

Department of the Environment – Yard Waste, Food Residuals, and Other Organic Materials Diversion and Infrastructure Study

Study Topic 2: Study the laws and regulations of other states, including the laws and regulations of Massachusetts, Connecticut, Vermont, California, and Rhode Island, governing the diversion of yard waste, food residuals, or other organic materials.

July 16, 2018

INTRODUCTION

Pursuant to Chapter 384 of 2017, *Department of the Environment – Yard Waste, Food Residuals, and Other Organic Materials Diversion and Infrastructure Study*, this document summarizes organic material diversion laws enacted in the following states: Massachusetts, Connecticut, Vermont, California, and Rhode Island. This document will explore laws and regulations related to source reduction, food donation, use of food as animal feed, and recycling (composting, mulching, and anaerobic digestion).

SOURCE REDUCTION AND REUSE

The U.S. Department of Agriculture (USDA) Economic Research Service reports an estimated 31 percent of food available for human consumption in 2010 was lost at the retail and consumer levels, resulting in an estimated total retail loss of \$161.6 billion. The top three food groups lost, in terms of retail monetary value, were animal-based at \$48 billion (30 percent), vegetables at \$30 billion (19 percent), and dairy products at \$27 billion (17 percent).^{1, 2} Laws which promote the source reduction of food residuals, donation of edible surplus food, or reuse of food through animal feeding can combat food loss in the U.S. These laws can include consistent and science-based date labeling provisions, liability protection and safety standards for food donation, and clear rules for use of human food residuals as animal feed. However, most states do not expand the donation liability protections, food labeling, and food safety requirements codified in federal laws. In addition, the complexity of federal animal feed laws can disincentivize the reuse of food residuals as animal feed. The subsequent sections will explore how states have adopted or expanded upon federal laws in these areas.

Date Labeling of Food

Consumers and sellers of food often rely upon date labels in determining when to discard food as no longer safe to eat or sell. However, in many circumstances, date labels are not required by law and are not intended to communicate information on product safety. Further, producers use a broad variety of date language to communicate information such as peak quality, leading to inconsistency and consumer confusion. States' labeling laws are not uniform in the food products regulated, nor in food products that are prohibited from being sold or served past the label's date. Rethinking date labeling policies and clarifying the meaning of labels through outreach can achieve source reduction by preventing the disposal of wholesome food simply because it is near or past the date on the label.³

At the federal level, the U.S. Food and Drug Administration (FDA) only regulates date labeling of infant formula.⁴ The USDA Food Safety and Inspection Service (FSIS) regulates the labeling of meat, poultry and egg products. FSIS regulations allow the voluntary use of date labels on regulated food products, provided that the labels are not false or misleading and comply with FSIS calendar date provisions.^{5, 6} Most states only regulate date labeling

¹ See Buzby, J., et al. *The Estimated Amount, Value, and Calories of Postharvest Food Losses at the Retail and Consumer Levels in the United States*. Economic Information Bulletin Number 121. Economic Research Service, United States Department of Agriculture. Feb. 2014. https://www.ers.usda.gov/webdocs/publications/43833/43680_eib121.pdf.

² The Economic Research Service's food loss estimations are adjusted to exclude inedible food residuals, such as vegetable peels.

³ *Keeping Food Out of the Landfill: Policy Ideas for States and Localities*, Harvard Food Law and Policy Clinic. p. 26. Oct. 2016. https://www.chlpi.org/wp-content/uploads/2013/12/Food-Waste-Toolkit_Oct-2016_smaller.pdf.

⁴ 21 CFR § 107.20.

⁵ 9 CFR 317.8 and 381.129.

of dairy products and shellfish. Table 1 provides an overview of Massachusetts, Connecticut, Vermont, California, and Rhode Island laws requiring date labels.

Table 1. State Food Date Labeling Laws

Citation	Food Items Requiring Date Labels	Sale Past Date Label Prohibited
California		
Cal. Food & Agric. Code § 27644	Eggs	No
Cal. Food & Agric. Code § 36004; 3 CCR § 627	Dairy products	No
Cal. Health & Safety Code § 114039	Shellfish	No
Connecticut		
Conn. Gen. Stat. Ann. § 22-197b; Conn. Agencies Regs. §22-133-131	Dairy products	No
Conn. Gen. Stat. Ann. § 26-78a(c) ⁷	Donated game meat	No
Massachusetts		
105 CMR 500.006	Prepackaged perishable or semi-perishable food products, with exemptions ⁸	Yes, with exemptions
Maryland		
COMAR 10.15.06.10-.11	Grade A Milk	Yes, with exemptions ⁹
Rhode Island		
R.I. Gen. Laws Ann. § 21-14-9	Shellfish	No
R.I. Gen. Laws Ann. § 21-33-2	Packaged baked goods	Yes, with exemptions
Vermont		
12-5 Vt. Code R. § 30:5-204	Shellfish	No
12-5 Vt. Code R. § 30:5-205	Ready-to-eat, potentially hazardous food	Yes

Massachusetts has a broad requirement for labeling of packaged food products with a recommended last date of retail sale (indicated with “sell by,” “best by,” or “use by” language) that provides for a reasonable subsequent period of home shelf life.¹⁰ Shelf life is not necessarily a safety-related concept but takes into account risk of spoilage, loss of nutritional value, and loss of palatability. Frozen or long shelf life food products may be date labeled, in which case they must follow the format of the label laid out in the regulation. Massachusetts generally prohibits sale of past-date food products, but provides additional detail, allowing food products to be distributed after the date if the food is (1) apparently wholesome and its quality is not considerably reduced; (2) segregated from food products that have not exceeded their date; and (3) labeled

⁶ In December 2016, the USDA FSIS issued new guidance which recommends the use of the “Best if Used By” phase when applying date labels to meat, poultry, and eggs products. The “Food Product Dating” guidance document can be view at: <https://www.regulations.gov/contentStreamer?documentId=FSIS-2016-0044-0001&contentType=pdf>.

⁷ Charitable organizations must notify recipients the donated game meat was not and is not required to be inspected under Connecticut’s food safety laws and the State is not liable for injury as a result of eating the meat, and meat should be labeled with the phrase “not for sale.”

⁸ The food products exempt from Massachusetts food labeling regulations include: fresh meat, poultry, fish, fruits and vegetables unpackaged or packaged in translucent containers; pre-packaged food products for retail sale weighing less than 1.05 ounces; and food products intended for sale outside of Massachusetts (105 CMR 500.006(B)(9)).

⁹ Food service facilities, hospitals, schools, institutions, and place where milk is consumed on the premises can serve Grade A Milk for no more than four days past the sell-by-date (COMAR 10.15.06.11).

¹⁰ 105 CMR 500.006(B)(5).

indicating the product is for sale after the recommended sale or use by date.^{11, 12} Vermont’s food label regulations incorporate food safety provisions, requiring ready-to-eat, potentially hazardous food to be labeled with a date that is at least seven calendar days from the preparation date or its removal from refrigeration of at least at 41 °F.^{13,14} If the food is not consumed or sold within this seven day period, it must be disposed of.¹⁵

Liability Protection for Food Donation

The Bill Emerson Good Samaritan Food Donation Act (the Emerson Act) serves as a federal baseline by providing liability protection to donors and nonprofit recipients of donated food where the food is distributed by a non-profit at no cost to needy populations and the donor or nonprofit distributor did not act with gross negligence or intentional misconduct.¹⁶ The Emerson Act also protects a person who allows the gleaning of donations on the person’s property from civil or criminal liability that arises due to the injury or death of the gleaner, where the donations are distributed to needy populations and the person did not act with gross negligence or intentional misconduct.¹⁷ The Harvard Food Law and Policy Clinic has examined the limitations of the Emerson Act and ways in which state laws may provide stronger liability protections.¹⁸ The Emerson Act does not provide liability protection for food donations that are distributed at a nominal fee to recipients or that are distributed directly to recipients without passing through a nonprofit. The donated food must comply with quality and labeling standards, even where those standards are not safety-related, and the Emerson Act does not explicitly protect food that is past the date on the label but is still safe for human consumption. The Emerson Act addresses only food donated for human consumption, not food used for animal feed.

Table 2. State Liability Protection Laws

State	Law Citation	Liability Protection		Distributors Covered		Nominal Fee Permitted	Past Shelf Date Covered
		Civil	Criminal	Non-Profit	Direct		
CA	Cal. Civ. Code § 1714.25	X		X	X		X
CT	Conn. Gen. Stat. Ann. §§ 52-557L-K; Conn. Gen. Stat. Ann. § 26-78a	X	X	X		X	
MA	Mass. Gen. Laws Ann. Ch. 94, § 328 ¹⁹ ; 105 CMR 500.006(B)(4)	X		X		X	X
MD	Md. Code Ann. Cts. & Jud. Proc. § 5-634; Md. Code Ann. Health—Gen. § 21-322	X		X			

¹¹ The Emerson Act defines “apparently wholesome” as food that meets all quality and labeling standards imposed by Federal, State, and local laws and regulations even though the food may not be readily marketable due to appearance, age, freshness, grade, size, surplus, or other conditions (42 U.S. Code § 1791(b)(2))

¹² 105 CMR 500.006(B)(4).

