REPORT: Landfill Closure Alternatives

A Waste Reduction and Resource Management Analysis for the City of Chicopee looking ahead to the closure of the Chicopee Sanitary Landfill

February 2016

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Catalyst for Regional Progress
PVPC

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Table of Contents

Executive Summary

Landfills are closing across the globe, including in Chicopee. The City is facing an annual $1,735,000 total estimated financial impact due to landfill closure[1]. To mitigate this financial impact, Chicopee is considering innovative resource management technologies that will result in solid waste reductions, an increase in recycling, and operational efficiencies. The Commonwealth of Massachusetts is committed to a path toward Zero Waste[2] (90-95% diversion) and there are significant grants, loans, incentives and other financial and technical assistance available to assist communities who commit to achieve this ambitious goal.

Key Findings: This crisis truly is an opportunity to investigate and implement waste reduction/recycling strategies and move forward with a commitment to Waste Reduction/Zero Waste in the next decade. Chicopee's commitment to waste reduction will be facilitated by:

- Robust Public Information & Education
- Phased in transition of a waste reduction program by gradually implementing modified "Pay As You Throw (PAYT)" (see Appendix 1 for an overview of PAYT and Appendix 8 for a case study from Malden);
- Transition to automated collection;
- Participation in regional disposal contract;
- Ongoing collaboration with Waste Management, with assistance from MA DEP as necessary, to manage landfill closure smoothly over time.

This recommended approach will allow the City to safely weather the storm of combined loss of income stream with increased service cost. It is in the city's interests and the interest of businesses and residents to manage resources to avoid/reduce costs.

In the longer term (5-10 years), there *may* be income generating opportunities for the City in the field of Resource Management[3], Anaerobic Digestion, or other proven technologies.[4]

Goal: Mitigate the impact of the landfill closing on the City of Chicopee and resident budgets

How: Multi-pronged approach of Recommended Actions

1) Educate residents, including businesses and institutions, of the need to manage and reduce waste;
2) Implement a series of Waste Reduction actions, including modified PAYT, becoming the first City in the Commonwealth to commit to Zero Waste by 2045;
3) Implement when ready, Resource Management technologies, starting with automated pick-up;
4) Meet with Waste Management to manage the Landfill Closure and possible short-term landfill expansion.

[1] (significant revenue loss, $1,000,000 + $734,800, estimated cost increase for disposal)
[2] http://www.mass.gov/eea/agencies/massdep/recycle/reports/solid-waste-master-plan.html
[3] (a la closed loop funds' Resource Recovery centers [http://www.recyclingtoday.com/article/closed-loop-investments-recycling-092415.aspx]
[4] Pyrolosis gasification and other new technologies are NOT factored into this report because the MassDEP has gone on record putting these technologies 'on hold' based on lack of successful test sites.

Recommended Actions

I. Public Information & Education

a. Jan-March: Begin public education - explanation of financial impact on Chicopee residents due to landfill closure
b. April-June: Communicate to Chicopee residents the need to reduce waste, increase recycling, and follow best practices for achieving both
c. July-August: Foundational work for new fee for bulky waste
d. Sept-Dec: Transition people toward PAYT public information—emphasize that the first 35 gallon tote bin is free

II. Waste Reduction

a. Institute a fee for bulky waste disposal (target date July 1, 2016) at the existing Landfill (research on surrounding communities shows rates from $5-20- depending on item - See Appendix #7 for area bulk waste fees)

1. Conduct research to determine city's bulky waste program after Landfill closes:

Possible Options

i. Operate a new site in the City;
ii. Direct users to existing resources in the region;
iii. Contract private pick-up;
iv. City operates a bulk waste pick-up service.

b. DPW implements modified PAYT:

1. Zero Waste policy adopted by City (goal: April 2016);
2. Apply to DEP for grants & no cost technical assistance (Max grant = $150,000) for PAYT implementation;
3. Conduct comprehensive analysis of how many multi-family, business, and commercial properties are afforded municipal service, including but not limited to regulatory review with goal of City determining eligibility for municipal pick-up and implementing necessary reforms (start date goal: April 2016);
4. Start with modified PAYT for commercial sites, condos, and Chicopee Housing Authority properties;
5. Expand modified PAYT to include residential properties with one free 35 gallon tote bin per household (start date goal: July 2017);
6. Launch a pilot organics pick-up or drop-off program combined with promotion of back yard home composting.

c. Work with PVPC to apply for a grant to undertake a comprehensive Resource Management planning process to achieve Zero Waste and serve as a model for the region.

III. Modifications to Existing Waste Collection

a. Start the process of transitioning to automated curb-side pick-up
b. Assume responsibility for trash pick-up at Doverbrook condo
c. Conduct a cost/benefit analysis at all 23 condo associations for integrating condo trash pick-up into the city solid waste curbside program
d. Work with surrounding communities on regional trash and yard waste disposal contract

IV. Continue to meet with Waste Management to Manage the Landfill Closure & Possible Short Term Landfill Expansion

a. Any extension of landfill would only provide short-term life and will still result in a period of time when alternate disposal options would still be necessary
b. Short-term landfill expansion does not eliminate the financial impact to the City of Chicopee

V. Estimated Financial Impact of Recommended Actions

a. Landfill closure is expected to increase costs to the City of Chicopee by $1,735,000 annually
b. The summary below indicates the estimated savings and extra revenue generation that could be expected from full implementation of report recommendations to mitigate the cost increase.

Recommended Action	Estimated Annual	
	Savings (from existing costs)	Revenue Generated
1. Institute Bulkwaste Fees		$50,000.00
2. Implement Modified Pay-As-You-Throw (PAYT) Program		
• Condos, Commercial, CHA Properties		$25,000.00 [1]
• Residential Properties		$250,000.00 [1]
• Solid Waste Reduction	$225,000.00 [2]	
3. Automate Curbside Collection		
• Workforce Reduction	$530,000.00 [3]	
• Injury Reduction	$50,000.00 [3]	
• Fleet Reduction	$90,000.00 [3]	
4. Resume Doverbrook Condo Municipal Curbside Collection	$75,000.00	
Subtotals	$970,000.00	$325,000.00
Estimated Total Savings	$1,295,000.00	

[1] Based on 10% weeky use of extra PAYT bags.
[2] Based on 25% reduction in curbside solid waste/increased recycling.
[3] Saving realized upon eventual reduction of workforce from 31 to 20 over several years.

DETAILS -- Action Recommendations

I. Public Information & Education

In the long term -- implementing these waste reduction (toward zero waste) actions has the potential to save Chicopee (both the City and its residents) millions of dollars, improve public health, prevent the release of hundreds of thousands Greenhouse Gas (GHG) emissions, conserve resources and save water. These Action Recommendations are the steps the Committee has identified to move Chicopee to a 21st century approach to "garbage", with a goal of Zero Waste (90-95% diversion from landfill) by 2045.

Almost every material can be re-used, re-purposed, and/or transformed into something useful, therefore every item has value and should not be buried or burned. Zero Waste (will be) the result of a transformation in the manufacturing, production, management, packaging, transportation, use, re-use, and regulation of goods, including product stewardship.

For this effort to succeed, the City is committed to an ongoing public information and education campaign to help residents, both individuals as well as businesses and institutions located in Chicopee, to understand the financial, health and environmental benefits of a Zero Waste approach to waste/resource management.

ACTION #I-1	Launch Waste Reduction Public Information & Education campaign focusing on waste reduction with a Goal of Zero Waste (90-95% diversion)
Lead/Support	Planning and Economic Development/DPW
Timeline	Immediate - the City will start with a series of informative media releases about waste reduction zero waste and resource management. The plan is to facilitate a gradual transition so that over the next 2.5 years, (until the Landfill closes) residents and businesses will be prepared and will have had time to plan and change their behavior to avoid drastic increases in waste management fees by increasing recycling, re-use, and other means to reduce waste including but not limited to composting.
Est Cost	Medium Cost, staff time plus Community engagement services and public information materials, translation and interpretation services, design, focus groups, testing, production, printing, distribution, possible purchase of air/media time/space.

ACTION #I-1a, 1b, 1c, 1d	Research, Design, Implement, & Evaluate Campaign (pending success in securing grant funding for this action step)
Lead	Communication Consultant
Timeline	• January-March: Research target audience and develop appropriate messaging • April-June: Focus groups to test understanding of how/what to communicate with target audience for maximum likelihood of success with changing their behavior • July 1, 2016: Foundation for modified PAYT—possible message: new fee for bulky waste (which is lower than area communities) is a good slow start to this new and necessary approach of 'zero waste' • Aug-Sep, 2016: Design program to recognize/reward people/neighborhoods, businesses, institutions, schools, etc who reduce their waste and make suggestions for how the City can reduce waste • Oct-Dec, 2016: Transition into modified PAYT public information—emphasize that the first bag is free, and offer no cost technical assistance, including a personal waste audit with tips on recycling, re-using and reducing packaging (Explore funding available from MA Department of Environmental Protection)
	Medium cost, for Consultant and Direct Costs (incl. community liaison/outreach workers stipends, billboard space rental, air time, bus space, etc.) plus ¼ staff time equivalent provided by City

II. Waste Reduction

The primary recommendation of this study group is that the City can and should significantly reduce the amount waste the City is processing. This concerted effort at waste reduction should produce very quick results. In the short-term, this process of instituting a fee for bulky waste will ease businesses and residential customers into the inevitable reality of having to pay for waste (resource) management.

