Solid Waste Master Plan: 2006 Revision

June 2006

Commonwealth of Massachusetts
Executive Office of Environmental Affairs
Department of Environmental Protection

EXECUTIVE SUMMARY

The *2006 Plan Revision* updates the Commonwealth's policies and strategies for managing solid waste through 2010, to the extent that solid waste management is regulated or can be influenced by the Massachusetts Department of Environmental Protection (MassDEP) or Executive Office of Environmental Affairs (EOEA). This revision maintains the overall goals and strategies of the *Beyond 2000 Solid Waste Master Plan (Beyond 2000 Plan*), while placing increased emphasis on expanding and targeting waste ban compliance and enforcement, leveraging resources and building partnerships, building cost-effective programs, and prioritizing materials and sectors where the greatest amount of waste reduction can be achieved.

Since the *Beyond 2000 Plan* was published in December 2000, (MassDEP), municipalities, citizens, businesses, and solid waste service providers have achieved significant accomplishments in reducing waste and furthering sustainable solid waste management, including:

- increasing Massachusetts' overall waste reduction rate from 53% in 1999 to 60% in 2004;
- reducing total disposal by 2% from 1999 to 2004, offsetting growing disposal rates during the 1990s;
- increasing the number of municipal Pay-As-You-Throw (PAYT) programs from 94 at the start of 2000 to 116 in 2004 and increasing the population served by PAYT programs by 30 percent;
- helping to establish a Supermarket Organics Recycling Network with nearly 60 participating stores, which have diverted between 60 and 75 percent of their waste and saved an average of $45,000 per store; and
- promulgating revised Site Assignment regulations and revised Solid Waste Permitting regulations to improve facility operations and oversight.

At the same time, changes in the solid waste management landscape and in state and local government budgets have created a mix of new challenges and opportunities that have prompted MassDEP to review the goals, policies, and strategies of the *Beyond 2000 Plan*. The *2006 Plan Revision* addresses a number of key trends and challenges in solid waste management, including a changing fiscal climate, new projections for waste export, expansion of construction and demolition (C&D) processing capacity, strong recycling markets, and a new focus on public-private partnerships. To address these trends and challenges, MassDEP has developed a range of new and innovative waste reduction strategies, including expanding public-private partnerships, cost minimization tactics, and a combination of targeted grants and enforcement that will enable Massachusetts to continue to make progress towards our waste reduction goals.

Waste Reduction Goals and Strategies

In the *Beyond 2000 Plan*, MassDEP established a vision to dispose of the "irreducible minimum" amount of waste through waste reduction efforts. MassDEP remains committed to the aggressive waste reduction goals established in the *Beyond 2000 Plan* and believes continued progress can be made in reducing waste by working in close partnership with a wide range of stakeholders. Therefore, MassDEP has maintained the 70 percent waste reduction goal by 2010 established in the *Beyond 2000 Plan*. MassDEP believes that a waste reduction goal that measures source reduction and recycling is a better measure than recycling alone; however, MassDEP has found that a recycling goal is simpler and easier to explain. Therefore, MassDEP also has established a recycling goal of 56 percent, eight percentage points above the 2004 recycling rate.

While MassDEP's overall vision and goals for solid waste have not changed, MassDEP and other stakeholders recognize that, at least for the immediate future, current funding and staffing levels require new and innovative waste reduction strategies that build on the successful initiatives of the past five years. At the same time, strong recycling markets present new opportunities to advance recycling through innovative partnerships that can both increase diversion and save money. The *2006 Plan Revision* establishes strategies that recognize these opportunities and seek to increase enforcement of existing regulatory requirements, build new partnerships, leverage resources from a wide range of stakeholders, increase efficiency, and reduce costs for businesses and municipalities. These strategies will emphasize the following:

- **Expand and Target Compliance and Enforcement** – MassDEP will use focused compliance and enforcement tools to increase waste reduction, targeting its resources on expanded waste ban enforcement and ensuring solid waste facilities operate safely.

- **Leverage Resources/Build Partnerships** – MassDEP will establish agreements and partnerships for reducing waste with product manufacturers, retailers, trade associations, and cities and towns; leverage matching grant contributions; seek additional funding sources; and coordinate with other state initiatives that can increase waste reduction.

- **Build Cost-Effective Programs Based on Recycling Market Opportunities** – Strong recycling markets provide excellent opportunities to reduce waste cost-effectively. Due to rapidly growing international markets, scrap paper is now the number one American export by volume, and exports of U. S. scrap of all kinds grew to $8.4 billion last year, more than double the 1999 total. This strong international demand has raised payments for recycled paper to between $80 and $120 per ton and has created a recycled paper supply shortage for American paper mills[1]. However, plenty of paper remains in the waste stream and, by not recycling, Massachusetts businesses and residents are literally throwing money away. An estimated 1.5 million tons of paper[2], with an estimated value

[1] Industry News: U.S. Paper Recycling Reaches a Record High, Source: Knight Ridder Washington Bureau, February 9, 2005.
[2] Waste Reduction Program Assessment and Analysis for Massachusetts, Tellus Institute, December 2002.

of more than $100 million[3], is thrown away each year by Massachusetts residents and businesses. Similar market dynamics exist for other recyclable commodities. While recycling markets are cyclical and could decline in the future, generators that reduce the amount of waste disposed can still save money through avoided disposal fees, which are typically $60-80 per ton in Massachusetts. MassDEP will provide hands-on technical assistance to municipalities and businesses that emphasizes waste reduction initiatives that save money such as Pay-As-You-Throw, improved recycling and solid waste contracting, increased participation in existing programs, and regional program coordination.

- **Focus On Priority Materials/Sectors** – In 2002, the Tellus Institute assessed potential additional waste reduction by waste sector and material category in Massachusetts, providing valuable guidance for targeting program efforts[4]. MassDEP will focus efforts on those waste streams with the greatest additional diversion potential and benefits, including:

  - **Commercial Municipal Solid Waste (MSW): organics (especially food waste) and paper and cardboard –** These materials have a combined additional annual waste reduction potential of more than 1.6 million tons, representing more than 75% of the total additional commercial waste reduction potential of 2.2 million tons per year. Both of these streams have the potential to be recycled or composted cost-effectively well beyond existing levels.
  - **Residential MSW: organics (leaves, yard waste and food waste) and paper (including cardboard) –** These materials have a combined additional annual waste reduction potential of more than 1.1 million tons, representing more than 75% of the total additional residential waste reduction potential of 1.5 million tons per year. Both of these streams, especially paper, have the potential to be recycled or composted cost-effectively well beyond existing levels.
  - **C&D: wood, asphalt shingles, and gypsum wallboard** –Wood and asphalt shingles represent the largest un-diverted portion of C&D waste, as asphalt, brick, and concrete (ABC) are recycled at a very high rate. Excluding ABC, remaining C&D materials are only recycled at a 10 percent rate. Recycling gypsum wallboard will reduce hydrogen sulfide odors at landfills and landfill closure projects[5].

The *Beyond 2000 Plan* established a goal to "Substantially reduce the use and toxicity of hazardous products and provide convenient collection services to all residents and very small quantity hazardous waste generators." MassDEP has had success in helping to clean out chemicals in schools and encourage increased collection of hazardous household products, but much remains to be done to reduce the toxicity of the waste stream. Reducing the toxicity of the waste stream poses different challenges than other waste reduction programs. Unlike recycling

[3] "It's Time to Be Proactive: Let's Use Our Regional Strengths", presentation by Pete Grogan, Weyerhauser, NERC Fall Conference, October 27, 2004.

[4] Figures cited for additional diversion potential throughout this report are based on *Waste Reduction Program Assessment and Analysis for Massachusetts*, prepared for MassDEP in December 2002, by the Tellus Institute.

[5] Although wood, shingles, and wallboard will be targeted for increased diversion, much of the projected tonnage increase in C&D recycling is expected to come from recycling increased amounts of asphalt, brick, and concrete (ABC) due to increased generation of those materials.

programs, which have the potential to help cities and towns save money, running hazardous product collection programs typically costs cities and towns money and some towns have eliminated or reduced their hazardous products collection programs in recent years. While some manufacturers have taken steps to reduce the toxicity of their products or established limited collection programs, these initial efforts need to be encouraged.

MassDEP has maintained the toxicity reduction goal laid out in the *Beyond 2000 Plan* as a long-term goal. MassDEP's immediate priority is to help maintain existing local and regional hazardous product collection programs and facilities, while making further progress in specific target areas such as mercury-containing products. MassDEP will seek to maximize sharing of reciprocal collection program access among nearby municipalities through regional agreements. MassDEP also will partner with other state agencies and manufacturers to reduce the toxicity of products entering the waste stream through a combination of voluntary partnerships, education and, where possible, regulatory and statutory initiatives.

Waste Management Capacity

In 2003, MassDEP changed the way it projects waste management capacity. Instead of showing a single set of values for projected in-state capacity and net export, MassDEP now projects a range based on two scenarios; one assuming the recycling rate would remain flat and the other assuming the recycling rate would grow to meet the 2010 milestone. These projections show projected net export of between 1.0 million and 2.1 million tons by 2010 and between 1.9 million and 3.0 million tons by 2012.

Massachusetts has sought to maintain enough solid waste management capacity to manage its own waste. However, due to various factors, including regional market conditions, Massachusetts has been a net exporter of waste for several years, and this trend is expected to continue.

In 2004, Massachusetts generated 14.1 million tons of waste, of which 12.5 million tons was managed through diversion (7.7 million tons) or in-state disposal (4.8 million tons), while 1.6 million tons was exported for disposal (on a net basis). Net export of waste represents final waste management capacity that is not available within Massachusetts.

The *Beyond 2000 Plan* established a policy goal of achieving no net import or export of solid waste by 2006. Under this policy, MassDEP would permit additional landfill disposal capacity up to, but not above, the amount of waste requiring disposal. Given planned landfill projects and projected recycling rates, it is clear that Massachusetts will not reach a no net import/export level in 2006. However, MassDEP believes that there are important benefits to striving towards a balanced waste management system, including cost savings from increased recycling, availability of local waste management options, and reduced reliance on fluctuating out-of-state disposal markets. Therefore, MassDEP will maintain a long-term goal of reaching no net import/export, but will not attach a milestone date to this goal. MassDEP will continue to assess and evaluate the Commonwealth's solid waste management needs, but will focus its resources on promoting waste reduction while relying on markets to ultimately guide disposal capacity decisions. MassDEP will place special emphasis on supporting the development of additional in-

state organics processing capacity, which can help businesses, cities and towns save money, reduce pressure on disposal capacity, create a valuable product, and support creation of additional jobs in Massachusetts.

Unless and until net export drops dramatically, MassDEP will no longer limit allocation of disposal capacity for new or expanded landfills. MassDEP will review all landfill proposals based solely on site assignment and permitting requirements.

MassDEP will maintain a moratorium on new municipal waste combustion capacity due to concerns about mercury emissions. Despite significant reductions in mercury emissions over the past several years, municipal waste combustion facilities continue to represent the largest in-state source of mercury emissions. MassDEP believes that further expanding municipal waste combustion capacity, which already represents nearly 50 percent of Massachusetts total disposal capacity and 65 percent of in-state disposal capacity, is inconsistent with EOEA's Zero Mercury Strategy and the New England Governors/Eastern Canadian Premiers Mercury Strategy.

Facility Oversight

Since the *Beyond 2000 Plan* was issued, MassDEP promulgated major revisions to the Site Assignment regulations (310 CMR 16.000) and the Solid Waste Facility Permitting regulations (310 CMR 19.000). MassDEP also has developed several guidance documents supporting these regulatory changes. These regulatory and policy initiatives maintain the policy framework established in the *Beyond 2000 Plan*.

MassDEP is continuing to develop approaches to effectively oversee solid waste facilities and materials management including:

- Developing guidance on addressing hydrogen sulfide emissions from landfills. MassDEP expects to complete this guidance in 2006.
- Improving oversight and tracking of landfill gas emissions from both active and inactive landfills.
- Ensuring waste ban compliance by waste haulers and generators, along with solid waste facilities.
- Implementing a policy signed in 2005 that eases the collection of sharps from home health care uses out of the recycling and trash streams

1. INTRODUCTION

2006 Solid Waste Master Plan Revisions

In December 2000, the Massachusetts Department of Environmental Protection (MassDEP) published the *Beyond 2000 Solid Waste Master Plan* (*Beyond 2000 Plan*.) To the extent that solid waste management is regulated or can be influenced by MassDEP and EOEA, this plan established a long-term vision, as well as specific policies and strategies, for how to manage the Commonwealth's solid waste from 2000 through 2010.

MassDEP committed to reviewing the *Beyond 2000 Plan* after several years of implementation and updating it as needed. MassDEP conducted this review in late 2004 / early 2005 and held several meetings with the Solid Waste Advisory Committee[6] and consulted with other interested stakeholders. This review affirmed the overall goals and framework of the *Beyond 2000 Plan*, but recognized that changes in the waste management system (including stagnant recycling rates, decreasing in-state disposal capacity, and cuts in state funding for waste reduction programs) as well as new waste reduction strategies and opportunities required revisions to the Plan to re-focus strategies for achieving the Plan's goal of 70% waste reduction by 2010. The *2006 Plan Revision* updates the strategies in the *Beyond 2000 Plan* to adjust to these recent changes and to take advantage of new opportunities and strategies.