¹³ Ready to eat food means food that is edible without washing, cooking, or additional preparation can be consumed in this form (12-5 Vt. Code R. § 30.13).

¹⁴ Potentially hazardous food means food that requires temperature control to prevent the growth of infectious or toxigenic bacteria (12-5 Vt. Code R. § 30:5-203).

¹⁵ 12-5 Vt. Code R. § 30:5-205.

¹⁶ 42 USC § 1791.

¹⁷ Id.

¹⁸ Harvard Food Law and Policy Clinic, *Keeping Food Out of the Landfill: Policy Ideas for States and Localities*, p. 6. Oct. 2016.

https://www.chlpi.org/wp-content/uploads/2013/12/Food-Waste-Toolkit_Oct-2016_smaller.pdf

¹⁹ A non-profit organization’s liability protection is contingent on the organization ensuring the food establishment which donated the food is compliant with the permit and inspections requirements of the Department of Public Health and the local board of health.

RI	R.I. Gen. Laws Ann. § 21-34-1—2; R.I. Gen. Laws Ann. § 21-33-3 ²⁰	X	X	X			Prepacked baked goods
VT	VT. Stat. Ann. Tit. 12 §§ 5761-5762 ²¹	X	X	X	X		

Table 2 summarizes the food donation liability laws in selected states. The limitations of the Emerson Act can be addressed within provisions of states’ individual “Good Samaritan” food donation laws. For example, California and Vermont protect direct donation of food to needy people, without passing through a non-profit.²² Specifically, California’s law protects direct donation by food facilities, and Vermont’s law protects donation by any “good-faith donor.”²³ Connecticut and Massachusetts both allow nonprofit organizations to distribute donated food at a fee while maintaining liability protection for the donor and nonprofit organization. In Massachusetts, the fee must be “sufficient only to cover the cost of handling such food,” and in Connecticut the fee must be “nominal.”²⁴ Massachusetts, which has stringent date labeling laws for food (see above), specifically allows for the donation of past-date food without losing liability protection, as long as that food meets other requirements related to wholesomeness, separation from other foods, and labeling.²⁵

Food Safety Standards for Food Donation

The FDA Food Code establishes national food safety standards for food establishments; however, it is not codified into federal law.²⁶ States can choose to adopt the FDA Food Code in its entirety or in part. Massachusetts, Connecticut, Vermont, California, and Rhode Island have all adopted a version of the FDA Food Code; however, neither the FDA Food Code nor these states’ food safety regulations provide comprehensive standards for safely handling food intended for donation.²⁷ The Comprehensive Resource for Food Recovery Programs,²⁸ the sole federally recognized food donation guide for entities facilitating food recovery programs, is updated infrequently and does not incorporate the FDA Food Code. This may discourage state regulatory agencies from adopting provisions of the Comprehensive Resource for Food Recovery Programs into state food safety regulations.²⁹

Texas and Washington have adopted regulations that provide comprehensive food safety guidance for food establishments participating in food recovery programs. If more states enacted similar laws, food establishments may be incentivized to participate in food recovery programs. Summaries of Texas’ and Washington’s donated food safety regulations are provided below:

²⁰ Rhode Island authorizes the sale of pre-packed baked goods after the “past date” as long as (1) its separated from products that have not and (2) is labeled as being offered for sale “past date.”

²¹ Vermont does not extend liability protection for the donation of canned goods that are rusted, leaking, swollen or defective

²² Cal. Civ. Code § 1714.25(a).

²³ VT. Stat. Ann. Tit. 12 §§ 5762(a).

²⁴ Mass. Gen. Laws Ann. Ch. 94, § 328; Conn. Gen. Stat. Ann. §§ 52-557l(a).

²⁵ Id.; 105 CMR 500.006(B)(4).

²⁶ The FDA Food Code webpage: <https://www.fda.gov/Food/GuidanceRegulation/RetailFoodProtection/FoodCode/>.

²⁷ Massachusetts adopted the 1999 FDA Food Code, Connecticut adopted the 2017 FDA Food Code; Vermont and California adopted the 2001 FDA Food Code; and Rhode Island adopted the 2005 FDA Food Code. See full list the adoption of the FDA Food Code by each state at <https://www.fda.gov/downloads/Food/GuidanceRegulation/RetailFoodProtection/FoodCode/UCM577858.pdf>.

²⁸ Food Recovery Committee. *Comprehensive Resource for Food Recovery Programs*. Apr. 2016, The Conference for Food Protection. <http://www.foodprotect.org/media/guide/comprehensive-resource-for-food-recovery-2016-version.pdf>.

²⁹ Harvard Law School Food Law and Policy Clinic and the Natural Resources Defense Council. *Don’t Waste, Donate: Enhancing Food Donations Through Federal Policy*. Mar. 2017, <https://www.nrdc.org/sites/default/files/dont-waste-donate-report.pdf>.

- Texas establishes requirements for properly handling, transporting, and storing potentially hazardous food for distribution through a charitable organization or directly to a recipient.³⁰ In addition, it outlines the food products that are not permitted for donation, which include, for example, foods previously served to customers, heavily rim- or seam-dented canned goods, packaged foods without the manufacturer's complete labeling, and foods that have been subject to extreme temperature or weather.
- Washington provides comprehensive donated food safety requirements for operating a food recovery program.³¹ It exempts donated food distribution organizations from requirements of a food establishment permit and certain food service regulations if (1) the food is donated to food insecure populations; and (2) potentially hazardous food prepared on-site is distributed within eight hours. It also:
 - Establishes standard operating procedures and equipment requirements for donated food distribution organizations to ensure food safety;
 - Lists the food products a donated food distribution organization may and may not receive, and requires all food products received to be inspected for quality and safety;
 - Allows alternative labeling of packaged foods; and
 - Requires record keeping of certain received donated foods for at least 30 days and annual reporting to the local board of health.

Animal Feeding Policies

Certain types of food residuals that cannot be used to feed hungry people may be used to feed animals, such as brewery grains; peels, hulls, pulp and other produce residuals; and human food products that are safe but not marketable for various reasons. A human food facility may provide food residuals directly to an animal producer for feeding or to an animal feed production facility for further processing. Or, a human food facility may process food into animal feed on site.

Federal and state laws govern the use of food residuals as animal feed with an emphasis on preventing the spread of diseases. The majority of state laws incorporate the animal feed requirements mandated in federal laws, including the following:

- Animal feed may not be adulterated or handled in unsanitary conditions nor may food labels be false or misleading, pursuant to the Food, Drug, and Cosmetic Act (FD&C Act);³²
- “Garbage” must be heat-treated (212°F for 30 minutes) by a licensed facility before being fed to swine, pursuant to the Swine Health Protection Act; and^{33, 34}
- Food residuals containing animal tissue may not be used as feed for ruminant animals, pursuant to the Transmissible Spongiform Encephalopathy/Ruminant Feed Ban Rule.³⁵

Table 3 summarizes state laws related to feeding food residuals to animals.

³⁰ 25 Tex. Admin. Code § 228.83.

³¹ Wash. Admin. Code § 246-215-09400 et seq.

³² 21 USC §§ 342 – 343.

³³ 9 CFR § 166.

³⁴ Federal law defines “garbage” as all waste material derived in whole or in part from the meat of any animal and other refuse of any character that has come into contact with the meat of an animal due to handling, preparation or consumption. This definition excludes meat containing food waste from a household that is fed to swine only for that household’s use (9 C.F.R. § 166.1).

³⁵ 21 CFR § 589.2001.

Table 3. State Laws Governing Use of Food Residuals for Animal Feed³⁶

Citation	Animal Covered	License To Feed	Treatment Requirements	Covered Food Scrap Types
California				
Cal. Food & Agric. Code §§ 10901–90	Swine	Required	Boil 212°F/30 min	Untreated garbage
Cal. Food & Agric. Code § 34006	Farm Livestock	No	Boil 145°F/30 mins or 185°F	Unpasteurized milk
Connecticut				
Conn. Gen. Stat. §§ 22-320a–g	Swine	Required	Boil 212°F/30 min	Untreated garbage
Maryland				
Md. Code Ann., Agric. § 3-404 ³⁷	Swine	Required	Heat-treated	Garbage
Massachusetts				
Mass. Gen. Laws ch. 270, § 9	All ruminants	No	None	Animal Tissue
Mass. Gen. Laws ch. 129, § 14B	Swine	Required	Boil 212°F/30 min	Untreated garbage
Rhode Island				
R.I. Gen. Laws §§ 4-3-1–11	Swine	Required	Boil 212°F/30 min	Garbage
Vermont				
Vt. Stat. Ann. tit. 6, §§ 1671–77	Swine	No	None	Garbage

In addition to these laws, animal food production facilities must comply with the FDA’s Food Safety Modernization Act (FSMA) Preventive Controls rule for animal food.³⁸ The FSMA Preventive Controls rule for animal food applies to facilities registered under the FD&C Act to manufacture, process, pack, or hold animal food.³⁹ It does not apply to farms, retail food establishments, restaurants, non-profits producing or serving food directly to consumers, and non-processing fishing vessels.^{40, 41} In general, the FSMA Preventive Controls rule requires animal food facilities to implement the following food safety controls: Current Good Manufacturing Practices (CGMPs); (2) Hazard Analysis and Risk-based Preventive Controls (HARPC); and if applicable, a Supply Chain Program.⁴² A human food facility that uses human food by-products for animal feed is subject only to basic CGMPs related to holding and distribution if it already complies with CGMPs and other safety requirements for human food under the FD&C Act, and does not further process (e.g. cook, pelletize) the by-products for use as animal feed. Modified requirements exist for very small businesses.