ACTION #2-a	Institute a fee for bulky waste disposal at the existing Landfill and for pick-up (research on surrounding communities shows rates from $5-20-depending on item - See Appendix #7)
Lead	DPW
Timeline	Feb-June Design and launch a low cost public information campaign: bill inserts, fliers at Landfill, City Hall, Libraries, media release, City Facebook, etc. educating users abut new fee and why it is being implemented Apr-June: Monthly media releases informing users about new fee July 1, 2016: Start new fee for bulky waste drop off and pick-up Aug-Dec, 2016: Enforcement—anticipate a period of ongoing customer training
Est Cost	Low cost, staff time

ACTION 2-a1	Conduct research on volume and origin/destination of bulky waste in City and develop a plan for how to manage bulky waste after Landfill closes. Options under consideration include: i. Operate a new site in the City ii. Direct users to existing resources in the region iii. Contract private pick-up iv. City operates a bulk waste pick-up service
Lead	DPW
Timeline	DPW to complete the work by end of 2016 and make a recommendation
Est Cost	Low cost, staff time

ACTION #2-b	DPW to implement PAYT - See Appendix #1 for PAYT definition/explanation
Lead/Support	Planning and Economic Development/DPW
Timeline	Immediate
Est Cost	Low cost, staff time

ACTION #2-b1	Zero Waste Policy Adopted by City
Lead/Support	Planning and Economic Development/DPW
Timeline	Immediate
Est Cost	Low cost, staff time

ACTION #2-b2	Apply to DEP for both financial and technical assistance on: a) educating residents about new bulky waste fee as described above, b) planning, designing and launching modified Pay As You Throw (PAYT) approach to Resource Management, including education and outreach of residents and business customers and possibly funding for bins and other necessary materials and supplies for phase in. Max. grant from DEP is $150,000
Lead/Support	Planning and Economic Development/DPW
Timeline	• Feb-Apr: City staff have a record of success securing these funds and are both familiar with the application process and well respected by the DEP. It is recommended that the City immediately request no cost technical assistance for staff support and work within DEP timeline for grants. • Feb-Apr: Request No Cost TA from DEP to oversee and inform this work plan • Feb-Apr: Determine time to apply for $150,000 grant from DEP to develop Zero Waste Plan and launch PAYT (1.5 yrs) and Organics Pilot element (Yr 1.5-2.5) over a 2.5 year period, July 2016-Dec 2018. • Spring: Apply
Est Cost	Low cost, staff time

ACTION #2-b3	Conduct comprehensive analysis of how many multi-family, business, and commercial properties are afforded municipal service, including but not limited to regulatory review with goal of city determining eligibility for municipal pick-up and implementing necessary reforms
Lead/Support	Planning and Economic Development/DPW
Timeline	April 2016
Est Cost	Low cost, staff time

ACTION #2-b4	Start with PAYT for commercial sites, condos, and Chicopee Housing Authority properties (Start goal: late 2016/early 2017)
Lead/Support	DPW
Timeline	Quantify cost savings from PAYT--Malden (similar size municipality to Chicopee) - see Appendix #7 Case Study • Fall 2016: Launch PAYT for commercial sites, condos, and Chicopee Housing Authority properties
Est Cost	Medium cost, staff time and funding for educational materials

ACTION #2-b5	Expand modified PAYT to residential properties with one free 35 gallon tote bin per household in 2017
Lead/Support	DPW
Timeline	2017
Est Cost	High cost, staff time and funding for educational materials and tote bins

ACTION #2-b6	Launch a pilot organics pick-up or drop-off program because organics are estimated to be 15% of residential waste stream and apply for DEP funds for composting bins as an alternative/supplement (for people who have yards) to organics pick-up/drop off
Lead/Support	DPW
Timeline	2017
Est Cost	Medium cost, grants from DEP for staff time and funding for educational materials & supplies

ACTION #2-c	Work with PVPC to apply for a DEP grant to undertake a comprehensive Resource Management planning process to prepare a detailed strategic plan to achieve Zero Waste by 2045
Lead/Support	DPW
Timeline	2017
Est Cost	Medium cost-- grants from DEP for staff time plus est $50,000-75,000 to support direct costs for planning work

III. Modifications to Existing Waste Processing

ACTION #3-a	DPW will start the process of transitioning to automated curb-side pick-up
Lead/Support	DPW
Timeline	This will be a phased-in process starting immediately—reducing the workforce through retirements/transfers
Est Cost	Medium-high cost, staff time, new equipment

ACTION #3-b	DPW will assume responsibility for pick-up at Doverbrook Condos
Lead/Support	DPW
Timeline	The City currently sub-contracts this work to Waste Management at a cost of & $78,000, and could absorb this site into existing routes, thereby saving the City this expense
Est Cost	Low cost, staff time

ACTION #3-c	Conduct a cost/benefit analysis of the City assuming pick up at all 23 condo associations
Lead/Support	DPW
Timeline	2016
Est Cost	low cost, staff time

ACTION #3-d	Continue to research and consider going out to bid, possibly with regional partners, for trash and yard waste disposal
Lead/Support	DPW
Timeline	Ongoing in 2016
Est Cost	low cost, staff time

IV. Continue to Meet with Waste Management on Landfill Closure

DPW staff, Consultants, and other City officials will continue their work in collaboration with Waste Management, the local property owner, DEP and others as appropriate to manage a smooth closure of the Landfill, including possible short-term landfill expansion. Even if short-term landfill expansion is possible, there will be a significant period of time when alternative disposal options will be necessary.

V. Estimated Financial Impact of Recommended Actions

The landfill closure is expected to increase costs to the City of Chicopee by $1,735,000 annually.

The summary below indicates the estimated savings and extra revenue generation that could be expected from full implementation of report recommendations to mitigate the cost increase.

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[2] Based on 25% reduction in curbside solid waste/increased recycling.

[3] Saving realized upon eventual reduction of workforce from 31 to 20 over several years.

Resources Reviewed

- MA DEP Pathway to Zero Waste, 2013 plus Appendices
    - http://www.mass.gov/eea/agencies/massdep/recycle/reports/solid-waste-master-plan.html
- MA DEP website---a wealth of information on all waste topics
- Pioneer Valley Planning Commission, Pathway to Zero Waste 2012
- "Solid Waste Management Alternatives Study" prepared by Stantec and HDR Consultants for City of Northampton
- Assessment of Materials Management Options for the Massachusetts Solid Waste Master Plan Review Final Report Submitted by Tellus Institute in Partnership with: Cascadia Consulting Group & Sound Resource Management
- Materials Management Options for Solid Waste Master Plan Review Final Report
- Clean Energy Results Annual Report to MA DOER from MA DEP 2013
- http://www.recyclingworksma.com/ recycling assistance program that helps businesses and institutions maximize recycling, reuse and food waste diversion

Appendix 1 -- Pay As You Throw explained

Pay-As-You-Throw Fast Facts

In a Pay-As-You-Throw (PAYT) solid waste program, residents pay a per-unit fee for disposal of the solid waste that they generate. Another name for these programs is Save Money And Reduce Trash (SMART). MassDEP has found that PAYT/ SMART is the most effective mechanism for encouraging real waste reduction at the municipal level.

- There are now 143 municipalities out of 351 in Massachusetts that have adopted this approach, about 40%. Looking at this from a household viewpoint, SMART/PAYT covers 20% of the total households in the state.[1] In each of these municipalities, solid waste tonnage was reduced by 25-50% through a combination of increased recycling, diversion to reuse, repair, donation, composting, and other methods of disposal.

- In CY2013 the average solid waste generated per household in SMART/PAYT municipalities was 1106 lbs, only 63% of the 1754 lbs per household average generated in municipalities without SMART/PAYT programs.[2]

- According to the US Census there are 2,500,000 households in MA. If the remaining 80% of the households in the state had a SMART/PAYT as incentive to reduce their waste, reducing their trash generation to the average seen in existing SMART/PAYT municipalities, it would reduce the statewide trash by over 650,000 tons per year![3]

- The projected 650,000 tons per year of solid waste that could be avoided if the all MA municipalities implemented SMART/PAYT programs represents over $45 million in potential savings by municipalities, assuming an average disposal cost of $70 per ton.

Additional Information

Visit the MassDEP web site:
http://www.mass.gov/eea/agencies/massdep/recycle/reduce/pay-as-you-throw-payt.html

[1] PAYT households served number was extracted from MassDEP PAYT database. Where there was no data on the number of households served, the statewide average (70%) of total households in a SMART/PAYT municipality was used. U.S. Census figure of 2,500,000 was used for the total number of households in the Commonwealth.
[2] The average pounds per year per household disposed of by PAYT municipalities is 1106 according to CY13 data submitted to DEP on the annual Waste and Recycling Survey required by the DEP grant program.
[3] Calculation 648,000 = .80*2500000*(1754-1106)/2000

Trash Metering // Pay As You Throw (PAYT) Overview/Summary (from MA DEP website)

Save Money And Reduce Trash (SMART).

In a Pay-As-You-Throw (PAYT) solid waste program, residents pay a per-unit fee for disposal of household trash. Most programs utilize pre-printed trash bags or stickers. **The price of the bag or sticker reflects the cost to dispose of the waste.** Residents are not charged a direct fee for recycling. As residents pay directly for the amount of trash they dispose, they have a financial incentive to reduce their waste through recycling, composting, and waste reduction.

Advantages

- **Fairness.** Residents pay for only the amount of trash that they generate. Households generating less trash pay less than households that generate more.
- **Decrease in Trash Tons Disposed and Associated Cost Savings.** PAYT has been shown to *decrease a community's residential trash tonnage disposed by 35 to 50 percent*, significantly reducing solid waste disposal costs.
- **Increased Recycling, Composting and Waste Reduction.** As residents come to understand that trash disposal costs more than recycling, they are encouraged to recycle more. PAYT programs conducted in conjunction with curbside recycling programs have been shown to increase a community's recycling tonnage by 20 to 35 percent in Massachusetts.
- **Improved Environmental Quality.** By diverting waste from disposal, PAYT programs extend the life of landfills, decrease air pollution from trash incinerators, and reduce the need for new disposal facilities. As communities increase reuse, recycling, and composting, natural resources such as land, air, and water, are protected and preserved and greenhouse gas emissions are reduced.

Types of Programs

3 varieties of PAYT programs currently in use in Massachusetts, **not** mutually exclusive and *can be combined* to meet a community's needs. The three systems are:

1. **Imprinted Trash Bags.** Residents purchase colored plastic bags imprinted with the name or seal of the municipality. The price of each bag should cover both the cost of the bag itself and the cost for disposal. Waste haulers are instructed to pick up only the specially marked trash bags.
2. **Stickers.** Residents purchase specially marked labels or tags and affix them to their own trash bags or barrels. Different sticker colors may indicate different volumes of waste being disposed.
3. **First Bag or Barrel Free.** This is considered a hybrid PAYT program, in which one container (not to exceed 35 gallons) is collected at the curb “free”. Trash in excess of 35 gallons must be placed in municipal PAYT “overflow bags” that residents purchase.

Appendix 2 -- Curbside Waste Spot Checks (12/15)

Reveals significant recycling content going to Landfill

BEFORE **AFTER**

Curbside Trash as set out **VS** **Recyclables in Trash**
Post removal showing amount of recyclables set out as trash

Appendix 3 -- State of Organics Processing in the Pioneer Valley (11/15)

The following information is based on research, including phone interviews, review of past reports, and review of web materials from municipalities on their programs. MassDEP Recycling Coordinators Sharon Kishida and Arlene Miller, and Center for Eco Technology staff Lorenzo Macaluso and Cate Foley were especially helpful in sharing their insights.

Yard waste

In 1990, the Massachusetts Department of Environmental Protection (MassDEP) introduced its first bans on landfilling and combustion of easy-to-recycle and toxic materials. These bans included yard waste, which has led to well established programs that separate and manage yard waste from the solid waste stream. Yard waste, including leaves and brush, from Chicopee, is currently hauled to Full Cycle in Westfield for composting.