In September 2005, MassDEP issued the Draft Solid Waste Master Plan Revision, held four public hearings, and accepted public comment until November 4, 2005. MassDEP made a number of revisions in the final *2006 Plan Revision* in response to public comments and prepared a Response to Comments document. Changes made in response to comments include refining and expanding initiatives to improve C&D materials management and updating program descriptions and recommendations. MassDEP also included new 2004 solid waste data in the final *2006 Plan Revision* and updated waste management capacity projections based on the 2004 data.

Background

Since the *Beyond 2000 Plan* was published, MassDEP, municipalities, citizens, businesses, and solid waste service providers achieved significant accomplishments in reducing waste and furthering sustainable solid waste management. Highlights of these accomplishments are found in three Progress Reports on the *Beyond 2000 Solid Waste Master Plan*, available on MassDEP's website at www.mass.gov/dep. From 1999 through 2004:

- Waste reduction (which is a measure of source reduction plus recycling) increased from 53 percent to 60 percent from 1999 to 2004[7].
- Recycling rates kept pace with an 11 percent increase in generation over this five-year period, at35 percent for MSW and 71 percent for C&D in 2004.

[6] Solid Waste Advisory Committee members are listed on DEP's website at www.mass.gov/dep
[7] The originally published waste reduction rate for 1999 was 51%; however, this rate has been updated based on updated Gross State Product data that is used to calculate the waste reduction rate.

- Total disposal dropped 2 percent from 1999 to 2004, from 6.5 million to 6.4 million tons.
- Net export for disposal has continued at about 1.5 million tons per year.

The *2006 Plan Revision* addresses a number of key trends in solid waste management:

Waste Export: Net export of waste for disposal is projected to continue throughout the remainder of this decade as in-state landfills fill up and limited new capacity comes on-line. Depending on recycling progress, net export is projected to be between 1.0 and 2.1 million tons by 2010 and between 1.9 and 3.0 million tons by 2012. As a result, Massachusetts will need to rely on the export of solid waste to meet its waste management needs.

Changes in Fiscal Conditions: Over the past several years, changing fiscal conditions in both state and municipal budgets have necessitated difficult budget cuts throughout state and local governments. Along with many other programs, recycling programs have seen their funding reduced, primarily in the area of municipal grants. The *2006 Plan Revision* includes a range of new and innovative strategies that target existing resources more effectively and leverage other resources wherever possible. MassDEP believes that these strategies will enable Massachusetts to continue to make progress towards these waste reduction goals.

C&D Processing Growth: Over the past five years, seven new construction and demolition (C&D) processing facilities have been built, adding approximately 800,000 tons of annual processing capacity in Massachusetts. Most of the material produced by these facilities is used at active and inactive landfills as daily cover and shaping and grading material. Although this use has helped to properly close and cap old unlined landfills, it also has resulted in odor and operational problems in a number of cases. MassDEP will focus on improving management of these materials while continuing to develop improved C&D end markets that are less dependent on landfills.

Organics Diversion Opportunities: Diversion of organics (e.g., food waste) has grown over the past several years and shows significant future potential. This growth is limited by a lack of in-state organics processing capacity, with a projected need of more than 380,000 tons per year by 2010 versus current permitted annual capacity of 130,000 tons. Because it is not cost-effective to transport food waste long distances, it will become increasingly important to develop local processing capacity to support increased diversion from large generators.

Strong Recycling Markets: Strong national and international markets for paper and other recyclables have created a supply shortage for paper mills and other companies that use recyclable commodities, increasing the value of recyclables.. Because of the strong long-term outlook for recycling markets combined with opportunities to lower disposal costs, which are typically $60-80 per ton in Massachusetts, many cities and towns and businesses can divert more materials and reduce their costs if they implement recycling programs efficiently.

Summary

MassDEP is committed to the aggressive waste reduction goals established in the *Beyond 2000 Plan* and believes continued progress can be made in reducing waste by working in close

partnership with a wide range of stakeholders. While MassDEP's overall vision and goals for solid waste have not changed, MassDEP and other stakeholders recognize that, at least for the immediate future, current funding and staffing levels require new waste reduction strategies that are less dependent on state funding. At the same time, strong recycling markets present new opportunities to advance recycling through innovative and efficient partnerships that can both increase diversion and save money. The *2006 Plan Revision* establishes strategies that recognize these trends and seek to increase enforcement of existing regulatory requirements, build new partnerships, leverage resources from a wide range of stakeholders, increase efficiency, and reduce costs for businesses and municipalities.

2. WASTE REDUCTION STRATEGY

2010 Waste Reduction and Recycling Rate Goals

MassDEP believes it is important to maintain an aggressive waste reduction goal to provide a clear focus for the Commonwealth's waste reduction strategies. Therefore, DEP has maintained the 70 percent waste reduction goal by 2010 established in the *Beyond 2000 Plan*.

MassDEP believes that a waste reduction goal that measures source reduction and recycling is a better measure than recycling alone; however, MassDEP has found that a recycling goal is simpler and easier to explain. Therefore, MassDEP has established a recycling sub-goal of 56 percent. MassDEP estimates that a 56 percent overall recycling rate, combined with expected source reduction, will meet the 70 percent waste reduction goal. MassDEP estimates that solid waste generation will be approximately 15.7 million tons in 2010. A 56 percent recycling goal would require 8.7 million tons of recycling in 2010, approximately 2.0 million tons more than the 6.7 million tons recycled in 2004.

2010 Toxicity Reduction Goals and Strategies

The *Beyond 2000 Plan* established a goal to "Substantially reduce the use and toxicity of hazardous products and provide convenient collection services to all residents and very small quantity hazardous waste generators." MassDEP has had success in helping to clean out chemicals in schools and encourage increased collection of hazardous household products, but much remains to be done to reduce the toxicity of the waste stream. Reducing the toxicity of the waste stream poses different challenges than other waste reduction programs. Unlike recycling programs, which have the potential to help cities and towns save money, running hazardous product collection programs typically costs cities and towns money and some towns have eliminated or reduced their hazardous products collection programs in recent years. Some manufacturers have taken steps to reduce the toxicity of their products or established limited collection programs, such as reducing lead in electronics and coated wire uses and holding pilot electronics collection events. These initial efforts need to be encouraged.

MassDEP will maintain the toxicity reduction goal laid out in the *Beyond 2000 Plan* as a long-term goal. Currently, an estimated 65 percent of residents live in communities with access to comprehensive, convenient programs, while other residents have access to somewhat less convenient collection opportunities. MassDEP's short-term priority is to help maintain existing local and regional hazardous product collection programs and facilities, while making further progress in specific target areas such as mercury containing products. MassDEP will seek to maximize sharing of reciprocal collection program access among nearby municipalities through regional agreements. MassDEP also will partner with other state agencies and manufacturers to reduce the toxicity of products entering the waste stream through a combination of voluntary partnerships and education.

Key Waste Reduction Strategies

MassDEP recognizes that different waste reduction strategies are necessary to respond to the challenges and opportunities presented by current trends in solid waste management. These strategies will emphasize the following:

- **Expand and Target Compliance and Enforcement** – MassDEP will use focused compliance and enforcement tools to increase waste reduction, by targeting its resources on waste ban enforcement and ensuring solid waste facilities operate safely.

- **Leverage Resources/Build Partnerships** – MassDEP will establish agreements and partnerships for reducing waste with product manufacturers, retailers, trade associations, and cities and towns; leverage matching grant contributions; seek additional funding sources; and coordinate with other state initiatives that can increase waste reduction.

- **Build Cost-Effective Programs Based on Recycling Market Opportunities** – Strong recycling markets provide excellent opportunities to reduce waste cost-effectively. Due to rapidly growing international markets, scrap paper is now the number one American export by volume, and exports of U.S. scrap of all kinds grew to $8.4 billion last year, more than double the 1999 total. This strong international demand has raised payments for recycled paper between $80 and $120 per ton and created a recycled paper supply shortage for American paper mills[8]. However, plenty of paper remains in the waste stream and, by not recycling, Massachusetts businesses and residents are literally throwing money away. An estimated 1.5 million tons of paper[9], with an estimated value of more than $100 million[10], is thrown away each year by Massachusetts residents and businesses. Similar market dynamics exist for other recyclable commodities. While recycling markets are cyclical and could decline in the future, generators can still save money through recycling, composting, and reducing waste through avoided disposal fees, which are typically $60-80 per ton in Massachusetts, if not higher. MassDEP will provide hands-on technical assistance to municipalities and businesses that emphasizes waste reduction initiatives that save money such as Pay-As-You-Throw, improved recycling and solid waste contracting, increased participation in existing programs, and regional program coordination.

- **Focus On Priority Materials/Sectors** – In 2002, the Tellus Institute assessed potential additional waste reduction by waste sector and material category in Massachusetts, providing valuable guidance for targeting program efforts. MassDEP will focus efforts on waste streams with the greatest additional diversion potential and benefits, including:
  - **Commercial Municipal Solid Waste (MSW): organics (especially food waste) paper, and cardboard –** These materials have a combined additional annual waste

[8] Industry News: U.S. Paper Recycling Reaches a Record High, Source: Knight Ridder Washington Bureau, February 09, 2005.
[9] Waste Reduction Program Assessment and Analysis for Massachusetts, Tellus Institute, December 2002.
[10] "It's Time to Be Proactive: Let's Use Our Regional Strengths", presentation by Pete Grogan, Weyerhauser, NERC Fall Conference, October 27, 2004.

reduction potential of more than 1.6 million tons[11], representing more than 75 % of the total additional commercial waste reduction potential of 2.2 million tons per year. Both of these streams have the potential to be recycled or composted cost-effectively well beyond existing levels.

- **Residential MSW: organics (leaves, yard waste and food waste) and paper (including cardboard) –** These materials have a combined additional annual waste reduction potential of more than 1.1 million tons, representing more than 75 % of the total additional residential waste reduction potential of 1.5 million tons per year. Both of these streams, especially paper, have the potential to be recycled or composted cost-effectively well beyond existing levels.
- **C&D: wood, asphalt shingles, and gypsum wallboard** – Wood and asphalt shingles represent the largest un-diverted portion of C&D waste, as asphalt, brick, and concrete (ABC) are recycled at a very high rate. Excluding ABC, remaining C&D materials are only recycled at a 10 percent rate. Therefore, MassDEP's efforts will focus on these other materials, particularly wood, gypsum wallboard, and asphalt shingles. Improving management of gypsum wallboard is a priority as gypsum has been identified as the primary factor causing hydrogen sulfide generation from C&D fines and residuals used for landfill daily cover and as grading and shaping material at landfill closure projects[12].

Throughout the remainder of this section, strategies for each program area are grouped in three categories:

- **New:** Initiatives that were not included in the *Beyond 2000 Plan.* In some cases, these initiatives are entirely new; in other cases, they began within the past several years.
- **Revised/Expanded:** Initiatives that have been or are being significantly changed since the *Beyond 2000 Plan.*
- **Continued:** Initiatives in the *Beyond 2000 Plan* that MassDEP is maintaining as they are.

Commercial Waste Reduction Strategy

MassDEP will focus its commercial waste reduction programs on increasing diversion of paper and organic wastes – especially food waste. MassDEP estimates that more than 1.6 million additional tons of these materials could be cost-effectively diverted from disposal annually by 2010. This increased diversion will require a combination of strong partnerships and new enforcement strategies to be effective. Strategies by material category are summarized below, followed by a description of each of the specific elements of MassDEP's commercial waste reduction strategy.

Paper: Paper materials make up nearly 40 percent of commercial waste disposal, and even more of potential additional commercial waste reduction. A strong regional, national, and international recycling infrastructure is already in place for paper. Increased amounts of post-

[11] Additional waste reduction potential includes recycling, composting, and source reduction.
[12] Although wood, shingles, and wallboard will be targeted for increased diversion, much of the projected tonnage increase in C&D recycling is expected to come from recycling increased amounts of asphalt, brick and concrete (ABC) due to increased generation of those materials.

consumer paper and cardboard are needed to meet increasing levels of industry demand. As a result, markets for all grades of paper have a very strong long-term outlook. MassDEP believes that Massachusetts businesses and institutions, especially small to medium-sized businesses, can significantly increase paper recycling, and that a mix of assistance, partnerships, and enforcement can help spur on this increased recycling, save businesses money, and support Massachusetts' paper recycling and manufacturing industries.

Food Waste and Other Organics: Food waste and other organics make up nearly 30 percent of commercial waste disposal, and even more of potential additional commercial waste reduction. The picture for food waste is much different than paper. Massachusetts has a limited infrastructure for hauling and processing food waste. MassDEP estimates that more than 1.1 million tons of commercial and institutional food waste will be generated annually in Massachusetts by 2010, with less than 10 percent currently diverted. MassDEP believes that Massachusetts can achieve a 34 percent diversion rate for this material, or 380,000 tons per year, by 2010. However, only 130,000 tons of annual food waste processing capacity is currently permitted in Massachusetts, leaving a gap of at least 250,000 tons statewide. Establishing in-state food waste processing capacity is critical because this material cannot be cost-effectively transported long distances. Like most solid waste management capacity, food waste processing capacity has been difficult to site due in large part to objections from communities about potential traffic, noise, and odor impacts.

