to access food waste transfer stations or food scrap processing facilities.⁸⁷

D. ENFORCEMENT LOGISTICS

Challenge

The costs and logistics of enforcement pose another challenge to states and cities implementing organic waste bans. To monitor each covered food waste generator directly would be costly and time intensive, given the number of covered generators and the limited resources and staffing of many states and cities. Although some localities have sought to monitor individual generators, such as by monitoring bins for source-separation at pick-up, most states have taken alternative approaches to enforcement.

This Part will address the different strategies that states and cities have adopted to monitor and increase compliance with organic waste bans.

Potential Solutions

Many states have focused on outreach and working with generators to achieve voluntary compliance, rather than on heavy-handed enforcement.

- In Connecticut, for example, DEEP has faced challenges in enforcing the state's commercial organics law because the law covers food establishments, entities over which DEEP traditionally has not had oversight because it is not the agency responsible for their permitting.⁸⁸ This is likely to be a challenge in many states due to divisions of responsibilities between agencies; studies to identify and map food waste generators, such as the study by MassDEP described in Section IV, Part A: Political considerations,⁸⁹ can help mitigate this challenge by providing a starting point for enforcing agencies. As DEEP endeavors to identify which food establishments trigger the applicability thresholds of the law, it has taken an educational approach to achieve voluntary compliance, and it has also worked with processing facilities to help identify generators that might be covered by the ban.⁹⁰
- In winter 2018, the Vermont Department of Environmental Conservation (DEC) began direct business outreach to facilitate compliance with both recycling and food scrap separation requirements for covered generators. DEC staff hope to conduct outreach in each region of Vermont before July 1, 2020.⁹¹

Some states enforce their organic waste bans without directly monitoring generators by carrying out inspections at waste transfer stations or landfill tipping floors. The tipping floor is the location in the transfer station or landfill where haulers unload their waste to be inspected, sorted, and, in the case of transfer stations, reloaded.⁹²

- In Massachusetts, inspectors can observe the hauling trucks as they offload waste at landfills, combustion facilities, or transfer station tipping floors, watching for loads that appear to contain

significant amounts of discarded food or other banned materials.⁹³ When a hauler's records show that a "failed load" came from an identifiable source, MassDEP may issue warnings or take enforcement actions.⁹⁴ Because Massachusetts' organic waste ban covers only entities that dispose of one ton of food waste in any given week, inspectors only need to look for larger loads, which are easier to identify, to enforce the ban.

- In Vermont, DEC staff perform occasional "spot checks" at transfer stations and landfill sites in order to enforce the ban on recyclables and leaf and yard debris.⁹⁵ Although these spot checks are not yet conducted for food waste, they may be implemented beginning in 2020, when no food waste in the state may be sent to the landfill.⁹⁶

States and localities may also use complaint-based enforcement, meaning that they can intervene when they receive a report of possible non-compliance.

- In Vermont, customers and neighbors of food waste generators can file complaints with the DEC about violations, as can local solid waste districts.⁹⁷ Customers can also report violations by haulers with regard to recyclables; as of December 2016, DEC had received fifty hauler complaints related to recycling, concerning nineteen different haulers, all of which were resolved voluntarily.⁹⁸
- In Austin, Texas, city staff may visit food businesses and inspect the premises to investigate a complaint and assess compliance.⁹⁹

If a violation is identified through any of these methods, most states and localities have processes for issuing warnings and providing opportunities for compliance prior to imposing penalties such as fines.

- In Massachusetts, when MassDEP identifies a violation by a generator, it will typically issue a notice of noncompliance (NON) for initial violations and an administrative consent order with penalties (ACOP) for repeat violations.¹⁰⁰ MassDEP may also send letters when it observes food materials in a load but is unsure whether it exceeds the one ton per week threshold.¹⁰¹ Initially, relatively few enforcement actions were pursued for violations of the food waste ban as compared to enforcement actions for violations of bans on materials such as recyclable products.¹⁰² However, enforcement actions for food waste have increased in recent years: as of March 2019, MassDEP had issued 39 NONs and 3 ACOPS for disposal of food material, and in 2018, this was the second most enforcement actions for a specific material behind cardboard.¹⁰³
- In Austin, Texas, city staff must issue two notices of noncompliance, each of which gives the property at least thirty days to come into compliance, before the city can issue a citation and a fine.¹⁰⁴ City of Austin staff are available to provide guidance and technical assistance to assist businesses with compliance.¹⁰⁵ Fines are not issued for the first year after the organics diversion requirement takes effect for a given category of businesses.¹⁰⁶ As of September 2018, no citations or fines had been issued for violations of the organics diversion requirement.¹⁰⁷
- In Connecticut, there are no fines specifically associated with the organic waste ban.¹⁰⁸ However, the DEEP can pursue enforcement actions if generators do not make a good faith effort to comply with the law.¹⁰⁹

In contrast to other states, in California, local jurisdictions play an important role in enforcing the statewide law. California's commercial mandatory organics recycling law required local jurisdictions to implement organics recycling programs beginning in January 2016, and it required businesses and multi-family residences to recycle organic waste beginning in April 2016.¹¹⁰ CalRecycle has the authority to assess whether local jurisdictions are meeting requirements under the law, but it is up to jurisdictions to implement and enforce their own commercial organics recycling programs.¹¹¹

Like states, localities may use a variety of enforcement mechanisms. Where localities contract with haulers for

curbside pickup, they may have the option to enforce an organic waste ban directly at the pickup location.

- San Francisco requires all businesses and residents to separate and properly dispose of their organic waste.¹¹² City haulers may inspect containers to ensure that food waste is being properly separated.¹¹³ If a hauler finds food waste in the trash, he or she can first leave a tag on the bin, and if violations continue, leave additional tags and written notice.¹¹⁴ After sufficient notice, violators may be subject to administrative penalties such as fines.¹¹⁵ By pairing this enforcement system with lower fees for compost collection than trash collection, an intensive public education campaign, random generator waste audits, and more frequent waste audits of low-performing (high-contamination) commercial generators, San Francisco has seen dramatic increases in composting and food waste diversion since introducing its organic waste ban.¹¹⁶
- Like San Francisco, Seattle initially enforced its food waste ban by requiring municipal waste collectors to inspect generators' trash and compost bins. Trash collectors were instructed to mark offenders' bins with a red sticker and assess a \$1 fine per violation for single-family homes and \$50 fine per violation for businesses and multi-family homes.¹¹⁷ Immediately after the ban became effective, nearly 300 customers a day were flagged for violations.¹¹⁸ However, in response to a lawsuit brought by the Pacific Legal Foundation on behalf of eight residents of Seattle, a state court held that the inspection of private garbage bins was an illegal invasion of citizens' privacy under the Washington State Constitution.¹¹⁹



Privacy Concerns with the Enforcement of Organic Waste Bans

Individual residents and organizations have voiced privacy concerns with the monitoring and enforcement of organic waste bans against individuals. The potential infringement on individual citizens' privacy has been a particularly significant issue in Seattle. Trash collectors in Seattle were instructed to monitor residents' trash bins for food waste in order to identify violators of the city's organic waste ban.¹²⁰ In 2016, however, in response to a lawsuit on behalf of Seattle residents, a Washington State Superior Court invalidated this enforcement method, deeming it a "disturbance of . . . private affairs" in violation of the state constitution's privacy protections.¹²¹ The court found only a narrow exception allowing trash collectors to inspect garbage that is "in plain view" when the collector opens a bin to empty it, without searching through garbage bags.¹²² As such, Seattle's organic waste ban remains in effect but with a much more limited enforcement mechanism.

E. CONTAMINATION

Food scraps contamination can be a serious challenge for organics processing facilities.¹²³ Contaminants can include physical contaminants such as plastic and glass; chemical contaminants such as pesticides and herbicides; and pathogens and heavy metals.¹²⁴ Contaminants can disrupt the digestion process¹²⁵ or prevent the production of a high-quality compost product. Although some facilities may have procedures to remove physical contaminants¹²⁶ and many chemical contaminants are broken down during the composting process,¹²⁷ preventing those contaminants from entering the compost feedstock is key to ensuring compost quality. In some states, such as California, compost facilities may also need to comply with compost quality standards that limit the amount of glass or plastic that can be present in compost.¹²⁸

Some jurisdictions have found contamination to be a particularly significant issue with regard to organic

waste from residential customers,¹²⁹ whereas others have achieved low contamination rates in their curbside collection programs.¹³⁰ Contamination may also be a particular issue in the food service sector in the front-of-house, because of similar difficulties about educating and monitoring consumers.

Potential Solutions

To minimize contamination, state and local governments, haulers, and processors can employ educational efforts to inform businesses and residents about the importance of reducing contamination in organic waste.¹³¹ For more information about education and public awareness, see Section VI, Part B: Public Outreach and Education. Well-designed setups that make source separation simple can also reduce contamination. Targeting these educational efforts to generators who are known to contaminate and delivering information through personal communication can be particularly effective.

- Thurston County, Washington, conducted a waste characterization study to identify which generators contributed contaminants, in order to more effectively target educational efforts.¹³² City staff examined samples from collection vehicles carrying organic materials from commercial and residential routes in order to study the composition of organic waste from different sectors.¹³³
- The City of Seattle, Washington, has solicited the help of volunteers in multi-family residences to check organic waste containers for contaminants and to provide educational information for their neighbors.¹³⁴

Local governments can also include provisions in their contracts with haulers that require haulers to minimize contamination.¹³⁵ For example, these contract terms could incorporate local goals for contamination standards, require haulers to inspect loads for contamination, require haulers to refuse overly contaminated loads, or charge more for loads with contamination.¹³⁶



Reducing Contamination in Front-of-House Institutional Settings

After University of Massachusetts at Amherst implemented a post-consumer composting program in its dining halls, whereby students could separate their compostable waste from recyclables and trash, it discovered high contamination rates.¹³⁷ The dining halls began a “front of the house” education program in which food service workers stood by the compost, trash, and recycling receptacles and directed students where to place their waste.¹³⁸ This program reduced contamination while educating students on proper source separation techniques.¹³⁹



V. BEYOND THE BAN — POLICIES AND PROGRAMS THAT CAN IMPACT ORGANIC WASTE BANS AND FOOD WASTE DIVERSION

Alongside the structure of an organic waste ban itself, the context of a particular state or locality is equally important in determining the efficacy of an organic waste ban. Numerous policies and programs shape the environment in which an organic waste ban will operate; these policies can support the efficacy of an organic waste ban and play an important role in maximizing its impact. For states and cities that are unable or choose not to implement an organic waste ban, these policies and programs can drive food waste reduction, recovery, and recycling even in the absence of an enforceable ban. This section will briefly discuss several relevant policies and programs.

