

Proposed Massachusetts Zero Waste Planning

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I. Toxics Action Center & Bentley University

Toxics Action Center is a non-profit organization that strives to protect the quality of air, water and soil. It works in a variety of different ways with environmental groups/activists and neighborhoods to fight toxic pollution in their communities. With the demand for a cleaner and healthier environment Toxics Action has taken on a new initiative to help Massachusetts' Department of Environmental Protection (DEP) devise a "Zero Waste" model for Massachusetts. This initiative will help to solve the problems of the current incineration and landfill methods of waste disposal in Massachusetts. Bentley's role in helping Toxic Action design a "Zero Waste" model for Massachusetts is having a graduate student do research as part of the Business Sustainability (MG799) course on what other states are doing to move towards Zero Waste. In looking into other state's recycling, composting and product stewardship programs and initiatives, we were looking for how adaptable they would be to all or some of Massachusetts as well as the costs associated with them.

II. Executive Summary

Zero Waste is a philosophy that shifts how we think about and use resources. Instead of turning all used products into waste, Zero Waste strives to keep the raw materials that make up products in use out of landfills and incinerators. In order to do that the goal of a "Zero Waste" model is to maximize recycling, reduce waste and consumption, and ensure products are made to be reusable and recycled.¹ While Zero Waste is not necessarily an attainable goal it sets an extreme target for waste reduction which forces new levels of innovation and efficiency by businesses and communities.

As Massachusetts would like to move towards a Zero Waste model this report highlights where Massachusetts is in waste management and offers programs and initiatives to help it move towards Zero Waste. The 2006 update from the Massachusetts DEP shows Massachusetts to have been at a 47% overall waste reduction rate with the goals to be 70% by 2010 and 74% by 2012. To help reach that goal some programs that have already been implemented in other cities and states are being recommended for Massachusetts to also implement. These programs are focused on commercial recycling, residential and commercial composting and product stewardship of electronic waste. The programs are generally about putting accountability on the waste generators to manage their waste in safer more environmentally friendlier ways with the use of recycling. To achieve that the state needs to (1) create opportunities to increase the ease and convenience of recycling, this is exemplified in the recommended free commercial recycling and curbside pick up for residential compost. (2) Pass some regulatory requirements like waste bans and Pay As You Throw programs (PAYT) that act as a deterrent to help change behavior. And (3) if at all possible provide some type of incentive like a rebate program or tax incentives, because with change you sometimes have to WIIFM and show people "what's in it for me." In some cases when the accountability can not easily be transferred to the waste generators (consumers) it should be shifted to the producer, in which case you implement programs like E-Cycle that require producers to pay the cost of recycling their hard to recycle goods. A combination of all of the above will help Massachusetts move in the right direction towards Zero Waste

¹ We're Working Towards Zero Waste. Central Vermont Solid Waste Management District. Oct 2005

III. Where We Are

As of 2006 Massachusetts was only diverting 47% of all of its waste and its 17 operating landfills reported disposal capacity of 2.5 million tons. Even with currently planned expansions executed the disposal capacity of these landfills will drop to 1.1 million by 2014. The option after recycling and land filling is exporting, and the amount of waste Massachusetts will have to export out of state for disposal will depend on how much Massachusetts can increase its waste diversion. Staying at a 47% diversion rate is projected to result in 4.1 million tons of waste being exported by 2014, but if the goal of 56% is reached then the net export of waste would only be 2.5 million tons.²

IV. Where We Can/Need To Be- Zero Waste Future

This section will outline programs and initiatives to focus on areas of recycling, composting, and producer responsibility that will help Massachusetts increase its waste diversion to from its current 47% to 74% by 2012. All of the programs and initiatives described below have already been under taken by other states or cities and are being referenced based on their adaptability to all or some part of Massachusetts.

A. Commercial Recycling Programs

Commercial Waste Ban would be the first start to increasing recycling. The waste ban would prohibit the disposal of commercial cardboard, office paper and yard waste requiring all business to recycle the prohibited waste. The goal of the commercial waste ban would be to increase the recycling rate, conserve resources and to lower the cost of doing business for those generators of the waste. While the waste ban would become effective at the beginning of a new year (Jan 1st), an education program would be conducted by the city the previous year to educate and create awareness to those that would be affected. For the first year that the waste ban would be in effect the city would offer a “grace period” and only tag violating bins with “mock tickets” allowing businesses to adjust. The following year the city would address violations with two warnings followed by a \$100 citation.