MassDEP's strategy for increasing food waste diversion will focus on simultaneously building the Commonwealth's processing and hauling infrastructure and working with targeted groups of commercial and institutional generators that generate the most food waste and have the best opportunity to cost-effectively divert food waste from disposal. These sectors include supermarkets, hospitals and other health care facilities, hotels and convention centers, colleges and universities, and state institutions such as prisons.

Commercial Waste Reduction Initiatives

<u>NEW</u>

- **Enforce Waste Bans Comprehensively and Equitably:** MassDEP will ensure that waste haulers and generators, as well as solid waste facilities, are in compliance with the waste bans. Under the waste ban regulations, no person is allowed to dispose or contract for disposal of restricted materials. Along with solid waste facilities, waste haulers and generators have a shared responsibility to comply with waste bans and avoid the disposal of restricted materials. MassDEP plans to continue to conduct waste ban inspections at solid waste facilities. Now these inspections will also evaluate whether waste haulers and generators are bringing in banned materials for disposal. When haulers and generators of failed loads can be identified, MassDEP will pursue enforcement against those entities. Although MassDEP does not expect to conduct waste ban inspections at generator or hauler locations at this time, MassDEP may choose to evaluate compliance at these locations in the future.

- **Expand Organics Processing Capacity**: Work with farms, cities, and towns and large institutions to expand organics processing capacity in Massachusetts, including:

    - Work with interested cities and towns with well-run composting operations to expand those sites to accept food waste from local food waste generators, and
    - Work with large institutions to develop increased on-site composting capacity. MassDEP will work closely with existing and new facility operators through a combination of outreach and technical assistance to expand organics processing capacity and ensure that composting operations are well run and do not create odor or other nuisance concerns.

- **WasteWise Partnership with EPA:** MassDEP recently established the first state WasteWise partnership with EPA, leveraging additional resources to support and recognize Massachusetts business and institutional recycling programs. This WasteWise Partnership will be used to support MassDEP's other targeted initiatives to increase commercial waste reduction, especially for medium and large businesses. As with other commercial waste reduction efforts, MassDEP will consider emphasizing those business sectors with the greatest additional diversion potential.

- **Continue Resource Management Contracting:** MassDEP will continue to support the development of Resource Management (RM) Contracting models for businesses and institutions. Through RM contracting, both the generator and the hauler share incentives for reducing waste, increasing recycling, and saving money. A recent one-year pilot project at Shattuck Hospital was successful in saving $11,000 annually by reducing disposal by 11 percent and more than tripling recycling and other diversion.

- **Surplus Office Equipment Reuse:** MassDEP will continue to work with the state's Operational Services Division, other state agencies, cities and towns, and other institutions to arrange exchanges of surplus office equipment, saving money for both parties while avoiding sending surplus, still usable office equipment for disposal. This will include developing a user-friendly website for state agencies and others seeking surplus equipment.

<u>REVISED/EXPANDED</u>

- **Expand Supermarket Partnership:** MassDEP will continue an innovative partnership with major supermarket chains, the Massachusetts Food Association (MFA), and haulers and compost facilities to increase supermarket composting and recycling. Major elements of this partnership include:
    - A memorandum of understanding (MOU) between MassDEP, the MFA, and major supermarket chains to establish program and performance standards for supermarket recycling and composting programs. This MOU exempts participating supermarkets from waste ban inspections, similar to exemptions for municipalities with Department Approved Recycling Program (DARP) status.
    - Hands-on technical assistance to supermarkets from leading industry consultants to help them establish and maintain effective diversion programs.

Build Other Business Partnerships: MassDEP will seek to develop similar partnerships with other business sectors that have high levels of potential additional diversion. Hospitals and other health care service providers are strong candidates since they dispose of large amounts of paper in particular[13]. MassDEP has joined Hospitals for a Healthy Environment (H2E) as a "Champion for Change". MassDEP will work in partnership with H2E as well as the Massachusetts Hospital Association on promoting waste and toxicity reduction. MassDEP will provide technical assistance to hospitals and other healthcare facilities to implement expanded waste reduction programs.

CONTINUED

- **Continue Facility Waste Ban Enforcement:** MassDEP will continue to maintain a presence at solid waste facilities to ensure that they are properly implementing their waste ban compliance plans. MassDEP will check waste ban compliance as a routine part of all solid waste facility inspections and also will conduct targeted waste ban enforcement initiatives.

- **Explore Waste Ban for Commercial Food Waste:** As stated in the *Beyond 2000 Plan*, MassDEP will continue to consider adding commercial and institutional food waste as an item banned from disposal. As with other waste bans, this will be dependent on sufficient infrastructure being developed to handle commercial and institutional food waste. An extension of the waste bans to commercial food waste would require a regulatory change with public hearing and comment.

- **Support Municipal Recycling Programs for Small Businesses:** MassDEP recently worked with the Northeast Recycling Council (NERC) to establish a statewide database of business recycling programs sponsored or operated by municipalities. MassDEP's regional Municipal Assistance Coordinators will use this resource to support the development of new and expanded small business recycling programs in interested municipalities. Depending on contracting arrangements, cities and towns may be able to obtain revenue while reducing costs for their small businesses.

- **Recycling Market Development Assistance:** MassDEP's funding for recycling market development grant programs has been cut dramatically. In addition, the Chelsea Center for Recycling and Economic Development, which had provided assistance, resources, and funding to support companies that use recycled products, has closed. MassDEP remains committed to fostering recycling markets through a combination of awarding limited, targeted grants, building industry partnerships, and providing information and referrals to companies interested in using recycled feed-stocks to produce new products. Specific initiatives include:
    - Provide limited Recycling Industry Reimbursement Credit grants to support the use of target recyclable materials as feed-stocks for manufacturing processes. Target materials include organics and C&D materials.

[13] According to DEP's Commercial Waste Disposal Assessment published in 2000, the medical and health services sector disposes of more paper than any other single business sector in Massachusetts – 220,000 tons per year.

  - Provide low-interest loans from the Recycling Loan Fund, currently capitalized at $3.1 million, to enable recycling processors and manufacturers to obtain conventional financing to support facility expansions and development of new facilities.
  - Refer interested businesses to market development assistance, resources, and information available on MassDEP's market development web page and through other agencies.
  - Work with the Executive Office of Environmental Affairs and the Operational Services Division to establish recycled product purchasing mandates for state agencies, with an emphasis on compost and construction materials.

- **Business Outreach and Information:** MassDEP will rely on partnerships with WasteCap and the Earth's 911 recycling web site to provide recycling and composting information to businesses.

Residential Waste Reduction Strategy

Ninety percent of Massachusetts residents have access to convenient recycling collection programs. Due to strong recycling markets, MassDEP sees promising opportunities to work with cities and towns to capture significantly more material from existing recycling programs and to do so in a way that will make these programs more efficient and save municipalities money.

MassDEP's work to advance residential waste reduction will achieve the greatest tonnage increases from paper (all types of paper, including cardboard) and organics (yard waste and food waste). Together, these material categories represent more than 1.1 million tons of additional diversion potential, more than 75 percent of the additional diversion potential for residential waste. The strategies for these materials are summarized below, followed by a description of each of the elements of MassDEP's residential waste reduction strategy.

Paper: Massachusetts has a mature paper recycling infrastructure. International demand for waste paper is very strong and is expected to remain so for some time, driving up payments for paper recycling. These high paper values provide a powerful financial incentive for municipalities to increase paper recycling by increasing participation rates in existing programs. Such initiatives also will typically increase recycling of other materials in addition to paper, such as food and beverage containers. In addition to supporting increasing participation in existing programs, MassDEP will devote some resources to help municipalities maintain current recycling services and avoid backsliding and to expand programs to collect all types of paper for recycling. Because of the promising long-term market outlook for paper and other recyclables, MassDEP believes that increasing paper recycling (as well as recycling of many other materials) will be cost-effective for most municipal recycling programs.

Yard and Food Waste: Strategies to increase diversion of yard waste, either through home or municipal composting programs, will be similar to those for paper. In some cities and towns, there is a greater need to expand yard and food waste composting programs to make them more convenient for residents. In most cases, municipalities have established yard waste composting

programs, and the greatest increases will come from expanding collection services or increasing home composting bin distribution.

Residential food waste composting is not widely established and is primarily limited to home composting. While residential food waste could potentially be captured through programs that collect yard waste, Massachusetts' food waste processing infrastructure must become better established before widespread residential food waste collection programs can occur. MassDEP is seeking to make food waste collection and composting more cost effective by working with commercial and institutional food waste generators, haulers, and composting facilities to expand locally available composting infrastructure. Once this collection and processing system has become better established for commercial and institutional generators and made more efficient, MassDEP will work more closely with municipalities to develop residential food waste composting programs.

Residential Waste Reduction Initiatives

NEW

- **Municipal Recycling Savings Program:** MassDEP will conduct outreach to municipal officials and residents to highlight the cost savings opportunities from strong recycling markets. MassDEP will continue to provide municipalities with a combination of hands-on assistance, targeted grants and information to help them develop and implement recommended program options such as Pay-As-You-Throw, recycling set-out requirements, outreach and incentives, and improved contracting to maximize capture of recyclables and save money.

- **Pilot Municipal Collection and Efficiency Improvements:** MassDEP will work with interested cities and towns to pilot new strategies to increase capture rates and collection efficiencies of recycling collection programs, including providing larger or second bins, establishing targeted incentive programs, and exploring approaches for implementing local recycling requirements.

- **Support Municipal Mandatory Recycling Initiatives:** MassDEP will work with cities and towns that choose to establish mandatory recycling initiatives at the local level. Cities and towns have found that these initiatives are effective at increasing recycling and reducing disposal, thereby saving municipalities money. When supported by extensive outreach, these initiatives have been very effective. MassDEP's role will include supporting case studies and pilot projects, providing guidance and model requirements, and encouraging mandatory recycling through revised Department Approved Recycling Program (DARP) standards.

- **School Green Team:** MassDEP sponsors a school educational program called the Green Team, which provides fun and interactive ways for students and teachers to learn how to reduce, reuse, recycle and compost in their classrooms, schools, homes and communities. Participating classes receive educational materials, Certificates of Recognition and prizes.

Recycling equipment and a lending library of videos and curricula are also available to members.

- **Pilot Municipal Collection Improvements:** MassDEP will support pilot municipal programs to assess how new containers, equipment, and collection systems can increase diversion, particularly of paper, from existing programs.

REVISED/EXPANDED

- **Expand Pay-As-You-Throw:** At the end of 2004, 117 municipalities had adopted Pay-As-You-Throw (PAYT) programs, serving a population of about 1.3 million (about 20 percent of the state's population). MassDEP's goal is to expand PAYT programs so that more than 50 percent of Massachusetts residents will live in a community served by PAYT by 2010. To meet this goal, MassDEP will prioritize PAYT assistance to larger communities. Specific initiatives include:

    - Keep PAYT programs as MassDEP's top priority for limited municipal grants and technical assistance from MassDEP staff and regional assistance coordinators. MassDEP has dramatically increased this hands-on assistance over the past several years and will continue to do so.
    - Enhance PAYT outreach through MassDEP's web page, workshops for targeted audiences and geographic regions, coordination with the United States Environmental Protection Agency (U.S. EPA) Region 1, and outreach and assistance to individual municipalities and staff.

- **Regional Program Coordination and Technical Assistance:** MassDEP staff and the six regional Municipal Assistance Coordinators funded by MassDEP will continue to provide extensive hands-on assistance to cities and towns to improve their existing recycling and composting programs. This technical assistance is one of MassDEP's best tools for increasing residential waste reduction. The municipal coordinators will bring together groups of municipalities to develop cost-effective regional program solutions, as well as work with individual towns to improve their programs. Specific areas of emphasis will include:

    - Develop and implement PAYT programs.
    - Support development of more cost-effective regional contracts and service agreements for solid waste and recycling collection and processing, yard waste and brush grinding, hazardous products collection, and purchasing of recycling equipment; help municipalities increase their purchasing power and deliver services more cost-effectively.
    - Provide model recycling and trash service RFPs, recycling and hauler ordinances, and contracting assistance to enable municipalities to develop more effective recycling and trash contracts, which are critical for municipalities to be able to save money from increased recycling and composting.
    - Support local education and outreach initiatives to increase recycling participation.

- Consider funding other innovative technical assistance project requests, such as local zero waste projects.

- **Review Department Approved Recycling Program (DARP) Certifications:** MassDEP will review municipal DARP certifications to ensure that the incentives provided through DARP are working effectively. Particular focus will be placed on yard waste collection and composting programs.

- **Advance DARP Standards:** MassDEP extended the existing DARP recycling program standards through June 2006 to be consistent with the municipal fiscal year budget cycle, and issued new standards in January 2006 that will take effect in July 2006. Under DARP, participating municipalities that meet minimum recycling and composting criteria are exempt from waste ban inspections at disposal and transfer facilities. MassDEP has focused on criteria such as increasing the range of materials collected, PAYT, mandatory recycling, and other aggressive recycling participation programs that will increase diversion from existing programs and reduce disposal costs.

