

# Integrated Materials (Waste) Management System



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How do we make it ALL go away?



# Basic Facts (2006 data)

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- Carroll Countians generate approximately 165,300 tons of trash per year
- Of the 165,300 tons, 52% is from residential sources, and 48% from non-residential sources
- 45,800 tons of potential trash is diverted from the waste stream by recycling/composting



# More Basic Facts

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- Solid waste management is supported by user fees and other income.
- The current tip fee is \$61
- 104,300 tons of trash are diverted to a landfill in Virginia at a cost of \$51/ton.
- FY 07 Income:

■ Tip fees	\$5,764,000
■ Recycling	227,000
■ BCC Grant	2,645,000
■ Rental	178,000
■ Other	<u>477,000</u>
■ Total	\$9,291,000
- FY 07 Expenses:

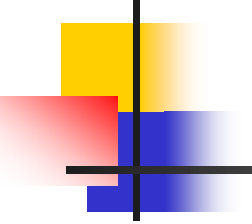
Debt Ser	\$1,187,000
Transfer	4,978,000
Operating	<u>2,919,000</u>
Total	\$9,084,000



# Even More Basic Facts

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- As designed, Northern Landfill consists of 5 cells.
- Cell 3 has just been completed (2 to go)
- It takes 10 years to site, permit and construct a new landfill
- A household generates about 1.5 tons of waste per year



# What is an Integrated Waste/Materials Management Plan? What is MSW?

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- Practices and procedures to deal with the entire municipal solid waste stream and the materials therein until there is nothing left.
- Municipal Solid Waste (MSW) is anything that is accepted, or would be accepted, at the landfill or its transfer stations.



# What is Acceptable MSW?

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- Residential garbage
- Yard waste
- Household hazardous waste
- Non-special commercial/industrial waste
- Construction and demolition debris



# What are the Parts of an IMMS?

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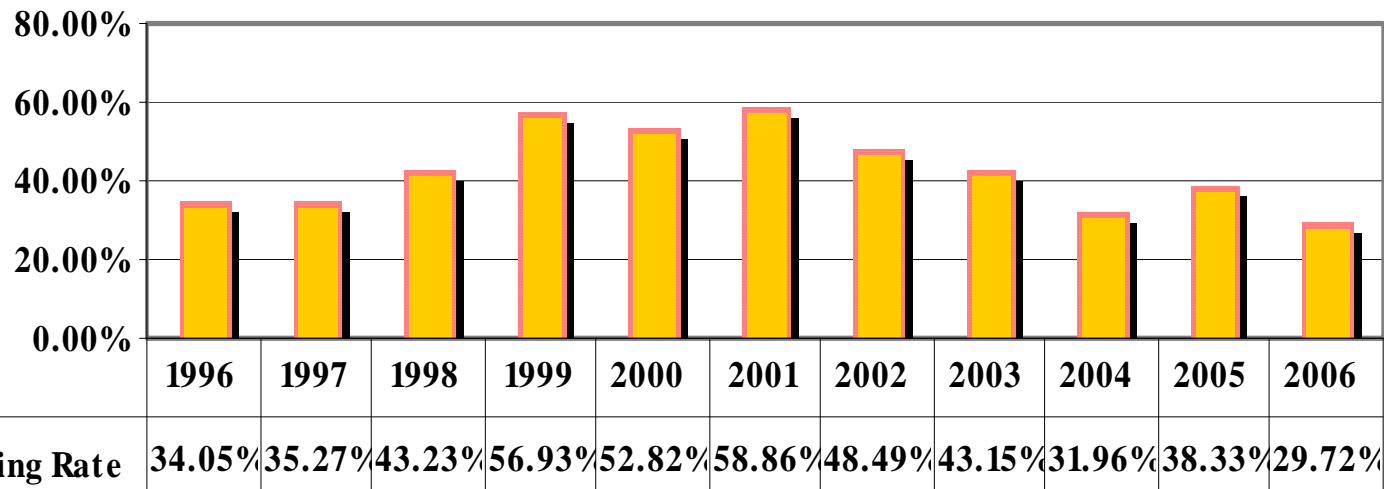
- 3 R's
  - Reduce
  - Reuse
  - Recycle
- Collection
  - Flow Control
  - Inside the towns
  - Outside the towns
- Disposal
  - Utilize
    - Compost
    - Waste to energy
  - Landfill
    - At home
    - Transfer