As food scrap composting expands, yard waste may become an increasingly valuable resource. For aerobic windrow composting facilities, food scraps (which are high in nitrogen), must be mixed with a carbon source. Soiled paper, cardboard, brush and leaves are all good sources of carbon. Recipes for composting mixtures vary, but an optimal mix for windrow composting consists of 75 percent leaves and brush and 25 percent food scraps, along with bulking agents. In Needham, Massachusetts, leaves and brush that had taken five to six months to compost in windrows only took two to three months with the addition of food scraps. Gary Liss & Associates have noted that in the future, as the number of composting programs increase, the competition for sources of carbon may expand and windrow facilities will be ever more challenged to manage nitrogen rich streams. This could lead to greater investment in anaerobic composting technologies, which do not require such an intense carbon component.

Food waste

Businesses and institutions

To divert some 450,000 tons of food waste annually from landfills and incinerators in Massachusetts, Mass DEP instituted a ban on disposal of commercial organic wastes from businesses and institutions that dispose of one ton or more of these materials per week. Though the ban was instituted in October 2014, businesses and institutions are still coming on board as they learn that they generate sufficient quantities so as to be subject to the ban.

For businesses and institutions working to meet requirements under the ban, tools, resources, and technical assistance are available through Recycling Works, a MassDEP recycling assistance program operated by Center for Eco Technology.

Mass DEP has provided some general guidelines to identify which businesses and institutions are likely subject to the ban:

- College or University
  - Residential – 730 students
  - Non-residential – 2,750 students
- Secondary School – 4,000 students
- Hospital – 80 beds
- Nursing Home – 160 beds
- Restaurant – 70 or more full time employees
- Resort/conference Property – 475 seats
- Supermarket – 35 or more full time employees

Environmental Protection Agency data on waste generation estimates from 2011 indicates that Chicopee may have several businesses/institutions subject to the ban.

Business/institution name	Street address	Estimated generation (tons/year)
Stop & Shop	672 Memorial Dr	450
Big Y	650 Memorial Dr Ste 3	253.5
Big Y	2189 Westover Rd	249
Friendly's	529 Memorial Dr	93
Lucky Strike Restrnt	703 Grattan St	82.5
Elms College	291 Springfield Street	75.55275
Debra Kopec	467 Memorial Dr	64.5
Bridge Cafe	840 Memorial Dr	63
Bernie's Dining Depot	749 James St	61.5
Fifties Diner	363 Burnett Rd	52.5
Fruit Fair Inc	398 Front St	52.5
Westover Consolidated Club	130 Galaxy Rd Bldg 6640	46.5
Copperline Caterers	409 Broadway St	45
Hu Ke Lau Rest Dinner Theatre	705 Memorial Dr	45
Panera	601 Memorial Dr	45
Arby's	1483 Granby Rd	37.5
McDonald's	1460 Memorial Dr	37.5
Aramark	291 Springfield St	34.5
Willimansett Center, East	546 Chicopee St	33.8355
Cavalier Restaurant	366 Chicopee St	33
Friendly's	411 East St	30
McDonald's	350 Burnett Rd	30
Taco Bell	1471 Memorial Dr	30
Willimansett Center, East	11 St. Anthony Street	27.9225
Dr Deegan's Restaurant	510 Burnett Rd	22.5
George Flevotomos	515 Montgomery St	22.5
Spiro's Restaurant	483 Grattan St	22.5
Rehab and Skilled Nurse Center	44 New Lombard Road	22.338

Starbucks	620 Memorial Dr	21
Cheng Garden Restaurant	920 Meadow St Ste C	18
Giovanni's Pizza Shop	1885 Memorial Dr	18
North China Restaurant	1995 Memorial Dr	15

Source: http://www.mass.gov/eea/agencies/massdep/recycle/reduce/food-waste-ban.html

Who is hauling food waste in the Pioneer Valley and where is it going?

Food waste is typically used for animal feed, or directed to composting facilities or anaerobic digesters that convert food waste into a biogas that can be used for heat and electricity. In the Pioneer Valley region, there are 12 locations accepting diverted food waste. The list and map on the following pages show 11 sites. These are from an October 2015 MassDEP list, but there seems to be an additional location based on research for this memo, Greensite Environmental in Hadley. In addition, Director of Green Business Services at Center for EcoTechnology Lorenzo Macaluso reports that Chicopee landfill operator Waste Management has a facility in Fitchburg that accepts food waste. He believes some food waste from Chicopee has been hauled for processing in Fitchburg.

For the Pioneer Valley, Macaluso notes that Martin's Farm in Greenfield continues to be the primary receiver of food waste for the region. The anaerobic digester in Hadley at Barstow's Longview Farm takes only wastes from food processing operations, such as Hood. These food wastes need to be provided as a slurry in "pumpable form." They are in the process of building a piece of machinery to do some slurrying on site so that can accept additional clean wastes, such as fruit rinds and cores.

As demand for processing of food wastes increases, existing facilities may expand operations and new facilities will come on line. Center for EcoTechnology staff report the following developments :

- The New England Small Farm Institute on Jackson Street in Belchertown had been operational and plans to come back on line in the near future with a new site operator

- Approval for a proposed anaerobic digester at Bar Way Farm in Deerfield is in process. See: http://mobile.gazettenet.com/home/15876405-108/patrick-melnick-revives-plan-for-methane-digester-to-turn-manure-into-electricity-at-bar-way; http://www.agreenenergyllc.com/updates/category/projects

- Connecticut is in the process of permitting several anaerobic digester facilities and a facility already exists in Ellington, called Harvest Power, that could receive waste from the region

- UMass is working with MassDEP to site an anaerobic digester on/near the Amherst campus

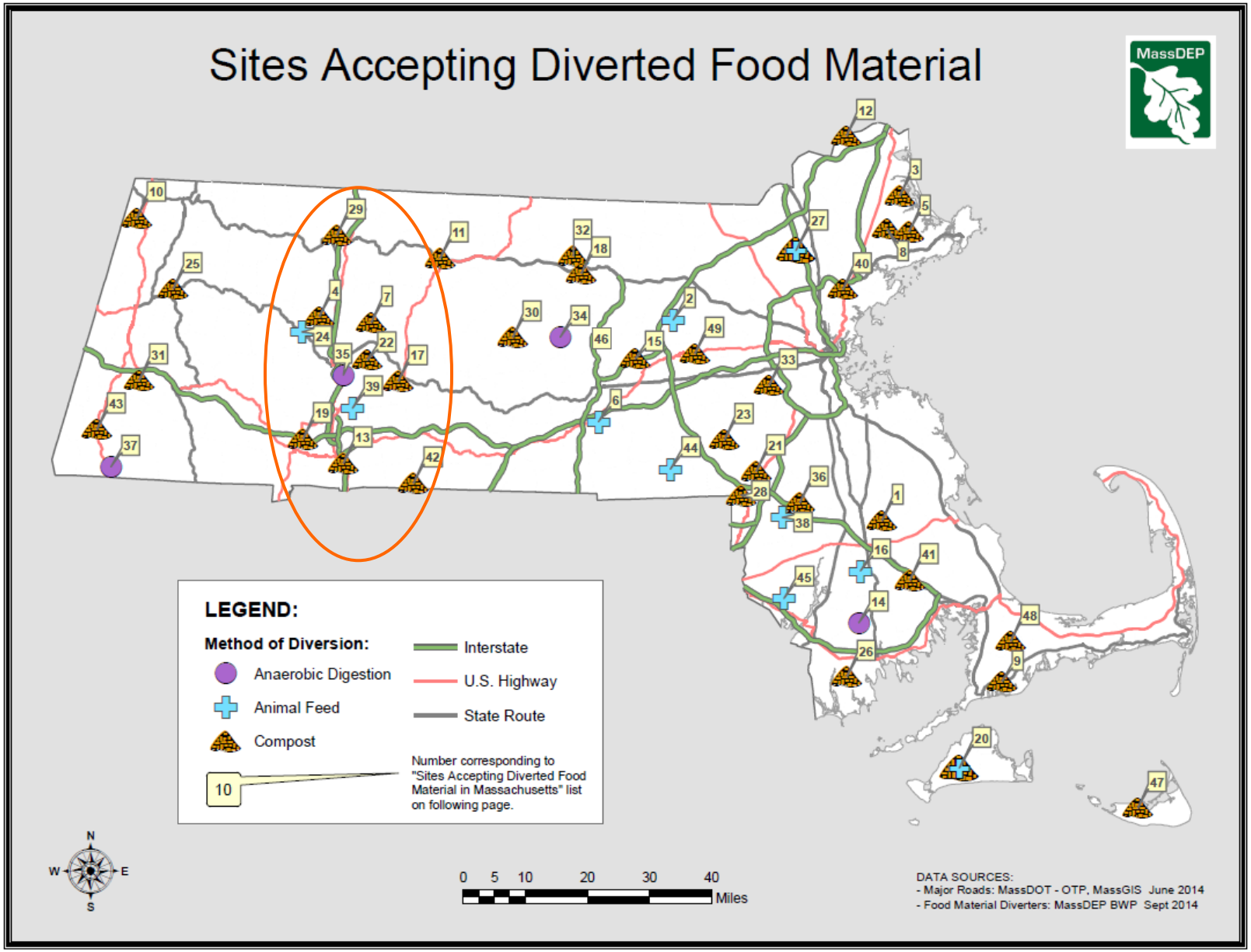
- Stop & Shop will be constructing their anaerobic digester in the eastern part of the state in the coming year.

Sites Accepting Diverted Food Materials in Pioneer Valley

Refers to # on Map	Company	Street Address	City	Telephone	Contact	Avg.Tons Per Day	Description
4	Bear Path Farm	134 Webber Rd.	Whately	(413) 665-2894	Bill O'Bear	15	Compost
7	Book and Plow Farm	173 Mill St.	Amherst	(413) 992-6464	Cameron Weimar	15	Compost
13	Cover Technologies	M St.	Agawam	(413) 552-2688	Kip Foley	15	Compost; Site Management
17	Farmer's Friend	George Hannum Road	Belchertown	(413) 552-3688	Eugene Bernat	15	Compost
19	Full Cycle Composting, Inc.	100 Sargent T.M. Dion Way	Westfield	(413) 562-0193	Red Gagnon	15	Compost
22	Hampshire College Farms	731 West St.	Amherst	(413) 559-5348	Leslie Cox	15	Compost
24	Hilltown Grazers	5 North St.	Williamsburg	(413) 588-7638		n/a	Animal Feed
29	Martin's Farm	341 Plain Rd.	Greenfield	(413) 834-3939	Adam Martin	15	Compost
35	Casella Organics - Barstows Longview Farm	14 Barstow Ln.	Hadley	(800) 933-6474	Jen McDonnell	100	Anaerobic Digester
39	Popielarz Pig Farm	128 Williamansett St.	South Hadley	(413) 626-9763	Wayne Walton	n/a	Animal Feed
42	Shadow Valley Farm		Hampden, CT	(860) 749-4795	Richard Jonelis	15	Compost

Notes:
(1) All registered or certified compost sites can accept 15 to 30 tons per day with a maximum of 105 tons per week. Tonnage limits for these facilities are specified in 310 CMR 16.00.
(2) Anaerobic digesters require food materials to be pulped or pumpable.
(3) This list does not include food rescue and donation organizations. Learn more about these options at www.recyclingworksma.com/donate.