³⁶ All state swine feeding laws exempt households from garbage treating licenses and authorize the feeding of untreated household garbage to swine on that household’s premises.

³⁷ Maryland law does not specify the temperature or duration the garbage must undergo heat-treatment. The law requires the garbage be heat-treated until it is a uniform consistency containing no more than one percent moisture and is determined to be non-putrescible; the resultant product is considered commercial animal feed, not garbage.

³⁸ 21 CFR § 507.

³⁹ 21 USC § 350d.

⁴⁰ 21 CFR 507.5(a). 21 CFR § 1.226 lists the facilities exempt from registration under section 350d of the FD&C Act; these facilities are also exempt from the FSMA Preventive Control rule for animal food.

⁴¹ Processing fishing vessels are required to develop and implement Preventative Controls rule for human food’s CGMPs and HARCPs for their operations (21 CFR 123).

⁴² *Leftovers for Livestock: A Legal Guide for Using Excess Food as Animal Feed*, by Harvard Law School Food Law and Policy Clinic and the Food Recovery Project at the University of Arkansas, provides a comprehensive guide of federal and state animal feeding laws. The full report can be accessed at https://www.chlpi.org/wp-content/uploads/2013/12/Leftovers-for-Livestock_A-Legal-Guide_August-2016.pdf

ORGANIC MATERIALS DISPOSAL BANS

The entire “Organic Material Disposal Bans” section contains updated and new information.

Overview of Bans and Recycling Mandates

Massachusetts, Connecticut, Vermont, California, and Rhode Island have enacted laws that ban disposal or require diversion of food residuals. All these states except Rhode Island have also passed laws that ban disposal of yard trimmings. California’s law requires commercial businesses that generate a specific tonnage of organic material to arrange for recycling services for those materials. The other four states prohibit covered generators of organic materials from disposing of those materials and/or require covered generators to divert those materials from disposal. Generators are subject to the laws if they generate greater than a threshold quantity of organic materials; some states also apply a threshold distance from an available composting or anaerobic digestion facility with capacity. See Table 4 for a summary of the laws in selected states.

Table 4. State Organic Waste Bans and Mandatory Recycling Laws

Citation	Waste Covered		Generation Threshold		Generators Covered			Distance Exemption
	Food	Yard			Residential	ICI	Gov't	
California Cal. Pub. Res. Code §§ 42649.81 - 42649.82 (2014) ⁴³	X	X	2016 2017 2020	8 yd ³ /week 4 yd ³ /week 2 yd ³ /week ⁴⁴		X		None
Connecticut Conn. Gen. Stat. Ann. § 22a-208v (1993) Conn. Gen. Stat. Ann. §22a-226e (2013)	X	X	1998 2014 2020	None 104 tons/year 52 tons/year	X	X X	X	None 20 miles
Maryland Md. Code Ann., Envir., §9-1724 (1992) ⁴⁵		X	1992	None	X	X	X	None
Massachusetts 310 CMR 19.017 ⁴⁶	X	X	1991 2014	None 1 ton/week		X	X	None
Rhode Island R.I. Gen. Laws Ann. § 23-18.9-17 (2014)	X		2016 2018	104 tons/year 52 tons/year		X		15 miles ⁴⁷
Vermont Vt. Stat. Ann. tit. 10, § 6621a (2012) Vt. Stat. Ann. tit. 10, § 6605k (2012)	X	X	2016 2014 2015 2016 2017 2020	None 104 tons/year 52 tons/year 26 tons/year 18 tons/year None	X X	X X	X X	None None

⁴³ Rural counties may adopt a resolution exempting the county from the mandatory recycling requirements.

⁴⁴ If by 2020 the statewide organic waste disposal rate has not been reduced to 50% of the 2014 levels, covered generators reaching two cubic yards (yd³) threshold will be required recycle organic material.

⁴⁵ The ban only applies to the disposal of source separate yard trimmings.

⁴⁶ A temporary disposal of restricted organic materials may be permitted if (1) the material is not acceptable for recycling or composting; and (2) if a recycling facility is unable to accept material.

⁴⁷ A waiver may be granted if a composting or anaerobic digestion facility tipping fee is greater than landfill or incinerator facility fee.

Vermont's Universal Recycling Law is the most extensive of the organics disposal bans, requiring all generators to comply with the disposal bans for yard trimmings and food residuals by 2016 and 2020, respectively.⁴⁸ The Vermont law incorporates several additional components, aside from the mandate on generators:

- The law includes waste management hierarchy language, declaring that "it is the policy of the state that food residuals collected...shall be managed according to the following order of priority uses: (1) reduction of the amount generated at the source; (2) diversion for food consumption by humans; (3) diversion for agricultural use, including consumption by animals; (4) composting, land application, and digestion; and (5) energy recovery."⁴⁹
- The 2012 version of the law instituted parallel collection of organic materials by solid waste haulers and drop-off centers. Both were required to offer yard trimmings and food residual collection services. Drop-off centers and waste haulers were required to offer recycling services for yard trimmings by 2015 and 2016 and to offer food residual recycling services by 2017 and 2018, respectively.⁵⁰ Act 208 of 2018 repealed the requirement for haulers to collect yard trimmings and provided that drop-off centers only have to collect yard trimmings between April 1st and December 15th. In addition, the requirement for haulers to offer food residual collection was delayed from July 1, 2018 to July 1, 2020.

Also, a provision was added in 2018 that requires haulers that offer bag-drop or fast-trash at a fixed site to offer collection of yard trimmings and food residuals.⁵¹ The next section will discuss how these changes to the Universal Recycling Law may impact organics diversion in Vermont.

Results of Organic Materials Ban

The following section will summarize successes and challenges experienced by Massachusetts, Connecticut, Vermont, California, and Rhode Island in implementing their organic materials diversion laws.

California

The most recent data available from California is from calendar year 2016. The Mandatory Commercial Organics Recycling Law became effective for certain businesses beginning in April 2016, so data is not yet available to determine whether the law has had an impact on recycling rates. According to the *2017 State of Disposal in California and State of Recycling in California Report*, in 2016 the State reported a recycling rate of 44 percent, which was the lowest rate since a 75% recycling goal was established in 2011.⁵² Calendar year 2016 marked the fourth consecutive year in which disposal rates have increased. Also, the largest component of landfill alternative daily cover (ADC) was green material.⁵³

The California Department of Resources Recycling and Recovery discussed in the 2017 report several challenges facing organics recovery. California's organic material processing infrastructure does not have enough capacity to process all the organic material generated, and the development of new composting facilities has stalled. The environmental value of compost use (improved soil health, etc.) has not been translated into monetary value, leading to a small market for compost. While the State has begun to monitor compliance with the commercial organics recycling requirement, the report noted that "there are few compliance tools in place to ensure that

⁴⁸ Act 148, Statutes of 2012 - An act relating to establishing universal recycling of solid waste.

⁴⁹ Sections 6605 and 6607a of the Conservation and Development Title require leaves and yard trimmings be managed according to the priorities established in subdivisions 6605k(a)(3)–(5).

⁵⁰ Vt. Stat. Ann. tit. 10, §§ 6605(j) and 6607a(g)(1).

⁵¹ Section 2 of Act 208, Statutes of 2018.

⁵² See the *State of Disposal in California and State of Recycling in California Report* at http://www.calrecycle.ca.gov/publications/Documents/1612/2017%20State%20of%20Recycling%20and%20Disposal%20Report_01612.pdf.

⁵³ Starting in 2020, using green materials as ADC will count as disposal under the 75 percent recycling 2011 law.

businesses recycle organic waste.”⁵⁴ Further, the report stressed that improved infrastructure will be key to implementing the new law and cited the State’s Organics Grant Program as one effort to address this challenge.⁵⁵

Connecticut

The Commercial Organics Recycling Law went into effect in 2014, and the food residuals generation threshold decreased in 2016, subjecting additional generators to the law. According to the *State-wide Solid Waste Composition and Characterization Stud[ies]* (the “study”) of 2010 and 2015, organic materials accounted for an estimated 26.7 percent in 2009 and 33.4 percent in 2015 of MSW (both residential and ICI) disposed.⁵⁶ When comparing the change in MSW composition between 2009 and 2015, the tons of yard trimmings disposed decreased by an estimated 79,000 tons; however, food residuals disposed increased by an estimated 198,000 tons (see Table 5).⁵⁷ The increase in food residuals may be due to the challenges related to (1) collecting source-separated food residuals; and/or (2) separating disposed food residuals from other refuse in order to be use as feedstock at an organic materials processing facility. In fact, an estimated 12.4 percent of the approximate 520,000 tons of food discarded in 2015 was packaged, which would require pre-processing and may prevent its recovery for composting or anaerobic digestion.

