

Life Beyond Garbage:

Vermont Waste Prevention and Diversion Strategies

By the *Vermont Waste Prevention Steering Committee*: a partnership of business, non-profit organizations, and local, state, and federal government stakeholders

*The entire report, *Beyond Waste: Vermont Waste Prevention and Reduction strategies*, is available on line at <http://www.anr.state.vt.us/dec/wastediv/R3/DECwpPLAN.htm>. To reduce paper usage for print versions, we have reduced the margins of the report.*

May 2008

Table of Contents

EXECUTIVE SUMMARY	1
1. Background	1
2. Overarching Themes	2
3. Priority Strategies	3
4. Implementing the Plan	4
SECTION 1 - WASTE PREVENTION OVERVIEW	7
A. The Problem and the Vision for Vermont	7
B. Waste Prevention and the Management of Solid Waste in Vermont	8
C. National Goals - EPA and U.S. States	11
D. Benefits of Preventing Waste	13
E. Vermont’s Waste Prevention Planning Process.....	14
SECTION 2 - STRATEGIES	15
A. Guiding Principles	15
B. Overarching Themes for the Five Priority Focus Areas.....	16
C. Recommended Strategies	17
SECTION 3 - IMPLEMENTING THE PLAN	19
A. Educate Vermonters about the Plan.....	19
B. ANR’s Role	19
C. Stakeholder Involvement	20
D. Developing a Materials Resource Economy.....	21
E. Funding the Plan.....	22
SECTION 4: APPENDICES	24
Appendix 1: Strategies - Traditional Recyclable Materials	24
Appendix 2: Strategies - Construction Waste and Demolition Debris	32

Appendix 3: Strategies - Organics41

Appendix 4: Strategies - Household Hazardous Waste 50

Appendix 5: Strategies - Electronic Waste..... 66

Appendix 6 - Glossary of Terms 81

Appendix 7 - The Waste Prevention Stakeholder Planning Process and Timeline..... 83

Appendix 8 - EPA National Goals and Connections to Vermont Strategies: 84

Appendix 9 - Statutory and Regulatory Authority86

Appendix 10: Steering Committee & Subcommittee Members87

Executive Summary

1. Background

Vermonters throw away more and more trash each year. Waste from Vermont businesses, residents, and institutions (municipal solid waste) grew from 350,000 tons in 1987 to 606,276 tons in 2006, *a 73 percent increase*. Although Vermont's population grew during this time period as well, *Vermonters generate nearly twice as waste (including trash and recyclable and compostable materials) per person as they did in 1987*. During this same period federal, state, regional, and local government spent countless resources attempting to curb this growth. Clearly, our strategies have not worked.

Act 78, Vermont's 1987 solid waste law, identified waste prevention -- not generating waste in the first place -- as the highest priority for managing the state's waste. It only makes sense: if waste is not generated, then it does not need to be transported, reused, recycled, processed, or disposed of. The waste prevention alternative is the least costly and provides the most benefits for the environment and human health. A number of other states and countries around the world have recognized this and have embarked on ambitious pro-active efforts to address waste prevention.

Unfortunately, today's economy doesn't make waste prevention easy. Products we buy and use move through our society in a largely one-way direction: raw materials are extracted, processed into consumer goods, transported to market, sold, consumed, and disposed of in landfills or incinerators. Waste is generated at every stage of a product's life cycle, presenting numerous challenges and numerous opportunities.

Over the past year, a diverse group of stakeholders participated in the Vermont waste prevention planning process. Their work was supported by the Vermont Agency of Natural Resources (ANR) and the U.S. Environmental Protection Agency (EPA). Through this initiative, the stakeholders have identified a comprehensive set of strategies to move Vermont forward in its effort to prevent waste. These strategies embrace the concepts of product stewardship, sustainable resource management, collaboration at the local, state, regional, and national levels, construction of new infrastructure, bans on landfilling certain materials, and public education about the problems we face and the solutions available.

The stakeholders also recognized that, particularly in the short term, not all waste can be prevented. Thus, this report also includes strategies for increasing the reuse, recycling and composting of existing waste materials. Like waste prevention, such strategies provide environmental benefits. They reduce greenhouse gas emissions, save energy, and conserve resources. Additionally, recognizing "waste" as a resource instead of throwing it away provides economic benefits and helps Vermont's economy by creating new business opportunities and jobs - by some estimates up to 10 times the number of jobs produced by traditional waste disposal facilities.

Executive Summary

Because waste prevention focuses on “upstream” processes - how products are designed, manufactured, distributed, and sold - it involves many more individuals than those solely in the waste management field. The strategies put forward in this report involve product designers, manufacturers, architects, educators, environmental groups, municipalities, schools, regional and national organizations, and others integral in fostering waste prevention. Preventing waste relies on the citizens of Vermont to be aware, to be educated, to develop sustainable habits, to push government and business for reform, and to show leadership for the rest of the country.

The waste prevention planning process was organized around five major sectors of materials and waste: 1) traditional recyclable materials (glass, metal, plastics, etc.), 2) construction waste and demolition debris, 3) organics (food scraps, yard waste, etc.), 4) electronics, and 5) household hazardous waste. The priority strategies are listed below and detailed in the appendices.

2. Overarching Themes

In the course of identifying waste prevention strategies, a number of key overarching themes emerged.

- ***Public Education and Outreach:*** Educate Vermonters about the value of waste prevention, why it is important, and how to prevent waste.
- ***Product Stewardship:*** Ensure that responsibility for waste is shared by all those involved in a product’s life cycle.
- ***Government Leadership:*** State government must show leadership in preventing waste through its purchasing practices and other policies, such as its state building contracts.
- ***Infrastructure:*** The state needs to develop collection and processing systems for reusable, recyclable, and compostable materials and provide incentives for the private sector to develop businesses that use and sell the materials.
- ***Mandates and Bans:*** Mandates and bans can provide the drivers to help build an economy to reuse and recycle discarded materials, and ensure that resources are not wasted.
- ***Standards:*** Standards can be developed to ensure that best practices are used for waste prevention, such as in designing and constructing buildings or manufacturing products. Standards can also insure that diversion efforts are conducted in an environmentally and socially responsible manner.
- ***Partnerships:*** The State of Vermont must actively collaborate and coordinate with regional, national, and international efforts to change the way we manage our resources.

3. Priority Strategies

Traditional Recyclable Products (glass, metal, plastic, etc. listed in priority order)

- Require Pay-As-You-Throw (PAYT) programs in all sectors across the state.
- Require mandatory statewide recycling.
- Enact landfill disposal bans.
- Expand Vermont's bottle bill.
- Promote waste prevention in schools.
- Promote recycling away from home.

Construction Waste and Demolition Debris (C&D - listed in priority order)

- Institutionalize waste prevention, deconstruction, and recycling in project design, specify waste diversion in construction bid documents.
- Develop regional reuse and recycling markets.
- Use economic incentives to build reuse and recycling infrastructure.
- Institute a phased landfill ban of select C&D wastes.
- Educate the public about C&D waste reduction.
- Collaborate with national and regional organizations.

Organics (in no particular order)

- Expand the existing perishable food redistribution network.
- Expand and improve the statewide infrastructure for composting
- Enable small and large scale composting.
- Develop economic incentives, as precursors to mandates, to encourage organics waste prevention.
- Within specific timeframes, mandate composting for all generators.
- Increase general public and school education about organics waste prevention, reuse, and diversion.

Electronic Waste (e-waste -- listed in no particular order)

- The State will take a leadership role in promoting the use of Electronic Product Environmental Assessment Tool (EPEAT) standards for computer purchases throughout state government.
- Collect, expand, and standardize statewide data on e-waste generation, recycling, reuse, and disposal.
- Review existing regulations and environmental standards in use (other states, federal government) for e-waste recycling (best management practices) and adopt standards appropriate for Vermont.
- Expand and sustain public education about e-waste
- Assess the existing infrastructure for collection of e-waste.

Executive Summary

- Develop businesses and markets for e-waste recycling and recycled materials in conjunction with state economic development initiatives.
- Implement phased landfill bans that include computers and peripherals, CRTs, televisions, uninterrupted power supplies /transformers, VCRs/DVDs, copiers/fax machines/printers, and cell phones.

Household Hazardous Waste (HHW-- listed in no particular order)

- ANR should develop a long range, 10-year HHW Management Plan that focuses on public awareness, infrastructure improvements, and extended producer responsibility to reduce the types of materials requiring management by municipalities.
- Establish a legislatively-appointed Advisory Council on Toxic Substances to assess hazardous, toxic, persistent, and bioaccumulative chemicals in consumer products and waste. Make recommendations to the Legislature and the Departments of Environmental Conservation and Health on methods to reduce impacts to human health and the environment.
- The State of Vermont should take a leadership role in product stewardship strategies for waste prevention and toxics use reduction in consumer products.
- The State of Vermont should take a leadership role in Environmentally Preferable Purchasing (EPP) to encourage the elimination of priority toxic substances in products and services purchased by the public and private sectors.

4. Implementing the Plan

The plan provides the framework, a starting point, for how Vermont can prevent waste from being generated in the first place, and how to expand reuse, recycling, and composting to achieve Vermont's statewide 50 percent diversion goal. Some of the strategies outlined in the Plan can be easily implemented in the short term - the low hanging fruit. Other strategies require more outreach, collaboration, partnerships, and funding, and will require a longer-range approach. Involving a diverse group of stakeholders in this collaborative process provides an essential foundation for these long-range efforts. This collaborative approach will be critical to all future planning and implementation efforts.

A. Funding and Resources

The strategies and action steps outlined will require funds and staff resources to implement. This work will need to be coordinated among state agencies. Partnerships will be essential to insure that the funding model effectively supports the waste prevention and waste diversion strategies. Lastly, partners will need to evaluate and adjust the model as needed.

Executive Summary

Funding strategies should be based on the following core principles:

1. *creating incentives* which will drive Vermonters toward preventing waste, followed by reusing, recycling and composting waste.
2. *creating disincentives* to using wasteful products (extra packaging, disposable products, etc)

ANR will need to work with stakeholders to explore funding sources and approaches, and to insure that incentives and disincentives shape decisions made by Vermont businesses, households and municipalities.

B. Continuing Stakeholder Involvement

At the January 2008 stakeholder meeting, an Executive Committee was formed, comprised of stakeholders from the Steering Committee. It identified next steps related to publicizing and implementing the plan which were to:

- Educate Vermonters about the plan and publicize it.
- Evaluate whether to host a Waste Prevention Forum to highlight the priorities outlined in the plan.
- Assess how to most effectively continue and build upon stakeholder involvement in implementing the waste prevention strategies.

C. ANR's Role in Implementing the Plan

- ANR will need to insure that waste prevention is a priority of the Agency and begin implementing the plan. It will need to incorporate applicable action steps into current and future ANR initiatives and work plans. As appropriate, the action steps recommended in this report will be incorporated in the State of Vermont Solid Waste Management Plan when ANR develops and adopts an updated State Solid Waste Plan. State statutes will need to be reviewed and new legislation enacted to put the waste prevention recommendations and goals of this report into law. New comprehensive legislation may be required and ANR will identify the best way to revise statute.

D. Next Steps

This plan represents the dedication and significant amount of work from a large number of stakeholders who participated throughout the entire eight-month planning process. This plan would not have happened without their hard work and the support of DEC staff and an outside consultant tasked with facilitating the process. This broad involvement provides a solid foundation for moving forward with implementation of its recommended strategies.

This report marks the end of the first phase of the planning process. A second phase will now entail prioritizing the list of strategies, developing detailed work plans for each priority, and implementing the selected priorities.

Ultimately, to succeed and to build success stories, the plan will need to start by narrowing the list of priority strategies to identify near-term "low hanging fruit". The first projects

Executive Summary

launched would consist of a carefully selected suite of activities involving education, workshops, technical assistance, and more. This would be the start of moving Vermonters toward a "*Life beyond Garbage.*"

Section 1 - Waste Prevention Overview

A. The Problem and the Vision for Vermont

Resources currently move through our society in a largely one-way direction: raw materials are extracted, processed into goods, consumed, and disposed. Although in the short-term this system may appear to work, over the long term it wastes our limited resources, degrades our ecosystems, and causes climatic changes, spiking energy prices, and global conflict over earth's dwindling resources.

But this is not just a global issue. Right here in Vermont, we are experiencing the consequences of this problem. Although Vermonters rightly take pride in environmental stewardship, we generate about 850,000 tons of solid waste¹ annually, and the quantity increases each year. Although the State set a goal of diverting (through reuse, recycling and composting) 50 percent of the municipal solid waste stream (waste from businesses and residents) by 2005, Vermont's waste diversion numbers barely surpassed 30% in 2006. In addition, the physical and environmental characteristics of the products we consume and throw away is changing.

Vermont experiences the consequences of this problem in conflicts over the siting of new landfills, social and environmental impacts from the transportation and disposal of the increasing amounts of waste, environmental risks from new and/or different wastes, and economic inefficiencies due to the waste of valuable resources.

We believe that Vermont has a tremendous opportunity to re-think the old paradigm of waste management - that waste is inevitable. The opportunity exists to move to a new perspective that waste is not inevitable; there are smarter and more efficient ways to make and use products that greatly reduce the amount and toxicity of waste generated.

Waste prevention is the cornerstone of the shift away from the idea of "waste" management to one of "resource" management. Waste prevention -- not generating waste in the first place -- results in the greatest benefit to the environment, human health, and the economy. Fewer resources are extracted and less energy is expended in manufacturing, distributing, and selling products. Less consideration needs to be given to reuse, recycling, or disposal systems; fewer toxins and greenhouse gases are emitted. Waste prevention is a key part of creating an economic system that is environmentally and socially sustainable.

Preventing waste in our consumption-driven and convenience-oriented society is a demanding and lengthy challenge. Vermont is part of the "global village," and social and market forces beyond our citizens' control are at work. Although waste will continue to be

¹ This tonnage represents all types of waste reported in Vermont including Municipal Solid Waste (MSW from businesses, institutions and residents), construction waste, household hazardous waste, and biosolids.

produced for the near term, we will need to develop more efficient and safer methods of managing those materials, turning them into resources, and extending their lifetimes beyond a single use, rather than burying or burning them. We need to embrace the concept of “cradle to cradle” rather than “cradle to grave.” Paper is recycled back into paper, food waste becomes food for the soil (instead of products being landfilled or incinerated).

Through creativity, visionary public policy, private investment, education, and a concerned citizenry, Vermonters can not only improve our State’s environment, reduce our energy consumption, create a sustainable economy, and better our lives, but also be seen as a model for others.

B. Waste Prevention and the Management of Solid Waste in Vermont

Act 78, Vermont’s legislation governing solid waste management, was passed in 1987 and put forth a hierarchy for how the state should manage its waste. The law clearly placed the highest priority on waste prevention, as not generating waste is the management strategy most efficient, least costly, and most beneficial to the environment. Waste prevention is followed, in order, by reuse, recycling, processing, and, finally, if there are no alternatives, disposal. (Statutory and Regulatory Authority in Appendix 9).

Although Act 78 placed this high priority on waste prevention, the state’s Solid Waste Plan does not contain any specific strategies or actions to accomplish waste prevention². This waste prevention planning process is intended to provide possible approaches to incorporate into the state’s Solid Waste Plan, as well as serving as the basis for action by state government and stakeholders.

Since the passage of Act 78 in 1987:

- 43 solid waste planning entities have worked to reduce waste at a local level. Often by partnering with private industry, these planning entities have allowed Vermonters increased opportunities to reuse, recycle, and compost their discarded materials. Virtually all citizens have access to curbside or drop-off collection of recyclables, can easily obtain backyard composting bins, and have nearby hazardous waste collection days. The items they can recycle include an ever-increasing list of materials, such as computers and textiles.
- New concepts have been developed at the national and international levels to manage materials throughout their lifecycle, including Product Stewardship, Cradle to Cradle, and Zero Waste. Such concepts provide waste managers with new tools for managing wastes.

² <http://www.anr.state.vt.us/dec/wastediv/solid/SWPlanning.htm>

Waste Prevention Overview

- “Climate Change” has become widely-recognized as an environmental threat to the planet. With this recognition has come a widespread public awareness of the consequences of poor resource management and the far reaching impacts of everyday consumer choices.
- A strong global demand for recycled materials has emerged as virgin resources decline, the price of oil increases, and recycling collection programs and infrastructure matures.
- More recently, there has been interest in “sharing” responsibility for managing waste (by manufacturers, distributors, retailers, and consumers)
- There has been widespread attention to creating a more sustainable economy, including local green jobs.

Despite steps being taken by ANR, solid waste planning entities, non-profits, and private businesses to support reuse, recycling, and composting, the waste stream from Vermont residents, businesses, and institutions (known as Municipal Solid Waste or MSW) has continued to grow.

- The total amount of MSW (trash and recycling) increased from 350,000 tons in 1987 to 606,000 tons in 2006, *a 73 percent increase*.³
- Although population growth contributed to this increase, Vermont residents and businesses, threw away on average *48.3% more trash and recyclables per person in 2006 than in 1987 - from 3.58 pounds per capita in 1987 to 5.31 to 2006*.⁴

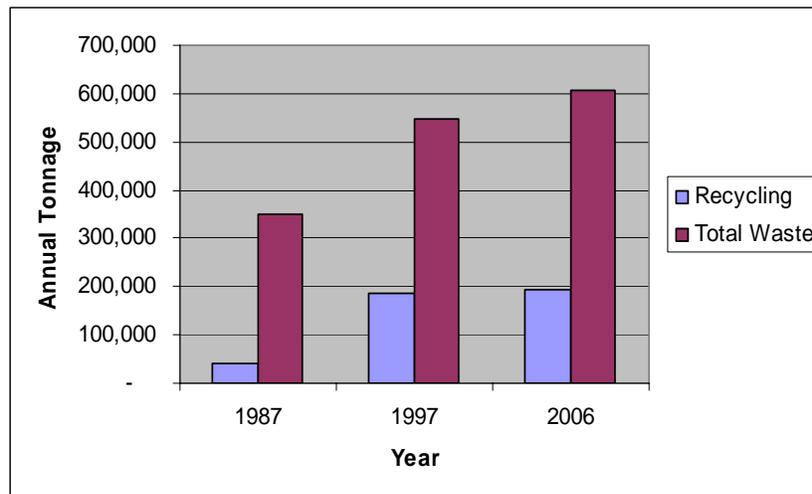
While the diversion rate for MSW increased significantly in the first 10 years after Act 78 was passed, from 12 percent in 1987 to 34 percent in 1997, the rate has leveled off around 30%. In addition, amounts of other wastes generated, not included in MSW, have increased appreciably. Disposal of one such waste, construction waste and demolition debris (C&D), increased over 100% between 1999 and 2006⁵.

³ <http://www.anr.state.vt.us/dec/wastediv/solid/pubs/2005DDfullrpt.pdf> (Table 2)

⁴ <http://www.anr.state.vt.us/dec/wastediv/solid/pubs/2005DDfullrpt.pdf> (Table 2)

⁵ Rates for recycling and reuse of C&D are not known, since ANR does not collect state wide data for these materials.

Vermont Waste Generation and Recycling



Preventing waste involves strategies that go beyond what the Agency and solid waste planning entities can “manage” alone. This is because waste is created during each stage of a product’s life cycle (extraction, manufacturing, distribution, retail and end use) - not only when consumers throw items away. Waste prevention strategies encompass how products are designed, made, distributed, sold, managed, and ultimately disposed of. Waste prevention involves consumer choices and economic factors beyond the control of ANR and local solid waste planning entities. It relies on working with a diverse group of stakeholders including manufacturers, distributors, retailers, businesses, institutions, households, educators and others as well as working at the local, state, regional and national levels.

The benefits from preventing waste go beyond the State’s goals of reducing waste generation and toxicity. Waste prevention helps to meet other State goals of reducing energy use and greenhouse gas emissions, creating jobs, and adding value to waste materials. Less consumption of resources lessens the entire burden on the ecosystem: land, soil, and water are conserved, and the air is cleaner.

Waste prevention is therefore the most important aspect of waste management in terms of greenhouse gas reduction, and is where efforts should be focused. ⁶

What is Waste Prevention -- Vermont’s Solid Waste Plan defines waste prevention as “the design, manufacture, use, or purchase of materials (such as products and packaging) to reduce the amount and toxicity of waste generated.”