- **Springfield Materials Recycling Facility (MRF) Contract:** MassDEP has awarded a 10-year contract to Recycle America Alliance to operate the Springfield MRF (2005-2015, with a 5 year extension option). The contract was awarded through a competitive bid and provides approximately 90 contract municipalities with guaranteed recycling revenue of $15.67 per ton of recyclables delivered, and an additional share of material revenues when the index price of recyclables exceeds $40 per ton. MassDEP will continue to manage the operator's contract but has transferred responsibility for operating the weigh scales and maintaining the facility to the operator, thereby lowering MassDEP's costs.

<u>CONTINUED</u>

- **Recycling and Composting Equipment and Education:** In addition to PAYT, education and outreach are important to maintain and increase participation in recycling and composting programs. Wherever possible these efforts will be focused on priority material categories. Specific initiatives include:

  - Provide grants for educational materials and technical assistance, targeting these to municipalities with new PAYT programs and other municipalities making significant program changes.

  - Maintain state contracts for recycling, composting, and hazardous products materials, equipment, and services. Municipalities rely on these contracts as an efficient means of procuring needed equipment and services without having to go out to bid.
  - Reduce the cost of municipal grants for customized recycling education materials by reducing the size of mailers and exploring other options to reduce the cost of printing and mailing this information.

- Produce generic press releases for local use and disseminate through the regional Municipal Assistance Coordinators.
- Support the Earth's 911 web site to provide free local recycling information via the web.
- Partner with other state and regional solid waste and recycling associations such as MassRecycle, the Massachusetts Chapter of the Solid Waste Association of North America, the National Solid Waste Management Association, the Construction Materials Recycling Association, and the Northeast Resource Recycling Association to hold jointly-sponsored workshops and conferences.
- Solicit sponsors to offset the direct costs of workshops and conferences for municipal officials and recycling stakeholders.

- **Home Composting Programs:** Home composting programs save municipalities money by reducing the amount of trash they need to collect and dispose, and benefit residents who can produce compost for use on their lawns and gardens. MassDEP will continue to promote home composting through:
  - Home composting and healthy lawn and landscape workshops.
  - Targeted grants for home compost bins and kitchen food waste collection buckets.
  - Home composting exhibits and demonstrations at conferences, public events, and horticultural shows.
  - Distributing home composting literature, videos, and press releases to raise awareness of the benefits of home composting and how to compost.

- **Recycling Market Development/Product Stewardship:** The recycling market development strategies described above under the commercial waste reduction strategy will also support market development for priority residential wastestreams. Product stewardship approaches that increasingly involve manufacturers and retailers in managing products such as electronics after use can reduce recycling and disposal costs for cities and towns for these materials.

- **State and Municipal Purchasing Programs:** MassDEP will continue to work with the Operational Services Division and other state agencies to support State Sustainability initiatives for state agencies and provide cost-effective opportunities for municipalities and state agencies to buy recycled and environmentally preferable products. MassDEP will support recycled purchasing mandates for EOEA agencies, especially for compost and construction materials.

- **Expanded Bottle Bill:** MassDEP will continue to support passage of an expanded bottle bill to increase recycling of single-serve juice and water and other similar containers that are frequently consumed away from the home. MassDEP will seek to expand recycling programs at large public events and frequently used public venues, which would work well with an expanded bottle bill system.

- **Bottle Bill Administration:** MassDEP will continue to oversee ongoing coordination of the Commonwealth's bottle deposit law, including:

  - Assisting EOEA with bottle bill policy and regulatory development.
  - Handling questions and complaints from consumers, redemption centers, distributors, and retailers regarding bottle bill issues.
  - Overseeing redemption center registrations.
  - Tightening bottle bill enforcement against fraudulent redemption.
  - Awarding redemption center grants.

- **Electronics Infrastructure and Regional Programs:** Over the past five years, MassDEP has worked with municipalities to establish an extensive collection system for computer monitors that contain cathode ray tubes, as well as televisions and other computer equipment. That system serves most residents in Massachusetts and has received national recognition. MassDEP will continue to provide information and technical assistance to support these efforts, while supporting regional and legislative initiatives to improve electronics collection and recycling programs.

Construction and Demolition Debris Waste Reduction Strategy

The C&D recycling rate is already very high (71 percent in 2004), primarily because asphalt, brick, and concrete (ABC), which make up the bulk of C&D tonnage, is recycled at a very high rate. However, other C&D materials such as wood, asphalt shingles, and wallboard are only recycled at about a 17 percent rate.

Materials produced by C&D processors are primarily reused at landfills as fines for daily cover and residuals for grading and shaping purposes. These are relatively low value uses and have resulted in odor problems at a number of facilities, and also rely on landfill operations that are continually declining in Massachusetts. In the short term, MassDEP will work with C&D processors and landfill operators to improve the management of C&D fines and residuals at active and inactive landfills. At the same time and continuing in the long term, MassDEP will continue to stimulate additional market development to stimulate additional markets and uses for C&D materials that are not dependent on landfills. Fortunately, most C&D is generated by a relatively small group of companies, which makes it easier for MassDEP to target waste reduction initiatives. The strategies for reducing these material categories are summarized below, followed by a description of each of the elements of MassDEP's C&D waste reduction strategy.

Wood: MassDEP's strategy for increasing diversion of wood from disposal is centered on a disposal ban on wood, combined with technical assistance and partnerships to stimulate market development. The ban will take effect in July 2006 and has already stimulated C&D processing investments in Massachusetts. MassDEP will work with solid waste facilities to implement the ban and with the construction and demolition industry and other stakeholders to develop additional markets for C&D wood, particularly clean wood that can be separated at construction sites. MassDEP has approved Beneficial Use Determinations (BUDs) for materials that contain C&D wood, which may contain treated wood. These BUDs are for use of C&D fines as daily cover material and C&D residuals as grading and shaping material at landfills. The sampling and analytical requirements for these C&D fines and residuals include:

- Total RCRA 8 metals;
- Total petroleum hydrocarbons;
- Semi-volatile organic compounds;
- Volatile organic compounds;
- Loss on ignition, and
- asbestos.

MassDEP agrees that our goal should be to develop alternative uses for wood beyond landfill-dependent uses. However, in the interim there is a need for landfill-related uses. MassDEP believes that these current market outlets, along with future market development potential for wood, provide a suitable basis for including both "clean" and treated wood in the C&D ban.

Gypsum Wallboard: The primary concern with gypsum wallboard is that it can cause hydrogen sulfide generation and odors, particularly when ground up in fines or residuals and used as landfill cover or grading and shaping material. MassDEP will continue working with gypsum wallboard manufacturers on their commitment to develop recycling capacity for gypsum wallboard and with the construction industry to develop programs to recycle clean gypsum wallboard from construction sites. As markets develop for wallboard recycling, MassDEP will consider adding gypsum wallboard as an additional material under MassDEP's waste ban regulations. This would require regulatory revisions.

Asphalt Shingles: MassDEP will take a similar approach with shingles as with gypsum wallboard. MassDEP will work to stimulate the development of additional recycling markets and diversion opportunities in advance of potentially adding shingles to the list of waste ban materials. This would require regulatory revisions.

C&D Waste Reduction Initiatives

<u>NEW</u>

- **Publish Hydrogen Sulfide Landfill Guidance:** MassDEP will publish draft guidance on controlling hydrogen sulfide emissions from landfills and inactive landfill closures. MassDEP will accept public comment on this guidance prior to finalizing it. This will build on MassDEP's experience with addressing significant problems at several landfill closure projects over the past several years.

- **Improve C&D Materials Management:** With input from C&D processors and other stakeholders, MassDEP will develop a set of strategies and action steps to improve the management of C&D fines and residuals, including reducing the amount of C&D fines and residuals that are produced by diverting materials to higher end uses.

- **C&D Project Review Team:** MassDEP will establish a project review team with high level management participation to clarify and expedite review processes for projects proposing to use C&D derived materials.

REVISED/EXPANDED

- **Build C&D Product Stewardship Initiatives:** MassDEP will work with manufacturers of construction materials to develop and build product stewardship initiatives where possible. This will include supporting the implementation of existing manufacturer commitments for carpet and wallboard and exploring product stewardship initiatives for other materials. When voluntary product stewardship initiatives are not successful, MassDEP will pursue regulatory controls such as waste bans more aggressively.

- **C&D Capacity Analysis:** MassDEP will prepare additional capacity analyses for C&D, including the projected capacity of inactive landfill closure projects and landfill daily cover uses. These capacity analyses will also address management of other materials such as contaminated soils and dredge spoils that may be used for landfill related uses.

- **Oversee Inactive Landfill Closures:** MassDEP will continue to oversee inactive landfill closure projects. As part of this effort, MassDEP will reassess existing landfill closure policies and beneficial use determination requirements to ensure that they are properly addressing management of residual C&D materials. In particular, MassDEP will consider whether the organic content standard for these materials should be lowered.

CONTINUED

- **Promulgate and Implement C&D Waste Ban:** MassDEP promulgated revisions to 310 CMR 19.000, the solid waste permitting regulations, that included a disposal ban on asphalt pavement, brick, concrete, wood, and metal. This ban is expected to have the greatest effect on increasing diversion of wood, since asphalt paving, brick, concrete and metal are already recycled at high rates. To support the ban, MassDEP has revised its waste ban guidance and held trainings on the ban, and will review and approve revised facility waste ban plans. Because the ban is focused on construction waste rather than residential materials, loads from transfer stations that only accept loads of less than 5 cubic yards (the size of a small dump truck) are exempt from the C&D waste ban and can be consolidated and sent for disposal. Under the ban, wood is allowed to be disposed at municipal waste combustion facilities.

  Over time, MassDEP will explore adding other C&D materials to the list of banned materials as markets for those materials develop and grow. Potential additional banned materials include asphalt shingles, gypsum wallboard, and carpet. Any extension of the waste bans would require a regulatory change with public hearing and comment.

- **Promote C&D Market Development:** MassDEP will continue to use financial incentives such as Recycling Industry Reimbursement Credit grants and Recycling Loan Fund loans to promote development of new processing outlets and end markets for C&D materials.

- **C&D Waste Reduction Outreach:** MassDEP will continue outreach on C&D waste reduction for the construction and demolition industries by distributing information via MassDEP's C&D web page and by speaking at conferences and workshops.

- **SWAC C&D Subcommittee and Workgroups:** MassDEP will continue to hold meetings of its SWAC C&D Subcommittee and Subcommittee workgroups on an as-needed basis.

Toxicity Reduction Strategy

Reducing the toxicity of the waste stream poses unique challenges. To make significant progress in this area requires either significant state or local funding or aggressive product stewardship initiatives, neither of which is in place in Massachusetts. Therefore, MassDEP's toxicity reduction strategy is to maintain existing progress and seek limited new initiatives for products that contain high priority substances such as mercury, lead and arsenic. As with other waste reduction strategies, MassDEP will seek to build partnerships among local governments, with business groups, and with other state agencies and universities to achieve these goals as cost-effectively as possible.

Toxicity Reduction Initiatives

<u>NEW</u>

- **Toxics Use Reduction Assistance, Research, and Technology Development:** MassDEP will support the Office of Technical Assistance (OTA) and the Toxics Use Reduction Institute (TURI) programs to test and promote alternatives to toxic chemicals used in Massachusetts industries and communities. These efforts will emphasize chemicals such as mercury, lead, and arsenic that have been identified as High Priority Substances that may be contained in products disposed of as solid waste. These program efforts include extensive workshops, training sessions, industry dialogues and facility site visits. MassDEP will continue to work with TURI and OTA to monitor new issues and opportunities for reducing toxics in products that may be disposed as solid waste.

- **Toxics Use Reduction Act Reporting and Planning:** Although the focus of the Toxics Use Reduction Act (TURA) is on reducing the use of toxic chemicals and their associated releases, risks, and costs in industrial processes, TURA facilities have significantly reduced the amount of toxics shipped in products, some of which end up in landfills or combustion facilities. Within the 2000 TURA Core Group (facilities that were required to report in 2000 and 2003), facilities reduced the amount of toxic chemicals shipped in product by 11 percent, after adjusting for a decrease in production. From 1990 to 2003, facilities in the 1990 Core Group reduced the amount of toxic chemicals shipped in products by 68 percent after adjusting for production increases. MassDEP will continue to work with the Toxics Use Reduction Institute and the Office of Technical Assistance to implement the TURA program and further reduce the amount of toxic chemicals shipped in products.

- **TURI Five Chemicals Study:** In FY06, TURI received funding to conduct an alternatives assessment of five chemicals that will identify the most significant uses of the chemicals and assess safer alternatives for these uses. The five chemicals are lead, formaldehyde, perchloroethylene, hexavalent chromium, and di(2-ethylhexyl) phthalate (DEHP), many of which are contained in products that can end up in the solid waste stream. TURI must report back to the Legislature on the study results by July 2006. Additional information on this study can be found on TURI's web site at www.turi.org.

- **Supply Chain Initiatives:** TURI has convened supply chain working meetings to learn about new trade issues and technologies and to design new safer products to be competitive in changing markets. Efforts to date have included:
  - Exploring alternatives that would eliminate or reduce the use of lead and brominated flame retardants in the coated wire industry.
  - Developing lead-free solder applications for electronics.