Table 5: Composition of Organic Materials in the Connecticut MSW* Stream ⁵⁸

Organic Waste Type	CY 2009		CY 2015	
	Est. % Disposed	Est. Tonnage	Est. % Disposed	Est. Tonnage
Yard Waste**	9.4%	223,958	6.2%	145,367
Food Waste	13.5%	321,481	22.3%	519,832

* MSW Stream includes both residential and ICI generated waste.

** Yard waste includes leaves and grass, and prunings and trimmings.

The 2015 study also included waste sampling at two material recovery facilities, which revealed that an estimated one percent of residential single-stream recyclables consisted of food residuals (including sorted bagged waste). The 2015 study does not include tonnages of food residuals received by material recovery facilities and cannot be compared to the more than 4,600 tons of food residuals diverted in 2017.⁵⁹ The Connecticut Department of Energy and Environmental Protection (DEEP) informed the Department that one broader challenge it faces in evaluating the impact of the food residuals disposal ban is tracking activities of food

⁵⁴ *State of Disposal in California and State of Recycling in California Report*, p. 19 at http://www.calrecycle.ca.gov/publications/Documents/1612/2017%20State%20of%20Recycling%20and%20Disposal%20Report_01612.pdf.

⁵⁵ *Id.*

⁵⁶ The 2015 *Connecticut Statewide Solid Waste Composition and Characterization Study* separated the categories of food waste (22.3%) and other organic waste (11.1%); these percentages are added together in the above discussion because they were not separated in the 2010 *Connecticut Statewide Solid Waste Composition and Characterization Study*. Note, the 2010 study contains results from waste sorting that occurred in 2009 and were then applied to Connecticut Department of Environmental Protection 2009 MSW tonnage.

⁵⁷ See Table 3-2 Comparison of Detailed MSW Composition from the 2015 *Connecticut Statewide Solid Waste Composition and Characterization Study*. Please note, change in the disposal of categories leaves & grass (-0.2%) and trimmings & prunings (-2.9%) were added together.

⁵⁸ See the *Statewide Solid Waste Composition and Characterization Stud[ies]* of 2010 and 2015 published on the Connecticut Department of Environmental Protection website at http://www.ct.gov/deep/cwp/view.asp?a=2718&q=439264&deepNav_GID=1639.

⁵⁹ The *CT Statewide Average Municipal Solid Waste (MSW) Statistics* document, which reports the average recycling, disposal and generation rates per fiscal year has not been made publicly available since 2014. However, the Connecticut Department of Environmental Protection through email correspondences with the Department provided tonnages for food residuals diverted to the State’s four permitted composting and anaerobic digestion facilities.

generators and food donation organizations. These generators or charitable organizations are not traditionally regulated by DEEP. Despite these challenges, DEEP believes that the increase in food scrap feedstocks led to the construction of one operating anaerobic digestion facility, and one composting facility has begun processing food residuals. Another three anaerobic digestion facilities have received DEEP authorization ; however, construction has yet to begin due to delays in finalizing power purchase agreements with utilities needed to secure financing.

Massachusetts

Since Massachusetts amended its solid waste disposal regulations to include a ban on disposing commercial food residuals in 2014, it has seen a growth in the in-state organics recovery industry.^{60, 61} When comparing the 2014 and the 2017 *Municipal Solid Waste & Recycling Survey* responses, 15 percent of reporting municipalities offered food residuals recycling services in 2017 versus only nine percent in 2014.⁶² In addition, municipalities enforcing mandatory recycling on a local level increased from 33 percent in 2014 to 49 percent in 2017.⁶³ Although 2,081 tons more of food residuals was composted in 2017, the tonnage of yard trimmings composted decreased by 92,789 tons from the levels reported in 2014.

Commissioned by the Massachusetts Department of Environmental Protection (MassDEP), consultant firm ICF analyzed the impact the Commercial Food Waste Disposal Ban on the organics recovery industry.⁶⁴ The study found that the Commercial Food Waste Disposal Ban further encouraged the cultural trend within the Commonwealth, which started in the 1990s, of residences and businesses adopting organic material diversion practices. Some other highlights from the report are as follows:⁶⁵

- In 2016, the organics recovery industry added approximately \$77 million to the gross state product and generated approximately \$175 million in economic activity.
- Food rescue organizations, organic material haulers, and organic materials processing facilities experienced a 150 percent increase in the number of employees from 2010 to 2015.⁶⁶
- Organic material haulers and processing facilities managed six and eight times more food residuals, respectively, in 2015 when compared to 2010.⁶⁷
- Some organic materials haulers and processors interviewees indicated their customer base has remained mostly consistent with pre-2014 levels but fluctuates as a result of pilot and short-term grant programs aimed at increasing food waste diversion.
- Food residuals processors and haulers are concerned with the availability of composting sites that have capacity to process high volumes of material at a low cost, as well are located nearby generators.
- Although food rescue organizations report an increase in food establishments willing to donate food, the solid waste regulations weighing the donation and recycling of food equally exacerbates the issue of large generators' preference for composting food residuals.⁶⁸

⁶⁰ 310 CMR 19.017

⁶¹ See ICF Inc. (2016, December). *Massachusetts Commercial Food Waste Ban Economic Impact Analysis*.

<https://www.mass.gov/files/documents/2016/12/nx/orgecon-study.pdf>.

⁶² In both 2014 and 2017, three fourths of Massachusetts municipalities participated in MassDEP's *Solid Waste and Recovery Surveys*. The excel sheets summarizing the annual Solid Waste and Recovery Surveys can be accessed on the "Recycling & Solid Waste Data for Massachusetts Cities & Towns" webpage at <https://www.mass.gov/lists/recycling-solid-waste-data-for-massachusetts-cities-towns>.

⁶³ Generators, haulers, and waste processors are regulated under the ban; however, Massachusetts municipalities can enact local laws and recycling programs to encourage compliance with state-wide commercial food waste ban.

⁶⁴ Ibid.

⁶⁵ Ibid.

⁶⁶ See "Figure 2. Average Number of Employees per Business" of the *Massachusetts Commercial Food Waste Ban Economic Impact Analysis*.

⁶⁷ Haulers and processors managed fewer than 33,000 tons in 2010 and more than 200,000 tons in 2015. Note, these tonnages only reflect information collected from survey respondents. See "Figure 5. Average Annual Tonnage of Food Received by Industry Segment, 2010-2016 per Business" of the *Massachusetts Commercial Food Waste Ban Economic Impact Analysis*.

Rhode Island

Rhode Island's statute requires all collected municipal refuse and recyclables be delivered to the Rhode Island Resource Recovery Corporation (RIRRC) solid waste acceptance facility.⁶⁹ Before the Commercial Food Waste Disposal Ban's 2016 effective date, the *2015 Rhode Island Solid Waste Characterization Study* revealed that vegetative food waste, at 17.1 percent, was the largest component of organic material received at the RIRRC landfill.⁷⁰ The RIRRC publishes an annual "Municipal Summary" that reports each municipalities recycling and diversion rates. The "2017 Municipal Summary" reveals the tonnage of leaf and yard waste composted peaked in 2015 (67,284 tons) and decreased by more than 4,000 tons as of 2017 (63,103 tons).⁷¹

It is difficult to empirically assess the impact of the Commercial Food Waste Disposal Ban in Rhode Island. The annual RIRRC "Municipal Summary" composted material tonnage reported and calculated mandatory recycling rate does not include commercially generated food residuals composted as a result of the ban. The Rhode Island Code of Regulations (RICR) lists leaf and yard waste as the only "mandatory" organic material that must be diverted under a municipal and business recycling program; the mandatory recycling rate incorporates the tonnage of RICR "mandatory recyclables" diverted from disposal.⁷² Also, Rhode Island businesses are no longer required to submit an "Annual Recycling Report" to the Rhode Island Department of Environmental Management (RIDEM) as of 2016.⁷³

Nonetheless, the RIDEM believes without the certainty of organic feedstock diverted under disposal ban the State's first commercial anaerobic digester would not have been constructed.⁷⁴ As of 2017, a commercial scale composting facility and animal feeding operation have begun to process food residuals.⁷⁵ However, the RIDEM expressed that the interest of commercial generators to recycle their food residuals exceeds the current organic material processing infrastructure capacity.

Vermont

Overall, the Universal Recycling Law has increased organic material diversion since its enactment in 2012. The *2016 Diversion and Disposal Report* notes the following changes in Vermont's organic material diversion:⁷⁶

- The diversion rate was higher than the average diversion rate over the last 17 years. Vermont diverted a total of 44,383 tons of organic materials, which included 32,788 tons of material composted at households and 11,595 material processed at organic recycling facilities;⁷⁷
- Nine composting facilities were certified to process food residuals and/or yard trimmings; and
- The Vermont Food Bank reported that 3,658 tons of food diverted was through food donation.

⁶⁸ Food rescue organizations explained that generators prefer composting food residuals because handling procedures do not involve food safety provisions and can allow for centralized waste management at all a generator's location.