⁶ <http://www.defra.gov.uk/environment/waste/wip/newtech/pdf/ClimateChange3.pdf>

C. National Goals - EPA and U.S. States

The U.S. Environmental Protection Agency has set a framework for reducing the nation's waste, known as the *Resource Conservation Challenge*⁷. EPA's vision is for the country to move from a waste management program to a materials management program; to see the problem not as the narrow question of how to deal with waste, but how to best manage materials from start-to-finish of any economic process, guided by five basic principles:

- **Product stewardship**
- **Beneficial use of materials (source reduction, recycling, and beneficial use)**
- **Energy conservation**
- **Priority and toxic chemical reduction in waste**
- **"Greening" the government**

The Vermont strategies recommended in this report are consistent with, and complement, the Resource Conservation Challenge principles. In addition, a number of other states are taking leadership roles in addressing these issues. For example, the State of Oregon's Department of Environmental Quality (DEQ) recently completed a comprehensive *Waste Prevention Strategy 2006 - 2016*⁸ to guide their effort in tackling the ever-increasing volumes of waste. The report contained an excellent characterization of waste prevention as:

- Reducing consumption (and wasting) of goods outright without substitution.
- Extending the life of products already in use (and by extension, delaying purchase of replacement items).
- Shifting purchases from disposable or single use products to products that are more durable, repairable, or reusable.
- Purchasing used products in lieu of new products.
- Shifting purchases from material intensive products to products that are less material intensive (dematerialization).
- Shifting consumption from goods to services so that needs and wants are satisfied in a different manner.

Some Opportunities for Vermonters to Prevent Waste

- Buy durable and repairable products.
- Compost yard and food scraps in your backyard
- Donate an unwanted computer to a charity (rather than recycling its parts).
- Print on both sides of paper.
- Bring a reusable bag to the grocery store.
- Buy used items.
- Buy goods that are minimally packaged.
- Lease or rent items rather than buying them.

⁷ <http://www.epa.gov/rcc/>

⁸ <http://www.deq.state.or.us/lq/pubs/docs/sw/WPSBkgd08.pdf>

Waste Prevention Programs around the World (including Vermont!)

Product Stewardship: Germany's Green Dot Program - In 1991, Germany passed an ordinance on the *Avoidance of Packaging Waste*, which makes industry responsible for its packages to the end of their life cycles. This responsibility includes covering the cost of collecting, sorting, and recycling packages after consumers discard them.⁹ A 1998 article written for *Pollution Prevention Review*, reported that during the program's first four years, the Green Dot program cut packaging consumption in Germany by a million tons. To avoid higher costs over the long term, manufacturers lightened their packages, eliminated unnecessary packaging (like boxes within boxes), and marketed their products in more concentrated forms. While it's impossible to make a direct comparison, during the same period U.S. packaging increased by 13 percent.¹⁰

Government to Lead By Example - The government of Ontario's Green Workplace Program facilitates waste reduction, resource conservation, and environmentally responsible purchasing in provincial facilities. In 1996, net savings from its in-vessel composting program saved \$39 per metric ton.¹¹

Standards - Vermont Builds Greener scorecard,¹² a rating program developed by Vermont Building for Social Responsibility includes points for waste prevention strategies including:

- use of long lasting, durable components,
- use of salvaged or recycled content building materials,
- optimization for standard building design, including designing for standard ceiling heights, wall lengths, building dimensions, and avoiding waste from structural over-design,
- donation of excess and re-usable materials for re-use,
- flexibility of design (e.g. adaptable for change in use in the future).

⁹ Germany, Garbage, and the Green Dot: Challenging the Throwaway Society, INFORM report http://www.informinc.org/xsum_greendot.php

¹⁰ E-Magazine article - No Longer Content to Just Recycle Waste, Environmentalists want us to Reduce it to Nothing <http://www.emagazine.com/view/?506&printview&imagesoff>

¹¹ U.S EPA Fact Sheet <http://www.ilsr.org/recycling/wrrs/food/food4.pdf>

¹² Vermont Building for Social Responsibility Score Card <http://www.bsr-vt.org/vbg/index.html>

D. Benefits of Preventing Waste

1. Waste Prevention Reduces Greenhouse Gases.

Greenhouse gases are emitted throughout a product's lifecycle - resource extraction, manufacturing, distribution, sale, and disposal. When waste is prevented or reduced, emissions are reduced or eliminated throughout a product's entire lifecycle. Additionally, waste prevention can reduce the amount of organic materials landfilled, reducing the amount of methane released when these materials decompose in a landfill. Methane is 21 times more potent as a greenhouse gas than carbon dioxide, and landfills are a major emitter of methane.

2. Waste Prevention Saves Energy.

When products are made with less material and when people reuse things, less energy is needed to extract, transport, and process raw materials and to manufacture products.

3. Waste Prevention Conserves Natural Resources.

Fewer virgin materials used to make a product results in fewer natural resources consumed. Reusing items also helps to conserve resources as it extends the life of an item and recycling helps reduce the need to extract virgin materials to make new products.

4. Waste Prevention Preserves Carbon-Storing Forests.

Trees absorb carbon dioxide from the atmosphere and store it in wood in a process called "carbon sequestration." Waste prevention (and recycling) of paper products allow more trees to remain standing in the forest where they can continue to remove carbon dioxide from the atmosphere.

5. Waste Prevention Protects Human Health and Ecosystems.

Designing products with less toxic materials reduces human exposure to these compounds. Reduced toxicity also lowers the risks to workers handling wastes for reuse and recycling and reduces risks to the environment due to accidents or leaks during transportation, recycling, or disposal of wastes.

6. Waste Prevention Saves Money.

Preventing waste can save money for communities, businesses, schools, and individuals. Such opportunities include buying products in bulk, buying reusable items (such as used furniture, clothes, and building materials), and buying longer-lasting durable products.

Vermont Companies Reduce Waste and Save Money

Ben and Jerry's Homemade, in Waterbury, Vermont switched from buying cherries and other variegated ingredients in 500 pound (55 gallon) drums and 5 gallon pails to 2,300 pound totes. By purchasing ingredients in totes instead of the drums, Ben and Jerry's estimates that 13 tons per year of solid waste were eliminated.

Green Mountain Coffee Roasters in Waterbury, Vermont reduced the thickness of its film packaging, the amount of chip board used to construct display boxes, and its use of corrugated boxes and banding material. Examples of these strategies include:

- GMCR reuses cardboard boxes, leftover from in-house manufacturing, by running them through a cutting machine, creating a "waffle-like" paper that it reuses as packaging.
- GMCR reuses some of its cardboard boxes (instead of recycling them) through the Canadian company, ReBox. In 2007, ReBox hauled fifteen tractor trailer loads, approximately 100,000 boxes, for reuse.

7. Reducing Waste through Waste Prevention, Re-use, and Recycling Creates Jobs.

A study by the Northeast Recycling Council (NERC) in June 2000 showed that the recycling industry in the Northeast is a \$44 billion dollar industry, with over 13,000 recycling and re-use businesses employing over 206,000 people and paying wages in excess of \$6.8 billion. These establishments collect, process, and/or turn the materials into new products.¹³

E. Vermont's Waste Prevention Planning Process

In the Spring of 2007, ANR began a waste prevention planning process to address these complex issues. ANR realized that the problems could not be solved by directives developed solely within the Agency. Since waste concerns everyone, it was important to give citizens and groups with interest in, and knowledge about waste prevention a voice in developing strategies to address this problem. In April, ANR held a *Waste Prevention Forum* to launch this stakeholder-driven process. Over 120 people attended the Forum, representing a wide variety of interests, with diverse viewpoints and ideas. These ideas were shared and discussed, then developed into foundation for a waste prevention planning process.

Following the Forum, ANR convened a stakeholder Steering Committee which then formed five subcommittees to create strategies for waste prevention in each of the five prioritized waste sectors. (See Appendix Section for a detailed timeline of the planning process). While the objective of the Waste Prevention initiative was to identify and develop the framework for preventing waste, the subcommittees identified additional diversion strategies as part of the framework for action -- how Vermont can achieve its 50 percent diversion goal, reduce the total amount of waste Vermonters generate, and provide economic and environmental benefits. Subcommittees met over the summer and fall of 2007 and the winter of 2008 to develop strategies for each of the five focus areas.

The Waste Prevention Plan provides a framework for action. However, the work plan does not end with this report. Stakeholders will continue to prioritize strategies, develop detailed work plans, and participate in their implementation.

¹³ Northeast Recycling Council Recycling Economic Information Study
http://www.nerc.org/documents/rei_report_highlights.html

Section 2 - Strategies

The Vermont Waste Prevention strategies that were identified and developed through this planning process were organized into five prioritized waste sectors:

- Traditional recyclable products (glass, metal, plastic, etc.)
- Construction waste and demolition debris (C&D)
- Organics (food, leaf and yard waste)
- Electronics (e-waste)
- Household hazardous waste (HHW)

These strategies are based on a set of guiding principles developed by the stakeholders:

A. Guiding Principles

- Preventing waste is the shared responsibility for all participants in a product's life cycle (product stewardship).
- Success of the strategies depends on collaboration and partnerships between the public sector, environmental advocates, educators, businesses, manufacturers and others.
- State government needs to lead by example in its policies and practices.
- Strategies must be based on protecting the environment and conserving natural resources.
- Strategies should, as much as possible, protect and stimulate local economic development.
- Strategies should be sustainable over the long term.
- Waste issues should be included in the continued discussion on climate change solutions.
- Prioritize programs and goals with a focus on upstream issues (product design, packaging reduction, standards).
- Utilize ecological and lifecycle accounting to understand and respond to social and ecological costs of present management and production systems.

Product Stewardship is a principle that directs all participants involved in the life cycle of a product to take shared responsibility for the impacts to human health and the natural environment that result from the production, use, and end-of-life management of the product.

The greater the ability of a party to influence the life cycle impacts of a product, the greater the degree of that party's responsibility.

The stakeholders typically include manufacturers, retailers, consumers, and government officials.

www.productstewardship.us

B. Overarching Themes for the Five Priority Focus Areas

Stakeholders identified the following themes as the key critical features overarching the five priority focus areas:

Public Education and Outreach: Waste prevention relies on an informed citizenry to be successful, regardless of how many facilities are available, or how well programs are planned and implemented. The general public and businesses need simple and uniform information about why waste prevention is important and how to actually go about achieving it. Outreach, education, and technical assistance are the cornerstones of effective waste prevention.

Infrastructure: “Pure” waste prevention does not require additional infrastructure. However, increasing reuse, recycling and composting will. Because convenience is a major factor in getting businesses and residents to divert waste materials, without a convenient and comprehensive waste diversion infrastructure throughout the state, Vermonters will be less likely to participate. Building infrastructure involves financing -- everything from providing backyard compost bins, building electronics recycling facilities, and starting a reuse store, costs money.

Incentives: Incentives help Vermonters make decisions about how they will manage their wastes. They can be either positive or negative. A higher tipping fee for waste is a negative incentive, free recycling is a positive incentive. Incentives typically are monetary, but could involve awards, recognition or publicity.

Mandates & Bans: Recycling mandates are aimed at materials that have stable and strong recycling markets, such as cardboard, metal cans, or clean wood, where disposal makes no economic sense. Similarly, landfill disposal bans can be enacted when the banned material can be and should be reused or recycled, or because the material in question (e.g., fluorescent bulbs) is an environmental threat and requires special handling.

Market Development: Development of accessible and economically sustainable markets is a key factor in supporting waste reduction programs. Sustainable markets provide the predictability needed by the private sector and municipalities to make investments in collection and processing infrastructure. Markets also provide assurance to residents and businesses that their efforts to separate materials for recycling will actually result in legitimate recycling of those materials.

State Government Leadership by Example: State government can itself be innovative preventing waste, by employing progressive strategies to determine their feasibility in the open market, or by funding pilot programs to determine the practicality of an idea. Government cannot ask or require the public to commit to what itself is unwilling or unable to do, or is found to be infeasible.

Strategies

Standards: Standards are important measures for many waste reduction programs. For instance, contaminant standards for compost protects the public and the environment, building codes allow or preclude the use of used building materials, and product stewardship standards for electronic waste prevent improper export of waste.

C. Recommended Strategies

The following are the strategies recommended for each waste sector:

Recyclable Products (in order of priority)

- Require Pay As You Throw (PAYT) Programs in all sectors across the state.
- Require mandatory statewide recycling.
- Enact Landfill Disposal Bans.
- Expand Vermont's Bottle Bill.
- Promote Waste Prevention in Schools.
- Promote Recycling Away from Home.
- Support Local and National Product Stewardship Initiatives.

Construction Waste and Demolition Debris (C&D -- in order of priority)

- Institutionalize waste prevention, deconstruction, and recycling in project design; specify waste diversion in construction bid documents.
- Develop regional reuse and recycling markets.
- Use economic incentives to build infrastructure.
- Institute a phased landfill ban of select C&D wastes.
- Educate the public about C&D waste reduction.
- Collaborate with national and regional organizations.

Organics (in no particular order)

- Expand existing perishable food redistribution network.
- Develop economic incentives to encourage organics waste prevention (precursors to mandates).
- Expand and improve the statewide infrastructure for composting.
- Enable small and large scale composting.
- Mandate composting/diversion for all generators with specific timeframes.
- Increase general public and school education about organics waste prevention and reuse/diversion.

Household Hazardous Waste (HHW -- in no particular order)

- ANR should develop a long range, 10-year HHW Management Plan that focuses on public awareness, infrastructure improvements, and extended producer responsibility to reduce the types of materials requiring management by municipalities.

Strategies

- Establish a legislatively appointed Advisory Council on Toxic Substances to assess hazardous, toxic, persistent, and bioaccumulative chemicals in consumer products and waste; and make recommendations to the Legislature and the Departments of Environmental Conservation and Health on methods to reduce impacts to human health and the environment.
- The State of Vermont should take a leadership role in Product Stewardship strategies for waste prevention and toxics use reduction in consumer products.
- The State of Vermont should take a leadership role in Environmentally Preferable Purchasing (EPP) to encourage the elimination of priority toxic substances in products and services purchased by the public and private sectors.

Electronic Waste (e-waste -- in no particular order)

- The State will take a leadership role in promoting the use of EPEAT standards (Electronic Product Environmental Assessment Tool) for computer purchases throughout state government.
- Collect, expand, and standardize statewide data on e-waste generation, recycling, reuse, and disposal.
- Review existing regulations and environmental standards in use (other states, federal government) for e-waste recycling (best management practices) and adopt standards appropriate for Vermont.
- Expand and sustain public education about e-waste that includes information about: environmental preferable purchasing; use of EPEAT standards; collection, recycling, about reuse options; how to reduce the volume of waste produced; toxic materials in electronics products and their impact on human health and the environment; products that become obsolescent quickly vs. those that have a long life and can be upgraded and/or reused.
- Assess the existing infrastructure for collection of e-waste.
- Develop businesses and markets for e-waste recycling and recycled materials in conjunction with state economic development initiatives.
- Implement phased landfill bans that include computers and peripherals, CRTs, televisions, uninterruptible power supplies /transformers, VCRs/DVDs, copiers/fax machines/printers, and cell phones.

SECTION 3 - IMPLEMENTING THE PLAN

This plan represents the dedication and significant amount of work of a large number of stakeholders that participated throughout the entire eight-month planning process. This plan would not have happened without their hard work and the support of DEC staff and an outside consultant tasked with facilitating the process.

The plan provides the framework, a starting point, for how Vermont can prevent waste from being generated in the first place, along with recommendations for how Vermont can expand reuse, recycling and composting to achieve Vermont's statewide 50 percent diversion goal. Some of the strategies outlined in the plan can be easily implemented - the low hanging fruit - while others require more outreach, collaboration, partnerships, and funding.

The next phase of the plan will involve prioritizing the list of strategies, developing detailed work plans for each priority, and most importantly, continuing the collaborative stakeholder process in order to successfully implement these strategies.

A. Educate Vermonters about the Plan

An Executive Committee (made up of the chairs from the Waste Prevention Subcommittees and ANR staff) will hold a series of meetings with various stakeholder groups to share the strategies outlined in the Plan. At meetings with solid waste district managers, businesses, government agencies, and others, the Committee will discuss ways that individuals and organizations can participate in advancing the strategies outlined in the plan. The Committee will publicize the Plan and ANR will post it on its Waste Prevention web page.

B. ANR's Role

ANR will need to insure that waste prevention is a priority of the Agency and continue the planning process to move into the next stage of research and implementation.

ANR

- Along with the Executive Committee, ANR will decide whether to host a public forum to highlight the strategies outlined in the plan and engage the broader stakeholder community in developing actions steps to implement it.
- ANR will need a full time person to implement this plan and additional ANR staff to assist with the various action steps. This work would include filling in the details for how each priority action step will be implemented.

Implementing the Plan

- The recommendations will need to be integrated into current and future ANR initiatives and work plans. These include:
 - ANR's Climate Change Transition Team
 - The Solid Waste Working Group charged by the Legislature with evaluating the January 2008 Solid Waste Report (prepared by ANR) and developing recommendations to implement and improve upon the report. This working group is to report to the legislature by January 2009.
 - ANR's reorganization, especially the soon to be established Center for Climate Change and Waste Reduction.
 - The State Solid Waste Plan - when revised

Through the leadership of the Governor's Office and the Executive Branch, action steps will need to be institutionalized throughout state government. All agencies will need to take a leadership role in implementing programs and policies to achieve the waste prevention goals of this report. For example, this could involve various state agencies (Economic Development, Agriculture, ANR) signing an MOU to plan, prioritize and implement the recommendations in this report.

- As appropriate, the strategies recommended in this report will be incorporated in the State of Vermont Solid Waste Management Plan when ANR develops and adopts an updated State Plan. Some action steps will need the involvement of other state agencies or other groups to implement.
- State statutes will need to be reviewed and new legislation enacted to put the waste prevention recommendations and goals of this report into law. New comprehensive legislation may be required and ANR will need to identify the best ways to revise statute.

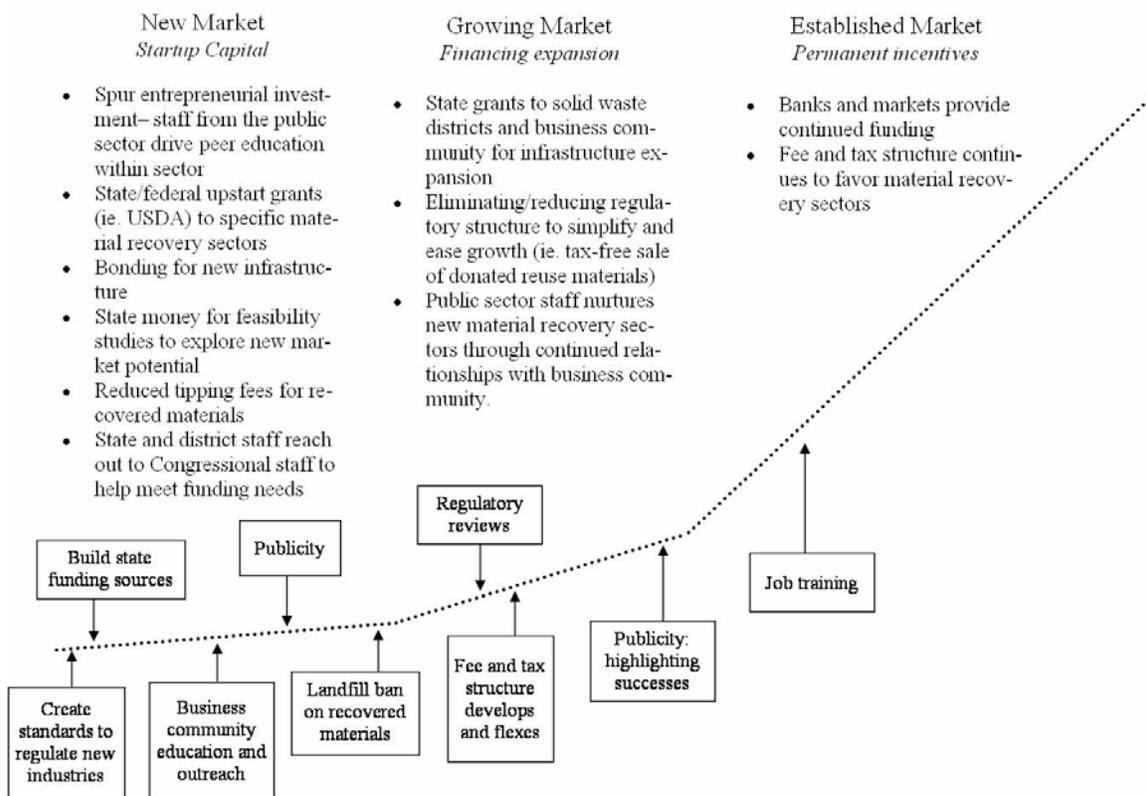
C. Stakeholder Involvement

The collaborative stakeholder process was essential for the development of the comprehensive set of strategies contained in this plan. The broad range of stakeholder involvement provides a solid foundation for the plan's implementation, particularly the long-term and more complex strategies. The next step will be to assess how to most effectively engage stakeholders in the plan's implementation - How can different stakeholders strengths be leveraged? What additional stakeholders should be involved? What resources are needed? Should the structure of the collaborative effort be changed, and if so, how?