- **Lowell Center for Sustainable Production:** The Lowell Center's Sustainable Production and Consumption Program works to promote sustainability in *all* of the life cycle phases of a product or service — including purchase, use, manufacture, and disposal. MassDEP will partner with solid waste-related components of the Lowell Center's Sustainable Hospitals program.

- **Healthy Lawn and Landscape Workshops:** MassDEP will continue to hold Healthy Lawn and Landscape Workshops that educate residents on pesticide use and ways to reduce use of fertilizers and pesticides through alternative lawn care practices, which reduce the need to manage leftover materials at hazardous product collection events.

- **Toxics Use Reduction Grants:** MassDEP will continue to partner with TURI on their Toxics Use Reduction Network grants to support toxics use reduction and pollution prevention on the local level. Recent grants have focused on pesticides use reduction.

REVISED/EXPANDED

- **Provide Regional Program Coordination and Technical Assistance**: Through Municipal Assistance Coordinators, MassDEP will work with cities and towns to maintain cost-effective collection programs to provide ongoing access for residents to safely dispose of hazardous products. These efforts will focus on organizing shared regional and reciprocal collection programs that provide a basic level of access at a relatively low cost to participating towns.

CONTINUED

- **Oversee Municipal Waste Combustor Material Separation Plans:** MassDEP will continue to work with municipal waste combustors and their contract municipalities to ensure that Material Separation Plans (MSPs) for mercury are implemented and revised as needed to maximize diversion and safe management of mercury-containing products from the waste stream. These plans focus on initiatives such as:

  - Collection programs for residents, schools, and businesses for products such as fluorescent lamps, thermostats, and batteries.
  - Education and outreach on mercury-containing products.
  - Thermometer exchanges.
  - School mercury cleanouts.

- **Support School Chemical Management Programs:** MassDEP will provide grants, training, information, and guidance to school systems on improving chemical purchasing, storage, use and management practices to reduce the use of hazardous chemicals and ensure proper disposal.

- **State Hazardous Product Collection Contracts:** MassDEP will continue to work with the Operational Services Division to maintain statewide contracts that support municipal hazardous product collection programs, eliminating the need for municipalities to go out to bid for collection events themselves.

- **State Sustainability Toxics Use Reduction:** MassDEP will continue to work with the State Sustainability Program and Operational Services Division to increase purchases of lower-toxicity and less hazardous products by state agencies and authorities. MassDEP will also partner with the Toxics Use Reduction Institute's (TURI's) efforts to support the development of environmentally preferable cleaning products.

3: WASTE MANAGEMENT CAPACITY AND FACILITY OVERSIGHT

Waste Management Capacity

Massachusetts has sought to maintain enough solid waste management capacity to manage its own waste. However, due to various factors, including regional market conditions, Massachusetts has been a net exporter of waste for several years, and this trend is expected to continue.

In 2004, Massachusetts generated 14.1 million tons of solid waste, of which 12.5 million tons was managed through diversion (7.7 million tons) or in-state disposal (4.8 million tons), while 1.6 million tons was exported for disposal (on a net basis). Net export of waste represents final waste management capacity that is not available within Massachusetts.

MassDEP has projected a range of future in-state management capacity and net export depending on whether recycling remains flat or grows to meet the 56% recycling goal in 2010[14]. Due primarily to shrinking in-state landfill capacity, projections for 2010 show a net export of between 2.5 million tons (if recycling remains flat) and 1.1 million tons (if recycling meets the 56% goal).

Figure 4, on page 41, shows two projected waste management capacity scenarios through 2010, using actual 2004 solid waste data as a starting point. These scenarios show the likely range of net export of waste depending on whether the recycling rate remains flat or increases to meet the goal of 56% recycling by 2010.

The "Baseline Recycling" scenario assumes that recycling tonnage will increase at the same rate as waste generation (2% per year), which results in the highest net export that would be expected in 2010, or 2.1 million tons. Projected net export would rise to 3.1 million tons by 2012 due to additional projected landfill closures. In this scenario, recycling tonnage increases keep pace with generation but recycling rates remain flat.

The "Increased Recycling" scenario assumes recycling tonnage will increase 4.3% per year to meet the 56% recycling goal, which results in the lowest net export that would be expected in 2010, or 1.0 million tons. In this scenario, projected net export rises to 1.9 million tons by 2012.

The data underlying these scenarios are shown in Table 13 on page 42. These scenarios also use the following assumptions:

- Generation tonnage will increase 2% per year, based on historical generation trends.
- Other Diversion of C&D (wood for fuel, fines for daily cover, and grading and shaping materials) will increase 2% per year, staying level with generation.
- Combustion capacity will remain constant at 2003 operating capacity.
- Landfill capacity will include currently permitted landfill capacity and landfill expansions that are planned but not yet permitted. Both current and potential landfill capacity

[14] In this scenario, the recycling rate remains level after 2010, with recycling tonnage increasing at the same rate as generation.

assumes landfills will operate at 81% of permitted capacity, based on historical trends of operating capacity. Table 12, on page 37, lists active landfill projects. Un-shaded numbers reflect currently permitted capacity. Shaded numbers reflect potential additional capacity that could be constructed based on existing facility plans, but is not yet permitted.

No Net Import/Export Policy

The *Beyond 2000 Solid Waste Master Plan* established a policy goal of achieving no net import or export of solid waste by 2006. Under this policy, MassDEP would permit additional landfill disposal capacity up to, but not beyond, the amount of waste requiring disposal. Given the lack of significant additional solid waste management capacity coming on line in recent years and projections that net export will continue over the coming decade, MassDEP recognizes that Massachusetts will continue to be a net exporter of waste for the foreseeable future.

MassDEP believes that there are important benefits to striving towards a balanced waste management system, including making Massachusetts less vulnerable to changes in available disposal capacity in other states. Therefore, MassDEP will maintain a long-term goal of reaching no net import/export, but will not attach a milestone date to this goal. This change recognizes that regional markets are the primary driver of waste management capacity development decisions and that a significant export infrastructure has developed over the past several years to handle waste generated in Massachusetts. It also recognizes the difficulty of siting and permitting new disposal capacity in Massachusetts. MassDEP will continue to assess and plan for the Commonwealth's solid waste management needs, but will focus its resources on promoting waste reduction while relying on markets to ultimately guide capacity decisions.

MassDEP recognizes that transport of waste by rail is an appropriate part of waste management infrastructure, and that transport by rail is likely to grow as in-state disposal capacity decreases. Rail haul facilities that function as waste handling facilities, processing facilities or transfer stations where waste is dumped and stored, processed, shredded, baled or subjected to any other activity that is not integral to a railroad operation are subject to Massachusetts solid waste facility regulations and require site assignment by the local board of health and permitting by MassDEP. MassDEP also acknowledges that facilities where waste is transferred to rail cars only in inter-modal containers are not subject to Massachusetts solid waste facility regulation.

In-state Waste Management Capacity Need

MassDEP has maintained the goal of disposing of only the "irreducible minimum" amount of waste and will continue to promote increased waste reduction through its various waste reduction programs. MassDEP will place special emphasis on supporting the development of additional in-state organics processing capacity, which can help businesses, cities and towns save money, reduce pressure on disposal capacity, create a valuable product, and support creation of additional jobs in Massachusetts. In addition, MassDEP will:

- Provide resources and information to support local Boards of Health responsible for reviewing proposals for processing facilities. This would include generic, statewide information for different categories of facilities, including the statewide benefits, typical facility profiles, local impacts to address, and best management practices.
- Ensure that current and future facilities operate soundly by providing information on best management practices and enforcing against poorly operated facilities to prevent nuisance impacts.
- Explore ways that MassDEP can stimulate increased organics processing capacity.
- Develop and provide capacity analyses for C&D and organics waste-streams, in addition to MassDEP's disposal capacity analysis.
- Continue to monitor the management of other material streams such as contaminated soils, dredge sediments, and coal ash that, while not typically managed as solid waste, may have implications for solid waste management capacity.
- Review and update as necessary components of the State's Disaster Debris Management Plan to support the Solid Waste Master Plan.

Disposal Capacity

Unless and until net export drops dramatically, MassDEP will no longer limit allocation of disposal capacity for new or expanded landfills. MassDEP will review all landfill proposals based solely on site assignment and permitting requirements.

MassDEP will maintain the municipal waste combustion moratorium to maintain progress that has been made in reducing mercury emissions under the state's Zero Mercury Action Plan.

The seven municipal waste combustors emitted an estimated 558 pounds of mercury in 2002, 329 pounds in 2003, and 385 pounds in 2004. Despite significant reductions in mercury emissions over the past several years, municipal waste combustors continue to represent the largest in-state source of mercury emissions in Massachusetts compared to other sources.[15] These reductions have resulted in measurable environmental improvements. MassDEP recently finished a study in the Merrimack Valley showing that several years after local mercury emissions (primarily from MWCs) went down, mercury concentrations in fish tissue showed a significant decrease. MassDEP wants to ensure that this progress is maintained and furthered, and believes that allowing additional municipal waste combustion at this time could jeopardize this progress.

MassDEP believes that further expanding municipal waste combustion capacity, which already represents nearly 50 percent of Massachusetts total disposal capacity and 65 percent of in-state disposal capacity, is inconsistent with the New England Governors/Eastern Canadian Premiers' Mercury Action Plan and EOEA's Zero Mercury Action Plan, which have as a goal the virtual elimination of mercury emissions.

[15] *Inventory of Anthropogenic Mercury Emissions in the Northeast*, NESCAUM, November 2005. Data reported by MWCs for calendar year 2003 and 2004 under the Toxics Use Reduction Act.

Solid Waste Regulations, Permitting, and Compliance and Enforcement

Since the *Beyond 2000 Plan* was issued, MassDEP promulgated major revisions to the Site Assignment regulations (310 CMR 16.000) and to the Permitting regulations (310 CMR 19.000). MassDEP also developed several guidance documents supporting these regulatory changes. These regulatory and guidance documents maintain the policy framework established in the *Beyond 2000 Plan* and include:

- Beneficial Use Determination (BUD) regulations and guidance that eliminate the one-size-fits-all approach and replace it with an approach tailored to the type of use proposed and the potential impacts from the use of a material. This guidance includes risk criteria for various contaminants.
- Expanding the waste bans to Construction and Demolition (C&D) wastes, including asphalt paving, brick, concrete, metal and wood. MassDEP has issued revised waste ban guidance to assist with implementation of the new waste bans.
- Updating landfill liner requirements to require double composite liners for new landfills and expansions. This will include revising the Landfill Technical Guidance Manual to address the revisions to the liner requirements

MassDEP is continuing to develop other approaches to effectively oversee solid waste facilities and materials management including:

- Developing guidance on addressing hydrogen sulfide emissions from landfills and inactive landfill closure projects. In cases in which landfills or closure projects accept C&D materials, this guidance will provide information on best management practices to avoid odor problems and health concerns. MassDEP expects to issue draft guidance for public review and input in 2006.
- Continuing to oversee inactive landfill closure projects. As part of this effort, MassDEP will reassess existing landfill closure policies to ensure that they are properly addressing management of residual C&D materials.
- Improving oversight and tracking of landfill gas emissions from both active and inactive landfills.
- Ensuring that waste haulers and generators, as well as solid waste facilities, are held accountable for compliance with the waste bans.
- Implementing a new sharps (i.e., needles, syringes) policy that builds on an earlier pilot program to make it easier and more cost-effective for boards of health and pharmacies to establish sharps collection locations for those who must administer home health care and to remove those sharps from the general solid waste and recycling streams for more appropriate management as infectious waste.

4: 2004 SOLID WASTE DATA

2004 Solid Waste Data and Waste Management Capacity Projections

To assist in implementing the *Beyond 2000 Solid Waste Master Plan*, MassDEP annually collects and analyzes solid waste management system data. The data are used to track progress in meeting waste reduction milestones and to evaluate waste management capacity needs. MassDEP has updated solid waste data through calendar year 2004 and revised waste management capacity projections through 2010 based on the 2004 data. A description of how MassDEP collects and analyzes solid waste data can be found in Appendix A. Briefly, MassDEP calculates the following rates:

Overall Waste Reduction Rate

$$= \frac{(\text{MSW Recycling}^{16} + \text{Source Reduction}^{17}) + (\text{C\&D Recycling} + \text{Source Reduction} + \text{Other Diversion})}{\text{Total Potential Generation}^{18}}$$

MSW Waste Reduction Rate

$$= \frac{\text{MSW Recycling} + \text{Source Reduction}}{\text{MSW Potential Generation}}$$

Non-MSW Waste Reduction Rate

$$= \frac{\text{Non-MSW Recycling} + \text{Source Reduction} + \text{C\&D Other Diversion}}{\text{Non-MSW Potential Generation}}$$

MSW Recycling Rate

$$= \frac{\text{MSW Recycling}}{\text{MSW Actual Generation (Recycling + Disposal)}}$$

C&D Recycling Rate

$$= \frac{\text{C\&D Recycling}}{\text{C\&D Actual Generation (Recycling + Other Diversion + Disposal)}}$$

C&D Diversion Rate

$$= \frac{\text{C\&D Recycling} + \text{C\&D Other Diversion}}{\text{C\&D Actual Generation (Recycling + Other Diversion + Disposal)}}$$

Progress in Meeting Waste Reduction Milestones

Table 1 summarizes waste reduction rates from 2002-2004. Waste reduction includes source reduction (preventing waste from being generated), recycling (including composting), and other C&D diversion.[19] Total waste reduction increased from 57% in 2002 to 60% in 2004. Municipal solid waste (MSW) waste reduction increased from 40% in 2002 to 45% in 2004. Non-municipal solid waste (Non-MSW) waste reduction remained essentially flat, going from 86% in 2002 to 88% in 2004. While the non-MSW waste reduction rate has reached the 88% goal set in the Beyond 2000 Master Plan, MassDEP believes that Massachusetts still faces several important challenges in improving management of C&D materials, including the need to increase separation of materials to enable and stimulate higher-value end uses, reduce landfill-dependent reuse of C&D materials, and increase recycling rates of materials other than asphalt paving, brick, and concrete, such as wood, asphalt shingles, and gypsum wallboard, which currently are only recycled at a rate of 9%.