⁶⁹ R.I. Gen. Laws Ann. §§ 23-18.9-1 and 23-19-4.

⁷⁰ See *RI Statewide Solid Waste Composition and Characterization Study 2015* at <https://www.rirrc.org/sites/default/files/2017-02/Waste%20Characterization%20Study%202015.pdf>.

⁷¹ See the "2017 Municipal Summary" at http://www.rirrc.org/sites/default/files/2018-03/2017%20Municipal%20Summary%20Detailed%20with%20Charts%2020180330_0.pdf.

⁷² 250-RICR-140-20-1.6 and 250-RICR-140-20-2.15.

⁷³ According to the RIDEM "Annual Recycling Report" webpage commercial business are no longer required to submit a recycling survey as RIDEM plans to remove this requirement in revised commercial regulations. See <http://www.ri.gov/DEM/recycling>.

⁷⁴ The Orbit Energy commercial anaerobic digestion facility is designed to accept up to 250 tons of food residuals daily. See Faulkner, T. (2017, May 8). *R.I.'s First Digester Expected to Take Food Scrap in June*. <https://www.ecori.org/composting/2017/5/8/food-digester-taking-scrap-in-june>.

⁷⁵ See "Rhode Island Wasted Food Stakeholder Engagement and Initial Findings" 2017 report by the Center for EcoTechnology at https://wastedfood.cetonline.org/wp-content/uploads/2018/03/AssessmentRI_112117_nomarks_nospread.pdf.

⁷⁶ See the *2016 Diversion and Disposal Report: A summary of solid waste management in the State of Vermont* at <http://dec.vermont.gov/sites/dec/files/wmp/SolidWaste/Documents/2016-Diversion-and-Disposal-Report.pdf>.

⁷⁷ The overall solid waste diversion rate was 36 percent and the overall disposal rate was 64 percent, which was the lowest rate achieved in Vermont since the late 1990s.

The 2018 amendments to the Universal Recycling Law temporarily eased the requirements on haulers and collection facilities. Haulers have more time to implement a food residuals collection program, while the repeal of the requirement to collect yard trimmings may increase their available capacity to collect food residuals. Also, the added requirement for haulers to offer food residuals and yard trimming collection at their fast trash or bag-drop site may encourage residents not serviced by a curbside collection program to comply with the organic waste ban.

PROMOTING RECYCLING INFRASTRUCTURE

The following sections discuss how Massachusetts, Connecticut, Vermont, California, and Rhode Island have addressed regulatory and technical barriers to organics recycling infrastructure development.

Updating Composting and Anaerobic Digestion Regulations

Like Maryland did in 2015, many states have updated their regulations in recent years to more clearly address composting facilities, distinguish those facilities from solid waste facilities, allow for composting of additional materials, and craft permit exemptions or general permits for facilities considered to pose less risk of environmental impact.⁷⁸ Some states have extended this process by amending their regulations to address anaerobic digestion and other technologies that recycle organics. The following are examples from California, Connecticut, and Massachusetts.

California- In-Vessel Digestion Regulations

California adopted significant updates to its compostable materials handling regulations in 2015. As part of that effort, it enacted regulations governing in-vessel digestion, which includes both anaerobic and aerobic digestion.⁷⁹ In addition to basic operational requirements, the regulations establish permitting tiers for different types of in-vessel digestion facilities, summarized in Table 5.

Table 7: California’s In-Vessel Digestion Permitting Tiers

Permitting Tier	Facility Types
Excluded (not regulated)	<ol style="list-style-type: none"> 1. Co-digestion at a POTW. Co-digestion of kitchen grease and food material with wastewater at a publicly owned treatment works (POTW); the POTW permit must address acceptance of the additional materials. 2. Agricultural Site. On-site digestion of material derived from an agricultural site, if no more than 1,000 cubic yards of composted digestate is given away or sold annually off-site. 3. Co-digestion at a dairy. Co-digestion of manure with agricultural material derived on- or off-site, and/or imported vegetative food material in accordance with a water permit. No more than 1,000 cubic yards of composted digestate may be given away or sold annually off-site. 4. Small volume. In-vessel digestion activities with less than 100 cubic yards of solid waste, feedstock, and digestate on-site.
Notification	<ol style="list-style-type: none"> 1. Research operations. Must submit results of research for review every two years. 2. Co-digestion at a dairy. Accepts imported solid waste feedstock and agricultural materials for co-digestion with manure, in accordance with a water permit.

⁷⁸ See U.S. Composting Council, State Compost Regulations, <https://compostingcouncil.org/state-compost-regulations-map/>

⁷⁹ 14 CCR §17896.2 et seq.

	<p>3. Distribution center digester. Accepts unsold products from retail stores to which the products were originally sent. All unsold products must be collected and processed in covered, leak-proof containers, and if putrescible must be refrigerated at the store and kept cool during transport.</p> <p>4. Limited volume. Receives less than an average of 15 tons of solid waste per day and not to exceed 105 tons per week.</p>
Registration ⁸⁰	<p>1. Medium volume. Receives on average between 15 and 100 tons of solid waste per day, not to exceed 700 tons per week.</p>
Full Permit	<p>1. Large volume. Receives on average greater than 100 tons of solid waste per day or greater than 700 tons per week.</p>

Connecticut - Separate Definition and Elimination of the Determination of Need for Waste Conversion Facilities

Information within this subsection was updated.

In 2017, Connecticut legislation distinguished waste conversion facilities from resources recovery facilities.⁸¹ Resources recovery facilities combust municipal solid waste (MSW) for electricity, while waste conversion facilities do not combust MSW, but use thermal, chemical or biological processes to convert solid waste into electricity, fuel, gas, chemical or other products. Waste conversion facilities include anaerobic digestion and MSW composting facilities. In contrast to a resources recovery facility, a waste conversion facility does not require the Commissioner to issue a determination of need as part of the permitting process. The determination of need is a determination that the facility is necessary to meet the solid waste disposal needs of the state and will not result in substantial excess capacity; it involves an additional public comment period. Since the enactment of this law, DEEP has not received any waste conversion facility permit applications; therefore, DEEP is unable to evaluate if these changes have reduced the regulatory burden of proposed composting or anaerobic digestion facilities.

Massachusetts - Site Assignment Regulations for Solid Waste Facilities

Massachusetts amended its regulations in 2012, excluding a broad variety of recycling facilities from the site assignment requirement,⁸² which is a determination by the Board of Health that designates an area of land as suitable for use as a solid waste facility.⁸³ The amended regulations also established specific permitting requirements for recycling, composting, and aerobic and anaerobic digestion. Handling of organic materials on farms is not subject to permits as long as it complies with guidelines and requirements of the Department of Agricultural Resources.⁸⁴ Small-scale anaerobic digestion operations that receive no more than 100 tons per day of organic materials, based on a 30-day rolling average, require a general permit. The general permit requirements for composting and anaerobic digestion facilities are similar and consist mainly of performance standards to prevent odors, harborage of vectors, and water pollution. Residuals may not be greater than 5 percent by weight of the materials received during any quarter. Anaerobic digestion facilities receiving more than 15 tons per day of nitrogen-rich material from off-site must have those materials delivered via sealed tank

⁸⁰ The registration tier is a less extensive version of the full permit, which requires submission of basic information about the facility. The agency reviews the information within 30 days and issues or denies the registration permit. Registration permits are issued by local enforcement agencies, while the full permit is issued by the State agency.

⁸¹ Public Act No. 17-218 of 2017.

⁸² 310 CMR 16.03c.

⁸³ 310 CMR 19.006.

⁸⁴ The Agricultural Composting Program is regulated under 330 CMR 25.00.

or vessel and transferred to the digester using a direct connection (e.g. hose) technology.⁸⁵ Facilities that do not qualify for the general permit are required to obtain a more extensive, individual permit for composting or “conversion” (which includes aerobic or anaerobic digestion or other enzymatic, thermal or chemical degradation of organic materials). The individual permit requires submission of detailed information, which is reviewed for additional criteria, such as whether there is a market for the compost or converted product.⁸⁶

Rhode Island – Organic Waste Recycling Facility Regulations

This subsection was added to “Updating Composting and Anaerobic Digestion Regulations.”

In response to the Commercial Food Waste Disposal Ban becoming effective, the RIDEM amended its organic waste recycling facilities regulations in 2016. Both small-scale and medium-scale composting operations are largely exempt from the provisions of Solid Waste Regulation Number 1 (General Requirements). These operations must still comply with (1) all zoning and other local laws; (2) RIDEM’s right to inspect a facility; and (3) penalties for non-compliance with applicable solid waste regulations.⁸⁷ Small-scale composting operations are not required to be registered with RIDEM.⁸⁸ Medium-scale composting operations must register with RIDEM using a one-time “Registration Form for Medium-Scale Composting Facility” and renew their registration every three years.⁸⁹ The Solid Waste Regulation Number 8 (R.I. Waste Composting Facility) provides detailed operation and infrastructure requirements for small to large-scale composting operations. In addition, Regulation 8 includes Rhode Island’s first provisions for the licensure and operation of anaerobic digestion facilities.⁹⁰

The RIDEM collaborated with the Rhode Island Food Policy Council to update Regulations Number 1 and Number 8; these amended regulations encourage the development of local community and small business based composting infrastructure.^{91, 92} Also, Regulation Number 1 allows a municipality with approval from RIDEM to conduct a limited demonstration pilot project prior to applying for an organic waste recycling facility license. Pilot projects may be conducted for up to six months and can process no more than 50 tons of organic material per day.⁹³ This will allow communities to test technologies and methodologies prior to making large investments in organic material recycling infrastructure.

