Solid Waste Task Force
March 25, 2010
4:00 PM
Room 24, City Hall

1. Austin Zero Waste Plan

   Documents: AUSTIN ZERO WASTE PLAN.PDF

2. ME Capacity Report 2007

   Documents: ME CAPACITY REPORT 2007.PDF

3. ME Waste Mgmt Plan 2009

   Documents: ME WASTE MGMT PLAN 2009.PDF

4. Solid Waste Recycling Study

   Documents: SOLID WASTE RECYCLING STUDY.PDF

Austin, Texas

Zero Waste Strategic Plan

December 4, 2008

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CITY COUNCIL RESOLUTION

No. 20090115-050

WHEREAS, consistent with its goal to make Austin the most livable city in the country, the Austin City Council adopted Resolution No. 20050519-44 in May 2005 supporting the United Nations Environmental Accord and committed the City to achieving a 20 percent reduction in per capita solid waste disposal to landfills and incinerators by 2012, and Zero Waste to landfills and incinerators by 2040; and

WHEREAS, Zero Waste is an ambitious goal to divert 90% of waste from landfills and incinerators by 2040 using a "whole system" approach to evaluate and manage the flow of resources and waste created by our communities; and

WHEREAS, Austin is part of a regional waste management system within the Capital Area Planning Council of Governments (CAPCOG) region; and

WHEREAS, as the Capital Area continually grows, outpacing other Texas communities, the region will be faced with a need to expand existing landfills, open new landfills, or divert a drastic amount of waste from current landfills to properly ensure the health and safety of the region. Austin's Zero Waste Plan seeks to extend the life of existing landfills while acknowledging that a certain amount of residual waste is inevitable; and

WHEREAS, the City Council adopts the Zero Waste Strategic Plan, attached hereto as Exhibit A and hereafter referenced as the "Plan," as a long term planning vehicle and further directs the City Manager to incorporate the Plan into the development of a Solid Waste Services Master Plan. City Council recognizes that the policy and program recommendations in Section C of the Plan may necessitate changes to rules, ordinances, and/or policies and will require on-going collaboration with key stakeholders, public private partnerships, and close coordination with public and privately owned regional waste disposal facilities and recycling and compost operations; and

WHEREAS, Austin recognizes the need to encourage and assist in the development of one or more public and/or public/private material recovery facilities which can respond to the solid waste and recyclables markets through composting recycling, landfilling and other appropriate means of solid waste management; and

WHEREAS, in 2007, the City hired Gary Liss and Associates to work with community members and develop a Zero Waste Strategic Plan; **NOW, THEREFORE,**

BE IT RESOLVED BY THE CITY COUNCIL OF THE CITY OF AUSTIN:

The City Council adopts the Zero Waste Strategic Plan, attached hereto as Exhibit A and hereafter referenced as the "Plan," as the long term planning vehicle. City Council recognizes that the policy and program recommendations in Section C of the Plan may necessitate changes to rules, ordinances, and/or policies, and will require on-going collaboration with key stakeholders, public private partnerships, and close coordination with public and privately owned regional waste disposal facilities.

City Council approval is required for any changes to existing policies in effect as of January 14, 2009 with regard to control over pricing, collection and disposition of commercial solid waste and commercial recyclable materials, or to impose surcharges to, or limit the rights of, area landfill operators to receive waste.

City Council recognizes that the successful implementation of the Plan and achievement of Zero Waste will require the adoption of policies and procedures designed to encourage all stakeholders to work cooperatively toward this ambitious goal.

The City Manager is directed to continue to inform and involve the City Council, the Solid Waste Advisory Commission, and other stakeholders as work progresses on specific programs, and to seek City Council approval on changes to policy and ordinances.

BE IT FURTHER RESOLVED:

The City Council directs the City Manager to develop an interim Zero Waste infrastructure transition plan to manage and implement the following four Zero Waste policy priorities pending completion of the Solid Waste Master Plan:

1. Lead by example. Evaluate departmental waste streams for baseline data and future monitoring within one year of adoption of the Plan. Within three years of adoption of the Plan, frame, develop and implement, where appropriate and feasible, waste diversion programs with input from City Departments.

2. Consider and implement proactive education and enforcement methods for the Commercial and Multi-family Recycling regulations. Develop and present to City Council City Code amendments as necessary to require recycling at all commercial enterprises and multi-family residences and include them in the stakeholder process. The proposed City Code amendments should become effective in phases over a three year period.

3. Reach out to institutions, industrial facilities, and manufacturers, to encourage them to adopt and implement zero waste goals.

4. Promote composting to remove organic material and compostables from landfills, which is necessary to reduce methane and carbon emissions. First, identify the best strategies to promote on-site composting at work and home. Second, evaluate infrastructure for residential curbside, commercial, and institutional composting; develop strategies to increase composting capacity; and implement a pilot curbside composting program when composting capacity is available.

The City Council further directs the City Manager to pursue the following Zero Waste items, as staff time and funding permits:

- Until the Master Plan can provide recommendations on the Pay-As-You-Throw rate structure, build on the progress made in the FY2009 budget and make the Pay-As-You-Throw rates incentivize waste diversion and fully fund zero waste initiatives and SWS operational requirements.

- Develop and present to City Council, City Code amendments or implement rule changes as necessary to encourage sustainable practices, including recycling and other zero waste practices, at events that require the use of public facilities and rights of way, starting with large events.

- Develop an education program for Appendix D of the Plan, identifying the various resources available to the community.

- Allocate staff time and resources to work with local government officials across Texas to launch a Texas Product Stewardship Council.

- Evaluate and develop a public and private partnership for neighborhood reuse center (possibly a pilot program).

- Play an active role in lobbying the state legislature to improve the Texas Computer Take Back Law and expand producer take back to other products such as TVs, fluorescent lighting, pharmaceuticals, nonrechargeable batteries, etc.

- Recognizing the legislative limits of flow control over landfills, begin a dialogue with regional partners to evaluate ways to influence flow control and enhance Zero Waste in the CAPCOG region.

- Evaluate advancements in technology and facilities that help the city/region achieve zero waste with an emphasis on the economic and environmental impact.

- Encourage existing landfill operators to collect methane gas, and initiate a study of issues surrounding the use of landfill methane as an energy resource and its implications for the City's goals regarding zero waste and climate protection.

ADOPTED: January 15, 2009 **ATTEST:** Shirley A. Gentry
Shirley A. Gentry
City Clerk

EXECUTIVE SUMMARY

Zero Waste is a design principle that goes beyond recycling to focus first on reducing wastes and reusing products and then recycling and composting the rest. Zero Waste works to redesign the system to mimic natural systems, recognizing that one man's trash is another man's treasure and everything is a resource for something or someone else. Currently, Austin is estimated to lose over $40 million annually by sending materials that could be recycled or reused to area landfills.

Austin's Zero Waste system will strive to recover that estimated loss and eliminate waste, or get darn close. This Plan defines success as reducing by 20% the per capita solid waste disposed to landfills by 2012, diverting 75% of waste from landfills and incinerators by 2020, and 90% by 2040.

Zero Waste Businesses are already leading the way, diverting over 90% of their wastes from landfills and incinerators. Local Zero Waste Businesses have documented that they save money, reduce their liabilities, increase their efficiency and contribute significantly to addressing climate change. Austin's Zero Waste Plan considered Austin's current and planned public and private solid waste infrastructure, as well as the City's Climate Protection Program.

Recommendations developed through this process are integral to achieve the City adopted United Nations Urban Environmental Accord's goal to reduce by 20% the per capita solid waste disposal to landfills by 2012 and Zero Waste by 2040. Zero Waste initiatives could reduce greenhouse gases by nearly 500,000 metric ton carbon equivalent (MTCE), making Zero Waste one of the most significant contributors to reducing climate change that the City can influence at the local level.

The City of Austin was an early leader to implement recycling and to adopt producer responsibility and commercial recycling policies. The City of Austin's Zero Waste Plan proposes to build on the City's past success to work together throughout the region and state to:

- Expand and improve local and regional reuse, recycling, and composting programs;
- Adopt new rules and incentives to reward those who embrace the goal of Zero Waste;
- Develop Green Campuses and Resource Recovery Parks for Zero Waste infrastructure;
- Advocate for producer and retailer responsibility for product and packaging wastes, and bans on problem materials;
- Educate and advocate for a Zero Waste agenda as part of climate change and sustainability policies and programs; and
- Involve the community through collaboration and partnerships to achieve Zero Waste.

On a regional scale, the Capital Area Council of Government's (CAPCOG) Solid Waste Advisory Committee noted that Austin's Zero Waste initiatives support the waste reduction goals of the Regional Solid Waste Management Plan and the recommendations of the Market Analysis of Recoverable Materials (2007) prepared for the CAPCOG region by R.W. Beck.

The City of Austin has already taken the first critical step by committing to Zero Waste. This plan is intended to serve as the first step on a long path towards a Zero Waste future. Dedication, collaboration, and continual re-evaluation will be essential to Austin's success.

A. BACKGROUND AND EXISTING SYSTEM

1. BACKGROUND

In 2005, the City of Austin Solid Waste Advisory Commission (SWAC) and its Long-Range Solid Waste Planning Task Force (Task Force) worked with staff of the City Solid Waste Services Department to develop a scope of work for the Zero Waste Plan. A consultant was solicited to develop a Zero Waste Plan that would:

- Consider current and planned public and private solid waste infrastructure;
- Consider the City of Austin's Climate Protection Program and the United Nations Urban Environmental Accords goal to reduce by 20% the per capita solid waste disposal to landfills by 2012 and zero waste by 2040;
- Emphasize reduction, reuse, and recycling of waste;
- Include a specific timetable for each priority, including actions to be taken for the greatest impact on the diversion of materials sent to landfills;
- Estimate order of magnitude costs for each priority action;
- Include public education and outreach to promote the concepts of the plan;
- Integrate the concept of eco-industrial parks;
- Include effective methodologies for maximizing Producer Responsibility;
- Address applicable rules, regulations and policies necessary to support zero waste goals;
- Address rules, regulations, policies and infrastructure investments that constitute barriers to achieve these goals; and
- Obtain input from the Task Force and SWAC, and seek input from a broad range of stakeholders, including businesses, environmental organizations, and the community at large.

On November 29, 2007, the City Council awarded a contract to Gary Liss & Associates (GLA), Loomis, CA to develop a Zero Waste Plan for the City of Austin.[1] GLA reviewed background information provided by City staff then met in Austin monthly over the following four months in an extensive series of public meetings, focus groups and interviews with key stakeholders, business leaders, environmental organizations and the community at-large. A list of the meetings held by GLA can be found in Appendix A.

At the first public presentation before the SWAC in January 2008, over 50 stakeholders and the public attended. The event received media attention from four local TV stations, two radio stations and two Austin newspapers. The focus of the first presentation was an Introduction to Zero Waste and what other communities and businesses were doing around the country. In February, GLA presented its preliminary findings to over 100 stakeholders and the public on its analysis of Austin's existing programs and facilities as well as untapped service opportunities that could help Austin achieve Zero Waste. In March 2008, GLA met with over 100 individuals in a series of three focus groups on: Organics; Green Building; and Construction and Demolition Debris Recycling and Reuse. For each of the focus groups, GLA invited service providers and waste generators, as well as other interested stakeholders, to help clarify the needs for Austin. In March, GLA also made an initial presentation to the Capital Area Council of Governments

(CAPCOG) Solid Waste Advisory Committee (SWAC), to obtain their input on Austin's Zero Waste initiatives. In April 2008, GLA presented Draft Recommendations to be part of the Zero Waste Plan, and solicited input from stakeholders and the public. GLA also met with the CAPCOG SWAC and separately with Travis County leaders to explore how Austin could work best with its regional partners on its Zero Waste initiatives. The public input and recommended policy options received were categorized based on goals/objectives and can be found in Appendix B.

This Plan summarizes the analysis and input received on Zero Waste and makes recommendations for the City of Austin on how to proceed to Zero Waste. Although there are several recommendations included in this Plan, there is no one right way to get to Zero Waste. Many paths can be taken. Zero Waste is about the commitment and the journey. Austin has taken the first step to commit to this goal. Everything else should fall into place by repeatedly evaluating whether and how it will contribute to Zero Waste. To reach its goal, the City will require a great deal of effort and support by all stakeholders: City staff and elected officials; solid waste, reuse, recycling and composting service providers; local businesses; environmental and civic groups; schools and colleges; religious leaders; County and regional staff and elected officials, State representatives for this region in the State Legislature, and State agencies. Hopefully this collaborative Zero Waste Plan process will serve as the genesis to continue discussion, planning, and action towards a Zero Waste future.

2. ZERO WASTE AND CLIMATE CHANGE

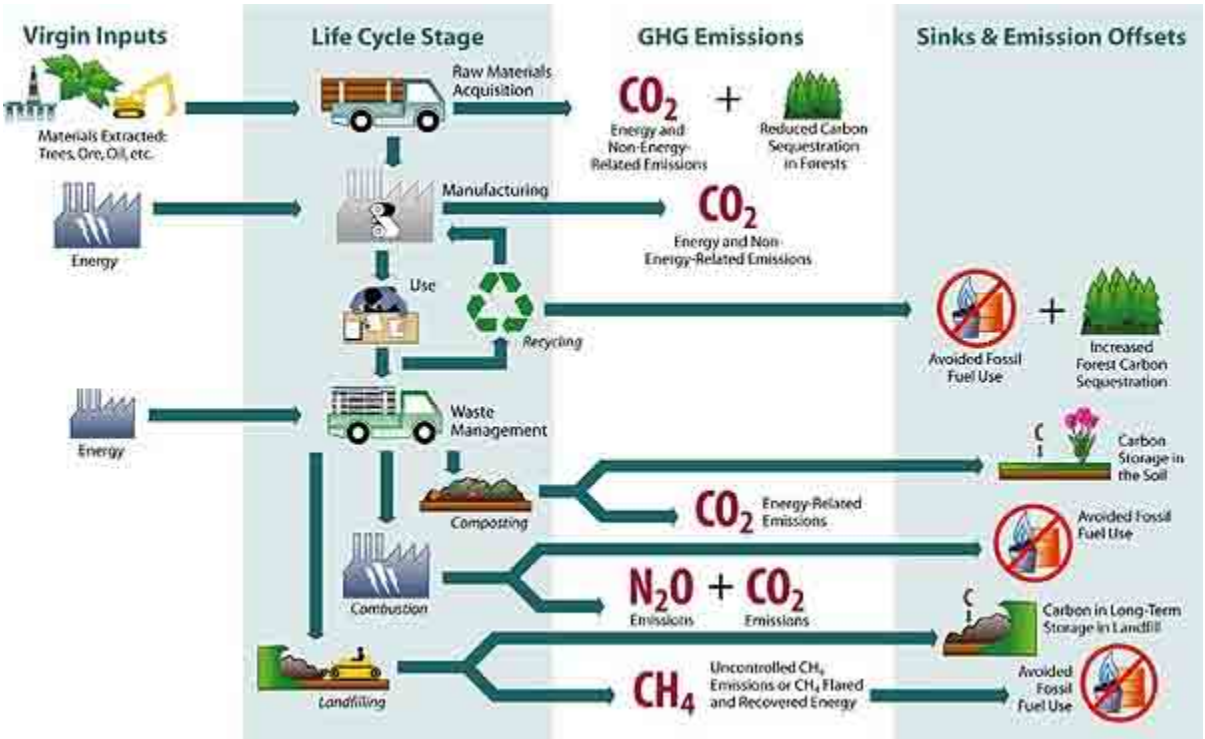
Concern about climate change has altered how communities handle and think about solid waste. Under Mayor Will Wynn's leadership, the City signed onto the Urban Environmental Accords which commits Austin to reduce its waste per capita by 20% by 2012 and achieve Zero Waste by 2040.[2] In 2007, the City of Austin also adopted its **Climate Protection Plan (CPP)** that highlights the importance of these issues**.** The intent of the CPP is to reduce greenhouse gas (GHG) emissions, the primary contributor to climate change, make Austin the leading city in the nation in the fight against global warming.[3] The CPP elements include:

- Municipal Plan - Make City of Austin facilities, fleets and operations carbon-neutral by 2020.
- Utility Plan - Expand conservation, energy efficiency, and renewable energy programs to reduce Austin Energy's carbon footprint; cap carbon dioxide emissions from existing power plants; and make any new electricity generation carbon-neutral.
- Homes and Buildings - Update building codes for new buildings to be the most energy-efficient in the nation, pursue energy efficiency upgrades for existing buildings, and enhance Austin Energy's Green Building program.
- Community-wide - Engage Austin citizens, community groups, and businesses to reduce greenhouse gas emissions throughout the community.
- "Go Neutral" Plan - Provide tools and resources for citizens, businesses, organizations, and visitors to measure and reduce their carbon footprint.

But how does Zero Waste influence Climate Change?

The U.S. Environmental Protection Agency has been studying the links between solid waste and climate change for over a decade. Their website contains detailed analysis and summary steps that individuals and businesses can take to reduce their carbon footprint.[4] The EPA graphic below (Figure 1) highlights "the different sources of GHG emissions from waste….The disposal of solid waste produces GHGs in a number of ways. First, the anaerobic decomposition of waste in landfills produces methane, a GHG 21 times more potent than carbon dioxide. Second, the incineration of waste produces carbon dioxide as a by-product. In addition, the transportation of waste to disposal sites produces GHGs from the combustion of the fuel used in the equipment. Finally, disposal of materials indicate that new products are being produced as replacements; this production often requires the use of fossil fuels to obtain raw materials and manufacture the items." [5]

Figure 1
Life Cycle of Waste



The State of California has given additional consideration to the relationship between climate change and solid waste disposal. The California Air Resources Board (CARB) is responsible for implementing AB32, the Global Warming Solutions Act. CARB convened the Economic and Technology Advancement Advisory Committee (ETAAC) which was comprised mostly of business leaders from different sectors of the state's economy. In their Final Report adopted in February 11, 2008, ETAAC recognized the connections between solid waste disposal and climate change:

> "ETAAC recognizes the hierarchy of waste reduction, reuse, and recycling to reduce GHG emissions. These waste management strategies also avoid the energy use and other environmental impacts associated with extracting, processing, and transporting raw materials. Eliminating upstream emissions by reducing,

recycling and composting can result in substantial climate change mitigation benefits."[6]

ETAAC then recommended the following measures to be adopted by the State:

- Develop Suite of Emission Reduction Protocols for Recycling
- Increase Commercial-Sector Recycling
- Remove Barriers to Composting
- Reduce Agricultural Emissions through Composting

The latest report on these issues, *Stop Trashing the Climate*, "provides compelling evidence that preventing waste and expanding reuse, recycling, and composting programs — that is, **aiming for Zero Waste — is one of the fastest, cheapest, and most effective strategies available for combating climate change**. This report documents the link between climate change and unsustainable patterns of consumption and wasting, dispels myths about the climate benefits of landfill gas recovery and waste incineration, outlines policies needed to affect change, and offers a roadmap for how to significantly reduce greenhouse gas (GHG) emissions within a short period."[7] The report also finds that "**significantly decreasing waste** disposed in landfills and incinerators **will reduce greenhouse gas emissions the equivalent to closing 21% of U.S. coal-fired power plants.** This is **comparable to** leading climate protection proposals such as **improving national vehicle fuel efficiency**. Indeed, preventing waste and expanding reuse, recycling, and composting are essential to put us on the path to climate stability."[8]

Based on the information gathered above, one of the keys to addressing climate change locally is by reducing the waste sent to landfills to reduce the methane produced in anaerobic conditions. **Even the best-managed landfills *over the average lifetime of the facility* are not expected to recover over 75% of the gases produced.**[9] In addition, 30 years after landfills are approved by the federal government for complete closure, private owners are no longer required to manage those landfills under federal law. The surfaces of sites that are not maintained open up allowing rain to enter through the cracks. Gas and leachate are produced and are no longer controlled. In addition to these direct landfill impacts locally, **for every ton of solid waste produced locally, there are 71 tons of waste produced "upstream" from mining, manufacturing and distribution of products.**[10] These upstream impacts also have many climate change implications as well, some of which are factored into calculators available from the US Environmental Protection Agency.

Based on this data, Zero Waste needs to be an integral part of the City's climate change initiatives. This will take close coordination and strong partnerships between the City's Climate Protection staff and the staff of the Solid Waste Services Department. In addition, all City of Austin facilities, fleets and operations should take an active role in evaluating and implementing ways to help meet Zero Waste goals as part of these climate change initiatives.

3. EXISTING SOLID WASTE AND RECYCLING SYSTEM

In considering how to get to Zero Waste, it is important to understand how Austin's solid waste management system currently functions, including what is within the City of Austin's control and what is not.

The City of Austin's Solid Waste Services Department is responsible for city-wide litter abatement and collection of solid waste from 163,965 residential customers, 234,965 anti-litter customers, and 2,603 commercial customers, which includes small multi-family dwellings of 4 units or less and a limited number of qualifying small businesses. In addition to providing weekly garbage pick services, the City also offers curbside recycling to its customers.

Using a conservative 7.3 lbs. per person per day and Austin's population of 743,358, GLA estimated that the annual tons generated for landfill in Austin, Texas is projected to be about 1,000,000 tons per year.[11] Modeling information from regional data and other cities of similar size and character, GLA then estimated the percentages by market categories of contributing materials in the 1,000,000 tons per year of discards. Many of the values were reconfirmed through site visits with recycling and composting industry representatives in the area. City recycling collection data also indicates that this analysis is fairly accurate. In FY06/07, the City collected over 70,000 tons of recyclable and organic resources: 31,876 tons (45.5%) from curbside recycling; 26,635 tons (38.1%) from collection of yard trimmings and brush; and 12,122 tons (17.3%) from private users of the City's materials recovery facility. Figure 2 separates these materials into categories and identifies compostable organics compose over half of the total material discarded. These categories were then broken out to the estimated annual tonnages of marketable resources and issued a value based on current market prices (See Table 1). Calculations indicate that the **value of the materials currently sent to the landfill and lost to the local economy is over $40 million annually**.[12]

Figure 2

Austin Texas Discards Sorted into the 12 Market Categories
Note: Half of the Materials are Suitable for Compost

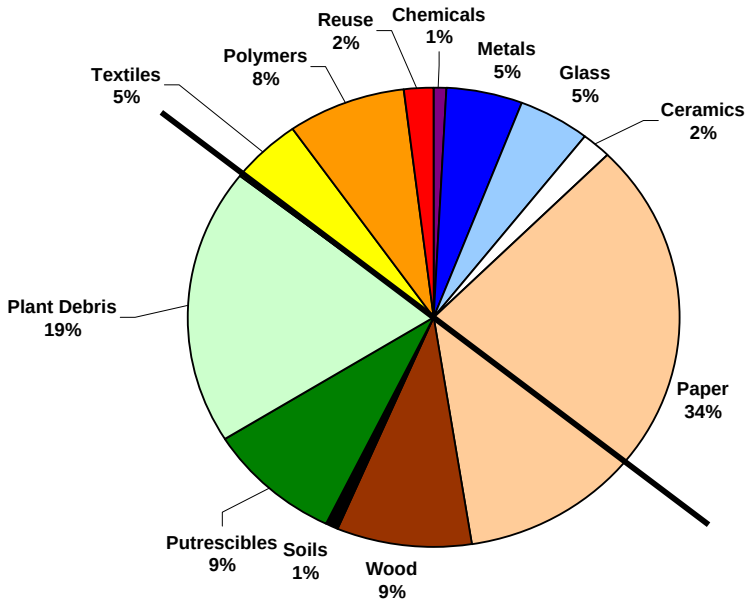


Table 1
Resource Commodity Analysis Austin Texas
(In order of value of materials discarded)

Categories	%	Annual Tons	$/Ton[13]	Annual $
Paper	36	360,000	50	18,000,000
Reusables	2	20,000	550	11,000,000
Textiles	5	50,000	100	5,000,000
Polymers	8	80,000	50	4,000,000
Metals	5	50,000	40	2,000,000
Plant Debris	20	200,000	7	1,400,000
Putrescibles[14]	9	90,000	7	630,000
Glass	5	50,000	10	500,000
Wood	6	60,000	8	480,000
Ceramics	2	20,000	4	80,000
Soils	1	10,000	7	70,000
Chemicals	1	10,000	5	50,000
Total	**100**	**1,000,000**		**$ 43,210,000**

With nearly 60% of the residents of Austin living in single-family dwellings and participating in curbside recycling for recyclable materials and organics, achieving Zero Waste among single-family residents is an ambitious, but achievable goal. Yet, is the same true for commercial and multi-family contributors?

While the City is responsible for single-family residential collection, multi-family residences, businesses, and institutions must contract with private haulers to collect and process their materials. Currently, the City can only control the flow of the residential streams, but not the commercial streams. The City can, however, influence what happens in the commercial sector through the policies, programs, and ordinances it adopts. This is best evidenced in the City's Commercial Recycling Ordinance passed by the Austin City Council in 1998 (Appendix C).[15]

According to the City's Recycling Ordinance:

- Apartments and Multi-Family Communities with 100 units or more must provide on-site recycling of any four of the following materials: aluminum cans, tin/steel cans, glass containers, plastic bottles, newspaper, cardboard, kraft paper bags, and home office paper.
- Businesses and Office Buildings with 100 employees ore more must provide on-site recycling of any two of the following materials: aluminum cans, tin/steel cans, glass containers, plastic bottles.

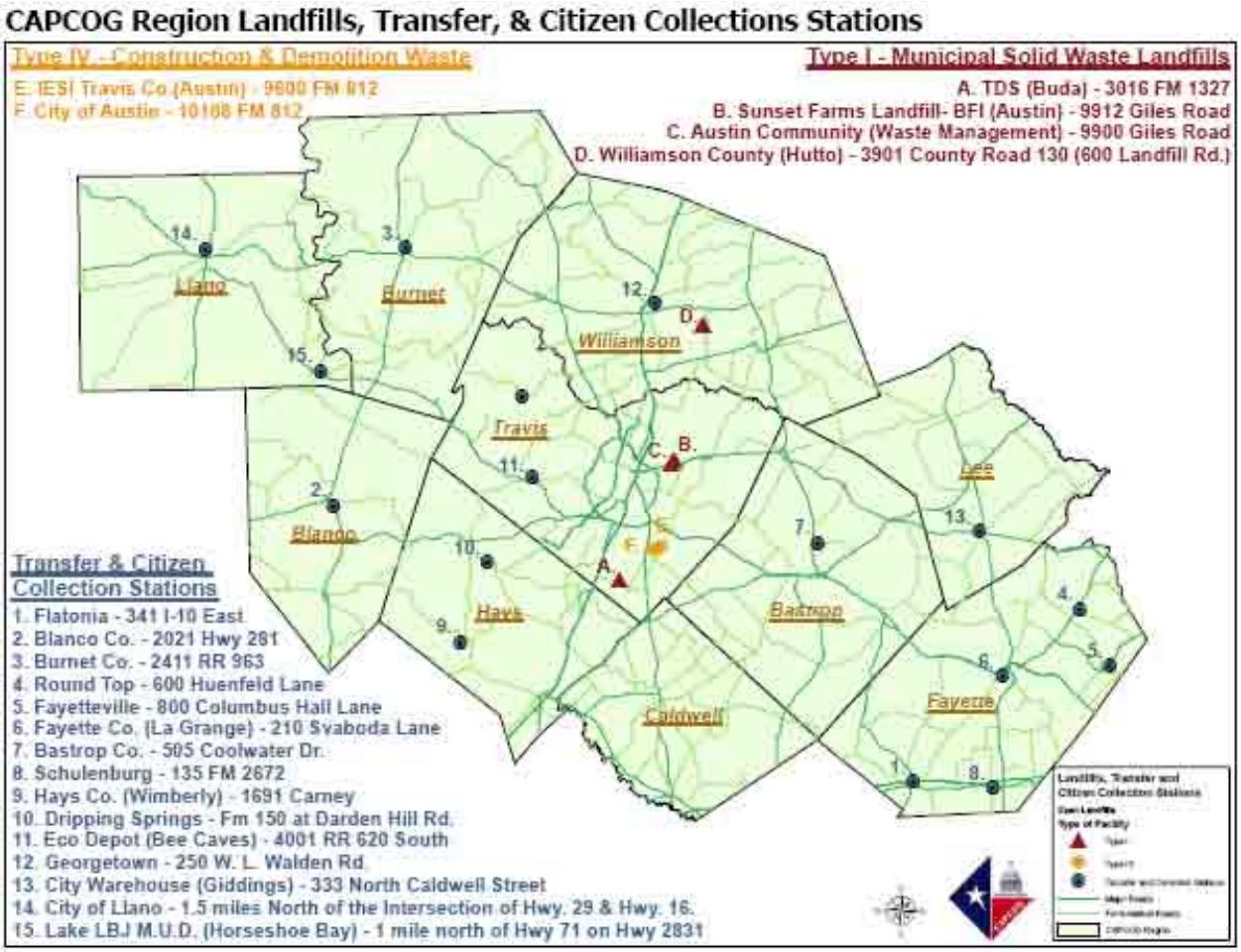
In part because of the Recycling Ordinance, numerous large buildings recycle paper, thereby supporting a substantially sized paper recovery industry in Austin. Similar benefits from the Recycling Ordinance were reported for other recyclables making the recovery of materials in Austin well established for most commodities. International markets are also thriving and have dramatically increased the value of these commodities in recent years contributing to the success

and sustainability of these markets. Clearly, the City is capable of having a greater impact on the commercial and institutional collection system by collaborating with stakeholders to adopt policies and programs that incentivize, encourage, and, as a last resort, require more environmental responsibility to stimulate a sustainable green market economy. Where collaboration falls short, the City can influence waste management practices by leveraging its regulatory authority over waste haulers.

Under Texas State Law, cities have the authority to regulate solid waste service providers in their communities. The City of Austin currently issues licenses to regulate commercial solid waste haulers authorized to transport waste in the City limits. The current annual fee is a multi-tiered system based on the number of containers and the number and size of trucks operating within the City limits by the hauler. The City of Austin may be able to use its regulatory authority to obtain more information about the total amount of waste being disposed by haulers, develop funding resources to support Zero Waste initiatives, and develop incentives to encourage recycling.

As noted above, the City has limited control over the disposal system. In fact, now that the City has closed its own landfill, it is just like the many other regional landfill users. Like many Texas cities, Austin is part of a regional system of landfills, transfer stations and citizen collection stations as depicted in Figure 3.[16] According to the Capital Area Council of Government's

Figure 3



(CAPCOG) Regional Solid Waste Management Plan, "…the implementation of Subtitle-D Regulations has produced the most significant impact on solid waste disposal in the State of Texas…. moving away from reliance on smaller rural landfills, to more regionalized systems, based on larger landfills."[17] In 1990, there were thirteen (13) landfills receiving waste in the CAPCOG region. By 1995, there were six (6) permitted landfills in the CAPCOG region receiving waste. As of 2008, the CAPCOG region still has six (6) permitted landfills receiving waste.

With the CAPCOG Region continually growing and outpacing other Texas communities, this region will be faced with a need to expand existing landfills, open new landfills, or divert a drastic amount of waste from current landfills to properly ensure the health and safety of the region. It has been projected that a total of 33 counties send some if not all of their waste to the four Austin area landfills in addition to the ten Counties that make up CAPCOG. Although there are some possibilities for controlling the flow of wastes going to those landfills, it will take a strong regional consensus to move those possibilities forward.

The focus of CAPCOG, outlined in the most recently adopted Regional Plan, is to:

- Encourage Household Hazardous Waste Collection and Diversion Programs
- Promote public education on integrated solid waste management
- Promote community clean up events to provide alternatives to illegal dumping
- Continue and enhance current illegal dumping enforcement programs
- Continue effective and efficient management and operation of recycling services
- Explore alternatives to dealing with the disposal of special wastes, including construction and demolition debris, oil, used tires and electronics
- Encourage proper management and disposal of solid waste
- Promote reduction in the disposal amount of yard waste and encourage recycling

Many of the focus items identified by the Regional Plan are addressed in the following analysis and recommendations, highlighting how Zero Waste is a logical extension of the policies and programs that have already been adopted in the region.

B. POLICY AND PROGRAM OPPORTUNITIES

1. SERVICE OPPORTUNITY ANALYSIS

Service opportunity analyses identify existing services available and highlight where new services are needed to help the community reach Zero Waste. In a Zero Waste systems approach, one of the first steps to be completed is an inventory of the materials generated in the service area and identification of the facilities that reuse, repair, recycle and/or compost the materials. This analysis incorporates all material generated and all facilities processing the materials, including self-hauled, public, and private service providers. The inventory does not, however, include landfills or incinerators. A complete analysis of the inventory will not only identify existing programs and facilities in the Austin area that currently reuse, recycle or compost discarded materials generated in Austin, but will also reveal voids or gaps in material markets and services available.

Discards are identified by standard classifications and sorted into twelve market categories, similar to the pie chart in Figure 2. For each classification, market options are identified, both inside Austin and outside Austin, including internationally. This step also allows identification of products or packages that have unacceptable disposal options and/or need opportunities for new services.

Issues of access, opportunity, availability and knowledge are addressed next. In many cases, such as disposable diapers, the inventory shows that there is no reuse, recycle or compost option. In such instances, these items should be addressed as producer responsibility issues. As Martin Bourque of the Berkeley Ecology Center explains, "If it can't be reused, repaired, rebuilt, refurbished, refinished, resold, recycled or composted, then it should be restricted, redesigned, or removed from production."[18]

The results of the market inventory can be found in Appendix D. Options to improve existing systems are summarized in the Program and Facility Analysis section of this Plan.

2. PROGRAM AND FACILITY ANALYSIS

A review of the service opportunities identify the areas where new rules coupled with redesigned storage, collection and processing systems would allow for the diversion of more materials from area landfills. Table 2 identifies the key opportunities.

Based on the information gathered, the most opportunity to improve diversion exists among the materials that already have a market potential to be reused, composted, or recycled such as used construction materials, treated wood, and organic materials such as food wastes. Several of the policy options discussed later in this Plan have the same goal as Single Stream Recycling and Resource Recovery Centers, making services more readily available in order to increase participation and expand the diversion services provided in Austin. There is also a significant amount of work needed in the area of making manufacturers responsible for taking back products and packaging they sell in the area that are not safe for landfills or are difficult to recycle locally.

Table 2
Program and Facility Opportunities

Material	Current Services	Program/Facility Opportunity
Food Waste	Some commercial food discards are accepted at one site.	Operating capacity is needed for the whole city.
Fish and Meat Waste	Some commercial discards are accepted at one site.	Operating capacity is needed for the whole city.
Used Construction Materials	Two companies take selected materials.	Need 12-category resource recovery centers located in neighborhoods to handle.
Treated Wood	One company is limited to accepting reusables.	Need 12-category resource recovery centers located in neighborhoods to handle.
Fines (e.g. soil from C&D excavation)	Residential market available. Limited commercial services available.	Need 12-category resource recovery centers located in neighborhoods to handle clean soil or establish systems for nurseries and contractors handle these materials directly
Window and Other Glass	Limited market if recovered completely during construction/demolition.	Need glass market for window and other glass
#3-7 and Other Plastics	Limited local market	Existing infrastructure should be evaluated to determine if it is capable of handling capacity.
Diapers/Hygiene Products	No market.	Products need redesign, restrictions or regulations.

4. ZERO WASTE POLICY AND PROGRAM OPTIONS

As previously stated, there is no one right way to achieve Zero Waste and many paths can be taken. The City has already adopted significant local policies establishing rules for residents and businesses to participate in the City's solid waste and recycling system. The City's Recycling Ordinance was designed to:

- Increase access to the benefits of recycling and waste reduction for area businesses and multi-family properties within the City of Austin
- Help increase the life of local landfills
- Decrease disposal costs for area businesses and multi-family properties
- Have a positive impact on the environment generally in terms of reduced pollution and energy consumption.

The Recycling Ordinance empowers the Director of the Solid Waste Services Department to adopt and revise rules, procedures and forms to regulate commercial and multi-family recycling in the City of Austin. Revisions to existing policies as well as most of the additional policies

recommended below could cite the same authorities and purposes identified by the Recycling Ordinance and enhanced by the provisions of the CPP adopted by Austin City Council in 2007.

During the Zero Waste Plan process, several policy and program options were discussed among community members and stakeholders. Appendix B details the options discussed with and recommended by the public to provide a better understanding of everything considered in making recommendations for the City of Austin and the region. Additionally, as the City achieves its goals, staff can look back at the options discussed with and recommended by the public to discuss and evaluate whether or not to implement the remaining options. The policy and program options detailed in Appendix B are organized by the following categories:

- **Upstream** - Advocate for Extended Producer Responsibility (EPR) legislation and programs for producers to take back their products and packaging.
- **Downstream** - Reduce, reuse, recycle and compost all materials that are discarded for their highest and best use.
- **Green Business, Green Buildings and Jobs** - Reinvest discarded resources into the local economy with incentives and support for green, sustainable, and Zero Waste businesses. Entrepreneurs will create new green collar jobs from discarded resources if given the opportunity, resources and stimulus to do so.
- **Residuals Management and Regional Coordination** – Stop or regulate the flow of wastes from outside the area into landfills in the Austin area as the region reduces its reliance on landfills.

These options were not intended to be adopted together. Some are complementary while others work best independently. In some cases, options may even conflict with one another. Each of the listed policies and programs were further organized into 3 categories:

- **Voluntary, Education & Incentives** may be the easiest policies and programs to implement, but may not achieve goals by themselves. Most of these options would complement other policies and programs.

- **New Rules & Advocacy** may be done with virtually no City funding required, except for initial education and ongoing enforcement staffing. These options may also require the largest investment of political capital to adopt them, but could also shift the responsibility for funding new programs to those who are currently benefiting the most from the sale of products and packaging. These approaches may also require the City to work with other interested communities and stakeholders in Texas to develop collaborative policies and programs, and/or to work with the State Legislature to adopt new policies and programs statewide.

- **New City Programs** will generally require the most funding. For example, new City programs could expand the approach used to serve single-family residents to serve multi-family residents and businesses. Whether the City provides the services itself, or contracts for services to be provided, it will need to budget for those services and plan for the likelihood of on-going expenses. New programs for multi-family and commercial businesses will require new funding sources,

which could be obtained through cooperative efforts with private service providers or from new rate structures, fees, or taxes on disposal.

UPSTREAM POLICY AND PROGRAM OPTIONS

Wasting is a design decision and does not have to be inevitable. Producers design products and packaging "upstream" from the local government solid waste and recycling system. For every ton of waste in the local solid waste and recycling system, there are 71 tons produced "upstream" from mining, manufacturing and distribution of wastes.[19] Producers and retailers have shifted the responsibility of managing the disposal of after-life products to local governments. In a Zero Waste system, once they accept physical and/or financial responsibility for their products and packaging, producers and retailers will have an incentive to design waste out of the system. This is known as "Extended Producer Responsibility" (EPR) or "Product Stewardship."

EPR is one of the most powerful opportunities that exist to move society and the economy towards Zero Waste, particularly for products and packaging items that are toxic or currently difficult to reuse, recycle or compost. In advocating for EPR, the system should establish efficient repair and reuse programs to retain the form and functions of products, rather than taking back products and packaging to just be crushed or shredded for recycling. EPR systems should also ensure the redesign of products and packaging to eliminate waste and encourage durability and longer product life cycles.

Local governments have authority in the area of health and sanitation to make rules as to what can and cannot be placed into the City waste system. If a material has been designated by a State or Federal Agency to be a pollutant or banned from the landfill, local governments can require the seller of the material to be responsible for disposal of that product. In New York City, an ordinance was recently adopted that requires all retailers of electronic products to take back those products to be reused or recycled.[20] The statutory basis for the New York City legislation was the state's Solid Waste Management Act, which requires local governments to provide solid waste and recycling services. Although Texas's Solid Waste Disposal Act does not provide local governments with the exact same regulatory authority as in New York, Austin can work with other regions and surrounding communities to identify key elements of the Texas Solid Waste Disposal Act that can be utilized or modified to help the Austin area achieve Zero Waste goals.

Under the Texas Solid Waste Disposal Act, the City of Austin and other local governments can assert their combined influence to develop and adopt policies that keep certain materials out of regional landfills. Once City and/or regional staff identify and agree on the options they are most interested in, further legal review will determine how the policy can be adopted locally, regionally, or whether legal authority from the State may be required. If State legislation is required, the City could use this opportunity to collaborate with surrounding communities, identify the materials that are most difficult and costly to manage locally/regionally, and unite local governments behind a common goal of shifting disposal responsibility of certain materials back to the producer.

Under Mayor Kirk Watson's leadership from 1997-2002, the City of Austin was an early leader in favor of producer responsibility and take back programs. In 2007, the Austin City Council and other local governments took a stand in favor of producer take back recycling of electronic

waste.[21] As a State Senator, Kirk Watson sponsored HB2714, landmark legislation passed in 2007 by the Texas Legislature requiring manufacturers who sell computers in Texas to provide convenient and free computer recycling. This is a model for other ways to collaborate on a statewide basis to develop the new rules, policies and incentives that will be essential to achieve Zero Waste.

DOWNSTREAM POLICY AND PROGRAM OPTIONS

Downstream policies and programs are designed to reduce, reuse, recycle and compost materials that are discarded based on their highest and best use. Highest and Best Use Hierarchies attempt to rank systems based on their ability to maximize resource conservation and minimize environmental and economic impacts. Austin may wish to use or adopt the hierarchy in Appendix H to guide its evaluation and consideration of future Zero Waste downstream policy and program options.

Zero Waste has been defined by the Zero Waste International Alliance as an economic and physical system that emulates natural cycles, where all outputs are simply an input for another process. This means designing and managing materials and products to place the highest priority on conserving resources and retaining their form and function without burning, burying, or otherwise destroying their form and function. It means eliminating discharges to land, water or air that harm natural systems. It means preventing rather than managing waste and pollution, and recommitting to the priority order of the waste reduction hierarchy which is: (1) reduce consumption; (2) reuse what is left; (3) recycle anything that is no longer usable; and (4) landfill any residuals.

Voluntary policies, education and incentives should be designed to engage, educate, motivate and inspire diverse audiences with simple, positive, clear communications. Policies and programs should develop partnerships within and beyond Austin, among other government agencies, businesses, and non-government organizations. Policies, incentives and new rules should aim to reduce and eliminate incentives for landfilling materials and phase out use of toxic materials in products and processes. Educational initiatives should champion, highlight, and celebrate successes in moving towards Zero Waste. The City should provide information about Zero Waste and sustainability actions – what to do, how to do it, and why it is important.

The two key areas of discussion for downstream options focused on (1) expansion of reuse, recycling, and composting opportunities and (2) modifying existing systems such as fee structures and permitting processes to create incentives to recycle more and reduce waste.

Expanding Reuse, Recycling, and Composting Opportunities. Like Austin, many communities are now implementing "single-stream" recycling programs for their single-family residential customers. Austin is replacing the current 18-gallon recycling bins with 90-gallon rolling carts in which all recyclables can be combined together. The new program is expected to increase recycling participation rates by 40%, based on the success of City conducted pilot programs. The reason for such a high increase in participation can be attributed to the fact that single-stream recycling programs make it more convenient for the public to participate and recover more materials.

The key to the success of single-stream recycling programs is providing strong education and information to participants and ensuring that processing facilities are designed and operated to produce no more than 10% residue. For Austin, it will also mean educating the public that separating "wet" waste from "dry" recyclable materials, which will be collected together in the single-stream carts, will be essential to ensuring single stream's success. Many successful Zero Waste communities implemented single-stream recycling carts, and later added another cart for all organics including yard trimmings, food scraps and food-soiled paper. After Austin launches its single-stream recycling program and has time to fine-tune the new city-wide recycling system, the next step should be to evaluate how to provide composting of all organics, including food scraps.

Resource Recovery Centers can help provide recycling services where no other options are available. Resource Recovery Centers are generally locations or facilities where all 12 market categories of materials can be brought by residents and/or businesses to be reused, recycled or composted. Typically the materials are placed into commercial or industrial-sized containers like roll-off boxes, or placed into designated areas on the ground separated by large concrete blocks to separate the different material drop-off areas. As the City continually evaluates its Recycling Ordinance, Resource Recovery Centers may be a viable alternative option for smaller commercial and multi-family customers.

Rate and Fee Structures. Garbage rate structures and permitting fees are two powerful tools to encourage increased diversion. The City of Austin adopted a Pay as You Throw rate structure to encourage residential customers to reduce and recycle. However, changes in that rate structure could significantly contribute to meeting Zero Waste goals as services are expanded and new programs are brought on line. Suggested changes to that rate structure are detailed in the Downstream Options in Appendix B.

While the City does not control private collection fees, like public service providers, private haulers should pay for valuable materials and provide free or low cost hauling for clean, source-separated materials. Service providers should also make up any lost revenues by charging more for solid waste hauling services, not recyclables. Such a fee structure rewards businesses and organizations that comply with the City Recycling Ordinance, which requires source separation of reusable, recyclable and compostable materials.

To encourage participation in recycling and diversion efforts, especially among construction projects, the City could also incentivize recycling of construction materials with adjustments to its permitting fees or by requiring deposits refunded when waste diversion goals are met. The City could also use its authority to add fees, taxes, and data reporting requirements on waste hauling as conditions of service providers operating in the City. To fund new Zero Waste initiatives, the City could encourage the adoption of fees and taxes on waste disposal by counties and the State. These fees would be particularly important if the City selected to provide any of the new City program options identified in Appendix B.

GREEN BUSINESS, GREEN BUILDINGS AND JOBS

Zero Waste policy goals should recognize the significant opportunity for generating "Green Collar" jobs through reinvestment of discarded resources into the local economy. Zero Waste

policies must help retain and expand local and regional reuse, recycling, composting and green manufacturing businesses and facilities, which are critical elements to sustain Zero Waste initiatives and become a truly sustainable city.

The City should offer tangible economic incentives and technical assistance for green, sustainable, and Zero Waste businesses. Expanding existing incentive programs, including Green Building and Green Business programs, will also support and energize businesses around Zero Waste goals. The City could assist existing reuse, recycling and composting service providers to upgrade their appearance and operations, in order to be good neighbors. To identify the best locations for needed services, the City could also work with environmental justice, neighborhood, workforce development, and business development organizations.

Austin has already experienced major successes in the use of recycled materials, particularly at City Hall, green buildings in the downtown area, and the new Long Center for the Performing Arts, which recycled 97% of the old Palmer Auditorium. Austin Energy (AE) highlighted that most products are delivered to job sites in protective packaging which results in cardboard, plastic, and Styrofoam waste even though the product itself may not create any additional waste in its installation.[22] Some materials that do not have construction waste may not have manufacturing waste, since they are fabricated in a controlled process that generates little, if any, waste. The AE Green Building (AEGB) rating program attempts to provide incentives for use of products that are more durable, have a longer lifespan, require no additional finishing on-site and have less frequent maintenance and repair cycles. AE's programs also give credits for products made from recycled content.

Most of the projects enrolled in the AEGB program surpassed the 50% waste diversion requirement significantly. AE's multi-family residential program recently separated from the commercial program in August 2007 and adopted the same standard waste diversion requirement of 50% and optional credit base of 75% waste diversion as used under the commercial program. The AE single-family residential program has documented diversion rates on the Mueller redevelopment project, which requires a minimum of 25% diversion rate, even though most builders have documented rates of over 30% and 40% in the first six months of construction.

Businesses are leading the way to Zero Waste, diverting over 90% of their wastes from landfills and incinerators.[23] Zero Waste businesses that have been documented have all saved money, reduced their liabilities, increased their efficiency, and contributed significantly to addressing climate change. Designing waste out of the system by process improvements and decreasing the amount of materials used in products and packaging saves the most money. Reusing products and packaging (e.g., use of returnable shipping containers and pallets) saves the next most money. Recycling and composting both avoid solid waste collection and disposal costs, as well as generate revenue from the sale of the materials recovered. Once a Zero Waste system is established in Austin, local businesses that embrace Zero Waste goals should save money, and those that don't embrace the goals could pay more for wasting.

RESIDUALS MANAGEMENT AND REGIONAL COORDINATION

Although Austin is striving for Zero Waste, the City must recognize that it will have an on-going need for some amount of disposal capacity as programs are phased in. This Plan defines success

at achieving the Zero Waste goal to be reducing by 20% the per capita solid waste disposed to landfills by 2012, diverting 75% of waste from landfills and incinerators by 2020, and 90% by 2040. This means that there still may be up to 10% of solid waste to dispose of otherwise. As a result, the City does need to ensure that there is some on-going disposal capacity to meet its long-term needs. If others use up available landfill space, then the Austin Zero Waste initiatives will not solve Austin's long-term waste management needs by themselves.[24]

In Travis and Williamson Counties, landfills reported to Texas Conservation on Environmental Quality (TCEQ) that they receive wastes from up to 33 counties within approximately 100 miles surrounding this area as depicted in Appendix E. This disposal practice evolved over the past decade as smaller landfills in outlying areas closed down because they could not afford to comply with new Federal and State regulations implementing Subtitle D landfill regulations of the Federal Resource Conservation and Recovery Act. The low cost of large regional landfills in Travis and Williamson Counties acted as a magnet for waste from an even larger region and undercut the economics of reuse, recycling and composting.

Therefore, although a majority of the landfills in the Capital Area are privately owned and cannot be controlled by local governments, **Austin's Zero Waste Plans must include finding ways to stop or regulate the flow of wastes from outside the area into landfills in the Austin area**. While local governments cannot demand flow control among private landfills, there maybe ways to influence flow control.

Under Texas law, counties with landfills in their jurisdiction can adopt policies not to allow NEW landfills.[25] Counties are also empowered to develop solid waste management plans that could stipulate conditions for use of area facilities. If new landfills opened, Travis and Williamson Counties Solid Waste Management Plans could add language that only allows the use of landfills in the County by counties that have adopted Zero Waste goals appropriate for their communities, and are working to implement those goals.

Under federal law, counties or cities could stop or limit the flow of wastes into landfills that are publicly owned. Currently, only one municipal solid waste landfill is publicly owned and it is located in Williamson County. Private landfill owners, however, may consider public acquisition in exchange for allowing them to continue operating the facility, and transferring long-term responsibility for the landfill to the public entity. The public agency could be a city or county government or a Solid Waste District composed of one or more of the above. Once public ownership is obtained, the public agency could prioritize phasing out imported wastes from outside the CAPCOG region.

Contracts between agreeing parties are also significant tools that could be used to address the lack of regulatory authority. Travis County, or a regional Solid Waste District, could negotiate with landfill owners in the region to voluntarily adopt a landfill surcharge to fund new reuse, recycling and composting programs, and to fund long-term liabilities after the state and federally mandated 30-year post-closure care period. In exchange, landfill owners could be enticed to participate in these initiatives if they were also considered to be eligible parties for grants or low-cost loans to fund new reuse, recycling and/or composting programs that they would like to build locally. Contracts could be structured between the governmental entity and the landfill owner not to go into effect until all the landfills in Travis County adopt comparable provisions.[26] This approach could generate a new source of cash for landfill owners that they could not afford to

charge themselves alone, as they would be put at a competitive disadvantage. Such an agreement could level the playing field for existing landfill owners to invest in more waste reduction activities and provide more Zero Waste programs and services.

As part of this Zero Waste Plan process, the City met with Travis County and the Solid Waste Advisory Committee of CAPCOG. As an outcome of those meetings, the City received letters supporting the City's Zero Waste initiatives, including working together on areas of common interest, such as:

- Expanded tire recycling programs;
- Expanded composting and organic waste diversion programs;
- Expanded Green Building initiatives throughout the region;
- Expanded recycling and reuse of construction and demolition debris;
- Development of Green Campuses and Resource Recovery Parks; and
- Support for Extended Producer Responsibility and manufacturer take-back policies and programs.

CAP Cog's SWAC also noted that Zero Waste initiatives support the waste reduction goals of the Regional Solid Waste Management Plan, and the recommendations of the Market Analysis of Recoverable Materials (2007) prepared for the CAPCOG region by R.W. Beck.[27]

Neighboring communities and counties should clearly understand that Austin alone cannot control what happens with solid waste in the region nor is that Austin's goal. Instead, Austin must collaborate with CAPCOG and surrounding communities to address the waste management challenges and opportunities facing the region.

One additional area in which regional cooperation would be particularly helpful would be in documenting the amount of solid waste disposed of in area landfills from different communities and different sectors, and how much is being reused, recycled or composted within the region through public, private and nonprofit activities. It is widely recognized that such data is not currently available to accurately assess the current status of wasting and recycling in the area.
Data should be reported and assessed using the 12 market categories detailed previously. This data would be helpful for the City's design of residential solid waste, reuse, recycling and composting facilities. It would also provide a measurable baseline for evaluating progress towards the Zero Waste goals and greatly assist in enforcement and understanding of how effective existing ordinances such as the Commercial Recycling Ordinance and future policies and programs are in achieving the City's goals.

Since the flow of materials occur on a regional basis, it would be best if more detailed reporting and data analysis were developed on a regional basis. Collaborating with CAPCOG will be critical to collecting this data. In many locations, data is required to be reported from private operators as conditions of permits, franchises or contracts. In Austin, a revised system of operating permits should include detailed data reporting requirements, as is commonly done in many other locations. Data for such reports could be sent to an independent third-party to protect private business practices from public review and ensure fair competition.

Additionally, the region may want to consider a regional waste characterization study funded by CAPCOG grants to get a better understanding of the existing waste system.

5. ENVIRONMENTAL IMPACTS

If recovered for recycling, reuse, and/or composting, the amount of materials shown in Resource and Commodity Table (Table 1) would have a clear impact on global warming and greenhouse gas production. Significant savings come from avoiding the wastes produced from mining, manufacturing and distribution of products equivalent to 71 tons of waste for every ton of products in the local waste stream. Using the total amount of the materials currently land filled in Austin, the EPA WARM computer model calculated that the Austin area could experience an estimated reduction of carbon measured by metric tons of carbon equivalent (MTCE) of nearly 500,000.[28] This is a significant emission reductions noted in Table 3.

Table 3 - EPA WARM Model Summary: Recycled Materials vs. Landfilling[29]

Material	Tons Land filled	Total MTCE*	Tons Recycled / Composted	Total MTCE
Glass	50,000	518	50,000	(3,789)
Dimensional Lumber	12,000	(1,596)	12,000	(8,038)
Food Scraps	90,000	17,764	90,000	(4,874)
Yard Trimmings	200,000	(11,947)	200,000	(10,831)
Mixed Paper	360,000	34,187	360,000	(347,263)
Mixed Metals	50,000	518	50,000	(71,692)
Mixed Plastics	80,000	829	80,000	(32,600)
Mixed Organics	58,000	3,737	58,000	(3,141)
Aggregate	20,000	207	20,000	(42)
Total	**920,000**	**44,217**	**920,000**	**(482,270)**
*MTCE = Metric Ton Carbon Equivalent				

6. ZERO WASTE AND JOBS ANALYSIS

> "Austin has 5 colleges. It has a greater concentration of people with intellectual ability than any other city in the Southwest. Combined with shrewd mercantile ability and manufacturing know-how, it has also become one of the computer capitals of the world. I believe we should use Austin's gifts to solve some of the world's problems...."[30]

In keeping with the spirit of Paul Robbins quote above, a Zero Waste approach would lead to many job opportunities from the processing of reused, recycled and composted materials, manufacturing of new products, and the sale and distribution of those products.