A. GRANTS FOR FOOD WASTE REDUCTION AND DIVERSION

States and localities can offer grants to support food waste generators, as well as service providers, in complying with an organic waste ban or otherwise reducing and managing food waste. Grants can be used to support the development of composting, anaerobic digestion (AD), or food rescue infrastructure, and to fund food waste prevention, food rescue, and recycling projects. Recipients range from municipalities to food rescue organizations to food businesses. This Part will focus on examples of state and local grant programs, organized by recipient, and will also briefly address examples of federal grant programs to support organic waste bans and infrastructure development.

The following states provide grants to local governments to fund projects designed to increase food waste prevention, food recovery, and food waste recycling.

- New York State offers grants to municipalities for waste reduction and recycling projects and also

offers grants to food banks and municipalities to support food donation efforts.¹ In 2017 and January 2018, the New York State Department of Environmental Conservation (DEC) provided \$800,000 to the New York State Food Bank association, as well as \$1.2 million in grants to municipalities for food donation and food waste recycling projects.² Funds were used to purchase composting and other food waste processing equipment and for the creation of food distribution centers to support small food pantries.³ The DEC also awarded an additional \$1.5 million to local governments through its Climate Smart Communities Grant Program, which funded projects to support food donation and organics recycling.⁴

- In 2015, South Carolina began offering two grants to local governments to help them divert food waste from landfills.⁵ The Compost Bin Grant Program offered \$2000 to local governments to promote backyard composting, and thirteen localities participated in the program.⁶ South Carolina also offered a Compost/Food Recovery Grant to local governments to support food waste diversion. The program distributed \$111,000 that year to five localities, which used the funds to promote composting and food rescue programs, among other uses.⁷
- In Massachusetts, the Massachusetts Department of Environmental Protection (MassDEP) makes Sustainable Materials Recovery Program (SMRP) grants available to municipalities to improve local recycling and composting programs, including by purchasing equipment, developing organics capacity, and implementing pay-as-you-throw programs.⁸

In addition to funding for localities, many states and municipalities provide grant funding to private food waste generators who adopt food waste reduction measures.

- New York City offers micro-grants of up to \$2000, in-kind donations, and mentorship support to businesses engaged in sustainable waste management practices.⁹
- The Food Waste Reduction and Diversion Reimbursement Program, a partnership between New York State and the Rochester Institute for Technology, offers reimbursements to businesses, municipalities, and nonprofits for technology and equipment that reduces or diverts food waste.¹⁰
- The City of Austin provides a Zero Waste Business Rebate of up to \$1800 for businesses to start or expand zero waste programs, including composting and recycling programs.¹¹ Eligible expenses include service invoices, composting or recycling bins, equipment, training and education, and zero waste events.¹² Over sixty businesses used these rebates in 2016.¹³

Grant funding can also support private entities such as developers in constructing food waste processing facilities.

- Massachusetts offers several options for funding organics processing operations. In the past, Recycling Business Development Grants have been used to fund food de-packaging facilities in the state,¹⁴ but at the time of publication, food scraps and organics are not included on the list of eligible materials for grant applications.¹⁵ MassDEP also partners with BDC Capital to administer the Massachusetts Recycling Loan Fund, which provides loans to eligible businesses, including recycling and composting companies.¹⁶ The Loan Fund offers preferred terms for composting, AD, and other food waste processing facilities.¹⁷ Another funding source for renewable energy projects is the Massachusetts Clean Energy Center, a quasi-public agency which provides grants and technical assistance for clean energy innovators.¹⁸

Cities and states may also establish funding specifically for nonprofit organizations engaging in food waste reduction, recovery, or recycling.

- San Francisco offers zero waste grants to nonprofit organizations that reduce, reuse, recycle, or compost waste and thereby help the city in achieving its zero waste goal.¹⁹

Some cities and states provide more flexible grant funding available to a broader selection of applicants and with a range of eligible projects.

- The state of California offers Food Waste Prevention and Rescue Grants to support new and existing food waste prevention and rescue projects.²⁰ Nonprofits, local governments, for-profit entities, state agencies, University of California campuses, solid waste facilities, public school districts, and qualifying Indian tribes may be eligible to apply for these funds.²¹ California also offers an Organics Grant program with funding from the state's cap and trade system, which generates significant revenue; about \$24 million was awarded to support organic waste diversion in 2016–2017.²²
- Oregon makes grant funding available for projects that promote solid waste prevention, reuse, and recovery through composting and AD.²³ In 2017, grant recipients included nonprofit organizations, state universities, local governments, and local solid waste districts.²⁴ Funding in 2017 supported projects including education campaigns to reduce household food waste; the purchase of equipment for gleaning organizations and food preservation projects; a school food waste compost project; several food rescue projects; and other uses.²⁵
- Tennessee supports food waste diversion through Organics Management Grants for counties and municipalities, nonprofits, and for-profit businesses.²⁶ Grants support the development of public-private partnerships, the provision of organics management services, and other solutions to reduce food waste through education, donation, animal feed, or recycling.²⁷

In addition to state and local grants, federal grant funding may also be available to support the construction of private food waste processing infrastructure and to support diversion efforts by states and municipalities.

- Federal funding sources such as the USDA's Rural Energy for America Program (REAP) can be used to support AD projects.²⁸ Agricultural producers and rural businesses can apply for REAP funding to purchase or install renewable energy systems, including AD systems.²⁹
- The 2018 Farm Bill, signed into law in December 2018, includes a new pilot program through which USDA will support localities in at least ten states in developing organic waste plans or food waste reduction plans.³⁰ Congress is authorized to appropriate up to \$25 million annually for a set of programs that includes this pilot.³¹



B. FOOD RESCUE INFRASTRUCTURE

Developing strong food rescue infrastructure and food donation partnerships can help generators divert surplus edible food while providing food to those in need. States and localities have taken several approaches to support the development of food rescue infrastructure, including developing guidance on safe food donation, facilitating connections between food waste generators and food rescue organizations, and in some cases even implementing requirements that edible surplus food be recovered for human consumption. States and localities may also provide grant funding to support food rescue, as discussed above in Section V, Part A: Grants for Food Waste Reduction and Diversion.

This section will outline how three states—Vermont, Massachusetts, and California—have sought to ensure that their organic waste bans support increased food donation. Beyond the programs and strategies discussed here, numerous other policies exist that impact food donation, such as liability protections for food donation, tax incentives for food donation, and food safety laws that adequately address food donation. More information about these policies can be found in the toolkit *Keeping Food Waste Out of the Landfill: Policy Ideas for States and Localities*.³²

Vermont

Vermont has seen particular success in increasing food donations following the passage of an organic waste ban. As noted earlier, Vermont's Universal Recycling Law incorporates a food recovery hierarchy that encourages, but does not require, food donation over organics recycling.³³ After passage of the law in 2012, several supermarkets prepared by renewing and expanding their relationships with the Vermont Foodbank and other food rescue organizations to facilitate the donation of perishable as well as non-perishable food.³⁴ Additionally, the Vermont Foodbank developed systems to allow nearby food pantries to collect perishable food donations from supermarkets directly, allowing them to capture fresher, healthier foods. Due in part to these partnerships, food donation nearly tripled from 2014 to 2017.³⁵ Through reduced need for purchasing, costs are also down for food rescue organizations as they collect significantly more food than they did prior to 2014. For example, the Salvation Army of Greater Burlington Area reported in 2016 that it spent less than \$500 per month on food to serve 40,000 meals that year, which amounts to less than five percent of the organization's food costs only two years prior.³⁶

In order to support these food rescue efforts, the Vermont Department of Environmental Conservation (DEC) and Department of Health released a fact sheet that provides information about safe donation practices for both hot and cold foods in 2016.³⁷ The Vermont Agency of Natural Resources (ANR) also created a Materials Management Map, which shows the locations of food waste generators and organizations that can receive surplus food, including food rescue organizations, composters, and transfer stations, to help facilitate connections between these organizations.³⁸

Massachusetts

After its organic waste ban took effect in 2014, Massachusetts saw a noticeable increase in inquiries about food donation.³⁹ In order to better understand how to support food donation, RecyclingWorks held several stakeholder meetings on the topic, bringing together state and local agencies as well as food rescue organizations.⁴⁰ MassDEP and RecyclingWorks also created food donation guidance to provide information to food businesses about how to develop a food donation program.⁴¹ Due in part to these efforts, the amount of food donated or rescued in Massachusetts has increased twenty-two percent since the organic waste ban went into effect, from 21,300 tons in 2014 to 25,900 tons in 2017.⁴²

California has taken a different approach to encouraging food rescue by passing legislation, SB 1383, mandating that twenty percent of edible surplus food that is currently being disposed be recovered for human consumption by 2025.⁴³ CalRecycle is still in the process of determining how this new requirement will be implemented; public comments on proposed regulations were being accepted as of June 2019.⁴⁴ The proposed regulations would require local jurisdictions to implement an edible food recovery program and require certain commercial food waste generators to recover surplus edible food for human consumption by contracting with food recovery organizations to collect surplus edible food.⁴⁵ An important issue that CalRecycle has sought to address throughout the regulatory process is how to define terms such as “edible food” and “edible food generators.”⁴⁶ These definitions are important because they determine which businesses are required to recover edible surplus food and can help ensure that the law only requires the recovery of safe, wholesome food that food recovery organizations can accept. Although the legislation has the potential to result in increased food donations, it may require additional support for food recovery organizations to ensure that there will be sufficient food rescue infrastructure to accept the increase in donations.⁴⁷

C. HAULING ARRANGEMENTS

The relationships between municipalities and haulers may impact the effectiveness and structure of organic waste bans. For residential waste hauling, a locality typically contracts with a particular waste hauler, hauls residential waste itself, or allows residents to contract with haulers directly. On the other hand, businesses generally must contract with private commercial waste haulers or haul their own waste.

