

Materials Management Infrastructure

Connecticut DEEP Request for Information
April 14, 2023

Connecticut has a goal of managing waste materials within its own borders. This document provides a high-level overview of Connecticut's current materials management landscape including the decreasing disposal capacity, baseline waste stream tonnages by sector, and disposal structure. The document also outlines a pathway toward self sufficient disposal and a mechanism to ensure a steady food waste feedstock through Unit Based Pricing (UBP) and co-collection.

Provided by WasteZero

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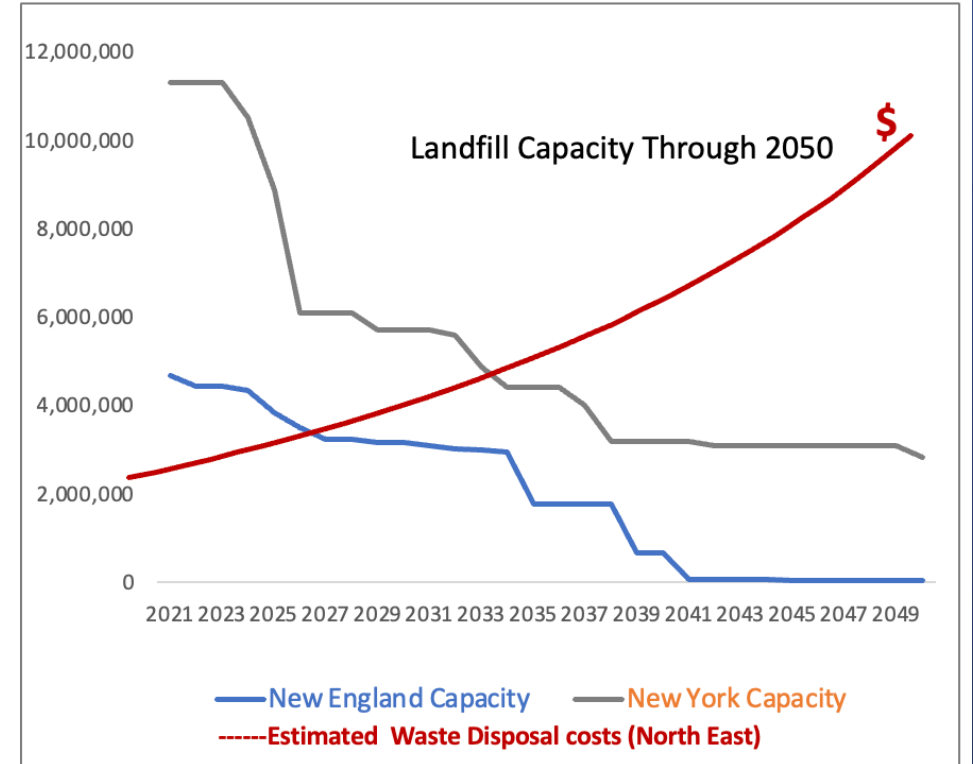
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Regional Waste Situation

