

BIENNIAL REPORT ON SOLID WASTE

1987 Act 78, 10 V.S.A. §6604(b)

Submitted to the
House and Senate Committees on Natural Resources and Energy

Agency of Natural Resources
Department of Environmental Conservation



January __, 2017

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I. EXECUTIVE SUMMARY

Act 78 Reporting Requirements

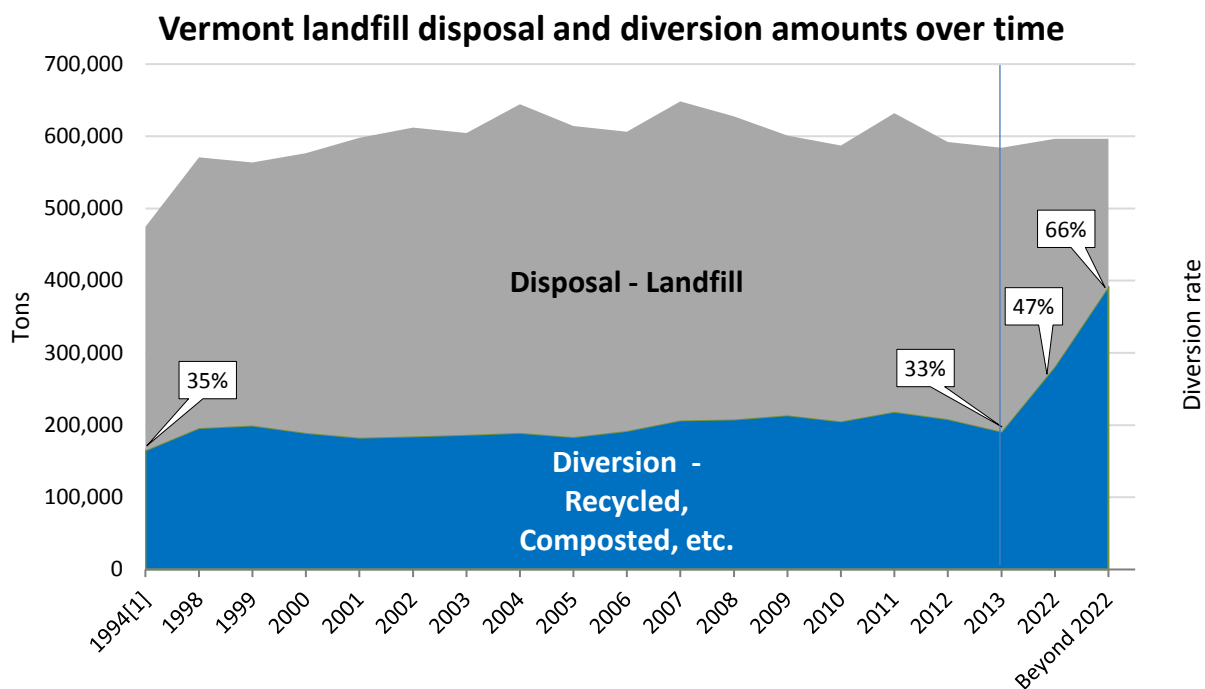
Through Act 78 (10 V.S.A. 6604(b)) the Vermont General Assembly charged the Secretary of the Agency of Natural Resources (ANR) to hold public hearings, conduct analyses, and make recommendations to the House and Senate Committees on Natural Resources and Energy regarding the volume, amount, and toxicity of the Vermont’s solid waste stream. The goal of the process is to ensure that packaging used and products sold in the State are not an undue burden to the State's ability to manage its waste. The Secretary shall report any recommendations or options for legislative consideration. As part of that process the Secretary will provide for a comment period of at least 45 days prior to submitting its report.

In carrying out this requirement, the Secretary was required to consider ways to keep hazardous material; toxic substances; and nonrecyclable, nonbiodegradable material out of the waste stream, as soon as possible. Contained in this report is a synopsis of work the Department of Environmental Conservation (DEC), Solid Waste Management Program, has underway or has completed to limit the volume and toxicity of materials in the waste stream.

Over the past 22 years, DEC has seen the amount of disposal fluctuate more drastically than the level of diversion (recycling, composting, etc). Within the past 10 years, after several stakeholder groups, legislative reports, contracted studies, and newly adopted legislation DEC has initiated several new programs to reduce overall volume of material sent to the landfill as well as the degree of toxicity of the materials that may be discarded through the municipal solid waste system. As a result:

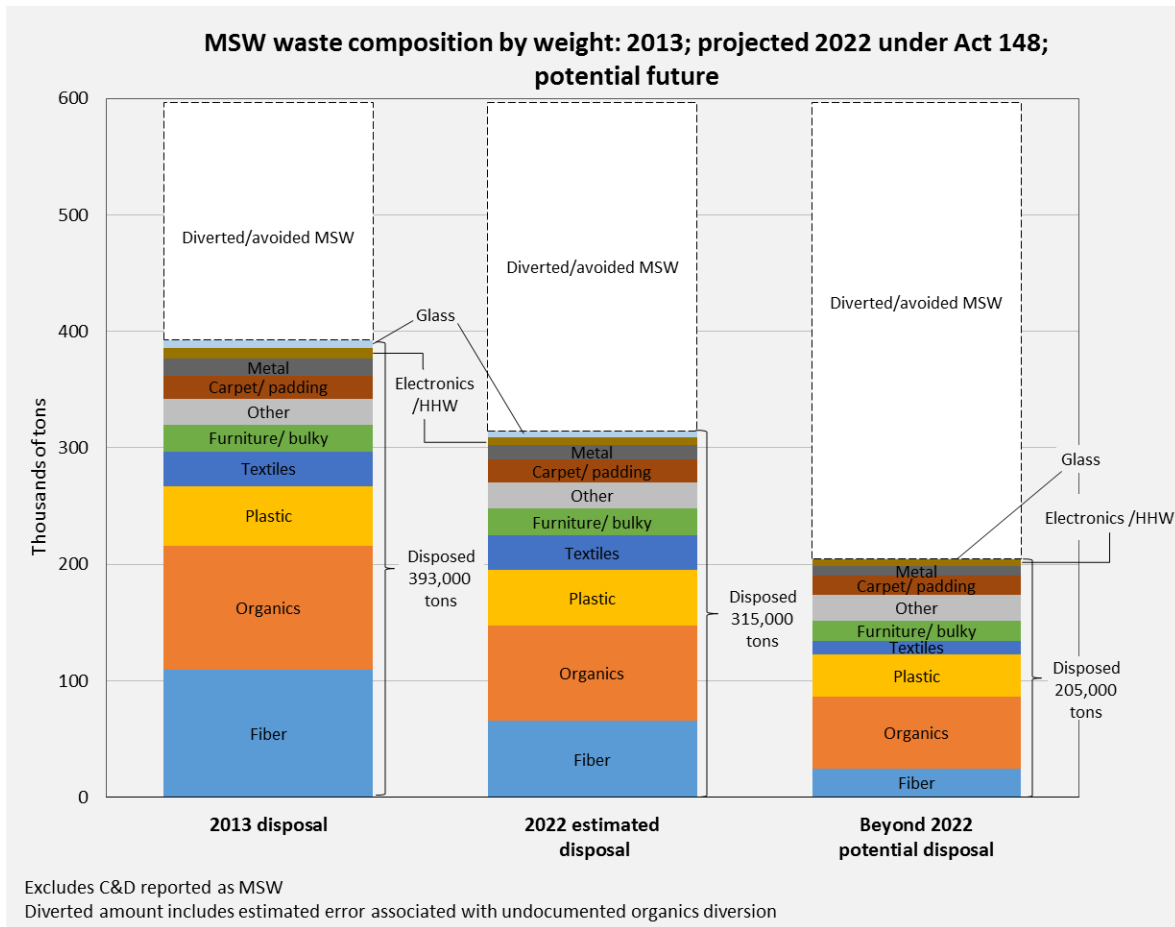
- Trash disposal throughout the state decreased 5%;
- Vermont’s recycling & composting rate has increased from 33% to 35%;
- Food rescue, has grown by nearly 40%, according to the Vermont Foodbank; and
- More Vermonters have access to recycling collection than ever before.

