OPENING

Good Morning Senator Boyle, Representative Welsh, Representative Grant, Representative Campbell, and Representative Reed.

My name is Robert Knudsen and I am here today representing the Penobscot Energy Recovery Company (or PERC), to offer the partnership and facility background in the matter before you today.

I am one of the officers in USA Energy Group, LLC, which is the managing general partner as well as the operator of PERC. We are involved in the oversight of the day to day operations of the facility as well as financial and regulatory issues that face PERC. My comments today will touch on all of these matters.

I want to state our appreciation, for the opportunity to discuss PERC's background and the issues this sub-committee must tackle to address the challenges of implementing Maine's 25 year old municipal solid waste disposal policies. Maine is at a crossroads in policy direction and emerging technologies available to its residents and commercial enterprises that will have an immediate impact on disposal options but perhaps more significantly an impact that future residents and business owners will face. The challenge of municipal solid waste management is an intrinsic part of our society and will not go away.

I will address several areas that were indicated to be of specific interest for today's meeting.

ORGANIZATION

Penobscot Energy Recovery Company, L.P. (or PERC) a partnership that owns and operates a waste-to-energy (WTE) facility in Orrington, Maine. There are three (or 108) partners in PERC:

- USA Energy Group, LLC, based in Minneapolis MN is the majority owner at 52.75% and is the managing general partner as well as operator;
- PERC Holdings, LLC, also based in Minneapolis, is a limited partner with 24.28% ownership;
- The remaining 22.97% of the partnership is owned by 86 municipal entities (made up of 106 communities) called the Equity Charter Municipalities who's limited ownership interests are represented by the Municipal Review Committee, Inc.

The PERC facility accepts municipal solid waste (MSW), processes the MSW into refuse derived fuel (RDF), the RDF is then combusted in boilers to produce steam for generating electricity. The ash and non-processables, about 10% of the volume are sent to a landfill for disposal.

By the late 1970's Maine had almost as many town dumps as towns. These unlined landfills dotted the landscape, often located on or next to low-lying wetlands areas or abutting streams. As environmental consciousness increased and the harmful impacts to groundwater from unlined landfills were demonstrated, towns were encouraged to close their individual dumps in favor of regional landfill solutions. By 1989, when the Legislature enacted the Solid Waste and Management Recycling Act, only 185 local dumps remained. This legislation revolutionized the management of waste in Maine. It established the waste hierarchy – *Reduce, Reuse, Recycle/Compost, Incinerate, Landfill* – that governs Maine's solid waste policies to this day. It also banned new commercially owned landfills and directed communities to regionalize the transportation and disposal of trash.

Prior to the passage of the Act, communities in the Penobscot Valley had begun planning for a new waste disposal system. In 1991, their foresight and planning led to the creation of the Municipal Review Committee, Inc. (MRC), a regional solid waste coalition of 80 communities. Seeking to ensure affordable, long-term and environmentally sound disposal of municipal solid waste, MRC communities contracted with PERC that opened in 1988 in Orrington. MRC membership now numbers over 170 communities. The Equity Charter Municipalities collectively own almost 23% of the PERC facility. The net tipping fee to MRC municipal members are among the lowest and most stable in Maine for solid waste disposal.

In partnership with its communities and haulers the PERC facility provides reliable, reasonably priced environmentally responsible waste disposal services to over one-third of Maine households. The unique ownership structure of PERC, which incorporated a substantial investment by the Equity Charter Municipalities, fosters a high degree of cooperation toward shared objectives. Maintaining stable costs and reliable service is dependent upon both, a consistent application of the Maine Solid Waste Management and Recycling Act and an on-going, reasonably priced disposal option for process residue from the facility.

PERC relieves communities of their waste disposal problems and, a 30 year electric supply contract with Bangor Hydro, provides renewable resource-based electricity to residences and businesses throughout central and eastern Maine

OPERATIONS & SERVICES

The PERC facility was first organized in 1983 for the purpose of developing and owning a 25.3 MW, 1,000 ton per day, waste to energy facility to be located in Orrington Maine that would process over 300,000 tons of MSW annually and generates in excess of 166,000 MWh.

The facility consists of two major systems: a front-end waste processing system and a power generation system. The front-end system is comprised of two independent processing lines which consist of flail mills, magnet separators, trammels, secondary shredders, and associated conveyors. This process shreds and separates the MSW into a uniform particle size (RDF) which fuels the combustion boilers. The non-combustible material from this process is further separated into ferrous metal (which is recycled) and front-end processing residue (glass and grit, and oversized bulk waste) which is delivered along with the ash from combustion to a landfill for disposal. MSW processed through PERC is reduced in volume by about 90%

The facility uses sophisticated continuous emission monitoring systems to maintain low levels of air emissions. All flue gases from the thermal process are monitored. Pollution control equipment consists of combustion controls; scrubber for acid gas control; and bag houses for particulate capture. Environmental performance limits are monitored by emission control equipment which includes CO, SO2, NOx, and opacity. This data is collected and sent to the control room data collection computer for monitoring and reporting purposes. This equipment along with highly skilled plant operators ensures air quality is kept at or below compliance levels to protect the environment.

Contracts

MSW – PERC services over 170 communities, with a population of over 300,000 residents, throughout central and eastern Maine. These communities supply 180,000 tons of MSW, approximately 60% of annual MSW requirements of the facility. The remaining MSW requirements are supplied by a combination of commercial, in-state, and out-of-state contracts.

Electric – PERC sells its net electrical output to Bangor Hydro Electric Company under a 30 year power sales agreement that expires in February 2018.

Residue Disposal – PERC's front-end processing residue (glass and grit, and oversized bulk waste) as well as ash are disposed of at a nearby landfill.

Landfills and the proper utilization of their capacity continues to be a major topic of concern in Maine. While landfill storage is viewed as the least desirable of the disposal options, it is a vital and necessary part of a fully integrated waste management system. Consequently, in addition to the energy recovery benefits of a WTE facility, PERC also significantly contributes to extending the life if its neighboring landfills by reducing the volume and type of waste delivered. Processing and the thermal reduction of MSW into ash help ensure that this valuable landfill capacity is utilized as efficiently as possible.

COST TO COMMUNITIES

As we wrestled with the issues that surround extending the life of the plant or "how to keep operating post PURPA" the cost of service to communities rose to the very top of the list of critical questions and perhaps more importantly what impact, intended, and unintended will this have on a typical Maine household.

To address these questions one needs to look at the current household cost (direct and indirect), the factors that are changing (or have changed) and what impact these changes will have on both the average household and the WTE industry. We must also look at how a WTE facility earns the majority of its income and how those changes will impact these economics.

From a cash flow perspective a WTE plant earns almost all of its income from two sources (less incidental sales of recyclable materials or interest income):

a. Tipping fees for waste delivered to the facility;
b. The sale of electricity to a registered counterparty.

These two sources account for virtually all of a facilities income. Change one and you unbalance the entire equation, a little like a playground teeter-totter.

For purposes of our discussion, let's assume that project finances are balanced with WTE tipping fees and a power purchase agreement. Then by examining the state data (attached) for the PERC

PERC communities, the cost per resident for waste disposal can be seen to range from $5.60 in Garland to $387 in the Midcoast Solid Waste District. The WTE tipping fee component of that cost however is effectively fixed and for both communities accounts for only a portion of the total cost per resident. Consequently, there must be other factors such as curbside collection, transfer station costs, recycling, transportation, labor and other related costs that go into the final assessment per household.

Therefore, to understand the costs on a tonnage basis which is how the data is collected we can look at other state figures on municipal solid waste generation per household from which it is possible to determine average costs per household attributable to sending MSW to a WTE facility. An average household in Maine accounts for approximately one ton of MSW per year after recycling (reduce/reuse/recycle). On that basis each household has to account for the tipping fee of that ton. Anything in excess of that number must therefore be attributable to other expenses as mentioned earlier. Also, any credit a municipality receives from WTE operations would likewise reduce that cost either directly or as an offset to other municipal costs.

This helps frame the problem and identify the impacts not only for WTE facilities but municipalities as well. What has and will continue to occur is a change to the power purchase agreements under which the WTE plants have been operating for the last 25 to 30 years. And that change from a federally directed contract to a fully deregulated market based power contract results in a near 60% drop in electric revenue. One side of the teeter-totter just hit the ground. In order to re-establish balance to the financial equation we must replace the lost revenue which until now has been provided by the residents of Maine through a surcharge on their electric utility costs. It is this imbalance that is threatening the stability of the industry and the genesis of the problem you seek to resolve during this study phase.

PRESERVE, PROTECT AND EXTEND

So where does this leave us and why is it important for Maine's Legislature to solve this problem now? There are three major reasons, each with a list of critical issues. But, primarily these fall into three categories:

1. Extend economic benefits;

2. Preserve the state's comprehensive waste management law (ME. Rev. Stat. Ann. Tit. 38§2101(1));
3. Protect the environmental benefits gained through that law

In the area of economics we retained Dr. Todd Gabe, a Professor of Economics at the University of Maine, to study the industry over a two year period from 2010 – 2012 that resulted in two reports, both of which are included in the notes I will leave with you as well as all material referenced in my comments. Professor Gabe's reports are extremely thorough and highlight several areas of critical importance. These studies show the following:

1. Maine's waste- to-energy (WTE) sector has three facilities that employ 149 workers collectively and provide $13.1 million in labor income annually (this data does not include the closed Maine Energy Recovery Company (MERC) facility).
2. Including multiplier effects, the three WTE facilities have an annual statewide economic contribution of an estimated $101.1 million in revenue, 404 full and part time jobs, and $23.4 million in labor income.
3. In 2011, Maine and its municipalities received an estimated $13.2 million in taxes and fees due to the economic activity associated with the three WTE facilities.
4. The WTE sector's state and local fiscal impact – that is taxes and fees – will average an estimated $15.8 million per year between 2011 and 2019.

Professor Gabe further summarizes these impacts in his study conclusion:

> After the recent closure of MERC, there are currently three waste-to-energy facilities located in Maine: ecomaine in Portland, Mid-Maine Waste Action Corporation (MMWAC) in Auburn, and Penobscot Energy Recovery Company (PERC) in Orrington. These facilities directly support a combined...149 jobs, which provide $13.1 million in labor income (an average of $88,106 per worker). Results of an economic impact analysis show that, including multiplier effects, the Maine WTE sector has a total statewide economic contribution of an estimated $101.1 million in revenue, 404 full and part time jobs, and $23.4 million in labor income (an average of $57,886 per worker).

In preservation of Maine's comprehensive waste management law (title 38, section 2101), society is engaged in a perpetual fight against time and the laws of nature by which all matter in the known universe passes from useful to useless in both form and substance. The State of Maine refers to it as Municipal Solid Waste, and passed legislation to manage it. In 1989, the Maine legislature undertook this noble struggle to discourage the production of useless material by enacting legislation to promote and support a system of waste management options from the most preferred, reduction of waste by-products to the least preferred land storage of waste. Also included were reuse, recycle, compost and

waste to energy in descending order. The following descriptions of the six identified options of the waste hierarchy are taken directly from the state's website:

Reduce

The best way to deal with trash is to not have any! Reducing the amount of trash you have to throw out actually prevents waste from piling up in the first place. To reduce your waste, avoid unnecessary packaging and items designed to be used only once. Reduce the need for 'single use' plastic bags by bringing your own bags when you shop, and use a travel mug when you buy coffee. Choose durable, reusable products to make less trash.

Reuse

Reusing items saves a lot of energy and money. Extend the life of items you buy by reusing them. For example, reuse containers and jars, and donate still usable household goods and clothing to charity.

Recycle

Every day we use products made from recycled materials. Take your glass, cans, newspapers, milk jugs and other acceptable recyclable items to your local transfer station or curbside collection so that they can be turned into new products like fleece jackets, Frisbees, cars, and soda cans. Recycling saves money, energy, and the environment. 38.7% of Maine's municipal solid waste was recycled in 2009.

Compost

Composting is nature's way of recycling. When you compost, you convert vegetable scraps, leaves, grass clippings and other materials into a nutrient rich soil material. You can use finished compost in your garden and around shrubs or other plants to help them grow. Composting also reduces the amount of materials that need to be landfilled.

Waste-To-Energy

Waste-to-Energy facilities accept our solid waste and combust it very high temperatures producing heat that is used to convert water into steam. The steam is used to run turbines to generate electricity. Scrubbers, filters, and other pollution control equipment reduce pollutants released during the incineration process. Ash and other residues are landfilled. Over 33% of Maine's garbage was combusted in 2009.

Landfill

Today's landfills are very different from the old ones where people just dumped their garbage in an open area. Landfills are constructed and operated to strict environmental standards, including liners to protect groundwater. Within this hierarchy, landfills are the last of the various solid waste management options that should be considered.

The Act set ambitious recycling goals and established the Maine Waste Management Agency as the branch of government with primary responsibility for achieving these goals. To continue the good faith efforts of all involved for the past 25 years and to preserve the gains achieved by this program, it is essential to promote all six options and encourage the judicious use of each to the maximum extent possible.

The last area of environmental benefits is somewhat more complicated. It would be easy enough to say that WTE is good because it is above landfill storage, the least desirable alternative, and let the logic of the statute speak for itself, but in reality the benefits extend beyond reducing the volume by 90%, the weight by 75%, recycling metals, producing ash to be used as a stable ground cover material and generating electricity with domestic fuels. The environmental benefits extend to include the benefits of avoiding the unnecessary environmental risks of unintended consequences. These indirect environmental benefits are largely attributable to environment liabilities we avoid by extending the life of existing landfills through the judicious use of existing capacity and postponing and avoiding the need for siting new landfills thereby avoiding the resulting environment liabilities and loss of use of other limited state resources.

Let me emphasize that we need our landfills, but we also need to manage our landfill capacity along with the other options as a limited resource and act accordingly.

To gain a better understanding of direct and indirect environmental benefits we once again turned to Maine resources and sought advice from the Honorable Bob Duchesne and Professor George Criner, also from the U's economics department. I offer these excerpts from their reports in hope that they demonstrate the broader environmental benefits associated with maintaining a strong thermal reduction option in the state hierarchy.

Former Senator Duchesne opens his report with a ringing endorsement of Maine's efforts to be an industry leader as he states:

> Disposing of Maine's municipal solid waste (MSW) 40 or 50 years ago was fairly easy and straight forward. Trash was brought to a local dump where it was stacked, and eventually doused with an accelerant and burned; convenient for some, a pollution problem for the state. It was the type of open dump that ultimately encouraged both federal and state legislators to push through massive changes to environmental laws addressing clean air and water. As a result of Maine's environmental efforts it has become a national leader in preserving the environment in part by converting combustible waste into much needed renewable energy.

For over 30 years Maine has enjoyed the benefits of federal programs that support the development of an integrated waste management program to deal with the issue of MSW disposal. Some of these programs are ending, leaving Maine at a critical public policy crossroads of how to support what has been a very successful program of good public policy best described by the Municipal Review Committee's mission statement:

> *The mission of the corporation is to better ensure the continuing availability to its members of long-term, reliable, safe, and environmentally sound methods of solid waste disposal at a reasonable cost.*

He further comments that "...WTE is a proven, environmentally friendly process that provides reliable electricity generation and sustainable disposal of post-recycling MSW. WTE technology is used extensively in Europe and other developed nations in Asia, such as Russia, Japan, Singapore, and Taiwan. Additionally, new policies to encourage WTE can have a sizeable effect on reducing greenhouse gas emissions. In fact, nation-wide use of the WTE technology can become one of the big contributors to America's planned reduction in greenhouse gas emissions."

And concludes that "WTE technology has significantly advanced with the implementation of the Clean Air Act; dramatically reducing all emissions. The EPA concluded that WTE now produces electricity with less environmental impact than almost any other source. WTE also operates 24/7 to reduce base load fossil fuel generation and is desirably located in proximity to urban areas where the power is most needed. It is also notable that WTE was designated as renewable in the 2005 Energy Policy Act, by the US Department of Energy and by twenty-three state governments."

Professor Criner, in his report, makes the following points:

1. Maine has roughly 400 closed landfills, and funding is not adequate to ensure public and environmental health. Millions of public Maine dollars have been spent on these landfills, and millions more will be needed to continue monitoring, maintaining, and fixing these closed landfills.

2. While Maine has a Solid Waste Management Hierarchy with a goal of minimizing the portion of waste being landfilled, the hierarchy while environmentally progressive, lacks...a financial support structure...

3. It is both geologically and politically challenging to find suitable landfill location in Maine. Environmentally suitable landfill sites have been legislatively recognized in Maine as being "... in limited supply..." and representing "...a critical natural resource."

4. Without some public policy support structure, rather than being the least preferred destination for waste, landfills will likely become the only choice, with associated long-run financial, public health, and environmental risks...

WTE is a significant component of the State's comprehensive waste management law and provides an environmentally responsible method to dispose of large quantities of MSW. It should be sustained.

I hope these comments have been informative in your evaluation of the issues facing the WTE industry and its benefits to the state of Maine.

Waste Not, Want Not: The Facts Behind Waste-to-Energy

Data and facts show that waste-to-energy avoids greenhouse gas emissions, generates clean renewable energy, promotes energy independence, and provides safe reliable disposal services.

ENERGY RECOVERY COUNCIL

Waste Not, Want Not: The Facts Behind Waste-to-Energy

Report by:
Ted Michaels
President
Energy Recovery Council

April 2009

The Energy Recovery Council (ERC) was formed to provide a forum for companies and local governments to promote waste-to-energy.

In addition to providing essential trash disposal services cities and towns across the country, today's waste-to-energy plants generate clean, renewable energy. Through the combustion of everyday household trash in facilities with state-of-the-art environmental controls, ERC's members provide viable alternatives to communities that would otherwise have no alternative but to buy power from conventional power plants and dispose of their trash in landfills.

The 87 waste-to-energy plants nationwide dispose of more than 90,000 tons of trash each day while generating enough clean energy to supply electricity to approximately two million homes nationwide.

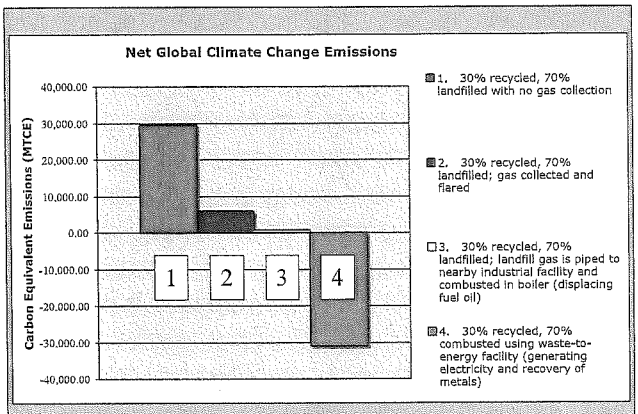
ENERGY
RECOVERY COUNCIL

There is a national need for energy sources that promote energy independence, avoid fossil fuel use, and reduce greenhouse gas emissions. Waste-to-energy is well-positioned to deliver these qualities while also providing for safe and reliable disposal of household trash. Application of EPA's lifecycle analysis demonstrates that for every ton of waste processed at a waste-to-energy facility, a nominal one ton of carbon dioxide equivalents is prevented from entering the atmosphere. As progressive environmental policymakers in Europe have learned, waste-to-energy not only reduces a nation's carbon footprint, it is compatible with high recycling rates and helps to minimize the landfilling of trash.