Residential Hauling

When an organic waste ban applies at the residential level, a locality’s approach to residential hauling—directly hauling its residents’ waste, contracting with one or more haulers, or allowing open hauling—may impact implementation strategies.⁴⁸ The residential hauling approach may also determine the feasibility of curbside organics collection more generally in jurisdictions without an organic waste ban.⁴⁹ For more information about the impact of residential waste hauling arrangements on organics collection, one helpful resource is *Municipal Curbside Compostable Collection: What Works and Why?*, a report from the Department of Urban Studies and Planning at the Massachusetts Institute of Technology.⁵⁰

Some municipalities haul their own waste, an arrangement that can be more expensive for the municipality but confers increased control over hauling operations.⁵¹ For instance, the city of Berkeley, California, which hauls its own garbage, was able to implement its curbside collection program quickly by reallocating existing resources to organics.⁵²

Alternatively, localities can contract with private haulers for collection services.⁵³ Some cities operate in a closed-hauling system, in which they contract with one or more hauler; others have an open-hauling system, in which residents contract with haulers individually.⁵⁴

A closed-hauling system offers several advantages for localities implementing waste bans or organics collections programs. First, because the contracted haulers have guaranteed business and often long-term contracts, they may be more willing to invest in new programs such as compost collection.⁵⁵ Second, closed-hauling systems allow localities to build long-term working relationships with a single hauler or a small number of haulers, which can make it easier to implement new programs.⁵⁶ One example of the benefits of a closed-hauling system is the City of San Francisco, where Recology is the sole service provider per a city ordinance.⁵⁷ The city has developed a close relationship with Recology, and Recology has played an important role in implementing San Francisco’s recycling and organics programs.⁵⁸

Open-hauling systems can pose challenges for cities implementing organic waste bans or curbside compost collection programs. Haulers in open-hauling systems compete with one another for customers, so they may be hesitant to implement new programs that could increase costs.⁵⁹ Some localities have been able to implement compost collection programs while operating in open-hauling systems. For example, Minnetonka, Minnesota was the first open-hauling jurisdiction in Hennepin County to provide compost collection.⁶⁰ Offering incentives to haulers has helped offset the costs of providing this additional service.⁶¹

Commercial Hauling

In the case of commercial hauling, businesses generally contract with a private hauler or haul their own waste. In some municipalities, the use of franchise zones determines the hauling options available to businesses. Franchise zones are collection systems in which municipalities require that businesses in a designated area must contract with a specific waste hauler.⁶² Some examples of cities that have implemented franchise zones are: Los Angeles, California; Oakland, California; San Jose, California; Portland, Oregon; and Seattle, Washington.⁶³ New York City has also proposed a non-exclusive franchise zone system, in which multiple haulers could serve a given zone.⁶⁴ Franchise zones can allow municipalities to more effectively control the waste management system, including requiring haulers to offer organics collection services.⁶⁵ In Los Angeles, the commercial franchise zone system, RecycLA, requires participating haulers to offer services such as blue bin and organics recycling.⁶⁶ However, by requiring businesses to contract with a particular hauler, franchise zones may lead to higher costs for businesses.⁶⁷ Smaller hauling operations have also expressed concerns that franchise zones may hurt their business due to increased requirements, such as insurance and fleet size requirements.⁶⁸



Involving Haulers in Food Rescue

States and localities can involve haulers in food waste reduction efforts beyond organics collection. For example, in Los Angeles, California, haulers participating in RecycLA are engaging in food rescue as well. As a part of its RecycLA contract, hauler Republic Services purchased a new refrigerated truck for Food Finders, a food recovery nonprofit, and has also worked to raise awareness of food donation among customers.⁶⁹ Food Finders has collected 250 tons of food from referrals through RecycLA.⁷⁰ States and municipalities can encourage partnerships between haulers and food recovery organizations to promote food rescue in addition to organics recycling.

D. RENEWABLE PORTFOLIO STANDARDS

Policies that support the development of energy markets for biogas can have a significant impact on infrastructure development. Renewable Portfolio Standards (RPS) are mandatory or voluntary policies that call for utility companies to supply a certain amount of electricity from renewable resources, such as wind, solar, geothermal, biomass, and hydroelectricity.⁷¹ States often determine which renewable energy sources are included in their RPS policies based on the state's available resources and other local preferences.⁷² RPS policies can help states diversify their energy resources and create a market for renewable energy sources.⁷³ State policies may also include renewable energy credits (REC), which allow utilities that produce more renewable energy than required under the RPS to sell credits to other utilities that do not produce enough.⁷⁴ Twenty-nine states and Washington, D.C. have adopted an RPS.⁷⁵ A 2017 study found that adoption of RPS policies, alongside other policies such as performance-based incentives, is correlated with an increased number of AD facilities in a state.⁷⁶

RPS policies that include biogas produced by AD can drive the development of AD infrastructure by creating

more demand for the energy produced. Connecticut, Massachusetts, Rhode Island, and Vermont have RPS policies that include energy produced from AD facilities, as well as programs that allow these facilities to access RECs.⁷⁷

- For example, Massachusetts' RPS began in 2003 with a requirement to provide 1% of electricity from renewable sources; that requirement increased gradually until it reached 4% in 2009.⁷⁸ The Green Communities Act of 2008 established two classes of renewable energy sources and increased requirements for energy from new renewable energy facilities.⁷⁹ The Green Communities Act also established net metering, which allows on-site generators, such as on-farm digesters, to receive credit for the energy they provide to the grid.⁸⁰ Vanguard Renewables, which operates several on-farm digesters in Massachusetts, has credited this policy for allowing it to sell excess power from its digesters back to the generators that send their food waste to Vanguard, or to local municipalities.⁸¹

Even where state RPS policies include energy from AD, AD facilities may still struggle to access power purchase agreements, in comparison to solar or wind facilities, because solicitations for these agreements are often drafted in ways that do not account for the benefits of AD.⁸²

E. CREATING MARKETS FOR COMPOST END-PRODUCTS

In order for composting to be profitable, markets must exist for the end product.⁸³ Just as RPS and other policies can drive demand for the biogas produced by AD, policies can help create markets for the use of compost. For example, states and localities can require the use of compost in state landscaping and construction projects. In June 2018, the Illinois state legislature passed a law requiring that state agencies engaged in construction projects that require soil and that are located within twenty miles of a permitted compost facility must solicit bids for compost-amended soil for the project.⁸⁴ Individual state agencies can implement similar policies; the New York State Department of Transportation, for example, requires the use of compost in its landscaping and construction projects.⁸⁵

In the absence of a statewide policy encouraging or requiring the use of compost in state projects, states can promote the use of compost by helping state and local government agencies develop individual compost procurement policies. For example, to encourage state and local agencies to create procurement programs, CalRecycle created guidelines on writing compost procurement policies.⁸⁶

F. ZONING FOR COMPOST AND AD FACILITIES

Zoning refers to the set of laws that governs the use, size, and density of buildings within geographic areas in a region.⁸⁷ Common zoning categories include residential, commercial, industrial, or agricultural.⁸⁸ In the United States, zoning codes were initially adopted to restrict the areas in which specific types of development could occur, with the goal of separating more intense uses, such as industrial uses, from less intense uses such as residential.⁸⁹ Zoning is typically exercised at the local level by counties or municipalities, with states generally determining the scope of the zoning strategy through a zoning enabling act.⁹⁰

Local zoning codes can determine where organics processing facilities can be sited and whether they can be located near large population centers that generate significant amounts of food waste. In states or cities that implement an organic waste ban with a distance exemption, zoning codes may also determine whether a facility can be built within range of the largest food waste generators, and therefore whether those large food waste generators will be covered by the organic waste ban.

One barrier to siting compost and AD facilities is that these facilities are often not defined in zoning rules and therefore fall under the broad category of "waste management activities," which is often a very restricted land use so as to protect public health and lessen negative environmental impacts.⁹¹ Another barrier is that zoning codes often fail to distinguish between large- and small-scale composting, which can impede the

development of small composting facilities by limiting them to heavily restricted zones such as industrial zones, which often have stricter development requirements than other zones.⁹² To reduce barriers to siting organics processing facilities, localities can amend their zoning codes to specifically define and allow composting within certain zoning categories, such as agricultural land use.⁹³

- In December 2013, Boston, Massachusetts, adopted Article 89 into its zoning code. Article 89 governs where in the city different types of urban farms can be located and also includes regulations for composting.⁹⁴ In Boston, composting is categorized as either a primary use, meaning more than twenty-five percent of the lot is devoted to composting, or an accessory use, meaning less than twenty-five percent of the lot is devoted to composting.⁹⁵ Commercial composting operations are categorized as primary use composting and require several permits.⁹⁶ Accessory use composting on urban farms, in comparison, is less restricted, requiring only registration with the Massachusetts Department of Agricultural Resources (MDAR).⁹⁷ Accessory use composting is allowed on ground-level and rooftop urban farms, but composting may only occupy 7.5 percent of the space on a ground-level farm and should primarily be used for on-site materials.⁹⁸
- Another example is the rural Maryland county of Anne Arundel, which in 2016 passed legislation to define composting and allow it as a conditional use on rural agricultural zoned land.⁹⁹ The bill was introduced in part to help satisfy demand for compost among local farmers, some of whom reported traveling to neighboring states to obtain compost for their crops.¹⁰⁰ The law requires that composting facilities be located on a lot of at least five acres and that the active composting area be limited to an area no more than twenty-five percent of the lot, up to ten acres.¹⁰¹



Model Zoning Codes

To begin the process of modifying zoning codes, city councils can refer to model language such as the Ohio Environmental Protection Agency's model zoning code for composting and urban agriculture, which provides example language and identifies factors to consider when regulating composting activities.¹⁰²

Although states and localities may recognize the need to rethink zoning laws to better support organics processing facilities, rezoning is often politically difficult, as residents may raise concerns about water quality, odor, or other potential nuisances.¹⁰³ For cities that must work within the bounds of existing zoning regulations, constructing organic waste processing facilities at existing sites such as wastewater treatment facilities may provide a viable option.¹⁰⁴

G. PERMITTING FOR COMPOSTING AND AD FACILITIES

Compost and AD facilities generally must obtain permits from relevant state and local agencies in order to operate.¹⁰⁵ Permitting requirements and procedures vary by state,¹⁰⁶ and complex permitting requirements and lengthy procedures can create barriers to developing new facilities.¹⁰⁷ To support the development of organics processing infrastructure, states can develop permitting procedures that are streamlined, tailored to different types and sizes of facilities, and that do not impose unreasonable costs. Recognizing this, a number of states have revised their permitting regulations in recent years to facilitate the development of composting and AD facilities.