D. Developing a Materials Resource Economy

Vermont has a tremendous economic opportunity to divert discarded materials into resources - from food waste and paper, to construction materials reuse. In doing so, Vermont can add value to discarded materials and create new jobs (for example, the diversion of used building materials to reuse rather than disposal can be worth up to \$100 per ton). Reuse, recycling, and composting businesses provide ten times the number of jobs created by landfills or incinerators.¹⁴ Vermont can start creating those jobs by promoting the growth of new material recovery sectors. Table 1 below illustrates the resources needed for market development through the stages of start-up, growth and full establishment.

Table 1: ¹⁵
Building New Material Recovery Markets



¹⁴ "Recycling Means Business". Institute for Local Self-Reliance. <http://www.ilsr.org/recycling/recyclingmeansbusiness.html> . April 16 2007.

¹⁵ Jessica Edgerly, Toxics Action Center, February 2008

E. Funding the Plan

In order to implement the strategies outlined in the plan, resources will be needed. State funding and staff resources will need to be coordinated among the Agencies involved, including the Agencies of Natural Resources, Agriculture, Economic Development, and Department of Buildings and General Services. Partnerships between policymakers and regulators, nonprofits, and reuse, recycling, and composting businesses need to be built to insure that the funding strategies developed effectively support waste prevention and waste diversion. Partners will need to evaluate and adjust the funding mechanisms as needed.

The selection of funding strategies should be based on the core principles of:

1. *creating incentives* which will drive Vermonters toward preventing waste, followed by reusing, recycling and composting waste.
2. *creating disincentives* to using wasteful products (extra packaging, disposable products, etc).

ANR will need to work with stakeholders to explore funding sources and approaches which insure that incentives and disincentives are relevant and appropriate for Vermont businesses, households and municipalities.

Funding approaches could include:

- Federal, state and private grants and loans, venture capital
- Bonds
- Increasing the amount of the Vermont state solid waste solid franchise tax (currently \$6.00 per ton) and directing the additional revenues to a capital fund that provides funding for new infrastructure and new market development. Evaluate current yearly disbursements from the Solid Waste Assistance Fund by ANR, as provided in 10 V.S.A. Section 6618, and determine whether additional funds can be made available to implement the plan.
- Increasing solid waste district surcharges to help fund additional waste reduction program costs.
- Dedicating a portion of revenues from Pay as You Throw (PAYT) programs for waste prevention.
- Applying product stewardship funding models (such as a packaging tax, escheat money [unredeemed bottle deposits], Advanced Recycling Fees [ARF], or percentage of market share paid by manufacturers for computers).
- Appropriating state funds including General Funds and Capital Funds (state and federal).

Implementing the Plan

- Setting up a Cap and Trade waste program to systematically reduce the amount of waste landfilled in the state each year (similar to the Chicago Climate Exchange¹⁶. Revenue from the Cap and Trade system would be allocated for strategies outlined in the plan.
- Institute a manufacturer tax on packaging to provide funding for product stewardship policy development and implementation.

Successful implementation will require a phased approach, starting with funding and staff resources focused on a limited number of initiatives - the "low hanging fruit" - to demonstrate the feasibility of this effort. This will be followed by a broader effort to implement the long-term priorities of the plan. The first few projects launched would consist of a carefully selected suite of activities involving education, workshops, technical assistance, and more. This would be the start to moving Vermonters toward a "*Life beyond Garbage.*"

¹⁶ <http://www.chicagoclimatex.com>

Section 4: Appendices

Appendix 1: Strategies - Traditional Recyclable Materials

Strategies

- Require Pay As You Throw (PAYT) Programs in all Sectors across the State.
- Require Mandatory Recycling Statewide.
- Enact Landfill Material Bans.
- Expand Vermont's Bottle Bill.
- Promote Waste Prevention in Schools.
- Promote Recycling Away from Home.
- Support Local and National Product Stewardship Initiatives.

Background

In 2001, ANR completed a waste composition study to collect data on the composition of the waste stream and to better target future waste prevention and diversion programs. The study identified that recyclable fibers (newspaper, boxboard, cardboard, magazines and paper) and containers made up 24% by weight of residential waste. Other waste, which included other non-recyclable containers and fibers, made up 39% by weight. In 2006, the Chittenden Solid Waste District (CSWD) conducted a residential waste composition study. Similar to ANR study, CSWD reported that recyclable paper and containers made up a significant percentage of residential waste destined for disposal (19.3% by weight).

The Solid Waste Program's 2005 Solid Waste Diversion and Disposal Report includes tonnages of materials recycled statewide (see table). Fibers and containers (cardboard, newspapers, glass bottles & cans) comprised the highest percentage of the waste stream. An increase in the amount of plastics has been noted, both in recycling and disposal.

Based on this information this subcommittee decided to focus its work on containers, fibers and packaging to improve both waste prevention and recycling.

Traditional Recyclable Materials

SOLID WASTE DIVERSION - 2006 2006 - ESTIMATED BY MATERIAL TYPE & DIVERSION ACTIVITY

MATERIAL	SOURCE OF MATERIAL						TOTAL
	Recycling Facilities	Soft Drink and Beer Distributors(1)(2) (Broker Direct)	Economic Recycling(2) (Direct to Market)	Scrap Metal Facilities	Organics Composting	Reuse Facilities & Programs(2)	
SINGLE STREAM	3164						3164
FIBERS	54,832	386	33,495			137	88,850
CONTAINERS	9,438	17,500	117			19	27,074
SCRAP METAL			251	34,830		159	35,240
ORGANIC WASTES					31,774	0	31,774
MISCELLANEOUS	3,720		14			2,167	5,901
Total:	71,154	17,886	33,877	34,830	31,774	2,482	192,003

2006 MSW DISPOSED (tons): 414,273

2006 MSW DIVERSION RATE: 32%

(1) Total includes 16,174 tons of deposit return containers processed by Vermont recycling facilities.

(2) Data for containers from report titled *Analysis of Vermont's Bottle Bill: Costs, Impacts and Expansion*, Northbridge Environmental Management Consultants, December 2006. Data for fibers from report titled *Vermont's Municipal Solid Waste Diversion Rate 2001*, DSM Environmental Services, September 2002

(3) Included in "Scrap Metal Facilities" totals.

(4) Includes composting data for exempt facilities from *Vermont's Municipal Solid Waste Diversion Rate 2001*, DSM Environmental Services, September 2002

Recommended Strategies

- Require Pay As You Throw (PAYT) Programs in all Sectors across the State.
- Require Mandatory Recycling Statewide.
- Enact Landfill Material Bans.
- Expand Vermont's Bottle Bill.
- Promote Waste Prevention in Schools.
- Promote Recycling Away from Home.
- Support Local and National Product Stewardship Initiatives.

Priority Action Steps are ranked in order of importance. However, the Action Steps: **Require Pay As You Throw (PAYT) Programs, Mandatory Recycling, Enact Landfill material bans and Promote Recycling Away from Home** are interdependent and will need to be supported simultaneously.

For example:

- A landfill materials ban can not be effective without convenient locations to recycle the banned materials (building infrastructure),
- Education and outreach about waste prevention opportunities, mandatory recycling, and places to recycle will need to be comprehensive and well-coordinated across the state including providing technical assistance to set up in-house programs.

Traditional Recyclable Materials

The overarching goal for recyclables is first to reduce the amount of these materials that Vermonter's generate (such as by reusing water bottles or reducing paper usage), second to achieve the state's 50 percent diversion goal by 2011. However, in order to accurately determine if the state has met its goal, it will need to capture all diversion beyond what is currently reported through facilities. This would include, at a minimum, adding economic recycling (larger stores that bring recyclables directly to market), scrap metal processors, recycling facilities outside Vermont accepting Vermont materials, bottle deposit tonnages, backyard composting estimates, and reuse. Before setting a goal to reduce waste generation, ANR will need to determine best way to collect the data that will represent the entire state's waste stream and the resources needed to do this.

Recommended Strategy Details

1 - Require Pay As You Throw (PAYT) programs in all sectors across the state. (Sectors include municipalities, businesses, special events, public spaces, etc).

What is PAYT? PAYT, also known as unit pricing or variable-rate pricing, requires that residents are charged for the collection of municipal solid waste based on the amount they throw away. Fees charged for waste are sufficient to cover all costs of the recycling program. This creates a direct economic incentive to recycle more and to generate less waste.¹⁷ Some communities are concerned about illegal dumping when switching over to a PAYT structure. According to the EPA, most communities with PAYT have found that illegal diversion has proven to be less of a concern than anticipated and that there are steps they can take to minimize its occurrence.¹⁸

Benefits of PAYT

- Environmental Sustainability -- Communities with PAYT programs in place have reported increases in recycling and significant reduction in disposal.
- Economic sustainability - Programs are structured that the costs of disposal will cover recycling expenses.
- Equity -- residents pay directly for the trash they generate.

Action Steps:

1. ANR and solid waste planning entities (SWPE) to research the extent of PAYT and types of rate structures currently operating throughout Vermont.
2. Based on extent and types of PAYT programs, ANR and SWPEs to develop minimum standard requirements for PAYT programs throughout Vermont (in collaboration with stakeholders such as Vermont League of Cities and Towns).
3. ANR to provide a clearinghouse for existing tools and educational materials to promote PAYT program development, such as EPA's PAYT Tool Kit¹⁹.

¹⁷ EPA's Pay As You Throw home page <http://www.epa.gov/epaoswer/non-hw/payt/intro.htm>

¹⁸ EPA PAYT Illegal Diversion concerns <http://www.epa.gov/epaoswer/non-hw/payt/top8.htm>

¹⁹ EPA PAYT <http://www.epa.gov/epaoswer/non-hw/payt/intro.htm>

Traditional Recyclable Materials

Timeline:

Years 1 to 3

Partners:

Solid Waste Planning Entities (SWPE), ANR

Estimated Cost:

Low

Potential Funding Sources:

Program would be self funding through waste disposal fees.

Measures of Success:

- PAYT implemented in all communities in Vermont
- State's 50 percent diversion goal achieved
- Per capita generation of waste reduced

2 - Require Mandatory Recycling Statewide (including from residents, businesses, institutions, and at special events and other locations away from home)

Action Steps:

1. Develop convenient, comprehensive recycling opportunities statewide, build infrastructure in underserved parts of the state.
 - a. ANR and SWPEs to inventory the current recycling mandates, locations of recycling centers and infrastructure including Material Recovery Facilities (MRFs), transfer stations, and other opportunities to aggregate recyclables.
 - b. Based on results of the inventory, determine where gaps exist in current infrastructure and develop a plan to work with solid waste planning entities, private sector, haulers and economic development agencies to build needed infrastructure.
 - c. Require licensed waste haulers to offer recycling to all customers as part of the re-licensing requirements.
 - d. Secretary of ANR can add additional mandatory materials as markets develop (or remove materials)

Timeline:

Years 1 to 3

Partners:

Legislature, ANR, SWPE

Estimated Cost:

Traditional Recyclable Materials

Low for initial legislation

Potential Funding Sources:

Fund infrastructure development through additional bottle deposit funds.

Measures of Success:

- The State's 50 percent diversion goal is achieved.
- Mandatory recycling is required in all municipalities.

3 - Enact Landfill Material Bans

Action Steps:

Enact a landfill ban for materials with established markets and collection programs. Currently, fibers, glass and containers (metal cans and 1&2 plastics) are the most recyclable materials collected through Vermont facilities (from 2006 diversion data).

- a. ANR and SWPEs to identify the specific recyclable materials to target for the ban, and to research other states' landfill material bans including how the bans are enforced.

Timeline:

Years 2 to 3

Partners:

The State legislature would enact the ban. ANR, along with SWPEs would implement and enforce the ban. ANR could require bans to be included in Solid Waste Implementation Plans (SWIP).

Estimated Cost:

Low to moderate, depending on infrastructure needs in some parts of the state. No cost to State's General Fund.

4 - Expand Bottle Bill²⁰

Action Steps:

1. Expand bottle bill to include all beverage containers (excluding dairy products).
2. Change deposit to \$0.10. The additional \$0.05 will be a fee used to develop recycling infrastructure.
3. Improve efficiency of the program.

²⁰ Note: a legislated study committee is currently reviewing and making recommendations to improving the program.

Traditional Recyclable Materials

Timeline:

Years 2 to 5

Partners:

Bottle Bill Working group, ANR, legislature

5 - Promote Waste Prevention in Schools

Action Steps:

1. Require waste prevention and waste diversion as an educational unit for grades K through 12.
2. Select the best teaching units available and promote the unit(s) throughout Vermont.²¹
3. Form a working group consisting of a member of the Association of Vermont Recyclers (AVR), a minimum of two teachers (one K-6, one secondary), an ANR staff person involved in outreach programs, and at least one solid waste district representative. Group should form by early 2008.
4. AVR to develop a Train the Trainer program, and have information available about the program on a website. AVR to develop a database of teachers who have received the training, and can teach the waste prevention and waste diversion curriculum. AVR to develop a list of additional volunteers interested in helping. Such a program would be modeled similar to the Master Composters *Train the Trainer* program²²
5. Integrate school education programs with mandatory recycling requirements. Ensure that the basics of recycling collection are consistently and efficiently integrated into school operations by involving facilities personnel, kitchen and custodial staff. (as well as the purchase of recycled-content and non-toxic products through the state of Vermont purchasing contracts²³)
6. AVR to develop a calculator for schools to measure their carbon footprint including a baseline of waste, tracking results, and sustained program participation.

Partners:

AVR, ANR, SWPE, teachers, and other environmental education providers.

Estimated Cost:

Low to moderate. Cost would include increasing funding for AVR for its school programs.

²¹ For examples - 1) see AVR's School Composting Guide and 2) the 8th grade class at Stowe school is doing a waste audit (trash sort), visiting a materials recovery facility (MRF), a landfill, and a waste water treatment plant. The class also toured a local grocery store with AVR to look at characteristics of packaging.

²² UVM Extension Master Composter Program <http://www.uvm.edu/mastergardener/mastercomposter/>

²³ VT Buildings and General Services paper purchasing contract
<http://www.bgs.state.vt.us/PCA/contract/11866.pdf>

Traditional Recyclable Materials

Potential Funding Sources:

State Solid Waste Management Assistance Fund (SWMAF), school budgets, and possibly state education funding. Waste prevention savings could help offset costs of the program (such as reducing paper usage).

Measures of Success (could be tracked within each school district)

- Waste generation and waste disposal costs reduced
- Diversion rates increased
- Energy use and greenhouse gas emissions reduced

6 - Promote Recycling Away from Home (public spaces)

Establish recycling programs away from home, including fairs, airports, sporting and other special events, convenience stores, downtowns, etc...

Action Steps:

1. Evaluate existing "tool kits" (such as EPA's recycling on the go -- ROGO²⁴). Select a program to promote throughout the state, one that can be easily put into practice by event organizers - from planning to implementation.
 - a. Implement recycling and composting at public events and fund pilot programs.
 - b. Evaluate whether to add a requirement for special event planning and implementation as part of the Solid Waste Program's Solid Waste Implementation Plans. (SWIP)
2. ANR to develop a rating program for special events, based on reaching gold, silver, or bronze levels; the rating system would include waste prevention, recycling and composting. Develop standards for each component.

Partners:

SWPE, ANR, through SWIP approvals, special event organizers, town and city managers

Estimated Cost:

Low to moderate

Measures of Success:

- Amount of waste diverted through the program
- Cost savings to the event
- Waste reduction programs are institutionalized into the ongoing operations and management for event operations (sustainable)

²⁴ EPA's Recycling on the Go <http://www.epa.gov/recycleonthego/>

7 - Support Local and National Product Stewardship Initiatives²⁵

Action Steps:

1. Bring Vermont's perspective to national dialogues, such as the Product Stewardship Institute (PSI).
2. Encourage PSI to tackle packaging as one of its priority materials.
3. ANR to work with Buildings and General Services, Purchasing Division to evaluate opportunities for product stewardship in State of Vermont purchasing contracts.

Estimated Cost:

Membership fees for the National Product Stewardship Institute

²⁵ Note - bottle bills are a form of product stewardship, thus expansion of Vermont's bottle bill fits into this category in addition to the bottle bill expansion Action Step

Appendix 2: Strategies - Construction Waste and Demolition Debris (C&D)

Strategies (in order of priority)

- Institutionalize waste prevention, deconstruction, and recycling in project design; specify waste diversion in construction bid documents.
- Develop regional markets.
- Use economic incentives to build infrastructure.
- Institute a phased landfill ban of select C&D waste.
- Educate the public about C&D waste reduction.
- Collaborate with national and regional organizations.

Background

Vermonters have made considerable strides in recycling, but the focus of state and local waste reduction efforts has been the municipal solid waste (MSW) stream, often at the expense of “special” wastes, such as construction waste and demolition (C&D) debris.

The revised Vermont Solid Waste Management Plan contains the goal of 50% municipal solid waste (MSW) diversion of the waste stream from disposal by 2011. While this goal does not include C&D, these wastes are part and parcel of the waste management dilemma: too much waste, too little waste prevention. Clearly, additional reduction, reuse, and recycling of C&D waste will need to be accomplished, and the State should set a goal for its C&D waste in addition to a MSW goal.

C&D waste is also prone to improper on-site disposal, either by burning or burial. Both of these methods of disposal are illegal, and can damage the environment and threaten public health.

What is Construction and Demolition Debris?

The Solid Waste Management Rules include a definition of “construction and demolition waste.” The definition has been developed from various guidance documents and certification conditions.

“Construction and Demolition Waste means, for the purpose of these rules, waste derived from the construction or demolition of buildings, roadways or structures including but not limited to clean wood, treated or painted wood, plaster, sheetrock, roofing paper and shingles, insulation, glass, stone, soil, flooring materials, brick, masonry, mortar, incidental metal, furniture and mattresses. This waste does not include asbestos waste, regulated hazardous waste, hazardous waste generated by households, hazardous waste

Construction Waste and Demolition Debris

from conditionally exempt generators, or any material banned from landfill disposal under 10 VSA §6621."

C&D waste, quite simply, is any waste material inherent to building construction or demolition. C&D waste also includes roadway waste, such as asphalt and concrete, although these wastes are generally managed differently than building debris, and are not included in this subchapter.

How Much Construction and Demolition Waste is Generated at a Single Project, and in Vermont as a Whole?

Various studies from around the country have concluded that about four pounds of C&D waste is generated per square foot of light building construction. For example, construction of a 1500 square foot home would result in the generation of 6000 pounds, or three tons, of waste.

Additionally, it is estimated that about 50 pounds of C&D waste is generated per square foot of light building demolition. Demolishing that same 1500 square foot house would generate 75,000 pounds, or over 37 tons, of debris.

The numbers add up. In Vermont, we legally disposed 127,590 tons of building related C&D waste in 2006. This figure does not include asphalt and concrete waste generated from road projects, nor does it include illegal disposal, on-site disposal, nor legal disposal of mixed loads of municipal and C&D waste. The actual tonnage is likely much higher. For comparison, Vermont disposed or incinerated about 414,273 tons municipal solid waste in 2006.

New residential C&D waste differs from new commercial and industrial C&D waste. The residential waste stream contains more wood, more drywall, and more asphalt roofing shingles. Residential loads are smaller, which frequently works against reuse and recycling; the amount of reusable or recyclable materials generated may not be worth the hauling cost to bring them to market.