The Role of Waste-to-Energy in Mitigating Climate Change

Waste-to-Energy reduces greenhouse gas emissions

Waste-to-energy achieves the reduction of greenhouse gas emission through three separate mechanisms: 1) by generating electrical power or steam, waste-to-energy avoids carbon dioxide (CO_2) emissions from fossil fuel based electrical generation, 2) the waste-to-energy combustion process effectively avoids all potential methane emissions from landfills thereby avoiding any potential release of methane in the future and 3) the recovery of ferrous and nonferrous metals from MSW by waste-to-energy is more energy efficient than production from raw materials.



Data Source: Thorneloe SA, Weitz K, Jambeck J. Application of the U.S. Decision Support Tool for Materials and Waste Management. WM Journal 2006 August.

These three mechanisms provide a true accounting of the greenhouse gas emission reduction potential of waste-to-energy. A lifecycle analysis, such as the Municipal Solid Waste Decision Support Tool, is the most accurate method for understanding and quantifying the complete accounting of any MSW management option. A life cycle approach should be used to allow decision makers to weigh all greenhouse gas impacts associated with various activities rather than targeting, limiting or reducing greenhouse gas emissions on a source-by-source basis. *(IPCC, EPA)*

The Municipal Solid Waste Decision Support Tool is a peer-reviewed tool, available through the U.S. Environmental Protection Agency and its contractor RTI International, which enables the user to directly compare the energy and environmental consequences of various management options for a specific or general situation. Independent papers authored by EPA (such as *"Moving From Solid Waste Disposal to Management in the United States," Thorneloe (EPA) and Weitz (RTI) October, 2005; and "Application of the U.S. Decision Support Tool for Materials and Waste Management," Thorneloe (EPA), Weitz (RTI), Jambeck (UNH), 2006*) report on the use of the Municipal Solid Waste Decision Support Tool to study municipal solid waste management options.

These studies used a life-cycle analysis to determine the environmental and energy impacts for various combinations of recycling, landfilling, and waste-to-energy. The comprehensive analysis examines collection and transportation, material recovery facilities, transfer stations, composting, remanufacturing, landfills, and combustion. The results of the studies show that waste-to-energy yielded the best results—maximum energy with the least environmental impact (emissions of greenhouse gas, nitrogen oxide, fine particulate precursors, and others). In brief, waste-to-energy was demonstrated to be the best waste management option for both energy and environmental parameters and specifically for greenhouse gas emissions.

When the Municipal Solid Waste Decision Support Tool is applied to the nationwide scope of waste-to-energy facilities that are processing 30 million tons of

trash—the waste-to-energy industry prevents the release of approximately 30 million tons of carbon dioxide equivalents that would have been released into the atmosphere if waste-to-energy was not employed.

Recognition of Waste-to-Energy as a Contributor to Climate Change Solutions

International Acceptance

The ability of waste-to-energy to prevent greenhouse gas emissions on a lifecycle basis and mitigate climate change has been recognized in the actions taken by foreign nations trying to comply with Kyoto targets. The European Union (Council Directive 1999/31/EC dated April 26, 1999) established a legally binding requirement to reduce landfilling of biodegradable waste. Recognizing the methane release from landfills, the European Union established this directive to prevent or reduce negative effects on the environment "including the greenhouse effect" from landfilling of waste, during the whole life-cycle of the landfill.

The Intergovernmental Panel on Climate Change (IPCC) has also recognized the greenhouse gas mitigation aspect of waste-to-energy. The IPCC acknowledges that "incineration reduces the mass of waste and can offset fossil-fuel use; in addition greenhouse gas emissions are avoided, except for the small contribution from fossil carbon." This acknowledgement by the IPCC is particularly relevant due to the IPCC being an independent panel of scientific and technical experts that shared the Nobel Peace Prize with Al Gore.

The German Ministry of the Environment published a report in 2005 entitled "Waste Sector's Contribution to Climate Protection," which states that "the disposal paths of waste incineration plants and co-incineration display the greatest potential for reducing emissions of greenhouse gases." The German report concluded that the use of waste combustion with energy recovery coupled with the reduction in landfilling of biodegradable waste will assist the European Union-15 to meet its obligations under the Kyoto Protocol.

Under the Kyoto Protocol, the Clean Development Mechanism (CDM) is a method of emissions trading that allows the generation of tradable credits (Certified Emission Reductions [CERs]) for greenhouse gas emissions reductions achieved in developing countries, which are then purchased by developed countries and applied toward their reduction targets. CERs are also accepted as a compliance tool in the European Union Emissions Trading Scheme.

Waste-to-energy projects can be accorded offset status under the CDM protocol (AM0025 v7) by displacing fossil fuel-fired electricity generation and eliminating methane production from landfills. An associated CDM memorandum that set out methodology for including waste-to-energy, among others, in CDM projects. The memorandum, entitled "Avoided emissions from organic waste through alternative waste treatment processes," stated in part that CDM status could be accorded projects where "the project activity involves ... incineration of fresh waste for energy generation, electricity and/or heat" where the waste "would have otherwise been disposed of in a landfill."

Domestic Recognition

The contribution of waste-to-energy to reduce greenhouse gas emissions has been embraced domestically as well. The U.S. Conference of Mayors adopted a resolution in 2004 recognizing the greenhouse gas reduction benefits of waste-to-energy. In addition, the U.S. Mayors Climate Protection Agreement supports a 7 percent reduction in greenhouse gases from 1990 levels by 2012. By signing the agreement, mayors have pledged to take actions in their own communities to meet this target, and have recognized waste-to-

> *"Generation of energy from municipal solid waste disposed in a waste-to-energy facility not only offers significant environmental and renewable benefits, but also provides greater energy diversity and increased energy security for our nation."*
>
> —The United States Conference of Mayors, Adopted Resolution on Comprehensive Solid Waste Disposal Management (2005)

How are greenhouse gases measured?

There are two types of carbon dioxide emissions: biogenic and anthropogenic. The combustion of biomass generates biogenic carbon dioxide. Although waste-to-energy facilities do emit carbon dioxide from their stacks, the biomass-derived portion is considered to be part of the Earth's natural carbon cycle. The plants and trees that make up the paper, food, and other biogenic waste remove carbon dioxide from the air while they are growing, which is returned to the air when this material is burned. Because they are part of the Earth's natural carbon cycle, greenhouse gas regulatory policies do not seek to regulate biogenic greenhouse gas emissions. *(IPCC)*

Anthropogenic carbon dioxide is emitted when man-made substances in the trash are burned, such as plastic and synthetic rubber. Testing of stack gas from waste-to-energy plants using ASTM Standards D-6866 can determine precisely the percentage of carbon dioxide emissions attributable to anthropogenic and biomass sources. Long-term measurements of biogenic CO_2 from waste-to-energy plants measure consistently at approximately sixty-seven percent. The amount of anthropogenic CO_2 is approximately 1,294 lbs/MWhr when considered as a separate factor. However, when other unit operations are also factored in on a life cycle basis—such as avoided CO_2, avoided methane, and recovered materials—the result is a negative value of 3,636 lbs/MWhr. This approach is favored by the IPCC, which has endorsed the use of life cycle assessment.

One must remember that direct emissions are only part of the equation. Because we live in a three-dimensional world, we must look at all inputs if we are truly interested in reducing how much greenhouse gas is being released to the atmosphere and how to reduce that number by the greatest amount. The use of waste-to-energy: avoids landfilling and prevents subsequent methane generation; replaces and offsets electric power generated by fossil fuels and offsets their higher greenhouse gas emissions; and recovers and recycles metals that can be used in products rather than virgin materials, which results in a large greenhouse gas savings.

It is the large amount of greenhouse gases avoided by the use of waste-to-energy compared to the limited amount of direct carbon dioxide emissions emitted through the combustion of trash that has led to the conclusion that for every ton of trash processed by a waste-to-energy plant, approximately one ton of carbon dioxide equivalents are avoided.

Air Emissions of Waste-To-Energy and Fossil Fuel Power Plants
(Pounds per Megawatt Hour)

Fuel Type	Direct CO_2[1]	Life Cycle CO_2E[2]
Coal	2,138	2,196
Residual Fuel Oil	1,496	1,501
Natural Gas	1,176	1,276
Waste-to-Energy[3]	1,294	**-3,636**

[1]Based on 2007 EPA eGRID data except WTE which is a nationwide average using 34% anthropogenic CO_2.
[2]Life Cycle CO2E for fossil fuels limited to indirect methane emissions using EPA GHG inventory and EIA power generation data. Life Cycle value would be larger if indirect CO_2 was included.
[3]Life Cycle CO_2E for WTE based on nominal nationwide avoidance ratio of 1 ton CO_2E per ton of MSW using the Municipal Solid Waste Decision Support Tool, which includes avoided methane and avoided CO_2.

energy technology as a means to achieve that goal. As of July 2, 2008, 850 mayors have signed the agreement.

Columbia University's Earth Institute convened the Global Roundtable on Climate Change (GROCC), which unveiled a joint statement on February 20, 2007 identifying waste-to-energy as a means to reduce CO_2 emissions from the electric generating sector and methane emissions from landfills. This important recognition from the GROCC, which brought together high-level, critical stakeholders from all regions of the world, lends further support that waste-to-energy plays an important role in reducing greenhouse gas emissions. The breadth of support for the GROCC position is evidenced by those that have signed the joint statement, including Dr. James Hansen of the NASA Goddard Institute for Space Studies, as well as entities as diverse as American Electric Power and Environmental Defense.

The History and Role of Waste-to-Energy as a Renewable Energy Resource

Municipal Solid Waste is a Renewable Fuel

The sustainable nature of MSW is a major component of its historic renewable status. For more than three and a half decades, despite all of the efforts of EPA and many others to reduce, reuse and recycle, the U.S. diversion rate of municipal solid waste has climbed to barely above 30%. During this same time period, the solid waste generation rate has more than *doubled* and the population has risen by more than 96 million people. Furthermore, for the past several years, the national average diversion rate has increased by less than one percentage point per year. Today, Americans dispose of 278 million tons of municipal solid waste per year of which less than 30 million tons is used as fuel in waste-to-energy facilities. It is clear to see that for the foreseeable future there will be no end to an amount of municipal solid waste available as a renewable fuel.

> *Waste-to-energy plants are a "clean, reliable, renewable source of energy" that 'produce 2,800 megawatts of electricity with less environmental impact than almost any other source of electricity." Communities "greatly benefit from the dependable, sustainable [solid waste disposal] capacity of municipal waste-to-energy plants."*
>
> —USEPA letter from Assistant Administrators Marianne Horinko, Office of Solid Waste and Emergency Response, and Jeffery Holmstead, Office of Air and Radiation to IWSA, 2/14/03

Waste-to-Energy has a Long Track Record as Renewable

Policymakers for three decades (since the inception of the commercial waste-to-energy industry) have recognized municipal solid waste as a renewable fuel. The most recent statutory recognition came in section 203 of the Energy Policy Act of 2005, which defined municipal solid waste as "renewable energy."

While the Energy Policy Act of 2005 is the most recent example, waste-to-energy is given full renewable status for the municipal solid waste it processes under a number of statutes, regulations, and Executive Orders, including:

- the Federal Power Act
- the Public Utility Regulatory Policy Act
- the Biomass Research and Development Act of 2000
- the Pacific Northwest Power Planning and Conservation Act
- Section 45 of the Internal Revenue Code
- Executive Order 13423
- Federal Energy Regulatory Commission regulations (18 CFR.Ch. I, 4/96 Edition, Sec. 292.204)
- statutes in more than two dozen states, including more than a dozen renewable portfolio standards.

The production of clean energy from garbage has been attained by a heavy investment by the waste-to-energy industry and its municipal partners. Waste-to-energy facilities achieved compliance in 2000 with Clean Air Act standards for municipal waste combustors. More than $1 billion was spent by companies and their municipal partners to upgrade facilities, leading EPA to write that the "upgrading of the emissions control

systems of large combustors to exceed the requirements of the Clean Air Act Section 129 standards is an impressive accomplishment."

Waste-to-Energy Generates Much Needed Baseload Renewable Power

It is important to consider that waste-to-energy plants supply power 365-days-a-year, 24-hours a day and can operate under severe conditions. For example, Florida's waste-to-energy facilities have continued operation during hurricanes, and in the aftermath of the storm provide clean, safe and reliable waste disposal and energy generation. Waste-to-energy facilities average greater than 90% availability of installed capacity. The facilities generally operate in or near an urban area, easing electric transmission to the customer and minimizing waste transport. Waste-to-energy power is sold as "baseload" electricity to utilities that can rely upon its supply of electricity. There is a constant need for trash disposal, and an equally constant need for reliable energy generation.

Waste-to-Energy Actively Participates in the REC Markets

Municipalities and companies that own and operate waste-to-energy facilities are already actively participating in the renewable energy trading markets. Waste-to-energy is included in many state renewable portfolio standards and has traded frequently in those markets. Facilities have also sold RECs to entities interested in acquiring RECs on a voluntary basis. Furthermore, waste-to-energy facilities have successfully won bids to sell RECs to the federal government through competitive bidding processes.

States Defining Waste-to-Energy as Renewable in State Law
(as of 6/30/08)

Alaska	Maine	New York
Arkansas	Maryland	Oregon
California	Massachusetts	Pennsylvania
Connecticut	Michigan	South Dakota
District of Columbia	Minnesota	Virginia
Florida	Montana	Washington
Hawaii	Nevada	Wisconsin
Iowa	New Hampshire	
Indiana	New Jersey	

Waste-to-Energy is Compatible with Recycling

Statistics compiled for more than a decade have proven that waste-to-energy and recycling are compatible despite many attempts by naysayers to conclude otherwise. Since research on the subject began in 1992, communities that rely upon waste-to-energy maintain, on average, a higher recycling rate than the national EPA average.

WTE Community Average Recycling Rate vs. National Average

Year	WTE Recycling Rate	National Recycling (4)
2004	34% (1)	31%
2002	33% (2)	30%
1992	21% (3)	17%

(1) Source: J. V. L. Kiser, based on feedback from 94 WTE communities.
(2) Source: J. V. L. Kiser, based on feedback from 98 WTE communities.
(3) Source: J. V. L. Kiser, based on feedback from 66 WTE communities.
(4) Source: U.S. EPA, based on most recent data available during the study year

Communities that employ integrated waste management systems usually have higher recycling rates and the use of waste-to-energy in that integrated system plays a key role. Specific examples of why waste-to-energy communities are successful recyclers include:

- communities with waste-to-energy plants tend to be more knowledgeable and forward thinking about recycling and MSW management in general;
- communities with waste-to-energy plants have more opportunities to recycle since they handle the MSW stream more;
- the municipal recycling program can be combined with on-site materials recovery at the waste-to-energy plant (e.g. metals recovered at a waste-to-energy plant post-combustion usually cannot be recycled curbside and would otherwise have been buried had that trash been landfilled); and
- waste-to-energy plant officials promote recycling during facility tours and conduct community outreach efforts that may not be occurring in other locations.

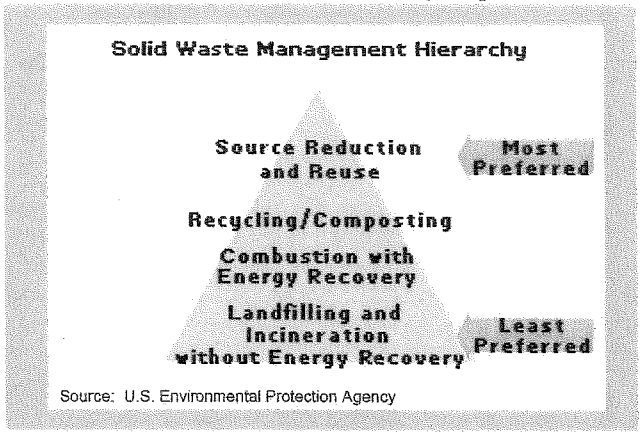
Many communities are connected to off-site recycling programs, such as curbside collection, drop off centers, MRFs, and/or yard waste management. In addition to the typical metals, glass, plastic, and paper from household and/or commercial sources, the communities reported having recycling programs for handling other materials. These ranged from batteries, used oil, and e-waste, to household hazardous waste, public and school outreach programs, and tires management, to scrap metals, food waste, and artificial reef construction projects.

The U.S. Environmental Protection Agency and the European Union Prefers Waste-to-Energy to Landfilling

Waste-to-energy has earned distinction through the U.S. Environmental Protection Agency's solid waste management hierarchy, which recognizes combustion with energy recovery (as they refer to waste-to-energy) as preferable to landfilling. EPA recommends that after efforts are made to reduce, reuse, and recycle, trash should be managed at waste-to-energy plants where the volume of trash will be reduced by 90%, the energy content of the waste will be recovered, and clean renewable electricity will be generated.

Municipal solid waste should be managed using an integrated waste management system. IWSA encourages and supports community programs to reduce, reuse, recycle and compost waste. Unfortunately, one hundred percent recycling rates are not technically, economically, or practically feasible. After waste is reduced, reused, and recycled, waste will be leftover that must be managed. That is where waste-to-energy comes in.

As noted earlier, EPA's hierarchy is consistent with actions taken by the European Union, which went further by establishing a legally binding requirement to reduce landfilling of biodegradable waste. The result has been increased recycling rates, higher waste-to-energy usage, reduced greenhouse gas emissions, and less dependence on fossil fuels.



EPA's Solid Waste Management Hierarchy underscores the importance of waste-to-energy as a critical component of any sustainable integrated waste management system.

Waste-to-Energy Reduces Greenhouse Gas Emissions in Three Important Ways

Avoided methane emissions from landfills. When a ton of solid waste is delivered to a waste-to-energy facility, the methane that would have been generated if it were sent to a landfill is avoided. While some of this methane could be collected and used to generate electricity, some would not be captured and would be emitted to the atmosphere. Waste-to-energy generates more electrical power per ton of municipal solid waste than any landfill gas-to-energy facility.