The chart below is a snapshot of the fluctuations in disposal amount compared to that of diversion. With full implementation of programs such as the Universal Recycling law, and continued efforts, or soon to be initiated programs to tackle harder to recycle materials, DEC anticipates a rapid, and significant increase to diversion rates, as projected in the table below.



New State Diversion Forecast

The 2012 passage of the Universal Recycling Law (Act 148) (UR) was established in part to address the concern that too much of Vermont’s waste was being landfilled rather than diverted for more beneficial uses. At that time the state’s diversion rate had stagnated between 30 – 36%. With the passage of Act 148, a new Materials Management Plan, and several new product stewardship programs, the DEC anticipates achieving 50% diversion rate by 2022. In tandem with implementing UR policy to divert basic recyclables, food scrap, leaf and yard debris, and clean wood DEC anticipates the diversion rate to climb to 66% as material specific programs are implemented. This may be achieved through new programs to capture packaging and printed materials as well as textiles, carpet and padding, and bulky items.



Recommendations

Fully Implement Existing Legislation - The Department of Environmental Conservation recommends that the Vermont Legislature continue to support the existing laws adopted to prevent, mitigate and divert materials from our landfill.

Increase Household Hazardous Waste & Construction/Demolition Debris Diversion - Beyond the existing legislation, DEC intends to increase efforts to address household hazardous wastes (HHW) and construction and demolition (C&D) debris. Over the next year DEC will work with stakeholders to identify opportunities for funding assistance, or alternative program management options that will not sacrifice convenience to residents.

Explore Diversion of Other Materials - Packaging (paper-based and non-paper based), paper and printed material were included in the list of Beyond Waste Advisory Group priority materials for DEC to address. Over the next two years DEC

intends to convene a stakeholder group to explore potential solutions to offer convenient collection, decrease disposal, and discourage non-sustainable packaging, paper and printed material production.

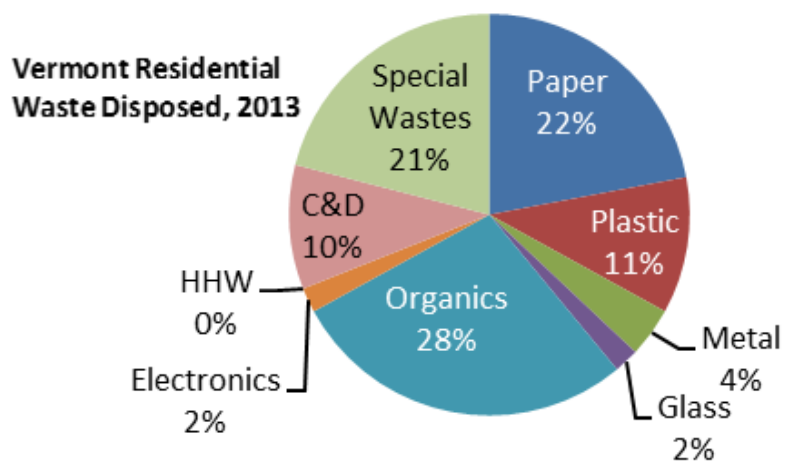
II. AUTHORITY & SCOPE

Under the Statutory Requirements for Solid Waste Reporting (10 V.S.A. 6604(b)) the Vermont General Assembly established the requirement for the Secretary of the Agency of Natural Resources (ANR) to report at the beginning of the biennium any recommendations or options for legislative consideration regarding the volume, amount and toxicity of the waste stream. As stipulated by the legislation, DEC is directed to prioritize development of solutions to remove hazardous materials, and nonrecyclable, nonbiodegradable materials from the waste stream. Material streams targeted by this directive are inclusive of chloride and polyvinyl chloride containing packaging, polystyrene packaging, products and packaging that may contain heavy metals, including paint, batteries, and unnecessary packaging that is nonrecyclable, nonbiodegradable. Solutions that DEC was directed to consider were inclusive of all legislative mechanisms available but emphasized voluntary changes under a voluntary compliance schedule. At least 45 days prior to submitting its report, the Secretary shall post any recommendations within the report to its website for notice and comment.

Beverage container deposit legislation, known as Bottle Bill, has existed for close to a half century. Generations of Vermonters have grown up redeeming beverage containers for a nickel or for fifteen-cents depending on the contents. Following adoption of the Universal Recycling law in 2012, DEC commissioned a report to assess the impact of implementing the law. A portion of that study, known as a Systems Analysis of the Impact of Act 148 on Solid Waste Management in Vermont, was to review the Bottle Bill system. That report estimated that there is an estimated 75% recovery rate for containers sold and redeemed in Vermont. The high recovery rate does not come without expense or challenges, but does indicate Vermonters dedication to the program and its ability to encourage recycling.

III. SUMMARY OF WASTE REDUCTION & TOXICITY PREVENTION IN VERMONT

The legislative authority directing the Agency of Natural Resources stems from original language adopted under Act 78 in 1987. This represented the first comprehensive solid waste law adopted in Vermont. Disposable products and packaging had become prevalent and oversight of the toxicity of the packaging materials was just developing. Manufacturing for recyclability at that time was an emerging concept and efforts continue in that regard nearly 30 years after Act 78 adoption. In the years since adopting Vermont's initial solid waste law, Vermont has enacted several extended producer responsibility programs, including stewardship programs for mercury containing lamps and thermostats, electronics, paint, and batteries. For household hazardous waste (HHW), municipal solid waste management entities provide multiple collection events a year, or offer a permanent collection facility. These HHW collection services for residents and small businesses are critical to mitigating the toxicity of the waste stream. Per the 2013 Waste Composition Study results, suggest that HHW is being diverted successfully through these statewide collection programs.



The 2013 statewide waste composition study¹ shows that approximately half of the materials placed into landfills are recyclables, leaf and yard debris, and food scraps that could be diverted and put to better use. Landfilling these materials (especially food scraps) contributes to climate change by producing methane, a potent greenhouse gas.

In 2012 Act 148 (Vermont’s Universal Recycling Law) passed unanimously seeking to improve the capture and diversion rates for these valuable materials to prevent them from being landfilled. By phasing out landfilling of certain materials (recyclables, food scraps, clean wood, and leaf and yard debris), ensuring parallel collection (collection of these materials at the same location as trash collection), and incentivizing diversion through variable rate pricing (commonly defined as “pay-as-you-throw”), more of these materials can be diverted from the landfill.

Nearly 50% of what Vermonters throw away could be recycled, donated to feed people in need, or composted.

Vermont’s Universal Recycling law also seeks to provide increased choices and convenience to Vermont residents and businesses, leading to more consistent statewide solid waste services such as recycling and composting. By requiring separation and diversion of materials (recycling and organics), the law creates an incentive to invest in sustainable materials management strategies such as recycling collection and processing, food donation, and composting. Finally, implementation of the law is phased over nearly a decade, allowing time to establish collection services and processing facilities for managing mandated recyclables and food, leaf, and yard materials. (See Appendix A).

IV. LAWS & PROGRAMS TO REDUCE TOXICITY & QUANTITY OF MATERIALS IN THE WASTE STREAM

A. Universal Recycling Law

To address the stagnating rate of waste diversion (30 – 36%) in Vermont over the past decade, the Universal Recycling law (Act 148) was unanimously adopted in 2012. The Universal Recycling law, an “act relating to establishing universal recycling of solid waste,” was adopted to improve the capture and diversion rates to prevent valuable materials from being landfilled. By phasing out landfilling of certain materials (recyclables, food scraps, and leaf and yard debris), ensuring parallel collection (collection of these materials at the same location as trash collection), and incentivizing diversion through variable rate pricing (commonly defined as “pay-as-you-throw”), policy tools were set in place to discourage waste generation and unnecessarily landfilling items.

The Universal Recycling law sets out to establish choices and convenience to Vermont residents and businesses, leading to more consistent materials management services statewide such as recycling and composting. By requiring separation and diversion of materials (recycling and organics), the law incentivizes a renewed effort to invest in materials management strategies. A phased-in design of the law was adopted to allow time to establish collection services and processing facilities for managing mandated recyclables and food, leaf, and yard materials.

