

Analysis of the Potential Impact of Vermont's Aggressive New Solid Waste Management Law (Act 148)

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Act 148

- Vermont's new solid waste management law adopted in 2012 arguably legislates best practices for increasing materials and organics diversion
- Recycling Best Practices
 - Requirement that all haulers offer parallel recycling collection with cost embedded in refuse collection cost, July 2014
 - Variable Rate Pricing (PAYT) ordinances required in all municipalities or solid waste districts, July 2015
 - All public buildings and lands where refuse bins are located are required to have a paired recycling bin, July 2015

Organics Mandates

- July 2014, If you generate >104 tons/year of food residuals and there is a facility within 20 miles willing to accept it you must divert
- July 2015, >52 tons food residuals must be diverted
- July 2016, >26 tons of food residuals
- July 2017, >18 tons of food residuals

Disposal Bans

- **Recyclables (July 2015):**
 - Aluminum and steel cans
 - Aluminum foil and plates
 - Glass bottles and jars from food and beverages
 - PET and HDPE bottles/jugs
 - OCC and paper bags
 - Newspaper
 - White and colored paper and paper mail/envelopes
 - Magazines and catalogues
 - Boxboard
- **Organics:**
 - Yard Waste, July 2016
 - All Food Residuals, July 2020, Including residential

DSM's Scope of Work

- **State-Wide Waste Characterization – 2012**
 - Sub-contractor, MSW Consultants
 - Final Report, May 2013
- **Systems Analysis**
 - Sub-contractors, Tellus Institute, Robert Spencer
 - Final Report, October 2013

Systems Analysis

- Conducted a detailed assessment of the current solid waste management system infrastructure, governance and costs
- Goal was to project additional infrastructure necessary to meet the objectives of Act 148, what it might cost, and what the impacts would be



Report can be found at:

http://www.anr.state.vt.us/dec/wastediv/solid/documents/FinalReport_Act148_DSM_10_21_2013.pdf

Systems Analysis

- While there is a desire to view each Act 148 change in isolation, these changes are inter-related requiring a Systems Analysis
- It is important to remember that collection costs remain the largest single cost associated with solid waste and materials management
- For this reason, the key to this analysis was to define the current collection system, and then evaluate changes to address Act 148 mandates, including:
 - Parallel collection of recyclables
 - PAYT pricing
 - Mandatory organics diversion

Systems Analysis Using Vermont Data

- 2012 Vermont Waste Composition Study
- Vermont facility reports for materials recycled and disposed
- Vermont MRF loss data and bale quality data
 - Including DSM sorting at Casella Rutland MRF
- Vermont beverage sales and returns
- Vermont consumer redemption behavior through surveys of consumer return behavior at redemption centers around VT
- Hauler survey data
- District cost data

Summary of Findings

- Maintaining the Status Quo is estimated to cost between \$1.2 and \$1.36 billion from 2014 through 2022
 - Average annual cost of about \$150 million
 - Range in costs reflects whether system costs include individuals driving to drop-offs and transfer stations
- Act 148 implementation may increase costs from 5 to up to 12 percent, depending on the system chosen, with a corresponding:
 - Increase in materials diversion (by weight) from 72 – 84%
 - Reductions in GHG emissions of an additional 34 – 39 percent over the current system
 - Increased monthly costs to households from \$3 to \$5 per month
 - Increased per ton costs to ICI sector from 2 – 12%

HOW DID WE GET THERE?

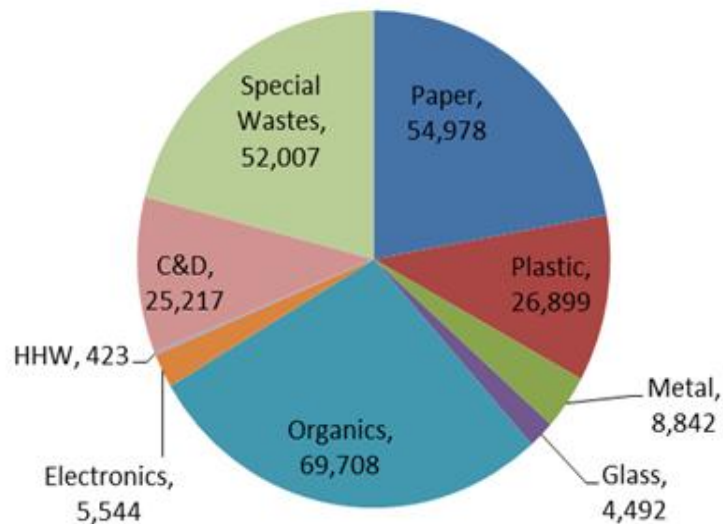
Impact of Act 148 on Solid Waste Management in Vermont