Avoided CO_2 emissions from fossil fuel combustion. When a megawatt of electricity is generated by a waste-to-energy facility, an increase in carbon dioxide emissions that would have been generated by a fossil-fuel fired power plant is avoided.

Avoided CO_2 emissions from metals production. Waste-to-energy plants recover more than 700,000 tons of ferrous metals for recycling annually. Recycling metals saves energy and avoids CO_2 emissions that would have been emitted if virgin materials were mined and new metals were manufactured, such as steel.

Penobscot Energy Recovery Company, LP
Ownership Structure and Operational Control

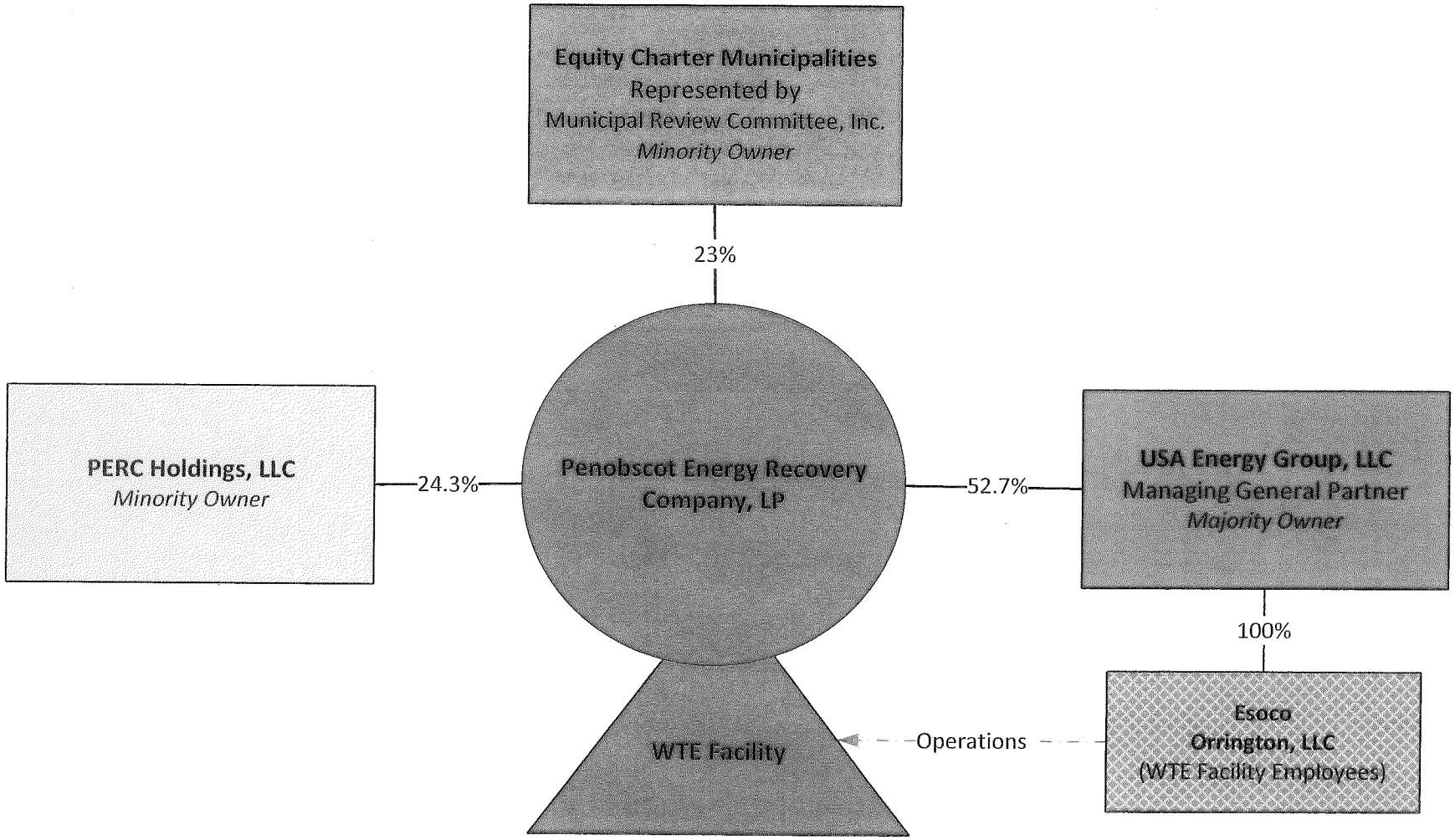


Figure ES-1

Municipal Review Committee, Inc. 7/11/2011

Charter Municipalities, solid waste districts and other municipalities served

A	Equity Charter Municipalities		
1	Albion	44	Midcoast SWD (A1)
2	Alton	45	Mid-Maine SWD (A1)
3	Atkinson	46	Milford
4	Baileyville (A2)	47	Millinocket
5	Bangor	48	Milo
6	Bar Harbor	49	Monson
7	Blue Hill (A2)	50	Mt. Desert
8	Boothbay RRDD (A1)	51	Newburg
9	Bradley	52	Old Town
10	Brewer	53	Orland
11	Brooks	54	Orono
12	Brownville	55	Otis
13	Bucksport	56	Owls Head
14	Burnham	57	Palmyra
15	Carmel	58	Parkman
16	Central Penobscot (A1)	59	Penobscot Co.
17	China	60	Pleasant River SWD (A1)
18	Clifton	61	Plymouth
19	Clinton (A2)	62	Reed Plt
20	Cushing	63	Rockland
21	Dedham	64	Sangerville
22	Dover-Foxcroft	65	Searsport
23	Eddington	66	South Thomaston
24	Enfield	67	Southwest Harbor
25	Fairfield	68	Stetson
26	Friendship	69	Steuben
27	Glenburn	70	Stonington
28	Gouldsboro	71	Surry (A2)
29	Greenbush	72	Thomaston
30	Guilford	73	Thorndike
31	Hampden	74	Tremont
32	Hancock	75	Trenton
33	Hermon	76	Troy
34	Holden	77	Union River SWD (A1)
35	Jackson	78	Unity
36	Lamoine	79	Vassalboro
37	Lee	80	Veazie
38	Levant	81	Verona
39	Lincoln	82	Waldoboro
40	Lucerne	83	Waterville (A2)
41	Mariaville	84	Winslow
42	Mars Hill	85	West Gardiner
43	Mattawamkeag	86	Winthrop

A	86	Equity Charters
A1	-6	Districts included above
A1	26	Municipalities in Equity Charter Districts
A2	12	0ther municipalities served
	118	
B	47	New Charters
B1	-2	Districts included above
B1	17	Municipalities in New Charter Districts
B2	7	0ther municipalities served
	187	**Total municipalities served by the MRC**

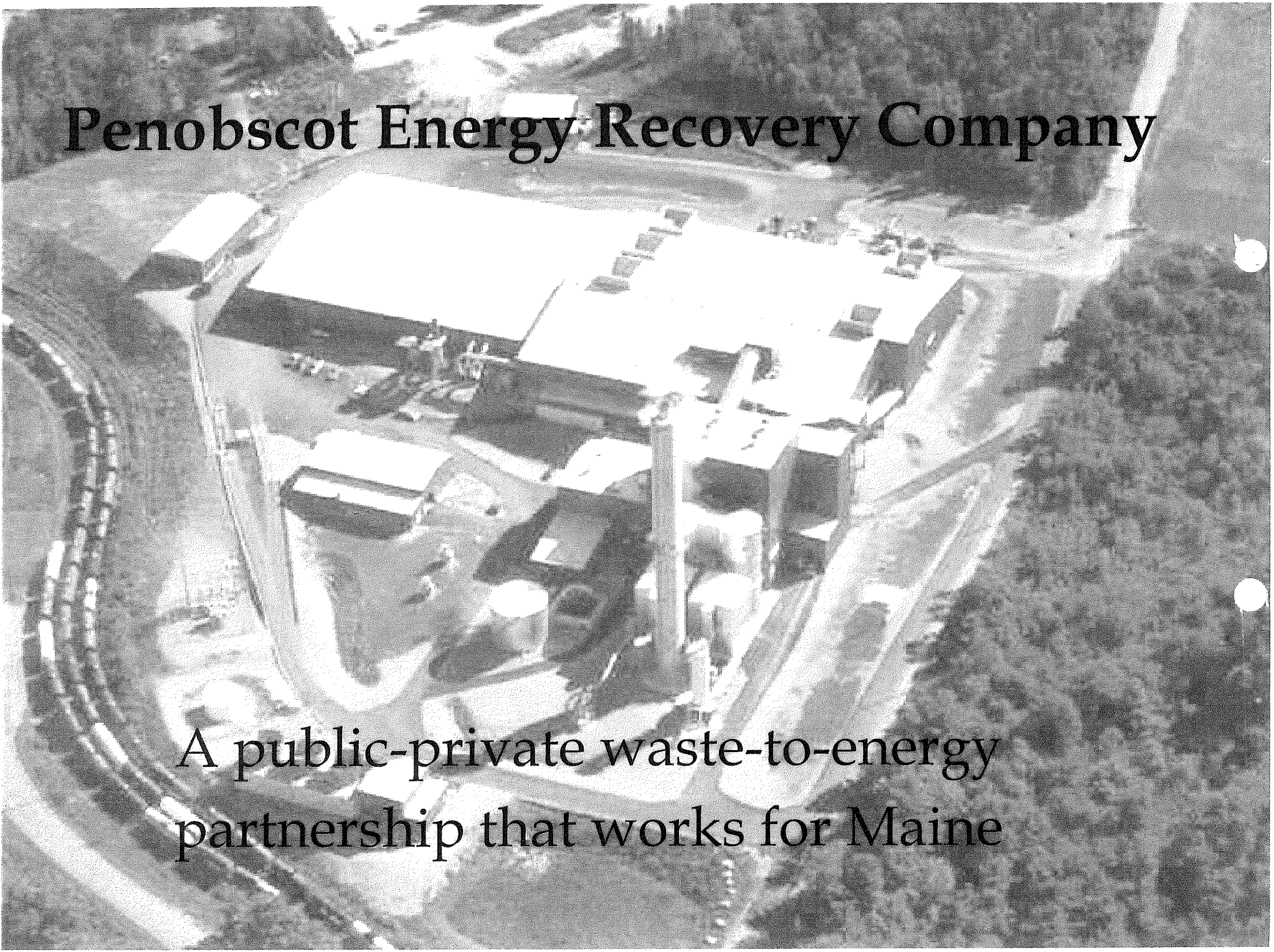
A1	ECM solid waste districts		
1	Boothbay RRDD	1	Boothbay
		2	Boothbay Harbor
		3	Edgecomb
		4	Southport
2	Central Penobscot	5	Bradford
		6	Charleston
		7	Corinth
3	Mid-Coast SWD	8	Camden
		9	Rockport
		10	Lincolnville
		11	Hope
4	Mid-Maine SWD	12	Corinna
		13	Dexter
		14	Exeter
		15	St. Albans
5	Pleasant River SWD	16	Addison
		17	Beals
		18	Centerville
		19	Columbia
		20	Columbia Falls
		21	Jonesport
6	Union River SWD	22	Amherst
		23	Aurora
		24	Great Pond
		25	Osborn
		26	Waltham

A2	Other municipalities served by ECMs		
1	Baileyville	1	Alexander
		2	Crawford
		3	Talmadge
		4	Grand Lake Stream
		5	Topsfield
		6	Baring
		7	Waite
2	Blue Hill/Surry	8	Brooksville
		9	Brooklin
		10	Sedgewick
3	Clinton	11	Benton
4	Waterville	12	Oakland

B	New Charter Municipalities
1	Abbot
2	Bancroft
3	Belfast
4	Bowerbank
5	Castine
6	Cherryfield (B2)
7	Chester
8	Cranberry Isles
9	Dixmont
10	Drew Plt
11	East Millinocket
12	Edinburg
13	Etna
14	Franklin
15	Freedom
16	Garland
17	Harrington
18	Haynesville
19	Howland
20	Hudson
21	Kenduskeag
22	Knox
23	LaGrange
24	Machias (B2)
25	Macwahoc Plt
26	Maxfield
27	Medford
28	Medway
29	Milbridge
30	Montville
31	N.Katahdin (B1)
32	Oakfield
33	Passadumkeag
34	Piscataquis Co.
35	Penobscot Town
36	Searsmont
37	Sebec
38	Sherman
39	Sorrento
40	Springfield
41	Stockton Springs
42	Sullivan
43	Swans Island
44	TCSWMO (B1)
45	Winn
46	Winter Harbor
47	Wiscasset (B2)

B1	New CM Districts		
1	N.Katahdin	1	Moro Plt
		2	Merrill
		3	Smyrna
		4	Mt. Chase
		5	hersey
		6	Dyer Brook
		7	Patten
		8	Crystal
		9	Island Falls
		10	Amity
		11	New Limerick
2	TCSWMO	12	Union
		13	Appleton
		14	Liberty
		15	Washington
		16	Palermo
		17	Somerville

B2	Others served by New CMs		
1	Cherryfield	1	Deblois
		2	Beddington
2	Machias	3	Marshfield
		4	Whitneyville
		5	Rouge Bluffs
3	Wiscasset	6	Alna
		7	Westport

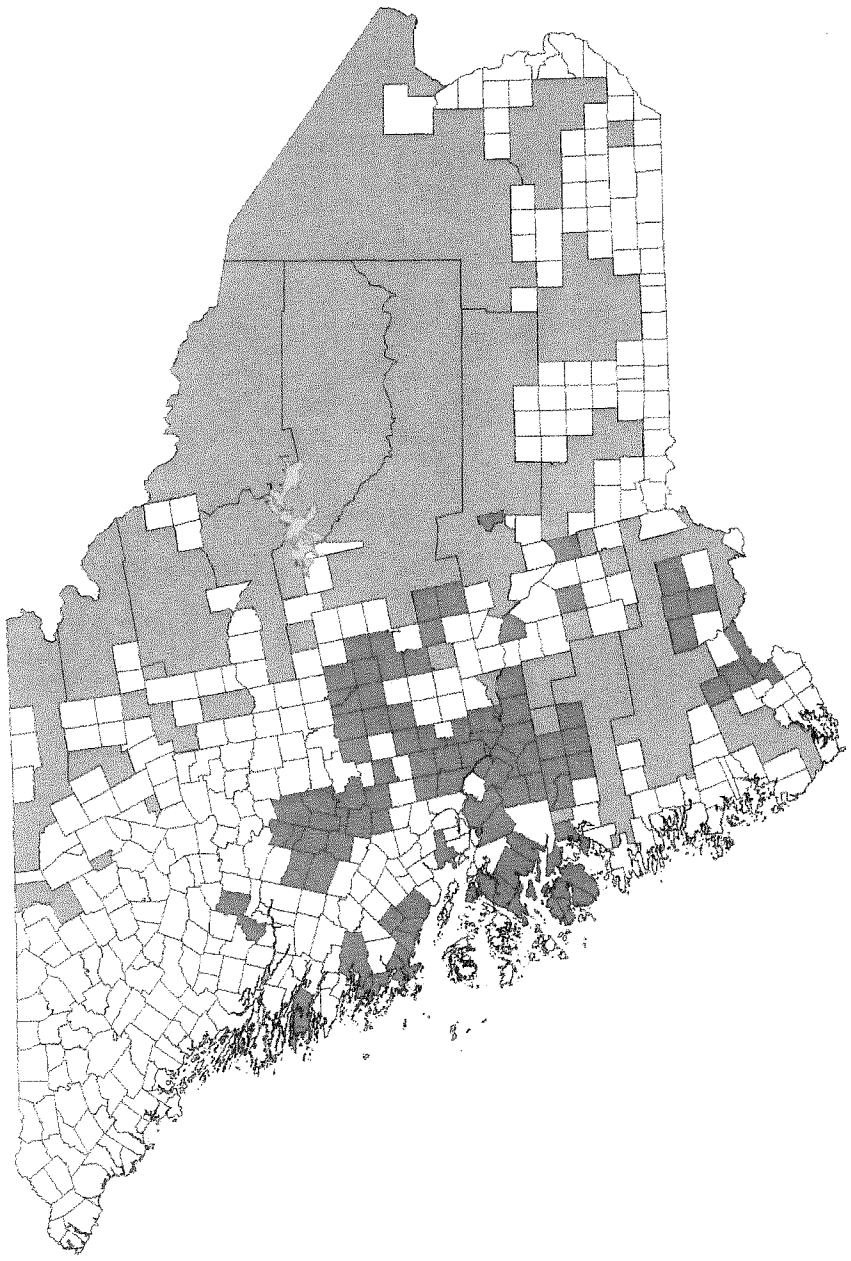


Penobscot Energy Recovery Company

A public-private waste-to-energy partnership that works for Maine

In 1977, 454 unlined town dumps dotted Maine's landscape. These were often located on or next to low-lying wetland areas, abutting streams or near other environmentally sensitive areas. By 1989, with the work of local and state officials that number had declined to 185.

MUNICIPAL REVIEW COMMITTEE
Member Communities ~ 1991



Planning for the Future

In early 1980,communities in the Penobscot Valley began planning for a new waste disposal system.