[16] MSW recycling includes both recycling and off site-composting, but does not include home composting, which is considered source reduction.
[17] Source reduction refers to the difference between potential generation and actual generation.

[19] For a discussion of how MassDEP measures waste reduction, see page 3-7 of the Beyond 2000 Solid Waste Master Plan.

Table 1 Waste Reduction Rates Based on *Potential* Generation[20]				
	2002	**2003**	**2004**	**2010 Milestone**
Total Waste Reduction Rate	57%	58%	60%	70%
MSW Waste Reduction Rate	40%	43%	45%	60%
Non-MSW Waste Reduction Rate	87%	86%	88%	88%

Table 2 shows recycling rates based on actual generation. Please see Figure 2 for a graphical description of generation, recycling, and disposal tonnage trends. Of the total waste that was generated 2004, 48% was recycled, an increase from 47% in 2002. The MSW recycling rate increased from 31% in 2002 to35% in 2004. The C&D recycling rate decreased from 75% in 2002 to 71% in 2004.

Table 2 Recycling Rates Based on Actual Generation			
	2002	**2003**	**2004**
Overall Recycling	47%	47%	48%
MSW Recycling *	31%	34%	35%
C&D Recycling	75%	71%	71%

***Excludes backyard composting which is source reduction**

Environmental and Economic Benefits of Recycling

In 2004, Massachusetts prevented the disposal of 9.6 million tons of waste through a combination recycling, composting and other waste reduction, saving enough landfill space to eliminate the need for nearly 22 landfills each equal to the state's largest (1,200 tons per day). Waste reduction also slows global warming, conserves natural resources, saves energy, and prevents pollution. By recycling or composting municipal solid waste alone in 2004, Massachusetts is estimated[21] to have:

- Reduced greenhouse gas emissions by nearly 2.6 million tons of carbon equivalent per year.
- Saved 108 trillion BTUs of energy, equivalent to 18 million barrels of oil, or 870 million gallons of gasoline.
- Saved 1.6 million tons of iron ore, coal, and limestone and saved nearly 17 million trees.

[20] [20] Potential Generation is an estimate of the amount of waste expected based on economic activity. MassDEP uses Massachusetts Gross State Product (GSP) as the economic "driver" to estimate potential generation. Newly released GSP estimates for 1997 – 2003 have been updated to reflect 2000 real-chained dollar values and rely on NAICS definitions, whereas previous GSP estimates were in 1996 real-chained dollar values and relied on SIC codes. This change has resulted in slightly higher waste reduction rates for previously published data.

[21] Source: *Recycling Environmental Impacts Model*, Northeast Recycling Council, December 2004. The increase in savings from 2002 is due to methodology changes in the model.

In addition, recycling bolsters the state's economy. Recycling, reuse, and remanufacturing directly support 19,000 jobs in Massachusetts, maintain a payroll of nearly $600 million, and bring in annual revenues of $3.6 billion. Total direct and indirect economic activity from recycling, reuse, and remanufacturing is estimated to generate more than $142 million annually in state revenues for Massachusetts[22].

[22] *Recycling Economic Information Study*, prepared for the Northeast Recycling Council by R.W. Beck, Inc, June 2000.

Solid Waste Management 2000 – 2004

Table 3 presents a comprehensive picture of solid waste management in Massachusetts for calendar years 1999-2004. Table 3a highlights how solid waste management changed from 2003 to 2004.

Table 3

Integrated Solid Waste Management System 2000-2004

			2000	2001	2002	2003	2004
Potential Generation			**14,850,000**	**14,660,000**	**14,440,000**	**15,250,000**	**15,990,000**
	MSW		9,520,000	9,380,000	9,260,000	9,800,000	**10,280,000**
	Non-MSW		5,330,000	5,250,000	5,180,000	5,450,000	**5,710,000**
Source Reduction			**2,040,000**	**1,880,000**	**1,200,000**	**2,040,000**	**2,050,000**
	MSW		1,530,000	1,270,000	900,000	1,340,000	**1,550,000**
	Non-MSW		510,000	610,000	300,000	700,000	**500,000**
Total Generation			**12,960,000**	**12,780,000**	**13,240,000**	**13,210,000**	**13,930,000**
MSW			7,990,000	8,130,000	8,350,000	8,460,000	8,720,000
		Residential	3,130,000	3,130,000	3,300,000	3,520,000	3,510,000
		Commercial	4,860,000	5,000,000	5,050,000	4,940,000	5,210,000
Non-MSW			4,970,000	4,650,000	4,890,000	4,750,000	5,210,000
		C&D	4,480,000	4,540,000	4,820,000	4,720,000	5,160,000
		Other	490,000	110,000	70,000	30,000	50,000
Diversion			**6,500,000**	**6,440,000**	**6,790,000**	**6,860,000**	**7,580,000**
MSW			2,700,000	2,780,000	2,610,000	2,870,000	3,070,000
	Residential Recycling		470,000	520,000	520,000	540,000	540,000
	Commercial Recycling		1,640,000	1,640,000	1,400,000	1,660,000	1,880,000
	Residential Composting		340,000	340,000	330,000	350,000	340,000
	Commercial Composting		250,000	280,000	360,000	330,000	310,000
Non-MSW			3,800,000	3,660,000	4,180,000	3,990,000	4,500,000
		C&D	3,500,000	3,150,000	3,590,000	3,360,000	3,650,000
	Other C&D Diversion		300,000	510,000	590,000	630,000	860,000
Disposal			**6,460,000**	**6,340,000**	**6,450,000**	**6,340,000**	**6,360,000**
	Landfill		1,760,000	1,710,000	1,790,000	1,710,000	1,720,000
		MSW	1,010,000	1,030,000	1,210,000	1,310,000	1,430,000
		C&D	660,000	620,000	520,000	370,000	270,000
		Other	90,000	60,000	60,000	20,000	30,000
	Combustion		3,070,000	3,130,000	3,090,000	3,130,000	3,080,000
		MSW	3,060,000	3,130,000	3,080,000	3,120,000	3,070,000
		Non-MSW	*0	*0	*0	*0	*0
	Net Exports		*1,630,000*	*1,500,000*	*1,570,000*	*1,510,000*	*1,560,000*
		Exports	*1,770,000*	*1,690,000*	*1,830,000*	*1,790,000*	*1,840,000*
		Imports	*140,000*	*190,000*	*250,000*	*280,000*	*280,000*

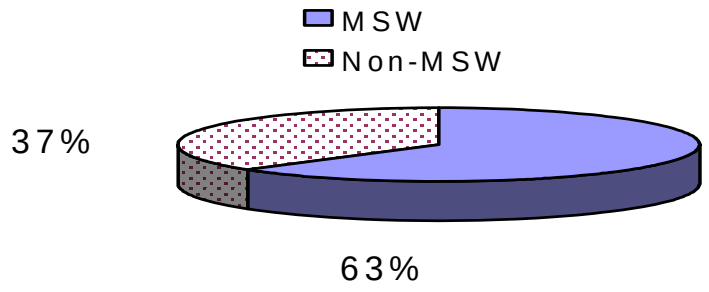
*Non-MSW combustion was less than 5,000 tons

*Non-MSW combustion was less than 5,000 tons. Note: Numbers do not all add exactly due to rounding.

Table 3a: Tonnage and Percent Change Summary: 2003-2004						
			2003	**2004**	**Tons Change**	**% Change**
Potential Generation			**15,250,000**	**15,990,000**	**740,000**	**4.9%**
	MSW		9,800,000	10,280,000	480,000	4.9%
	Non-MSW		5,450,000	5,710,000	260,000	4.8%
Source Reduction			**2,040,000**	**2,050,000**	**10,000**	**0.5%**
	MSW		1,340,000	1,550,000	210,000	15.7%
	Non-MSW		700,000	500,000	(200,000)	-28.6%
Total Generation			**13,210,000**	**13,930,000**	**720,000**	**5.5%**
MSW			**8,460,000**	**8,720,000**	**260,000**	**3.1%**
		Residential	3,520,000	3,510,000	(10,000)	-0.3%
		Commercial	4,940,000	5,210,000	270,000	5.5%
Non-MSW			**4,750,000**	**5,210,000**	**460,000**	**9.7%**
		C&D	4,720,000	5,160,000	440,000	9.3%
		Other	30,000	50,000	20,000	66.7%
Diversion			6,860,000	7,580,000	720,000	10.5%
MSW			**2,870,000**	**3,070,000**	**200,000**	**7.0%**
		Residential Recycling	540,000	540,000	-	0.0%
		Commercial Recycling	1,660,000	1,880,000	220,000	13.3%
		Residential Composting	350,000	340,000	(10,000)	-2.9%
		Residential On Site Composting	590,000	580,000	(10,000)	-1.7%
		Commercial Composting	330,000	310,000	(20,000)	-6.1%
Non-MSW			**3,990,000**	**4,500,000**	**510,000**	**12.8%**
		C&D	3,360,000	3,650,000	290,000	8.6%
		Other C&D Diversion	630,000	860,000	230,000	36.5%
Disposal			6,340,000	6,360,000	20,000	0.3%
	Landfill		**1,710,000**	**1,720,000**	**10,000**	**0.6%**
		MSW	1,310,000	1,430,000	120,000	9.2%
		C&D	370,000	270,000	(100,000)	-27.0%
		Other	20,000	30,000	10,000	50.0%
	Combustion		**3,130,000**	**3,080,000**	**(50,000)**	**-1.6%**
		MSW	3,120,000	3,070,000	(50,000)	-1.6%
		Non-MSW	-	-	-	
	Net Exports		**1,510,000**	**1,560,000**	**50,000**	**3.3%**
		Exports	1,790,000	1,840,000	50,000	2.8%
		Imports	280,000	280,000	-	0.0%
Note: % Change is calculated based on the rounded amounts in this table.						

In 2004, 13.9 million tons of solid waste were *actually* generated in Massachusetts. Of this amount, 8.7 million tons were MSW (63%) and 5.2 million tons were Non-MSW (37%). Generation increased by more than five percent from 2003 to 2004, from 13.2 million tons to 13.9 million tons. Of the 14.1 million tons generated, 7.6 million tons (54%) were diverted (includes recycling, composting, and other diversion) and 6.4 million tons (46%) were disposed.

Figure 1
Total Solid Waste Generation in 2004



From 2000 to 2004, the amount of total waste requiring disposal decreased by 1.5%. From 2003 to 2004, total disposal increased slightly, by about 0.3%. 4.8 million tons (34%) of total waste generated were disposed in-state either by landfilling (27% of disposal) or by combustion (49% of disposal). In 2004, there were 21 landfills and 7 combustors operating in the state that received MSW and/or Non-MSW. The combustion facilities produce approximately 200 megawatts of electricity each year. The state exported for disposal 1.8 million tons and imported 0.3 million tons, and thus was a net exporter of 1.6 million tons (11%) of total waste generated. See Table 10 and 11 for more detailed import/export data by state.

Table 4 shows the calculation of total waste reduction in 2004. Waste Reduction is the combined effect of source reduction, recycling, and other C&D diversion as a percentage of *potential* waste generation. The 42 percent recycling rate shown below is lower than the overall 48 percent recycling rate because it is based on potential, rather than actual generation. This table shows that, while recycling continues to comprise most waste reduction tonnage, source reduction plays an important role, comprising 12% of potential waste generation in 2004.

Table 4 2004 Total Waste Reduction (in tons)	
	2004
Potential Generation without Source Reduction	15,990,000
Source Reduction *% of potential generation*	*2,050,000* *13%*
Recycling* *% of potential generation*	*6,720,000* *42%*
C&D Other Diversion *% of potential generation*	*860,000* *5%*
Total Waste Reduction *% of potential generation*	*9,630,000* *60%*
* The recycling rate is 48% when based on *actual* generation.	

Municipal Solid Waste Management

In 2004, 8.7 million tons of MSW were generated in Massachusetts, or 7.5 pounds per person per day, up from 7.4 pounds per person per day in 2003. Of this amount, 35% was recycled (including off-site composting, but excluding on-site backyard composting), which is an increase from 34% in 2003 and 31% in 2002. This increase can be attributed to an increase in recycling markets for some materials in 2003 and 2004. The per capita MSW recycling rate was 2.6 pounds per person per day, and the per capita disposal rate (including export) was 4.9 pounds per person per day. The residential MSW recycling rate (excluding home composting) was 25% and the commercial MSW recycling rate was 42%. Residential MSW generation (excluding commercial waste) in 2004 was 3,510,000 tons, an average of 3.0 pounds per person per day.