Dairy Farm Biogas Programs

Anaerobic digestion projects located on animal farms are of increasing interest to state legislators. These operations promote the diversion of agricultural by-products and provide a profitable alternative for manure management. California and Vermont have enacted legislation to encourage development of dairy farm anaerobic digestion projects.

⁸⁵ A summary of permit requirements are provided on the “Instructions: General Permit Certification for New or Newly Acquired Recycling, Composting & Aerobic or Anaerobic Digestion Operations pursuant to 310 CMR 16.04” document at <http://www.mass.gov/eea/docs/dep/recycle/approvals/swgpinst.pdf>.

⁸⁶ 310 CMR 16.05.

⁸⁷ 250-RICR-140-05-1.5, 1.6.08(a) and (d), 1.6.09, and 1.6.10.

⁸⁸ 250-RICR-140-05-1.6.

⁸⁹ 250-RICR-140-05-1.6 and 250-RICR-140-05-8.D.

⁹⁰ 250-RICR-140-05-8.

⁹¹ The Rhode Island Food Policy Council, launched by the State House in 2011, consist of a diverse group of Rhode Island food system stakeholder. The council’s mission is to promote a sustainable and equitable Rhode Island food system through the creation of partnerships and policies. Learn more on the Rhode Island Food Policy Council website at: <http://rifoodcouncil.org/>.

⁹² See the 2016 “Rhode Island announces rules for composting facilities” report in the *Waste Dive* newsletter at <https://www.wastedive.com/news/rhode-island-announces-new-rules-for-composting-facilities/419839/>.

⁹³ 250-RICR-140-05-1.6.11.

California’s Dairy Biomethane Pilot Projects

Senate Bill 1383 of 2016 established a statewide goal for the reduction of short-lived climate pollutants, including a 40% reduction of methane emissions below 2013 levels by 2030.^{94, 95} To achieve this goal, the bill directs the California Public Utility Commission (CPUC) to require California utility companies to implement at least five dairy biomethane pilot projects to demonstrate interconnection to a common pipeline system.⁹⁶ The pilot projects must use biomethane produced from California dairy farms and result in a measurable reduction in GHG emissions. In response to the bill, CPUC will issue a request for proposals in spring 2018.

Vermont’s Cow Power Ombudsman Program

In 2004, Vermont's legislature approved the implementation of the Cow Power program, which provides financial incentives and technical assistance to promote the development of anaerobic digestion projects on Vermont farms. Act 69, Statutes of 2013 requires Vermont utilities to implement renewable energy pricing programs that allow customers to voluntarily invest in renewable energy, currently \$0.04 per kilowatt-hour (kWh).⁹⁷ These proceeds are deposited into a Renewable Energy Development Fund, administered by Green Mountain Power (GMP), and used to provide production incentives to farm digesters through financial and technical assistance.⁹⁸ To achieve the goals of the Cow Power program, the Agricultural Anaerobic Digestion Ombudsman position was created in 2005. The ombudsman serves as a consultant to assist farmers in developing anaerobic digestion projects and provides subsequent technical support. Since 2005, the ombudsman has assisted in the development of 16 anaerobic digestion projects.⁹⁹

RECYCLING FINANCIAL INCENTIVES

State Tax Incentives

Tax incentives can be used to reduce the tax liability of organics generators or recyclers by providing credit for energy produced using organics, money spent on organics recycling equipment or infrastructure, value of donated food, or costs to transport donated food.¹⁰⁰ The tax incentives summarized in Table 5 were enacted by states to support food donation, renewable energy, or organic material recycling infrastructure.

Table 8: State Tax Incentive Laws

Citation	Tax Incentive	Tax Affected	Provisions
California			
Cal. Rev. & Tax. Code § 17053.88	Credit	Income	15% of the qualified value of fresh fruits or fresh vegetables donated by a farmer to a food bank until 2020.
Cal. Rev. & Tax. Code § 17053.12	Credit	Income	50% of the transportation costs incurred for the donation

⁹⁴ The Climate and Clean Air Coalition defines short-lived climate pollutants as contaminants with short lifetimes in the atmosphere, in comparison to longer-lived pollutant carbon dioxide (CO₂), with a capacity to heat the atmosphere that is tens to thousands of times greater than CO₂. This category of pollutants includes methane, hydrofluorocarbons, ground ozone, and black carbon. The Coalition’s short-lived climate pollutants webpage can be accessed at <http://www.ccacoalition.org/en/science-resources>.

⁹⁵ Cal. Health & Safety Code, §39730.5(a).

⁹⁶ Cal. Health & Safety Code, §39730.7(d).

⁹⁷ Vt. Stat. Ann. tit. 30, § 8003.

⁹⁸ The Vermont Public Service Board Order Proposal for Decision to approve the Cow Power program can be accessed at <http://puc.vermont.gov/sites/psbnew/files/orders/2004/6933fnl.pdf>.

⁹⁹ See EPA’s “Case Study: Overcoming Barriers in Vermont, Anaerobic Digestion Ombudsman at: https://www.epa.gov/sites/production/files/2016-02/documents/vt_ombudman_case_study_1_20_16.pdf.

¹⁰⁰ See Sam, A., et al. How Incentives Affect the Adoption of Anaerobic Digesters in the United States. *Sustainability* 2017, 9(7), 1221. <http://www.mdpi.com/2071-1050/9/7/1221/html>.

			of agricultural product to a non-profit charitable organization.
Cal. Rev. & Tax. Code §§ 18851-55	Donation	Income	A taxpayer can donate a portion of their income tax refund to the Emergency Food for Families Voluntary Tax Contribution Fund.
Connecticut			
Conn. Gen. State. § 12-81ff	Exemption	Property	Authorizes local governments to provide a property tax exemption for equipment for recycling installed after October 2013. The exemption applies to the increased value of the property the first fifteen assessment years after installation.
Massachusetts			
Mass. Gen. Stat. ch. 64H, § 6(s)	Exemption	Sales	Exempts purchase of machinery used for agricultural production and producing electricity delivered to consumers through mains, lines, or pipes from the 6.25% sales tax.
Rhode Island			
R.I. Gen. Laws Ann § 44-3-3	Exemption	Property	Exempts qualifying renewable energy systems and associated equipment used in the residential and manufacturing sectors. ¹⁰¹
R.I. Gen Law §44-3-9	Stabilization	Property	Authorizes local governments to provide property tax stabilization agreements for renewable energy systems for up to 20 years.
Vermont			
Vt. Stat. Ann. tit. 32, § 9741	Exemption	Sales	Exempts purchase of anaerobic digestion equipment, with a capacity of 500 kilowatts (kW) that is available for distribution on grid-tied systems and off-grid systems, from the 6% sales tax.

State Government Financial Assistance

New companies in the recycling industry may struggle to secure capital from conventional lenders due to (1) high capital cost of installing recycling technology and equipment, (2) uncertainty in feedstock supply levels and recyclable product prices, and (3) the lack of comparable recycling business to evaluate.¹⁰² For example, food product depackaging equipment, which can improve the ability to recover food residuals for animal feed or recycling, can cost between \$250,000 and \$500,000.¹⁰³ This section provides examples of state grant and loan programs intended to increase the development of organic materials processing infrastructure.

California - Recycling Market Development Zones

The Recycling Market Development Zone (RMDZ) Program provides loans, technical assistance, and free product marketing to eligible businesses that (1) produce commodities from recycled materials normally disposed of in California landfills; (2) increase market demand from diverted recyclable materials; and (3) are located in within a RMDZ designated area, which consists of 88,000 square miles.¹⁰⁴ The program provides loans with a 4.0% fixed interest rate on up to \$2,000,000 or 75% of total project costs. Businesses and nonprofits are eligible, and the loans may be used for machinery and equipment, working capital, real estate purchases and improvements, refinancing of excessive debt that result in increased diversion, and loan-closing points. According to the RMDZ

¹⁰² Kirckpatrick, D. "Financing Recycling Ventures: There are increasing financial resources for recycling start-ups and expansions." *Recycling Today*, Aug. 2001. <http://www.recyclingtoday.com/article/financing-recycling-ventures/>.

¹⁰³ Spencer, Robert and Casella, Morgan. "Massachusetts Pioneers Food Waste Separators." *BioCycle*. Jan. 2018 <https://www.biocycle.net/2018/01/11/massachusetts-pioneers-food-waste-separators/>.