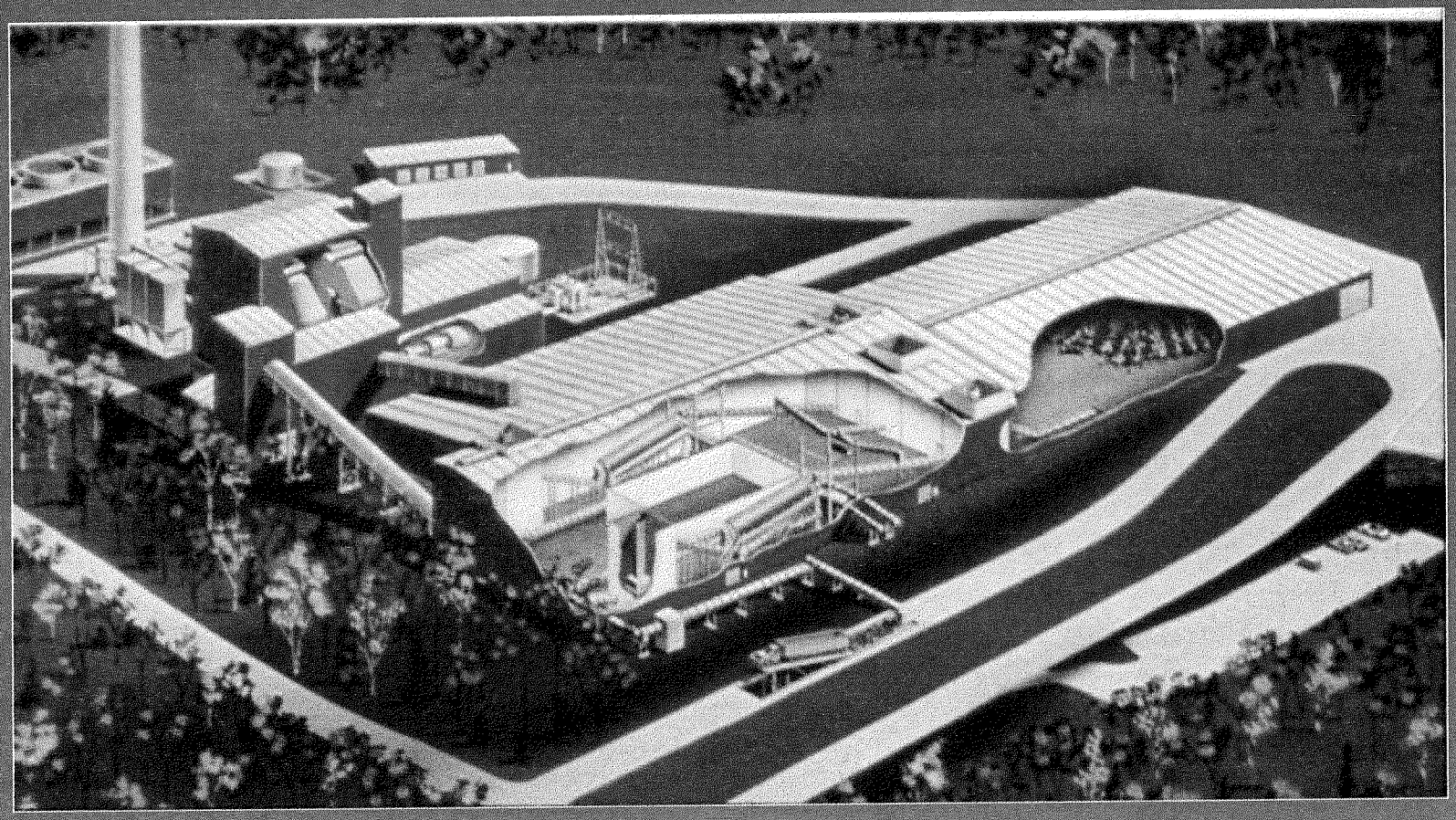
These communities contracted with the Penobscot Energy Recovery Company (PERC) to construct a waste-to-energy facility, which began service in 1988.

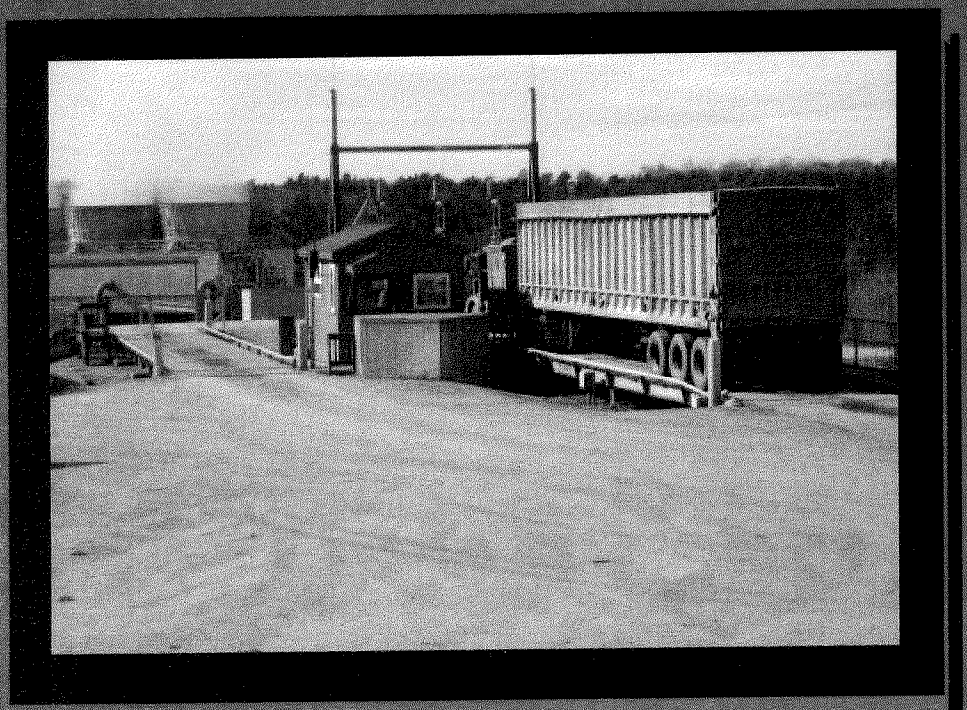
This foresight and planning lead in 1991 to the creation of the Municipal Review Committee, Inc. (MRC), a regional solid waste coalition of 80 communities.

Serving Maine Communities Two Ways

- The Penobscot Energy Recovery Company relieves communities of their waste in an environmentally sound way; and

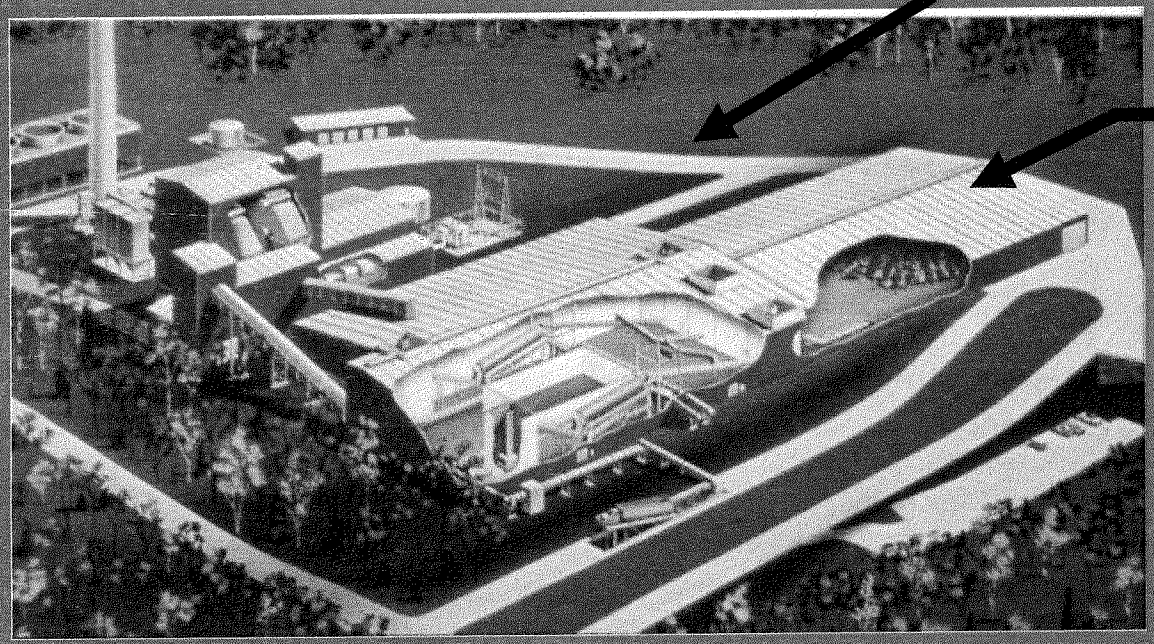
- Through a 30-year power purchase agreement with Bangor Hydro, PERC supplies renewable resource-based electricity to residences and businesses throughout central and eastern Maine.



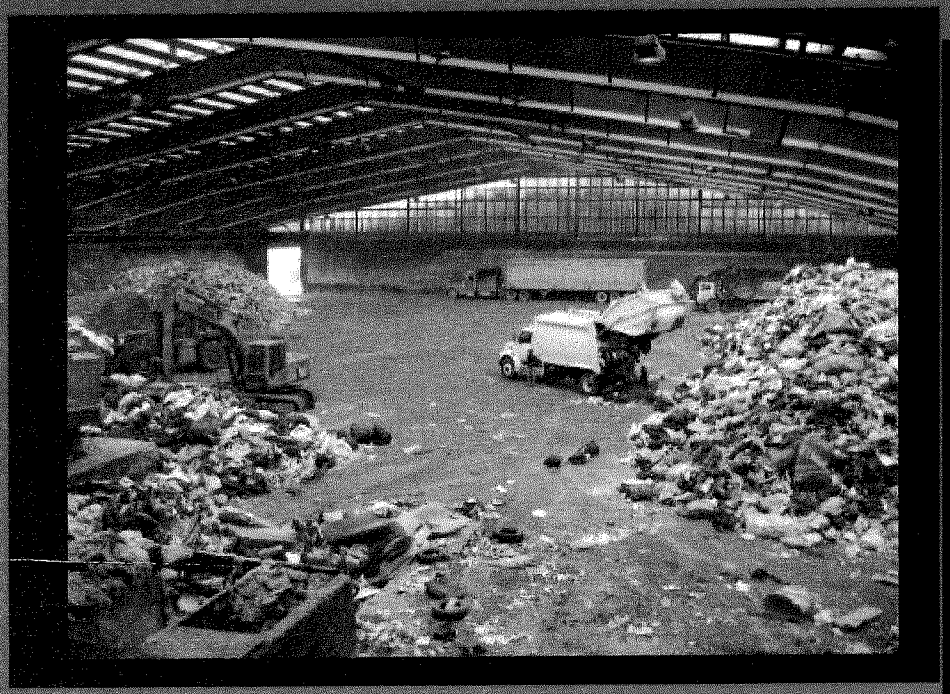


How PERC Works

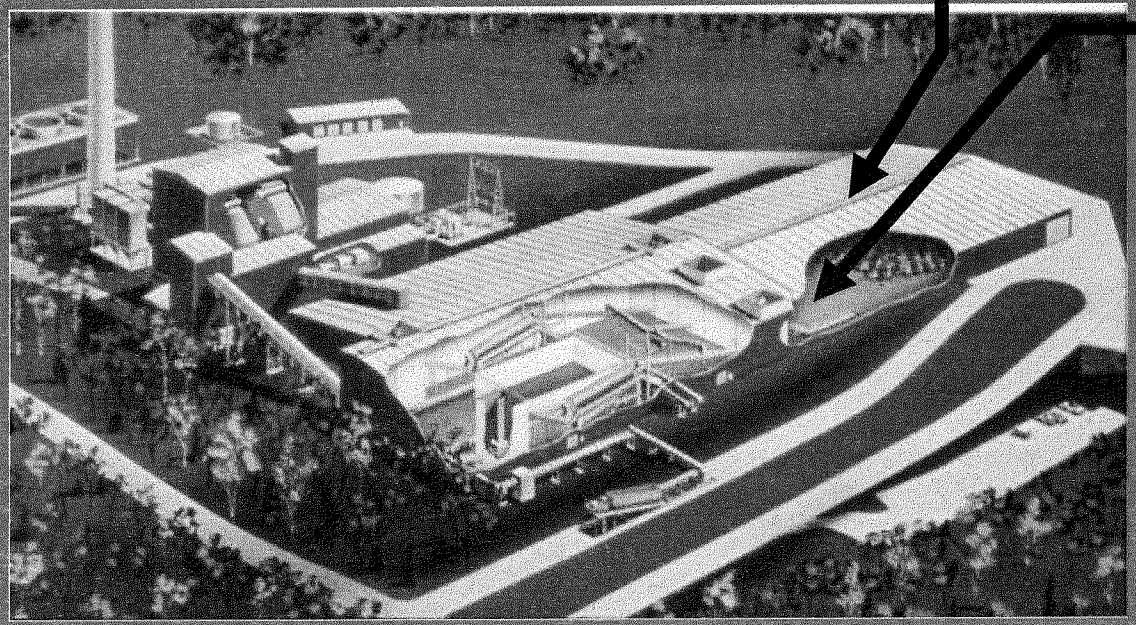
- Each truck carrying MSW is weighed when they enter the facility.
- After these trucks are weighed, the MSW is delivered to the tipping floor.



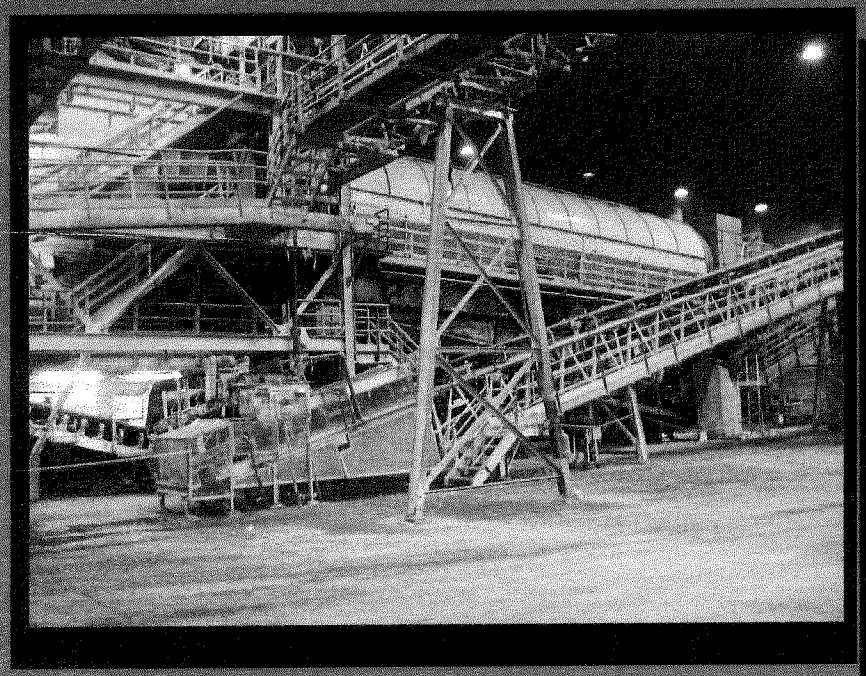
The Process Begins



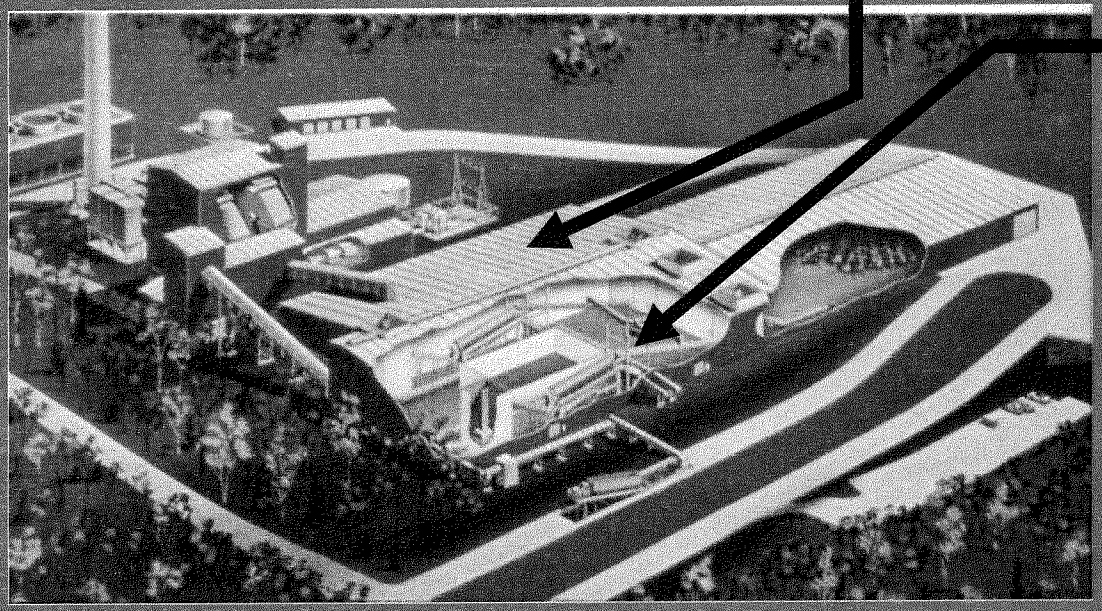
- The tipping building serves as the delivery point and inspection area for the MSW. The over-sized and unacceptable material is sorted out by equipment operators.
- The remaining MSW is fed into the process lines by stationary excavators.

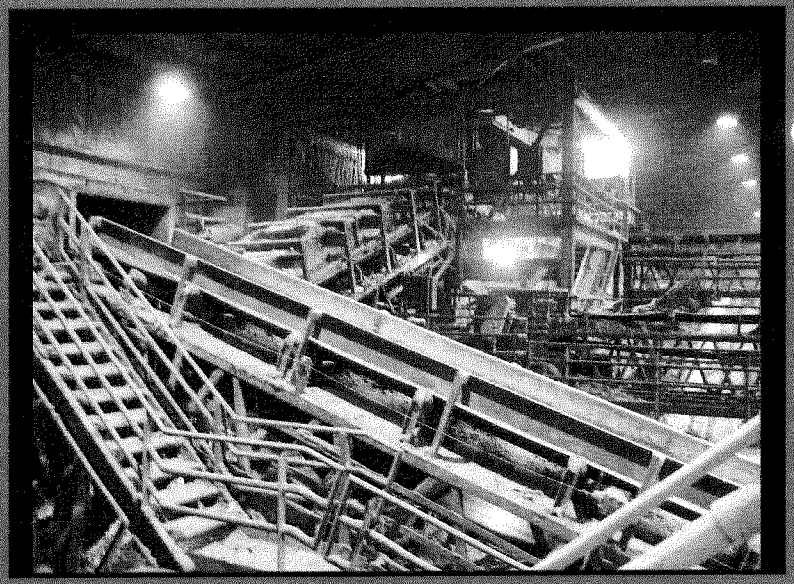


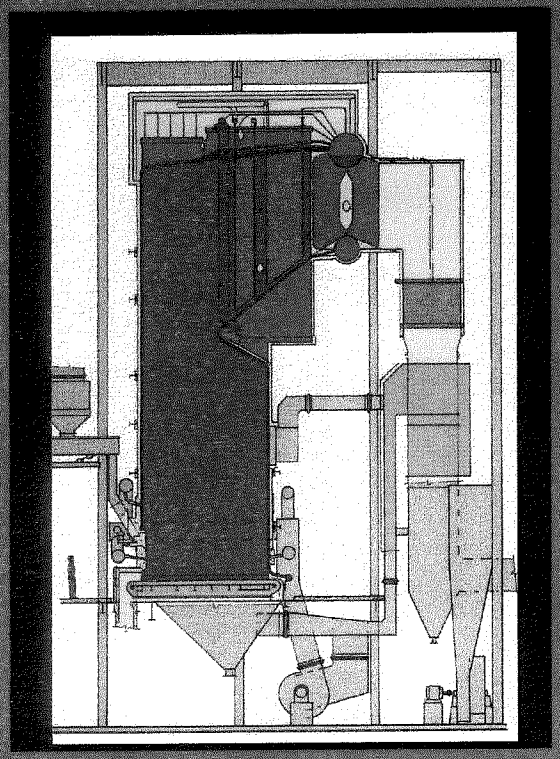
Fuel Process Plant



- PERC has two independent processing lines each consist of flail mills, magnet separators, trommels, secondary shredders and associated conveyors.
- The MSW is shredded and ground into a uniform particle size (RDF) and non-combustible material is separated from the combustible portion of the waste.