MATERIAL	FACILITIES	HAULERS	LANDFILL BAN
Recyclables	2014	2015	2015
Leaf/Yard Waste	2015	2016	2016
Food Scraps	2017	2017	2014-2020
Clean Wood			2016

Universal Recycling Law - Required Collection & Landfill Ban Implementation Dates

Implementation dates were designed to make recycling and composting as easy as trash disposal. The legislation also required municipalities to adopt variable rate pricing structures (often called Pay As You Throw). These pricing systems must be based on either a per

¹ DSM Environmental Services, Inc., and MidAtlantic Solid Waste Consultants. *State of Vermont Waste Composition Study. 2013.* <http://www.anr.state.vt.us/dec/wastediv/solid/documents/finalreportvermontwastecomposition13may2013.pdf>

unit of weight or volume basis. While many towns and haulers were already using this type of pricing, the legislation has led to adoption of town ordinances that require weight or volume based pricing statewide.

DEC set a goal in the MMP to increase the statewide diversion rate of trash from approximately 36% to approximately 50% with full implementation of the Universal Recycling law requirements.

Through implementation programs and outreach campaigns, in 2015 DEC saw a 5% reduction in the amount of municipal solid waste disposed from Vermont. This is a significant accomplishment considering that waste typically doesn't decrease other than during times of recession and economic downturn. Refer to the *Vermont's Universal Recycling Law – Status Report 2016* for more details.

B. Materials Management Plan

As mandated by Vermont law (10 V.S.A. § 6604), “the secretary [of the Agency of Natural Resources] shall publish and adopt, after notice and public hearing..., a solid waste management plan which sets forth a comprehensive statewide strategy for the management of waste...” The statutory language also requires that the Plan be revised at least once every five years. In 2014 the Agency adopted the “Vermont Materials Management Plan” in accordance with statutory requirements of 10 V.S.A. § 6604 which serves as the state’s latest solid waste management plan. For purposes of moving towards a sustainable materials management vision and away from an end-of-pipe “waste” management system, the Secretary of the Agency of Natural Resources changed the name from the Solid Waste Management Plan to the “Materials Management Plan” (MMP) to recognize that materials we no longer need have value (e.g. metal cans for steel “I” beams, food scraps for compost, etc.).

Elements of the MMP seek to further DEC’s goal to reduce the disposal rate of municipal solid waste (MSW) by 25% from 413,517 tons to approximately 306,772 tons by end of the Plan term, in 2019. To track progress towards attaining this goal, DEC compiles data reports annually from certified facilities to estimate the annual diversion and disposal rates.

This MMP was designed to develop programs and offer services that will guide the reduction of the amount and toxicity of solid waste in Vermont. Clear and definitive performance standards for both the state and local solid waste management entities (SWMEs) provide benchmarks to measure progress toward achieving MMP goals for each of five material streams. Those being recyclables, organics, construction and demolition debris, household hazardous waste, and biosolids. Within each category, performances standards establish expectations for outreach and education and convenience to support a waste reduction system that not only makes residents and businesses aware, but ensures that recycling, composting, donation, and other diversion options are readily accessible.

Municipal Solid Waste Goals

The MMP sets two goals—one being the disposal rate goal and the other being the diversion rate goal—for the state to use to measure its success with waste reduction and diversion (recycling, composting, etc).

Disposal Rate: The MMP sets the goal for the state to reduce the disposal rate of municipal solid waste (MSW) by 25% from 413,517 tons to approximately 306,772 tons by end of the 5-year Plan term. The per capita disposal rate of MSW will be reduced from the current 3.62 lbs. per person per day to 2.69 lbs. per person per day. This will be achieved through implementation of the Universal Recycling law and a variety of new and existing efforts designed to educate and to offer services to Vermont citizens and organizations in the proper management of materials.

Vermont aims to reduce the disposal rate of municipal solid waste (MSW) by 25% from 413,517 tons to approximately 306,772 tons by 2019.

The MMP sets a second goal to increase the statewide diversion rate of all MSW from approximately 36% to approximately 50% with full implementation of the Universal Recycling law requirements and other MMP programs in 2020. The “diversion rate” is the amount of material diverted (by composting, reusing, and recycling materials), divided

by the sum of waste diverted and waste disposed (at disposal facilities, landfills and incinerators). Materials used for alternative daily cover at landfills do not constitute materials diverted from the landfill. Achieving this 50% recycling goal will require increased separation, recycling, food donation, and composting of recyclables and organic materials (food scraps/leaf & yard debris). The remaining 50% of the waste stream was addressed through a “Beyond Waste” stakeholder process covered in section IV of this report. The state hopes that full implementation of Vermont’s Universal Recycling law, coupled with Beyond Waste efforts will achieve diversion rate increases to 66%.

Solid Waste Implementation Plans (SWIPs)

By law municipalities are ultimately responsible for solid waste and materials management. State law requires that municipalities manage solid waste within their jurisdiction in conformance with the state solid waste management plan, now called the MMP. Since adoption of the Materials Management Plan in June of 2014, each solid waste management entity (SWMEs) has submitted and received approval from DEC on their individual solid waste implementation plan (SWIP). This is the first time the Agency has obtained full SWIP compliance, which it attributes to a clear and streamlined SWIP approval process, weeks of guidance, meetings and direct one on one assistance to towns, and collaboration between solid waste districts, alliances of towns, and independent towns. Of the 27 SWMEs operating in Vermont, as of November 2016, 10 were chartered solid waste districts, 6 were groups or alliances of towns with formal partner agreements, and 11 were independent towns. *Appendix B* reflects the current map of the SWMEs operating in partnership or independently from each other.

The updated Materials Management Plan was intentionally designed to drive measurable action on the part of DEC and the SWMEs. Many ambitious goals are embodied within the MMP, but it is the baseline expectations captured by performance standards of each material chapter, that set the tone. To drive awareness and diversion, the performance standards fall into two categories, relating first to outreach and education (such as schools and businesses), and second to ensure convenience for collection exists within each municipality or region. Using results based accountability (RBA) measurement structures, coupled with annual reporting requirements from each SWME, gives the opportunity for DEC to confirm that the commitments made in the SWIP are being executed for each of the material types. Moving the MMP away from a planning document to one that is action oriented, has had the effect of encouraging partnership development and resource sharing between the SWMEs. One specific driver of this partnership has been the performance standards tied to establishing collection events or permanent collection facilities for household hazardous waste (HHW).

All 27 municipal entities charged with meeting the performance standards of the Materials Management Plan, have each adopted an approved Solid Waste Implementation Plan. That 100% compliance rate will benefit all Vermont businesses and residents.

Targeting Toxicity in the Waste Stream

Although HHW is exempt from state and federal regulation as “hazardous waste”, Vermont statute requires the Solid Waste Program to address the volume and toxicity of the waste stream. Since the early 1990s SWMEs and municipalities in Vermont have been required to include provisions in their Solid Waste Implementation Plans (SWIPs) for the management of this household hazardous waste as “unregulated hazardous waste.” Collecting and managing HHW can be expensive, yet is important to remove the toxics and hazards from the waste stream. Toxics can pose hazards to human health and the environment if not collected and restricted from potential release. To assist with this expense, DEC has issued more than \$400,000 in grants on an annual basis since 2007 to the SWMEs to assist with the costs of HHW collection and SWMEs must cover the remaining costs for managing these materials. Even with the financial grants provided by DEC, the cost of collecting and managing HHW is expensive and requires additional financial resources from the SWMEs.

Household hazardous waste and conditionally exempt generator (CEG) hazardous waste is collected and managed at several fixed, full-time facilities in the state and at numerous collection events hosted by municipalities throughout the year. A total of 752.1 tons of combined HHW and CEG materials were collected in 2014, a 43% increase over the 525 tons

collected in 2013. The factors leading toward increased collection volumes in 2014 may include the success of the first year of the Vermont PaintCare program, a product stewardship initiative, and improved HHW/CEG reporting from municipalities.

