

MAINE STATE LEGISLATURE

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**1999 Solid Waste Generation and
Disposal Capacity Report to the
Joint Standing Committee on Natural Resources
of the 120th Legislature**

State Planning Office
Waste Management & Recycling Program
38 State House Station
Augusta, Maine 04333-0038
(207) 287- 8050

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STATE OF MAINE
 EXECUTIVE DEPARTMENT
 STATE PLANNING OFFICE
 38 STATE HOUSE STATION
 AUGUSTA, MAINE
 04333-0038

ANGUS S. KING, JR.
 GOVERNOR

EVAN D. RICHERT, AICP
 DIRECTOR

February 1, 2001

120th Box 2

Honorable Senator John L. Martin, Chair
 Honorable Representative Scott W. Cowger, Chair
 ✓ Members of the Natural Resources Committee

Dear Senator Martin, Representative Cowger, Committee Members:

I am pleased to present to you the 1999 Solid Waste Generation and Disposal Capacity Report. This biennial report, prepared and submitted under MRSA Title 38, Chapter 24, § 2124-A, provides details and perspectives on the volume and types of municipal solid waste being generated in Maine as well as how that waste is being managed.

The report shows that even though recycling and composting efforts continue to improve, the overall municipal solid waste tonnage produced by Maine residents and businesses increases at a faster rate. Issues and perspectives on landfill disposal capacity and incinerator tonnage processed are presented and discussed.

This report also includes the exploration of other matters relating to the management of the municipal solid waste stream in Maine, including:

- Recycling Efforts in the State - What is happening and what may be needed to reach the 50% goal;
- Toxicity in the municipal solid waste stream and efforts to reduce it; and
- Product Stewardship – a discussion and application of this management strategy

Should you have questions on this report, or would like a presentation to the committee on it, please contact me or George MacDonald, Manager of the Waste Management & Recycling Program.

Thank you.

Evan D. Richert, AICP
 Director

Attachment



DESIGN BY: [unreadable]

OFFICES LOCATED AT: 184 STATE STREET
 Internet: www.state.me.us/spo

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I. Executive Summary

The purpose of the Solid Waste Generation and Disposal Capacity Report is to analyze how communities and businesses in Maine are managing their solid waste; identify potential future issues; and, measure Maine's recycling progress up through 1999.

The municipal solid waste volume generated by residents and businesses continues to increase, yet the physical ability to incinerate and landfill that solid waste is not just static, but decreasing, in regard to landfill capacity. Recycling efforts, along with waste reduction activities and composting, continue to divert a significant portion of the state's solid waste stream from the existing processing and disposal facilities. However, these alternative waste management strategies are unable to totally reduce our dependence upon disposal facilities for the foreseeable future.

Some of the significant findings from the report include:

- Maine residents, businesses and visitors generated 1,696,006 tons of Municipal Solid Waste (MSW) in 1999, up from 1,635,136 tons reported in 1997 and an increase from 1,293,401 tons in 1993. This increase from 1997 is largely due to a combination of economic growth and improved collection of MSW disposal data.
- 40.4% of the municipal solid waste stream was recycled in 1999, which is down from the 1997 state-wide rate of 42%. Recycling efforts continue to increase, from 680,000 tons in 1997 to 685,000 in 1999, but have been unable to keep pace with the increase in MSW generation. Maine still ranks among the top 10% of states ranked by percentage of municipal solid waste recycled.
- The ban on new commercial landfills and the closing of licensed and unlicensed landfills has left 10 MSW remaining landfills in Maine (8 municipal & 2 commercial). The total amount of Maine-generated MSW (which includes garbage, front end process residue and construction/demolition debris) managed through landfilling was 376,924 tons. An additional 28,670 tons of MSW from out-of-state sources were landfilled in Maine.
- Municipal solid waste incinerators received and processed 809,884 tons of MSW (of which 140,039 tons were from out-of-state). 91,274 tons of MSW were exported during 1999 to facilities in neighboring states and the Province of New Brunswick.
- There are two commercial landfills serving the state – the Waste Management Inc. (WMI) Crossroads landfill in Noridgewock, and the Sawyer Environmental Recovery Facility (SERF) in Hampden. WMI is in the process of applying for additional landfill disposal capacity, while the expansion for SERF (approved by the Maine Department of Environmental Protection) was recently approved by the Hampden Town Council, pursuant to the decision rendered by the State Supreme Court.

II. Introduction

The Maine State Planning Office (SPO) is required by 38 M.R.S.A. 2124-A to report to the legislature on:

- statewide generation of solid waste;
- statewide recycling rates; and
- available disposal capacity.

The subject of this report is consistent with the goals and objectives of the State Planning Office's strategic plan for the Waste Management and Recycling Program. The stated goal is to:

"Plan for changes in waste management trends that ensure sufficient and economically-viable disposal and recycling capacity, improve and support SPO's municipal technical assistance programs, and provide analyses and policy recommendations to the legislature."

The calculation of the solid waste generation and the recycling rate includes Municipal Solid Waste (MSW) only (i.e. special waste is excluded from the calculation). MSW is the waste typically generated by households and businesses and managed by municipalities. It includes nonbulky waste (corrugated cardboard, newsprint, office paper, mixed paper, food waste, plastics, glass, metals and textiles) and bulky waste (tires, appliances, furniture, wood waste, yard waste, inert fill, and construction and demolition debris).

In evaluating generation rates, management strategies and disposal capacity, this report addresses both MSW and certain special wastes (primarily ash from MSW incinerators) disposal issues. Current operating solid waste disposal facilities include 4 waste-to-energy incinerators, 8 municipal landfills permitted to accept MSW, (6 of which are permitted to accept special waste as well as is the RWS landfill), and 2 commercial landfills permitted to accept municipal solid waste (including construction/demolition debris) and special waste.

III. Statewide Waste Generation and Recycling Rate

A. Methodology

Overview

Since 1989, Maine law has charged the State, (State Planning Office), with analyzing and preparing a plan for the management, reduction, and recycling of solid waste for the State. In response to this directive, the State has kept a census of the percentage of municipal solid wastes recycled in Maine. This census is part of the ongoing effort of the State to reach a recycling goal of 50% of the municipal solid waste stream and to track progress toward achieving this goal.

In 1992, the State's first formal assessment of the recycling effort in Maine consisted of a Broker's Survey and a composition study of municipal waste. In 1993, the State once again conducted a survey for private recyclers, supplementing that information with municipal recycling data. This process is repeated biennially. An outside consultant is hired to conduct the Broker Survey to provide confidentiality of information provided by the private sector. This survey is used to gather the tonnage of municipal solid waste generated in Maine that is managed by private recycling companies. The state has four data years of solid waste information based on the methodology outlined in this report.