- The New York DEC recently revised its solid waste management regulations to facilitate development of "composting and other organics recycling facilities."¹⁰⁸ The new regulations, effective November 4, 2017, divide permitting requirements into three tiers based on capacity of the facility. "Exempt" composting facilities, such as neighborhood composting sites, may accept up to 1000 pounds or

one cubic yard of organic waste per week on average, whichever is greater, and do not require a permit.¹⁰⁹ Larger “registered facilities” may accept no more than 5000 cubic yards or 2500 wet tons of organic waste per year, whichever is less, and no more than 800 cubic yards in any month, and must register with the state and meet certain operating criteria.¹¹⁰ Facilities that do not qualify as “exempt” or “registered”—including large commercial composting operations—require a state permit and must meet strict design and operation criteria.¹¹¹ Anaerobic digestion facilities are similarly tiered by the amount of organic waste they accept.¹¹² This type of permitting structure can enable food waste diversion infrastructure to grow across the state and reduce burdens on smaller or mid-size facilities that cannot cost-effectively meet the strict permit requirements necessary for large commercial facilities.

- Rhode Island has similarly created a tiered permitting system for composting and AD facilities. This system was implemented in 2016, the same year the state’s organic waste ban took effect, at which point Rhode Island had almost no food waste infrastructure in place.¹¹³ Rhode Island established permitting tiers similar to New York’s, with small-scale composting exempt from registration requirements, medium-scale facilities requiring only one-time registration with the Rhode Island Department of Environmental Management (DEM), and only large-scale facilities required to renew their registration every three years.¹¹⁴ These new regulations also included Rhode Island’s first permitting process and standards for AD facilities.¹¹⁵ Rhode Island has since permitted a large commercial AD facility and seen expanded operations at one long-running but small composting site, and it anticipates further composting development.¹¹⁶
- In 2012, Massachusetts streamlined its permitting regulations to better support small-scale composting and increase the production of renewable energy from AD.¹¹⁷ Small composting operations that process less than twenty cubic yards or ten tons per week and are not located at a residence are exempt from site assignment and permitting requirements as long as they comply with best management practices and submit a form to MassDEP.¹¹⁸ Composting and AD operations that are too large to qualify for this exemption but that fall below size criteria outlined in the regulations can apply for a General Permit for Recycling, Composting or Aerobic and Anaerobic Digestion Operations using a single application; eligible operations do not need to meet additional requirements such as facility permits or site assignments, but they do need to comply with performance standards and best management practices.¹¹⁹ Larger operations that do not qualify for an exemption or general permit must acquire a recycling, composting, and conversion (RCC) permit.¹²⁰ The application for an RCC permit is lengthier and involves a pre-application meeting, MassDEP review, and public review of the draft permit.¹²¹

H. TIPPING FEES

Landfills, both public and private, generally charge tipping fees to commercial waste producers who dispose of trash there. Factors that influence tipping fee rates include whether the landfill is public or private, availability of other revenue streams, location, disposal tonnage, and proximity to other landfills.¹²²

Although tipping fees at individual landfills vary, a region’s mean tipping fee is highly correlated with the percentage of waste disposed of in the region’s landfills.¹²³ In general, the higher the tipping fees, the less waste is disposed of in landfills and the more viable diversion options may be.¹²⁴ This trend bears out in the Western, Northeast, and Mid-Atlantic regions, for example, where tipping fees are the highest and larger amounts of waste are diverted from landfills to recycling and composting facilities.¹²⁵ Where higher landfill tipping fees make organics recycling more cost-competitive, implementing an organic waste ban or other organics diversion program may be more politically and economically feasible. In the following states, for example, tipping fees may create an incentive for generators to reduce and divert waste.

- Vermont landfills charge relatively high fees of \$90 per ton on average, as compared with the national average landfill tipping fee of \$51 per ton.¹²⁶ High tipping fees make it more attractive for generators to reduce their waste and pursue less expensive options for disposal.

- Tennessee landfills charge tipping fees of about \$71 per ton on average, about \$35 higher than fees in the surrounding states,¹²⁷ which could help create a market for diversion infrastructure in the state.
- In 2017, Rhode Island raised tipping fees at its state-operated landfill for the first time in over twenty years.¹²⁸ The tipping fee rate for municipal waste increased to \$39.50 for the 2017–2018 fiscal year and \$47 for the 2018–2019 fiscal year.¹²⁹ The rate for commercial solid waste with a three-hundred ton minimum contract is \$80 per ton.¹³⁰ This increase is intended to encourage diversion from landfills in the face of limited landfill space and to increase funding to the landfill.¹³¹ Because Rhode Island’s organic waste ban provides a waiver for generators that would have to pay more at organics processing facilities than they do to dispose of organic waste in the landfill, the increased landfill tipping fee may reduce the number of food waste generators that are exempt from the law.

In contrast, in regions like the South and Midwest, where tipping fees are comparatively low, up to seventy-five percent of waste is disposed of in landfills, and waste generators have less of a financial incentive to divert waste.¹³²

To support increased organics diversion and make organic waste bans a more viable option, states and municipalities can explore opportunities to change incentive structures to make organics recycling more cost-competitive. One way to better incentivize diversion would be to increase landfill tipping fees. In addition to creating incentives to divert recyclables and organics, increased tipping fees could help ensure that landfills receive sufficient revenue to remain profitable, even as additional material is diverted from the landfill.

For example, municipalities often rely on revenue they receive from landfill tipping fees to repay the bonds used to finance the landfill.¹³³ This reliance on tipping fees could disincentivize efforts to divert recyclables and organics, because increasing diversion could cause the municipal landfill to lose much-needed tipping fee revenue. Revenue from tipping fees is also often used to fund state and local recycling and organic waste diversion programs. CalRecycle, for instance, is partly funded by landfill tip fees,¹³⁴ as are many municipal recycling initiatives in New York.¹³⁵ As an organic waste ban increases diversion from landfills, the diversion programs themselves may lose funding. Raising tipping fees could help provide revenue to repay bonds and fund diversion programs even as more waste is diverted from landfills.

However, municipalities that own landfills may be unwilling to raise fees due to concerns that haulers would choose other disposal facilities, causing the municipality to lose revenue. Likewise, private companies that own landfills may be concerned that raising their tipping fees would put them at an economic disadvantage as compared to other landfills.

If raising landfill tipping fees is not politically feasible, another option is to subsidize tipping fees at recycling or organics facilities to incentivize diversion. For example, the Metro Council in the Portland region subsidizes the commercial food scraps tip fee at the Metro Central Transfer Station in order to ensure that the rate remains stable and encourages the development of food scraps collection across the region.¹³⁶ The tipping fee for food scraps at that transfer station is \$66.23 per ton, about \$9 less than the fee would be without the subsidy.¹³⁷

Additionally, states and municipalities can support organics processing facilities through grants and loans, as discussed in Section V, Part A: Grants for Food Waste Reduction and Diversion, in order to reduce the costs of developing these facilities and help make them more cost competitive.

One final consideration is that even where tipping fees are lower for composting and AD than for landfills or waste-to-energy facilities in a given region, these lower tipping fees may not always be passed on to generators. Where haulers bundle collection fees and tipping fees, for example, businesses may not see the benefits of reduced tipping fees at organics processing facilities.¹³⁸ This may affect the incentive for businesses to divert their food scraps, particularly where they are not required to do so by an organic waste

ban. Cities and states should try to understand this landscape in order to ensure that the benefits of lower tipping fees for organics recycling facilities are passed on to businesses.



Regional Market Dynamics

Regional market dynamics, and policies and infrastructure in neighboring states, can impact the efficacy of organic waste bans and create incentives or disincentives for generators to divert organic waste. In the United States, waste markets are generally regional and are not bounded by state lines.¹³⁹ Differences in tipping fees for organics recycling facilities compared to landfills, not just within individual state, but across a region, can drive organic waste generators to send their waste to a landfill if the transportation costs and landfill tipping fee are less expensive than the fees at nearby composting or AD facilities.

Accordingly, some states export much of their trash to nearby states that have lower tipping fees and more landfill capacity.¹⁴⁰ States with excess landfill capacity may seek to keep their tipping fees low in order to attract trash imports from nearby states, because trash importing confers economic benefits such as job creation and revenue for the municipal budget.¹⁴¹ For example, Pennsylvania is one of the largest importers of trash and receives a significant amount of trash from nearby New York and New Jersey, two of the largest exporters in the country.¹⁴² In some states that have an organic waste ban, disposing of organic waste in the trash and sending it to a landfill out of state may be a violation of the ban. In practice, however, this violation may be difficult to identify depending on the method of enforcement; if enforcement of the ban is done at the landfill or transfer station, this violation would likely not be observed.

