

Solid Waste Report to the Vermont Legislature

January, 2008

Prepared by the

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Statutory requirements:

This report was prepared to fulfill the requirements of Section 293b of the 2007 Budget Bill (see Appendix A for text of bill). The statute requires the Agency of Natural Resources to submit a report that addresses the following:

- (1) how the agency's reorganization will necessitate changes with regard to the way the state regulates and manages solid waste;
- (2) the strengths and weaknesses of the state's existing solid waste management system;
- (3) information that is necessary in assessing the extent to which the state's regulatory process succeeds in implementing the waste management priorities established in 10 V.S.A. § 6604;
- (4) the direction in which the agency proposes that the solid waste management system should evolve over the next ten years, including those steps the agency can take on matters within its existing jurisdiction.

Following the submittal of this report, by February 15, the Agency is to convene a working group with representatives of various groups to evaluate the report and develop recommendations to implement and improve upon the report. This working group is to report to the legislature by January 2009.

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Executive Summary

Over the past twenty years, solid waste management has changed significantly in Vermont since the passage of Act 78. Solid waste districts were formed, plans were prepared, infrastructure was constructed, and programs were implemented. Currently, in some areas of the state, excellent programs and services are available, while in other areas the same level and types of programs and services are not offered.

The state goal was established to divert (via reuse, recycling and composting) 50% of municipal solid waste by 2005; however, over the past five years the diversion rate has only reached about 30%. A new strategy is needed to improve how solid waste is managed in Vermont.

Strengths and weaknesses of the current solid waste system are identified in this report, along with recommendations to address the weaknesses. Data used to measure progress of the solid waste management program are also included. New measures are proposed to evaluate the progress of the solid waste program while implementing changes to move the program in a new direction.

The Agency of Natural Resources (Agency) recommends the state move towards a Sustainable Materials Vision as a new direction for solid waste management in Vermont. This vision focuses on preventing or minimizing waste rather than managing waste after it has been generated. Key features of the proposed vision include:

- focusing on upstream waste prevention options, emphasizing sustainable use of resources
- sharing of responsibility of waste management, to include not only government but all those who generate waste
- establishing a state-wide waste generation goal, for the total amount of waste generated in Vermont
- developing more state-wide strategies, rather than having scores of strategies developed and implemented
- expanding and creating new partnerships, within Vermont, regional and nationally
- continuing to meet on-going solid waste management responsibilities
- expanding criteria for decision making, to include factors such as green house gas reductions
- measuring progress differently, including new businesses and jobs created managing recycled materials, reductions in energy and materials consumed.

This report outlines a framework for implementing this new vision. An essential component to the framework will be evaluating the current statutes (including Act 78), rules and plans to determine changes that may be needed to move solid waste management in this new direction.

The Agency plans to work with partners and work in conjunction with other initiatives, such as the recommendations in the Governor's Climate Change Report, the Waste Prevention Initiative, and the upcoming Agency reorganization.

With respect to the Agency's reorganization, the solid waste program would be included in the Center for Climate Change and Waste Reduction. The reorganization should allow more flexibility among programs and facilitate work to be conducted using a multi-disciplinary approach.

Introduction

Twenty years ago Vermonters were concerned about the way solid waste was managed in Vermont. They were concerned about various forms of pollution from the more than 70 unlined landfills in the state, the depletion of resources and the wasting of those resources by burying or disposing of them. To address these issues, the Vermont legislature passed Act 78.

Since the passage of Act 78 in 1987, we have expended considerable effort and resources to manage solid waste in Vermont. Solid waste management changed in Vermont from primarily disposing of solid waste in over 70 unlined landfills to using two large, highly engineered, lined landfills. These two landfills manage the majority (about 80%) of Vermont solid waste that is disposed with the remainder disposed out-of-state. Recycling infrastructure was nearly nonexistent and needed to be developed. Recycling markets required local, regional and national approaches. Reducing, reusing, and recycling materials became the strategy to reduce the amount of waste that is disposed.

Since 1987 there has been a significant increase in the amount and types of materials diverted from disposal as well the numbers of markets for recyclable materials. This was accomplished by extensive planning and implementation at the state, regional, and local levels. The Agency developed the State Solid Waste Management Plan which established priorities for managing solid waste in Vermont. Local solid waste districts were formed and adopted their own plans. Infrastructure was planned and constructed. Grants were issued to promote priorities and implement innovative projects. Incentives and restrictions were developed to reduce the toxicity of waste being disposed, along with banning certain types of waste from disposal.

While progress has been made, a plateau has been reached where the waste diversion rate for municipal solid waste has been about 30% for the past five or more years, even though the state goal for municipal solid waste diversion was 50% by 2005. Meanwhile, the amount of solid waste Vermonters generate has increased over time.

The Agency needs to develop a new strategy to improve solid waste management in Vermont. This report outlines the Agency of Natural Resources' new Sustainable Materials Vision and strategy. It focuses on *preventing and minimizing* solid waste rather than managing waste *after* it has been generated. The Agency will need to continue to provide sound solid waste management options while working on new waste reduction strategies.

Vermont will not be alone in forging this new sustainable materials vision. Other states and regions, such as Oregon, California, Washington, several Canadian Provinces, and parts of Europe, are already moving in a similar direction. Likewise, several solid waste initiatives are developing to address waste issues of product stewardship, toxicity, waste prevention, and behavior change.