This information is used in conjunction with data collected from Municipal Solid Waste Annual Reports, which is also used to calculate individual recycling rates for municipalities and regions. Maine municipalities are required to report MSW disposal and recycling data for their municipal solid waste management activities and have been very cooperative in providing data via the Municipal Solid Waste Annual Reports. The private sector waste management and recycling companies have been helpful in completing the needed data requests initiated by the outside consultant.

MSW Generation

The amount of wastes generated within and managed by municipalities, including recycling, is reported annually by municipalities to the State Planning Office. This information is then combined with the data derived from the Broker's Survey and other sources to form an estimate of the level of waste generation and recycling in Maine; these other sources include the annual reports of disposal facilities (landfills and incinerators) and disposal data from neighboring state and provincial governments. The estimated statewide solid waste generation combines the amount of waste disposed (incinerated, landfilled and exported), recycled, composted, and reused.

Recycling rate

The recycling rate was derived by using recycling and disposal data in conjunction with the following formula:

$$\text{Recycling Rate} = \frac{(\text{recycling})}{(\text{disposal} + \text{recycling} + \text{reuse})} * 100$$

This process is not a precise measurement. Some data is incomplete, particularly for composting and reuse efforts in the public sector and certain recycling activities in the private sector. Additionally, adjustments were made to try to eliminate duplicate counting when material moves from a broker to an in-state end-user. Although there may be errors in the estimates for some individual materials, SPO estimates that the overall result is accurate to within two (2) percentage points.

B. Statewide MSW Generation

Maine residents and visitors generated 1,696,006 tons of MSW in 1999; this is an increase over the 1,635,000 tons of MSW generated in 1997 and 1,293,401 tons in 1993. MSW management methods and amounts for 1999 (disposal, recycling, and generation) are outlined in **Figure 1**. These numbers were adjusted to account for imports and exports across state lines in order to include only waste generated in Maine.

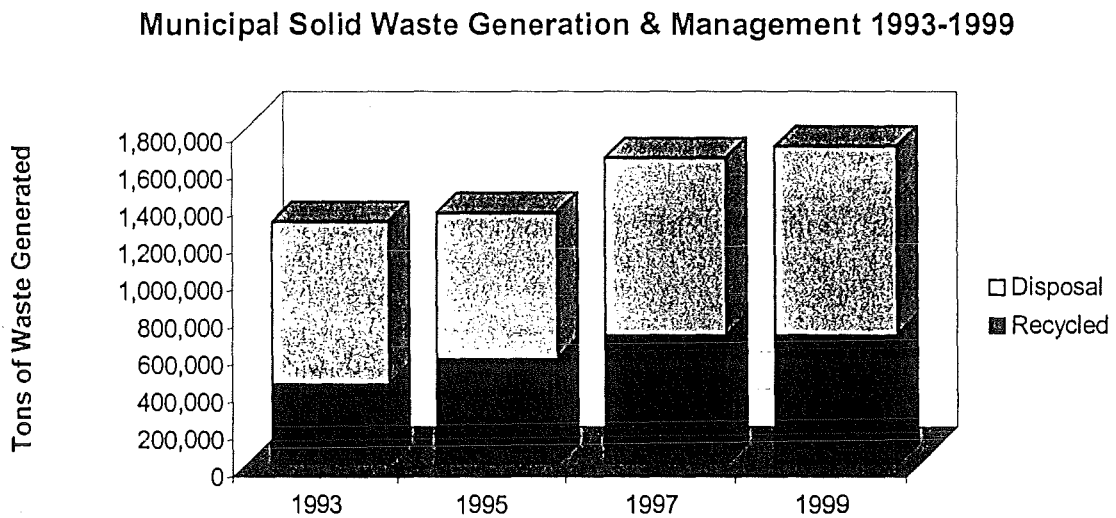


Figure 1

C. Statewide Recycling rate

Based upon information and data received, the State Planning Office estimates that 40.4% of the municipal solid waste was recycled in 1999. This reflects an approximately 1.5 percentage point decrease from the statewide recycling rate determined in 1997. There has been a shift in some of the categories of materials recycled but the overage tonnage reported as being recycled or reused has not significantly changed since 1997. The total of recycled material has risen only slightly, from 679,878 tons in 1997 to 684,621 tons in 1999, not quite keeping pace with overall MSW generation rates. The material breakdown and totals for recyclables in 1993, 1995, 1997, and 1999 are displayed in **Figure 2**:

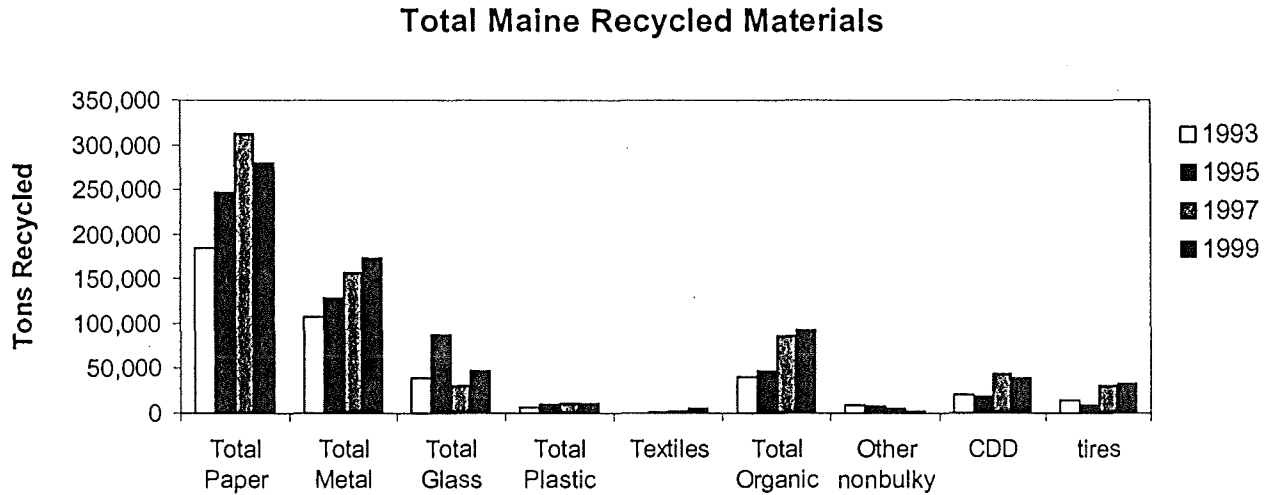


Figure 2

Methodology: Maine versus U.S. EPA in Determining Statewide Recycling Rate

The U.S. EPA has considered developing standards for measuring MSW recycling on a national basis but has run into considerable opposition from many states because of the possible 'realignment' and loss of credit due to change in applicable categories. Under EPA guidelines, construction and demolition debris (CDD) is treated as a separate category and not as part of MSW. However, Maine statute includes CDD in its MSW definition. These methodologies were applied to calculate each recycling rate in **Table A**. Using guidelines set forth by the EPA results in a recycling rate of 43.1%.