Summary of historic hazardous waste collections and participation

	2014	2013	2012	2011	2010	2009	2008	2007	2006
Total HHW and CEG tons collected	752	525	460	467	489	566	436	444	521
% participating VT households (avg.)	6%	7%	9%	7%	6%	8%	9%	7%	6%
Pounds collected per household (avg.)	102	62	34	47	46	45	30	39	44

C. Landfill Disposal Bans

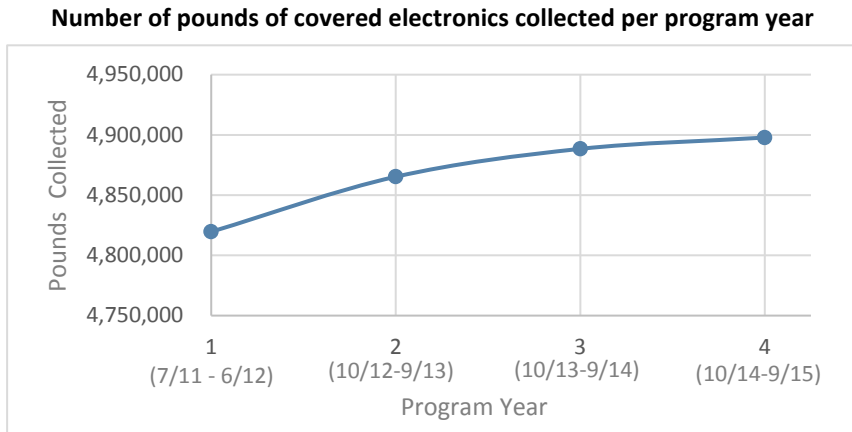
In Vermont, landfill bans are in place on rechargeable batteries, lead acid batteries, certain banned electronic devices, fluorescent bulbs, motor oil, paints, and mercury-added lamps, thermostats, and other products. Banned electronic devices include computers, peripherals, monitors, cathode ray tubes, televisions, printers, personal electronics such as personal digital assistants and personal music players, electronic game consoles, fax machines, wireless telephones, telephones, answering machines, VCRs, DVD players, digital converter boxes, stereo equipment, and power supply cords used for charging.

There are also landfill bans on non-hazardous materials, such as tires and household appliances such as refrigerators, washers, and stoves. Vermont’s Universal Recycling law expands the landfill ban list to include mandated recyclables (aluminum and steel cans, glass bottles and jars, plastic bottles and containers PET and HDPE, cardboard and paper); leaf, yard and clean wood debris; and food scraps by July 1, 2020. Other potential landfill bans for both non-hazardous and hazardous containing products are evaluated based upon information from Waste Composition Study and the availability of cost effective and convenient options for collection, recycling, and safe end-of-life handling of these materials. Additionally, materials may also be targeted to minimize the amount of material being sent to the landfill that has been identified either through legislation or a stakeholder process. Such materials were considered by the Beyond Waste Advisory Group in 2015 and subsequent material specific stakeholder groups for tires, textiles, and construction and demolition debris were initiated as a result.

D. Extended Producer Responsibility Programs

1. ELECTRONICS RECYCLING

PERFORMANCE TREND



DATA SUMMARY & PROGRAM BACKGROUND

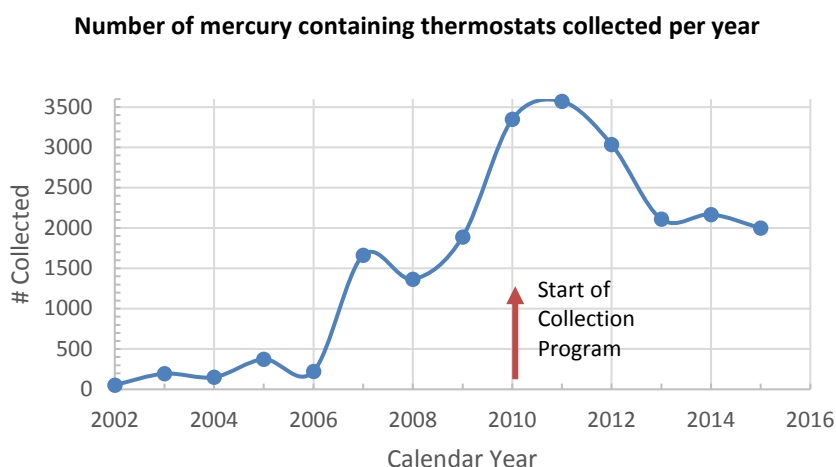
Electronic waste is a growing and problematic waste stream that contains toxic materials (such as lead, mercury, and chromium), valuable materials such as precious metals, recyclable plastics, and metal like steel and aluminum. Yet as late as 2009 there was no consistent and convenient means of capturing electronic waste throughout Vermont.

The Vermont legislature passed the e-waste law “Collection and Recycling of Electronic Devices” in 2010 resulting in the creation of the Vermont E-Cycles Program that started operations in 2011. The goal of the Program is to provide free and convenient collection and recycling of TVs, computers, monitors, and printers. Like other product stewardship programs, the costs of this electronics recycling program are borne by the manufacturers that sell these electronic devices in Vermont.

Despite challenges to the E-cycles Program from volatile recycling markets, the amount of material recycled has increased slowly and steadily from 4.8 million pounds to 4.9 million pounds. The Vermont E-Cycles Program is considered one of the most convenient and effective electronics recycling programs in the country and reports the highest per capita collection rate in nation.

2. MERCURY CONTAINING THERMOSTATS, AUTO SWITCHES & LAMPS (BULBS)

PERFORMANCE TREND – Mercury Thermostat



DATA SUMMARY & PROGRAM BACKGROUND – Mercury Thermostats

Mercury (Hg) is one of the most widespread, persistent, and toxic contaminants in our environment. Its incorporation into many products and its emission from combustion processes has resulted in well documented instances of population poisonings, high level occupational exposures, and worldwide, chronic, low-level environmental exposures. Even a small amount of mercury can damage our lakes and streams and poison fish and wildlife. It is because of mercury’s toxicity that

restrictions (limits) have been placed on how and where mercury-added products are disposed. Vermont has addressed mercury elimination through its Mercury Education and Reduction Campaign (MERC), which has included thermometer exchanges, school clean-outs, retailer and contractor mailings, dairy manometer exchanges, pharmacy pledges and various other outreach efforts to remove mercury from the solid waste stream.

To address mercury-containing thermostats, legislation was passed in 2008 requiring thermostat manufacturers to establish a mandatory collection program that provides residents and contractors with a \$5.00 rebate incentive for every mercury thermostat collected in the state. The Thermostat Recycling Corporation (TRC) manages this program on behalf of mercury thermostat manufacturers and each year reports to DEC the total mercury thermostats collected from over 160 retail, household hazardous waste, and wholesale collection locations across the state.

In the 2015 TRC report, 14.23 pounds of mercury was collected from a total of 2,000 thermostats. This is a significant decrease from the 3,349 collected in 2010, and a decrease of 8% from 2014 numbers. To-date much of the outreach efforts by TRC have been targeted solely to wholesalers and distributors, though they represent only about 25% of the total volume collected in Vermont this past year.

The thermostat legislation sets a target goal of 65% of thermostats available for recycling to be collected by the program. The state is working with TRC to bring the collection numbers up by requiring them to expand outreach efforts to the general population and heating contractors, highlighting the \$5.00 incentive. Additionally, DEC has requested TRC to increase oversight efforts and direct contact with each collection site. It is anticipated that these increased efforts will raise awareness of the program to increase collection numbers in Vermont. Next year's report and totals will be assessed to evaluate TRCs overall effectiveness going forward and any future modifications that will need to be made to increase collection numbers.

PERFORMANCE TREND – Mercury Auto Switches

Mercury auto switches have been phased out in newer model cars, resulting in fewer and fewer mercury switches that need to be properly managed.