The benefits of the new Sustainable Materials Vision will extend beyond solid waste and resource management. If appropriately implemented, the Agency's proposed strategy can help economic goals (such as creating jobs and developing businesses) and environmental goals (including reducing green house gas emissions and fossil fuel use). The Agency recommends the implementation of this new Sustainable Materials Vision be integrated with three other concurrent state initiatives:

- The Governor's Commission on Climate Change report, particularly recommendations on Advance/Expanded Recycling and Composting (AFW-9) and Programs to Reduce Waste Generation (AFW-10);
<http://www.vtclimatechange.us/>
- ANR's Waste Prevention Stakeholders Initiative, a group of stakeholders representing a wide range of sectors, forming the Waste Prevention Steering Committee to develop strategies to reduce the amount of materials Vermonters discard; and
<http://www.anr.state.vt.us/dec/wastediv/R3/DECwpPLAN.htm>
- ANR's reorganization, especially the soon to be established Center for Climate Change and Waste Reduction.
<http://www.anr.state.vt.us/site/cfm/TVWF/taskforceinfo.cfm?taskforce=ccwr>

Section I: Strengths and Weaknesses of Vermont's Solid Waste System

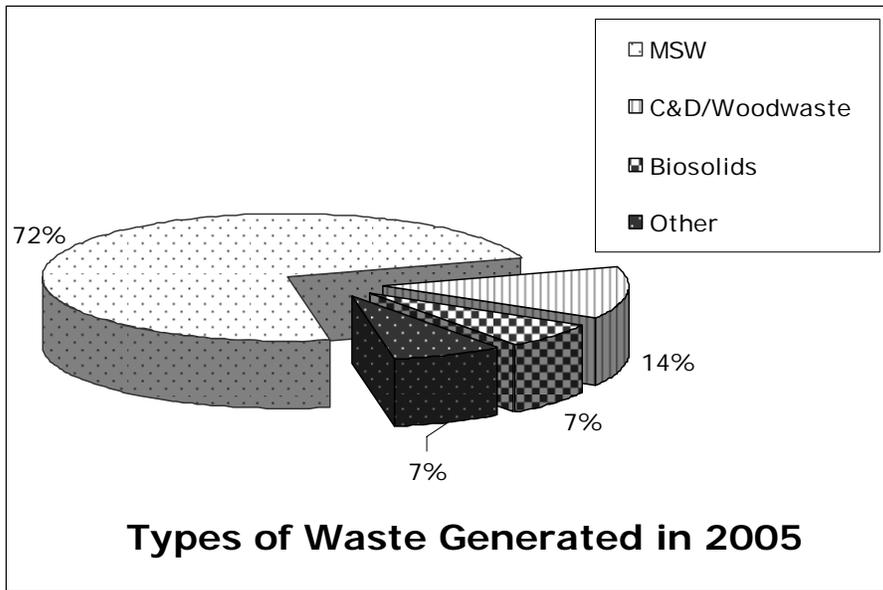
1. Summary of Current Solid Waste Management Infrastructure, Programs and Responsibility

Vermont law (24 V.S.A. §2202a) states that municipalities are responsible for the management of the solid wastes generated within their boundaries. Most municipalities have chosen to meet this responsibility by working cooperatively, either in a district or alliance. There are currently 43 different solid waste planning entities consisting of 9 solid waste management districts (union municipal districts), 7 alliances or groups of municipalities working together, and 27 “independent” municipalities that are not part of a district, alliance or group of municipalities working together on a less formal arrangement. Of the 27 independent municipalities, 18 have approved solid waste implementation plans (SWIPs), 2 have submitted SWIPs that have not yet been approved by DEC and 7 have not developed SWIPs. A total of 228 (of 255), or 89% of municipalities are members of a solid waste district, alliance, or group (see Appendix for most recent map). The number of planning entities has decreased in the past 5 years as independent municipalities have joined districts.

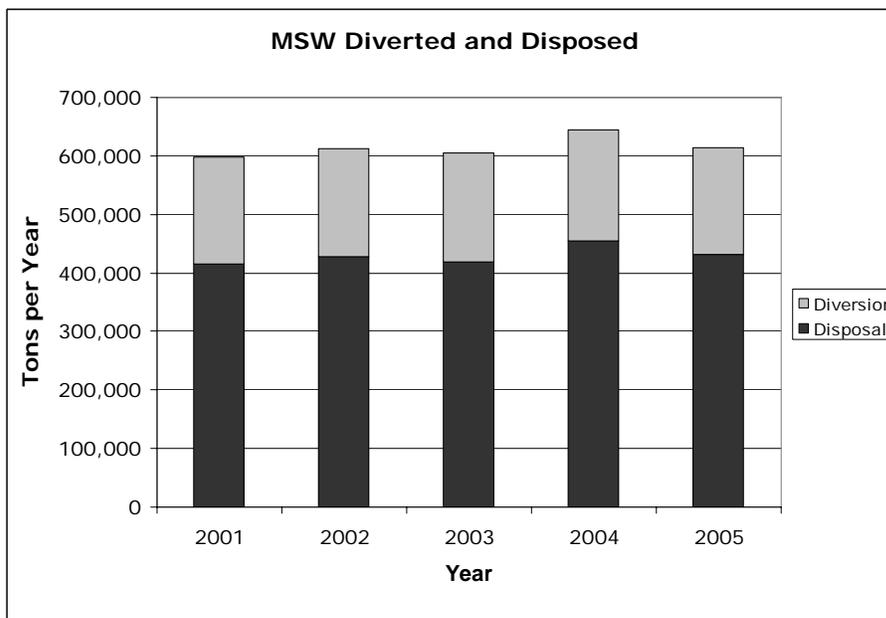
Waste management planning is accomplished on two levels in Vermont. Vermont law (10 V.S.A. §6604) requires the Secretary of the Agency of Natural Resources to publish and adopt a solid waste management plan, and to revise the plan once every five years. The plan establishes a comprehensive state-wide strategy for managing solid and hazardous waste. To date, three plans have been adopted: the original State of Vermont Solid Waste Management Plan (State Plan) was adopted in 1989; a completely revised State Plan was adopted on August 31, 2001; and the 2001 State Plan was re-adopted in its entirety on September 27, 2006.

Vermont law (24 V.S.A. §2202a) requires solid waste planning entities to adopt solid waste implementation plans (SWIPs) that conform to the State Plan and include all elements required for consistency with the State Plan. SWIPs are reviewed by DEC staff regarding conformance with the State Plan and approved by the Director of the Waste Management Division within DEC.

Vermont's solid waste management infrastructure and systems are owned and operated by a mixture of public- and private-sector entities. The solid waste districts, alliances, and independent municipalities have developed infrastructure to serve local needs (i.e. for trash drop-off facilities, recyclable materials collection, and household hazardous waste collection). The private sector is largely responsible for curbside collection, transporting solid waste, operation of large transfer stations, and developing and operating the two large regional landfills in Vermont (as well as out-of-state disposal facilities that accept waste from Vermont).