MAINE STATE RECYCLING RATE -- 1999

Recycling rate = recycled/generated (disposed + recycled + exported)

MAINE STATE GUIDELINES		EPA GUIDELINES (CDD not included)	
MSW with CDD disposed	1,696,006	MSW w/o CDD disposed	1,496,529
MSW recycled	684,621	MSW recycled	684,621
		less CDD	39,469
		Recycled:	<u>645,152</u>
RECYCLING RATE:	40.4%	RECYCLING RATE:	43.1%

Table A

Maine still ranks among the top 10% of states ranked by percent of municipal solid waste recycled. This high status is the result of teamwork on the part of many organizations in the public and private sectors and very clearly demonstrates that recycling is an important part of the established waste management infrastructure. It also underscores the importance and value of having strong and consistent markets for the recyclables managed by Maine municipalities and businesses. Without strong markets for recyclables, the resulting increased disposal needs of Maine communities could quickly disrupt the existing solid waste management system.

D. Progress Towards Achieving State Goals.

MSW management and the hierarchy

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

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

Figure 3 displays MSW management methods for 1999. The majority of exported MSW is landfilled.

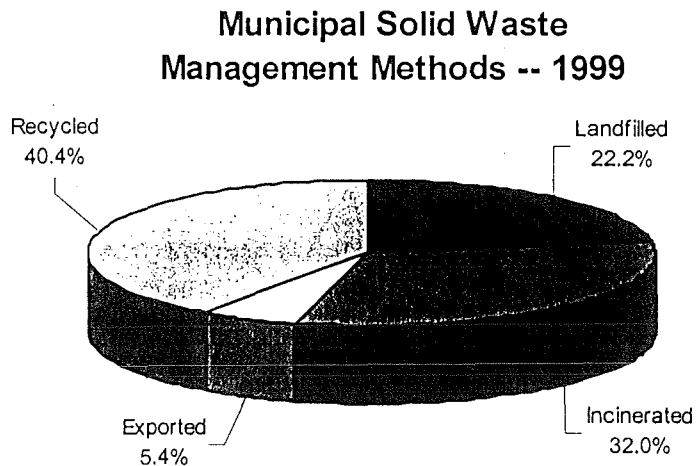


Figure 3

In evaluating the state's progress towards implementing the hierarchy; a comparison was made of MSW generated, recycled (materials reused, composted and recycled), and disposed (landfilled or incinerated) for 1993, 1995, 1997, and 1999 (**Figure 4**). It demonstrates that recycling has continued to grow at a rate consistent with the MSW stream. Though the state-wide efforts have been able to slow down the growth of solid waste requiring disposal, there are still opportunities to reduce the volume of MSW delivered to incinerators or landfills.

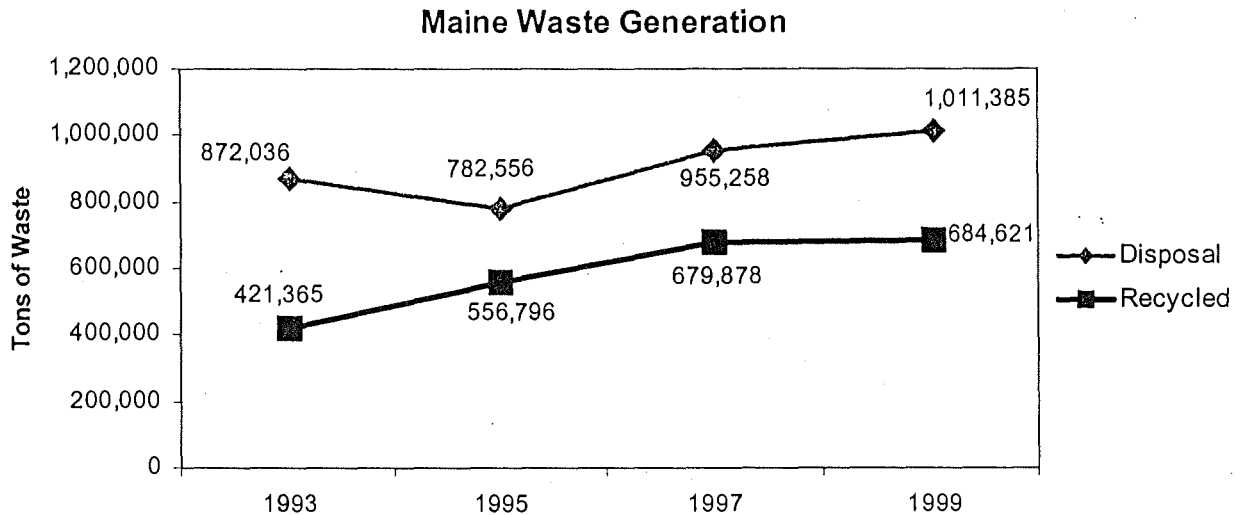


Figure 4

A Perspective on the Value of Recycling

It is important to keep in mind that each ton of solid waste that is diverted from disposal, whether reused, recycled or composted, is one less ton of solid waste that requires disposal. When the tonnage of reused, recycled and composted solid waste is considered in light of the disposal capacity required to accept that material, the value of these actions becomes very clear. By implementing these other waste management strategies (actually resource management strategies), we have reduced the need for and our dependence upon incinerators and landfills for the disposal of these materials.

State Recycling Goal

In 1989, the Maine State Legislature established the goal of recycling 50% of the state's municipal solid waste. This goal was set in response to Maine's anticipated solid waste disposal crisis, which included increasing disposal costs to municipalities and businesses, and decreasing available landfill capacity. The target date to accomplish this was set for 1995 and later amended to 1998. The 1999 state recycling rate is calculated to be 40.4%, short of the 50% goal. However, the State remains committed to reaching the 50% goal in light of the value of recycling and composting on reducing the need for additional solid waste disposal facilities.