Decreasing Disposal Capacity

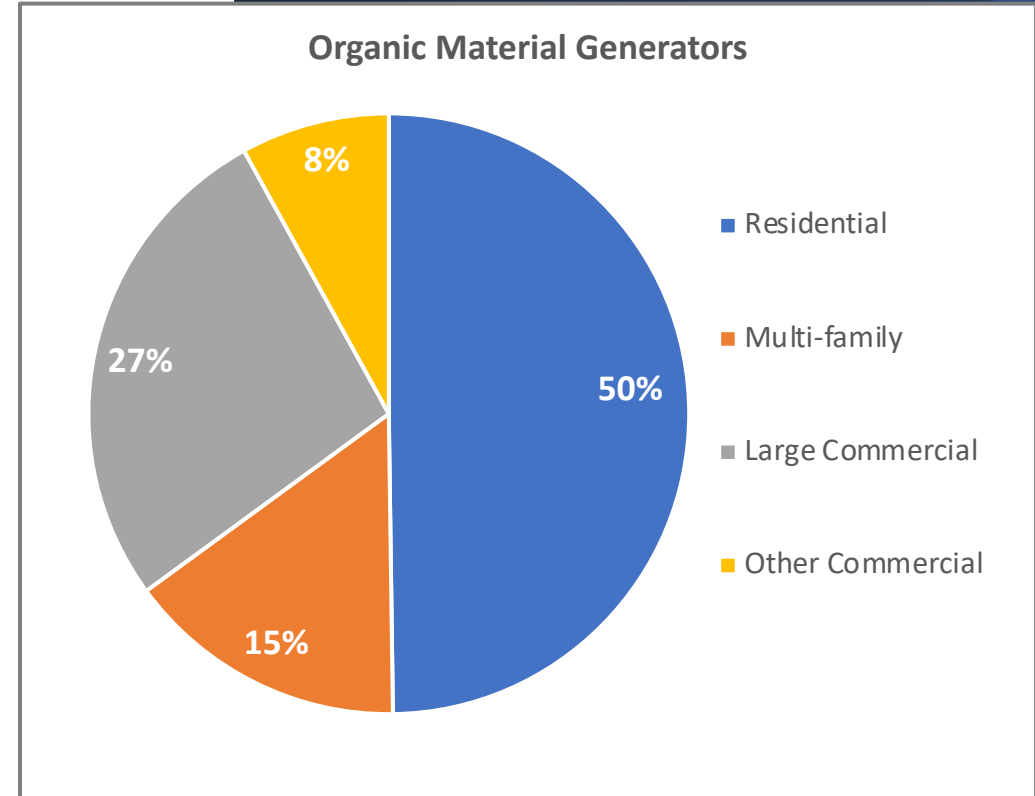
- Landfill capacity in New England is expected to drop to zero as early as 2041.
- Only one new incinerator has been built in the US in the past 32 years (Florida in 2015).
- Anecdotal evidence suggests that investment in upkeep and maintenance of these facilities is insufficient and that their Private Equity owners have diversified into landfills. This allows them to profit from incinerator outages and increase profits by replacing higher cost incinerators with lower cost assets at the same or higher disposal costs.
- The capacity crisis is not just limited to New England. In 1990, the US had over 6,000 landfills. Today there are just over 1,000 landfills remaining.
- Given laws, regulations, and public opposition, it is functionally impossible to add meaningful waste disposal capacity in the region. The loss of existing disposal capacity and inability to add new capacity are driving significant increases in trash tipping fees.
- Since many cities and towns are directly responsible for trash tipping fees, this has a direct impact of hundreds of millions of dollars in new expenses for local government.