Realistically, at least for the foreseeable future, C&D wastes will continue to be generated despite our best efforts to prevent it. This is especially true for demolition and renovation waste. While current and future buildings should be sustainable, more durable, and generate less waste, the current building stock in Vermont will, invariably, become structurally obsolete and need to be managed. Demolition wastes, and new construction wastes that cannot be "prevented," may be appropriate for reuse and recycling.

While C&D waste prevention was the focal point of the subcommittee, strategies for reuse and recycling of wastes that are generated are also included in this subchapter.

Recommended Strategy Details

1 - Institutionalize Waste Prevention, Deconstruction, and Recycling in Project; Specify Waste Diversion in Construction Bid Documents

The greatest opportunity to prevent waste begins at the building design stage. From “Requests for Proposals” for institutional buildings, to homeowner conversations with their builder, planning for waste reduction should begin at the earliest stages of the project. For example, property owners can rehabilitate older buildings, build smaller buildings using standard dimensions, and use environmentally preferable and durable products. All of these measures equate to less waste generated.

Additionally, if waste reduction options are considered at the conception of the construction project and thoughtfully incorporated into the written documents that direct it, more of the waste generated, will end up reused and recycled. Only when the owner, designer, and contractor have a written understanding as to waste prevention opportunities through design and waste diversion, will expectations for waste prevention and waste diversion be maximized.

Waste prevention does not lend itself to formal specifications as readily as waste diversion. That is, most waste prevention occurs in the project planning and design stage, rather than during construction. Additionally, unless not performing the work is an option, demolition or renovation waste generate is difficult to prevent through specifications, and diversion of these wastes is the only logical alternative. Therefore, guidelines for waste prevention should be available, and specifications for waste diversion should be developed and incorporated.

Action Steps:

1. ANR staff to research and recommend waste prevention and waste diversion practices to incorporate into Vermont projects. ANR will work with Vermont American Institute of Architects (VT AIA), the Vermont Green Building Network (VGBN), Associated General Contractors (AGC), Construction Specifications Institute (CSI) and other relevant organizations to develop the best C&D management practices and formal specifications and promote and institutionalize them.
2. ANR will work with Vermont Department of Buildings and General Services to “lead by example” by incorporating the waste reduction guidelines and specifications, thereby providing leadership for Vermont developers, builders, and contractors to follow.
3. ANR will promote the waste prevention and diversion practices within the Natural Resources Board (Act 250) process, municipal permitting processes, and Vermont builder associations, and with the general public for building project specifications.
4. ANR will support work with the Vermont Green Building Network and other “green building” organizations. For example, ANR will work toward mandating LEED (Leadership in Energy and Environmental Design), or LEED-equivalent designs, for large publically-funded projects. LEED, which is a voluntary, consensus-based

Construction Waste and Demolition Debris

national rating system for developing high-performance, sustainable buildings, includes credits for waste prevention, reuse and recycling. ANR, along with these organizations, will facilitate and encourage sustainable building designs, innovative construction practices, and environmentally preferable materials.

Timeline: Year 1

Partners: Vermont American Institute of Architects (VT AIA), the Vermont Green Building Network (VGBN), Associated General Contractors (AGC), and the Construction Specifications Institute (CSI)

Estimated Cost: 0.05 FTE of an ANR staff person for technical assistance. Two to three ANR FTEs for general Act 250, landfill material bans, and waste stream enforcement. See Strategy 3, below.

Funding Sources: Solid Waste Management Assistance Fund

Measures of Success: Waste prevention planning and implementation becomes standard practice for commercial and industrial buildings. Specifications are uniform and accepted. Residential building waste prevention becomes common.

The following Action Steps to Develop Regional Markets; Build Infrastructure; and Developing a Phased Landfill Ban for Selected Materials are interrelated. Implementation of each Action Step will need to be simultaneous with other the steps in order to be effective.

For example:

- A landfill materials ban can not be effective without alternative markets for the banned materials,
- Incentives and technical assistance needs will need to be put in place to help develop or expand existing markets,
- ANR permitting for recycling collection and processing facilities needs to align with the low risk nature of the materials. That is, unnecessary regulatory hurdles should not hinder market development or be a needless economic disadvantage.
- Education and outreach to developers, builders, contractors, haulers, and homeowners - all of the parties involved in C&D waste management - is integral to the success of the overall program. Education will need to be comprehensive and well-coordinated between all of these groups.
- C&D recycling markets are regional, many located outside of Vermont. It is imperative that ANR keep informed of market conditions, align ourselves accordingly, and keep abreast of emerging technologies and markets.

In order to accomplish this, ANR will need to partner with the Sustainable Jobs Fund (SJF), Department of Economic Development (DED), Small Business Development Center (SBDC), VT Economic Development Authority (VEDA) and other economic development providers to help develop a sustainable materials management strategy. Funding the strategy would

come from a shift in waste management fees -- an increase in disposal costs by raising the Solid Waste Management Assistance Fund tax.

2. Develop Regional Markets

This work will need to be done in coordination with a larger sustainable materials management strategy. Partners in the strategy will need to research costs and resources needed to develop infrastructure (including capital and technical assistance)

2.1 Reuse markets

The waste management hierarchy identifies reuse as a preferred waste management option to recycling. Reuse further conserves natural resources. Reuse of building materials preserves embodied energy (the energy invested to extract raw materials and manufacture the original product). A door is reused as a door; a cabinet is re-installed as a cabinet. Lumber may be reused as lumber, or may be up-cycled into a higher grade material such as trim or furniture stock.

Deconstruction of obsolete buildings, rather than demolition, is becoming more commonplace across the country. Subsequently, the resale and reuse of used building materials is also increasing, and this is a trend that the State should encourage as reuse of materials is environmentally preferable to recycling and generally more economical for the consumer. Portions of Vermont are fortunate to be served by deconstruction entities and used building material stores. Still in many areas, these services are non-existent or far from potential customers. Markets for reusable building waste have expanded and ANR can continue to increase its support for value-added options from used building materials such as by creating furniture, picture frames, sheds, and more.

Action Steps:

1. ANR will work with Department of Economic Development, Vermont Economic Development Authority, and Sustainable Jobs Fund to set up an infrastructure to financially support development of collection points for used building materials (UBM) and swap sheds, and UBM retail stores themselves in all parts of the state. This would allow homeowners and commercial entities located anywhere in the state to be assured of a place to either sell or donate used building materials, and to buy UBM.
2. C&D reuse and recycling businesses are nontraditional and not well understood or deemed risky by the banking industry. Financing for these firms is often difficult to obtain. Work with financial institutions to substantiate the value from deconstruction and used building material businesses. Further, ANR and Solid Waste Planning Entities (SWPE) will educate the public about used building materials. Finally, ANR and SWPEs will promote the Vermont Business Materials Exchange²⁶ and

²⁶ <http://vbmex.org/index.php>

Construction Waste and Demolition Debris

the Vermont Construction Reuse Network²⁷ as an option for buying or selling used construction materials.

3. ANR will continue to explore ways of facilitating the “harvest” of reusable materials from the C&D waste stream. Solid waste implementation plans must contain language encouraging reuse, facility certifications should contain conditions which allow, or even mandate the collection of reusable materials. Basically, ANR certification and planning processes will encourage and not hinder the reuse of C&D materials.
4. State BGS should continue to be a model for C&D reuse by, where feasible, providing used building materials from renovation projects, and using UBM in new construction.
5. Through financial, technical and marketing assistance, the State and Solid Waste Planning Entities shall promote the use of C&D materials in the manufacture of value added products.

2.2 Recycling Markets

The subcommittee determined that clean wood, drywall, and asphalt shingles warranted particular reuse and recycling marketing efforts. As with most wastes, stable and economic markets are crucial to successful reuse and recycling options for these particular components. Often, reuse and recycling efforts for wood, drywall and shingles are hampered by the inconsistency of material collection programs throughout the state, and the lack of collection and/or processing infrastructure. Particular priority emphasis should be given to developing statewide collection systems and secure markets. This effort could include offering technical assistance, conducting research and pilots projects, and pursuing financial assistance, such as grants and loans.

As with reuse, ANR should continue to streamline the regulatory process for recycling facilities, or for facilities that want to add C&D recycling components.

Action Steps:

Clean Wood Waste

1. More and more large public and private buildings are burning biomass for fuel, and yet most clean C&D wood waste is landfilled (or burned on site.) ANR and SWDs should facilitate relationships between the sources of clean wood (transfer stations, municipal “stump dumps,” haulers) and industrial wood-fired boilers in the state (schools, industrial plants, et al...).
2. As part of the sustainable materials management strategy, assess the practicality of funding a mobile chipper for clean wood waste.
3. To consolidate materials and create economies of scale, ANR should facilitate a network of district, municipal, and/or regional private sector clean wood collection points.

²⁷ <http://www.vcrn.org/>

Construction Waste and Demolition Debris

4. Because there are current markets for clean wood other than as fuel, such as for mulch and compost bulking agent, truly, no clean wood should be landfilled. This material should be the first C&D item to be banned from landfills.

Asphalt Shingles

Asphalt shingles are recyclable. Markets in other states are strong and past ANR research has determined that asphalt shingles can be incorporated into various beneficial road products in Vermont.

Vermont needs to encourage regional private sector entities (aggregate processors, hot mix asphalt plants) to enter the marketplace by providing incentives (financial or technical assistance) for existing aggregate producers to incorporate shingles in their aggregate mix, and work with VTrans, Vermont Local Roads, and municipalities to utilize the end products.

Drywall

Drywall recycling markets are emerging throughout the country, and do exist to some degree in Vermont. Vermont should continue to advance drywall recycling in order to create the "critical mass" necessary to establish a statewide, economical collection and transportation system. Vermont should continue to research alternative local uses of scrap drywall such as land application and as a compost ingredient.

Timeline: Years 1-5 (2008 - 2013)

Partners: Department of Economic Development, Vermont Economic Development Authority (VEDA), Sustainable Jobs Fund, VTrans, Financial Institutions

Cost: Unknown

Potential Funding Sources: commercial lending institutions, Solid Waste Management Assistance Fund, VEDA.

Measures of Success: By 2013, 100% of clean wood waste is recycled or burned for energy. By 2011, 75% of drywall and asphalt shingles are recycled, and by 2014, 100% of these wastes are recycled.

3 - Institute a Phased Landfill Ban of Select C&D Waste

In conjunction with education and reuse and recycling market development, certain C&D wastes should not be landfilled. These materials have existing markets, or markets are emerging, and these material are easily identified and segregated from the waste stream. Landfill bans will encourage the prevention of these wastes through more efficient building designs, product stewardship, "greener" materials, and serve to promote alternative reuses and recycling. The ban could include the following:

Construction Waste and Demolition Debris

Action Steps:

1. Phase in ban. Start with materials with established recycling markets (metal, cardboard, asphalt, brick, concrete). Phase in materials such as clean wood, drywall, and tear-off asphalt roofing shingles over time.
 - a. Landfills and transfer stations must reject loads with banned materials and/or provide collection areas for marketing these materials.
 - b. Publicize successful enforcement cases to help other companies comply. Add enforcement to the landfill material bans and include who enforces and how.
 - c. ANR and SWPEs must perform job site "dumpster dives" to encourage waste prevention and reduction, and to enforce material specifications and landfill material bans.

Timeline: Starting year 3 (2011) for clean wood, cardboard, asphalt, brick and concrete. Starting year 6 (2014) for drywall and asphalt shingles.

Partners: SWPE

Estimated Cost: In year one, 0.10 FTE of an ANR staff person to facilitate statutory changes. Two to three ANR FTEs for general Act 250, landfill materials ban, and waste stream enforcement. See Strategy 1, above.

Potential Funding Sources: Solid Waste Management Assistance Fund

Measures of Success: By 2014, no clean wood, cardboard, asphalt, brick and concrete, drywall or asphalt shingles are landfilled.

4 - Use Economic Incentives to Build Infrastructure

(This priority action would be developed as part of the Sustainable Materials Management Strategy). Incentives could include funds for R&D, pilot projects and technical assistance.

5 - Public Education

Educate all sectors in the production of C&D wastes - from the building material manufacturer to the waste hauler - in options for waste prevention and diversion. ANR and SWPEs must promote case studies that indicated that proper C&D management could save money as compared to simple disposal.

Action Steps:

1. Provide waste prevention, reuse, and material exchange information to ANR permit specialists, Act 250 district coordinators, and local zoning offices. (Apply for a building permit and receive waste prevention info.)
2. Give waste prevention information to haulers to put in customers' invoices.
3. Leave waste prevention information at building supply stores.

Construction Waste and Demolition Debris

Timeline: Years 1-5 (2008 - 2013)

Partners: Municipalities, Building Industry, SWPE

Estimated Cost: 0.10 FTE of an ANR staff person, 0.10 FTE of other groups' time

Potential Funding Sources: Solid Waste Management Assistance Fund

Measures of Success: construction and demolition waste prevention, reuse and recycling options are known and understood by the majority of the potential C&D generators. Information is accessible, current, and useful to all segments.

6 - Collaborate with National and Regional Organizations

Strategies will be coordinated with national organizations and efforts related to reducing C&D waste. Some of these organizations include the Building Materials Reuse Association, the Construction Materials Recycling Association, the U.S. Green Building Council, product stewardship organizations and the U.S. EPA.

Appendix 3: Strategies - Organics

Strategies (in no particular order)

- Expand the existing perishable food redistribution network.
- Develop economic incentives to encourage organics waste prevention (precursors to mandates).
- Expand and improve the statewide infrastructure for composting.
- Enable small and large scale composting.
- Mandate composting/diversion for all generators with specific timeframes.
- Increase general public and school education about organics waste prevention and reuse/diversion.

What is Organic Matter (Waste)?

“Source separated” organics refers to food scraps, yard trimmings, wood, and soiled, non-recyclable (“dirty”) paper (such as used paper, cups, and napkins) that have been separated at the source by the generator. The US EPA defines organic matter as *carbonaceous waste contained in plant or animal matter and originating from domestic or industrial sources*. Other organic wastes include waste water treatment sewage and sludge, food processing special waste (such as wash water), and animal manures. These latter organics were, in most part, not an element of this plan.

Why is it important to keep organics out of landfills?

Keeping organics out of landfills saves landfill space, and in doing so, generates less methane. Methane is an extremely potent greenhouse gas, about 20 times more potent than carbon dioxide. Besides reducing the costs to landfill organics, these materials provide valuable nutrients to build healthy soils and reduce the need for commercial fertilizers and pesticides.

How much organic material is in Vermont’s waste stream?

Organic matter comprises a very large percentage of the municipal solid waste stream (MSW), estimated upward of 30 percent. Most of this is food waste, with lesser amounts of soiled paper and, because of Vermont’s rural nature, a very small fraction of yard waste.

The Agency of Natural Resources 2001 Waste Composition Study²⁸ found that in residential loads, organic matter, (primarily food, dirty paper, and yard waste) made up more than 30 percent of MSW disposed at landfills (food scraps 21 percent, dirty paper less than 9 percent, yard trimmings less than 1 percent). In commercial loads from offices, retail stores, restaurants, groceries, motels/hotels, and mixed commercial, organic material

²⁸ Vermont Waste Composition Study, June 2002, DSM Environmental Services, Inc.

Organics

ranged from 20 percent to almost 60 percent food waste, depending on the business. Restaurants and grocery stores had the highest percentage of organics waste.

To give an estimate of how much organic matter could be generated, a 1990 study of waste generation put the split between residential and commercial at about 50/50. Using this estimate and the 30 percent of MSW generated, the amount of residential organic matter still available for source separation from the waste stream is estimated at 60,000 tons. Without further data, it is not possible to estimate the commercial waste. The amount of animal manure and industrial sludges is also unknown.

General Concepts and Trends

To achieve the highest level of waste prevention for organics, stakeholders must work to further develop cost-effective food rescue and on-site composting (backyard or business), to its greatest extent within the confines of being cost-effective.

Composting the remaining organics will require more facilities that could accept food waste throughout the state. To be economically viable, the facility generally must be located within 10 miles of the generators. Currently, there are many areas in Vermont where there is no facility. Even in areas with an established facility, there is a need to develop a second facility so that if one is shut down for a period of time, the other can continue to operate.

Research and collaboration will be necessary for developing business opportunities related to food rescue and composting organics waste. In addition, successful prevention of organics waste will need to include addressing upstream issues. Upstream issues involve integrated strategies with a range of stakeholders. For example, the trend toward more packaged products (such as wrapped fruit and vegetables) makes it more difficult to collect materials for composting. Likewise, the move toward individual servings for condiments in restaurants (such as individually-wrapped butter pats) often leads to more contaminated compost. Biodegradable packaging is an alternative that has also begun to make its way into the market. Successful prevention of organics waste, therefore, will need to include an integrated approach with packaging systems.

Goals for Organics

- Create a system where within 10 years it is cheaper to reuse and divert organic waste for generators and receivers.
- Set a goal to divert 70 percent of organics in 10 years.
- Set a goal to divert 100 percent of organics in 15 years.
- Manage unused organics materials in a manner that helps to maintain food security in Vermont.

An underlying assumption of all these recommendations is the need for the state and other stakeholders to commit resources (funds, staffing, etc.) to enable implementation.

Organics

In order to accomplish this, ANR will need to partner with the Sustainable Jobs Fund (SJF), Department of Economic Development (DED), Small Business Development Center (SBDC), and other economic development providers to help develop a sustainable materials management strategy.

Recommended Strategy Details

1 - Expand the Existing Perishable Food Redistribution Network

Vermont has an existing network (through Vermont Foodbank and its partners) which redistributes food from growers, retailers, manufacturers, and suppliers which is not saleable but still consumable, to those in need around the state. The majority of non-saleable food, however, is currently still disposed or composted, rather than redistributed. There are a number of measures which could expand the participation in this network of food-waste generators.

Action Steps:

Outreach and Technical Assistance to Commercial Donors

1. Develop education and promotion tools to increase awareness of the existing Food Rescue program.
2. Educate potential donors about Good Samaritan Laws.
3. Work with grocers on liability issues related to perishables.
4. Target broad variety of potential donors, including schools, food manufacturers, grocers, and others.

Promotion to General Public:

Promote food banks and what they do; educate the public about the fact that food donations are tax deductible.

State Policy Changes:

Work with Health Department to improve regulations that are an obstacle to redistribution.

Partners:

Vermont Foodbank and its network partners, state agencies, donors (grocers, food manufacturers, restaurants, wholesalers, schools, caterers).

Estimated Cost:

Medium, \$150K. Funds are needed to develop and produce promotional and technical assistance materials. Personnel are needed to provide outreach and technical assistance services and to facilitate state policy changes.

Potential Funding Sources:

Private donations, foundation grants, state government, in-kind donations

Organics

Measures of Success:

Growth in pounds rescued and distributed food products

2 - Use Economic Incentives and other Tools to Increase Organics Waste Reduction (precursors to mandates).

Incentives can be an effective precursor to mandates (such as banning organic waste from landfills) by helping establish infrastructure and by increasing the public's familiarity with alternatives to landfilling. Furthermore, incentives help level the playing field. Under the current economic system, the full costs (such as greenhouse gas impacts, and other environmental and social impacts) of traditional disposal methods are not directly borne by the waste generator.

Action Steps:

Incentives:

1. Offer haulers a one-time tax and/or other economic incentives for developing new and expanding existing programs. Include other non-cash incentives, such as subsidized collection containers.²⁹
2. Establish a reverse economic incentive by charging generators extra for contaminated compost.
3. Research "full-cost accounting/economic valuation" systems being developed for carbon emissions, such as where carbon-emitting or resource impacting activities are taxed. Link waste diversion activities to these systems as they develop. Assess the EU packaging tax structure as a model.
4. Provide haulers with promotional information and materials to pass on to their customers to encourage generator participation.
5. Develop resources for generators to identify and locate haulers providing organics hauling services. (i.e. a webpage on state and solid waste district websites, etc.)
6. Provide local farms with their own composting operations to reduce double hauling (to the compost facility and then back to the farm).
7. Create a market for "compost tea" or dehydrated compost tea.