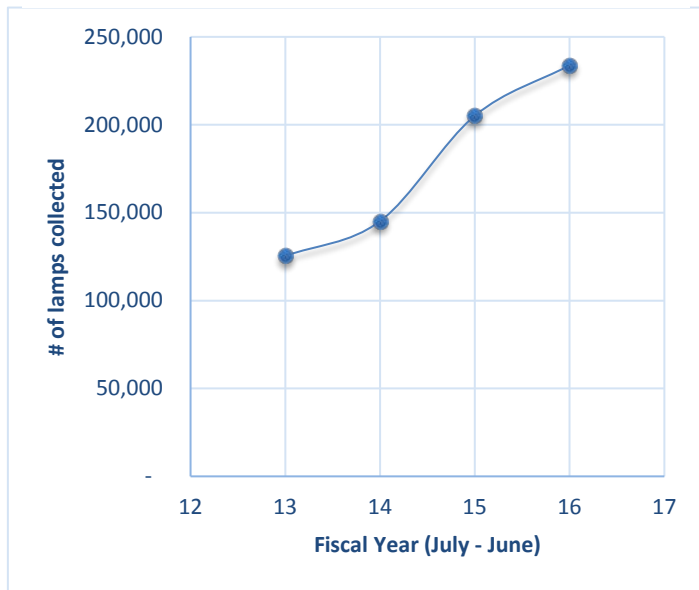
DATA SUMMARY & PROGRAM BACKGROUND – Mercury Auto Switches

Mercury from switches used in vehicle components, can be emitted to the environment when vehicles are crushed, shredded, and then smelted to produce new steel. The primary source of this mercury is hood and trunk “convenience light” and “anti-lock brake” switches used in some vehicles until Model Year 2003. Mercury emissions from steel manufacturing plants that process scrap steel from vehicles is listed as the third largest source of mercury emissions in the U.S. in the 2013 Toxics Release Inventory. Foreign processing of scrap metal exported from the U.S. also emits mercury.

All 50 states, the USEPA, the regulated community, environmental groups, and other stake holders have developed and are implementing the National Vehicle Mercury Switch Recovery Program (NVMSRP) through a Memorandum of Understanding (MOU), to remove mercury switches from end-of-life vehicles and thereby reduce mercury emissions. Vermont's “mercury added motor vehicle components” legislation will sunset at the end of 2017.

PERFORMANCE TREND – Mercury Lamps

Number of mercury containing lamps collected per year



DATA SUMMARY & PROGRAM BACKGROUND – Mercury Lamps

Mercury is a highly toxic heavy metal that is released into the environment when mercury-containing lamps are broken or discarded. Although lamps contain a relatively small amount of mercury, the high volume of spent lamps generated in Fluorescent lamps (linear and compact fluorescent) and high intensity discharge (HID) lamps warrants proper recycling options be made available. HID is a term used to describe mercury vapor, metal halide, and high pressure sodium lamps.

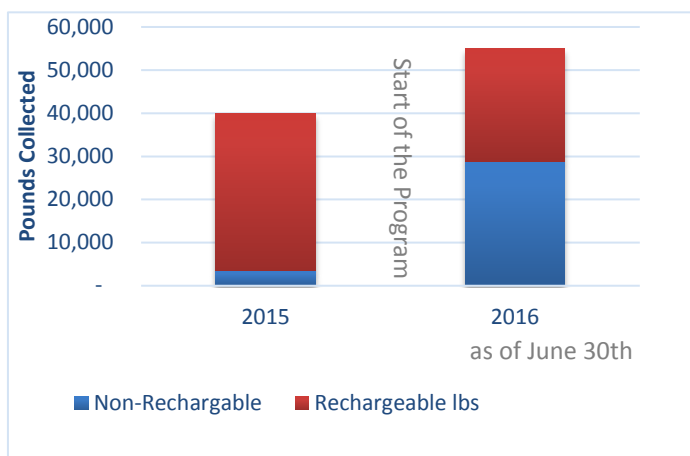
Spent mercury containing lamps, whether generated by businesses or households, cannot, by law, be disposed in the trash, and are collected throughout the state to be recycled. Spent lamps generated by businesses and institutions are subject to Universal Waste Management Standards

contained in the Vermont Hazardous Waste Management Regulations (VHWMR) (Subchapter 9). Vermont's manufacturer-funded lamp recycling program managed and funded by the National Electrical Manufacturers Association (NEMA) was implemented in July of 2012 under a five-year collection plan approved by the state. Each year for the past four years the number of mercury-containing lamps collected in the state has steadily increased. During the July 2014-June 2015 period 205,155 lamps were collected while the July 2015-June 2016 period saw an increase to 233,820 lamps collected. Having free and convenient collection locations offered statewide by SWMEs and various retailers benefits Vermonters seeking to properly recycle bulbs.

3. PRIMARY BATTERIES

PERFORMANCE TREND

Pounds of batteries collected



DATA SUMMARY & PROGRAM BACKGROUND

In 2014, Vermont became the first state to recycle single-use batteries, with the passage of the Vermont Battery Stewardship Law. The law requires producers of primary batteries (non-rechargeable batteries) sold in Vermont to register with Vermont Department of Environmental Conservation (DEC) and provide a stewardship plan to manage the proper recycling and/or disposal of primary batteries sold in Vermont. A Primary Battery is a non-rechargeable battery weighing two kilograms or less, including alkaline, carbon-zinc, and lithium metal batteries. Producers may choose to submit an individual stewardship plan or participate in a shared stewardship plan. Currently, most producers who sell in Vermont are under a

shared stewardship plan which is implemented by the stewardship organization Call2Recycle.

Call2Recycle implements both the primary (non-rechargeable) battery stewardship program and the manufacturer-led rechargeable battery collection program. This allows for both types of batteries to be collected at no cost to consumers in Vermont in convenient locations throughout the state. There are 135 collection sites available in Vermont for battery

recycling which offers 96% of Vermont residents and businesses access to a collection site within 10 miles of their home or business. The stewardship program is funded by battery producers who pay fees based upon their Vermont sales.

The collection program began January 1, 2016 and has already collected 28,612 pounds of primary batteries and 26,047 pounds of rechargeable batteries as of June 1, 2016. This past June—six months after the law went into effect—single-use battery collections were up 2,947% over 2015. Even rechargeable battery collections were up 29% year over year.

Part of the program’s success is due to the work of Vermont’s solid waste management entities who have partnered with Call2Recycle to organize collection at their transfer stations, towns offices, local retailers and special collections.

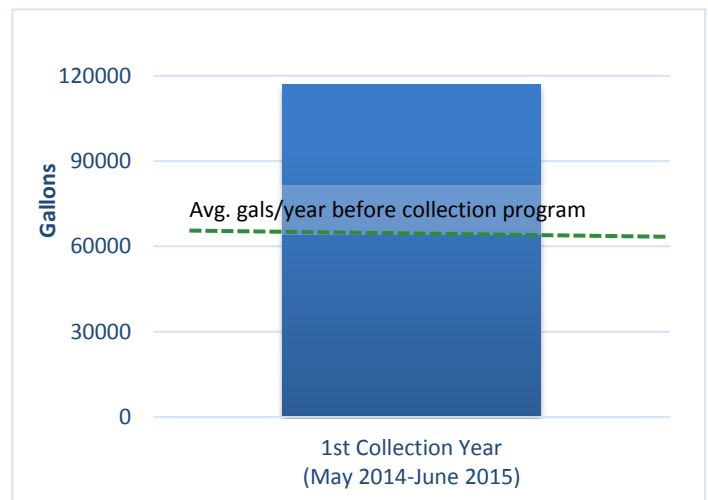
4. PAINT

PERFORMANCE TREND

DATA SUMMARY & PROGRAM BACKGROUND

The Vermont Paint Stewardship Law was signed on June 3, 2013. The law requires producers of architectural paint sold in Vermont to register with DEC and provide a stewardship plan to manage the proper recycling and/or disposal of architectural paint sold in Vermont. Architectural paint is defined as interior and exterior architectural coatings that are sold in containers of five gallons or less. Producers may choose to submit their own individual plan or participate in shared a stewardship plan. All manufacturers of architectural paint who sell paint in Vermont participate in an approved paint stewardship plan implemented by the stewardship organization [PaintCare](#).

Number of gallons of paint collected per year



This stewardship program is funded by paint manufacturers and the paint consumer. Consumers support the program through a stewardship assessment fee placed on all paint containers 5 gallons or less to fund the transportation and recycling or proper disposal of architectural paint.

Since the collection program began May 1, 2014, [PaintCare](#) has established 72 year-round collection sites in addition to working with the existing seasonal Household Hazardous Waste events which has resulted in 99.5% of Vermont residents and small businesses having access to a drop off site within 15 miles of their home or business. PaintCare through partnerships with retailers, towns, waste haulers and solid waste management entities have collected 116,961 gallons of paint. This is almost double the approximately 60,000 gallons per year of paint that was collected in Vermont prior to the paint stewardship program being implemented.

