

Staff Briefing

# Municipal Solid Waste Management Services in Connecticut

October 8, 2009

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## Introduction

In May 2008, the Legislative Program Review and Investigations Committee approved a study focused on the ownership options and implications of the state's four resources recovery facilities (RRF) operating at the time in connection with the Connecticut Resources Recovery Authority (CRRA). The study was prompted by concerns about the future ownership of these facilities and, specifically, what problems private ownership of a critical component of the state's solid waste management system—resource recovery-- might cause (absent market competition or increased state economic regulation).

Staff presented an interim report on September 23, 2008, entitled *Resources Recovery Ownership: Options and Implications*. While the committee study scope focus was on the four RRFs connected to CRRA, similar concerns about ownership were raised about the other two RRFs. Regarding all the RRFs, the report noted that:

- the RRFs were developed and constructed using long-term bonds issued either under CRRA's bonding authority or the statutory authority of municipalities;
- the operating and service contracts associated with these facilities are equally long term, with those contract termination dates keyed to the debt retirement dates; and
- agreements made at least 20 years ago about who would own the facilities after the long-term debt was retired are now starting to be operationalized.

The agreements, like the projects, are all different. Based on updated information since the interim report, it appears that:

- three facilities are or will be privately owned (Bridgeport, Southeast (Preston), and Wallingford);
- one facility will be privately owned unless the authority involved exercises its option to purchase at a fair market value (Bristol); and
- two facilities will be publicly owned by quasi-public authorities (Mid Connecticut and Lisbon).

Since the publication of the last briefing study, the actual transition of one facility (Bridgeport) and planned transition of another facility (Wallingford) have gone relatively smoothly. As described in more detail within this document, all the affected municipalities have renegotiated disposal contracts or found alternatives for the disposal of their municipal solid waste.

At the program review committee meeting on September 23, 2008, many committee members raised questions about and expressed interest in a number of municipal solid waste-related areas beyond trash-to-energy ownership not contemplated in the May 2008 scope. Based on that discussion, the committee co-chairs met to determine how a more comprehensive scope could be developed to address committee concerns.

At its December 9, 2008, meeting, the committee approved an expanded scope to review the full range of municipal solid waste management services from trash haulers and transfer stations, through recycling facilities, trash-to-energy facilities, MSW landfills, and ash landfills in order to assess whether the services are: 1) adequate; 2) available at a reasonable cost; 3) sustainable, and 4) compatible with state policies and goals. The study is to also explore alternatives to the state's current disposal technologies and the potential uses of ash residue.

This briefing report covers a significant portion of that new scope of study. It describes the characteristics of key elements of the municipal solid waste (MSW) system including collection, recycling, transfer stations, resources recovery facilities, landfills, and out-of-state-disposal. A discussion of how municipalities operate with respect to each element is provided along with the identification of significant laws and regulations pertinent to each element. In addition, trends in solid waste management, the planning process, and the roles of various participants in the system are explained, while potential uses of ash residue are also described.

**Next phase.** The information contained in this report provides an overview of the MSW system components necessary for the next part of this study. During the next phase of research, program review staff will be examining a number of issues in the formulation of findings and recommendations. Specifically, the following questions will be examined.

- *Is the overall municipal solid waste system adequate?* This question will be addressed by exploring how well the system meets the larger purpose of solid waste management – that is, to provide a clean and wholesome environment by ensuring safe and sanitary disposal options.
- *Are the solid waste management services provided in Connecticut sustainable as currently structured?* Answers to this question will involve an examination of how the municipal solid waste system may continue as currently structured given the projections of increasing waste generation levels of solid waste with a consideration of uncontrolled variables that may impact the system.
- *Are municipal solid waste services available at a reasonable cost?* For this area, reasonable cost will be analyzed in terms of the existence of a competitive market for solid waste services.

These questions will be answered within the context of existing state policies and goals identified in statute and in the State Solid Waste Management Plan.

## **Report Contents**

This report is organized into six sections. The first section provides an overview of municipal solid waste – how it is defined, how it is managed, how the disposal capacity shortfall is defined, and how management practices compare to other states. The roles of the government and the private sector in waste management, the planning process, and the components of the waste management system are described in the second section. The final four sections describe the main characteristics of principal elements of the waste management system – collection systems and transfer stations, recycling facilities, resources recovery facilities, and landfills.



## Municipal Solid Waste Overview

Connecticut is very different from the rest of the United States in how it manages its solid waste. Over several decades, the state has completely transformed its approach to solid waste management by virtually eliminating municipal solid waste landfills, mandating recycling, and developing a viable network of resources recovery facilities. However, indications suggest that under current management practices, elements of the infrastructure have reached their capacity. This section provides an overview of solid waste in Connecticut. After defining solid waste, it describes the various trends in waste generation, recycling, and disposal. The trends reveal basic themes that include:

- overall predominate use of resources recovery facilities in Connecticut and a decreasing use of landfills for the disposal of municipal solid waste;
- increasing waste generation within the state, even after accounting for any increases in population;
- stagnating recycling rates that have not surpassed the pace of waste generation;
- declining in-state disposal capacity and an increasing use of out-of-state disposal options - usually landfills; and
- far more reliance on resources recovery than any other state in the country.

### What is Municipal Solid Waste?

Connecticut's legal definition of *solid waste* essentially refers to any type of unwanted and discarded material in a solid, liquid, or contained gaseous form. *Municipal solid waste* (MSW) is a subset of solid waste. It is defined in statute as solid waste from residential, commercial, and industrial sources, excluding hazardous wastes and special wastes.<sup>1</sup> Both hazardous and special wastes, such as scrap metal, biomedical waste, sewerage sludge, and bulky wastes (e.g., landclearing and demolition debris), require special handling and disposal.

For the purpose of this study, these special waste streams have been excluded because they are handled and processed differently than typical residential and commercial MSW. The term "waste" is a bit of a misnomer as it suggests all the material is useless. The legal definitions of both solid waste and MSW include materials that can be and are reused or recycled. Within this document, it will be noted when the term MSW just refers to non-recyclable trash.

### How is MSW Handled in Connecticut?

Figure I-1 shows how the total amount of MSW in Connecticut in 2003 was handled. The Department of Environmental Protection (DEP) estimated the total amount of MSW

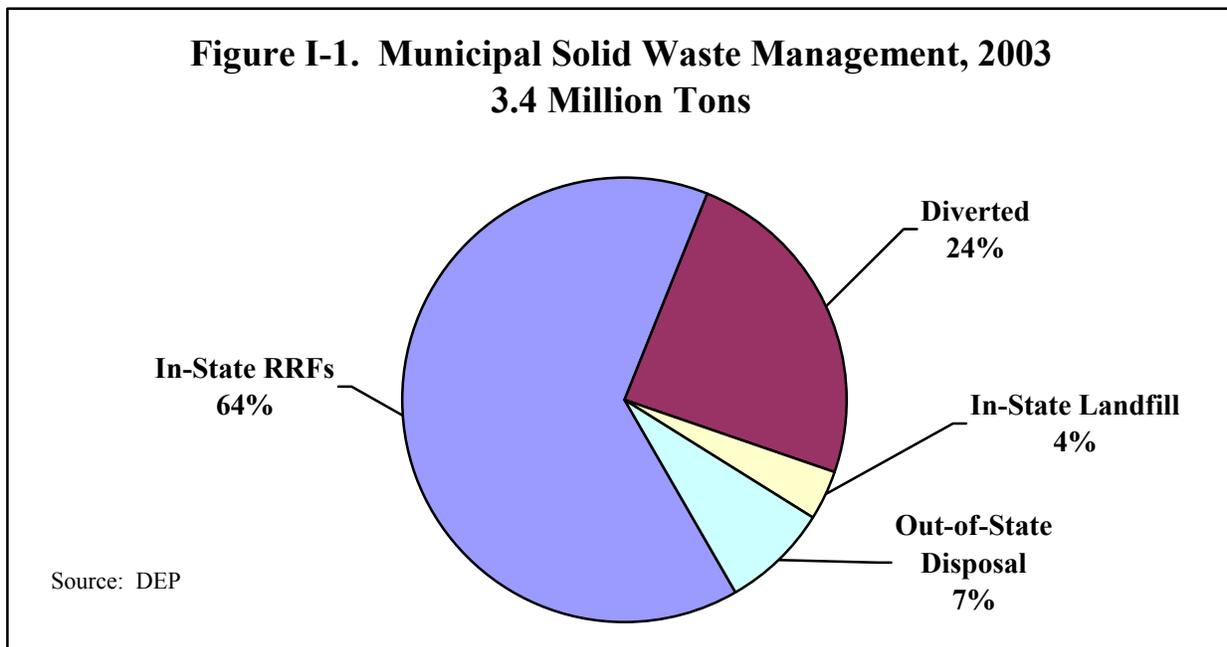
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<sup>1</sup> C.G.S. Sec. 22a 207(3) and (23)

generated in Connecticut in FY 2003 was 3.4 million tons. Sixty four percent of the waste was disposed of at in-state resource recovery facilities (RRF), which are also called waste-to-energy plants. These plants burn trash, which heats water for the generation of steam and electricity. There are six RRFs in Connecticut located in Bridgeport, Bristol, Hartford, Lisbon, Preston, and Wallingford.

Four percent of MSW is landfilled in Connecticut, while 7 percent is disposed of outside of Connecticut (mostly in landfills). Landfill capacity for MSW in Connecticut is virtually nonexistent. As reported to DEP, by 2015 the one remaining Connecticut MSW landfill (Windsor/Bloomfield) will be at capacity and/or closed, at which point all MSW must go to either Connecticut RRFs or be shipped out of state. The amount transported out of state has been increasing from about 27,000 tons in FY 1994 to about 354,000 tons in FY 2006.

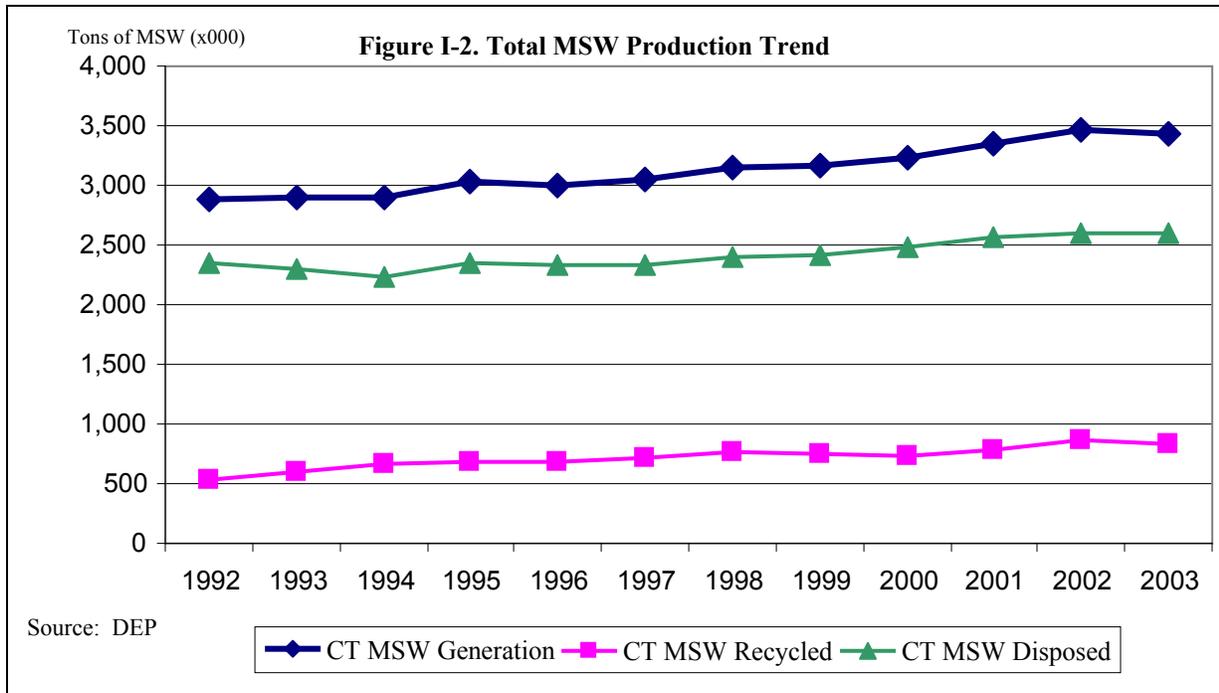
About 24 percent of MSW was diverted from disposal in 2003. Diversion refers to source reduction efforts, composting, and recycling. Typically, the diversion figures collected by DEP do not include estimates for certain parts of the waste stream, such as home composting and material recycled through the bottle bill deposit system. Estimates to capture that part of the stream for 2005 were generated by DEP to assist in the production of the State Solid Waste Management Plan (SWMP). Using that more inclusive estimate, about 30 percent of MSW was diverted from disposal. Approximately 22 percent of the diverted MSW was recycled, six percent was organics that were recycled or composted, and one percent was MSW that was grasscycled (i.e., recycling of grass by leaving clippings on the lawn when mowing) or homecomposted.



**Trends.** Since FY 1993, the total amount of MSW generated in Connecticut has climbed over 500,000 tons, from about 2.9 million tons to 3.4 million tons in FY 2003 (not including

non-reported recyclables). The amount of material recycled has increased too, from about 605,000 tons in FY 1993 to 830,000 tons in FY 2003 – or about 225,000 tons.

While the amount of MSW generated and recycled has increased, the *ratio* of diverted to disposed waste does not appear to have changed, as can be seen in Figure I-2. The percentage of municipal solid waste recycled has increased only slightly over the 11-year period -- from about 21 percent in FY 1993 to 24 percent in FY 2003. Consequently, because the amount of recycling has not kept pace with the quantity of waste generation, the amount of MSW requiring disposal has increased 13 percent from 2.3 million tons to 2.6 million tons.



Many factors can impact the rate of waste generation. One reason for increased MSW generation could be an increase in population. Simply put, more people usually means more trash generation. To account for changes in population growth, MSW generation rates can be examined on a per capita basis. Between 1993 and 2003, the population of Connecticut increased by five percent. The amount of waste generated per person climbed from .88 tons per capita per year in FY 1993 to .99 tons per capita per year in FY 2003. Thus, MSW generation rates have increased in Connecticut even when accounting for population growth.

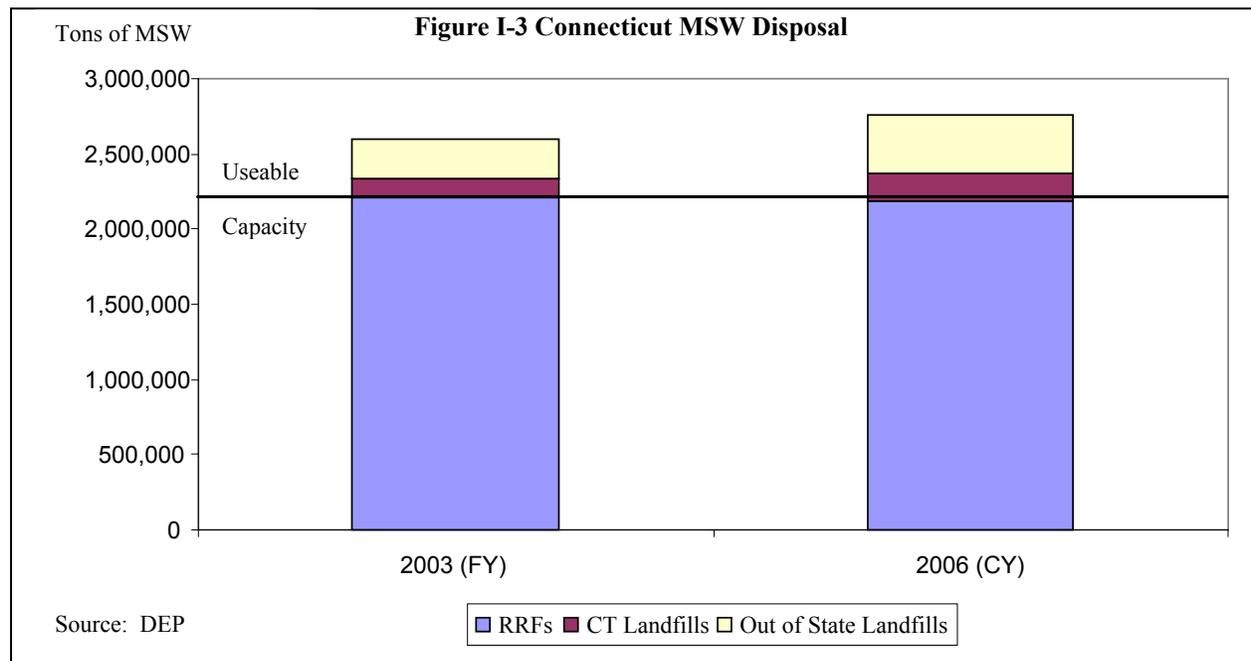
**Imports and exports.** Connecticut is a net exporter of solid waste. Approximately 33,108 tons of MSW disposed of in Connecticut were imported from other states in 2006, most of which was from Massachusetts (30,890) and New York (2,163). In contrast, Connecticut exported approximately 386,843 tons of MSW in 2006, for a net exportation of about 354,000 tons. The amount of MSW imported has decreased dramatically in recent years as RRF capacity has been filled with in-state MSW and existing in-state landfills have reached capacity. The amount of export has increased heavily since 1992 when there were no reported exports as most municipalities were still relying heavily on local landfills. The amount of Connecticut MSW

exported fluctuated between approximately 246,000 and 387,000 tons during FY 1997 to CY 2006.

### What is Connecticut’s Capacity Shortfall?

Connecticut’s capacity shortfall refers to the lack of in-state MSW disposal capability. With no appreciable in-state landfill capacity in Connecticut, municipal solid waste that is not diverted must be disposed at either an in-state RRF or exported to an out-of-state disposal facility. Currently, the six RRFs in Connecticut have a permitted capacity of approximately 2.6 million tons of MSW per year, the smallest of which, Wallingford, has a permitted capacity of 420 tons/day and the largest of which, Mid-Connecticut (Hartford), has a permitted capacity of 2,850 tons/day.

Permitted capacity is a maximum amount not assumed to be actually useable due to maintenance and other operational aspects. So assumptions about how much capacity is actually useable are important. A standard estimate of useable capacity is 85 percent of permitted capacity, which would mean in Connecticut approximately 2,209,000 tons, the average tonnage processed at Connecticut RRFs from FY 2000 through FY 2004 (shown as a line in Figure I-3). As noted above the amount of waste requiring disposal is about 2.6 million tons, meaning the annual shortfall is about 400,000 tons.



The DEP’s State Solid Waste Management Plan projects that the waste generation rate will continue to climb and the capacity shortfall is expected to grow. The department projects that by 2024 the disposal shortfall will grow to about 1.5 million tons, assuming that the current diversion rate remains constant. The plan sets as a primary state goal that the state will increase diversion rates from roughly 30 percent steadily up to 58 percent by 2024 to meet the projected growth in MSW with the current level of RRF capacity. The plan acknowledges the challenge of

that goal, noting that the diversion rate remained relatively stagnate while fluctuating between 22 percent and 25 percent from 1994 to 2003.

### How Do Connecticut's Solid Waste Management Practices Compare to Other States?

Connecticut relies on resources recovery as a way to dispose of its municipal solid waste far more than any other state in the nation. According to the 2006 State of Garbage in America report, Connecticut leads the nation by disposing 64.9 percent of its disposable solid waste using RRFs. Massachusetts at 37 percent is second. Ten states are estimated to send 10 to 28 percent of their MSW to waste-to-energy facilities, while the remaining thirty-eight states send less than 10 percent to RRFs. It should be noted that the comparability and reliability of recycling estimates reported by each state is often problematic. Some states include auto scrap as well as construction and demolition waste when reporting their recycling rates. This 2006 study claims to have adjusted for those anomalies, though estimates still had to be developed for the amount of composting that occurred in some states. Composting is considered a form of recycling.

Table I-1 shows how Connecticut's municipal waste stream is handled in comparison to the national average, the New England average, and other northeastern states. As the table shows, nationwide the average amount of MSW disposed of in landfills was 64.1 percent, over double the amount recycled (28.5 percent), while the amount of MSW sent to RRFs (7.4 percent) was a very distant third.

<b>Table I-1. Connecticut Municipal Waste Stream: Selected Comparisons</b>			
	<b>Percent of Municipal Waste Stream by Methods of Handling</b>		
	<b>Waste to Energy</b>	<b>Landfill</b>	<b>Recycling</b>
National Average	7.4	64.1	28.5
New England Average	35.0	36.0	29.0
<b>Connecticut</b>	<b>64.9</b>	<b>10.9</b>	<b>24.2</b>
Maine	19.1	46.4	34.5
Massachusetts	37.0	29.2	33.8
New Hampshire	16.1	58.8	25.1
Rhode Island	0.2	87.4	12.5
Vermont	8.8	61.9	29.3
New Jersey	15.1	49.0	35.9
New York	19.5	37.5	43.0
Source: State of Garbage in America 2006, Produced by Biocycle and Earth Engineering Center of Columbia University. All data from 2004, except Connecticut data from 2003			



### **Solid Waste Management Participants, Planning, and System Components**

Solid waste planning has become increasingly important as the complexity of management needs has expanded along with the scope of governmental oversight. The number of participants involved and the procedures for managing those needs have also evolved over time. This section provides a description of who is responsible for solid waste management in Connecticut, the planning process, and components of the waste management system. In brief, it can be noted:

- responsibility for waste management rests primarily with state and local governments and the quasi-public sector, but the federal government and the private sector play important roles;
- the state DEP role is primarily planning and regulating; local governments, quasi-public authorities, and the private sector are implementers;
- DEP recently updated the statutorily-required, state solid waste management plan with the assistance of extensive stakeholder input;
- the statewide plan for managing waste is required to be consistent with statutorily preferred management methods, which emphasize waste reduction and recycling over waste incineration and landfilling;
- any action by a person, municipality, or regional authority dealing with solid waste management is supposed to be consistent with the solid waste plan;
- since the mid-1980s, solid waste planning requirements for municipalities and regional authorities have been eliminated;
- because of projected increases in waste generation and the nearly stagnate capacity of current in-state disposal options, the plan calls for nearly doubling the current waste diversion rate of MSW by 2024; and
- waste management strategies are implemented within a very complex waste management system that includes a number of functions: waste generation and separation; collection; transfer; transportation; transformation; and disposal.

### **Responsibility for Waste Management**

Proper solid waste management is a complex enterprise that requires the coordination of a number of different functions and responsibilities including planning, enforcement, the provision of services, and the development of sound financial arrangements and incentives. In Connecticut, the responsibility for solid waste management is divided among a number of entities. Although primary responsibility for the management of municipal solid waste in Connecticut rests with state and local governments as well as the quasi-public sector, it is shared with the federal government and the private sector. Each entity has certain statutory and regulatory responsibilities and limitations.