Regional Waste Situation

Connecticut's Food Waste Breakdown by Sector

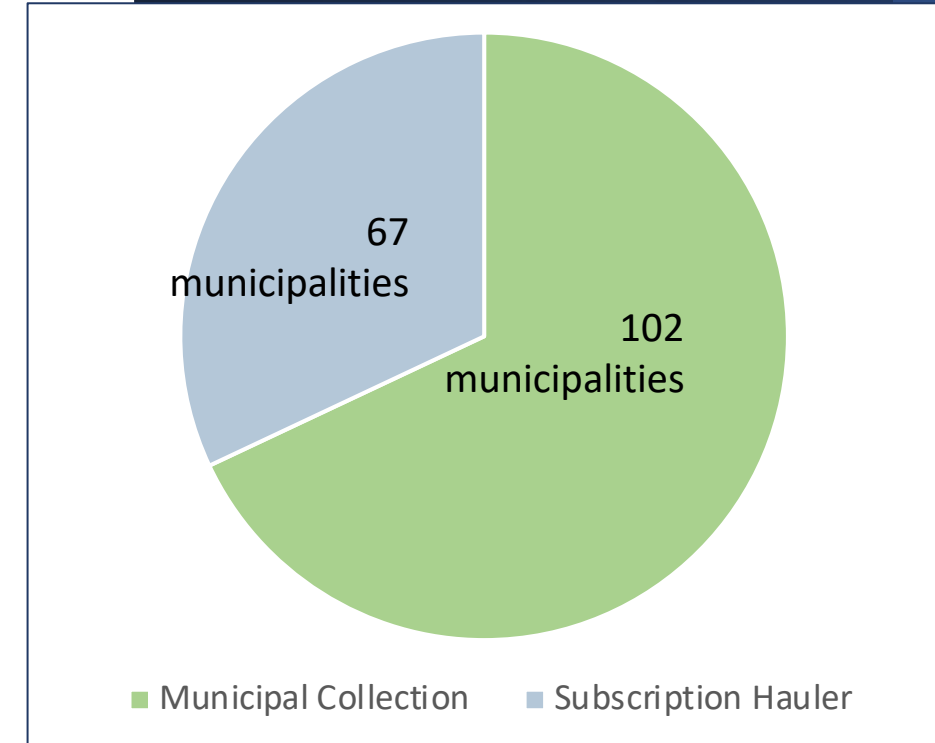
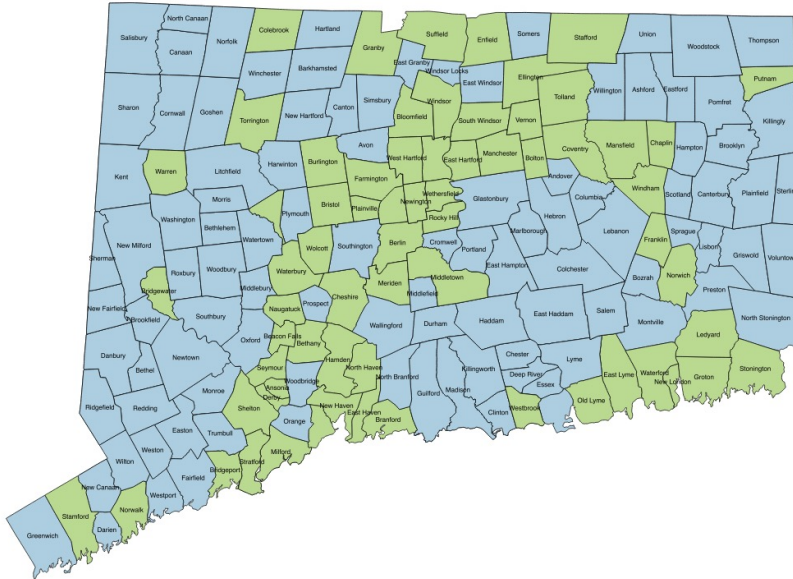
- Food scraps make up approximately 22% of the waste stream.
- Residential homes (50% of available food scraps) are defined as all homes that are 4 family (attached) or smaller which are collected through a side or rear load truck (municipal or subscription collection). Data are sourced from the US Census or are provided by individual municipalities.
- Multi-family homes (15% of available food scraps) make up the remaining homes in CT and are collected via dumpster collection and included in the commercial waste stream.
- Large Commercial generators (27% of available food scraps) include: grocery, institutions, restaurants, health care, colleges, resorts, wholesalers and manufacturers.
- Small Commercial generators make up the remaining portion of the food waste stream and include: offices buildings, schools, retail and small businesses in commercial zones.



Connecticut's Challenges

Municipal Structure

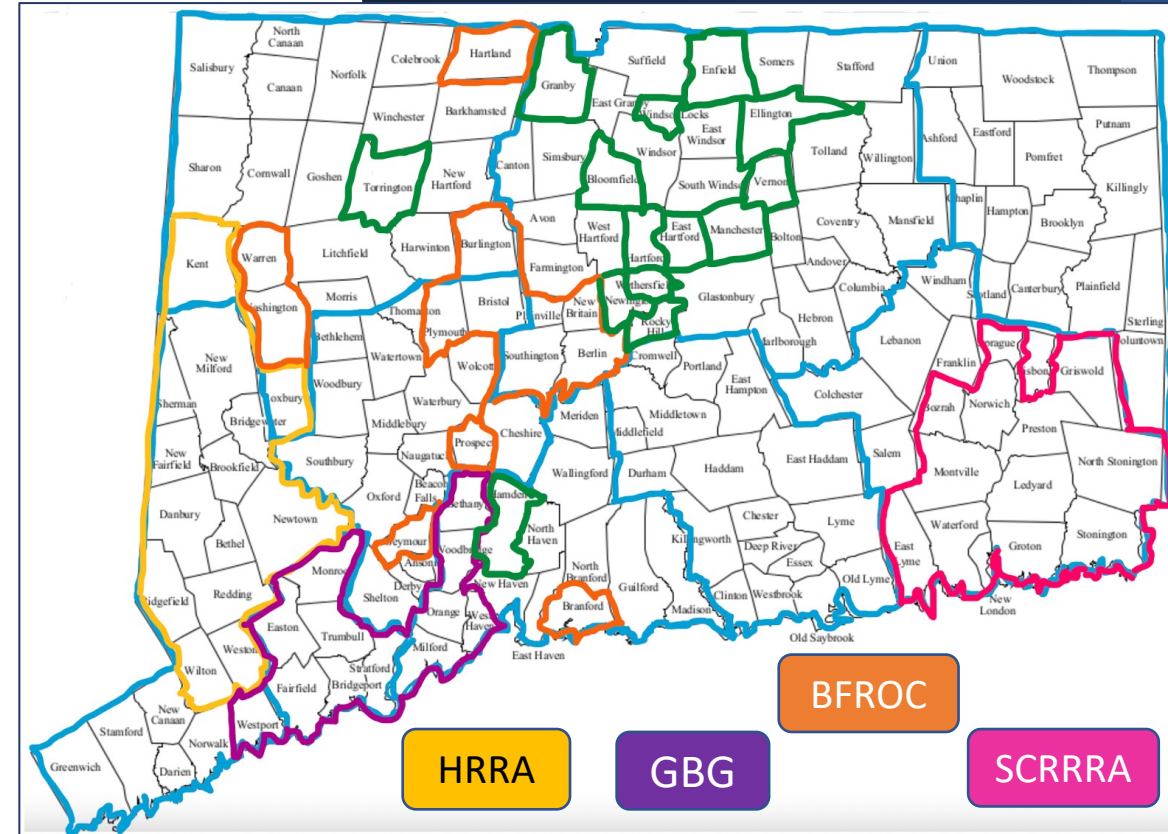
- Connecticut has a relatively small population which is served by 169 municipalities, most with two-year political cycles.
- 68% of the waste stream is generated by 67 municipalities with municipal curbside collection.
- 102 municipalities do not include all solid waste services in the taxes. Nearly all offer transfer station services for waste drop off for residents. Approximately 25% of homes utilize transfer stations in these communities. The remaining residents use private subscription haulers.
- A little over 75% of residential waste is covered through municipal taxes (68% curbside and 8% through transfer stations).