IV. Disposal Capacity

A. Landfill

1. Municipal landfills

A survey of MSW landfills indicated that among the 8 municipally operated MSW landfills, there are approximately 1,550,700 tons of available capacity. This capacity is sufficient to carry those communities for an average of thirteen years, supposing a continual growth in the volume of municipal solid waste requiring disposal. In 1999, 112,444 tons of MSW was disposed of at those landfills. The actual remaining life varies for each landfill with the result that a community or region may encounter a lack of disposal capacity before a state-wide disposal capacity issue arises. **Table B** provides information on each individual municipal landfill, including fill rates and available capacity.

1999 Municipal Landfill Tonnage Received and Capacity			
	Tons received MSW	Remaining Capacity Years (est.)	Capacity Tons (est.)
	1999		
Bath landfill	24,273	10	238,000
Little Squaw	1,600	19	30,000
CWFC	1,750	10	16,500
Augusta	32,716	15	487,000
Brunswick	10,048	20	207,000
Fort Fairfield	23,602	8	185,000
Presque Isle	14,455	18	270,000
Lewiston	4,000	29	117,200
Total MSW landfilled	112,444		
Estimated remaining capacity			1,550,700

Table B

Nearly two dozen communities each operate a disposal facility for locally generated Construction and Demolition Debris (CDD), with a combined current disposal capacity of approximately 274,000 tons. The remaining capacity at individual facilities varies - - though state-wide numbers indicate that adequate capacity exists for another nine to ten years, a number of these facilities will be full before then, creating 'pockets' where CDD disposal options will need to be reconsidered.

CDD disposal capacity and management needs, along with those for bulky municipal solid waste, will continue to be a common highlighted issue in the management of municipal solid waste. These material streams are unacceptable at incinerators and cannot be recycled or reused without some investment of capital and labor to have these items processed. Markets for processed CDD and bulky wastes do exist but are limited regionally due to the volume being generated and transportation issues. This topic is considered further in the recommendations section of this report.

2. Commercial landfills

Having two commercial landfills operating in the state has served the state well in terms of providing competitive disposal capacity options for municipal solid waste, special wastes and construction & demolition debris.

The total disposal capacity currently permitted at the two commercial landfills in the state is approximately 4 million tons. Waste Management Inc. (WMI) Crossroads landfill, located in Norridgewock, is in the application stage for additional disposal capacity, which, if approved, will add approximately 4.1 million cubic yards of landfill space. Casella Waste Services, owner of the SERF landfill in Hampden, recently received local municipal approval of the 3.1 million cubic yard expansion that was approved by the Maine Department of Environmental Protection 2 years ago. The town had denied the expansion request, but a series of court cases, ending at the State Supreme Court, ended with the high court ruling the town could not deny SERF its expansion request. The additional capacity at SERF will add about 17 years of disposal capacity, based on projected fill rates.

The attempt to re-activate the regional landfill siting effort in Hammond Township, renewed over a year ago by the Southern Aroostook Solid Waste Disposal District, has ceased. The District had linked with a private firm (which could provide operational/management services) in the development of a regional landfill that would service the needs of the southern Aroostook communities.

3. Special Wastes

Special wastes are those wastes that generated by other than domestic and typical commercial establishments, that exists in such an unusual quantity or in such a chemical or physical state that require special handling, transportation and disposal procedures. Some examples of special wastes are: ash from municipal solid waste incinerators; wastewater treatment plant or other sludges; sand blast grit; coal ash; and, industrial and industrial process waste. These wastes are typically required to be landfilled with some exemptions provided to wastewater treatment plant sludges and certain types of ash.

The ash from municipal solid waste incinerators is special waste and is required to be landfilled. The ash from the Maine Energy and PERC incinerators is buried at the commercial landfills whereas the ash from RWS is buried in their own landfill and the ash from MMWAC is buried at the City of Lewiston landfill.

Disposal capacity at these facilities is consumed by the landfilling of this special waste – nearly 165,000 tons of MSW incinerator ash was buried last year. In addition, nearly 123,00 tons of other types of Maine generated special wastes were disposed of at the commercial landfills in 1999.

B. Incineration

Maine's four waste-to-energy facilities receive and process approximately 32% of Maine's generated MSW. While they have provided a reliable outlet for MSW, the seasonal nature of waste generation has caused some tonnage overage problems during the summer months and the need to 'attract' additional tonnage during the winter months. The incinerators continue to provide service in reducing the volume of MSW requiring disposal and in 1999 operated at just under 106% of their combined design capability.

Front End Process Residue and Incinerator Ash

The residuals from the Maine Energy and PERC facilities that are presently being disposed of are front end process residue (FEPR) and ash, and from RWS and MMWAC just ash. In 1999, the Maine generated portion of these materials totaled 226,934 tons (70,910 tons of FEPR; 156,024 tons of ash); this represents about 34% of the tonnage processed by these facilities. All ash is currently being landfilled at various landfills in the state.

Currently, ash from Maine Energy is going to Waste Management Inc. Crossroads landfill in Norridgewock, and the ash from PERC is going to the Sawyer Environmental Recovery Facility landfill in Hampden. RWS landfills its ash in its own landfill; however, they are approaching capacity but have begun the process to permit additional capacity at that site. The ash from the MMWAC's incinerator is disposed of at the City of Lewiston's secure landfill, under a special arrangement with Lewiston.

FEPR had been used in conjunction with landfill closure programs but since September of 1998, this has not been an available outlet due to the fact that the state-wide landfill closure program is completed. The FEPR waste stream has a potentially strong impact on landfill capacity since alternatives to landfilling do not readily exist. Some composting of FEPR has been done but the resulting product typically contains levels of heavy metals that restrict its use to landfill cover applications only.

C. Imported/Exported MSW

In 1999, two of the incinerators in Maine (PERC and Maine Energy) accepted about 140,039 tons of out-of-state MSW with an additional 28,670 tons of imported MSW buried at the WMI Crossroads landfill, while total exports were 91,274 tons. Of the total MSW exported, 44% (40,412 tons) was construction/demolition debris. Unlike in 1997, when Maine's MSW imports and exports were balanced, in 1999 the state saw a drop in solid waste exported with a slight increase in tonnage imported.

V. Conclusions and Recommendations:

As noted in the 1998 Waste Management and Recycling Plan, the current solid waste infrastructure appears to be effectively managing the state's solid waste. This report focused on the MSW portion of the solid waste stream, although disposal capacity for the two commercial facilities, which manage special waste and construction and demolition debris, was also evaluated.