When imposing a waste ban the city needs to offer readily available alternatives for waste management and one way to do that is to offer **Free Commercial Recycling**. Along with helping businesses reduce their environmental footprint the goal of this program would be to offer businesses a cost effective way to recycle their prohibited waste. Very small businesses that produce less than 96 gallons per week of the prohibited waste would be able to participate in residential curbside recycling with the regular recycling bins. For businesses that generate greater quantities of waste the city would provide businesses with two free 96 gallon carts for their dry recyclables at no direct cost to the business. The government would cover the costs of the carts, and the franchised haulers would be responsible for delivering them. The carts would be collected with regular curbside collection routes resulting in little incremental increase to labor. If businesses generally have more than the two 96 gallon volume then they would need to request recycling services from a recycling company for the additional waste³ To cover the cost that the government does incur in

² Massachusetts 2006 Solid Waste Data Update. Mass DEP.

³Commercial Recycling via Material Ban Ordinance (Seattle, Washington). Ann Arbor Commercial Recycling Task Force Commercial Recycling Program Profiles. 08/09/06 http://74.6.239.67/search/cache?ei=UTF-8&p=Novia+Scotia+enforcement+of+disposal+bans&fr=yfp-t-501-s&u=www.recycle.com/AAC_0612e_programprofiles.pdf&w=novia+nova+scotia+enforcement+disposal+bans+ban%27s&d=TXRoPOLURuLm&icp=1&.intl=us

labor, carts, etc. the city would also mandate a revenue share back, where the revenues generated from the recyclables would be shared among the haulers and the government.

Recycling Rebate Program would be an element of the commercial recycling initiative offering additional support for businesses that exceed the limits of free commercial recycling provided by the government. For businesses to qualify for the rebate they would first need to submit an application to be registered into the rebate program and use the recycling services of a franchised hauler or waste management firm that is on a government approved list. The government approved list would consist of those haulers and waste management firms that have maintained compliance with the best practice standards of waste management and are registered in a government database. The government approved listing would be key in order to make sure that the service being provided to businesses comes with consultation on waste management and a waste audit that is provided to the government. These activities described would determine the rebate amount given based on the business's total waste diversion.⁴ The rebate would be paid on an annual basis using the same cycle period as the state income tax using April 15th as the end of the fiscal year for receipts and waste audits to be submitted.

Other specifics of the Commercial Recycling Programs would include:

1. Infrastructure/Facilities: For all the commercial recycling programs the existing infrastructure would be used to support the increase in the recycling rate.
2. Tonnage/Percentage Processed: The timeline of implementing the commercial recycling programs would happen in phases based on the area of Massachusetts. Eastern Massachusetts would be phased in first due to the higher percentage of business operations that have a negative environmental impact. Then Western Massachusetts would be phased in six months later to make it a complete state wide program. To align with the timeline the goal of the program would be to increase the commercial recycling rate by 10% in the first three years of the commercial recycling programs being state wide.¹
3. Employees/Jobs: Massachusetts should expect that some additional headcount would be required to support the programs whether part-time or full time. In general when recyclables are sorted and processed that creates 10 jobs for every 10,000 tons of material¹. For the franchised haulers and private recycling firms they may need to add additional headcount to increase their work capacity, but that is all dependent on the business the companies are able to acquire. For instance if a hauler/recycling firm can acquire ten new accounts that may accumulate 1,000 tons then additional an headcount may be required. On the part of the government, the waste ban would call for trained staff to ensure proper enforcement of the ban, and recycling rebate program would have administrative duties tied to it to maintain and manage the progress of businesses qualifying for a rebate. The administrative duties could create as least two full time positions managing the eastern and the western regions of Massachusetts.
4. Operating Costs: The cost to the government for the free commercial recycling program would include the carts being provided to businesses at a cost of about

⁴San Francisco Commercial Collection Overview. Norcal Waste Systems, Inc, <http://www.sfreycling.com/commercial/index.php?t=b>

\$582.36 for each cart ⁵and for the recycling rebate program it would include the rebates offered to businesses based on their total waste diversion.