The federal government's role in solid waste management is to provide guidance, technical assistance, and regulatory oversight through the establishment and enforcement of certain operating standards and pollution control requirements, chiefly for landfills. State agencies plan, regulate, and implement certain aspects of waste management, while municipalities are required to make provisions for the disposal of solid waste and for the separation, collection, processing, and marketing of designated recyclables generated within their communities. Many municipalities have also formed or joined various regional entities to assist in this effort. A number of businesses ranging from haulers, recycling facilities, and resources recovery plant operators also carry out important waste management activities. The roles of the governmental entities and the private sector are described in more detail below.

**Federal.** Federal government involvement in solid waste began with the passage of the Solid Waste Disposal Act (SWDA) in 1965. At that time, open burning and the use of landfills without health and environmental protections represented acceptable practices. The SWDA provided planning and research funds to state and local governments to better manage solid waste. Amendments to SWDA in 1976 became known as the Resource Conservation and Recovery Act (RCRA), which were further amended in 1980 and 1984. The federal Environmental Protection Agency (EPA) is responsible for administering RCRA. At a minimum, states must adopt RCRA standards for solid waste management. RCRA prohibits open dumping of waste and mandates strict requirements for the disposal of wastes. Significantly, EPA promulgated new standards for MSW landfills in October 1991 requiring the installation of costly technology safeguards, such as liners, leachate collection systems, ground water monitoring systems, and gas vents.

These requirements altered solid waste management practices. As noted above, most solid waste prior to 1980 was disposed in open dumps owned and operated by local governments. As federal environmental controls tightened, many municipalities were forced to close their dumps and concerns about a capacity shortage grew. The number of landfills has decreased dramatically nationwide – from nearly 8,000 in 1988 to about 1,800 in 2007.<sup>2</sup> By the mid-1990s, private businesses had taken over much of the disposal business by building large new landfill facilities.<sup>3</sup>

It should also be noted that resources recovery facilities are regulated under federal law, including, RCRA, the Clean Air Act, and the Clean Water Act. An RRF is required to obtain air emission and waste water discharge permits as well as monitor and report various air emissions and any discharges that could cause adverse impacts to human health and the environment.

**State.** In response to increasing environmental concerns and federal regulation as well as decreasing landfill capacity, Connecticut enacted several key pieces of legislation. In 1966, state law changed to prohibit open burning, requiring municipalities to use sanitary landfills instead. While this transition in solid waste disposal was underway, the 1971 Solid Waste Management Act, among other items, required that each municipality “make provisions for the safe and

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<sup>2</sup> U.S. Environmental Protection Agency. *Municipal Solid Waste In The United States: 2007 Facts And Figures*, EPA 530-R-08-010, November 2008. The EPA has provided an estimate of over 20,000 MSW landfills in the U.S. in the 1970s, but some commentators believe that is an overestimate due to poor record keeping by the states.

<sup>3</sup> See for example, Edward Repa, *Solid Waste Disposal Trends*, Waste Age, April 1, 2000.

sanitary disposal of all solid wastes generated within its boundaries.”<sup>4</sup> While fixing municipal responsibility, the act in other ways represented the first time a statewide approach to solid waste was contemplated.

By 1973, when it adopted the Solid Waste Management Services Act (not to be confused with the 1971 Solid Waste Management Act noted above), the legislature made several findings, including: “*that prevailing solid waste disposal practices generally, throughout the state, result in unnecessary environmental damage, waste valuable land and other resources, and constitute a continuing hazard to the health and welfare of the people of the state.*”<sup>5</sup>

The legislature went further and established a series of solid waste policies for the state, beginning with the first: “*That maximum resources recovery from solid waste and maximum recycling and reuse of such resources in order to protect, preserve and enhance the environment of the state shall be considered environmental goals of the state*”. Passage of the Solid Waste Management Services Act identified resources recovery as a favored disposal method in Connecticut, furthering that policy with the establishment of the quasi-public CRRA to encourage a regional approach by municipalities using resources recovery.

One of the first statewide recycling initiatives can be attributed indirectly to the beverage container deposit and refund system that began in Connecticut in 1980. Although the system was started as a litter control measure, the collection of clean bottle bill material was incentive to develop markets for those materials, especially certain plastics. The legislature addressed recycling in a more comprehensive manner in a bill passed in 1987 that mandated the separation and recycling of certain items by January 1, 1991. The specific items to be recycled were actually designated by the DEP commissioner through the regulatory process as discussed in Section IV.

Solid waste facilities are also required to be permitted under state law. RRFs, for example, must obtain two separate permits from DEP to construct and operate such a facility. Generally speaking, the state’s requirements for the permitting of solid waste facilities exceed federal minimum standards.

*DEP and CRRA.* Two key state agencies have significant roles in overseeing and assisting in the management of solid waste in Connecticut. The Department of Environmental Protection is an environmental planning and enforcement agency that was established in 1971.<sup>6</sup> Key functions related to solid waste management include: permitting of solid waste facilities and certifying the operators of those facilities; developing and amending the State Solid Waste Management Plan (described further below); and assuring compliance with solid waste management requirements through technical assistance, education, and enforcing environmental laws.

As noted above, the Connecticut Resource Recovery Authority was established in 1973 as a quasi-public agency under the Solid Waste Management Services Act.<sup>7</sup> The authority’s

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<sup>4</sup> C.G.S. Sec. 22a-220

<sup>5</sup> C.G.S. Sec 22a-269

<sup>6</sup> C.G.S. Sec. 22a-2

<sup>7</sup> C.G.S. Sec 22a-261

powers are vested in an 11-member board of directors. The governor can also appoint eight ad hoc board members, two representing each RRF, at the request of the municipality in which the RRF is located. Ad hoc members are empowered to vote solely on matters pertaining to the projects they represent.

The primary statutory purpose of the authority is to implement the state solid waste plan, developed by DEP, and in doing so it is to promote the development of resources recovery projects. As its mission statement declares, the authority "...is to work for – and in – the best interests of the municipalities of the State of Connecticut in developing and implementing environmentally sound solutions and best practices for solid waste disposal and recycling management on behalf of municipalities."

The creation of CRRA was based on the belief that resources recovery projects and related services could be developed more quickly and with greater flexibility by an independent, quasi-public organization authorized to issue special revenue bonds, than through a state agency structure. The authority developed and at one time oversaw an integrated system that included four of the six resources recovery facilities in Connecticut, two regional recycling centers, five landfills (none of which are in operation), and several transfer stations. One of the original four RRFs (Bridgeport) is now owned and operated by a private entity. The three CRRA-connected RRFs and the Bridgeport RRF handle nearly 80 percent of the municipal solid waste disposed of in Connecticut.

CRRA is required to be self-funded, deriving its revenues from tip fees for trash disposal, the sale of electricity, and from the sale of recyclable commodities. While the authority has used long-term municipal service agreements in the past that obliged cities and towns to use a particular RRF, CRRA does not have the power to require municipal participation in any of its projects. Prior to the expiration of the long-term contracts related to the Bridgeport facility, CRRA provided disposal services to 110 municipalities.

**Municipalities.** As mentioned earlier, municipalities have the responsibility to make provisions for the safe disposal of solid wastes and the recycling of designated items generated within its boundaries. There are a number of ways that municipalities handle this responsibility. All municipalities must at least register haulers. Many cities and towns, though not all, provide or contract for garbage collection and recycling services. Collection services are discussed further in Section III. By statute, municipalities can designate the area where its solid waste can be disposed of and where recyclables shall be taken for processing.<sup>8</sup> This authority, also known as flow control, is limited in certain circumstances, as discussed in the next section. Municipalities have other specific responsibilities regarding recycling, including designating a recycling contact person, submitting an annual report to DEP, adopting an ordinance that requires residents and businesses to recycle, and enforcing that recycling ordinance.<sup>9</sup> Municipalities may also designate people other than police officers to issue citations for violations of waste disposal laws and establish monetary penalties by adopting ordinances related to littering, illegal dumping, or mixing solid waste with recyclables.<sup>10</sup>

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<sup>8</sup> C.G.S. Sec. 22a-220a

<sup>9</sup> C.G.S. Sec. 22a-220(f), (h)

<sup>10</sup> C.G.S. Sec. 22a-226d

Most of Connecticut's municipalities have contracted directly or indirectly in some way with a resources recovery facility to provide for disposal needs. Aside from contracting with CRRA's facilities, state statutes allow municipalities to come together in various ways to jointly manage on a regional basis their recycling and disposal responsibilities. Three of these options are described further below.

*Interlocal agreement.* Through an interlocal agreement, 16 municipalities have contracted with Bristol Resource Recovery Facility Operating Committee (BRRFOC) to oversee and manage the owner and operator of the Bristol Resource Recovery Facility (Covanta) in providing disposal services. These agreements are authorized under C.G.S. Sec. 7-339a *et seq.* The law outlines a process to enact such an agreement that includes the authorization from each participating town's legislative body, a public hearing, the creation of an interlocal advisory board, and a range of governance procedures. Several of these towns are also served by the Tunxis Recycling Operating Committee, which handles the region's recycling needs. In addition, the Southwest Connecticut Regional Recycling Operating Committee (SWEROC) is composed of 19 municipalities in the Bridgeport area that have joined together through an interlocal agreement for the purpose of providing regional recycling services. SWEROC and CRRA have entered into an agreement that involves the development and operation of the Stratford recycling center.

*Municipal Resource Recovery Authority.* The creation of a municipal resource recovery authority is authorized under C.G.S. Sec. 7-273aa *et seq* the purpose of which is to conduct a comprehensive program for solid waste disposal and resource recovery, and for solid waste management services. Three large entities operate under the authority of this statute -- Eastern Connecticut Resource Recovery Authority (ECRRA), Housatonic Resources Recovery Authority (HRRRA), and Southeastern Connecticut Regional Resources Recovery Authority (SCRRRA). These authorities were established through the passage of concurrent ordinances in member towns and require the development of rules of governance by participating municipalities. They have broad powers to: acquire property; develop, own, and operate resources recovery projects; and issue bonds. The bonds can pledge the full faith and credit of the municipalities as well as the revenues derived from the operation of any facilities.

ECRRA is composed of one municipality – Middletown. It owns an RRF in Lisbon, which is operated by a private company, Wheelabrator Technologies. The operator is responsible for ensuring there is enough waste delivered to the plant to maintain full operation. There are some other towns that have developed single town resource recovery authorities, such as Mansfield, but no other town owns an RRF.

HRRRA has 11 member towns in western Connecticut. This authority does not own an RRF but contracts with a private company (Wheelabrator) to dispose their solid waste at a privately operated facility, typically the Bridgeport or Lisbon RRF, though out-of-state disposal is an option. HRRRA also owns a recycling facility that is operated by a private contractor.

SCRRRA is made up of 12 member towns in southeastern Connecticut and was created in 1987. The authority entered into an agreement with CRRA to construct and operate an RRF in Preston. CRRA issued bonds for the construction of the facility and the bonds are secured by service agreements with the participating municipalities.

*Joint purchase.* In anticipation of the expiration of a long-term contract with CRRA for waste disposal at the Bridgeport RRF Project, the City of Norwalk decided to issue a Request for Proposals for the operation of its transfer station and disposal services in an attempt to acquire these services at a lower cost. Norwalk invited other towns to join in return for covering a portion of the procurement costs. Each town only needed a commitment from the town's mayor or town selectmen as required by local ordinance. After the selection of a vendor, each town was responsible to contracting separately with the winning bidder. Ultimately, five towns entered into separate 5-year agreements with a private vendor who provides disposal services.

Some municipalities have joined together in a less formal way to form advisory committees to discuss their mutual interests regarding solid waste management. This includes the Greater Bridgeport Solid Waste Advisory Board (SWAB) and the five-town advisory board associated with the Wallingford RRF. Currently, the Capitol Region Council of Governments is exploring possible governance models for a collective entity to manage the region's MSW, including the creation of a new authority.

A number of other legal options to structure joint municipal action do not appear to have been used by municipalities for the management of solid waste, including shared asset agreements, metropolitan districts, or regional solid waste management authorities.

**Private sector.** Commercial enterprises are involved in the full range of solid waste management services. Private haulers are responsible for collecting and transporting significant amounts of the state's waste stream. Significant parts of the state's recycling effort is carried out by the private sector, including the operators of recycling processing facilities and other companies like scrap metal and bulk paper dealers that handle a variety of materials for recycling. Private firms have been involved with the design, development, and operation of all the resources recovery facilities.

## **Solid Waste Management Planning**

The DEP commissioner is responsible for developing a statutorily-required, state-wide solid waste management plan (SWMP) to guide policy and program decision making. The plan: includes specific goals for source reduction, bulky waste recycling, and composting; is developed in accordance with the waste management hierarchy (described below); assesses landfill capacity needed for residue from resources recovery facilities and for bulky waste; and develops specific strategies for reducing waste generated in the state.<sup>11</sup> The statutes do not include a specific planning horizon, but DEP has selected a 20-year timeframe. There is no longer any requirement for municipal or regional planning.

**Integrated waste management.** The State Solid Waste Management Plan utilizes a widely accepted approach for handling solid waste, called integrated waste management. The federal EPA has defined and endorses this method, which reduces or manages municipal solid waste through a variety of practices. The various approaches to solid waste management are listed in statute in a hierarchical or priority order:

1. source reduction;

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<sup>11</sup> C.G.S. Sec. 22a-228

2. recycling;
3. composting of yard waste or vegetable matter;
4. bulky waste recycling;
5. resources recovery or waste to energy plants; and
6. incineration or landfilling.

Source reduction or waste prevention seeks to prevent waste from being generated. Waste prevention strategies would include reductions in packaging materials, designing products to last longer, and the use of alternative methods that would reduce the toxicity of materials. Recycling involves the collection and reprocessing of materials to make new products or materials, while composting converts organic waste materials into soil additives. Wastes that cannot be reduced or recycled should be disposed at a Resources Recovery Facility (RRF) or other waste-to-energy facilities. Resources recovery facilities reduce the volume of waste (up to 90 percent of volume and about 70 percent of weight) and produce a beneficial byproduct – electricity. For all other waste that cannot be reduced, recycled, or combusted, disposal and containment at a properly designed and managed landfill is warranted. Incineration without energy recovery is a method of combustion that is no longer used in Connecticut.

**Adoption process.** The current plan was adopted in December 2006 and replaced a plan that was 15 years old. DEP engaged in an extensive outreach effort to ensure a wide range of opinions were included. Beginning in June 2005, DEP offered several ways for various stakeholders to participate in the planning process, including hosting a statewide public stakeholder forum; creating external and internal stakeholder workgroups; presenting to various government, community, businesses, and industry groups, as well as various recycling and waste management groups; conducting telephone and personal interviews with individuals involved in waste management; and maintaining a website with all pertinent information regarding the development of the plan.

As required by regulation, DEP also held three public informational meetings and three public hearings on a proposed plan in July and August 2006. The hearing officer then reviewed the entire record of public hearings and testimony submitted on the proposed plan and prepared a Hearing Officer’s Report, which was submitted to the commissioner for her review. The commissioner signed off on the plan on December 20, 2006.

**Plan vision and goals.** The December 2006 SWMP covers the period of FY 2005 through FY 2024. DEP notes that compared to when the 1991 plan was adopted, “solid waste management has changed dramatically from mainly a state and local issue to one that is increasingly a regional, national, and global issue.” The plan contains a vision statement and three goals, which are:

- Goal 1: Significantly reduce the amount of Connecticut generated solid waste requiring disposal through increased source reduction, reuse, recycling, and composting;

- Goal 2: Manage the solid waste that ultimately must be disposed in an efficient, equitable, and environmentally protective manner, consistent with the statutory solid waste hierarchy; and
- Goal 3: Adopt stable, long-term funding mechanisms that provide sufficient revenue for state, regional, and local programs while providing incentives for increased waste reduction and diversion.

In support of these goals, the plan identifies eight critical areas that contain 80 recommended strategies. The critical areas include: source reduction; recycling and composting; management of solid waste requiring disposal; management of special wastes; education and outreach; program planning, evaluation, and measurement; permitting and enforcement; and funding. Many of the strategies require changes in the law or additional funding. After three sessions of the legislature since the plan's creation in 2006, eight of the 80 strategies have been implemented, though little additional money has been allocated for these strategies. A particularly frustrating aspect of the process, expressed to program review staff by both internal and external stakeholders, is the lack of funding and support from the legislature to actually implement the plan. This is true even when low cost measures are offered to improve the system.

In the last session (2009), for example, the House-amended version of House Bill 5474, among other things, expanded the types of items that must be recycled, required recycling receptacles at common gathering venues (e.g., sports arena), required municipalities and collectors to offer recycling if they offered MSW pick-up, and limited local zoning restrictions in order to allow greater use of recycling containers. The original bill contained a recycling incentive grant program, enhanced recycling enforcement mechanisms, and other cost items that were struck from the bill. The amended bill had a fiscal note that discussed possible cost implications but had no specific fiscal impact on the state, and identified possible cost offsets for municipalities due to increases in recycling. The bill passed the House but was not raised in the Senate.

**Insufficient in-state disposal capacity.** As noted earlier, one of the key issues that the plan identifies is the increasing shortfall of in-state disposal capacity – meaning that there is not enough in-state capacity to dispose of all of the waste generated within Connecticut. The plan is premised on the idea that Connecticut should be self-sufficient when it comes to handling all of the state's MSW. The plan estimates that in FY 2005 about nine percent (327,000 tons) of MSW was shipped out of state, mostly to landfills. If no additional disposal capacity is added and the diversion rate stays the same, the amount of MSW shipped out of state is projected to increase to about 28 percent (1.4 million tons) by 2024.

To resolve this problem, the plan proposes to nearly double the diversion rate (i.e., the amount of MSW reduced or recycled) from about 30 percent to about 58 percent. This strategy is consistent with the first and second goals of the plan and with the waste hierarchy.

There are two important points to be made about this goal. For one, the recycling rate has been stagnant over the last 10 years as the population and per capita waste generation rates have increased. Any increases in the diversion rate would mean the state would have to introduce new

or invigorated methods of recycling and source reduction to accomplish this goal. The plan spends a good deal of time discussing various strategies to do that. Second, as CRRA has pointed out, the goal was developed by determining what diversion rate would be necessary to ensure that no new disposal capacity, such as new RRFs, was necessary; the viability of such a premise was not analyzed.

**Implementation.** Although implementation of the solid waste management plan is shared by anyone who handles solid waste, the statutes single out CRRA, in particular, as having the responsibility to plan, design, construct, and operate any type of solid waste facility that is "necessary, desirable, convenient and appropriate in carrying out the provisions of the solid waste management plan ..."<sup>12</sup> With regard to specific planning responsibilities, the statutes give CRRA the authority to "... assist in the preparation, revision, extension or amendment of the state solid waste management plan..." and "... revise and update, as may be necessary to carry out the purposes of this chapter, that portion of the state solid waste management plan defined as the 'solid waste management system'."<sup>13</sup> The "solid waste management system" refers to "that portion of the overall state solid waste management plan specifically designed to deal with the provision of waste management services and to effect resources recovery and recycling by means of a network of waste management projects and resources recovery facilities developed, established and operated by the authority..."<sup>14</sup>

CRRA is also required by statute to develop an "annual plan of operations" to aid in the revision and updating of the SWMP.<sup>15</sup> The CRRA annual plan must be approved by the DEP commissioner and two-thirds of the authority's board of directors. CRRA had not produced an annual plan for several years until the current SWMP was adopted in 2006.

CRRA has maintained that it could not produce an annual plan because the prior SWMP plan (1991) was substantially out-of-date. CRRA's current annual plan, which covers FYs 2008 and 2009, was submitted to DEP in February 2008. It noted that the SWMP does not include any strategies addressing the "solid waste management system" as defined in statute. CRRA developed its own strategies to address this deficiency. In July 2008, DEP found CRRA's plan lacking an overall comprehensive strategy to maintain and improve the waste management system consistent with the SWMP and submitted several questions to the authority. CRRA responded in December 2008. DEP has not acted on that response. The authority's unapproved annual plan expired at the end of FY 2009.

DEP has assigned itself the task of being a significant partner along with municipalities, the private sector, regional authorities, and others in order to assist in promoting and implementing the strategies in the SWMP. To that end, DEP has created the State Solid Waste Management Advisory Committee to assist the department in implementing the SWMP, identifying emerging solid waste issues and solutions, and revising the current SWMP. Membership on the committee is open to all and meets on a regular basis.

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<sup>12</sup> C.G.S. Sec. 22a -262

<sup>13</sup> C.G.S. Sec. 22a-264

<sup>14</sup> C.G.S. Sec. 22a-260 (23)

<sup>15</sup> C.G.S. Sec. 22a-264

Clearly the legislature intended CRRA to play a major role in carrying out the solid waste management plan. Equally evident, though, is the fact that the statutes give each municipality maximum flexibility in determining how it wants to manage its own solid waste. No municipality was or is required to join CRRA or any regional authority. As noted above, the legislature also created a number of ways for a municipality to jointly manage its solid waste with other municipalities or go on its own like Middletown did in creating ECCRA.

Because joining CRRA is voluntary, a fundamental question arises as to whether CRRA is really equipped to act on a statewide basis. While the responsibility to act on a statewide basis is envisioned in statute, the necessary authority to do so is not. The member towns of CRRA may also question the fairness of having to fund and have liability for solid waste initiatives with potential statewide benefits and use.

In addition, no other resources recovery authority is required to develop a plan of operations and submit it to DEP for approval.<sup>16</sup> In 1971, municipalities and regional entities were required to create their own solid waste management plans that had to be approved by the DEP commissioner by 1975. In 1979, a program review and investigations study noted that only 30 local plans had been approved and found little evidence that any approved plan led to improved solid waste planning. After 1981, only municipalities with landfills that needed to be closed were required to submit a plan, though municipalities are allowed to submit their own plans on or after 1987 for approval by the commissioner if they want to vary from the state plan.<sup>17</sup>

The DEP commissioner has other sources of authority to control and guide solid waste management. Under law, any action regarding waste management taken by any person, municipality, or regional authority must be consistent with State Solid Waste Management Plan. The department reviews all permit applications for solid waste facilities for consistency with the SWMP. In addition to securing a permit, anyone who wishes to build additional RRFs as well as ash and MSW landfills must also prove there is a need for these facilities and prove that any new facility will not result in any “substantial excess capacity.” Further, the DEP commissioner is required to approve solid waste contracts between any municipality or regional authority with any other person, municipality, or regional authority for processing or disposal of solid waste outside of the municipality’s boundaries to ensure that the facilities conform “to recognized standards of public health and safety.”<sup>18</sup> DEP reports that this approval process has not been used in the recent past. The commissioner may also issue, modify, or revoke any order to implement the plan.<sup>19</sup> But the commissioner’s primary role is in fulfilling planning and regulatory duties (including enforcement); she does not have the ability to direct waste flow, initiate the siting of facilities, or decide in which types of facilities to invest.