1. Reevaluation of the Statewide Recycling Rate Goal: From 1991 to 1997, the state recycling rate increased from 16% to 42%; however, since 1997, the rate has declined slightly. The state is still nearly 10 percentage points shy of the 50% goal set for 2000.

Recommendation: The state should consider extending the timeframe for the 50% goal and encourage further development of infrastructure needs and upgrades.

2. Waste Reduction Efforts: Reducing the volume of solid waste being generated and managed by facilities in Maine is important from both a cost and facility use/development perspective as well as conserving natural resources.

Recommendation: The State will increase its education/information efforts in promoting waste reduction, both in volume and toxicity of the solid waste, to municipalities and businesses. The Office will also coordinate its outreach with the other states in the Northeast, to provide a larger 'voice' to industry and residents as to the value of waste reduction activities.

3. Municipal & Commercial Landfill Capacity: In the 1998 Waste Management and Recycling Plan, it was projected that there would be adequate landfill capacity between the municipal and commercial landfills for approximately 15 to 20 years, depending on the assumptions. Any changes in the current operations of these facilities would have a major impact on the number of years of available disposal capacity for the state.

It is important to recognize that although adequate landfill capacity may exist, when considering the state as a whole, there may exist disposal deficiencies at a lower, more regional level, necessitating the longer transport of the region's solid waste stream to a suitable disposal facility.

Recommendation: The state should continue monitoring the consumption of capacity of the landfills to ensure adequate disposal capacity remains for the state, in regard to the possible development of a state owned solid waste disposal facility.

4. Management Options for CDD and Bulky Wastes: Where the capacity for disposal of these materials continues to decline and in some cases, these materials consume space in special waste licensed disposal facilities, this is an area where the municipalities, private sector and state could pursue processing and reuse options for these materials.

Recommendation: The state, in conjunction with existing CDD processors, should promote reuse opportunities and encourage municipal cooperation in diverting these materials to processors as well as work to provide markets for the processed products.

5. Management Options for Front End Process Residue: Where there is a significant volume of this waste being generated, as a by-product of the Refuse Derived Fuel technology employed by two municipal solid waste incinerators, and this waste is being buried at landfills, alternatives to the landfilling of this material should be investigated.

Recommendation: The state, in conjunction with the generators of FEPR, should increase efforts to determine other management options for this waste stream.

Looking to the future

It appears that at this point in time, the current solid waste management system is functioning well and will continue to do so, for the foreseeable future. Upon closer examination, however, the foreseeable future is less than twenty years. Is now the appropriate moment to query 'what responsibility do we wish to accept for managing our solid waste and what are we going to 'pass off' to the next generation'?

Maine should be proud of its continued commitment to require and provide for environmentally conscious solid waste disposal facilities; however, its reluctance to accept additional disposal facilities conveys an 'ethical responsibility'. Only by adopting today aggressive waste reduction, recycling and composting actions and programs will the state be able to wisely utilize existing disposal capacity and truly reduce the need for and construction of additional landfills and related disposal capacity.

VI. Recycling Efforts in the State - What is happening and what may be needed to reach the 50% goal

Review of municipal and commercial recycling efforts

One of the great successes of the past ten years has been the creation of a statewide recycling infrastructure that has become and will remain a permanent part of the waste management system. While generation of municipal solid waste and recycling tonnages continue to increase {municipal solid waste generated statewide has increased by 27% (356,654 tons)}, recycling efforts have not been successful in slowing down the tonnage of MSW requiring disposal.

Even with increasing levels of participation in recycling, however, there remains the challenge both to reduce the amount of waste generated and also to improve the recovery rates for recyclable materials. **Figure 5** provides a comparison by material of tons recycled for 1993 and 1999, which highlights the changes in recovery rates for each material.

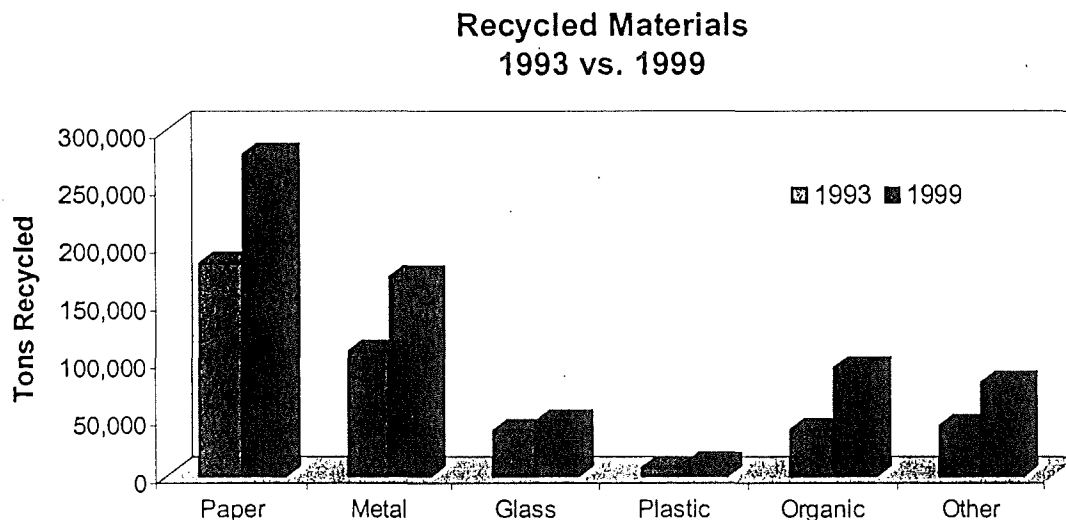


Figure 5:

Municipal Recycling Programs

Municipal recycling programs have been typically designed by individual communities and/or the regions to best address local needs and concerns and have been modified over time to improve and/or expand material recovery. As a result, a variety of program formats and strategies have been successfully employed throughout the State. Over 98% of Maine's population has access to a municipally supported recycling program. Presented here is an overview of common recycling programs and formats.

Typically, recycling programs may be broken into three major areas:

collection of recyclables:

curbside programs: a vehicle goes from stop to stop collecting recyclables

remote drop-off programs: containers are left in public areas for drop-off of
recyclables by residents

facility drop-off programs: recyclables are left at the solid waste facilities

processing of recyclables:

local processing: recyclables are processed for market in or near the community
where collected

regional processing: recyclables are processed for market outside the community
or area where collected

marketing of recyclables

marketing: typically done by the facility that does the processing of recyclables;
may be done as part of a cooperative effort with other facilities

Approximately 41% of Maine's residents enjoy a curbside collection program for their trash with 35% of Maine's residents having a curbside recycling collection program available. This means that well over half of Maine's residents have to deliver trash themselves to a transfer station or disposal facility while nearly two-thirds of residents have to carry their recyclables to a facility or container for collection and processing.