For every 10,000 tons of waste land filled, only 1 job is created. For every 10,000 tons of organic materials composted, 4 jobs are created. For every 10,000 tons of recyclables processed, 10 jobs are created. For every 10,000 tons of reusables processed, 75-250 jobs are created.[31] The recycling industry in America is as large as the automobile industry.[32] In California, the

recycling industry is as large as the movie and video industry.[33] Each dollar spent on diversion instead of landfill disposal generates nearly twice as many sales tax revenue dollars and jobs.[34]

For the million tons of wastes currently disposed in Austin area landfills, the total number of jobs that could be generated is estimated to be just over 1,800 as explained in Table 4.

Table 4 - Jobs from Discards[35]

Market Category	Tons Per Year	Jobs Potential
1. Reuse	20,000	249
2. Paper	360,000	63
3. Plant Trimmings	200,000	60
4. Putrescibles	90,000	40
5. Wood	60,000	36
6. Ceramics	20,000	7
7. Soils	10,000	20
8. Metals	50,000	29
9. Glass	50,000	125
10. Polymers	80,000	745
11. Textiles	50,000	425
12. Chemicals	10,000	20
Total	1,000,000	**1,819**

C. POLICY AND PROGRAM RECOMMENDATIONS

The recommendations listed below are based upon the public input received and detailed in Appendix B as well as a cursory analysis of Austin's legislative authority and potential for developing sustainable green markets. After implementing the recommendations, the City can utilize the remaining options listed in Appendix B to serve as guidance in developing new initiatives and continuing on a path towards Zero Waste.

1. UPSTREAM POLICY AND PROGRAM RECOMMENDATIONS

a. Be a strong advocate for Extended Producer Responsibility (EPR) legislation and programs regionally, statewide and nationally. Work to form the Texas Product Stewardship Council composed only of representatives of local government to clearly address this "unfunded mandate."
b. Work to obtain legal authority and regional cooperation to ban problem products and packaging or require businesses and institutions to take back designated products and packaging sold in Austin, CAPCOG, and in the State that are toxic in their manufacture, use, or disposal, and/or are not currently recyclable in the area.
c. Develop public/private and or intergovernmental partnerships to setup convenient neighborhood centers for reusables, recyclables, compos tables, construction and demolition (C&D) debris and household hazardous wastes funded by producers and/or retailers.
d. Explore other ways to encourage and support on-site composting at homes, schools and colleges, businesses and institutions with sufficient space so that the producers of these organic wastes take care of it themselves.

2. DOWNSTREAM POLICY AND PROGRAM RECOMMENDATIONS

a. City of Austin agencies lead by example to implement all actions asked or required of residents and businesses.
b. Encourage venues and special events to adopt Zero Waste goals as part of a larger "green events" policy and use incentives and technical assistance to help them implement goals.
c. Continue programs on an on-going basis to educate residents, businesses and visitors about how and where to reduce, reuse and recycle in Austin.
d. Update, expand, educate, enforce, and effectively implement the Commercial and Multi-Family Recycling Ordinance and encourage other governmental entities to follow Austin's lead.
e. City review residential Pay-As-You-Throw rate structure on regular basis at a minimum of every five years to phase-in more incentives for residents to reduce wastes and recycle more, particularly once the single-stream recycling program is implemented. Include innovative ways to address the use of excess garbage bags and stickers to promote recycling. Include additional revenue needed to fund new residential Zero Waste initiatives in structuring rates.
f. Support continuation and expansion of local, regional and state landfill fees and surcharges, hauling fees, and bond issues to fund low-interest loans, grants, contracts and/or staffing (comparable to other large cities) to develop needed programs and infrastructure to support Zero Waste programs and initiatives.

g. Set up system for commercial waste hauling that specifies recycling services, reporting and hauling fees.
h. Adopt a City goal that no compostable organics go to landfill by 2015, including support of a statewide legislative initiative.
i. Develop pilot programs by the City of Austin and through public/private partnerships to incorporate food scraps and food-soiled paper to City of Austin's residential and commercial organics collection program.
j. Investigate and develop needed legal authority to require businesses and institutions in Texas to recycle food scraps and food-soiled paper and mandate private haulers and solid waste management facility operators to establish needed infrastructure to properly manage those materials.

3. GREEN BUSINESS, GREEN BUILDINGS AND GREEN JOBS

a. Adopt Precautionary Principle for City purchases and Zero Waste purchasing goals.
b. Develop one or more Green Campuses and/or Resource Recovery Parks in the Austin or nearby and encourage development within CAPCOG region.
c. Ask Businesses to adopt and implement Zero Waste goals.
d. Work with Austin Energy Green Building Program to:
    1) Review recycling goals and ensure that they are based on % diverted from facilities certified by Austin Energy or another City department.
    2) Evaluate how to revise its reuse goals to value the recovered products by the price for which they are sold, or some multiple of their weight, to reflect the higher value of reuse.
e. Expand Austin's use of required Green Building waste management and recycling standards for all major projects in the City, not just special development areas.
f. Work to pass an Ordinance to require in all new construction that adequate space be provided for recycling, composting and trash containers.
g. Work with state agencies and local governments to use more recycled and compost products, especially in the CAPCOG region.

4. REGIONAL COORDINATION AND RESIDUALS MANAGEMENT

a. Ask CAPCOG SWAC to adopt a resolution in support of Austin's Zero Waste Plan.
b. Ask CAPCOG and all counties that currently use landfills in Travis and Williamson Counties to support Austin's Zero Waste goal and to work together to implement that goal.
c. Work with CAPCOG to develop more detailed data reporting system for solid waste and recycling for the entire region.
d. Work with Travis County, Williamson County, and the CAPCOG SWAC to identify ways to influence, stop, or regulate the flow of wastes from outside the CAPCOG area into landfills in the Austin area.
e. Investigate alternatives for regional and state cooperation to support and implement the Zero Waste policies in jurisdictions outside the City of Austin and support needed State legislative initiatives.

Zero Waste is an ambitious but important endeavor. No single strategy will result in success and each community must carve its own path, cognizant of and willing to work within its existing political environment, financial boundaries, and legislative systems. The next step down the path to Zero Waste will be the development of a Solid Waste Services Master Plan that will include detailed timetables and budget to implement this Zero Waste Plan. By utilizing various strategies identified in this plan, developing supportive partnerships, and remaining dedicated to the long term goal of Zero Waste, Austin will achieve its goal of being among the most sustainable cities in the nation.

Endonotes

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[5] Ibid. *Global Warming – Waste: Basic Information.* 29 November 2008. <http://yosemite.epa.gov/oar/globalwarming.nsf/content/ActionsWasteBasicInfoGeneralLifeCycle.html>
[6] State of California. Environmental Protection Agency Air Resources Board. 11 February 2008. *Recommendations of the Economic and Technology Advancement Advisory Committee Final Report*. 29 November 2008. <http://www.arb.ca.gov/cc/etaac/ETAACFinalReport2-11-08.pdf>
[7] Institute for Local Self Reliance. June 2008. *Stop Trashing the Climate Full Report.* 29 November 2008. <http://stoptrashingtheclimate.org/>
[8] Ibid.
[9] Netherlands Environmental Assessment Agency. 2007. *Mitigation of Climate Change: Contribution of Working Group III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change.* Chapter 10, page 16. 29 November 2008. <http://www.mnp.nl/ipcc/pages_media/AR4-chapters.html>. States that "estimates of 'lifetime' recovery efficiencies may be as low as 20%."
[10] GrassRoots Recycling Network. 2000. *Wasting and Recycling in the United States 2000*. Page 13. 29 November 2008. <http://www.grrn.org/order/w2kinfo.html>
[11] Data derived from two sources. Regarding estimated tons per day per person, Capital Area Council of Governments. 9 February 2005. *Regional Solid Waste Management Plan 2000-2022*. Pages 10 and 15. 29 November 2008. <http://www.capcog.org/documents/solidwaste/RSWMP%20Vol%20II%20as%20Adopted.pdf> Regarding estimated City of Austin population, see United States Census. *Fact Finder projected 2006*. 10 December 2008. <www.census.gov> Calculation: 7.3 lbs/day x 743,358 x 365 days/year.
[12] Estimated calculations do not include the cost to separate, process, and transport the materials.
[13] Ibid.
[14] Putrescibles are also considered food scraps.
[15] City of Austin, Ordinance No. 981022-P, Chapter 15-6, Article V
[16] CAPCOG serves as an advocate, planner, and coordinator of special initiatives that, when undertaken on a regional basis, can be more effective and efficient. This includes coordinating regional solid waste management needs using the Regional Solid Waste Management Plan. The Texas Commission on Environmental Quality (TCEQ) regulates all Texas landfills.
[17] Capital Area Council of Governments. 9 February 2005. *Regional Solid Waste Management Plan 2000-2022*. Page 11. 29 November 2008. <http://www.capcog.org/documents/solidwaste/RSWMP%20Vol%20II%20as%20Adopted.pdf>
[18] GrassRoots Recycling Network Zero Waste Conference, New York City, April 2005.
[19] GrassRoots Recycling Network. 2000. *Wasting and Recycling in the United States 2000*. Page 13. 29 November 2008. <http://www.grrn.org/order/w2kinfo.html>
[20] "NY City Council Overrides E-Waste Veto." WasteAge.com. 20 May 2008. WasteAge Magazine. 29 November 2008. <http://wasteage.com/news/NYC_e-waste_veto_overridden/>
[21] The Central Texas cities of Georgetown, Kyle, San Marcos, Lakeway and Round Rock as well as Hays and Travis Counties all passed resolutions in favor of producer takeback recycling of electronic waste.

[22] Cook, Miki, 8 April 2008. Email to the Author. 1 October 2008.
[23] Zero Waste Businesses identified to date in the Capital Area include, but are not limited to: Toyota (San Antonio), Dell Computers, Applied Materials, Barr Mansion, Habitat Suites, Goodwill Computer Works, Balcones Recycling, and Allied Recycling
[24] According to the latest landfill data available from TCEQ from calendar year 2007, there is about 30 million tons of remaining capacity in area landfills, and it is currently being used at a rate of 2.2 million tons per year. That yields a total remaining life in area landfills at current use levels of 13.6 years.
[25] Under Section 364.012 of the Texas Health and Safety Code, the County may prohibit the disposal of solid waste in one location as long as it designates another area of the County where such disposal is not prohibited. See: <http://tlo2.tlc.state.tx.us/statutes/docs/HS/content/htm/hs.005.00.000364.00.htm#364.012.00>
[26] Such an agreement could also include Williamson County as well.
[27] Capital Area Council of Governments. September 2007. *Market Analysis of Recoverable Materials: Final Report*. 29 November 2008. <http://www.capcog.org/documents/solidwaste/Recoverable_Materials.pdf>
[28] United States Environmental Protection Agency (EPA). *Climate Change: WARM Model*. 10 December 2009. <http://www.epa.gov/climatechange/wycd/waste/calculators/Warm_home.html> EPA created the Waste Reduction Model (WARM) to help solid waste planners and organizations track and voluntarily report greenhouse gas emissions reductions from waste management practices.
[29] Ibid.
[30] Robbins, Paul. *Austin Environmental Directory 2003: Creating An Employment Base From Environmental Business*. Page 2. 29 November 2008. <http://environmentaldirectory.info/PDFs/EBusinessPart3.pdf>
[31] Institute for Local Self-Reliance. *Waste to Wealth: Recycling Means Business*. 10 December 2008. <http://www.ilsr.org/recycling/recyclingmeansbusiness.html>
[32] USEPA. *Waste Resource Conservation: Recycling Market Development*. 10 December 2008. <http://www.epa.gov/jtr/econ/rei-rw/rei-rw.htm>
[33] State of California Integrated Waste Management Board. September 20, 2004. *Recycling: Good for the Environment/Good for the Economy*. Page 5. 10 December 2008. <http://www.ciwmb.ca.gov/Publications/Economics/41004002.pdf>
[34] Alameda County, California. 10 December 2008. <www.stopwaste.org>
[35] Based on analysis done by Institute for Local Self-Reliance for State of Delaware 2005.

APPENDICES

- **APPENDIX A. LIST OF ZERO WASTE PLAN MEETINGS**
- **APPENDIX B. PUBLIC RECOMMENDED POLICY & PROGRAM OPTIONS**
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APPENDIX A.
LIST OF ZERO WASTE PLAN MEETINGS

January 2008

- Solid Waste Services Department (SWS) Staff
- Orientation Tour of Facilities (Balcones Recycling, Hornsby Bend Dillo Dirt Composting Program, TRIAD Building Maintenance, Goodwill Industries, Center of Maximum Potential, Habitat for Humanity, BFI Recycling, Ecology Action, Texas Disposal System)
- Austin Solid Waste Advisory Commission

February 2008

- Public Meeting
- Green Business (open to the public)
- City Staff
- Service Providers
- Austin Long Range Solid Waste Planning Task Force (invite Cap COG reps.)
- Austin Energy Green Building
- Texas Campaign for the Environment

March 2008

- City Council Candidates and City Council Aides (scheduled, but rained out)
- Public Meeting (scheduled, but rained out); Zero Waste Challenge issued
- Green Business Public meeting
- Organics Focus Group (Hotels, Bars, Restaurants, grocers, food distributors, nurseries)
- Green Buildings + Construction and Demolition debris Focus Group - Architects, Contractors, Developers, Austin Energy
- Thrift shops and Reuse - Service Providers (private and nonprofits)
- Austin Long Range Solid Waste Planning Task Force
- Elected officials and Business Leaders at Barr Mansion
- City Economic Development and Small Business Development staff
- Capital Area Council of Governments (CAPCOG) SWAC
- Recycling and Composting Service Providers

April 2008

- SWS staff
- Citywide Dept. Directors and Asst. Directors
- City Council Aides
- Austin Long Range Solid Waste Planning Task Force
- Austin Small Business Development Program
- State Staff (TXDOT)
- Travis County (Comm. Gomez, Eckhardt, aides and staff)
- Austin Independent School District
- CAPCOG SWAC

APPENDIX B.
PUBLIC RECOMMENDED POLICY & PROGRAM OPTIONS

UPSTREAM PROGRAM & POLICY OPTIONS

Goal : Require Producers to Take Responsibility for Products	
Voluntary, Education, and Incentives	Engage industry, make them aware of materials and products that are problems for Austin, and establish a process for producers to resolve those problems. Encourage businesses and institutions to take back products and packaging sold in Austin that are toxic in their manufacture, use, or disposal, and/or are not currently recyclable in the area.[1]
New Rules and Advocacy	Be a strong advocate for legislation and programs regionally, statewide and nationally to make business responsible for their packages and products. ▪ Expand upon existing EPR Resolution (2000803-68) supporting changes to procurement policy by adopting a new EPR Resolution to clearly establish support of EPR as City policy. [2] ▪ Help set up TX Product Stewardship Council ▪ Work with other local governments and organizations such as the TX Municipal League, Natl. League of Cities, Product Policy Institute, and Product Stewardship Institute to promote EPR and clearly authorize local governments to adopt policies and programs. Ban products or packaging from being sold in Austin that are toxic in their manufacture, use, or disposal, and/or are not currently recyclable in the area and join with other local governments in the region to do the same. Require businesses and institutions to take back designated products and packaging sold in Austin that are toxic in their manufacture, use, or disposal, and/or are not currently recyclable in the area and join with other local governments in the region to do the same.
New City Programs	Establish centers throughout the City to receive household hazardous wastes (e.g., e-waste, batteries, oil, paint, pesticides, cleaners) and join with other local governments in the region to do the same. Develop public- private partnership to develop industry sponsored facilities to receive household hazardous wastes and difficult to recycle materials. ▪ Evaluate similar programs like those in Boulder, CO CHaRM Center and BC Product Care Centers. [3] ▪ Join with other local governments in the region to do the same.

DOWNSTREAM PROGRAM & POLICY OPTIONS

Goal : Lead by example. Reduce/recycle City of Austin agency waste.	
Voluntary, Education, and Incentives	Evaluate employee incentives to encourage recycling. ▪ Department Challenges similar to the Combined Charities Event Challenges ▪ Offer recognition to the departments that recycle the most material. Evaluate employee education and outreach programs to increase participation in recycling and reduction efforts. ▪ Utilize inter-office website, emails, meetings, and magazines to communicate information ▪ Establish "green teams" in each department or office building to encourage other employees to recycle, continually evaluate reduction efforts and recycling services, and recommend improvements to the City's departmental programs. Educate employees to distinguish between recycling systems. Once composting program is in place, use colors and graphics to support the message that one color (blue) is for recyclables and another color (green) is for compostables.
New Rules and Advocacy	Require all public venues and special events, starting with large events, to implement a Zero Waste program. For City solid waste contracts of their own facilities, require that all materials be reused, recycled, or composted, and only inerts be buried in landfill Review current purchasing practices and develop specifications with "green" in mind. This could include requiring reduced packaging, delivery of computers with minimal packaging, purchasing office supplies with a certain amount of post-consumer recycled content, etc. Adopt Precautionary Principle for City purchases and Zero Waste purchasing goals. Require city facilities and public projects to use the mulch and compost made from the City's composting program towards landscaping local roads, public venues, and public property. Require the use of other recycled materials in sub-base (e.g., recycled concrete aggregate), road mixes (e.g., crumb rubber) and surface treatments (e.g., glass traffic beads) in all public projects in Austin and surrounding areas. Include C&D derived aggregate material as part of City Public Works Master specification. Work with TXDOT engineers to develop specifications. Require buildings leased to house City departments and services to provide space for recycling and/or offer recycling services. Austin Energy should stop including landfill gas as a green energy source in its "Green Choice" program. The recovery of gases should be required for environmental reasons, and not provided incentives. Any incentives given to landfills make Zero Waste less economic.
New City Programs	Provide single stream recycling to all City of Austin departments and office buildings and evaluate progress annually. Train managers and maintenance staffs of city buildings and facilities about Zero Waste policies, systems, and resources. Place recycling bins wherever there are trash bins in all public locations, including parks facilities. Once organic composting program is fully functional, include organics bins wherever food is served in public locations.

DOWNSTREAM PROGRAM & POLICY OPTIONS (continued)

Goal: Reduce waste from single family homes.	
Voluntary, Education, and Incentives	Evaluate rate structure for incentives. Once single stream recycling program is implemented: ▪ Adopt closer-to-linear Pay-As-You-Throw rates to provide greater incentive for residents to reduce wastes. o Once comprehensive organics program is implemented, that includes food scraps and food soiled paper, adopt a linear pay-as-you-throw rate structure,[4] and o Develop a pilot program to evaluate how to offer lower rates for less frequent garbage collection service.
New Rules and Advocacy	Adopt policy that no compostable organics should go to landfill. Once single stream recycling program **<u>and</u>** "all" organics programs are implemented, establish rules to keep "wet" garbage separate from "dry" materials.
New City Programs	Develop one or more Green Campuses and/or Resource Recovery Parks in Austin (or nearby) to accept all 12 market categories of reusables, recyclables and compostables from the public. [5] ▪ Provide locations for reuse, recycling and composting businesses to process materials, manufacture products and sell products to the public. ▪ Encourage similar development in CAPCOG region. ▪ Partner with nonprofit organizations, thrift shops, home stores, supermarkets and shopping malls to establish drop-off recycling centers and swap shops throughout the City to receive 5 clusters of all 12 market categories of materials. [6] Require reuse, recycle or composting of all bulky items collected by City. ▪ Partner with local non-profit organizations and thrift stores to achieve most cost effectively. Once single stream recycling program is performing successfully, add food scraps and food-soiled paper to residential organics collection program. ▪ Start with pilot program to determine how best to roll-out citywide. ▪ Tour other communities that offer such services first to help design pilot. Help fund development of new processing facilities for local reuse nonprofit organizations. Consider designating part of Green Campus processing facility for this activity.

DOWNSTREAM PROGRAM & POLICY OPTIONS (continued)

Goal: Reduce waste from commercial, multi-family, and institutional entities.	
Voluntary, Education, and Incentives	Develop programs on on-going basis to educate residents, businesses and visitors about the new rules and changes over time. ▪ Reinvigorate the Greater Austin Waste Reduction Association to work with City staff on outreach and education with businesses. ▪ Develop Master Recycler education of local residents who can act as advocates in the community. ▪ Train university students to help on outreach to local businesses to implement City's Recycling Ordinance like Fresno.[7] ▪ Use MySpace, YouTube, texting and celebrities to talk about Zero Waste. Develop major community based social marketing campaign to support Zero Waste. ▪ Explore other ways to encourage and support on-site composting at homes, schools and colleges, businesses and institutions with sufficient space. Ask major businesses in Austin area to use Resource Management techniques to contract for solid waste services that require that all materials be reused, recycled or composted, and only inerts buried in landfill to reduce business' liabilities.[8] Ask Businesses to adopt and implement Zero Waste goals. Help promote reuse businesses throughout City. ▪ Develop and continually update a Reuse Guide to be distributed to all thrift stores, available on the City's website, and utilize other innovative approaches. ▪ Designate "Reuse Zones" to encourage expansion of reuse stores in those areas (e.g., South Congress and Burnet Streets are naturally doing this).
New Rules and Advocacy	Update, educate, expand and effectively implement Commercial and Multi-Family Recycling Ordinance to require ALL multi-family dwellings, businesses and institutions to recycle and compost. Develop a regulatory system for commercial waste hauling that specifies types of recycling services, reporting requirements and fee payments that vary with the amount of waste diverted from landfill and incineration.[9] Set hauler/landfill fees to provide more economic incentives for recycling, and to generate funds for new Zero Waste programs. Agree upon and require all permitted waste haulers and recyclers to achieve waste diversion targets. Require that all permitted haulers provide equal amount of container service (size and frequency of collection) for recycling as provided for garbage service. Once food scrap composting program services are available, develop pilot programs by the City of Austin and/or through public/private partnerships to collect and process food scraps and food-soiled paper from businesses and institutions. Help market using urban organics to farmers to restore the health of soils and reduce use of fertilizers, pesticides and irrigation water. Work with local and state permitting agencies to make it easier for farmers to use such resources.
New City Programs	Develop and fund programs that can evaluate and approve waste management plans and monitor commercial and multi-family diversion activities to confirm that they are reaching agreed upon goals. Develop and fund recognition programs to promote businesses that achieve diversion goals. Develop drop-off recycling centers and swap shops throughout the City to receive 5 clusters of all 12 market categories of materials, partnering with nonprofit organizations, thrift shops, home stores, supermarkets and shopping malls.[10] Help develop new processing facilities for local reuse nonprofit organizations (e.g., by designating part of processing facility in Green Campus to be used partly for this activity).

DOWNSTREAM PROGRAM & POLICY OPTIONS (continued)

Goal: Reduce waste from development projects.	
Voluntary, Education, and Incentives	For projects that appropriately document that they reused, recycled or composted a certain percentage of their construction/demolition materials, return a portion of their fees/deposits based on the percentage of diversion.
New Rules and Advocacy	Require all contractors and developers to certify to the City that they reuse, recycle or compost at least 50% of materials from C&D projects and to maintain weight slips as an audit trail to document those activities Require waste management plans from businesses and service providers, and deposits for all construction/demolition projects. Work with Austin Energy Green Building Program to revise recycling goals to be based on % diverted from facilities certified by Austin Energy another City department. Work with Austin Energy Green Building Program to revise its reuse goals to value the recovered products by the price for which they are sold, or some multiple of their weight, to reflect the higher value of reuse.
New City Programs	Develop, fund, and staff programs that approve waste management plans and monitor data from construction projects to verify that debris has been recycled or composted. Develop and fund programs that recognize the success of development projects that consistently achieve agreed upon diversion goals.

Goal: Develop and invest in Zero Waste infrastructure	
Voluntary, Education, and Incentives	Include Zero Waste infrastructure needs, such as Resource Recovery Parks and Green Campuses, as part of local climate action plans. Support continuation and expansion of local, regional and state landfill fees, hauling fees, and bond issues to fund low-interest loans and/or grants, contracts and/or staffing (comparable to other large cities) to local governments, private businesses, and nonprofit organizations to develop needed programs and infrastructure.[11]
New Rules and Advocacy	Modify Zoning Code to facilitate the development and expansion of Zero Waste infrastructure in appropriate zones. This will need to be done very carefully and require high standards for design, signage, landscaping and operations to be compatible with neighborhoods. Consider Berkeley, CA Recycling Zone as a model of land use overlay
New City Programs	Form partnerships with the private sector and nonprofit organizations for Zero Waste infrastructure development such as composting programs, Resource Recovery parks, etc. Perform a complete evaluation of current infrastructure and identify infrastructure needed to implement Zero Waste strategies Work with job training programs to support reuse, recycling and composting programs.

DOWNSTREAM PROGRAM & POLICY OPTIONS (continued)

Goal: Enlist region to support Austin Zero Waste efforts	
Voluntary, Education, and Incentives	Work with school districts to integrate Zero Waste into curriculum and implement Zero Waste systems for all schools and administrative offices. Ask regional agencies and TXDOT regional offices to include in their contractor specifications the use of mulch and compost made from urban organics to landscape freeways, and the use of other recycled materials in sub-base (e.g., C&D debris), road mixes (e.g., crumb rubber) and surface treatments (e.g., glass traffic beads).[12] Ask CAPCOG and all counties that currently use landfills in Travis and Williamson Counties to adopt Zero Waste as a goal and to work to implement that goal. Investigate alternatives for regional and state cooperation to support and implement the above policies in jurisdictions outside the City of Austin and support needed State legislative initiatives.
New Rules and Advocacy	Require landfill operators to confirm with drivers the source of wastes delivered, and to report that information to TCEQ and/or CAPCOG so that better planning can be done in future. Ask State to require all landfills in area to develop a Resource Recovery Park to accept all 12 market categories of reusables, recyclables and compostables from the public. For NE Travis County landfills, require the development of a single Resource Recovery Park at their landfills or nearby. Fund initiatives with landfill surcharges.
New City Programs	

GREEN BUSINESS, GREEN BUILDING, AND GREEN JOBS

Goal : Retain and Expand Green Businesses and Green Collar Jobs	
Voluntary, Education, and Incentives	Provide preferences in Austin procurement, funding and permitting for certified Green Businesses in Austin. Encourage businesses to purchase Zero Waste products and services: return to vendor any wasteful packaging; reduce packaging and buy in larger units; use reusable shipping containers; purchase reused, recycled and compost products; buy remanufactured equipment; lease, rent and share equipment; buy durables, using life-cycle cost analyses; and buy less toxic products. Ask businesses to adopt Zero Waste goals and plans that follow Zero Waste Business Principles.[13] Expand "go to head of line" for permits and financing help for Zero Waste businesses (not just for Affordable Housing projects as currently set up). Encourage Austin Community College to offer Management/Development of Green Business, Green collar" job training and certification courses, Green product/process R&D, Green continuing education courses for the general public, on-campus "Green centers" to support the curriculum and provide recycling and other services to nearby communities, like the partnership with the high tech industry and Chamber of Commerce in the 1990s.
New Rules and Advocacy	Adopt Precautionary Principle for all City of Austin purchases
New City Programs	Require City to purchase Zero Waste products and services, including contract services: ▪ Return to vendor any wasteful packaging; ▪ Reduce packaging and buy in larger units; ▪ Use reusable shipping containers; ▪ Purchase reused, recycled and compost products; ▪ Buy remanufactured equipment; ▪ Lease, rent and share equipment; ▪ Buy durables, using life-cycle cost analyses; and ▪ Buy less toxic products. Support research and development into new products and business opportunities from discarded materials at Green Campus. Support "think pads" at proposed Green Campus to stay on the cutting edge of Zero Waste practices. Provide one-time start-up grants and/or loans for needed Zero Waste infrastructure out of funding recommended in Zero Waste Plan (e.g., landfill surcharge or fees on commercial hauling). Set aside portion of Workforce Development funds for green job training and wages.

GREEN BUSINESSES, GREEN BUILDINGS, AND GREEN JOBS (continued)

Goal : Encourage Green Building Construction Standards	
Voluntary, Education, and Incentives	Encourage residents and businesses to restore functional buildings, rather than demolish them. Encourage businesses to include Green Buildings in their specifications for rental spaces. Help promote residential developments that are certified as green buildings. Levy mitigation fees on high impact facilities to mitigate impacts of operation and to compensate those most impacted by needed facilities. Encourage on-site crushing of recycled materials in Green Building projects with best available control technology especially over sensitive karst limestone geology. Expand "go to head of line" for permits and financing help for Zero Waste businesses (not just for Affordable Housing projects as currently set up).
New Rules and Advocacy	Expand Austin's use of required Green Building standards for all major projects in the City, not just in special development areas. Get check-off box on permit renewal requirements for Green Building and Zero Waste projects. Require advertising of upcoming demolition projects while permits are being finalized, so that maximum deconstruction can be arranged. Require general contractor and subs training on C&D reuse and recycling requirements as condition of permits. Work with Austin Energy Green Building Program to: ▪ Base success on reuse of highest and best use of products in buildings and decorative architectural features and by value of materials recovered (not by weight); ▪ Evaluate adding another "innovative point" to realize higher lifecycle benefits by recovering higher value of reused products. ▪ Evaluate adding Zero Waste as "bonus point." Work with Austin Energy Green Building Program to base Green Building "status" on recycling goals achieved through % diverted from facilities, not by weights from each project. Require in all new construction that adequate space is provided for recycling, composting and trash containers, comparable to MRP1 in LEED – and add provision for organics/compostables. Once infrastructure and markets are established for C&D materials, prohibit landfilling C& D debris.
New City Programs	Evaluate how Solid Waste Services staff, AE staff, AWU staff, and WPDRD permitting staff can work together to establish and sustain a certification program to certify Green Buildings that meet BOTH green building requirements and Zero Waste goals.

Notes

[1] The City of Ottawa Ontario developed a voluntary takeback program that publicizes businesses that voluntarily accept products they sell from their customers, which engenders customer loyalty and appreciation for their corporate responsibility.
[2] See Appendix G based on model resolution from Product Policy Institute at: http://www.productpolicy.org/assets/word/MODEL_Local_EPR_Resolution.doc
[3] Ecocycle. *Center for Hard to Recycle Materials*. 10 December 2008. <http://www.ecocycle.org/charm/index.cfm>
[4] For example, offer 32-gallon-cart option for garbage from Austin residents at 50% of the cost of a 64-gallon-cart option and provide cost alternatives for low-income large families.
[5] This would be comparable to the City's Green Campus proposal, with addition of reuse and composting activities, or at least collection of all 12 market categories. It would also be good to include a major baler at the Green Campus to help in marketing the single-stream materials to be processed there.
[6] Set up at least one center in each "waste shed" of City to conveniently take from the public Reusables, Recyclables, Compostables, Concrete and Demolition Materials, and recyclable Household Hazardous Wastes (e.g., batteries, oil and paint). In California, the state requires supermarkets to establish convenient recycling centers in their parking lots (or within 2 miles of the store) to receive designated recyclable materials.
[7] City of Fresno, CA hired 5 students to contact every business in the City to help them implement a similar mandatory Recycling Ordinance. See article in April 2008 *Resource Recycling* journal.
[8] United States EPA. *Waste Partnerships – Waste Wise Program*. 10 December 2008. <http://www.epa.gov/epaoswer/non-hw/reduce/wstewise/wrr/rm.htm>
[9] State of California Integrated Waste Management Board. *Incentive Programs for Local Government and Waste Reduction*. 10 December 2008. <http://www.ciwmb.ca.gov./LGLibrary/Innovations/Incentives> Monrovia, California, reduces its nonexclusive commercial service agreement fees directly proportional to the amount of wastes diverted. Franchise fees are 16 percent for haulers diverting 24 percent or less, 12 percent if they divert 25 to 49 percent, and 8 percent if they divert 50 percent or more.
[10] Set up at least one center in each "waste shed" of City to conveniently take from the public Reusables, Recyclables, Compostables, Construction & Demolition Materials, and recyclable Household Hazardous Wastes (e.g., batteries, oil and paint). In California, the state requires supermarkets to establish convenient recycling centers in their parking lots (or within 2 miles of the store) to receive designated recyclable materials.
[11] Particularly include as eligible costs the startup of new takeback programs by industry sectors that agree to levy an industry-wide fee to keep such programs going after grant is over.
[12] Texas Department of Transportation. *Recycling Summary*. 10 December 2009. <http://www.txdot.gov/business/contractors_consultants/recycling/performance.htm>
[13] GrassRoots Recycling Network. *Zero Waste Business Principals*. 10 December 2009. <http://www.grrn.org/zerowaste/business>

APPENDIX C.
EXISTING RECYCLING ORDINANCE

7.0 COMMERCIAL / MULTI-FAMILY RECYCLING GUIDELINES[1]

7.1.0 SCOPE OF RULES

The City of Austin requires that all businesses with 100 employees or more and multi-family properties with 100 units or more must provide on-site recycling services. Under this requirement, businesses and multi-family properties continue to choose their own waste haulers and recyclers and to negotiate prices for these services.

The Recycling guidelines contained within this document are intended to articulate the standards and expectations for commercial and multi-family recyclables collection as authorized in the City Code Chapter 12-3, Article VI.

7.2.0 ADOPTION AND REVISION OF RECYCLING GUIDELINES

Under authority of City Code Chapter 12-3, Article VI, the Director of the Solid Waste Services Department [*hereinafter* Director] is authorized to adopt and revise rules, procedures and forms to implement provisions of that Chapter which regulate commercial and multi-family recycling in the City of Austin.

7.3.0 GENERAL PRINCIPLES

City Code Chapter 12-3, Article VI is designed to increase access to the benefits of recycling and waste reduction for area businesses and multi-family properties within the City of Austin and thus help increase the life of local landfills, decrease disposal costs for area businesses and multi-family properties, and have a positive impact on the environment generally in terms of reduced pollution and energy consumption.

The Ordinance requires that multi-family property owners and business owners provide on-site recycling opportunities to their residents and employees in much the same way that the City of Austin has provided this opportunity to single-family homes through curbside recycling. As is the case with the City of Austin's curbside program, the participation of each individual resident or employee is voluntary.

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[1] City of Austin Solid Waste Services Department. *Chapter 12-3: Solid Waste Guidelines.* 10 December 2008. Page 13. <http://www.ci.austin.tx.us/sws/downloads/rules.pdf>

APPENDIX D.
PRODUCT & MATERIALS MARKET INVENTORY[1]

Item	Programs/Facilities Accepting Materials
1. Reusable	
Appliances (e –waste)	Goodwill, Computers for Kids, Axcess Technologies, Earth Protection Services
White Goods[2]	Goodwill: Salvation Army: TDS Landfill, COA Diversion Recycling Center, Austin Energy's refrigerator pickup and recycling program
Durable plastic products	Goodwill, Salvation Army, Thrift stores
Usable Textiles	Goodwill, Salvation Army, St. Vincent de Paul Store, Assistance League of Austin Thrift House,
Mattresses	Salvation Army: Habitat for Humanity:
Furniture	Goodwill: Salvation Army Re-Sale, Big Brother/Big Sister, ARCH, any non-profit organization, St. Vincent de Paul Store, Assistance League of Austin Thrift House
Books	Goodwill, Salvation Army Re-Sale, Bookstores, Library, Austin libraries, Ecology Action, Half Price Books stores various locations
Building Materials	Habitat for Humanity (limited)
Other reusables and repairables	Goodwill, Salvation Army Re-Sale, Habitat for Humanity, Austin's Yellow Bike Project, Bikes Not Bombs
2. Paper	
Cardboard	COA-MRF, Balcones Recycling, Allied Waste Services, Moving Company, Ecology Action, Solid Waste Services, Ecology Action
White ledger	COA-MRF, Balcones Recycling, Allied Waste Services, Recycle curbside, Paper retriever dumpsters, Ecology Action, Solid Waste Services
Newsprint	COA-MRF, Balcones Recycling, Allied Waste Services, Recycle curbside, Paper retriever dumpsters, Ecology Action, Solid Waste Services
Magazines / Catalogs	COA-MRF, Balcones Recycling, Allied Waste Services, Recycle curbside, Paper retriever dumpsters, Ecology Action, Solid Waste Services
Other office paper	COA-MRF, Balcones Recycling, Allied Waste Services, Recycle curbside, Paper retriever dumpsters, Ecology Action, Solid Waste Services
Paperboard	COA-MRF, Balcones Recycling, Allied Waste Services, Recycle curbside, Paper retriever dumpsters, Ecology Action
Other / Composite paper	Balcones Recycling, Recycle curbside, Paper retriever dumpsters, Ecology Action
3. Plant Debris	
Leaves & Grass	TDS Landfill (composting program), COA Hornsby Bend Facility Compost, Curbside yard Solid Waste Services [3]
Prunings	TDS Landfill (composting program), COA Hornsby Bend Facility Compost, Curbside yard Solid Waste Services
Branches & stumps	Whittlesey Landscape Supplies, TDS Landfill (composting program), COA Hornsby Bend Facility Compost, Curbside yard Solid Waste Services

Product and Materials Market Inventory (continued)

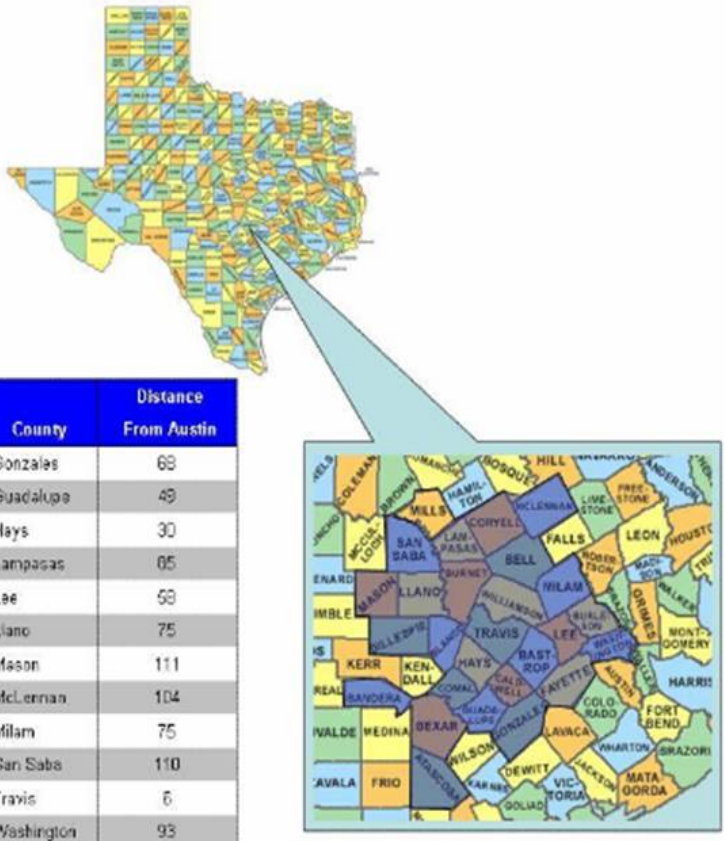
Item	Programs/Facilities Accepting Materials
4. Putrescibles	
Food waste	Compost Texas Disposal Systems, Texas Organic Products composting (Accepts commercial food waste on limited basis).
Fish and meat waste	Unclear
Sewage sludge	Austin Water Utility, City of Austin's Hornsby Bend Wastewater treatment plant
5. Wood	
Untreated wood	Habitat for Humanity, Austin Wood Recycling, Texas Organic Products composting program
Treated wood	Habitat for Humanity (Limited)
6. Ceramics	
Concrete	Habitat for Humanity, Roadmix Co, Marcelo's Sand and Loam
Asphalt paving	Roadmix Co, Marcelo's Sand and Loam
7. Soils	
Gypsum board	TDS Landfill, Habitat for Humanity
Fines	(Unclear)
8. Metals	
Auto bodies	Salvage yards, Commercial metals, CMC-Austin/AMP Recycling
Aluminum cans	COA-MRF, All American Recycling, Southside Recycling, DNT Recycling, Allied Waste Services, Gardner Iron & Metal, Ecology Action, Curbside recycling. Solid Waste Services, CMC-Austin/AMP Recycling, Austin Metal and Iron, Beaman Metal Co.
Steel cans	COA-MRF, All American Recycling, Southside Recycling, DNT Recycling, Allied Waste Services, Gardner Iron & Metal, Ecology Action, Curbside recycling. Solid Waste Services, CMC-Austin/AMP Recycling, Austin Metal and Iron, Beaman Metal Co.
Other Ferrous metals	COA-MRF, Commercial Metals, All American Recycling, Southside Recycling, DNT Recycling, Allied Waste Services, Austin Metal & Iron, Ecology Action, Austin Metal and Iron, Gardner Iron and Metal
Other Non-ferrous	COA Diversion Recycling Center, COA-MRF, Commercial Metals, All American Recycling. Southside Recycling, DNT Recycling, Allied Waste Services, Austin Metal & Iron, Ecology Action, Austin Metal and Iron, Gardner Iron and Metal
9. Glass	
Clear glass	COA MRF, Ecology Action, Curbside recycling, Local recycling center, Tri-Recycling
Green glass	COA MRF, Ecology Action, Curbside recycling, Local recycling center, Tri-Recycling
Mixed glass	COA MRF, Ecology Action, Curbside recycling, Local recycling center, Tri-Recycling
Brown glass	COA MRF, Ecology Action, Curbside recycling, Local recycling center, Tri-Recycling
Window glass	Habitat for Humanity, Ecology Action
Other glass	Ecology Action

Product and Materials Market Inventory (continued)

Item	Programs/Facilities Accepting Materials
10. Polymers	
# 1 PET	COA Curbside, Ecology Action, Local recycling center, BFI MRF, Cycled Plastics
#2 HDPE	COA Curbside, Ecology Action, Local recycling center, BFI MRF, Cycled Plastics
#3 PVC	COA Curbside, Ecology Action, Cycled Plastics
#4 LDPE	COA Curbside, Ecology Action, Cycled Plastics
#5 PP	COA Curbside, Ecology Action, Cycled Plastics
# 6 PS	COA Curbside, Ecology Action, Cycled Plastics
#7 plastic	Ecology Action (limited)
Other plastics	
Asphalt Roofing	Marcelo's Sand and Loam
Tires	Sears stores ($2 fee), Most tire stores—call first, Eco Depot
11. Textiles	
Poly fibers	Goodwill, Salvation Army, St. Vincent de Paul Store, Assistance League of Austin Thrift House
Cotton and wool	Goodwill, Salvation Army, St. Vincent de Paul Store, Assistance League of Austin Thrift House
12. Chemicals	
Used motor oil	COA/SWS-Disposal Services/, Oil change shops, Solid Waste Services' Household Hazardous Waste Facility, Eco Depot
Household Hazardous Wastes	COA COA/SWS-Disposal Services/HHW, Solid Waste Services Household Hazardous Waste Facility
Disposable Diapers	Stericycle Biohazardous Waste
Medical waste	Stericycle Biohazardous Waste, COA HHW

[1] The Market Inventory is constantly evolving. Staff will need to work diligently to keep the information up to date.
[2] White Goods are also known as home appliances
[3] City currently collects yard trimmings from containers provided by homeowners.

APPENDIX E.
MAP OF CONTRIBUTING COUNTIES



County	Distance From Austin	County	Distance From Austin
Atascosa	112	Gonzales	68
Bandera	126	Guadalupe	49
Bastrop	29	Hays	30
Bell	59	Lampasas	65
Bexar	76	Lee	58
Blanco	45	Llano	75
Burleson	86	Mason	111
Burnet	50	McLennan	104
Caldwell	34	Milam	75
Comal	66	San Saba	110
Coryell	69	Travis	6
Fayette	59	Washington	93
Gillespie	66	Williamson	35

APPENDIX F.
REGIONAL LETTERS OF SUPPORT

Travis County Commissioners Court

SAMUEL T. BISCOE
County Judge

RON DAVIS
Commissioner, Pct. 1

SARAH ECKHARDT
Commissioner, Pct. 2

GERALD DAUGHERTY
Commissioner, Pct. 3

MARGARET J. GÓMEZ
Commissioner, Pct. 4

Travis County Administration Building, 314 W. 11th, Commissioners Courtroom, 1st Floor, Austin, Tx 78701

May 13, 2008

The Hon. Will Wynn, Mayor
City of Austin
P.O. Box 1088
Austin, TX 78767

Dear Mayor Wynn:

The Travis County Commissioners Court would like to support and contribute to the City of Austin goal of achieving Zero-Waste. We would welcome the opportunity to work with the City of Austin, the Capital Area Council of Governments and local governments in the region on policies and programs to reduce the waste going to landfills by:

- Expanding tire recycling programs
- Expanding composting and organic waste diversion programs
- Expanding Green Building initiatives
- Recycling and reuse of construction/demolition debris
- Developing Green Districts and Resource Recovery Parks
- Supporting programs and policies for Extended Producer Responsibility

Thank you for your leadership in this vital component of your Climate Protection Initiative. We look forward to working with you and your Zero Waste team to pioneer these policies and programs in the region.

Sincerely,

Samuel T. Biscoe
County Judge

Ron Davis
Commissioner, Precinct One

Sarah Eckhardt
Commissioner, Precinct Two

Gerald Daugherty
Commissioner, Precinct Three

Margaret J. Gomez
Commissioner, Precinct Four

Capital Area Council of Governments

P.O. Box 17848
Austin, TX 78760-7848

6800 Burleson Road
Building 310, Ste. 165
Austin TX 78744

PH. 512.916.6000
FAX. 512.916.6001

www.capcog.org

Bastrop

Blanco

Burnet

Caldwell

Fayette

Hays

Lee

Llano

Travis

Williamson

Counties

May 14, 2008

Mayor Will Wynn
P.O. Box 1088
Austin, Texas 78767

Dear Mayor Wynn:

The Solid Waste Advisory Committee (SWAC) of the Capital Area Council of Governments (CAPCOG) would like to lend our support to the City of Austin's Zero Waste initiatives, which are consistent with the past and continuing efforts of CAPCOG and the SWAC. These initiatives also support the waste reduction goals of the Regional Solid Waste Management Plan, and the recommendations of the Market Analysis of Recoverable Materials (2007) prepared for the CAPCOG region by R.W. Beck.

We would welcome the opportunity to work on policies and programs together throughout the region, including:

- expanded tire recycling programs
- expanded composting and organic waste diversion programs
- expanded Green Building initiatives throughout the region
- expanded recycling and reuse of construction and demolition debris
- development of Green Districts and Resource Recovery Parks, and
- support for Extended Producer Responsibility and manufacturer take-back policies and programs.

Thank you for your leadership in this vital component of your Climate Protection Initiative. We look forward to working with you and your Zero Waste team to pioneer these policies and programs in the region.

Sincerely,

Maurice Pitts, Jr.

The Honorable Maurice Pitts, Jr, SWAC Chair

cc: Melissa Martinez, City of Austin Solid Waste Services

APPENDIX G.
MODEL EPR RESOLUTION

MODEL RESOLUTION NO. _____
RESOLUTION OF THE CITY OF AUSTIN
SUPPORTING EXTENDED PRODUCER
RESPONSIBILITY

WHEREAS, approximately 1,000,000 tons of discarded materials and products are currently sent to disposal from our community which are valued at over $40 million per year; and

WHEREAS, federal and state rules ban landfill disposal of certain products that are deemed hazardous, including [confirm ones that apply: household batteries, fluorescent bulbs and tubes, thermostats and other items that contain mercury, as well as electronic devices such as video cassette recorders, microwave ovens, cellular phones, cordless phones, printers, and radios]; and

WHEREAS, it is anticipated that the list of waste products determined to be hazardous and therefore banned from landfills will continue to grow; and

WHEREAS, state policies currently make local governments responsible for achieving waste diversion goals; and

WHEREAS, household hazardous waste management costs are currently paid by taxpayers and rate payers of the City of Austin and are expected to increase substantially in the short term unless policy changes are made; and

WHEREAS, local governments have no input on the design of the products, make no profit from the products, and do not have the resources to adequately address the rising volume of discarded products; and

WHEREAS, costs paid by local governments to manage products are in effect subsidies to the producers of hazardous products and products designed for disposal; and

WHEREAS, the City Council of the City of Austin supports statewide efforts to hold producers responsible for hazardous products and other product and packaging waste management costs; and

WHEREAS, there are significant environmental and human health impacts associated with improper management of hazardous products; and

WHEREAS, Extended Producer Responsibility (EPR) is a policy approach in which producers assume responsibility for management of hazardous waste products and which has been shown to be effective; and

WHEREAS, when producers are responsible for ensuring their products are reused or recycled responsibly, and when health and environmental costs are included in the product price, there is an incentive to design products that are more durable, easier to repair and recycle, and less toxic; and

WHEREAS, EPR framework legislation establishes transparent and fair principles and procedures for applying EPR to categories of products for which improved design and management infrastructure is in the public interest; and

WHEREAS, the California Product Stewardship Council (CPSC) is an organization of California local governments working to speak with one voice in promoting transparent and fair EPR systems in California; and

WHEREAS, in (Date), the City of Austin adopted a municipal Zero Waste Plan, and this plan describes how zero waste cannot be achieved unless product manufacturers reduce the toxics in their products and design them to be reusable and recyclable; and

WHEREAS, the City of Austin wishes to incorporate EPR policies into the City's and County's product procurement practices to reduce costs and protect the environment;

NOW, THEREFORE BE IT RESOLVED BY THE COUNCIL OF THE CITY OF AUSTIN that the Council of the City of Austin urges the Texas Commission on Environmental Quality (TCEQ) to support legislation, policies and programs on Extended Producer Responsibility; and

BE IT FURTHER RESOLVED, that the Council of the City of Austin encourages the formation of a Texas Product Stewardship Council as an organization of Texas local governments working to speak with one voice in promoting transparent and fair EPR systems in Texas to shift waste management costs from local government to the producers of the product, and which will give producers the incentive to redesign products to make them less toxic and easier to reuse and recycle; and

BE IT FURTHER RESOLVED, that the Director of Solid Waste Services Department be authorized to send letters to Texas local government organizations, state agencies and the State legislature and to use other advocacy methods to urge support for EPR legislation; and

BE IT FURTHER RESOLVED, that the (Jurisdiction name) encourages all manufacturers to share in the responsibility for eliminating waste through minimizing excess packaging, designing products for durability, reusability and the ability to be recycled; using recycled materials in the manufacture of new products; and providing financial support for collection, processing, recycling, or disposal of used materials; and

BE IT FURTHER RESOLVED, that the City of Austin will lead by example to develop producer responsibility policies for its own purchases, such as leasing products rather

than purchasing them and requiring producers to offer less toxic alternatives and to take responsibility for collecting and recycling their products and the end of their useful life.

PASSED AND ADOPTED by the Council of the City of Austin, State of Texas on _____ by the following vote:

AYES:
NOES:
ABSENT:
ABSTAIN:

Signed: _____ Date: (mo/day/year)
Will Wynn, Mayor

ATTEST: _____
(Name), Clerk
City of Austin

APPENDIX H.
HIGHEST AND BEST USE HIERARCHY

Zero Waste has been defined by the Zero Waste International Alliance as a philosophy and visionary goal in which manufacturing and supply chains emulate natural cycles, where all outputs are usable inputs for other value-added processes. It means designing products and managing materials and systems for maximum resource conservation, highest, most efficient use, and minimum negative environmental impact. It means eliminating harmful discharges to land, water and air, by preventing rather than managing waste and pollution.

Highest Use

Redesign Manufacturing & Supply Chain

Mandate Extended Producer Responsibility (EPR)
Produce durable, reusable, recyclable, and recycled-content products
Use environmentally sustainable feedstocks & materials
Design for repair, reconditioning, disassembly, deconstruction and recycling
Make brand owners/first importers responsible to take back products & packaging

Reduce/Refuse/Return

Reduce Toxicity
Reduce toxic materials in products
Replace toxic materials in products with less toxic or non-toxic alternatives
Reduce Consumption
Purchase and use less
Apply Environmentally Preferable Purchasing (EPP) standards to purchasing
Reduce Packaging
Purchase products with less packaging
Incentive durable, reusable packaging

Reuse/Preserve Form & Function

Repair and recondition products
Deconstruct and salvage buildings and building products
Support thrift stores and charity collection

Recycle/Compost/Digestion

Recover & return materials to economic mainstream for remanufacture to like-value products
Recover & return materials to economic mainstream for composting to value-added soil amendment products
Ambient temperature (<200 degrees) processing of organic materials for recovery of fuels and energy, with composting of residue

Down Cycle

Recover & return materials to economic mainstream for remanufacture to non- or marginally-recyclable products, such as office paper to tissue paper, or soda bottles to toys or clothing

Waste-Based Energy[1]

Biological energy recovery technologies, including anaerobic digestion
Thermal energy recovery technologies including gasification, plasma arc, pyrolysis

Bury/Incinerate

Bioreactor landfilling, when design incorporates sufficient safety & environmental protections
"Beneficial" landfill use, such as alternative daily cover (ADC) or landfill construction
Traditional landfilling

Lowest Use

[1] Revision made by staff with SWAC input.

APPENDIX I.
ZERO WASTE RESOURCES

Austin Zero Waste:	www.austinrecycles.com Jessica King 512-974-2728 jessica.king@ci.austin.tx.us Rebecca Hays 512-974-7720 rebecca.hays@ci.austin.tx.us
GrassRoots Recycling Network:	www.grrn.org
Zero Waste International Alliance:	www.zwia.org
Earth Resource Foundation:	www.earthresource.org/zerowaste.html
Gary Liss & Associates:	www.garyliss.com/id18.html

Solid Waste Generation & Disposal Capacity Report

For Calendar Year 2007

Prepared by the Maine State Planning Office

for the

Joint Standing Committee on Natural Resources of the 124th Legislature

January 2009

Acknowledgements

This report is prepared by the State Planning Office in accordance with 38 MRSA §2124-A.

Calculations are based on data provided by municipalities, commercial recycling brokers, and public and private disposal facilities. We would like to thank the hundreds of municipal officials and private sector waste management and recycling companies for their help with supplying data. Without them, the State Planning Office could not produce this report.

Data from calendar year 2007 are the most current, complete data available for this report.

Executive Office
State Planning Office
Waste Management & Recycling Program
38 State House Station
184 State Street
Augusta, Maine 04333-0038
(207) 287- 8934
www.maine.gov/spo/recycle

January 2009

Printed under Appropriation #014 07B 1655 008208

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Executive Summary

Solid waste generation in Maine increased from 2006 to 2007, from 1,989,266 tons to 2,066,448 tons. Recycling efforts of both public and private programs continued but were unable to maintain the 2006 recycling rate of 36.2 percent, with it slipping to 34.8 percent, due to the increase in the tonnage of waste generated. The state has unused, permitted disposal capacity that will meet Mainers' needs until at least 2015, with potentially permittable capacity for another 15 to 20 years beyond that.