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<sup>16</sup> C.G.S. Sec 22a-229

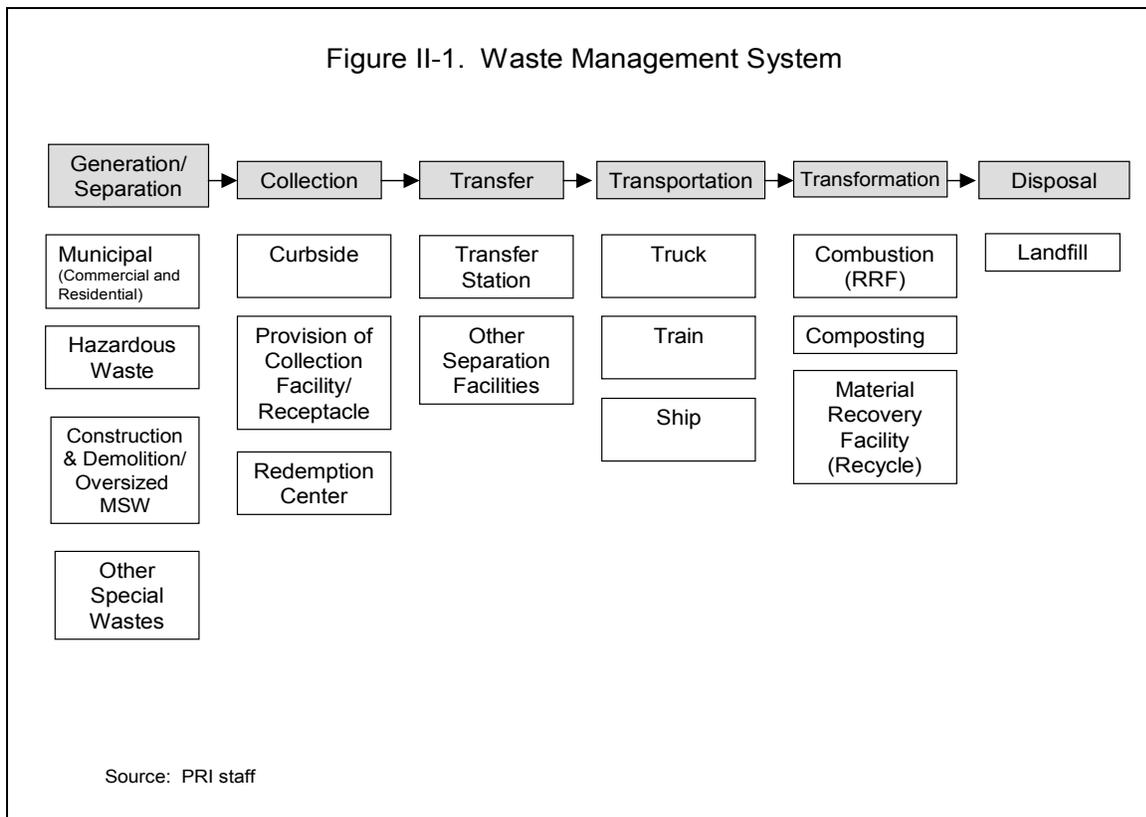
<sup>17</sup> C.G.S. Sec 22a-227

<sup>18</sup> C.G.S. Sec 22a-213

<sup>19</sup> C.G.S. Sec 22a-230

## Waste Management System<sup>20</sup>

Integrated waste management strategies are implemented within a waste management system that includes waste generation and separation, collection, transfer, transportation, treatment, and disposal. This system is complicated because it is impacted by many decision makers, including local, state, and federal governments, private enterprise, various global markets, and individual citizens. The waste management system is illustrated in a simplified way in Figure II-1.



At a minimum, the system involves a dynamic interaction between and among the several participants as well as their interests, such as promotion of the integrated waste management options discussed above, the application (or not) of different technologies by the various players at each level in the system, accommodation of local government and private customer preferences, and concerns for cost efficiency, as well as being responsive to changing federal and state laws.

As illustrated in the figure, the waste management system can be thought of as a series of activities between the generation of waste and the final disposal of end products. Each of these activities is separate from each other and could be delivered by different entities. As discussed further below, this separation of services is typically the case in Connecticut. Some activities or all the activities could also be provided by one entity, which is called vertical integration. Not all

<sup>20</sup> Note that the concept of a solid waste management system discussed here is not the same as those responsibilities of the Connecticut Resources Recovery Authority outlined in C.G.S. Sec. 22a-260 (23).

of the elements are necessarily a part of the system for each individual municipality. For example some municipalities may collect solid waste at the curb and deliver it directly to an RRF, forgoing the need for a transfer station. The activities are briefly described below.

**Generation/separation.** The first activity in the waste system begins with the generation and separation of solid waste at the source, which encompasses a number of materials and can be classified in different ways. Waste generation includes those activities in which materials are identified as no longer of value. It is at this point where individuals exert the most influence on the system by deciding on what and how much to consume, recycle, and dispose. This initial identification step varies with each individual.

Separation of MSW by the generator has been a requirement in Connecticut since the recycling of certain materials was mandated in 1991. This created a distinct waste stream that required a special type of infrastructure to collect and process, as will be discussed further in Section IV. Chief among the changes was the requirement that any generator of MSW manually separate certain material from the rest of the waste stream.

**Waste collection.** There are many different ways to collect municipal waste. Common methods include: 1) curbside pick up and emptying of containers by a contractor or municipal forces; 2) the provision of a collection facility that the generator brings trash or recyclables to; and 3) specially designated redemption centers for recyclables that require a deposit. Waste collection includes the local transportation from a source of waste to the next point; usually a transfer station, an RRF, a recycling facility, or a landfill. Typically, for commercial accounts the container would be a dumpster. Connecticut law allows for the provision of a number of smaller type of facilities that act as collection points for resident to bring their trash and recyclables for disposal such as a “drop site facility.”

**Transfer.** Transfer stations are established because it is too costly to transport municipal waste over long distances in typical waste collection vehicles. Waste collection vehicles unload their waste into larger containers and in some cases compactors. Transfer stations are normally constructed to control noise, dust, and order emissions.

**Transportation.** Transportation is an important waste management activity whenever a transfer station exists between a waste collector and transformation facility (see below). Waste at transfer stations can be reloaded into very large containers and transported by trucks, trains, or ships to a treatment facility or landfill.

Trucks are the most common form of waste transportation in Connecticut as it is they provide the most cost effective method for the relatively short distances between transfer stations and resources recovery facilities within the state, where most of all MSW is handled in the state. Long haul trucking of municipal waste to other state landfills is also an option because of logistical flexibility and has the least fixed assets. Increasingly, rail is being explored an option in Connecticut. Transportation by train of MSW that has been bailed can provide a less costly and more environmentally friendly option over long distances. Norwalk and Stamford are reportedly developing this option for transporting their MSW. Waste transportation by ship or barge is not used in Connecticut and is relatively uncommon in the United States. Certain facilities such as RRFs also rely on providers to transport ash to final disposal.

**Transformation.** One of the main objectives of waste treatment or transformation is the elimination or minimization of negative impacts of waste on humans and the environment. Major options for waste treatment or transformation include combustion, composting, and the conversion of recyclables into another product.

**Disposal.** Disposal of waste is the last element in the waste management system. There are currently no combinations of waste management techniques that do not require landfilling. Some wastes are just not recyclable or compostable. Ash residue is a byproduct of resources recovery facilities that is landfilled. Modern landfills must adhere to much stricter regulations than landfills of decades ago. They do not accept hazardous wastes or bulk liquids. They are required to have gas control systems, liners, leachate collection systems, extensive groundwater monitoring systems, and be properly sited to take advantage of natural geological conditions. Landfills also must be monitored for a period of at least 30 years after closure to detect and minimize any negative environmental impacts.

Under certain circumstance, landfills can be considered a resource. Methane gas recovery does occur at solid waste landfills, though this practice is not used in Connecticut due to the small size and age of the landfills. Landfills may also be converted into recreational areas, while other landfills, such as ash landfills, may be “mined” in the future should a cost-beneficial use of ash be found.

## **Next Sections**

The next sections of this briefing document shall examine in more detail five topic areas that are part of the solid waste management system - collection and transfer of waste, recycling facilities, resources recovery facilities, and landfills. Each section will describe current characteristics about each element and how it operates.



### **Solid Waste Collection and Transfer Stations**

The collection of solid waste is a critical part of the solid waste management system. Collection begins with containers holding material (both recyclables and other discarded material) that a generator (e.g., resident, business, or industry) no longer finds useful and ends with transportation to a location for processing, transfer, or disposal.

Provisions for solid waste collection are largely a local government responsibility. Basic issues that confront each community in determining the type of collection program it wants include determining the level of service to provide, the appropriate role for the public and private sector, waste reduction goals, and funding mechanisms. Answers to each of these issues affect the amount of control the municipality wants or has over the ultimate disposition of its municipal solid waste.

This section describes various aspects of solid waste collection (or hauling), including the various types of collection systems, basic characteristics of collection practices in Connecticut, legal requirements, system funding, flow control, and problem areas. This section also identifies the types of transfer stations and describes their role in the solid waste management system. Based on the discussion below, the following observations can be made about MSW collection in Connecticut:

- the municipal solid waste collection system is complex and varied;
- municipal choices over the level of control they wish to exercise and their amount of participation in solid waste collection impact statewide outcomes for generation, diversion, and disposal of waste;
- absent any contractual agreements or enforceable municipal ordinances, haulers can exercise tremendous discretion over how and where MSW is disposed;
- illegal anti-competitive practices by haulers have been uncovered recently in Connecticut, but various legislative proposals to address this issue have failed; and
- transfer stations provide a link between collection and disposal of waste and processing of recyclables that can provide flexibility to local governments and the private sector in selecting disposal and recycling options.

#### **Types of Collection Systems**

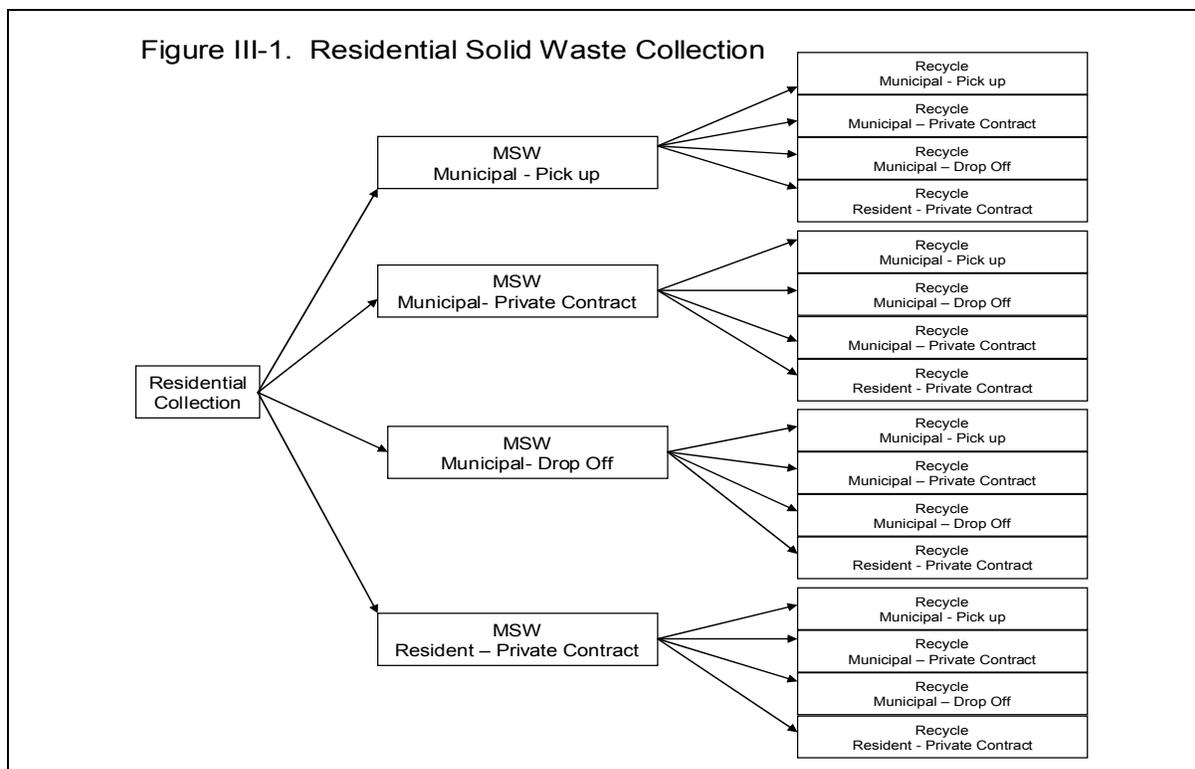
Solid waste collection involves the provision of a service that can be provided through the use of various systems. The most common approaches include the following:

- *Municipal collection* - a municipal department uses its own employees, fleet of vehicles, and other equipment to collect solid waste and determines its level of service;
- *Municipality contracts with private collector* - a municipality contracts for a specific level of service with a private provider to collect waste;
- *Municipal drop off*- a municipality provides a drop off station that residents bring their trash to;
- *Resident contracts with private collector (also called subscription)* – residents directly pay and contract with private trash collectors. Some communities using this approach give residents the complete freedom to choose haulers and the level of service provided; and
- *Combination* – some municipalities may use a combination of public and private options for collection services.

**Collection practices in Connecticut.** Under state statute, each Connecticut municipality must “make provisions for the safe and sanitary disposal of all solid wastes generated within its boundaries.” It is not entirely clear what “make provisions for” means because, similar to other locally provided services, MSW collection practices can vary tremendously among municipalities.

Service levels typically differ depending on the type of customer (i.e., commercial or residential), size of customer (e.g., one household versus apartment building), and type of material to be separated and collected (i.e., recyclables and other waste). In addition, other variables that are not the focus of this report come into play such as how other waste streams will be handled, such as bulky waste, and the technology employed for pick up (automated versus manual).

An example of this complexity is shown in Figure III-1. The figure illustrates 16 possible options that are available to municipalities when considering service levels just for residential collection of MSW (meaning all trash except recyclables) and recyclables. This picture can be further complicated by the fact that different service levels may be provided within the same municipality. For example, some Connecticut municipalities offer municipal pick up of MSW to certain parts of town and not others, while recyclables pick up by the municipality may be offered to all residents or none.



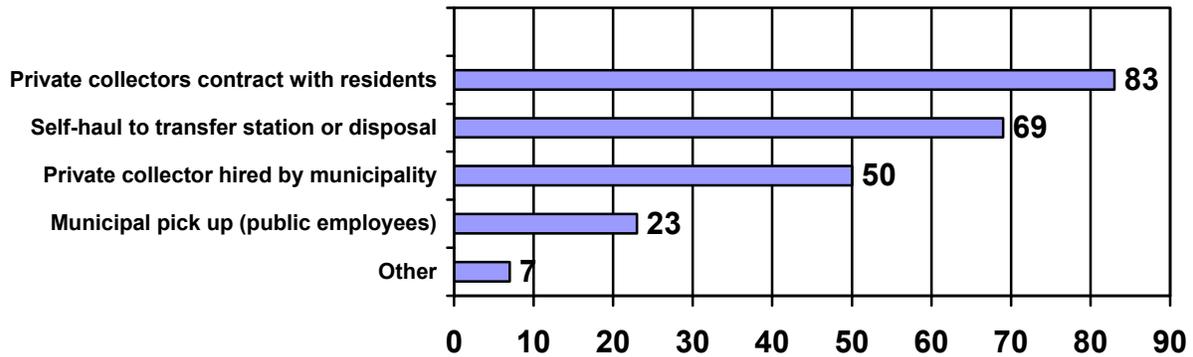
*Basic collection characteristics.* No state agency formally monitors or tracks the various collection arrangements that exist within municipalities on a regular basis. The following characteristics about both residential and commercial collection services in Connecticut are based on a voluntary survey conducted by the Department of Environmental Protection in the summer and fall of 2008. It is based on 161 responses (95 percent) from the state's 169 municipalities, though total responses to individual questions differ.

Figure III-2 shows the various types of collection services for residential customers by the number of municipalities that provide each type.<sup>21</sup> A private collection contract with residents was the most prevalent response, followed by municipalities that allow residents to self-haul to a transfer station. It can be noted that when both forms of municipal pick up (private contractor hired by municipality and municipal employees) are combined, that becomes the second most prevalent level of service.

The survey indicates that about half of Connecticut municipalities (83) have collection performed by a private hauler for at least some of their residents; at least 43 percent of municipalities (73) pick up refuse from at least some of their residents. This is consistent with the experience of CRRA, which indicated to PRI staff that about 55 percent of haulers who received by their projects were private haulers.

<sup>21</sup> More than one answer is possible.

**Figure III-2. MSW Residential Collection, 2008**



Source of Data: DEP More than one response is possible

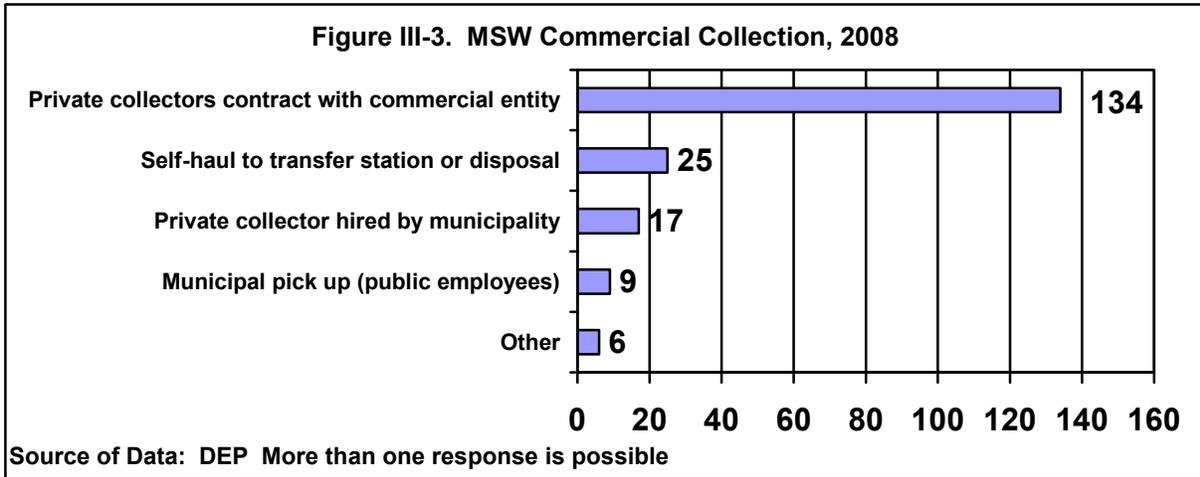
The size of the residential unit served can also vary for those municipalities that provide curbside pick up of MSW (or contract with a private collector). The maximum number of units from which they collect ranged from a single family unit to any sized residential building, though most respondents answered six units or less. Different collection methods are used by collectors – from fully automated, semi-automated, and manual pick up.<sup>22</sup> About 43 percent of municipalities indicated that MSW was manually picked up, nearly one-third indicated an automated or semi-automated system was used, and about one-quarter indicated a combination of methods were being used.

Figure III-3 illustrates the various levels of service for commercial collection of MSW. Commercial buildings include small and large businesses, municipal buildings, schools, churches, condominium complexes, and other types of institutions. A contract between a private collector and a commercial entity was the most common response.<sup>23</sup>

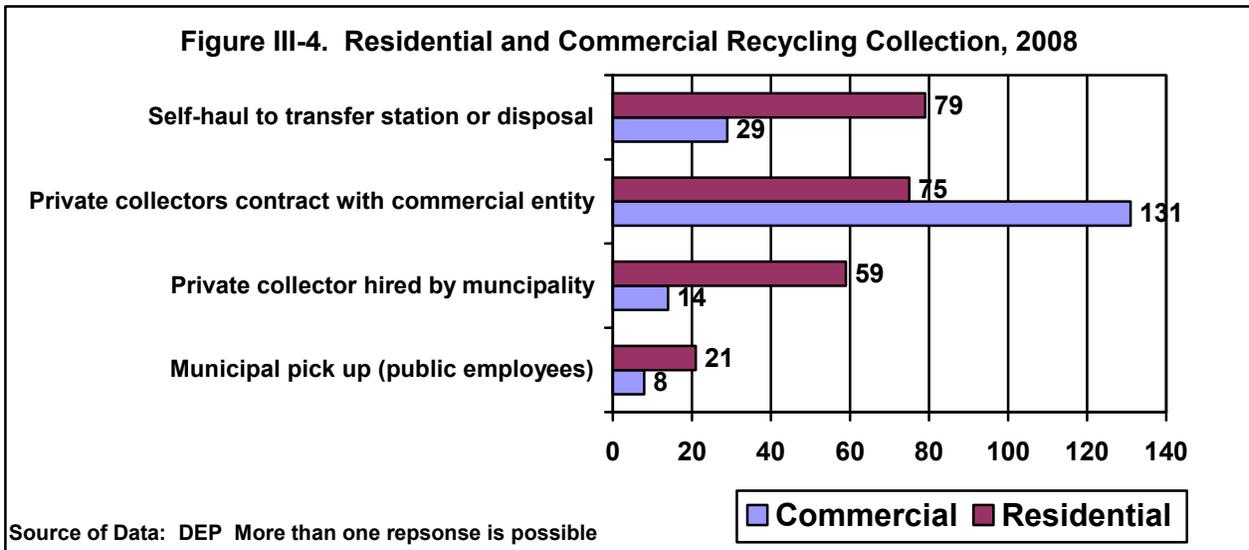
Twenty-six municipalities noted that they participate in the collection of commercial MSW. A number of these respondents, though, noted that they collected from a limited set of “commercial” entities, such as school buildings and other municipal buildings.

<sup>22</sup> Manual collection requires workers to physically pick up the trash receptacles and empty them into a truck. A semi-automated vehicle requires a worker to wheel the trash receptacle to a hydraulic lifting device mounted on the truck body, which empties the receptacle into the truck. An automated vehicle allows the driver to control the hydraulic arm from inside the vehicle.

<sup>23</sup> More than one response was possible.



The types of collection services for recycling are shown in Figure III-4 for both residential and commercial entities.<sup>24</sup> Self-haul and collection by a municipality (either by a private collector or public employees) were the most common levels of service for residential recycling, while contracting with a private provider was the typical response for commercial. Eight percent of residential curbside recycling collection was performed manually, 80 percent was automated or semi-automated, and 12 percent of recyclables collection used a combination of methods.