On the other hand, availability of organics processing capacity in neighboring states can help support states with organic waste bans by providing additional infrastructure. In some states where food waste generators are covered only when they are located within a certain distance of a processing facility, the availability of processing facilities just over the border in neighboring states may bring additional food waste generators within the coverage of the law. For example, in Connecticut, food waste generators located within twenty miles of a food waste processing facility in neighboring states are covered by the state's organics recycling law.¹⁴³

Additionally, states with organic waste bans may provide feedstock for facilities across a region, including in neighboring states that do not have an organic waste ban. For example, Massachusetts has provided significant feedstock for a large anaerobic digester in Exeter, Maine since the passage of the Massachusetts disposal ban.¹⁴⁴ These factors and the regional nature of the organic waste market should be taken into account when developing a policy for organics diversion.

I. PAY-AS-YOU-THROW AND UNIT-BASED PRICING MODELS

Many municipalities charge a flat fee for collection services, or else cover the costs of these services through

property taxes.¹⁴⁵ However, some municipalities use a model called pay-as-you-throw (PAYT), otherwise known as unit-based or variable-rate pricing, to charge residents for collection services based on the amount of waste that they throw away.¹⁴⁶ By charging more when residents dispose of more trash, or by charging less for recycling and organics collection than for trash collection, PAYT models can incentivize residents to decrease their trash generation and recycle or compost more.¹⁴⁷ PAYT systems can be structured in several different ways.

- Under a bag-based PAYT model, charges are based on the number of municipally-provided trash bags that residents put out for collection.¹⁴⁸
- Tag-based PAYT models also require residents to pay per bag, but residents must attach pre-paid tags to their bags of trash.¹⁴⁹
- For PAYT models that charge for overflow, residents pay a flat fee to purchase a trash receptacle of a certain size and must pay extra for any additional amount of waste that does not fit in the receptacle.¹⁵⁰
- Under variable rate cart PAYT models, residents can purchase different sized carts or bins, with large bins costing more than smaller bins.¹⁵¹
- Finally, a cash-based PAYT structure requires residents to pay a fixed per-bag fee at a specified drop-off site.¹⁵² Unlike the models described above, this model applies when residents drop off their trash at a designated location, rather than when trash is collected curbside.¹⁵³

As part of Vermont's universal recycling law, all towns and solid waste districts in the state were required to adopt PAYT systems, and as of December 2016, Vermont DEC reported that all towns and solid waste districts were in compliance with this requirement. Some towns have reported decreased trash disposal and reduced collection costs as a result of adopting PAYT.¹⁵⁴

Several cities have also adopted PAYT, often using variable-rate cart systems. Variable-rate cart systems are more likely to affect residents' behavior when the price differential between larger and smaller municipal garbage bins is greater, pushing residents to choose smaller garbage bins and sign up for municipal composting services.¹⁵⁵

- Austin, Texas charges \$24.95 more per month for the largest bin it offers than for its smallest bin; only fifteen percent of Austin residents choose the largest bin size.¹⁵⁶
- In Seattle, Washington, the price differential between large and small bins is even larger—\$86.50—although data about how many of the city's residents choose its largest bin is not available.¹⁵⁷
- By contrast, Minneapolis, Minnesota, charges only \$3 more for its largest garbage bins than its smallest ones, and ninety-two percent of city residents opt for the large bin.¹⁵⁸ As part of its zero waste plan, Minneapolis planned to consider increasing the price differential between large and small bins to encourage residents to select smaller bins and dispose of less waste.¹⁵⁹

PAYT systems can encourage increased recycling and composting because these fee structures provide an incentive to dispose of less in the trash bin.¹⁶⁰ Municipalities can also pair a PAYT system with lower cost recycling and organics collection services to further incentivize these diversion options. Revenue from the PAYT collection fees can help cover the costs of the recycling and organics collection services.¹⁶¹

J. FLOW CONTROL AND LANDFILL GAS CONTRACTS

In order to support the financial stability of their landfills, some cities and states have developed waste management strategies, such as flow controls, landfill gas contracts, and "put or pay" contracts, that may have important implications for organic waste diversion.

- Flow controls are legislatively prescribed obligations of state or local governments that require a set amount of waste to be delivered to specific waste processing facilities, landfills, or transfer stations.¹⁶² Flow controls are often put in place to ensure that facility owners can repay their bonds and that the facilities remain profitable over time.¹⁶³
- Landfill gas contracts refer to contractual agreements between landfill owners and end users, including utility companies and direct-users such as factories or industrial facilities, for the sale of landfill gas.¹⁶⁴
- “Put or pay” contracts require municipalities to pay a landfill facility for a certain amount of waste disposal, even if they actually dispose of less.¹⁶⁵

Because flow control arrangements with landfills or transfer stations guarantee that these facilities receive a certain amount of incoming waste material, these arrangements can hinder efforts to divert material to recycling, composting, or AD facilities, particularly if they specifically require recyclable or compostable materials to be sent to a landfill. For example, Miami-Dade County has implemented flow controls to ensure that Miami-Dade County Resource Recovery facility, a waste-to-energy (WTE) facility, remains viable.¹⁶⁶ The county has taken steps to limit the recyclable materials that can be diverted in order to ensure the facility receives adequate tipping fees.¹⁶⁷ This arrangement represents one example of how flow controls and similar arrangements may hinder efforts to divert recyclables, organics, and other materials.

On the other hand, an EPA report notes that many flow control agreements exclude certain recyclables and organics,¹⁶⁸ meaning that these materials would not be required to be sent to the landfill and could be diverted to recycling facilities, limiting the negative impacts discussed above. Additionally, flow control facilities often charge higher tipping fees, which could be used to fund recycling and organics programs and facilities.¹⁶⁹ States or localities that do choose to implement flow controls should structure these arrangements to allow recyclables and organics to be diverted to appropriate processing facilities. Regardless of whether flow controls are in place, states and municipalities can explore opportunities to use landfill tipping fee revenue to support recycling and organics programs.

Like flow controls, landfill gas contracts also determine how waste is distributed. Landfill gas agreements vary in structure. For example, the Rhode Island Resource Recovery Corporation has a contract in which it grants all rights to the landfill gas produced at the state’s Central Landfill to Broadrock Gas Services.¹⁷⁰ Other landfill gas contracts might require the landfill to provide a minimum amount of gas to an end user.¹⁷¹ Because organic material is needed to produce the landfill gas required under these contracts, contracts for the sale of landfill gas may discourage the diversion of organic materials to composting and AD facilities.

Because flow controls and landfill gas contracts can potentially interfere with diversion from landfills, state and local governments should use caution in implementing any new arrangements. As existing contracts come up for renewal, state and local governments can take the opportunity to reevaluate the need for such contracts and to explore opportunities to renegotiate terms to better support diversion of recyclables and organics.

BEYOND THE BAN: POLICIES AND PROGRAMS THAT CAN IMPACT ORGANIC WASTE BANS AND FOOD WASTE DIVERSION



Below is a checklist of policies and programs to consider in evaluating state or local context. These policies and programs can impact the efficacy of an organic waste ban or provide avenues for addressing food waste in the absence of an organic waste ban.

Grants for food waste reduction and diversion (Page 42)	<input type="checkbox"/> Does the state or locality offer any grant funding to support food waste reduction, recovery, and recycling projects?
	<input type="checkbox"/> If not, what possible funding sources exist? Are there existing grant programs that could be extended to food waste reduction projects?
Policies and resources to support food rescue infrastructure (Page 45)	<input type="checkbox"/> Does the state/locality have food donation guidance?
	<input type="checkbox"/> Are there policies in place that encourage or require the donation of edible surplus food?
Hauling arrangements (Page 46)	<input type="checkbox"/> Does the municipality haul its own residential waste, or does it contract with private hauler(s)? <input type="checkbox"/> If the municipality contracts with private haulers, does it operate in a closed- or open-hauling system?
	<input type="checkbox"/> For commercial hauling, does the municipality have franchise zones?
Renewable portfolio standards (Page 47)	<input type="checkbox"/> Does the state have a renewable portfolio standard that includes biogas from anaerobic digestion?
Creating markets for compost (Page 48)	<input type="checkbox"/> Do state, local, or agency policies require or encourage the use of compost in public landscaping or construction projects?
Zoning for compost and anaerobic digestion facilities (Page 48)	<input type="checkbox"/> Is composting defined and allowed in particular land use categories?
Permitting for compost and anaerobic digestion facilities (Page 49)	<input type="checkbox"/> Are permitting requirements tailored to different sizes and types of facilities?
	<input type="checkbox"/> Are permit applications streamlined and affordable?

BEYOND THE BAN: POLICIES AND PROGRAMS THAT CAN IMPACT ORGANIC WASTE BANS AND FOOD WASTE DIVERSION (CONTINUED)



Below is a checklist of policies and programs to consider in evaluating state or local context. These policies and programs can impact the efficacy of an organic waste ban or provide avenues for addressing food waste in the absence of an organic waste ban.

Tipping fees (Page 50)	<input type="checkbox"/> Are tipping fees in the state generally higher or lower than regional and national averages?
Pay-as-you-throw and unit-based pricing (Page 52)	<input type="checkbox"/> Has the municipality adopted a pay-as-you-throw model to charge residents for waste disposal based on the amount they throw away?
	<input type="checkbox"/> Are residents charged less for recycling and organics collection than for trash collection?
Flow control and landfill gas contracts (Page 53)	<input type="checkbox"/> Are there mechanisms in place – including flow control arrangements, landfill gas capture contracts, and put-or-pay contracts – that could interfere with diversion of organics from landfills?
Technical assistance for food waste generators and service providers (Page 57)	<input type="checkbox"/> What entity (government agency, non-governmental entity, etc.) is best situated to provide assistance to food waste generators and service providers?
	What methods of TA can that entity provide (on-site, phone hotline, online resources)?
Public outreach and education (Page 60)	<input type="checkbox"/> Does the state/locality have capacity to conduct a public education and outreach campaign?