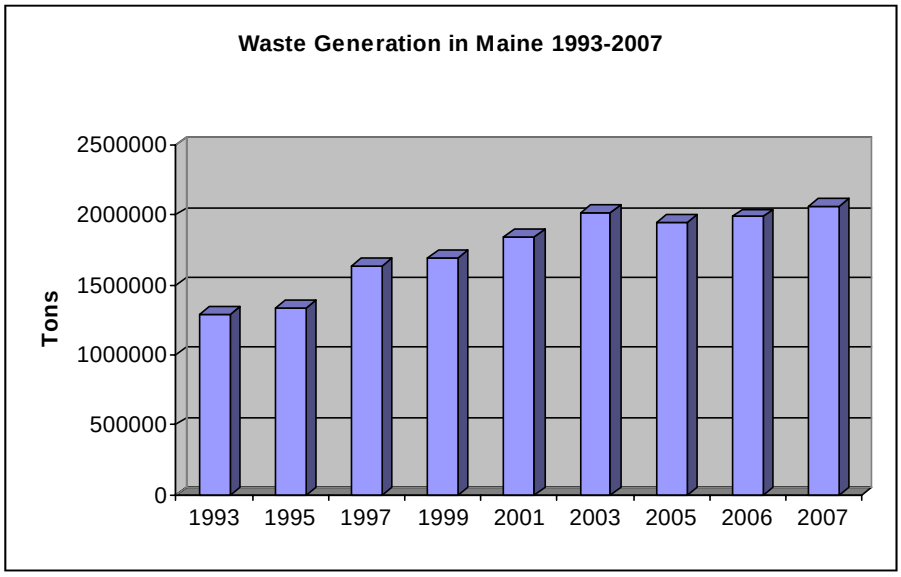
This report provides an overview of Maine's municipal solid waste generation, recycling, combustion, and landfill activities for 2007, in order to:

1) determine the impact of these activities on available solid waste disposal capacity,
2) identify planned and consumed capacity at disposal facilities, and
3) project the lifespan of capacity.

The report also assesses progress towards achieving the state's 50% recycling goal.

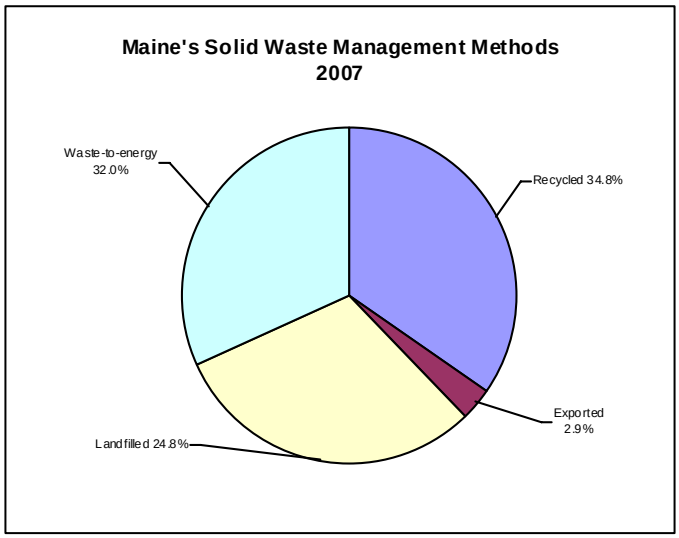
KEY FINDING: Municipal Solid Waste generated in Maine increased.

Residents and businesses in Maine generated 2,066,448 tons of waste in 2007, a three (3) percent increase over waste generation experienced in 2006. This increase varies from recent year's solid waste generation, where it has been fairly stable.



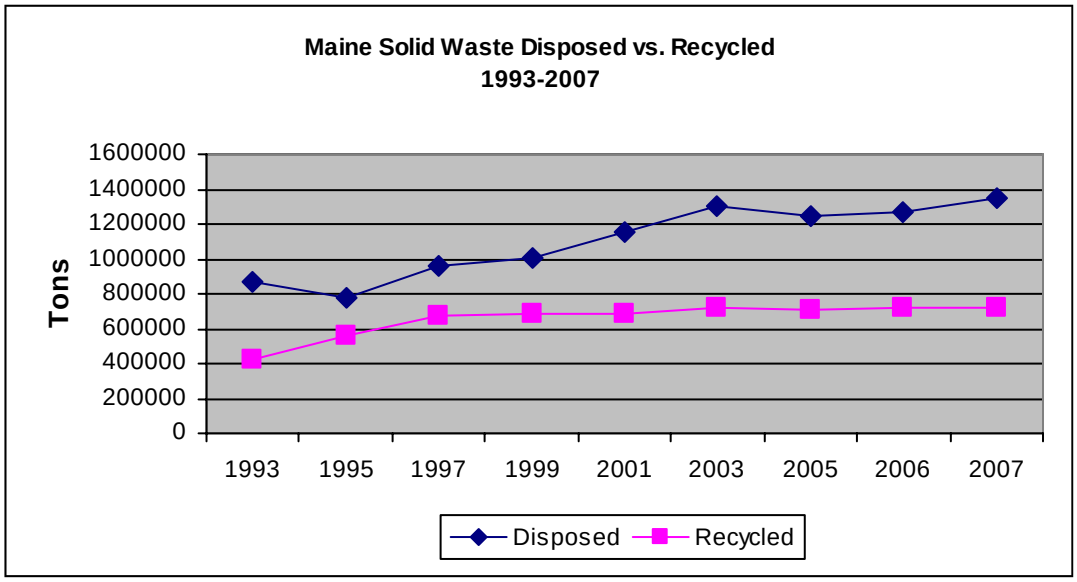
KEY FINDING: Management of municipal solid waste.

32% of Maine's total municipal solid waste tonnage was delivered to the four waste-to-energy facilities, recycling managed 34.8%, and both activities reduced the volume of waste requiring landfilling. The tonnage of raw municipal solid waste being directly landfilled was 24.8% of the total, (total tonnage landfilled, including processing residues, was 30.3%) and 2.9% of the state's municipal solid waste was exported.



KEY FINDING: Mainers' continue to recycle more each year, but recycling has not kept pace with the growth in the amount of waste we generate.

Maine has had a 13-year trend of growth in both solid waste generated and recycling efforts, though that has flattened in the past few years. However, in 2007, solid waste generation increased 3% from 2006, which when coupled with a slight decrease in recycled tonnage, depressed the state's recycling rate from 36.2% to 34.8%.



By

the Numbers (tons)

Municipal Solid Waste Management in Maine

	2006	2007
Waste Generation - Total	1,989,266	2,066,448
Recycled/Reused	720,410	718,613
Combusted	504,078	503,226
Landfilled	688,798	879,731*
Exported	75,980	60,491
Imported	437,037	456,580

*****(includes bypass and residues from waste to energy facilities)

Recycling in Maine

	2006	2007
Municipal/Public Efforts	227,767	201,358
Commercial/Business Efforts	492,643	517,643
Total Tons Recycled	**720,410**	**718,613**
% of MSW Recycled	**36.2%**	**34.8%**

Processing for Combustion at Waste-to-Energy Facilities

	2006	2007
Delivered MSW tonnage	867,606	826,292
By-pass	36,183	27,014
FEPR	122,512	110,016
Metal	22,044	22,032
Combusted	504,078	503,226
Ash	169,000	164,003

Out-of-state Generated Municipal Solid Waste

	2006	2007
MSW – Maine Energy	136,472	117,320
MSW – PERC	29,323	37,148
MSW Landfilled – commercial landfills	7,547	8,576
CDD Landfilled – Pine Tree	259,310	290,493
CDD Landfilled – Crossroads	4,385	3,043
Total Imported	**437,037**	**456,580**

Landfill Disposal (Instate Generated Municipal Solid Waste & Residues from Processing Municipal Solid Waste)

	2006	2007
Juniper Ridge	290,435	309,950
9 Municipal Landfills	124,615	142,143
Municipal CDD Landfills	27,446	(est.) 28,000
2 Commercial Landfills	246,302	399,638
Total Landfilled	**688,798**	**879,731**

*Disposal Capacity in Maine**

W-T-E Facility Capacity	2007 Capacity – currently available (tons/year)	2010 Capacity – projected remaining (tons/year)	2012 Capacity – projected remaining (tons/year)	2017 Capacity – projected remaining (tons/year)	2027 Capacity – projected remaining (tons/year)
MMWAC - Auburn	70,000	70,000	70,000	70,000	70,000
ecomaine - Portland	170,000	170,000	170,000	170,000	170,000
Maine Energy - Biddeford	310,000	310,000	310,000	310,000	310,000
PERC - Orrington	304,000	304,000	304,000	304,000	304,000
Total	**854,000**	**854,000**	**854,000**	**854,000**	**854,000**
Landfill, Disposal Capacity	2007 Licensed Capacity – end of year (cubic yards)	2010 Licensed Capacity – end of year (cubic yards)	2012 Licensed Capacity – end of year (cubic yards)	2017 Licensed Capacity – end of year (cubic yards)	2027 Licensed Capacity – end of year (cubic yards)
State Landfills (2):					
Carpenter Ridge – T 2 R 8	Undeveloped	Undeveloped	Undeveloped	Undeveloped	Undeveloped
Juniper Ridge – Old Town	8,462,000	6,200,000	4,100,000	0	0
Juniper Ridge – Old Town (expansion)	Unlicensed	Unlicensed	Unlicensed	20,500,000	8,100,000
Municipal Landfills (9)					
7 - Municipal landfills	2,416,700	1,900,000	1,600,000	2,500,000	1,200,000
2 - Municipal - ash	1,184,450	1,000,000	880,000	580,000	0
Commercial landfills (2)					
Crossroads - Norridgewock	3,900,000	2,500,000	1,850,000	160,000	0
Pine Tree - Hampden	1,000,000	0	0	0	0
Total	**16,963,153**	**11,600,000**	**8,430,000**	**23,740,000**	**9,300,000**

* This table does presume continued operation of the four waste-to-energy facilities. It does include planned expansions of the Presque Isle, Tri-Community and Juniper Ridge Landfills but the permitted capacity may vary from these projections, since that new capacity is dependent upon receiving the necessary environmental approvals.

I. Introduction

Maine law requires the State Planning Office to report annually to the Legislature on the state's recycling rate and the available and projected disposal capacity and how that capacity affects disposal prices. The full statutory language appears in Appendix A.

To accomplish this, the State Planning Office calculates the volume and tonnage of waste generated by Mainers, the amount of recycling, and how and where waste is disposed. It compares the disposal capacity needed with the available capacity, taking into account planned, new capacity and consumed, lost capacity. It also identifies the impact that recycling has on capacity and identifies potential recycling and disposal capacity issues for specific regions around the state. Additionally, the report provides insight on how disposal capacity impacts disposal fees.

How policymakers can use this report

The capacity report provides policymakers with the information needed to plan for and make decisions about future capacity investment. Maine law requires that the Legislature be notified with recommendations for developing new disposal capacity when there is six years of capacity remaining. In addition to the currently operating state-owned landfill known as Juniper Ridge, located in Old Town, the state also owns a permitted, 'greenfield' site known as Carpenter Ridge in Township T2 R8. This report provides the basis for recommendations for developing new landfill capacity when needed.

The report also assists policymakers with understanding the progress toward our waste reduction and recycling goals and their impact on disposal capacity.

Planning for solid waste management

This report provides an analysis of disposal capacity. The data contained within this report is used to support the development of the state's five-year *Waste Management & Recycling Plan*. The plan takes a broader view of waste management activities in Maine including analyzing how we manage waste, offering policy perspectives on solid waste management, and presenting scenarios on possible options for future management needs.

About this report

The State Planning Office updates this report each year in order to provide the most current data and information to policymakers, which, in turn, will help them respond more quickly to changing waste management needs for Maine citizens.

The report includes an analysis of the solid waste disposal needs of the State for the next 3, 5,10, and 20 years. The report also analyzes how the fill rate at each solid waste

landfill has affected the expected lifespan of that landfill, as required by statute. In addition, the report assesses supracompetitive pricing and its possible implications.

Data for the calculations in this report are provided by municipalities, commercial recycling brokers, and public and private disposal facilities. Supporting information was also used from the soon to be released '*Recycling Economic Information Study*', completed through the Northeast Recycling Council for five northeastern states, with Maine being one of those states. Data from calendar year 2007 are the most current, complete data available for this report.

This report focuses on municipal solid waste (MSW) as defined by Maine law. MSW comprises household, baggable waste and bulky wastes such as furniture, tires, and metal, and construction and demolition debris.

Though this report focuses on municipal solid waste, it does include some sludge and ash tonnages considered 'special wastes.' Special wastes are generated by other than typical housholds or businesses and due to their quantity or chemical or physical properties require particular handling. They include primarily ashes, sludges, and industrial process wastes. These wastes are landfilled at facilities specifically designed and licensed for their disposal. This report looks at only those special wastes which are residues of managing municipal solid waste, primarily incinerator ash. In projecting the remaining disposal capacity at the state owned landfill, all of the waste streams being delivered are considered.

Industrial wastes are also not included in this report. Industrial wastes are not part of the waste managed by municipalities. These wastes are typically managed by the generator and disposed at generator-owned facilities or out-of-state.

Appendix B provides definitions for terms and acronyms used in this report.

II. Municipal Solid Waste Generation

The amount of municipal solid waste (MSW) generated by Mainers is the starting point for the calculations and projections in this report. It provides the basis for determining the statewide recycling rate as well as all the projections that follow.

A. Methodology

Municipal Solid Waste

This report considers only municipal solid waste and its residues (primarily ash from waste-to-energy facilities). MSW is waste typically generated by households and businesses and managed by municipalities. It includes household garbage and other non-bulky waste (corrugated cardboard, newsprint, office and mixed papers, food waste, plastics, glass, metals, and textiles) as well as bulky waste (construction and demolition debris, appliances, furniture, tires, wood waste, and yard waste).

Waste Generation Calculation

The State Planning Office uses three pieces of data to determine the statewide generation of municipal solid waste:

1. data provided by municipalities in their annual solid waste reports to the State Planning Office;
2. data provided by public and private disposal facilities in their annual license reports to the Maine Department of Environmental Protection; and
3. data provided by commercial recyclers and end-users in a voluntary survey.

The Office combines the tonnage of waste processed and disposed, as well as that which is recycled, composted, and reused, to create a reliable estimate of waste generation in Maine.

B. Statewide Municipal Solid Waste Generation

Maine residents and visitors generated 2,066,448 tons of municipal solid waste in 2007, up from 1,989,266 tons in 2006. Waste generation is a function of population growth, lifestyles, economic activity, and manufacturing and production practices.

As shown in Figure 1, over the recent past, waste generation growth had leveled. In 2007, though, the total waste generated grew by 77,182 tons, a 3% increase. This increase can be attributed to the amount of unprocessed wastes delivered to landfills.

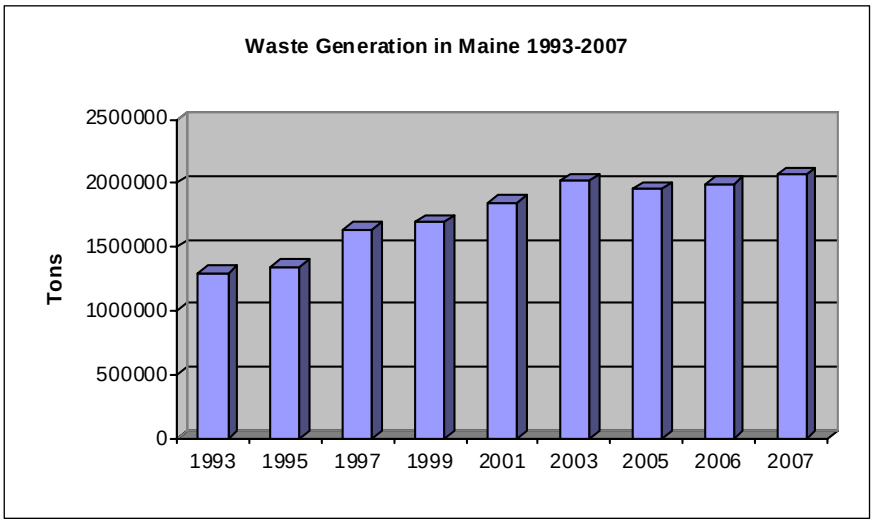


Figure 1: Maine Waste Generation, 1993-2007
Source: State Planning Office

C. Per Person Waste Generation

Municipal waste generation, when calculated on a 'per person' basis, shows that each Maine resident generates approximately 3,200 pounds of MSW a year, or about 8.8 pounds of waste per person per day.[1] Maine's per person generation is higher than the 2007 national average of 4.6 pounds per person reported by the U.S. Environmental Protection Agency.

One obvious reason why Maine's per person number is higher than the national average is that Maine includes both bulky waste and construction and demolition debris (CDD) in its definition of MSW, which the U.S. EPA does not. If we exclude CDD from our numbers, the Maine per-person rate drops to about 7.5 pounds per day. The bulky waste fraction of the municipal solid waste stream is not tracked by all handling or receiving facilities so the extent of bulky waste remaining in the MSW is unknown.

Anther explanation for the higher weight per person is the high success in capturing commercially generated solid waste tonnages, as well as the additional impact of visitors on solid waste generation.

Note: in the State of New Hampshire, their 'per person' solid waste generation calculation for 2007 was 6.9 pounds. Conversations with their agency staff yield similar conclusions about the actual composition of waste and tracking of its generation.

[1] Based on an estimated 2007 Maine population of 1,315,398

III. Recycling

The Maine Legislature set a 50% recycling goal for the state.

A. Statewide Recycling Rate

Recycling Rate Calculation

The recycling rate is derived by using recycling data in conjunction with disposal and generation data according to the following formula:

$$\text{Recycling Rate} = \frac{\text{(MSW recycled)}}{\text{(MSW generated)}} * 100$$

This calculation is not a precise measurement. Some data are incomplete, particularly for composting and reuse efforts. Adjustments are made to eliminate duplicate counting of recyclables. However, the Office estimates that the overall result is accurate to within two (2) percentage points.

Recycling Trends

Maine recycled 34.8% of its municipal solid waste in 2007, a decrease from the 2006 recycling rate of 36.2 %, due to the increase in overall waste generated coupled with a slight decrease in tons of material recycled.

Approximately thirty percent of Maine's reported recyclables are handled by municipal recycling programs. The balance of recycling efforts statewide is the result of business-generated recyclables, handled by private sector waste management companies.

The rapid rise in recycling rates during the first half of the 1990s was due to a concentrated effort by private sector, local public programs, and the state acting in partnership, with recycling having not only a priority statutory identity, but state level presence and support. During this time, the state invested $12.5 million in local grants for recycling collection and processing equipment, provided for statewide public education, and conducted hundreds of training workshops for local officials. Since that time, state funding has not been available and local programs compete with other municipal services for their share of property tax dollars.

However, at the same time, there has been an upward trend in municipal solid waste being generated. Figure 2 shows the tons of waste disposed compared to the tons recycled. The growth in waste generation prevents the recycling rate from increasing despite greater tonnages being recycled.

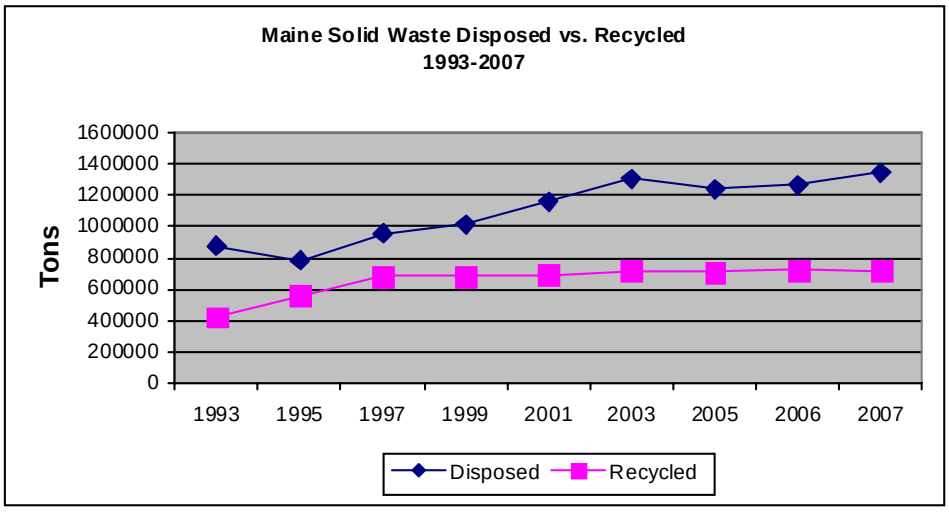


Figure 2: Maine Solid Waste Disposed vs. Recycling, 1993-2007
Source: State Planning Office

Two overarching reasons why recycling rates have not kept pace with increases in solid waste generation:

- First, recycling has not advanced aggressively into other components of the waste stream that are growing, such as organics management (through composting) and construction and demolition debris;
- Secondly, even though markets for traditional recycling commodities have grown throughout the first half of this decade, many municipal programs have not been able to adjust their programs to increase recycling efforts.

EPA Definition of Municipal Solid Waste

The state recycling rate is also calculated using the U. S. Environmental Protection Agency's definition for MSW, which is primarily 'baggable waste'. Determining the 2007 statewide recycling rate with EPA's definition, Maine's statewide recycling rate becomes 39.6%. Table A shows the two methodologies for calculating the state's recycling rate and Figure 3 shows a comparative trend line.

Table A: Maine Statewide Recycling with and without CDD - 2007				
Maine Definition (*CDD included*)			EPA Definition (*CDD not included*)	
MSW with CDD generated	2,066,448		MSW w/o CDD generated	1,748,958
MSW with CDD recycled	718,613		MSW w/o CDD recycled	692,987
Recycling Rate	34.8%*		Recycling Rate	39.6%*

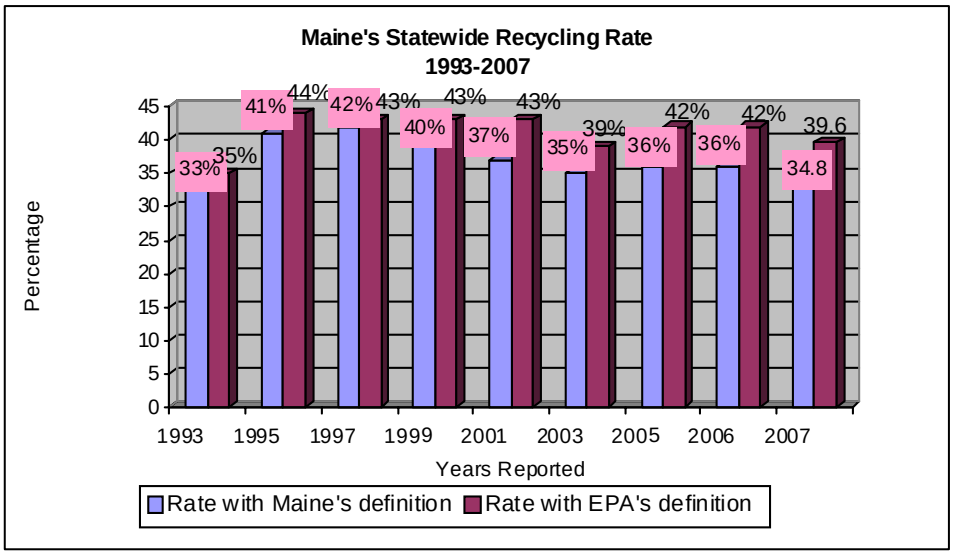


Figure 3: State Recycling Rate with and without CDD included
Source: State Planning Office

B. Type and Amount of Materials Recycled

Maine recycles a wide variety of materials with the biggest recovery rates in glass, metal, and paper. See Appendix C for a table depicting recyclable categories and tonnages from 1997 to 2007.

C. Municipal Recycling Programs

Maine cities and towns by law are responsible for providing for municipal solid waste disposal. As a result, Maine municipalities have designed and implemented various solid waste management facilities over the years, including the construction and operation of approximately 240 transfer stations, over 300 public recycling programs, and over 70 composting facilities.

Individual municipalities and regions are not required to achieve a 50% recycling rate; but they are required to demonstrate progress towards the goal. Recycling progress varies from community to community, but overall, programs removed 201,358 tons from the state's waste stream that would otherwise need disposal.

D. Progress Toward Achieving State Goals

MSW Management and the Hierarchy

Maine's solid waste policy is to plan for and implement an integrated solid waste program based on a management hierarchy. The hierarchy guides public decisions regarding investments in, and the permitting of, solid waste management facilities. 38 MRSA §2101, establishes the management priorities within the hierarchy in priority order as follows:

1. *Reduction, including both the amount and toxicity of waste;*
2. *Reuse (use of a product in same form as the original use);*
3. *Recycling (reprocessing of waste and creation of a new, usable material);*
4. *Composting of biodegradable waste;*
5. *Volume Reduction (waste processing that reduces the volume of waste requiring disposal, including incineration for-energy recovery); and*
6. *Land disposal.*

Maine's Recycling and Waste Reduction Goals

In 1989, the Maine Legislature established a goal to recycle 50% of the state's municipal solid waste annually. The legislated date to achieve the goal is January 1, 2009. The 2007 state recycling rate is 34.8%, fifteen percentage points short of the goal. The state remains committed to reaching the 50% goal in light of its value on reducing overall solid waste management costs, the positive impact on the environment, and a lessening of the need for additional solid waste disposal facilities.

The state waste reduction goal challenges Mainers to reduce waste generation by 5% every two years. As waste generation continues to climb in Maine, we have not achieved this goal. However, we are seeing a modest trend in waste reduction from decreases in the weight of consumer goods, for example when products get smaller, are made of more lightweight materials, or use lighter weight packaging.

Achieving our Recycling Goal and Beyond

There are a number of efforts on the horizon to help Maine reach its 50% recycling goal, including organics recovery and composting, improved collection efforts, and a revitalized statewide public awareness campaign.

Perhaps the most significant has been the move to adopt ‘single stream’ or ‘single sort’ recycling collection strategies, which has been implemented in the Greater Portland area as well as in approximately a dozen other communities. ‘Single stream’ or ‘single sort’ simply means collecting co-mingled recyclables and sorting them at a central processing facility. This collection method makes it easier for residents to recycle, reduces collection time, labor and transportation costs while increasing the volumes of materials collected.

As successful as these programs may be, nevertheless, these improvements require significant capital investment, which can be challenging to achieve at the current time.

In 2005, a state policy review task force called for Maine to move beyond a 50% recycling goal. Recycling is increasingly critical as a foundation for sustainable production. We need to maximize use of waste and minimize its consumption of landfill capacity. It’s time to view waste, not as a disposable, but as a resource.

IV. Existing and Planned Processing and Disposal Capacity

In 2007, Maine's solid waste disposal facilities included: one state-owned landfill, two commercial landfills, nine municipally-operated landfills, an estimated 20 municipal construction and demolition debris (CDD) landfills, and four waste-to-energy facilities. Several processing facilities/operations were available for managing construction and demolition debris.

Assumption: Capacity figures provided for the state-owned landfill assume that operations achieve a ratio of 1.0 tons of waste per cubic yard of landfill space. At the commercial landfills, the assumption is that operations also achieve a one-to-one ratio of tons-to-cubic yards in landfill compaction.

A. Landfills

Landfills receive a variety of wastes, and that variety differs among the facilities, depending upon what their approval allows for acceptable wastes. Included in that variety of wastes are: raw garbage; construction and demolition debris; residues and ash from waste to energy facilities; contaminated soils; sludges; ash from bio-mass operations; and, other special wastes. This report focuses on municipal solid waste, including construction and demolition debris as well as the residues from the processing of those wastes, but in reviewing landfill capacity, the tonnages of the other special wastes that are accepted by the landfills do consume capacity, and for that reason, those wastes and their impact on landfill capacity is included in this report.

State-owned Landfill[2]

In 2007, the state-owned landfill in Old Town, known as Juniper Ridge, received a total of 472,600 tons of in-state generated waste, of which 151,073 tons were municipal solid waste and CDD and another 158,877 tons were residues from processing or incineration of MSW. The balance of the waste buried at the landfill included various types of sludges, contaminated soils and approved wastes from other in-state commercial and industrial generators (non-msw wastes).

[2] In addition to the Juniper Ridge Landfill, the State Planning Office owns 1500 acres of land in T2 R8 (near Lincoln), upon which a special waste landfill was permitted in the mid 1990s. Known as Carpenter Ridge, it has a landfill design for about two million cubic yards of waste. It was acquired by the former Maine Waste Management Agency and has been held by the state for disposal capacity when it is needed.

Assessment of Facility

Available disposal capacity remaining at Juniper Ridge at the end of 2007 was approximately 8,462,000 cubic yards, which translates into space for approximately 7.15 million tons of solid waste. At projected fill rates[3], the present licensed capacity should provide 11 - 12 years of disposal capacity for the state. Starting in 2009/2010, however, with the closure of the Pine Tree Landfill and the initiation of processing at the planned construction/demolition processing facility in Westbrook (as permitted by Casella Waste Systems, Inc.) an expected additional 300,000 tons of wastes will be delivered to the Juniper Ridge Landfill for disposal. With the addition of these wastes, the consumption of the space at the landfill is expected to change, from approximately one ton of waste per cubic yard of space to 0.8 tons of waste per cubic yard. This change impacts the planned life of the landfill, leaving approximately 9 -10 years of remaining capacity, as of the end of 2007.

In late 2006, the State Planning Office proposed an expansion at Juniper Ridge to provide an additional 22.5 million cubic yards of disposal capacity. As of the date of this report, the application for the expansion has not been submitted to the Maine Department of Environmental Protection. We expect this approval process to take at least 3 to 4 years. If approved as proposed, the expansion would provide an additional 18-20 years of capacity extending the life of Juniper Ridge to at least 2035.

Commercial Landfills

Maine has two commercial landfills grandfathered under the 1989 Solid Waste Management Act that banned the development of new commercial disposal facilities. Having the commercial landfills has provided competition and disposal options for municipal solid waste, construction and demolition debris, and special wastes. The two commercial landfills are:

- Crossroads Landfill, located in Norridgewock, owned by Waste Management, Inc.
- Pine Tree Landfill, located in Hampden, owned by Casella Waste Services, Inc.

The Crossroads Landfill is permitted to take special waste, municipal solid waste, and construction and demolition debris. It provides recycling and disposal services on a contract basis for municipalities and businesses. It currently serves 30+ Maine communities in Western Maine. In 2007, the landfill accepted 336,854 tons of solid waste. Of that tonnage, 182,525 tons were Maine generated municipal solid waste and CDD and 19,922 tons of residues from the processing of MSW. The balance of wastes included Maine generated special wastes (59,974 tons), and CDD and special wastes generated outside of Maine (74,433 tons).

[3] The State Planning Office projects that wastes delivered to Juniper Ridge will average 550,000 tons per year, but will increase to 850,000 tons per year starting in 2010, with wastes diverted from the planned closure of the Pine Tree Landfill in 2009, and from additional residues and wastes generated from CDD processing operations within the state.

The Pine Tree Landfill is permitted to take special waste, by-pass municipal solid waste, and construction and demolition debris. In 2007, the Pine Tree Landfill accepted 557,793 tons of solid waste. Of that tonnage, 39,058 tons were Maine generated municipal solid waste, CDD and 158,133 tons of residues from its processing. The balance of wastes included Maine generated special wastes (35,971 tons) and MSW by-pass, CDD and special wastes generated outside of Maine (324,631 tons). Through an agreement reached among the Town of Hampden, Maine Department of Environmental Protection and the landfill's owner, the landfill will cease accepting solid waste by the end of December 2009.

Assessment of Facilities

The total disposal capacity currently licensed at these two commercial landfills is approximately 5.0 million cubic yards. The majority of this capacity is at the Crossroads Landfill, with an estimated 3.9 million cubic yards of capacity remaining at the end of 2007. Table B shows estimated remaining disposal capacity at the commercial landfills.

Table B: Capacity at Maine's Commercial Landfills – end of 2007

	2007 Fill Rate (tons)	**Remaining Capacity (Cubic Yards)**	**Remaining Capacity (tons)**	**Estimate in years of life remaining based on 2007 fill rates**
Crossroads Landfill	336,854	3,900,000	3,900,000	10-12 years
Pine Tree Landfill	557,793	1,000,000	970,000	< 2 years
Total	894,647	4,900,000	4,870,000	

Municipally Operated Landfills

In 2007, 107,248 tons of solid wastes and 59,100 tons of ash were disposed at nine municipally-operated landfills. Table C provides information on each individual landfill, including fill rates and estimated available remaining capacity.

Table C: Municipal Landfill Tonnages – 2007				
	2007 Fill Rate (tons)	**Remaining Capacity Cubic Yards (est.)**	**Remaining Capacity (tons)**	**Years of life remaining based on 2007 fill rates at .65 tons/yard[4]**
MSW Landfills:				
Bath	23,552	422,000	274,300	11 years
Brunswick	4,850	140,000	91,400	19 years
Greenville	600	56,000	36,500	60 years
Hatch Hill (Augusta)	25,961	937,000	609,000	20 years
Presque Isle*	20,140	149,900	85,800	4 years
Tri-Community (Fort Fairfield)*	31,145	703,800	457,500	18 years
CFWF (West Forks)	1000 (est.)	8,000	5,000	<1 year
Total Tons:	**107,248[5]**			
Total Remaining Capacity (est.)		**2,416,700**	**1,559,500**	
	2007 Fill Rate (tons)	**Remaining Capacity Cubic Yards (est.)**	**Remaining Capacity (tons)**	**Years of life remaining based on 2007 fill rates at 1 ton/yard**
Ash Landfills:				
ecomaine	40,320	915,700	915,700	20-30 years
Lewiston	18,780	268,750	268,750	12 years
Total Tons:	**59,100**			
Total Remaining Capacity (est.)		**1,184,450**	**1,184,450**	

* *Both the Presque Isle and Tri-Community landfills are currently seeking additional disposal capacity that would provide up to 50 years additional capacity at each facility.*

Assessment of Facilities

Among the seven municipally-operated MSW landfills, there is approximately 2.4 million cubic yards of remaining available capacity that can accept approximately 1.56 million tons of municipal solid waste. This capacity is sufficient to carry those communities for 10 to 14 years (on average), with growth in solid waste of 4 percent a year.

The actual remaining life varies for each landfill, resulting in 'unevenness' of municipal capacity across the state. This variation, as to when a particular community or region may exhaust their current disposal capacity, is independent and possibly irrespective of

[4] Different ton-cubic yard conversion rates are used for different facilities. Household, baggable waste at municipal landfills typically converts at 0.65 tons per cubic yard. Ash is heavier than municipal solid waste, so SPO uses a 1:1 conversion rate with one ton equalling one cubic yard. Commercial landfills, with heavier equipment for compaction and more varied waste streams, also typically achieve a 1:1 conversion rate.

[5] 83,043 tons were municipal solid waste or construction demolition debris. The balance was other wastes, including special wastes.

any possible statewide disposal capacity concern, but will be of significant concern to those regions (see Section V.B on Regional Disposal Issues).

Bath and Brunswick are two of the state's oldest secure landfills. Brunswick serves only its own residents and a portion of its businesses. Both communities adopt programs to extend the life of their landfills, such as 'pay-as-you-throw' (PAYT) and single stream recycling collection. The Hatch Hill Landfill in Augusta serves eight communities and was recently expanded. A study on expanding recycling options within these communities was just released.

Together, the Presque Isle and Tri-Community (Fort Fairfield) landfills serve nearly 50 communities in Aroostook County. Both are currently seeking expansions that will provide capacity to serve those communities for upwards of fifty years.

The Caratunk, Forks, and West Forks landfill was closed in 2008, ending that facility's use.

As part of an arrangement with the Mid Maine Waste Action Corporation, the City of Lewiston brings its waste to the MMWAC incinerator in Auburn. MMWAC, in exchange, disposes its incinerator ash at the Lewiston landfill. In addition, the Lewiston Landfill accepts CDD and other wastes.

Municipal CDD Disposal Facilities

There are approximately 20 municipal disposal facilities that accept locally-generated construction and demolition debris**,** inert fill, brush, and trees. Local facilities furnish a 'short-transport' option for the management of these wastes. An estimated 28,000 tons of materials were buried at these sites during 2007; in 2006, these facilities accepted 27,466 tons. Typically, scales are not available at these facilities so a conversion factor of 400 pounds per cubic yard of delivered waste has been used to estimate tonnage.

Assessment of Facilities

The remaining capacity at individual CDD facilities varies, but numbers indicate that landfill space exists for an overall capacity for another 10-12 years. A number of these facilities will be full before then, creating 'pockets' where CDD disposal options will need to be reconsidered. Four of the facilities have an estimated six years or less of capacity at current fill rates and licensed footprints. One site, Marion Township in Washington County, is currently exploring developing a replacement disposal site.

CDD disposal capacity and management continue to be problematic. These materials are unacceptable at waste-to-energy facilities and cannot be recycled or reused without investment in equipment, labor, and sufficient land area to aggregate and process them. Markets for processed CDD and bulky wastes do exist but, on the small scale that most Maine towns operate, are limited. Communities' low volume and dispersed facilities do not often produce the economics needed for sustainable recycling markets.

Maine has several commercial CDD processors, KTI Biofuels in Lewiston; Commcercial Paving and Recycling (CPRC) in Scarborough; Plan-it Recycling in Gorham. KTI is a fixed operation. It accepts only clean wood products (from in-state and out-of-state) for processing for use as biomass fuel. CPRC used to provide mobile services but now operates strictly from its Scarborough facility, hauling in material and shipping out the finished product. Plan-It Recycling also operates from a fixed location. Casella Waste Systems has permitted a CDD processing operation that would accept up to one thousand tons of CDD per day in Westbrook and anticipates building that facility in 2009. There are also several commercial wood chippers that move from site to site to manage smaller brush piles. Additional commercial CDD processing capacity may be permitted in Maine in 2007-8, which would provide an outlet for Maine-generated CDD.

B. Waste-To-Energy Facilities

In 2007, 32% of Maine's municipal solid waste was sent to a waste-to-energy (W-T-E) facility. Maine's W-T-E facilities received 826,291, tons of MSW, a decrease of 867,606 tons of MSW in 2006, as shown in Figure 7. Of this 2007 tonnage, 671,823 tons were generated in-state and 154,468 tons were imported, both a decrease from 2006 tonnages. Table D shows the processing capacity of the four waste-to-energy facilities:

Table D: Maine W-T-E Capacity

Waste-To-Energy Facility	Annual processing capacity (tons/year)	Tonnage received in 2007
ecomaine	170,000	157,637
Maine Energy (ME)	310,000	280,210
Mid Maine Waste Action Corporation (MMWAC)	70,000	92,696
Penobscot Energy Recovery Corporation (PERC)	304,000	295,749
Total of W-T-E Facilities	854,000	826,292

The facilities provide both a product from combustion as well as a reduction of the MSW tonnage requiring disposal, thus reducing the need for landfill capacity. They produce a combined capacity of approximately 62 megawatts a day of electricity and reduce the volume of waste requiring landfilling by about two-thirds.

The four waste-to-energy facilities, while combusting MSW and producing electrical power, also produce several streams of materials and residues: by-pass waste, front-end process residue, and ash. These residues, which require disposal in landfills, comprise approximately one-third of the waste processed by these facilities (Figure 4).

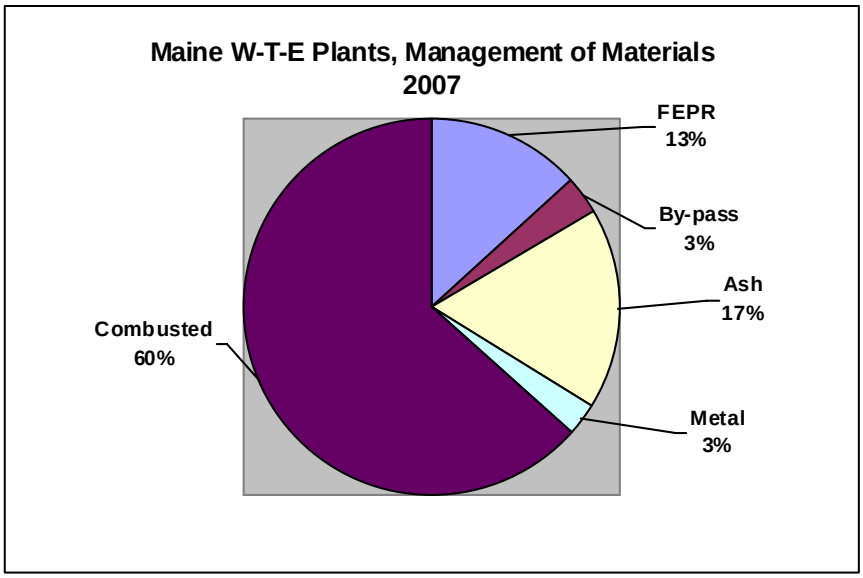


Figure 4: Maine W-T-E Plants, Management of Materials
Source: Facility Annual Reports, State Planning Office

By-pass Waste

By-pass waste is that portion of the municipal solid waste stream intended for delivery to and incineration at a waste-to-energy facility, but diverted because the facility could not accept it. Solid waste is 'by-passed' if there are operational interruptions or facility shut-downs or if the facility reaches its operational capacity and cannot accept waste that it is contractually-obligated to receive. The by-pass waste is typically delivered to a landfill for disposal.

Front-end Process Residue

Front-end process residue (FEPR) is removed prior to incineration, and may include ferrous metals, glass, grit, and fine organic matter. While metals are recycled, most FEPR is landfilled. In the past, FEPR was used in conjunction with landfill closure programs, but this is no longer a viable outlet. The FEPR waste stream has a strong, negative impact on landfill capacity, since alternatives to landfilling it do not readily exist. While some composting of FEPR has been done, the resulting product typically contains contaminants that restrict its use to limited landfill cover applications only.

Maine Energy (ME) and Penobscot Energy Recovery Company (PERC) use a 'refuse derived fuel' technology and generate front-end process residue as a by-product of their operations. These facilities dispose of the front-end process residue at landfills. Mid-Maine Waste Action Corporation (MMWAC) and *ecomaine* use a 'mass burn' technology and do not produce FEPR.

Waste-To-energy Facility Ash

Ash is a by-product of incineration, is classified as a special waste, and is landfilled. The ash from ME and PERC was buried at the commercial landfills and Juniper Ridge. The ash from MMWAC was buried at the City of Lewiston's landfill and e*comaine's ash* was buried at their landfill.

Assessment of Facilities

Three of these facilities are at their 20th year of operation. The plants' maintenance programs, along with upgrades, have kept these facilities functioning well, and should continue to do so for the foreseeable future. Facility upgrades occur in response to environmental regulations, primarily aimed at air emissions reductions. All of the Maine W-T-E facilities perform at or better than their license requirements.

To produce the electrical generation contracted for, waste-to-energy facilities need to operate at maximum capacities. The seasonal nature of waste generation causes tonnage overage problems during the summer months and the need to 'attract' additional tonnage during the winter months. Facilities bypass waste when they reach their daily operating capacity and import waste to make up for shortfalls.

C. Imported/Exported Municipal Solid Waste

Movement of solid waste across state lines is protected under interstate commerce laws. Municipal solid waste is considered a commodity and is subject to fluctuations accruing to supply and demand at the regional and national level.

In 2007, 456,580 tons of municipal solid wastes were imported to Maine, while exports totaled 60,491 tons. The amount of MSW imported to Maine is relatively stabile. Exports of waste to New Hampshire and New Brunswick landfills fluctuates but appears to be declining, as shown in Figures 5 and 6.

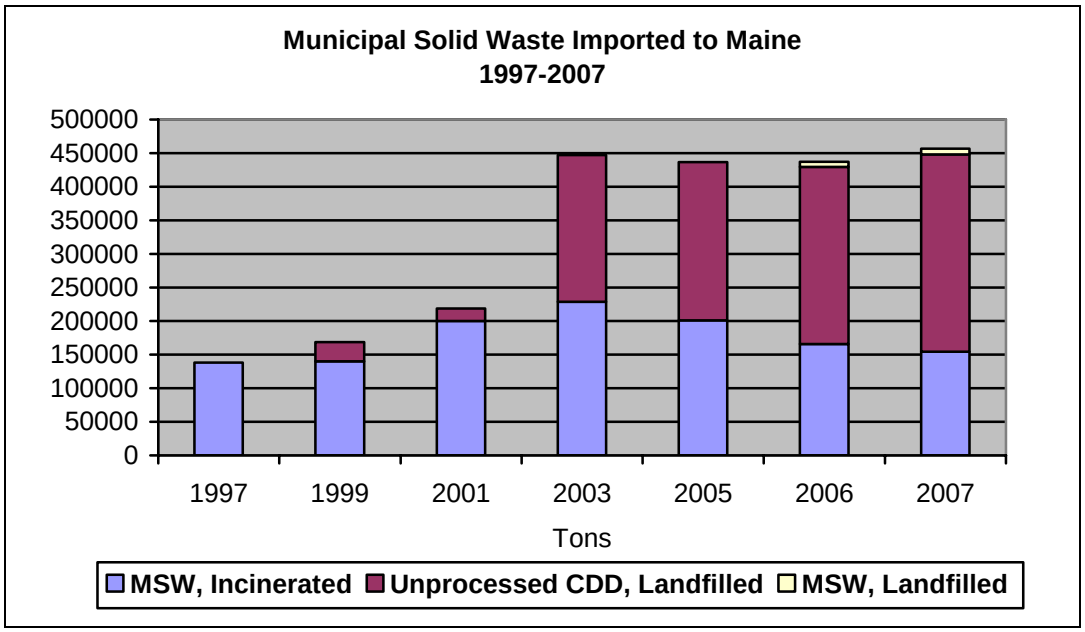


Figure 5: Municipal Solid Waste Imported to Maine, 1997-2007
Source: State Planning Office

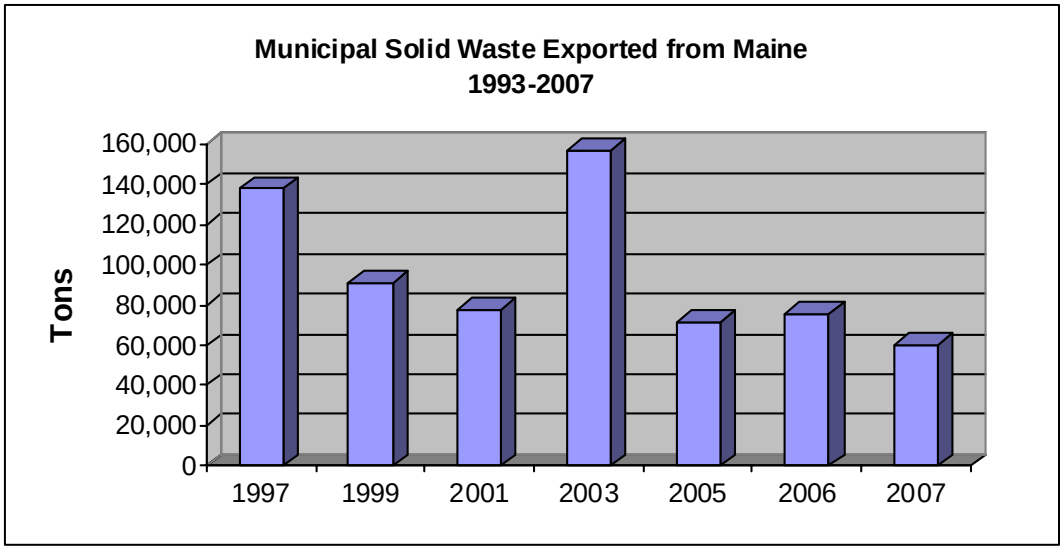


Figure 6: Municipal Solid Waste Exported from Maine
Source: State Planning Office

D. Recycling Capacity

Maine has recycled over 700,000 tons per year during recent years; approximately a third of which is handled by municipal recycling programs. There are approximately 300 local recycling programs relying upon about 145 processing operations, with a dozen of those being major municipal recycling processing centers.

Recycling consists of two operations: collection and processing. Collection can be done by the municipality or a private hauler by curbside pick-up or self-transported by residents to a collection center. Small collection centers provide short-term storage with some minimal processing (i.e. crushing glass) to reduce volumes. From there materials are moved to processing centers or sometimes, depending on the material, directly to end users.

Processing centers consist of building capacity to house storage and processing operations, equipment such as paper and plastic balers, glass crushers, and forklifts, and office space. They process material to meet market specifications and amass sufficient quantities to move directly to markets.

Assessment of Facilities

Today, Maine recycling operations have the ability to process current tonnages, as well as modest increases.

There have been significant, recent (within the last five years) improvements in processing capacity in the following regional programs: Bangor, Pittsfield, Skowhegan, Rockland, Camden, Coastal Recycling, and Lincoln County. In 2007, *ecomaine,* Maine's largest recycling region serving its 21- owner-municipalities in Cumberland County, completed a $3.8 million upgrade to its materials recovery facility in Portland and is offering processing of 'single sort' recycling collection services to expand its recycling efforts. Similarly, FCR Goodman Recycling, through Pine Tree Waste services, offers 'single stream' recycling collection services to many of its municipal clients, and transports the comingled recyclables to a processing facility in Massachusetts.

The State Planning Office recently conducted extensive interviews with regional recycling managers and operators around the state and concluded that there is capacity to process an additional 20,000 tons of recycled materials with the existing infrastructure. Almost all of Maine's municipal recycling physical plant was put in place in 1990-93 and is approaching 20 years of use.

V. Projected Waste Processing and Disposal Needs and Capacity

Based on our projections, Maine will require approximately 34 million cubic yards of landfill capacity over the next 20 years to properly manage the municipal solid waste that is directly landfilled, along with the residues generated by the four waste-to-energy facilities and other processing facilities that also require landfilling. Over this same time, we project there will be 39 million cubic yards of capacity. Maine has sufficient capacity to meet its needs for the next 20 years.

A. Statewide Disposal Capacity

Capacity Needed

Disposal capacity is a factor of need versus availability. Maine generated just over two million tons of waste in 2007. Assuming a 4% annual increase, we will generate over 4.6 million tons in 2027. With a 34.8% recycling rate, 1.6 million tons per year will be recycled, 0.86 million tons will be sent to a W-T-E facility, and leaving 2.4 million tons will require landfilling.[5] That landfilled waste includes unprocessed solid waste, residues from waste to energy facilities and processing operations, and special wastes such as ash.

By 2027, total tons needing disposal are projected to increase to 3 million tons. Of that, 2.4 million tons, or over 2.5 million cubic yards of wastes, will need to be landfilled per year. Figure 7 shows Maine's projected capacity needs over the next 20 years.

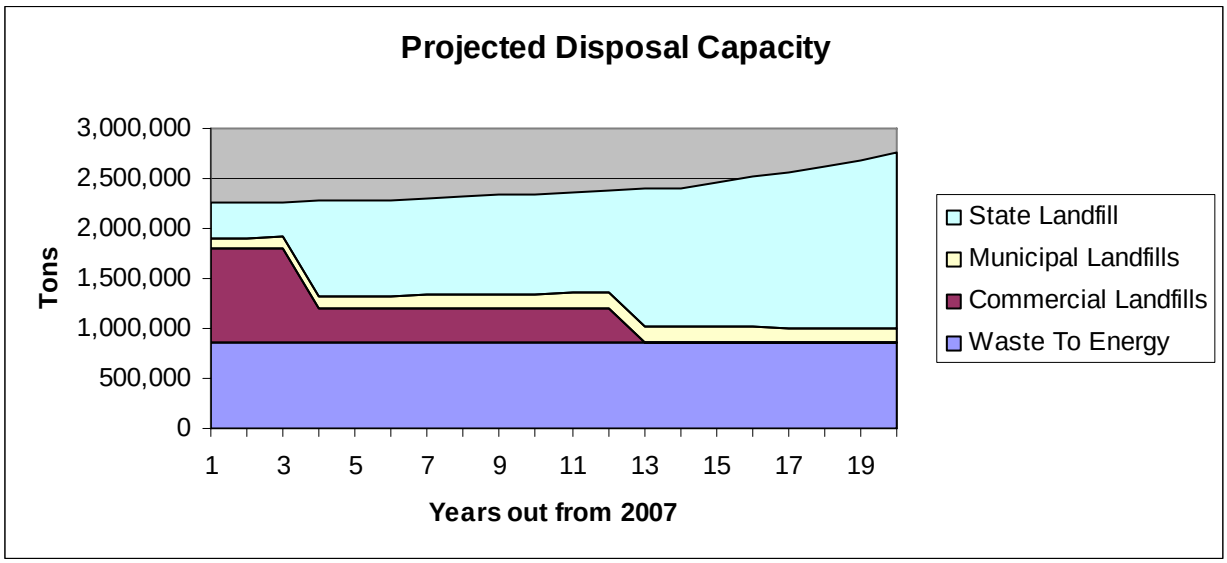


Figure 7: Maine Projected Capacity Needs in Tons, 2007 – 2027
Source: State Planning Office

[5] Including out-of-state waste

Specifically, this report is to address projected disposal capacity needs at four points in time: 3 years, 5 years, 10 years, and 20 years out from the date of this report. In projecting those needs, we presume recycling efforts are unchanged from today and that activities and demands reflect the projected changes described before. With those caveats, it is estimated that: in 3 years the disposal capacity needed will be 1.5 million cubic yards; in 5 years, the disposal capacity needed will be 1.7 million cubic yards; and in 10 years, the disposal capacity needed will be 2 million cubic yards.

To handle this projected tonnage over the next 20 years, Maine will need approximately 34 million cubic yards of landfill capacity, based on the following assumptions:

- continued growth in MSW generation at 4% per year (with no waste reduction assumptions built in and recycling at 34.8%). This four percent increase is conservative and it is possible that actual increases may be softened or eliminated by improved recycling and waste reduction efforts, or an uncertain economy. However, given that development of disposal capacity is not a quick or easy process, having adequate capacity anticipates that time lag and reduces the possibility of a shortage of capacity.
- recycling tonnages increase as waste generation increases to maintain a 34.8% recycling rate[6]
- imports decrease as capacity at W-T-E facilities is replaced by Maine MSW as generation increases and landfills close
- exports remain at 2007 levels

Projected Capacity Available

The projection of solid waste disposal capacity is based on these parameters:

- continued operation of and reliance upon the four W-T-E facilities
- no significant change in municipally-operated landfills
- closing Pine Tree Landfill
- Crossroads Landfill ceasing operations around 2017
- a license amendment and expansion permit for Juniper Ridge is approved
- additional capacity is approved for the Presque Isle and Tri-Community landfills

Currently, we estimate that Maine has about 17 million cubic yards of disposal capacity for municipal solid waste and the residues from processing operations and waste to energy facilities, as follows:

- 2.4 million cubic yards in municipal landfills (1.9 million tons)
- 1.2 million cubic yards in municipal landfills (1.2 million tons of ash)
- 0.85 million cubic yards in municipal CDD landfills (170,000 tons)
- 4.9 million cubic yards in commercial disposal facilities (4.7 million tons)
- 8.5 million cubic yards in Juniper Ridge Landfill (7.4 million tons)

[6] Note that even to maintain a 34% recycling rate will require that Maine increase the tons recycled from 700,000 to 1.4 million tons over the next 20 years.

The amount of available disposal capacity will be affected by both increases and decreases in capacity as follows:

Projected Consumed Capacity

The planned closure of Pine Tree Landfill in 2009 will have an impact on Maine's current solid waste management system, in that approximately 150,000 tons of *in-state* generated special wastes and construction and demolition debris waste that was annually disposed of at that landfill will be diverted to the Juniper Ridge Landfill. In addition, the residues from the processing of construction/demolition debris at Casella Waste System's planned processing facility in Westbrook will also be directed to Juniper Ridge, an additional 150,000 to 200,000 tons expected. The planned closure responds to state policy adopted in 1989 that sought to restrict additional private sector development of disposal capacity.

Projected Planned Capacity

The State Planning Office is seeking an additional 22.5 million cubic yards (18 million tons with a compaction rate of 0.8 tons per cubic yard of landfill space) of disposal capacity at the state-owned Juniper Ridge Landfill. The effort to permit the proposed capacity expansion at Juniper Ridge is currently underway and is planned to be submitted to the Department of Environmental Protection in early 2009. That review is expected to take several years and if approved and permitted will provide disposal capacity to the state for an additional 15 to 20 years beyond its current life.