Source: Drawn from MassDEP document covering all Massachusetts accessed at: http://www.mass.gov/eea/agencies/massdep/recycle/reduce/food-waste-ban.html


Sites Accepting Diverted Food Material
MassDEP
LEGEND:
Method of Diversion:
Anaerobic Digestion
Animal Feed
Compost
Interstate
U.S. Highway
State Route
10
Number corresponding to "Sites Accepting Diverted Food Material in Massachusetts" list on following page.
N
W
E
S
0 5 10 20 30 40
Miles
DATA SOURCES:
- Major Roads: MassDOT - OTP, MassGIS June 2014
- Food Material Diverters: MassDEP BWP Sept 2014

Macaluso cautions against overlooking the key role that haulers play in getting food wastes to processors. These companies figure out where it is they are going to take the organics that they are hauling. In the Pioneer Valley Alternative Recycling and Triple T are the primary organics haulers. Empire Zero Waste, out of Albany, New York, is also providing some services in the region, according to Macaluso.

Residential programs
Based on waste characterizations studies, MassDEP estimates that food waste accounts for 15.5% of residential waste.

Many Massachusetts communities are moving toward residential curbside collection of food waste. The number of communities receiving MassDEP grants for curbside carts, kitchen top units, and outreach and education support to pilot these programs more than doubled from some 3 communities in 2013 and 2014 respectively to 7 communities in 2015.

One of the communities currently undertaking a pilot residential curbside organics program, Newburyport, notes some of the key drivers:

- increasing populations and consumption and decreasing capacity at incinerators and landfills
- difficulty of budgeting when it comes to trash; reducing waste stream makes good economic sense
- trend toward composting organics with recent Massachusetts-wide ban for those generating more than 1 ton of food waste per week, and Vermont-wide ban on residential organics to be fully implemented by 2020

<u>Town-wide curbside food waste collection</u>
Three communities in Massachusetts currently have town-wide curbside food waste collection programs (Hamilton, Wenham, and Manchester by the Sea). Hamilton and Wenham, the first to go town-wide in 2012, share their program through an intermunicipal agreement.

While the details of these programs vary, elements that are common to these 3 programs are:

- All have instituted Pay as you Throw programs, which incentivize people to participate in food scraps, recycling, and yard waste collection disposal programs
- Organics and recycling are collected weekly and trash is collected every other week. Residents have option to take trash to transfer station if they want. Note that this transition to trash collection every other week in Manchester by the Sea was recent and is meeting with vocal opposition from a few. MassDEP representative said that political leaders in town are going to hold fast to schedule. She believes the lesson learned here is that relaxing trash pick-up schedule should be done in early spring of fall, not in the heat of summer.

- All use the same hauler, which takes waste to local farm where there is good capacity for organics composting. This hauler also handles trash and recycling for all three towns and the economics seem to work well for everyone.

- All received MassDEP funding to help with purchase of curbside organics carts, counter top containers, and education and outreach. While Hamilton-Wenham offered a free program in the first year, residents paid $75 per household in the second year. Manchester's program currently does not charge an additional fee to residents.

- Most housing stock in these communities is single family residential.

- All have very little contamination in their food waste stream. Likely due to a combination of factors, including the fact that participation in the organics program is entirely voluntary, and ban on plastic bags in 2 of the towns (Hamilton and Manchester By the Sea)

- Program started with hard work of local champions who pulled together other like-minded people to get things going. In Manchester by the Sea a local activist saw what her friend had organized in Hamilton and Wenham and wanted to see the same in her town. DPW director provided support and high school, which is very environmentally conscious, was also involved.

<u>Pilot curbside foodwaste collection programs</u>

Municipalities currently piloting residential curbside collection programs include the City of Cambridge, City of Beverly, City of Salem, Town of Ipswich, and City of Newburyport. The accompanying spreadsheet—to be distributed at the upcoming meeting—provides detail about each of these programs. Several highlights worth noting are as follows:

- All of these pilots involve an incremental approach to developing a curbside pick up program. That is: municipalities are starting with a limited program to gather information and understand how to best unfold a more expanded program down the road.

- Newburyport, which just began its program in September, focused on recruiting participants from just one single route. This creates certain efficiencies for implementation and for documenting the environmental and economic benefits of curbside collection of organics.

- Cambridge, which has a diverse mix of housing stock, began a residential drop off program some time ago. Their curbside pick up pilot was limited to Monday routes in North Cambridge and to single family and multi-family with up to 12 units. After two years, when the program is slated to go city-wide, 13+ unit family buildings will be reviewed for inclusion on a case by case basis.

- In Beverly, the pilot is being done through a private pay hauler with each residential participant paying $67 per year. The City provides a subsidy based on savings from tipping fees. Ipswich is also conducting a pilot through a private pay hauler. This approach of not starting with offer of free pilot can make it difficult to recruit participants and build

acceptance. Essentially people are being asked to pay on top of flat fee they are already paying for trash disposal.

- Several of these programs encourage those already doing back yard composting to participate in curbside pick up since their particular program accepts more than what you can typically compost in the back yard, including meat and bones, natural kitty litter, and soiled papers.

- Salem and Cambridge offer participants free compost for their gardens.

Other programs

Boston began piloting a 24-hour residential food waste drop off program with two sites in 2014. In 2015, this expanded to three additional sites. Drop off is open to those living or working in the neighborhood. The program is called "Oscar," named after Oscar the Grouch from Sesame Street.

In Amherst, Easthampton, Hadley, and Northampton, Alternative Recycling Systems of Hatfield offers curbside food and yard waste collection as part of their current trash and recycling services. This private hauler delivers all food and yard waste they collect to Greensite Environmental in Hadley. The program began in Sept. 2012 and they report that it makes good sense for them economically as a private company. Customers who want food and yard waste pick up get a 65 gallon cart for the curbside and a 2 gallon container for the kitchen. Customers can have the option of organics and yard waste collection either weekly or every other week, depending on need.

Several useful resources

In addition to the contacts identified on the spreadsheet of municipal programs, there are several other resources that may be useful if taking next steps with a residential composting program. These include model programs and resources, as well as the MassDEP Sustainable Materials Recovery grant program:

Recycling Works program run by Center for Eco Technology for MassDEP has services to assist businesses and institutions in developing effective food waste diversion programs.

Center for Eco Technology also has expertise and good resources to do the following:

- provide outreach, education, and training for residential food waste programs

- provide compost site technical assistance to expand or improve existing operations, including expanding yard waste composting sites to include food waste composting

Bob Spencer in Brattleboro, Vermont, was a key player in setting up the successful curbside program there. According to Center for EcoTechnology staff, he is a valuable resource:

Bob Spencer
Environmental Planning Consultant
15 Christine Court
Vernon, Vermont 05354
978-479-1450

Columbia County Maryland has some good example curbside programs. They had a comprehensive strategy to training residents. Their "opt in" approach is also a good model for residential programs.

Mass DEP Sustainable Materials Recovery Progam
Mass DEP's Sustainable Materials Recovery Program makes grants to support development of curbside organics collection, including:

- organics carts, $20 per cart with a maximum of $100,000
- $10 per household (up to 1,000 household pilot) to offset start up implementation costs, including increased collection costs and incremental cost to tip organics ta a composting facility if it exceeds solid waste fee

This grant also offers funds for:

- Innovative education and outreach strategies to increase public participation in reuse, recycling, composting, and waste reduction programs. Grants range from $10,000 to $100,000.
- Efforts aimed at expanding management capacity for source separated food waste through reuse, composting or anaerobic digestion. Projects may be located at municipal or other public site or at a private facility that has entered into a long-term contract with a host municipality to process source separated organics. Grants are accepted for projects that range from $10,000 to $500,000 in cost. Feasibility studies are not eligible.

Grants are typically due in late spring and awarded in the fall each year.

Appendix 4 -- Research Summary MA Waste Management (10/15)

Scope: Research Best Practices of Landfill Closing, focusing on recent landfill closings in the area combined with existing Commonwealth of MA initiatives, plans, reports, guidance and regulations, & prepare a summary report

Resources reviewed (to date):

- MA DEP Pathway to Zero Waste, 2013 plus Appendices
    - http://www.mass.gov/eea/agencies/massdep/recycle/reports/solid-waste-master-plan.html
- MA DEP website---a wealth of information on all waste topics
- Pioneer Valley Planning Commission, Pathway to Zero Waste 2012
- "Solid Waste Management Alternatives Study" prepared by Stantec and HDR Consultants for City of Northampton
- Assessment of Materials Management Options for the Massachusetts Solid Waste Master Plan Review Final Report Submitted by Tellus Institute in Partnership with: Cascadia Consulting Group & Sound Resource Management
- Materials Management Options for Solid Waste Master Plan Review Final Report
- Clean Energy Results Annual Report to MA DOER from MA DEP 2013
- http://www.recyclingworksma.com/ recycling assistance program that helps businesses and institutions maximize recycling, reuse and food waste diversion
- Interview with David Veleta-Northampton Landfill Mgr

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Overview of Best Practices/Resources and Technical Assistance:

Best Practice--Maximize diversion (through source reduction, recycling and composting) and then look at alternative waste management technologies---right now anaerobic digestion is the preferred technology in MA (not gasification or pyrolosis --troubled history)

Zero Waste and Economic Development Opportunities for Chicopee

Planning for the eventual closure of the Waste Management operated Landfill located in Chicopee is an opportunity for the City to:

- make money / save money
- improve government services
- reduce GHG emissions
- generate clean energy and
- reinforce Chicopee's role as a regional and state-wide Municipal Innovation leader

Opportunities

- Host a composting collection facility
- Anaerobic Digester
- Recycling Center as described in Fortune magazine article, "Closed Loop" fund, a social impact fund investing $100 million to increase the recycling of products and packaging
- Other Resource Recovery infrastructure
- Clean Manufacturing
- Middle-Person/Connector, like Rubicon Global http://www.wired.com/2015/01/rubicon-global/
- other?