Municipal Solid Waste Program costs

A study conducted by SPO in 1999 took an in-depth look at the costs related to providing solid waste management programs at the municipal level. Twenty two towns, representing a variety of programs, participated in this study, in which the focus was on the costs incurred by municipalities in furnishing municipal solid waste collection, consolidation, transportation and disposal services as well as similar costs in the area of recycling services. Communities with similar programs were compared and profiled. Some general trends and observations:

- Even for similar type of programs, between similar communities, there are cost differences which reflect the individuality of each community and the nature of the program they have selected.
- While there is variation among municipalities, the overall average cost per ton for recycling and disposal of MSW are almost exactly the same -- *just over \$100/ton*.
- The recycling program costs calculations did include the income received from the sale of recyclables (average of \$14 per ton). This is a very important variable encountered in the study and ranged from \$0 per ton to \$41 per ton.

Commercial Recycling Efforts

Maine is fortunate to have businesses commit to supporting not only 'in-house' recycling programs but businesses that assist with municipal programs. A large percentage of the tonnage of solid waste that is separated from the waste disposal stream for recycling has been generated by the business and commercial sector. Similar to the municipal program options, the business recycling programs vary widely in terms of materials handled and the methods employed in managing those recyclables.

Office paper and corrugated cardboard separation and recovery programs are among the most common recycling programs in the commercial sector. The value received from the separation and recycling of office paper assists with the costs associated with that material stream. Due to its volume, corrugated cardboard, when recycled, helps keep management costs down, both in transportation and disposal fees.

Conclusion

One of the most common needs of both municipal and commercial recycling programs is an effective, continuous education/information campaign extolling the benefits of recycling, and not just from an environmental standpoint. Recycling efforts provide needed resources for the secondary materials, furnish jobs and opportunities, decrease the tonnage of greenhouse gas emissions and decrease the need for disposal capability to manage that tonnage. Add to this the nearly equivalent costs of managing discards as either trash or recyclables and the value of recycling becomes more clear.

Recommendations regarding what levels and types of assistance may be necessary to help achieve the 50% recycling goal

Recycling

- Increase ongoing technical assistance to municipal recycling and composting programs throughout the State:
 - continue development and dissemination of products to assist in educating and informing residents of the value of recycling, through such activities as 'Maine Recycles' Week
 - leverage state resources with existing programs and groups to maximize results
 - encourage municipalities to link small commercial generators into their programs
- Serve as a clearinghouse on recycling markets; in conjunction with other state agencies, identify potential markets and assist in development where appropriate.
- Sponsor training and certification programs to improve the quality of recyclables prepared by municipal programs.

Composting

- Direct available grant funds to communities to encourage the implementation of appropriate solid waste management activities, with preference given to:
 - advancing composting of organics
 - working with municipalities to manage leaf and yard waste as a separate waste stream: encouraging backyard and municipal composting programs

Construction & Demolition Debris

- Direct available grant funds to communities to encourage the implementation of appropriate solid waste management activities, with preference given to:
 - recycling/beneficial use of CDD
 - cooperative regional waste management opportunities.
- Encourage communities and regional groups to examine management and disposal options for CDD to identify reuse, recycling and beneficial use possibilities.

Waste Reduction Efforts

The State, through MRSA Title 38 § 2132. 2., is directed to establish a waste reduction goal. The waste reduction goal was set at 5% and was not included in the 50% recycling and composting goal established for the state.

Waste reduction, often referred to as 'source reduction', sits at the top of the solid waste management hierarchy, yet is often the most difficult action to measure and/or implement. Waste reduction is defined as 'not generating waste'..... as opposed to the diversion of wastes to a facility or activity.... and can be as simple as not taking a shopping bag to carry your purchases home, or as complicated as redesigning a mechanical process that results in less waste being produced by a cutting operation. Waste reduction addresses both the volume and toxicity issues of solid waste.

The major difficulty in establishing any goal is substantiating a base value or point of reference and determining the efforts employed toward attaining that goal. Specifically, with the waste reduction goal, a baseline in reference to municipal solid waste generation needs to be explained and marked. This may be a statewide or per capita value and needs to be tied to a certain point or year. At a future point, that value needs to be redetermined and any change defined as resulting from either the effect of the efforts towards the goal (here it would be waste reduction efforts) or from some other outside influence (such as a change in consumption, population, income or some other external factor).

The State Planning Office will be increasing its education/information efforts in promoting waste reduction actions to municipalities and businesses. The Office will also coordinate its outreach with the other states in the Northeast, to provide a larger 'voice' to industry and residents as to the value of waste reduction activities.

VII. Toxicity in the municipal solid waste stream and efforts to reduce it

Introduction:

Household hazardous wastes (HHW) are wastes that if generated by businesses are regulated as hazardous wastes under Chapter 850, the Maine Hazardous Waste Rules, but that are exempt from Chapter 850 requirements solely because they are generated by households. When disposed of along with other household wastes, HHW can release contaminants such as mercury and volatile organic compounds into the environment. This release can be prevented and some materials recycled if HHW is separated from municipal solid waste (MSW) prior to disposal. The purpose of this plan is to discuss options for collection and management of these different HHWs and to provide a roadmap for developing a consistent system that is accessible throughout Maine for collection and recycling of these wastes.

DEP and SPO invited representatives from the private and public sectors to participate in a HHW Management Plan Advisory Committee to advise in the development of a statewide HHW management system. The Advisory Committee coalesced around several desired outcomes, including that the plan:

- propose a realistic funding mechanism that provides long-term secure funding to maintain this program beyond the proposed initial bond funding.
- promote participation by the general population by developing and distributing consistent and accessible information on HHW.
- emphasize reduction of the toxicity and use of hazardous household products and promote the use of "clean" products.
- be convenient, affordable, and accessible to all the citizens of the state.
- create a permanent, regular means for communities to manage and reduce HHW that is cost effective and efficient.
- incorporate existing municipal and regional programs.