Additionally, the Presque Isle and Tri-Community landfills are seeking approvals to expand their disposal capacity to extend their useful lives for up to another fifty years.

Impact of Recycling on Disposal

Recycling will continue to divert significant tonnages from disposal. The State Planning Office estimates that over 20 years, recycling will divert 20 million tons (cumulatively) from disposal at today's recycling rate of 34.8%. If the recycling efforts can be increased, and the expected overall waste generation rates remain as predicted, the required disposal capacity to handle the state's solid waste will be reduced.

Out-of-state Waste

The types and amount of out-of-state waste will likely shift in response to changes in Maine's waste generation and management systems.

The waste-to-energy facilities that currently take out-of-state waste will continue to rely upon it to fulfill their boiler needs and power contracts. However, the State Planning Office anticipates that as Maine-generated solid waste tonnages needing disposal increase, waste-to-energy facilities' need for imported municipal solid waste will decrease. The state's remaining commercial landfill (after 2009) may continue to accept unprocessed CDD from out-of-state.

For purposes of this report, we estimate a 4% annual reduction in MSW imported and decreases in unprocessed CDD to a nominal amount by 2015, or an estimated 4 million cubic yards (cumulative) over 20 years.

Biomass Fuel

This report does not address processed green wood or construction and demolition debris imported into state for use as biomass fuel. This material is used in industrial boilers in Maine. Ash from its incineration has been managed by the industrial owner and until recently has not impacted capacity at the state public or commercial landfills.

Nevertheless, with uncertain oil prices and continuing tax incentives for green energy, interest in biomass fuel is growing. Anticipated development of construction and demolition debris processing facilities in Maine, in response to demand for biomass fuel recovery as well as recovery of other components of that waste stream, will rely upon out-of-state generated debris for at least part of their operation.

The residues from these processing facilities would be disposed of at landfills within the state. The ash from the combustion of the CDD fuel wood could be disposed of at any of the state's licensed special waste landfills, including the state-owned Juniper Ridge Landfill, with a corresponding affect on the lifespan of those facilities. This continues to be an issue that warrants watching.

Projected Disposal Capacity, Available vs. Needed

Based on the above analysis, Maine will have an estimated 39 million cubic yards of landfill capacity over the next 20 years, meeting our need for nearly 34 million tons as shown in Table E.

Table E: Projected Disposal Capacity Available vs. Needed 2007-2027

Landfill Capacity Available (cubic yards)			Capacity Needed (tons)	
Municipal Landfills	2,416,700		Total waste generated	65,000,000
Municipal CDD Landfills	850,000		Imported Waste	4,000,000
Commercial	4,900,000		Recycled	(22,000,000)
Juniper Ridge	8,462,000		Exported	(1,200,000)
Juniper Ridge expansion*	22,500,000		Diverted to, combusted at W-T-E	(12,000,000)
Total Landfill Capacity Available:	**39,128,700**		**Total Landfill Capacity Needed:**	**33,800,000**

** projected capacity, not yet approved*

Table E: Projected Disposal Capacity Available vs. Needed, 2007-2027
Source: State Planning Office

While Maine has sufficient landfill capacity to meet its needs, we must not become complacent. Siting new disposal capacity is a costly and highly volatile undertaking. Maine should do all that it can to make the existing capacity last beyond the next two decades. This will require state and local investment in waste reduction and recycling.

Another factor to consider in projecting total needed disposal capacity is the location of that capacity. The number and actual location of disposal facilities influences competition of type, quality and cost of solid waste services. As the number of disposal options decreases, this issue warrants consideration.

B. Regional Capacity Issues

Regionally, Maine is divided into “waste sheds” with waste feeding into regional disposal facilities as shown in Figure 12. Some waste sheds are geographically large like PERC (170+ communities) and the Crossroads landfill (30+ communities), some receive municipal solid waste from a single community or a small region, such as the two landfills on the mid-coast in Brunswick and Bath.

While this report typically looks at statewide disposal capacity, the State Planning Office has identified some regional or local areas where disposal capacity is uneven or in flux.

Aroostook County

The Presque Isle Landfill is currently seeking approval for an expansion. The expansion, if approved, will extend their capacity for another 50 years. The Tri-Community Landfill in Fort Fairfield also is seeking a landfill expansion at this time which will serve those communities for another possible 50 years. These efforts will require significant local resources but should not disrupt the solid waste capacity in the region.

Washington County

The Marion Regional CDD Landfill in Marion Township is reaching capacity and is expected to close in the near future. A new construction and demolition debris landfill for that region was being planned but now that project's fate is uncertain.

York County

In 2006, local officials undertook an effort to purchase and close the Maine Energy W-T-E facility. This facility, which serves about 36 communities in York County, is located in downtown Biddeford. Proposals were put to the voters in Biddeford and Saco to raise the money to buy the facility, but were turned down.

The loss of disposal capacity in Southern Maine would disrupt Maine's waste management system, but it would not precipitate a crisis. The loss could be absorbed through a combination of aggressive waste reduction and recycling efforts by communities in the service area, transporting waste to other instate and out-of-state disposal facilities[7], and, with a possible license amendment to Juniper Ridge to accept "bagged" or household MSW, transporting waste there.[8] The state, municipalities, and the private sector would need to work in partnership to find the best solution for the long term.[9]

C. Recycling Capacity

To achieve a 50% recycling goal would require municipal and private sector recycling programs to handle 300,000 tons more of material based on what we generate today. This number will grow each year to match projected increases in waste generation.[10]

[7] The cost-benefit of transporting wastes long distances would have to be considered.
[8] Any change in the type of waste accepted at Juniper Ridge would require approval from the Maine Department of Environmental Protection.
[9] Another consideration for this region is the contract renewal for electrical generation payments. A lower price could increase tip fees and impact volumes at waste to energy facilities.
[10] Based on an assumed 4% annual growth in municipal solid waste generation

Over the next 20 years, simply to maintain the state's current 34.8% recycling rate will require public and private programs to double their recycling handling abilities. As waste generation increases, the volume of recyclable materials at a 34.8% rate will increase from 700,000 tons in 2007 to over 2 million tons in 2027.

To achieve a 50% recycling goal by 2009 and hold it for the next twenty years would require the capture and processing of nearly 30 million tons from the waste stream over that period (increasing from 718,613 tons in 2007, to 1.1 million tons in 2009 and over 2 million tons by 2027).

Currently, municipalities do not have the capacity to handle these kinds of new volumes; neither the physical (buildings and equipment) nor human (staffing) capacity. Municipal recycling programs currently handle, on average, 90,000 tons of 'traditional' recycled materials per year. As discussed earlier, they have additional capacity for another roughly 20,000 tons annually.[11]

The private sector can likely handle additional tonnages or be in a position to respond with capital investment needs to grow their tonnages if the economics warrant it.

There are also concerns over where this volume would come from. Higher yields and participation rates can be stimulated with public awareness programs, incentives such as pay as you throw, and technological advances including single sort. Many communities are responding with these kinds of efforts, but greater effort is needed to generate the tonnage to achieve a 50% recycling goal.

It will take significant infrastructure capital investment by both the public and private waste management sectors to achieve our 50% recycling goal. Maine should begin to prepare now to build the infrastructure needed to manage an increase in recycling.

[11] This does not include the recent *ecomaine* recycling processing operation expansion which can by itself accept an additional 15,000 tons a year of recyclable material.

VI. Disposal Prices

A. Disposal Fees

The cost of managing solid waste is one of the biggest portions of municipal budgets. Disposal expenses comprise collecting, transporting, and 'tipping' waste. Disposal fees or 'tipping' fees are a key driver of municipal disposal costs. Current disposal fees range from $40.00 to $158.00[12] per ton at Maine's landfills and incinerators and have stabilized allowing predictability for municipal budgeting and long-term planning.

Tipping fees at the four waste-to-energy facilities are fairly consistent and reflect the commitment of the municipalities who either own the facility or have long-term contracts for disposal services.

The State, in its operating agreement with Casella Waste Systems, established a 'ceiling' for tip fees that sets an upper limit on how much can be charged for wastes delivered to the Juniper Ridge Landfill. It is anticipated that this will act as a check on pricing for the disposal of similar materials at other solid waste facilities.

Energy Revenues

Tipping fees at waste-to-energy facilities are influenced by revenues received from the sale of the electricity they generate. The revenues reduce the facility's operating expenses, yielding a reduction in the tip fee charged for solid waste. Should electrical sales revenue drop, tip fees may increase. Conversely, should the electrical sales increase, the possibility exists lower or maintain tip fees being charged.

B. Supracompetitive Prices

Supracompetitive, as applied to '*prices,'* means prices that are higher than they would be in a normally functioning, competitive market; usually as a result of overconcentration, collusion, or some form of monopolistic, oppressive practice. State law requires the State Planning Office to determine whether changes in available landfill capacity have generated, or have the potential to generate, supracompetitive prices and make recommendations for legislative or regulatory changes as necessary.

Disposal capacity at Maine landfills is sufficient to meet current needs. At the time of this report, the disposal capacity situation does not appear to have generated, nor does it appear to have the potential to generate supracompetitive disposal fees. In looking ahead, however, at that point when disposal capacity exists with fewer facilities than today, it is possible that prices will become supracompetitive. Where the actual date and timing of this is not known, it is critical that the Office maintain a firm awareness of this possibility and keeps the Governor and Legislature informed.

[12] This does not reflect spot market prices.

Appendices

A. Legislative Reference

Title 38: WATERS AND NAVIGATION
Chapter 24: SOLID WASTE MANAGEMENT AND RECYCLING
Subchapter 2: SOLID WASTE PLANNING

§2124-A. Solid waste generation and disposal capacity report

By January 1, 2008 and annually thereafter, the office shall submit a report to the joint standing committee of the Legislature having jurisdiction over natural resources matters, the Governor and the department setting forth information on statewide generation of solid waste, statewide recycling rates and available disposal capacity for solid waste.

The report submitted under this section must include an analysis of how changes in available disposal capacity have affected or are likely to affect disposal prices. When the office determines that a decline in available landfill capacity has generated or has the potential to generate supracompetitive prices, the office shall include this finding in its report and shall include recommendations for legislative or regulatory changes as necessary.

Beginning on January 1, 2009 and every odd-numbered year thereafter, the report submitted under this section must include an analysis of how the rate of fill at each solid waste landfill has affected the expected lifespan of that solid waste landfill. The January 2009 report must also include an analysis of the solid waste disposal needs of the State as of January 1, 2009 for the next 3, 5 and 10 years.

Beginning on January 1, 2010 and every even-numbered year thereafter, the report submitted under this section must include an analysis of consolidation of ownership in the disposal, collection, recycling and hauling of solid waste.

The joint standing committee of the Legislature having jurisdiction over solid waste matters may report out legislation related to the report submitted pursuant to this section.

B. Definitions and Acronyms

The following definitions are provided to assist the reader in reviewing this document:

Broker's Survey – *a biennial survey conducted of private sector recycling brokers and end-users to determine level and effort related to management of commercial recyclables.*

Bulky Wastes – *these are solid wastes that do not typically fit into a 30 gallon trash container, and may include such items as wood, large metal appliances and construction materials.*

Construction/Demolition Debris (CDD) – *these are the wastes generated by building, remodeling and/or destruction activities and may include such wastes as wood and wood products, concrete and brick, gypsum board, shingles and other common components of buildings.*

Front-end Process Residue (FEPR) – *residual of municipal solid waste resulting from the processing of solid waste processing prior to incineration or landfilling, and includes, but is not limited to, ferrous metals, glass, grit and fine organic matter.*

Household Hazardous Wastes (HHW) – *items generated by households that are corrosive, toxic, ignitable, or reactive, and as such are hazardous to humans and/or the environment if disposed of improperly.*

Incinerator Ash – *this is the residue from the combustion of municipal solid waste at waste-to-energy facilities. It may also contain fly ash from the facility's operation and is designated as a 'special waste'.*

Municipal Solid Waste Annual Reports – *these are the reports submitted to the State Planning Office by municipalities, as required through 38 MRSA § 2133. These reports convey their efforts related to municipal solid waste management and provide detail on the tonnage of solid wastes they have overseen and a description of the various solid waste management practices utilized.*

Municipal Solid Waste (MSW) – *solid waste emanating from household and normal commercial activities.*

Special waste – *wastes that generated by other than domestic and typical commercial establishments that exist in such an unusual quantity or in such a chemical or physical state that require special handling, transportation and disposal procedures.*

Supracompetitive *when applied to prices – means prices that are higher than they would be in a normally functioning, competitive market -- usually as a result of overconcentration, collusion or some form of monopolistic, oppressive practice.*

Universal Wastes – *a category of wastes that including: PCB containing lighting ballasts; Cathode Ray Tube (CRT) containing devices; fluorescent lamps; other lamps containing hazardous wastes; and, mercury-added devices from commercial sources.*

Waste-to-energy facilities (W-T-E) – *incinerators which receive municipal solid waste, and through combustion, recover energy and convert it into electricity, while reducing the volume of waste requiring disposal.*

<u>The following acronyms are provided to assist the reader in reviewing this document:</u>

CDD – *means Construction/Demolition Debris, wastes generated by building, remodeling and/or destruction activities and may include such wastes as wood and wood products, concrete and brick, gypsum board, shingles and other common components of buildings.*

CRT – *means 'Cathode Ray Tube', the projection device located in certain computer monitors and television sets*

DEP – *means the Maine Department of Environmental Protection*

EPA – *means the United States Environmental Protection Agency*

FEPR – *means Front-End Process Residue, residual of municipal solid waste resulting from the processing of solid waste processing prior to incineration or landfilling, and includes, but is not limited to, ferrous metals, glass, grit and fine organic matter.*

MSW – *means Municipal Solid Waste, solid waste emanating from household and normal commercial activities.*

PCB – *refers to Polychlorinated Biphenyls, a class of chlorinated aromatic hydrocarbons*

SPO – *means the Maine State Planning Office*

W -T- E – *means waste-to-energy facilities, incinerators which receive municipal solid waste, and through combustion, recover energy and convert it into electricity, while reducing the volume of waste requiring disposal.*

C. Maine Recycled Materials, 1997-2007

Materials:	2007	2005	2003	2001	1999	1997
high grade paper	72,846	72,965	3,951	43,125	11,570	31,470
corrugated cardboard	117,324	117,144	88,166	202,129	198,442	214,536
newspaper	26,453	32,300	33,442	32,069	42,612	44,710
magazines	8,532	8,723	1,881	13,259	6,104	3,702
mixed paper	11,131	5,226	13,919	14,766	12,860	12,207
other paper	7,668	8,900	3,166	27,376	12,671	6,465
other grades	42,210	36,805	132,475			
Total paper	286,164	282,063	277,000	332,724	284,259	313,090
clear glass	10,656	11,058	6,334	11,706	8,324	10,590
brown glass	23,544	24,377	11,270	12,200	12,545	7,060
green glass	11,878	12,622	3,142	6,700	26,167	11,767
all other glass	3,442	3,598	21,672	620	440	1,734
Total glass	49,520	51,655	42,418	31,226	47,476	31,151
white goods	82,493	78,401	68,125	115,219	142,640	122,895
aluminum	2,454	2,163	2,109	6,100	1,862	1,332
tin cans	1,989	1,089	3,154	9,754	18,833	10,693
non ferrous	25,655	23,213	18,847	22,491	18,652	21,572
other (various materials)	72434	68,432	68,984			
Total Metal	185,025	173,298	161,219	153,564	181,987	156,492
HDPE	8,530	9,377	3,420	2,274	4,410	4,160
PET	5,277	4,766	8,725	9,042	6,521	6,021
LDPE film	576	526	711	4		
polystyrene		8	0	554	6	6
Other	798	631	531	1,917	1,211	1,042
Total Plastic	15,181	15,308	13,387	13,791	12,148	11,229
wood waste	86,544	93,582	92,154	40,443	41,103	38,402
leaves	29,448	29,938	33,376	26,340	27,421	24,528
food waste	214	142	2,623	23,744	24,582	23,240
Total Organic	116,206	123,662	128,153	90,527	93,106	86,170
tires	30,545	30,374	35,467	19,621	32,530	30,559
CDD, other wastes	25,626	23,425	49,714	38,848	39,469	44,209
Mercury-added/UW	848	487	327	242		
Total Hard to Manage	57,019	54,286	85,508	58,711	71,999	74,768
Textiles	2,196	1,724	2,260	3,827	6,023	1,726
Other nonbulky MSW	7,302	6,935	7,638	3,445	2,740	5,252
TOTAL TONS RECYCLED:	**718,613**	**708,931**	**717,583**	**687,815**	**699,738**	**679,878**

Waste or Resource?

Rethinking Solid Waste Policy

State of Maine

Waste Management and Recycling Plan

January 2009

The Maine State Planning Office is directed by the Legislature to develop state policies that promote a balance between economic growth and natural resource conservation. To fulfill that charge within the scope of its mission, the Waste Management and Recycling Program continues to ensure sufficient land disposal capacity within our borders to meet the needs of today's waste management system and the economy that depends upon it. At the same time, we encourage the development of waste-to-resource systems that reduce waste destined for disposal, with the dual aims of alleviating our impacts on Maine's health and environment and enhancing Maine's economy and quality of place.

Maine State Planning Office
Waste Management and Recycling Program
38 State House Station
184 State Street
Augusta, Maine 04333-0038
www.maine.gov/spo
www.mainerecycles.com

January 2009

The State Planning Office would like to thank the Department of Environmental Protection and members of the Maine Waste Solid Management Advisory Council for their input and assistance in developing this plan.

Cover photo features one of a series of posters from the *Maine Recycles* public awareness campaign launched in 2008 and designed to encourage Mainers to recycle more.

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Waste-to-energy facilities (W-T-E) – *incinerators which receive municipal solid waste, and through combustion, recover energy and convert it into electricity, while reducing the volume of waste requiring disposal.*

Preface

Declaration of Policy

The Legislature finds and declares it to be the policy of the State, consistent with its duty to protect the health, safety and welfare of its citizens, enhance and maintain the quality of the environment, conserve natural resources and prevent air, water and land pollution, ***to establish a coordinated statewide waste reduction, recycling and management program.***

The Legislature finds and declares that it is the policy of the State ***to pursue and implement an integrated approach to hazardous and solid waste management, which shall be based on the following priorities: reduction of waste generated at the source, including both the amount and toxicity of waste; waste reuse; waste recycling; waste composting; waste processing which reduces the volume of waste needing disposal, including waste-to-energy technology; and land disposal.***

The Legislature finds that it is in the best interests of the State to prefer waste management options with lower health and environmental risk and to ensure that such options are neither foreclosed nor limited by the State's commitment to disposal methods. The Legislature declares that ***it is in the public interest to aggressively promote waste reduction, reuse and recycling as the preferred methods of waste management.***

The Legislature finds that environmentally suitable sites for waste disposal are in limited supply and represent a critical natural resource. At the same time, new technologies and industrial developments are making ***recycling and reuse of waste an increasingly viable and economically attractive option which carries minimal risk to the State and the environment and an option which allows the conservation of the State's limited disposal capacity.***

The Legislature further finds that needed municipal waste recycling and disposal facilities have not been developed in a timely and environmentally sound manner because of diffused responsibility for municipal waste planning, processing and disposal among numerous and overlapping units of local government. The Legislature also finds that direct ***state action is needed to assist municipalities in separating, collecting, recycling and disposing of solid waste,*** *and that sound environmental policy and economics of scale dictate a preference for public solid waste management planning and implementation on a regional and state level* (bold added here for emphasis).[1]

Such was the clarity of our beginnings and, for 20 years, Maine has worked to implement this policy. During this time, the state has made significant progress in reducing, reusing, and recycling its municipal solid waste.

- The state's recycling rate has more than doubled; recycling more than five and a half million tons of solid waste over this period.
- Public recycling services have expanded to serve over 98% of our population.

[1] 38 Maine Revised Statute Annotated, Chapter 13

- Businesses have adopted and implemented recycling programs that support the state's objectives.
- We've reduced toxics in the solid waste stream by banning from disposal in Maine solid waste disposal facilities: mercury-added products, cell phones, and cathode ray tubes (CRTs) found in computer monitors and televisions, and requiring the recycling of hazardous consumer products known as 'universal wastes'.
- The number of municipalities offering collection programs to divert and safely manage household hazardous waste (HHW) has grown to 140 municipalities in 2007. Additionally, two permanent HHW collection facilities have been established to better serve the on-going household hazardous waste management needs of Maine's residents.
- Nearly 100% of the state's unlicensed, unlined, substandard landfills have been capped and closed, significantly reducing their impacts on Maine's environment.

In the decade since the last waste management plan, recycling progress has slowed. The statewide recycling rate leveled off as our growing economy and changing lifestyles resulted in waste generation levels that outpaced our efforts and support of recycling. The amount of solid waste being disposed increased 60 percent.

The legislated date to achieve the state's 50% goal is January 1, 2009. The 2007 state recycling rate is 34.8%, fifteen percentage points short of the goal. The state remains committed to reaching the 50% goal in light of its value on reducing overall solid waste management costs, the positive impact on the environment, and a lessening of the need for additional solid waste disposal facilities.

The state waste reduction goal challenges Mainers to reduce waste generation by 5% every two years. As waste generation continues to climb in Maine, we have not achieved this goal. However, we are seeing a modest trend in waste reduction from decreases in the weight of consumer goods, for example when products get smaller, are made of more lightweight materials, or use lighter weight packaging.

In 2005, a state policy review task force called for Maine to move beyond a 50% recycling goal. Recycling is increasingly critical as a foundation for sustainable production. As the current stewards of this system, we have the obligation to counter the notion of useless waste as an unavoidable conclusion of normal everyday living. Our work for the coming years is to return these "resources" to either their natural or industrial systems.

The Purpose of this Plan

The intent of the ***Declaration of policy*** placed into law in 1989 is unambiguous; as is the direction it provides the plan.

While this plan does offer specific resource management objectives and suggestions to achieve them, and has analytical and informational functions, it is deliberately a forward looking policy document for policymakers and program managers at the state, regional, and municipal level. The plan is intended to encourage them to make full use of the waste hierarchy when crafting decisions about program implementation, to provide them with the policy standards to apply to those decisions and to persuade them to pursue and achieve the state's 50% recycling goal; one of the fundamental legislative reinforcements of the hierarchy.

The plan takes a look at the development of Maine's waste management system in order to assess the effectiveness of current state efforts. The plan also:

- looks at how solid waste is currently being managed in Maine;
- provides an update on issues cited in the last plan ten years ago; and
- identifies issues that warrant monitoring and new trends.

Finally, it describes strategies for how Maine might move forward managing municipal solid waste into the next decade.

In addition, the plan is the basis for:

- communicating Maine's waste management priorities and policies;
- assessing statewide disposal capacity, recycling progress, and waste management strategies; and
- guiding public benefit determination for environmental licensing.

Appendix A provides the statutory references for the plan.

The Plan's Format

This plan update contains edited excerpts from the most current *Solid Waste Generation and Disposal Capacity Report*. The capacity report has been expanded in scope and is now revised on an annual basis. Certain requirements of the plan and the report overlap including determination of existing and potential disposal capacity, and projected demand for capacity.

The goal of this "link up" is to develop mechanisms through which the State Planning Office can readily scrutinize the progress and effectiveness of Maine's solid waste policies and programs against the most current numbers and projections supplied by the capacity report.

This change in format is in keeping with the move to a standing Solid Waste Management Advisory Council from the once-every-five-year task force and the change to the annual report; to develop a more timely, policy-guided review of any changes and trends of Maine's solid waste management practices and translate the information gained into appropriate action.

I. Waste Characterization

Municipal Solid Waste Generation[2]

The amount of municipal solid waste (MSW) generated by Mainers is the starting point for the calculations and projections in this plan. It provides the basis for determining the statewide recycling rate as well as all the projections that follow.

Municipal Solid Waste
This plan considers municipal solid waste and its residues (primarily ash and front-end process residue generated by waste-to-energy facilities). MSW is waste typically generated by households and businesses and managed by municipalities. It includes household garbage and other waste (corrugated cardboard, newsprint, office and mixed papers, food waste, plastics, glass, metals, and textiles) as well as construction and demolition debris, appliances, furniture, tires, wood waste, and yard waste.

Waste Generation Calculation
The State Planning Office uses three pieces of data to determine the statewide generation of municipal solid waste:

1. data provided by municipalities in their annual solid waste reports to the State Planning Office;
2. data provided by public and private disposal facilities in their annual license reports to the Maine Department of Environmental Protection; and
3. data provided by commercial recyclers and end-users in a voluntary survey.

The Office combines the amount of waste processed and disposed and the tonnage recycled, composted, and reused to create a reliable estimate of waste generation in Maine.

A. Statewide Municipal Solid Waste Generation

Maine residents, businesses and visitors generated 2,066,448 tons of municipal solid waste in 2007, up from 1,989,266 tons in 2006. Waste generation is a function of population growth, lifestyles, economic activity, and production practices.

Between 1993 and 2003, municipal solid waste generation in Maine increased over 55%. While we can attribute some of this growth to increased economic activity, we also recognize that improved data collection plays a part. During this period, for each successive reporting year, the Office was able to capture more precise waste generation numbers. However, as can be seen in Figure 1, over the last four years, waste generation increases have slowed. Again, improved accuracy in data plays a part.

[2] Excerpted from the *2007 Solid Waste Generation and Disposal Capacity Report*, Maine State Planning Office, January 2009 (edited)

Nevertheless, a fundamental change in the waste stream is occurring; a change that impacts waste tonnages. Products and product packaging today are increasingly made from lighter weight materials. This saves on both manufacturing and transportation costs. Shifting from glass to plastic packaging, downsizing packaging, and switching from metal to plastic product components are occurring across industries. For example,

- newspapers are smaller and lighter weight;
- aluminum and plastic containers are being manufactured with less material;
- glass is disappearing from supermarket shelves; and
- computer components are often now made of plastic rather than metal.

These changes impact waste stream composition. Plastic, which used to be 7% of the waste stream by weight, now comprises 12-13%, displacing glass and metal. Where 24 aluminum cans used to weigh a pound, now there are 34 cans to a pound. Newspaper is now a smaller percent of the waste stream by weight.

Changes in society also contribute to decreasing the weight of what we dispose. Smaller families, reading their morning newspaper on-line, and eating more restaurant meals, generate less waste. A trend of growing-your-own or buying local produce may also reduce food waste in places.

At the same time, we continue to see increases in disposable, single-use, convenience packaging. Today's on-the-move lifestyle takes advantage of ready-made meals, and also the demands of higher food hygiene standards. Everything from plastic utensils and beverage cups to throwaway floor mops to disposable underwear and socks for travelling represents a growing share of household waste, particularly if you consider its volume. Disposable products and packaging, while increasing in amount also appear to weigh less; a contributing factor to Maine's slowing waste generation tonnages.

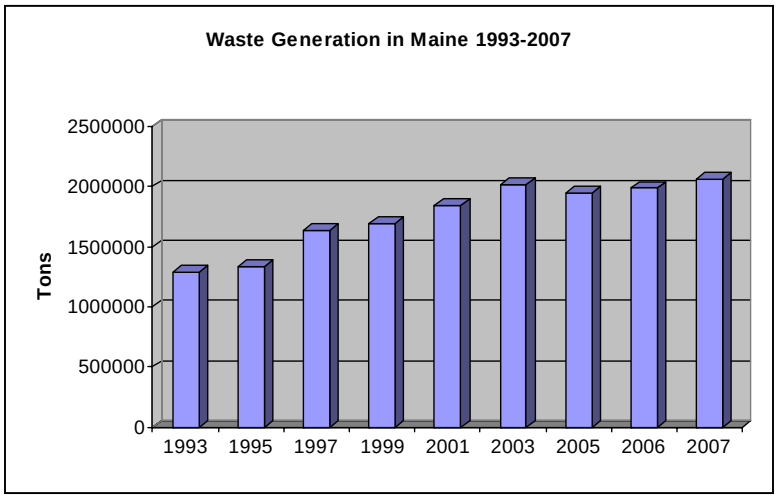

Figure 1: Maine Waste Generation, 1993-2007
Source: State Planning Office

B. Per Person Waste Generation

Municipal solid waste generation, when calculated on a 'per person' basis, shows that each Maine resident generates approximately 3,200 pounds of MSW a year, or about 8.8 pounds of waste per person per day.[3] Maine's per person generation is higher than the 2007 national average of 4.6 reported by the U.S. Environmental Protection Agency.

One reason why Maine's per person number is higher than the national average is that Maine includes both bulky waste and construction and demolition debris (CDD) in its definition of MSW, which the U.S. EPA does not. If we exclude these wastes from our numbers, the Maine per-person rate drops to approximately 7.5 pounds per day. For comparison, New Hampshire's 6.9 pounds per person per day in 2007 includes CDD,[4] also higher than the national average.

Another explanation for the higher weight per person is the high success in tracking and capturing commercially-generated solid waste tonnages, as well as the considerable additional impact of visitors on solid waste generation. Maine sees tens of millions of overnight stays and hundreds of thousands of extended stays by nonresidents per year. For example the Mount Desert area with a year round population in the thousands, sees over three million visitors per year that have an enormous impact on MSW generation numbers.

C. Types of Waste

1. Composition of Household Wastes

The plan depends upon the *EPA Waste Characterization Study* of the same data year in order to assess the types and amounts of Maine-generated MSW (See Figure 2 below).

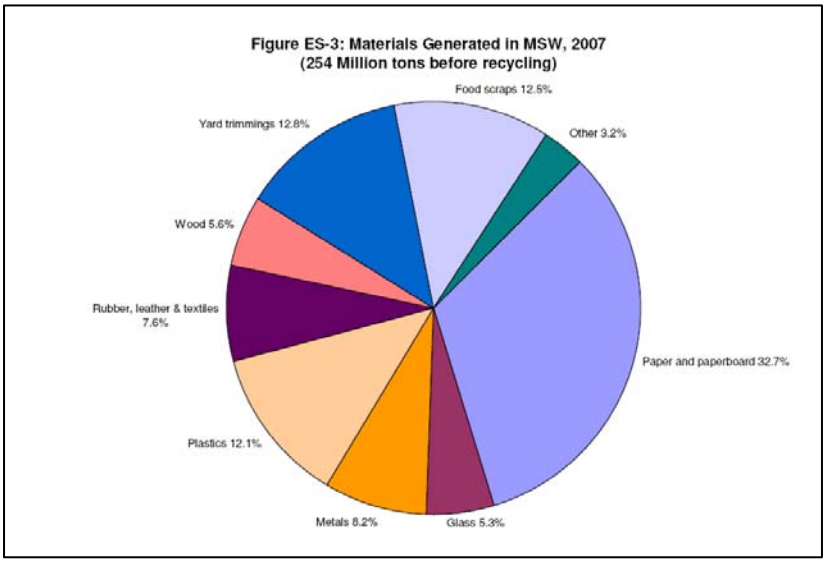

Figure 2: Municipal Solid Waste Characterization
EPA Waste Characterization Study 2007

[3] Based on an estimated 2007 Maine population of 1,315,398, US Census
[4] New Hampshire Department of Environmental Services

We can apply these percentages to the amount of Maine's MSW, but we must subtract CDD as the EPA chart does not include that waste stream.

Subtracting out the 2007 CDD tonnage leaves 1,748,958 tons of MSW generated. By applying the percentages of the chart to Maine's tonnage, we can estimate the types and amounts of MWS as shown in Table 1.

Table 1: Maine Recyclables Generated (in tons) - 2007	
paper and paperboard	571,910
yard waste	223,867
food scraps	218,620
plastic	211,624
household metal	143,415
textile, rubber and leather	132,920
wood waste (other than CDD)	97,942
glass	92,695
other	55,967

It is worth comparing these numbers with the recovered numbers reported in Table 6. While the categories do not match up precisely, they are close enough in definition to warrant their use here. Table 2 shows the percent recovered for selected recyclable materials.

Table 2: Recovery Rates of Selected Recyclable Materials 2007			
Waste type	**Amount generated**	**Amount recovered**	**% recovered**
Paper/ paperboard	571,910	286,164	50%
Yard waste	223,867	29,948	13.3%
Food scraps	218,620	214	minimal
Plastic	211,624	15,181	7%
Household Metal	143,415	86,936*	61%
Textile/rubber/leather	132,920	9,498	7.1%
Wood waste	97,942	**	
Glass	92,695	49,520	53.4%

* includes white goods ** no corresponding definition

This comparison confirms current trends in recycling data. The mature recycling commodities – glass, metals, and fiber – have the highest recovery percentages, while plastics is gaining share in generation but lags behind in recovery due to the complexity of chemistries that relates directly to weakness in recycling efforts. It also highlights where Maine can make the most gains by concentrating on fiber, plastics, construction demolition debris, and the organic fraction.

Another way to look at Maine's waste stream is to look at the source of the waste. Maine has a larger commercial share than the US average because of our MSW definition inclusive of CDD (see Table 3).

Table 3: Breakdown of Sources of Waste - 2007			
Type of Waste		**Percent of MSW Generated**	
Residential	Includes waste from single-family and multi-family dwellings	Maine 46%	US 55-65%
Commercial	Includes waste from businesses, schools, institutions, and the MSW portion waste generated by industrial sites (e.g. office waste)	Maine 54%	US 35-45%

2. Composition of Construction/Demolition/Debris

In 2007, Maine generated an estimated 317,490 tons of CDD. Based on waste composition models, as shown in Figure 3, we can assess the types and amounts of the CDD waste stream.

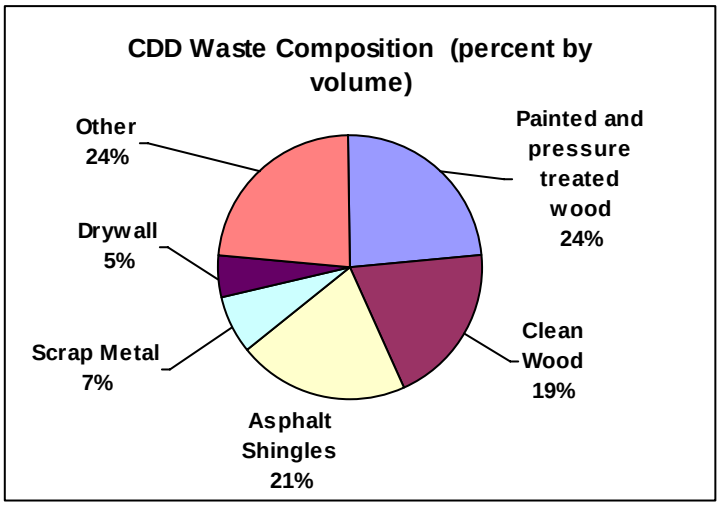

Figure 3: Vermont CDD Composition Study 2003

Using the percentages of Figure 3, it is estimated that Maine generated the following amounts and types of CDD, shown in Table 4:

Table 4: Types of CDD generated – 2007 (in tons)	
Painted and other wood	76,198
Clean wood	60,323
Asphalt shingles	66,673
Metals	22,224
Drywall	15,875
Other[5]	76,198

[5] "other" includes carpet, plastic floorings, insulation, plastic conduit, joint compound, containers, and paper products, and mixed materials products that could not be categorized.

Again referring to Table 6, Maine recovered 25,626 tons of CDD and other wastes for a recycling rate of just over 8% of our CDD stream.

State Recycling Goal

A. Recycling Trends

The goal of the state of Maine is to recycle 50% of the state's waste each year. Maine recycled 34.8% of its municipal solid waste in 2007. This reflects a decrease from the 2006 recycling rate of 36.2 % and falls below the recycling rate of 35.5% experienced in 2003. The Office estimates that the overall result is accurate to within two (2) percentage points.

Approximately 33% of Maine's recyclables are handled by municipal/public recycling programs. The balance of recycling efforts statewide is the result of private business-generated and managed recyclables, handled by private sector waste management companies.

Maine's recycling rate grew rapidly in the first ten years following the enactment of the Maine Solid Waste Management Act – from an estimated 17% in 1987 to 42% in 1997. It has since leveled off, declining slightly each year since the high of 42%. Figure 4 shows the state's recycling rate over time.

The rapid rise in recycling rates from 1987 to 1997 was due to a concentrated effort by private sector, local public programs, and the state acting in partnership, with recycling having not only a priority statutory identity, but state level presence and support. During this time, the state invested $12.5 million in local grants for recycling collection and processing equipment, provided for statewide public education, and conducted hundreds of training workshops for local officials. Since 1998, state funding has been available at a fraction of previous levels ($475,000 in 1998, $600,000 in 2003) and local programs compete with other municipal services for their share of property tax dollars.

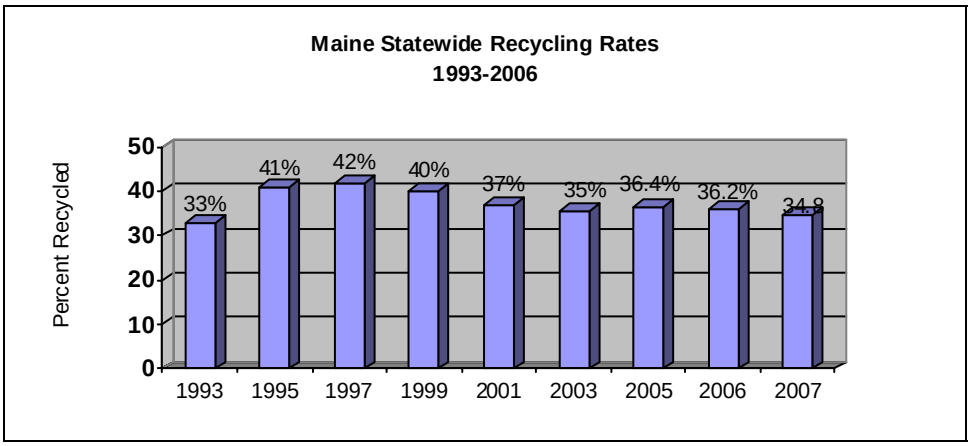

Figure 4: Maine Recycling Rates, 1993-2007
Source: State Planning Office

At the same time, there has been an upward trend in municipal solid waste being generated. Figure 5 shows the tons of waste disposed compared to the tons recycled. The growth in waste generation prevents the recycling rate from increasing despite greater tonnages being recycled.

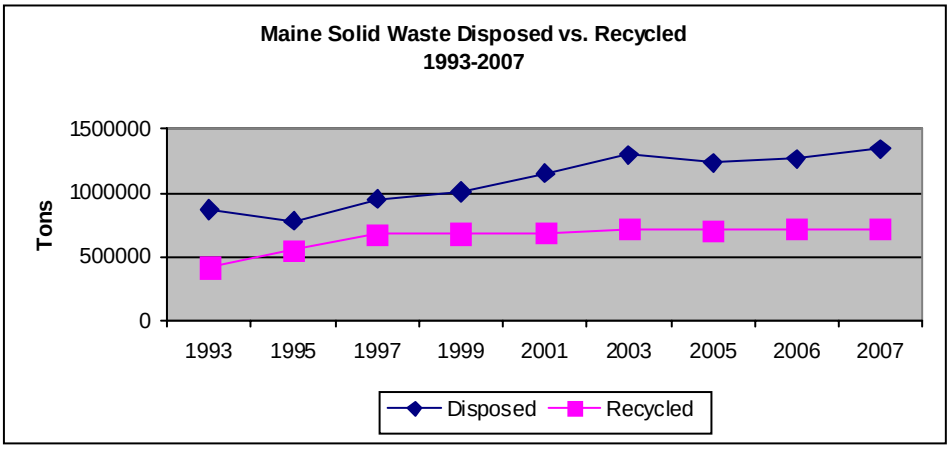

Figure 5: Maine Solid Waste Disposed vs. Recycling, 1993-2007
Source: State Planning Office

There are four broad reasons why recycling rates are falling behind generation rates.

First, recycling has not advanced aggressively into other components of the waste stream that are growing, such as the organic fraction and construction and demolition debris.

Secondly, even though markets for traditional recycling commodities have grown throughout the first half of this decade with strong revenues and encouraging price signals, municipal programs have not sought to follow their lead and increase recycling efforts. This is primarily due to yearly budget constraints that prevent investment to take advantage of market opportunities.

Thirdly, municipal programs typically view recycling as an "add-on" to their MSW program and may lack confidence in recycling as an integral part of their management system, creating a divide between what they are required to do by law and what they may desire to do.

And lastly, municipal recycling programs are often not extended to cover small businesses (i.e. less than 15 employees, the threshold for required recycling under state law) so a large amount of material is missed, falling in the gap between large scale commercial recovery and municipal/residential resource recovery efforts.

B. EPA Definition

We can also compute the state recycling rate using the U. S. EPA's definition for MSW, which excludes CDD. When the 2007 statewide recycling rate for Maine is calculated using the EPA guidelines, our statewide recycling rate becomes 38.8%. Table 5 shows the two methodologies for calculating the state's recycling rate and Figure 6 shows a comparative trend line.

Table 5: Maine Statewide Recycling with and without CDD 2007				
Maine Definition (*CDD included*)			EPA Definition (*CDD not included*)	
MSW with CDD generated	2,066,448		MSW w/o CDD generated	1,748,958
MSW with CDD recycled	718,613		MSW w/o CDD recycled	692,987
Recycling Rate	34.8%*		Recycling Rate	39.6%*

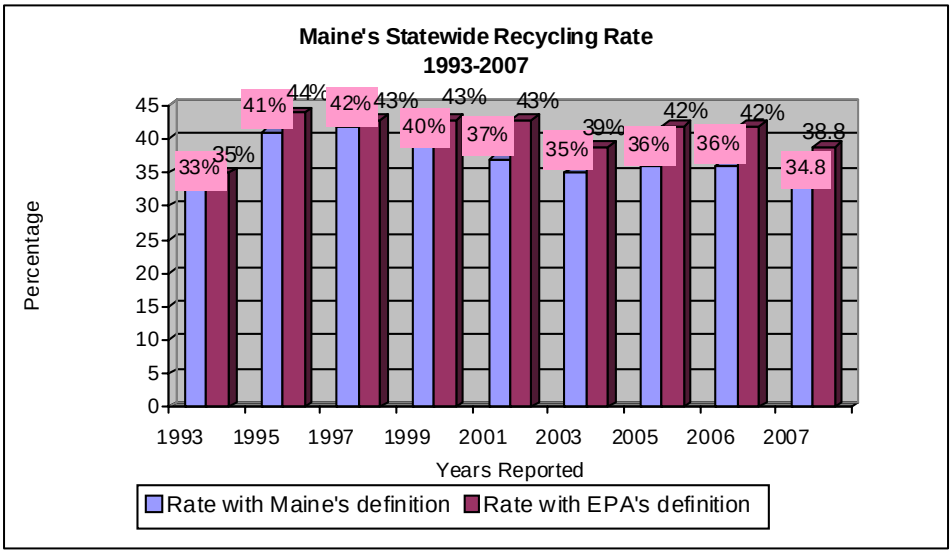

Figure 6: State Recycling Rate with and without CDD included
Source: State Planning Office

Conclusion: Waste Characterization

Waste generation increases appear to have slowed. Societal changes and reduced packaging contribute to this. Mainers are recycling more each year. Nevertheless, we continue to throw away more. Our recycling rate cannot keep pace with waste generation.

Table 6: Type and Amount of Materials Recycled 1997-2007

Materials:	2007	2005	2003	2001	1999	1997
high grade paper	72,846	72,965	3,951	43,125	11,570	31,470
corrugated cardboard	117,324	117,144	88,166	202,129	198,442	214,536
newspaper	26,453	32,300	33,442	32,069	42,612	44,710
magazines	8,532	8,723	1,881	13,259	6,104	3,702
mixed paper	11,131	5,226	13,919	14,766	12,860	12,207
other paper	7,668	8,900	3,166	27,376	12,671	6,465
other grades	42,210	36,805	132,475			
Total paper	286,164	282,063	277,000	332,724	284,259	313,090
clear glass	10,656	11,058	6,334	11,706	8,324	10,590
brown glass	23,544	24,377	11,270	12,200	12,545	7,060
green glass	11,878	12,622	3,142	6,700	26,167	11,767
all other glass	3,442	3,598	21,672	620	440	1,734
Total glass	49,520	51,655	42,418	31,226	47,476	31,151
white goods	82,493	78,401	68,125	115,219	142,640	122,895
aluminum	2,454	2,163	2,109	6,100	1,862	1,332
tin cans	1,989	1,089	3,154	9,754	18,833	10,693
non ferrous	25,655	23,213	18,847	22,491	18,652	21,572
other (various materials)	72434	68,432	68,984			
Total Metal	185,025	173,298	161,219	153,564	181,987	156,492
HDPE	8,530	9,377	3,420	2,274	4,410	4,160
PET	5,277	4,766	8,725	9,042	6,521	6,021
LDPE film	576	526	711	4		
polystyrene		8	0	554	6	6
Other	798	631	531	1,917	1,211	1,042
Total Plastic	15,181	15,308	13,387	13,791	12,148	11,229
wood waste	86,544	93,582	92,154	40,443	41,103	38,402
leaves	29,448	29,938	33,376	26,340	27,421	24,528
food waste	214	142	2,623	23,744	24,582	23,240
Total Organic	116,206	123,662	128,153	90,527	93,106	86,170
tires	30,545	30,374	35,467	19,621	32,530	30,559
CDD, other wastes	25,626	23,425	49,714	38,848	39,469	44,209
Mercury-added/UW	848	487	327	242		
Total Hard to Manage	57,019	54,286	85,508	58,711	71,999	74,768
Textiles	2,196	1,724	2,260	3,827	6,023	1,726
Other nonbulky MSW	7,302	6,935	7,638	3,445	2,740	5,252
TOTAL TONS RECYCLED:	718,613	708,931	717,583	687,815	699,738	679,878

II. Solid Waste Management Infrastructure Capacity

Recycling Capacity

Maine cities and towns by law are responsible for providing for municipal solid waste disposal. Title 38, Chapter 13, section 1305 states, "Each municipality shall provide solid waste disposal services for domestic and commercial solid waste generated within the municipality…"

Individual municipalities and regions are not required to achieve a 50% recycling rate; but they are required to demonstrate progress towards the goal. Recycling progress varies from community to community, but overall programs removed 90,000 tons of paper and plastic and metal and glass containers from the state's waste stream that would otherwise need disposal, and recycled an additional 137,000 tons from other waste streams in 2007.

Based on what we generate today, municipal and private sector recycling programs would need to handle 300,000 tons more of material to achieve a 50% recycling goal. This number will grow each year to match projected increases in waste generation.[6]

Over the next 20 years, simply to maintain a 35% recycling rate will require public and private programs to double their recycling handling abilities. As waste generation increases, the volume of recyclable materials at a 35% rate will increase from 700,000 tons in 2007 to 1.6 million tons in 2027.

To achieve and maintain a 50% recycling goal by 2009 would mean processing 30 million tons from the waste stream over the 20-year period as shown in Figure 7 (increasing from 700,000 tons in 2007, to 1 million tons in 2009 and 2.4 million tons by 2027).

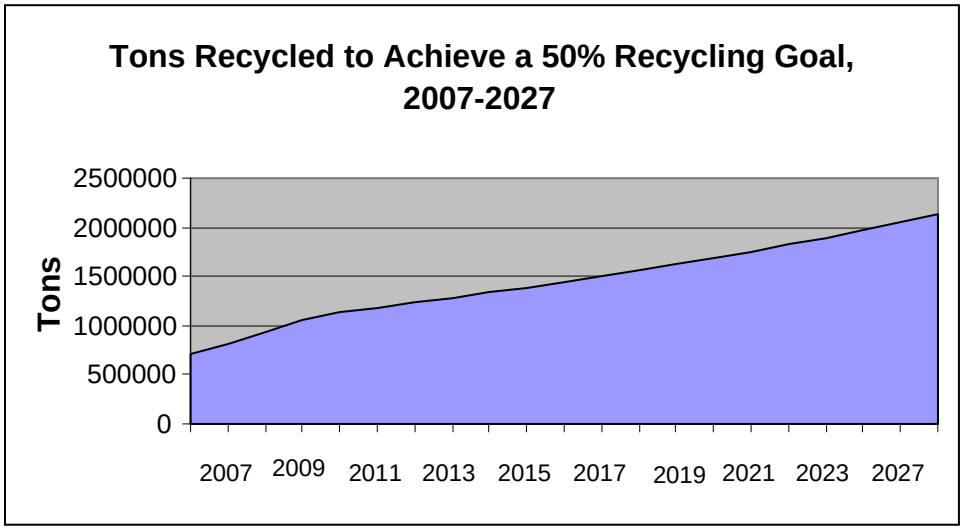

Figure 7: Tons Recycled to Achieve a 50% Recycling Goal
Source: State Planning Office

[6] Based on an assumed 4% annual growth in municipal solid waste generation.

Currently municipalities do not have the capacity to handle these kinds of new volumes; neither the physical (buildings and equipment) nor human (staffing) capacity. Municipal recycling programs currently handle, on average, 90,000 tons of fiber, packaging, products and container recycled materials per year. The Office estimates that they have additional capacity for another roughly 25 to 30,000 tons annually.[7]

The private sector can likely handle additional tonnages or be in a position to respond with capital investment needs to grow their tonnages if the economics warrant it.

There are concerns over where this volume would come from. Higher yields and participation rates can be stimulated with public awareness programs, incentives such as pay as you throw, and technological advances including single sort. Many communities are taking these kinds of actions, but greater effort is needed to generate the tonnage to achieve a 50% recycling goal.

Today there is sufficient down time at most the regional recycling centers[8] that most of the changes needed to meet future capacity needs at those facilities can be met by additional labor time and increases in personnel. There will always be the requirement to have sufficient funds to repair/maintain and replace equipment, but not necessarily the demand to expand processing capacity (i.e. adding more and bigger balers). An alternative would be to add new stationary or mobile infrastructure in order to change over single sort recycling systems, which partially eliminates the need for additional personnel.

We can look at *ecomaine* for a real world example. They are actively seeking more recycling tonnage to go from their 2007 level of approximately 25,000 tons to 40,000 tons. At the higher figure they can run their new MRF at capacity for a single shift. To double that tonnage over 17 years will take some refinement of their current operation to improve throughput, eventually adding a second shift to as their projected throughput builds from 40,000 to 80,000 tons. That one additional shift at that one facility represents 25% of the future recycling capacity needs of Maine's municipalities.

The gradual increase in material levels over the next several years will mean that municipalities will also see pressure to move towards more efficient collection/aggregation systems whether that be improvements in curbside systems or the move from drop off to curbside, or larger more efficient drop offs that eliminate bottle necks and over handling.

It is anticipated that future municipal recycling infrastructure costs will be for collection, containment, and storage, for the traditional recycling stream, and expanding into organics diversion through composting and to accommodate increased CDD recycling.

It will take significant infrastructure capital investment, by both the public and private waste management sectors to achieve our 50% recycling goal. Maine should begin to prepare now to build the infrastructure needed to manage an increase in recycling.

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[7] This does not include the ecomaine recycling collection and processing expansion that is predicted to add 15,000 tons a year of recyclable material or expansion of other single stream materials recovery efforts.

[8] A regional recycling center is defined here as 2 or more communities, several balers or at least one horizontal baler, a tipping floor to handle large amounts of incoming materials, sufficient bale storage for a truckload of more than one type of material, with a transport and marketing system in place and sufficient personnel and auxiliary equipment.

Processing and Disposal Capacity

In 2007, Maine's solid waste disposal facilities included: one state-owned landfill, two commercial landfills, eight municipally-operated landfills, (including Greenville in closure negotiations) 23 municipal construction and demolition debris (CDD) landfills, and four waste-to-energy facilities. Several processing facilities/operations were available for managing construction and demolition debris.

Assumption: Capacity figures provided for the state-owned and commercial landfills assume that operations of those facilities achieve a one-to-one ratio of tons-to-cubic yards using best management practices for landfill compaction.

A. Landfills

Landfills receive a variety of wastes, and that variety differs among the facilities, depending upon what their approval allows for acceptable wastes. Included in that variety of wastes is: raw garbage, construction and demolition debris, residues and ash from waste to energy facilities, contaminated soils, sludge, ash from bio-mass operations, and other special wastes. This report focuses on municipal solid waste, including construction and demolition debris as well as the residues from the processing of those wastes, but in reviewing landfill capacity, the tonnages of the other special wastes that are accepted by the landfills do consume capacity, and for that reason, those wastes and their impact on landfill capacity is included in this report.

1. State-owned Landfill[9]

In 2007, the state-owned landfill in Old Town, known as Juniper Ridge, received a total of 472,600 tons of in-state generated waste, of which 151,073 tons were municipal solid waste and CDD and another 158,877 tons were residues from processing or incineration of MSW. The balance of the waste buried at the landfill included various types of sludge, contaminated soils and approved wastes from other in-state commercial and industrial generators (non-MSW wastes).

Assessment of Facility

Available disposal capacity remaining at Juniper Ridge at the end of 2007 was approximately 8,462,000 cubic yards, which translates into space for approximately 7.15 million tons of solid waste. At projected fill rates[10], the present licensed capacity should provide 10-12 years of disposal capacity for the state.

Starting in 2009/2010, however, with the closure of the Pine Tree Landfill and the initiation of processing at the planned construction/demolition processing facility in

[9] The State Planning Office owns 1500 acres of land in T2 R8 (near Lincoln), upon which a special waste landfill was permitted in the mid 1990s. Known as Carpenter Ridge, it has a landfill design for about two million cubic yards of waste. It was acquired by the former Maine Waste Management Agency and has been held by the state for disposal capacity when it is needed.

[10] The State Planning Office projects that wastes delivered to Juniper Ridge will average 550,000 tons per year, but will increase to 850,000 tons per year starting in 2010, with wastes diverted from the planned closure of the Pine Tree Landfill in 2009, and from additional residues and wastes generated from CDD processing operations within the state.

Westbrook (as permitted by Casella Waste Systems, Inc.) an expected additional 300,000 tons of wastes will be delivered to the Juniper Ridge Landfill for disposal. With the addition of these wastes, the consumption of the space at the landfill is expected to change, from approximately one ton of waste per cubic yard of space to 0.8 tons of waste per cubic yard. This change impacts the planned life of the landfill, leaving approximately 10 years of remaining capacity, at the end of 2007.

2. Commercial Landfills

Maine has two commercial landfills grandfathered under the 1989 Solid Waste Management Act that banned the development of new commercial disposal facilities. Having the commercial landfills has provided competition and disposal options for municipal solid waste, construction and demolition debris, and special wastes. The two commercial landfills are:

- Crossroads Landfill, located in Norridgewock, owned by Waste Management, Inc.
- Pine Tree Landfill, located in Hampden, owned by Casella Waste Services, Inc.

The Crossroads Landfill is permitted to take special waste, municipal solid waste, and construction and demolition debris. It provides recycling and disposal services on a contract basis for municipalities and businesses. It currently serves 30+ Maine communities in Western Maine. In 2007, the landfill accepted 336,854 tons of solid waste. Of that tonnage, 182,525 tons were Maine generated municipal solid waste and CDD and 19,922 tons of residues from the processing of MSW. The balance of wastes included Maine generated special wastes (59,974 tons), and CDD and special wastes generated outside of Maine (74,433 tons).

The Pine Tree Landfill is permitted to take special waste, by-pass municipal solid waste, and construction and demolition debris. In 2007, the Pine Tree Landfill accepted 557,793 tons of solid waste. Of that tonnage, 39,058 tons were Maine generated municipal solid waste, CDD and 158,133 tons of residues from its processing. The balance of wastes included Maine generated special wastes (35,971 tons) and MSW by-pass, CDD and special wastes generated outside of Maine (324,631 tons). Through an agreement reached among the Town of Hampden, Maine Department of Environmental Protection and the landfill's owner, the landfill will cease accepting solid waste by the end of December 2009.