Connecticut's Challenges

SWA's, COG's and Haulers

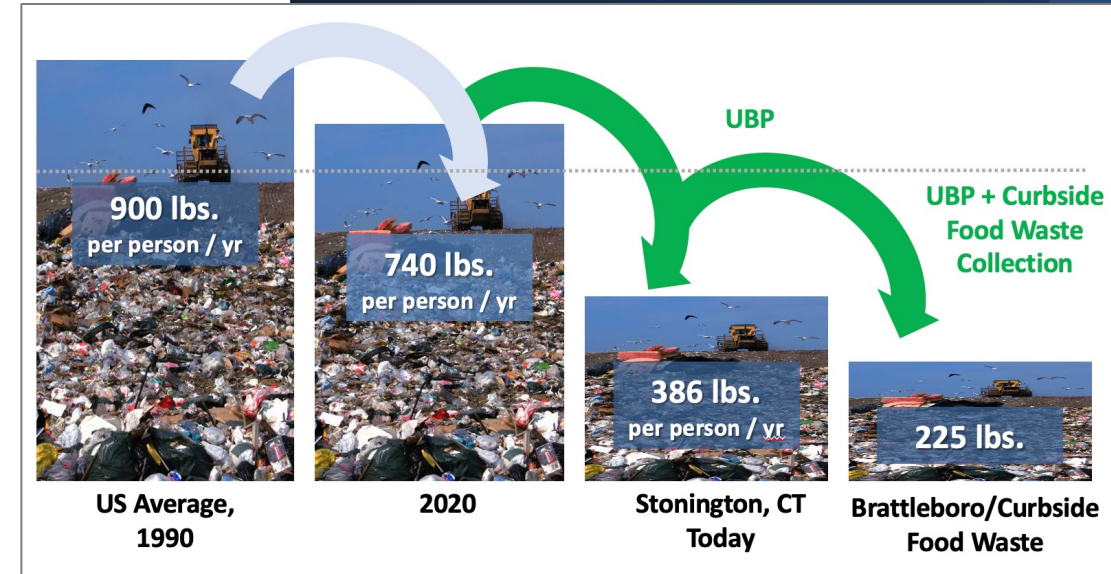
- Most municipalities make disposal decisions unilaterally, creating a fragmented system.
- Connecticut does not have County Government. The Councils of Government act in some way as Counties to provide contracts and services to their towns. COG's could influence policy and facilitate contracts as a group without becoming a formal Solid Waste Authority.
- 44.5% of residential waste is sent to the 4 incinerators (Bridgeport, Lisbon, Bristol, Preston)
- 38% of the residential material is contracted through 4 disposal entities:
 - Two solid waste authorities SWA's HRRA and SCRRRA and two solid waste disposal contracted groups - BFROC and SCRRRA
 - Members may exit the groups (which requires agreement of other member). These contracts are all ten years and are expiring between 2024 and 2030.
- The SCRRRA (SWA) controls all residential and commercial material. SCRRRA owns the land that the Preston incinerator is located on. There is additional land which could be permitted for expansion. The Preston facility leases the space from SCRRRA
- SCRRRA is interested in a food waste solution and is actively working on siting an aerated static pile (ASP).
- There are several haulers with out of state disposal capability managing about 43% of residential disposal.
- Nearly all commercial material is handled through subscription haulers, however the disposal of commercial material in the SCRRRA SWA is handled through the authority. There is also a handful of smaller municipalities that still handle the disposal of commercial material.