Table 5 How MSW was managed from 2002-2004			
	2002	**2003**	**2004**
Recycled	31%	34%	35%
Combusted	37%	37%	35%
Landfilled	15%	15%	16%
Net Exported	17%	14%	14%

Between 2003 and 2004:

- MSW generation increased 4%, from 8.4 million tons to 8.7 million tons. Per capita MSW generation rose from 7.1 pounds per person per day to 7.5 pounds per person per day.

- Residential MSW generation increased 6%, from 3.3 million tons to 3.5 million tons, while commercial MSW generation increased 3%, from 5.1 million tons to 5.2 million tons.

- MSW recycling (including composting) increased 18%, from 2.6 million tons to 3.1 million tons. This was primarily due to increased commercial recycling, whereas residential recycling and composting only increased 4 percent during this two-year period.

- Total MSW disposal (disposal in-state and exported out of state for disposal) remained about the same at 5.7 million tons.

- MSW net exports for disposal decreased about 20%, from 1.5 million tons to 1.2 million tons.

Figure 2
Generation, Recycling and Disposal Trends

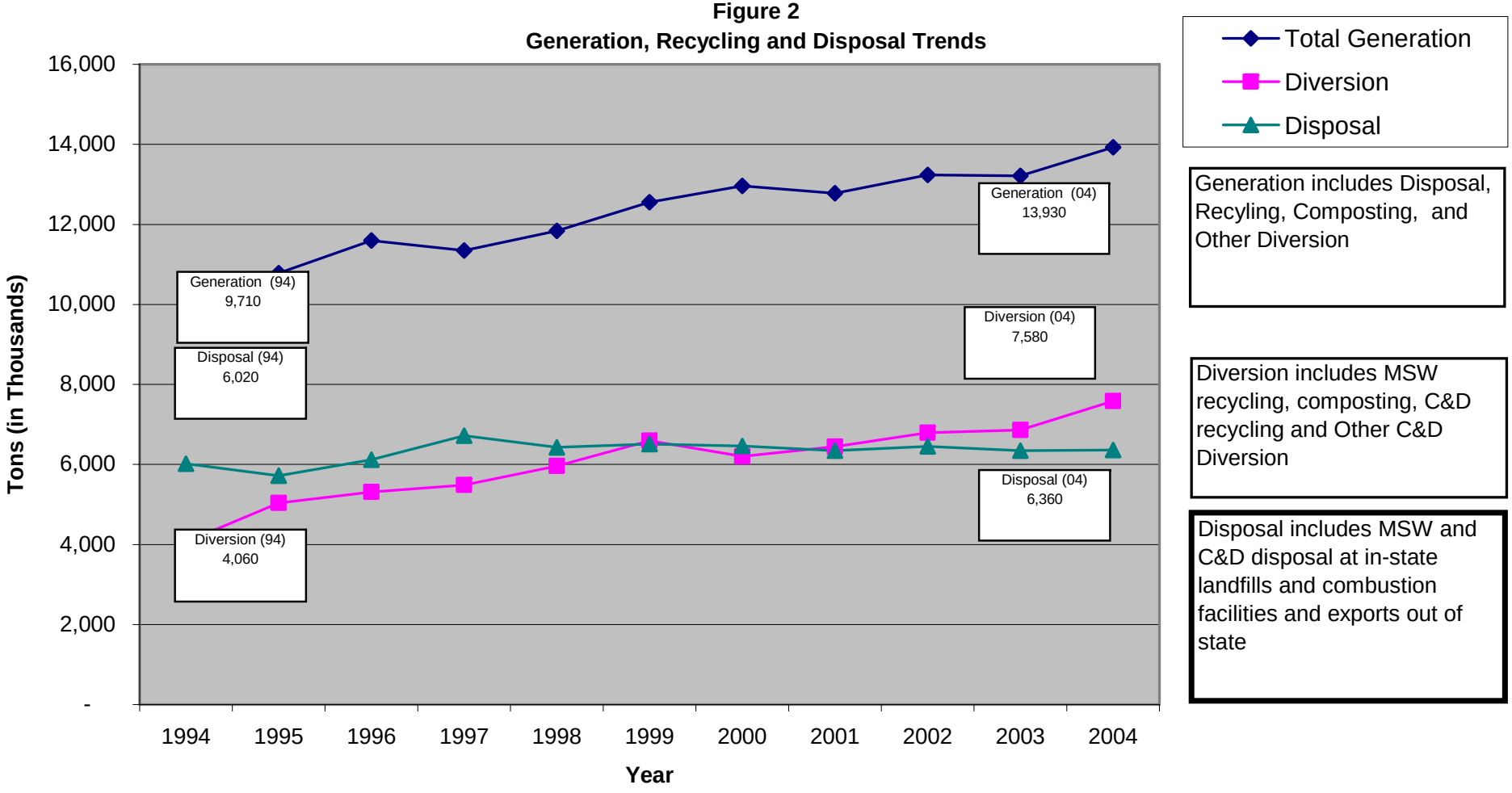


Figure 3
Breakdown of MSW Materials Recycled in 2004
(excluding composting)

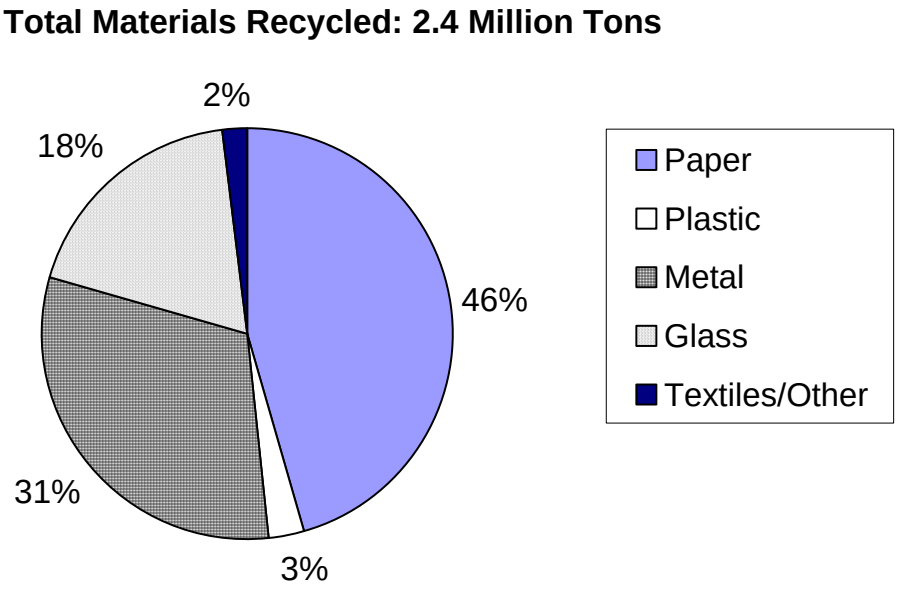


Table 6 shows the calculation of MSW waste reduction in 2004. Waste reduction is the combined effect of source reduction and recycling as a percentage of *potential* waste generation.

Table 6 **2004 MSW Waste Reduction (in tons)**	
	2004
Potential MSW Generation without Source Reduction	10,280,000
Source Reduction	*1,550,000*
% of potential generation	*15%*
Recycling*	*3,070,000*
% of potential generation	*30%*
Total Waste Reduction	*4,620,000*
% of potential generation	*45%*
*The recycling rate is 35% when based on *actual* MSW generation Note: percentages do not add exactly due to rounding.	

Municipal recycling rates by year are shown in Table 7. This table shows that the distribution of municipal recycling rates has not changed substantially over the past five years. *(Note: MassDEP did not collect FY02 municipal recycling data because it switched to a calendar year datasheet time frame to match other solid waste reporting.)*

Table 7
Municipal Recycling Rates

Municipalities Achieving:	FY2000	FY2001	CY 2002	CY2003	CY2004
30% or greater	162	182	181	162	156
20-29%	68	73	61	86	78
10-19%	40	34	41	41	41
5-9%	2	7	5	11	8
Not included due to incomplete or missing data	79	55	63	51	68

Non-MSW Waste Management

In 2001, MassDEP added a new category called "C&D Other Diversion" to account for materials such as C&D fines and wood for fuel used for beneficial uses. In 2002, an additional material, "C&D residuals", was added to account for materials used for grading and shaping at landfill closure projects that began in 2002. This tonnage is counted as generation, but not as recycling or disposal since this use is not considered to be either recycling or disposal. However, these activities are considered diversion since they divert material from disposal and free up capacity for other materials.

In 2004, 5.2 million tons of C&D were generated in Massachusetts, up from 4.7 million tons in 2003. Of the amount generated, 71% was recycled, the same as in 2003. Including C&D Other Diversion with recycling, the overall C&D diversion rate was 88% in 2004. Table 8 shows how C&D was managed 2002 – 2004.

Table 8 C&D Management in 2002 -2004			
	2002	**2003**	**2004**
Generated	**4,750,000**	**4,720,000**	**5,160,000**
Disposed	**620,000**	**720,000**	**660,000**
• **In-State**	520,000	370,000	270,000
• **Out-of-State**	100,000	350,000	390,000
Diverted	**4,130,000**	**3,990,000**	**4,500,000**
• **Recycled**	**3,540,000**	**3,360,000**	**3,650,000**
o ***Asphalt, Brick, and Concrete (ABC)***	3,280,000	3,200,000	3,470,000
o ***Metal***	50,000	80,000	100,000
o ***C&D wood***	40,000	20,000	30,000
o ***Wood Waste***	110,000	40,000	50,000
o ***Other****	60,000	20,000	20,000
• **C&D Other Diversion**	**590,000**	**630,000**	**860,000**
o **C&D Fines/Residuals**	460,000	540,000	810,000
o **C&D Wood for Fuel**	130,000	90,000	50,000

*Other materials include ceiling tiles, carpet, gypsum wallboard, and asphalt roofing shingles. Table 9 shows the calculation of non-MSW waste reduction in 2004. Waste reduction is the combined effect of recycling, source reduction and other C&D diversion as a percentage of *potential* generation.

Table 9 2004 Non-MSW Waste Reduction (in tons)	
	2004
Potential generation without source reduction	5,710,000
Source Reduction *% of potential generation*	*500,000* *9%*
Recycling* *% of potential generation*	*3,650,000* *64%*
C&D Other Diversion *% of potential generation*	*860,000* *15%*
Total Waste Reduction *% of potential generation*	*5,000,000* *88%*
* The recycling rate is 71% based on *actual* generation. Note: percentages do not add exactly due to rounding.	

Other Non-MSW Management

A relatively small amount of non-MSW materials other than C&D are disposed in Massachusetts landfills or sent out of state for disposal each year. In 2004, 30,000 tons of these materials were disposed including industrial waste, medical waste, wood waste, ash and sludge.

In addition, a significant amount of other non-MSW materials are managed each year in management systems that have in the past been tracked separately from the primary MSW/C&D waste management system. These include MSW combustion ash disposal, use of materials as alternative daily cover at landfills (both active and inactive), and other beneficial uses of materials in non-landfill applications.

Materials Used for Daily Cover

Table 10 shows materials used as daily cover at landfills.

Table 10
Reported Daily Cover Material at Active Landfills
(in tons)[23]

	2002	2003	2004
Auto Shredder Residue	120,000	20,000	50,000
Soil/Sand	270,000	180,000	230,000
Contaminated Soils	180,000	140,000	280,000
C&D Fines	230,000	300,000	300,000
Other Materials[24]	310,000	300,000	240,000
TOTAL	**1,100,000**	**940,000**	**1,100,000**

Municipal Waste Combustor Ash

Seven waste-to-energy combustors operated in Massachusetts in 2004. In 2004, these combustors generated approximately 790,000 tons of combustion ash (excluding recovered post-burn metals), 90,000 of which was beneficially reused and 700,000 tons of which was disposed of in six[25] combustion ash mono-fills located in Massachusetts. A number of these mono-fills are nearing their capacity, and efforts are underway by a number of combustors to expand capacity. The current status of these ash landfills is summarized in Table 11.

Table 11
Active MSW Combustion Ash Landfills

Municipality	Site Name	Current Permit Expires
Agawam	Bondi's Island Ash Landfill	2009
Peabody	Peabody Ash Landfill	2006
Saugus	Wheelabrator Ash Landfill	2008
Haverhill	Ward Hill Neck Ash Landfill	2009
Shrewsbury	Shrewsbury Ash Landfill	2013
Carver	CMW Ash Landfill	2013

[23] Daily Cover tonnages have been revised for consistency across time, and do not include material disposed at Quarry Hills, since this is not an active landfill.
[24] "Other Materials" includes approximately 20 various materials such as ground asphalt and DPW wastes.
[25] One of the 7 waste-to-energy combustors sends its combustion ash out of state.