Important Context:

MA is out front with Food Waste Ban and other bans and relatively high recycling rates

US Conference of Mayors voted to encourage every city in the nation to pursue Zero Waste goals.

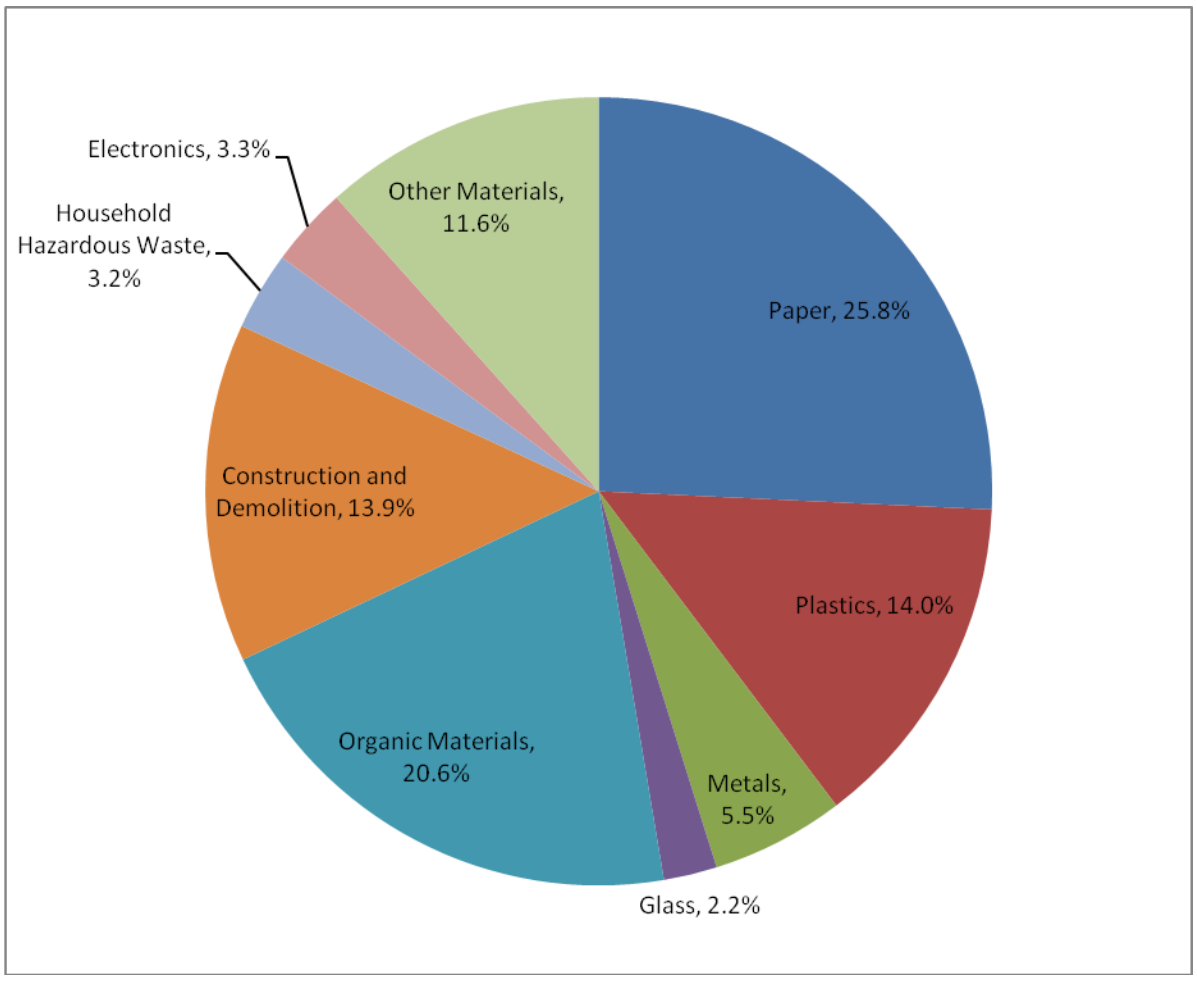
The Commonwealth is committed to a Pathway to Zero Waste, as is the Pioneer Valley region

Banned materials from Landfills:

Asphalt Pavement, Brick & Concrete
Cathode Ray Tubes
Clean Gypsum Wallboard
Commercial Food Waste (Effective October 1, 2014)
Ferrous & Non-Ferrous Metals
Glass & Metal Containers
Lead Acid Batteries
Leaves & Yard Waste
Recyclable Paper, Cardboard & Paperboard
Single Resin Narrow-Necked Plastics
Treated & Untreated Wood & Wood Waste (Banned from Landfills Only)
White Goods (Large Appliances)
Whole Tires (Banned from Landfills Only; Shredded Tires Acceptable)

Next to be banned:

plastic bags and polystyrene
carpet
electronics
beverage containers



State waste stream make-up

Having knowledge of the composition of the waste stream is helpful to understand the applicability of the innovative waste conversion technologies:

1. Anaerobic Digestion
2. Autoclaving
3. Gasification
4. Plasma arc gasification
5. Pyrolosis
6. Hydrolosis
7. In-Vessel Mixed Waste Composting

Understanding the fundamentals of waste composition is also useful for consideration of food waste or source separated organics.

The Big 3:

1. Source Reduction
2. Recycling
3. Compositing

Goals:

1) Reduce solid waste in Massachusetts disposal by 30% by 2020, from 6,550,000 tons of disposal in 2008 to 4,550,000 tons of disposal by 2020—Status???
2) Continue to divert toxic substances from the solid waste stream

From a lifecycle environmental emissions and energy perspective, source reduction, recycling and composting are the most advantageous management options for all (recyclable/compostable) materials in the waste stream. Best Practice--Maximize diversion (through source reduction, recycling and composting) and then look at alternative waste management technologies---right now anaerobic digestion is the preferred technology in MA (not gasification, pyrolosis or burning)

Waste Management/Processing in the Region

- Covanta (Bondi's Island in Springfield) - It's Waste Energy Facility. Covanta currently has a regional contract with 14 municipalities with Longmeadow as the 'lead' community (see attached copy of existing contract and RFQ). The contract began in March 2014 and is due to expire by June 2017. Upon expiration of the contract, these collective communities will be seeking a new bid in which Chicopee may be able to join in on...The participating communities within this regional arrangement include:
    - Amherst, Belchertown, East Longmeadow, Granby, Granville, Greenfield, Longmeadow, Ludlow, Shutesbury, Southwick and Wilbraham.

- Republic (located in Indian Orchard) - It's Transfer Station. There are possibly 3 or 4 communities that participate with Republic for curbside collection.

- Valley Recycling (located in Northampton) - It's also a Transfer Station. West Springfield participates with them.

Grants and Technical Assistance available from MA DEP: waste reduction, organics, Trash metering

Chicopee received grant of $20,000 in Sept 2015 Recycling Dividends Program (RDP)

MA DEP Efforts to Reduce Waste:

Product Stewardship--reducing the life-cycle impacts of products. In MA DEP and many others, are working with manufacturers and commercial enterprises to reduce packaging and to get them to accept items back after use so consumers don't have to dispose of them

Source Reduction
- Trash Metering, aka Pas As You Throw (PAYT)
- Home composting
- Surplus Equipment Exchange

Hazardous Products Reduction
- Regional collection programs
- Chemical Management grants (at schools and other institutions)
- Other efforts to remove mercury from schools and hospitals
- Workshops on reducing use of pesticides and fertilizers

Commercial Recycling and Composting
- Supermarket Recycling Organics
- Food waste recycling information for haulers
- Earth911 Business Recycling website
- Business Recycling Partnerships

Residential Recycling and Composting
- Technical assistance grants and funding for pilot Municipal composting programs (Northampton)
- Workshops and Trainings

Market Development
- Recycling Industry Reimbursement Credit (RIRC) grants to develop organics and C&D processing capacity
- Recycling Loan Fund
- Business Recycled Product Purchasing Collaborative
- Require/Encourage state agencies to purchase recycled products

Household Hazardous Products
- Municipal mercury collection programs

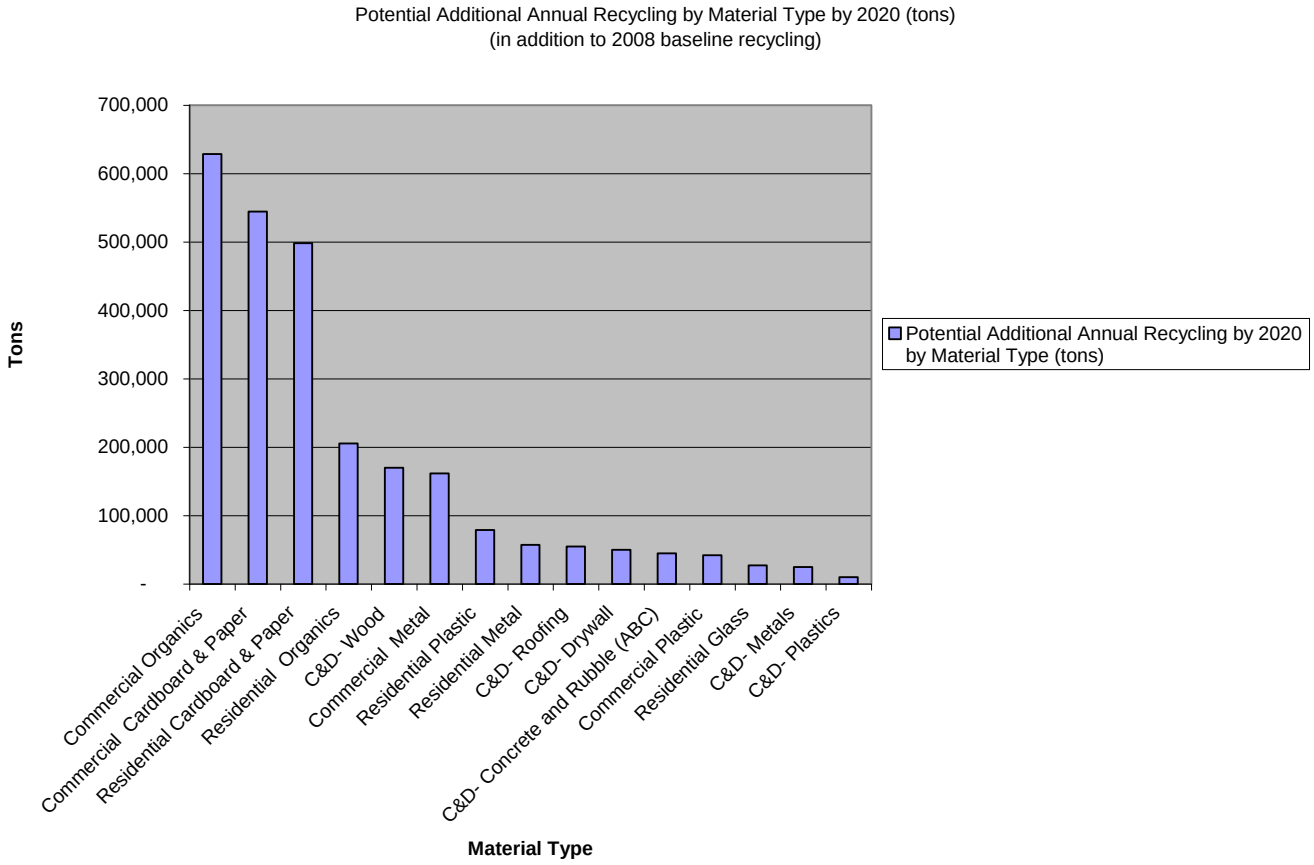
Construction and Demolition Debris
- Established a waste ban on asphalt, brick and concrete, wood and metal
- Worked with C&D subcommittee and Work Groups on C&D processing, marker development and other issues
- Supported a clean wood separation study
- Completed a wood market analysis
- Worked with gypsum manufacturers and other stakeholders to increase recycling of gypsum wallboard[5]