VI. TECHNICAL ASSISTANCE AND PUBLIC AWARENESS

A. TECHNICAL ASSISTANCE FOR FOOD WASTE GENERATORS AND SERVICE PROVIDERS

Technical assistance (TA) typically involves one-on-one assistance designed for generators, food rescue organizations, haulers, processors, associations, or government officials.¹ States and municipalities may choose to prioritize TA regardless of whether or not lawmakers intend to institute an organic waste ban.² However, the availability of TA plays an important role in supporting organic waste bans by increasing awareness of these policies and helping generators, haulers, and processors prevent mistakes and realize benefits as they seek to comply.³

Providing TA to different stakeholders can help increase the number of participating stakeholders in each sector, from food waste generators, to haulers, to processors, making food waste reduction and diversion more economically viable for all parties.⁴ For example, providing assistance to food waste generators can increase the number of potential customers for haulers and processors of food waste, while providing assistance to haulers and processors helps ensure there are businesses in place to offer these services to generators. TA can also benefit food businesses by helping them identify cost saving opportunities across the food recovery hierarchy and identify food rescue options that match the business' needs.⁵ In particular, TA providers can help connect food waste generators with service providers that best meet their needs and invest in the correct containers, signage, and equipment for their particular business.⁶

This section will outline several methods of TA and analyze the different kinds of entities that can provide TA services.

TA Methods

There are several methods for providing TA to food waste generators, some of which are described in the table below:

Method	Description
Hotline communication	TA providers engage in two-way phone or email communication, typically with representatives of businesses and institutions who are curious to learn more about diverting food waste. ⁷
On-site TA	TA providers offer additional on-site assistance beyond an email or phone call. On-site TA should be customized in order to meet different generator needs, and may help evaluate existing waste streams; identify opportunities to prevent, donate, and recycle surplus food; connect generators with haulers and processors; conduct cost analyses of waste diversion options; design an appropriate collection system; create customized waste bin signage; empower employees through education and training; and monitor progress and troubleshoot challenges. ⁸
Capacity building	TA providers can engage in capacity building by convening stakeholders from different sectors—including haulers, processors, service providers, food rescue organizations, and government officials—to share information and coordinate efforts. ⁹
Public industry events	TA providers can attend public events to deliver information or training in-person. ¹⁰
Online resources	TA providers can create online materials to assist generators in implementing food waste diversion programs. Examples of resources include toolkits; ¹¹ fact sheets; ¹² estimator tools; ¹³ food donation guidance; ¹⁴ source separation guidance; ¹⁵ and guidance on contracting for hauling services. ¹⁶



Hotline Communication Case Study

The Boston Public Market is an example of how providing a small amount of assistance to a generator through hotline communication can set an organization up for success in implementing a new diversion program.¹⁷ The Boston Public Market contacted RecyclingWorks in Massachusetts, a recycling assistance program funded by the Massachusetts Department of Environmental Protection (MassDEP) and administered by the Center for EcoTechnology (CET), to ask about setting up food rescue and food scrap recycling programs at their new indoor marketplace, which is home to 40 permanent vendors and approximately 20 seasonal vendors.¹⁸ Through this phone call, the Boston Public Market received the information they needed to start developing their donation and diversion programs. In the first eight months of operation, the Market donated enough food for over 17,000 meals and composted more than 14 tons of food scraps.¹⁹

In addition to TA for food waste generators, states and cities can also offer assistance to providers of organics processing services, such as composting and AD facilities. Providing advice on best management practices can support food waste processing infrastructure and help ensure well-operated sites. The following states have offered TA for composting facilities:

- The Vermont Department of Environmental Conservation (DEC) has offered training and assistance to educate compost site operators on best practices and help more facilities receive certification.²⁰
- In 2015, Massachusetts began offering TA to help compost site operators with sound composting practices. RecyclingWorks enlisted the help of composting industry experts to serve as consultants to the program, conducting site visits for approved compost facilities and producing a report with site-specific recommendations for the operator.²¹
- The Pennsylvania Department of Environmental Protection offers composting technical assistance to local governments. The state offers assistance, up to a \$7,500 value, for local governments to support the improvement of recycling programs across the state.²²



TA Providers

The efficacy of TA and the manner in which it is administered may depend on the type of entity providing the TA. TA can be provided by regulatory bodies or by non-regulatory, third-party entities. The table below outlines some of the benefits and challenges of each type of TA provider, as well as some examples.

Types of TA Providers

	Benefits	Challenges	Examples
Regulatory Body (state or local regulatory agencies)	<ul style="list-style-type: none"> • Can impose enforcement actions such as fines, which may increase compliance and motivate generators • Can institutionalize TA at an agency through permanent regulatory staff 	<ul style="list-style-type: none"> • May be restricted from making specific recommendations about technologies or service providers because, as regulators, they do not want to promote particular products or providers over others • May not be able to provide neutral guidance to entities that are not in compliance with a ban due to enforcement duties 	<ul style="list-style-type: none"> • Austin, Texas: Austin Resource Recovery provides one-on-one technical assistance to businesses and institutions implementing organics diversion and other zero waste programs²³
Non-Regulatory/ Third-Party TA Provider	<ul style="list-style-type: none"> • Businesses may be more receptive to advice and assistance from non-regulatory entities that are not involved with enforcement • Due to dedicated staffing and resources, non-regulatory providers may be better able to assist entities not covered by a ban, such as service providers and smaller food waste generators 	<ul style="list-style-type: none"> • May not have the same leverage as a regulator to influence organizations that are resistant to complying with an organic waste ban 	<ul style="list-style-type: none"> • Prior to implementation of Massachusetts' organic waste ban, the Center for EcoTechnology (CET) was selected to create and administer the RecyclingWorks in Massachusetts program.²⁴ RecyclingWorks provides TA to a range of businesses and institutions, and MassDEP refers generators covered by the disposal ban to RecyclingWorks for assistance with compliance²⁵ • The New York State Department of Environmental Conservation (DEC) contracted with the New York State Pollution Prevention Institute (NYSP2I), housed at the Rochester Institute of Technology, to administer a Sustainable Food Program.²⁶ Through this program, NYSP2I offers direct assistance, an online clearinghouse of information, outreach, and education about food recovery²⁷

B. PUBLIC OUTREACH AND EDUCATION

Outreach and education are important tools to raise awareness of food waste reduction strategies and increase buy-in and compliance with an organic waste ban among both the general public and food businesses. Moreover, organic waste bans represent an important opportunity to increase awareness of the problem of food waste among the general public, even where individual residents are not covered by the ban. This public awareness is particularly important because 43 percent of food waste occurs in the home.²⁸

Awareness and buy-in from the general public can make the process of implementing an organic waste ban smoother, particularly where the policy covers residential waste generators. In the absence of such a policy, public education can still increase participation and reduce contamination in residential collection

programs. The following cities provide examples of successful public education and outreach campaigns directed at individual residents.

- When Minneapolis, Minnesota, expanded curbside composting collection from twenty-five to one hundred percent of city residents in 2015 and 2016, it also conducted a comprehensive public education campaign, funded by the state at \$315,000, which included advertisements by radio, direct mail, on the sides of trucks and buses, and on social media.²⁹ Minneapolis has continued providing public outreach to promote the program, and summer interns knocking on neighborhood doors have been some of the city's most effective communicators.³⁰ In 2017, thirty-six percent of Minneapolis residents reached through door-knocking signed up for the composting service.³¹
- In support of its organic waste ban, San Francisco has focused heavily on outreach and messaging, including conducting public education campaigns and conducting a multi-lingual door-knocking campaign to help residents learn how to comply with the law.³²

As an alternative to creating their own educational materials, states and municipalities can partner with national food waste awareness campaigns to bring more attention to local food waste diversion efforts. National campaigns can offer their messaging expertise to help states and municipalities effectively frame the issue and engage the public. For example, Dakota County, Minnesota, has partnered with NRDC's Save the Food Campaign to increase awareness of food waste among residents.³³ Save the Food is a campaign created by NRDC and the Ad Council to encourage people to take simple steps to reduce food waste.³⁴ Through this partnership, Dakota County will disseminate resources created by the Save the Food Campaign as part of a food waste prevention initiative.³⁵

Education and outreach directed at food businesses is also important to achieving state and local food waste reduction goals and compliance with organic waste bans. Building awareness is particularly important because food waste generators may fail to comply with a ban simply because they do not know its details. Mechanisms for building awareness of food waste reduction and diversion options among food waste generators can include media campaigns, online resources, press releases, public events, and direct outreach.³⁶

- In Massachusetts, in the year before the food waste ban took effect, RecyclingWorks raised awareness of the ban through strategies such as press releases, interviews with news outlets, and presentations at events across the state.³⁷
- The Oregon Department of Environmental Quality (DEQ) has created Wasted Food Wasted Money, a public awareness campaign that encourages food businesses to prevent and reduce food waste.³⁸ DEQ developed customizable materials that local governments can use to run their own campaigns.³⁹

Furthermore, education and outreach can be directed at service providers such as food rescue organizations, haulers, and processors. Vendor fairs are one effective way of conducting outreach and connecting these service providers with one another and with food waste generators.⁴⁰