Tables 12 and 13 how MSW and C&D export and import data by state. The export and import data for Massachusetts was collected from annual facility reports (AFR) submitted to MassDEP and from calling other states directly. In some instances, the MSW export data provided in the AFR differed from that reported from the states. In order to make the most conservative estimate of export, the higher number from the two sources was used. For example, if an AFR reported that Massachusetts sent Connecticut 10,000 tons of MSW, and Connecticut reported receiving 29,000 tons of MSW, 29,000 tons of export was used. The C&D import and export data is strictly from the AFRs, as confirmation from other states was not available at time of preparing this document.

Table 8
MSW Export by State: 2002-2004

	2002	2003	2004
CT	40,168	39,088	39,060
ME	290,977	222,957	230,686
NH	318,129	301,022	186,000
NY	380,000	193,817	277,716
OH	98,253	120,450	130,284
PA	14,375	5,039	3,695
RI	32	5,984	6,223
SC	401,318	446,351	492,295
VA	1,785	12,107	3,696
VT			4,195
Canada			
Other Unknown		43	
TOTAL	**1,545,037**	**1,366,858**	**1,374,918**

Table 8a.
MSW Import by State: 2002-2004

	2002	2003	2004
CT	24,320	60,969	53,028
ME	8,759	9,066	20,787
NH	25,483	26,426	41,027
NY	8,883	77,530	73,473
RI	14,438	24,539	26,155
VT	4,924	4,627	5,475
Canada	978		
TOTAL	**87,785**	**203,157**	**219,945**

Table 9 C&D Export by State: 2002-2004			
	2002	**2003**	**2004**
CT	18,452	5,404	1,117
ME	49,414	148,317	137,751
NH	4,991	14,410	11,713
NY	60,508	19,591	17,965
OH	138,398	180,702	240,484
PA	474		1,912
RI	2,631	4,046	1,024
SC		31,933	32,403
VA		10,440	
VT	300	26	
Canada			
Other Unknown			
TOTAL	**275,168**	**414,869**	**444,369**

Table 9a. C&D Import by State: 2002-2004			
	2002	**2003**	**2004**
CT	132,051	54,473	36,869
ME	12,690	983	
NH	5,481	2,414	10,205
NY	2,517	6,579	7,676
RI	736	34	626
VA	24		
TOTAL	**153,499**	**64,483**	**55,656**

Tables 14 and 15 detail all solid waste that was accepted and diverted through Massachusetts Transfer Stations in 2003 and 2004. This data is different from the import/export data reported above since it includes waste that was generated and disposed in Massachusetts in addition to the waste that was imported and exported. This data indicates the significant role that transfer stations play in managing Massachusetts' waste.

Table 14 Transfer Stations - Waste Accepted (rounded to nearest 1,000 tons)		
Waste Class	**2003 Tons Accepted**	**2004 Tons Accepted**
C&D	471,000	524,000
MSW	2,405,000	2,440,000
MSW Recycling	243,000	233,000
Non-MSW	25,000	27,000
Sludge	1,000	2,000

Table 15 Transfer Stations - Waste Diverted (rounded to nearest 1,000 tons)		
State Sent To	**2003 Tons Sent for Diversion**	**2004 Tons Sent for Diversion**
MA	358,000	410,000
NH	17,000	8,000
CT	4,000	2,000
RI	3,000	3,000
ME	3,000	3,000
VT	1,000	<1,000
NJ	<1,000	<1,000
NY	<1,000	<1,000
Canada	<1,000	0

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Table 12
Projected Landfill Capacity (Tons Per Year)

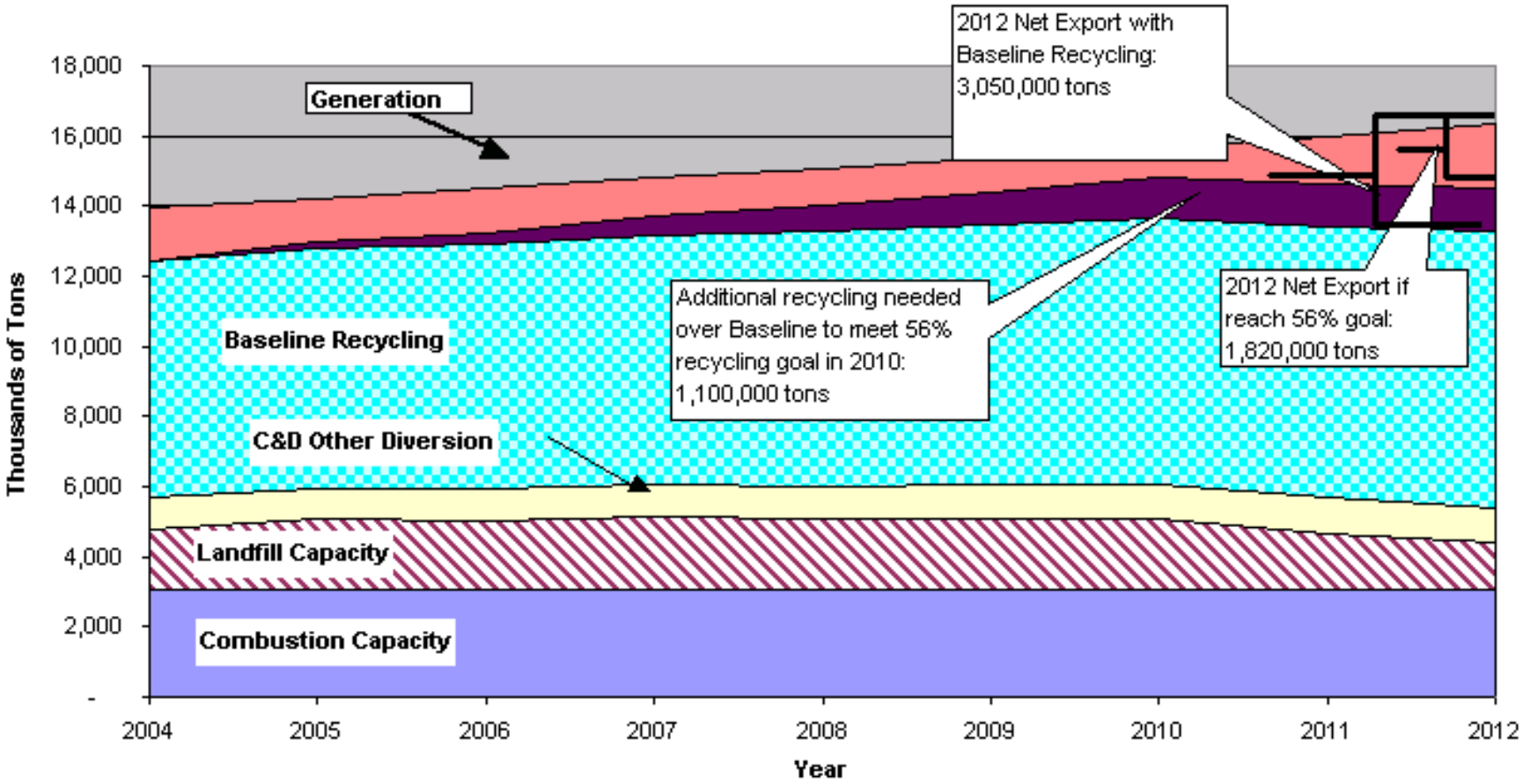
Town	2003 Permitted Capacity	End of current permit	Lifetime of LF	Proposed change in tonnage	date of proposed change going online	new tonnage after new capacity	2004	2005	2006	2007	2008	2009	2010	2011	2012
Active Landfills															
Barre	93600	2007	**2013**	0	0	93600	93600	93600	93600	93600	93600	93600	93600	93600	93600
Bourne	219000	2006	**2024**	0	0	219000	219000	219000	219000	219000	219000	219000	219000	219000	219000
Carver	97982	2013	**2013**	0	0	97982	60000	60000	60000	60000	60000	60000	60000	60000	60000
Chicopee	365000	2007	**2012**	-145000	2004	220000	220000	220000	220000	220000	220000	220000	220000	220000	220000
Dartmouth	115000	2007	**2021**	0	0	115000	115000	115000	115000	115000	115000	115000	115000	115000	115000
Fall River*	490000	2006	**2010**	0	0	490000	490000	490000	490000	490000	490000	490000	490000	0	0
Gardner	93600	2005	**2005**	0	0	93600	93600	93600	0	0	0	0	0	0	0
Granby	146000	2008	**2011**	89000	2005	235000	146000	235000	235000	235000	235000	235000	235000	235000	0
Hardwick	82800	2007	**2025**	151200	2007	234000	82800	82800	82800	234000	234000	234000	234000	234000	234000
Hull	833	2006	**2006**	0	0	833	833	833	833	0	0	0	0	0	0
Middleborough	9620	2011	**2011**	0	0	9620	9620	9620	9620	9620	9620	9620	9620	9620	0
Nantucket	30000	2015	**2015**	0	0	30000	30000	30000	30000	30000	30000	30000	30000	30000	30000
Northampton	50000	2007	**2007**	0	0	50000	50000	50000	50000	50000	0	0	0	0	0
South Hadley	123260	2011	**2016**	0	0	123260	123260	123260	123260	123260	123260	123260	123260	123260	123260
Southbridge	180960	2019	**2019**	0	0	180960	180960	180960	180960	180960	180960	180960	180960	180960	180960
Sturbridge	410	2016	**2016**	0	0	410	410	410	410	410	410	410	410	410	410
Taunton	120120	2007	**2015**	0	0	120120	120120	120120	120120	120120	120120	120120	120120	120120	120120
Warren	2000	2005	**2005**	0	0	2000	2000	2000	0	0	0	0	0	0	0
Wayland	2345	2005	**2011**	0	0	2345	2345	2345	2345	2345	2345	2345	2345	2345	0
Westminster	156000	2007	**2025**	140400	2005	296400	156000	296400	296400	296400	296400	296400	296400	296400	296400
	2378530														
TOTAL PERMITTED CAPACITY							**2,373,930**	**2,462,930**	**2,364,985**	**1,806,352**	**677,232**	**442,232**	**442,232**	**442,232**	**309,352**
TOTAL POTENTIAL CAPACITY							**2,373,930**	**2,462,930**	**2,367,330**	**2,517,697**	**2,467,697**	**2,467,697**	**2,467,697**	**1,977,697**	**1,607,472**

KEY:

Permitted Capacity	number without shading
Potential Additional Capacity	number with shading

* DEP issued an Authorization to Construct the next phase of cells at Fall River; however, the city revoked the landfill's Site Assignment. BFI appealed the city's action, and the court ruled in favor of BFI. Construction of the cells has begun, but the city is appealing the court's decision, so it is uncertain when or if this additional capacity will go online.

Figure 4: Waste Management Capacity Projections



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Waste Management Capacity Projections - 56 % recycling in 2010

	2004	2005	2006	2007	2008	2009	2010	2011	2012
Total Generation	13,934,840	14,213,536	14,497,807	14,787,763	15,083,518	15,385,189	15,692,893	16,006,750	16,326,885
Baseline Recycling	6,717,586	6,851,937	6,988,976	7,128,756	7,271,331	7,416,757	7,565,092	7,716,394	7,870,722
Increased Recycling (to meet 56% goal)		167,940	346,795	537,126	739,515	954,577	1,182,951	1,206,610	1,230,743
Total Recycling (to meet 56% goal)	6,717,586	7,019,877	7,335,771	7,665,881	8,010,846	8,371,334	8,748,044	8,923,005	9,101,465
Increased Recycling Rate	48.2%	49.4%	50.6%	51.8%	53.1%	54.4%	55.7%	55.7%	55.7%
C&D Other Diversion	877,637	895,190	913,094	931,355	949,983	968,982	988,362	1,008,129	1,028,292
Combustion Capacity	3,078,146	3,078,146	3,078,146	3,078,146	3,078,146	3,078,146	3,078,146	3,078,146	3,078,146
Potential LF Capacity	1,724,859	1,994,973	1,917,537	2,039,335	1,998,835	1,998,835	1,998,835	1,601,935	1,302,052
Total In-state Capacity (baseline recycling)	12,398,228	12,820,246	12,897,753	13,177,592	13,298,294	13,462,720	13,630,435	13,404,604	13,279,212
Total In-state Capacity (total recycling)	12,398,228	12,988,186	13,244,548	13,714,717	14,037,809	14,417,297	14,813,387	14,611,215	14,509,954
Net Export (baseline recycling)	1,536,612	1,393,290	1,600,054	1,610,171	1,785,224	1,922,468	2,062,457	2,602,146	3,047,674
Net Export (total recycling)	1,536,612	1,225,351	1,253,259	1,073,046	1,045,709	967,892	879,506	1,395,536	1,816,931

Assumptions:

Generation Increase	2.0%	(annual)
Baseline Recycling Tonnage Increase	2.0%	(annual)
Total Recycling Tonnage Increase	4.5%	(annual)
C&D Other Diversion Increase	2.0%	(annual)

Combustion Capacity is projected to remain level from 2004 through 2010.

Landfill capacity is calculated to be 81% of total potential based on historical disposal patterns. For 2004, actual landfill disposal is used, which was 73% of permitted capacity.

Net export is calculated by subtracting Total In-State Management Capacity from Total Generation. Total In-State Management

Capacity is the sum of Total Diversion, Combustion Capacity and Potential Landfill Capacity