E. CONSTRUCTION & DEMOLITION DEBRIS

In 2014 the Vermont Legislature adopted Act 175 to divert construction and demolition debris (C&D) for six material types from large projects across Vermont, when a C&D recycling facility is within 20 miles to accept the materials. Those materials types include metal, clean wood, recycled asphalt shingles, drywall, and oriented-strand board and plywood.

In response to recommendations by the Beyond Waste Advisory Group and Act 175, a stakeholder group convened in the fall of 2015. The objective of the group was to develop policies or legislative direction to reduce the amount of C&D waste generated and to increase the diversion of these materials to beneficial reuses and recycling markets. Refer to the *Report to the Vermont Legislature on 10 V.S.A. §6605m Architectural Waste Recycling (Act 175)* for more detail on infrastructure for collection, markets for materials, and outreach to impacted parties.

F. BOTTLE BILL

Beverage container deposit legislation, known as Bottle Bill, has existed for close to a half century. Generations of Vermonters have grown up redeeming beverage containers for a nickel or for fifteen-cents depending on the contents. Following adoption of the Universal Recycling law in 2012, DEC commissioned a report to assess the impact of implementing the law. A portion of that study, known as a Systems Analysis of the Impact of Act 148 on Solid Waste Management in Vermont, was to review the Bottle Bill system. That report estimated that there is an estimated 75% recovery rate for containers sold and redeemed in Vermont. The high recovery rate does not come without expense or challenges.

Glass is an example of one of the challenges. For the typical recycling facility, keeping glass clean and free of contaminants so that it may receive a high commodity value is difficult. Glass is easily contaminated by paper, metal and plastics and is difficult to clean because of its breakability. When glass is processed through the Bottle Bill system, it is separated often at the point of redemption leaving a cleaner stream of materials to capture a higher commodity value. The collection system for blue bin recyclables causes glass to be an expense for material recovery facilities (MRF) rather than a source of revenue in many cases. Having a Bottle Bill reduces some beverage container glass from going to the MRF and offers a higher-grade material for the commodities market to choose from.

V. BEYOND WASTE MATERIALS

With the passage of the Universal Recycling law, the state aims to increase recycling and reuse statewide, reaching 50% diversion of municipal solid waste by 2022. Of the remaining 50% or so disposed is comprised of materials that are difficult or less convenient to reuse or recycle. The MMP committed to initiating a process by which stakeholders would be convened to evaluate materials that do not fall under the disposal bans adopted under the Universal Recycling law.

In response to this remaining 50% of the waste stream, a “Beyond Waste Advisory Group” was convened in the fall of 2014. Materials recommended by the Beyond Waste Advisory Group for additional individualized management strategies were chosen because of their high volume within the waste stream or their hazardous nature, and therefore pose the greatest risk to, or stress on, Vermont’s waste (materials) management system and natural resources. The four material types prioritized included textiles, tires, construction and demolition debris, and HHW, oil and oil filters, and a second tier of priorities as pharmaceuticals, plastic film and agricultural plastic, and Paper, Printed material, and Packaging.

Matrix of criteria for evaluating prioritization of material type for further stakeholder review

Categories & Criteria	Sub Criteria
<i>Characteristics of Material</i>	
Environment & Human Health	Product toxicity and potential impact on human health and the environment, including GHG emissions
Value	Inherent value in the material; existing markets and potential of the market to expand
Recyclability	Able to be recycled, reprocessed or repurposed
Volume	Impact on existing landfill capacity; amount currently diverted. Weight is often used as a proxy because volume data is difficult to collect. Though there are instances where low weight high volume materials impact landfill capacity
<i>Existing Infrastructure</i>	
Low Recovery Rate	Material reflects a low recovery, or diversion rate
Opportunities to Expand Existing Programs	Opportunity exists to improve under-performing programs; access to programs is low; importance of assessing program effectiveness; and existing recovery rate
Infrastructure Readiness	Collection and processing logistics
Cost	Cost to consumers, manufacturers, municipalities all effect diversion rates. Is there a more costs effective way to handle the material and maintain a high diversion rate

A. TIRES

It is believed that approximately 300 million scrap tires are generated each year in the United States, or about one scrap tire per person per year. Using this USEPA and industry accepted rule-of-thumb, about 625,000 scrap tires are generated each year in Vermont. To verify this, DEC undertook a statewide survey in 2012.

The findings from that survey reflected that a total of 62 individual scrap tire piles were identified in the inventory reported. Unless field verified by DEC staff, the size of the individual tire pile was represented by a range: an estimate of the quantity provided by the person who reported the pile. Utilizing the lowest number of each range of the unverified piles, in addition to the field verified quantities, yields a cumulative estimate of 417,000 problem tires. Utilizing the highest number of each range of the unverified piles, in addition to the field verified quantities, yields a cumulative estimate of 458,000 problem tires.

Range of Tires in Pile	# of Tire Piles
Quantity not reported or verified	5
100-200	19
201-1000	22
1001-10,000	10
10,000+	6

As with most commodities and recyclable materials, the market for scrap tires is volatile and greatly influenced by economic factors, energy prices, and political circumstances outside of Vermont and, increasingly, outside of the United States. To respond to the findings of the survey and recommendations of the Beyond Waste Advisory Group, a tire stakeholder group (Tire Group) was convened in the spring of 2015. The Tire Group agreed that there were three areas of concern with scrap tire management in Vermont: legacy scrap tire piles, ongoing illegal dumping of scrap tires, and the lack of recycling markets. To address those concerns the Tire Group suggested options such as creating a monetary deposit on new tires, establishing an Extended Producer Responsibility (EPR) program, or adding a State-mandated fee on scrap tires. There was some consensus that any fee on tires to cover the management of scrap tires should be moved to the time of new tire purchase rather than at the time of disposal, and that the fee should be uniform and transparent. Additionally, the Tire Group discussed adding a fee on tires that would generate resources to address the legacy tire piles problem and to help to develop sustainable markets for scrap tires. A *Report to the Vermont Legislature on Problem Scrap Tire Piles – 2013* was written and can be found at <http://dec.vermont.gov/sites/dec/files/wmp/SolidWaste/Documents/ScrapTireReportLegJan13.pdf>.

B. TEXTILES

In response to the Beyond Waste Advisory Group priority materials, the Textiles Stakeholder Series was convened in the spring of 2016. Before developing a set of action items to improve the collection and diversion of textiles from the waste stream DEC reviewed a 2002 report, *Vermont's Municipal Solid Waste Diversion Rate: Results of Reuse and Recycling Survey*. That survey estimated just over 1,790 tons of textiles were diverted from the landfill in 2002. Although DEC has not commissioned a similar report since then, the 2014 diversion data submitted by 9 out of 27 SWMEs indicated just 147.58 tons diverted. Late reporting from two additional SWMEs added another 757 tons, and one for-profit organizations that provided DEC data added another 58.5 tons. Collectively, a low-end estimate of 963.08 tons were diverted in 2014. There are likely additional tons being diverted but it is not feasible to know how much more tonnage that may be since a large amount of textiles are managed through reuse organizations.

Participants in the stakeholder series determined that Vermont faces a unique challenge with a lack of convenient and affordable collection options across the state. Factors that contribute to these collection challenges include a steep decline in the commodities markets, as seen with other basic recyclables. Additionally, the rural geography of the state is expensive for end-users to transport to sorting hubs for processing and resale. With that in mind recommendations developed during the meetings focus more on infrastructure and market support than on outreach and education.

C. PHARMACEUTICALS

The 2016 Legislature adopted an Act Relating to Combatting Opioid Use in Vermont with the purpose of establishing a product stewardship program for collecting unused prescription drugs. Prior to adoption, Vermont did not have a voluntary or mandatory statewide drug stewardship program for unwanted drugs, and drug manufacturers and producers had not supported a permanent collection program. This law is being driven by the opiate addiction and overdose problem.

Oversight authority for the program was delegated to the Agency of Human Services, Department of Health to ensure that unused prescription drugs have convenient collection locations across the state for easy and safe disposal. This program is new and still being formed.