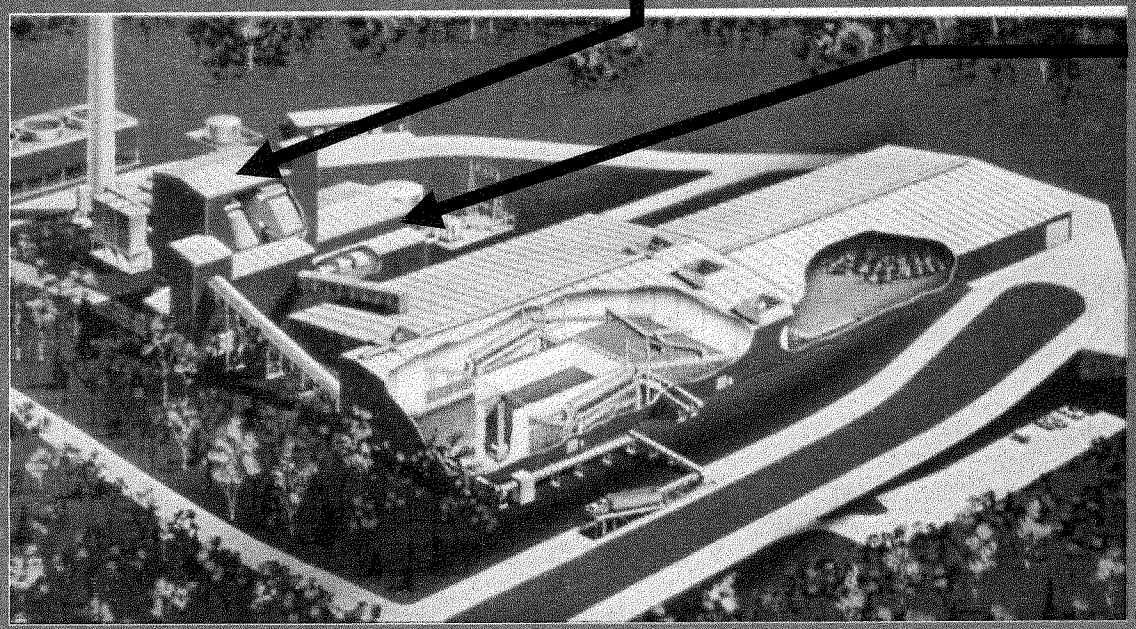


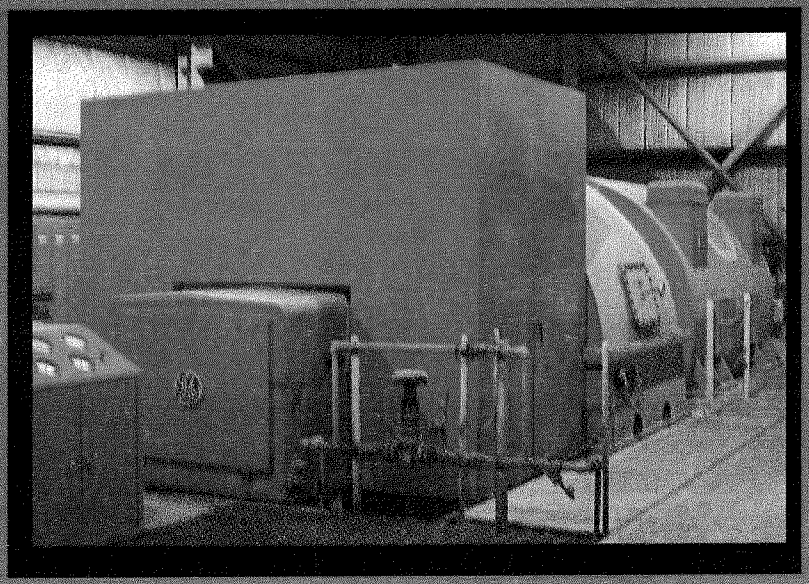


Electrical Generation

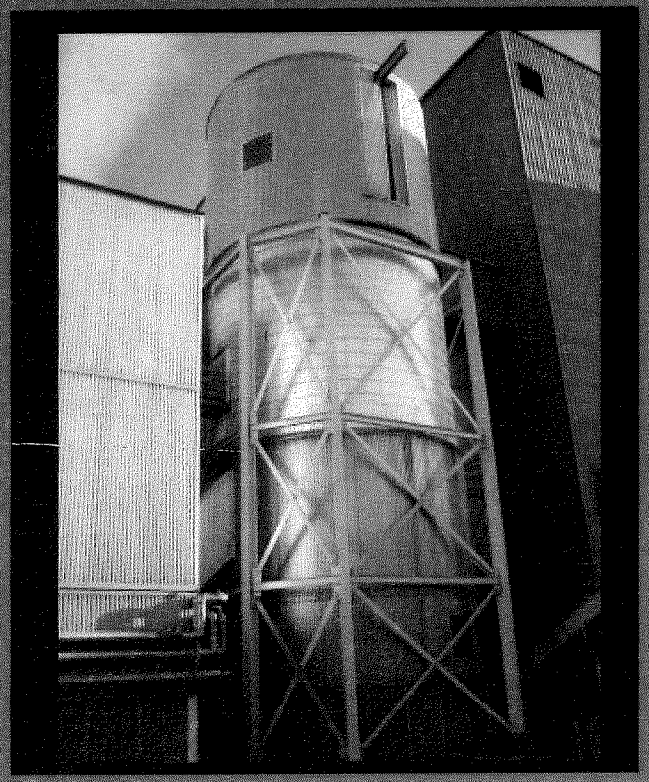
- The combustible portion of the waste, the RDF, is conveyed to the boilers. Steam generated by the boilers drives a steam turbine-generator which produces electricity.

- Electrical power from the turbine-generator is connected to Bangor Hydro's power transmission lines. The steam from these boilers produces over 25 MW gross (21 MW Net) of electrical power.

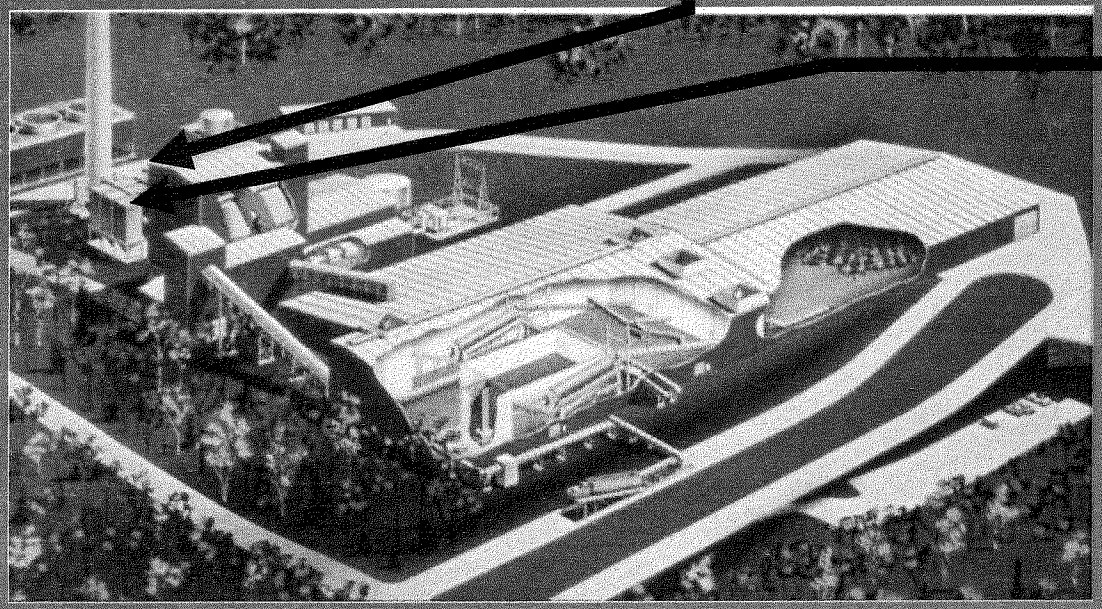




Pollution Control Equipment



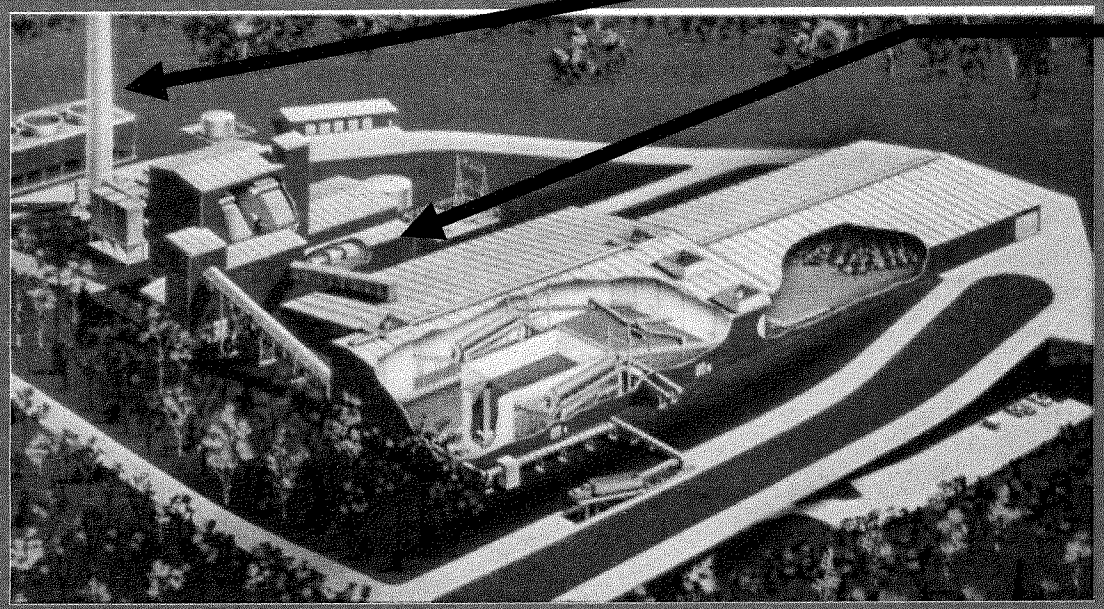
- After the RDF is combusted, the flue gas enters the scrubber, which is the first stage of the air pollution control system. In the scrubber, lime is sprayed into the flue gas to neutralizes the SO2.
- As the flue gas exits the scrubber, it enters the bag house. As the flue gas passes through these bags, particulate matter is removed.
- The flue gas then goes through the stack prior to being released.



Environmental Controls

- Midway up the stack, PERC has Continuous Emission Monitoring equipment (CEM) that monitors the flue gas emissions. The monitoring system continuously samples and analyzes flue gases for environmental compliance.

- Data collected from the CEM equipment is fed back to a computer in the control room. Adjustments are made as needed to maintain compliance with permit limits.



Saving Landfill Space in Maine

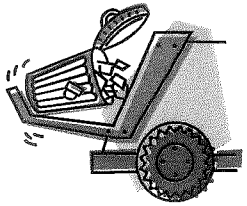
For every ten garbage cans of solid waste delivered to PERC, the waste-to-energy process reduces the volume requiring disposal at the landfill to just one garbage can of residue.

Trash processed through PERC is reduced in volume by about 90%.

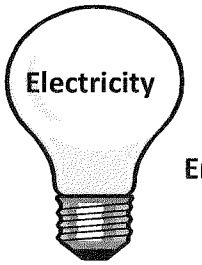

A Waste-to-Energy Partnership
that Works for Maine
The PERC facility works in partnership with communities and haulers to provide reliable, reasonably priced, environmentally responsible waste disposal services to over one-third of Maine households.
PERC
Penobscot Energy Recovery Company
P.O. Box 160, Route 15 River Road
Orrington, Maine 04474
207-825-4566

WASTE-TO-ENERGY CASH-FLOW DIAGRAM

Where it Begins

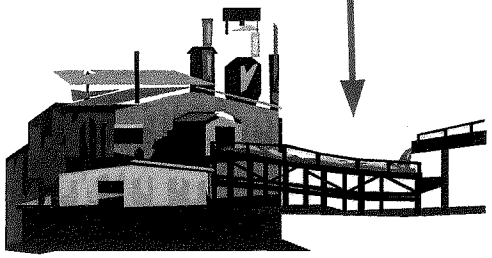


Tipping Fee
Revenue

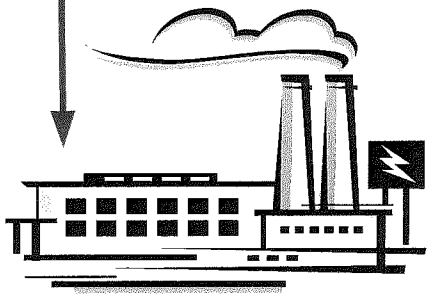


Energy Market
Revenue

Conversion of Waste to Energy



Waste Processing
Expense



Electric Generation
Expense

Energy
End Users

2010 Data Comparing PERC's MSW Deliveries to State Data Related to Municipal MSW Expenses

Municipality	PERC MSW Deliveries①	ME Muni MSW (tons)②	ME Muni MSW Expenses②	ME Cost per Person②	Pop.②
Charter Munis					
Abbot	161.31	229.90	$ 48,374.39	$ 80.22	603
Albion	1,087.88	1,166.75	$ 128,300.00	$ 65.93	1,946
Alton	331.74	331.74	$ 24,545.01	$ 30.08	816
Bailleyville③	1,739.36	1,940.86	Nothing reported	$ -	2,981
Bangor	30,724.32	16,289.12	$ 2,184,083.00	$ 69.40	31,473
Bar Harbor	4,857.86	4,922.76	$ 508,438.00	$ 105.49	4,820
Belfast	1,033.36	2,054.68	$ 220,795.68	$ 34.60	6,381
Boothbay RRDD③	4,536.12	6,147.95	$ 1,300,000.00	$ 183.93	7,068
Bradley	555.12	569.00	$ 83,043.00	$ 66.86	1,242
Brewer	6,782.15	3,399.00	$ 462,129.00	$ 51.42	8,987
Brooks	375.50	384.27	$ 71,931.90	$ 70.38	1,022
Brownville③	663.49	663.49	$ 88,040.00	$ 69.93	1,259
Bucksport③	1,888.12	1,284.18	$ 370,048.00	$ 52.55	7,042
Burnham	660.13	269.00	Nothing reported	$ -	642
Carmel	1,200.51	1,200.00	$ 90,000.00	$ 37.25	2,416
Castine	252.33	503.60	$ 108,316.00	$ 80.65	1,343
Central Penobscot	2,697.93	2,905.93	$ 309,442.79	$ 60.75	5,094
Chester	405.11	405.29	$ 51,904.89	$ 98.87	525
China	1,705.95	1,985.87	$ 290,000.00	$ 70.63	4,106
Clifton	543.18	743.00	Nothing reported	$ -	743
Clinton⑧	2,404.31	1,937.62	$ 166,725.79	$ 14.82	11,253
Dedham	749.83	828.75	$ 127,052.02	$ 89.35	1,422
Dixmont	149.95	164.31	$ 41,607.00	$ 39.07	1,065
Dover-Foxcroft③	2,359.21	2,795.55	$ 298,840.00	$ 45.70	6,539
East Millinocket	795.48	795.48	Nothing reported	$ -	1,828
Enfield	823.33	953.43	$ 132,454.00	$ 81.96	1,616
Fairfield	4,509.15	4,662.25	Nothing reported	$ -	6,573
Franklin	257.96	257.96	$ 40,589.69	$ 18.91	2,147
Freedom	150.65	147.80	$ 49,055.11	$ 76.05	645
Garland	262.03	262.03	$ 5,540.60	$ 5.60	990
Glenburn	2,300.44	2,406.54	$ 356,044.00	$ 89.82	3,964
Gouldsboro	589.05	754.01	$ 100,000.00	$ 51.52	1,941
Greenbush	642.07	857.47	$ 150,000.00	$ 105.56	1,421
Hampden	3,445.08	4,075.20	$ 381,532.00	$ 60.30	6,327
Hancock	465.73	664.52	Nothing reported	$ -	2,147
Harrington	431.50	431.50	$ 92,000.00	$ 104.31	882
Haynesville	60.62	60.62	$ -	$ -	122
Hermon	3,669.66	3,833.11	Nothing reported	$ -	4,437
Holden	908.36	1,031.60	$ 137,519.00	$ 48.64	2,827
Hudson	151.70	151.70	Nothing reported	$ -	1,393
Jackson	193.48	193.48	$ 40,091.77	$ 79.23	506
Kenduskeag	391.22	173.60	$ 48,876.00	$ 41.74	1,171
Knox	363.41	363.41	$ 9,858.46	$ 13.20	747
Lamoine	588.85	588.85	$ 84,944.12	$ 56.82	1,495
Lee	386.82	484.18	$ 78,312.00	$ 92.68	845