Assessment of Facilities

The total disposal capacity currently licensed at these two commercial landfills is approximately 5.0 million cubic yards. The majority of this capacity is at the Crossroads Landfill, with an estimated 3.9 million cubic yards of capacity remaining at the end of 2007. Table 7 shows estimated remaining disposal capacity at the commercial landfills.

Table 7: Capacity at Maine's Commercial Landfills – end of 2007				
	2007 Fill Rate (tons)	**Remaining Capacity (Cubic Yards)**	**Remaining Capacity (tons)**	**Estimate in years of life remaining based on 2007 fill rates**
Crossroads Landfill	336,854	3,900,000	3,900,000	10-12 years
Pine Tree Landfill	557,793	1,000,000	970,000	< 2 years
Total	894,647	4,900,000	4,870,000	

3. Municipal MSW Landfills

In 2007, 107,248 tons of solid wastes and 59,100 tons of ash were disposed at nine municipally-operated landfills. Table 8 provides information on each individual landfill, including fill rates and estimated available remaining capacity.

Assessment of Facilities

Among the seven municipally-operated MSW landfills (excluding Greenville and West Forks), there is just over 2.4 million cubic yards of remaining available capacity that can accept 1.56 million tons of municipal solid waste. This capacity is sufficient to carry those communities for 15 years (on average), supposing a relatively flat growth in the volume of municipal solid waste requiring disposal.

The actual remaining life varies for each landfill, resulting in 'unevenness' of municipal capacity across the state. This variation, as to when a particular community or region may exhaust their current disposal capacity, is independent and possibly irrespective of any possible statewide disposal capacity concern, but will be of significant concern to those regions.

Bath and Brunswick are two of the state's oldest secure landfills. Brunswick serves only its own residents and businesses. Both communities are adopting programs to extend the life of their landfills, such as 'pay-as-you-throw' (PAYT) and single stream recycling collection. The Hatch Hill Landfill in Augusta serves eight communities and was recently expanded. None of these facilities is expected to expand beyond their current footprint.

Together, the Presque Isle and Tri-Community (Fort Fairfield) landfills serve nearly 50 communities in Aroostook County. Both are currently seeking expansions that will serve those communities for an additional fifty years.

As part of an arrangement with the Mid Maine Waste Action Corporation, the City of Lewiston brings its waste to the MMWAC incinerator in Auburn. MMWAC, in exchange, disposes its incinerator ash at the Lewiston landfill. In addition, the Lewiston Landfill accepts CDD and other wastes.

Table 8: Municipal Landfill Tonnages – 2007				
	2007 Fill Rate (tons)	**Remaining Capacity Cubic Yards (est.)**	**Remaining Capacity (tons)**	**Years of life remaining based on 2007 fill rates at .65 tons/yard[11]**
MSW Landfills: [12]				
Bath	23,552	422,000	274,300	11 years
Brunswick	4,850	140,000	91,400	19 years
Greenville *see footnote*	600	56,000	36,500	60 years
Hatch Hill (Augusta)	25,961	937,000	609,000	20 years
Presque Isle	20,140	149,900	85,800	4 years
Tri-Community (Fort Fairfield)	31,145	703,800	457,500	18 years
CFWF (West Forks) *see footnote*	1000 (est.)	8,000	5,000	<1 year
Total Tons:	**107,248***			
Total Remaining Capacity (est.)		**2,416,700**	**1,559,500**	
	2007 Fill Rate (tons)	**Remaining Capacity Cubic Yards (est.)**	**Remaining Capacity (tons)**	**Years of life remaining based on 2007 fill rates at 1 ton/yard**
Ash Landfills:				
ecomaine	40,320	915,700	915,700	20-30 years
Lewiston	18,780	268,750	268,750	12 years
Total Tons:	**59,100**			
Total Remaining Capacity (est.)		**1,184,450**	**1,184,450**	

4. Municipal CDD Disposal Facilities

In 2007, 17 municipal disposal facilities reported accepting locally-generated construction and demolition debris (CDD)**,** inert fill, brush, and trees. Local facilities furnish a 'short-transport' option for the management of these wastes. A total estimated 28,000 tons of materials were buried at these sites during 2007; this is a decrease from the 34,839 tons landfilled in 2005, as shown in Figure 8.

[11] Different ton-cubic yard conversion rates are used for different facilities. Household, baggable waste at municipal landfills typically converts at 0.65 tons per cubic yard. Ash is heavier than municipal solid waste, so SPO uses a 1:1 conversion rate with one ton equaling one cubic yard. Commercial landfills, with heavier equipment for compaction and more varied waste streams, also typically achieve a 1:1 conversion rate.

[*] 83,043 tons were municipal solid waste or construction demolition debris. The balance was other wastes, including special wastes.

[12] The CFWF landfill ceased operations in 2008. The Greenville landfill is in closure negotiations.

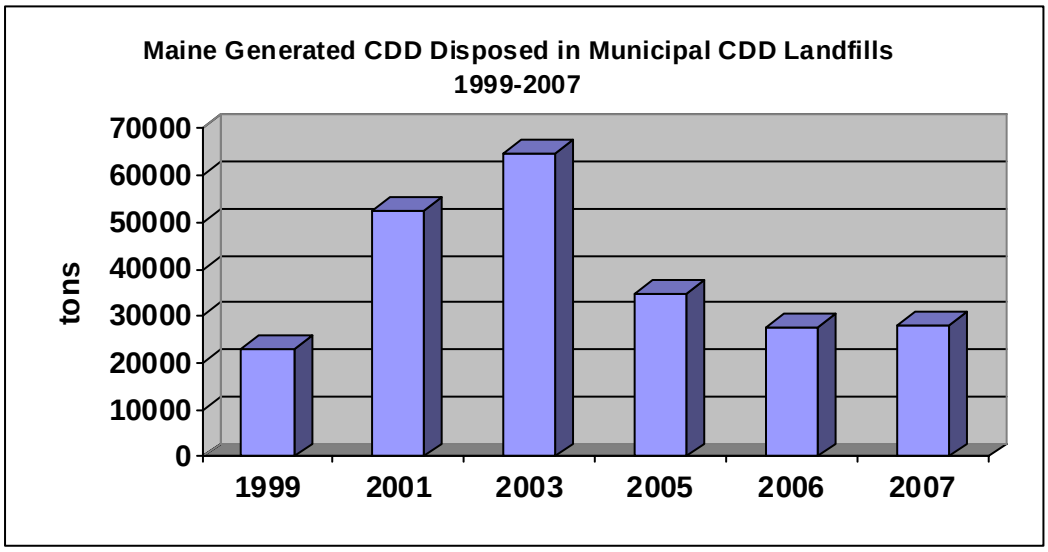


Figure 8: Maine CDD Disposed in Municipal CDD Landfills, 1999-2007
Source: State Planning Office

Assessment of Facilities

The remaining capacity at individual CDD facilities varies. Although statewide numbers indicate landfill space exists for an overall capacity sufficient for another 10-12 years, a number of these facilities will be full before then, creating 'pockets' where CDD disposal options will need to be reconsidered. Four of the facilities have an estimated six years or less of capacity at current fill rates and licensed footprints. One site, located in Marion Township in Washington County, is expected to be full in 2-3 years and the owners of that facility were pursuing development of a replacement disposal site, but those plans have been shelved for 2009.

CDD disposal capacity and management continue to be problematic. These materials are unacceptable at waste-to-energy facilities and cannot be recycled or reused without investment in equipment, labor, and sufficient land area to aggregate and process them. Markets for processed CDD and bulky wastes do exist but the small scale at which most Maine towns operate limits access to those markets. Communities' low volume and dispersed facilities do not often produce the economics of scale needed for sustainable recycling markets.

Maine has several commercial CDD processors: KTI Biofuels in Lewiston; Commercial Paving and Recycling (CPRC) in Scarborough; and Plan-it Recycling in Gorham. KTI is a fixed operation. It accepts only clean wood products (from in-state and out-of-state) for processing for use as biomass fuel. CPRC used to provide mobile services but now operates strictly from its Scarborough facility, hauling in material and shipping out the finished product. Plan-It Recycling also operates from a fixed location. Casella Waste Systems has permitted a CDD processing operation that would accept up to one thousand tons of CDD per day in Westbrook and anticipates building that facility in 2009, providing an additional outlet for Maine-generated CDD. There are also several commercial wood chippers that move from site to site to manage smaller amounts of wood waste.

B. Waste-To-Energy Facilities

In 2007, 32% of Maine's municipal solid waste was sent to a waste-to-energy (W-T-E) facility. Maine's W-T-E facilities received, 826,291 tons of MSW, down from 867,606 tons of MSW in 2006 as shown in Figure 9. Of this, 671,823 tons were generated in-state and 154,468 tons were imported, both a decrease from 2006.

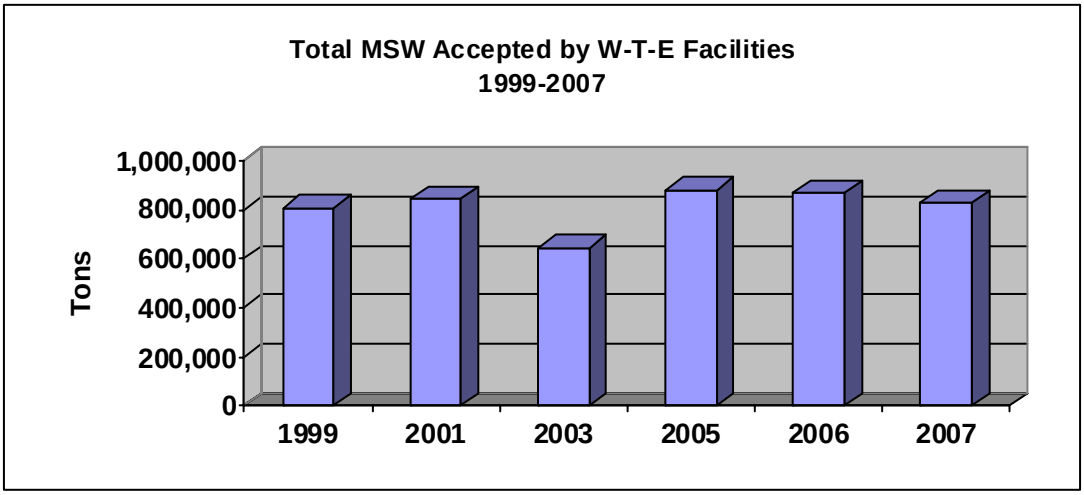


Figure 9: MSW Accepted by W-T-E Facilities, 1999-2006
Source: Facility License Reports, Maine DEP

Table 9 shows the processing capacity of the four waste-to-energy facilities:

Table 9: Maine W-T-E Capacity

Waste-to-energy Facility	Annual Processing Capacity (tons/year)	Tonnage Received in 2007
ecomaine	170,000	157,637
Maine Energy (ME)	310,000	280,210
Mid Maine Waste Action Corporation (MMWAC)	70,000	92,696
Penobscot Energy Recovery Corporation (PERC)	304,000	295,749
Total of W-T-E Facilities	**854,000**	**826,292**

The facilities provide both a product (electrical power) from combustion as well as a reduction of the MSW tonnage requiring disposal, thus reducing the need for landfill capacity. They produce a combined capacity of approximately 62 megawatts a day of electricity and reduce the volume of waste requiring landfilling by about two-thirds.

The four waste-to-energy facilities, while combusting MSW and producing electrical power, also produce several streams of materials and residues: by-pass waste, front-end process residue, and ash. These residues, which require disposal in landfills, comprise approximately one-third of the waste processed by waste-to-energy facilities (see Figure 10 and Table 10).

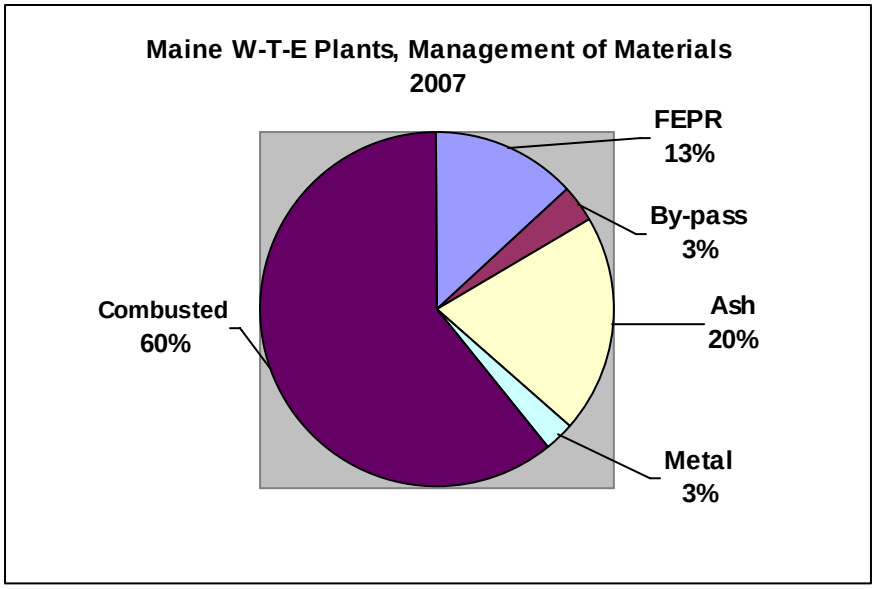


Figure 10: Maine W-T-E Plants, Management of Materials
Source: Facility License Reports, Maine DEP

Table 10 - W-T-E – All Waste Streams - Combined Tonnages		
	2006	**2007**
Delivered MSW tonnage	867,606	826,292
By-pass	36,183	27,014
FEPR	122,512	110,016
Metal	22,044	22,032
Combusted	504,078	503,226
Ash	169,000	164,003

1. By-pass Waste

By-pass waste is that portion of the municipal solid waste stream intended for delivery to and incineration at a waste-to-energy facility but is diverted because the facility could not accept it. Solid waste is 'by-passed' if there are operational interruptions or facility shut-downs or if the facility reaches its operational capacity and cannot accept waste that it is contractually-obligated to receive. The by-pass waste is typically delivered to a landfill for disposal.

2. Front-end Process Residue

Front-end process residue (FEPR) is removed prior to incineration, and may include ferrous metals, glass, grit, and fine organic matter. While metals are recycled, most FEPR is landfilled. In the past, FEPR was used in conjunction with landfill closure programs, but this is no longer a viable outlet. The FEPR waste stream consumes landfill capacity, since alternatives to landfilling

it do not readily exist. While some composting of FEPR has been done, the resulting product typically contains contaminants that restrict its use to limited landfill cover applications only.

Maine Energy (MERC) and Penobscot Energy Recovery Company (PERC) use a 'refuse derived fuel' technology and generate front-end process residue as a by-product of their operations. These facilities dispose of the front-end process residue at the Pine Tree Landfill, though a portion was delivered to other disposal facilities. Mid-Maine Waste Action Corporation (MMWAC) and *ecomaine* use a 'mass burn' technology and do not produce FEPR.

3. Waste-To-energy Facility Ash

Ash is a by-product of incineration, is classified as a special waste, and is landfilled. The ash from MERC and PERC was buried at the commercial landfills and Juniper Ridge. The ash from MMWAC was buried at the City of Lewiston's landfill and e*comaine's* ash was buried at their landfill.

Assessment of Facilities

Three of these facilities are at or close to their 20th year of operation. The plants' maintenance programs, along with upgrades, have kept these facilities functioning well, and should continue to do so for the foreseeable future. The facilities are essentially in "as new" operating condition.

Facility upgrades occur in response to environmental regulations, primarily aimed at air emissions reductions. All of the Maine W-T-E facilities perform at or better than their license requirements.

Looking at future supply stream, 2018 is an important date in the planning process. On that date the majority of the municipal disposal contracts held with PERC and MERC will expire.

To produce the electrical generation contracted for, waste-to-energy facilities need to operate at maximum capacities. The seasonal nature of waste generation causes tonnage overage problems during the summer months and the need to 'attract' additional tonnage during the winter months. Facilities bypass waste when they reach their daily operating capacity and import waste to make up for shortfalls (see Section IV.C on Imported/Exported Municipal Solid Waste).

C. Imported/Exported Municipal Solid Waste

Movement of solid waste across state lines is protected under interstate commerce laws. Municipal solid waste is considered a commodity and is subject to fluctuations accruing to supply and demand at the regional and national level.

During 2007, 456,580 tons of municipal solid wastes were imported to Maine, while exports

totaled 60,491 tons. The amount of MSW imported to Maine is stabilizing while the amount exported[13] fluctuates as shown in Figures 11 and 12.

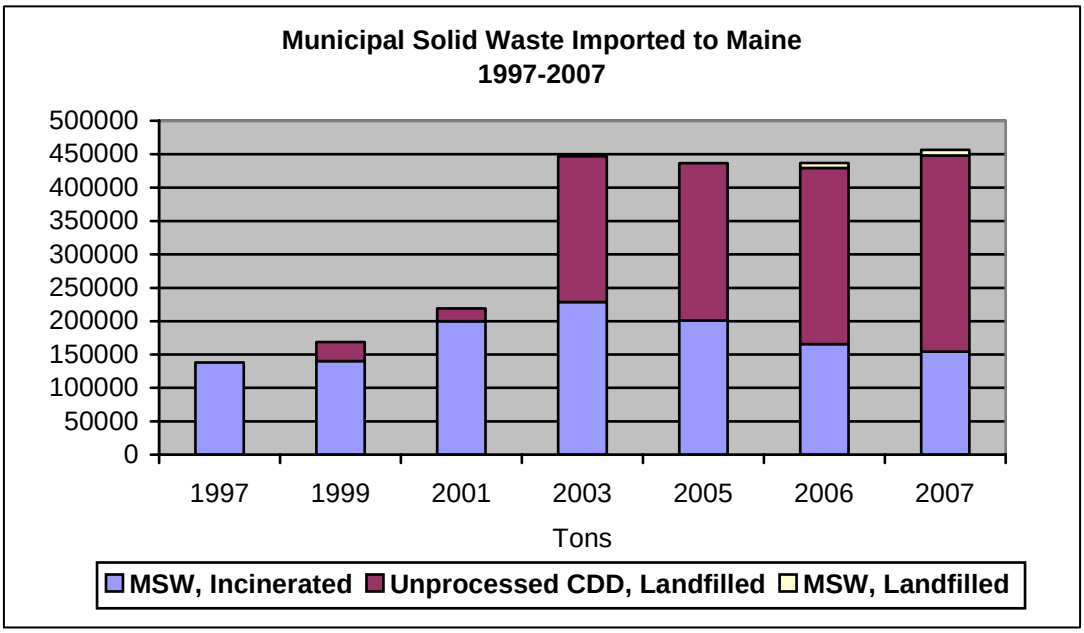


Figure 11: Municipal Solid Waste Imported to Maine, 1997-2007
Source: State Planning Office

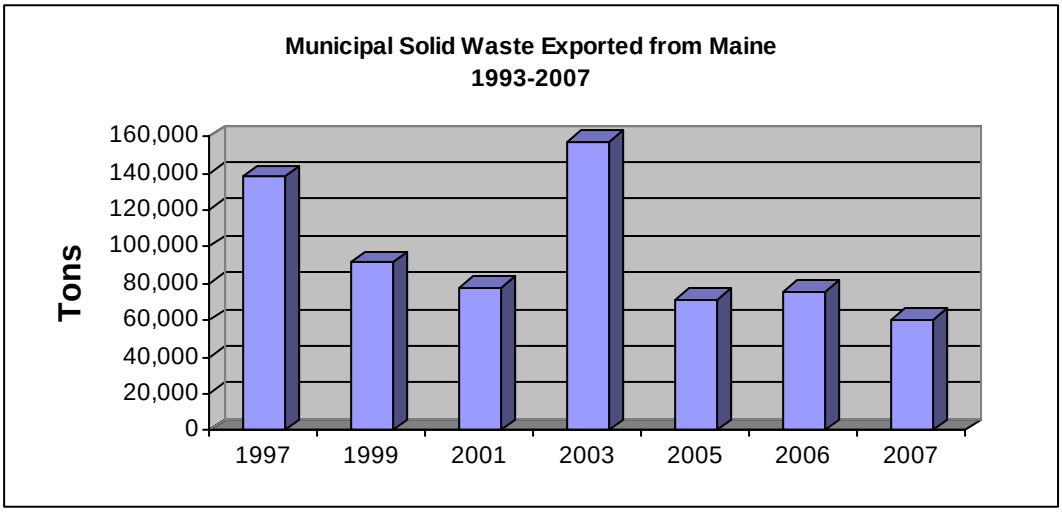


Figure 12: Municipal Solid Waste Exported from Maine
Source: State Planning Office

Imported waste in 2007 consisted of approximately 33% municipal solid waste that was incinerated and 66% construction and demolition debris that was landfilled (see Table 11).

[13] Exported waste was delivered to landfills in New Hampshire and New Brunswick for disposal.

Table 11: Imported Waste by Facility		
	2006	**2007**
MSW – Maine Energy (MERC)	136,472	117,320
MSW – PERC	29,323	37,148
MSW Landfilled – commercial landfills	7,547	8,576
CDD Landfilled – Pine Tree	259,310	290,493
CDD Landfilled – Crossroads	4,385	3,043
Total Imported	**437,037**	**456,580**

Projected Waste Processing and Disposal Demands and Capacity

Based on our projections, Maine will require approximately 34 million cubic yards of landfill capacity over the next 20 years to properly manage the municipal solid waste that is directly landfilled, along with the residues generated by the four waste-to-energy facilities and other processing facilities that also require landfilling. Over this same time, we project there will be 39 million cubic yards of capacity. With approval of the proposed additional disposal capacity, Maine has sufficient capacity to meet its needs for the next 20 years.

A. Statewide Disposal Capacity

1. Capacity Needed

Disposal capacity is a factor of need versus availability. Maine generated just over two million tons of waste in 2007. Assuming a 4% annual increase, we will generate over 4.6 million tons in 2027. With a 34.8% recycling rate, 1.6 million tons per year will be recycled, 0.86 million tons will be sent to a W-T-E facility, leaving 2.4 million tons that will require landfilling.[14] That landfilled waste includes unprocessed solid waste, residues from waste to energy facilities and processing operations, and special wastes such as ash. Figure 13 shows Maine's projected capacity needs over the next 20 years.

To handle this projected tonnage over the next 20 years, Maine will need 34 million cubic yards of landfill capacity based on four assumptions.

1. Continued growth in MSW generation at 4% per year (with no waste reduction assumptions built in and recycling at 34.8%). This four percent increase is conservative and it is possible that actual increases may be softened or eliminated by improved recycling and waste reduction efforts, or an uncertain economy. However, given that development of disposal capacity is not a quick or easy process, having adequate capacity anticipates that time lag and reduces the possibility of a shortage of capacity.
2. Recycling tonnages increase as waste generation increases to maintain a 34.8% recycling rate.[15]

[14] Including out-of-state waste.
[15] Note that even to maintain a 34% recycling rate will require that Maine increase the tons recycled from 700,000 to 1.4 million tons over the next 20 years.

3. Imports decrease as Maine MSW replaces capacity at W-T-E facilities as generation increases and landfills close.
4. Exports remain at 2007 levels.

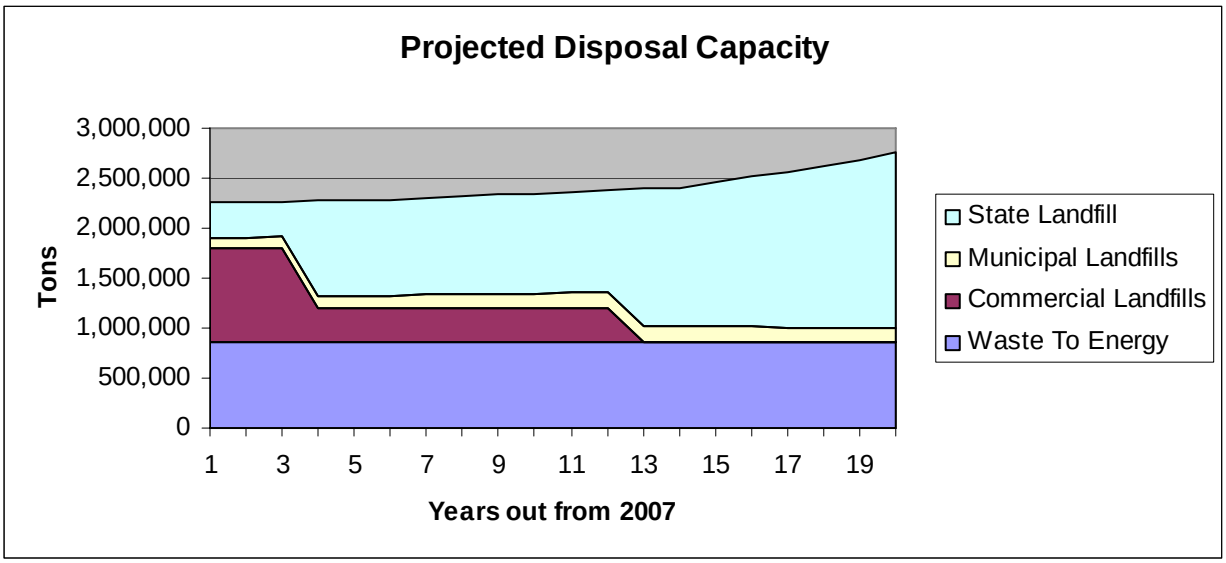


Figure 13: Maine Projected Capacity Needs in Tons, 2007 – 2027
Source: State Planning Office

2. Projected Capacity Available

The projection of solid waste disposal capacity is based on these parameters:

- continued operation of and reliance upon the four W-T-E facilities;
- no significant change in municipally-operated landfills;
- additional capacity is approved for the Presque Isle and Tri-Community landfills;
- closing Pine Tree Landfill;
- Crossroads Landfill ceasing operations around 2017; and
- a license amendment and expansion permit for Juniper Ridge is approved.

Currently, we estimate that Maine has 17 million cubic yards of disposal capacity for municipal solid waste and the residues from waste to energy facilities, as follows:

- 2.4 million cubic yards in municipal landfills (1.9 million tons)
- 1.2 million cubic yards in municipal landfills (1.2 million tons of ash)
- 0.85 million cubic yards in municipal CDD landfills (170,000 tons)
- 4.9 million cubic yards in commercial disposal facilities (4.7 million tons)
- 8.5 million cubic yards in Juniper Ridge Landfill (7.4 million tons)

The amount of available disposal capacity will be affected by both increases and decreases in capacity as follows.

Projected Consumed Capacity

The planned closure of Pine Tree Landfill in 2009 will have an impact on Maine's current solid waste management system, in that approximately 150,000 tons of *in-state* generated special wastes and construction and demolition debris waste that was annually disposed of at that landfill will be diverted to the Juniper Ridge Landfill. In addition, the residues from the processing of construction/demolition debris at Casella Waste System's planned processing facility in Westbrook will also be directed to Juniper Ridge, an additional 150,000 to 200,000 tons expected. The planned closure responds to state policy adopted in 1989 that sought to restrict additional private sector development of disposal capacity.

Projected Planned Capacity

The State Planning Office is seeking an additional 22.5 million cubic yards (18 million tons) of disposal capacity at the state-owned Juniper Ridge Landfill. The effort to permit the proposed capacity expansion at Juniper Ridge is currently underway and is planned to be submitted to the Department of Environmental Protection in early 2009. That review is expected to take several years and if approved and permitted, will provide disposal capacity to the state for an additional 15 to 20 years over its current life.

Impact of Recycling on Disposal

Recycling will continue to divert significant tonnages from disposal. The State Planning Office estimates that over 20 years, recycling will divert 20 million tons (cumulatively) from disposal at today's 34.8% rate.

Out-of-state Waste

The types and amount of out-of-state waste will likely shift in response to changes in Maine's waste generation and management systems.

The waste-to-energy facilities that currently take out-of-state waste will continue to rely upon it to fulfill their boiler needs and power contracts. However, the State Planning Office anticipates that as Maine-generated solid waste tonnages needing disposal increase, waste-to-energy facilities' need for imported municipal solid waste will decrease. The state's commercial landfills will continue to accept unprocessed CDD from out-of-state for economic reasons. But as those facilities fill up and close, imported waste will drop.

For purposes of this report, we estimate a 4% annual reduction in MSW imported and decreases in unprocessed CDD to a nominal amount by 2015, or an estimated 4 million cubic yards (cumulatively) over 20 years.

3. Projected Disposal Capacity, Available vs. Needed

Based on the above analysis, Maine will have an estimated 39 million cubic yards of landfill capacity over the next 20 years, more than meeting our need for nearly 32 million cubic yards as shown in Table 12.

Table 12: Projected Disposal Capacity Available vs. Needed 2007-2027				
Landfill Capacity Available (cubic yards)			**Capacity Needed (tons)**	
Municipal Landfills	2,416,700		Total waste generated	65,000,000
Municipal CDD Landfills	850,000		Imported Waste	4,000,000
Commercial	4,900,000		Recycled	(22,000,000)
Juniper Ridge	8,462,000		Exported	(1,200,000)
Juniper Ridge expansion	22,500,000		Diverted to, combusted at W-T-E	(12,000,000)
Total Landfill Capacity Available:	**39,128,700**		**Total Landfill Capacity Needed:**	**33,800,000**

Source: State Planning Office

While Maine has sufficient landfill capacity to meet its needs, we must not become complacent. Siting new disposal capacity is a costly and highly volatile undertaking. Maine should do all that it can to make the existing capacity last beyond the next two decades. This will require state and local investment in waste reduction and recycling.

In addition, while the state makes use of the remaining capacity at commercial and municipal landfills in these projections, the state does not have any direct control over the rate at which the capacity is consumed at those facilities. In 2007, the state prohibited the disposal of out-of-state wastes in municipal landfills but does not control access to that capacity from waste streams generated within the state.

B. Regional Capacity Issues

Regionally, Maine is divided into "waste sheds" with waste feeding into regional disposal facilities. Some waste sheds are geographically large like PERC (170+ communities) and the Crossroads landfill (30+ communities), some receive municipal solid waste from a single community or a small region, such as the two landfills on the mid-coast in Brunswick and Bath. While this report typically looks at statewide disposal capacity, the State Planning Office has identified some regional or local areas where disposal capacity is uneven or in flux.

1. Regions in Flux

Aroostook County

The Presque Isle Landfill is currently seeking approval of an expansion that is part of an engineered solution to ongoing environmental issues that will, if the entire proposal is pursued and approved, provide in excess of 50 years capacity. Closure of the existing site by the end of 2010 is also being discussed in the context of negotiations on a schedule of compliance.

The Tri-Community Landfill in Fort Fairfield is also seeking a landfill expansion at this time, which will serve those communities for another 15-20 years. These efforts will require significant local resources but should not disrupt the solid waste capacity in the region.

Washington County

The Marion Regional CDD Landfill in Marion Township is reaching capacity and is expected to close in 2008-9. A new construction and demolition debris landfill for that region was in the planning stages in 2008, but the plans have been scrapped for 2009. The potential sources and volumes of the waste, potential costs, intermittent participation in the process by the local communities and their lack of buy-in to the project were given as the reasons. The fate of the project is uncertain.

York County

In 2006, local officials undertook an effort to purchase and close the Maine Energy W-T-E facility. This facility, which serves about 36 communities in York County, is located in downtown Biddeford. Proposals were put to the voters in Biddeford and Saco to raise the money to buy the facility but were turned down.

The loss of disposal capacity in Southern Maine would disrupt Maine's waste management system, but it would not precipitate a crisis. The loss could be absorbed through a combination of aggressive waste reduction and recycling efforts by communities in the service area, transporting waste to other instate and out-of-state disposal facilities[16], and, with a possible license amendment to Juniper Ridge to accept "bagged" or household MWS, transporting waste there.[17] The state, municipalities, and the private sector would need to work in partnership to find the best solution for the long term.[18] These solutions must take into account the environmental impacts of the long distance transport of the waste.

Conclusion: Infrastructure Capacity

Maine has a mature infrastructure for both recycling and disposal. Recycling infrastructure, nearing two decades of use, will need upgrading and expansion to accommodate the increase in materials to meet the 50% recycling goal. Maine's combination of W-T-E facilities and state-owned, commercial, and municipal landfills provide sufficient disposal capacity for 20 years.

[16] The cost-benefit of transporting wastes long distances would have to be considered.

[17] Any change in the type of waste accepted at Juniper Ridge would require approval from the Maine Department of Environmental Protection.

[18] Another consideration for this region is the contract renewal for electrical generation payments. A lower price could increase tip fees and impact volumes at the ME facility.

III. Assessing the Effectiveness of Current State Policies

Recent Policy Discussions

The three previous state solid waste plans were products of the times in which they were written. The 1990 plan signaled the start of Maine's "modern" era of waste management. The 1993 plan was essentially a progress report written just after a large infusion of public bond funds into the state's municipal recycling infrastructure. The 1998 plan noted the success of the ten-year-old policies, the high point in the state's recycling rate, and what had occurred in the three years since the demise of the Maine Waste Management Agency. This plan is no exception and reflects the last five years, during which:

- In 2003, the Legislature authorized the state acquisition of the Juniper Ridge Landfill. In directing the state to purchase the landfill, the Legislature hoped to achieve two public policy goals: providing statewide land disposal capacity, and aiding a financially troubled paper company and the jobs it represented for the Penobscot region. Maine became the one of only two states to own a landfill and the only state to directly own a landfill without creating an intermediary authority.

- In the fall of 2005, 35 people representing the interests of state, regional, and local government, public entities, citizens groups, environmental organizations, the private sector and the general public came together as the Solid Waste Policy Review Task Force.[19] They reviewed current policies and concluded that the state should maintain the ban on commercial disposal facilities, continue to apply the waste management hierarchy, and expand efforts to achieve the 50% recycling goal.

- The Legislature's Natural Resources Committee was prompted to form a Blue Ribbon Commission to examine questions on how Maine manages its municipal solid waste. The Commission met in several locations throughout the summer and fall of 2006 and reported out legislation for consideration by the Second Regular Session of the 123rd Legislature (LD 1908).[20]

- At the direction of the Legislature, a new, permanent state Solid Waste Management Advisory Committee was formed to replace the Solid Waste Policy Review Task Force. This committee met for the first time in June 2008.

The 123rd Legislature passed several pieces of significant solid waste legislation that in sum acted to strengthen the solid waste hierarchy.

[19] The report of the Solid Waste Policy Review Task Force, April 2006, can be found on-line at: http://mainegov-images.informe.org/spo/recycle/docs/wastepolicytaskforce_finalreport04-24-06.pdf.
[20] The report of the Blue Ribbon Task Force, date, can be found on-line at: http://www.maine.gov/dep/rwm/solidwaste/blueribbon/.

Years of Decisions, Decades of Consequences

Coming into 1987, the state faced a solid waste disposal crisis. That crisis was the backdrop for our current policy. There was a potential landfill capacity shortage. Recycling, as a waste management strategy, was accounting for well under ten percent of the waste stream. There was no integrated waste management approach.

In less than three years, we as a state, by actions of the Legislature, decided how we wanted to manage our municipal solid waste. To a great degree, the structure of our current system is a reflection of those few basic decisions made 20 years ago.

The priority objectives were to:

1. bring the state's landfill disposal into compliance and end the use of unlined landfill disposal;
2. prevent the state from becoming a disposal site for MSW produced by the "BosWash" megalopolis to our south; and
3. place into law a policy to pursue a coordinated statewide waste reduction, recycling, and management program implemented through an integrated approach generally referred to as the waste management hierarchy.

To assist in achieving these objectives, the Legislature placed the following into law:

- a ban on new commercial disposal facilities;
- state authority to acquire and to oversee land disposal capacity;
- reinforced municipal responsibility for disposal services; and
- a statewide 50% recycling goal.

These laws were applied through a comprehensive set of solid waste rules over all processing and disposal activities and facilities coupled with financial and technical assistance programs.

A. Ending the Use of Unlined Landfills

To address the looming environmental, financial, and legal problems posed by grandfathered landfills, the Maine Legislature established closure dates for unlicensed landfills and created the Solid Waste Landfill Remediation and Closure Program to close landfills that pose hazards to public health and the environment. Under the landfill closure program, in full swing by the late 1980s, the hundreds of small, open, unlined landfills that had been the standard means of local disposal for all manner of wastes for a century rapidly disappeared from the landscape.

Outcome: Bringing Municipally-owned Land Disposal Operations into Environmental Compliance

In the last two decades, the number of open, operating, unlined, publicly-owned MSW landfills has shrunk from over 300, ranging in size from covering hundreds of acres to only two acres, in Greenville and West Forks, which are in near term closure negotiations.

Just eight licensed municipal landfills are currently in operation, with individual remaining capacity ranging from 6 to 30 years at current fill rates. Only a few

municipalities built their own replacement landfills, many joining with neighboring towns to develop regional facilities.

These landfills are supplemented by some two dozen municipally-owned landfills restricted in size to less than six acres and to the disposal of construction and demolition debris only (CDD.)

Today, landfills overall provide 25% of the disposal needs for Maine's unprocessed municipal solid waste and provide disposal services for the ash and process residue of the waste-to-energy facilities.

B. Controlling Out-of-state Waste

The Legislature placed restrictions on expansions of existing commercial landfills and banned the construction and operation of all new commercial disposal facilities.[21] The ban on new commercial disposal facilities was put in place to shield the state from the importation of 'out-of-state' waste.

Outcome: Banning New Commercial Disposal Facilities
In 2008, the number of commercially-owned and operated solid waste landfills remains at two, the same number as 20 years ago, due to the continuous enforcement of the commercial landfill ban.

C. Ensuring Sufficient Disposal Capacity

In the 1980s, the federal government provided funding to states to invest in alternative solid waste management and disposal systems for energy production. The city of Auburn constructed a waste-to-energy facility using mass burn technology to serve its needs and the needs of several surrounding communities, forming the Mid Maine Waste Action Corporation (MMWAC).

Portland area communities had previously joined together to form the Regional Waste Systems (RWS). Regional Waste Systems (now *ecomaine*) also built a mass burn waste-to-energy facility. Private companies[22] built two refuse-derived fuel facilities large enough to serve regions in York County (in Biddeford) and in Bangor-Brewer (in Orrington) and signed long-term contracts with those towns to provide the waste needed by those facilities. 180 communities have 23% ownership in the PERC facility in Orrington with their interests represented by a Municipal Review Committee, the MRC.

Over 32% of Maine's MSW, almost 700,000, tons is now delivered to and processed for its fuel value in one of the four waste-to-energy (W-T-E) facilities, prior to landfilling. In 2007 the four W-T-Es required landfill space for 301,000 tons of ash, residue and by pass wastes.

From the outset, one of the state's priorities was to make sure that the operations of the four in-state W-T-Es would not be affected by a sudden loss of in-state land disposal capacity for their by-products of ash and front-end process residue.

[21] Publicly-owned disposal facilities were exempted from this ban.
[22] Both W-T-E facilities were built prior to the ban on commercial disposal facilities.

In order to ensure that there would be sufficient disposal capacity available, the 1989 Solid Waste Management and Recycling Act gave the state the authority to own, design, develop, and operate new solid waste disposal facilities.

That authority, coupled with municipal reluctance to take on the debt and the social and environmental liabilities associated with land disposal, has meant the state has taken on the role of provider of last resort for disposal capacity in Maine.

The state-owned special waste landfill would be a safety net to be brought on line when disposal capacity was needed.

The state purchased land then owned by Lincoln Pulp and Paper on Carpenter Ridge in T2 R8. It was then successfully permitted as a state-owned special waste landfill that remains to this day ready to be developed when it is needed.

The state's strategy to provide capacity for land disposal within Maine has increased by a factor of five with this recent acquisition of Juniper Ridge with 10 million cubic yards adding to the 1.9 million cubic yards of capacity currently permitted at the Carpenter Ridge site.

> *Outcome: Sufficient Disposal Capacity*
> Maine has in-state disposal capacity for municipal solid waste and special waste for the next 12-30 years. This is the direct result of the continued investment in W-T-E upgrades and acquisition and development of Juniper Ridge.[23]

D. Fostering the Solid Waste Management Hierarchy

The 1989 law established a hierarchy of Maine waste management systems. The Legislature also established ambitious waste recycling goals. It instituted both incentives, in the form of credits, grants, and loans, (not currently available) and disincentives, in the form of deposits and fees (removed or expired), to encourage appropriate waste management practices. It also provided in statute for financial and technical assistance to municipalities and businesses to further these practices.

The hierarchy guides state and local decisions regarding solid waste funding and grants, investments in, and the permitting of, solid waste management facilities, the operation of such facilities, and the management of residential and commercial waste.

> *Outcome: Toxics Reduction Success*
> In order to reduce the toxicity of the waste stream, the state has aggressively pursued eliminating the use for and of the overwhelming majority of mercury-added products. Today, mercury-added products from all sources are banned from disposal within Maine and must be recycled. Maine also enacted a first-in-the-nation program for the collection and recycling of electronic waste. Devices, such as computer monitors and TVs containing cathode ray tubes, cellular phones, and other electronic wastes from all

[23] The range in the time frame is based on current projected fill rates and reflects status under current license restrictions versus the potential expanded build out of the facility.

sources are banned from disposal within Maine and must be recycled, the responsibility for proper management shared among the manufacturer, government, and consumer.

In addition to these state-initiated, targeted, pollution prevention programs, many municipalities now offer once-a-year collection for the category of MSW known as household hazardous wastes (HHW). In 2007, 140 municipalities offered such opportunities to their residents. Maine now has two permanent facilities for HHW collection located in Lewiston and Portland open to all Maine citizens. These efforts target a small but toxic part of the municipal waste stream for action.

The Toxics Use Reduction Act (TURA) program created by the Maine State Legislature to reduce the amount of toxic substances introduced annually into Maine's environment from industrial generators, has also had several notable accomplishments including:

1. significant reductions at existing facilities in toxic use, release, and hazardous waste categories;
2. continued success with outreach and education particularly to smaller facilities without full-time environmental staff and in need of greater technical assistance (outreach examples include assisting smaller companies in switching from toxic cleaners and solvents to less hazardous or non-hazardous chemicals);
3. implementation of cost accounting (comparing the costs of utilizing toxic chemicals and generating hazardous waste with the economical benefits of reducing such use and generation) along with introducing worker safety concepts that reduce worker exposure to toxics; and
4. an emerging opportunity in the TURA program to track new toxics coming into the marketplace and to utilize the technical assistance tools adapted by DEP staff to address them.

Outcome: Recycling Success

Through steady local, state, private and public support for recycling and composting and long-term growth of these management systems, in-state markets have developed for the recycling and compost resources diverted from the waste stream, and are further supported by similar gains in regional, national, and global markets.

Over twenty million dollars of state and local match bond funding have resulted in recycling programs and facilities that now consistently manage the municipal share of the approximately 33% of our MSW currently recycled, accomplished through a series of local collection and regional processing programs.

Over 98% of Maine residents and the commercial sector have access to public or private recycling programs that have grown from just 24 programs in place twenty years ago to 320 working programs today. Over 60% of Maine communities have reached a 35% recycling rate or better. Over 22% have reached a fifty percent or better.

One third of Maine's MSW, over 700,000 tons, is physically removed from the waste stream, separated and collected and sent to manufacturers both in-state and around the world for use as replacement of virgin raw materials in their manufacturing processes (recycling). Approximately two-thirds of these recyclables are collected by the private

sector from the private sector. The remaining percentage is diverted through municipal programs from residents and local commercial sources.

Though the state made good gains, reaching a high point of 42% in 1997, Maine has yet to reach the 50% recycling goal in statute for 2009, and in 2007 had the same rate as in the mid-1990s.

Outcome: The Hierarchy Applied

As of 2005, waste reduction is now recognized in statute with its own goal. Reuse has gained status through widespread public support for the local institution of municipal reuse centers at transfer stations. On a much larger scale, the Department of Environmental Protection's solid waste rules (Chapter 418) governing the beneficial use of solid waste encourage such opportunities through clear guidelines and standards.

It has been left to municipalities to put the hierarchy into practice as there is no state law mandating the recycling of the majority of the components of Maine's municipal solid waste, other than those discussed above under toxics reduction, or the recovery of its organic fraction. The only state wide disposal bans are on white goods, whole tires in landfills and car batteries, again except for those that apply to toxics reduction.

This local exercise of choice in the degree and method of recycling has determined the wide variation in our largely voluntary recycling system and in our level of support for the hierarchy.

While the goal was to develop a statewide integrated waste management system based on the hierarchy, it was left to local governments to build the links of one approach in the hierarchy to another and how to assure that all resources worth recovering would be removed prior to land disposal.

Waste management programs have tended to flatten the hierarchy in order to focus on the maintenance of a stable range of prices of disposal and stable costs for operations and transportation. The marketplace has responded and disposal prices and costs for now are stable, but this perspective has left us short of our goal and recovery potential. The hierarchy was put in place with an intentional bias; all approaches are not equal.

E. Municipal Responsibility for Solid Waste Disposal

Maine is a home rule state and it is a municipal responsibility to provide disposal services for the residential and commercial activities in their jurisdiction.

The old local dumps have been replaced by a complex set of private and public partnerships, underpinning a system of hundreds of small consolidation transfer stations, largely paid for by municipal bonds, connected by long-term contracts and truck transport to a relatively few disposal facilities. There is now a collection and transportation infrastructure of 240 public transfer stations and several large private facilities serviced by private and public truck transport. There are 320 public recycling programs and over 70 municipalities have set up leaf and yard waste composting sites.

The inter-connected system that has evolved to meet the municipal responsibility has been built by initiative and need, often in concert with private entities. These private/public partnerships have been put together in a wide variety of combinations that manage a large percentage of the collection, consolidation, processing transportation, and disposal of Maine's MSW.

Outcome: Regionalization

One result of the rapid conversion of the state's solid waste management structure was that municipal solid waste programs were among the first public programs to adopt the concept of regionalization to improve cost to benefit performance, and those programs to a noteworthy extent have held together and expanded. Approximately half of Maine's municipalities share solid waste management responsibilities with at least one other municipality, with several regional efforts supported by membership of 20 communities or more. Regionalization helps avoid situations where problems and proposals rise and fall as local issues to which there are no real local solutions.

Local governments remain the key to Maine's MSW management. They have control over the MSW generated within their jurisdictions whether they choose to exercise that control or not. When a proposal for a new municipal facility or an activity is put forward or a change in solid waste management suggested at the local level, the guidelines of the hierarchy, the attainment of the 50% recycling goal and 5% waste reduction goal should attach to the proposal and to the waste stream they intend to manage. The state must remain aware and assert its role as the principle proponent of its own policy.

The state's municipal partners should be encouraged to plan for their future waste management needs to accommodate anticipated growth and development through support for the hierarchy and to achieve the state's recycling and waste reduction goals.

Conclusion: Positive Outcomes of Current Policy

Maine's solid waste policies have largely achieved the Legislature's desired ends.

1. The objective of ending unregulated disposal of solid waste as standard practice was reached well over a decade ago. The Department of Environmental Protection has worked in conjunction with Maine's solid waste professional community to achieve a high level of environmental compliance.

2. The great majority of Maine citizens have the opportunity to recycle as an alternative to disposal.

3. Across the state, on a daily basis, over 5,500 tons of municipal solid waste are collected, consolidated, transported, processed for recycling or combustion, and disposed of in compliance with current regulation. With the commitment of existing public and private efforts, this loosely organized arrangement has the ability to continue to perform its tasks for years to come. Though problems with solid waste arise from time to time, generally they are site or waste stream specific and there is a process in place to manage them.

4. There is sufficient landfill disposal capacity to meet the state's current and projected future needs.

5. For the most part, Maine manages its own municipal solid waste. About three percent of Maine's overall waste stream is currently exported for disposal. This out-of-state disposal is often a local decision made by municipalities near our borders and results in the utilization of land disposal facilities located within New Hampshire or New Brunswick. This is based upon the favorable combination of disposal fees and transport costs, when compared to 'in-state' disposal options.

6. The policy of pursuing an integrated waste management system based on the hierarchy and the four strategies of 1989: the ban on new commercial disposal facilities; municipal responsibility; a recycling goal with measured progress; and state oversight of land disposal capacity are all still in use. The image of Maine as dumping ground for the northeast has not materialized but questions persist for state and local officials about what to do with the out-of-state waste that comes into Maine in response to market forces and legitimate opportunities.

IV. What has Happened Since the 1998 Plan?

Several solid waste issues were identified in the 1998 plan. Among them were:

- The high cost of solid waste management for municipalities;
- The need for secure and stable markets for recycled/composted materials;
- The lack of management options for construction and demolition debris; and
- The desire to promote beneficial use.

The following section is a brief overview of where these issues stand in today.

Costs of Municipal Solid Waste Management

Certainly costs have remained an issue for municipalities. As the 1998 plan predicted, the need to lower municipal costs must coexist with innovations to improve recycling rates. It has had an effect by contributing to and in some ways exacerbating the stagnant character of the state's pursuit of the 50% recycling rate and local enthusiasm for using the waste hierarchy in solid waste decisions.

In 2007, citizens, businesses, municipalities, and others spent an estimated *$200 to $250 million* to reuse, recycle, compost or dispose of the two million tons of municipal solid waste generated within Maine.

Municipalities arranged for the disposal of about 50% of Maine's total municipal solid waste generation, or just over one million tons, and reported spending approximately $90 million per year[24] on the solid waste and recycling services that they provided. Recycling efforts conserved landfill space and provided an avoided disposal cost of approximately $6 million while contributing a net gain of $5 million to those communities from the sale of the recyclables.

On average, according to information from the Maine Municipal Association, Maine communities spend about 10% of their municipal budget to secure and provide necessary solid waste and recycling services. Most municipal expenditures are available on the municipalities' web sites.

Solid waste disposal varies among communities and ranges from municipalities that simply contract with a disposal facility and leave all other responsibilities and costs to their residents and businesses, to communities that pay for the full collection and disposal services as part of the municipal budget.[25]

While the state does not have precise information on municipal costs for MSW management from the early 1990s for comparison, it appears based on municipal information reported to the

[24] In 2005, businesses and citizens spent another estimated $120 to $160 million to secure these necessary solid waste disposal and recycling services.

[25] Most municipal solid waste expenses are paid by the municipality from tax revenue, although some assess user fees to reduce costs (75% of municipalities versus 25% that offer fee-based waste services).

State Planning Office that costs have recently stabilized in terms of both actual dollars spent and as a percentage of municipal budgets, to a range of $95 to $110 per ton. This figure is supplied with the following caution: that many communities to not apply full-cost accounting measures to their solid waste budgets and many do not bear all the costs of all the municipal solid waste streams generated within their jurisdictions.

A. Disposal Fees

Disposal expenses comprise collecting, transporting, and 'tipping' waste. Disposal fees or 'tipping' fees are a key driver of municipal solid waste costs. Current disposal fees range from $40.00 to $158.00[26] per ton at Maine's landfills and incinerators and have stabilized allowing predictability for municipal budgeting and long-term planning.

Tip fees at the four waste-to-energy facilities are stable and reflect the commitment of the municipalities who either own the facility or have long-term contracts for disposal services. A number of regional landfill facilities (Bath, Augusta, *ecomaine*) recently implemented price increases that should hold for the foreseeable future.

The state, in its operating agreement with Casella Waste Systems, established a 'ceiling' for tip fees that sets an upper limit on how much can be charged for wastes delivered to the Juniper Ridge Landfill. It is anticipated that this will act as a check on pricing for the disposal of similar materials at other solid waste facilities. In fact tip fees at the state's W-T-Es have been stable for years. For example, the PERC base tip fee for charter communities has remained at $45.00 per ton for close to fifteen years.

B. Energy Revenues

Revenues from the sale of the electricity largely determine tipping fees at waste-to-energy facilities. The revenues reduce the facility's operating expenses, yielding a reduction in the tip fee charged for solid waste. Should electrical sales revenue drop, tip fees may increase. Conversely, should the electrical sales increase, the possibility exists to lower or maintain tip fees currently being charged.

C. Municipal Expenses

Expenses vary from municipality to municipality due to a variety of factors such as cost of disposal, operation of a transfer station, number of hours the transfer station is open, level of recycling services, and bulky waste acceptance and processing. The more services that a community offers, generally the more expense is incurred.

Communities have also formed regional programs to gain an "economy of scale" advantage, allowing the smaller towns to offer a larger range of services.

The selected towns listed in Table 13 below have variable collection and disposal costs for municipal solid waste that reflects disposal fees and different levels of municipally-provided services. Table 13 shows the variability in costs, not for an "apples to apples" comparison.

[26] This does not reflect spot market prices.

Table 13: Disposal Costs for Selected Municipalities

Municipality/ Region	Disposal Facility	Collection System	Transfer Station	$ Per Person
Brunswick	Town Landfill	Municipal curbside	No	$55.28
Tri-Community	Regional Landfill	Curbside & Drop off	No	$49.37
Hartford	Crossroads Landfill	Contracted curbside	No	$60.28
Temple	Crossroads Landfill	Contracted curbside	No	$68.30
Livermore Falls	Crossroads Landfill	Subscription	Yes	$55.19
Farmington	Crossroads Landfill	Subscription	Yes	$7.46
Minot	MMWAC	Subscription	No	$28.76
Lewiston	MMWAC	Contracted curbside	Yes	$54.02
Norway-Paris	MMWAC	Drop-off	Yes	$63.16
Sabattus	MMWAC	Drop-off	Yes	$36.97
Bangor	PERC	Contracted curbside	No	$40.07
Unity	PERC	Contracted curbside	No	$68.83
Winthrop	PERC	Drop-off	Yes	$68.74
Yarmouth	ecomaine	Drop-off	Yes	$95.45
Casco-Naples	ecomaine	Drop-off	Yes	$122.42
Portland	ecomaine	Municipal curbside	No	$83.30
Cumberland	ecomaine	Contracted curbside	No	$114.24
Saco	Maine Energy	Municipal curbside	No	$42.08
North Berwick	Maine Energy	Drop-off	Yes	$59.35
Sanford	Maine Energy	Cont Curb	Yes	$69.51

Profiles of two differing local recycling programs are provided in Appendix B that show the variations in local costs.

Markets for Recycled Materials

A. Market Stability and Growth Over the Long-term

There is a direct and obvious correlation between markets and recycling success and support for the hierarchy.

Unlike a decade ago, recycled and composted materials have reached a high level of price stability. This is due in part to new North American mills and to the steady rise in offshore markets for fiber and steel, and an increase in prices for virgin raw materials. Figures 14, 15, and 16 show three examples of pricing trends in the fiber market that illustrate the stability and general upward trend in pricing.

The new market stability is reflected best by the price strength relative to recent history for the category of recycled fiber generally known in Maine as mixed paper (see Figure 16).