SECTION 1 ENDNOTES

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- ⁴ DANA GUNDERS & JONATHAN BLOOM, NAT. RES. DEF. COUNCIL, WASTED: HOW AMERICA IS LOSING UP TO 40 PERCENT OF ITS FOOD FROM FARM TO FORK TO LANDFILL 14 (2d ed. 2017), <https://www.nrdc.org/sites/default/files/wasted-2017-report.pdf>.
- ⁵ U.S. ENVTL. PROT. AGENCY, MUNICIPAL SOLID WASTE GENERATION, RECYCLING, AND DISPOSAL IN THE UNITED STATES: FACTS AND FIGURES FOR 2012 4 (2014), https://www.epa.gov/sites/production/files/2015-09/documents/2012_msw_fs.pdf (noting that after MSW recovery via recycling and composting, food waste makes up 21% of discards).
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- ⁹ *AB-1826 Solid Waste: Organic Waste Bill History*, CAL. LEGISLATIVE INFO., https://leginfo.legislature.ca.gov/faces/billHistoryClient.xhtml?bill_id=201320140AB1826 (last visited Oct. 3, 2018).
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- ¹² Organic waste includes food waste, green waste, landscape and pruning waste, non-hazardous wood waste, and food-soiled paper waste mixed in with food waste. CAL. PUB. RES. CODE § 42649.8(c) (West 2018).
- ¹³ Source-separation generally means the separation of waste into categories at the generation stage. Haibin Chen et al., *Source separation of municipal solid waste: The effects of different separation methods and citizens' inclination—case study of Changsha, China*, 67 J. AIR & WASTE MGMT. ASS'N 182, 182 (2017), <https://www.tandfonline.com/doi/pdf/10.1080/10962247.2016.1222317>.
- ¹⁴ CAL. PUB. RES. CODE § 42649.81(b) (West 2018); *Mandatory Commercial Organics Recycling Frequently Asked Questions*, CALRECYCLE, <https://www.calrecycle.ca.gov/recycle/commercial/organics/faq> (last updated Dec. 27, 2018).
- ¹⁵ CAL. PUB. RES. CODE § 42649.81(a)(1) (West 2018).
- ¹⁶ CAL. PUB. RES. CODE § 42649.81(a)(2) (West 2018).
- ¹⁷ CAL. PUB. RES. CODE § 42649.81(a)(3) (West 2018); see CAL. PUB. RES. CODE § 42649.1(b) (West 2018).
- ¹⁸ CAL. PUB. RES. CODE § 42649.81(a)(4) (West 2018).
- ¹⁹ CAL. PUB. RES. CODE § 42649.82(a)(1) (West 2018).
- ²⁰ CAL. PUB. RES. CODE § 42649.82(d)(1) (West 2018).
- ²¹ CAL. PUB. RES. CODE § 42649.81(b) (West 2018); CALRECYCLE, *supra* note 14.
- ²² CAL. PUB. RES. CODE § 42649.81(d) (West 2018); CALRECYCLE, *supra* note 14.
- ²³ CAL. PUB. RES. CODE § 42649.82(a)(2)(A)–(C) (West 2018).
- ²⁴ CAL. PUB. RES. CODE § 42649.82(a)(2)(A)–(D) (West 2018).
- ²⁵ CAL. PUB. RES. CODE § 42649.82(e)(1) (West 2018).
- ²⁶ CAL. PUB. RES. CODE § 42649.82(e)(3) (West 2018).
- ²⁷ CAL. PUB. RES. CODE § 41780.01(a) (West 2018).
- ²⁸ CAL. PUB. RES. CODE § 41821.4 (West 2018).
- ²⁹ CAL. HEALTH & SAFETY CODE §§ 39730.5–39730.8 (West 2018).
- ³⁰ CAL. PUB. RES. CODE § 42652.5 (West 2018).
- ³¹ See *Short-Lived Climate Pollutants (SLCPs): Organic Waste Methane Emissions Reduction*, CALRECYCLE, <https://www.calrecycle.ca.gov/laws/rulemaking/slcp> (last updated Feb. 4, 2019).
- ³² CONN. DEP'T OF ENERGY & ENVTL. PROT., TIMELINE HISTORY OF ORGANICS RECYCLING IN CONNECTICUT 3–4 (2014), http://www.ct.gov/deep/lib/deep/compost/compost_pdf/organicsrecyclinghistorytimeline.pdf.
- ³³ CONN. GEN. STAT. ANN. § 22a-226e (West 2018).
- ³⁴ CONN. GEN. STAT. ANN. § 22a-226e(a)(1) (West 2018).
- ³⁵ CONN. GEN. STAT. ANN. § 22a-226e(a)(1) (West 2018).
- ³⁶ CONN. GEN. STAT. ANN. § 22a-226e(a)(2) (West 2018).
- ³⁷ *Commercial Organics Recycling Law: Information & Guidance for Food Residual Generators*, CONN. DEP'T OF ENERGY & ENVTL. PROT., www.ct.gov/deep/cwp/view.asp?a=2718&q=552676 (last updated June 2018).
- ³⁸ *Id.*
- ³⁹ *Id.*
- ⁴⁰ *Id.*
- ⁴¹ See 310 MASS. CODE REGS. 19.017 (2018); MASS. DEP'T OF ENVTL. PROT., FINAL AMENDMENTS TO 310 CMR 19.000 REGULATIONS (2014), <https://www.mass.gov/files/documents/2016/08/tj/wbreg14.pdf>.
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60 N.Y. ENVTL. CONSERVATION LAW § 27-2213 (2019).

61 N.Y. ENVTL. CONSERVATION LAW § 27-2211(2) (2019).

62 2014 R.I. Pub. Laws 184.

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64 23 R.I. GEN. LAWS § 23-18.9-17(a) (2018); 23 R.I. GEN. LAWS § 23-18.9-7(18) (2018).

65 A “[c]overed entity” means each commercial food wholesaler or distributor, industrial food manufacturer or processor, supermarket, resort or conference center, banquet hall, restaurant, religious institution, military installation, prison, corporation, hospital or other medical care institution, [or] casino.” 23 R.I. GEN. LAWS § 18.9-7(19) (2018). Covered educational facilities are “a building or group of two (2) or more interconnected buildings owned or used by a [higher educational or research] institution at which organic waste materials are generated.” 23 R.I. GEN. LAWS § 23-18.9-7(21) (2018).

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71 *Vermont’s Universal Recycling Law*, VT. DEP’T OF ENVTL. CONSERVATION, <http://dec.vermont.gov/waste-management/solid/universal-recycling> (last visited Mar. 14, 2019).

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73 VT. STAT. ANN. tit. 10, § 6607a(g)(1)(C) (2018).

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76 VT. STAT. ANN. tit. 10, § 6605k(a) (2018). Alternatively, covered generators can manage their waste on-site through one of these methods. VT. STAT. ANN. tit. 10, § 6605k (2018).

77 *See* VT. STAT. ANN. tit. 10, § 6605k (2018).

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79 VT. STAT. ANN. tit. 10, § 6605k(c)(1) (2018).

80 VT. STAT. ANN. tit. 10, § 6605k(c) (2018).

81 *See* VT. STAT. ANN. tit. 10, § 6605k(c)(5) (2018); *see* VERMONT DEP’T OF ENVTL. CONSERVATION, UNIVERSAL RECYCLING LAW TIMELINE (July 2018), http://dec.vermont.gov/sites/dec/files/wmp/SolidWaste/Documents/Universal-Recycling/Timeline-factsheet_CURRENT.pdf.

82 *See* VT. STAT. ANN. tit. 10, § 6605k(b) (2018).

83 *See* VT. DEP’T OF ENVTL. CONSERVATION, VERMONT’S UNIVERSAL RECYCLING LAW STATUS REPORT DECEMBER 2016 9 (2016), http://dec.vermont.gov/sites/dec/files/wmp/SolidWaste/Documents/Universal.Recycling.Status.Report.Dec_.2016.pdf; Paris Achen, *Mandatory Recycling? There’s Little Enforcement*, BURLINGTON FREE PRESS (July 18, 2015), <https://www.burlingtonfreepress.com/story/news/local/2015/07/17/mandatory-recycling-little-enforcement/30327889/>.

84 Generators are covered only for weeks during which they meet the threshold. MASSDEP, *supra* note 45, at 2-3.

85 Covered waste generators may receive a temporary exemption from these requirements if (a) the waste is contaminated and the person responsible takes steps to prevent the contamination from recurring; or, (b) if a waste generator’s usual processing service declines and the generator cannot find an alternative. 310 MASS. CODE REGS. 19.017(5) (2018).

86 Generators may apply for a temporary waiver if they can demonstrate “undue hardship,” including if the cost of recycling organic waste is not competitive with the cost of landfill disposal, nearby organics recyclers do not have sufficient capacity, or other unique circumstances. N.Y. ENVTL. CONSERVATION LAW (2019).

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103 *Zero Waste Regulations*, CITY OF BOULDER COLO., <https://bouldercolorado.gov/zero-waste/regulations> (last visited Mar. 14, 2019).

104 See *Universal Zero Waste Ordinance*, CITY OF BOULDER COLO., <https://bouldercolorado.gov/zero-waste/universal-zero-waste-ordinance> (last visited Mar. 14, 2019).