*System funding.* Various funding mechanisms exist to support MSW collection services that can generally be classified into three types – property taxes, flat-fee, and variable rate. Property taxes are a traditional way of funding solid waste collection. An advantage of funding these services through property taxes is the ease of administration, though it can also decrease the incentive for reducing the amount of waste generated. In Connecticut, this method may also

<sup>24</sup> Multiple responses were allowed.

be used in special districts and boroughs. Flat-fee systems, where a resident pays a set monthly fee for collection, can be used by both a municipality and private hauler. Finally, under a variable rate system, residents are charged on a sliding scale depending on how much waste is put out for collection. This variable rated system is variously referred to as Pay-As-You-Throw (PAYT) or unit based pricing.

The Department of Environmental Protection reports six towns in Connecticut have curbside PAYT. In addition, 25 towns reported in their survey responses having transfer station PAYT (including two with curbside PAYT). (Transfer stations will be discussed further below). The prevalence of the other type of funding mechanisms was not determined in the DEP study. The survey also found that the average amount paid by 41 municipalities that provide or contract out curbside collection of MSW was just over \$1 million annually, while 45 municipalities that provide or contract out for curbside collection of recyclables reported paying about \$351,000 per year on average.

**Flow control.** Flow control laws allow municipalities to direct their solid waste to certain designated facilities. Flow control had been widely used nationwide to guarantee that projected amounts of waste (and revenues) would be received at waste management facilities funded by bonds. Similarly, in Connecticut, the resources recovery facilities require a certain amount of solid waste to be received to be economically feasible. Waste haulers and landfill owners, most large waste management firms, and the trade association representing the private waste management, though, view flow control as a barrier to their industry's ability to compete for waste management services. As a result, they generally oppose flow control.

Flow control can be exercised through a number of the collection approaches described above. For example, a municipality providing or contracting with a hauler to provide collection services may direct where that waste will be disposed. However, a municipality's ability to require by ordinance where its MSW is disposed has changed recently. The U.S. Supreme Court ruled on local flow control ordinances in two cases decided 13 years apart—one in 1994 and one in 2007. The pivotal factor distinguishing these cases was private versus public ownership of the solid waste facility.

In 1994 in C&A Carbone, Inc. v. Clarkstown 511 US 383 (1994), the Supreme Court held that a Clarkstown, New York flow control ordinance that forced trash haulers to deliver waste to a particular *private* processing facility violated the Commerce Clause.

A few years after the Carbone case was decided (which involved a private facility-- although that characterization was disputed by at least one Justice), garbage haulers again went to federal court in New York challenging flow control ordinances involving public processing facilities as also violative of the Commerce Clause. In United Haulers Association, Inc., et al v. Oneida-Herkimer Solid Waste Management Authority, 550 U.S. 330 (2007), the Court determined that the flow control ordinances in the Herkimer case were valid. The Court compared this case to the Carbone case and noted that:

*The only salient difference (with Carbone) is that the laws at issue here require haulers to bring waste to facilities owned and operated by a state-created public benefit corporation. We find this difference constitutionally significant. Disposing*

*of trash has been a traditional government activity for years, and laws that favor the government in such areas—but treat every private business, whether in-state or out-of-state, exactly the same—do not discriminate against interstate commerce for purposes of the Commerce Clause.*

*Implications.* Thus, while a municipality can contract with a collector to bring its MSW to a particular facility (public or private), a municipality can not require private collectors, who are contracted by residents, to dispose of waste at a privately-owned disposal facility. As previously discussed, the RRFs in Bristol, Bridgeport, and Wallingford are or will be privately owned and the Preston plant may become privately owned. This legal decision has a number of implications.

- *Hauler is decision maker for disposal site in some cases.* In situations where a municipality does not have a contract with a publicly-owned facility or where a private hauler is not under contract with a municipality, private haulers have tremendous discretion as to where that municipality's MSW is ultimately disposed. This is especially true for commercial collection because municipalities rarely pick-up any of the commercial trash generated within their borders or contract for commercial service. Among other things, this practice has the possibility of leaving municipalities open to liability concerns under the federal Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA).<sup>25</sup> In addition, disposal practices exercised by haulers may run contrary to the waste management hierarchy.
- *Frustrates municipal contracting efforts.* Some municipalities have contracted with privately-owned disposal companies to provide disposal services at a certain tip fee in exchange for a guarantee that the municipality will ensure the delivery of a certain amount of MSW to that company or pay for any shortfall (i.e., put or pay). Where private collectors contract with residents directly for collection services, municipalities are impaired from requiring private collectors to bring MSW to those private facilities and from possibly meeting those minimum requirements.
- *Frustrates waste management planning efforts.* The loss of governmental control over the flow of MSW can hamper effective planning efforts. State statutes require that state and local governments plan for and manage the appropriate type and number of facilities to handle the long-term generation of waste within the state. Being able to predict the quantity of solid waste over time allows state and local governments to plan for and develop future capacity. The regulatory inability of government to control the flow of solid waste, conflicts with the State Solid Waste Management Plan's premise of self-sufficiency. Absent public ownership of solid waste facilities, market

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<sup>25</sup> CERCLA is intended to reduce and eliminate threats to human health and the environment posed by uncontrolled hazardous waste sites. To meet this objective, CERCLA created a hazardous waste site response program and a comprehensive liability scheme that authorizes the government to hold persons who caused or contributed to the release of hazardous substances liable for the cost or performance of cleanups.

reasons may encourage out-of-state disposal of Connecticut waste and at times in-state disposal of out-of-state waste – frustrating the premise of the state plan.

- *Hampers funding for environmentally preferred facilities.* Connecticut had relied on flow control and long-term contracts to finance the construction and operation of resources recovery facilities. Funding mechanisms to support long-term debt for the construction of solid waste facilities that rely on flow control to privately-owned solid waste facilities may be impacted by the most recent Supreme Court decision. Fundamentally, bond holder risk in the RRF projects is reduced by the guarantee of the delivery of specific levels of waste through long-term municipal contracts. Flow control and long-term contracts were used as a way to ensure that all waste generated in a municipality would end up at a designated RRF and not a landfill or other disposal option. The municipality usually gets a predictable price over a period of time and the benefit to the facility is that it could ensure that a minimum amount of waste (and revenue) would be guaranteed.

On the other hand, solid waste haulers and others point out that there are positive aspects to the government's diminished capability to direct the flow of solid waste. For one, mandatory flow control can result in market inefficiencies. Flow control can foster the monopolistic control of solid waste by local governments that may lead to increased costs without concurrent increased benefits. When laws restrict competition, natural market forces that keep prices from unnecessarily rising disappear. Many believe that government-owned businesses do not fear competition and the loss of revenue and, therefore, do not have incentives to reduce costs and improve efficiency. Residents could also be burdened with paying for excess capacity if the RRF or other solid waste facility is not utilized to the fullest extent possible. There have been occasions in the 1990s, for example, when there was a scarcity of MSW to fuel the RRFs in Connecticut.

Secondly, flow control and long-term contracts with RRFs could have an impact on the amount of material that is recycled because there is an incentive to provide a steady stream of waste to a facility, which can be a disincentive for source reduction and diversion.<sup>26</sup> Similarly, a monopolistic environment may also inhibit innovation in the recycling and source reduction marketplace because aggressive diversion efforts may compete with need for fuel for RRFs.<sup>27</sup> Finally, local governments can still make financial guarantees if they choose to operate or contract for solid waste collection services. Similarly, a municipality may be able to direct the flow if it owns or can make arrangements with a publicly owned transfer facility.

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<sup>26</sup> Studies reviewed by PRI staff that attempt to determine the impact of RRFs on recycling programs appear to be inconclusive. One reason is because the studies fail to account for differences in state recycling policies. Further, staff was unable to find research on the effects of "put-or-pay" provisions in municipal contracts on recycling rates, regardless of the amount of MSW that is obligated.

<sup>27</sup> It should be noted that many items that are recycled have limited fuel value for an RRF. This includes certain noncombustibles, such as glass and metals, as well as leaves and yard waste that have a high moisture content. On the other hand, plastics and wood have a high BTU value.

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**Legal requirements.** There are relatively few legal requirements imposed on MSW collectors to start and run a business compared to the operators of solid waste facilities. Many legal requirements apply to anyone handling solid waste in the system from generators to disposal facilities. Examples of the principle requirements placed on MSW collectors include the following:

- collectors of solid waste generated within a municipality must register with that municipality and identify any other municipalities in which that collector hauls solid waste;
- requirement for vehicles that haul solid waste be marked with business name and address;
- collectors must deliver MSW to a permitted facility;
- prohibitions from knowingly mixing recyclables with other solid waste;
- requirement to report the name and address of any out-of-state recycling facility used by the collector and ensure by contract that the facility complies Connecticut's reporting requirements for recyclables;
- responsibility to notify a municipality about any resident/customer believed to be discarding recyclables with solid waste; and
- requirements to comply with various restrictions on the disposal of certain types of waste (which is a universal requirement no matter who is disposing of the waste), like grass clippings and lead acid batteries.

**Enforcement and compliance.** Program review staff interviewed private solid waste collectors, municipal officials, and directors of regional authorities, and reviewed the results of the governor's 2006 solid waste hauling task force report regarding municipal registration practices (discussed further below). Taken together, these sources suggest that municipal registration practices vary widely among towns. Some towns impose registration fees and may or may not require information about insurance liability and workers compensation insurance. The registration fees in the Housatonic region, for example range from \$25 to \$500. There does not appear to be any town that requires financial and related business disclosures or subject collectors to background checks.

DEP reports that collectors have been cited for operating illegal transfer stations and illegal disposal. One notable case involved a collector who was operating an illegal transfer station in Manchester. This collector was subject to a large fine in 2000 and has recently been cited again by DEP for similar illegal activities.

## **Current Issues**

There are two current issues regarding MSW collection services – competition and data collection. A recent investigation has found anticompetitive practice in the hauling industry as detailed below. In addition, DEP has noted several concerns in collecting accurate data about disposal and recycling.

**Competitiveness and property rights system.** A recent criminal investigation and prosecution between 2003 and 2008 by the federal government revealed an extensive price fixing scheme or “property rights system” in the collection business in western Connecticut as well as Westchester and Putnam Counties in New York resulting in the arrest and conviction of 33 individuals. The investigation centered on James Galante, who controlled 25 trash hauling and related companies, including a transfer station in Danbury. It is important to note that Galante did not act alone, as several other companies in Connecticut and in eastern New York also participated in the system to eliminate competition.

A property rights system is a fraudulent scheme to monopolize MSW collection services. It is defined in the United States Memorandum in Aid of Sentencing filed with the federal District Court in Connecticut on September 2, 2008 in regard to the above described case:

*The property rights system is based on the rule that a customer or account (“a stop”) stays with a participating trash hauler forever because other participating companies will not honestly compete for that customer’s business, opting instead to refrain from soliciting that customer or, when asked to provide a bid or price quote, intentionally submitting prices above those of the current service provider.*

In addition to discussing Galante’s links to organized crime families in New York, the sentencing memorandum goes on to describe various price fixing activities including incidents of bid-rigging, predatory low bidding to eliminate competition, damaging competitor’s property, attempts to work with police contacts to harass competitor’s truck drivers, arranging to have competitors’ access to transfer stations denied, and planned acts of violence where law enforcement officials had to intervene to stop.

*Impact.* The federal government described the criminal enterprise as a “multi-million dollar money making machine.” The Housatonic Resource Recovery Authority (HRRA), an eleven-town regional authority responsible for MSW disposal and recyclables, has estimated that losses to customers in the HRRA region, due to the illegal activity, can be conservatively estimated at \$19 million and if other customers outside the region are included the estimated losses exceed \$32 million over a 20-year period. The Galante-owned hauling businesses controlled at least 57 percent of the market share of MSW in the HRRA region in 2006. This understates his influence because it does not include the other solid waste collection companies who participated in the property rights scheme but were not owned by Galante. Since 2006, the control exercised by the Galante businesses, which are now run by the federal government, has declined to about 47 percent of the market share. These businesses still control over 50 percent of the hauling in four of the 11 towns in the region. In addition, Galante owned a transfer station in Danbury and, as noted further below, it handled over 80 percent of the region’s MSW. The federal government has begun an auction process for the former Galante assets. The City of Danbury is bidding on the transfer station. It appears that the sale will most likely be completed by early 2010.

*Executive and legislative efforts.* In the wake of these revelations, Governor Rell requested that the commissioners of the Departments of Public Health, Consumer Protection, Environmental Protection, and Public Safety and the Office of the Chief State’s Attorney form

an advisory group regarding solid waste hauling. In September 2006, the advisory group made several recommendations, including:

- requiring the licensing of solid waste haulers through DEP and background investigations through DPS;
- creating an authority that would have the responsibility to investigate fraudulent, predatory, anti-competitive, and other illegal conduct of licensed haulers;
- empowering DEP to modify, deny, transfer, suspend, and revoke licenses for waste haulers under certain conditions; and
- appointing a director to manage the daily activities of the authority.

A bill to create a solid waste commission based on the advisory group's recommendations (HB 7092) and a similar bill to license solid waste haulers (SB 1288) in 2007 did not pass. At least four bills have been introduced in the last two years that would require the licensing of haulers either by DEP or the Department of Consumer Protection as well as imposing other regulatory requirements, but none have passed.<sup>28</sup>

The level of competitiveness in the solid waste collection industry in Connecticut is difficult to readily ascertain because the state does not separately license or require registration of municipal solid waste collectors. This fact makes developing any information about collectors in Connecticut difficult, including a basic fact as to how many there are. (The federal government used an undercover agent to infiltrate the Galante operation to discover monopolistic practices).

Various efforts have been tried to obtain a list. For example, the Department of Consumer Protection tried to obtain a rough estimation of the number of collectors in Connecticut based on a phone book analysis and found about 650 collectors. In addition, DEP conducted a survey of municipalities collectors in 2007. That list contains about 320 collectors. DEP acknowledges that not all municipalities responded to the survey and some redundancies may exist. These efforts do not accommodate the fact that many different businesses (similar to the Galante case) may be owned by a single entity, nor do they indicate the size of the various businesses. Program review staff have been told by various sources that there may be less than a dozen large haulers in the state. Staff are continuing to try to obtain a list of haulers in the state and where they operate.

**Data collection.** Another problem related to MSW collector activities is the inability of DEP to obtain all the necessary data from haulers about where solid waste is disposed. DEP is supposed to use this data to understand trends in the MSW market, make projections for planning purposes, and advise policy makers on various disposal issues.

State statutes require various solid waste facilities to report solid waste and recycling data to the department. DEP has found that some solid waste facilities misidentify the origin of waste received at their facilities due to inaccurate information from haulers. Some haulers are reluctant

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<sup>28</sup> In 2008 -- SB 522, SB 137; In 2009 -- SB 918, SB 324

to divulge the origin or destination of waste because of alleged concerns about confidentiality. Other haulers may be contracted by a municipality to bring MSW to a specific RRF but will go somewhere else due to spot market price reductions. Moreover, as more of Connecticut's waste gets shipped out of state, the ability of DEP to track that waste becomes difficult. This waste does not necessarily go through a Connecticut permitted facility and, therefore, a primary source for that information is the haulers themselves. The haulers are not required to report MSW disposal information. Although haulers are required to report the name and address of out-of-state recycling facilities that they use and the facility is supposed to abide by certain reporting requirements, DEP does not routinely receive evidence that compliance with this requirement is occurring. This is because the collector or the municipality would have to first report to DEP that this is occurring for the department to enforce the reporting requirement.

Currently, DEP requires waste haulers obtain a permit to haul hazardous wastes, industrial liquids, and biomedical wastes. The State Solid Waste Management Plan endorses the idea of MSW haulers having to register with DEP and report certain information. The department also notes that registration requirements could also facilitate hauler compliance with environmental laws.

## **Transfer Stations**

Facilities that serve as an intermediate collection point for small scale waste haulers are called transfer stations.<sup>29</sup> Usually, these facilities serve as an aggregation and transfer site for MSW prior to transport to an RRF and for recyclables before being processed at an Intermediate Processing Center (as discussed in Section IV). Transfer stations are a necessary element in the waste management system because it is too costly to transport municipal waste over long distances in typical waste collection vehicles. Waste collection vehicles unload their waste into larger containers and in some cases compactors, which can be held at the stations for no more than 48 hours. Transfer stations also provide an opportunity to sort some wastes suitable for recycling and some can serve as a convenience center for public use to drop off recyclables or MSW.<sup>30</sup>

**Legal requirements.** Although no federal regulations exist that are specifically applicable to transfer stations, they are required to be permitted by DEP. The information required to permit a transfer station is fairly extensive. All facilities must be consistent with the State Solid Waste Management Plan, the Connecticut Solid and Hazardous Waste Land Disposal Siting Policy, and the Connecticut Water Quality Standards. The operators of transfer stations, like all solid waste facilities in Connecticut, must be certified by DEP. The actual siting of transfer stations is in response to individual town or private industry requests. There has not been any attempt to determine how all the transfer stations could be best coordinated, utilized, or constructed based on technical, environmental, and economic criteria. For example, it is unclear if transfer stations are located in the right place to maximize collection efficiency throughout the state.

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<sup>29</sup> The legal definition of a transfer station is found in C.G.S. Section 22a-207.

<sup>30</sup> Other facilities permitted to process or transfer recyclables include Intermediate Processing Centers and Volume Reduction Plants.

By law transfer stations are required to control noise, dust, and odor emissions. The regulations also address processing limitations, specific waste storage methods, fire control, waste restrictions, and control of vectors (disease transmitting organisms). No long-term storage of waste is intended at a transfer station. Waste cannot be stored at a transfer station for longer than 48 hours after a container is filled. They would appear relatively easier to site than other waste facilities because they have fewer restrictions, perform little processing of waste, and do not pose the same environmental risk as landfills or RRFs. However, they are still likely to engender opposition because of associated truck traffic and noise, as well as perceived negative environmental impacts. In recent years community acceptance of new transfer stations has been limited and a few municipalities have sought to exclude such facilities through zoning restrictions. DEP reports that between 2004 and 2008, 16 enforcement actions have been taken against transfer stations. This represents about one-third of all enforcement actions taken against permitted solid waste facilities.<sup>31</sup>

**Types of facilities.** Table III-1 shows the various kinds of permits that have been issued for the 255 transfer stations in Connecticut by type of owner – either public or private. Although transfer stations may be owned by a public entity they can be operated by a private contractor. Municipalities or government authorities are the permittees of 171 transfer stations and 84 are privately owned.

The publicly owned stations can be divided among individual permits (95) and general permits (76). According to DEP, based on the designed processing capacity (tons per day), individual permits are issued directly to an individual applicant (public or private), whereas general permits are issued to authorize similar, but limited, activities with individual registrants being submitted by either private or municipal entities under the auspices of that general permit. A general permit establishes certain conditions for conducting an activity, and is a quicker and more cost-effective way to permit specific limited activities. Transfer stations can be permitted to handle a number of different materials including recycling materials, solid waste, bulky waste and other special wastes. DEP reports that it typically takes between six and 24 months to issue an individual permit for a transfer station and about four to six week to issue a general permit registration.

As the table shows, certain types of MSW and recycling transfer stations can be authorized by a general permit registration. While there is only one type of MSW transfer station, there are four types of recycling facilities that can be authorized under a general permit registration. The recycling transfer stations differ based on volume of material processed and the types of materials they are allowed to process. The recycling general permits are available to both municipalities and private businesses. The general permit for municipal transfer stations is available only to municipalities.

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<sup>31</sup> Most of the solid waste enforcement actions (74 percent) are against unpermitted facilities.

<b>Table III-1. Transfer Station Facilities</b>			
<b>Owner</b>	<b>Permit Type</b>	<b>Description (processing capacity)</b>	<b>No.</b>
<b>Public</b>	<b>Individual Permits</b>		
	Small	<= 75 tons/day	70
	Medium	>75 and <= 150 tons/day	6
	Large	>150 tons/day	19
	<i>Total Individual Permits</i>		<b>95</b>
	<b>General Permit Registrations</b>		
	Transfer Station	<=120 tons/day	42
	Recycling		34
	<i>Total General Permit</i>		<b>76</b>
	<b>Total Public</b>		<b>171</b>
<b>Private</b>	<b>Individual Permit</b>		
	Small	<= 75 tons/day	2
	Medium	>75 and <= 150 tons/day	4
	Large	>150 tons/day	4
	<i>Total Individual Permits</i>		<b>10</b>
<i>Total General Permit Registrations (recycling only)</i>		<b>74</b>	
<b>Total Private</b>		<b>84</b>	
<b>Grand Total:</b>		<b>255*</b>	
<p>*For the purposes here, two separate permits owned by the City of Greenwich have been combined into one large permit. See further explanation below.  The designations "small", "medium" and "large" for transfer stations were created by PRI staff.  Source of Data: DEP (9/30/09)</p>			

Individual permits for transfer stations have been issued for 95 public and 10 private facilities. Individual permits are categorized by three sizes based on the designed maximum amount of tonnage that may be received per day (from less than or equal to 75 tons per day to greater than 500 tons per day). The largest number of individual permits for MSW transfer stations has been issued for small facilities for the public sector. Most of the private sector transfer stations are medium or large facilities.

Table III-2 shows the self-reported tonnage of MSW handled by medium and large transfer stations. Although most transfer facilities are publicly owned, the largest transfer station is the former Galante-owned private facility in Danbury (Transfer Systems Inc.).