In 2005, over 845,000 tons of solid waste were generated in Vermont, including municipal solid waste (MSW), construction and demolition (C&D) debris, wood waste, biosolids and septage, and various special or other wastes. This amount under-estimates the actual amount of waste in Vermont since the amount of C&D debris recycled or otherwise diverted from disposal cannot be estimated, but is known to be significant. In addition, the amount of



economic recycling (businesses that self haul recyclables directly to markets) is likely underestimated. Of the 845,000 tons of waste, 73% is MSW – the trash and recyclable materials generated by households, businesses, industry, institutions and the like. Key statistics describing Vermont’s solid waste management for the past 5 years are also illustrated in the chart above. More detailed solid waste data is presented in Appendix C.

Since 2001, there has been little change in the destinations for disposal of solid wastes generated in Vermont. The majority is disposed at two privately owned and operated lined landfills in Moretown and Coventry. In addition, there are two small unlined municipal landfills (each limited to accepting less than 1,000 tons of solid waste per year), and one small privately owned construction and demolition waste landfill. One

small unlined municipal landfill closed in the fall of 2005. In 2005, Vermont exported approximately 20% of its MSW to other states for disposal. In 2001, the amount exported was 25%.

In addition to wastes disposed in landfills, there has been an increase in the amount of waste utilized in landfills as alternative daily cover and road base material. In 2005, the amount used in landfills was about 31,000 tons. The waste materials used as alternative cover material included C&D debris, biosolids, wood wastes, contaminated soils, foundry sand, and paper sludge. The wastes used as road base at landfills included C&D, crushed glass and ground wood.

Summary of Permitted Solid Waste Facilities in Vermont (2006):

Facility Type	Number	Description
Transfer stations	85	58 district or municipal, 17 private. Some include recycling and/or HHW/CEG waste drop-off facilities
Composting		
Categorical	22	Small compost facilities, cannot accept biosolids, cannot accept more than 7 tons/week food waste or animal offal/carcasses
Full	1	Intervale Compost (Burlington)
HHW/CEG	3	CSWD (South Burlington), NEKWMD (Lyndonville), Addison SWD (Middlebury)
Recycling		
Categorical	47	Small collection facilities (managing between 50 and 400 tons/year)
Full	26	Large collection facilities (managing greater than 400 tons/year) including material recovery facilities (MRFs)
Landfills		
Lined	2	Waste USA (Coventry), WSI (Moretown)
Unlined	3	Two small municipal landfills (accepting less than 1,000 tons/year) (Bristol and Salisbury), one C&D landfill (Bennington)
Proposed, lined	3	CSWD (Williston), GUVSWMD (Hartland), NWSWMD (Sheldon)
Categorical	16	Restricted to clean wood, asphalt, brick, concrete, glass, street sweepings, car wash grit, ANR wildlife disposal pits, and dead animal disposal
Closed	55	Have legal documents governing post closure
Biosolids/Septage		
Land Application	25	Each certification may include multiple sites
Compost	8	Compost and/or other treatment for public distribution
Other treatment	11	At a wastewater treatment plants, including drying beds and storage lagoons
Sludge Management Plans	78	Treatment or storage at wastewater treatment plans where biosolids is sent to another facility for treatment
TOTAL:	384	

The previous table lists permitted solid waste facilities in Vermont. Solid waste infrastructure includes landfills, as stated above, along with a large number of permitted transfer stations and recycling facilities. The transfer stations and recycling facilities are of various sizes. The types of materials accepted at the recycling facilities are inconsistent throughout the state and in many cases the facilities have not been modified to be able to accommodate the expanding list of materials that can be recycled. A moderate number of composting facilities are permitted, mostly small operations. There are only 3 permitted permanent facilities to collect Household Hazardous Waste and waste from Conditionally Exempt Generators (businesses that generated only small quantities of hazardous waste). There are also a number of facilities that manage biosolids (sludge from municipal wastewater plants) and septage.

The transportation of waste is also regulated through the commercial haulers permitting program.

Summary of commercial haulers licensed in Vermont (2006):

Type of License	Number
Solid Waste	273
Hazardous Waste	113
Biosolids/Septage	107
Total number of haulers	≈ 386

Note: The number of licenses does not equal the number of haulers since haulers may be licensed to transport more than one type of waste material.

2. Strengths and Weaknesses

This section does not contain an exhaustive or detailed list of all strengths and weakness of solid waste management in Vermont; rather it includes main issues that have been identified, along with recommendations for addressing the weaknesses.

A. Strengths:

(1) Solid Waste Programs

Excellent solid waste programs have been developed by some solid waste districts, alliances, towns and the private sector. They have gone beyond offering basic minimum services. Chittenden Solid Waste District is a leader in this area with a broad range of programs provided to its citizens and businesses, such as:

- support and promotion of product stewardship,
- reuse of items with Recycle North and reuse zones at facilities,
- single stream for sorting recyclables,
- paint recycling program,

- mandatory recycling for certain materials,
- reuse, recycling, and composting opportunities for an extensive and growing lists of materials,
- business outreach programs to promote increased recycling,
- pay as you throw fee structures, and
- educational programs.

The financial resources and population density are two key factors that allow Chittenden Solid Waste District to have such a broad range of successful programs.

(2) Well-Managed Existing Infrastructure

Although the infrastructure available to Vermonters throughout the state is not consistent, the infrastructure that exists is well managed. Some of the solid waste districts, alliances and towns as well as private businesses have constructed and are currently operating good facilities and continue to keep them in good operating condition. This investment benefits those who have access to the facilities.

(3) Commitment to Solid Waste Management

There are several factors that give Vermont a high potential to improve existing programs and implement new ones. First, many Vermonters hold a high value for the environment and natural resources. Secondly, Vermonters are committed to solid waste planning and management. More than 99% of Vermonters are members of a solid waste planning entity which are already implementing programs outlined in their solid waste implementation plans. Thirdly, certain solid waste districts, alliances, and towns have developed or have the potential to develop excellent programs with their existing staff that are knowledgeable and experienced in solid waste issues.