To estimate the size of the rebate cost structure, we examined what a business' monthly pricing for commercial recycling might look like. On the low end, a low collection/low disposal of a one-cubic yard bin is \$34.40/month adding up to \$412.80 for the year. On the high end of that a high collection cost/medium disposal cost of an eight-cubic yard bin is \$306.16/month adding up to \$3673.92 for the year. The medium to larger businesses would typically exceed the two 96 gallons of recycling offered by the government and could fall anywhere in between this spending range.⁶

To make the rebate an appealing incentive the government should offer a rebate for 5-40% of the cost to the business based on their total waste diversion and that cost could range from \$20.64 - \$734.79. This rebate should be funded by the government whether it is through a waste management budget or a government grant for waste management initiatives. Again, this is where the waste audits from the government approved list of waste management firms would be used to help validate the amount of a business's total waste is being diverted through recycling. To be in alignment with the push towards commercial recycling, waste management and recycling companies should be encouraged to (1) reduce the cost for recycling and (2) increase the cost for waste disposal.

5. Revenue: For the commercial recycling where private haulers are involved in the labor of collection, there would be a revenue share back so that the haulers and the government would share the revenue generated from the recyclables. Additionally the government would earn revenue from the citations, but it is expected that both the revenue share back and the revenue from citation would go towards covering the costs incurred by the government. For the rebate programs, increased revenues could be generated by those franchised haulers and private recycling firms that benefit from their increased business resulting from the rebate program.

B. Composting

Households are usually not in the habit of recycling their organic waste (food scraps) but the right education programs can help to change that behavior. **Green Cart Recycling** would be a program that can leverage the existing free recycling of bottles, cans and paper and also recycle organic waste in a green cart through curbside pick up. Greens recycling carts would be provided by the government just as the blue recycling carts are. Residents would be able to start collecting their organic waste throughout the week just as they do their dry recyclables and could simply recycle them using curbside service already provided for the dry recyclables. The goal is that Green Cart Recycling program would make it easier and more convenient for residents to start recycling their organic waste⁷ and could increase composting by 5% in the first two years of the program.

⁵ Betty Mills Recycling Containers.

http://www.bettymills.com/shop/super_category/list/super_category/Recycling%20Containers.html?qclid=CKiv8v66o5cCFQECGgodljb-lw

⁶ Cost of Commercial Recycling Collection. Steven, Barbara. <http://www.p2pays.org/ref/03/02927.pdf>

⁷ San Francisco Curbside Recycling Program Overview. Norcal Waste Systems, Inc. <http://www.sfrecycling.com/residential/index.php?t=r>

Home Composting Programs is one of the least expensive ways to manage organic waste so Massachusetts would continue to offer home composting workshops and demonstrations, where participants may obtain composting bins at a discounted price.⁸ To improve the efficacy of the workshops and demonstrations Massachusetts already offers it would have to increase its outreach and education on the benefits of composting along with how easy it is to do. The recommendation is for Massachusetts to sponsor a small campaign in areas where composting would be the most useful, particularly in the more rural areas of Massachusetts.

The **Massachusetts Composting Partnership** would be a commercial recycling program that would need to be funded by \$1 million state grant during a two year trial period in Massachusetts. It would target the rural areas of Massachusetts to serve restaurants, grocery stores, and schools in helping them recycle their food waste. Some key target towns would be Concord, Stow and Maynard. The food waste recycling would not be entirely free but there would be an incentive period when implementing the program to maximize buy-in and participation early on. During the incentive period participating schools would receive free hauling and tipping fees until the end of the school year and businesses would have free hauling and tipping fees for 3 months both paid for by the grant funding. In both cases the city would work with the schools and the businesses to renegotiate their trash contract by doing a waste management cost assessment and by collecting data on the weight of food scraps diverted during the trial period.

After the incentive period fees would be in effect for recycling the food waste. The cost provided below reflects the numbers in a similar trial period implemented by Vermont. Note that Vermont is currently re-evaluating their cost structure as it is too low; the data has shown that the price charged does not reflect the true costs incurred of taking on commercial composting.⁹

<u>Large Generators</u>	<u>Small Generators</u>
■ \$6/tote	\$2.50/tote
■ \$10/pick up	\$5/pick up
■ \$1 rental fee/tote	\$1 rental fee/tote
■ \$30 tipping fee/ton	\$30 tipping fee/ton

Aside from the incentive period the program would also provide:

- 4 gallon buckets for collecting the food waste
- Carts to transport the 4 gallon buckets
- 48 gallon totes with lids and wheels for storing the food scraps
- Signage and training for the kitchen and maintenance staff

Businesses could also look forward to the good publicity resulting from the program with promotions, press releases, ads in the local publication, and window stickers identifying the business as a participant of the Massachusetts Composting Partnership.¹⁰