<b>Table III-2. MSW Public &amp; Private Transfer Stations (Medium &amp; Large)</b>				
<b>Transfer Station (TS)</b>	<b>Permittee</b>	<b>Town</b>	<b>Tonnage FY 2008</b>	<b>Capacity (tons/day)</b>
<b>Publicly-Owned Transfer Stations</b>				
Hebron TS	Municipality	Hebron	No reports	100
Union TS	Municipality	Union	220	100
Wilton TS	Municipality	Wilton	No reports	100
Eastford TS	Municipality	Eastford	No reports	120
Barkhamstead (RRDD1) TS	Municipality	Barkhamstead / New Hartford	3,778	150
Ellington TS	CRRA	Ellington	64,130	150
Bridgeport TS	Municipality	Bridgeport	14,707	165
New Canaan TS	Municipality	New Canaan	10,036	200
Greenwich TS	Municipality	Greenwich	25,170	230/125
Milford TS	Municipality	Milford	67,779	250
Ridgefield TS	Municipality	Ridgefield	13,098	250
New London TS	Municipality	New London	No reports	300
Essex TS	CRRA	Essex	74,552	300
Stamford TS	Municipality	Stamford	62,422	400
Norwalk TS	Municipality	Norwalk	80,389	460
Watertown TS	CRRA	Watertown	118,957	550
Darien TS	Municipality	Darien	3,102	600
Fairfield TS	Municipality	Fairfield	23,217	600
Trumbull TS	Municipality	Trumbull	37,365	600
Westport TS	Municipality	Westport	19,635	600
Stratford TS	Municipality	Stratford	50,151	600
Deep River TS	Municipality	Deep River	1,386	650
Torrington TS	CRRA	Torrington	72,560	650
New Britain TS	Municipality	Berlin	2,257	860
New Haven TS	Municipality	New Haven	84,130	925

<b>Table III-2 (continued). MSW Public &amp; Private Transfer Stations (Medium &amp; Large)</b>				
<b>Transfer Station (TS)</b>	<b>Permittee</b>	<b>Town</b>	<b>Tonnage FY 2008</b>	<b>Capacity (tons/day)</b>
<b>Privately-Owned Transfer Stations</b>				
Superior Recycling, Inc.	Superior Recycling, Inc.	Bozrah	No reports	100
Wheelabrator Env. Systems, Inc	Wheelabrator Env. Systems, Inc	Newtown	13,839	100
Willimantic Waste Paper Co. Inc.	Willimantic Waste Paper Co. Inc	Plainfield	No reports	100
Willimantic Waste Paper Co. Inc.	Willimantic Waste Paper Co. Inc	Willimantic	28,154	150
Dainty Rubbish Service, Inc.	Dainty Rubbish Service, Inc.	Middletown	25,177	250
Waste Management of CT, Inc.	Waste Management of CT, Inc.	Norwalk	228	250
City Recycling Inc.	City Recycling Inc.	Stamford	42,560	400
Transfer Systems Inc.	Transfer Systems Inc.	Danbury	205,994	900
Notes: CRRA transferred a 230 ton per day transfer station permit to the City of Greenwich. The city maintains two permits for two facilities on two contiguous parcels of land with the daily tonnages noted in the table. For the purposes here, both permits are combined and defined as a single large facility. No Report means the facilities have not reported any MSW being received or have not reported to DEP. Source of Data: DEP (9/30/09)				

An important point to consider about the role of transfer stations is that they can serve as a collection and economic control point for the flow of MSW and recyclables. As noted above, they are generally built to save collectors money by shortening the distance between the generation source and the disposal facility. Transfer stations also provide municipalities and private owners flexibility when considering different disposal facilities and options even if those options are more distantly located. For example, the city of Stamford has a transfer station that is permitted to bail MSW with the intent of loading it onto rail cars to be shipped out of state. Stamford has not used this capability yet. Currently, there are nine rail transfer stations for construction and demolition waste that ship that material out of state. DEP has received many inquiries about the requirements for permitting MSW rail transfer stations.

Sometimes this control point aspect can be problematic. Aside from the property rights scheme described above, the Danbury station, which was owned by Galante, engaged in practices in the late 1990s that were contrary to contractual arrangements made by municipalities in the HRRRA region. The HRRRA municipalities entered into a “put or pay” contract with Wheelabrator Connecticut, Inc. to deliver a guaranteed minimum amount of MSW to Wheelabrator in exchange for a set tip fee. If the municipalities did not deliver the minimum amount, they could be liable for penalty payments to Wheelabrator. Most of the HRRRA region’s waste flowed through the Danbury station.

According to HRRRA, solid waste haulers were allowed by the Danbury transfer station owner to choose whether to pay the HRRRA tip fee or to pay a tip fee that was \$10-\$15 per ton

less to another company located on the same site as the Danbury station. Because the station is privately owned, private haulers could choose the cheaper tip fee. Wheelabrator sued a Galante company for breach of contract because that company (Greensphere) was contractually obligated (separate from the municipalities) to take all MSW generated in the region to a Wheelabrator disposal site. If Greensphere was not under contract with Wheelabrator, there would not have been any basis for a lawsuit. Greensphere countersued, and after five years of litigation the parties settled in 2003. The second tip fee offering ended, and the MSW was once again transported to a Wheelabrator facility. During the five year battle, the HRRRA municipalities did not meet their put or pay obligations and the regional authority's operations were hobbled. Eighty-four percent of the MSW in the HRRRA region still flows through that Danbury-based transfer station. Because transfer stations can provide options beyond the state's management system, they are subject to the same implications discussed above regarding flow control.



### Recycling

Recycling is probably the most positively perceived of all waste management practices. Under statute, recycling is defined as “the processing of solid waste to reclaim material therefrom.”<sup>32</sup> Recycling in Connecticut involves a multifaceted system that includes required and voluntary self-separation of certain specific materials by residents and other waste generators. These reusable materials are collected in a variety of manners including curbside pickup and at drop-off facilities like transfer stations or redemption centers.

The materials are eventually transformed when waste products are used as raw materials for another product. For example, plastic soft drink bottles can be turned into material to manufacture polar fleece clothing and various types of plastics can be made into building products, such as decking material. Home composting of yard wastes or other organic materials is another means of recycling.

This section provides an overview of recycling practices in Connecticut. Principally, it can be noted that:

- the recycling system is based on both mandatory and voluntary participation with incentives provided for various participants including individuals, local governments, and collectors;
- there is considerable variation in the range of items that can be recycled on a town-by-town basis and in the costs for recycling;
- paper products and yard waste are the primary materials recycled in Connecticut;
- there is a well developed infrastructure for most of the items mandated for recycling that has helped the state reach its current recycling rate; and
- there is little infrastructure for non-mandatory items that will need to be addressed, such as institutional and commercial organics, to meet future recycling goals.

### Background

Two significant pieces of legislation have helped to define Connecticut’s approach to recycling – one is the “bottle bill” which has recently been expanded and the other involves mandatory recycling.

**Bottle bill.** Connecticut’s bottle bill was passed in 1978 and was effective on January 1, 1980. It established that certain beverage containers would have a five cent charge or deposit on them at the time of purchase, which is returned to the consumer (or any other person who collects the container) when the empty bottle is returned to a redemption center. Each retailer

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<sup>32</sup> C.G.S. Sec. 22a-207

who sells the designated beverage containers is required to participate in the deposit system and is required to act as a redemption center for the containers the retailers sell. Retailers are not required to take containers they do not stock. The bottle bill was originally created as a way to prevent litter because the bottles have a value and are often picked up by people who collect them for a refund. DEP notes that states with bottle bills have much higher recycling rates for containers than non-bottle bill states because of the cash value on each container. Connecticut is one of 11 states that have a container deposit system.

The original bottle bill covered beer, malt, and carbonated soft drinks. The types of beverage containers included in the bottle bill have recently been expanded. In special sessions in the fall of 2008, the legislature approved two measures that concern recycling in the state, both having to deal with the bottle deposit law. First, the unclaimed bottle deposits that had, since the program's inception, been funds that were handled and claimed by the retail outlets and operators of the redemption machines were instead claimed for use in the Connecticut state general fund. The change in law that put the unclaimed money into the general fund happened despite DEP's suggestion in the SWMP that the unclaimed funds be used by the state for dedicated recycling purposes.

The second measure passed last year added non-carbonated beverage containers (i.e., water, flavored water, but not juice or mineral water) to the list of items on which deposits must be paid. This provision was slated to begin in April of 2009, but some extensions were granted that delay full implementation until October 2009. Disposable plastic bottles, especially for water, were not nearly as prevalent when the original deposit laws were passed as they are now. As the adjustments to the deposit laws are phased in, more data should become available on how much recycling is being done within the deposit system as well as how many items with deposits are not returned.

**Mandatory recycling.** The second major push into recycling began in 1986 when the state offered incentive grants to towns that required their residents to separate out their recyclable materials. At the same time, an advisory council, a trust account, and a plan to enact municipal solid waste recycling were created in order to comply with the SWMP. In 1988, the DEP commissioner designated certain items as required to be recycled and was allowed to create a secondary list of items that are "suitable for recycling." At that time, the SWMP was modified by the legislature to include a recycling rate goal of 25 percent. In 1991, mandatory recycling, both residential and non-residential, was enacted.

The legislation that was passed during this period demonstrated a preference toward regional handling of recyclables, as did the allocation of financial incentives. Municipalities were required to submit plans to show how they were to comply with the mandate. One option was to join one of 10 recycling regions in the state. In addition, DEP was tasked with providing monetary support for many recycling programs.

Throughout the 1990's, DEP provided nearly \$42 million worth of grants, the majority of which went towards capital expenses (e.g., bins, trucks, and facility upgrades) of regional recycling programs, such as the Southwest Connecticut Regional Recycling Operating Committee. Some money was also allocated for municipalities that were not part of a regional program, but that had set up adequate local recycling programs. Over \$5 million of the overall

grants distributed came from trust funds and were primarily used for recycling education programs and short-term (one year) recycling coordinator staffing.

The state had met the initial recycling goal of 25 percent by the mid-1990s, and in 1996 the legislature established a new recycling and source reduction goal of 40 percent by 2000. This goal has not been met. As noted earlier, the current rate remains at about 25 percent (not including bottle bill returns, auto scrap, and certain commercial recyclables).

These legislative efforts along with the extensive cooperation of regional and municipal officials and fairly significant seed funding provided by the state, promoted the development of a dynamic infrastructure for the collection, processing, and marketing of recyclables on a scale that did not exist before 1991. Since the initial allocations, funding for recycling programs has essentially ended. Interviewed personnel from several municipalities and regional organizations indicated that the lack of continued financial incentives for recycling has been the largest contributor to the stagnant statewide recycling rate.

### **Recyclable Materials**

Initially, nine items were designated as mandatory recyclables and could not be disposed of in a trash receptacle. This list was expanded in 1996 with the addition of nickel cadmium batteries. Grass clippings were banned from disposal in landfills and RRFs in 1998. The items currently required to be recycled under Connecticut law are:

- corrugated cardboard,
- glass food containers,
- metal food containers,
- leaves,
- newspaper,
- office paper (non-residential),
- scrap metal,
- batteries (lead acid and nickel cadmium), and
- waste oil.

The list of items that must be recycled is not, however, a comprehensive list of what *can* be recycled. Plastic bottles, for example, are not a required item. Local recycling requirements are often based on the recycling capabilities of the hauler, vendor, or the processing facilities that take the local recyclables.

**Range of recyclables.** According to a recent DEP survey, over 125 Connecticut municipalities recycle plastics marked as number one or two,<sup>33</sup> magazines, and discarded mail

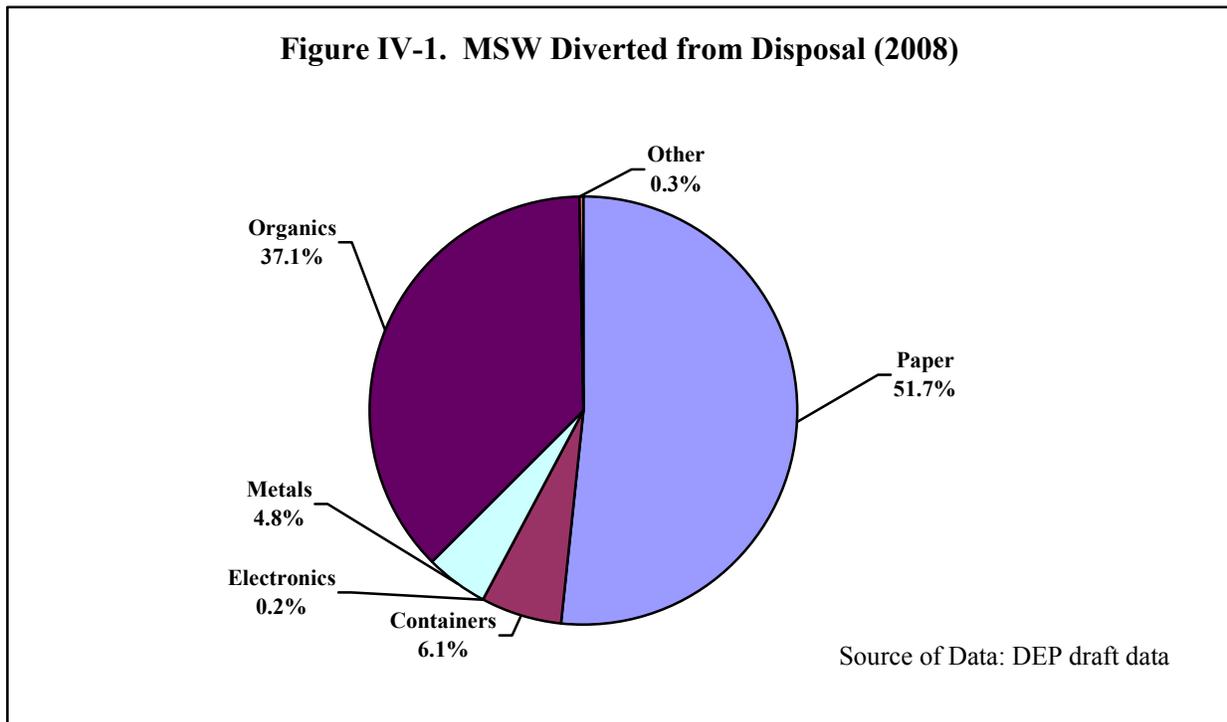
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<sup>33</sup> Plastics can be identified through a voluntary resin identification coding system, which is a set of symbols placed on plastics by manufacturers to identify the polymer type. The primary purpose of the codes is to allow efficient separation of different polymer types for recycling. Plastics are coded with a recycling symbol and a number from one to seven.

through their curbside recycling programs. In the same survey, over half of the respondents indicated that their curbside recycling programs included coated paper beverage cartons, telephone directories, and boxboard. Additionally, around 25 percent of municipalities accept plastics marked with numbers one through seven through curbside recycling.

Town-to-town variations in what can and cannot be recycled may cause confusion about what belongs in the recycling bin. The inclusion of non-recyclable items leads to contamination of the recycling stream and more work for the sorting facility, which must either sort the non-recyclable items out or in some cases reject the entire load. If recyclables are rejected, then those reusable materials are disposed of as trash.

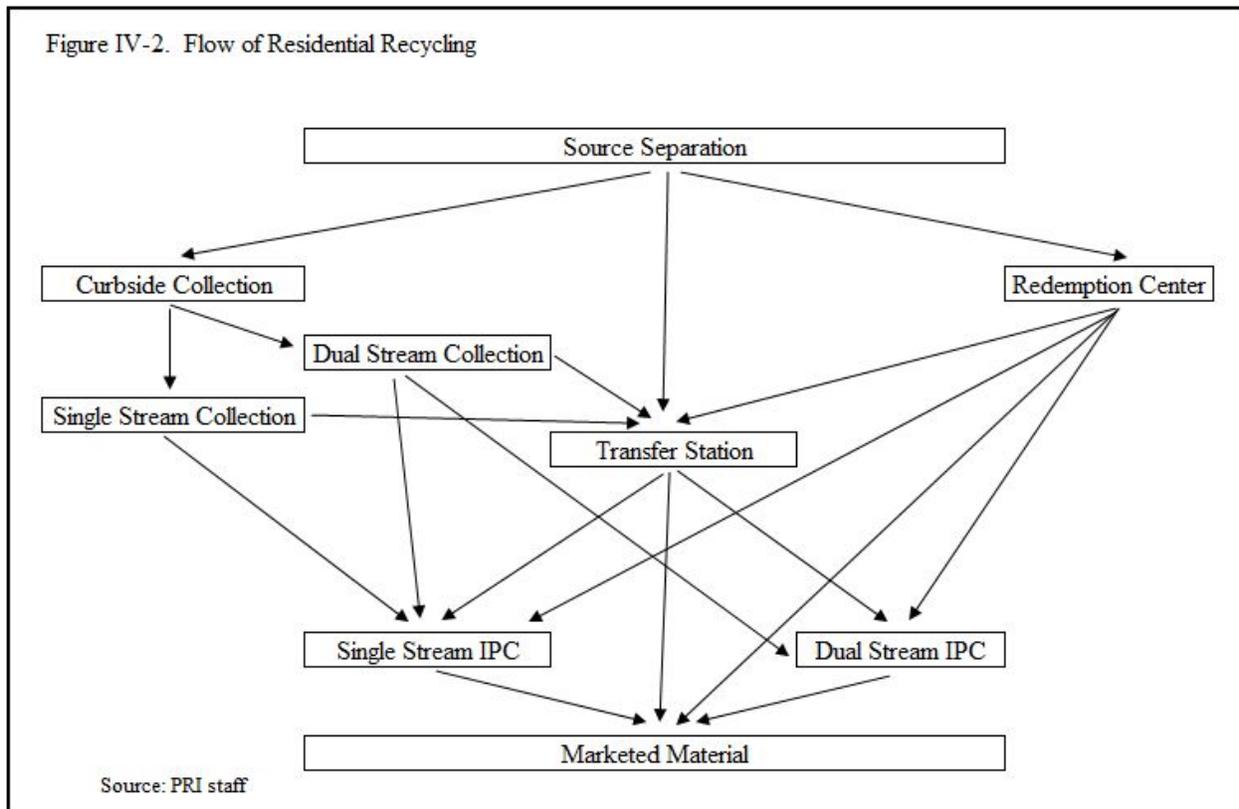
Figure IV-1 shows the breakdown of MSW recycled and composted in Connecticut in FY 2008 according to unaudited reports received by DEP. The largest percentage of recycled material consists of paper (e.g., cardboard, newspaper, magazines, and office paper), followed by organics (e.g., leaves, grass, and brush), containers (glass, plastic, steel, and aluminum), scrap metal, other items (e.g., used oil, textiles, and antifreeze), and electronics.<sup>34</sup>



<sup>34</sup> Recycling data are provided to DEP from a variety of entities (i.e., facilities, and municipalities). The data have not been verified by DEP and is still considered in draft form.

## Flow of Recyclable Materials

Recycling begins when a waste generator (i.e. a resident, business, or institution) separates materials from waste so that those materials can be reused. The recyclables are then collected from the generator and eventually transported to an intermediate processing center (IPC), which is a recycling sorting facility. After undergoing a sorting process, the materials leave the IPC as marketable commodities that can be sold directly to an end-user, such as a factory or mill, or through a broker who agrees to find a buyer for the sorted materials. The possible paths of residential recycling are shown in Figure IV-2. Each step in the recycling process is described in further detail below.



**Collection.** There are essentially three forms of residential collection for recyclable material – redemption centers, curbside collection, and transfer stations or convenience centers. As noted above, certain beverage containers in the state are subject to a refundable deposit fee. These items, such as glass, aluminum, and plastic beverage containers, are able to be returned to redemption centers, where the returner can recover the deposit. The deposit redemption centers serve as one type of collection, separation, and aggregation of recyclable materials within the state.

In addition, municipalities either provide or allow for curbside pickup of residential recycling. Around 21 towns have municipal employees performing the curbside collection of recycling and at least 59 have contracted with a private hauler to provide curbside service for at

least part of the town. The remaining towns use some combination of residential subscription to private haulers and/or residential drop-off of recycling at a local transfer station or convenience center.

*Commercial participation.* While nearly all residents have access to curbside or drop-off recycling services, DEP has noted that the situation is different for the commercial sector. Although a few municipalities provide for recycling pick-up or drop-off (i.e., at a transfer station) services for businesses, the majority of commercial recycling services is provided by the private sector. Large businesses tend to have developed recycling programs that enable them to save on costs due to economies of scale and may, in some instances, recycle items beyond those that are mandated depending on the market for those materials. For small businesses, there is a lack of programs or hauling alternatives to achieve cost efficient collection of recyclables. This fact together with a lack of enforcement by municipalities results in limited participation by small businesses. DEP has noted that some haulers, especially those connected to IPCs, have revenue sharing arrangements with businesses but many IPC managers and recycling officials believe that haulers do not share the revenue with generators.

*Dual and single stream.* The actual methods of curbside recycling differ between towns, largely based on differences in the capabilities of the hauler and the destination IPC. The two primary methods are called dual stream and single stream.

At the outset of mandatory recycling, residents were typically asked to sort their recyclables into two general categories, or dual-stream collection. The dual-stream method consists of having a recycling bin for commingled containers (e.g., glass bottles, aluminum or tin cans, and plastic bottles if accepted) and a separate bundle or bag for fibers (e.g., newsprint, cardboard, and office paper). Single stream, the use of which is increasing in Connecticut, is where all recyclable material is mixed in one container.

The type of truck used to collect recycling can vary with the method of sorting used at the destination IPC. When using dual-stream methods, haulers can choose to use a truck with separate compartments for the two streams or to use two trucks with a single compartment (or the same truck twice). If using a two compartment truck, haulers may fill one compartment before the other and thus be forced to drive to their unloading destination without a full load. Depending on the makeup for the recyclables on a particular route and day, the dual compartment truck may or may not drive less for the same amount of material than the equivalent of two trucks with single compartments.

While many MSW collection trucks are equipped with compacting equipment, the compactors do not work well for recycling collection, as the commingled containers are more easily sorted before they are crushed or broken. The extra space used by non-compacted recyclables is taken up mostly by the air within the containers, which is not efficient for the haulers to be moving around.

In the single-stream method, all acceptable materials are able to be transported in a single compartment, which could allow haulers to eliminate the need for multiple trucks running the same route for recycling. In single-stream collection, all the materials are sorted by residents

into a single recycling container, so haulers now have greater ability to use the generally more cost-effective automated collection for recycling.

**Transport and sorting.** After collection, source-separated material is then transported to an IPC. Recyclables may be transported directly to one of the IPCs, also called material recovery facilities, or be aggregated for longer hauls at a transfer station. Besides the materials recovered at redemption centers, source separated recycling is subject to further sorting at an IPC.

In an IPC, the materials are sorted to certain specifications, then shredded, crushed, or bailed in preparation for shipment to market. Materials leave the IPC as marketable commodities and may either go directly to a factory or mill as capital resources, or to a commodities broker, who will find a facility that will reuse the reclaimed materials.

Like transfer stations, IPCs function as a collection and aggregation point for recyclable materials, which are ultimately transported to another destination to be processed further. Under Connecticut law, IPCs are considered volume reduction plants and are not licensed as transfer stations. Part of the permitted difference between an IPC and a transfer station is that a transfer station may not store any material for longer than 48 hours, while IPCs are able to store material both pre- and post-sorting in permitted conditions.

Of the seven IPCs in the state, two, in Willimantic and Berlin, use single-stream sorting and one, in Hartford, has both single- and dual-stream systems in use. The privately owned IPC in Hartford only accepts paper and cardboard, so it is able to process a portion of recyclables that are collected dual stream. The other three IPCs, in Stratford, Danbury, and Groton<sup>35</sup>, are currently only accepting dual-stream material. The three facilities that accept single-stream are all able to process dual-stream as well, while the dual-stream facilities cannot process single-stream materials.

Three of the IPCs are owned by a public entity and operated by a private vendor (Groton, Hartford, and Stratford). The remaining four are owned and operated by private entities. Table IV-1 provides more details on the IPCs.

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<sup>35</sup> The IPC in Groton will cease operations and relinquish its permit by October 31, 2009.