D. CHLORIDES IN PACKAGING

At the time of Act 78 adoption in 1987, chlorides were a high concern for the legislature to address. In the nearly 30 years since that legislation was adopted, the content of the products in the waste stream as well as their relative amount has changed. Product packaging continues to be a challenge for Vermont but the concern has moved further from the conversation of toxicity in packaging, to that of high tonnage but low or no recyclability. To be responsive to the evolving face of the waste stream, DEC has not placed specific priority on addressing chlorides but has worked to reduce toxicity in packaging through waste prevention and consumer education efforts.

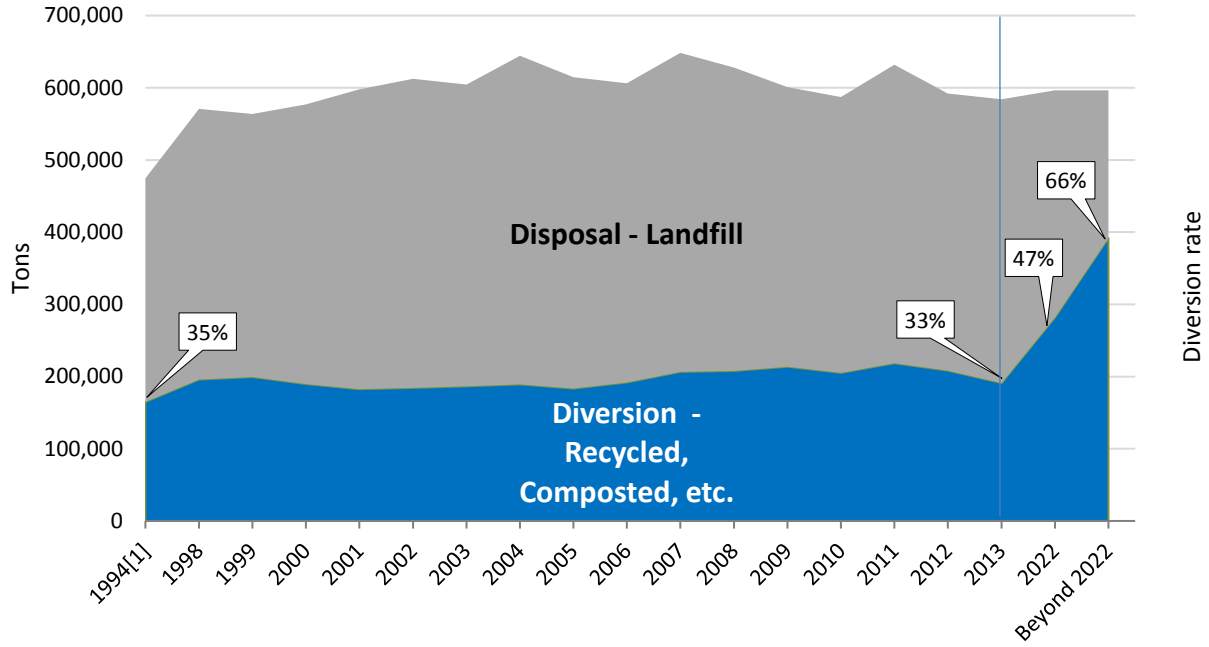
VI. NEW STATE DIVERSION FORECAST & RECOMMENDATIONS

NEW STATE DIVERSION FORECAST

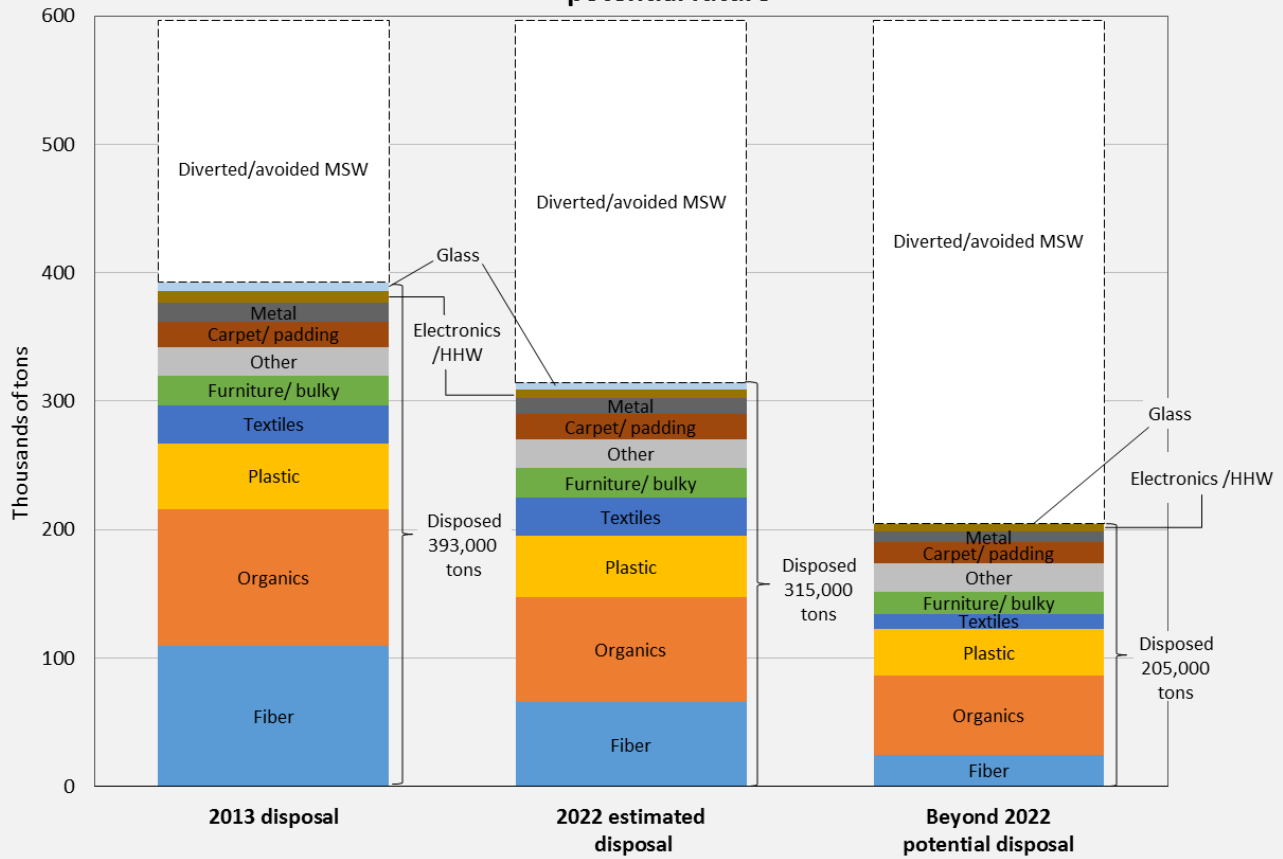
In 2001 the Solid Waste Management Plan set a goal to divert 50% of the waste stream by 2005. However, the state's diversion rate has stagnated between 30 – 36% diversion. A great deal of work has been completed since that time, including the passage of the Universal Recycling law, a new Materials Management Plan, and several new product stewardship programs. These efforts have set Vermont to meeting not only the 50% diversion goal but potentially surpassing it and achieving the goal of 66% by targeting materials identified by the Beyond Waste Advisory Group. In tandem with implementing UR policy to divert basic recyclables, food scrap, leaf and yard debris, and clean wood DEC anticipates the diversion rate to climb to 66% as material specific programs are implemented. This may be achieved through new programs to capture packaging and printed materials as well as textiles, carpet and padding, and bulky items. A priority for DEC is not only to capture as much material as possible to find markets for but also to reduce the overall amount of waste generated as identified by the MMP.

The waste management sector nationally has evolved in the past 15 years to change the paradigm to a sustainable materials management approach. By focusing not only on the amount of materials diverted but also looking at the amount generated overall, DEC provides systems thinking approach to addressing difficult and nuanced material streams. This allows DEC to develop solutions upstream, closer to the source of production or consumption.