Partners: generators, haulers, solid waste planning entities (SWPE), state and federal departments of agriculture

Potential Funding Sources: State solid waste tax, economic development funding, Sustainable Jobs Fund, Vermont Environmental Consortium, USDA, EPA

Measures of Success:

Three incentives adopted, tons of compostable material diverted, energy use in producing end product decreases

²⁹ Alameda County, CA and the CA Integrated Waste Management Board have developed interesting incentive models to evaluate.

3. Expand and Improve the Statewide Infrastructure for Composting.

An effective infrastructure for expanding and improving composting in Vermont must include site development, management improvements, improved hauling systems, the ability to quantify the amount of materials being composted (scales), and a statewide data management system (database and GIS maps).

Action Steps:

1. When possible, state agencies that handle critical composting resources (e.g., wood chips) should direct these materials to composting facilities handling food scraps.
2. Provide alternative waste disposal options for compostable materials: i.e., drop-off opportunities at solid waste districts for organic waste or frequent curbside collection of organics waste from residents.
3. Increase residential composting. Provide backyard compost bins at reduced prices for residents and funding for residential food waste digesters, where not already available.
4. Promote development of on-farm, small-scale composting operations in order to reduce hauling to compost facilities and back to the farm.
5. Develop resources for food waste generators to identify and locate haulers providing organics hauling services. This would include creating a webpage on state and district websites, etc.
6. Create a market for compost products.
7. Provide financial support to develop compost facilities including funds for equipment. Financial support should be available to a full range of compost facility sizes, from small exempt sites to large fully certified sites.
8. Improve on-site management of existing and future composting sites relating to stormwater management, leachate management and on-site operations.

Partners:

Haulers, Composters, Composting Association of Vermont, ANR, Agency of Transportation, Agency of Agriculture, Private sector disposal companies, solid waste planning entities, Highfields Institute

Estimated Cost:

High for facility infrastructure: ranges from \$50K for on farm small scale composting site to \$1.5M for a large scale facility.

Potential Funding Sources:

Increase the state solid waste management assistance fund, private sector, state general fund, Agency of Agriculture, USDA, private foundations, federal resources (via legislators), Department of Energy, state backed loans, bonding, loan funds, solid waste Districts, ANR

Organics

Measures of Success:

Amount diverted, number of new facilities, number of new programs, number of haulers licensed, increased number of collection routes, increased participation rates, accessibility to services statewide (percentage of food waste generators with access to services), decrease in waste water treatment plant influent flow.

4 - Enable Small and Large Scale Composting.

Existing rules and regulations that govern land use and composting in Vermont do not adequately address the realities of composting and have not kept pace with the growth of the industry in Vermont. Changes in current rules and regulations must include permit requirements that are appropriate to the scale of composting facilities and focused on goal-based environmental, public health, and agricultural viability considerations.³⁰

Action Steps:

1. Review, revise, and clarify site permitting process and regulations for composting facilities. (Act 250, ANR and Agency of Agriculture). Work collaboratively through the Composting Association of Vermont (CAV) to gather stakeholder feedback and recommendations for permit policy reform. Regulations must work to promote composting and not over regulate it.
2. Study existing barriers and challenges to on-farm composting and fund programs to encourage the development of small facilities.
3. Review the feasibility of co-composting waste water treatment plant sludge with other organic matter.

³⁰ For instance, the definition of composting as an agricultural activity requires that 51% or more of the material composted need to be generated by the farm. Given that most farms are composting high moisture, high nitrogen materials it is common that on-farm composters typically import well more than 50% of their compostable materials in order to handle their farm byproducts, such as manure or butcher residuals. Additionally, food scraps composted by a farm for agricultural purposes do not necessarily pose any greater threat to public or environmental health than livestock manures, however they are regulated differently. Given the scope of ACT 250 to regulate a commercial operation of over ten acres and the 51% definition for agricultural composting, most farms whose total operation is greater than ten acres who import more than 51% of their material are potentially subject to ACT 250 regulation which is stringent enough to eliminate most of these operations. In addition, the cost for technical services for small composters and facility start-up should be shared and based on need. Finally, the State of Vermont and stakeholders must establish priorities for soil health, statewide nutrient management planning, community capital, and emissions reduction.

Organics

Partners:

Composters and composting consultants, Composting Association of Vermont, State agencies: ANR, Agriculture and ACT 250, Environmental and agricultural advocacy organizations, Vermont Law School, Solid waste districts and planning entities.

Estimated Cost:

Low, \$50K

Potential Funding Sources:

SWMAF grant, State solid waste tax, economic development funding, Sustainable Jobs fund, Vermont Environmental Consortium, USDA, EPA, solid waste districts, Agency of Agriculture, private sector

Measures of Success:

Increased number of facilities developed or in the permitting process, changes in rules and regulations or changes in legislation as needed.

5 - Mandate Composting/Diversion for all Generators with Specific Timeframes.

Action Steps:

1. Establish commercial-sector mandates to divert organic materials, including but not limited to groceries, restaurants, caterers, institutions, manufacturers and offices.
2. Establish residential organics mandates.
3. Define parameters for mandatory regulations, for example what materials cannot be disposed of in landfills. Discourage the use of garbage disposals for organic materials that can be composted or otherwise diverted from landfills.
4. Mandate state entities and grant recipients to divert organics waste. Establish minimum requirements about diversion of organics waste for all state contract and grant recipients.
5. Keep private sector informed and involved in establishing or creating mandates. (Pair with incentive and investment programs - see incentives)

Partners:

State agencies, Generators, Haulers, Composters, Solid waste districts, Legislature

Estimated Cost:

Low, less than \$20,000

Potential Funding Sources:

Agency of Natural Resources, Agency of Agriculture, Department of Health, Department of Buildings and Grounds, manure methane projects, private foundations (Kellogg Foundation), USDA

Organics

Measures of Success:

Percent capture rate changes, lower volume of compostable materials going to landfills. development of private sector and infrastructure in response to policy, development of small and large scale composting facilities throughout the state

Next Steps:

1. Establish goals and timeline.
2. Review existing and proposed legislation in other states, such as in Massachusetts.
3. Identify "needs" (limitations in our current capacity to fulfill the mandate).
4. Begin funding programs to support and stimulate infrastructure development in order to encourage early adopters before the ban is actually implemented. This should be a funded mandate, which helps to develop critical resources, including hauling programs and composting sites, early in the process to build up the private sector and establish programs well before the mandate goes into effect.
5. Make goal of mandate to stimulate private sector, as well achieving end-use priorities.
6. Research the effects of compostable materials in landfills and the benefits of organic waste being composted and used for soil amendment.

6 - Increase General Public and Private School Education about Organics Waste Prevention and Reuse/Diversion.

A statewide public education program on reducing waste and the best use of compostable materials is critical to achieve the goals of waste prevention. Such education is part of the mission of the Association of Vermont Recyclers (AVR). Greater emphasis on organics education could be incorporated into AVR programs. Over the next three years, ANR and the solid waste districts could work more closely with AVR and teachers that are doing waste prevention in schools to develop a program to articulate the importance of organic materials as critical food and energy resources for the state. This would improve the understanding of these issues so that other actions to implement or to legislate programs are supported by an informed citizenry.

Action Steps:

1. Hold public forums on waste reduction.
2. Increase understanding of the benefits of composting and food rescue by all generators.
3. Educate homeowners about composting as a cheaper alternative to trash disposal.
4. Disseminate information on the relationship between climate change and wasting organics materials.
5. Utilize existing school curriculum better (composting programs, Zero Waste lunch challenge, etc.) to teach children about waste prevention and composting.
6. Develop a database of teachers that teach waste reduction.

Organics

Partners:

Association of Vermont Recyclers, Solid waste districts, teachers

Estimated Cost:

Low to moderate.

Potential Funding Sources:

Department of Education

Appendix 4: Strategies - Household Hazardous Waste

Strategies (in no particular order)

1. ANR should develop a long range, 10-year HHW Management Plan that focuses on public awareness, infrastructure improvements, and extended producer responsibility to reduce the types of materials requiring management by municipalities.
2. Establish a legislatively-appointed Advisory Council on Toxic Substances to assess hazardous, toxic, persistent, and bioaccumulative chemicals in consumer products and waste. Make recommendations to the Legislature and the Departments of Environmental Conservation and Health on methods to reduce impacts to human health and the environment.
3. The State of Vermont should take a leadership role in Product Stewardship strategies for waste prevention and toxics use reduction in consumer products.
4. The State of Vermont should take a leadership role in Environmentally Preferable Purchasing (EPP) to encourage the elimination of priority toxic substances in products and services purchased by the public and private sectors.

Background

The State Solid Waste Management Plan (2006) defines “Household Hazardous Waste (HHW) as a broad term used to signify the automotive fluids and batteries, household chemicals, and electrical products with hazardous components that are disposed by households. The Solid Waste Rules define HHW as waste that would be subject to regulation as hazardous waste if it were not from households.”

HHW is categorically exempt from regulation under both federal and state hazardous waste regulations. Nevertheless, since 1992, municipalities in Vermont have been required to include in their solid waste plans provisions for the management of “unregulated hazardous waste.” Although unregulated, most HHW is prohibited from landfill disposal.³¹

According to Vermont’s 2002 Waste Composition Study, HHW constitutes 0.6 percent of the municipal solid waste destined for disposal. This equates to 2, 568 tons of HHW disposed of in landfills in 2002. In the same year, 511 tons of HHW were collected and reported by municipal programs. These data suggest that only 16.5 percent of HHW is diverted from landfill or other disposal by HHW programs.

³¹ However, data suggest that HHW may still be entering landfills or being disposed of down the drain. In 2006, Vermonters disposed of approximately 414,273 tons of solid waste.

Household Hazardous Waste

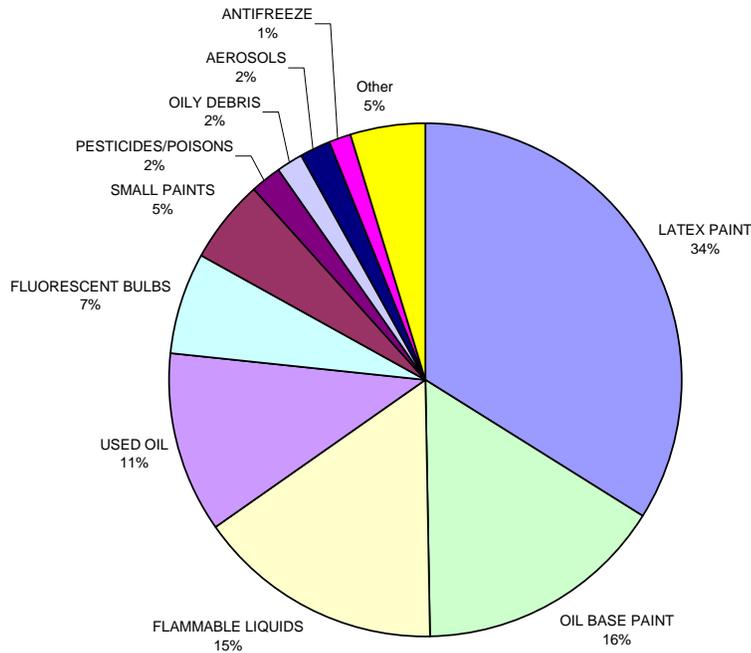
Vermont's State Solid Waste Management Plan requires solid waste entities to hold a minimum of two household hazardous waste events per year to collect unregulated hazardous waste (HHW). HHW management is accomplished through District and Alliance programs as well as individual municipalities or towns that are not a part of a District or Alliance. Each of these solid waste planning entities is required to develop and implement a Solid Waste Implementation Plan (SWIP) that conforms with the State Plan. SWIPs require an education and outreach component addressing HHW as well as hazardous wastes from small businesses and institutions, known as conditionally exempt generators (CEGs), who generate less than 220 pounds per month of hazardous waste. Some planning entities also provide collection services for CEGs. Only a small percentage of CEGs utilize these services.

One of the first HHW programs in the state, the Hazardous Waste Depot, was started in October 1990 by Burlington Public Works as a pilot HHW program for Burlington residents. The program proved to be extremely successful and in March 1991, the Chittenden Solid Waste District (CSWD) took over the program and expanded its use for all District member towns in Chittenden County. In 1991, CSWD began one of the first mobile household hazardous waste collection programs in the country with the Rover, a satellite to the Depot that was used for single-day HHW collection events. The Rover continues to provide a convenient mechanism to collect household hazardous waste from the more rural areas of Chittenden County during the peak times of HHW generation. Rutland County Solid Waste District and Northeast Kingdom Solid Waste District also operate mobile collection programs.

Many programs that started out as single day events or pilot projects have evolved into more permanent HHW collection programs. Vermont has four permanent year round HHW facilities, two seasonal HHW facilities, and two proposed permanent HHW facilities. Many municipalities still only hold the minimum of two collection events per year with no permanent facility.

The current HHW management infrastructure inherently leads to issues of inequity in convenience and accessibility to collection events. Approximately 42 percent of Vermont households have access to permanent year-round collection facilities; 12 percent of Vermont households have access to seasonal (warmer months only) HHW facilities; and the remaining 46 percent have access to the required minimum of two HHW collection events per calendar year.

CSWD FY06 UHW PROGRAM MATERIAL MANAGED BY WEIGHT

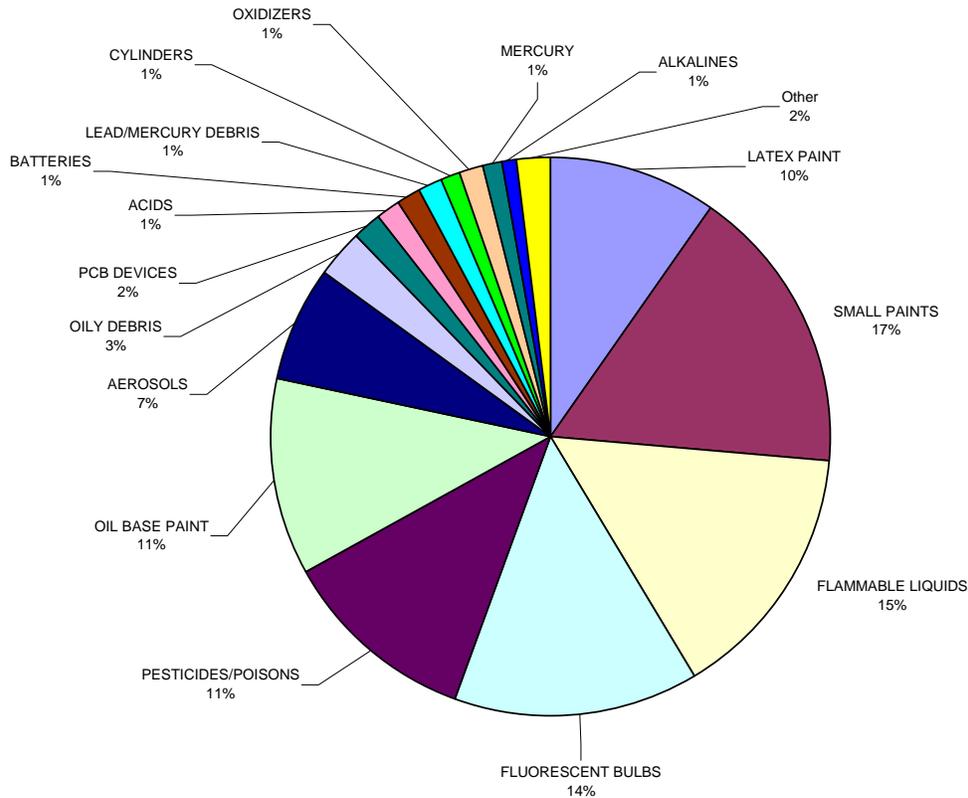


The statewide average household participation rate in HHW programs is 6 percent, with some areas of the state averaging 13 percent and others less than 1 percent. As part of each approved SWIP, solid waste planning entities must address these issues of convenience, accessibility and participation and develop plans and program enhancements to at least meet the statewide average participation rate.

The data in the pie charts above and below is taken from CSWD's HHW program and shows the percentage by weight of types of HHW collected as well as disposal costs incurred by waste type. These data are representative of the state as a whole. The largest HHW streams by weight and type are paints, flammable liquids, used oil, and fluorescent bulbs. HHW disposal costs are highest for waste paints (38%), followed by flammable liquids (19%), fluorescent bulbs (14%) and pesticides (11%).

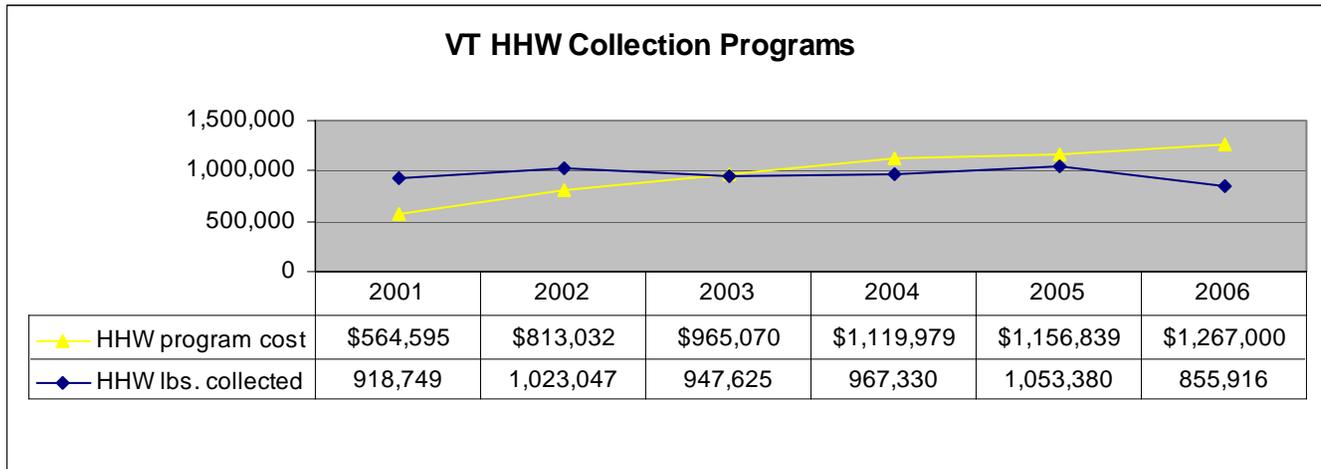
Household Hazardous Waste

CSWD FY06 UHW PROGRAM MATERIAL DISPOSAL COSTS



On a statewide basis, program participation is increasing as well as program management costs. Program participation has ranged from 17,800 in 2005 to 19,300 in 2006 and has cost approximately \$1,156,000 (2005) and approximately \$1,267,000 (2006).

Based on Statewide HHW data collected from Vermont Solid Waste planning entities, we see several interesting trends appearing in the management of HHW. Based on the graph below, we can conclude that HHW program costs are increasing and the amount of HHW collected is decreasing. Some of this may be explained in recent consolidation and the limited number of contractors providing HHW collection services, as well as the rural nature of some of the state. Some of this could also be a result of waste reduction efforts across the state.



Although the amount of HHW collected in Vermont's municipal programs is decreasing, toxic substances remain prevalent in consumer products. There has been significant success in reducing mercury in products and keeping it out of the waste stream due to enactment of bans on sales of products containing mercury in Vermont as well as mercury product landfill disposal bans. However, there is a large range of other toxic substances and other poorly studied chemicals used in consumer products, some of which are persistent bioaccumulative toxins (PBTs). These PBTs are of particular concern because of their ability to bioaccumulate through the food chain and persist for long periods of time in animal and human tissues.

For example, brominated flame retardants are PBTs that are used in many consumer products ranging from plastics in televisions and computers, to upholstered furniture and mattresses. Products containing these chemicals can become a source for human exposure while they are being manufactured, used by the consumer, and when they are finally discarded. The use of brominated flame retardants was prevalent before health and safety concerns were identified. Several states are now banning or phasing out the use of the most toxic flame retardants in consumer products. Other toxic substances in consumer products, such as cleaners, also find their way into wastewaters and waters of the state through the normal use of the products. These are just two examples of toxic substances that end up in solid waste landfills and/or in the environment through normal use and of currently acceptable disposal practices that can lead to broad and varied pathways of exposure.

Other State HHW Management Programs

The HHW Subcommittee looked at other state HHW management programs that have been viewed as leaders in waste prevention and toxics use reduction in order to inform the process of developing recommended strategies for Vermont. The HHW programs in Washington and Oregon are highlighted below. Two key themes of these programs, in addition to a waste prevention approach to management, are the comprehensive plans that are in place and the broader perspective taken on addressing toxic substances in products that are not traditional HHW, but nevertheless may affect human health and the environment through consumer use and disposal.