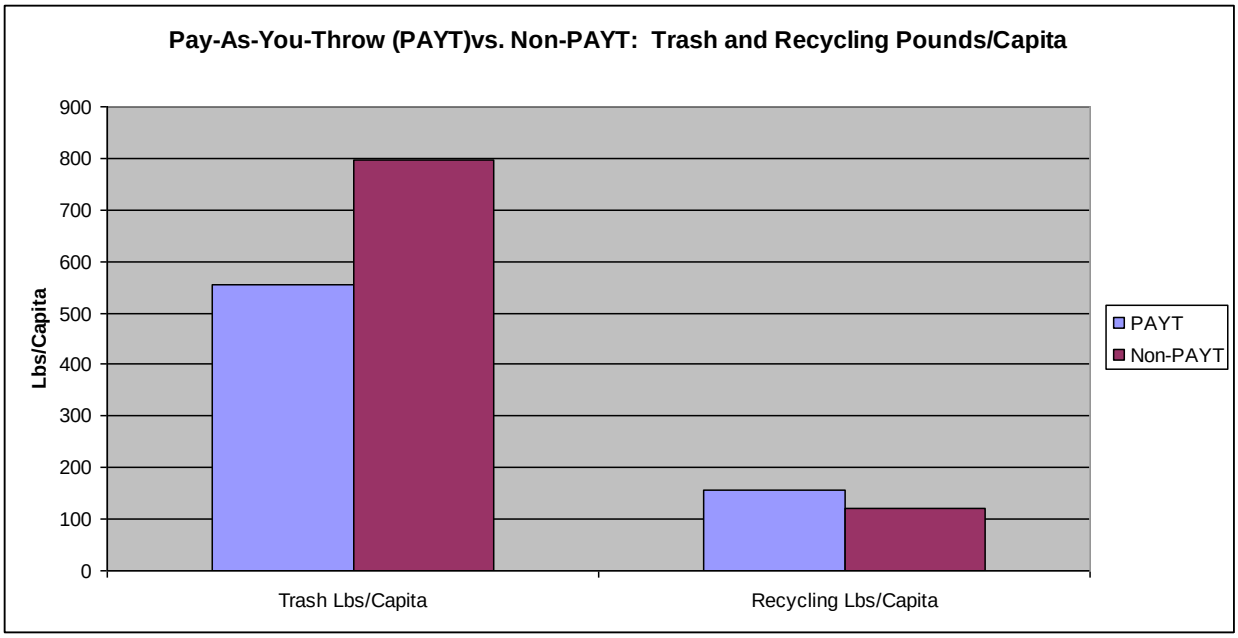
[5] pp 1.2 and 1.3 Stantec Report

MA DEP New Initiatives

The Commonwealth's policy is to meet our waste management capacity need primarily through the development of increased recycling and composting capacity, instead of through the development of long-term disposal capacity. This Plan continues and/or expands a number of existing initiatives and includes several critical new initiatives to more effectively reduce the amount of waste that is generated and disposed. Major new initiatives include:

- Using recycling funding from municipal waste combustor renewable energy credits to fund recycling and composting initiatives through the Sustainable Materials Recovery Program.
- Establish a framework for a producer responsibility system. Work with Northeast states on a regional framework;
- Requiring haulers to provide full recycling services to their customers to ensure a level playing field for all waste haulers;
- Amending Massachusetts' siting regulations to streamline siting of recycling, anaerobic digestion and composting facilities while ensuring a high level of environmental performance;
- Expanding MassDEP's authority over problem landfills to step in and conduct site cleanup work if needed;
- Establishing more rigorous waste ban standards and requiring waste composition studies by municipal waste combustors and landfills; and


Potential Additional Annual Recycling by Material Type by 2020 (tons)
(in addition to 2008 baseline recycling)
Tons
700,000
600,000
500,000
400,000
300,000
200,000
100,000
-
Commercial Organics
Commercial Cardboard & Paper
Residential Cardboard & Paper
Residential Organics
C&D- Wood
Commercial Metal
Residential Plastic
Residential Metal
C&D- Roofing
C&D- Drywall
C&D- Concrete and Rubble (ABC)
Commercial Plastic
Residential Glass
C&D- Metals
C&D- Plastics
Material Type
Potential Additional Annual Recycling by 2020 by Material Type (tons)


Pay-As-You-Throw (PAYT)vs. Non-PAYT: Trash and Recycling Pounds/Capita
Lbs/Capita
900
800
700
600
500
400
300
200
100
0
Trash Lbs/Capita
Recycling Lbs/Capita
PAYT
Non-PAYT

Objectives and Strategies(from MA DEP Solid Waste Master Plan 2010-2020)

Three primary objectives form the framework for specific action items to achieve the goals described above over the coming decade. Under each objective, there are a variety of strategies that will help to achieve the Plan's goals. Each objective is listed below, with the primary strategies listed below each objective.

Objective 1: Reduce Waste and Maximize Recycling

- *Increase Business and Institutional Recycling and Composting* – Increase recycling and composting by businesses and institutions through technical assistance to small businesses, require waste haulers to provide full recycling services to their customers, and enforce waste ban compliance by waste generators and haulers more aggressively. Focus on paper and organics as priority materials because they continue to be disposed of in large quantities and they have the greatest potential for significant improvement in their capture and use as resources.

- *Increase Residential Recycling and Composting* – Using technical assistance and targeted grant programs, increase recycling and composting through development of cost-effective municipal and regional residential recycling programs, including Pay-As-You-Throw program expansion, and collection of all recyclables together through single-stream recycling. As with businesses, focus on paper and organics as priority materials for their additional diversion potential.

- *Strengthen Incentives Through Producer Responsibility* – Work with the Legislature to create incentives for better managing products and packaging after use through expanded producer responsibility legislation (such as the "E-waste" bill) and an expanded bottle bill, and develop a broader framework for producer responsibility requirements.

- *Stimulate Greater Reuse of Materials and Products* – Implement a regional materials exchange to facilitate material reuse among businesses and institutions and work with broad groups of stakeholders to develop new strategies to encourage increased reuse of materials and products to save money for businesses, institutions, and residents and to reduce disposal.

- *Deploy Diversion Strategies for Organics and C&D***–** Implement integrated organics and C&D diversion strategies that include a combination of initiatives to increase diversion and build markets.

- *Build Local and Regional Recycling Markets* – Drive development of new and expanded recycling markets and bolster existing markets through innovative pilot projects, state procurement, cost-effective regional programs, targeted business development assistance, and aggressive implementation of existing and new waste bans.

- *Commonwealth Leading by Example* **–** Ensure that state agencies lead by example and implement innovative materials management strategies that improve purchasing

efficiencies, reduce waste, maximize the percent of waste that is recycled or composted, and minimize disposal.

- *Statewide Education Campaigns* – Work with municipal, non-profit, and business stakeholders, including the waste management industry, to develop and implement a series of targeted education campaigns and school educational programs to support waste reduction and increased recycling by residents, businesses, and institutions.

- *Eliminate Barriers to Siting Anaerobic Digestion, Recycling and Composting Facilities* – Working with a broad stakeholder group, identify barriers to siting anaerobic digestion, recycling, and composting facilities and develop regulations, technical, and financial mechanisms to mitigate or eliminate those barriers. MassDEP promulgated final rules amending 310 CMR 16.00 and 19.00 streamlining permitting for these facilities in November, 2012 while maintaining strict environmental and public health standards and facility oversight to ensure a high level of environmental performance. See http://www.mass.gov/eea/agencies/massdep/climate-energy/energy/anaerobic-digestion/ for more information.

- *Keep Toxics Out of the Waste Stream* –Expand regional programs to collect and safely manage hazardous household products before they are sent for disposal, implement the Mercury Management Act, and reduce toxics in products and packaging by supporting "Safer Alternatives" legislation and participating in inter-state and national chemical policy reform initiatives.

Objective 2: Improve the Environmental Performance of Solid Waste Facilities

- *Modify the Moratorium on Municipal Waste Combustion* – Modify the moratorium on municipal solid waste combustion to encourage innovative and alternative technologies (e.g., gasification or pyrolysis) for converting municipal solid waste to energy or fuel on a limited basis. The moratorium will remain in place for new capacity for traditional combustion of municipal solid waste. Total additional capacity for gasification or pyrolysis of municipal solid waste will be limited statewide to 350,000 tons per year. This limit is set at ½ of the projected in-state capacity shortfall of approximately 700,000 tons if our disposal reduction goals are met, ensuring that we do not overbuild long-term capacity. Proposed projects will have to meet stringent emissions energy efficiency, and upfront recycling standards. These technologies will be used for those portions of the waste stream for which reuse or recycling are not an option. New facilities will be subject to the same site assignment rules as other facilities. MassDEP will seek stakeholder input while developing performance standards for municipal solid waste conversion facilities. Any new facilities will be required to employ state of the art processing technologies focused on removing recyclable materials to the greatest extent possible so that these facilities do not supplant recycling or re-use options.

- *Improve Solid Waste Facility Waste Ban and Recycling Performance* – Improve facility compliance with waste bans and revise regulations to include more stringent requirements in facility waste ban plans.

- *Reduce Emissions of Municipal Waste Combustors* - Develop regulatory standards that will improve the energy conversion efficiency and improve emission and air pollution control systems for existing municipal waste combustors, particularly for nitrogen oxides and other emissions of concern. When possible within the parameters of existing facilities, enable facility modifications to improve the energy conversion efficiency of existing facilities.