While the cost of the programs is funded by the grant, the goal after the two year trial would be to do some analysis on the cost structure of the program to make it competitive yet profitable. At that time, it is recommended that a commercial hauler take over the collection of the food waste that is initially handled by the city. Due to the distance

⁸ Massachusetts Network of Home Composters Workshops & Demonstrations. <http://www.mass.gov/dep/recycle/enforcement/comwkshp.htm>

⁹ Interview: Donna Barlow Casey. Executive Director of Central Vermont Solid Waste Management District

¹⁰Northern Vermont Composting Partnership. Highfields Institute. <http://www.highfieldsinstitute.org/programs.htm>

between the waste generators and the facilities there would be several destinations for the material with the goal of never having to drive more than 20 minutes from generator to facility. The destinations would be the receiving facilities and would include local farmers and non-profit organizations. In the case of the farmers, dairy farms are required by law to manage their manure. For farmers, a more cost effective way would be to compost it instead of paying for its disposal. In serving as a receiving facility these dairy farms and other farms that prefer to do their own composting would charge the waste generators a tipping fee of \$30-\$35/ton to accept their waste. Other receiving facilities include non-profit organizations, which use the waste to provide composting materials and demonstrations to local farmers and other facilities looking to learn.

Other specifics of the Commercial Recycling Programs would include:

1. Infrastructure/Facilities: While many facilities exist, the capacity of each may not be sufficient to support increased composting. It is recommended that each of the four regions of Massachusetts build an infrastructure of facilities that can process from 5 - 15 tons/week¹¹. Considering the costs, the government should encourage the private sector to take on the task of building the needed infrastructure for composting. This would include offering government contracts and tax incentives to those in the private sector willing to take on the task.

Active Compost Sites by MassDEP Region and Site Type¹²

MassDEP Region

	Central	Northeast	Southeast	Western	TOTAL
Municipal	36	42	59	36	173
Private	2	1	0	0	3
Commercial	6	7	13	5	31
State	0	0	1	1	2
Federal	0	1	0	1	2
Agricultural	2	2	1	2	7
TOTAL	46	53	74	45	218

2. Tonnage/Percentage Processed: The goal for the Western Massachusetts Composting Partnership Program would be to divert 200 tons a year¹⁰. If the needed infrastructure was built in the other regions it would allow the composting program to expand diverting more waste from the landfills.
3. Employees/Jobs: There would be a number of jobs created with all the composting programs. Generally, four jobs would be created for every 10,000 tons of material being composted⁵. There would need to be sufficient staff to train and facilitate demonstrations that provide training to the businesses and the residents that participate in the Home Composting Program and the Massachusetts Composting

¹¹ Interview: Tom Gilbert. Highfields Institute

¹² Active Compost Sites. Massachusetts Department of Environmental Protection, Bureau of Waste Prevention. July 2007

Partnership. There would also be a need for some additional headcount of drivers for the collecting the waste.

4. Operating Costs: Outside of all the new jobs that would be created with the composting programs the government should plan to invest \$50K - \$200K. This estimate includes obtaining the permits, building the site with the physical infrastructure, containers and signage, program design, marketing and education, implementation and hauling. This estimates does not include the additional costs of trucks, processing the material and administrative jobs that would still need to be considered.¹¹

5. Revenue: According to the chart of active compost sites many of them are owned and operated by the city. This would allow cities the opportunity to process the compost being recycled and sell it in the secondary markets that exist to offset some of the cost of implementing the composting programs. The price charged for finished compost ranges anywhere from \$6 - \$35 per cubic yard ¹³ and could be sold back to farms especially in the western and the southeast areas of Massachusetts. If The Massachusetts Composting Partnership were to meet its goal and generate 200 tons/year it could generate enough compost to make 1,920 ponds of nitrogen able to fertilize roughly 9 acres of mixed vegetables, and 30 tons of organic matter for soil building each year. The local farmers being used as receiving facilities have an opportunity for two streams of revenue, (1) from the tipping fee paid by the generator and (2) from selling the compost and/or animal feed processed. Yard waste can be processed into mulch and used for city landscaping projects for the city as well as being sold to businesses in the area. For the home and backyard composting programs implemented they offer a cost saving benefit in the diversion of organic waste from landfills. On an average the government will spend \$12/ton on organic materials composted at home to educate the public and promote the program, there will be an average savings of \$23/ton in reduced collection costs and \$32/ton in reduced disposal fees, which all amounts to about a \$43 net benefit from home/backyard composting.¹⁴