Washington State

The State of Washington's Beyond Waste strategy is one of the more progressive and forward-thinking state waste management plans for managing hazardous wastes and toxics in the waste stream. Beyond Waste is a long-range waste prevention strategy (30 years) to eliminate toxic substances in products and wastes, both from households and small businesses, known as moderate risk wastes (MRW) in Washington. Key areas of focus are to reduce the burden on local government to pay for the management of these toxic substances, target the most harmful and toxic substances for waste prevention, and promote product stewardship as a primary means for accomplishing this. Priority action steps in the next five years include:

- Develop a science-based process to identify toxic and hazardous substances of high risk and exposure potential and prioritize these for action. The first set of priority substances are: mercury, polybrominated flame retardants (PBDEs), electronic waste, pesticides, and architectural paints and coatings.
- Lead by example at the state level in environmentally preferable purchasing and product stewardship (extended producer responsibility) to promote toxics use reduction
- Enhance existing HHW management infrastructure and facility compliance to address the current management needs, while working toward the long-term elimination of toxic and hazardous substances in products.

Oregon

The State of Oregon developed a six-year HHW Management Plan (2005-2011) with the following priorities:

- Develop a risk-based prioritization of HHW streams to address in the plan
- Develop baseline data on customer needs and program performance
- Conduct ongoing evaluation of program performance
- Provide necessary planning and implementation grants for municipal HHW programs
- Provide funding to support HHW-related training of municipal program staff
- Design and implement a comprehensive behavior change program to reduce the use and generation of hazardous products and waste

Household Hazardous Waste

- Remain active in regional and national forums for product stewardship that engage product manufacturers, wholesalers, and retailers in reducing and managing HHW risks.

HHW Goals

- To expand and provide convenient and cost-effective HHW management systems statewide, with universal access to year-round HHW collection programs in close travel proximity to all residents (15 mile radius suggested).
- To establish statewide sustainable funding mechanisms for HHW management.
- To increase recycling and reuse of HHW instead of disposal.
- To reduce and minimize the environmental and carbon footprint of HHW management.
- To increase HHW program participation rates.
- To increase general public awareness of HHW programs, alternative products, and the health and environmental impacts of toxic HHW products.
- To increase consumer use of alternative, less toxic products, resulting in a decrease in the number and volume of hazardous materials collected and in the toxicity levels of the waste stream.
- To Increase the number of manufacturer product take-back programs for end-of-life products with toxic and hazardous constituents.
- To establish a risk-based prioritization process to identify toxic substances of greatest health and environmental concern in consumer products, including but not limited to persistent bioaccumulative toxic chemicals (PBTs) and persistent organic pollutants (POPs), with highest priority substances targeted for enhanced waste management, reduction, and/or elimination or phase-out from use in consumer products.
- To shift laws, regulations, and policies from managing toxic substances in waste to preventing or eliminating toxic substance use and release, including consideration of cross-media (air, land, and water) effects.

Recommended Strategy Details

1 - Department of Environmental Conservation to develop a long range, 10-year HHW Management Plan, using a stakeholder process, which addresses the following:

Action Steps:

1. Raises awareness through public education about the availability of HHW management services (events, collections) and waste prevention and toxics use reduction (information, resources).
2. Improves HHW management infrastructure in a cost-effective manner that results in increased public accessibility to facilities and events, an increase in number of

Household Hazardous Waste

collections, and an increase in solid waste district staff awareness of, and collaboration with, private HHW collectors.

3. Conducts a risk-based prioritization assessment of household hazardous waste by waste category in order to guide plan priorities for improving HHW management. This could include looking beyond traditional HHW items (e.g., flame retardants) and use the same criteria and process for the advisory council risk-based assessment of PBTs (see recommendation #2).
4. Establishes a standardized method for collecting data (from solid waste planning entities) in order to create baseline data on HHW generation and collection and measures of success (reduction) that will be utilized to measure progress in achieving goals.
5. Evaluates the existing HHW regulations (environmental standards, compliance and enforcement) and the need for regulatory changes to achieve the goals of the plan.
6. Assesses product stewardship (producer responsibility) strategies that will promote waste prevention, toxics use reduction, and other goals to the plan.
7. Assesses and identifies existing and new funding mechanisms that can be utilized to support and enhance statewide HHW management.
8. Uses environmentally preferable purchasing (EPP) policies and strategies to encourage waste prevention and toxics use reduction in the public and private sectors.
9. Incorporates a multi-media (air, land, water) approach to this work.

Rationale:

Vermont has a unique opportunity at this time to assess its HHW management system and take a broader look at the issue of toxic substances in products and reducing risk to Vermonters through waste prevention and toxics use reduction approaches. There have been many successes over the years but also shortcomings and challenges in providing comprehensive, convenient, and cost-effective collection programs across all parts of the state. A planning process involving stakeholders can set a course for short-term program enhancements, while developing a longer range waste prevention approach to toxic substances in the waste stream that addresses the goals articulated in this plan for HHW management. A risk-based prioritization of HHW and toxic substances in products is essential for focusing limited dollars on the biggest problems first.

The last few years have signaled the beginnings of a paradigm shift in HHW management and toxics in the waste stream - to one of elimination rather than management of the problem and shifting the burden away from solely state and municipal responsibility for the problem. Mercury regulatory and education and reduction programs set an example of this paradigm shift. A shorter term goal of mercury reduction programs has been to provide adequate public education and outreach to promote proper management of mercury wastes and use of alternative products, while creating mandates for manufacturers to phase out the use of mercury in new products and take responsibility for discarded mercury-added products. The New England States and Eastern Canadian Provinces have set a goal of virtual elimination of mercury releases to the environment and, through implementation of comprehensive planning. They are well on the way to achieving 75% reduction in anthropogenic releases in a little more than ten years.

Household Hazardous Waste

Progressive and forward-thinking planning approaches such as those in Washington and Oregon that look “beyond waste” to elimination and waste prevention have set an example. These plans recognize that the problem of toxic substances in products is complex, broad in scope, long term and requires a focus on risk to establish priority actions. Given resource constraints at the state and municipal levels, it is imperative that we develop well thought out plans that assess our current state of affairs, establish clear goals for our desired future, lay out priority actions that can be accomplished within budget constraints, and develop measures of success to monitor performance.

Next Steps:

- Define process (within 3 months)
- Identify stakeholders (within 3 months)
- Planning process underway (within 12 months)
- Long range plan (completed at the end of year 2)

Timeline:

(See above)

Partners: DEC, Waste Prevention Steering Committee, Toxics Advisory Council representative, Districts, alliances, and/or municipality representatives; Private sector representatives: industry, collectors, retailers, Department of Health, Agency of Agriculture, General public representative, Environmental groups, Media/PR representative

Estimated Cost:

- 2-3 FTEs (state and private staff time)
- \$50,000 (meetings, consultant, food/coffee)

Potential Funding Sources:

General funds, SWMAF, Grants (EPA, private foundations), Clean and Clear money, Lake Champlain Basin program

Measures of Success:

- A functional plan within two years
- Sustainable funding obtained

2 - Establish an Advisory Council on Toxics Substances (ACTS) through Legislative Authority

Action Steps:

This Advisory Council would assess hazardous, toxic, persistent, and bioaccumulative chemicals in consumer products and waste. It would make recommendations to the Legislature and Departments of Health and Environmental Conservation on methods to

Household Hazardous Waste

reduce risk to human health and the environment from these substances, including methods that involve cross-media (air, water, and land) strategies.

The Advisory Council should be charged with reviewing DEC's progress in developing and implementing the long range plan for HHW management and should advise the DEC and the Legislature on all of the plan elements outlined in recommendation #1 above. On a broader scale, the Advisory Council should be charged with recommending priority toxic substances for phase-out or elimination from products that pose the greatest threat to public health and the environment. Additionally, legislative authority should be given to the DEC to establish chemical action plans to eliminate the priority toxic substances in consumer products identified by the ACTS.

Rationale:

The term Household Hazardous Waste (HHW) has traditionally been limited in its definition to a finite list of waste items such as those exemplified in the pie-charts in the introduction to the HHW chapter. The management of HHW has also been traditionally limited to households and conditionally-exempt generators (CEGs - small businesses and organizations that do not generate enough hazardous waste to fall under the regulations applied to large generators of hazardous waste such as manufacturers and large institutions). In addition, the management of HHW has prioritized waste by volume/weight, toxicity, and the cost of disposal.

Increasingly, however, attention is being focused on a different set of chemical pollutants called Persistent Organic Pollutants (POPs) or persistent, bioaccumulative, toxic chemicals (PBTs). The list of these pollutants includes some, but extends far beyond the traditional list of HHW. The impact of these pollutants affects all users and generators of waste, large and small. The distinguishing characteristics of POPs/PBTs are that they:

- persist in the environment (do not quickly biodegrade into harmless elements)
- bioaccumulate in the environment (build up in body fat and accumulate in increasingly higher levels as the chemicals move up the food chain)
- travel easily across/through environmental media (land, water, air)
- are linked to cancer and/or serious hormonal, reproductive, neurological, and immune disorders

Currently there are over 80,000 chemical compounds manufactured and in use around the world. Less than five percent of these elements have been tested for toxicity and their cumulative impact on human health and the environment. The main U.S. federal law regulating chemicals, the Toxic Substances Control Act (TSCA), does not require chemical manufacturers to produce and publicize health and environmental impact information about their products. In addition, the Environmental Protection Agency has little authority and resources to study the impact of, and oversee the use of, these compounds. Subsequently, a plethora of chemicals has been released into the environment with little or no information about their impact individually as well as in combination with one another over time. It is estimated that in the United States alone, over a half a million chemical

Household Hazardous Waste

products are available to consumers in the form of cleaners, personal care products, clothes, household repair products, appliances, plastics, furniture, etc.

The tide is turning as researchers are now finding hundreds and significant amounts of these chemical compounds in human tissue (meaning they are bioaccumulative), regardless of a person's age and geographical location in the world. Research is also beginning to link many of these chemicals to significant health problems. Consequently, the European Union (EU) has taken a leadership role in requiring the registration, evaluation, and authorization of the tens of thousands of chemicals products available on the market today for use by manufacturers and consumers. In addition, the EU now requires that research information be shared with the public so that consumers can make informed decisions about products they purchase. A key element of the EU directive is its underlying principle, the precautionary principle, which in essence means that the EU will take action on the potential risk of a chemical even if science cannot prove with absolute certainty that the chemical has a significant negative impact on human health and the environment. Other countries and a number of U.S. states (e.g., California and Washington) are following or paralleling the actions of the EU, taking a much closer look at the impact of, and regulating POPs/PBTs.

Vermont, like the rest of the country and the world, cannot afford to continue to live in a vacuum of information about the health and environmental impacts of the traditional household hazardous wastes and additional POPs/PBTs. Children in particular, are especially vulnerable to the impacts of these toxins. Because the POPs/PBTs chemicals in particular travel easily between environmental media (e.g., from land to water to air), no single department or program in Vermont is set up to monitor these chemicals. While mercury is closely tracked and well-regulated in Vermont, most other common POPs/PBTs and toxins in HHW are not. An advisory council on toxic substances would enable the State to begin to gather information about the health and environmental impacts of various HHW and POPs/PBTs, assess and prioritize, based on risk, those that need immediate regulatory and preventative action, and provide invaluable recommendations to the legislature and those departments that would implement any subsequent regulatory mandates.

Next Steps:

- Legislative authority for a Toxics Advisory Council (by June 2008)
- Advisory Council convenes by Oct 1, 2008
- Review traditional HHW and PBTs in risk-based assessment and prioritization of toxic substances and advise DEC about what toxic substances to focus on (within one year)
- Look at what other states have already done (research, action plans) in addressing PBTs (within one year)

Timeline:

(See above)

Partners:

Household Hazardous Waste

As defined by statute and, in addition, a representative from a solid waste district, and the Agency of Agriculture, and organizations representing worker safety advocacy, communities, and public health advocacy.

Estimated Cost:

- 1 FTE

Measures of Success:

- Legislation passed in 2008 session
- Defined risk-assessment prioritization process (in coordination with HHW management planning process)
- Prioritized toxic substances list (in coordination with HHW management planning process)
- Legislative report completed by end of year one

3 - The State of Vermont to take a Leadership Role in Product Stewardship (Extended Producer Responsibility/EPR)

Action Steps:

1. State to participate at the regional and national levels in product stewardship initiatives for priority waste streams (to be determined in HHW management plan). This would include partnering with the Product Stewardship Institute and other product stewardship organizations and initiatives.
2. State to get involved at the state and local level in promoting product stewardship initiatives with the public (including solid waste districts) and the private sector.
3. State to assist with the development of EPR framework legislation as well as product specific product stewardship legislation.
4. State to report annually to the Advisory Council on Toxic Substances.

Rationale:

Local government has been mandated with providing collection and management of leftover hazardous products that consumers purchase, yet has no control over what manufacturers are producing and marketing to consumers or what consumers choose to purchase. As solid waste entities struggle to fund adequate collection for HHW and education on toxics use reduction, more and more products are being generated and purchased that need special management at the end of their useful life such as mercury containing lamps and electronic waste. Solid waste entities that fund these HHW collections and services are providing a "subsidy" to the producers of toxic products and are "enabling" consumers to purchase and discard unwanted portions of these products by making it free and accessible through HHW collection programs.

Extended Producer Responsibility (EPR) entails making manufacturers responsible for the entire lifecycle of the products and packaging they produce. EPR is generally a mandatory approach. One aim of EPR policies is to internalize the environmental costs of products

Household Hazardous Waste

into their price. Another is to shift the economic burden of managing products that have reached the end of their useful life from the local government and taxpayers to product producers and consumers.

Product stewardship means that all parties involved in producing, selling, or using a product take responsibility for the full environmental and economic impacts of that product. Product stewardship is less regulatory in nature and recognizes that in order to reach product sustainability, all stakeholders must be involved. The ultimate goal of both EPR and product stewardship is to eliminate or at least reduce product impacts.

Product stewardship/EPR has been an environmental policy tool that has been used for years in Europe and Canada but has just started gaining significant momentum in the U.S. Several states and/or regions have formed product stewardship councils to work on product stewardship initiatives and legislation in their region. Councils are moving towards developing framework legislation rather than product-specific legislation that allows for administrative additions of products without re-engaging in separate legislation. The legislation has goals, guiding principles, roles and responsibilities, governance, and program effectiveness and measurement. Products can be added to without changing the framework itself.

In addition to regional councils, there are two national non-profit organizations that work primarily on EPR and product stewardship.

- The Product Stewardship Institute (PSI) works with stakeholders through research and dialogue to reduce the health and environmental impacts of consumer products. PSI takes a unique product stewardship approach to solving waste management problems by encouraging product design changes and mediating stakeholder dialogues. There is great opportunity for local and state government to participate in these dialogues as well as collaborate with other regional and state product stewardship initiatives.
- Alternatively, the Product Policy Institute (PPI) works on environmental policies that advance sustainable production and consumption and good governance. PPI works with NGOs and state and local governments to develop policy solutions to high impact problems in product production, consumption and disposal.

Next Steps:

- Assign staff responsibilities in product stewardship initiatives (within 3 months)
- Prioritize product stewardship initiatives in concert with the development of the long range HHW Plan (within 6 months)
- Participate in Product Stewardship Institute and Product Policy Institute initiatives and with other regional and national groups or councils (on-going)
- Report to Toxics Advisory Council (by end of year one)

Timeline:

(See above)

Partners:

Household Hazardous Waste

- DEC, Buildings and General Services, Agency of Agriculture, Districts/alliances/municipalities

Estimated Cost:

- 1 FTE

Measures of Success:

- Increased state participation in regional and national initiatives
- List of prioritized products developed

4 - The State of Vermont should take a leadership role in Environmentally Preferable Purchasing (EPP)

The role would be to encourage the elimination of priority toxics substances (previously identified by DEC and/or the Advisory Council on Toxic Substances) in products and services purchased by the public and private sector.

Action Steps:

1. Ensure that state government is a leader in EPP by assigning staff to work with state purchasing officials on policies and contract language for specific product categories.
2. Develop measures of success for EPP (starting with state and municipal governments) that can be monitored and tracked over time.
3. Educate the public and private sector on EPP and developing incentives for public and private sector adoption of EPP principles.
4. Assure that product life cycle impacts are accounted for in establishing EPP policies.
5. Report annually to the Advisory Council on Toxic Substances.
6. Participate in Product Stewardship Institute initiatives and in other regional and national groups or councils.

Rationale:

Vermont state government has been a leader in the development and application of environmentally preferable purchasing (EPP) and reduction of hazardous and toxic substance use. The establishment of the Vermont Clean State Council by Executive Order in 1994 and rededication and expansion of the executive order in 2004 has led to many EPP initiatives related to reducing the use of toxic substances in the products and services acquired by the State. In 2004, the Department of Buildings and General Services (BGS) issued its Comprehensive Environmental and Resource Management Program to articulate policies, goals and objectives related to improving efficiency of consumption of natural resources and energy by State Agencies. Part of this plan deals specifically with promoting EPP by:

- creating a “level field” for bidding for environmental products;
- developing full-circle purchasing contracts (requiring product take-back); and

Household Hazardous Waste

- employing an EPP checklist for purchasing agents to use in applying significant environmental criteria to purchasing decisions.
 - The EPP checklist has elements relating to reducing the purchase of products containing toxic substances.
 - Specifically, the checklist addresses purchase of chlorine-free paper products; mercury free products and equipment; and compliance with international directives such as the European Union's Directive, Restriction of Hazardous Substances, reduction of chlorinated plastics (PVC) and brominated flame retardants; the use of recyclable non-toxic packaging; and compliance with the European Union's WEEE Directive on electronic products.
 - Vermont state government has developed many EPP purchasing contracts, including lighting, latex paints and primers, cleaning products, computers and electronic products, paper products, and batteries.

The Agency of Natural Resources currently provides very little technical support to the Department of Buildings and General Services in carrying out its Comprehensive Environmental and Resource Plan, especially as it relates to toxic substances. In addition, the Vermont Clean State Council has been dormant for several years, in providing guidance and assistance on EPP. In the past, both ANR and the Council had been active in advising the Purchasing and Contracts Division in developing EPP policies and contracts dealing with cleaning supplies, mercury equipment, chlorine-free paper products, electronic equipment. In order for state government to maintain and enhance its leadership role in EPP, there is a need to continually research and review new information on toxic substances in products, revise and update existing purchasing contracts, and develop EPP contracts for other categories of product purchases.

ANR needs to play a more active role in educating the public and private sectors on EPP as it relates to toxic substances. Although the private sector has begun to embrace EPP, there is an opportunity for raising awareness and sharing information on EPP with Vermont's business community. There is also a need to educate retailers in certain sectors to consider carrying less toxic or non-toxic products and continued efforts to educate consumers about purchasing less toxic alternatives. However, a more effective strategy in the long run is to reduce toxic substances in consumer products through product stewardship initiatives by the manufacturers of these products. Therefore, ANR needs to maintain an active role in product stewardship efforts and initiatives as well.

Next Steps:

- Assign DEC staff to work on EPP (within 6 months)
- Establish EPP priorities (within 1 year)
- Design measures for monitoring EPP within state government and track over time (within 1 year)
- Initiate EPP education/awareness program (within 2 years)
- Report to Toxics Advisory Council (by end of year 1)
- Assess and standardize state model contract and purchasing language (on-going)
- Educate state managers responsible for purchasing about EPP (on-going)

Household Hazardous Waste

- Educate general public and private sectors about EPP policies and practices (starting in year 2)

Timeline:

(See above)

Partners:

- DEC, Buildings and General Services, Department of Education (school purchasing), Vermont Department of Health (Envision program)

Estimated Cost:

- 1 FTE

Measures of Success:

- Consistent use of EPP practices across state departments
- Increased public awareness of EPP practices
- Distribution of educational materials on EPP
- Creation of website about EPP

Appendix 5: Strategies - Electronic Waste

Strategies (in no particular order)

- The State will take a leadership role in promoting the use of EPEAT standards (Electronic Product Environmental Assessment Tool) for computer purchases throughout state government.
- Collect, expand, and standardize statewide data on e-waste generation, recycling, reuse, and disposal.
- Review existing regulations and environmental standards in use (other states, federal government) for e-waste recycling (best management practices) and adopt standards appropriate for Vermont.
- Expand and sustain public education about e-waste that includes information about: environmental preferable purchasing; use of EPEAT standards; collection, recycling, about reuse options; how to reduce the volume of waste produced; toxic materials in electronics products and their impact on human health and the environment; products that become obsolescent quickly vs. those that have a long life and can be upgraded and/or reused.
- Assess the existing infrastructure for collection of e-waste.
- Develop businesses and markets for e-waste recycling and recycled materials in conjunction with state economic development initiatives.
- Implement phased landfill bans that include computers and peripherals, CRTs, televisions, uninterrupted power supplies /transformers, VCRs/DVDs, copiers/fax machines/printers, and cell phones.