Materials Disposed

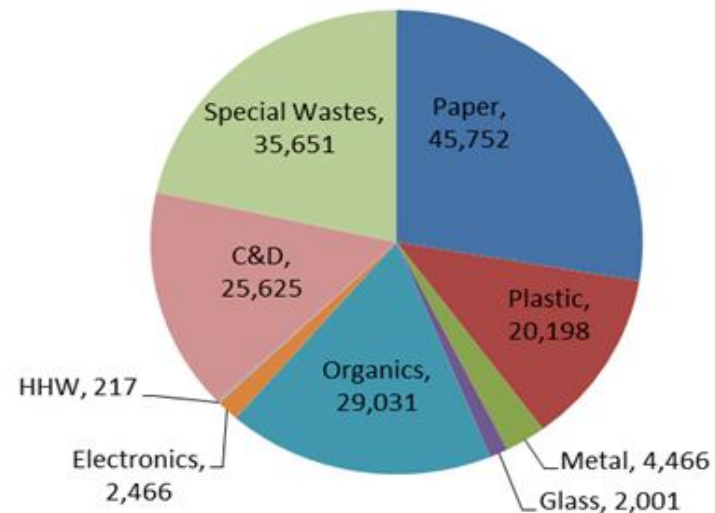
Vermont Waste Composition Study, 2012

(Exclusive of C&D Wastes Disposed Separately)

**Residential Waste Disposed,
Tons by Material Type**



**ICI Waste Disposed,
Tons By Material Type**



Materials Recovered

Reported 34% *Recycling Rate*

Material Category	Recycling, CY 2011 (tons)
Fibers and Containers (2)	80,796
Bottle Bill Material (3)	17,800
Appliances and White Goods (4)	6,500
Special Wastes (5)	1,978
Organics (6)	
<i>Certified Compost Facilities</i>	11,620
<i>Exempt Facility Estimate</i>	866
<i>Yard Waste (7)</i>	1,157
<i>Stumps, Brush, Wood (7)</i>	4,151
Total:	124,868

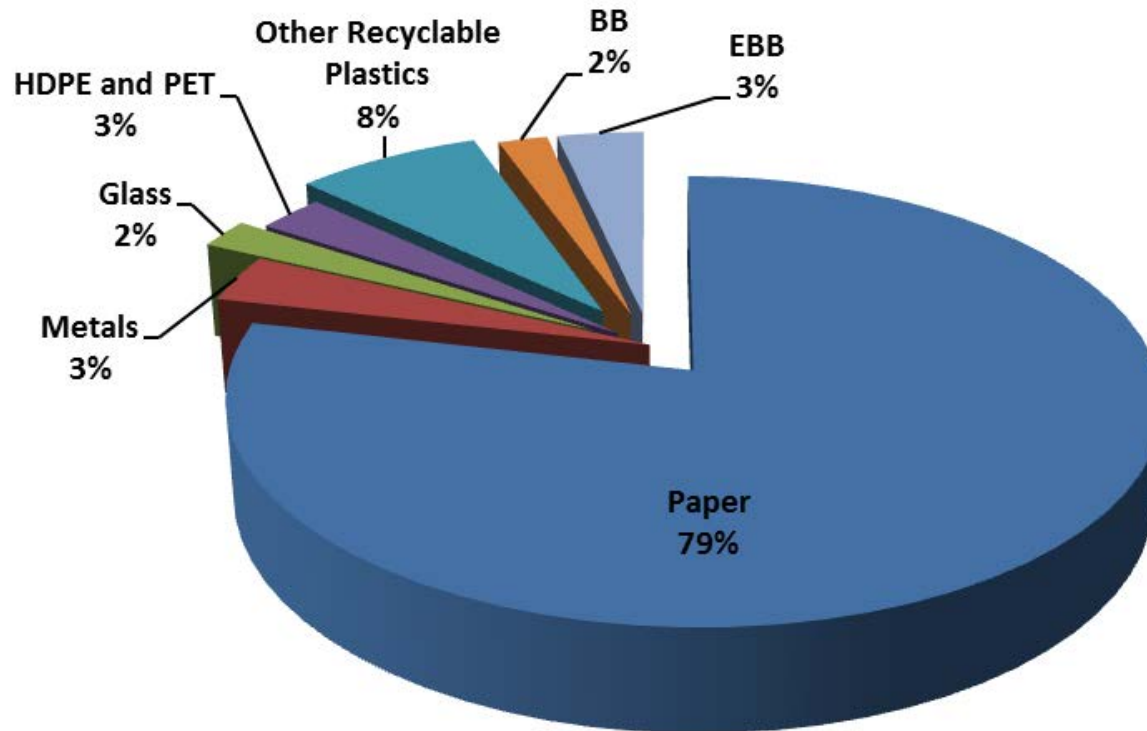
Materials Recovery Rates

For printed paper and packaging, ***an overall 50 percent materials recovery rate*** is our best estimate based on Vermont's recent waste composition study and most current recycling data

MATERIAL	SYSTEM 1: BASE CASE			
	Disposed (tons)	Recovery (3) (tons)	Generation (tons)	Recovery Rate (%)
Aluminum - UBC (1)	870	2,300	3,170	73%
Glass	5,900	25,300	31,200	81%
PET	3,000	2,600	5,600	46%
HDPE	2,000	1,400	3,400	41%
Other Plastics (2)	7,800	1,500	9,300	16%
Steel Cans	2,900	1,700	4,600	37%
Aluminum - Other	210	20	230	9%
Fibers	73,200	62,100	135,300	46%
Totals:	95,880	96,920	192,800	50%

But Vermont Can Do Better!