(4) Private and Public Sector Involvement

As stated earlier, Vermont's solid waste management infrastructure and systems are owned and operated by a mixture of public and private sector entities. While this mix is not completely balanced or equal for all aspects of solid waste management, there is the opportunity for both private and public sector to be involved.

(5) Protection of Public Health and the Environment

Concern about impacts to public health and the environment regarding the way solid waste was managed was a main force prompting the passage of Act 78 twenty years ago. The solid waste regulatory program is effective at providing this protection, with its regulations, certification, compliance and enforcement efforts. The Agency has established rules, procedures and

standards for the management of solid waste. Since being adopted in 1989, the Solid Waste Rules have been revised six times as new waste management issues or concerns arise, or as required by legislation. When revising the Rules, DEC works with the Department of Health and other state and federal agencies or departments to help ensure appropriate human health and environmental considerations are addressed.

B. Weaknesses:

(1) Lack of Success on Waste Reduction

The top solid waste management priority, as stated in the Vermont Solid Waste Plan, is to reduce waste through waste prevention, reuse, and recycling. Waste prevention means consuming and throwing away less, reducing the amount of waste generated. Reuse, recycling and composting are methods of “waste diversion” (diverting waste from being disposed in a landfill or incinerated). Although great strides have been made in managing solid waste since Act 78 was passed, the total amount of waste generated annually in Vermont has increased over time. At the same time, the amount of MSW diverted from disposal has not increased beyond 30% over the past five years. Most solid waste programs in Vermont currently focus on managing waste after it is generated, rather than preventing it.

Lack of this success was acknowledged in the 2006 ANR solid waste report¹ to the legislature. ANR recognized action was needed and launched the Vermont Waste Prevention Initiative. It started with a conference in April 2007, to lay the foundation of the waste prevention work. Since then, stakeholders have met many times and are developing specific actions steps and recommendations to reduce waste. For more details, see web page at <http://www.anr.state.vt.us/dec/wastediv/R3/DECwpPLAN.htm>

Education and outreach is mainly conducted by local programs. Some districts and towns have good programs, others virtually none. These efforts to provide information about reducing waste and waste management choices may be more effective if conducted on a state-wide basis. Educating consumers could be more productive with a collaborative statewide approach – especially in preventing waste from being generated in the first place.

(2) Lack of Convenient, Consistent, Cost-effective Services Statewide

While some areas of the state have excellent services and facilities providing reuse and recycling opportunities, this is not the case in all areas. In order for the three Rs (reduce, reuse, recycle) to be effective, the services and facilities need to meet the three Cs (convenient, consistent, and cost-effective), and

¹ <http://www.anr.state.vt.us/dec/wastediv/solid/pubs/LCARJustification.pdf>

also be flexible to be able to respond to changes. Programs, infrastructure and services provided throughout the state need to be examined to determine which areas require improvements and the type of improvements needed. Then, a strategy should be developed working with the solid waste districts and businesses.

(3) Ineffective Incentives and Disincentives

One reason for the increase in the amount of waste generated is that the current incentives and disincentives are not sufficiently effective to help Vermonters choose to reduce their waste. Three financial methods are the state disposal tax (\$6/ton state franchise tax), local disposal tax (variable amounts by solid waste districts and towns) and unit base pricing (also known as pay as you throw). The local tax and unit base pricing are inconsistently used throughout the state. Better use of these methods, along with other options for providing incentives and disincentives should be examined.

Other than weak incentives/disincentives, there are few requirements to reduce, reuse, and recycle. Although solid waste districts and municipalities have the ability to adopt ordinances requiring mandatory recycling, many have chosen not to. Mandatory recycling at a state level should be explored.

(4) Large Number of Solid Waste Entities

There are 43 different solid waste planning entities (districts, alliances, groups, and municipalities) in Vermont, who are responsible for managing solid waste in their area. More than half of these are “independent” towns that do not belong to a district, alliance or group. With so many different entities providing solid waste services, it is not surprising that the services provided in Vermont are inconsistent. Also, due to limited resources and economies of scale, it is more difficult for some areas to achieve convenient and cost-effective services.

(5) Solid Waste Implementation Plan Process

As required by statute, Solid Waste Implementation Plans (SWIPs) are required to be developed by each solid waste planning entity and approved by ANR if found to be consistent with the State Solid Waste Plan. There are two issues associated with SWIPs:

- the process of developing and approving SWIPs is not efficient and
- there should be more incentives to encourage full implementation of SWIPs.

A tremendous amount of time, effort, and resources are spent in developing and approving SWIPs. Many involved in solid waste planning question whether the benefits of the local planning process (i.e. requiring SWIPs be

developed and approved by DEC as being in conformance with the State Plan) justifies the time, effort, and resources spent.

While the SWIP process is a mechanism to require a minimum level of programs and services are provided in Vermont, it has not been effective at ensuring implementation of programs included in approved SWIPs.

(6) Limited Flexibility in Statute and Rules

The current solid waste statutes and rules provide limited ability to consider new technologies or to respond to changes in resource management. Much of the statute and rules focuses on the disposal aspects of waste management, rather than prevention or diversion of solid waste.

C. Recommendations to Address Weaknesses:

- Focus resources on waste prevention, reuse and recycling for key waste materials.
- Continue working with stakeholders on the Waste Prevention Initiative, to develop and implement action steps and goals for reducing specific wastes (organics, recyclables, construction & demolition, electronics and household hazardous wastes).
- Develop a more integrated statewide approach for certain education and outreach efforts to gain greater efficiencies.
- Evaluate the effectiveness of unit based pricing (also known as pay as you throw) programs throughout the state. In areas where the program does not exist or is not as effective, promote change to improve effectiveness.
- Evaluate the effectiveness of the numerous solid waste districts, alliances and municipalities. Develop strategies for working together to meet goals.
- Work with solid waste districts, businesses, and others to improve the current system to provide convenient, consistent, and cost-effective statewide infrastructure/services for collection, processing, and support of end markets for recyclable and compostable materials. The system should be developed to include capacity for handling changes in recyclable materials.
- Expand partnerships to include economic developers. While the Solid Waste Program has already partnered with many of the critical partners, to move forward there is a need to foster economic development opportunities through waste reduction and solid waste management.