Self Sufficiency Through Waste Reduction

Unit Based Pricing

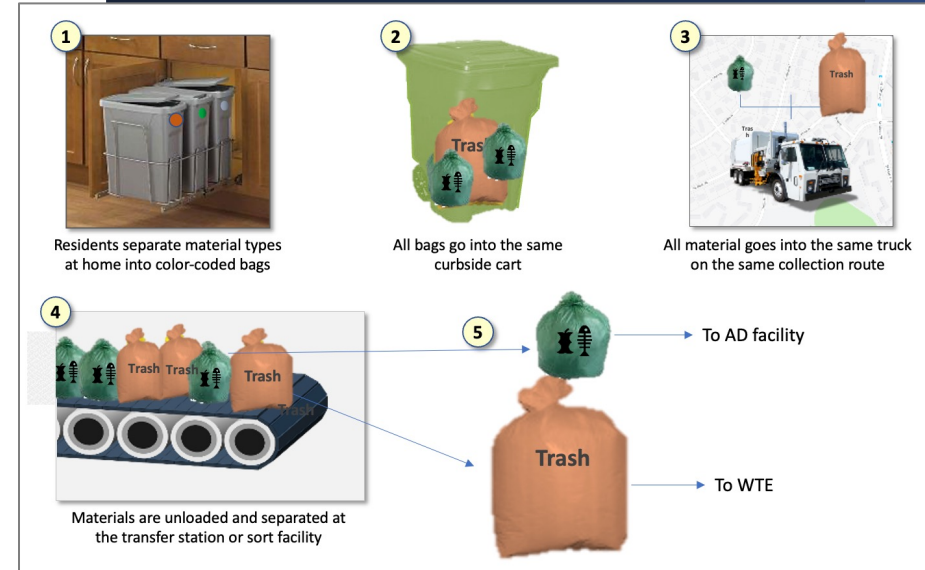
- An important step to managing infrastructure needs is to reduce the demand for disposal capacity. Unit Based Pricing (UBP) has been implemented successfully in nearby states, reducing waste by an average of 44%. The program is either mandatory or it is strongly supported by the state. UBP coupled with curbside food scrap collection could reduce waste in Connecticut by nearly 70%.
- CT has been actively engaging with municipalities to move UBP forward over the past years. Key findings from municipal leaders include:
 - Since 2007, the attitude of the DPW and the senior municipal leadership has changed significantly, demonstrating strong interest and support for UBP.
 - 75% strong support from DPW officials
 - 75% strong support from highest elected officials
 - 67% strong interest from both DPW and highest elected official (in the same muni)
 - 54% have taken or plan to take steps to move forward
 - Gaining resident support at the local level is politically challenging because of social media.
 - Moving UBP forward takes nearly as much effort in a small community as it does in a larger community.
 - Municipal leaders would not see UBP as an unfunded mandate and would like support from state legislation.
 - There has been a strong hauler presence at meetings and underlying pushback with officials.
- Over 40% of Massachusetts residents live under some type of UBP regulation. This regulation is managed at the local level with significant support from the Massachusetts Department of Environmental Protection (DEP).