105 CITY OF BOULDER COLO., *supra* note 103.

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170 Food enterprises are phased in by size. Properties over 15,000 square feet were covered as of October 2016; properties over 5,000 square feet were covered as of October 2017; all food enterprises will be covered as of October 2018. AUSTIN, TEX., CODE OF ORDINANCES § 15-6-91(E) (2018).
171 Property or business owners may apply for one-year exemptions and may reapply one time for another one-year extension. BOULDER, COLO., MUN. CODE 6-3-17(a) (2018).
172 For a full list of covered entities see Hennepin County, Minn., Ordinance 13, Section IV (Nov. 27, 2018).
173 For a more comprehensive list, see Admin. Rule of Metro Code ch. 5.10-4015 (2018).
174 Local jurisdictions may establish procedures for granting temporary waivers to covered businesses if the business produces less than 250 pounds of food waste per week, physical barriers to compliance exist, compliance would be unreasonable costly, or compliance would result in a violation of another local rule. Admin. Rule of Metro Code ch. 5.10-4065 (2018).
175 Renewable 12-month waivers are available to owners of two or fewer food service establishments if both establishments (1) have a floor area of less than 7,000 square feet; (2) are franchisees of a covered food waste generator; and (3) are not the recipient of private waste carting services from an agreement between a parent company and private waste carter. N.Y.C. ADMIN. CODE § 16-306.1(g) (2018).
176 Exemptions may be provided to persons who can demonstrate that there is not sufficient space for different containers on-site. S.F., CAL., ENV'T CODE § 1910 (2018).
177 Press Release, City of San Diego, San Diego Adopts Zero Waste Plan (July 13, 2015) https://www.sandiego.gov/mayor/news/releases/20150713_ZeroWaste.
178 SAN DIEGO ENVTL. SERVS. DEP'T, CITY OF SAN DIEGO ZERO WASTE PLAN 2 (2015), <https://www.sandiego.gov/sites/default/files/legacy/mayor/pdf/2015/ZeroWastePlan.pdf>.
179 *Id.*
180 *Id.*

181 *Id.* at 12.
182 *Id.*
183 *Id.* at 13.
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185 See STATE OF OREGON DEP'T OF ENVTL. QUALITY, OREGON DEQ WASTE PREVENTION STRATEGY: TEN-YEAR FRAMEWORK AND SHORT-TERM PLAN 1–2 (2007), <http://www.oregon.gov/deq/FilterDocs/wprWPrevStrategy.pdf>.
186 See STATE OF OREGON DEP'T OF ENVTL. QUALITY, MATERIALS MANAGEMENT IN OREGON: 2050 VISION AND FRAMEWORK FOR ACTION 2–3, 7 (2012), <http://www.oregon.gov/deq/FilterDocs/MManagementOR.pdf>.
187 *Id.* at 2.
188 See STATE OF OREGON DEP'T OF ENVTL. QUALITY, OREGON DEQ STRATEGIC PLAN FOR PREVENTING THE WASTING OF FOOD 4-5 (2017), <http://www.oregon.gov/deq/FilterDocs/foodstrategic.pdf>.
189 *Id.* at 8.
190 *Id.* at 10-19.
191 See TENNESSEE DEP'T OF ENERGY & CONSERVATION, 2015-2025 SOLID WASTE MATERIALS AND MANAGEMENT PLAN 95 (2015), https://www.tn.gov/content/dam/tn/environment/solid-waste/documents/sw_2025-plan-final.pdf.
192 *Id.* at 95-100.
193 See Alle Crampton, *Advancing Composting in Tennessee*, BIOCYCLE, Feb. 2017, at 19, <https://www.biocycle.net/2017/02/14/advancing-composting-tennessee/>.
194 *Id.*
195 *Id.*
196 *Organics Management Grants*, TENN. DEP'T OF ENV'T & CONSERVATION, <https://www.tn.gov/environment/about-tdec/grants/grants-materials-management-grants/grants-organics-management-grant.html> (last visited Mar. 15, 2019).

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- ¹ See ICF, MASSACHUSETTS COMMERCIAL FOOD WASTE BAN ECONOMIC IMPACT ANALYSIS 4 (2016), <http://www.mass.gov/eea/docs/dep/recycle/priorities/orgecon-study.pdf>.
- ² *Id.* at 5.
- ³ *Id.*
- ⁴ *Id.*
- ⁵ *Id.* at 6-7.
- ⁶ *Id.* at 7.
- ⁷ *Id.*
- ⁸ *Id.*
- ⁹ *Id.* at 19. Although the disposal ban did not take effect until 2014, job growth between 2010 and 2014 may in part reflect development in anticipation of the pending disposal ban.
- ¹⁰ *Id.*
- ¹¹ *Id.* at 10.
- ¹² *Id.* at 19.
- ¹³ *Id.* at 13.
- ¹⁴ *Id.* at 19. Data on actual job growth in 2017 is not yet available as of the time of publication.
- ¹⁵ This table is recreated from ICF, MASSACHUSETTS COMMERCIAL FOOD WASTE BAN ECONOMIC IMPACT ANALYSIS 19 (2016), <http://www.mass.gov/eea/docs/dep/recycle/priorities/orgecon-study.pdf>.
- ¹⁶ *Id.* at 12.
- ¹⁷ *Id.*
- ¹⁸ Kevin Pink, *Food Rescue and Donation Continue to Increase Across Massachusetts*, RECYCLINGWORKS MASS. (June 20, 2018), <https://recyclingworksma.com/food-rescue-and-donation-continue-to-increase-across-massachusetts/>.
- ¹⁹ INDUS. ECON. INC., BENEFIT-COST ANALYSIS OF POTENTIAL FOOD WASTE DIVERSION LEGISLATION 1 (2017), <https://www.nyserderda.ny.gov/-/media/Files/Publications/Research/Environmental/Benefit-Cost-Analysis-of-Potential-Food-Waste-Diversion-Legislation.pdf>.
- ²⁰ *Id.*
- ²¹ *Id.* at 4 (defining institutions as including colleges and universities, hospitals, nursing homes, and correctional facilities; retail as including wholesale facilities, big box stores, convenience stores, supermarkets, and supercenters; and the service and hospitality sector as including hotels, motels, and restaurants).
- ²² *Id.* at 5 (presenting the breakdown of institutions and food waste generation as follows: there were 329 institutional generators, which would produce an estimated 72,362 tons of food waste per year; 1164 retail generators, which would produce an excess of 312,019 tons per year; and 201 service and hospitality generators, which would produce an excess of 32,244 tons per year).
- ²³ *Id.* at 7.
- ²⁴ *Id.* at 8.
- ²⁵ The breakdown of costs was as follows: \$9,997,031 from hauling costs, \$26,593,877 in tipping costs, \$4,411,721 in greenhouse gas emissions damages, and \$277 in sulfur dioxide emissions damages. *Id.* at 11.
- ²⁶ *Id.* at 12.
- ²⁷ *Id.* at 12-13.
- ²⁸ *Id.*
- ²⁹ *Id.* at 13.
- ³⁰ *Id.* at 13-14.
- ³¹ *Id.* at 13-14.
- ³² *Id.* at 20.
- ³³ *Id.* at 19 (showing that in the all-compost scenario the state is projected to save \$3,221,688 in gas emissions damages and \$999,990 for the all-AD scenario).
- ³⁴ *Id.* (explaining that the compost scenario generates \$5,107,471 in revenue from compost, whereas the AD scenario generates \$10,102,957 in electricity value).
- ³⁵ *Id.*
- ³⁶ *Id.*
- ³⁷ *Id.* at 23-26.
- ³⁸ *Id.* at 22.
- ³⁹ *Id.*
- ⁴⁰ *Id.* at 21.
- ⁴¹ *Id.* at 22.
- ⁴² *Id.* at 12, 19; ICF, *supra* note 1, at 18.
- ⁴³ See Indus. Econ. Inc., *supra* note 19, at 19.
- ⁴⁴ *Id.* at 16, 19-20.
- ⁴⁵ See, e.g., Amy DeLorenzo et al., *Regulating Ontario's Circular Economy Through Food Waste Legislation*, SOC. & BUS. REV. (2018); JLA PUBLIC INVOLVEMENT, INC. FOR METRO, FOOD SCRAPS COLLECTION RESEARCH AND SURVEY REPORT 6 (2016).
- ⁴⁶ See CHAMPIONS 12.3, THE BUSINESS CASE FOR REDUCING FOOD LOSS AND WASTE 13 (2017), https://champions123.org/wp-content/uploads/2017/03/report_business-case-for-reducing-food-loss-and-waste.pdf.

47 *Id.*

48 See INDUS. ECON. INC., *supra* note 19, at 26.

49 *Id.* at 25. Note that because tipping fees vary across the country, savings from hauling and tipping costs may vary for businesses depending on their location.

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54 *Id.*

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56 *Id.*

57 See SAN DIEGO ENVTL. SERVS. DEP'T, CITY OF SAN DIEGO ZERO WASTE PLAN 3 (2015), <https://www.sandiego.gov/sites/default/files/legacy/mayor/pdf/2015/ZeroWastePlan.pdf>.

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65 *Id.* at 17.

66 See, e.g., *id.* at 15.

67 *Id.*

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82 *Id.*

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SECTION 3 ENDNOTES

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- ⁴ MASS. GEN. LAWS ANN. ch. 21A, §§2, 8 (West 2018); MASS. GEN. LAWS ANN. ch. 111, § 150 (West 2018).
- ⁵ AUSTIN, TEX., CHAPTER 15-6 ADMIN. RULES 8.12.7.4 (2016).
- ⁶ *See, e.g., Waste Bans and Compliance*, RECYCLINGWORKS MASS., <https://recyclingworksma.com/waste-bans-and-compliance/> (last visited Mar. 15, 2019) (noting that inspectors monitor incoming loads at disposal sites).
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- ⁸ *See* VT. STAT. ANN. tit. 10, § 6605k (2018).
- ⁹ Hennepin County, Minn., Ordinance 13, Section IV (Nov. 27, 2018).
- ¹⁰ CAL. PUB. RES. CODE § 42652.5 (West 2018).
- ¹¹ AUSTIN, TEX., CHAPTER 15-6 ADMIN. RULES 8.5.1, 8.5.4 (2016).
- ¹² AUSTIN, TEX., CHAPTER 15-6 ADMIN. RULES 8.5.4 (2016); AUSTIN RESOURCE RECOVERY, UNIVERSAL RECYCLING ORDINANCE TECHNICAL GUIDE 18 (2014), http://austintexas.gov/sites/default/files/files/URO_Technical_Guide_web_201501.compressed.pdf.
- ¹³ *See, e.g.,* CAL. PUB. RES. CODE § 42649.81 (West 2018); CONN. GEN. STAT. ANN. § 22a-226e (West 2018); 310 MASS. CODE REGS. 19.017 (2018); 23 R.I. GEN. LAWS §18.9-17 (2018).
- ¹⁴ *See* 23 R.I. GEN. LAWS § 18.9-17(a) (2018).
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SECTION 4 ENDNOTES

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