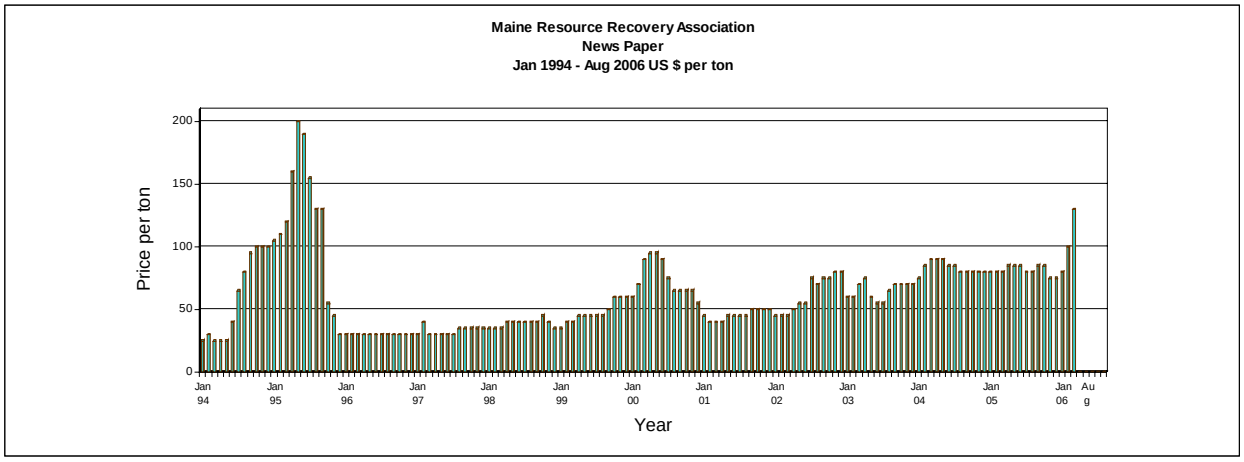


Figure 14: Price Per Ton, Newspaper, 1994 – 2006
Source: Maine Resource Recovery Association

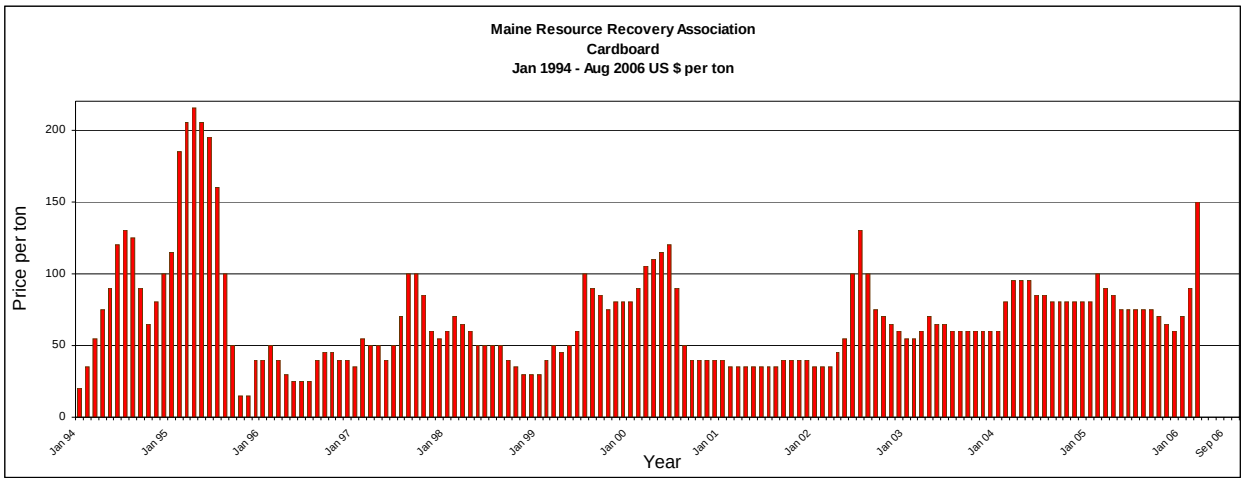


Figure 15: Price Per Ton, Cardboard, 1994 – 2006
Source: Maine Resource Recovery Association

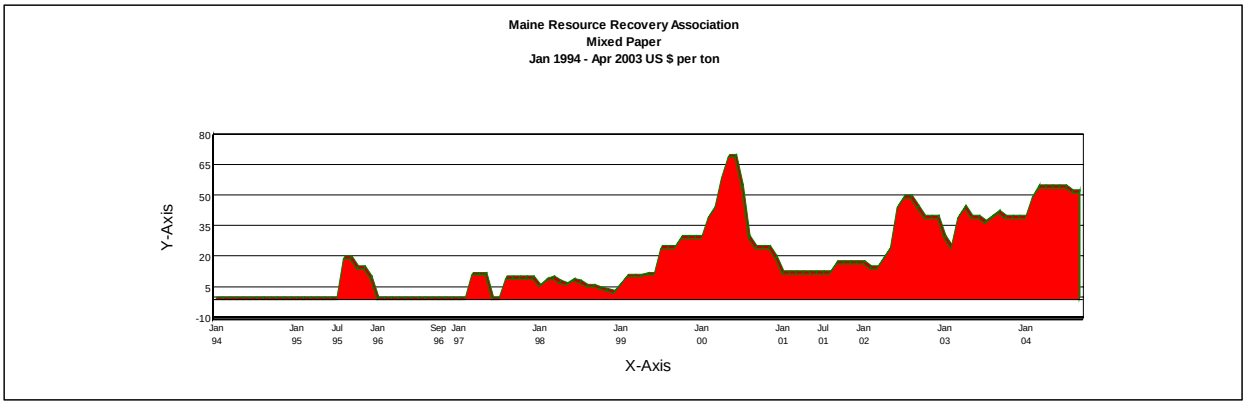


Figure 16: Price Per Ton, Mixed Paper, 1994 – 2004
Source: Maine Resource Recovery Association

Excluding the spike of 1994-95, there is an obvious upward trend in the year-to-year market prices. This is true across the fiber, metals, and plastics markets, but not of glass that is losing market share to lighter weight materials.[27]

Domestic and overseas markets have responded to the industrial growth in Asia. Overseas economies will not produce enough recycled product to meet their own needs for feedstock for at least a decade, meaning they will need to continue to import recycled materials from the U.S. for some time to come.

The challenge for marketers is to commit to move their recovery systems forward to increase supply, at the same time be able to respond to and take advantage of possible changes and opportunities in materials, in products and packaging, manufacturing processes, commodity and product delivery systems, consumer demand, global conditions, and new laws and policies.

In 2008 recycled products remain the number one container ship export from U.S. west coast ports. Recycled product revenues for all products on average exceed $50 per ton. The trend shows the annual cyclical market slowly moving up every year.

As in 1998, nationwide there is still a lack of markets for plastics labeled #3-7. Plastics recycling remains the province of numbers one and two necked containers. There has been some progress in combining the #3-7 resin types of plastics chemistries with other materials to use in structural applications, and they have some value in the low-priced, overseas market.

For the next two decades, the challenge for Maine suppliers will be to make changes to increase supply to take advantage of stable prices. This is particularly true of public, municipally-controlled programs where recovery efforts for fiber and containers have stayed below 100,000 tons annually.

Whatever changes are made, quality controls must be kept at current levels. Maine commodities have always moved in the market even at times of low prices and over supply because of their

[27] The ’94 spike in fiber was caused by a temporary high demand from overseas that was misread and led to a huge oversupply to the market that took several months to correct.

reputation for quality. Quality control is essential to mitigating the effects of low price cycles in the commodities' market.

B. Recent Downturn in Pricing

The global financial crisis of the last quarter of 2008 is reflected in the steep decline in price for recycled materials across the board that has carried into the first quarter of 2009. In this current economic climate there are a few facts worth remembering.

- Recycling markets go through periodic fluctuations; witness the corrugated cardboard boom and bust of the mid '90s, but consistently trend upward over the long term, despite two recessions in the last 20 years.

- This is not a structural problem in the recycling industry. It is an economic problem of supply and demand. Once economies around the world and in the U.S. pick up, recycling markets will return.

- In down markets, quality materials have a much better chance with buyers that are looking to keep their own costs as low as possible and produce defect free product. Maine materials have always enjoyed a reputation for quality in the recycled commodity market.

- Recycling reduces disposal fees that are placed on every ton of material that leaves a facility as waste for disposal.

In a down market, recycling program managers should look for ways to increase volume. This may seem to be a contradiction when demand is dropping off, but the more quality recycled product in the market, the more manufacturers will turn away from virgin raw materials when they decide to buy. Buyers prefer to purchase materials from large suppliers with whom they have a good working relationship. The goal is to keep the buyer.

C. Municipal Compost Supply

Although composting of leaf and yard waste now takes place at many municipal facilities and appears to be steady, there has been little growth over the last several years in the number of public programs despite high local consumer demand for the final product. The growth in organics composting beyond leaf and yard to include food waste and other organics in the waste stream has been very slow to develop.

The State Planning Office sponsored a food composting initiative in 2004, which resulted in one successful on- going permanent project. The Office provided financial and technical assistance to a partnership consisting of the town of Farmington, the University of Maine at Farmington, Franklin Memorial Hospital, and the Sandy River Recycling Association, along with assistance and regulatory oversight by the Maine DEP. The regional program composts food wastes from the university and hospital. It gives the finished product to the town for municipal uses.

Management of Construction and Demolition Debris

A 2008 study done by the State Planning Office found that the common factor in successful Maine recycling programs, the ones that exceed 50%, is that they accepted a large number of items for recycling, and they include construction and demolition materials in their recycling programs, such a waste wood, asphalt shingles, sheetrock, metals, unwanted furniture, and other large items. They also have active reuse programs for home construction products and large household items.

The rate of construction and demolition debris (CDD) disposal and recycling is directly related to the state of Maine's economy and to the cycle of residential and commercial construction.

A. CDD Composition

Wood waste makes up between 33-54% of the total volume of the CDD loads, with clean wood totaling between 17-32% by volume. Second to wood waste is asphalt shingles totaling between approximately 15-26% by volume.

Asphalt, brick, and concrete waste overall is found in very small quantities. An all other CDD waste category would include various wastes such as plastic compound buckets, plastic crates, nail boxes, non recyclable packaging, electronics, rugs, bedding, broken tools, bottles and cans, and other municipal solid waste.

B. Municipal Collection and Management

Maine towns manage CDD primarily through their local solid waste facilities. In 2007, municipalities recycled an estimated 13,000 tons, or approximately 50% of the total CDD recycled in-state for the year. This is an estimated 4% of the total 317,490 tons of CDD waste managed within the state.

Most CDD in Maine is landfilled without processing. An estimated 100,000 tons of municipally-managed CDD was landfilled at either the six municipal MSW landfills, the 23 municipal CDD landfills, the state-owned landfill at Juniper Ridge in Old Town, or the Waste Management Inc, landfill in Norridgewock. Additionally a small amount of mixed MSW/CDD tonnage is exported into New Hampshire and Canada by some of Maine's border communities.

The state's four waste-to-energy facilities also receive a small CDD fraction with their other MSW deliveries. Maine Energy is not designed to process these materials into fuel and must remove and landfill them; MMWAC and *ecomaine*, as mass burn facilities, can burn CDD but are limited by their small fuel feed openings. PERC has recently purchased a small grinder for materials too large or problematic for their fuel processing system.

Additionally, at some transfer stations, the wood portion of CDD waste suitable for fuel is not recycled; it is open-burned, without air pollution controls or energy recovery. This practice is allowed under state statute with some limitations and conditions.

The estimated combined generation of asphalt shingles and sheetrock, two components of CDD that are being recycled at some locations, is over 88,000 tons annually in Maine, while the recovery rate for all CDD is just over 25,626 tons. There is a tremendous opportunity for growth in recovery efforts.

C. Quality Control

"Source separation" is the basic strategy for controlling the quality of the CDD waste for reuse, recycling, or processing. It entails the sorting of usable elements of CDD at the point of generation (i.e. a demolition site) or collection (i.e. a municipal transfer station).

Local facilities have significant control of how the waste is delivered and sorted. They have the ability to manage delivery of relatively clean components of the construction and demolition debris waste stream for reuse, recycling, or processing. CDD storage areas and areas set aside to check load contents are inexpensive to construct and operate, but are heavily dependent on supervision of the customers to ensure adequate separation of potential contaminants.[28]

D. Management Options

There has been considerable discussion around the best management options for Maine's CDD stream. Boiler fuel is the largest potential market for locally-generated, source-separated, wood CDD. Local transfer stations, which manage CDD waste wood for the fuel market by requiring source separation, can typically receive a waste stream that is at least 95% wood.

However, potential recycling opportunities are tempered by the relative lack of sufficient concentrated volume outside Southern and Midcoast Maine to guarantee the financial success for any additional expansion of CDD processing capacity, the lack of sufficient local markets, and negative effects of transport costs. Thus, planning for future in-state CDD processing capacity suffers from a lack of long-term volume predictability. There has also been hesitancy on the part of municipal or public programs to commit to recycling of these materials.

If all municipal CDD were managed to separate wood waste at the point of collection, and assuming that 25% of the CDD waste stream could be processed into wood fuel that met market and regulatory specification, Maine municipalities potentially could generate 75,500 tons of CDD wood fuel annually for which there would be a ready in state market.

In the area of municipal construction demolition debris management, the major change will be the gradual closure of the state's two dozen small (under six acres) CDD landfills. If recycling opportunities do not come forward, the present alternative outside of southern Maine will be to continue to land dispose of CDD, which would be using up local landfill capacity.[29]

Whether or not municipal programs will seek to permit and license new, small-scale, CDD disposal facilities or seek to expand an existing one is an open question, given the costs and potential extensive permitting process for either option. Small-scale CDD landfills may no

[28] Maine Department of Environmental Protection. Report on the Substitution of Wood from Construction and Demolition Debris for Conventional Fuel in Biomass Boilers, April 2007

[29] Managing municipal CDD for maximum CDD wood fuel generation could reduce the amount of Maine landfill capacity currently used for disposal of CDD by 133,200 yds annually.

longer pay for themselves and in fact may have to expand in order to be financially viable. The attempt to site one such new facility in Washington County may suggest the complexity of any such undertaking.

If the two dozen small regional CDD disposal facilities do close, that will mean those programs currently using them will face either transport and disposal to the remaining large centralized landfills; or the development of CDD separation and aggregation storage areas to facilitate shipping to processing facilities where the materials are recovered as previously discussed.

Beneficial Use

The solid waste management hierarchy provides guidance on determining, selecting and implementing possible 'end of life' management options for unwanted products and materials, in descending order from reduction to landfilling. The second option within that hierarchy is 'reuse', which includes beneficial use.

A. What is Beneficial Use?

Beneficial use is the term applied when the substitution of a waste product occurs for a raw material in a manufacturing process, as a construction material, or as a fuel. The 1998 state *Waste Management and Recycling Plan* asserted that beneficial use could have a major impact on diverting certain hard-to-manage waste streams, such as tires, wood waste, and ash, from disposal to a different use or application.

Beneficial use is a practice that takes appropriate secondary materials out of the waste stream and uses them in place of more traditional virgin material. Beneficial use has potential in a number of industries, including construction, transportation, electrical generation, and waste treatment, to provide cost effective replacements for aggregate, fill, cementitious material, drying agents, and many other materials currently in demand. Beneficial use not only provides secondary materials for Maine companies to use, but it also decreases cost and demand for disposal facilities and maintenance.[30] Determination of a certain waste product for beneficial use requires Maine Department of Environmental Protection review and approval.

B. Examples of Beneficial Reuse

The use of waste as substitution for raw materials or other items has been practiced for many years. Some examples of secondary materials and their currently approved beneficial use in Maine include[31]:

1. Multi-fuel Boiler Ash – may be used as: alternative liming material; soil stabilizer; odor absorbent for compost and waste treatment; possible concrete additive/cement replacement.

[30] University of Maine. Beneficial Use of Solid Waste in Maine, 2006.
[31] University of Maine. Beneficial Use of Solid Waste in Maine, 2006.

2. Fly Ash – may be used as: raw material in a cement kiln; additive to cement clinker prior to grinding; addition to concrete mix as a partial replacement for cement; lightweight aggregate; controlled low-strength material (flowable fill); autoclaved cellular concrete; structural fill; landfill cover; water treatment; soil stabilization and modification.

3. Cement Kiln Dust – may be used as: soil stabilization; waste stabilization/solidification, Portland cement replacement; asphalt pavement; controlled low strength material (flowable fill); lightweight aggregate; construction fill.

4. Dredged Material – may be used in: wetland management, restoration, creation, and enhancement; shoreline and sedimentation stabilization; erosion control; wildlife habitat development; water quality improvement; recreation and cultural resources; contaminant stabilization; dike construction; rip rap; and other applications.

5. Lime Mud – may be used as: an agricultural liming material; in waste stabilization and sanitation; as a construction material.

6. Tire Shreds – may be used as: lightweight fill for embankment construction on weak foundations; retaining wall and bridge abutment backfill; to limit frost penetration; drainage layers for roads and landfills. Tire shreds have had three principal uses in Maine once they are processed into suitable sized chips: (1) as base grading materials (as demonstrated in the construction of the Sabattus interchange on Interstate 95); (2) as part of the landfill liner systems, and (3) as fuel in solid fueled boilers licensed to burn them.

7. Oil Contaminated Soil – may be used as: aggregate for hot and cold mix asphalt processes; concrete aggregate; raw material replacement.

8. Street Sweepings – may be reused as road sand; as fill material; as landfill cover; as a raw material replacement.

9. Waste Wood/Brush and Construction or Demolition Waste – these are two of the more commonly 'beneficially used' categories of municipal solid waste. To highlight this, the following is devoted to these wastes:
    - *Clean Wood Waste* – discussed below
    - *Construction or Demolition Debris, including concrete and asphalt shingles* – discussed below
    - *Sheetrock/Gypsum* – discussed below

Since 1998, much of the Department's work in this area has been to develop rules (see Maine Department of Environmental Protection, Rule Chapter 418) to allow for the beneficial use of construction and demolition/debris (CDD), and in particular, to create fuel standards for the use of construction derived wood (CDW) as boiler fuel. Wood from construction or demolition debris (CDD wood) refers to the wood component of the solid waste resulting from construction, remodeling, repair or demolition of structures.

The adopted rule also provides guidelines and standards for the use of tire chips, brick, concrete, porcelain, and glass as fill materials, as well as exempting recycling activities that produce secondary products in substitution for virgin materials in manufacturing.

The demand for the recovered wood waste fraction of CDD, principally the CDW, of the waste stream has increased in recent years and has the potential for growth. Several biomass boilers in Maine are permitted to combust this fuel substitute. As a result of increased demand, there has been a corresponding increase in the number and locations of grinding and screening machinery that accepts the CDD and processes it to capture the usable wood fraction.

Clean Wood Waste
Clean wood waste is recovered from demolition sites, and excess wood from the construction process, may also be used in many other ways. CDD can be used as a fill material or aggregate and may be a reasonable alternative to valuable natural resources in certain applications.

Construction or Demolition Debris
CDD contains many products and items, and if a home is demolished, may include the kitchen sink! Consequently, metal is a common component of CDD and is the most-recycled of CDD materials, due largely to the historic market and demand for recovered metals. The metal recovered from CDD is recycled and used to create new products from the old metal.

Concrete
Concrete can be readily crushed and reused. The most common use of crushed concrete is as road-base gravel, but it is often also used as an aggregate in asphalt or concrete manufacturing. One estimate is that 50 million tons of asphalt and concrete from pavement that is torn up is reused.[32] Of that total, up to fifty percent is reused as Reclaimed Asphalt Pavement, or often referred to as 'reclaim', which when properly placed, provides for a solid surface.

Asphalt Shingles
Asphalt shingles separated from CDD streams can be reused in making hot or cold mix asphalt, or even new roofing materials. Excess or cut shingles from construction sites are more widely used for recycling than used asphalt shingles collected from a demolition site, but both have value. What follows is a description of how one Maine business beneficially uses discarded asphalt shingles:

Commercial Recycling Systems (CRS) of Scarborough, Maine has been successfully recycling asphalt shingles for over seven years. The CRS processing facility currently accepts shingles delivered in both roll-off and dump trailers, containing 12-20 tons per load. Roofing products come from numerous towns, cities, and private roofing contractors in New England.

Collection of the shingles occurs at both municipal and commercial transfer stations, and through direct delivery to the CRS facility. An inspection is performed to make

[32] University of Maine. Beneficial Use of Solid Waste in Maine, 2006.

sure that incoming loads are comprised of shingles only and do not include any wood, flashing, or other debris. After inspection, the shingles are processed into the desired particle size at the facility, with measures taken to both remove roofing nails and minimize asphalt dust. The processed shingles are then incorporated into various road construction products, such as HMA and 'cold patch' at rates based on the product performance requirements. The use of the shingles in the construction materials replaces some or all of the virgin asphalt in the various grades of road building materials, which are produced to meet Maine Department of Transportation product specifications.

Sheetrock/Gypsum

The gypsum material in sheetrock can be removed from the paper backing for use in manufacturing new sheetrock. In addition, the gypsum has many other practical uses as well. Often thought of as having liming abilities, gypsum does not alter the pH of soil or water when added to either.

In looking ahead at methods and practices that reduce the volumes of solid waste destined for disposal, beneficial use continues to be a working option for those materials already permitted and remains an opportunity for further application, given current efforts to consider wastes as resources and divert their 'end of life' management from landfills to 'a second chance'.

Conclusion: Changes over 10 Years

The issues raised in the 1998 state *Waste Management and Recycling Plan* are mostly still of concern today. Municipalities face cost worries, however, waste tip fees have become more predictable and recycling revenues help offset expenditures. Markets for recyclables over the long-term have grown, with spikes and declines that track a global economy. The lack of management options for CDD remains a concern. And, while there are viable options for beneficial reuse, there remain opportunities to do more.

V. Long-term Issues to Watch

Growth in Waste Generation

Maine currently disposes more solid waste than it reduces or recycles. While that fact alone is cause for concern, that we as a state find ourselves in this situation after 20 years of effort to reach 50% recycling goal, the data trend over the last six years shows that the increase in disposal is outpacing any increase in recycling. Though recycling tonnages continue to increase, recycling's share of the MSW stream has declined relative to disposal over the last several years.

This continuing and growing disproportion raises concerns that our current policies and programs are insufficient to guarantee an improved future for Maine citizens when it comes to solid waste management programs that properly reflect the quality of the place we consider Maine to be.

Out-of-state Wastes

A. Why do we Import MSW?

Why not ban out-of-state waste?
Many people wonder why the state doesn't just ban the importation of waste. Movement of solid waste across state lines is protected under the federal commerce clause of the U.S. Constitution. This federal law overrides individual state action to restrict that market at their borders. The law enacted in Maine in 1989 to ban the development of new commercial disposal facilities was in direct response to the limitations imposed by the commerce clause. Those publicly-owned and private disposal facilities that remain in Maine today may accept wastes from beyond Maine's borders as long as that acceptance does not run counter to the regulatory, legal, or contractual provisions under which they operate.

1. Out-of-state Waste Makes Energy and Supports our In-state MSW System

The Fuel Gap

The majority of the state's businesses and residents rely on the four W-T-E facilities to manage their MSW. Since their inception, the four W-T-Es located in Maine have required, either occasionally, or on a seasonal, or permanent year round basis, more fuel (MSW) than is currently available to them from Maine market sources. This *over capacity* creates a demand that their managers have to meet by looking out of state for additional fuel. Given our current level of W-T-E capacity, out-of-state waste is necessary to continue to manage our own MSW. It maintains operational efficiency at the W-T-Es and allows them to meet their contractual responsibilities.

The facilities are not only dependent upon a predictable flow of over 800,000 tons of fuel per year (with a portion of that fuel coming in from out of state); but also upon access to landfills for their own waste streams of by-pass, ash and, for the two refuse-derived fuel plants, front-end process residue (FEPR). Current technology has not achieved any significant resource recovery from either of the two waste streams under present regulatory conditions.

In the long term, we need to decide whether and how the state should sustain this exchange of waste for energy if Maine recommits to and reinforces the hierarchy and with the reality that at least for the next several years the fuel needs of the W-T-Es will need be met by out-of-state sources.

In the meantime out-of-state wastes support the conversion of our own wastes into energy and thus support the hierarchy in preference over landfilling.

Out-of-state Wastes and Biomass Fuel

Maine has by far the largest concentration of biomass steam plants in the northeast region. What Maine lacks is processing capacity for CDD or the waste stream volume to supply wood for those boilers.

Current Market

Only two of the seven boilers approved for construction derived wood (CDW) fuel combustion are presently burning it: Sappi Westbrook and Boralex-Livermore. Roughly two-thirds of the CDW fuel for these plants was fuel processed outside of Maine. If all seven boilers combusted wood waste up to their full capacity allowed by license requirements and by state law,[33] they could generate an annual demand for 1.37 million tons. The Office does not believe that we are likely to attain this full level of demand.

In-state Sources

Maine does not produce enough CDD wastes from which a sufficient amount of CDW can be derived to meet today's fuel demands of in-state biomass boilers, or the fuel demands of new, yet-to-be-proposed technologies, such as gasification, that are under consideration, or the financial requirements for throughput of any future CDD landfills or processing facilities.

At the current rate of capture and processing of wood waste from CDD, Maine municipalities supply less than 1% of the maximum annual projected demand for CDD wood fuel. Processing of in-state commercial waste currently provides an additional 3%. If all municipal CDD were managed to separate wood waste at the point of collection, and assuming that 25% of the CDD waste stream could be processed into wood fuel, Maine municipalities potentially could generate 75,000 tons of CDD wood fuel annually. This is an estimated 6% of the maximum CDD wood fuel permitted for use in Maine biomass boilers today.

Out-of-state Sources

Because of Maine's low volumes of CDD wood waste, there is concern over a potential influx of very large amounts of CDD from out of state to fuel the present seven licensed biomass boilers.

To combust the maximum amount of CDW fuel approved for use, biomass boilers would need to rely upon CDW fuel that originates outside of Maine, or on fuel that is produced in Maine from out-of-state CDD.

[33] DEP licenses for these facilities restrict the annual tonnage of CDW to no more than 50% of its licensed fuel supply.

Recent legislation has written into law that waste, produced by the processing or recycling, or incineration in Maine of out-of-state waste, is considered to be waste generated within the state. Thus those wastes may be received by any facility licensed to receive those types of wastes.

For example, in 2007, 293,536 tons of out-of state, unprocessed CDD was sent to Maine's commercial landfills. If this amount were separated and processed for CDD wood fuel production rather than landfilled, it would create an estimated additional 75,000 tons of CDD wood fuel (roughly 6% of the projected maximum demand) and reduce the landfill capacity used by at least an equivalent amount.

CDD Products and Recyclables (other than Wood)

Most large construction and demolition debris processing facilities produce a variety of recycled products in addition to CDD wood fuel. These facilities remove as much salvageable and reusable material from CDD as is practical in order to recover value from the waste constituents and to minimize the transportation and disposal costs associated with landfilling construction and demolition debris. Materials recovered by these facilities include aggregate from bricks, concrete, asphalt, rocks, and dirt; ferrous and non-ferrous metal; asphalt shingles, un-used gypsum board for reuse, and wood for reuse or for fuel in wood-fired biomass boilers.

Additionally, other CDD components not suitable for recycling may be mixed with the recovered aggregate materials and marketed to operating landfills as a soil substitute to cover waste or for shaping and grading material for landfill closure projects. Generally, 20-35% of a mixed CDD waste stream can be processed into CDD wood fuel.

Typically, the processing facilities offer generators financial incentives to send wood rich loads of CDD separately from wood poor loads or require source separated loads from demolition and building contractors. This allows the processor to use the wood poor CDD loads to create landfill closure material or to by-pass the CDD directly to landfills for disposal.

Maine Processing Facilities

Current in-state processing of CDD wood is performed by mobile shredders that process stockpiles of pre-separated CDD wood into fuel at municipal collection sites, and by five commercial processing plants – Aggregate Recycling Corp (ARC) in Eliot, CPRC Group in Scarborough, KTI Biofuels in Lewiston, Simpson, Inc. in Sanford and Plan-It Recycling in Gorham. Another facility, owned by Casella Waste Systems, is newly licensed to operate in Westbrook, but is not yet operational.

Currently, the wholesale replacement of out-of-state processing capacity by in-state facilities is unlikely since it is significantly less expensive to process locally (nearer the sites of CDD generation) and to pay to transport only the portion of CDD that is processed into wood fuel than to transport mixed CDD into Maine for processing. The degree to which out-of-state CDD processors can increase their operational capacity to meet increased fuel demand is also limited. Out-of-state processors are currently operating at close to capacity.

B. The Impact of Imported CDD on Landfill Capacity

When the state's two commercial landfills reach capacity and are closed, those disposal options for imported CDD will dry up, which will reduce the importation of out-of-state waste for landfilling. [34]

However, given the recent change in law that defines processing waste as waste generated within the state, the residue from the processing of CDD imported from out of state for the purposes of creating fuel for Maine biomass boilers could consume valuable landfill space either at Juniper Ridge or at some future publicly-owned and -controlled disposal facility.

There are five, soon to be six, Maine facilities that may receive out-of-state CDD for processing CDD into fuel. The processing of CDD into wood fuel by these facilities potentially could increase in the future. A possible projection has the processing of CDD into wood fuel generating residues that could use up to 15-20% of Maine's current remaining landfill capacity annually (without an expansion).

Several conditions would have to be present for this scenario to emerge. First, the six processors would need to expand their existing operating capacities to process all the CDW fuel needed. This would require equipment purchases and regulatory consent. There would need to be sufficient building and construction activity to generate the supply of material to be processed. In-state disposal costs would need to be low enough to offset the increased costs of transportation. Finally, there would need to be sufficient demand for the product (i.e. the seven Maine boilers consume CDW fuel up to their licensing and/operational limits). This scenario also assumes that all of these conditions align at the same time and remain constant for a sufficient period of time so that all the necessary investments can be made and permit approvals obtained.

Nevertheless, this situation requires prudent and timely monitoring because of the potential for growth in market supply and demand (based on operational limits of current processing facilities and biomass boilers) that could then escalate the demand on Maine's landfill capacity, a core concern of the state.

Also, it is likely that some of the ash from the biomass boilers will continue to be disposed of in generator-owned landfills to add stability to paper mill sludge, reducing the reliance on public landfill capacity.

Out-of-state Wastes and Bypass

Recent legislation has defined bypass and included bypass waste from Maine waste to energy facilities, recycling and processing facilities under the definition of waste generated within the state. One of the potential consequences of this legislation is that out-of-state waste destined for one of the W-T-Es may be directed on to a licensed public or private disposal facility in Maine.

[34] Through an agreement with the Maine DEP, Pinetree Landfill in Hampden will close in January of 2009. Crossroads in Norridgewock will reach capacity between 2019 and 2023 (this is only an estimate based upon today's fill rates).

In conclusion, the types and amount of out-of-state waste disposed of in Maine will likely shift in response to changes over time in Maine's waste generation and management systems. Without changes to current law both commercial land disposal facilities will eventually fill and close, shutting off those disposal outlets for out-of-state waste. While new CDD processing facilities may bring out-of-state wastes into Maine, they will also serve to improve the recovery of Maine-generated CDD.

The Role of Local Government

Since their local dumps were ordered closed or radically changed to meet new state law and standards in the 1980s, and the affirmation of home rule, municipalities have wrestled with their role in solid waste management and the questions of who has control, who has ownership, and who has responsibility and what those words mean.

The positive result is that over the last two decades each Maine city and town has chosen, built, and managed their individual MSW systems to their liking, as long as they stayed in compliance with state laws and rules. The people in the 495 civil divisions with their own governance have the right to choose the level of services they want to pay for.

The principle negative result of this system of local control is this same variability of service so that communities next door to one another have widely different levels of service and approaches.

Also, the full life cycle costs and benefits of all the components of the waste stream and the various possible means of their management are often not evaluated or even recognized in the typical annual "services versus taxes" municipal budgeting process. Municipalities are only obligated to provide a means of disposal for MSW generated within their borders. Following that minimal scenario, it is rational and acceptable to send solid waste "downstream" shifting the burden geographically or to future generations, in order to minimize immediate local risks and costs. The long-term environmental and social impacts of "downstreaming" solid waste and the cost of siting future disposal facilities generally are not usually factored into annual budget choices by those who manage the MSW at the local level. [An exception should be noted for those eight communities that still operate their own landfills and must have long term plans for preserving landfill space, possible mitigation, monitoring, closure, and post closure disposal.]

The recent U.S. Supreme Court ruling on flow control does give municipalities potential, wide-ranging control over MSW generated within their jurisdictions. It gives local governments standing as both market regulators and market participants with the power to direct MSW into their own facilities as long as they pass a balancing test where the public benefit is greater than the burden, particularly in those circumstances where those bearing the potential burden are the same as those enacting the law. This new situation may have long-term, positive effects on building greater regional cooperation to direct MSW into municipally-owned recycling and composting facilities.

Other Issues

Besides the growing waste generation versus recycling imbalance, out-of-state wastes, and the role of local government, there are three adjoining issues that concern current policy.

A. Limits to Private/Public Partnerships

Certain private/public partnerships have been very successful in terms of sharing power, providing service, and stabilizing prices —witness the PERC-MRC relationships.

Until recently, financial and environmental risks have limited the number and use of municipal landfills to meet the disposal needs of their municipal owners for solid waste generated within their borders or under contract or agreement with adjacent communities. This status quo has been challenged by proposals for municipal partnerships with private companies that are testing the definition of commercial disposal facilities.

The potential short term advantages for municipalities are: relief from the costs of operations; a reduced or no tip fee for its own solid waste; and, a revenue stream from several possible sources depending upon the terms of the contract. Again depending upon the contract, they may get relief from mitigation, closure, and potential pollution costs connected with a facility.

The private company would receive valuable landfill space in a state with limited permitted sites, with predictable costs and revenues to serve their collection and hauling contracts.

This issue raises many questions, principally; where is the source(s) of the private company's MSW, what types, and volumes of the solid waste would be disposed of; does the use violate state law and would it pass the public benefit determination test. Recent legislation has addressed some of these concerns by prohibiting the disposal of out-of-state wastes into municipal landfills.

B. Changes in Public Attitudes

For generations until the 1970s and into the 1980s, most Mainers lived with unlined open burning dumps within their individual communities, often within a short driving distance to or bordering on residential areas.

Today, environmental, health, and property value considerations, the changing social dynamics around solid waste activities, and concerns over what is in the waste stream and where it is generated are at the forefront of the public's perception about solid waste. Newer facilities built and maintained to stringent environmental standards that were once accepted as part of the local landscape, or even seen as an economic boon to a community, are now often under severe and constant public scrutiny.

It should be noted that all large scale development projects face opposition, even those proposals that seem to benefit the environment. But a 2006 survey published in *Waste News* reflected current public sentiment as waste disposal facilities ranked at the bottom of community development preference, below rock quarries, casinos, and airports.

Communities across Maine have worked for more than a decade to become fully involved in defining what it means to be a host community. Up to now there has been little common ground in discussions of options and alternatives to the present facilities.

This has potentially serious implications for our system that is heavily dependent upon maintaining a small number of relatively large regional waste processing (four W-T-Es) or landfill disposal facilities (eight by 2010).

C. The State of Maine as a Market Participant

Finally, we must consider the effects and future implications of the state as a market regulator and as a market participant. The state has become a market participant with its purchase and operation of the Juniper Ridge Landfill, but not in the manner envisioned by the crafters of the 1989 legislation. It was anticipated that given the eventual demise of the state's two commercial landfills and the reluctance of public entities to seek to replace them with new, large-scale, publicly-owned landfills, that the state would be the provider of last resort of the capacity for the waste streams from the four W-T-Es, special wastes, and CDD, in the manner prescribed in statute. Today, however, unlike the states in the southern tier of New England, Maine continues to have overcapacity in W-T-Es and potentially very significant landfill capacity.

The passage of the legislative resolve of 2003 and the purchase of the landfill bypassed the statutory "trigger" and that anticipated process, but provided the state with the opportunity to gain significant capacity with potentially one of the largest landfills in the Northeast.

We must consider how the capacity at Juniper Ridge can be used to support the hierarchy and to the best advantage for the people of Maine.

Juniper Ridge is already perceived by the private and public waste sectors as having an effect on disposal pricing. It was a significant factor in the decision of Casella Waste Systems, who holds the operating services agreement to operate Juniper Ridge, to close the Pine Tree landfill in Hampden and to permit the CDD processing facility in Westbrook, to aid in fulfilling their obligation under the Operating Services Agreement for the Juniper Ridge Landfill.

Also, Juniper Ridge may be directly impacted over time by the recent legislation defining by-pass and in-state processing wastes as wastes generated within the state. Its capacity may be open for use by those waste streams.

Conclusion: Issues to Watch

Such is Maine's MSW management landscape. But all of these issues and concerns can be turned to our advantage if we apply the hierarchy with all the resources, knowledge and tools developed over the last 20 years, and adhere to the 50% goal as we pursue their solutions.

If the hierarchy is to mean what it says, Maine must move from 'waste management' to 'resource management'. To do so by the 2020s, we must consider what is now called solid waste instead to be feed-stocks and resources from which all potential value is extracted; and we put an end once and for all the practice of down-streaming waste to future generations or someone else, somewhere else.

VI. New Trends

The basic common thread for effective waste management is in the waste itself because there is no difference in the MSW from Berwick to St. Agatha. This commonality of generation, characteristics, and results provides the state with an opportunity to take a lead role in the process of identifying, researching, and if found appropriate for Maine, pushing new trends in MSW management that can be generally applied.

Energy and Greenhouse Gas Initiatives

In 2007 the following language was added to the state waste hierarchy:

> Waste reduction and diversion. It is the policy of the state to actively promote and encourage waste reduction measures from all sources and maximize waste diversion efforts by encouraging new and expanded uses of solid waste generated in this state as a resource (underlining added here for emphasis).

This new language encourages the state to look at new technologies and methods for managing MSW that are currently not part of the waste hierarchy.

Since the first Earth Day, recycling has played a role in discussions on global resource conservation. Now all aspects of solid waste management have been drawn into discussions on several larger environmental issues, such as global warming related to greenhouse gas emissions reduction, changing energy markets, energy self reliance and conservation, toxics reduction, and the carbon cycle. These issues are on the table as we conduct our own debates about what is the best way for us to manage our solid waste, and have the potential to be the controlling issues of the near future.

Landfills are one of the largest human-formed sources of green house gases. Methane, the principle gas released from landfills, is 21 times more potent a greenhouse gas than CO_2. The state of California has estimated that the recycling and composting of all discards would be the equivalent of removing all emissions from all vehicles on their roads.

Recognizing the relationship between solid waste management and greenhouse gases, the US EPA created two web-based tools to aid in this effort: WARM and ReCon.[35]

The Waste Reduction Model (WARM) helps solid waste planners and organizations track greenhouse gas emissions reductions from several different waste management practices. WARM calculates and totals emissions of waste management practices source reduction, recycling, combustion, composting, and landfilling. The model calculates emissions in metric tons of carbon equivalent, metric tons of carbon dioxide equivalent, and energy units across a wide range of material types commonly found in municipal solid waste.

[35] EPA. Office of Climate Change. Waste Web Page.

The Recycled Content (ReCon) Tool helps companies and individuals estimate life-cycle greenhouse gas emissions and energy impacts from purchasing and/or manufacturing materials with varying degrees of post-consumer recycled content.

Maine recognizes the impact of greenhouse gas as well. Maine citizens, the Legislature, and the Executive branch, through the Maine Department of Environmental Protection, are implementing a plan to actively reduce emissions of greenhouse gases in Maine. According to the Department of Environmental Protection, Maine continues to make significant progress toward its goal of reducing greenhouse gas emissions by 10% below 1990 levels by 2020. Maine continued to lead regional efforts toward establishment of the Regional Greenhouse Gas Initiative (RGGI), becoming the first state to adopt rules to implement the program. In addition to directly reducing greenhouse gas emissions in the electrical power sector, the program will generate significant new funds for electrical efficiency investments.

New Technologies

A. Waste Conversion Technologies

There are three broad categories of waste conversion technologies: 1) thermochemical, such as gasification, pyrolysis, and plasma arc technology; 2) physiochemical, such as distillation of ethanol and the production of biodiesel; and 3) biochemical, such as anerobic digestion and ethanol fermentation and hydrolysis.

While research into these technologies is ongoing, key questions remain: do they reduce the carbon footprint, do they reduce the toxics footprint, and do they continue Maine's strong commitment to protect public health and the environment. In general, their touted benefits are lower carbon emissions, lower air emissions, renewable energy, offset fossil fuels, sustainability, and beneficial use of their residual wastes.

Three technologies are briefly discussed here because they are new and have relevance for Maine and large-scale applications for waste management.

1. Gasification

At present, there are gasification proposals being floated in Maine. Gasification is a term that describes a chemical process by which carbonaceous (hydrocarbon) materials (coal, petroleum coke, biomass, etc.) are converted to a synthesis gas (syngas) by means of partial oxidation with air, oxygen, and/or steam.

A hydrocarbon feedstock is fed into a high-pressure, high-temperature chemical reactor (gasifier) containing steam and a limited amount of oxygen. Under these "reducing" conditions, the chemical bonds in the feedstock are severed by the extreme heat and pressure and a syngas is formed. This syngas is primarily a mixture of hydrogen and carbon monoxide. The syngas is then cleansed using systems that remove particulates, sulfur, and trace metals. The resulting gas mixture is itself a fuel.

Gasification is potentially a very efficient method for extracting energy from many different types of organic materials. The potential advantage of gasification is that burning the gas mixture would be more efficient than direct combustion of the original fuel; such as the current W-T-E technology employed in Maine. More of the energy contained in the fuel is extracted. In addition, the high-temperature process refines out corrosive ash elements allowing cleaner gas production from otherwise problematic fuels, and produces lower emissions of greenhouse gases than current W-T-E systems.

2. Plasma Arc Technology

Plasma arc gasification as a waste treatment technology uses high electrical energy and high temperature created by an electrical arc gasifier to break down the waste primarily into elemental gas and a solid waste slag. The process is intended to be a net generator of electricity, depending upon the composition of wastes, and also to reduce the volumes of waste being sent to landfill sites.

A different type of plasma arc waste conversion that uses plasma to refine gases produced during waste conversion, rather than to destroy waste, has recently shown itself to be successful on a full commercial test scale in Ontario. Its emissions are also lower than other thermal waste processing systems, and by converting waste to CO2 and water, rather than to methane, the greenhouse gas emissions of the process are much less than competing technologies.

There has been a number of large scale plasma projects proposed to come on line over the next several years including proposals in Ottawa, Ontario, St. Lucie County, Florida and the city of Tallahassee also in Florida.

3. Landfill Gas-to-energy Projects

This technology actively manages MSW landfills for their gas recovery potential. The gas is then used to fuel generators to produce electricity. Pipes are placed in the landfill; slight pressure is maintained sufficient to draw the gas into a recovery plant but not enough to draw oxygen in through the landfill cap. The gas is then cleaned and piped to the generator plant, which is either connected to the power grid or into a local application. There is also the potential to recover the waste heat created in certain circumstances.

Maine has recently seen its first power to the grid from landfill gas at the Casella facility in Hampden. The amount of solid waste deemed as the minimum amount to make such a project feasible is decreasing, making the technology available for consideration by smaller landfills such as we have in Maine.

Two of those smaller landfills, Bath and Tri-Community in Fort Fairfield are moving forward into the carbon credit market where small facilities are encouraged to reduce their carbon footprint by capturing and flaring landfill gases in exchange for revenue from the credits.

Single Sort Recycling

While not new, but new to Maine in 2007, this collection and processing technology, called "single sort", offers the ability for recycling programs to collect unsorted, commingled recyclable materials. Its principle benefits are that it is a very efficient collection strategy that also offers convenience that may encourage more people to participate in recycling programs and in turn give the state the opportunity to recycle greater amounts and more items.

Single stream, single sort, fully co-mingled, are all terms used to describe a means for residents and small businesses to mix all recyclables, paper products and containers together in one bin or tote or cart. Those recyclables can then be dropped off into one large undivided container at a recycling drop off facility, or if curbside service is available, collected by one truck with one compartment in which all the recyclables are compacted.

Whether from the drop off facility or by the truck collecting curbside, the mixed recyclables are then transported to a facility, commonly referred to as a "materials recovery facility" or MRF, then and there to be "unmixed". Separation through a combination of machinery and hand labor prepares them for sale as commodities in the market, and finally materials are shipped to mills around the country and the world.

Thus single stream is a collection <u>and</u> processing operation that emphasizes efficiency in collection in exchange for more expensive infrastructure and more complicated and problematic processing operations. *ecomaine* and FCR Goodman are fully committed to this type of system.

The <u>potential</u> and proven benefits include:

- increased ease and convenience to residents;
- increased participation;
- increased recycling reduces disposal costs;
- wider range of materials: most plastics, most paper grades;
- far less labor intensive: no handling past the collection container;
- compaction, if used, results in fewer trips, lowering transport costs; and
- for curbside, faster collection of materials, collection and transportation savings.

The drawbacks to single sort/single stream are:

- reduced revenue from the sale of recyclables, or the imposition of per ton processing fees, as is currently the case in times of down market cycles;
- communities still need to be involved in quality control process – they cannot leave it all up to the Materials Recovery Facility (MRF); they must keep MRFs "honest" about levels of contamination, residuals etc., not passing on contaminants that increase operating costs and disposal at receiving mills; and
- a loss of 20 years of source separation/quality education of residents, which would be difficult to 're-teach' if is not successful.

Additional questions that communities may want to consider are:

- Is there an additional community benefit (public good will) in continuing with the source separated system?
- Is there a compelling reason to change the current program? Such as going to curbside collection, mandatory recycling or PAYT? Or an external community reason such as a budget crisis?
- Once the program is committed to providing material into a centralized single sort facility, how will single stream facilities react to changes in the marketplace? Will the program end up sharing the costs of processing?
- Will materials from MRFs carry the same reputation in the marketplace as Maine products currently enjoy?
- People still have to overcome their resistance to the basic separation of trash from recyclables. If the program already enjoys a high recycling rate what will be the increase in participation?
- Will the percentage really up-tick, with more people recycling more stuff?
- Does the potential increase in recyclables volume cover the costs of upgrading to a more expensive system?

It remains to be seen what kind of increase in recycling tonnage a program achieves. In other areas, single sort alone has brought an increase of 3-7% in the volume of recyclables.

There are ancillary issues to consider such as local control over the recycling program, the sustainability of existing regional programs that employ source separation in the face of competition with single stream providers, and limited competition in the market (i.e. only two vendors are actively engaged in single sort).

If single sort can deliver the expected growth in recycling tonnages as anticipated by those 50 plus communities that have signed onto it, then it is worthy of serious consideration throughout the state. Initial reports from communities that have adopted single sort are encouraging.

The Product Stewardship Model

The product stewardship model, begun in Maine with the mercury-added products recycling law and then expanded under Maine's first in the nation cathode-ray tube (CRT) management legislation, has recently been expanded again to include thermostats and cellular telephones.

The model puts forth that the responsibility for reducing product impacts on public health and the environment is shared among industry, government, and consumers. Each item of the waste stream is examined for its impacts on the environment, its recyclability, or ease with which it can be returned to the technological resource stream, its marketability, and the condition of those markets. Manufacturers are given guidelines and goals to increase the recyclability of the products and to lower toxicity. Generators are pushed to be responsible and follow the program, and the collective government entities expand access and convenience and enforce the program at all points of the system.

For example, cathode ray tubes (CRTs) found in all televisions and computers prior to flat screen technology contain significant amounts (3-8 lbs.) of lead and other toxic heavy metals.

In Maine, before 2003, these items were landfilled and crushed. The lead was exposed and posed a potential threat to land and water and the health of Maine citizens. To alleviate this risk, the Maine DEP developed legislation that requires the manufacturers to pay for the transportation and recycling of these items generated from Maine households.

The Department also created the regulatory and program structure to achieve this goal efficiently. Municipalities are required to provide the means for home owners to recycle the CRT-containing units. The State Planning Office provided over 1.3 million dollars in grant funding to assist municipalities in developing the CRTs collection infrastructure.

Homeowners are required to separate these items out from their other MSW and deliver them to the appropriate facility or program. Once all program elements were in place, CRTs were banned from disposal and required to be recycled by state law. In Maine to date, several thousand tons of TVs and computer monitors have been recycled through this program.

Product stewardship initiatives are currently being developed in the northeast by the Product Stewardship Institute, of which the Maine DEP is a participating member, and at similar organizations on the west coast, on several products including among others, paint, pesticides, telephone books, carpeting, and pharmaceuticals. By engaging them at the onset of the process, product stewardship efforts encourage manufacturers to take increasing responsibility to reduce the entire life-cycle impacts of a product and its packaging beginning with product design through to its end-of-life management.

Product stewardship is an approach that has the potential to be widely applied to many current products and those new products or new combinations of materials currently making their way into Maine's MSW stream.

Personal Responsibility

Finally, debates over infrastructure and operations involving hundreds of millions of dollars overshadow and at the same time sidestep the issue of personal responsibility. Products are brought to market and purchased without regard to their disposition after their original use. Generally, there is a disconnection between the consumption of goods and services and the full, life cycle costs; social, environmental, as well as financial of those goods and services.

Municipal solid waste management comes down to mitigating the effects wrought by the choices we make as consumers and the consequences of the actions we take as individuals to manage our own waste. As we move into the next decade, the decisions we make as voting citizens, must shift from personal denial to personal responsibility.

Conclusion: New Trends

Waste management is more than putting garbage at the curb and forgetting it. Economic and environmental considerations dictate that we find new ways to manage our waste and responsibility for this is shared across society. In the future, in Maine and elsewhere, MSW can no longer be considered separately from global environmental issues.

VII. Where Do We Go from Here?

Past plans ('90, '93, '98) focused on the prospects and positive performance of the emergent recycling efforts during those building years. Our perspective is different when we are looking at a mature system and at figures showing us moving away from achieving our stated priorities.

As the current stewards of Maine's MSW program, we know how to protect public health and minimize and mitigate damage to the environment and these will remain our core obligations. But once again as in 1987 we have had extensive public discussion on how we manage our solid waste, and again we have the opportunity to decide what is fitting for Maine. What is our vision of the future, what are our goals for the decades to come? Will it be reactive to external challenges, or will it be forward thinking? We can chart our own course.

This section of the plan describes how Maine might achieve and then move beyond the 50% recycling goal.

Assumptions
The starting point for these strategies is the baseline assumptions of Maine's MSW management out to 2027 at the current 35% recycling rate and a 4% annual increase in waste generation.

Discussion of the growth rate
The 4% annual increase may or may not be viable for all planning scenarios. It is used here because it is based on the growth rate of the previous two decades and because using such a scenario is protective of the state's landfill capacity and of the process required to seek and secure additional new capacity if it be required.

However, the current situation from the latter part 2008 and into 2009 saw flat or declining tonnages at some of Maine's disposal facilities. The economy, particularly the consumer economy, may not come back to present levels for some time and waste is linked to economic activity. Waste reduction strategies in product design, packaging, and consumer choice, may take hold, particularly in this time of economic change, and those strategies may result in permanent reductions in certain components of the MSW stream leading to overall reductions in tonnages.

Thus, the projected 4% growth rate may be too aggressive. It should be qualified by connecting it with overall state economic growth and with progress in waste reduction and other green efforts to slow or reverse the growth of waste. The 4% rate should be seen as the high case Maine's economic growth rate to provide the plan with the background in which to base the forward looking reduction and recycling strategies.

The plan is built from the annual waste generation data contained in the state *Waste Generation and Disposal Capacity Report*. The annual report is aptly more fluid than the plan and reflects actual solid waste conditions in Maine. The plan takes a longer view of waste data in order to assess the effectiveness of statewide policies. It relies on the trends provided over time by the annual data.

Tied to the 4% growth rate question is the issue of the importation of waste. There are questions as to whether or not out-of-state waste will really decline and be supplanted by the growth of in-state waste for the W-T-Es. If delivery numbers from Maine communities continue to decline, due to their economic conditions or recycling and waste reduction efforts, the fuel gap will grow, maintaining the flow of out-of-state wastes.

The Run Up to 50%

A strategy for achieving Maine's 50% recycling goal.

Meeting a 50% recycling goal would extend the life of the state's existing state and municipal land disposal facilities. It would require an increase in recycling by 300,000 more tons a year at today's generation totals and up to 2.3 million tons a year by 2027. It could be accomplished through the expansion of public and private sector recycling efforts. Most local programs could on average achieve a 60% participation rate.

All strategies and goals assume some level of state assistance within available resources, to encourage these efforts through grants, education, outreach, and technical assistance.

Objective: Improve collection and participation in public recycling programs.

- Single sort recycling and other efficiency based collection and processing systems would be implemented by all those programs in which the technology demonstrates a clear advantage over their previous method(s). This would include the majority if not all of the most heavily populated areas of the state. It would be combined in many situations with the adoption of curbside collection and PAYT (pay as you throw) programs and an expanded list of items to be recovered.

- Maine materials would still move to market in times of over supply due to improved quality controls installed at the processors and by public education and inspection at the municipal level.

- The relationship of volume to price will stay within acceptable limits (excluding current market conditions) because any potential reduction in revenue will be more than offset by the increase in recycling volume and the decrease in disposal costs.

- The state would provide targeted infrastructure, planning, and equipment grants to regions to improve collection and participation rates..

Objective: Mandate recycling of old corrugated cardboard (OCC).[36]

- OCC is easily identified, easily separated, of good value, and comprises 14% of the MSW stream (excluding CDD). If the majority of recycling programs in Maine had banned corrugated cardboard from disposal, the amount of OCC recycled in 2007 (117,000 tons) would have doubled and thus could have provided 20% of the tonnage needed to reach the 50% recycling goal. It is already mandatory for businesses with 15 or more employees to recycle OCC. This strategy would extend that program to all businesses and residences.

Objective: Encourage communities to ban the disposal of leaf and yard waste.

- Municipalities would be encouraged to establish their own leaf and yard waste compost programs to divert up to 13% of their waste stream from disposal and provide quality compost for municipal projects and community use. The goal is to build up the

[36] There has been an ongoing debate on mandatory recycling since the inception of the state recycling goal. There are real questions as to how such programs would gain public acceptance and be monitored and enforced.

composting infrastructure in numbers of locations and the capacity of those locations around the state.

Objective: Encourage recycling the components of the CDD waste stream that can be recycled.

- CDD recycling can have dramatic effects on recycling rates. While they require oversight, space, access, regulatory requirements for operating surface and separation between materials, CDD recycling operations are not complicated and there are many municipal programs in the state with high diversion rates that can serve as model programs and be replicated in other locations. As with the compost facilities, communities would be encouraged to set up and run new programs or expand existing facilities.

Objective: Expand recycling opportunities for commercial sources.

- Businesses would embrace recycling similar to other green energy, efficiency, and green building initiatives. The state would engage business in a public/private grassroots effort to realize the financial and social benefits of recycling, through a grants and technical assistance program through the regional councils as part of their current outreach to business programs. The state will encourage expansion of municipal programs to include recycling from commercial sources.

Objective: Maine state government, the state's largest employer in terms of employees and building square footage, leads by example.

- The state would routinely achieve a 65% recycling rate for its own operations and facilities, including the university and community college systems.

Objective: Continue efforts to remove toxic wastes from Maine's MSW stream.

- Expand the number of permanent HHW facilities from 2 to 16 (every county). Include mobile collection infrastructure with these HHW service centers in order to improve the level of access and convenience for all Maine residents.

Moving Beyond 50%

Once we achieve the 50% goal, what could we do to move beyond it? What if we change our perspective on who's responsible for the products that we make and buy and then no longer want? What if we were to keep the defining line between what we call a waste and what we call a resource always fluid, always moving towards resource?

Beyond 50% will call for building on the steps outlined to get to there and then proceeding on two pathways. One would fully exploit our traditional means of resource recovery. The other would pursue shared responsibility or stewardship for certain individual products or classes of products.