<b>Table IV-1. Connecticut Intermediate Processing Centers</b>			
<b>Permittee Applicant</b>	<b>Ownership</b>	<b>Processing Lines</b>	<b>Permit Expiration</b>
<i>Facility Location</i>	<b>Permitted Capacity (Tons/Day)</b>	<i>Materials Accepted</i>	
Murphy Road Recycling, LLC	Private	Paper Only	8/09 <sup>36</sup>
<i>Hartford</i>	1,170	<i>Paper/Cardboard</i>	
CRRA	Public	Single and Dual	2/12
<i>Hartford</i>	560	<i>Commingled Containers and Paper/Cardboard</i>	
CRRA	Public	Dual	6/12
<i>Stratford</i>	250	<i>Commingled Containers and Paper/Cardboard</i>	
Recycling Technologies, Inc.	Private	Dual	N/A
<i>Danbury</i>	200	<i>Commingled Containers and Paper/Cardboard</i>	
SCRRA	Public	Dual	5/11
<i>Groton</i>	200	<i>Commingled Containers, Paper/Cardboard, and Other</i>	
Murphy Road Recycling, LLC	Private	Single	12/13
<i>Berlin</i>	1,000	<i>Commingled Containers, Paper/Cardboard, and Other</i>	
Willimantic Waste Paper Co.	Private	Single	10/09 <sup>37</sup>
<i>Willimantic</i>	815	<i>Commingled Containers, Paper/Cardboard, and Other</i>	
<b>Total Daily Capacity:</b>	<b>4,195</b>		
Source of Data: DEP			

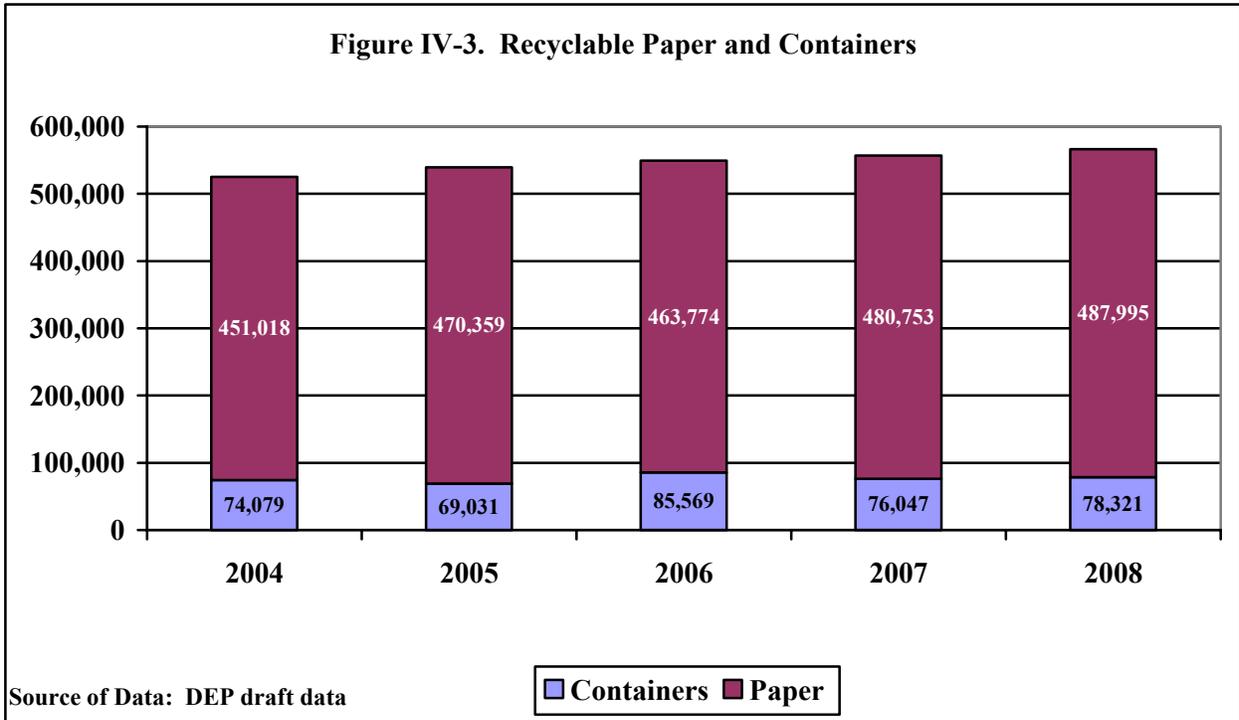
*IPC usage.* In FY 2008, Connecticut recycled approximately 462,000 tons of paper or cardboard and 54,000 tons of commingled containers, for an average of over 1,400 tons per day. The 1,400 tons per day of paper and commingled containers represents the use of one-third of the state's recycling capacity for those currently mandated items, without accounting for the additional capacity of redemption centers.

Figure IV-3 shows the total tonnage of recyclable materials that were marketed for sale from FY 2004 to FY 2008. The tonnage of paper has typically been around six times the tonnage of containers, which can be partially attributed to a combination of the differences in densities between the material (paper is much more dense than containers) and the difference in percentage of the overall waste stream (paper is a larger percentage of the waste stream than plastics, metals, and glass combined).<sup>38</sup> The total amount of recycled materials that were marketed increased consistently over the five-year period.

<sup>36</sup> Renewal application is currently under review by DEP. When an renewal application is properly submitted, the facility can continue operations under the previous permit conditions until the application is acted upon.

<sup>37</sup> Renewal application is currently under review by DEP. When an renewal application is properly submitted, the facility can continue operations under the previous permit conditions until the application is acted upon.

<sup>38</sup> CT DEP Interim Waste Characterization Study Results 2009



## Composting

Composting is the controlled biological decomposition of organic material, such as food waste, grass clippings and yard waste<sup>39</sup>. Despite being a preferred method of disposal according to the SWMP, Connecticut lacks a significant infrastructure for composting. Most of the composting facilities within the state are permitted to accept and process yard waste, but there are few facilities capable of handling food waste.

Few towns (14, according to the DEP survey) budget for a leaf/yard waste composting facility, but over 40 towns and 20 individuals or businesses each have a general permit for a leaf and grass composting site. There is little data available on the effectiveness of leaf composting programs, though yard waste was the second highest tonnage of recycled material in FY 2008. At over 331,000 tons composted, yard waste is over 37 percent of the state's recycling tonnage.

Other than a single private food waste composting site in western Connecticut, there is currently no infrastructure within the state that enables large scale recycling or composting of food wastes. Like many pieces of the waste stream, a large scale food waste composting system needs both disposal and transfer facilities. According to DEP, there are over 1,300 large-scale food waste generators (i.e., universities, supermarkets, and correctional institutions) that generate approximately 99,000 to 153,000 tons of food waste, over 3 percent of the MSW generated in Connecticut. If institutional food waste from 2008 was composted, instead of disposed of at a RRF or landfill, the statewide recycling rate would go from the current approximate 24 percent to as much as 27 percent.

<sup>39</sup> C.G.S. Sec. 22a-207a

The SWMP describes a few small institutional food scrap composting efforts on both the state and local level, such as the Department of Correction's decade old program of composting food scraps in Enfield, and several local elementary school food scrap programs. There is undoubtedly some home composting of food wastes occurring within the state, but there is no information on its scope. There are currently few programs to encourage home composting of food wastes. DEP has noted, through its waste characterization study, that about 25 percent of the MSW waste stream is composed of organics, and would be a prime target for additional diversion efforts.

## Costs

The monetary costs of recycling can be thought of in two important ways, the actual costs incurred and the disposal costs that are averted. Like non-recyclable MSW, the two main fees assessed for recycling are based on collection/transportation costs and disposal costs. While the collection and transportation costs are similar to traditional MSW, the disposal costs of recycling are quite different.

**Incurred costs for disposal /reimbursements.** Within the state, the cost of disposal for recyclables generated in municipalities with long-term disposal contracts range from paying \$39 per ton to getting reimbursed \$17.50 per ton. The large range is partially explained by variations in revenue sharing agreements based on the sale of the recycled commodities.

Regional authorities and municipalities that bundle disposal and recycling together can choose to charge higher MSW tip fees to help subsidize recycling programs and/or use revenues gained through recycling to stabilize or lower MSW tip fees.<sup>40</sup> In some cases, decision makers use a combination of both to help offset the year-to-year changes in both markets. (See Section V for additional discussion of tip fees.)

Beyond the above issues and regional differences, there remain differences in the costs borne by municipalities and their residents. Some towns and regional authorities, such as HRRRA and TROC, have arrangements where a tip fee is assessed when the recycling is delivered and, once a minimum revenue level is reached, some percentage of the revenues from the commodity sale is returned in proportion to the tonnage of recyclables delivered. CRRA offers its members a \$0 tip fee for recyclables at both Mid-Connecticut Project and Southwest Project. The members of the Mid-Connecticut project were also offered the possibility of a revenue-based refund in the last two years (\$10 per ton in FY 2008 and \$5 per ton in FY 2009), but the Southwest members are not eligible to receive the same refunds. Some privately owned IPCs, such as Willimantic Waste Paper and City Carting, Inc., have been able to offer contracts that pay municipalities for each ton of recyclables delivered. Willimantic Waste, for example, has reported that it has paid an average of \$11.11 to \$18.97 per ton to 20 Connecticut municipalities for its recyclables over the last five years.

**Cost avoidance.** The cost avoidance of recycling instead of using traditional disposal methods makes recycling a relatively simple way to lower total disposal costs. Even municipalities that are paying relatively high recycling tip fees (around \$40 for HRRRA members)

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<sup>40</sup> A tip fee is a charge levied for a given quantity of waste received at a processing facility -- usually on a per ton basis.

are still paying much less per ton for recyclables than they would have to pay for traditional disposal (around \$80 for HRRRA members). At the minimum, HRRRA members are saving \$40 per ton by recycling. On the other extreme, Norwalk has a transportation and disposal fee of around \$75, but is currently getting paid \$17.50 for each ton of recyclables delivered for a net savings of \$92.50 for each ton that is recycled instead of burned or landfilled.

**Price of recyclable material.** Once recyclable materials have been sorted and bailed, they become marketable commodities. The price of recyclable materials can range from a few dollars per ton for the least valuable items, or even negative value for some types of glass, up to hundreds of dollars per ton for some plastics and metals.

The market price for recyclable items is also rather volatile. The prices within the recyclables market consistently grew before a dramatic downturn in the fall of 2008. Since the sharp decline, prices have begun to recover, though finding buyers in rough economic conditions appears to be more difficult than in more robust periods. For example, CRRRA reports that the average price it received for paper and cardboard at the Hartford IPC went from about \$154 per ton in August 2008 to about \$54 in November 2008. By July 2009, the average price rose to \$66 per ton. Similarly, the price for number two plastic (HDPE natural) declined from \$863 per ton in October 2008 to \$267 per ton one month later.

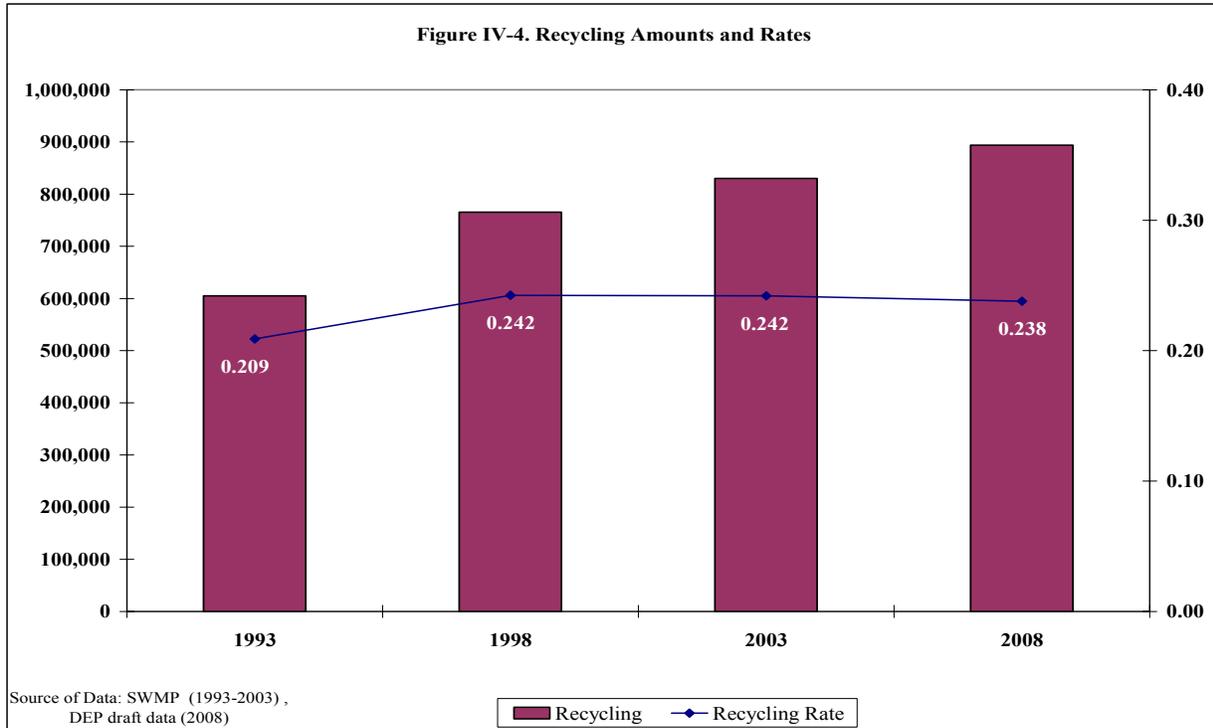
## Recycling Rate

One of the problems facing Connecticut's recycling system is obtaining accurate data, especially data that is comparable to other states and regions. Recycling rates can vary greatly from one location to another, but in many cases it is difficult to discern whether the difference is based on actual behavioral differences or on accounting differences. The recycling rates of states vary greatly in large part because there is no reliable list of what should be counted as recycled. Most states account for the more traditional items like paper, cans, bottles, and even plastic containers. Some differences are due to state specific decisions on how to account for yard waste<sup>41</sup>. The glaring differences in recycling rates may be based on estimates of recycled or diverted waste that include such things as used or scrapped cars.

Since the early 1990s the amount of MSW generated in total and per capita has climbed steadily upward. The amount of waste that is recycled and marketed has also consistently grown, but the ratio of recycled to disposed waste has not changed much after an initial surge in the early 1990s, as can be seen in Figure IV-4. The result is that, while the recycling rate remains steady, the total amount of MSW that must be disposed continues to increase.

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<sup>41</sup> State reporting of yard waste recycling varies from not being included in recycling figures to relying on estimates on the amount of yard waste that does not leave the point of generation. DEP typically counts the tonnage of yard waste accepted by composting facilities towards recycling figures, but does not include estimates of home composting.



According to estimates in the 2006 SWMP, the recycling rate in 2005 with the deposits based recyclables included is about 30 percent. It is arguable that the state has been meeting the original recycling rate goal of 25 percent, but even the estimate of 30 percent falls short of the revised statutory goal of 40 percent. Further, the SWMP predicts that, in order to be able to continue to meet statewide disposal demand without exporting to other states, the statewide recycling rate would have to increase to 58 percent by 2024.

It appears that the current recycling system was adequate to meet the original diversion goal of 25 percent, but it is possible that the system that is currently in place is not capable of meeting higher recycling goals. It remains to be seen how several recent developments, such as adjustments to the deposit laws and capital upgrades at IPCs, will impact the statewide recycling rate.

Both EPA and DEP recommend that a better approach to measuring the amount of waste diverted is to rely on using per capita disposal rates to assess performance, instead of recycling percentages. The per capita rate at least partially accounts for both source reduction and reuse, which is not captured by recycling percentage statistics. Also, the recycling rate can show towns with relatively low generation rates as failing certain benchmarks, while indicating that a town with a high generation rate, but average recycling rate is adequate.

### Recent Developments

The addition of single-stream capability to a few of the in-state IPCs (both private and quasi-public) is expected to dramatically increase the recycling rate for residents of the towns they serve. Hartford was one of the first municipalities to adopt single-stream collection methods through the introduction of several pilot projects. After growing by no more than 6

percent per year from FY 2005 to 2008, the amount of recycling collected in FY 2009, when the single-stream recycling began in earnest, increased by around 40 percent. It is difficult to draw definitive conclusions from these initial results because of the short time period and the impact of the recent economic downturn. However, the initial results appear encouraging. The effects of switching to single-stream collection are likely to be remarkable as more and more towns convert from current dual stream methods.



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### Resources Recovery

Connecticut relies on resources recovery as a way to dispose of its municipal solid waste far more than any other state in the nation. The state's heavy reliance on RRFs for MSW disposal and a variety of ownership situations for those facilities have been questioned in recent years.

This section includes a description of RRF technology, a summary of Connecticut's use of RRFs, an overview of each facility in the state, an update on facility ownership information, and discussion of RRF financing. Specifically, it can be noted that:

- RRFs are waste disposal facilities that are able to reclaim energy as a byproduct of the incineration process;
- Connecticut relies on RRFs more than any other state;
- RRFs are capital-intensive facilities that rely on steady streams of waste for both fuel and revenue;
- circumstances have changed since the six current RRFs were built and some of these changes make the construction of new facilities less feasible;
- the existing RRFs differ from each other in many critical ways;
- important aspects of the waste disposal market, including ownership of RRFs and availability of disposal alternatives, are affected by the expiration of long-term municipal obligations;
- revenues for a RRF are tied to disposal prices and the sale of energy;
- RRFs are monitored for air and water quality issues; and
- though MSW deliveries at RRFs are supposed to be monitored for recyclable content, little is done to keep recyclables from being burned.

### Resources Recovery Technology

Waste burning facilities, such as RRFs, around the world fall into a few general categories: incinerators, transportable energy creators, and steam-converters. The fuel source, or feed stock, for the plants can be a mixture of waste types including construction and demolition debris (C&D), MSW, medical waste, and, in some instances, tires. The types of facilities, and their abundance, vary as described below.

- Incinerators burn waste to reduce volume before landfilling and typically do not recapture energy in any form. They also tend to emit any number of regulated pollutants. There are no longer any active incinerators in Connecticut and the number of incinerators nationwide is decreasing.

- Steam-capturing plants burn waste and use the heat from the combustion to produce steam. The steam can be provided to steam loops as a source of heat or can be combined with an electrical turbine to produce electricity. There are over 100 steam-capturing plants of some variety in use in the United States, and many more overseas, as these types of facilities are often the cheapest way to generate electricity while disposing of waste. The RRFs in Connecticut are steam-capturing facilities that process only MSW<sup>42</sup>
- Transportable energy creating facilities use a high-temperature process, such as plasma-arc technology, to reduce the waste into energy-filled solids or gases that can be used to generate electricity on site or sold to specialized power plants or individual industries for their own use. The main advantage of these facilities is that the energy that is recovered from the waste can be stored and transported, whereas the steam-based facilities must immediately use the steam as it is generated. There are few of this type of facility in the United States (none in Connecticut), but these facilities are relatively common in Europe and Asia.

There are six active MSW resources recovery, or waste-to-energy, facilities in Connecticut and they all employ similar technologies to obtain energy from waste. With the exception of the Mid-Connecticut Project, the plants use a “mass burn” technique where all of the feed stock is burned heterogeneously and any remaining recyclable materials (ferrous metals, etc.) can be filtered out of the remaining ash residue.

The Mid-Connecticut Project uses refuse derived fuel (RDF) instead of a mass burn approach. In the RDF model, items with low burn potential and non-processible materials (e.g., grit, metal, and glass) are filtered out prior to combustion and the remaining feed stock is made more uniform through shredding. Use of the RDF model is meant to increase the homogeneity of fuels and produce a more reliable energy stream, as the components of the fuel are more closely monitored than in mass burn models. However, operation of the sorting facility and disposal, typically at landfills, of the non-processed materials may more than negate any efficiency gains made during incineration.

While the plants have been updated with additional environmental control features, the basic technology of the plants has remained largely unchanged from their construction and opening. As the plants were constructed between 14 to 20 years ago, it is possible that the technology, current at the time, has become outdated. Several companies have made notable strides in the efficiency of waste-to-energy facilities in Europe and Asia and are capable of bringing those technologies to the United States if demand grows here. These technologies are currently used in the United States in experimental and small scale operations. The two main advantages of some of the new technologies are improved efficiency in the amount of energy generated per ton of waste processed and a reduction in the amount of ash that must be disposed. The ash residue, discussed at greater length in Section VI, that is left over from Connecticut’s current facilities has around 10 percent of the volume of the original waste stream and between

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<sup>42</sup> The Exeter Energy Plant in Sterling, Connecticut is a waste-to-energy facility that only processes tires as feed stock.

20-30 percent of the weight. New technologies promise a 99 percent or more volume reduction from the original waste stream. Some disadvantages of the new technologies are that higher initial costs are possible and that their economic feasibility has not been proven in the United States.

### **Resources Recovery Usage**

Since the early 1990s, Connecticut has relied on waste-to-energy plants as the primary mode of disposal for MSW. The RRFs in the state began operation between 1988 and 1995, while the state was making a specific effort to reduce reliance on landfills. The RRFs are able to produce a small, but significant, amount of energy while reducing the amount of MSW that would be landfilled in both volume and weight.

In FY 2008, over 75 percent of Connecticut's non-recycled MSW (2,188,000 tons) was processed at the RRFs, while less than 25 percent was landfilled (676,000 tons). The percentage of MSW that Connecticut disposes of at RRFs far outweighs the nation's second most reliant state, Massachusetts, which has historically used RRFs for around 55 percent of non-recycled MSW.

The Northeast regional average of RRF use is near 50 percent; however, that number is highly skewed by the heavy reliance of Connecticut and Massachusetts. The remaining Northeastern states use RRFs to dispose of only 10 to 35 percent of non-recycled MSW, except Rhode Island, which has no RRFs and relies almost exclusively on landfills (less than 1 percent RRF use). The national average of MSW disposal at RRFs is around 10 percent.<sup>43</sup>

Connecticut's use of RRFs is directly linked to the availability of disposal options within the state. The in-state disposal infrastructure as of July 1, 2009, includes six RRFs and a single, town-owned MSW landfill. The RRFs have a combined permitted capacity of approximately 2.6 million tons of MSW per year, but due to maintenance and other operational considerations, the facilities have processed 2.2 million tons per year on average since 2000, around 85 percent of design capacity.

### **Resources Recovery Facilities**

The six RRFs in operation in Connecticut are located in Bridgeport, Bristol, Hartford, Lisbon, Preston, and Wallingford. The RRFs vary in several operational aspects, including their capacity, the number of towns under long-term contracts, and facility operator as seen in Table V-1.

**Municipal use and membership.** The number of municipalities associated with a particular facility is contingent upon several things, most notably, the overall and available capacity of the facility and the amount of MSW a municipality controls.

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<sup>43</sup> "The State of Garbage in America." *BioCycle* 47.4 (2004): 26-40.