Self Sufficiency Through Waste Reduction

Food Scrap Collection

- There are almost no municipal-contracted source separated food scrap collection programs in the US (**i.e. separate collection route just for food, paid for by the municipality**).
 - There are a number of haulers that offer food scrap collection service directly to homes that wish to pay a fee. Access and participation are very low (less than 1% of US homes). The programs are costly and inefficient.
 - California has the most advanced food scrap legislation and residential access to curbside collection. Most municipalities offer food scrap collection with yard waste collection in the same cart. Almost all residential material is going to compost combined with yard waste, not to AD. Most AD feedstock is from large commercial generators.
 - In New England, high disposal costs and carbon reduction initiatives are driving interest in residential food scrap collection, though adoption is slow. Because of the seasonal weather, nearly no year-round municipal yard waste collection programs exist. The California model of co-collecting yard and food is not a good option for the Northeast.
 - Separate municipal collection of food waste is cost prohibitive and difficult to justify in most municipal budgets.
- Co-collection allows community-wide adoption of source separated materials without the significant cost and logistics of separate collection (truck purchasing, hiring and managing new staff, etc.). By using different color bags for different materials, the system can be quickly integrated with existing equipment and can be easily modified over time as the landscape of materials management changes.
- In 2005, Sweden banned landfilling of organic matter and combustible waste, which drove the development of waste-to-energy plants and new methods for collecting food waste. This is where Optibag developed their optical sorting facility that separates co-mingled food waste, bagged in green food waste bags, from the residual waste stream.



Self Sufficiency Through Waste Reduction

Economies of Scale

- Many states throughout the country manage solid waste at a county level to benefit from economies of scale. Given that CT's population is the same as larger cities like Los Angeles and the geographic area is similar to large counties in other states, it may be more cost-effective for the State to act on a statewide basis rather than on a voluntary individual municipal basis.
- What is preventing the State from moving to UBP on a statewide basis to more accurately manage and right-size infrastructure needs? Can the State facilitate long-term contracts for new infrastructure, similar to the way it facilitated waste to energy infrastructure development years ago?
- MIRA has certain authority i.e:
 - MIRA can utilize its existing legal authority to pursue innovative "volume reduction, recycling, intermediate processing and resource recovery" (Connecticut General Statutes [CGS] Chapter 446e, Section 22a-262).
 - MIRA has **responsibility for implementing solid waste disposal and resources recovery systems and facilities and solid waste management services where necessary and desirable throughout the state** in accordance with the state-wide solid waste management plan and applicable statutes and regulations..." (Connecticut General Statutes (CGS) Chapter 446e Section 22a-259 (8) (emphasis added)).
 - MIRA has authority to, "...purchase... any solid waste disposal facility, volume reduction plant or solid waste disposal areas owned by a municipality or regional authority..." without limitation as to where these facilities may be located. (CGS Chapter 446e 22a-275 (a)). MIRA is permitted to undertake these actions "...when and as deemed necessary, convenient or desirable..."
 - MIRA can utilize its existing legal authority to pursue innovative "volume reduction, recycling, intermediate processing and resource recovery" (Connecticut General Statutes [CGS] Chapter 446e, Section 22a-262).
 - "The provisions of this chapter shall not be construed to limit any municipality or any two or more municipalities from entering into an agreement with the Materials Innovation and Recycling Authority to provide for the administration of a waste management project by such municipality or municipalities." (CGS Chapter 446e 22a-284).

Self Sufficiency Through Waste Reduction

Fairness and Equity

- Unit Based Pricing (UBP) would eliminate the need to replace closing landfills and incinerators, helping reverse the legacy of injustice in historically burdened neighborhoods.
- Property taxes increase as municipal waste disposal costs increase. Landlords pass on these costs through increased rents. In today's system, everyone bears the cost of community members who don't bother to recycle. A UBP system would give all families control of their own expenses, without subsidizing the wasteful behavior of others.
- The impact on lower income families isn't a barrier to the program – or even an argument against it. Program design can easily assist different groups with free bags or bags / carts charged at a lower cost. UBP pricing absolutely allows you to insulate certain populations from any financial impact if that is desired.
- Landfills and WTE's are generally located in already-overburdened communities. These communities are bearing the brunt of everyone else's solid waste decisions.
- Continuing to burn resources (recycling and reuse materials) decreases job opportunity in the state and region.