Background:

The Electronic Waste Subcommittee (E-waste Subcommittee) is a diverse group of stakeholders who discussed and considered a wide range of issues and strategies associated with e-waste prevention and recycling in Vermont. This report presents an overall consensus view of the subcommittee, meaning that all participants agree with the overall theme and intent of the recommendations, although not every participant necessarily agrees with the details of all recommendations.

Overview and Trends

According to the U.S. Environmental Protection Agency (EPA), the products that are considered electronics for the purposes of waste management include televisions, computers and computer peripherals, audio and stereo equipment, VCRs and DVD players, video cameras, telephones, fax and copying machines, cell phones, wireless devices and video game consoles. Although environmental groups, regulatory agencies and manufacturers have not uniformly agreed on a definition of covered items when it comes to

Appendixes

electronics waste management, the EPA definition includes electronic devices that have been discussed and considered by this e-waste subcommittee.

While used electronics currently represent less than two percent of the municipal solid waste stream, it is the fastest growing category of waste. The overall amount of municipal waste actually decreased from 2004 to 2005 but the amount of electronic waste (or e-waste) increased from 2.44 million tons to 2.63 million tons. In 2005, discarded televisions, personal computers, peripherals (including printers, scanners, and fax machines), mice, keyboards and cell phones totaled about 2 million tons. Of that, about 80-85% (1.6 to 1.7 million tons) was discarded, primarily in landfills. One factor that contributes significantly to the increase in e-waste is the continual, rapid advancements in technology that result in the continual replacement of software and equipment which quickly become obsolete. For example, it is estimated that in 2007, nearly one in three consumers replaced their computers.³²

Environmental and Human Health Concerns

Electronic products are made from valuable resources, including precious and other metals, engineered plastics, glass, and other materials. Many of these resources in electronic products could be profitably recycled with little effort. Throwing away old electronic equipment not only wastes these resources, but subsequently generates more pollution and consumes additional energy through the extraction and production of virgin materials and in the manufacture of new products.

Volume, wasted natural and energy resources and pollution during extraction and production are not the only problems with e-waste. Many of the components in consumer electronics contain toxic constituents. An average desktop computer is made up of a variety of metals, plastics and other compounds. The primary materials of concern are lead, cadmium, beryllium, barium, and mercury, as well as hexavalent chromium, all of which are known to be hazardous to human health and the environment. Older computer monitors and televisions using cathode ray tubes (CRTs) contain an average of four pounds of lead. In addition, certain brominated flame retardants (which are often used in electronics products) are the subject of increasing concern over their persistent bio-accumulation and suspected endocrine-disrupting properties. When disposed of in landfills or incinerated, there is an increased risk of discharge of these toxic compounds to groundwater or air. The U.S. EPA estimates that currently half of all heavy metals found in U.S. landfills can be traced to discarded electronics. It may take years to understand the full nature and degree of the hazards presented by these toxic elements in electronic products. Nonetheless, prudence would suggest the need to remove them from the waste stream now.

Finally, there is growing concern over the impacts associated with e-waste recycling, including labor, human health and environmental concerns, both in the U.S. and abroad. This concern is particularly acute in relation to the export of e-waste to countries with

³² Consumer Reports, see: http://www.greenerchoices.org/electronicsrecycling/el_ewaste.cfm

Appendixes

little to no recycling infrastructure and minimal environmental and worker health and safety regulations. Impacts from improper e-waste recycling may be felt globally. For example, there are concerns that the burning of e-waste in China emits toxins into the air that circulate the globe; or toxic metals (such as lead) extracted from e-waste end up in products produced overseas and then imported into the U.S. Guidelines and standards could be developed to protect the environment and worker health without compromising the legitimate markets for reuse and recycling that exist abroad.

Vermont Regulations

Disposal: Currently, in Vermont virtually all electronic waste can be disposed of in landfills just like solid waste, with three exceptions: 1) Any product containing mercury, such as some liquid crystal display computer monitors; 2) Any electronic products from businesses and institutions that are considered a hazardous waste (cathode ray tubes (CRTs) and printed circuit boards are the primary electronic waste components consistently identified as meeting the definition of hazardous waste); and 3) Some municipalities and waste districts in Vermont have enacted bans on the disposal of various electronics products in regular trash.

Collection: Vermont has existing rules on how collectors need to handle and store CRTs³³. Collection of CRT's is also subject to the January 2007 EPA CRT rule. There are no standards for collection and transportation of other types of e-waste.

Recycling: There is some lack of clarity in Vermont's regulations about whether e-waste collected for recycling or re-use should be considered solid waste and thus regulated as solid waste under the Vermont Solid Waste Rules. This lack of clarity is particularly true in the case of re-use. As a matter of policy, recyclers of e-waste in Vermont are not currently required to obtain solid waste certification and therefore are not subject to the Vermont Solid Waste Rules.

Vermont E-waste Recycling

Municipal e-waste collection and recycling started in Vermont in September 1999³⁴ with a one day collection event held by the Addison County Solid Waste Management District in collaboration with the Addison County Community Action Group and a local computer services store, Computer Alternatives. Since that time, other solid waste planning entities have started collecting e-waste. Although consistent and clear definitions of access and convenience have not been developed, estimates of the percentage of Vermonters with

³³ Vermont Hazardous Waste Management Regulations, Subchapter 9 Universal Waste Management Standards, §7-908, See: http://www.anr.state.vt.us/dec/wastediv/rcra/hazregs/VHWMR_Sub9.pdf

³⁴ Non-municipal recycling of e-waste started prior to this date by Recycle North.

Appendixes

access to permanent collection sites or collection services for e-waste range from 76%³⁵ to 84%³⁶,.

Based on EPA calculations, Vermont produced approximately 8,000,000 pounds of e-waste in 2005. According to the Vermont Department of Environmental Conservation (DEC)³⁷, 786,000 pounds of e-waste were collected for recycling in 2005, a 54% increase from 2004 when 510,000 pounds of e-waste were collected. The 2005 numbers indicate a recycling rate of 10%, although this does not account for recycling of e-waste from businesses and institutions. The EPA estimates that in 2005 discarded e-waste was recycled at a rate of about 15%-20% nationwide and that this recycling rate remained fairly constant from 1999 to 2005. Although recycling continues to increase, so does the total amount of e-waste disposed of each year, resulting in no increase in the percentage of e-waste recycled.³⁸ In order to significantly increase e-waste recycling rates in Vermont, the following barriers must be addressed:

High Cost of E-waste Collection and Management Programs: The cost of e-waste collection programs is a concern for most solid waste planning entities (i.e. solid waste districts, alliances, and independent municipalities). Most e-waste collection programs charge the consumer to recover some of the costs. The majority of solid waste districts and municipal programs that collect e-waste partially subsidize costs associated with the collection and recycling of e-waste. The Chittenden Solid Waste District estimates that it subsidized the cost to recycle CRTs in 2006 by \$42,000 (not including labor and overhead costs).

Inconsistent and Inconvenient E-waste Collection Programs: Successful e-waste collection programs need to have convenient hours and locations. In order to address convenience, some of the larger solid waste management districts have developed permanent e-waste collection facilities that are open year-around. However, the smaller districts, alliances, and independent municipalities rely on two 1-day collection events per year, which is the minimum required by the State of Vermont Solid Waste Management Plan. Because there are no requirements regarding the length of time the 1-day collection programs need to be open, some are only open for a few hours, further limiting convenience and accessibility for the general public.

Collection Fees: As noted above, it is necessary to charge fees at most collection programs to help recover costs. There is some concern that charging fees to cover costs for e-waste recycling may act as a disincentive and negatively affects participation and amounts collected. In some locations, residents can legally dispose of e-waste with their regular trash at a lower cost. Although free drop-off events for e-waste generate large amounts of

³⁵ 2004 ANR report, titled "Electronic Waste Management in Vermont," which indicated that this access was mostly for computers

³⁶ Robin Ingenthron, Good Point Recycling

<http://spreadsheets.google.com/cc?key=paPvjeegcUIUPsRdrxd7RBw&hl=en>

³⁷ Vermont DEC, Solid Waste Management Diversion & Disposal Annual Reports,

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

³⁸ It should be noted that much of the data on e-waste generation and recycling is incomplete and based on approximations or theoretical calculations, rather than direct measurements or tracking. More accurate and comprehensive data is needed.

Appendixes

materials, it is not clear if these materials would have otherwise been improperly disposed of or stored.

Public Generally Unaware of E-waste Issues: Anecdotal evidence suggests the general public does not yet fully understand the environmental, human health, and socio-economic concerns and issues regarding e-waste. Without comprehensive information about e-waste or a sound understanding of the related issues, the public is more likely to make poor or inappropriate decisions about how to best manage e-waste.

Lack of Mandates Banning E-waste from Disposal: Currently, in Vermont virtually all e-waste can be disposed of in landfills just like solid waste, with some exceptions. Some e-waste generators will continue to dispose their e-waste until mandates force them to recycle or otherwise discontinue disposal in landfills.

Lack of Enforcement: Ordinances, laws, policies, or regulations are only effective if properly enforced. While understanding the need for or benefits of enforcement, most solid waste planning entities have minimal enforcement programs or capabilities. The result is even in those solid waste planning entities that have disposal bans or mandate e-waste diversion, generators feel they can manage their e-waste as they wish because of the lack of enforcement.

National Efforts

In addition to municipal collections, some national computer manufacturers have developed their own recycling programs. They range from no-cost recycling with the purchase of a new computer to a fee-based recycling pick-up service. Additionally, some of the national retailers offer take-back programs for computers and other electronic equipment. There have also been a number of efforts since 2000 to develop a more uniform and effective national approach to e-waste management. In recent months, there has been an effort originating from eight U.S. Senators and Representatives to develop a National Electronics Product Stewardship Act.

Over the past few years, due to the absence of federal legislation, a range of state legislative initiatives have evolved to address electronic waste. These initiatives can be divided into three basic approaches or models:

1) Extended Producer Responsibility (EPR): Under this approach (also called “producer takeback”), producers pay for the collection and proper disposal and/or recycling of their products. Consumers can return products free to collection centers. Nine states and New York City have passed “extended producer responsibility” laws to date, and a number of other states (14) are currently considering similar laws.³⁹

2) Advanced recycling fee (ARF): Under this approach, the consumer pays a recycling fee when purchasing items, and the fee then goes into a statewide fund to cover the

³⁹ Electronics TakeBack Coalition

Appendixes

costs of collection and recycling. California has adopted an ARF law and two states are considering this type of legislation.⁴⁰

3) Landfill material bans: Under this approach, e-waste is banned from disposal at landfills. This approach has been used in conjunction with both the EPR approach and the ARF approach, although it can also be used on its own, leaving it to the private or public sectors to develop methods for managing these wastes.

Summary

Over the past 10 years Vermonters have made as much progress as could have been expected without a landfill materials ban, ARF, EPR, or other incentive programs in place. For example, Vermont has made large strides in the recycling of computers and televisions. Which incentives or mandates will most effectively increase electronics recycling in Vermont is a matter of conjecture at this time. Assessing how much difference exists between recovery rates in EPR, ARF, and landfill materials ban states will be important though difficult to evaluate when each state is different and track records are short.

What is undisputed is that states which have vigorously engaged e-waste recycling, through convenient access (Vermont), through landfill material bans (NH, MA, NC, RI), ARFs (CA), or through EPR (ME, CT, MN, WA, MD) have saved more resources, conserved more energy, produced less toxicity, and generated more green jobs than states which have not begun any kind of a program. The important thing is to continue to grow and improve. Vermont is in a position to do more without any of the "growing pains" experienced by CA, MA, ME and others which began with legislation first and access second. Vermont has little to lose and much to gain by promoting electronics recycling more aggressively.

Recommended Strategy Details

At this time, the E-Waste Subcommittee is able to recommend 7 strategies. It is important to note that the Subcommittee was not able to complete deliberation on some key issues related to e-waste such as product stewardship, methods for increasing recycling (e.g., extended producer responsibility and advance recycling fees), and legislation addressing these strategies.

1. The State will take a leadership role in promoting the use of EPEAT standards for computer and monitor purchases throughout state government and in promoting recycling and re-use of all electronics utilized by state government.
2. Collect, expand, and standardize statewide data on e-waste generation, recycling, reuse, and disposal.
3. Review existing regulations and environmental standards in use elsewhere (other states, federal government) for e-waste recycling (best management practices) and adopt standards appropriate for Vermont.

⁴⁰ Electronics TakeBack Coalition

Appendixes

4. Expand and sustain public education about e-waste.
5. Assess the existing infrastructure for collection of e-waste for adequacy: convenience, accessibility, participation rates, etc.
6. Develop businesses and markets for e-waste recycling and recycled materials in conjunction with state, regional, and local economic development initiatives.
7. Implement a landfill ban that includes computers and peripherals, CRTs, televisions, uninterrupted power supplies /transformers, VCRs/DVDs, copiers/fax machines/printers, and cell phones.

1 - The State will take a leadership role in promoting the use of EPEAT standards for computer and monitor purchases throughout state government and in promoting recycling and re-use of all electronics utilized by state government.

The State will also promote and encourage the use of EPEAT standards by others (schools, municipalities, businesses, consumers, etc.). In addition, the State will establish policies for the recycling or re-use of all electronics (including collection of data about e-waste generation and disposal) and follow the environmental standards for recycling (developed under recommendation #3)

What is EPEAT?

EPEAT, or electronic product environmental assessment tool, is a program of the Green Electronics Council. According to the EPEAT website⁴¹, "EPEAT is a system to help purchasers in the public and private sectors evaluate, compare and select desktop computers, notebooks and monitors based on their environmental attributes. EPEAT also provides a clear and consistent set of performance criteria for the design of products, and provides an opportunity for manufacturers to secure market recognition for efforts to reduce the environmental impact of its products."

Rationale

To date the State of Vermont has not adopted any consistent state purchasing policy for computer equipment. In fact, the state contracts for purchasing computer related equipment currently gives state agencies and departments the leeway to purchase on or off contract. These contracts address ordering, quantity, cost, delivery, leasing, and invoicing but do not have any environmental attributes, (other than a take back clause by manufacturer for a fee). Other states address environmental life assessment through the use of established national standards such as the EPEAT standards. Adoption of the use of EPEAT standards would contribute to the conservation of natural resources, the reduction in waste throughout the life cycle of computers and monitors, and the reduction of the use and release of highly toxic elements that are harmful to human health and the environment.

⁴¹ <http://www.epeat.net/>

Appendixes

Vermont's Agency of Natural Resources recently signed onto the Northeast Recycling Council's (NERC) (<http://www.nerc.org>) electronic challenge that voluntary utilization of EPEAT standards in computer and monitor purchases. The next logical step is for the entire State to move forward with comprehensive implementation of these standards.

The State also does not have any consistent policies that ensure the proper recycling and reuse of its used electronic products (computers, monitors, peripherals, printers, fax machines, copiers, etc.). Reviewing the recycling policies of other states and collaborating with key recycling organizations would generate the information necessary for developing a policy for the State. Finally, any recycling policy implemented by the State should conform to the environmental standards for recycling outlined in recommendation #3.

Next Steps:

- Obtain Governor's and/or Administration's buy-in, possibly use an executive order to implement EPEAT across all of State Government;
- Develop method for reporting on success of implementation;
- Determine whether model contract and purchasing language needs to be developed;
- Educate all purchasing managers throughout State Government; and
- Develop a recycling and reuse policy for state government and/or require that all electronics be banned from disposal in landfills.

Partners:

Governor and Administration, the Vermont Department of Buildings and General Services (in particular the Purchasing & Contract Administration), all State agencies and departments, NERC (electronics challenge), Vermont State Colleges, recyclers, recycling organizations (e.g., NERC, WR3A).

Timeline:

Obtain Governor's and/or Administration's commitment to EPEAT and a comprehensive recycling policy within one year.

Estimated cost:

Overall, low. Will require State staff time to become knowledgeable about EPEAT standards, revise purchasing documents. State may realize some cost savings with the purchasing practices.

Potential Funding Sources:

State funding (to implement EPEAT standards and purchase computers and monitors that comply with the standards).

Goals and Measures of Success:

EPEAT standards in place within next purchasing contract cycle; purchasing managers aware of, and complying with EPEAT standards.

2 - Collect, expand, and standardize statewide data on e-waste generation, recycling, reuse, and disposal.

Current data collection and reporting practices across the state are inconsistent and varied. Data collection must be more inclusive (e.g., include data from recyclers and State agencies and departments) to capture a more complete picture of quantities and practices.

Rationale:

E-waste data presently submitted to the Department of Environmental Conservation (DEC) is incomplete. Data is submitted through solid waste planning entities which offer e-waste collections, as well as through solid waste facility reports. Very little private e-waste recycling or collection facility data is submitted or collected by DEC. In order to have a more complete understanding of how e-waste is managed in Vermont a more inclusive and accurate collection and reporting of e-waste data is necessary. Uniformity of data collection, evaluation and comparison are essential for determining effective program change.

Next steps:

- Research potential benefits and challenges of mandatory reporting by transfer stations, haulers, solid waste districts, highway department, etc. about illegally disposed e-waste
- Mandatory reporting by recyclers (via the licensing requirement for recyclers suggested in recommendation #3);
- Research impact of mandatory or voluntary reporting requirements on out-of-state recyclers;
- Develop standardized measures of data collection; and
- DEC develop a reporting format that is accessible via the internet, oversight of data collected (including confidentiality concerns).

Partners:

Solid waste planning entities, recyclers, DEC, Northeast Resource Recovery Association (NRRRA), U.S. EPA.

Timeline:

Complete within one year.

Estimated Cost:

Medium for initial set-up, low to maintain. Will require Department of Environmental Conservation (DEC) staff resources to collect, analyze and disseminate the data. Will require costs for recyclers/handlers to administer and collect data.

Potential Funding Sources:

State funding (DEC staff resources), partners (who need to collect and provide data) and manufacturers.

Goals and Measures of Success:

Appendixes

DEC publishing of complete data similar to MSW reporting, reporting format up and running on DEC website.

3 - Review existing regulations and environmental standards in use elsewhere (other states, federal government) for e-waste recycling (best management practices) and adopt standards appropriate for Vermont.

Regulations and standards should be such that they ensure that recycling of e-waste is done in a manner that is protective of human health and the environment, and is consistent with Best Management Practices within the e-waste recycling sector. Develop and implement a licensing/certification process for recyclers in Vermont.

Rationale:

There is increasing awareness and concern about environmentally harmful and unsafe management of e-waste, particularly for e-waste shipped from the U.S. and other countries to poor developing countries. These improper practices include exposure of broken/fractured e-waste to precipitation and open water resulting in water pollution, open burning of e-waste, resulting in worker exposure and discharge of highly toxic air pollutants, lack of proper safety equipment for workers, and dumping of waste chemicals and solids onto land or into water resources

The public and environmental regulators need assurances that firms or entities that collect, process, transfer, reuse, and/or recycle e-waste are operating in a manner that protects human health and the environment. Different states have taken different approaches: some states regulate e-waste handlers and facilities via permit programs; others use enforceable standards such as best management practices. Vermont, either through legislation or rulemaking, needs to adopt clear and effective regulation of e-waste.

The new regulation(s) need to address the following concerns:

- The regulations need to protect human health and the environment in Vermont, and to the degree possible provide similar protection within and outside the US;
- The regulations should maintain a “level-playing field” for Vermont businesses that accept e-waste for recycling and/or reuse (i.e., the regulations should not overly burden Vermont businesses creating a competitive disadvantage compared to e-waste businesses located outside the State).