<b>Table V-1. Resources Recovery Facilities in Connecticut: Selected Information</b>				
<b>Facility</b>	<b>Contracted Towns</b>	<b>Commercial Operation Date</b>	<b>Approx. Capacity (tons/day)</b>	<b>Current Operator</b>
Bristol Resource Recovery Facility	14	1988	650	Covanta
Bridgeport Resources Recovery Project	13	1988	2,250	Wheelabrator
Mid-Connecticut Project (Hartford)	70	1988	2,850	Covanta/ MDC
Wallingford Project	5	1989	420	Covanta
Southeast Project (Preston)	12	1992	690	Covanta
Wheelabrator Lisbon Waste-to-Energy Facility	1	1995	535	Wheelabrator
<b>Total</b>	<b>115</b>		~7,400	

Source: SWMP (2006), PRI Staff Interviews, updated as of September, 2009

By far the largest number of municipalities connected to any one RRF is the 70 under contract with CRRA for the Mid-Connecticut Project. Three projects, located in Bristol, Bridgeport, and Preston, each have 12 to 14 member towns, but differ in the capacity available for non-member towns. The Wallingford project processes trash from its five member towns, with little capacity to spare. The Lisbon facility has only one member town, Middletown, so it is able to, and needs to, provide the majority of its capacity to towns or haulers without long-term contracts.

Eleven municipalities are associated with HRRRA, which has a long-term contact with Wheelabrator that allows Wheelabrator the flexibility to send MSW from HRRRA towns to any Wheelabrator facility, or facilities owned by its parent company Waste Management Inc. Within the HRRRA contract, preference is given to facilities in Connecticut over out-of-state options. Another town, Windsor, has less than five years worth of capacity left available in its landfill. After accounting for the HRRRA towns and Windsor, there are 42 towns without long-term contracts to dispose of their trash at in-state disposal facilities. See Appendix A for further municipal membership and use information.

**Ownership.** The ownership of each facility is based upon the original long-term contracts that were entered into as the facilities were built. At the expiration of the last of the initial long-term contracts (FY 2020), two facilities, Mid-Conn and Lisbon, will be publicly owned, and the remaining four will be privately owned<sup>44</sup>.

The ownership of the facilities was the main focus of the predecessor to this study<sup>45</sup>. As such, details of the ownership situation for each facility were discussed in the briefing presented

<sup>44</sup> BRRFOC has the option to purchase the Bristol facility at fair market value at the expiration of the initial long-term contracts. If purchased by BRRFOC the facility would switch from private to public ownership.

<sup>45</sup> "Resources Recovery Facility Ownership: Options and Implications" briefing presented September 23, 2008.

on September 23, 2008. Table V-2 explains and updates the expected ownership scenarios for each facility.

<b>Table V-2. CT Resources Recovery Facilities: Ownership and Membership</b>
<p><b>■ Mid-Connecticut Project (Hartford)</b></p> <p><i>The facility was financed through CRRRA bonds. CRRRA owns the facility now and will remain the owner. The initial long term contracts expire in 2012. Both CRRRA and current Mid-Conn members are exploring their options for 2013 and beyond. All 70 towns involved remain under contract through 2012.</i></p>
<p><b>■ Bridgeport Project</b></p> <p><i>Wheelabrator Technologies, Inc. took ownership of the plant as of December 31st, 2008. The facility was financed through CRRRA bonds and CRRRA was the official owner of the project until Wheelabrator exercised its contractual right to purchase the plant for \$1. Of the 19 towns that formerly had long-term disposal contracts, 12 have signed long-term contracts (five years plus options) through CRRRA to dispose of their MSW at the Bridgeport facility and one has signed a long-term contract directly with Wheelabrator for disposal at the facility. The remaining six towns no longer have a contractual obligation to dispose of their MSW at the Bridgeport facility.</i></p>
<p><b>■ Southeast (Preston) Project</b></p> <p><i>This project was set up under an agreement with CRRRA and SCRRRA, including CRRRA financing, so that Covanta is the equity owner of the facility when the long-term solid waste disposal agreement concludes and the revenue bonds are repaid. The initial long-term contracts expire in 2015, but there are options for extensions, which would extend the current terms through at least 2018.</i></p>
<p><b>■ Wallingford Project</b></p> <p><i>The project was set up under an agreement between CRRRA and Covanta, using CRRRA bonds, so that Covanta is the owner when the solid waste disposal agreement concludes, unless CRRRA purchases the facility for fair market value. At the urging of the member towns, CRRRA did not exercise its purchase right. The five current member towns have signed long-term agreements (ten years beginning in July of 2010 plus two five year options) directly with Covanta to continue to bring their waste to the Wallingford facility. Though the towns did not sign agreements through CRRRA, CRRRA purchased Wallingford facility capacity from Covanta.</i></p>
<p><b>■ Bristol Resource Recovery Facility</b></p> <p><i>The Bristol facility was financed using non-CRRRA bonds. When the bonds are repaid in 2014, Covanta is the owner unless BRRFOC purchases the facility for fair market value (there is also an option to extend the agreement, or for a new contract for the entire disposal capacity).</i></p>
<p><b>■ Lisbon</b></p> <p><i>The Lisbon facility was financed through non-CRRRA bonds. The Eastern Connecticut Resource Recovery Authority (ECRRA) whose sole member is Middletown owns the facility now and will remain the owner when the bonds are paid.</i></p>
<p>Source: 2006 SWMP App. K and PRI staff interviews, information is current as of September, 2009</p>

All six facilities are operated by two companies. Wheelabrator Technologies, Inc. and/or its subsidiaries operate the Bridgeport and Lisbon facilities. Covanta Energy Corporation operates the remaining four facilities (Mid-Conn, Bristol, Preston, and Wallingford).

**Facility overview.** The following section discusses each facility in greater detail. Appendix B provides additional summary information about each, including design capacity and the average amount of solid waste processed per year.

*Bristol.* The Bristol Resource Recovery Facility is overseen by the Bristol Resource Recovery Facility Operating Committee (BRRFOC). For the duration of bond-repayment, BRRFOC has significant control over the budget and is able to set tip fees for its member towns. There are 14 towns that are members of BRRFOC and will remain so through at least 2014 when the bonds are repaid. The Bristol facility was the first of the current six to begin operation, which it did in May of 1988. The Bristol facility is one of two that are not now and never have been formally associated with CRRA. The facility has a capacity of 650 tons per day, which makes it the fourth largest facility in the state. The facility uses mass burn technology and takes its ash residue out of state to a landfill in Seneca Meadows, New York to be disposed.

*Bridgeport.* The Bridgeport Resources Recovery Facility is owned and operated by Wheelabrator Technologies, Inc. The facility, the second largest in the state, has three separate processing lines with a combined capacity of 2,250 tons per day. Any single processing line at the Bridgeport facility has more capacity than the combined capacities of four of the five other RRFs in the state, as each of the three incinerator and boiler lines is capable of processing 750 tons per day. The Bridgeport facility began operation in July 1988, just two months after the Bristol facility.

The current facility was built after another RRF in Bridgeport, known as Bridgeport I, had several high profile failures, including a well-publicized explosion. Bridgeport I was not linked to the current facility or its owner, but the failure of the initial project created a need for additional disposal capacity in the region. The failure of Bridgeport I was undoubtedly a contributing factor in the ownership agreements that left Wheelabrator the owner and also passed to the company much of the risk of building and operating the facility.

*Hartford.* In October 1988, the Hartford facility became the third of the existing plants to begin operation. The facility in Hartford is the largest in the state, with a daily capacity of 2,850 tons. The Hartford facility, part of the Mid-Connecticut Project, is the lone RRF in the state to use RDF technology. The RDF system was chosen, in part, because the RRF technology was retrofitted into the existing power plant. Because of the RDF system, the facility employs two separate buildings, one for separation and waste processing and another, called the energy block, for the incineration and energy generation. The energy block is operated by Covanta and the sorting facility is currently operated by the Metropolitan District (MDC).

Another unique part of the Mid-Connecticut Project is that the facility itself is part of the Black Start emergency system through ISO New England. The project houses jet engines and a store of fuel that, in case of a major blackout, provide the energy for other power plants as they restart. The system can also be used to help prevent brownouts during times of peak usage. Because of the designation, the facility has extra security measures tied to it.

*Wallingford.* The smallest of the RRFs in Connecticut, the Wallingford facility has a capacity of 420 tons per day. The facility began operation in 1989 and has since been governed by CRRA with input from the Wallingford Project Policy Board, which has representation from each of the five member towns. At different times since operation began, the Wallingford facility has been considered for both closure and expansion. Despite these considerations, the facility has stabilized in part because of the consistent waste stream from member towns. Since FY 2001, the facility has run at full capacity through mainly the waste generated by the member towns. In fact, from FY 2001 to FY 2008, the facility has had to divert to another RRF or export to a landfill between 9,000 and 22,000 tons of MSW each year.

*Preston.* The Preston facility is part of the Southeast Project that was bonded through CRRA, but largely governed through the Southeastern Connecticut Regional Resources Recovery Authority, and operated through Covanta. The facility began operation in 1992 and has a capacity of 690 tons per day, making it the third largest facility in the state.

*Lisbon.* The Lisbon facility began operation in 1995, the most recent of the six active RRFs. The facility was created through a unique partnership between ECRRA, Wheelabrator, and Lisbon. Unlike four of the six facilities, the Lisbon facility, along with Bristol, has not been formally associated with CRRA. Technically, the only member town of the facility is Middletown, which is the sole member of ECRRA. Wheelabrator operates the plant and is responsible for securing minimum operating tonnages so long as Middletown brings the MSW that it controls to the facility.

There is no other facility in the state that is owned by a single municipality and, likewise, there is no other arrangement where a municipality owns a solid waste facility that is not within its own borders. As the most recently constructed and permitted, the Lisbon facility was the only facility that was subject to the determination of need process to obtain a permit. While the determination of need process will be discussed further in Section VI, it is important to note that the disposal needs of the HRRRA towns, though roughly 100 miles from the Lisbon site, were an important part of the facility's ability to demonstrate need. Also, the Lisbon facility was sited and built less than 10 miles from the facility in Preston.

**Revenues.** RRFs are capital intense facilities that are largely dependent on a steady source of fuel (i.e., MSW). The facilities must have enough fuel to run consistently, as there are large efficiency decreases while a facility or unit of a facility is brought up to the appropriate temperature for incineration. In order to be economically viable, the facilities were all built in conjunction with long-term contracts that would ensure that there was enough waste to run the plants efficiently. Further, many of the initial long-term contracts included put-or-pay provisions, where municipalities had to provide a minimum amount of trash or pay for the equivalent each year.

**Tipping fees.** Tipping fees are typically a per ton charge on waste handling or disposal. They are based primarily on the operating and administrative expenses of waste disposal, which may include a variety of subcosts, including transport, transfer station use, actual disposal, and debt repayment. Tipping fees may or may not include a separate recycling fee, as noted in Section IV.

Each load of MSW that is brought to a RRF is subject to a tipping fee. The tipping fee for each facility differs depending on agreements a town, regional authority, or hauler have with a facility owner and/or operator. According to the National Solid Wastes Management Association (2005 Tip Fee Survey), the Northeast Region (CT, ME, MA, NH, NY, RI, VT) saw average 2004 tipping fees of \$70.53 per ton in comparison to the 2004 national average of \$34.29. The Northeast was by far the highest region, as the remaining six regions ranged from \$24.06 to \$46.29. In general, tipping fees at non-landfill facilities have been higher than landfill sites.

Table V-3 shows recent tip fee information for towns with long-term contracts with each of the six RRFs. Initially, long-term contracts were used to bind municipalities to a particular RRF for approximately a 20-year time period; now a long-term contract could mean as little as one year, though typically the newer contracts are for five or more years.

PROJECT	FY2006	FY2007	FY2008	FY2009	FY2010
Bridgeport <sup>46</sup>	\$74	\$78	\$81	\$98.50/\$63 <sup>47</sup>	\$63 <sup>48</sup>
Mid-Connecticut	\$70	\$69	\$69	\$72 <sup>49</sup>	\$69
Southeast	\$60	\$60	\$60	\$60	\$60
Wallingford	\$57	\$58	\$59	\$60	\$60
Bristol	\$65.50	\$65.50	\$65.50	\$65.50	\$65.50
Lisbon	\$60-\$66	\$60-\$66	\$60-\$66	\$60.25	\$60.80

Source: CRRA, ECRRA, BRRFOC, PRI staff interviews

The variation in what tipping fees cover makes direct comparison difficult. In some cases, a tipping fee for MSW may include a subsidy for recycling hauling and/or tipping, while in other cases, revenues from recycling are used to stabilize and/or subsidize the MSW tipping fee. Tipping fees may include transport and operation of a transfer or it may be a bare “at the gate” disposal cost. For instance, CRRA operates four transfer stations as part of the Mid-Connecticut project. Member towns of the Mid-Connecticut Project pay the same per ton disposal rate regardless of whether the towns use the transfer stations or haul directly to the RRF in Hartford.

In addition, public entities that set the tip fee (e.g., CRRA, BRRFOC, and HRRA) all have some discretion in creating funds to stabilize year-to-year fluctuation. Some years, the tip fee may be raised to create a reserve fund, while other years, the fund may be tapped in to.

<sup>46</sup> From FY 2006 to FY 2009 Bridgeport members paid the listed tip fee for the tonnage they brought up to their minimum commitment. Tonnage provided in excess of minimum commitments was discounted between \$5 and \$18.50 per ton depending on the year.

<sup>47</sup> In the second half of FY 2009, the initial long-term contracts ended and the new terms began.

<sup>48</sup> Includes \$2 administrative fee for CRRA that is not paid by the lone town that contracted directly with Wheelabrator.

<sup>49</sup> Member towns paid \$10 less (\$62) in second half of FY 2009 due to a revenue surplus from the previous year.

*Spot market.* In addition, MSW that is not controlled under long-term agreements may be subject to the spot market price. The spot market for trash is the price that a disposal facility, be it a landfill, transfer station, or RRF, is willing to take for a load of trash on a particular day. In the spot market, tip fees can fluctuate greatly day-to-day and seasonally. As previously mentioned, RRFs need a certain amount of MSW to run efficiently, so a facility that is running low on MSW to use as fuel will lower its spot market price and, in the process, become a more attractive disposal option for haulers who have discretion in where to deliver loads of MSW. If a facility has enough MSW, it may leave the spot market price at or above the long-term contract price so as to dissuade extra tons from being delivered.

Industry personnel have indicated that the in-state spot market price can be as low as \$40 in the winter when MSW is least available. Haulers with the ability to choose between disposal sites on a daily basis can take advantage of fluctuations in the spot market price. However, those same haulers are not necessarily guaranteed a place to dispose of the MSW for which they are responsible. The risk of relying on the spot market is somewhat lessened if the hauler has access to one or more backup disposal options, such as out-of-state landfills. If done correctly, using the spot market could lead to significant savings.

*Combined tip fees.* One way for municipalities to take advantage of the spot market is to lock in a combination transport and disposal fee with a particular hauler and allow the hauler to either work out short-term deals (less than one year) with disposal facilities or take the collected trash to the facility with the lowest spot market price. In some instances, these combination contracts have a maximum fee outlined as well as provisions for sharing whatever savings a hauler might accomplish between hauler and municipality. Committee staff interviewed several municipalities without long-term contracts with specific facilities. These municipalities reported tip fees in the \$70 to \$80 range that included at least transport and disposal, and sometimes operation of a transfer station.

HRRRA has a long-term contract, not with any one facility, but instead with Wheelabrator (through Wheelabrator of Connecticut). The contract includes a transport and disposal fee that has grown from \$74 in CY 2004 to \$80 in CY 2009. Wheelabrator is responsible for taking the waste from one of the regional transfer stations to any Wheelabrator-run facility, though priority is given to the two facilities in Connecticut, Lisbon and Bridgeport.

As the long-term debt obligations for these facilities retire over the next several years, it might be expected that tipping fees would decrease, all things being equal. However, one part of the tipping fee that has not been previously discussed is the energy generation and sale.

## **Energy Sale**

The main difference between an incinerator and a RRF is energy generation and sale. RRFs produce steam during the incineration process. The steam is then used to move a turbine that is part of a generator, creating electricity.

The facilities all produce more power than is necessary to run the plant, so the remaining energy is sold to power utility companies. Connecticut resources recovery facilities generate

approximately 184 Megawatts of electricity, which is 2.7 percent of the capacity of all current electricity generating resources in Connecticut (6,700 Megawatts total).

Currently, electricity providers purchase RRF-generated energy under contracts entered into at a time when electricity providers were compelled by statute to purchase all available RRF-generated energy at the same rate that energy was sold to municipalities.<sup>50</sup> The statute provides that the rate and the mandate to buy last the length of the original contract, so long as the contract was valid for at least 20 years after the initial operation of a facility.

The RRFs were able to lock in a long-term rate for the energy that they provided for sale to the local power utilities. These rates were part of long-term projections, many of which, in retrospect, overestimated the growth of energy prices. In some cases, the locked-in rates were at or just above current market rates, but other facilities are currently selling their energy at several times the current market rate. According to the Energy Information Administration, the average wholesale price for the New England Region from January to September 2009 was around \$.045 per kilowatt hour with a range from \$.025 to \$.130 per kilowatt hour, while the price received by RRFs for energy produced at the facility ranged from \$.08 to \$.24 per kilowatt hour. Of note is that the locked-in higher rates effectively function as a subsidy for tip fees, a subsidy that is paid by electricity rate payers.

As most of the original energy purchasing contracts are keyed to the financing of the facilities, the energy contracts are also beginning to expire. Without further statutory direction, electric providers will most likely purchase the RRF-generated energy at the much cheaper wholesale rate rather than the municipal rate. Whatever decrease there may be in revenue from energy sales will partially offset savings gained from debt retirement in the long-term tip fees.

Power companies still have some additional incentive to purchase RRF-generated energy. Under P.A. 07-242, the legislature outlined energy generation preferences with a set of renewable portfolio standards. Electricity providers must purchase a certain amount (10 percent by 2010) of a combination of Class I (e.g., solar or wind power) and Class II (trash to energy or biomass energy). Of the overall 10 percent, 7 percent must be Class I, but the remaining 3 percent can be Class I or II. Electricity providers could potentially avoid using RRF-produced energy if they are able to purchase enough Class I energy, but if the RRF energy is provided at market rates, there seems little reason to avoid it.

## **Regulation and Enforcement**

As complex systems, RRFs are subject to regulation in three different areas: materials management, water quality, and air quality. All three areas are monitored by DEP, but by different sections of the agency.

**Water.** Water is used at RRFs in several ways. As each facility generates electricity through steam, there must be a viable source of water to be superheated, sent through a generator and cooled again before being released back into the system. As the water is kept separate from the incinerator ash and other pollutants, there are few concerns about the outgoing water being contaminated. However, the temperature of the previously superheated water must be brought

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<sup>50</sup> C.G.S. Sec. 16-243e

down to acceptable levels before leaving the facility to prevent serious ecological harm. Waste water and water run off are also controlled at RRFs. The facility sites must be self-contained and the collected water must be sent to a water treatment plant. DEP has issued two Notices of Violation (NOV) to RRFs for water issues in the last ten years<sup>51</sup>.

**Air.** The air around a facility is managed in several ways. To begin with, the tip floor of a facility is held under negative pressure to keep odors from escaping. Typically the air from the tip floor is pulled into the incinerator as a fuel for the incineration process. As materials are burned, vapors are released that can contain any number of harmful elements. The gases from the incinerator are sent through a series of air quality filters that are designed to capture most, if not all, of the harmful gas.

The air emissions of the RRFs are closely monitored for harmful elements. As part of their permit, the facilities are equipped with monitoring equipment. Facility operators are required to self-report any and all emissions violations, as well as summaries of monitoring data to DEP, which addresses the violations and audits the summaries quarterly. Additionally, DEP performs regular stack tests to assess the calibration of the on-site monitoring equipment and to test for the presence of potentially harmful elements that are not continuously monitored.

DEP took formal action towards a RRF seven times and issued another 13 NOVs for air compliance infractions in the last ten years<sup>52</sup>. The few violations that occur are typically the result of significant shifts in the waste that is being burned. These shifts or spikes can happen when the feed stock has changed, such as getting a particularly saturated load on a rainy day, or when improper materials, such as batteries, are burned.

**Waste materials.** As previously discussed, recycling of certain items in Connecticut is mandatory. As such, disposal of recyclable material at an RRF is illegal. RRF operators have the authority and responsibility to report haulers who deliver loads with “excessive” amounts of recyclable materials. The amount of recyclable material that constitutes an “excessive” amount is not defined by statute or regulation. Violations of this nature seem to be under-reported, partly due to the lack of a clear definition of what constitutes an infraction. DEP rarely conducts inspections on the amount of recyclables delivered by haulers as MSW and does not receive regular updates from the RRFs on their inspection history or results.

When DEP does perform the occasional tip floor inspection, fines or NOVs are levied against the hauler or generator and not the RRF itself. To date, DEP has yet to present an RRF with a NOV for either allowing recyclables to be delivered as MSW or for failure to inspect loads for recyclables. RRF owners and operators have little incentive to enforce recycling mandates. The facilities are always looking for MSW to use as fuel, so it may be difficult to justify turning away a hauler who is providing that feed stock, even if it is full of recyclables.

RRFs are required to report to DEP the tonnages received and town of origin for all the MSW delivered to the facility. While scales at the facilities allow RRFs to determine the weight of a particular load, the town of origin is typically obtained from the hauler. As described in

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<sup>51</sup> Both NOVs were issued to the Mid-Connecticut Project.

<sup>52</sup> Formal actions are considered less severe than a NOV. The NOV were issued as such: Wallingford (5), Hartford (4), Preston (2), Bristol (2), Bridgeport (0), Lisbon (0).

Section III, haulers may misrepresent the town of origin for a load of MSW or take a load to the incorrect facility, all of which can contribute to inaccuracies in DEP's municipal data.

Since DEP does not regulate haulers directly, there is little state-wide information available about hauler monitoring. CRRA does collect some information on hauler violations. From FY 2007 to FY 2009, CRRA conducted over 26,000 inspections at five of the six RRFs<sup>53</sup>. There were approximately 1,600 violations noted, meaning that 6 percent failed inspection. Of those violations, only 99 were for recycling (less than 0.4 percent of inspections and 6 percent of total violations) and 320 were for various flow issues (i.e., misreporting the town of origin for a load, or going to the wrong facility). The remaining citations were a combination of safety issues and unacceptable wastes (i.e., bulky waste, hazardous waste, and household furniture).

### **Changing Statewide Capacity**

There has been no change in the statewide RRF capacity since the most recently constructed facility began operation in 1995. Absent new landfill capacity or drastic increases in diversion rates, Connecticut needs more capacity at RRFs in order to become self-sufficient for disposal. RRF capacity can be increased one of two ways; 1) through the creation of new facilities, or 2) through the expansion of existing facilities.