Trash Trucks



Incinerators

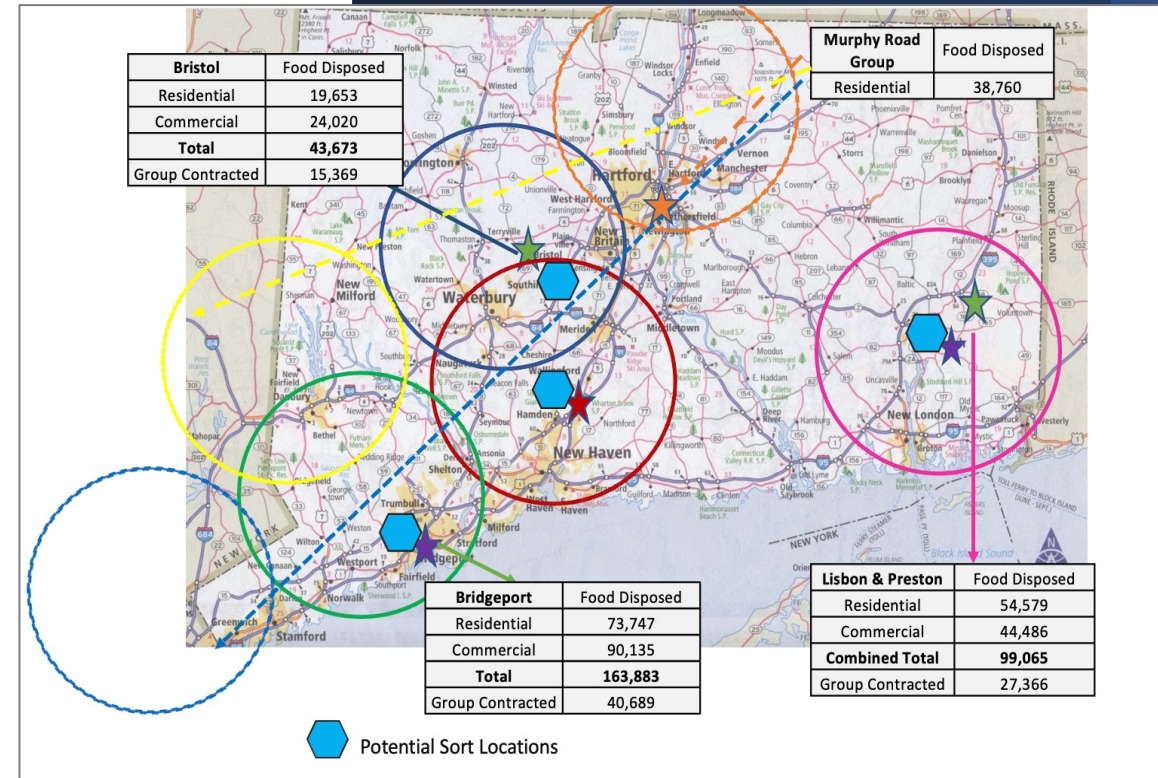


Landfills

Co-Collection and Sort Center Economics

Build on Existing Pathways

- There are at least four logical co-collection sort locations where food scraps and waste can be separated prior to disposal. After sort / separation, waste can move to the neighboring WTE facility or to a transfer station for shipment out of state. Food material can be transported to AD or composting sites. The State could enter into long-term contracts for new infrastructure (sortation and anaerobic digestion) to support its development, as it did with waste to energy facilities many years ago. Or the state could work with private industry to facilitate a strategic and planned development
- A co-collection system would build on existing waste transportation pathways and waste collection contracts. i.e. haulers that pick up from a given community would continue to do so. The only change would be to deliver material to a sort facility near existing disposal facilities. The provision allowing for an alternative delivery point is likely already written into existing hauling contracts.
- Co-collection would work with existing collection systems (manual, semi-automated or automated). Existing routes would be maintained, without added collection time or other disruptions.