Vermont landfill disposal and diversion amounts over time



MSW waste composition by weight: 2013; projected 2022 under Act 148; potential future



Excludes C&D reported as MSW

Diverted amount includes estimated error associated with undocumented organics diversion

RECOMMENDATIONS

Fully Implement Existing Legislation - The Department of Environmental Conservation recommends that the Vermont Legislature continue to support the existing laws adopted to prevent, mitigate and divert materials from our landfill. Despite its rural nature Vermont has a good foundation for providing convenient and consistent services to all Vermonters and Vermont businesses. Through collaboration with municipalities and the private sector that collect, transport, and process materials within our borders, our solid waste infrastructure can be directed at recycling, organics diversion, and product stewardship programs rather than a primary reliance on landfills. By partnering with organizations outside of the field of traditional materials management, DEC can have more influence to prevent waste from being generated and assist with creating partnerships to exchange materials prior to needing downstream disposal options.

UNIVERSAL RECYCLING

In summary, the Universal Recycling is working. See the *Vermont's Universal Recycling Law – Status Report 2016* for more details. DEC is recommending no changes and supports full implementation of this legislation.

E-CYCLES

The Program continues to be a model of success in state-legislated e-waste programs. DEC does not recommend any changes at this time. In the future, changes could be considered to address the changes in the electronic markets, where products may not fit well into today's defined categories and some devices may become less toxic.

MERCURY THERMOISTATS, SWITCHES, & LAMPS

Thermostats: DEC has requested and TRC has committed to, increased mercury thermostat recycling outreach to both the public and contractor sectors in Vermont. DEC will be looking for increases in thermostat collection and will evaluate collection effectiveness next year.

Auto Switches: DEC supports the NVMSRP and encourages further enhancements of removal strategies as well as information dissemination to all vehicle dismantlers.

Lamps: In 2017 NEMA is required by statute to submit a new plan for managing lamps, to continue the manufacturer obligation for this program and to hire a third-party independent auditor to examine the overall effectiveness of the program for the past five years. DEC will continue to monitor the efforts of the program.

BATTERIES

Call2Recycle will continue to implement both the primary (non-rechargeable) battery stewardship program and the voluntary rechargeable battery collection program, and will promote them through news articles, radio, emails, bus signs and newspaper ads. Call2Recycle in partnership with solid waste management entities, haulers and retailers maintains 135 collection sites providing 96% of Vermont residents with access to a battery collection site within 10 miles of their home. The Agency does not recommend any changes to this program at this time.

PAINT

PaintCare will continue to implement the paint stewardship and collection program and will promote public awareness of the program through social media, radio, tv and newspaper advertising and the distribution of brochures and factsheets at retail and other drop-off sites. PaintCare in partnership with solid waste management entities and retailers, maintains 74, year-round collection sites providing 99.5% of Vermont residents with access to a paint collection site within 15 miles of their home. The Agency does not recommend any changes to this program at this time.

Increase Household Hazardous Waste & Construction/Demolition Debris Diversion - Beyond the existing legislation, DEC intends to place additional effort to address household hazardous wastes (HHW) and construction and demolition (C&D) debris. These two categories of material are resource intensive and expensive to manage. Historically HHW has been managed at the expense of municipalities with some financial assistance from DEC. Municipalities are stressed financially by offering HHW collection services which residents rely on throughout the year. DEC will work with stakeholders in the coming year to find solutions to find funding assistance, or alternative program management options that will not sacrifice convenience to residents.

Following a series of C&D stakeholder meetings DEC recognizes that the volume of this material, while not part of municipal solid waste, contributes a high level of tonnage to the landfill. The material is nuanced and is not easily mitigated through uniform programs or services without the assurance of market interest to procure the processed material for reuse or recycling. One of the C&D material types that DEC intends to solicit stakeholder input on is asphalt shingles.

Explore Diversion of Other Materials - Packaging (paper-based and non-paper based), paper and printed material were included in the list of Beyond Waste Advisory Group priority materials for DEC to address. This prioritization was based on their high landfill volume in Vermont per the 2012 Waste Composition Study. Considering the challenge of collecting these materials through existing systems, DEC intends to convene a stakeholder group to explore potential solutions to offer convenient collection, decrease disposal, and discourage non-sustainable packaging, paper and printed material production.

To implement the UR law, DEC seeks collaborative support from a broad stakeholder base to meet the requirements and deadlines as outlined in the legislation as it was adopted in 2012. For materials beyond those addressed in the UR law, DEC intends to continue to work with stakeholders on developing programs for challenging to managed materials, as discussed during the Beyond Waste stakeholder meetings.

TIRES

The Tire Stakeholder Group recognizes that there are many important details which must be understood before a scrap tire fee structure can be established and implemented. It is recommended that a group of interested stakeholders be convened to:

- Investigate the logistics and feasibility of moving to a fee based system where the cost of scrap tire management is part of the purchase price of new tires;
- Consider whether the fee is an Advanced Recovery Fee or Extended Producer Responsibility;
- Determine the appropriate fees to manage scrap tires, including a method of adjusting the fees to reflect changes in the marketplace;
- Establish a system of collecting, managing, and disbursing the funds collected;
- Determine the level of funding needed for the ongoing recycling of collecting scrap tires;
- Determine the funding, and potential sources of funds, needed for legacy tire pile clean ups;
- Identify types of financial assistance needed for market development; and
- Determine methods for tracking tires to ensure that the program is not collecting out-of-state tires.
- Provide an evaluation of the DEC's scrap tire compliance and enforcement strategy, and means to increase education of tire dealers, fleet managers, and the general public on scrap tire management.

TEXTILES

The Textile Stakeholder Series held from April to September 2016 resulted in a *Textile Resuse & Recycling in Vermont* report. It is the intent of DEC to work with stakeholders involved in those discussion as well as others to implement the recommendations identified in the report. Recommendations included:

- Request Solid Waste District Managers' Association to consider collaborating on a contract with one or more

textiles collection organizations, which could help them find an affordable collector and ensure convenient infrastructure is in place and is maintained for Vermonters

- Improve information sharing between collectors and municipalities to clarify things such as how collectors evaluate ability to place a bin, or the type and quality of materials accepted through various collection methods
- Increase matchmaking efforts to partner schools and community groups with collection organizations
- Adopt consistency in language similar to neighboring state efforts to align with inter-state commerce

PLASTIC BAGS

As part of the Beyond Waste Advisory Group priorities, DEC was directed to tackle materials that are high volume or pose high toxicity primarily to the waste stream. As DEC continues to chip away at those, stakeholders identified priorities for specific problem materials such as packaging. For example, in 2016 DEC provided testimony to the House Natural Resources and Energy Committee on the impact a disposable bag ban or bag fee may have on reducing the amount of single use bags consumed in the state with the goal of preventing the materials from getting into our waterways, obstructing views of the otherwise pristine landscape, and from film plastics that get caught in machinery at our recycling facilities, requiring time-consuming and costly delays that endanger workers.



Universal Recycling Law TIMELINE

JULY 1
2014

- » Transfer stations/Drop-off Facilities must accept residential recyclables at no separate charge
- » Food scrap generators of 104 tons/year (2 tons/week) must divert material to any certified facility within 20 miles

JULY 1
2015

- » Statewide unit based pricing takes effect, requiring residential trash charges be based on volume or weight
- » Recyclables are banned from the landfill
- » Transfer stations/Drop-off Facilities must accept leaf and yard debris
- » Haulers must offer residential recycling collection at no separate charge
- » Public buildings must provide recycling containers alongside all trash containers in public spaces (exception for restrooms)
- » Food scrap generators of 52 tons/year (1 ton/week) must divert material to any certified facility within 20 miles

JULY 1
2016

- » Leaf, yard, and clean wood debris are banned from the landfill
- » Haulers must offer leaf and yard debris collection
- » Food scrap generators of 26 tons/year (1/2 ton/week) must divert material to any certified facility within 20 miles

JULY 1
2017

- » Transfer stations/Drop-off Facilities must accept food scraps
- » Haulers must offer food scrap collection
- » Food scrap generators of 18 tons/year (1/3 ton/week) must divert material to any certified facility within 20 miles

JULY 1
2020

- » Food scraps are banned from the landfill



» For more information, visit www.recycle.vt.gov

APPENDIX B: Map of Solid Waste Management Entities