2010 Data Comparing PERC's MSW Deliveries to State Data Related to Municipal MSW Expenses

Municipality	PERC MSW Deliveries①	ME Muni MSW (tons)②	ME Muni MSW Expenses②	ME Cost per Person②	Pop.②
Levant	1,020.05	986.40	$ 134,377.00	$ 61.60	2,171
Lincoln	3,721.03	3,870.61	$ 496,280.00	$ 95.05	5,221
Macwahoc Plantation	66.16	66.16	Nothing reported	$ -	98
Mariaville	155.84	155.84	Nothing reported	$ -	414
Mars Hill	985.34	1,444.19	Nothing reported	$ -	1,480
Mattawamkeag	353.67	444.14	$ 79,971.00	$ 96.93	825
Medford	83.64	93.23	Nothing reported	$ -	231
Medway ③	739.57	754.57	$ 120,470.00	$ 67.87	1,775
Midcoast SWD	5,816.72	9,889.00	$ 2,000,000.00	$ 387.00	5,168
Mid-Maine SWD	5,556.82	4,797.00	$ 769,380.00	$ 78.41	9,812
Milbridge	627.23	627.23	$ 105,723.00	$ 82.66	1,279
Milford	1,005.93	1,187.64	$ 177,166.28	$ 60.06	2,950
Millinocket	2,526.94	2,566.94	$ 388,228.00	$ 74.62	5,203
Monson③	211.45	420.88	$ 16,149.76	$ 21.56	749
Montville	104.61	104.61	$ 40,914.07	$ 40.83	1,002
Mt. Desert④	2,172.00	3,002.08	$ 499,280.00	$ 236.74	2,109
Newburgh	741.69	741.69	Nothing reported	$ -	1,394
Northern Katahdin③	1,136.97	1,407.00	$ 290,752.00	$ 66.99	4,340
Old Town	4,573.97	3,037.69	$ 640,000.00	$ 78.72	8,130
Orono	3,928.05	1,439.58	$ 276,643.51	$ 30.36	9,112
Palmyra	1,003.24	1,003.24	$ 123,364.37	$ 63.17	1,953
Parkman	201.46	264.85	$ 51,725.09	$ 63.78	811
Passadumkeag	184.08	186.58	$ 29,000.00	$ 65.76	441
Penobscot Co.	890.93	820.00	$ 188,861.00	$ 130.52	1,447
Penobscot, Town of	573.07	635.91	$ 90,976.00	$ 67.69	1,344
Piscatquis Co.	116.48	146.48	$ 52,872.17	$ 87.97	601
Pleasant River SWD⑤	1,958.16	1,045.21	Nothing reported	$ -	4,887
Plymouth	609.87	609.87	$ 87,961.82	$ 69.98	1,257
Reed Plt	102.85	102.85	$ 24,855.47	$ 120.07	207
Rockland	5,342.44	5,457.25	$ 2,063,421.00	$ 271.18	7,609
Searsmont	178.99	186.99	$ 53,350.00	$ 45.44	1,174
Searsport (+Sawyer)⑥	523.57	699.04	$ 112,665.78	$ 42.66	2,641
Sorrento	61.83	61.83	$ 13,977.80	$ 48.20	290
Springfield	168.33	170.33	$ 25,000.00	$ 65.96	379
Stetson	657.53	661.47	$ 90,007.51	$ 91.75	981
Steuben	582.23	528.23	$ 114,035.77	$ 101.28	1,126
Stockton Springs	463.15	463.15	$ 64,882.00	$ 43.81	1,481
Stonington③	1,063.14	1,063.14	Nothing reported	$ -	1,152
Sullivan	114.90	114.90	Nothing reported	$ -	1,185
Thomaston Group	4,027.15	4,027.15	$ 543,823.00	$ 80.39	6,765
Thorndike	218.70	218.70	Nothing reported	$ -	712
TCSWO	1,472.84	1,795.00	$ 354,459.00	$ 59.36	5,971
Troy	241.38	265.60	$ 58,360.42	$ 60.60	963
Unity	876.75	876.75	$ 37,475.00	$ 19.84	1,889
Vassalboro	1,571.13	1,803.36	$ 289,502.00	$ 71.53	4,047
Verona	312.00	312.00	$ 48,810.29	$ 91.58	533

2010 Data Comparing PERC's MSW Deliveries to State Data Related to Municipal MSW Expenses

Municipality	PERC MSW Deliveries①	ME Muni MSW (tons)②	ME Muni MSW Expenses②	ME Cost per Person②	Pop.②
Waldoboro Group③	3,183.44	3,503.44	$ 572,296.00	$ 76.80	3,503
Waterville (+CapCty100%)⑦	8,534.89	7,974.97	$ 686,530.00	$ 43.99	15,605
West Gardiner	885.29	895.00	$ 197,219.67	$ 67.96	2,902
Winn	232.32	232.32	Nothing reported	$ -	420
Winslow	3,200.49	3,250.49	$ 470,000.00	$ 60.70	7,743
Winthrop	2,646.90	3,159.00	Nothing reported	$ -	6,232
Wiscasset③	1,996.61	2,367.00	$ 508,964.00	$ 101.33	5,023
Sub-Total	**168,975.18**	**158,209.94**	**$ 21,670,163.00**		**311,549**
Other Munis					
Detroit	355.79	355.79	$ 54,141.06	$ 66.35	816
Ellsworth	1,391.04	1,991.52	$ 409,754.16	$ 63.47	6,456
Frankfort	332.11	344.33	$ 45,629.00	$ 43.83	1,041
Monroe	244.18	289.23	$ 36,000.00	$ 40.82	882
Nobleboro/Jefferson③	3,882.47	4,856.26	$ 618,582.53	$ 72.05	8,585
Orrington	1,845.36	1,897.11	nothing reported	$ -	3,526
Pittsfield	2,528.24	1,300.15	$ 408,000.00	$ 96.82	4,214
Warren	987.49	1,542.41	$ 226,700.00	$ 59.75	3,794
Winterport	1,372.48	1,738.06	$ 184,253.25	$ 51.15	3,602
Sub-Total	**12,939.16**	**14,314.86**	**$ 1,983,060.00**		**32,916**
Total Combined	**181,914.34**	**172,524.80**	**$ 23,653,223.00**		**344,465**

①Data about PERC was provided by facility staff.

②All Maine data was obtained from the State of Maine's website. The data from the state does not include commercial. The link is http://www.maine.gov/spo/recycle/data/2010data/Expenses.pdf.

③The report calls this listing a region - uncertain if PERC's municipality covers same population area as report.

④The municipality PERC tracks is Mt. Desert & EMR - that total tonage was 5933.16. Tonnage listed is for Mt. Desert alone.

⑤State's report does not list this as a SWD uncertain if it covers same population area.

⑥The information listed for the state is Searsport only. Sawyer was not on the list.

⑦The information listed include only Waterville.

⑧ State Report has numbers for Clinton/Benton, PERC's community is Clinton only.

Municipal Solid Waste Expenses in Maine

Report: Expenses
Year: 2010

Town/Region	*Municipal MSW Expenses*	*$ Per Person*	*Tons Mun MSW*	*Pop*
Abbot	$48,374.39	$80.22	229.9	603
Acton	$258,194.00	$120.37	967.28	2145
Albion	$128,300.00	$65.93	1166.75	1946
Alfred	$153,401.85	$61.43	1215.8	2497
Alton	$24,545.01	$30.08	331.74	816
Anson	$100,000.00	$38.71	1006.2	2583
AROOSTOOK VALLEY	$14,745.65	$7.88	1068.23	1871
Arrowsic	$33,750.00	$70.75	125.84	477
Arundel	$64,450.00	$18.05	2014.94	3571
Athens	$59,506.74	$70.26	461.06	847
Auburn	$757,499.00	$32.65	8326.22	23203
BAILEYVILLE REGION		$0.00	1940.86	2981
Bangor	$2,184,083.00	$69.40	16289.12	31473
Bar Harbor	$508,438.00	$105.49	4922.76	4820
Bath	$915,000.00	$98.75	1481	9266
Belfast	$220,795.68	$34.60	2054.68	6381
Belgrade	$230,200.29	$77.30	1257	2978
Belmont	$47,548.72	$57.92	433.83	821
Berwick	$495,815.00	$78.04	2479.72	6353
BETHEL REGION	$355,020.92	$118.10	3256.73	3006
Biddeford		$0.00	9551	20942
BINGHAM REGION	$155,742.00	$108.68	1104	1433
BLUE HILL REGION	$753,969.00	$114.15	2416	6605
BOOTHBAY REGION	$1,300,000.00	$183.93	6147.95	7068
Bowdoin		$0.00	309.07	2727
Bowdoinham	$172,012.00	$65.85	319.66	2612
Bradley	$83,043.00	$66.86	569	1242
Brewer	$462,129.00	$51.42	3399	8987
Bridgewater		$0.00	112.58	612
Bridgton	$624,876.00	$127.97	2796.55	4883
BRISTOL REGION		$0.00	2621.26	2644
Brooks	$71,931.90	$70.38	384.27	1022
Brownfield	$0.00	$0.00	806.13	1251
BROWNVILLE REGION	$88,040.00	$69.93	663.49	1259
Brunswick	$333,500.00	$15.75	3654.69	21172

Town/Region	*Municipal MSW Expenses*	*$ Per Person*	*Tons Mun MSW*	*Pop*
BUCKFIELD/SUMNER	$182,254.00	$70.72	1141.51	2577
BUCKSPORT REGION	$370,048.00	$52.55	1284.18	7042
BURLINGTON REGION		$0.00	269	642
Burnham		$0.00	660.13	1142
Buxton	$499,005.28	$66.96	3393.68	7452
Calais	$113,453.00	$32.91	434	3447
Canaan	$115,340.00	$57.18	769.04	2017
Cape Elizabeth	$844,804.00	$93.16	2578.78	9068
Carmel	$90,000.00	$37.25	1200	2416
Carthage		$0.00	203	520
Casco	$337,350.00	$97.25	1165.04	3469
Castine	$108,316.00	$80.65	503.6	1343
CENTRAL PENOBSCOT SOLID	$309,442.79	$60.75	2905.93	5094
CHERRYFIELD REGION	$147,663.00	$119.57	877.25	1235
Chester	$51,904.89	$98.87	405.29	525
Chesterville	$91,076.00	$77.84	567	1170
China	$290,000.00	$70.63	1985.87	4106
Clifton		$0.00	543.18	743
CLINTON/BENTON	$166,725.79	$14.82	1937.62	11253
Cornish	$97,834.39	$77.10	925.32	1269
Cranberry Isle	$98,000.00	$765.63	65.67	128
Cumberland	$394,325.00	$55.08	1648.74	7159
Danforth	$0.00	$0.00	502.69	629
Dayton		$0.00	938.45	1805
Dedham	$127,052.02	$89.35	828.75	1422
Deer Isle	$160,189.97	$85.80	1880.15	1867
Denmark	$117,875.09	$117.41	639.57	1004
Detroit	$54,141.06	$66.35	355.79	816
Dixmont	$41,607.00	$39.07	164.31	1065
DOVER-FOXCROFT REGION	$298,840.00	$45.70	2795.55	6539
Dresden	$27,510.00	$16.93	448.44	1625
Durham	$175,492.00	$51.91	1170.03	3381
East Millinocket		$0.00	795.48	1828
Eliot		$0.00	1398	5954
Ellsworth	$409,754.16	$63.47	1991.52	6456
Embden		$0.00	236.55	881

Town/Region	*Municipal MSW Expenses*	*$ Per Person*	*Tons Mun MSW*	*Pop*
Enfield	$132,454.00	$81.96	953.43	1616
EUSTIS REGION	$121,258.70	$136.25	595	890
Fairfield		$0.00	4662.25	6573
Falmouth	$364,500.00	$35.35	2032.45	10310
Farmington	$69,205.19	$9.34	920.1	7410
Frankfort	$45,629.00	$43.83	344.33	1041
Franklin	$40,589.69	$18.91	257.96	2147
Freedom	$49,055.11	$76.05	147.8	645
Freeport		$0.00	2017.34	7800
Frenchboro	$10,800.00	$284.21	27.28	38
Frye Island	$0.00	$0.00	191.69	70
Fryeburg		$0.00	2027.25	3083
Garland	$5,540.60	$5.60	262.03	990
Georgetown		$0.00	452	1020
Glenburn	$356,044.00	$89.82	2406.54	3964
Gorham	$839,389.12	$59.36	2099.31	14141
Gouldsboro	$100,000.00	$51.52	754.01	1941
Grand Isle		$0.00	0	518
Gray	$750,000.00	$109.97	2996.23	6820
Greenbush	$150,000.00	$105.56	857.47	1421
Greene	$185,466.26	$45.50	1651.21	4076
Greenville		$0.00	766	1897
GREENWOOD/WOODSTOCK		$0.00	1036	2109
Hampden	$381,532.00	$60.30	4075.2	6327
Hancock		$0.00	664.52	2147
HARMONY TRANSFER STATION	$4,177.60	$3.45	104.6	1212
Harpswell	$152,052.00	$29.02	1440.94	5239
Harrington	$92,000.00	$104.31	431.5	882
Harrison	$362,947.00	$156.78	1528.63	2315
Hartford		$0.00	467.69	963
Hartland	$120,187.65	$66.18	757.13	1816
HATCH HILL		$0.00	23377	41785
Haynesville	$0.00	$0.00	60.62	122
Hermon		$0.00	3833.11	4437
Holden	$137,519.00	$48.64	1031.6	2827
Hollis	$359,307.00	$87.34	953.46	4114

Town/Region	*Municipal MSW Expenses*	*$ Per Person*	*Tons Mun MSW*	*Pop*
HOULTON REGION		$0.00	3552.01	10364
Hudson		$0.00	151.7	1393
Indian Township		$0.00	319	676
Industry	$2,366.42	$3.00	273.39	790
Islesboro	$177,226.00	$293.91	610.38	603
JACKMAN REGION	$108,020.00	$81.77	762.33	1321
Jackson	$40,091.77	$79.23	193.48	506
JAY REGION	$993,970.00	$62.12	4492	16001
Kenduskeag	$48,876.00	$41.74	173.6	1171
Kennebunk	$202,194.00	$19.30	3888.53	10476
Kennebunkport	$0.00	$0.00	1508.96	3720
KINGFIELD/NEW PORTLAND	$72,000.00	$28.72	697.29	2507
Kittery	$285,361.00	$29.90	3408	9543
Knox	$9,858.46	$13.20	363.41	747
Lakeville	$20,118.00	$319.33	45.73	63
Lamoine	$84,944.12	$56.82	588.85	1495
Lebanon	$356,735.00	$70.18	2190.72	5083
Lee	$78,312.00	$92.68	484.18	845
Leeds	$52,894.27	$26.43	924.17	2001
Levant	$134,377.00	$61.90	986.4	2171
Lewiston	$1,520,000.00	$42.59	12648.51	35690
Limerick	$258,114.23	$115.23	1401.56	2240
Limington	$407,911.00	$119.87	1580.15	3403
Lincoln	$496,280.00	$95.05	3870.61	5221
Lincoln Plt.	$8,914.44	$193.79	34.35	46
Lisbon	$529,437.00	$58.33	2802.37	9077
Littleton	$76,800.00	$80.42	492.57	955
Livermore Falls	$160,410.00	$49.71	1099.05	3227
Long Island	$87,579.00	$433.56	280	202
LOVELL REGION	$205,401.00	$162.76	747.97	1262
Lubec	$72,569.00	$43.93	686.66	1652
Lyman	$298,350.00	$78.60	1105.47	3796
Macwahoc Plt.		$0.00	66.16	98
Madison	$246,121.00	$54.42	2569.49	4523
Magalloway Plt.	$7,133.50	$192.80	23.5	37
Mariaville		$0.00	155.84	414

Town/Region	*Municipal MSW Expenses*	*$ Per Person*	*Tons Mun MSW*	*Pop*
MARION TRANSFER STATION	$771,331.00	$100.00	10200	7713
Mars Hill		$0.00	1444.19	1480
Mattawamkeag	$79,971.00	$96.93	444.14	825
Mechanic Falls	$110,949.00	$35.36	632.91	3138
Medford		$0.00	93.23	231
MEDWAY REGION	$120,470.00	$67.87	754.57	1775
Mercer	$31,542.82	$48.75	196.73	647
MID COAST SOLID WASTE	$2,000,000.00	$387.00	9889	5168
MID MAINE SOLID WASTE	$769,380.00	$78.41	4797.5	9812
Milbridge	$105,723.00	$82.66	627.23	1279
Milford	$177,166.28	$60.06	1187.64	2950
Millinocket	$388,228.00	$74.62	2566.94	5203
Minot	$2,000.00	$0.89	1228.07	2248
MONMOUTH	$238,838.00	$49.24	1552	4850
Monroe	$36,000.00	$40.82	289.23	882
MONSON REGION	$16,149.76	$21.56	420.88	749
Monticello		$0.00	269.46	790
Montville	$40,914.07	$40.83	104.61	1002
Morrill	$32,780.63	$42.35	244.75	774
Mount Desert	$499,280.00	$236.74	3002.08	2109
Naples	$283,650.00	$86.64	1427.2	3274
New Gloucester		$0.00	2084.07	4803
New Sharon	$89,355.24	$68.89	557.17	1297
New Vineyard		$0.00	135	725
Newburgh		$0.00	741.69	1394
Newfield	$130,000.00	$97.89	822.22	1328
Newport		$0.00	1748.96	3017
NOBLEBORO REGION	$618,582.53	$72.05	4856.26	8585
Norridgewock		$0.00	735.84	3294
North Berwick	$220,236.70	$51.30	689.7	4293
North Haven	$126,962.00	$333.23	356.4	381
North Yarmouth	$289,474.00	$90.18	641.5	3210
NORTHERN AROOSTOOK	$960,543.00	$88.99	9576	10794
NORTHERN KATAHDIN REGION	$290,752.00	$66.99	1407	4340
NORTHERN OXFORD REGION		$0.00	9684.19	13982
Northport	$59,033.00	$44.35	629.77	1331

Town/Region	*Municipal MSW Expenses*	*$ Per Person*	*Tons Mun MSW*	*Pop*
NORWAY/PARIS	$372,392.78	$39.60	2725.46	9404
Oakland	$359,641.00	$60.35	2659.55	5959
Ogunquit	$301,833.03	$246.19	775.84	1226
Old Orchard Beach	$359,198.58	$40.56	4897.57	8856
Old Town	$640,000.00	$78.72	3037.69	8130
Orient		$0.00	115.46	145
Orono	$276,643.51	$30.36	1439.58	9112
Orrington		$0.00	1897.11	3526
Otisfield	$126,522.00	$81.10	671.6	1560
Oxford	$219,596.00	$55.45	1046.72	3960
Palmyra	$123,364.37	$63.17	1003.24	1953
Parkman	$51,725.09	$63.78	264.85	811
Passadumkeag	$29,000.00	$65.76	186.58	441
Penobscot	$90,976.02	$67.69	635.91	1344
PENOBSCOT COUNTY	$188,861.00	$130.52	820	1447
PHILLIPS REGION		$0.00	764.61	1667
Phippsburg	$200,689.00	$95.29	1447.87	2106
PISCATAQUIS COUNTY	$52,872.17	$87.97	146.48	601
Pittsfield	$408,000.00	$96.82	1300.15	4214
Pleasant Ridge Plt.		$0.00	45.38	83
PLEASANT RIVER		$0.00	1045.21	4887
Plymouth	$87,961.82	$69.98	609.87	1257
Poland	$42,985.33	$8.83	1711.56	4866
Portland	$4,368,454.00	$67.99	11533.97	64249
Pownal		$0.00	171.08	1491
PRESQUE ISLE REGION	$1,330,246.17	$90.94	12011.09	14628
Princeton	$70,400.00	$78.92	461.02	892
RANGELEY REGION	$311,811.00	$239.49	1603.11	1302
Raymond		$0.00	1468.74	4299
READFIELD-WAYNE	$237,503.51	$68.41	1350.22	3472
Reed Plt.	$24,855.47	$120.07	102.85	207
Richmond	$34,314.00	$10.40	39.01	3298
Rockland	$2,063,421.00	$271.18	5457.25	7609
Sabattus	$180,996.00	$40.35	858.2	4486
Saco		$0.00	5204.12	16822
Sanford	$1,643,516.00	$78.99	5833.52	20806