C. Producer Stewardship

Producer responsibility is a way of holding manufactures accountable for the hard to recycle products they produce. Shifting the responsibility of disposal to the producers and manufactures forces them to think about the entire life cycle of their products from the raw materials that go into the product to the packaging. For Massachusetts it is recommended that it starts with electronics using an E-Cycle program that mimics the one implemented in Washington. E-cycle would be a program that offers free electronics recycling in Massachusetts that is paid for by the manufacturers of the products. Its goal would be to increase the safe and proper recycling of hard to recycle electronics while shifting the burden onto the producers of the product. Due to the economies of scale needed for this initiative it would be implemented at a state wide level. For manufacturers to sell their products in Massachusetts the initiative would require them to (1) put on permanently affixed labeling on products that attribute the product to the manufacturer and (2) register to be on a Manufacturers Registration List, which lists manufacturers who are compliant or

¹³Cost Components of Alternative Methods.

http://www.oznet.ksu.edu/swr/Module4/Cost_Components_of_Aalternatives.htm

¹⁴ Community Backyard Composting Programs. Rhonda Sherman-Huntoon. North Carolina Cooperative Extension Service

pending compliance. For retailers the responsibility would fall on them to (1) only sell electronic products that are on the Manufacturers Registered List, (2) provide consumers with information on how and where they can recycle their purchased electronics, and (3) make sure they are also registered manufacturers if they also act as manufactures of electronics.¹⁵

Other specifics of the Commercial Recycling Programs would include:

1. Cost to Producer: The estimated cost (based on Washington's figures) of administering the program on a state wide level is \$223,715. Cost would be incurred by the manufacturers on a scale basis where the more electronics a manufacture sold in the state the more of the cost they would incur.
2. Cost to State: The state carries no real cost for the E-Cycle program, all the cost would be incurred by the manufacturers. This shifts the burden from consumers that may have been paying a fee to recycle their hard to free recycle electronics.
3. Efficacy: The structure of the program increases the efficacy of it for a few reasons. For one, manufacturers are required to participate in the program if they plan to sell their products in the state. In addition, the state wide program offers standardization and economies of scale that provides other states the opportunity to leverage the program by using the same Manufacturers Registered List and processes.

D. Residue Land filling

1. Number of Facilities: Even though 17 operating landfills have reported a 2.5 million ton capacity, it is recommended that Massachusetts not increase its capacity by creating landfills. Massachusetts should work with the landfilling infrastructure it currently has, with the goal to reduce the use of landfilling with the implementation of recycling and composting programs.
2. Cost of operation: As the infrastructure would remain the same and there would be initiatives in place to reduce the use of landfills it is expected that the cost of operation would decrease.

V. Conclusions

In the initial stages of moving towards Zero Waste, Massachusetts should be ready to invest at minimum of \$3M on a state wide level to: ramp up the infrastructure and the workforce needed, raise awareness and education, and change behavior. Early on Massachusetts should be looking for ways to have the private and public sector share in the responsibilities of moving towards Zero Waste, and that can take the form of trash taxes and recycling fees. This would also mean that they share in the benefits as well with revenue sharebacks, job creation, tax incentives, and a cleaner healthier environment.

There is no clear cut formula on the results to expect from recycling programs, but all newly implemented programs should be tracked and evaluated every two years to measure its cost benefit. In the short term, the data may show that the costs outweigh the benefits, but in

¹⁵ E-Cycle Washington. Washington State Department of Ecology.
<http://www.ecy.wa.gov/programs/swfa/eproductrecycle/index.html>

gathering the data Massachusetts can track “benefits realization” and make adjustments to the cost structure, frequency, or scale of an initiative. Benefits to look for both in the short and long term include the cost savings of not having to export 4.1 million tons of waste out of state and the creation of secondary markets for waste turned to resources. There is also a lot to look forward to in job production as an already healthy recycling economy with 1,437 recycling businesses, 19,500 recycling jobs, and \$557M in annual payroll will only grow with the push of Zero Waste. Ten times more jobs will be created in sorting and processing materials versus disposing of them, and companies who use recycled materials in their new products will employ even more people at high wages than the typical sorting and processing company.¹⁶ Overall, the benefits in the long term will come to outweigh the costs but to get there Massachusetts just needs collaboration, commitment and innovation from the private sector, the public sector and interested non-profits

¹⁶ The Massachusetts Recycling Economy. Massachusetts Department of Environmental Protection