The traditional approach will call for on-going commitments from both the state and municipalities. Not only investments in collection and processing, management and equipment, but recognizing recycling as the centerpiece for managing business' and residents' discards. Waste as unwanted "garbage" must be seen as secondary and only constitutes what has not, as

yet, been recycled. Waste systems will be converted to recycling systems and recycling becomes a resource recovery management system.

The second track will entail the development and implementation of a new set of policies based on stewardship of individual products using extended producer responsibility. The goal, to paraphrase the California Product Stewardship Council's mission statement, is to shift Maine's system of managing certain discarded products from one focused on government waste diversion efforts to one that relies on producer responsibility in order to reduce public and environmental costs and drive improvements in product design that promote environmental sustainability.

The following are some of the steps to build all or part of this dual scenario.

A. The State

By direct participation in the management of municipal solid waste, the state will:

Objective: Encourage personal responsibility by building public trust in recycling.

- In order for Mainers to agree to a recycling system, they must trust that: the system is effective; their participation makes a difference; and, is a shared community value that most of the people respect most of the time. This message would be delivered through a continual state public education and awareness campaign in unison with local program elements.

Objective: Enact a statewide ban on the disposal of all commodities for which there is a proven accessible market.

- Cardboard, newspaper, mixed paper, #1, and 2 plastics, steel containers, metals, glass, etc. would be banned from disposal, subject to an emergency provision. The state would provide targeted infrastructure, planning, and equipment recycling and composting grants to regions.

Objective: Encourage the separation and collection of organics, leaf and yard waste and food wastes.

- The full utilization of existing facilities and the development of a system of public and private composting facilities within all major service center areas would support full-scale organics composting.
- Leaf and yard materials would be banned from disposal by 2020.
- Communities that contract for collection service would include organics collection provisions to homes and commercial establishments in their contracts.

Objective: The state would encourage management efficiencies and provide clear state-level direction by:

- Encouraging collection and transportation efficiencies to reduce to the extent practical the energy required to collect and transport Maine's MSW.
- Establishing recycling standards for all materials delivered to disposal facilities and CDD processing facilities based on the waste hierarchy and the state recycling and reduction goals as applied to their annual tonnage.

B. Local Government

Objective: Municipalities join into regional programs in order to take more effective control over their waste streams including the following municipal initiatives:

- Public recycling services would be encouraged through targeted grants to extend to all commercial entities within their jurisdictions;
- Ongoing reuse and recycling clean-up programs would be provided;
- Recycling and trash collection contracting practices in public/private partnerships would be changed so that all parties have the maximum incentive to increase recycling collections tonnage and to process materials to achieve best available market prices as private sector's revenue share (percentage) would increase as recycling tonnage increases. Under the proper structure, the public and private would become genuine partners, both having incentive to maximize recycling and minimize disposal and contamination;
- Recognizing that recycling and composting have to compete with trash for market share, programs would encourage curbside collection, container sizing (larger bins for recycling, smaller bins for garbage), and single sort mechanisms;
- A CDD recycling component would be attached to all building permits, through local ordinance;
- Participation in recycling programs would be incentivized;
- Collection and transportation efficiencies would be increased in order to reduce to the greatest extent practical, the energy required to collect and transport Maine's MSW; and
- 'Flow control' initiatives based on the key points of the Supreme Court ruling would be used.

The state would assist municipalities with enhanced technical and educational recycling assistance for outreach to:

- the commercial sector,
- to multi family units, and
- in public areas and at public events.

C. Product Stewardship

Maine can pursue a product stewardship system by considering each item or class of items and developing legislation, regulations, and programs to address that specific class. This approach has been a success with computer and TV monitors and thermostats —a common process with clear goals but flexible approaches.

As a place to start, the state could use the key elements of our existing electronics waste (E-waste) law as templates for future deliberation. In brief, the basic premise is that the management of products that are disposable and exhibit hazardous characteristic(s) by design and manufacture

is not a core function of local government, but should be shared by the producers and consumers and government, with the preponderance of responsibility borne by the producers.

In broad terms, products would be chosen using criteria that looks at their volume, complexity, and characteristics. Complexity refers to the relative ease or difficulty by which the product may be managed through the traditional recycling/resource recovery system.

There would be clear policy goals, guiding principles, definitions, clear roles and responsibilities, governance, products and product categories covered, program effectiveness and measurement. These are the key elements that reflect Maine's E-waste law.

Whichever system we design for the future, the goal is to respond quickly to new products or changes to current products that affect their impact on the environment; identifying them on their way into the market, before they enter the waste stream.

The steps to go beyond 50% could result in the following:

1. Although waste prevention will remain a challenge, as so little of what Mainers consume is produced here, the state will join with other jurisdictions in the region and across the nation to put in place extended producer responsibility programs, using sales bans and mandatory producer recycling efforts and encouraging sustainable purchasing by the retail markets. The reduction and elimination of toxic and complex products will remain the number one priority.

2. There will be on-going public relations and education campaigns across media and in all markets utilizing as many channels as practical with several specific annual elements (for example, Maine Recycles Week, and the yearly best of all media high school and college contests), coordinated through a campus media project and paid for though private sponsorship. The sustained high level of public awareness campaigns may lead to Maine produced ads and advertising agencies finding their way into the national marketplace.

3. There would be a significant increase in recycling volume and participation after the statewide ban on the disposal of all materials for which there was an established, proven market demand; eventually including all fiber products, 1-7 plastics, metals, and glass. Despite some predictable market fluctuations, additional gains would be realized when it becomes the accepted practice for municipalities to extend public recycling services to all commercial entities. With quality assurance practices in place, collection and processing systems such as single stream would be widespread.

4. Market demand and prices for recycled commodities in the long term will remain stable. The overseas markets will mature, as they produce more of their own recycled commodities, but rising standards of living across the globe and the high cost of energy and the relatively low cost and energy efficient nature of recycled resources over virgin extraction will keep them attractive to the market.

5. Local governments' role in MSW management will remain essential as they are encouraged to join into regional entities, a process may lead to the development of several regional waste-to-resources master plans.

6. Although the state will not find it necessary to impose a full ban on the disposal of all organics, local programs will be given incentives and encouraged through grants and aid to pursue the separation and collection of organics, including the full utilization of existing facilities and the development of a system of public and private composting facilities within all major service center areas. Thus, communities that contract for collection service will be rewarded if they included organics collection provisions to homes and commercial establishments in their contracts.

7. There would certainly be effects on and to the state's recycling and disposal capacity. As local recycling programs grow in volume, they will need to choose between expansion of local collection and processing capacity through their own capital investment, and combining with or into larger regional efforts. Among the outcomes would be to extend the life of the state's existing land disposal capacity.

D. Waste and Greenhouse Gases

Addressing waste generation and its impact on disposal capacity and toxicity of waste is only part of an effort to move beyond 50%. To truly move from a waste to resource, we must also look at larger environmental issues such as climate change related to greenhouse gas emissions.

To move beyond 50%, the state of Maine could establish an emissions goal for all waste management facilities:

- through an expanded hierarchy;
- directed by a state solid waste greenhouse gas initiative;
- to take into account energy and emissions using the improved life cycle analysis WARM (model) or the best available technology;

Performance standards for all recycling and waste facilities would be developed so that those facilities may be issued a greenhouse gas initiative rating. The performance measure will encourage collection and transportation efficiencies to reduce to the greatest extent practical the energy required to collect and transport Maine's MSW and the emissions from our facilities.

Common Threads

Maine's solid waste program managers will make their own plans for the future. They may choose to use all or parts of the scenarios outlined in the plan or something else entirely. But there are some common threads that ought to be included as essential parts in any effort from the smallest local program to statewide initiatives.

1. **Waste prevention remains the top priority**. It is the goal of the state to take advantage of every available means to change practices at the source of production through state, local, and regional projects, using all levels of technical and financial assistance, voluntary agreements, and legislative action to reduce the amount of solid waste we produce.

2. **It is the goal of the state to maintain and promote recycling as Maine's preferred solid waste management method.** Recycling is cost-effective and we should actively seek ways to increase recycling tonnage. It will extend the life of existing land disposal facilities and lower health and environmental risks.
3. **It is the goal of the state to continue to make every effort to remove toxics from our MSW stream**. As its has with mercury products, CRTs, and now cell phones, we must continue to find and extract those toxic products from the waste stream and assign appropriate responsibility for their sound and sustainable management. We must find and continue support for household hazardous waste collection and look to find ways to include remedies for very small quantity commercial generators of similar waste types and amounts.
4. **It is the goal of the state to include greenhouse gas emissions reduction, energy self-reliance, and energy conservation** in our present operations and future waste management plans. We should develop measurement and reporting tools so that all parts of our system are aware of the effects and consequences of their operations. This could mean using the EPA WARM system, available life cycle analysis, or any improvement upon those systems.
5. **It is the goal of the state to promote personal responsibility**. If we produce waste, our responsibility does not end at the curb. We are responsible for it as long as it remains waste. In effect, it stays in our custody.

Conclusion: We Have a Choice

Maine is at a crossroads. After 20 years, we have achieved laudable results. We have dramatically reduced the environmental risks posed by our disposal facilities. We have a waste management system that effectively handles the waste we generate. Guided by ambitious goals, with minimal incentives, municipalities and businesses voluntarily recycle a third of Maine's waste stream. We can continue with minimal investment to maintain an effective and respectable system. Or we can go beyond that. We can change the way we view waste. We can enact more aggressive waste management policies. We can make new investments. We can adopt more rigorous standards and regulations. It's a matter for policy makers to choose.

Appendix A: Statutory References for the Plan

These chapters are edited for relevancy to the purposes of this section.

Title 38: Chapter 13: Subchapter 1-A: Article 3: §1310-N. Solid waste facility licenses
1. Licenses. The department shall issue a license for a waste facility whenever it finds that:
C. In the case of a disposal facility or a solid waste processing facility that generates residue requiring disposal, the volume of the waste and the risks related to its handling and disposal have been reduced to the maximum practical extent by recycling and source reduction prior to disposal.
3. Public benefit determination.
5. Recycling and source reduction determination.
5-A. Recycling and source reduction determination. The requirements of this subsection apply to solid waste disposal facilities and to solid waste processing facilities that generate residue requiring disposal.
A. An applicant for a new or expanded solid waste disposal facility shall demonstrate that:
(1) The proposed solid waste disposal facility will accept solid waste that is subject to recycling and source reduction programs, voluntary or otherwise, at least as effective as those imposed by this chapter and other provisions of state law. The department shall attach this requirement as a standard condition to the license of a solid waste disposal facility governing the future acceptance of solid waste at the proposed facility; and
(2) The applicant has shown consistency with the recycling provisions of the state plan.
B. The provisions of this paragraph apply to solid waste processing facilities that generate residue requiring disposal.
(2) A solid waste processing facility that generates residue requiring disposal shall recycle or process into fuel for combustion all waste accepted at the facility to the maximum extent practicable, but in no case at a rate less than 50%. For purposes of this subsection, "recycle" includes, but is not limited to, reuse of waste as shaping, grading or alternative daily cover materials at landfills; aggregate material in construction; and boiler fuel substitutes.
(3) A solid waste processing facility subject to this paragraph shall demonstrate consistency with the recycling provisions of the state plan.

Title 38: Chapter 13: Subchapter 1-A: Article 3: §1310-AA. Public benefit determination
1-A. Public benefit determination for acceptance by publicly owned solid waste landfills of waste generated out of state. Prior to accepting waste that is not generated within the State, a solid waste facility that is subject to this subsection shall apply to the commissioner for a determination of whether the acceptance of the waste provides a substantial public benefit.
2. Process. … In making the determination of whether the facility under subsection 1 or the acceptance of waste that is not generated within the State under subsection 1-A provides a substantial public benefit, the commissioner shall consider the state plan,……..
3. Standards for determination. The commissioner shall find that the proposed facility under subsection 1 or the acceptance of waste that is not generated within the State under subsection 1-A provides a substantial public benefit if the applicant demonstrates to the commissioner that the proposed facility or the acceptance of waste that is not generated within the State:
A. Meets immediate, short-term or long-term capacity needs of the State;

B. Except for expansion of a commercial solid waste disposal facility that accepts only special waste for landfilling, is consistent with the state waste management and recycling plan;
C. Is not inconsistent with local, regional or state waste collection, storage, transportation, processing or disposal;

The following statutes also have bearing on the purposes of this section:

Title 38: Chapter 24: Subchapter 1: §2101. Solid waste management hierarchy
1. Priorities. It is the policy of the State to plan for and implement an integrated approach to solid waste management for solid waste generated in this State and solid waste imported into this State, which must be based on the following order of priority:
A. Reduction of waste generated at the source, including both amount and toxicity of the waste;
B. Reuse of waste;
C. Recycling of waste;
D. Composting of biodegradable waste;
E. Waste processing that reduces the volume of waste needing land disposal, including incineration; and
F. Land disposal of waste.
It is the policy of the State to use the order of priority in this subsection as a guiding principle in making decisions related to solid waste management.

2. Waste reduction and diversion. It is the policy of the State to actively promote and encourage waste reduction measures from all sources and maximize waste diversion efforts by encouraging new and expanded uses of solid waste generated in this State as a resource.

Title 38: Chapter 24: Subchapter 3: §2132. State goals
1. State recycling goal. It is the goal of the State to recycle or compost, by January 1, 2009, 50% of the municipal solid waste tonnage generated each year within the State.

1-A. State waste reduction goal. It is the goal of the State to reduce the biennial generation of municipal solid waste tonnage by 5% by January 1, 2009 and by an additional 5% every subsequent 2 years. This reduction in solid waste tonnage, after January 1, 2009, is a biennial goal. The baseline for calculating this reduction is the 2003 solid waste generation data gathered by the office.

Title 38 MRSA §2122. State waste management and recycling plan
The office shall prepare an analysis of, and a plan for, the management, reduction and recycling of solid waste for the State. The plan must be based on the priorities and recycling goals established in sections 2101 and 2132. The plan must provide guidance and direction to municipalities in planning and implementing waste management and recycling programs at the state, regional and local levels.

1. Consultation. In developing the state plan, the office shall consult with the department. The office shall solicit public input and may hold hearings in different regions of the State.

2. Revisions. The office shall revise the analysis by January 1, 1998 and every 5 years after that time to incorporate changes in waste generation trends, changes in waste recycling and disposal technologies, development of new waste generating activities and other factors affecting solid waste management as the office finds appropriate.

§2123-A. State plan contents

The state plan includes the following elements.

1. Waste characterization. The state plan must be based on a comprehensive analysis of solid waste generated, recycled and disposed of in the State. Data collected must include, but not be limited to, the source, type and amount of waste currently generated; and the costs and types of waste management employed including recycling, composting, landspreading, incineration or landfilling.

2. Waste reduction and recycling assessment. The state plan must include an assessment of the extent to which waste generation could be reduced at the source and the extent to which recycling can be increased.

3. Determination of existing and potential disposal capacity. The state plan must identify existing solid waste disposal and management capacity within the State and the potential for expansion of that capacity.

4. Projected demand for capacity. The state plan must identify the need in the State for current and future solid waste disposal capacity by type of solid waste, including identification of need over the next 5-year, 10-year and 20-year periods.

§2124. Reports

The office shall submit the plan and subsequent revisions to the Governor, the department and the joint standing committee of the Legislature having jurisdiction over natural resource matters.

Appendix B: Municipal Cost of Solid Waste Management: Contrasting Profiles

The communities of Hartford, ME (pop. 963) and Portland (pop. 64,249) offer two very different perspectives on the costs of managing solid waste.[37]

Town of Hartford

- Contracts for curbside MSW and recyclable collection
- Operates small bulky waste transfer station
- MSW Disposal at Crossroads Landfill at $70.50/ton
- Expenses paid from tax revenue

The Town of Hartford, with a population of 963 and 364 year-round housing units, contracts with Archie's, a local trash collection firm, for curbside municipal solid waste collection that is disposed of at Waste Management's Crossroads Landfill. Recyclables are also collected curbside by Archies. Hartford pays a disposal tip fee of $70.50/ton. Hartford has 206 seasonal housing units, and a large summer population. Hartford operates a small transfer station for construction/demolition debris, large bulky items, and metal appliances. In 2005, Hartford disposed of 380.63 tons of municipal solid waste, which is equivalent to 790.6 pounds per person, and recycled 115.71 tons of municipal solid waste, which was equivalent to 240.4 pounds per person.

As shown in the chart below, Hartford spent a total of $58,050, or $60.28 per person:

Personnel	$1,200
Curbside MSW Collection	$25,920
MSW Disposal Fee	$26,155
Recycling	$1,000
Bulky	$3,775
Total:	$58,050

City of Portland

- Provides full service recycling, MSW and bulky waste disposal
- Municipal employees collect residential MSW and recyclables curbside
- Residents "pay-by-the-bag" (PAYT) for solid waste removal
- City operates Riverside bulky waste processing facility
- MSW Disposal at Ecomaine $88/ton + additional financial assessments
- Expenses paid by tax revenue and from the PAYT fees and bulky waste fees

[37] Information presented in these profiles is based upon the annual solid waste management reports submitted to the State Planning Office

The City of Portland, with a population of 64,249 and 29,714 year round housing units, has its public works employees provide curbside pick-up of MSW and recyclables. Portland has a 'pay by the bag' trash collection program, where residents are charged $.95 for a 30-gallon bag of trash and $.47 for a 15-gallon bag of trash. Portland has a crew of 20 in solid waste and recycling collection and operates six recycling trucks, four solid waste trucks, and one roll-off truck. Portland services single-dwelling homes and apartment buildings with up to nine units. Portland is a member of *ecomaine*, formerly Regional Waste Systems, where its MSW is incinerated and recyclables processed.

Portland residents have the option of curbside recycling pick-up, or drop-off at 14 recycling roll-off containers placed around the city.

Portland contracts with Commercial Paving and Recycling Company to operate the Riverside Bulky Processing Facility. This facility is open to Portland residents and businesses, as well as surrounding municipalities. Residents and businesses in Portland account for about one-half of the material received at Riverside. The Riverside facility is staffed by four Portland employees and 8-10 Commercial Paving and Recycling Company employees. Portland residents receive an annual punch-pass for their use of the facility. Businesses and commercial waste operators are charged a fee for using Riverside

In 2005, the single-family dwellings and qualified apartment building residents generated 12,249 tons of municipal solid waste, or about 381.2 pounds per person. The city collected 5,018 tons of recyclables, and *ecomaine* recycled 151 tons of metal for a total of 5,169 tons, or 161 pounds per person. About two-fifths of Portland's solid waste and recycling program is paid through fees collected, and three-fifths from tax revenue.

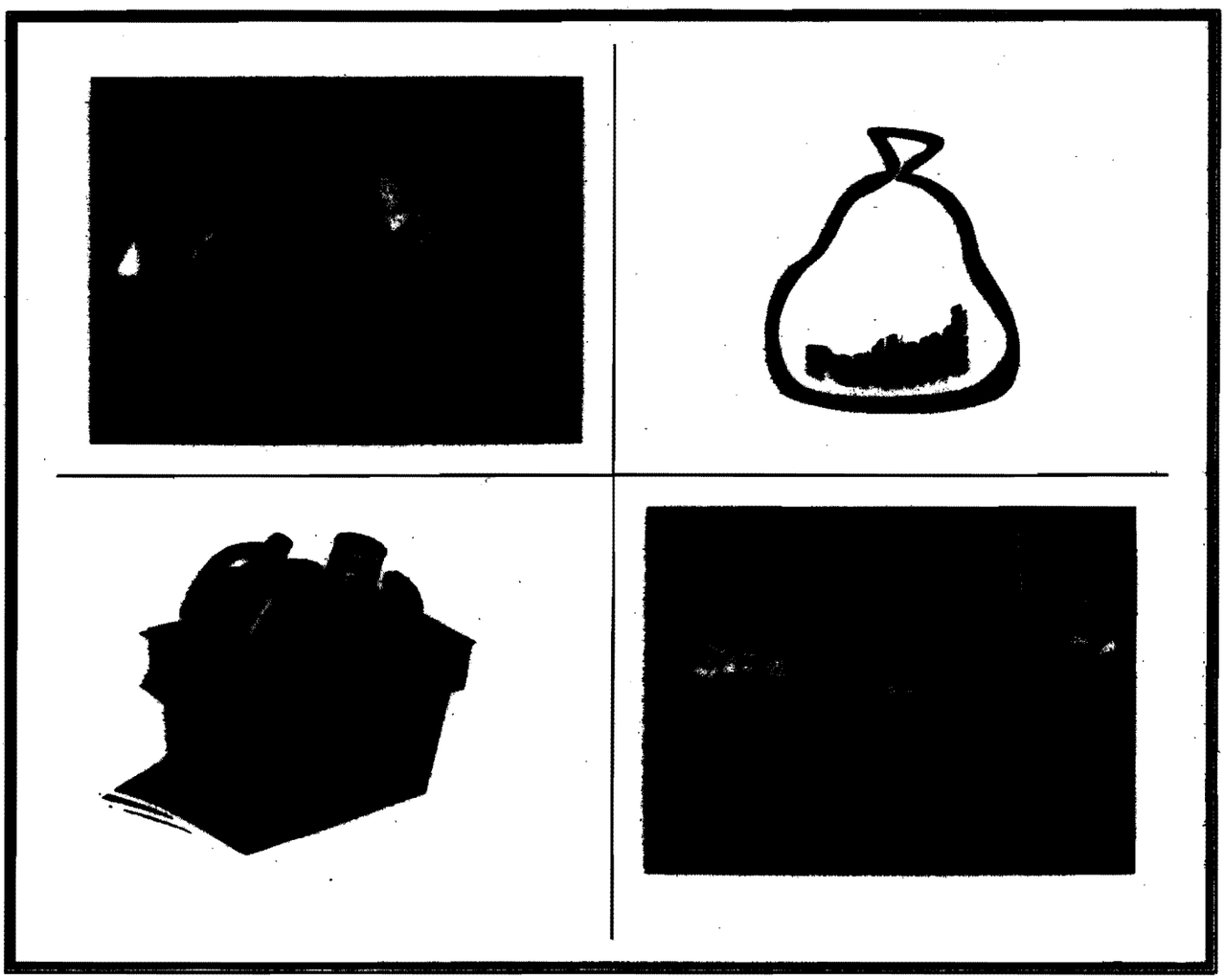
As shown in the chart below, Portland spent $5,351,834, or $83.30 per person, though not all residents qualified to receive the solid waste services provided by the city:

Personnel	$779,954
Equipment Purchase	$160,000
Equipment maintenance	$101,320
Spring Clean-Up	$100,000
MSW Disposal	$1,110,560
ecomaine Assessment	$1,100,000
Riverside Facility	$2,000,000
Total:	$5,351,834

These two examples highlight the complexity in cost and other points of comparisons between the over three hundred municipal programs and operating systems.

Recycling Advisory Committee

Cheryl Leeman, Chairman



Report to the

Portland City Council

October 26th, 1998

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ACKNOWLEDGMENTS

This report is the result of a lengthy process that examined various options to reduce, recycle and reuse the City's solid waste. The membership included representatives from a diverse group of neighborhoods, organizations and businesses.

Special thanks to the city staff who provided support and valuable input to this document.

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At-large

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Executive Summary

Neighborhood recycling was introduced to Portlanders in 1990 by RWS through the use of roll-off recycling containers commonly referred to as "silver bullets." That program currently diverts only 7% of Portland's waste stream from the incinerator. As demonstrated by actual numbers, in 1997 residents of Portland generated 22,504 tons of trash and recycled only 1,666 tons.

With a mandate from the State of Maine and the residents of the city (see Appendix A), the Portland City Council empanelled an advisory committee of citizens representing different neighborhoods. This committee pursued the following goals and objectives:

Mission Statement: Increase recycling and promote solid waste reduction.

Residential

I. Goal: Develop a cost effective residential integrated waste management plan.

A. Objective: To explore various options including household hazardous waste, leaf/yard waste, big item pick up and education.

City

I. Goal: Develop City waste reduction and procurement policies.

A. Objective: To update current administrative regulation No. 42, Recycling Policy and examine options for new opportunities.

Commercial

I. Goal: Develop recommendations that encourage businesses to reduce, recycle and reuse.

A. Objective: To examine a variety of options including, but not limited to, Buy Recycled Purchase Policies, business assisted programs, economic incentives, how-to-guide and education.

After framing out their task, the committee reviewed the history of waste disposal in the city, current programs for rubbish collection/recycling and explored various options for creating an integrated solid waste management program targeted at increasing recycling and reducing the amount of solid waste generated.

The primary conclusion of their review was that the City of Portland's recycling rate is far below where it should be, especially when compared to other cities in the Northeast and State of Maine who recycle 40% - 50% of their waste stream. The Advisory Committee recommends, therefore, that the City of Portland provide its citizens with alternative methods of waste disposal to increase recycling by adopting a pay-per-bag trash pick-up program complemented by a curbside recycling program. The committee also recommends that the City adopt a yard waste collection program, a hazardous waste collection program and that the Public Works Department collect bulky items by appointment.

The pay-per-bag trash pick-up program will require residents of Portland to set their trash out in an approved, officially stamped and color-coded bag. These bags will be purchased from local retailers. The City's sanitation crews would continue to collect residential trash once a week.

The curbside recycling program will provide residents with a way to dispose of a significant portion of their waste stream at no charge. The City will distribute bins, purchased with money from a grant from the State Planning Office, to each eligible resident. Residents will collect their recyclables in this bin and set it out on their regular trash day. A contracted vendor will collect the material.

Research and the experience of other communities have shown that such programs dramatically increase waste reduction and recycling because they attach a cost to wastefulness. Reducing waste, increasing recycling and integrating our waste management programs will benefit Portland residents tremendously:

- Minimizing the waste stream will reduced tipping fee at RWS and result in cost savings for taxpayers
- Less waste to the incinerator is more environmentally responsible
- Removing yard waste and hazardous waste from the waste stream creates additional cost savings and reduces toxic emissions from the incinerator
- Controls abuses of the heavy item collection
- Frees the District Crews to work in the neighborhoods during the month of September

Realizing the importance of public support for a change in our current policies for trash disposal, the Advisory Committee further recommends that the City conduct a substantial education program prior to implementation. They also recommend that an enforcement program accompany any policy changes. To that end, a public

relations/educational campaign will be developed and enforcement will be part of the educational effort.

Additionally, the Advisory Committee recommends that current practice govern who will receive sanitation and recycling services. Staff will work with landlords and the Portland Housing Authority to address issues arising from service to multi-family buildings. (See Appendix D)

Finally, the Advisory Committee recommends a change in the City's site plan review for new construction that would ask for (not mandate) a narrative description of proposed recycling efforts. They also suggest that the Economic Development Department explore ways to support new or relocating companies to improve recycling.

While the focus of the Advisory Committee's work was on residential programs, two other groups should be recognized for their work on the City and commercial aspects of recycling. Because it is important for the City to lead by example of this issue, a City Hall task force reviewed the current recycling policy (AR 42) and recommends several changes. The Commercial Sub-committee representing the business community – which generates 60% of Portland's waste – recommends that an ongoing task force be established to determine the current level of recycling among businesses and develop a plan for increased recycling efforts. Maine Businesses for Social Responsibility has agreed to lead this effort. The work accomplished by both groups appears in this report in the Institutional and Commercial sections.

In conclusion, upgrading the City of Portland's residential waste recycling program is the right thing to do and long overdue. The Advisory Committee's recommendations incorporate a synergistic system of waste management. They make environmental sense, they expand current services while reducing costs to taxpayers and they will help make Portland -- and the planet – a better place for generations to come.

Introduction

The environmental quality of our community is of utmost importance to current and future generations. Out of concern over closing landfills, pollution and the destruction of natural resources, the City of Portland undertook the examination of ways to expand and/or enhance efforts in the area of solid waste management through reuse, waste reduction and recycling.

On April 22, 1998 the Portland City Council unanimously voted to approve council agenda item #304 which read as follows:

ORDERED, that the Recycling Advisory Committee is hereby established for the purpose of reviewing all recycling options available to the City and for the purpose of promoting and encouraging recycling and making recommendations to the City Council for that purpose; and

BE IT FURTHER ORDERED, that the Recycling Advisory Committee shall focus primarily on residential recycling options and a sub-committee shall be created for the purpose of focusing on options available and to promote and encourage commercial recycling, said committee to be called the Commercial Recycling Advisory Subcommittee; and…

This report will focus on the residential, commercial and governmental current practices. It explores the various options evaluated to develop recommendations for the implementation of an Integrated Waste Management System that will result in a reduction of solid waste. These will provide substantial benefits to the environment and community because it is the right thing to do. Further, the new plan will increase the level of service currently provided to the residents of the City of Portland.

[redacted]

I. HISTORY

A. Regional Waste Systems

RWS is a nonprofit corporation formed as a result of an interlocal agreement dated November 14, 1984. The purpose of the corporation is to own and operate a regional solid waste management system for "mutual and civic benefit." There are currently 21 member municipalities and 10 associate members.

The Member Municipalities, including the City of Portland, have each entered into waste handling agreements with RWS whereby the municipalities pledge to send their solid waste to the RWS facility for processing. In turn, RWS agrees to accept all waste delivered by the communities and agrees to process the waste. Portland entered into its waste handling agreement on May 1, 1985. The Participating Municipalities also enacted "flow control" ordinances requiring that any solid waste generated in their respective communities be delivered to RWS. The pledge of the waste stream from the Municipalities has been used by RWS to obtain bond financing for the construction and operation of the facility.

In 1994, the United States Supreme Court struck down a flow control ordinance similar to the ordinances in place in the Participating Municipalities. As a result, mandatory flow control by local ordinance became unenforceable. The Participating Municipalities remain contractually bound to RWS to deliver the solid waste from their communities to RWS. In Portland's case, this means the waste picked up by the City - residential and waste from schools and City buildings - has continued to be brought to RWS as required by the Waste Handling Agreement.

Under the terms of the Waste Handling Agreement, recyclable material is considered solid waste and must be delivered to the RWS facility for processing. The agreement does provide, however, that any material recycled by the City of Portland as of May 1, 1985 can continue to be recycled and need not be delivered to RWS. The agreement also provides that the City can remove recyclables from the waste stream if

RWS grants the City permission to do so. The permission described in the Agreement would require a vote of the RWS Board.

B. Riverside Recycling Facility

Until the fall of 1996 this facility operated as an unlined, bulky waste and construction & demolition debris (C&D) landfill for the City of Portland. In the fall of 1996, the City contracted with L.R. Higgins to cap the landfill, to construct a pad on which to operate a C&D recycling facility and to operate the facility once it was constructed. Since this time, the facility has separated and processed a variety of materials including brush, demolition debris, metal, wood, leaves and yard waste. The facility was designed to operate as a regional facility, so in addition to waste generated through municipal operations and by Portland residents, it accepts waste from commercial waste haulers and from other municipalities.

This facility has been a vital resource for the City as it provides a convenient location for crews to deliver waste collected during H.I.P., the leaf program and through municipal maintenance operations.

C. Residential Recycling Efforts

The RWS Neighborhood Recycling Program began in the fall of 1990 with the distribution of the first roll-off recycling containers. The City of Portland received four "*silver bullet*" containers, adding additional containers and locations when conditions allowed. (Since most containers are on private property, siting additional recycling containers has been challenging.) There are currently fourteen containers located at eight locations around the city. (Two schools also host containers, primarily for their own use.)

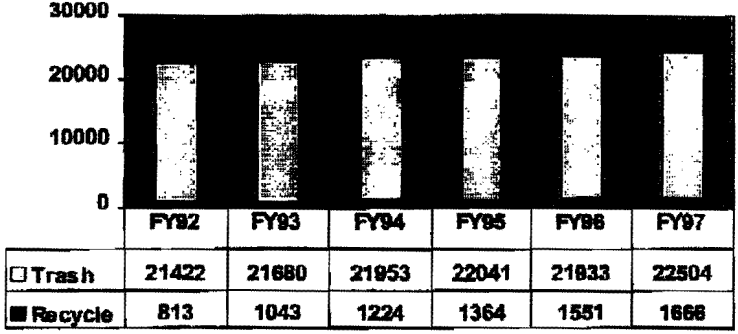
When the program began, RWS was responsible for pulling the containers and delivering them to the processing facility. This responsibility has now passed to the member communities. In Portland, the Department of Public Works has one employee and one roll-off truck assigned to this duty. This employee empties each container at least once a week. He empties the containers at the most popular locations more frequently.

D. Pilot Curbside Recycling Project

In 1991 RWS conducted a pilot curbside recycling program. A sample of 836 households in Falmouth, South Portland, Scarborough and Portland received a recycling bin and instructions on how to participate in the program. According to an RWS report, between 70% and 80% of the households served by the program participated, setting out an average of 11.26 lbs. of material each week. Contamination rates were reportedly very low. Despite the success of the program, RWS chose not to continue the program once the demonstration period had ended, citing cost as the primary factor in their decision.

E. Performance

The voluntary drop-off recycling program has had limited success in the City of Portland. Records indicate that the "*silver bullets*" diverted just over 3% of the city's municipal solid waste during the first year of the program. Although the amount of waste diverted from the waste stream increased in subsequent years, the percentage of waste diverted from the incinerator has remained small.



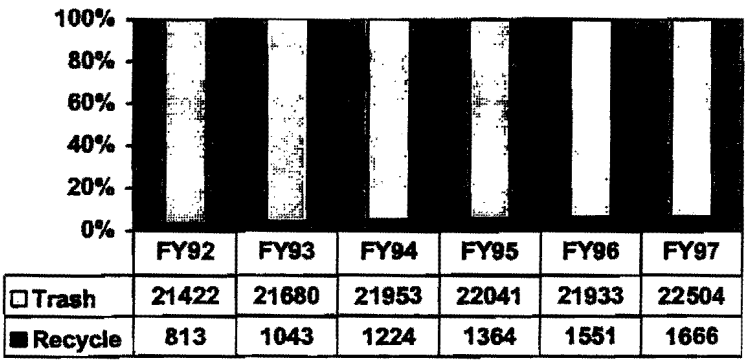
Total Waste Tonnage,

FY92 - FY97

This graph shows a steady growth in the amount of residential waste generated in the City of Portland over the past six years, from 22,235 tons in FY92 to 24,170 tons in FY97. As the dark section at the bottom of each column indicates, the amount of waste recycled during this period has doubled, rising from 813 tons in FY92 to 1666 tons in FY97.

Household Waste by Percentage

FY92 - FY97



Despite this increase, the percentage of waste diverted from the incinerator by the drop-off program has remained low, reaching only 6.9% of the total waste generated in FY97.

F. Institutional Recycling

The first effort to recycle in City Hall was initiated by Deputy City Manager, Mark Green, in 1989. A working committee made up of City employees was formed to plan a recycling pilot program for City Hall. The objective of the program was to determine the feasibility of recycling throughout the City organization. Until this time, only office and computer paper generated by MIS had been recycled.

The goals of this program first effort were:

- to recycle all computer paper
- to recycle all standard office paper

To this effect, bins were placed on each floor of City Hall for paper collection. William Goodman & Sons supplied the bins and emptied them. Some employees volunteered to be floor leaders to educate coworkers and monitor the bins as they filled.

Education was a major part of the project, with displays set up around City Hall and recycling articles and other information posted at the recycling bins and near the photocopiers. Each employee received a cardboard box to hold the paper they generated and a "YES/NO" recycling sheet describing the acceptable and unacceptable materials. Revenues from the recycled paper were to be put in a fund and used to purchase recycled product gifts and other educational incentives for participants.

The program was moderately successful. Since it was a voluntary program, there were some employees who were just not interested and were given no incentive to recycle. On the other hand, the program installed the bins in City Hall that have been used consistently ever since. There was no follow-up monitoring of the program, therefore, no assessment was made of its success.

In the summer of 1996, a second recycling committee came together to broaden and further the scope and objectives of the first recycling effort. A student intern from U.S.M. assisted the committee. The objectives of this program were:

- To broaden the existing recycling program to include the School Department and the Barron Center.
- To consider other items for recycling, such as food from the Barron Center, and magazines and newspapers, mixed paper;

- To consider other options to reduce waste, such as by purchasing reusable coffee cups, printing on two sides of paper, etc; and
- Purchasing of products made of recycled materials was encouraged.

An educational campaign and promotional effort were proposed as part of this effort. Special recycling containers were to be spray painted and handed out to employees to kick-off the program. Volunteers were again recruited to educate employees in each department and monitor the filling and emptying of the bins. The City Manager signed Administrative Regulation #42, setting forth the policies and objectives of the program. (See Appendix E.)

Currently, most City of Portland offices recycle office paper through William Goodman & Sons. Some departments also make extensive efforts to reduce waste and recycle material. In Public Works, for example, Districting and Construction crews reuse bricks, cobblestones, pavers and curbing. The Vehicle Maintenance section recycles a wide range of materials from anti-freeze to machine parts. They also purchase biodegradable, citrus solvents as an alternative to more toxic chemical solvents. Both Public Works and Parks and Recreation make extensive use of the recycling capabilities at the Riverside Recycling Facility, delivering significant volumes of brush and inert materials to the facility for processing and recycling.

II. Current Programs

II. CURRENT PROGRAMS

A. Trash Disposal

The City of Portland currently provides weekly curbside rubbish collection to approximately 23,000 households. Six rear loading rubbish packers provide service Monday through Friday. Each vehicle has a crew of two. In total, Sanitation has eighteen employees: 16 Maintenance Worker II, one foreman and the Commercial Waste Programs Administrator.

City ordinance specifies that all single family homes and all multi-unit apartment buildings with ten or fewer units will receive sanitation service. Condominiums are excluded. The ordinance includes a grandfathering provision, however, that extends service to many apartment buildings with more than ten units and some condominium developments. Additionally, the majority of Portland Housing Authority units receive sanitation service.

B. Recycling

Residents currently have the option to participate in a voluntary drop-off recycling program. There are a total of fourteen "Silver Bullet" recycling containers in eight locations around the City. Additionally, two schools host containers, primarily for their own use. Containers can be found in the following locations:

- Northgate Shopping Center
- Marginal Way Parking Lot
- 118 Congress Street (Munjoy Hill)
- CVS Plaza, Forest Ave.
- RSVP Discount Beverage
- Portland Ice Arena
- Salem Street (behind Danforth Heights)

- Casco Bay Lines

Each container has four compartments and accepts the following items:

- Mixed paper -- newspapers, phone books, paper bags, magazines, old mail
- #2 Plastic -- "natural" only, such as milk and water jugs
- Glass, cans & aluminum -- metal food and drink containers, empty spray cans, clear and colored glass
- Paperboard -- cereal boxes, toilet paper centers, poster board

Public Works picks up the containers on a rotating schedule and delivers them to RWS where the material is processed and marketed. RWS owns the containers.

The Department of Public Works and RWS recently arranged to place a container in the Marginal Way parking lot to collect corrugated cardboard.

C. Other Programs:

1. Heavy Item Pick-up (HIP)

Each September the Districting crews perform a bulky waste collection. Collection generally begins on the Peninsula (Districts 1&2) the day after Labor Day. The following Monday the crews move into the remaining Districts, spending a week in each one.

Historically, residents were able to simply bring their items to the curb. Starting last year, however, they were required to sort their items by type, metal in one pile, wood in another pile and so forth. These separations are required to facilitate the recycling process at Riverside Recycling Facility. The additional time required to handle the materials in separate streams raised the program cost dramatically, particularly overtime costs. For four weeks the Districting Crews are pulled from neighborhood projects to deal with the H.I.P. program.

2. Leaf Program

Each November Public Works conducts a leaf collection program. For the past few years, residents have bagged their leaves in standard plastic lawn and leaf bags and placed them at the curb on their regular trash day. Since the compost facility could not accept the plastic bags, the crews were responsible for the labor-intensive job of ripping open the bags and dumping the contents into the hopper of the packer truck. The foreman on duty collected the empty bags from the crews for disposal at RWS.

This year residents will have to purchase special biodegradable leaf bags in order to have their leaves collected. Since the bags will be acceptable at the compost facility crews will be able throw the bags and their contents into the hopper. By eliminating the need to de-bag the leaves, we expect to save approximately 40% in labor costs.

D. In-house Recycling

Interviews with various participants in the City's recycling program revealed and administrative policy (AR 42) that has never been fully implemented. Individual recycling bins were never distributed and the recycling program never progressed beyond office and computer paper in most departments. However, education did increase throughout the organization and the large recycling containers began to be emptied on a more regular basis.

E. Commercial

Businesses in Portland are responsible for their own trash disposal. Most contract with waste haulers or have waste disposal handled through their building's management. Recycling is also an individual business decision. The City's only involvement in the commercial waste sector is code enforcement issues and the waste hauling assessment.

III. Integrated Solid Waste Management Options

III. INTEGRATED SOLID WASTE MANAGEMENT OPTIONS

(Each option assumes the addition of a yard waste collection program, a hazardous waste collection and bulky waste collection (H.I.P.) by appointment. See Section B, "Other Components."

A. SANITATION/RECYCLING

1.) Trash Pick-Up and Voluntary Drop Off Recycling

This option is maintains the current level of service provided by Public Works except for minor changes. It includes weekly trash pick-up for single-family homes, multi-unit buildings with fewer than 10 units and most Portland Housing Authority units. Many multi-unit buildings with more than 10 units and some condominiums receive sanitation services due to the grandfathering clause in the existing sanitation ordinance. (See Appendix D.)

Option 1 maintains the existing voluntary drop-off recycling program and incorporates the changes noted above. This program will result in an estimated recycling rate of 10% at an additional cost of $68,000.

2.) Trash Pick-Up and Expanded Voluntary Drop-off Recycling

This option maintains the current trash pick-up program but expands the voluntary recycling program by placing "silver bullet" recycling containers in neighborhoods that do not currently have containers -- outer Brighton Ave., for example. Making this change would have little appreciable impact on the existing sanitation program. The changes would make the program more convenient for residents but would probably not increase the volume of recycled material significantly enough to anticipate avoided costs in tipping fees at RWS.

The current program is performed in-house by the Department of Public Works. It employs the use of one worker and one piece of equipment. Increasing the existing program with any degree of significance would undoubtedly require additional personnel and equipment.

Option 2 increases the number of locations for "silver bullets" with changes in other components as noted above. This program will result in an estimated recycling rate of 15% with an additional cost of $79,000.

3.) Pay-Per-Bag Trash Pick-Up and Expanded Voluntary Drop-off Recycling

This option includes a pay-per-bag trash pick-up program which would require residents to put set their trash out in an officially stamped, color-coded bag. Trash in unapproved containers of any type would not be picked up.

In concert with a pay-per-bag program, an expanded recycling program as described in Option 2 would be established.

Option 3 maintains the current trash collection program but requires residents to use approved trash bags instead of other containers. This option expands the voluntary recycling program by increasing the number of "silver bullets" available to the residents but it does not offer curbside recycling. This program would result in an estimated recycling rate of 20% and save the City approximately $441,000 per year.

4.) Trash Pick-Up and Voluntary Curbside Recycling

This option maintains the existing trash collection program. It further incorporates a curbside recycling program.

It is anticipated that such option would promote a *"commingled"* program with two distinct separations: containers (that is, glass, cans, plastic, etc.) and paper products. This would be accomplished either by supplying residents with two separate bins or by asking residents to bundle paper products and place them on top of the containers in one recycling bin. The bins would eliminate the need for most of the "silver bullets." A private contractor would collect the material from the residents on a weekly basis.

Option 4 maintains the current trash pick-up program but adds a voluntary curbside recycling program and other component changes as described above. (It does not include pay-per-bag.) Such a program would result in a recycling rate of approximately 25% at an additional cost of $375,000.

5. Pay-Per-Bag Trash Pick-Up and Curbside Recycling

This option is a combination part of Option 3 and Option 4. It maintains the current trash collection but requires residents to set out their trash in approved bags, which would be purchased at local stores. It also includes a curbside recycling program. The City would supply residents with a bin -- purchased with funds from a State Planning Office grant -- for commingled recyclables including glass, cans, paper, etc. A contractor would collect this material from the curb on the same day City crews collect the trash bags.

Option 5 is a pay-per-bag/curbside recycling program and includes other components as described above. This program would result in an estimated recycling rate of 35% at a cost savings of between $247,000 and $563,000, depending on the price of the bags. Cost savings factor projected additional program costs, offsetting revenue from bag sales and money saved by avoiding tipping fees at RWS through waste reduction and recycling.

B. OTHER COMPONENTS:

Yard Waste Collection

The City of Portland currently has no yard waste collection program with the exception of Public Works' leaf collection program in November. Throughout the spring, summer and early fall, however, the vast majority of yard waste such as grass clippings, brush, inert materials, etc., most likely wind up placed in trash bags and sent to RWS along with the weekly household trash. Yard waste is quite heavy and, therefore, contributes significantly to our annual sanitation costs.

Household Hazardous Waste Collection

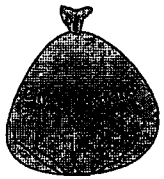
The City currently has no Household Hazardous Waste Collection program. One can generally assume; therefore, that residents discard hazardous materials during weekly trash pick-up. This means that our work force is handling hazardous waste on a daily basis and that such waste is being burned or baled by RWS.

Bulky Waste Collection (H.I.P.)

The Department of Public Works currently performs an annual bulky waste collection program, or *"Heavy Item Pick-Up (HIP),"* during the month of September. This program is performed by the Districting Crews, which, for all intents and purposes, puts our entire infrastructure maintenance efforts on hold for five (5) or so weeks each year.

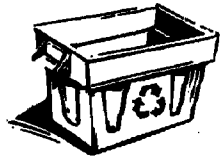
Note: Options 1 - 5 assume changes in current practices for "Other Components." They add a yard waste collection, a hazardous waste collection day and reorganize H.I.P. so that it offers collection by appointment from April 1 - November 30 instead of once annually.

IV. Recommendations



Pay per Bag

- Bags required to receive service
- Bag cost $0.50 - $0.75



Recycling

- City-wide curbside collection
- Commingled collection
- Collect wide range of materials

Integrated Solid Waste Management Plan

Household Hazardous Waste

- Annual collection day
- Sponsored by Public Works in association with the Fire Department

H.I.P.

- By appointment only, Spring - Fall.
- Rules to be established by Director of Public Works

Leaf & Yardwaste

- Leaf collection during November
- Biodegradable bags required
- Bring packers to neighborhoods for twice weekly yard waste drop-offs, Spring - Fall.

IV. RECOMMENDATIONS

The Recycling Advisory Committee recommends that the City of Portland adopt the following waste reduction and recycling programs and policies.

A. RESIDENTIAL SERVICE

The Committee recommends that the City adopt an integrated approach to solid waste management. Such an approach would:

- Provide residents with a financial incentive to reduce, reuse and recycle
- Make recycling and composting a convenient alternative to disposal
- Reduce cost of trash disposal to city taxpayers and
- Increase public awareness of the need to reduce waste.

An integrated waste management program would provide Portland residents with environmentally sound methods to manage their household waste materials through the following components:

1. Trash Disposal/Recycling (Option 5)
    - Pay-per-bag rubbish collection (City)
    - Weekly curbside collection of commingled recyclables (Contract out)
2. Other Components
    - Yard waste collection
    - Household hazardous waste collection
    - Heavy Item Pick-up by appointment (HIP)

The Committee recommends that all residents currently receiving sanitation service be eligible for these services. This includes all units covered by the grandfathering provisions of the sanitation ordinance and Portland Housing Authority units. (See Appendix D.)

B. CITY IN-HOUSE RECYCLING

The Committee feels that the City should lead by example. Therefore, it is important that we revitalize and augment our policies regarding waste reduction and recycling. We recommend that the City of Portland take the following measures to further this end:

1. Required recycling

Mandate the recycling of office paper and any other agreed upon material. Each employee would be educated as to the appropriate materials to recycle and the methods for recycling. Each employee would be provided with a recycling container.

2. Expanded paper recycling/reuse

Expand our current office paper recycling effort to include other materials. Many aspects of this expanded program were included as recommendations in A.R.42.

Include other paper

- newspapers and magazines
- cardboard

Institute reuse policies

- make different sizes of scratch pads out of used office paper,
- reuse file folders
- purchase copiers that can reliably make two-sided copies

Reduce paper consumption

- do not use fax cover sheets
- print on two sides of paper

3. Other items

Work with Parks and Public Works Departments who currently recycle and reuse construction equipment, signs, automobile oil and antifreeze, vehicles and parts, toner cartridges and other equipment.

Craft an agreement between the Parks and Recreation Department and the Riverside Recycling facility to compost yard waste, leaves, and grass clippings for reuse on park land.

Work with School Department and Barron Center to compost food wastes.

Coordinate with the Public Works Department to dispose of hazardous wastes when the household hazardous wastes are being collected.

4. General Store

Set aside a large area to store and exhibit used equipment and furniture. Assign accounts to each department: items dropped off earn credits which may be used to purchase other items. Open store to the public on a monthly basis. An updated inventory would be circulated to departments on a regular basis. In conjunction with the General Store, an effort should be made to make damaged bricks, pavers and cobblestones more readily available to residents for their household projects.

5. Personnel & Equipment

Designate a person to serve as a liaison between departments, manage materials storage, set up education programs for employees and the public, broker contracts with material haulers and processors.

Coordinate with all City Departments to share equipment and expertise. For example, the School Department owns a baler that is located at the Portland Expo. Schedule the transport of waste cardboard to the Expo from various City Departments and select a hauler/processor.

As part of the coordination effort, send out a newsletter or contribute to Human Resources newsletter and reconvene City employee subcommittee regularly.

Expand the cleaning service contract to include the emptying or sorting of recycling containers or transport of materials to a central storage area.

Make recycling more convenient by creating "recycling centers" on each floor. Recycling centers would contain well-marked bins for the various recycled materials. Educational and promotional materials will be posted, as well as a telephone number to call if the containers are full

Establish a central storage location (perhaps as part of the General Store) where the materials to be recycled can be stored, shredded, baled and picked up. The ability to stockpile will give the City an opportunity to realize a greater profit.

Place a silver bullet or igloo at City Hall and/or Public Works to collect additional materials such as bottles, cans, newspaper, or cardboard.

Purchasing

Set up a revised purchasing policy for the City that will reduce waste, require life cycle cost analysis, and encourage recycling by its vendors.

purchase to reduce waste

- buy products with minimal packaging

- discontinue the purchase of disposable cups and supply coffee mugs instead (incentive: free or reduced cost refills at basement counter with mug)
- Purchase the least toxic material suitable for a job. (herbicides, non-latex paints)

purchase to promote recycling

- purchase "recycled content" products such as office paper, tissue paper, paper towels, carpet, office furniture, building materials an toner cartridges. Include a "recycled content" percentage in any bid solicitation.

C. COMMERCIAL RECYCLING

Business waste makes up approximately 60% of Portland's waste stream. Consequently an effort must be made to promote waste reduction and recycling in this sector. In keeping with the philosophy that the private sector should manage its own waste stream, the Committee recommends that business organizations and their members take the lead in this effort. In this spirit, the Sub-Committee on Commercial Recycling offers the following recommendations:

1. Conduct a survey of businesses to determine the current extent of recycling efforts.
2. Establish a task force to design and define the criteria for an acceptable storage and collection system for recyclables from businesses in Portland.
3. Develop a highly visible "Reduce, Reuse, and Recycle" program aimed at small businesses in Portland.

4. Continue to partner with communities in the greater Portland area to seek regional solutions. Seek government and/or private support to offset the start-up costs of a new commercial recycling system.
5. Create an on-line directory of reduce/reuse/recycle resources for Portland.
6. Develop a program to offer state-of-the-art office recycling systems to businesses at discounts accrued through bulk purchasing.
   goals and other efforts.
7. Link Portland 's efforts to EPA climate change goals and other efforts.
8. Require that space for recycling be considered in site plan reviews for all new developments.

Conclusion

Responsibility, leadership, and funding for carrying out most of the recommendations can come from a consortium of business organizations and Portland businesses. The Maine Businesses for Social Responsibility, Wastecap Maine, and other business organizations have on-going commitments to promote responsible action in regards to recycling.

However, waste management, including recycling, is a public policy issue. The leadership for finding funding solutions for new recycling systems that will help keep long-term costs of waste disposal down must come from the City of Portland. Developing fair, accurate, and appropriate accounting methods for fees and taxes associated with commercial trash disposal and recycling is also the responsibility of the City of Portland. Finally, creating and modifying ordinances, codes, and site plan review criteria to encourage, not discourage the "reuse, reduce and recycling" of resources is the responsibility of local government as well. Thus, accomplishing recommendations #4 and #8 will require a special commitment and attention from the City of Portland.

D. PROPOSED SITE PLAN ORDINANCE REVISION

Section 14-525(2)(o)
Size and location of all on-site storage containers for recyclable materials for any commercial or industrial property.

Section 14-525(c)
All new commercial property and industrial development shall include a narrative description of the estimated amount and type of recyclable material generated on-site; the location, size and type of containers providing temporary outdoor storage of recyclable materials; the manner and methods of timely removal of recyclable materials generated on-site; and the screening and landscaping proposed to provide adequate buffering between the stored materials and remainder of site and neighboring properties. The applicant may provide any other information detailing its plan to address the temporary storage and timely removal of recyclables.

V. Implementation

V. IMPLEMENTATION

A. TRASH COLLECTION/RECYCLING

Pay-Per-Bag Trash Pick-Up

Pay-Per-Bag programs are common throughout the country. Several companies, therefore, manufacture plastic bags specific to these programs and within the specifications outlined by the individual community, that is, thickness, volume, color and any printed information. The cost of production is borne by the bag manufacturer and/or the distributor. Bags are available to residents through grocery outlets, hardware stores, garden centers, neighborhood corner stores and the like. Public Works will work with a distributor to supply bags to retailers.

The price per bag would be set and reviewed annually through the budget process by the City Council. It will be the Council's prerogative to decide the portion of needed funding that would be attributable directly to bag sale revenues.

The actual collection of bagged trash would remain a function of the Department of Public Works on a weekly basis. No new equipment or other cost-incurring factors are anticipated. Bagged trash would be delivered to RWS daily, as is the current practice.

Anticipated Start Date: ***July 5, 1999***

Curbside Recycling

The Department of Public Works will provide every eligible Portland resident with a recycling bin. Residents will set their bins out for collection each week. We anticipate our program to be a commingled curbside recycling program. Commingling would allow customers to place their cans, bottles and jars and plastic goods in one container. Acceptable paper products would be bound or

otherwise grouped and simply placed on top of the commingled products on the day of collection or set in a separate bin. Collection days would be the same day as the customer's normal sanitation day.

Although we would expect to continue to pick up sanitation utilizing City forces, it is our recommendation that the curbside recycling effort be done by contract with a private hauler. This obviously would require the submission of RFP's by interested contractors. We would look to tie the contractor down to a minimum five (5) year contract. This would discourage "low-balling" the initial quotes in order to get the contract with an eye toward inflating the numbers in future years.

Anticipated Start Date: ***July 5, 1999***

B. OTHER COMPONENTS

Yard Waste Collection

The yard waste collection program would be established to provide residents with a method of disposal of their yard waste and to eliminate this heavy and costly waste-item from our waste stream.

It is suggested that three (3) strategically located "drop-off points" be established throughout the City where an operator could park a trash collection truck (packer) and accept yard waste from residents. This service would be provided on Tuesdays and Saturdays each week during the Spring, Summer and Autumn months at times convenient to the user.