Types of Collection Systems Reviewed – National & International:

Manufacturer Take Back Programs: Manufacturer take back programs, a.k.a. "Extended Product Responsibility" (EPR), in which manufacturers take cradle to grave responsibility for their product(s), are becoming more common and acceptable. The following is a very brief summary of some programs. The list is not exhaustive but is meant to give the reader a brief overview of the types of programs that are currently in place or are agreed upon and under development.

United States: In 1995, members of the rechargeable nickel-cadmium battery industry established the Rechargeable Battery Recycling Corporation (RBRC). Recently, Hunnewell and General Electric established the Thermostat Recycling Corporation (TRC) to collect used mercury thermostats at wholesalers. The concept of EPR is beginning to be discussed in policy-making circles in the U.S., but there are no laws requiring cradle-to-grave responsibility of manufacturers. Minnesota has recently entered an agreement with Sony and Waste Management, Inc. to take back Sony's electronic and personal computer products at the end of their useful life.

International Approaches

- Europe, Asia, Canada and most recently Latin America are embracing waste policies that ask the private sector to get involved in managing products at the end of life:
- Japan has one of the most recent product stewardship laws for recycling certain waste electronics.
- Germany was the first nation to institute a comprehensive product stewardship approach, passing a law in 1991 requiring manufacturers to assume the costs of collecting and recycling used packaging.
- The European Union developed a directive on packaging in 1994. Now the concept of product stewardship is being expanded to other products, most notably scrap cars and electronics waste. Currently electronics take-back is mandatory in the Netherlands, Norway, Denmark, Sweden, Switzerland and parts of Belgium. In the United Kingdom, Motorola has partnered with network providers to enable customer returns of cell phones to Motorola distributors.
- British Columbia has implemented a program to manage its paint. This was North America's first industry funded paint recycling program, operated by paint brand-owners and it now provides over 100 collection depots province-wide. The main goal of the program is to provide consumers with an easily accessible means of returning leftover paint without disposal charges. Leftover paint collected through the program is reused or recycled, utilized for energy recovery or properly treated and contained. In the first four years of operation, over 10 million equivalent liter containers of leftover paint have been collected and diverted from improper disposal.

Home and commercial paints, varnishes and stains, including aerosols, are all accepted at all locations. The program promotes recycling and reuse of leftover paint through public paint exchanges. The program was developed by the paint industry in cooperation with the provincial government. British Columbia's program is funded by industry-assessed eco-fees collected on the sale of new paint. No government tax is involved.

Types of municipal collection programs

Periodic collection programs: Periodic household hazardous waste collection events are defined as temporary collections held in a location that is not improved for the express purpose of collecting HHW. The wastes are typically packed onsite and shipped directly to a Treatment, Storage and Disposal Facility (TSDF) or disposal facility. These types of collections have been held throughout the United States for over a decade now, including in Maine.

Door-to-door collection: Door-to-door programs are collections of hazardous waste from a resident's household or from a small quantity generator (SQG) business. Typically this type of event is coordinated by a governmental entity, with pickups done by a contractor. The citizen makes an appointment and is either present at the time of pickup, or leaves the wastes in a convenient location other than the curb.

Permanent collection facilities: A permanent collection facility is generally thought of as a fixed facility that collects a particular HHW product or products on an on-going basis. Transfer stations and recycling facilities are being used throughout the United States to collect HHW either for reuse, recycling, fuel blending or disposal. Some are setup for the sole purpose of collecting HHW and perhaps hazardous wastes from SQGs. Others are part of a comprehensive facility that also handles municipal solid waste. In Maine, transfer stations and recycling centers are allowed to handle waste oil, universal wastes, paints, and propane tanks provided they follow regulatory and safety guidelines. The on-going collection of other HHWs may best be handled at 2 or more regional private or public facilities established specifically for this purpose.

Where Do We Go From Here?

To effectively capture all types of HHW and other problematic wastes, a statewide system needs to have both on-going and periodic collection to be easily accessible to both urban and rural populations. Which type of collection will handle each type of waste is dependent on the level of risk associated with, and the complexity of safely handling of each waste, as well as the timing of and extent to manufacturers implement 'Extended Product Responsibility'. It is envisioned that a mix of the above described "collection systems", adequately funded and supported, will result in the most effective program for the state. A major component of this program needs to be an extensive and repetitive campaign aimed at residents and businesses.

Current and Planned Activities

In 2000, the Legislature approved a special one time allocation of \$438,000 from the Solid Waste Management Fund to develop safe handling options for mercury products and other problematic wastes. The use of these funds has been targeted roughly in thirds 1/3 for education and outreach, 1/3 capital grants, 1/3 for expansion of existing programs. Following the adoption of the Universal Waste Rule, SPO and DEP will be looking at a variety of sources both in house and from outside state government, for the development and delivery of education and outreach programs to several audience groups. These efforts will include pilot projects, sole source contracts, Requests for Qualifications and Requests for Proposals, and other mechanisms.

SPO will implement a grants procedure to award approximately \$280,000 in grants to assist in the management of universal wastes and household hazardous wastes. These monies will be earmarked to: 1) fund the establishment of a voluntary municipal collection infrastructure; 2) assist existing household hazardous waste programs to target mercury added products and universal waste for collection; 3) encourage the start up of new programs with the same objective; and 4) conduct a limited number of collections of targeted wastes, e.g., carbon tet fire extinguishers, mercury thermometers.

DEP and SPO will develop educational components on recycling and reducing the use of mercury-added products in schools appropriate for use in teacher and school custodial staff training programs.

The following programs have been initiated in 2000 and will continue in 2001:

- The Maine DEP and SPO will sponsor or co-sponsor a collection and exchange program for mercury fever thermometers as well as opportunities to partner with other entities conducting exchanges such as hospitals and POTWs.
- An education and outreach program for mercury added products has been prepared and is in the first phases of implementation.
- The Department and the SPO will encourage the on-going collection of mercury added products through existing household hazardous waste collection programs across the state as well as the removal of mercury added consumer products from retail sale.
- The Department and SPO are working with the Department of Agriculture to locate, remove and replace mercury manometers used by dairy farmers. This program began in August, 2000 and will continue through 2001.

The following actions are planned for 2001:

- ❖ Award grants initially to encourage the collection and recycling of Universal Waste and mercury-added products, including lamps, by public entities. Depending upon available resources, the grants will be expanded to include funding infrastructure to collect and manage other House Hazardous Products
- ❖ Conduct an extensive statewide public awareness and education campaign related to Universal Waste and mercury-added products.
- ❖ Conduct workshops for municipal officials and solid waste facility operators to familiarize them with the intent of the universal waste rule and the options for handling waste mercury-added products, including lamps.