Town/Region	*Municipal MSW Expenses*	*$ Per Person*	*Tons Mun MSW*	*Pop*
Scarborough	$1,896,640.00	$111.76	5516.12	16970
Searsmont	$53,350.00	$45.44	186.99	1174
Searsport	$112,665.78	$42.66	699.04	2641
Sebago	$136,276.16	$95.10	655.59	1433
Shapleigh		$0.00	1066.96	2326
Sidney	$69,123.82	$19.67	720.33	3514
Skowhegan	$751,009.00	$85.11	6671	8824
Smithfield	$65,000.00	$69.89	410.52	930
Solon	$61,031.55	$64.93	392.92	940
Sorrento	$13,977.80	$48.20	61.83	290
South Berwick	$150,000.00	$22.49	1121.23	6671
South Portland	$2,292,674.00	$98.30	7202.23	23324
Southwest Harbor		$0.00	2088.17	1966
Springfield	$25,000.00	$65.96	170.33	379
St. George	$520,041.00	$201.57	1561	2580
Standish	$548,646.00	$59.09	3372	9285
Starks	$8,000.00	$13.84	148	578
Stetson	$90,007.51	$91.75	661.47	981
Steuben	$114,035.77	$101.28	528.23	1126
Stockton Springs	$64,882.00	$43.81	463.15	1481
STONINGTON REGION		$0.00	1063.14	1152
Strong	$4,796.79	$3.81	108	1259
Sullivan		$0.00	114.9	1185
Swanville		$0.00	142.77	1357
Sweden		$0.00	0	324
THOMASTON REGION	$543,823.40	$80.39	4027.15	6765
Thorndike		$0.00	218.7	712
Topsham	$394,455.00	$43.35	1094.08	9100
Tremont		$0.00	1172.94	1529
Trenton		$0.00	1388.18	1370
TRI-COMMUNITY		$0.00	14358	24306
TRI-COUNTY	$354,459.00	$59.36	1795	5971
Tri-Town	$295,443.73	$185.93	1710.08	1589
Troy	$58,360.42	$60.60	265.6	963
Turner		$0.00	1573.44	4972
Unity	$37,475.00	$19.84	876.75	1889

Town/Region	*Municipal MSW Expenses*	*$ Per Person*	*Tons Mun MSW*	*Pop*
Scarborough	$1,896,640.00	$111.76	5516.12	16970
Searsmont	$53,350.00	$45.44	186.99	1174
Searsport	$112,665.78	$42.66	699.04	2641
Sebago	$136,276.16	$95.10	655.59	1433
Shapleigh		$0.00	1066.96	2326
Sidney	$69,123.82	$19.67	720.33	3514
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Report to the Joint Standing Committee on
Environment and Natural Resources

126th Legislature, First Session

Waste Generation and Disposal Capacity Report For Calendar Year 2011

February 2013

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Executive Summary

This report is submitted to the Joint Standing Committee on Environment and Natural Resources pursuant to 38 MRS §2124-A. (see Appendix A). It provides an overview of Maine's solid waste generation, diversion, and disposal activities for 2011, and a projection of how those activities will impact available solid waste disposal capacity.

The report includes a projection of the solid waste disposal needs of Maine for the next 3, 5, 10, and 20 years. The report also projects how the fill rate at each solid waste landfill could affect the expected lifespan of that landfill. In addition, the report assesses supracompetitive pricing and its possible implications on solid waste management costs.

The information in this report can assist policymakers with planning for future solid waste disposal capacity investment. This report evaluates Maine's progress toward our waste reduction and recycling goals and the impact on disposal capacity.

Highlights

Solid waste generation is largely tied to a combination of the strength of the economy, our consumption of goods, and economic development activities.

- Maine residents and businesses continue to generate less waste. Total municipal waste generation decreased by 3% from 1,777,498 tons in 2009 to 1,722,160 tons in 2010, and in 2011 declined to 1,675,375 tons.

- At current disposal rates, Maine will need approximately 22.8 million cubic yards of landfill capacity over the next 20 years. The State currently has 17.4 million cubic yards of licensed capacity.

- Maine has capacity in the various public-owned landfills and the commercial landfill together to provide for the disposal of the total wastes generated through 2020. However, not all facilities will have capacity to accept wastes for disposal through that time period.

- Recycling tonnage as reported by municipalities declined slightly from 2010 to 2011. However, the Department has been able to augment the data historically supplied to the State Planning Office by the municipalities with data from other sources. Using this more comprehensive data, Maine's recycling rate for 2011 is calculated to be 41.91%.

I. Introduction

In 2012, 2011 Public Law ch. 655 transferred many of the State Planning Office's ("SPO's") solid waste management and recycling responsibilities to the Department of Environmental Protection ("Department"). These responsibilities include development of the State Waste Management and Recycling Plan, assisting municipalities and businesses with managing solid waste, maintaining an information clearinghouse on recycling markets and services, assisting municipal solid waste incinerators in soliciting waste to meet contractual energy content requirements, review and approval of applications to establish disposal districts, tracking annual waste generation and recycling information from municipalities, and annually reporting to the legislature on the generation of solid waste in Maine, statewide recycling rates and available disposal capacity for solid waste.

Historically, the Department has been responsible for licensing and compliance of solid waste management facilities to ensure appropriate handling of materials. This traditional regulatory approach is designed to protect the environment and public health from pollution. Consolidation responsibilities for waste management planning and recycling provided the Department with an opportunity to apply a more holistic approach to waste management that encourages waste diversion and narrows the stream of waste materials ultimately disposed at landfills. While maintaining a traditional regulatory approach to waste mangement in the Solid Waste Division, the Department created a new Sustainability Division to incorporate the Department's waste diversion and recycling, pollution prevention, product stewardship, toxics reduction, and climate adaptation efforts. The Sustainability Division will coordinate with other Department programs to support the state's waste management hierarchy and other efforts to provide long-term resources for Maine.

By integrating recycling tracking systems together with the Department's broader-reaching oversight of waste handling facilities, systems and diversion programs, the Department has been able to develop a more comprehensive assessment of recycling and diversion of waste from disposal for this year's report.

Waste Management Hierarchy

Maine statute establishes a hierarchy for management of solid waste, to be used as a guiding principle in decision-making. 38 MRS §2101 states:

> 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.

This report discusses the various efforts underway in Maine to divert wastes from land disposal, and provides an assessment of long-term landfill capacity based on current waste generation and recycling rates.

Methodology Utilized Within the Report

The most current, complete data available for this report is from the calendar year 2011, and comes from a variety of sources, including:

- recycling and waste management data submitted by municipalities to the Department in accordance with 38 MRS §2133;
- solid waste data from the public and private processing, composting, and disposal facilities' annual license reports to the Department in accordance with 38 MRS §1304-C, 2205, and 2232, and from other states which receive waste for disposal from Maine;
- data from annual reporting by manufacturers implementing product stewardship programs in Maine; and
- recycling data voluntarily provided by commercial entities.

The Department combines the tonnages of waste processed and disposed, as well as recycled, composted, and reused, to estimate the total quantity of solid waste generated in Maine.

The Department receives landfill capacity estimates from each of the public and private facilities, and annual reports of the amount of waste being disposed at each facility. The Department projects the amount of waste expected to be disposed over time at current disposal rates to estimate the projected life span of each facility. Those calculations are then totaled to provide an estimate of remaining capacity at a statewide level. Further decreases in solid waste disposal rates will, therefore, extend the life span of Maine's disposal facilities.

Lastly, state economic indicators are examined as an alternative to historical data to project future waste amounts. In the past, state economists found a strong correlation between Maine retail sales and waste generation.

Additional assumptions used in making these projections:

- Reuse, recycling and composting tonnages increase as waste generation increases, working towards the State's 50% goal;
- Exported waste tonnages remain at their decade median;
- Continued operation of and reliance on the three remaining waste-to-energy facilities, at their existing mix of tonnages (out-of-state waste, processed residues, etc.); and
- No significant change in municipally-operated landfills.

Factors that would significantly change the projections and assumptions include:

- significant closures or start-ups of waste processing or disposal facilities,
- major swings in market conditions for recyclables, and
- policy changes to increase public and private waste diversion.

One significant facility change occurred in 2012: the Maine Energy Recovery Company (MERC) waste-to-energy facility in Biddeford was sold to the City of Biddeford and subsequently ceased operations in December 2012. The in-state generated municipal solid waste that was being delivered to the facility is now being transferred to other disposal facilities, and the out-of-state waste which went to MERC is no longer brought into Maine. The impact of this closing on demand for disposal capacity in Maine cannot be fully accounted for until the review of proposed changes to other solid waste disposal facility licenses has been completed.

This report focuses on municipal solid waste (MSW) as defined by Maine law. MSW is comprised of household baggable waste and construction demolition debris, including such items as furniture, tires, and metal. The report does include some sludge and ash tonnages considered 'special wastes', since the disposal of those wastes at landfills impacts the disposal capacity remaining at the disposal facility, one of the metrics tracked. Special wastes are wastes that are generated by other than housholds or typical businesses and, due to their quantity or chemical or physical properties, require particular handling. They include primarily ashes, sludges, and some processing wastes. Industrial wastes are not included in this report. Industrial wastes are not part of the waste managed by municipalities.

This was the first year that all municipal solid waste management reports were submitted to the Department for a consolidated review and analysis. The Department has found that some avenues of waste diversion are not reported and, therefore, are difficult to quantify. To estimate recycling, the Department combines municipal, commercial and private recycling tonnages and adjusts the figures to eliminate duplicate counting of recyclables. The calculation is not a precise measurement. Some data are incomplete: as the reporting required by Maine law does not capture recycling by

businesses directly through private brokers and waste management companies, and reporting by municipalities on their solid waste management and recycling is often incomplete. The Department will be establishing a strategy for more comprehensive analysis of Maine's waste stream in the 2014 revision to the state's Waste Management and Recycling Plan.

State Waste Management and Recycling Plan

In accordance with 38 MRS 2122, the Department is required to revise the state's waste management and recycling plan every five years. The state plan contains data on capacity needs and management options. The capacity report annually furnishes updates on those numbers. A key to achieving Maine's statutory waste management goals is having the data available for short-term course corrections (consistent with the state plan) when and where they are indicated by the findings in the capacity report.

The Department will be updating the State's Waste Management and Recycling Plan during 2013. The Department will conduct a broad evaluation of all activities in Maine that divert wastes from disposal and opportunities to support additional waste diversion through regulatory, voluntary, and market-based programs.

II. Municipal Solid Waste

Municipal Solid Waste Definition

Municipal solid waste (MSW) is waste typically generated by households and businesses. It includes household garbage and other waste including recoverable materials such as cardboard, newsprint, office and mixed papers, food waste, plastics, glass, metals, textiles, appliances, furniture, tires, wood waste, and yard waste, as well as construction and demolition debris.

Construction or Demolition Debris (CDD) are the wastes generated by building, remodeling and destruction activities and may include such wastes as wood and wood products, concrete and brick, gypsum board, shingles, and other common components of buildings. Maine includes CDD in its definition of MSW.

Municipal Solid Waste Generation and Management

Every day, approximately 4,600 tons of municipal solid waste is generated within Maine by residential and commercial activity. Maine residents, visitors and businesses generated an estimated 1,675,375 tons of municipal solid waste in 2011, as compared with 1,722,160 tons in 2010. Waste generation is a function of population growth, lifestyles, economic activity, and manufacturing and production practices.

The solid waste management system that receives and manages this waste is a blend of municipal and private service providers that has evolved over the past thirty years. Municipalities are responsible for providing "solid waste disposal services for domestic and commercial solid waste generated within the municipality and may provide these services for industrial wastes and sewage treatment plant sludge." (38 MRS § 1305).

Where each municipality is responsible for providing solid waste disposal services, there is a wide variety and level of systems and programs in place. These services may be provided by the municipality, or by a private contractor. For example, cities utilize curbside collection of trash and recyclables, while most towns provide a transfer station to which residents and businesses can deliver their trash and recyclables. Many municipalities have established cooperative or regional programs and facilities with neighboring municipalities in an effort to benefit from economies of scale.

The same regional approach may also be found with disposal facilities, with ownership varying from public (single municipalty to multiple municipalties) to corporations and even a blend of both, as in the case of the Penobscot Energy Recovery Company facility in Orrington.

Imported/Exported Municipal Solid Waste

Movement of solid waste across state lines is protected under federal interstate commerce laws from state and local restrictions, except that state-owned disposal facilities have the authority to place restrictions on the types of wastes they accept. Municipal solid waste is considered a commodity and is subject to fluctuations of supply and demand at the regional and national level.

In 2011, the following wastes were imported to Maine:

- 264,138 tons of municipal solid waste were brought into Maine and delivered to the four waste to energy facilities to meet their boiler operation needs. (See Table 4 for individual facility's tonnages.) The residuals from the combustion of this waste were landfilled.

- 250,132 tons of construction or demolition debris were trucked to facilities in Maine for processing and reuse, (35,173 tons of which were used as approved alternative daily cover material at a private landfill). The most common action was processing into a wood fuel product as a beneficial reuse activity. Those processing residues that could not be utilized as an alternative fuel were either utilized at landfills as alternative daily cover or were landfilled.

This 514,270 tons total is higher than the 467,725 tons of municipal solid wastes (including CDD) imported in 2010, but less than the 574,345 tons of wastes imported to Maine during 2009. The Department expects less future municipal waste imports due to the closure of the MERC waste incineration facility.

Exports of municipal solid waste and construction/demolition debris have continued to decline, from 43,153 tons in 2009 to 40,916 tons in 2010 and 35,989 tons In 2011.

III. Waste Diversion

Source Reduction

The Department provides technical assistance to businesses, commercial and industrial facilities to evaluate the type and quantities of wastes generated, and opportunities to reduce materials consumption. This assistance is provided during licensing, compliance reviews, and other collaborations with the Department.

Many manufacturers supplying products to Maine are implementing strategies to reduce materials use and waste throughout the lifecycle of their products. Waste prevention strategies reduce wastes generated during manufacturing and distribution,

and produce goods that are more recyclable. Examples of common waste prevention activities include:

- reducing the packaging materials necessary for a product's safe transportation and sale to the consumer;
- downsizing packaging, such as smaller laundry detergent containers holding more concentrated product;
- eliminating duplicative packaging, e.g., a plastic bag within a sealed box; and
- the use of different packaging materials, such as substituting a plastic container for a glass container.

The Department also implements the Environmental Leader program, to promote and recognize efforts by Maine businesses to implement waste reduction and pollution prevention strategies. Businesses receive points toward Environmental Leader certification for practices such as: using only paper that has at least 30% post-consumer recycled content; recycling ink cartridges, used electronics, paper, plastic, glass, metal, cardboard, pallets; composting kitchen wastes; collecting vegetable oil and brown grease for bio-fuel or other energy generation; and eliminating use of styrofoam.

Diversion

The Department also implements many diversion programs, such as Dry mercuric oxide and rechargeable batteries, mercury auto switches, electronic waste, mercury thermostats, and mercury lamps. Details regarding these diversion programs are provided in the January 2013 *Implementing Product Stewardship in Maine* report.

Reuse

Maine residents and companies are adept at maximizing the value from everyday products. The saying 'use it up, wear it out, make it do or do without' has been the mantra for many generations. Reuse stores and businesses are located throughout the state, ranging from nationally established organizations such as Goodwill and the Salvation Army to more locally based operations such as the local thrift or 'gently used garment' stores. Construction supplies have their own reuse opportunities through enterprises such as the Maine Building Materials Exchange and the various ReStore resale outlet facilities operated by Habitat for Humanity. Additionally, many manufacturing and distribution operations 'reuse' materials or products, reducing the amount of waste being generated; for example, reusable plastic delivery 'totes' for shipping products to retailers have replaced single use corrugated shipping cartons.

Many municipalities provide a 'too good to toss' facility at their transfer station or recycling center, supporting the concept that 'one person's trash is another person's treasure'. The ubiquitous 'yard sale' or 'lawn sale' opportunities that are prevalent throughout the state during the warmer months provide for a sizeable reuse opportunity for products and items that might otherwise continue sitting unused or be

simply disposed of. And of course, there's the long-standing tradition of passing clothes along to younger members of a family or sharing with neighbors and friends, again, maximizing the value of products through reuse activities.

Most of these reuse activities occur without any tracking of materials exchanged. If a conservative estimate of 725,577 residences in Maine is used, and an average of one hundred pounds of product(s) are reused annually by each household, this totals 36,200 tons, and would add roughly another two percent to the state's calculated recycling rate.

In accordance with 38 MRS §1304, the Department implements programs encouraging innovative uses of waste materials. Department rules provide streamlined licensing requirements for industrial facilities substituting waste materials for virgin production materials and fuel, and conducting agronomic utilization of ash, sludge and compost. In 2011, beneficial uses occuring in Maine included the use of about 40,000 tons of oil-contaminated soil, 20,053 tons of asphalt shingles, 11,922 tons of sheetrock, and 1,053 tons of boiler ash by mineral materials production facilities in Maine in asphalt and concrete products. Many facilities with boilers and kilns are licensed to burn waste materials such as fuel chips from wood wastes and construction and demolition debris, tire chips, and sludge. More than 20,000 tons of waste materials were burned in licensed boilers in lieu of fossil fuels or biomass. Additionally, 80 waste generators (including muncipal waste water treatment plants and industrial facilities) are licensed to land-apply wood ash, biosolids (waste water treatment plant sludge), papermill sludges and other wastes to 136 agronomic utilization sites.

Composting

The Department provides technical assistance and licensing to municipal, commercial, institutional and industrial facilities that compost organic wastes generated on-site or collected from other sources.

There are almost 150 licensed composting facilities in Maine, including 27 that compost fish and food wastes, and 18 that compost sludge and septage. The volume of wastes diverted to these facilities is impacted by transportation costs. As more composting facilities operate across the state, shorter distances from the waste generators will increase the cost-effectiveness of commercial composting as a waste diversion strategy.

Over 100 facilities are licensed to compost leaf and yard waste, mostly at municipal transfer stations. The Department is actively engaged with more than a dozen towns that are establishing new composting operations, and expects that number to continue to increase. Municipal composting efforts generate soil amendments that are returned to residents, keeping nutrients within the communities where they are produced.

Processing

Processing facilities reduce the volume or change the chemical or physical characteristics of solid waste. Along with reducing the volume of the waste prior to disposal, processing facilities may create materials that can be beneficially used in place of virgin materials in construction products or projects, wood chips for fuel substitution, and commodities that can be sold for manufacturing of new products. Processing facilities include but are not limited to facilities that employ shredding, baling, mechanical and magnetic separation, or other stabilization techniques to reduce or otherwise change the nature of solid waste.