Residents would simply drive their yard waste to the most convenient location where it will be deposited into the packer. At the end of each "yard waste day", the packer would deliver the waste to the Riverside Recycling Facility where the waste will be composted and eventually reused.

Anticipated Start Date: ***April 20, 1999***

Household Hazardous Waste Collection

A household hazardous waste collection day would be designated and collection locations *(perhaps the same as the Yard Waste sites for continuity)* would be determined so that residents could bring their hazardous waste such as batteries, paints, thinners, anti-freeze, motor oil and the like for disposal. A contractor licensed in hazardous waste disposal would collect and properly dispose of these materials. This collection would occur once a year.

Because of the obvious *fire prevention benefits* this type program provides, it could be coordinated by the Fire Department in cooperation with Public Works.

Anticipated Start Date: ***October 1999***

Bulky Waste Collection (H.I.P.)

A "HIP by Appointment Program" would be established from April 1 to November 30 annually. Under this program residents will call a designated telephone number and request a bulky waste pick-up. Through a detailed scheduling and work order process, a collection date will be assigned and the service provided. The Director of Public Works shall promulgate rules establishing the parameters of this service. Residents would have one final H.I.P. in the fall of 1999 prior to the implementation of this program.

Anticipated Start Date: ***April 1, 2000***

C. PUBLIC RELATIONS AND COMPLIANCE CAMPAIGNS

Although it is imperative that our programs be well-thought-out and properly structured, without solid *"public relations and compliance campaigns"* these programs would yield little success while fostering confusion.

Several months prior to the initiation of each phase of the integrated program, we will commence a full-scale media and public education effort. This effort will include, but not be limited to:

- **HCD Neighborhood Meetings**
- **Radio Advertising**
- **Enclosures with tax bills**
- **Newspaper Advertising**
- **Newspaper Articles**
- **Press Releases**
- **Direct Mailings**
- **Posters in Public and Private Buildings**
- **Booths at Community Events**
- **Public Service Announcements**
- **Hand Billing through School Children**
- **Use of the Public Works Mascot (Jack Hammer)**

A professional PR Consultant may be sought. We expect the entire effort; however, to fall under the coordination of the Public Relations Coordinator, Customer Service Division, Department of Public Works.

D. ENFORCEMENT

As Public Education is essential to the success of these programs, so is Enforcement. It is only through enforcement that total compliance will ever be achieved. The vast majority of Portland's residents will comply simply because

we will have explained the programs and will have asked them to comply. As in any such effort, however, a small contingent will resist. There will also be a small group that will need to be continually reminded.

The program revenue will pay for two (2) new enforcement personnel be added to the Inspection Services Division of the Department of Planning and Urban Development whose sole duty will be the continual enforcement of the rules of these programs. Initially, enforcement will be a strong part of the educational process. Through the inspectors, violators will be dealt with personally and courteously in an effort to make them aware of their violations and to politely prompt compliance throughout the community.

Although these Inspectors will have the ability to issue summons, the issuance of summons would be considered only after all other efforts to gain compliance have failed. Especially in the beginning, these individuals will be kept quite busy responding to *"illegal put-outs", that is, improper containers; yard waste with sanitation; hazardous waste with sanitation; broken glass; animal feces and other illegal materials defined by ordinance.*

[redacted]

VI. FINANCIAL

A. CURRENT COSTS

Assessment/Fees to RWS

The City has two different costs for RWS on an annual basis. They are as follows:

1. **Tip Fee** – A per ton fee charged at the gate for every ton of waste that crosses the scale. This fee (currently $53 per ton) is set according to market conditions. The City is billed each month for the waste delivered for disposal at the RWS facility. Any material delivered to RWS in the silver bullets as recyclable material is presently received by RWS at no charge. The total estimated cost for FY99 is $1,080,000, based on 22, 041 tons.

2. **Annual Assessment** – This assessment represents the operating deficit of all operating expenses minus all operating revenues. It is assessed at a fixed percentage based on the number of municipal tons delivered to RWS in the base year (Portland is at 30.06% of total municipal tonnage, base year is 1995). The cost for FY99 is $1,012,613.

Revenue from Commercial Haulers

Prior to the elimination of flow control, commercial haulers paid $65 per ton at RWS, and were required to take any waste they hauled from Portland to RWS. Without flow control, commercial haulers were able to take waste from Portland to any facility. Other facilities were charging lower gate fees, which RWS could not compete with. This created the potential for RWS to lose the volume of waste it needed to operate efficiently. RWS responded by lowering the per ton charge to $40.

Lowering the gate fee caused a revenue shortfall. By calculation of the assessment, the City was required to pay a higher assessment amount, (approximately $1,000,000). To offset that cost, the City Council passed an ordinance that imposed a fee on commercial haulers. The fee was calculated as the difference between the original $65 gate fee and the lower fee set by RWS, or
$25.

As RWS has raised its gate fee, the corresponding City commercial hauler fee has been reduced, so that the commercial haulers continue to pay a total fee of $65, but in different proportions to the City and RWS. The effect of this is that the revenue to the City is reduced as the RWS gate fee increases.

Riverside Recycling Facility

L. R. Higgins is currently paid $677,200 annually to manage the facility. They are also paid $103,548 annually for five years for capital investment items that would stay with the City if the contract was terminated.
The City shares in the revenue generated by the facility by receiving the first $56,433 collected in fees each month, after disposal costs. Any additional revenue is split 50/50 between Higgins and the City. The estimated City revenue for FY99 is $317,045. Higgins accepts all of our HIP volume for no gate fee. However, we participate in the cost of disposal for any portion of the debris that cannot be recycled.

Public Works

In FY99, the City has budgeted approximately $690,000 in the Public Works budget for trash pickup, HIP and marketing for the bio-bag program.

Financial Summary, Options 1 - 5

			1	2			
	Option/Description	**Est. Additional Program Cost**	**Est. Avoided Costs**	**Est. Gross Bag Revenue**	**Est. Net Cost**	**Est. Additional Tons Recycled**	**Notes**
1A	Current programs	0	0	N/A	0	0	Current recycling rate = 7.5%
1B	Current programs + yard and haz. waste collection + HIP by appointment	$100,000	($32,000)	N/A	$68,000	607	Assumes a 10% recycling rate
2	Current trash collection + expanded drop off recycling + yard and haz. waste collection + HIP by appointment	$175,000	($96,000)	N/A	$79,000	1,822	Assumes a 15% recycling rate
3	Pay-per-bag trash collection + expanded drop off recycling + yard waste and haz. waste collection + HIP by appointment	$497,000	($161,000)	($777,000) **$0.50/bag**	($441,000)	3,037	Assumes a 20% recycling rate
4	Current trash collection + curbside recycling + yard waste and haz. waste collection + HIP by appointment	$600,000	($225,000)	N/A	$375,000	4,252	Assumes a 25% recycling rate
5	Pay-per-bag trash collection + curbside recycling + yard waste and haz. waste collection + HIP by appointment	$739,000	($354,000)	($632,000 - $[illegible]) [illegible] $0.50 - $0.75/bag	($247,000) ($563,000)	6,682	Assumes a 35% recycling rate

Drop off recycling only

Curbside recycling, without *pay-per-bag*

Curbside recycling with *pay-per-bag* ***(Recommended Option)***

1. *Tons diverted through recycling, $53 per ton cost avoidance. RWS does not currently charge a tip fee for recyclables.*
2. *Based on average estimated number of bags per household, adjusted for increased recycling. Assumes 25 lbs. per bag.*

Note: This schedule does not include any possible changes in the RWS annual assessment.

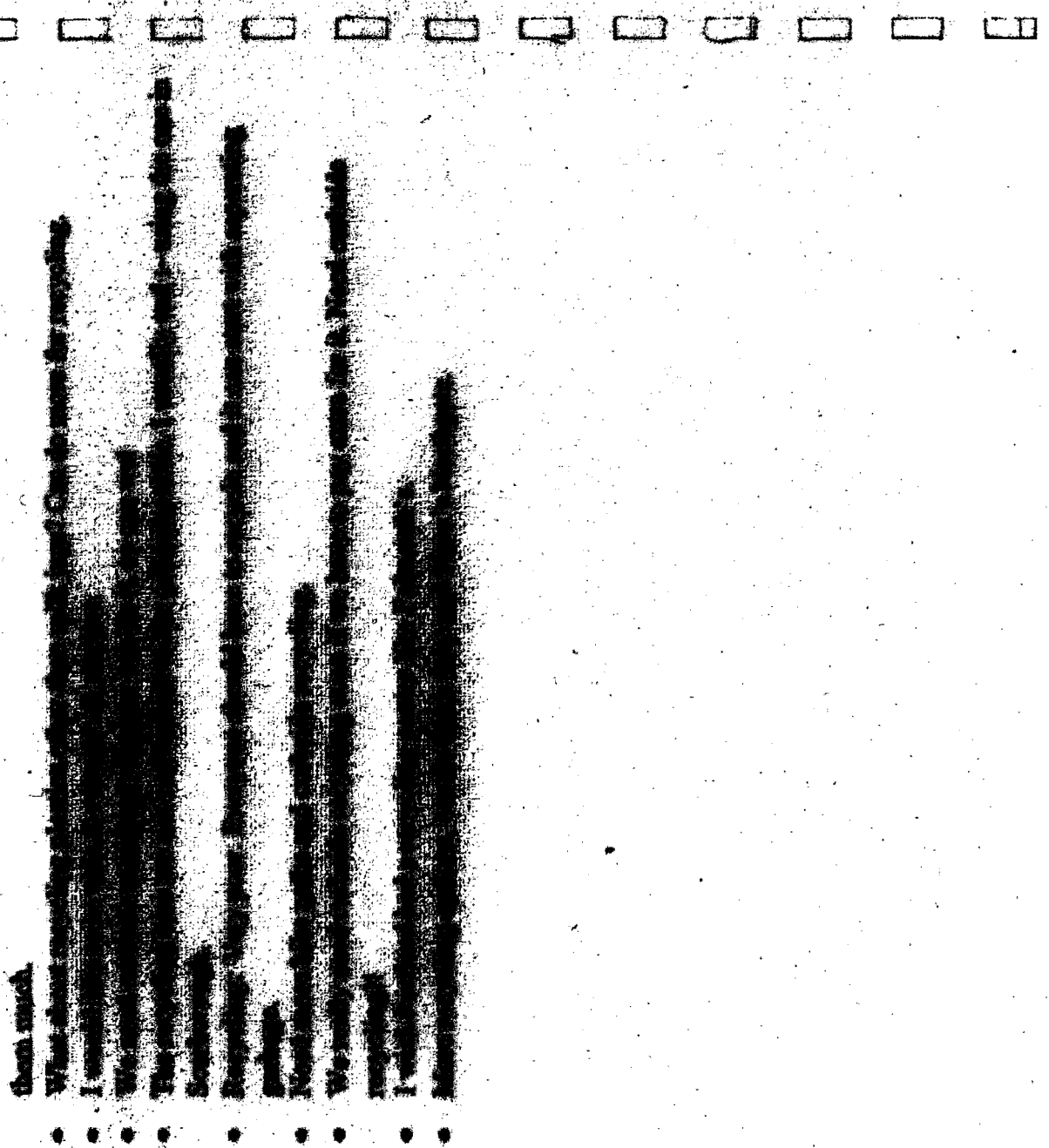
[redacted]

APPENDIX A

Comments about recycling received by Public Works in response to the Calendar Questionnaire

- We need curbside recycling.
- The recycle bins are not emptied frequently enough. Could there be one at Pine Tree Shopping Center?
- Enact a curbside recycling program. And pay per bag rubbish collection. The latter can pay for the former.
- Need to recycle different types of all plastics.
- Great job on both cleanliness and recycling efforts.
- Would like more recycling done!
- No comment on recycling efforts,
- Curbside recycling would be great.
- Should be doing curbside recycling of newspapers and cans at least.
- Please provide more access to recycling containers and include more plastic and paper board items.
- Should have recycling pickup.
- Silver bullet is good but not enough. Could be more cardboard, curbside pick-up of recyclables, leaves.
- Curbside recycling may encourage more people to participate.
- Recycling is good - more people need to get with it.
- I find it difficult to find a place to properly dispose of used motor oil. How and where?
- Please adopt a city wide recycling system.
- Where do we dispose of cardboard?
- Wish I could recycle from home using bags to separate categories - I'd be willing to pay for bags.
- Curbside recycling would encourage more participation in recycling.
- What recycling??
- 4 Recycling
- Wish you had recycling pickup.
- Need recycling center at Westgate.
- Recycling efforts good. Thank you.
- Excellent on glass/paper/cans. We need usable household goods put in a recycle area for giveaway to a new home. After 2 weeks display then crush. Please!
- Why did you move the recycling bins near Shop N Save?
- It would be nice to have newspaper recycling.
- Re: Recycling: Not enough collection locations. Other cities and towns have better collection systems.
- We had a recycling bin at the old Reed School. Someone complained, now it's gone. I'm complaining because I have to go to Northgate. Public Works promised to rectify this, no action. How come a complaint removed something lots of people use.

- Recycle cardboard, motor oil, insecticides, etc.
- No change in recycling efforts.
- We need curbside recycling.
- I would like to know all the materials that may be recycled.
- I'm a new resident and don't know where to recycle.
- Curbside recycling?
- Need curbside recycling.
- Curbside recycling would allow those with no car to recycle on a regular basis and would make it easier for everyone.
- Need curbside recycling.
- With such a mixed population on the peninsula it is a wonder the trash pick-up goes as well as it does. Forget curbside recycling.
- Would like to see a city wide recycling pick-up system, just as garbage is picked up weekly.
- Curbside recycling would be nice for the items that pile up quickly -newspapers, milk containers, cardboard.
- We need more recycling drop-off areas.
- More recycling locations. Add cardboard.
- Why do we not have recycling as well as rubbish removal?
- Recycling pick-up would be useful.
- Recycling is pretty good, need more participation, though.
- The recycling bins on the boulevard are always full.
- More recycling. Curbside would be nice.
- A few more recycling bins would be great.
- Sidewalk recycling!
- Recycling good, but more needs to be done.
- Portland is not serious about recycling.
- Recycling: Should ty to do more.
- Recycling is not good enough.
- Recycling is A+, but I live on Peaks Island...and we are the only district with curbside recycling.
- How about curbside recycling like other cities?
- Would like more recycling.
- Need recycling bins in the Pine Tree Shopping Center.
- Need curbside recycling.
- We need curbside recycling.
- Curbside recycling is a must!
- Great litter and brush control, No recycling efforts.
- Include more plastics in recycling, esp. #1 and #5. More recycling!!
- A mandatory recycling effort would be ideal. Although costly, it would make your city pick-up of trash much lighter and city dumps more free of waste. Recycling is very good. The suburbs are lax about picking up around their businesses.
- Recycling needs more promotion. People don't seem to know where the bins are or use



APPENDIX B

Excerpt from Mayor's Task Force on Solid Waste Report, December 22, 1997

2. Recycling:

The task force concluded that neither RWS nor the City of Portland are (for perhaps quite different reasons) doing as much as they could be doing in the area of recycling. RWS for some time was in something of a conflict--it needed material to burn--recycling reduced the waste stream available for burning; end result--very little recycling. More recently RWS has a large enough volume of material (actually more than enough) to meet their burn commitments, but though RWS may be in a position to handle larger volumes of recyclable materials, it does not appear that they have made the front-end investment in separation equipment that would enable them to handle in an economically beneficial manner significantly higher volumes of recyclable materials. In short, they're doing more than ever before, but less than seems possible.

For a long time the city, more or less supporting RWS's early needs for volume, largely ignored recycling. Municipal tipping fees for household wastes were reasonable by virtue of "flow control"; the public was not demanding recycling; and the city did not wish to make an investment in front-end separation equipment. Portland didn't seem to have the volume to justify this investment; moreover, secondary markets for recyclables (which might have produced income for the city) were unpredictable and subject to wide price variations. The end result -- very little recycling. At some point the city put the silver bullets (large recycling containers) in place to support RWS's increased recycling effort, but we did little else. These containers collect about 1800 tons of recyclable material, about 6-7% of Portland's household wastes, each year. Coupled with our annual heavy item pickup, which also generates about 1800 tons of material, Portland's total level of recycling each year is around 12-14%, of total household waste. This is

one of the lowest levels of municipal recycling in the state.

Recently however, two or three important factors have changed suggesting the need for new approaches to recycling by both RWS and the city. First, "flow control" is gone, probably forever. Whether you thought it was a good thing or a bad thing is irrelevant today -- nothing the task force heard suggests it is coming back -- period. Life without "flow control" means higher tipping fees for household wastes -- these could rise to "much higher" over time. Second, the private sector recycling industry has grown tremendously. Portions of it operate globally; at its best, it is integrated and sophisticated; it utilizes constantly improving technology; it has made huge investments in front-end separation, sorting, cleaning, shredding, and baling equipment. Many private sector recyclers operating in the region are in a better position than either RWS or Portland to flexibly react to, and to make money from, the broadening market for recyclable materials. Given these factors the task force would offer the following recommendations.

A. The time has come for RWS to either get into the recycling business on a more committed basis (competing with private sector recyclers on their own terms) or get out of the recycling business by spinning it off to private sector firms ready, willing, and able to take over these activities from RWS, expand regional recycling efforts, and make money doing it. Continuing on as we have seems the worst alternative; we don't recycle as much as we could or should; we don't derive much revenue from recycling; we burn materials that we ought not to burn, complicating our ash disposal problems. RWS should explore spin-off possibilities (including an appropriate level of participation in any future success of a privatized recycling activity) through an RFP process.

On the basis of present information, it can be argued that of the two approaches (getting into recycling more fully or getting out by privatization) the latter is preferable. RWS could then concentrate on doing what it does best--running the trash to energy facility. Privatizing RWS's recycling activity has the added benefit of enabling RWS to avoid significant capital investment costs that would certainly be necessary if RWS were to attempt to become a major player in the recycling marketplace; moreover, it would keep RWS out of this highly volatile, competitive, and often unpredictable marketplace.

B. The City of Portland should significantly expand its recycling effort focusing on household wastes and utilizing a separation and pay per bag approach. The time is right. To encourage each household to separate, recycled materials (including organic wastes--leaves and grass clippings) would be picked up **FREE** by public works personnel. All other materials would be bagged, utilizing a standard 30 gallon bag sold at reasonable cost ($.75 or $1.00) by the city; these bagged wastes would also be picked up by the public works department. Bagged wastes would be delivered to RWS for burn; recycled materials would be delivered to RWS or its designee and move into secondary recyclable goods markets. Alternatively, Portland could negotiate its own contract for the handling of these recyclable materials (similar to the Hamlin's Pit contract) with a private recycling firm. Here, too, the alternatives could be explored through use of the RFP process. The avoided cost alone (presently $49.00 a ton for household wastes delivered to RWS for incineration)* justifies an expanded city-wide recycling effort. As previously noted, between

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* The actual tipping fee per ton of household wastes delivered by the city to RWS to burn is presently $95.00, but approximately $46.00 of this total is Portland's share of surcharges to cover RWS budget deficits that arose with the loss of "flow control". Increased recycling would not reduce the city's surcharge costs--one way or another these must be paid; but each ton of wastes not burned (but which is instead recycled) will save us $49.00.

the silver bullets and heavy item pickup, the city presently recycles about 3600 tons (12-14% of Portland's household wastes) each year. If that percentage could be increased to 25-30% (which would still be below the state average) the city would save (avoid costs of) close to $200,000. If we reach the projected state average for municipal household waste recycling (50%) the savings would approximate $500,000. Whatever we got for the recycled materials would be an added revenue. The approach the task force recommends would for the time being leave commercial waste streams alone. Some commercial generators (mostly large firms) already do a good deal of recycling for the same reason laid out above--to save money. Private haulers who gather most of the commercial wastes in the city would be strongly encouraged to work with the city and/or with RWS to expand their respective recycling efforts, particularly with smaller generators, but no direct control over commercial recycling is recommended at this time.

C. A fall back position to that outlined above is to move to a separation and pay per bag approach in at least two large-scale demonstration areas of the city, one off-peninsula, a second on-peninsula. Any demonstration should be for a long enough period of time to enable us to assess the problems and benefits fully, probably a year or more. A demonstration would save less and provide less revenue from the recycled materials, but it would allow us to work out the logistics and mechanics of the new system in a more bite-sized manner before expanding the system city-wide. Of the two approaches (B and C) the task force would recommend approach B. Going city-wide from the start is doable. The mechanics and logistics can be worked out before we put the program in place; hundreds of cities throughout the country have moved in this direction -- we can learn from their mistakes; we would maximize savings and environmental

benefits; and finally, everyone in the city would be treated equally.

D. The least Portland should do – an approach which the task force would recognize but does not endorse (because it does not go far enough) is to significantly expand the number, access-ability, and use of silver bullets throughout the city. This approach, if taken, should be accompanied by more frequent emptying of these containers, wide distribution of maps showing where these containers are located, and efforts in the schools and through social service organizations to expand use of these facilities. These efforts will no doubt increase our present rate of recycling somewhat; the city will realize some cost savings, but it is a timid option – one that largely misses the opportunities of the moment.

Note: Whatever approaches are taken by RWS and the Portland city council to expand present recycling activities, they should be preceded and accompanied by an extensive public education effort demonstrating the economic and environmental advantages of whatever program is adopted. There are private professional organizations (such as Global Action Inc.) that can assist in these efforts. But neighborhood meetings, school involvement, enlisting the aid of environmental and service organizations, working with all forms of the mass media will benecessary if expanded recycling efforts are to succeed.

In discussing these issues with the state office of solid waste management, which is now within the state planning office, it became clear that if we adopted either approach B or C as outlined above, they would support us with a significant demonstration grant. An amount was

not discussed, but based on the demonstration grant they gave us to start up Hamlin Pit, we are almost certainly talking about a six figure level of assistance..

Lastly, to make it clear that a separation and pay per bag system would not be an added burden and cost to homeowners who already pay high property taxes, the task force recommends that the current public works department household waste pickup costs be calculated and subtracted from every homeowner s property tax bill. Every homeowner property taxpayer should see these savings up-front. Then the only cost for household waste pickup would be the cost for individual bags. Those households with low volume, who do a lot of separating will pay very little; remember separated recyclables and appropriately bagged organic wastes will be picked up free. Those households with high volumes of waste, and/or who don't want to separate will pay a lot more. That's as it should be.

APPENDIX C

Maine Municipalities that have Pay-As-You Throw Programs

Source: 1996 Municipal Solid Waste Reports Maine State Planning Office

Appleton
Arundel
Bowdoinham
Bucksport
Calais
Charleston
Corinth
Dixmont
Dresden
Durham
Ellsworth
Falmouth
Freedom
Fryeburg
Garland
Harmony
Holden
Houlton
Howland
Hudson
Islesboro
Jackman
Knox
Leeds
Liberty
Linneus
Mars Hill
Marion
Monmouth
Monson
New Vineyard
Oakfield
Palermo
Rogers Ridge
Sacramento
Searsport
Sidney
Somerville
Sorrento
Starks
Stockton Spring
Sullivan
Thorndike
Topsham
Troy
Union
Unity
VanBuren
Warren
Washington
Wells
Whitefield
Whitneyville
Windsor
Winter Harbor

APPENDIX D

Sanitation Programs for Multi-Unit Buildings in other Communities

	Apartment Buildings	**Housing Authorities**
Lewiston	up to 8 units	no pick up
South Portland	apts: up to 4 units Cluster: will pick up 8-12 units if no room for dumpster	depends on various PILOT agreements
Westbrook	up to 10 units	no pick up
Auburn	n/a	n/a
Bangor	up to 4 units	n/a

APPENDIX E

Approved By: Robert Hanley
City Manager

Effective Date: Aug 7, 1996

ADMINISTRATIVE REGULATION NO. 42

Recycling Policy

PURPOSE

This Administrative Regulation (AR) is intended to set forth the basis and procedures for controlling waste generation and disposal practices. Consistent with the State of Maine's waste management priorities, the City's first priority of waste management is to "reduce" both in amount and toxicity of wastes generated. The City's second priority is the "reuse" of waste. Our third priority is the "recycling" of our waste. Collectively these are referred to as the "3 R's".

Reduction

The City of Portland has established "reduction" as its first waste management priority because it prevents the creation of waste; other methods only manage waste after its creation. By reducing waste generation, the City will decrease' the amount of materials that must be reused, recycled or disposed of and will reduce its total costs of handling materials. Suggestions or questions regarding "reduction" should be directed to the City's Purchasing Agent.

Listed below are some recommendations of reducing waste generation:

- minimize paper usage by using E-Mail, voice mail, using routing slips instead of issuing multi-copies of documents, photocoping two sides of paper, using clean side of paper for note pads, editing work on P.C./Word processing C.R.T. versus paper copy, etc.

- Investigate option of returning unused materials to ihe original supplier for credit. The same option should be used for unneeded and expired supplies.

- Keep all inventories to the minimum. Return to the supplier any out-of-date inventory for credit. Audit inventory monthly to identify any over-stocked items.

- Where cost effective, purchase products who packaging is not excessive, consistent with the City's goals of controlling costs and minimize waste generation.

The City of Portland has identified reuse as its second waste management priority. By recognizing materials and items that are still usable and by identifying uses for these materials, the City reduces its purchases, recycling and disposal costs.

Materials that may be appropriate to reuse include:

- Fire trucks, rehabilitated, refitted, and modernized.
- Construction equipment rehabilitated and modernized.
- Brick and granite curb removed during reconstruction can be reused.
- Office furniture can be cleaned and repainted.
- Obsolete equipment to be sold by public auction or donated to needy organization.
- Excavated earth can be blended into suitable construction material.
- Wood waste chipped into bark mulch.
- Leaves and grass clippings compacted into a soil conditioner and fertilizer.
- Sale of obsolete items to salvage company.

Suggestions or questions regarding "reuse" should be directed to the City

Purchasing Agent. Recycling

The City of Portland has identified "recycling" as its third waste management priority. After waste reduction and reuse have been maximized, materials that remain may be appropriate for recycling. By recycling materials that cannot be reused, the City minimizes the amount of materials requiring disposal, as well as the environmental and monetary cost associated with disposal.

State law requires recycling of office paper and cardboard at all facilities where 15 or more people are employed. The City is meeting this requirement by implementing an office paper collection and recycling at its facilities.

The City recycles a wide range of materials, and it continues to search for reuse or recycling options for materials which are disposed of currently.

All employees are encouraged to investigate and pursue recycling options for all materials, where such recycling is cost effective.

All employees are required to purchase materials and items which are made from waste (recycled) materials or contain recycled content. The City's policy is to support a strong market for recycled products to ensure that recycling will be cost effective

The City will require the contractors to purchase and use recycled construction and landscape materials available at the Riverside Small Recycling Facility whenever these materials meet City [illegible]. The City also encourages its contractors to use recycled materials when available and appropriate.

Suggestions or questions regarding "recycling" should be directed to the Purchasing Agent and/or the City's Recycling Coordinator.

ref~.a

Portland Press Herald, Monday, December 8, 1997

IN PORTLAND

Pay-per-bag plan will save tax dollars and environment

● City councilors should back the idea, but prepare for criticism.

A pay-per-bag trash disposal system in Portland can be depended upon to produce both positive and negative results.

On the positive side, having Portland residents pay for each bag of trash they produce will do a lot to encourage recycling. Other communities in the region use the system to great success.

Experience shows people will recycle when not doing so costs them money. With more items recycled, the city will save money. The city pays $44.45 per metric ton ($49 per ton) for trash disposal to Regional Waste Systems. The city will also collect money from residents who buy bags for waste disposal.

The result of such a program will be fewer dollars spent on trash disposal and less of an impact on the environment. Ultimately, the city will be able to lower taxes or avoid a tax increase thanks to the savings and added revenue.

On the negative side, some residents won't like the inconvenience and are sure to complain.

These two certainties put the Portland City Council in the middle. Here they have an idea that will save the city and its taxpayers money and help the environment in the process. It is endorsed by the Solid Waste Task Force appointed by Mayor George Campbell.

This idea, however, is bound to bring some angry folks to the microphones at some future council meeting. City councilors should be prepared for this, and resolve to do the right thing. The worst thing they could do is approve the program and then rescind their approval the first time they are challenged on it.

Portland Press Herald, Saturday, April 18, 1998

Portland trying again to improve its recycling rate

p.1B

● The City Council will appoint an advisory panel Wednesday to explore the city's options.

By ANDREW D. RUSSELL
Staff Writer

Portland's days as one of the worst recycling communities in Maine may be numbered.

The city is forming a new recycling committee. Its goal is to change the way residents of Maine's largest city throw away their trash by developing a citywide recycling program.

For six months, the Recycling Advisory Committee will study residential and commercial recycling options. These range from doing nothing new to starting a pay-per-bag trash pickup system. The City Council is expected to vote on a plan early next year.

It's all part of an effort to improve Portland's recycling record, which lags behind that of most communities around the state.

> *"We'd like to see Portland do better. If Portland would do better, all the communities would be doing better."*
>
> **Collin Therrien, state planner**

Portland recycles just 20 to 25 percent of its waste, compared with the statewide average of 35 percent, state and local officials say. The statewide recycling goal for municipalities is 50 percent.

"I think we all can do more," said Chris McDuffie, a Wellwood Road resident who plans to serve on the recycling committee.

City officials agree.

"I think there's a public recognition that we need to do more with regards to recycling," said Cheryl

Please see RECYCLE, *Page* 4B

RECYCLE

Continued from Page 1B

Leeman, a city councilor who will chair the committee. "So we'll look to have a plan in place that does a better job of dealing with our environment and our waste."

The effort mirrors a recommendation from a city solid waste task force that suggested Portland could save as much as $200,000 a year in trash disposal costs by instituting a comprehensive, citywide recycling program.

At present, residents who want to recycle must deliver their recyclables to one of 10 drop-off points around the city. Heavy items can be disposed of at the Riverside Recycling Center, formerly Hamlin's Pit.

Among the recycling options the committee is expected to consider are:

- Increasing the amount of waste recycled by adopting a pay-per-bag system that would require residents to buy bags for non-recyclable trash.
- Collecting recyclable items at curbside.
- Increasing the number of recycling drop-off containers – so-called "silver bullets" – around the city.
- Hiring a private contractor to run a citywide recycling program.

"The ballfield is wide open," said Troy Moon, who runs commercial waste programs for the city's Public Works Department. "They're going to look at everything that's available and develop a program to make the best fit for Portland."

Beyond the environmental benefits of recycling, there's no real pressure on the city to improve its recycling rate. The state goal is not a mandate, although communities that try hard to recycle may be eligible for grants to help support their programs.

Still, state officials who monitor recycling programs say they'd like to see Portland improve its standing – if only for the message it sends.

"We'd like to see Portland do better," said Collin Therrien, a senior planner with the state's waste management program. "If Portland would do better, all the communities would be doing better."

It's not that Portland hasn't tried to improve recycling. City officials first proposed a pay-per-bag system in late 1991. But they dropped it a few months later after residents opposed the idea.

What's more, residents in some neighborhoods with easy access to drop-off points, such as North Deering, recycle as much waste as those who live in towns with aggressive municipal recycling programs, such as Falmouth or Freeport, said Eric Root, recycling coordinator for Regional Waste Systems.

"Because Portland has different neighborhoods, there's sort of a mix," Root said. "And if you look at the towns in the state that are doing well, they are by and large municipalities that have a citizens' recycling committee."

That's the goal behind Portland's new committee. Members, who are to be appointed Wednesday by the City Council, will include local residents who both favor and oppose recycling programs.

"We want to make sure we get different viewpoints to give the committee balance to make the right choices," said Leeman.

Faster than a silver bullet

Forget those inconvenient drop-off locations. Curbside recycling and pay-per-bag trash are Portland's best shots at reducing its flow of garbage.

■ LAURA CONAWAY

Like many Portland residents, SarahRose Werner is serious about recycling. At home, Werner dutifully collects paper, plastic, aluminum and glass in a cardboard box until the contents are overflowing. Then she loads it all into a camper's backpack and hikes 20 minutes from her West End apartment to the "silver bullet" recycling container on Marginal Way. More than once Werner, who doesn't own an automobile, has lugged her recyclables across the city, only to find that the container had been moved or was stuffed to capacity. "I suspect most people who don't have a car don't recycle at all," she said. "Very few people are willing to haul their trash around, especially when you get there and the thing is full."

Inconvenient recycling and unlimited trash disposal have caused Portland to lag behind much of the rest of the state in recycling. Garbage pickup costs the same whether you put out two bags or 10, so there's little incentive for people to separate their trash and haul recyclables to the city's eight silver bullet containers. As a result, Portland recycles less than one-quarter of its trash, compared to the statewide average of 41 percent. "I know in my neighborhood, people really, really want to get involved [in recycling]," said Portland Mayor George Campbell, "and we don't make it easy for them."

Now a new citizen committee, chaired by City Councilor Cheryl Leeman, is ready to study ways Portland could reduce its flow of garbage and increase recycling. Options range from leaving the present system as it is to charging residents for each bag of garbage they set out and offering free curbside pickup of paper, glass, plastic and aluminum. "The right program could save us money," Leeman said. "It's a win-win situation. The taxpayers get a break, and the environment gets a huge break. How can you say no to that?"

The short answer for why taxpayers have said no to curbside recycling is that they believe the service would cost too much. Residents in 1991 also rejected the idea of paying for each individual bag of non-recyclable trash, arguing that they pay for collection with property taxes. A short-lived curbside recycling program was canceled that year after it proved astronomically expensive.

For nearly a decade, the city has collected recycling door-to-door on Peaks Island, but to get that convenience, islanders agreed to sacrifice other municipal services, such as having sanitation workers staff the dump full-time. That type of trade-off might not work for people who live in town, suggested Carol Eisenberg, who founded the weekly pickup program on Peaks and started the failed pilot program on the mainland. She suggested mainlanders would rather use recycling drop-offs than pay higher property taxes for door-to-door pickup. "I'm not sure curbside is the answer," Eisenberg said.

But in fact, a pay-per-bag system can be used to help fund curbside recycling and might be the only way to motivate people to throw away less. Portland, which pays $49 per ton to incinerate trash at Regional Waste Systems (RWS), could actually save money if residents recycled more of their garbage. A task force last year predicted taxpayers could save $200,000 on the city's annual $1.1 million garbage bill if Portland collected recyclables along with household trash. And if Portland charged residents for each bag of non-recyclable waste they set out, the predicted yearly savings would rise to at least $500,000 — enough to offset some of curbside recycling's considerable expense.

Towns such as Cumberland, which offer curbside recycling but have unlimited trash disposal, still lag behind the state average. Among RWS member communities, the places with highest recycling rates are those where residents pay more if they throw away more — even if they have to lug their old newspapers and cans to silver bullets themselves. "Everybody knows 'reduce, reuse, recycle,'" said Eric Root, director of recycling at RWS. "But it's not happening, except in those municipalities where bills are paid by pay-per-bag."

CBW 4.23.98

When Falmouth converted to a pay-per-bag system in 1992, residents immediately reduced the amount of garbage they sent to RWS by 35 percent. The town's household recycling, meanwhile, climbed dramatically, and is topped only by the rate in Durham, which also charges residents per bag. "Obviously, you have an incentive," said Tony Hayes, Falmouth's director of public works. "You could fill the trash bag full of everything and throw it away, or you could recycle two-thirds of your trash with no cost."

In Falmouth, residents set their trash out in specially marked bags sold at area stores. A 33-gallon bag costs 91¢ and a 22-gallon bag goes for 64¢. "People recognized, for once, that it was costing a lot of money to get rid of trash," Hayes said. "The cost was hidden in taxes, and people didn't realize the town was paying about $200,000 to get rid of trash." He estimated Falmouth now saves about $100,000 a year as a direct result of increased recycling.

Root said Falmouth's reduction in garbage couldn't have come at a better time, since RWS has almost always had more trash than it could possibly burn, and has since the day it opened in 1988. Last year, RWS had to bury some 10,000 tons of waste, because there was no room to incinerate it. That has lead some recycling consultants to speculate that RWS will either have to expand the current facility or build a new one — two enormously expensive propositions. "I don't think we could afford it, and I don't think we could get it [environmentally] permitted," Root said. "Recycling is certainly where we have to start .... The time for decisions is upon us."

Leeman's citizen committee isn't expected to make recommendations to the City Council for six months. Meanwhile, Portland officials are planning to try a pay-per-bag program when the city runs its leaf-collection program in November. City Manager Bob Ganley said residents will have to buy specially marked corn-starch bags — at a projected cost of 27¢ each — to dispose of leaves at the annual curbside pickup. Not only will the sale of bags offset the cost of collection, but the bags also decompose, saving sanitation workers the hassle and expense of slitting open and throwing out plastic bags.

Ganley predicted Portland will eventually have curbside recycling, even if the city has to charge residents per bag of trash in order to make the program seem worthwhile to average citizens. "Times change and people come around to it," he said. "There's a big next step in just getting people to really, really commit to it. Do they do that voluntarily, or do you sort of financially push them?"

Garbage statistics

Numbers aren't what they seem

Depending on whose statistics you trust, Portland recycles either 24 percent of its waste or a mere 6.9 percent. The gap between estimates is so wide because the city's department of public works includes material such as paper and cardboard recycled by municipal government and schools, which boosts the figures. Meanwhile, Regional Waste Systems (RWS) considers only the tons of trash recycled at the plant versus the tons incinerated, which brings the number down. And when state planners claim Maine recycles about 41 percent of its garbage statewide, they're including returnables like bottles and cans — items Portland leaves out of its calculation.

"There's a certain percentage of the waste stream that's not included in our figure," said Troy Moon, who oversees commercial garbage programs for Portland public works. That makes it difficult to judge how well the city is doing at recycling.

But there are two solid recycling statistics, said Eric Root, director of recycling for RWS. The first, from a survey of RWS member communities, shows that 66 percent of the population recycles some of their garbage at least some of the time. The second, from municipal waste reports, shows that when towns and cities begin charging citizens for each bag of trash they create, the total volume of non-recyclable garbage drops by one-third. "The data's absolutely consistent across the country," Root said. "Nothing else you do gets that kind of result."

LAURA CONAWAY

comment

The recycling cycle

CBW 4·23·98

On the first Earth Day in 1970, I was an idealistic 6-year-old who wrote letters to President Nixon about saving the whales. I didn't litter, and I liked to lecture people who did (the line between idealism and self-righteousness is, of course, very thin). So when my mother got a gig helping to write the speech New York Mayor John Lindsay would deliver at the inaugural green event, I thought it was pretty cool — especially since it meant I would be able to attend. I vaguely remember wandering with my mom around Union Square, checking out the booths and tables of long-haired environmental reformers. One recollection stands out: a large glass aquarium filled with filthy water from the Hudson River, holding one very unhappy-looking fish, its gills heaving in the struggle for oxygen.

SO NOTED

We've come a long way since then. Environmental concepts that were radical back in 1970 — the responsibility of industry to clean up after itself, the inherent value of wild places, the importance of a biologically diverse planet — have become widely accepted. So we're doing great, right?

Well, maybe not. Earth Day itself has become a cultural institution, but that's not necessarily a good thing. These days, the connection between April 22's ubiquitous blue-and-green globes and concrete action on environmental issues is about as real as the link between the Easter Bunny and the risen Christ. Symbols and rote phrases — "Reduce! Reuse! Recycle!" — have become a comfortable substitute for the difficult choices that need to be made if we're not going to drown in our own waste.

Portlanders, for instance, are way behind the state average in the recycling of household trash (see "Faster than a silver bullet," page 8). There are all sorts of excuses for not separating recyclables: It's messy, it takes up precious space in cramped apartments, the recycling containers are few and far between. Curbside recycling, I've often heard people say, would at least make things easier and more convenient.

But curbside recycling costs money, and Portlanders seem to be stuck in the mindset that you can throw things away for free. It isn't so. The cost of rampant trash-tossing is hidden, but it's real. We'd better acknowledge it. Across the nation, studies have shown that the only way to reduce the bulky flood of refuse that emerges from the average home is to make people pay for what they set out on the curb. Nothing motivates like money.

In Maine towns and cities where a pay-per-bag policy is in effect, it has been proven to work. Such a policy, along with curbside recycling, would most likely be effective in reducing the garbage stream here as well. Let your city councilor know you'd be willing to spend a little extra on trash bags to help pay for the convenience of curbside recycling. That would be the best way of celebrating the Earth this year, after Earth Day has been left behind.

The long goodbye

As you'll see from the advertisement on page 39, we're in the process of searching for a new editor. After nearly three years in the job, I've made the decision to move on, but I'll be here for the next two months to ensure a smooth transition. Watch this space for developments.

SARAH GOODYEAR

FREE

MUNJOY HILL OBSERVER

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MAY 1998

PORTLAND MAINE

Recycle It!

Perhaps, its not whimsical to imagine the day when East End residents will be able to set their recyclable items on the curb for pick-up. Portland has recently created a Recycling Advisory Committee to improve its recycling record. Currently, Portland ranks very low in percentage of trash recycled compared to the state average. Portland recycles 20 to 25 percent compared to the state average of 35 percent. The statewide recycling goal for municipalities is 50 percent.

By now, many Hill residents realize that Earth Day is more than once a year. Recycling has been integrated into many lives through conscientious use of Regional Waste Systems "silver bullet" recycling bins. It takes effort to collect, sort, and haul recyclables to the bins, but people find it is worth the work to decrease their trash output and preserve our environment. If the City decides to adopt a pay-per bag trash pickup system, Portland residents will have even more incentive to recycle.

RWS is the entity responsible for waste handling and recycling in this area. It is a non-profit corporation that converts trash to energy for cities and towns in southern Maine. It has more than 80 recycling bins in 28 towns in Southern Maine, including a dozen in Portland.

RWS is governed by a 28-member board and is owned and controlled by its member municipalities. Much of the waste transported to the facility located on outer Congress Street in Portland is incinerated to create electricity, which is then sold to Central Maine Power Company. With its 35 percent recycling rate (State Planning Office calculation), RWS is making a substantial contribution to the achievement of the state's solid waste reduction goals.

RWS Board Chairman Jim Soule commented on local recycling efforts, "Our programs have been a success because the people in southern Maine do a great job of using our recycling bins to help reduce trash disposal. We provide the bins. But people use them. And that's the key."

The bins handle mixed paper such as phone books, catalogs,

See RECYCLING, Page 4

Recycling is Good

Continued from page 1

paper bags and newspapers; chipboard such as cereal boxes and egg cartons; hard materials such as glass, steel and aluminum cans; and No. 2 plastics such as milk cartons and water bottles.

Eric Root, director of materials recovery at RWS, says it is important to follow instructions and crush the plastic jugs you recycle. It can ıt as much as three times the xpense to haul full-size containers compared to those that are compressed. He also said that plastics collected are limited to clear HDPE #2 containers.

The RWS "silver bullet" location most accessible to Hill residents is located at 118 Congress Street, the former site of the Whole Grocer. Additional nearby bins are at the Casco Bay Ferry Terminal, Commercial Street at Franklin Arterial, and the USM Parking Lot on Marginal Way across from the Whole Grocer's new location.

Root says that local government has played an active role in Portland's recycling efforts. He also said that additional silver bullets are available upon request, if someone can identify an appropriate location.

For additional information on recycling, call Eric Root at RWS, 773-6465. Watch this space for updates on Portland's Recycling Advisory Committee.

Pay-per-bag plan gains favor

● As recycling by residents lags, a city committee is again proposing the system to reduce disposal costs.

By MARK SHANAHAN
Staff Writer

P.1B

Portland soon could join the growing number of Maine communities that charge residents fees to dispose of their household trash.

Disappointed by the relatively paltry number of residents who now recycle, city officials are considering implementing a pay-per-bag trash pickup system as early as next summer.

By making people pay to throw away their trash, officials hope to reduce the amount of trash being generated by Portland households and increase residents' participation in the recycling program.

"The taxpayers could control their own cost and also control that line item in the (city) budget," said City Councilor Cheryl A. Leeman, chairwoman of the city's recycling committee. "A pay-per-bag system would give the taxpayer the incentive to do more."

Although it is just one of five options being considered by the recycling committee, the pay-per-bag plan has strong support and is likely to be recommended to the City Council.

This is not the first time that a pay-per-bag system has been discussed in Portland. But as trash disposal costs continue to climb and recycling rates remain low, the talk is turning serious.

Portland now generates about 22,500 tons of household trash a year and pays $53 per ton to dispose of it at the Regional Waste Systems incinerator. Barely 7 percent of Portland's household trash is recycled, according to city officials.

That number is so low because the city's recycling program is completely voluntary. Residents who want to recycle must take their items to one of 10 drop-off points around the city. Heavy items can be disposed of at the Riverside Recycling Center.

"Trash is a problem everywhere," said Henry Dozier, a Portland resident on the recycling committee. "People think there's a trash fairy – just put it out and it's gone. But as soon as you get people's wallets involved, you get results."

Under the plan being considered, the city would continue to pick up residents' trash – but only if it is in special bags bought at a store for between 50 and 75 cents each. The city would hire a firm to collect residents' recyclables – glass, plastic, aluminum or newspaper – at the curbside.

In theory, Portland could pay for the expanded recycling program over time with money that it saves in disposal fees at RWS.

Other parts of the plan call for collecting yard waste and hazardous waste at established drop-off points and doing the annual heavy-item pickup by appointment, rather than only during September.

For six months, the recycling committee has studied ways to increase recycling. Leeman even visited Worcester, Mass., a city more than twice the size of Portland that runs a successful pay-per-bag system.

Once a self-described "nonbeliever" in pay-per-bag trash collection, Leeman said she is now convinced that it is good for the environment

Please see **TRASH**, *Page* **1B**

RECYCLING OPTIONS

Portland's Recycling Committee has been meeting for six months, studying ways to increase participation in the city's recycling program. It is considering five options:

Continuing the same level of service, which includes curbside trash pickup and voluntary recycling.

Continuing curbside trash pickup and increasing voluntary recycling by adding more recycling receptacles around the city.

Instituting pay-per-bag trash pickup and expanding the voluntary recycling program.

Continuing current curbside trash pickup and adding curbside recycling.

Instituting pay-per-bag trash pickup and curbside recycling.

and could save the city some money.

"People will complain about having to buy bags," Leeman said. "But there are direct financial benefits to the taxpayer, and it's the right thing to do."

According to the State Planning Office, 65 cities and towns in Maine already charge residents for trash bags. Virtually every one has seen a marked increase in recycling and a decrease in disposal costs.

Recycling rates statewide have climbed from 16.5 percent in 1988 to better than 40 percent now. However, that reflects all types of recycling, including composting yard waste and grinding up lumber.

"Recycling is not hard. This is about changing habits," said Bridget Chase, a Portland resident who is on the recycling committee. "You can teach an old dog new tricks."

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Pay-As-You-Throw

A Fact Sheet for Elected Officials

As an elected official in your community, you have many responsibilities besides municipal solid waste (MSW) management—but it's an important service.

Residents in most communities have come to expect efficient, reliable trash collection and disposal, and tend to support those officials that can get the job done.

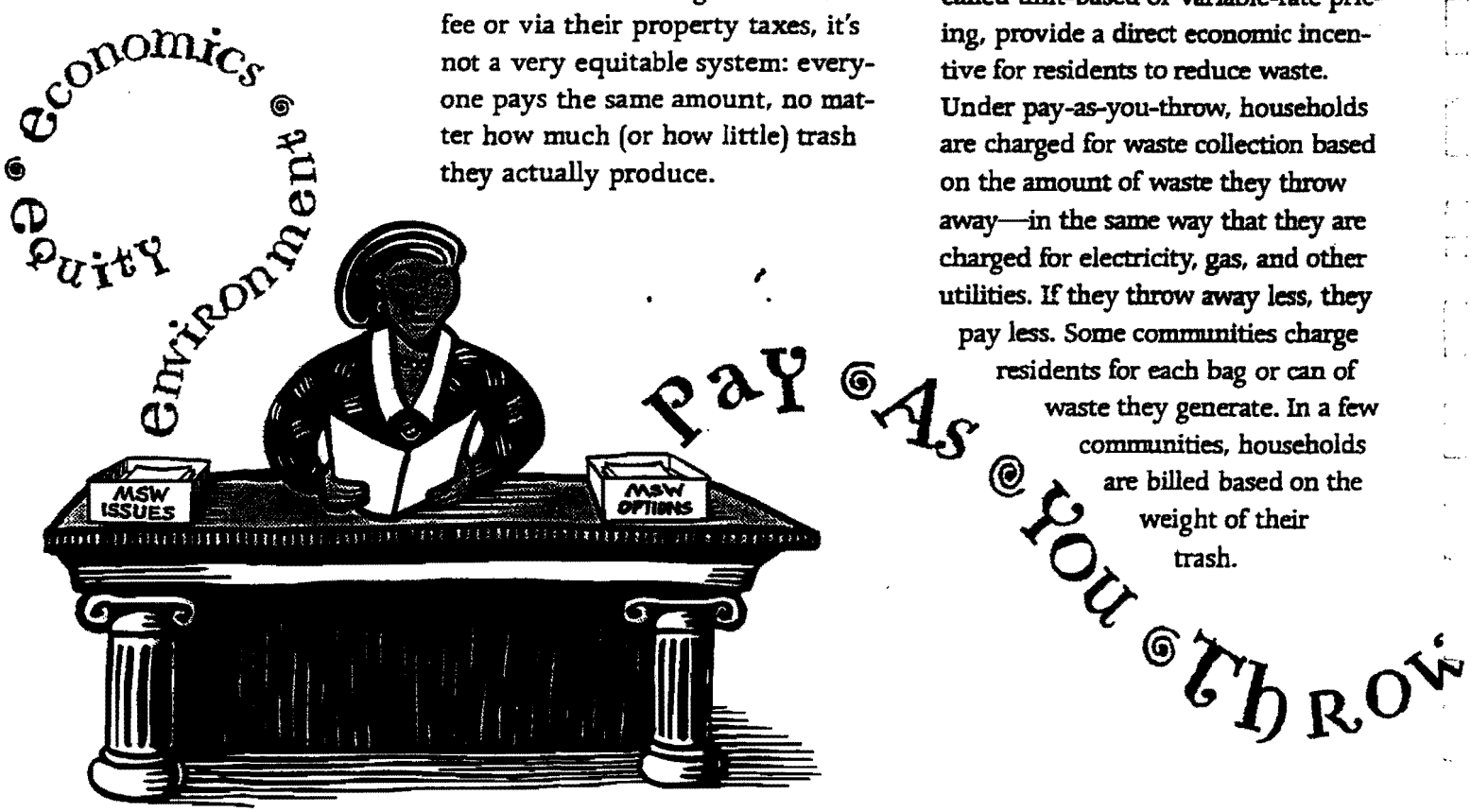
This task has been growing more complicated, however. First of all, it's likely that your residents are generating more waste each year, even if you have a recycling program in place.

That can mean escalating costs. And whether your residents pay for MSW services through a direct, flat fee or via their property taxes, it's not a very equitable system: everyone pays the same amount, no matter how much (or how little) trash they actually produce.

What is pay-as-you-throw?

Fortunately, there is a system out there that can help your MSW management personnel meet these challenges. In nearly 2,000 communities across the country, a program called "pay-as-you-throw" is offering residents a more equitable way to pay for collection and disposal of their trash—while, at the same time, encouraging them to create less waste and increase the amount they recycle.

Pay-as-you-throw programs, also called unit-based or variable-rate pricing, provide a direct economic incentive for residents to reduce waste. Under pay-as-you-throw, households are charged for waste collection based on the amount of waste they throw away—in the same way that they are charged for electricity, gas, and other utilities. If they throw away less, they pay less. Some communities charge residents for each bag or can of waste they generate. In a few communities, households are billed based on the weight of their trash.



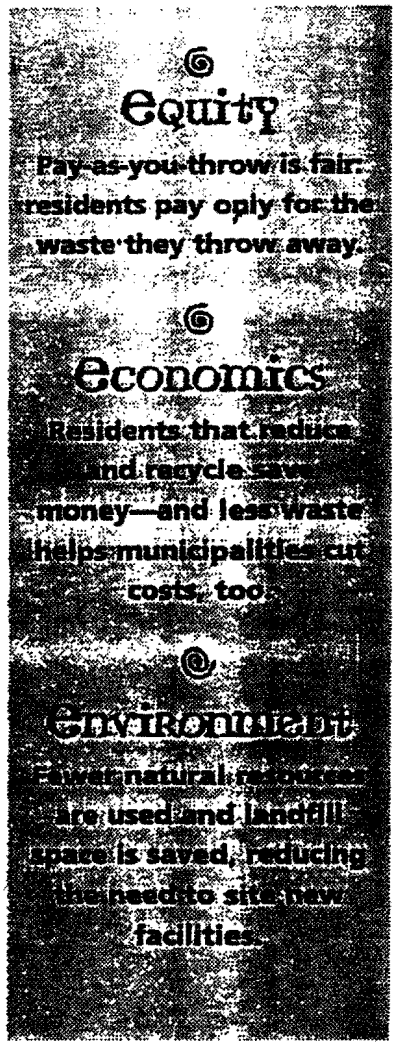
What are the benefits of pay-as-you-throw?

Pay-as-you-throw gives residents greater control over their costs. While they may not realize it, your constituents are paying for waste management services. And, whether they pay through taxes or a flat fee, residents that generate less and recycle more are paying for neighbors that generate two or even three times as much waste. When a few residents generate more waste, everyone pays for it. With pay-as-you-throw, residents that reduce and recycle are rewarded with a lower trash bill.

As a result, households under pay-as-you-throw tend to generate less waste. Communities with programs in place have reported reductions in waste amounts ranging from 25 to 45 percent, on average. Recycling tends to increase significantly as well. And less waste means that a community might be able to spend less of its municipal budget on waste collection and disposal—possibly even freeing up funds for other essential services like education and police protection.

Because residents stand to pay less (if they generate less), pay-as-you-throw communities have typically reported strong public support for their programs. The initial reaction from residents can vary, however—some residents might feel that the program is no more than an added charge. To address this, it is important to explain to residents at the outset how the program works, why it is a more equitable system, and how they can benefit from it. Pay-as-you-throw has tended to work best where elected officials and other community leaders have reached out to residents with a thorough education campaign.

Many of the resulting programs have been highly successful, and have often attracted attention. In some cases, pay-as-you-throw has worked so well that the communities have become models in their region, demonstrating how MSW services can be improved. And within the community, elected officials can point to pay-as-you-throw as an example of municipal improvements they helped bring about.



Are there disadvantages to pay-as-you-throw?

While there are potential barriers to a successful program, communities with pay-as-you-throw report that they have found effective solutions. Illegal dumping is a frequently raised issue. While it is often assumed that illegal dumping will increase once residents are asked to pay for each container of waste they generate, most communities with pay-as-you-throw have found this not to be the case. This is especially true when communities offer their residents recycling, composting for yard trimmings, and other programs that allow individuals to reduce waste legally. Others, particularly lower-income residents, worry about the amount they will have to pay. In many communities, however, coupon or voucher programs are being used to help reduce trash collection costs for these households.

How can I learn more about pay-as-you-throw?

EPA has developed a guidebook for anyone interested in pay-as-you-throw programs. *Pay-As-You-Throw: Lessons Learned About Unit Pricing* (EPA530-R-94-004) contains background information on the advantages of pay-as-you-throw and provides detailed information on how these programs work. To order a copy, call the EPA/RCRA Superfund Hotline at 800-424-9346 or TDD 800-553-7672 for the hearing impaired. For Washington, DC, and outside the United States, call 703-412-9810 or TDD 703-412-3323.