¹⁰⁴ Cal. Pub. Res. Code §§ 42010 –24.

businesses location search tool, there are 68 RMDZ participating businesses in California utilizing organic material feedstock.¹⁰⁵

California - Greenhouse Gas Reduction Grant and Loan Programs

These programs provide financial incentives for capital investments in infrastructure for composting, anaerobic digestion and recycling manufacturing facilities that will reduce greenhouse gas emissions and deliver economic benefits in disadvantaged and low-income communities.¹⁰⁶ The programs include the following:

- **Food Waste Prevention and Rescue Grant Program:** grants up to \$500,000 for projects that prevent food waste generation at the source or recover food to be distributed to people, with any remaining food residuals sent to composting or digestion when available in the project service area. Businesses, nonprofits, and state and local government agencies are eligible.
- **Organics Grant Program:** grants up to \$3,000,000 for composting projects and \$4,000,000 for anaerobic digestion projects, with \$2,400,000 allocated for requested infrastructure costs and \$600,000 delivered in performance payments. Eligible costs include construction, renovation, and expansion of facilities. Of the total composting grants awarded, \$3,000,000 is reserved for projects serving rural communities. Businesses, nonprofits, and state and local government agencies are eligible.
- **Greenhouse Gas Reduction Loan Program:** loans up to \$2,000,000 or 75 percent of total project costs, whichever amount is less (with a 25% matching requirement). Eligible costs include purchase of equipment, real estate, and improvements to real property for facilities for digestion or composting of materials into soil amendments, biofuels, or bioenergy; pre-processing facilities; and food waste prevention projects.

Connecticut - Green Bank Anaerobic Digestion Pilot Project Program

Public Act 11-80 of 2011 established the Clean Energy Finance and Investment Authority, also known as the Connecticut Green Bank.¹⁰⁷ The Green Bank is a quasi-public finance institution responsible for partnering with the private sector to leverage public and private funds to finance renewable energy and energy efficiency projects.¹⁰⁸ The Green Bank administers the Anaerobic Digestion Pilot Project Program. Anaerobic digestion projects can be financed through loans, loan enhancements, power purchase agreements, or grants.^{109, 110} A total of \$5,000,000 is allocated for the program, with funding per project not to exceed \$450 per kW of energy generated over a 15 or 20-year term. Businesses, nonprofits, farms, and state and local governments are eligible. Eligible projects are anaerobic digestion projects with a generator a capacity of no more than three megawatts (MW) that are in the development phase and will distribute energy off-site.

Connecticut - Recycle CT Foundation

Public Act 14-94 of 2014 established the Recycle CT Foundation, Inc., (Foundation), a nonprofit state chartered foundation. The Foundation's purpose is to promote education programs that increase the public's participation in recycling and reuse activities.¹¹¹ The Foundation administers the following programs.

¹⁰⁵ The Recycling Market Development Zones Business Search tool can be accessed at <http://www.calrecycle.ca.gov/rmdz/Reports/Businesses/>

¹⁰⁶ Cal. Pub. Res. Code §§ 42995 – 99. A summary of the Greenhouse Gas Reduction and Loan Programs and links to each program's webpage can be accessed at <http://www.calrecycle.ca.gov/climate/grantsloans/>.

¹⁰⁷ Conn. Gen. Stat. Ann. § 16-245n.

¹⁰⁸ A description of the Green Bank role in financing renewable energy projects in Connecticut can be accessed at <https://www.ctgreenbank.com/about-us/>.

¹⁰⁹ See the Clean Energy Finance and Investment Authority's "Anaerobic Digestion Request for Proposals" at https://www.energizect.com/sites/default/files/uploads/V1%20S103_11-80%20AD%20Rolling%20Enroll%20%28final%206-14-13%29.pdf.

¹¹⁰ The Anaerobic Digestion Pilot Project Program was expanded under PA 15-152 of 2015 for two additional years.

¹¹¹ Conn. Gen. Stat. Ann. § 22a-228a. See the RecycleCT Foundation webpage at <http://www.recyclect.com/about-us.html>.

- **School Grant program**¹¹²: provides grants of \$500 - \$1500 for projects that educate and encourage reduction, reuse, recycling, composting and/or anaerobic digestion activities. Eligible awardees include all Connecticut-based K-12 schools; however, preference will be given to registered CT Green LEAF Schools.¹¹³
- **Innovation Grant Program**¹¹⁴: provides grants of \$2,500 - \$10,000 per project for new and innovative programs, processes or demonstration projects related to sustainable materials management. Eligible awardees include non-profits, municipalities, higher education institutions, school districts, and public housing authorities.

Massachusetts - Recycling Business Development Grants

Massachusetts Department of Environmental Protection provides grants to recycling processors and manufacturers who create sustainable markets and add value to municipal and business recycling efforts.¹¹⁵ Grants range from \$50,000 to \$400,000 per project, with a required match of 25 percent. Eligible projects include processing, manufacturing, and reuse of eligible materials, such as processing source-separated contaminated food materials. Non-profit and for-profit organizations are eligible.¹¹⁶

Massachusetts - Sustainable Materials Recovery Program (SMRP) Municipal Grants

The SMRP awards grants to local governments to conduct certain activities in order to improve local recycling, composting, reuse, and household hazardous waste diversion programs.¹¹⁷ Projects that expand capacity for food donation, composting or anaerobic digestion are eligible for grants of \$10,000 to \$250,000.¹¹⁸

Massachusetts - Clean Energy Center (CEC) Commonwealth Organics to Energy Grants

CEC, which administers the Massachusetts Renewable Energy Trust Fund consisting of surcharges on customers of electric utilities, provides grants of up to \$500,000 for organics to energy implementation projects and up to \$250,000 for organics to energy pilot projects.¹¹⁹ A cost-share of 25 percent applies to the design phase, and 50 percent to the construction phase. Commercial, industrial, institutional and public entities are eligible.¹²⁰ Previously funded projects include the construction of an anaerobic digestion facility to process food residuals at a Stop and Shop distribution center.¹²¹

Rhode Island - Rhode Island Resource Recovery Corporation Municipality Grants

When funds allow, the RIRRC may make funding available to finance municipal grants.¹²² Grant amounts of at least \$5,000 are available for project-based grants and grants of at least \$2,000 are available for training-based

¹¹² See the RecycleCT School Grant Application at <http://www.recyclect.com/assets/downloads/SchoolGrantDraftApplication2017.pdf>.

¹¹³ Connecticut Green LEAF Schools a statewide initiative in which participating schools to provide environmental and sustainability geared education to improve the health of students and staff, and the sustainable use of school resources.

¹¹⁴ See the RecycleCT "Application Guidelines for RecycleCT Innovation Grant"

<http://www.recyclect.com/assets/downloads/Innovation%20Grant%20Criteria%20and%20FAQ.pdf>

¹¹⁵ Mass. Gen. Stat. ch. 25A § 11F(d); 310 CMR 19.303(2)b; and the Declaration of Trust. Article 2.1/

¹¹⁶ See 2017 Recycling Business Development Grant Application at https://www.mass.gov/files/documents/2017/11/06/rbdgap_3.pdf.

¹¹⁷ 310 CMR 19.300. The grant program is funded by 50 percent of the revenue from Waste Energy Credits earned by municipal waste combustors.

¹¹⁸ Massachusetts DEP, Sustainable Materials Recovery Program Municipal Application - Grant Guidance

<https://www.mass.gov/files/documents/2018/03/21/smrpguid.pdf>

¹¹⁹ Mass. Gen. Laws Ch. 23J, § 9.

¹²⁰ Massachusetts CEC, Commonwealth Organics-to-Energy Grants for Implementation Projects and Pilot Projects, Solicitation No. 2017-COTE-IP5, <http://files.masscec.com/Implementation%20-%20Read%20Me%20First%20Solicitation.pdf>.

¹²¹ Massachusetts CEC, Stop & Shop, <http://www.masscec.com/success-stories/stop-shop>

¹²² R.I. Gen Law § 23-19-32. See the "Resource Recovery Grantmaking Policy" eligibility and application guidance document at <http://www.rirrc.org/sites/default/files/2017-02/Grantmaking%20Policy%20%28PP%29%2020170208.pdf>. Chapter 23-19 of the Rhode

grants, with a dollar for dollar match requirement. Municipalities may apply for grants for programs that promote waste diversion and recycling practices, initiate public-private partnership, focus on providing long-range waste diversion solutions, and invest in professional development opportunities for employees.

Vermont- Compost Heat Recovery Grants

Act 74, Statutes of 2005 established the Vermont Clean Energy Development Fund, administered by the Vermont Public Service Department, to advance cost-effective and environmentally sustainable electric power resources in Vermont; specifically, renewable energy sources utilized in combined in heat and power technologies.¹²³ Eligible projects are compost heat recovery projects located on Vermont farms. Grants of \$15,000 to \$63,000 per project are available (with a total availability of \$63,000), with a matching requirement of at least 60% of the cost of the heat recovery and heat distribution equipment.

Renewable Energy Mandated Purchasing Agreements

States have attempted to incentivize the development of the renewable energy industry by enacting renewable portfolio standards (RPS), policies that require a minimum portion of electricity purchased by utility companies to be from designated renewable sources. Utilities can enter into power purchase agreements with renewable energy generators to satisfy their RPS obligations. Power purchasing agreements incentivize utility-scale renewable energy projects by providing stable and long-term revenue streams to generators, and low-cost energy sources and renewable energy credits for utility companies.¹²⁴ This section discusses legislation that mandates power purchase agreements with anaerobic digestion facilities.