Examples of processing facilities include those that chip used motor vehicle tires and construction and demolition debris (CDD), and anaerobic digesters. In 2011, Maine waste processing facilities produced 25,090 tons of tire chips and more than 23,625 tons of CDD fuel chips to be used in place of fossil fuels and biomass.

Maine has two large-scale commercial CDD processors: KTI Biofuels in Lewiston and the CPRC Group in Scarborough. KTI Biofuels accepts clean wood products and CDD for processing for use as biomass fuel. In 2011, it received 177,581 tons of mixed CDD, of which 10,714 tons were generated within Maine. KTI also accepted 52,398 tons of clean wood waste, of which 10,770 tons were generated in-state. CPRC accepts multiple types of materials and ships out a variety of finished products from its Scarborough facilities, as well as offering mobile or 'on-site' services. In 2011, CPRC accepted 17,784 tons of used asphalt roofing materials, 11,308 tons from in-state sources. There are also several commercial wood chippers that move from site to site and are used to manage brush and clean CDD wood at municipal facilities.

There are two anaerobic digesters operating in Maine: Exeter Agri-Energy and McCain Foods. These facilities process waste materials generated on-site, and from other larger scale generators of organic wastes, such as farms, grocers, restaurants, and bio-fuel manufacturers. Methane gases produced by the waste digestion are used as a fuel source to generate heat and electricity for the facilities.

IV. Recycling

Statewide Recycling Rate

Recycling is defined at 38 MRS §1303-C as "the collection, separation, recovery and sale or reuse of materials that would otherwise be disposed of or processed as waste or the mechanized separation and treatment of waste, other than through combustion, and the creation and recovery of reusable materials other than as a fuel for the generation of electricity."

The statewide recycling rate has historically been calculated by dividing the total amount of MSW recycled (including estimates of composting, reuse, and beneficial use other than fuel substitution) by the total amount of in-state generated MSW. As described previously, this does not take into account significant amounts of materials that are diverted from disposal.

For comparison against previously published estimates, the Department estimates that 702,202 tons of materials were recycled in 2011, or 42% of the waste stream. This is an increase from the 665,315 tons recycled in 2010 as previously reported to the legislature. Much of this increase is due to the opportunity to integrate data from additional sources beyond those traditionally available to and utilized by the former State Planning Office.

The figures used to calculate the recycling and diversion rates for Maine-generated MSW & CDD are:

	tons
MSW landfilled in state	212,836
MSW incinerated in state	351,490
MSW disposed of out-of-state	30,796
Mixed CDD landfilled in state	262,938
Mixed CDD processed/disposed of out of-state	5,193
CDD processing residue- ME component	51,563
Subtotal waste disposed	863,253
Beneficial use of processed CDD as fuel chip	54,960
MSW recycled - reported by municipalities*	116,216
Other MSW recycled (computers and monitors, white goods, metals, tires, vehicle batteries)	273,623
Business waste recycled	284,419
MSW composted (includes leaf & yard waste)	27,944
Total MSW recycled & composted	702,202
Total MSW & CDD generated in Maine	1,675,375
Percent recycled	41.91%
Additional percent diverted from landfilling	3.28%

Appendix B lists the quantities of materials recycled by waste type.

Progress Toward State Goal

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 was revised in 2012 and extended to January 1, 2014. Individual municipal and regional recycling programs are not required to achieve a 50% recycling rate, but they are required to demonstrate progress towards the goal.

Using previous, more limited data collection methods, the calculated recycling rate in 2011 would be 37%. Using this consistent calculation method, Maine's recycling rate has been fairly steady for the past ten years, ranging from a low of 34.8% in 2007 to a high of 38.8% in 2009. However, the rate calculated in this way did not include all forms of recycling that occur at the municipal level, nor statewide. As described above, utilizing additional data sources to account for recycling occurring outside the municipal sector and through product stewardship programs, Maine MSW recycling rate for 2011 is 42%. Note that this rate still does not account for much of the reuse of materials that occurs routinely in Maine. For example, many municipal transfer stations and recycling centers set aside areas for the exchange of used goods, such as furniture, toys and books that might otherwise be disposed of. Many Maine citizens also use larger exchange networks such as *Uncle Henry's* and Craigslist. The Department estimates that more than 36,000 tons of materials each year are reused in this manner.

The State remains committed to reaching the 50% goal in light of the value of reducing overall solid waste management costs, the positive impact on the environment, and a lessening of the need for additional solid waste disposal capacity. The Department created the Sustainability Division to focus resources on programs that will further the state's progress toward this goal.

In addition, the State has a goal to reduce the biennial generation of municipal solid waste tonnage by 5% beginning on January 1, 2009, and by an additional 5% every subsequent 2 years (38 MRS §2132(1-A). This is a biennial goal and the baseline for calculating this reduction is the 2003 solid waste generation data gathered by the former State Planning Office. The State experienced a reduction in the generation of municipal solid waste during the past several years, reflecting the economy and expenditures of residents and businesses. In 2009, the tonnage of municipal solid waste generated was 1,777,498 tons and in 2011 generation was 1,675,375 tons, a difference of 102,123 tons and a 5.75 percent reduction.

V. Disposal

In 2011, Maine's solid waste disposal facilities included: two operating state-owned landfills; one commercial landfill; nine municipally-operated landfills; 19 municipal construction and demolition debris (CDD) landfills; and, four waste-to-

energy facilities. The State has another landfill site, known as Carpenter Ridge, located in T2 R8 that remains undeveloped.

Landfills

Landfills receive a variety of wastes. The types of wastes permitted for disposal differ among the facilities, as requested in their licensing applications. Included in that variety of wastes is: raw garbage; construction and demolition debris; residues, such as front end processing residue and ash from waste to energy facilities; contaminated soils; sludges; ash from biomass 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.

However, in projecting the consumption of landfill capacity, the Department combined the tonnages of the various cover materials and the other special wastes that were landfilled, along with the municipal solid waste tonnages, to estimate the remaining life of the landfills since all these waste types consume landfill capacity. For that reason, those wastes and their impact on landfill capacity are included in this report.

The following table provides details on each of the landfills, the types and tonnages of materials received at each, and remaining disposal capacity, as reported to the Department.

This report provides information for the calendar year 2011. In September 2011, the State acquired the Dolby Landfills in East Millinocket as part of the effort to secure a buyer and operator for the paper mills in East Millinocket and Millinocket. The Dolby landfill's use and capacity is restricted to waste generated from operations at those mills, which is industrial waste, and is not part of the solid waste stream presented in this report.

TABLE 1- ACTIVE LANDFILLS, WASTE TYPES, TONNAGES AND REMAINING CAPACITIES - 2011 DATA								
Landfill	MSW (tons)	CDD (tons)	Special Wastes, Residues	Other cover materials landfilled (cubic yards)	Waste Fill Rate (tons)	Cubic Yards of Capacity Consumed (est.)	Cubic Yards of Capacity Remaining (est.)	Years of Licensed Capacity Remaining at current fill rate
Augusta (Hatch Hill)	26,438		450	17,719	26,888	56,711	1,075,366	17.9
Bath	10,282	1,575	339	18,300	12,196	38,340	298,800	8
Brunswick	3,543			500	3,543	14,286	349,678	24
Presque Isle	5,573	1,283	2,723	1,906	9,579	15,669	284,331	18
Tri-Community	14,460	2,566	1,962		18,988	42,003	1,704,366	41
ecomaine*			43,303		43,303	41,891	1,057,926	23.5
Lewiston		893	35,658		36,551	16,915	627,108	37
Crossroads	70,841	75,967	120,913		267,721	276,524	3,730,095	13
Juniper Ridge	125,565	150,536	427,759		703,860	689,044	5,866,775	8.5
MidCoast Solid Waste (Rockport)		2,822			2,822	7,950	73,175	9
Rockland		25,890			25,890	40,350	242,700	6
Totals	**256,702**	**261,532**	**633,107**	**38,425**	**1,151,341**	**1,239,683**	**15,310,320**	

*ecoMaine excavated 1,418 tons MSW to combust

Municipal CDD Disposal Facilities

There are 19 municipal land disposal facilities that accept locally-generated construction and demolition debris, inert fill, brush, and trees. These operations furnish a 'short-transport' option for the disposal of these wastes. These facilities landfilled a total of 38,579 tons of CDD in 2011, including the 28,712 tons in Rockland and Rockport as listed in Table 1.

The remaining capacity at individual CDD facilities varies, but conversations reflect that landfill space exists for an overall capacity for another 10-12 years. Seventeen of these facilities are small operations, with an operating area of less than six acres, which serve an immediate area's need for disposal of waste wood, construction or demolition debris, inert fill, and similar wastes. These facilities are of local importance, providing a 'nearby' disposal option for these wastes, often at low cost.

Finding acceptable alternatives to land disposal for CDD continues to pose problems in Maine's rural areas. These materials cannot be recycled or reused without investment in equipment, labor, and sufficient land area to aggregate and process them. Markets for processed CDD do exist, but given the often small scale that most Maine towns operate on, with low volume and dispersed facilities, rural operations do not often produce the scale needed for sustainable recycling efforts. CDD that has been processed to produce a fuel substitute product can be used for combustion at licensed industrial facilities. As of this report, RE-Energy (formerly Boralex), Gallop Power Greenville, Sappi (Westbrook), and Perma Treat Corporation are currently licensed for, and utilizing varying tonnages of this fuel substitute

Waste-To-Energy Facilities

In 2011, 32.4% of Maine's municipal solid waste was sent to waste-to-energy (WTE) facilities. Maine's WTE facilities received a total of 822,058 tons of MSW, a decrease of 34,883 tons from 2010. Table 2 and Table 3 provide an overview of the four facilities and the management of the wastes delivered.

At the time of this report, the Maine Energy Recovery Company (MERC) waste-to-energy facility in Biddeford has been sold to the City of Biddeford and is now closed. The in-state generated municipal solid waste that was being delivered to the facility is now being transferred to other disposal facilities.

TABLE 2 - SUMMARY OF MAINE'S FOUR WASTE TO ENERGY FACILITIES - 2011

FACILITY	MUNICIPAL TONS OF WASTE RECEIVED	COMMERCIAL TONS OF WASTE RECEIVED	SPOT MARKET WASTE TONS	OTHER TONS OF WASTE RECEIVED	TOTAL TONS OF WASTES RECEIVED	BYPASS TONS*	FRONT END PROCESS RESIDUE TONS*	METALS RECOVR'D TONS	ASH TONS*	COMBUSTED TONS
Maine Energy	55,019	199,692		4,565	259,276	3,261	42,690	6,226	50,051	157,048
Ecomaine	63,567	68,030	36,328	9,353	177,278	874	N/A	3,301	41,891	131,212
Mid ME Waste Action Corp	37,484	14,313	19,732		71,529	10,572	N/A	2,077	17,673	41,207
PERC	196,420	105,959	11,596		313,975	164	60,624	9,152	55,565	188,570
TOTALS	**352,489**	**387,994**	**67,656**	**13,918**	**822,058**	**14,871**	**103,214**	**20,756**	**165,131**	**518,084**
					% of total	*1.81%*	*12.56%*	*2.52%*	*20.09%*	*63.02%*

* Definitions for these residue streams are found on the next page

The following Table 3 shows the breakdown of source of the wastes received by each Waste-To-Energy facility:

Table 3 - Source of MSW for Waste to Energy Facilities

Facility	In-state tons	Out of State tons	Total Tons
ecomaine	174,312	2,966	177,278
Maine Energy	89,385	169,891	259,276
Mid Maine Waste Action Corp	71,410	119	71,529
PERC	222,813	91,162	313,975
Totals	***557,920***	***264,138***	***822,058***

Waste to Energy facilities combust municipal solid waste to generate electricity. That process generates residues that require disposal in a landfill, but the volume of waste requiring disposal is greatly reduced by as much as ninety (90) percent, and total weight by two-thirds, reducing the need for landfill capacity as compared with landfilling of unprocessed municipal solid waste. The four waste to energy facilities have a combined generation capacity of approximately 62 megawatts of electricity.

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 issues 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 acquire, often through importation, wastes to make up for shortfalls.

As there are changes in any of the current waste-to-energy facilities and their operations, there could be a reduction for both the demand for out of state waste and the disposal associated with its processing. For example, the closing of the Maine Energy incinerator in Biddeford will result in a decrease of about 50,000 cubic yards of ash needing disposal each year. Also the approximately 90,000 cubic yards of MSW from Maine previously managed by MERC (54,000 of which was actually incinerated) will need to be disposed of elsewhere, potentially fulfilling the needs of the other three WTE incinerators which imported about 95,000 tons of MSW in 2011.

WTE Residues

The waste-to-energy facilities produce by-pass waste, front-end process residue (FEPR), and ash. These residues, which require disposal in landfills, comprise approximately one-third of the waste processed by these facilities. The metals are recovered for recycling.

- *Bypass Waste:* Bypass 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 bypassed if there are operational interruptions or facility shutdowns, or if the facility reaches its operational capacity and cannot accept waste that it is contractually obligated to receive. The bypass waste is typically delivered to a landfill for disposal. This category also includes waste that cannot be processed by the facility due to size or composition.

- *Front-end Process Residue:* Maine Energy Recovery Company (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 landfills. Front-end process residue (FEPR) is removed prior to incineration, and may include ferrous metals, glass, grit, and fine organic matter. Mid-

Maine Waste Action Corporation (MMWAC) and *ecomaine* use a 'mass burn' technology and do not produce FEPR.

- *Ash:* Ash is a by-product of combustion, classified as a special waste, and is landfilled. The ash from MERC and PERC is disposed of at the Juniper Ridge Landfill. The ash from MMWAC is disposed of at the City of Lewiston's landfill and *ecomaine's* ash is buried at the *ecomaine* landfill.

V. Future Waste Processing and Disposal Capacity

At 2011 disposal rates, Maine will require an estimated 22.8 million cubic yards of landfill capacity over the next 20 years to manage the municipal solid waste that is directly landfilled, along with the residues generated by the three waste-to-energy facilities and other processing facilities that also require landfilling of residues. The following table illustrates projections of anticipated disposal capacity in Maine at 2011 fill rates, with no adjustment in projections of tonnages of waste being generated requiring disposal.

Table 4: Disposal Capacity in Maine

		3 Years	5 Years	10 Years	20 Years
WTE Facility Capacity	2011 Capacity – available (tons/year)	2014 Capacity – projected remaining (tons/year)	2016 Capacity – projected remaining (tons/year)	2021 Capacity – projected remaining (tons/year)	2031 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	0	0	0	0
PERC – Orrington	304,000	304,000	304,000	304,000[6]	304,000
Total	**854,000**	**544,000**	**544,000**	**544,000**	**544,000**
Landfill Disposal Capacity at current fill rate	2011 Licensed Capacity – end of year (cubic yards)	2014 Licensed Capacity – end of year (cubic yards)	2016 Licensed Capacity – end of year (cubic yards)	2021 Licensed Capacity – end of year (cubic yards)	2031 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	5,866,775	3,799,643	2,421,555	0	0
Juniper Ridge – Old Town (expansion being sought)	Unlicensed	Unlicensed	Unlicensed	Unlicensed	Unlicensed
Municipal Disposal Sites (9)					
7 - Municipal wastefills	3,712,248	3,211,221	2,877,203	2,042,158	372,068

2 - Municipal – 'ash'	1,685,034	1,508,616	1,391,004	1,096974	508,914
Commercial landfills (1)					
Crossroads - Norridgewock	3,726,343	2,888,515	2,329,963	933,583	0
Total	14,900,400	11,407,995	9,019,725	4,072,715	880,982

VI. Disposal Prices

Disposal Fees

Disposal expenses are comprised of collection and transportation costs and tipping fees on the disposal of waste. Disposal fees or tipping fees are a major factor in solid waste management costs for municipalities and businesses. Current disposal fees range from $40 to $135 per ton at Maine's landfills and waste-to-energy facilities. These have stabilized in most instances, allowing predictability for municipal budgeting and long-term planning.

Tipping fees at each of the four waste-to-energy facilities have been 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 services agreement with Casella Waste Systems, established a ceiling for tipping fees that sets an upper limit on how much can be charged for wastes delivered to the Juniper Ridge Landfill, which has had a stabilizing impact on pricing for the disposal of similar materials at other solid waste facilities.

Tipping fees at waste-to-energy facilities are influenced by revenues received from the sale of the electricity they generate. The revenues reduce operating expenses, yielding a reduction in the tip fee charged for solid waste. Should electricity sales revenue drop, tipping fees may increase. Conversely, should the electricity sales value increase, the possibility exists that lower tipping fees, or maintaining current fees, would occur.

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 Department 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

supracompetitive disposal fees, because disposal prices have not experienced any significant changes during the last three years. The Department maintains a firm awareness of its responsibility to stay attuned to the possibility of supracompetitive pricing.

Appendix A

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, 2013 and annually thereafter, the department shall submit a report to the joint standing committee of the Legislature having jurisdiction over natural resources matters and the Governor 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 department determines that a decline in available landfill capacity has generated or has the potential to generate supracompetitive prices, the department shall include this finding in its report and shall include recommendations for legislative or regulatory changes as necessary.

Beginning on January 1, 2013 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.

Beginning on January 1, 2014 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

Appendix B

Quantities Recycled by Waste Type

Recyclables reported by municipalities	Tons of each waste type
Aluminum cans/foil	1,183.60
Brown/amber glass	0.91
Clear glass	276.33
Co-mingled containers	1,018.84
Co-mingled paper & OCC	1,197.72
Computers and Peripherals	510.89
Corrugated carboard (OCC)	29,703.64
Green glass	1.40
HDPE (#2) plastic	883.57
LDPE (#4) plastic	288.08
Magazines (OMG)	147.80
Mixed electronics	80.45
Mlxed Glass	2,384.40
Mixed newspapers & magazines	9,850.76
Mixed paper grade	7,293.39
Mixed plastics	969.39
Mixed recycleables/Single stream	39,019.35
Newspapers (ONP)	7,415.57
Office paper grade	860.01
PETE/PET (#1) plastic	450.90
PVC (#3) plastic	145.16
Steel Cans	1,016.74
subtotal reported by municipalities	**104,698.90**
Other recyclables	
Metals	84,405.00
Metals - ferrous	132,841.00
Metals - non-ferrous	7,179.19
WTE metal recovered	11,724.48
Batteries - rechargeable	17.14
Vehicle Batteries	2148.33
Tires	16,983.83
Monitors & TVs	18,324.00
subtotal other recyclables	**273,622.97**