Co-Collection and Sort Center Economics

Multi-Fraction Upside

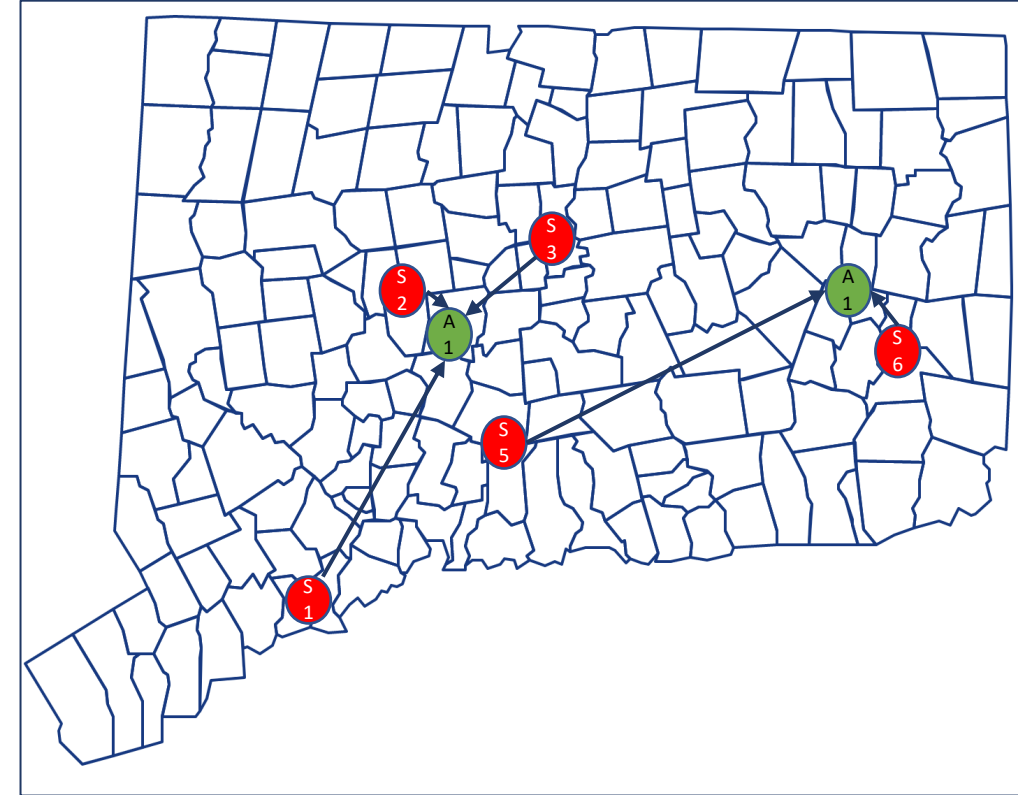
- Residential, multifamily and small to mid-size commercial establishments represent approximately 80% of all available food waste. This is untapped and is best served by the co-collection model.
- Organic feedstock is the first of many “fractions” of the waste stream that can be unlocked through a co-collection sort facility. This feedstock has high commercial demand from an existing and growing anaerobic digestion (AD) industry. Food waste alone can justify the cost of building and operating.
- Other materials such as glass, textiles, hard to recycle plastics, diapers, etc. can easily be added to system using a different colored bag and with no additional collection costs and limited additional sort expense.



Food Waste Processing Infrastructure

Anerobic Digestion

- In today's market, the average Anaerobic Digestion (AD) facility requires 100,000 tons of food waste material to justify investment. Based on DEEP's 2015 waste characterization, the State of Connecticut has up to 500,000 tons of available food scrap feedstock. About 250,000 tons is associated with residential homes. Capture of residential food scraps is critical to provide the feedstock necessary to scale infrastructure. Co-collection is essential to capture this material.
- Co-collection has been used in Europe as a cost-effective way to provide convenient, affordable, equitable food scrap collection to all homes.
- Connecticut has 169 municipalities with different disposal end destinations the majority of which travel through four areas (Bridgeport, Bristol / Southington area, Lisbon / Preston area, and Hartford area).
- A hub and spoke system, where the Anerobic Digester is the hub and the sort facilities are the spokes, would facilitate the growth of AD infrastructure:
 - De-risks AD investment
 - Spoke facilities allow AD companies to secure contracted feedstock by outsourcing the digestion process (out of state) prior to building new capacity.
 - Sort facilities can be located in existing trash flows
 - Minimizes freight
 - System is designed for future growth



Food Waste Processing Infrastructure

Aerated Static Piles

- Building out a regional ASP system, perhaps as part of the regional COG network, would help limit transport expenses.
- Three or four ASPs in a region would create a hub and spoke system, similar to what is proposed for AD facilities, and could support local transfer stations.
- There are over 80 municipal transfer stations used by residents who do not utilize municipal service or a contracted subscription hauler. Local transfer station material could be shipped to regional ASP hubs to save on hauling costs.
- Some businesses do not naturally lend themselves to the co-collection model, such as small grocery stores. The businesses that require a separate collection vehicle for food scraps could save on transportation costs and drop off at an ASP hub location.
- Host communities could benefit from tipping revenue and the use or sale of end products.
- A network of regional ASP hubs could work together and share resources such as heavy equipment as well as engineers and subject matter experts.
- Regional ASP locations would make it easy for businesses to comply with current legislation (Sec. 22a-226e. Recycling of source-separated organic materials within 20 miles of facility).