- Evaluate the requirements and process for developing and approving Solid Waste Implementation Plans. Determine how the process can be done differently, more effectively and efficiently. Consider incentives and disincentives that will encourage full implementation of SWIPs.
- Evaluate the Solid Waste Statutes and Rules and make improvements that allow flexibility to consider new emerging technologies and resource management changes. The rules should strive to be flexible to address changes in materials management where materials are used rather than wasted while also providing definitive guidance for the regulated community. Revisions of the rules will be needed to address appropriate standards and requirements for emerging changes in facilities, technologies and processes for materials to be diverted from disposal with the goal of minimizing unnecessary impediments to waste diversion. Particular areas include composting, alternative uses of materials, treatment, recycling and reuse.

Section II: Information Assessing Success with Solid Waste Priorities

The key statutory priority for solid waste management in Vermont is embodied in the requirement that through adoption of a solid waste management plan, the secretary set forth a comprehensive state strategy for the management of solid waste (10 VSA §6604(a)). The plan and strategy are based upon the following priorities, in descending order:

- (A) the greatest feasible reduction in the amount of waste generated;
- (B) reuse and recycling of waste to reduce to the greatest extent feasible the volume remaining for processing and disposal;
- (C) waste processing to reduce the volume or toxicity of the waste stream necessary for disposal;
- (D) land disposal of the residuals.

Processing and disposal alternatives shall be preferred which do not foreclose the future ability of the state to reduce, reuse and recycle waste. In determining feasibility, the secretary shall evaluate alternatives in terms of their expected life-cycle costs.

The Vermont Solid Waste Management Plan adopted in 1989 as well as State Plan adopted in 2001 and readopted in 2006 have addressed a wide range of solid waste management issues as part of the strategy for addressing these priorities².

In 2006, the Agency evaluated the success in achieving the Plan's goals³. A wide range of information was evaluated, including the Agency's annual reports on solid waste diversion and disposal and a report was prepared that summarized this evaluation⁴. While the Agency determined that many of the critical issues in the 2001 State Plan related to solid waste management have been addressed, the Agency reported that there has been limited success for the critical issue "Reducing Waste Through Waste Prevention, Reuse and Recycling". This is in part due to the fact that minimal resources have been directed towards determining strategies to achieving success.

The key indicators used by the Agency since 1999 to measure waste prevention and diversion are the municipal solid waste diversion rate and the per capita disposal rate. The desired trend is for the diversion rate to increase, the disposal rate to decrease, and the per capita generation rate to decrease. As shown in the table below, this has not occurred. In the current Solid Waste Management Plan, the Agency estimated that in

² <http://www.anr.state.vt.us/dec/wastediv/solid/pubs/VTSWMgmtPlan.pdf>

³ <http://www.anr.state.vt.us/dec/wastediv/solid/pubs/LCARJustification.pdf>

⁴ <http://www.anr.state.vt.us/dec/wastediv/solid/DandD.htm>

order to achieve a 50% diversion goal, the per capita disposal rate would have to decrease to 2.7 pounds/person/day.

MSW Diversion Trends:

MSW Generation, Diversion & Disposal - Actual 2001-2006					
	2001	2002	2003	2004	2005
Generation	597,811	612,279	604,442	644,327	614,519
Diversion	182,562	184,149	186,407	189,047	183,289
Disposal	415,249	428,130	418,035	455,281	431,230
Population	613,090	616,408	619,107	621,394	623,050
Per Capita MSW Generation (Tons/Year)	0.98	0.99	0.98	1.04	0.99
(Pounds/Day)	5.34	5.44	5.35	5.68	5.40
Per Capita MSW Diversion (Tons/Year)	0.30	0.30	0.30	0.30	0.29
(Pounds/Day)	1.63	1.64	1.65	1.67	1.61
Per Capita MSW Disposal (Tons/Year)	0.68	0.69	0.68	0.73	0.69
(Pounds/Day)	3.71	3.81	3.70	4.01	3.79

% of MSW Waste Generation					
	2001	2002	2003	2004	2005
Generation	100%	100%	100%	100%	100%
Diversion	30.5%	30%	31%	29%	30%
Disposal	69.5%	70%	69%	71%	70%

Information used to determine these rates are

- tonnage reports submitted quarterly or annually by solid waste facilities,
- franchise tax reports submitted by transfer stations, Vermont landfills and haulers,
- information provided by the Solid Waste District Investigator from hauler audits, and
- data from a 2002 report prepared for the Vermont Department of Environmental Conservation (titled Vermont's Municipal Solid Waste Diversion Rate 2001, DSM Environmental Services).

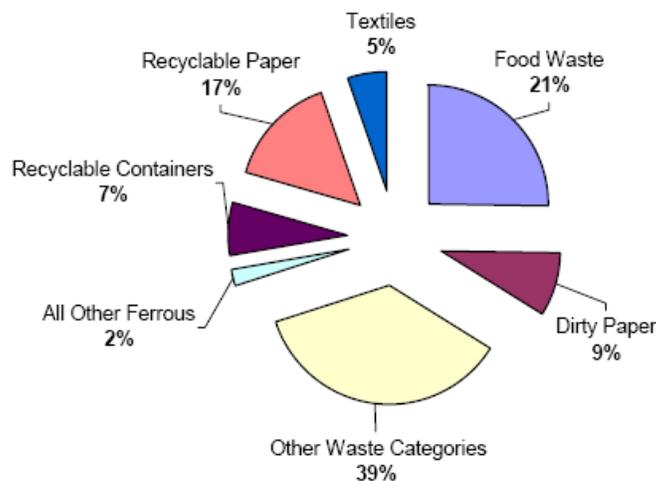
This approach has been successful each year at obtaining the majority of diversion and disposal tonnage data for solid waste facilities permitted by this Agency and out of state disposal tonnages. However some forms of diversion are not captured, such as recycling tonnages from scrap metal dealers and from businesses that self haul their recyclables directly to end markets instead of recycling through a Vermont solid waste facility. Data included in the 2002 DSM report is used each year when determining the annual diversion and disposal rates, rather than surveying scrap dealers and other businesses. Because of this, since 2002, the diversion rate each year is most likely underestimated.