Request for Information

This subsection was added to “Renewable Energy Mandated Purchasing Agreements.”

In June 2017, the Philadelphia Water Department (PWD) issued a food waste co-digestion Request for Information (RFI) to solicit business plans from vendors that can collect, preprocess, and transport food waste slurry to be digested at a city-owned treatment plant. This RFI will allow the City of Philadelphia to identify potential organic waste processors to manage the increased food residuals diverted under the 2015 update to the Philadelphia Code. The amended “Dumpster Code” bans all commercial businesses from disposing of food residuals in dumpsters; business must grind up non-packaged food residuals in the sink garbage disposal or arrange for organic waste recycling services.¹²⁵ In total, PWD received 12 responses and three inquiries from food residuals pre-processing facilities. Most responses proposed providing PWD treatment plants with industrial and institutional food residuals, and scaling up their pre-processing activities by adding shifts or modules at their facilities. Overall, the RFI confirmed that PWD’s business strategy for pre-processing food residuals is viable and has encouraged investment in Philadelphia’s organic recycling infrastructure.¹²⁶

Island General Laws created the RIRRC. The RIRRC is responsible for providing solid waste management and recycling services for Rhode Island.

¹²³ Vt. Stat. Ann. tit. 30, § 8015. See “Request for Proposals for Heat Recovery from Composting”

<http://www.trorc.org/wp/wp-content/uploads/2018/02/RFP-for-Compost-Heat-Recovery-Grants-2018.pdf>

¹²⁴ See The National Conference of State Legislators “State Policies for Power Purchase Agreements” webpage at <http://www.ncsl.org/research/energy/state-policies-for-purchase-agreements.aspx>.

¹²⁵ Section 10-722, Title 10 of the Philadelphia Code.

¹²⁶ See the “draft SWRAC meeting minutes 9-28-17 final” from the City of Philadelphia Solid Waste and Recycling Advisory Committee (SWRAC) meeting at https://www.philadelphiastreet.com/images/uploads/documents/draft_SWRAC_meeting_minutes_9-28-17_final.pdf.

Long-term contracts

Connecticut, pursuant to Public Act 17-144 of 2017, issued a request for proposals to procure up to 899,250 megawatt hours (MWh) per year of renewable energy, and associated renewable energy credits, from technologies such as anaerobic digestion for 20 year contracts.^{127, 128} A previous renewable energy solicitation in 2016 resulted in the selection of only solar energy projects.¹²⁹ The current 2018 solicitation excludes solar projects, and includes annual carve-out of 74,250 MWh per from fuel cells and anaerobic digestion.

New paragraph was added to this subsection.

The New York State Energy Research and Development Authority (NYSERDA) purchases qualifying renewable energy credits from renewable resources that became operational on or after January 1, 2015 through fixed-price long-term contracts pursuant to the Clean Energy Standard (formerly known as the Renewable Portfolio Standard).¹³⁰ The Clean Energy Standard requires energy to be generated from at least 50% of any eligible Tier 1 renewable energy source by 2030, including biogas. The Clean Energy Standard differs from some other RPS by not including generation carve-outs for each type of Tier 1 renewable energy source.^{131, 132}

Feed-in Tariffs and Net Metering Programs

Feed-in tariffs are performance based incentives that allow greater participation of renewable energy generators by providing price certainty, streamlining the contracting process, and allowing access to small scale renewable energy generators.¹³³ Net metering systems allow residential and commercial renewable energy generators to sell surplus electricity back to a utility company, reducing their utility bills and distributing renewable energy to other customers. The adoption of aggregate net metering and virtual or community net metering has allowed non-profits, multi-dwelling housing, and municipalities unable to install renewable energy generating systems to benefit from the net metering systems.¹³⁴

The Vermont utility company GMP offers a feed-in tariff to farm biomethane generators through the Cow Power program, a renewable energy pricing program which allows customers to voluntarily invest in renewable energy, pursuant to Act 69, Statutes of 2003.¹³⁵ GMP rate payers can subscribe to the Cow Power program and make a voluntary \$0.04 per kWh payment on their utility bill in turn for access to renewable energy. Customers can select to have 25%, 50%, or 100% of their electricity generated by Vermont farmers. When purchasing electricity from farm generators under a Vermont's Standard-offer Program, GMP provides a production incentive to these generators by purchasing RECs for up to \$0.04 per kWh.¹³⁶ The program promotes anaerobic digestion projects

¹²⁷ Draft Notice Of Request For Proposals From Private Developers For Clean Energy
[http://www.dpuc.state.ct.us/DEEP/Energy.nsf/c6c6d525f7cdd1168525797d0047c5bf/c5b302de4d16dcdc852581f70059cddb/\\$FILE/2017.12.15_FINAL%20Draft%20RFP.pdf](http://www.dpuc.state.ct.us/DEEP/Energy.nsf/c6c6d525f7cdd1168525797d0047c5bf/c5b302de4d16dcdc852581f70059cddb/$FILE/2017.12.15_FINAL%20Draft%20RFP.pdf).

¹²⁸ Conn. Gen. Stat. Ann. § 16a-3h.

¹²⁹ The 2017 Press Release for the "Shared Clean Energy Pilot Projects Selected" can be accessed at
<http://www.ct.gov/deep/cwp/view.asp?A=4918&Q=594296>.

¹³⁰ Public Authorities Law §§ 1850 et seq (2013).

¹³¹ See New York Public Service Commission Order in Case No 15-E-0302, Establishing Clean Energy Standard.

¹³² The first Renewable Energy Standard Request for Proposals in 2017, under the Clean Energy Standard, resulted in no biogas generators systems being selected; see <https://www.nyserda.ny.gov/All-Programs/Programs/Clean-Energy-Standard/Renewable-Generators-and-Developers/RES-Tier-One-Eligibility/Solicitations-for-Long-term-Contracts/2017-Solicitation>.

¹³³ See *Best Practices for Implementing a Feed-in Tariff Program*, University of California Los Angeles Luskin School of Public Affairs at: <https://luskin.ucla.edu/sites/default/files/Best%20Practices%20for%20Implementing%20a%20Feed%20in%20Tariff%20Program.pdf>.

¹³⁴ See The National Conference of State Legislators "State Net Metering Policies" webpage at <http://www.ncsl.org/research/energy/net-metering-policy-overview-and-state-legislative-updates.aspx>.

¹³⁵ Vt. Stat. Ann. tit. 30, § 8003.

¹³⁶ Vermont farmers enter a purchasing agreement with GMP through the Vermont Standard-offer program, which pays a fixed price over a 20-year contract. In 2017, the Vermont established a price cap of \$0.145 per kWh for large farm methane generators and for \$0.199 per kWh for small farm methane generators. Learn more about the 2018 Standard-Offer Program at <http://www.vermontstandardoffer.com/farm-methane/>.

on farms by depositing unused proceeds into the Renewable Energy Development Fund for later investments into farm based anaerobic digestion projects.¹³⁷

New paragraph was added to this subsection.

The NYSERDA from 2011 to 2015 offered the Anaerobic Digester Gas-to-Electricity Program, operated under the former RPS.¹³⁸ Financial incentives offered under the program are as follows: capacity incentives to offset system installation cost; performance-based incentives of \$0.0025/kWh for up to 10 years; digester project enhancement incentives; and interconnection incentives to offset cost of implementing grid connection. The program was available to residential, commercial, industrial, agriculture, non-profit, school, and government applicants who installed anaerobic digestion systems. In 2016, \$4 million was available for the development of Anaerobic Digester Gas-to-Electricity Systems in New York State.¹³⁹

California has combined the benefits of feed-in tariffs and net metering systems through the Renewable Energy Self-Generation Bill Credit Transfer Tariff (RES-BCT) program, established under Assembly Bill 2466 of 2008. The RES-BCT program allows local government institutions with one or more 5 MW renewable generating systems to export surplus energy to the electricity grid and share the resultant generation credits, which lowers utility cost of the benefiting account, with up to 50 other metering accounts owned by same local government institution.¹⁴⁰ The program increases access to renewable energy to rate payers across California and provides a performance incentive to large public renewable energy generators.

¹³⁷ See “Cow Power — the Vermont brand of electricity”. *Times Argus*. May 2013. <https://www.timesargus.com/articles/cow-power-the-vermont-brand-of-electricity/>.

¹³⁸ The NYSERDA is no longer accepting applications and may re-open Program Opportunity Notice if funding becomes available, see <https://www.nyserdera.ny.gov/All-Programs/Programs/Anaerobic-Digester-Gas-to-Electricity-Program>.

¹³⁹ See the NC Clean Energy Technology Centers “Anaerobic Digester Gas-to-Electricity Rebate and Performance Incentive” webpage at: <http://programs.dsireusa.org/system/program/detail/2725>.

¹⁴⁰ The RES-BCT program is summarized on the California Public Utilities Commissions “Net Energy Metering” webpage at <http://www.cpuc.ca.gov/General.aspx?id=3800>.