- *Landfill Oversight* - Building on new and stricter standards for landfill setbacks, landfill liners, and ground water monitoring that MassDEP has established since the Beyond 2000 Master Plan, MassDEP will work to ensure that both active and closed landfills comply with stringent environmental requirements and that any inactive landfill closure projects are safely implemented.

Objective 3: Develop Integrated Solid Waste Management Systems

- *Integrated Facility Partnerships* - Work with interested parties, including municipalities and businesses, to develop integrated solid waste management systems that achieve our objectives by integrating reuse, recycling, and composting opportunities into holistic solid waste facility design.

- *Innovative Pilots* - Pilot innovative approaches that can achieve our objective of improving the environmental performance of solid waste facilities, divert up to 100percent of waste materials from disposal, and help achieve the goal of zero waste at a local and regional level.

- *Highlight Successful Systems* - A leadership example of such an integrated approach is provided by Nantucket, which combines the following program actions to achieve a 91 percent recycling rate:
    - biodegradable packaging by law,
    - a comprehensive recycling drop-off center,
    - a materials recovery facility,
    - monthly hazardous product collections,
    - a reuse swap shop,
    - a C&D handling facility, and
    - co-composting of the remaining trash with sewage sludge to produce compost.

Organics Diversion and Anaerobic Digestion [6]

MassDEP promulgated final regulations in December 2012 designed to streamline the siting of anaerobic digestion operations and other advanced organics processing technologies. In 2013, MassDEP, with stakeholders, developed a framework for implementing a ban on landfill disposal and incineration of organic waste by large generators. This action will increase the incentive for siting anaerobic digestion facilities to manage these materials. A draft regulatory package was developed and issued for public comment in July 2013 and the final regulation was promulgated in early 2014, with the ban set to begin October, 2014. MassDEP continues to work with numerous private and public partners on projects, providing technical and financial assistance, including the MWRA, the Town of Bourne, the New Bedford Solid Waste District, the Town of Hamilton and the Town of Lexington. MassDEP is also supporting the Division of Capital Asset Management and Maintenance (DCAMM) efforts to site anaerobic digesters on state land. Feasibility studies were completed at three state-owned properties, MCI-Shirley, MCI-Norfolk and UMass-Amherst and work has begun to seek input from local officials and residents through public meetings. MassDEP continues to provide financial incentives for the diversion of organics and support of anaerobic digestion technology development. $3 million in funding was awarded through the Recycling Loan Fund (RLF) targeting assistance to anaerobic digestion projects.

DOER also made $1 million available for grants to public entities for anaerobic digestion through MassDEP's Sustainable Materials Recovery Grant Program. MassDEP and DOER have awarded $100,000 to the Massachusetts Water Resources Agency (MWRA) for its wastewater treatment plant at Deer Island. The MWRA currently digests sludge in 12 large digesters to help run the plant. A pilot project will introduce food waste into one of the digesters to determine the effects of co-digestion on operations and biogas production. $200,000 has been awarded to the City of New Bedford for a pilot scale anaerobic digestion project to include food waste at the Crapo Hill landfill and $30,000 has been awarded to the Town of Bourne for consulting assistance with developing a lease to build and operate an AD facility on their property. This DOER funding comes from the 2010 and 2011 Alternative Compliance Payment (ACP) Spending Plan. ACPs are paid by electric retail suppliers if they have insufficient Renewable Energy Certificates to meet their compliance obligations under the Renewable Portfolio Standard programs. DOER establishes the plan for use of these funds to support clean energy development in the Commonwealth.

[6] From Clean Energy Results report, pp 4-5

Appendix 5 -- City of San Diego Media Coverage Adoption of Zero Waste

San Diego OKs 'zero waste' policy
Cutting edge approach puts city at forefront of national movement to boost recycling

By David Garrick | 6:23 p.m. July 13, 2015

Trucks back up as they drive into Miramar Landfill last year. — *John Gastaldo*

San Diego — San Diego moved to the forefront of nationwide efforts to reduce waste in landfills on Monday when the City Council unanimously adopted a complex blueprint for shrinking the amount of trash produced locally to zero by 2040.

The move comes one year after Los Angeles adopted a similar “zero waste” policy and one month after the U.S. Conference of Mayors voted to encourage every city in the nation to pursue such goals. Other cities with zero waste policies include New York, San Francisco and Austin, Texas.

Zero waste plans aim to help preserve dwindling landfill capacity while also boosting the environment by encouraging more recycling, less production of waste and the development of new markets for recycled and composted materials.

While San Diego wouldn’t literally recycle 100 percent of its trash in 2040, “to the maximum extent feasible no material would be deposited in the landfill,” said Mario Sierra, director of the city’s Environmental Services Department.

Last year, more than 865,000 tons of waste was disposed in the Miramar Landfill, the city’s only such facility. That’s down from 1.3 million tons in 1998.

San Diego’s plan includes a package of new regulations, incentives and fee hikes aimed at sharply increasing recycling rates.

“Reducing waste to zero is something we should 100 percent support,” Mayor Kevin Faulconer said after the council’s 9-0 vote. “The ‘Zero Waste’ plan is just the latest step we’re taking to leave a better tomorrow for the next generation of San Diegans.”

Councilman David Alvarez, chairman of the council’s Environment Committee, said the plan could also save the city money long-term by lengthening the life of the Miramar Landfill.

“The more we have the landfill available to us, the less it will cost us to provide trash services to our residents,” Alvarez said.

The city launched the "zero waste" goal in December 2013, directing staff to come up with a way to meet it.

The 19-page plan adopted Monday lays out dozens of specific strategies that would help San Diego boost its recycling rate of 67 percent to 75 percent in 2020, which is required by state law, and then to 90 percent by 2035, which matches with the goals in an ambitious Climate Action Plan that Mayor Faulconer proposed last fall.

Those strategies include requiring greater recycling of materials during construction projects, recycling more organic materials such as food and yard trimmings, and eliminating recycling exemptions now given to small businesses and apartment complexes.

For the city’s subsequent climb to 100 percent, the plan is less specific.

It suggests the city could repeal the 1919 People’s Ordinance, which guarantees free trash pick-up at all single-family homes, or shift to “exclusive” franchise agreements for trash hauling. Both approaches would give the city more opportunity to provide incentives and penalties.

Because the people’s ordinance provides free trash services by right, it’s impossible for the city to offer discounts to residents who boost their recycling rates or levy fines on those who don’t.

The San Diego County Taxpayers Association said the city needs to fix that in order to achieve the zero waste goal.

“Certain residents in the city have no financial incentive to reduce their waste,” said Theresa Andrews, the association’s interim chief executive. “We encourage this council and the Environmental Services Department to look at other programs and services that would incentivize these residents to recycle and reuse.”

Shifting to exclusive franchise agreements with trash haulers, something City Auditor Eduardo Luna has recommended that San Diego study, would allow the city to incentivize haulers to meet goals for recycling and composting.

“It’s the perfect vehicle for the city to tailor and negotiate their program,” said Lauren Ahkiam, a policy analyst for the Los Angeles Alliance for a New Economy. “They could charge for damages if goals are not met and give bonuses if they are met.”

Exclusive franchise agreements are key to the zero waste campaign in Los Angeles, but shifting to them has been controversial because critics say the new system will drive up rates by putting small haulers out of business when it takes effect in 2017.

San Diego couldn’t make such a switch for at least five years because state law requires haulers be given at least that much notice before a change. Sierra, San Diego’s environmental services director, said the city plans to lengthen that time frame by agreeing to seven-year contracts with its haulers in coming months.

Another challenge facing San Diego is that less trash being disposed at Miramar means less revenue for the facility, requiring the city to find other ways to fund trash and recycling services.

City officials estimate that the new programs in the zero waste plan will cost the city about $8 million per year starting in 2020.

Proposals to close that projected budget gap include closing the Miramar Landfill on Sundays and hiking a variety of waste, recycling and franchise fees paid by trash haulers.

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Appendix 6 -- Closed Loop Financing

This new idea could change recycling in the U.S. forever

by Katie Fehrenbacher @katiefehren SEPTEMBER 24, 2015, 1:15 PM EDT

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A new fund wants to disrupt recycling with the help of $100 million from corporate giants like Walmart, Goldman Sachs, and Coca-Cola.

By this time next year a major high-tech recycling plant in Baltimore could be sorting 54,000 tons of recycled plastic materials—yogurt cups, milk cartons, plastic soda bottles— annually and servicing a 500-mile radius area across the East Coast. It will be one of the largest of its kind in the U.S.

While the factory's laser technology, which identifies and sorts different types of waste, is cutting edge, it's not really what makes the plant so remarkable. That would be how the factory was financed.

The Baltimore recycling plant is one of the first projects funded by a new group called Closed Loop Fund. It has amassed $100 million from ten of the largest U.S. consumer goods companies including Walmart WMT -0.30% , Coca-Cola KO -0.83% , PepsiCo PEP -1.23% , Johnson & Johnson JNJ -0.56% , Procter & Gamble PG -0.30% , Unilever UN 0.07% , 3M MMM -0.63% , and Goldman Sachs GS 0.41% .

The fund uses its checkbook to provide zero interest loans to cities and companies that want to build new recycling centers and projects. Company QRS, which is building the plastic recycling plant in Baltimore, used $2 million from the fund, and combined that with other types of financing, to support the new site's construction.

The idea is so simple, it's snooze-worthy. But unlocking capital for such an underdeveloped industry could be transformational.

"Recycling has been stagnant for the last five to ten years in the U.S.," Closed Loop Fund co-founder Rob Kaplan told *Fortune* in an interview.

A new recycling plant in Baltimore, from recycling company QRS. Photo courtesy of Closed Loop Fund

The U.S. has few nationwide waste and recycling standards, and cities—many strapped for cash—have often been unable to find money to pay for new recycling facilities and programs. But many of the companies that generate the most waste hope for more recycling infrastructure and recycled goods.

Enter the fund to close the gap. Last year, Kaplan, Walmart's former director of sustainability, and Ron Gonen, Mayor Bloomberg's former New York City deputy commissioner of recycling and sustainability, founded the fund. After working out the many details, the group on Thursday announced that it has funded its first three projects.

The Baltimore plant is just one of them. The fund has backed two other projects, both focused on collecting recycled goods from homes. One will launch in Portage County, OH, and the other in Quad Cities region in Iowa. Over ten years, the Closed Loop Fund says that the three projects will divert half a million tons of waste from landfills. Collectively, the fund used $7.8 million on its first three programs, and combined that with another $17 million in funding from state grants, bank loans, and city bonds. In total, America's recycling industry received $24.8 million in backing, a huge amount of money compared to what is usual.

The fund still has more than $90 million left to dole out, and Kaplan says that his team will go through a long list of additional proposals over the next 6 to 12 months. “We’re pretty excited that we’re finally able to make this concept a tangible reality,” Kaplan said.