Either a periodic update of the parts of the solid waste diversion system needs to be routinely done or another method for obtaining this data needs to be implemented.

The Agency's 2001 waste composition study⁵ assessed the composition of the waste stream destined for disposal. Determining the types and amounts of waste disposed can assist in identifying which waste streams should be targeted for action. The study identified:

- While Vermont has made impressive progress in increasing recycling, approximately 24% of the residential waste stream (combined urban and rural samples) consists of recyclable paper, bottles and cans.
- Food waste (approximately 21%) was the largest single material on a weight basis found in the residential waste stream for which organics management systems such as composting may be an important method for increasing diversion.
- Textiles are a significant enough part of the residential waste stream (5%) to consider further development of collection and marketing programs for this material.
- Plastics are a growing part of the waste stream. Of particular significance, although they only represent 3% on a weight basis, is the relatively large volume of plastic film (exclusive of garbage bags) in the waste stream destined for disposal.

Figure E.1
Composition of Residential Waste
(% by weight)



A more recent residential waste composition study performed by the Chittenden Solid Waste District in 2006 reported that recyclable paper and containers made up 19.3% of residential waste (urban) and organics made up 33.2%.

⁵ VT Waste Composition Study
<http://www.anr.state.vt.us/dec/wastediv/solid/pubs/VT%20WASTE%20COMP.pdf>

Future Measures:

To more adequately assess our effectiveness at reducing waste and give ourselves credit for our efforts, the Agency will need to use other measures of success in addition to its on-going annual determination of the municipal solid waste diversion rate (% diverted) and the per capita disposal rate (lb/capita/day). The per capita disposal rate will continue to be a key tool to assess effectiveness since it is based on readily available data and effectively measures progress towards reducing the amount of waste disposed. New measures must be aligned with our vision for the next 10 years. These measures would include successes the Agency achieves by participating in initiatives at a local, regional and national level. Examples of other measures of success could include:

Waste Prevention:

- Measure energy savings and greenhouse gas reductions by preventing waste generation.⁶
- Monitor progress towards achieving a waste generation limit, once such a limit has been established.

Waste Diversion (Reuse, Recycling and Composting):

- Monitor progress of meeting the goal of diverting 50% of MSW from disposal.
- Monitor progress of meeting diversion goal for C&D, once has been established
- Number of business start ups and the number of existing businesses using recovered materials.
- Amount of energy saved and greenhouse gas reduced by recycling and composting.
- Number of recycling centers to provide statewide convenience for recyclable materials.
- Types of materials that are collected for recycling (textiles, plastic films, etc) and location of the end markets for materials collected.
- Number of materials that manufacturers and retailers are taking back for recycling (increase in product stewardship opportunities – such as the Rechargeable Battery Association take back program, Staples computer take-back program)

⁶ Northeast Recycling Council Environmental Benefits calculator for VT
http://www.nerc.org/topic_areas/environmental_benefits_calculator.html
EPA WARM model for Source Reduction
http://www.epa.gov/climatechange/wycd/waste/calculators/Warm_home.html

Waste Processing to Reduce volume and toxicity:

- Number of HHW events, facilities, and amounts collected.
- Number of additional materials banned from landfilling or incineration.
- Changes in regulations or manufacturing to limit or eliminate contaminants that pose risk as waste.

Land Disposal:

- Monitor reduction in the amount disposed to compare to limit
- Reduction in the amounts and types of recyclable materials being disposed.
- Increase energy conversion from methane at VT landfills
- Number of new technologies which reduce the amount of waste requiring disposal
- Conduct waste sorts on periodic basis to determine types and amounts waste being disposed and track trends

Section III: Solid Waste Management Strategy for the Next 10 Years

Proposed Sustainable Materials Vision

In order to meet the goals of the Vermont Solid Waste Plan to reduce solid waste generation in Vermont and reduce reliance on disposal options, a new and innovative vision and approach are required. The vision and approach need to change how Vermonters think about “waste” and “waste management”, and it needs to address all of the environmental, energy, and other adverse impacts of waste management. In addition, the vision and approach can and should help Vermont achieve sustainable growth and community development goals.

The Agency of Natural Resources proposes a new Sustainable Materials Vision for waste management in Vermont, including goals, a list of key features, and framework for implementation, as described in this section.

Goals of the Proposed Sustainable Materials Vision for Vermont:

*To promote sustainable materials management,
To prevent waste from being generated,
To minimize reliance on waste disposal, and
To minimize energy consumption, green house gas emissions and other adverse environmental impacts.*

Key Features of the Proposed Sustainable Materials Vision:

- 1. Focus on Sustainable Materials Management:** The state’s current model assumes solid waste will be generated and focuses on “end of pipe” waste management options. A sustainable material model is more focused on “upstream options” preventing or minimizing waste generation while using resources more effectively. A sustainable materials model would include product stewardship⁷ and involve all stages and players in a product’s life cycle (which includes the extraction of raw materials, manufacturing, distribution, retail, consumption, and end-of life management). Vermont will need to work in partnership with national, regional, state, and local efforts. Ultimately, the shift in

⁷ Product stewardship is a product-centered approach to environmental protection. Also known as extended product responsibility (EPR), product stewardship calls on those in the product life cycle—manufacturers, retailers, users, and disposers—to share responsibility for reducing the environmental impacts of products. (From EPA: <http://www.epa.gov/epaoswer/non-hw/reduce/epr/about/index.htm#prod>)

waste management perspective would be from the existing management strategies of “cradle-to-grave” to the new “cradle-to-cradle”⁸ models.