Conclusion:

The HHW problem, while complex, is not insurmountable. In 1999, over 80 Maine communities participated in a HHW collection event. The solution will be a network of collection options, based on the waste stream volume, funding, and identified geographic area. The State will work closely with interested municipalities to develop and implement a collection program that will best fit their individual or regional needs. The State also has a possible lead role to be an advocate for 'manufacturer take back' programs, building on larger regional efforts wherever possible. Europe has blazed a new path and we have the benefit of learning from their efforts. By insisting on manufacturer responsibility for wastes, product design changes are being made that will help us all on the road to a sustainable future.

VIII. Product Stewardship

What is it? How could it become an important future solid waste management strategy?

Product stewardship is a different way of looking at the management of waste. It can also be called 'Manufacturer Take Back Program', a.k.a. "Extended Product Responsibility" (EPR), in which manufacturers take cradle to grave responsibility for their product(s). Traditionally, it has been the responsibility of a combination of the consumer and the municipality to provide for the disposal of waste. Product Stewardship turns some of that responsibility back to the manufacturers. If manufacturers were given the responsibility for the disposal of the products they produce, they would then have an incentive to redesign their products to meet their end-life needs.

Product Stewardship tends to focus on products that are either bulky or may contain hazardous materials. Under EPR, producers of these products would have additional motivation to alter the product's design so it could be more easily disassembled to allow for easier remanufacturing or recycling. Since it is often complicated and expensive to dispose of hazardous materials, the producer could reduce, or even eliminate, the use of hazardous materials. Products might even be designed to last longer so producers could reduce the volume requiring management and/or disposal. This could even encourage them to use more of their own recycled materials and create a self-sustaining cycle for an increased recycling rate and a reduction of the waste stream requiring disposal. Presently, there is little incentive for manufacturers to improve upon the end life management options of their products.

Some of the larger categories and most dangerous products are paint, pesticides, electronics, and mercury. Rather than being broken down and disposed of properly or even recycled, they are typically disposed of in incinerators and landfills. These kinds of wastes can seep into the soil and contaminate our ground water or be released to the atmosphere, causing harm such as birth defects and cancer.

In an ideal product stewardship situation, a paint manufacturer would sell its products, the consumer would use what they needed, then the manufacturer would be responsible for the end life of the un-used portion of the product and as well as its container. The producer would take in the remaining paint and mix it together with new paint as reuse or remanufacture it all together. The same concept could be applied to pesticides and electronics manufacturers -- giving them the responsibility of disposal would provide the incentive to improve upon the end life management of their product. There are often numerous toxics and heavy metals in electronics equipment, some of which could be substituted with a non-toxic substance. The final result would be a safer, cleaner end product that is more environmentally friendly (both for humans and the natural environment), lasts longer, is reusable, and/or more easily recycled.

Under the extended product responsibility scenario, manufacturers of mercury containing products would work to minimize or eliminate the use of mercury in their products. Florescent light bulbs, thermostats, electric and/or mechanical switches or fever thermometers could be re-engineered with a goal of ending the use of mercury. Maine currently has programs that could be considered 'extended product responsible', i.e., the returnable container law, the automobile battery redemption policy and the nickel-cadmium battery collection program. (These programs have the producer or distributor of a product involved in the management of that item at the end of that products' life.)

A company located in Atlanta, Georgia, *Interface, Inc.*, does this, to be responsible for their product during it's useful life and after. *Interface Inc.*, one the world's largest interior furnishings companies, manufactures carpeting but doesn't really 'sell it' to customers. Instead, the company leases the carpeting to the customer and when the carpet needs to be replaced, will remove the used carpeting, replace it with new, and recycle the old carpet into new carpet, completely 'closing the loop' in product manufacturing. Ray Anderson, Founder, Chairman, and CEO of *Interface, Inc.* describes the steps the petroleum-dependent company is taking in its quest to become a sustainable enterprise - one that will never have to take another drop of oil from the earth, in his book "Mid-Course Correction". This business takes the concept of product stewardship and embraces it fully. Guilford of Maine is a business associated with *Interface, Inc.*

Product Stewardship could be an important component in future solid waste management programs. If manufacturers become more involved in the management of their products at end of life, the volume and toxicity of solid waste requiring disposal decreases and the opportunities for recycling increase. The primary three end results of product stewardship are:

- reduction of hazardous materials employed in product manufacture
- reduction of unnecessary materials in the production of a product, and
- increase in recycling of the product at its end-of-life.

Smart Production Initiative

The Maine Department of Environmental Protection has developed and is promoting a concept called the Smart Production Initiative. Smart Production is the leadership-driven integration of business objectives and environmental objectives into an operation's essential purpose. It looks at the production process as an integrated system: seeking, at the same time, both business and environmental innovations to gain competitive advantage. Environmental objectives are not an "add on" to the business purpose, but rather an essential part of it.

Smart Production looks to natural processes as a model for this integration, for natural processes are effective, self-renewing, and produce no waste that cannot be readily assimilated. It requires a long-term view. It is driven at the front end by business innovation, which may be supported and enabled by government incentives. It also needs to be supported by just, consistent and timely enforcement against those that do not follow the rules. In this way, the competitive advantage accrues to those out in front, rather than those who are lagging behind, and environmental goals and forces of the market place can achieve some synergies. Smart Production recognizes that on a global scale, systems have to work both ecologically and economically.

From a systems standpoint there are three components: inputs, products, and byproducts. It seeks to use inputs that are renewable, recycled, and non-toxic. (Some companies have taken the approach of running their inputs through an "intellectual filter," identifying which substances are toxic, hazardous, carcinogenic, mutagenic, etc., and seeking to eliminate as many of these inputs as possible.) In terms of products, Smart Production looks at the entire life cycle of a product to optimize its life, utility, and/or value, with a high degree of reuse capability. And finally, it seeks ultimately to eliminate discharges of pollutants to air, land and water.

It is important to figure out how to *redesign* our production processes, to eliminate waste and restore the environment, while simultaneously increasing the wealth necessary to support human systems. Some companies have begun to figure out how to do this. Globalization of the economy and the explosion of information technology offer opportunities to make quantum leaps in our efforts to renew and sustain the planet.

In short, the objective of Smart Production is to wisely integrate sustainable technologies into not just the manufacturing and other production oriented businesses but into our own daily lives - - the purchases we make, transportation decisions we employ, the demands we place upon our environment, etc. Successful implementation by all parties will assist in helping us become a sustainable society.