The challenge for the fund will be to pick projects that have the biggest potential impact. The recycling projects need to make money, and pay back the loans, but they also need to be large enough to make a dent in the waste stream. It could be a tricky balance.
But if the model is successful, it could provide a brand new way to encourage large-scale recycling.

To learn more about how companies can reduce waste, watch this Fortune video: http://fortune.com/2015/09/24/new-idea-recycling/

2016 Recycling Center or Transfer Station fees

Disposal	City/Town											
or Recycling	Amherst	E. Longmeadow	Egremont	Greenfield	Holyoke	Longmeadow	Ludlow	Northampton	South Hadley	Southwick	Westfield	W. Springfield
website						longmeadow.org			southhadley.org	southwickma.org		
Books	swap shop shed	NA	swap shop	NA	free	Free	NA	Free	Free	Free - Read Tree	Free	Free
CRTs	$10-$20	$10-$25	$10-$15	$12-$18	first 2 free	$10-$25by size	$10	$10-$30 by size	$5-$20 by size	$20	$5 to $25	Free
Electronics	$3-$25 by size	$10-$20 by size	$10-$15	NA	free	$5-$15		$0-$30 by size	NA	Free	Free	Free
Fluorescents	$1	Free	$.25 per foot	$0.50	free	Free	Free	Free residential	Free residential	Free	Free	Free
Other Hg	Free	Free		NA	free	Free	Free	Free residential	Free	Free	Free	Free
Batteries	Free	Free (no auto)	free	NA	free	Free	Free	Free residential	$1 auto	Free	Free	Free
Clothing	Army	NA	swap shop	free		Salvation Army	Planet Aid	Salvation Army	Goodwill/Salvation Army	Salvation Army	Free	
SWAP shop	Yes	NA	Yes	NA	latex paint	Yes	NA	YES	Yes	NA		NA
Scrap Metal	$55 per ton	Free	Free	Free	free	Free	free	$0-$10 by size	Free	Free	Free	Free
	<200 lbs $5											
Veg. oil/grease								Free residential	Free			
Rigid Plastics								Free residential	Free			
Motor Oil	Free	Free	NO	Free	free	NA	Free	Free residential	Free	Free	Free	HHW event
Antifreeze	HHW event	HHW	NO	Free res. only	free	NA	free	Free residential	Free	Free	Free	HHW event
Oil paint	HHW event	HHW	HHW	$0.50-$15	HHW	HHW	HHW	HHW	HHW	NA	Free	HHW event
Propane tanks	$0-$20 by size	NA	NO	$5-$7	free	free 20 lbs only	free	0-$20 by size	$1-$5 ea	$5	$5	Free
Tires	$7/$25 car/truck	NA	NO	$4-$7 limit 4	8 free	Free	Free- no trucks	$4-$6	$4-9, $15/20	$5ea limit 4	$2 or $3	Free
	$100 tractor							$25 w/rim	$25	19" or less	no limit	
Freon appliances	$30	$15-$30	NO	$15-$25	5 free	$10	$10	$20	$10	$10	$10	Free
Mattresses/	$15-$25	$10	$20-$30	$20-$25	2 free	$25	$10	$5-$30 by size	$15-$20	$16 ea	$10	NA
Large appliances	$15	Free w/o freon	free w/o freon	$5-$15	free	$10	$10	$10	Free	20 ea	Free	Free
large furniture	$10	$10	$50	$15-$40	free	$25	$10	$10-$30 by size	$15-$20 by size	Free, 3' pieces	$10	NA
Other furniture	$10 or by weight	$10	$25-$30	$15-$20 cy	free	$10-$25 by size	$10	$2-$30 by size		metal stripped	Free	NA
Carpet	$10	$10	$10-$30	$15-$20	free	$10	$10	$2-$30 by size		Free, cut to 3'	Free	NA
										wide strips		
Residential trash	PAYT bag	curbside only	free/unlimited	$2-$3 PAYT	free	At curb only	PAYT	$0.75-$3 PAYT	$1-$2 PAYT	With sticker	Free	curbside only
	$130 per ton							(3 sizes of bags)				
	<150lbs $10											
Residential	Free	curbside only	free/unlimited	$10 non res		At curb only	Free	Free	Free	free with sticker	Free	Free
Recycling				business fee	free					(see below)		& curbside
C+D	ABC $110/ton	small wood only	$15-$25	$100-$125 cy A	free	$5-40 by load	Not allowed	$2-$80 by load	$28-$53 by load	Not allowed	Not allowed	Not Allowed
	<150lbs $10		$133 3/4 ton pu	$125-$150 cy B		mixed load						
			$100 1/2 ton pu									
residential food												
waste	YES		YES	YES				YES- free				
Vehicle Sticker	$85 residential	$50 residential	Yes - no charge	$5 residential	permit card	$40	$10/free 62+	$25/$5/$0	Sticker included	$100/$50 senior	$10/yr	NA
	$110 commercial					$30/65+	Nothing larger		in annual trash fee	One Day $22	$5 second car	
						Nothing large	than pick-up			Recycle $10/yr	One day/$5	
						than ppick-up						
Hours	T,Th	Sat 9-5	Sat 9-3	T,W 12:30-2:30	M,T,W,F	Wed. 10-5	W-Sa 8:00-3:00	Locus St TS	W,Sa 8:00-3:00	Su,M,Th closed	M-F 7-2:45	M_F
	Sa 8:00-2:00	Wed 9-5 (seasonal	Sun 12-4	Th,F 11:00-2:30	7:15 - 2:30	Sat: 8-5		M-Sat. 7AM-4PM		T 11:30-7:20	Sa 7-11:45	7AM-Noon
			T-Th 8-1	Sa 7:30-2:00	Th	Sun. 10-5		Glendale Rd TS		W,F 8-4:20		12:30-3PM
					7:15 - 7:00	seasonal hours		W 8-12, Sat.7-12		Sa 8-3:50		
		*** Considered			seasonal hours	apply						customer
		bulk items @			apply							service
		$10 per car										263-3246
		$30 per pickup										
		truck										

Appendix 8 -- Malden PAYT Case Study

City of Malden Pay-As-You-Throw (PAYT) Program

In a Pay-As-You-Throw (PAYT) solid waste program, residents purchase preprinted stickers or bags for disposal of trash, thereby paying directly for the amount of solid waste they generate. There is no direct fee for recycling.

Community Population: 56,000
Households Served: 17,783 (FY09)
Services Provided: Weekly curbside trash and dual-stream recycling collection

Program Overview

- Residents pay $2 for each 33-gallon bag, or $1 for each 15-gallon bag, to offset the cost of trash disposal.
- The average household spends less than $200 annually in PAYT trash bags.
- Community Development Block Grant (CDBG) money is used to pay for bags for residents who are income eligible.
- All residential trash must be in City-approved bags. There is no limit to the number of PAYT bags a resident may purchase and use each week.
- All residents are eligible to receive one free recycling bin; additional bins are sold for $5 each. Residents can also obtain free recycling stickers, which can be used to convert an existing container or trash receptacle into a recycling container.
- The residential PAYT Program serves all residential dwellings up to 6 units, as well as the Malden Housing Authority and other municipal buildings.
- The City was awarded a PAYT start-up grant of $71,132 from MassDEP.

History

- In 2000, the City of Malden successfully instituted a commercial PAYT Program for residential buildings with more than 6 units, mixed-use buildings and businesses.
- In order to balance the FY09 budget, the Mayor of Malden proposed a residential PAYT Program, citing an estimated $2.5 million dollars could be freed up (from disposal cost savings and revenue from the sale of PAYT bags), avoiding substantial program and personnel cuts.
- The City Council approved the PAYT ordinance in June 2008.
- Directly following the vote, a campaign was launched to educate and inform the public. The City spent $47,000 on outreach efforts.
- In October 2008, Malden implemented a full PAYT program, whereby all residential trash must be placed in City-approved bags.

Implementation

- The PAYT bag vendor manufactures bags, warehouses inventory and delivers bags to stores. PAYT bags are sold at 16 local retailers as well as several municipal locations (City Clerk's Office, City Treasurer, DPW).
- The City initially ordered 750,000 33-gallon bags representing a projected 4-month inventory. Two months later, the City Council voted to offer a smaller bag option (15 gallon capacity, sold for $1 each) for residents who do not fill a 33-gallon trash bag weekly.
- Retailers place bag orders with the bag vendor (Waste Zero). Waste Zero then drop-ships bags to retailers and bills them.
- Retailers, in turn, pay the City. The City keeps Waste Zero apprised of which retailers are delinquent on paying bills.

- Retailers receive no mark up for selling bags.

Administration and Enforcement

- All PAYT bag revenue currently goes into the General Fund. It is anticipated that the City will establish a Solid Waste Enterprise Account.
- Non-compliant trash bags are not collected and residents are notified to re-bag.
- Repeat offenders are issued a bright yellow violation notice and fined $50 (minimum) plus a disposal charge.
- A hotline was created for residents to report non-compliance.
- The City of Malden has noticed no increase in the amount of illegal dumping since the implementation of PAYT.
- The City strengthened its illegal dumping ordinance, increased fines to $300 and posted signs around the City (targeting known illegal dumping sites) warning that illegal dumping carries a $300 fine.

Additional Waste Services

- The City allows the collection of 1 bulky item (burnable items that will not fit in PAYT bag) per property per week at no fee.
- White goods may be picked up curbside or dropped off. Disposal stickers cost $20 each and must be purchased in advance from DPW.
- TVs, computers, monitors must be dropped off at DPW with $5 fee per item.
- Hazardous Waste collection days are held on a quarterly basis.
- Yard waste: Curbside collection varies by season.

Successes to be Replicated

- Mayor formed four working groups to tackle Communication, Enforcement, Finance and Ordinances; these groups met weekly to work out the details of the program
- Strong outreach to the community included: Informational meetings, a clear and consistent message, a dedicated hotline, FAQ document and other notices delivered to homes in multiple languages, press releases, TV announcements, as well as PAYT programming on local cable channel.
- Customer service training.

Waste Reduction Results in First Year (October 2008-September 2009)

- Compliance rate: Over 98 percent.
- Recycling rate: Up 74 percent.
- Solid waste tonnage: Down 49 percent.

Financial Results

- Nearly $2.5 million in savings to the City.
  - Solid waste disposal savings ($801,723).
  - Revenue from sale of PAYT bags ($1.7 million).

Positive Outcomes

- The City of Malden received a 2010 EPA Merit Award for this program.

For More Information

- Malden DPW: (781) 397-7162

Web site: www.cityofmalden.org


Catalyst for Regional Progress
PVPC
Pioneer Valley
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www.pvpc.org