- 2. Share Responsibility:** Tackling the complex problem of reducing waste requires an integrated approach involving all residents, businesses, manufacturers, and institutions, rather than placing the primary responsibility on government and municipalities. Efforts need to be made to engage everyone in discussing the benefits of this more broad approach. Education and outreach will be critical to promote a better awareness of choices, including purchasing and how unwanted material can be avoided or better managed. Fostering product stewardship will include working with businesses and manufacturers, including those beyond our state borders, as well as solid waste districts, municipalities and governments.
- 3. Establish Statewide Waste Generation Goal:** Vermont currently has a goal of diverting 50% of the waste generated from being disposed in landfills. Diverting waste from disposal is accomplished through reuse, recycling, composting and other similar activities. While promoting diversion of waste is good, it does not address the total amount of waste that is generated, which has increased dramatically since 1987. Waste generation has increased as consumption has increased due to economic growth along with population growth. Vermonters should consider a waste generation goal as well.
- 4. More Integrated State-wide Strategies and Implementation:** To be successful, all Vermonters need to have access to convenient, cost-effective, and consistent programs, services, and facilities. While some areas of the state are fairly good at achieving this goal, many areas are not as well served. New strategies need to be developed and implemented to achieve state-wide success. Developing a sustainable materials economy means collaboratively working throughout the state with solid waste districts, economic developers, waste haulers, processors and businesses that can use compostable and recyclable materials. Also a focus on “upstream” strategies will need a statewide (and sometimes regional and national) approach for promoting product stewardship and other similar initiatives.
- 5. Expand Current and Create New Partnerships:** Working with others to implement this Sustainable Materials Vision will be essential. ANR will be a central partner in a large and diverse group of public- and private-sector stakeholders, such as those involved in sustainable materials management,

⁸ Cradle to Cradle Design is a system of thinking based on the belief that human design can approach the effectiveness and elegance of natural systems by learning from nature and incorporating its patterns. Industry can be transformed into a sustaining enterprise—one that creates economic, ecological, and social value—through thoughtful and intentional design that mirrors the safe, regenerative productivity of nature and eliminates the concept of waste.

<http://www.mbdc.com/challenge/cradle-to-cradle.shtml>

developing businesses, and promoting better awareness of impacts of consumer choices. Partners will be both in-state and out-of-state organizations.

- 6. Continue to Meet Ongoing Responsibilities:** While moving forward with this Sustainable Materials Vision, ANR will continue to meet its ongoing responsibility to protect human health and the environment, including oversight of solid waste activities such as responsible management and disposal of solid waste.
- 7. Expand Criteria Used When Making Decisions:** Decisions on waste management strategies currently focus on volume, toxicity, and cost. The decision making criteria should also include other environmental impacts, such as energy use and green house gas emissions.
- 8. Measure Progress Differently and Better:** New tools and measurements will be developed, where necessary, and implemented to better and more effectively measure progress towards the vision's goals. Current measures involve amounts of waste, disposed or diverted. New measurements of success may also include: the number of business start ups, jobs created, businesses incorporating recycled materials into their products, reductions in materials and energy consumed, and reduction in green house gases emitted.

Framework for Implementing the Sustainable Materials Vision for Vermont:

No vision is viable unless there is realistic framework for how to implement the vision.

- **Evaluate Vermont's Solid Waste Planning Entities:** In addition to state planning, there are 43 solid waste planning entities in Vermont, including districts, alliances, groups of municipalities, and independent municipalities. This large number of entities makes it difficult to effectively and efficiently plan for and implement the programs, services, and infrastructure needed to carry out the Sustainable Materials Vision for Vermont. ANR will work with the solid waste planning entities and the Legislature to determine how to best develop integrated state-wide strategies and achieve successful implementation.
- **Create Long-Term and Adaptable Outreach and Education Programs:** All Vermonters, including residents, businesses, institutions, and government, will need to understand the Sustainable Materials Vision for Vermont and corresponding paradigm shift in solid waste management, and how all Vermonters can participate. A key feature of the Sustainable Materials Vision for Vermont involves significant changes in behavior regarding how "waste" is viewed (from being "waste" to being a "resource" or "sustainable material") and "managed" (from something that lacks value and primarily needs to be disposed to something that has value and should be managed based on that value). Behavior change will need to happen on various levels, including as individual Vermont residents, a community, business, or institution. To influence and help cause the desired behavior change, significant and

long-term collaborative outreach and educational programs are needed. As we progress, the outreach and education programs can and should change to meet the change in the types of programs needed.

- **Target Certain Waste Streams and Establish Measurable Goals:** Certain waste should be identified and targeted to be reduced from landfill disposal. Those wastes that are a large component of waste disposed (organics, recyclables, and construction & demolition waste) and those wastes that are toxics (electronics and household hazardous waste) should be targeted. A report will soon be completed by the Vermont Waste Prevention Stakeholder Initiative. The group will identify specific action steps to reduce these five targeted of solid wastes. ANR will evaluate the recommendations of that report and revise the State Solid Waste Plan accordingly. ANR will also work with stakeholders in establishing target reduction goals for each waste stream.
- **Increase Infrastructure and Evaluate New Technologies:** There is a wide variation in the types and number of solid waste management infrastructure and materials management in Vermont, which results with inconsistency in the types of materials collected for diversion at facilities around the state. Solid waste services need to be more consistent throughout the state and also must be convenient and at a reasonable cost to users in order to be effective. Recycling services also need to be capable of handling a changing list of materials. ANR must work collaboratively with Solid Waste districts, alliances, and municipalities as well as businesses to develop an effective strategy to provide infrastructure and more consistent materials management programs throughout the state. An increased infrastructure and more convenient, consistent, cost-effective recycling throughout the state would also help with managing all recyclables, including beverage containers. New emerging technologies should be evaluated when deciding which type of facility should be planned and constructed.

Adoption of goals should be considered, such as

Convenient, consistent, and cost-effective recycling for all Vermonters -- on the go (such as shopping, ball games, etc) and at home as part of residential and commercial curbside collection or within 10 miles of home.