Next Steps:

- Review/research what others (states, private entities) have implemented in terms of regulations, environmental standards, and Best Management Practices;
- Review/research possible licensing/certification methods, including third party certification and voluntary certification of compliance with environmental standards, such as ISO 14001 and the World Reuse, Repair and Recycling Association;

Appendixes

- Establish the mechanism to license e-waste recyclers; and
- Develop the mechanism to audit or monitor compliance with the standards.

Partners:

E-waste recyclers, DEC, U.S. EPA, NERC, Vermont Occupational Safety and Health Administration, NRRA, WR3A.

Timeline:

Develop guidelines within one year, developing and implementing regulations will take at least two years.

Estimated Cost:

Medium

Potential Funding Sources:

Licensing fees, manufacturers, and possibly state funding.

Goals and Measures of Success:

Standards and regulations have been developed and adopted, all recyclers licensed in Vermont.

4 - Expand and sustain public education about e-waste.

These efforts should include information about: environmentally preferable purchasing; use of EPEAT standards; collection, recycling, and reuse options; how to reduce the volume of waste produced; toxic materials in electronics products and their impact on human health and the environment; upgradeable/reusable products versus rapid-obsolescence products. Efforts must involve public and private sector collaboration and include the development of a state electronics resource webpage.

Rationale:

Vermont residents and businesses are faced with daily decisions about the purchase, use and disposal of electronic products. Their decision-making will be enhanced when provided with information on e-waste's impacts on human health and the environment, and when informed about methods to prevent the generation of e-waste or best manage that which is generated.

These education programs should be based on the following elements:

- Comprehensive information about the various e-waste issues and strategies/options available to either prevent or best manage e-waste.
- Multi-media delivery approach, including traditional mechanisms (mailings, print media, television, radio, primary and secondary school curriculums) as well as newer mechanisms (websites and web-based services, cellular telephone and other mobile devices services).

Appendixes

- Sustained over time to continue to remind Vermonters about e-waste and update them as waste prevention and management strategies change and improve.

Next Steps:

- Develop a strategy for education efforts including collaborations with manufacturers/retailers/solid waste districts/recyclers; and
- DEC to take a leadership role in developing and implementing strategies

Partners:

Advisory council on toxic substances (see the HHW recommendation), DEC, solid waste planning entities, Association of Vermont Recyclers (AVR), recyclers, retailers, manufacturers, U.S. EPA, Northeast Recycling Council (NERC) and other appropriate regional entities, the media.

Timeline:

Since an on-going education strategy is recommended, there is no timeline per se for this recommendation. However, the education strategy should be fully implemented once funding is developed, which could take two years or more.

Estimated cost:

Overall, high due to the cost of developing and implementing education strategies. It is important to note some costs already being met (for instance solid waste planning entities providing educational programs about or that include e-waste).

Potential Funding Sources:

Manufacturers, retailers, solid waste planning entities, DEC, U.S. EPA.

Goals and Measures of Success:

Data indicating positive results (including collection data vs. sales data, waste sorts), advertising numbers (for instance the number advertisements on radio and television), education programs provided or delivered.

5 - Assess the existing infrastructure for collection of e-waste for adequacy: convenience, accessibility, participation rates, etc.

This process must coincide with the development of a more comprehensive database of information included in recommendation #2 and the development of a state resource webpage included in recommendation #4. Once the assessment is complete, recommendations about expanding and/or strengthening the existing infrastructure may be forthcoming.

Rationale:

The State and stakeholders would like more information about 1) the capacity and ease of availability of the existing electronic waste collection infrastructure, 2) its capacity to handle additional materials, 3) its need for improvement in specific areas, and 4) the

Appendixes

resources (money, personnel) needed to bring this infrastructure up to a satisfactory level of convenience and accessibility for Vermont residents/businesses and sufficient capacity level to handle additional materials that landfill bans and legislation would add. This information should be based on clearly defined terms (i.e., ease of availability, capacity, etc.), assessed for trends over time, and compared to data from other states.

Next Steps:

DEC to develop and complete a capacity/needs study (hiring of outside consulting services may be necessary).

Partners:

Solid waste planning entities, manufacturers, retailers, recyclers, DEC.

Timeline:

Capacity/needs study completed within one year

Estimated Cost:

Low (the cost of the capacity/needs study is not expected to cost more than \$50,000). Will require DEC staff time develop the study and/or request for proposal and to oversee completion of the study.

Potential Funding Sources:

Manufacturers, state funding, license/registration fees.

Goals and Measures of Success:

Completed study, comprehensive database of information, and implementation of any recommendations that come out of the study.

6 - Facilitate the development of businesses and markets for e-waste recycling and recycled materials in conjunction with state, regional, and local economic development initiatives.

Rationale:

In order for landfill material bans and other regulatory measures to be effective and feasible, recycling options and markets for recycling and recycled materials must be available. In some cases, when new regulations are enacted limiting the disposal of certain materials, new management methods along with new service markets quickly emerge. Last year New Hampshire banned all display devices from disposal in landfills and incinerators and businesses quickly sprang up to manage these items. In other cases, although economically profitable businesses and markets are feasible, they require technical or financial assistance to foster their development. E-waste activities should be integrated with state, regional, and local economic development activities, which are proficient in assisting individuals and businesses to take advantage of these types of emerging economic opportunities.

Appendixes

Next Steps:

- DEC dedicate staff resources specific to e-waste and to help establish relationships with stakeholders and partners
- Identify key markets, businesses, or products to focus on in Vermont
- Establish relationships with economic development agencies and advocacy groups to help them understand the need for and benefit of creating and/or fostering e-waste recycling and markets.

Partners:

Vermont Department of Environmental Conservation, Vermont Sustainable Jobs Fund, Vermont Economic Development Authority and other similar agencies or groups, regional economic development agencies, the Vermont Small Business Development Center, Recycle North and job development type entities, WinCycle, Good Point Recycling.

Timeline:

Since an on-going strategy to develop e-waste business and markets is recommended, there is no timeline per se for this recommendation

Estimated Cost:

None - this recommendation should be self-sustained

Potential Funding Sources:

Primarily federal funds (Rural Development, Sustainable Jobs Fund, Vermont Economic Development Authority, etc.) that flow through state entities.

Goals and Measures of Success:

The increase in new jobs and new businesses engaged in recycling of e-waste, development of new products from recycled materials.

7 - Implement a landfill ban that includes computers and peripherals, CRTs, televisions, consumer product uninterrupted power supplies/transformers, VCRs/DVDs, copiers/fax machines/printers, and cell phones. Uninterrupted power supplies and transformers refer only to consumer products and not utility-scale devices.

Rationale:

Historically materials have been banned from disposal in landfill or incinerators based on their toxicity or volume. Banning e-waste from disposal will increase the recycling, reuse and/or longevity of electronic products, resulting in the following benefits:

- Reduction of risks of detrimental impacts to Vermont's land and water resources from disposal of toxic compounds in landfills.

Appendixes

- Conservation of limited natural resources (such as precious metals)
- Reduction of environmental impacts from mining and manufacturing related to new electronic products. These impacts from mining and manufacturing include waste production, energy consumption, and discharge of pollutants to land, water, and air.

The positive impacts of a landfill materials ban will extend beyond waste and resource management. Banning e-waste from disposal should help businesses that collect, recycle, and/or reuse e-waste to locate in Vermont and help create jobs within those businesses.

Currently, the only e-wastes that are banned state-wide from disposal in Vermont are mercury-containing devices which would include electronics that use fluorescent lamps for back lighting such as lap top computers and flat screen monitors. CRTs are not banned from disposal, but are considered a hazardous waste and thus must be managed as hazardous waste (as opposed to non-hazardous solid waste). Because households are exempt from hazardous waste regulations, CRTs generated by households may be managed as non-hazardous solid waste and disposed in landfills.

Next Steps:

- Develop a landfill materials ban, either through legislation or rulemaking, as appropriate.
- Develop supporting information on e-waste proposed for the landfill materials ban including, but not limited to 1) material content, 2) degree of toxicity, 3) availability of recycling options, 4) natural resources saved by recycling and reusing e-waste, 5) potential for new e-waste recycling and reuse businesses and jobs and 6) barriers and opportunities for development of new recycling options. Include an assessment of both current conditions and future trends.
- Obtain support from solid waste businesses

Partners:

Legislature, solid waste businesses, solid waste planning entities, public interest groups, DEC, e-waste recyclers.

Timeline:

6 months

Estimated Cost:

The cost of developing, proposing, and obtaining support for a landfill materials ban is low. Will require DEC staff time to develop the related regulations, to monitor compliance with the ban, and to enforce the ban.

Potential Funding Sources:

Not applicable other than state funding for necessary DEC staff resources.

Measures of Success:

Legislation adopted and the landfill materials ban is complied with and enforced.

Appendix 6 - Glossary of Terms

Composting is the controlled biological decomposition of organic matter through active management to produce a stable humus-rich material.

Construction and Demolition (C&D) Waste, in this report, is any waste generated from construction, remodeling, or demolition of buildings, but excludes road-related debris. The Solid Waste Management Rules include clean wood, painted and treated wood, plaster, sheetrock, roofing, insulation, glass, flooring, and siding as C&D waste.

Electronic Waste (E-waste) is consumer and business electronic equipment that is obsolete or non-functional and is destined for reuse, resale, salvage, recycling or disposal. Computers, televisions, VCRs, stereos, copiers, and fax machines are examples of e-waste. E-waste represents a fast growing segment of the solid waste stream and one of the most problematic due to the toxic substances contained in some electronic items.

Household Hazardous Waste (HHW) is any waste from households that would be subject to regulation as hazardous wastes if it were not from households. Examples of HHW paints, cleaners, oils, batteries, and pesticides. Because they contain potentially hazardous ingredients, these wastes require special management.

Municipal Solid Waste (MSW) can be thought of as trash or garbage, and is the combined household, commercial, and industrial solid wastes. Organic waste, C&D, E-waste, and HHW are all subsets of MSW.

Organic Waste is composed of waste of a biological origin such as paper and cardboard, food, green and garden waste, animal waste, and biosolids and sludges. For this report, biosolids and sludges are excluded. Organic wastes are amenable to decomposition processes such as composting.

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.

Recycling is using waste as material to manufacture a new product. Recycling involves processing a waste and making a new object from the processed material

Reuse is using an object or material again, either for its original purpose or for a similar purpose, without significant processing or altering its physical form.

Waste Reduction are actions taken before waste is generated to either reduce or prevent the generation of the waste. Waste reduction is the combined efforts of [waste prevention](#), [reuse](#), [composting](#), and [recycling](#) practices.

Waste Prevention is actions or choices that prevent the generation of waste. Waste prevention involves altering the design, manufacture, purchase, or use of products and materials to reduce the amount and toxicity of what gets thrown away.

Upcycling is any process that takes used or recycled materials and creates a new product with a higher quality or value than the original materials

Appendix 7 - The Waste Prevention Stakeholder Planning Process and Timeline

- Summer 2006 RFP for Waste Prevention facilitation services issued.
- Fall 2006 Edelstein and Associates selected to facilitate the process (funded through EPA Region 1).
- April 12, 2007 Launched Waste Prevention Planning process with a conference (First postponed, due to the largest snowstorm in state history!) All Forum presentations are posted at <http://www.anr.state.vt.us/dec/wastediv/R3/conference.htm> Five breakout groups brainstormed on priority focus areas selected at the conference: Organics, Education, Construction and Demolition Debris (C&D), and "Outside the box". Participants were asked if they wanted to serve on a Waste Prevention Planning Team to develop the Waste Prevention Plan. ANR staff selected Steering Committee members based on having all sectors, such as businesses, municipalities, environmental groups, schools, etc represented (see appendix for list of steering committee members)
- June 18, 2007 First meeting of the Waste Prevention Steering Committee (SC) Committee decided on priority areas for waste prevention and formed four subcommittees: recyclable products, organics, C&D, household hazardous waste, electronics (e-waste). The chairs of each subcommittee were chosen from the steering committee. See waste prevention website for dates and minutes from all Steering Committee and Subcommittee meetings⁴²

⁴² <http://www.anr.state.vt.us/dec/wastediv/R3/WPplanning/steering.htm>

Appendix 8 - EPA National Goals and Connections to Vermont Strategies:

The U.S. Environmental Protection Agency's (EPA) long-term vision is to move from a waste management program to a materials management program and is guided by five basic principles:

- Product Stewardship,
- Beneficial Use of Materials (source reduction, recycling, and beneficial use),
- Energy Conservation,
- Priority and Toxic Chemical Reduction in Waste, and
- "Greening" the Government.

These principles provide a sense of direction and established the 2002, Resource Conservation Challenge⁴³ (RCC). The RCC is a national effort to conserve natural resources and energy by managing materials more efficiently. The RCC actively recruits Stakeholder partners (i.e. state and local governments, the private sector, non-governmental organizations) to the RCC. The goals of the RCC are to:

- Prevent pollution and promote reuse and recycling;
- Reduce priority and toxic chemicals in products and waste; and
- Conserve energy and materials.

EPA has identified four national focus areas or priorities for the Resource Conservation Challenge (RCC):

- Municipal Solid Waste Recycling;
- Industrial Materials Recycling;
- Priority and Toxic Chemical Reductions; and
- Green Initiatives - Electronics

Many of EPA priorities directly align with the priorities set by the VT Waste Prevention Dialogue, specifically:

- **Packaging/Containers:** Paper folding cartons, wood packaging, and polymer wraps/films and all types of beverage containers (i.e., aluminum, glass, and plastic) need to be re-invigorated in a comprehensive program to increase recycling. In addition, many Americans recycle at home, so why not when they're on the go? It's time to put recycling places in public spaces and **Recycle on the Go!**
- **Food Scraps and Yard Trimmings:** Organic material can include both yard trimmings and food wastes and constitutes 24% of the US municipal solid waste

⁴³ <http://www.epa.gov/epaoswer/osw/conserves/index.htm>

stream. There is a continued need to increase recovery of this valuable resource stream.

- **Green Electronics:** E-Waste is the fastest growing waste stream in the country. Promoting and Practicing Environmental Stewardship (purchasing, operation and end-of-life disposition) for electronic products.
- **Construction and Demolition Materials (C&D):** Promoting reuse and recycling materials that are generated every time a building, road, or bridge is constructed, remodeled, or demolished. Encourage source reduction and beneficial reuses to promote the solid waste hierarchy of reduce, reuse and recycle.

Appendix 9 - Statutory and Regulatory Authority

Waste Prevention is the cornerstone of Vermont laws pertaining to solid waste management, appearing frequently and with significance. Abbreviated examples include:

10 V.S.A. § 6601, the “declaration of policy and purpose” of the Agency of Natural Resource’s (ANR’s) waste management program states that state action is necessary to “*reduce the amount of waste generated* and to promote environmentally acceptable and economical means of waste management.”

10 V.S.A. § 6603 allows ANR to issue grants and loans “for waste stream reduction facilities that precede refuse disposal.”

10 V.S.A. § 6604 requires the State to develop and adopt a solid waste management plan based on four overarching priorities, the top priority being “the greatest feasible reduction in the amount of waste generated.”

Over time, statutory prohibitions on landfill disposal of certain wastes have been enacted as a waste prevention strategy. Banned wastes now include lead-acid and Ni-Cad batteries, appliances, tires, paint, and mercury containing products.

Appendix 10: Steering Committee & Subcommittee Members

Key

ST = Steering Committee

Subcommittees: C = Subcommittee chair, CC = Subcommittee co-chair

Rec = Traditional Recyclables

C&D = Construction Waste and Demolition Debris

Org = Organics

HHW = Household hazardous waste

EWaste = Electronics

\$ = Funding

First Name	Last Name	ST	Rec	C&D	Org	HHW	E - W	\$	Company	Representation
Alyssa	Schuren	X		X					Toxics Action Center	Environmental Advocacy
Andrea	Asch				X				Ben & Jerry's	Manufacturing
Andy	Johnson					X			Clean Harbors	Hazardous Waste Management
Anne	Macmillan					X			Agency of Agriculture	State Government
Bill	Hochstin	X	X				X		Dartmouth College	Institution
Bob	Blankenheim	X	X						Intrpac Group/VOCAL	Business/Citizen Group
Bryan	Mitofsky				X			X	Coffee Corner	Restaurant
Cathy	Jamieson	X					X		Solid Waste Program	State Government
Charity	Carbine						X		VPIRG	Environmental Advocate Group
Chris	Beling	X		X			X		EPA	Federal Government
Clare	Innes	X	X						Chittenden SWD	Planning Entity
David	Pill			X					Black River Design	Architecture
Deane	Wilson					X			Rutland County SWD	SW Planning Entity
Don	Maglienti					X			Addison County SWD	SW Planning Entity
Donna	Barlow Casey	X			C				Central VT SWD	SW Planning Entity
Doug	Robie	X		X					DEW Construction	Construction
Erich	Kruger	X		C				X	ReNew Bdg. Materials & Salvage	Deconstruction & Reuse
Jen	Holiday	X				CC	X		Chittenden SWD	SW Planning Entity
Jesse	Larose			X					Home Depot	Retail
Jesse	Robbins			X					Freeman French Freeman	VT Green Bld. Network/Architect
Jessica	Edgerly	X				X	X	C	Toxics Action Center	Environmental Advocate Group

Jim	McCullough	X	CC					House of Representatives	State Legislature
John	Turcogeoorge					X		Veolia ES Technical Solutions, L.L.C.	Business
John	McIntyre						X	Buildings and General Services	State Government
John	Hurd						X	GUVSWMD	SW Planning Entity
Jon	Anderson	X						House of Representatives	State Legislature
Joyce	Majors						X	Lamoille SWD	SW Planning Entity
Karen	Horn	X						VT League of Cities and Towns	Local Government
Linda	Boccuzzo					X		Dept of Public Health	State Government
John	Malter						X	Mad River SW Alliance	SW Planning Entity
Mark	Buckley						X	Staples	Retail
Mary Ann	Remolador	X						Northeast Recycling Council	Regional Recycling Organization
Mary	O'Brien					X		SW/WCSWMD	SW Planning Entity
Megan	Hellstedt	X	X		X			Hannaford Brothers	Grocery
Michelle	Montpetit					X		Enpro	Hazardous Waste Management
Mike	Viani	X		X				Casella Waste Mgmt.	Solid Waste Management
Nancy	Hulett				X			UVM Ext/VT Master Composter Prgm	Citizen
Pam	Clapp					X	X	SWAC SWD	Planning Entity
Paul	Comey	X	X				X	Green Mtn. Coffee Roasters	Manufacturing
Paul	Burns					X	X	VPIRG	Environmental Advocacy Group
Peter	Crawford	X	CC					VT Small Bus. Dev. Ctr.	Business
Peter	Gaskill				X		X	TTT Trucking	Hauling
Phil	Scott			X				Senator	State Legislature
Ray	McKenzie	X					X	VT Hospitality Council	VT Chamber of Commerce
Renny	Perry	X	X					City of Vergennes/VLCT	Local Government
Robin	Ingenthron						X	Good Point Recycling	Computer Recycler
Rowen	Hurley				X			Hunger Mt Coop	Grocery
Tasha	Wallis					X	X	VT Retail Assoc	Retail
Teresa	Murray Clasen				X			Montpelier High School	Institution
Tim	Mann						X	IBM	Manufacturer
Todd	Lyones	X		X				DEW Construction	Construction
Tom	McGrail	X		X				Smugglers Notch	Resort

									Resort	
Tom	Metzner					X			CT DEP	State Government
Tom	Abbiati				X				Vermont Foodbank	Food Rescue
Tom	Gilbert				X				The Highfields Institute	Compost Consulting
Tracey	Tsugawa	X			X	CC	C		VOCAL	Citizens Group
Valerie	Rickman						X	X	ITIC	Industry
Vicky	Tebbetts	X			X			X	VT Hospitality Council	VT Chamber of Commerce
Will	Colgan	X		X	X				N.E.C.I.	Institution, Restaurant

CT DEP - Connecticut Department of Environmental Protection
 GUVSWMD - Greater Upper Valley Solid Waste Management District
 ITIC - Information Technology Industry Council
 N.E.C.I. - New England Culinary Institute
 SW/WCSWMD - Southern Windsor/Windham County Solid Waste Management District
 VOCAL - Vermont Organized Community Against Landfills