The creation of a new RRF in the state faces several potential challenges. In order to be permitted, any potential facility must meet or exceed a series of requirements from DEP as outlined further in Section VI. Of note, the geological requirements for a RRF are less rigorous than for a landfill, but there are still concerns about a potential location meeting environmental justice standards and overcoming any regional or local resistance to new waste facilities. A new facility would also have to demonstrate that there is sufficient need for additional capacity. The determination of need process will be discussed further in Section VI. While there is currently a capacity shortfall, it remains unclear whether additional capacity would be deemed necessary without the state meeting or exceeding MSW diversion goals.

Beyond the permitting process, facilities created today may face a different set of challenges than those faced by the existing facilities. The existing facilities were helped to be economically viable through the existence of flow control, long-term contracts, and favorable energy sales, all of which made obtaining the necessary bonding and financial backing easier. While a new publicly-owned facility could still employ flow control to ensure some amounts of waste, it appears unlikely that many municipalities would be willing to enter into contracts with lengths of 20 years or longer. It also seems extremely unlikely that any new facility would receive long-term energy contracts that are well above market rates.

Given the challenges associated with building a new facility, expansion of existing facilities seems to be a relatively straightforward way to increase statewide capacity. As there are already RRFs operating on site, expansions are not likely to face the same level of local opposition or siting issues of a new facility, although new DEP permits would be required. If all six of the facilities were able to increase their capacity by roughly one third, the equivalent of

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<sup>53</sup> CRRA did not report performing inspections at the Bristol RRF.

adding a fourth processing line to a three line facility, statewide capacity would increase from approximately 2.2 million to 2.9 million tons of MSW a year.

It should be noted that not all of the six facilities are in a position to expand, and there are no guarantees that those with the ability to expand could increase their capacity by one third. Further, even the lofty estimate of an expanded yearly capacity of 2.9 million tons would barely meet the state's current disposal needs. Both the population and the amount of MSW generated per capita have been steadily increasing over the last 10 to 20 years. If that trend continues, the state would again face an in-state disposal capacity shortfall, even after greatly expanding the existing RRFs.



### Landfills

While landfills and open burning dumps were once commonly used, federal and state laws and regulations have affected the siting and use of landfills in Connecticut. Landfills, though a relatively cheap and widely used disposal method across the country, are the least preferred disposal method in Connecticut according to the statutory waste disposal hierarchy. This section includes several things of note about landfills including:

- the rules and regulations surrounding the minimum health and safety requirements for landfills have grown more stringent over time at both the federal and state level;
- the minimum requirements for landfills in Connecticut exceed the federally accepted minimums;
- burying MSW at landfills is the least expensive disposal option;
- the number of landfills in Connecticut has diminished, as few landfills of any type, and no MSW landfills, have been built in the previous 20 years;
- resources recovery, though a more preferred method on the hierarchy than landfills, has a landfill component; and
- some states, though not Connecticut, currently allow the beneficial reuse of ash residue.

### History and Regulation

To gain a sense of why Connecticut has stopped building landfills and prefers not to use them, it is important to look at the circumstances that led to their decreased use and favorability as well as what barriers there are to the creation of additional landfills. Specific concerns over ground water protection and the consequent increase in federal and state regulation of landfills severely reduced the number of landfills in Connecticut and the nation.

**Groundwater protection.** One of the major reasons for moving away from the old, unlined landfills was to prevent the contamination of water, especially potable water, within the state. At the time when the state moved on from the old dumps many, if not most, residents were reliant on well water. Regardless of the actual use of wells, it remains difficult to find parcels of land in the state that are not currently developed and do not have potential drinking water wells. In order to protect the drinking water, both federal and state laws and regulations have been enacted over the last 40 years.

**Federal guidelines.** The federal Environmental Protection Agency (EPA) has regulatory control over many aspects of waste disposal. The federal Resource Conservation and Recovery Act (RCRA) of 1976 amended the federal Solid Waste Disposal Act of 1965. RCRA Subtitle D set planning standards for state and regional entities, requiring that state planning for waste

disposal “contain requirements that all solid waste ... shall be (A) utilized for resource recovery or (B) disposed of in sanitary landfills” and “provide for such resource conservation or recovery and for the disposal of solid waste in sanitary landfills or any combination of practices so as may be necessary to use or dispose of such waste in a manner that is environmentally sound.”

*Sanitary landfills.* As part of ongoing technology improvements in waste disposal and the requirements of RCRA subtitle D, the EPA clarifies what constitutes a “sanitary landfill” and how it differs from open dumps. Federal standards for sanitary MSW landfills include:

- **“Location restrictions**—ensure that landfills are built in suitable geological areas away from faults, wetlands, flood plains, or other restricted areas.
- **Composite liners requirements**—include a flexible membrane (geomembrane) overlaying two feet of compacted clay soil lining the bottom and sides of the landfill, protect groundwater and the underlying soil from leachate releases.
- **Leachate collection and removal systems**—sit on top of the composite liner and removes leachate from the landfill for treatment and disposal.
- **Operating practices**—include compacting and covering waste frequently with several inches of soil to help reduce odor; control litter, insects, and rodents; and protect public health.
- **Groundwater monitoring requirements**—requires testing groundwater wells to determine whether waste materials have escaped from the landfill.
- **Closure and postclosure care requirements**—include covering landfills and providing long-term care of closed landfills.
- **Corrective action provisions**—control and clean up landfill releases and achieves groundwater protection standards.
- **Financial assurance**—provides funding for environmental protection during and after landfill closure (i.e., closure and postclosure care).<sup>54</sup>

**State regulation.** The state DEP also has regulatory control over solid waste facilities, including landfills. At minimum, DEP must impose the federal guidelines and requirements. In many cases, state statute and regulations are more stringent than the federal requirements. That the bar for environmental safety is raised higher by the state than is required federally appears to be largely a function of the state’s commitment to environmental responsibility and the particular circumstances that faced the state as the existing landfills were closed.

DEP oversees the permitting of solid waste facilities, as discussed in detail later in this section. Along with its permitting activities, DEP is responsible for ensuring that towns are fulfilling their obligations to provide for the safe and sanitary disposal of trash, including inspecting and, if necessary, citing violations at permitted waste facilities, including landfills.

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<sup>54</sup> 2008. Criteria for MSW Landfills. US EPA. <http://www.epa.gov/epawaste/nonhaz/municipal/landfill.htm> (accessed August 21, 2009).

DEP is also charged with overseeing the closure and post-closure activities of a landfill, which will be discussed later in this section. DEP collects data from many closed landfills but, in general, lacks the staffing to thoroughly address the large amount of monitoring data that comes to the agency. DEP staff resources for landfill monitoring are prioritized to track landfills with previously established violations rather than combing through looking for issues on facilities that have not been previously flagged.

## **Lifecycle of a Landfill**

Like many facilities, landfills have an expected useful life. Landfills begin by obtaining the necessary permits. Once the permits are approved, the landfill site is prepared and eventually opened for daily operations. When the capacity of a landfill has been depleted, the landfill closes and begins a post-closure monitoring period. After a landfill is closed, it may be tapped to collect gases that build up during decomposition.

**Permitting.** The permitting process for a landfill is extensive and can take several years. Any entity, public or private, must invest resources in investigating potential landfill sites, acquiring the proper materials, and preparing an application for a permit. Once an application is submitted, it is reviewed by DEP, which focuses on two important aspects; the features of the proposed site and the need for additional disposal capacity within the state.

*Siting.* In addition to the federal regulations for sanitary landfills, DEP requires any potential landfill site to have a number of geological features, most notably, proximity to a large body of water that is not classified as a source of drinking water. The body of water creates a potential dilution point for the leachate should the liners and other preventative measures of a modern sanitary landfill give out. Trying to find bodies of water within the state that are both large enough to serve as a potential source of dilution but that are not of high enough quality to be used as drinking water is difficult.

A result of being a geographically small state with high environmental standards and an expressed preference to avoid using landfills is that the siting process for a new landfill is extensive. Industry personnel have taken exception to some of the fail-safe requirements as unnecessarily restrictive, but the DEP position is that the geological requirements serve as a backup should the required liners fail.

*Determination of need.* Beyond the physical location requirements, a written determination of need from the DEP commissioner is necessary for new or expansion permits for a landfill (or RRF)<sup>55</sup>. The first part of the determination of need process is determining whether the combined capacity of all existing in-state facilities is sufficient to process the waste generated within the state. Should there be a capacity shortfall, the process goes on to determine whether the proposed additional facility or expansion would leave the state with “substantial excess capacity.” If a proposed facility leaves the state with excess capacity, the application will not be approved.

The determination of need process does not specify the time frame of need and thus do not necessarily consider long-term need and future planning. No consideration of adequate

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<sup>55</sup> C.G.S. Sec. 22a-208d

markets and/or competition in the state as a whole or within specific regions are comprehended by the determination of need process.

**Daily operation.** Once a landfill has been properly permitted and constructed, the facility is ready to accept waste. Operation of a landfill is a relatively simple process, especially in comparison to operation of other disposal methods such as resources recovery. Most landfills begin as excavated pits with the necessary liners in place. Incoming loads are often unloaded in a central location within the landfill, then spread or compacted into the appropriate areas that allow the pit to be filled evenly as capacity is used. Daily operation of a landfill requires few expenses, needing little more than a scale, a way to move the trash (often a front-end loader or bulldozer), possibly a compactor, and the workforce to control the equipment.

Depending upon the capacity of the facility and the amount of waste (either MSW or ash residue) processed daily, landfills can remain open anywhere from a few years to several decades. While the facilities typically begin as pits, they are closed when the pile of waste approaches the maximum permitted slope.

Industry personnel have estimated that the actual costs incurred before profit for a landfill may be as low as \$5 to \$10 per ton. As the expenses of landfills are quite low, so are the tipping fees in comparison to more capital intensive disposal methods. The SWMP indicates that tipping fees at out-of-state landfills in several states (e.g., Virginia, Ohio, and Pennsylvania) are often as low as \$20 to \$30 per ton. Ash-only landfills will be discussed later in this section.

**Post-closure, monitoring, and land use.** Ultimately, all landfills, regardless of type, are closed. In most cases, landfills are capped using some combination of synthetic material and soil, though, as discussed above, the requirements have changed with the adoption of sanitary landfill requirements. Current regulation requires a landfill to be monitored for a number of water, soil, and air contaminants for at least 30 years after the landfill has been closed. Landfills are typically unavailable for land reuse immediately after their closure, but are often able to be repurposed as passive green space after certain milestones of post-closure have been met.

The responsibility for landfill monitoring typically falls on the landowner, often a municipality, unless the owner has made provisions with a separate operator. Monitoring data, including violations, are self-reported to DEP for documentation and further action as necessary. Landfills that were in use prior to the mandatory switch to sanitary landfills in the mid-1970s were not part of a permitting system, so records on the former town dumps are scarce. Current estimates are that there may be well over 300 unpermitted closed landfills, which go largely unmonitored unless a problem is discovered in nearby wells.

**Landfill gas to energy.** Landfills produce several gas byproducts as the materials within landfills decompose. Landfills can be fitted with wells that are able to capture the gas as it builds up. In some cases, the gas is of a high enough quality and density that it is able to be compressed and sold as fuel. In other cases, the gas is combusted on site. Depending on the facility, the combusted gas may provide power to some internal or external unit. In many instances, however, the quality of the gas does not warrant attaching expensive capital to a particular site, so the wells are used as exhaust valves to keep pressure from building up and to control the amount of gas that is allowed to escape into the atmosphere.

## Landfill Usage

Landfills remain the primary source of MSW disposal nationally. In 2004, of the 390 million tons of MSW that were not recycled, 90 percent went to MSW landfills while only 10 percent were disposed of at RRFs<sup>56</sup>. It is estimated that there are over 1,800 active MSW landfills in the country, compared to around 100 RRFs. Connecticut's use of landfills differs greatly from the national average. In the late 1960s, Connecticut had at least 144 municipal landfills – now there is only one landfill in Connecticut that is permitted to accept MSW.<sup>57</sup> The remaining MSW landfill, in Windsor, has approximately 126,000 tons of MSW capacity remaining, which is estimated to be filled by 2015<sup>58</sup>.

Table VI-1 shows the current number of active landfills permitted by the DEP.

<b>Active Landfills by Type of Material Accepted</b>	<b>Number</b>
MSW	1*
Bulky Waste (e.g., land clearing debris)	26*
Ash	1
Special Wastes	3
Source: DEP	
*includes Windsor landfill in counts for both MSW and BW	

As there is little available landfill capacity in-state, most of the MSW generated within the state that exceeds the fixed capacity of the RRFs has to be exported, where it will likely be disposed of at a landfill. In FY 2008, approximately 649,000 tons of MSW were sent out of state. As statewide generation grows, so will the dependence on out-of-state landfills, despite the fact that both use of landfills and exporting MSW go against the stated goals of the SWMP.

## Ash Residue

Beyond the state's position on the use of MSW landfills, there is a landfill component to the more preferred disposal method of waste-to-energy. Ash residue is a byproduct of the resources recovery process. The residue ash has about 10 percent of the volume and 20 to 30 percent of the weight of the original MSW. The ash itself is a combination of fly-ash, which is known to contain potentially dangerous amounts of heavy metals, and bottom ash, which is typically considered to be non-hazardous.

The bottom ash, as its name suggests, is the non-combustible or non-combusted material that remains at the bottom of an incinerator after being processed. The fly-ash, the portion that goes up the chimney of the incinerators, is sent through air quality control filters and often mixed with a treatment, such as a type of lime slurry, to help counteract some of the negative elements before being further combined with the bottom ash. The combination of bottom ash and fly ash

<sup>56</sup> "The State of Garbage in America." *BioCycle* 47.4 (2004): 26-40.

<sup>57</sup> Number of landfills cited in *Annual Plan of Operations for FY 2008 and 2009*, CRRA. January 2008.

<sup>58</sup> Capacity and use estimates prepared by Fuss & O'Neill for the Town of Windsor

is the material referred to as ash residue. The ash residue must be disposed of, and in Connecticut the only legal disposal method for ash is landfilling.

From 1999 through 2008, there were two ash landfills within the state. The closure of the Hartford landfill at the end of 2008, which had been accepting both MSW and ash in separate sections, leaves the Putnam ash landfill, owned by Wheelabrator Technologies Inc., as the only remaining in-state ash disposal facility for 2009 and beyond.

According to the SWMP, the Putnam facility had approximately 6.7 million tons of remaining capacity as of the end of 2004. The SWMP contains an estimate that the Putnam facility may exhaust the rest of its remaining capacity in 2018; however that estimate is based on the assumption that all the ash from the six in-state RRFs would be disposed of at the Putnam facility. Since the SWMP was published, only two of the RRFs, Lisbon and Bridgeport, both of which are also operated by Wheelabrator, have consistently brought all their ash to the facility. The Southeast RRF in Preston uses the Putnam facility to dispose of a portion of their residue ash and CRRA began bringing the ash from the Mid-Connecticut facility to Putnam in 2009.

A more recent estimate of remaining space provided by Wheelabrator was calculated at the close of FY 2009. The survey indicated that the remaining space could hold an additional 7.6 million tons. At the current ash disposal rate of approximately 450,000 tons per year, the Putnam landfill would remain open, without expansion, for nearly another 17 years.

## **Ash Reuse**

Ash residue is a substance that hardens over time and sets up with a consistency close to that of concrete. Ash residue has several potential methods of reuse, including as an ingredient for asphalt or concrete, and their many derivatives such as shingles, paver blocks, or road sub-base. According to a recent survey<sup>59</sup>, Florida, Massachusetts, Pennsylvania, Maryland, New Hampshire, New York, Hawaii, and Missouri allow at least one type of beneficial use of ash residue. In most cases, the eight states allow ash residue to be used as a component of asphalt, as road base, or as supplemental material for landfills (i.e., daily cover or under liner base).

Since there are no ash reuse methods in place within the state, it is unclear whether methods used in other states would meet the environmental standards of DEP. Connecticut law requires a permit in order to reuse MSW ash residue, but to date, no formal application has been submitted.

Legal and permitting issues aside, unless a reuse method develops that proves to be more cost effective than using an ash-only landfill, it is not likely there would be a market for items that contain reused ash. It should be noted, however, that there are reuse programs in place for coal ash, which has similar characteristics to MSW ash residue. DEP has indicated that the reused coal ash has effectively flooded any market there may be for MSW ash residue.

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<sup>59</sup> “2006 Beneficial Use Survey Report” November, 2007. Association of State and Territorial Solid Waste Management Officials.

## Recent Developments

In 1989, DEP published a report that indicated there were 13 sites around the state that appeared to meet minimum siting requirements for an ash landfill, including the necessary large body of water among the other requirements. In the twenty years since the study was published, at least four of the potential sites have been developed for other uses or otherwise eliminated from consideration. By statute, CRRA, by itself or through a regional resources recovery authority, may establish not more than two ash landfills on either side of the Connecticut River. For a new ash landfill to be cited in the state, it likely would have to be located at one of the nine remaining locations indicated in the DEP report.

CRRA recently investigated the possibility of siting an additional ash landfill at one of the sites listed in the report in Franklin, Connecticut. CRRA pursued the landfill while stating that a publicly owned ash landfill could save municipalities money in the long-term while providing additional in-state infrastructure to support the RRFs. CRRA's geological testing showed that the Franklin site would meet the criteria set forth by DEP. However, CRRA's board of directors decided in August of 2009 to suspend their pursuit indefinitely "based on its understanding of the directives received from State leaders"<sup>60</sup>. At that time, CRRA also made known their intention to pursue other low-costs options for ash disposal.

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<sup>60</sup> "CRRA Resolution Regarding Ash Landfill Initiative". CRRA. August 27, 2009.  
<[http://crra.org/documents/press/2009/CRRA\\_board\\_resolution\\_regarding\\_ash\\_landfill\\_8-27-2009.pdf](http://crra.org/documents/press/2009/CRRA_board_resolution_regarding_ash_landfill_8-27-2009.pdf)>



# APPENDICES



# Appendix A

## Member Municipalities by Long-term Resources Recovery Facility Contracts

<b>Mid-Conn Project (70)</b>				<b>HRRRA (11)</b>	<b>Bristol (14)</b>
Avon	East Windsor	Middlebury	Suffield	Bethel	Berlin
Barkhamsted	Ellington	Middlefield	Thomaston	Bridgewater	Branford
Beacon Falls	Enfield	Naugatuck	Tolland	Brookfield	Bristol
Bethlehem	Essex	New Hartford	Torrington	Danbury	Burlington
Bloomfield	Farmington	Newington	Vernon	Kent	Hartland
Bolton	Glastonbury	Norfolk	Waterbury	New Fairfield	New Britain
Canaan	Goshen	North Branford	Watertown	New Milford	Plainville
Canton	Granby	North Canaan	West Hartford	Newtown	Plymouth
Chester	Guilford	Old Lyme	Westbrook	Redding	Prospect
Clinton	Haddam	Old Saybrook	Wethersfield	Ridgefield	Seymour
Colebrook	Hartford	Oxford	Winchester	Sherman	Southington
Cornwall	Harwinton	Portland	Windsor Locks		Warren
Coventry	Hebron	Rocky Hill	Woodbury	<b>Wallingford Project (5)</b>	Washington
Cromwell	Killingworth	Roxbury			Wolcott
Deep River	Litchfield	Salisbury		Cheshire	
Durham	Lyme	Sharon		Hamden	
East Granby	Madison	Simsbury		Meriden	<b>Lisbon Project (1)</b>
East Hampton	Manchester	South Windsor		North Haven	
East Hartford	Marlborough	Southbury		Wallingford	Middletown
<b>Non-Member Municipalities (43)</b>					
<b>Bridgeport Project (13)</b>	<b>Southeast Project (12)</b>	<b>Non-Member Municipalities (43)</b>			
Bethany	East Lyme	Andover	East Haddam	New Haven	Thompson
<b>Bridgeport</b>	Griswold	Ansonia	Eastford	Norwalk	Union
East Haven	Groton	Ashford	Franklin	Plainfield	Voluntown
Easton	Ledyard	Bozrah	Greenwich	Pomfret	West Haven
Fairfield	Montville	Brooklyn	Hampton	Putnam	Weston
Milford	New London	Canterbury	Killingly	Salem	Willington
Monroe	North Stonington	Chaplin	Lebanon	Scotland	Windham
Orange	Norwich	Colchester	Lisbon	Somers	Windsor
Shelton	Preston	Columbia	Mansfield	Stafford	Wilton
Stratford	Sprague	Darien	Morris	Stamford	Woodstock
Trumbull	Stonington	Derby	New Canaan	Sterling	
Westport	Waterford				
Woodbridge					



## Appendix B

### Resources Recovery Facility Summary Information

<b>Selected Information</b>	<b>Bridgeport RRF</b>	<b>Wallingford RRF</b>	<b>Southeast RRF</b>	<b>Mid-CT RRF</b>	<b>Bristol RRF</b>	<b>Lisbon RRF</b>
<b>Maximum Permitted Design Capacity (tons/year) (1)</b>	821,250	153,300	251,485	888,888	237,250	195,640 (2)
<b>Average Amount (tons) of MSW Burned/Year (3)</b>	722,692	143,158	250,484	715,011	196,113	181,987
<b>Generation Capacity (Megawatts) (4)</b>	67	11	18	68.5	16.3	15
<b>Year Bonds Will be Paid off</b>	2008	2009	2015	2012	2014	2020
<b>Operator</b>	Wheelabrator	Covanta	Covanta	Covanta/MDC	Covanta	Wheelabrator
<b>2007 Owner</b>	CRRA	CRRA	Covanta	CRRA	Covanta	ECRRA
<b>Contract End Owner (5)</b>	Wheelabrator	Covanta	Covanta	CRRA	Covanta	ECRRA
<b>Ash Disposal Site</b>	Putnam	Peabody/ Springfield (MA)	Putnam	Putnam	Seneca Meadows (NY)	Putnam
<p>1) This represents the maximum (theoretical) amount of waste the facility is permitted to process per day multiplied by the number of days a year the facility operates.</p> <p>2) As appropriate, 13,140 tons/year are dedicated only for processed demolition wood (based on the Lisbon RRF permit to operate)</p> <p>3) The Average Amount of Waste burned per year is based on the five year period of FY 2000-FY 2004.</p> <p>4) Information obtained from facility operators (Wheelabrator Inc, Covanta Energy). Numbers are approximate at permitted capacity.</p> <p>5) This category refers to what entity is expected to own the facility after the financing bonds are repaid. The items do not reflect potential purchase of the facilities through contractual options or otherwise, except the Bridgeport plant which already exercised its ownership option.</p> <p><b>SOURCE: based on SWMP (2006) updated</b></p>						