- **Participate in Regional and National Efforts, Initiatives, and Partnerships:** Sustainable materials and solid waste management issues cross state and regional boundaries. To be effective and practical, many sustainable materials management policies and programs must be implemented on a regional or national basis. Implementing product stewardship programs is an example where we will need to work beyond our state boundaries, to effectively work with manufacturers. In addition, Vermont's efforts will be more effective when joined by other states and regions. ANR will seek out, participate in, and/or initiate partnerships that benefit and promote the Sustainable Materials Vision for Vermont.

- **Strengthen Current and Create New In-State Partnerships:** To implement the Sustainable Materials Vision for Vermont, a large and diverse group of stakeholders needs to be actively involved. ANR will play a key role and will need to strengthen its relationships with its current partners and establish relationships with new partners. These partners include, but are not limited to:
 - Solid Waste Managers: Solid Waste Districts, alliances and independent towns, private solid waste businesses, non-profit organizations;
 - State educational groups: Association of Vermont Recyclers, Vermont Earth Institute and 10% Challenge, colleges and universities;
 - Business and Economic Development: Vermont Sustainable Jobs Fund, Manufacturing Extension Centers, Small Business Development Centers, VBSR, State Economic Development Agencies for economic development
 - Green and Waste Prevention Groups: Vermont Green Building Network, VPIRG, Building for Social Responsibility, reuse organizations (VT Food Bank, Salvation Army);
 - Environmental Groups: VPIRG, VT Toxics Action Coalition, NOEMOA, NERC;
 - Other Government entities: Agency of Transportation, Agency of Agriculture, Vermont League of Cities and Towns, municipalities, State Buildings and Purchasing, and EPA;
 - Regional and National organizations promoting sustainable materials management and product stewardship

- **Revise Vermont Statute, the State Solid Waste Management Plan, and the Solid Waste Management Rules:** For Vermont to commit to the Sustainable Materials Vision for Vermont, the goals and key features need to be integrated into the statute, regulations, and planning documents. An evaluation should be conducted to determine the necessary changes, which will include both general and specific modifications to the statutes, plan and rules. In terms of Vermont statute, the main waste management statute are found in 10 VSA Chapter 159 and 24 VSA § 2202a, which statute requires adoption of rulemaking process using the Administrative Procedures Act. The main regulations are the Solid Waste Management Rules and the Hazardous Waste Rules. The state-wide planning document is the State of Vermont Solid Waste Management Plan.

Specific items that should be considered are:

- Alternative methods for SWIP development and approval
- Issuing grants more regionally for developing needed infrastructure and services
- Certificate of need for new or expanding landfills
- Specific restrictions or bans on the disposal of certain types of wastes (beyond existing ones)
- More flexibility to consider new and emerging technologies

- **ANR Leadership:** As ANR takes on a leadership role in promoting and advancing the Sustainable Materials Vision for Vermont, it will need to take on new functions and increase its capabilities. ANR staff will become experts in the policies, programs, and technologies associated with the Sustainable Materials Vision for Vermont. The Agency's current reorganization efforts will foster the ability of ANR to be a leader in this area.

Section IV: Impact of ANR Reorganization on the Regulation and Management of Solid Waste

The ANR reorganization, also known as the Vermont Way Forward, should result with more flexibility among programs to share resources and technical expertise. The ANR of the future will strive to be integrally linked with business, academia, and the community. With respect to the current Solid Waste Program, it is envisioned much of the work of the program would be located within the Center for Climate Change and Waste Reduction. A goal of this new center will be to have both the Air and Waste programs working together in multi-disciplinary teams, encouraging and promoting activities that would result with less green house gas emissions being generated along with a more sustainable use of materials and resources.

The Solid Waste program is evolving from a program that focused on end-of-pipe waste management (after the waste is generated) to one that focuses on upstream starting with product stewardship and prevention of waste generation. We will need to continue managing solid waste responsibly while we work on reducing waste generation. The Program will need to provide more education and outreach to businesses and residents on how to live more sustainable lives, in conjunction with the new Environmental Communication and Education Center.

Helping Vermonters understand the connection of waste reduction with climate change is an important one. By looking “upstream”, material resources and energy can be saved and reductions in green house gases can be gained in every step of production.

With the ANR reorganization, staff in the same Center will work on promoting strategies that will prevention waste generation, provide for sustainable materials management, and reduction in green house gas emissions along with other environmental and economic benefits.

Appendix

- A. Section 293b of 2007 Budget Bill
- B. Map of Vermont Solid Waste Planning Entities

Appendix A: Statutory Requirement for this Report

Section 293b of 2007 Budget Bill

REPORT; SOLID WASTE MANAGEMENT FACILITIES WORKING GROUP

(a) The agency of natural resources shall report to the committees on natural resources and energy by no later than January 15, 2008 with regard to:

(1) how the agency's reorganization will necessitate changes with regard to the way the state regulates and manages solid waste;

(2) the strengths and weaknesses of the state's existing solid waste management system;

(3) information that is necessary in assessing the extent to which the state's regulatory process succeeds in implementing the waste management priorities established in 10 V.S.A. § 6604;

(4) the direction in which the agency proposes that the solid waste management system should evolve over the next ten years, including those steps the agency can take on matters within its existing jurisdiction.

(b) The agency of natural resources shall convene a solid waste working group by no later than February 15, 2008. The working group shall include: one member of the senate to be appointed by the committee on committees; one member of the house of representatives to be appointed by the speaker of the house; the secretary of natural resources or his or her designee; two representatives of solid waste management districts; two representatives of citizens groups involved with solid waste issues; a member of the Vermont league of cities and towns to be recommended by the league; a representative of an environmental group; two representatives of the private solid waste industry in Vermont, one a landfill owner and one a solid waste hauler; a representative from the business sector; and a third party consultant skilled in solid waste facility design or risk assessment; together with representatives of other interests as added to the group by the secretary. The working group shall examine the report required by this section and develop proposals and recommendations to implement and improve upon the report, including best management practices. The group shall not be limited to matters recommended by the secretary. The group shall report to the house and senate committees on natural resources and energy by no later than January 15, 2009.

State of Vermont Solid Waste Planning Entities