Almost 100,000 tons of potentially recyclable Printed Paper and Packaging Remain in the Waste Stream



Estimated Materials Recovery Rates

Full Implementation of Act 148

MATERIAL	Current	USS	USS/BB	USS/EBB
	Recovery Rate (%)	Recovery Rate (%)	Recovery Rate (%)	Recovery Rate (%)
Aluminum - UBC (1)	73%	66%	87%	89%
Glass	81%	61%	83%	84%
PET	46%	43%	48%	70%
HDPE	41%	42%	42%	43%
Other Plastics (2)	16%	24%	24%	25%
Steel Cans	37%	39%	39%	39%
Aluminum - Other	9%	22%	22%	22%
Fibers	46%	68%	68%	68%
Totals:	50%	63%	67%	68%
Total Tons Recovered	96,920	120,730	128,510	130,210

Organics

- One of the challenges of this analysis was estimating the impact of the phased-in organics ban
 - Haulers are required to offer collection, but not to embed the cost in refuse collection
 - How will consumers and businesses respond to the mandate when they have to pay more for collection services?
 - How will private haulers react?
 - What percent will switch to every other week collection of refuse and recycling with every week collection of organics?

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Estimated
Organics
Diversion by
2022,
*Showing
Cumulative %
Change from
2014 to 2022*

	2014 Tons	2022 Tons	% Change Over 2014
Organics			
ICI Organics			
Food Residuals Disposed	18,592	6,095	67%
Reduced		1,608	
Food Rescue		1,592	
New Diversion		10,889	
Yard Waste Disposed	4,818	2,409	50%
On-site Disposal		964	
Diverted		1,445	
Compostable Paper Disposed	6,345	3,173	50%
Diverted		3,173	
Total ICI Disposed	29,755	11,677	61%
Residential Organics			
Food Residuals Disposed	41,486	18,007	57%
On-Site Composting		5,471	
Diverted		18,007	
Yard Waste Disposed	7,913	2,216	72%
On-Site Disposal		2,374	
Diverted		3,323	
Compostable Paper Disposed	15,506	7,753	50%
Diverted		7,753	
Total Residential Disposed	64,905	27,976	57%
Total Disposed, ICI & Residential	94,660	39,653	58%

Organics Processing

- How much of the material will be processed using aerobic composting?
 - If the majority is aerobically composted, carbon will be a significant additional cost and potential constraint
 - The demand for carbon will encourage collection of waste paper with food residuals and yard waste
 - Waste paper will increase front-end and back-end screening requirements to produce a clean enough material for sale
- Anaerobic digestion may play a key role – if the system can be organized to utilize existing on farm digesters.
 - Initial estimates are that adding 10 percent slurried food waste to on-farm digesters can double energy output
 - This may require centralized processing facilities to first clean and grind organics before trucking to farms

Implementation Issues

- The infrastructure has the capacity to handle the increase in single stream materials collected but parallel access to collection of recycling and refuse needs to be better defined
 - Roughly 25 percent of households don't have parallel access to recycling
 - True parallel access will be a challenge for many small haulers
- Unit based pricing in subscription collection systems requires changes in hauler licensing, municipal ordinances and enforcement to ensure an equal playing field
- Municipal public space recycling requires technical assistance and education programs, as well as funding
- Source separation of organics will require a major enforcement effort combined with relatively large investments in collection and processing infrastructure

Implementation Issues

- **Enforcement**
 - Historically there have been large variations in how solid waste laws and regulations have been enforced across Vermont
 - From active involvement and high recovery in some areas to almost no involvement and low recovery
 - This is unlikely to change unless the Agency of Natural Resources decides to equally enforce Act 148.
 - A critical issue will be where enforcement occurs - Municipal or regional governance level, hauler or at the disposal site
- **Data collection and analysis need to be strengthened at the State level under Act 148**
 - Act 148 cannot be managed if it can't be measured
 - Standardized performance data for MSW, recyclables, organics and special wastes is critical.

Implementation Issues - Funding

- An estimated \$40 million investment in new trucks, carts and organics processing facilities will be necessary over the next 6 years to fully implement Act 148
- A broad based funding source that covers the full range of packaging and food residuals generated in Vermont is necessary
 - It is highly unlikely that sustainable materials management can be funded entirely on the backs of municipal property taxes, landfill surcharges and unit based prices.
 - The added cost of a food residuals ban will be borne entirely by VT households and businesses who already face high solid waste management costs relative to other, more densely populated areas of the U.S.
 - The failure to include the large producers of packaging and food products not impacted by the bottle bill leaves out an essential component of any attempt to internalize sustainable materials management in Vermont.

Contact Information

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