# Recycling

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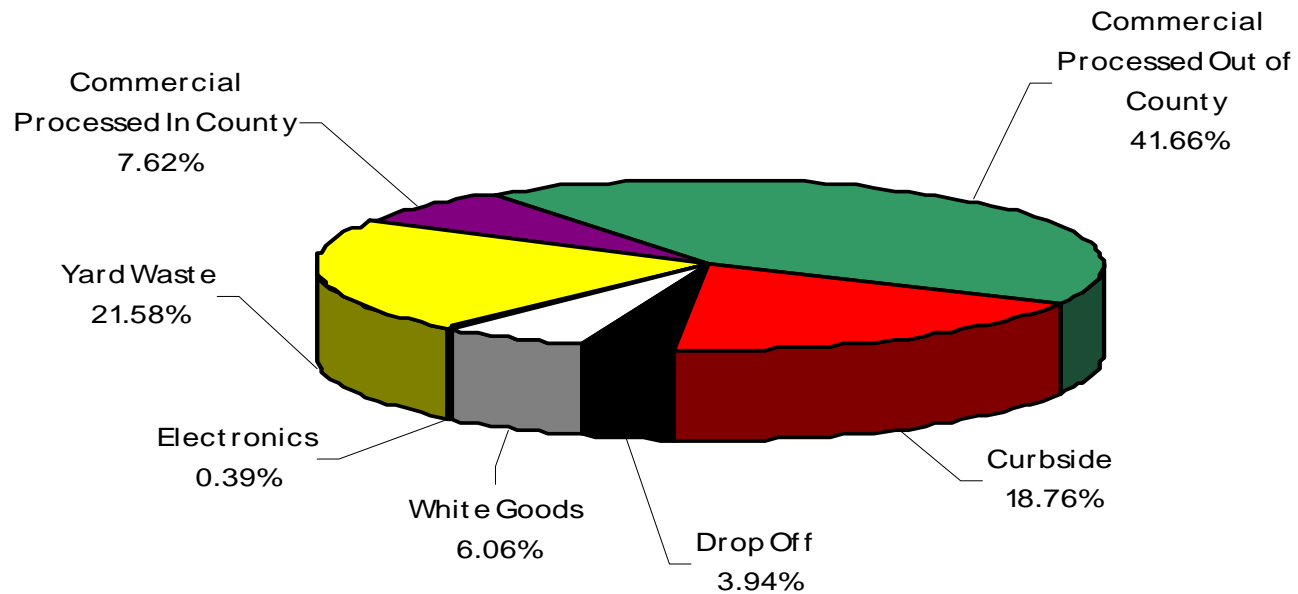
# Recent Recycling History



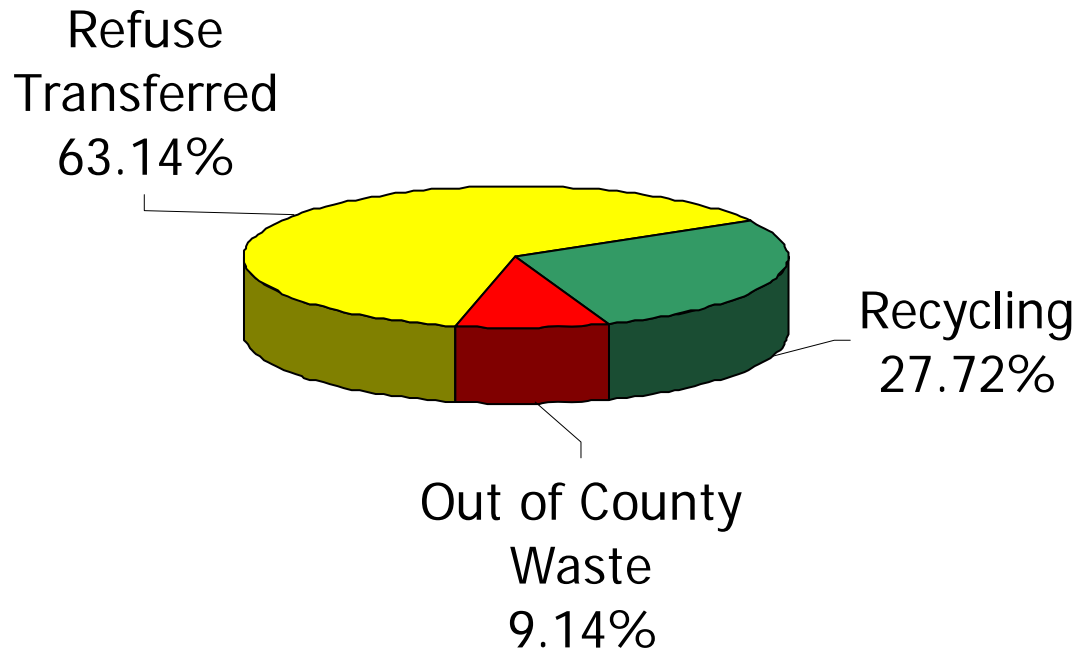
# Recycling Summary Based on Reports to MDE 1996-2006 (100's)

Category	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
<b>Recycling</b>											
Commercial	32.97	32.26	34.32	0.44	59.46	49.74	52.14	45.89	36.30	36.07	35.28
Curbside	74.37	73.09	71.36	71.16	71.16	71.16	71.16	71.16	71.16	71.16	71.16
Drop Off	13.21	12.55	12.96	14.55	15.76	14.83	16.28	16.66	19.89	16.13	18.03
Clean Wood	7.46	16.98	46.17	69.88	35.15	39.04	3.31	0.00	0.00	0.00	0.00
Yard Waste	56.48	48.03	60.74	72.05	70.62	83.04	96.85	154.45	132.38	125.59	98.85
Tires - Landfills	0.43	0.29	0.65	0.66	0.80	0.72	0.00	2.57	0.00	0.00	0.00
White Goods	17.52	17.52	16.12	16.61	17.58	20.93	18.86	23.39	28.78	28.45	27.75
Electronics	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.15	0.27	1.78
Businesses Reporting	<u>322.17</u>	<u>333.35</u>	<u>428.46</u>	<u>586.53</u>	<u>654.67</u>	<u>744.50</u>	<u>607.77</u>	<u>505.72</u>	<u>311.58</u>	<u>311.88</u>	<u>190.85</u>
Gross Recycled	525.71	540.83	679.09	887.70	935.14	1,030.95	876.44	836.27	616.91	606.07	458.46
LESS: Residue	<u>3.07</u>	<u>2.98</u>	<u>1.54</u>	<u>5.40</u>	<u>0.36</u>	<u>0.36</u>	<u>0.36</u>	<u>0.36</u>	<u>0.36</u>	<u>0.36</u>	<u>0.36</u>
<b>Net Recycled</b>	<b>522.64</b>	<b>537.85</b>	<b>677.55</b>	<b>882.30</b>	<b>934.78</b>	<b>1,030.59</b>	<b>876.08</b>	<b>835.91</b>	<b>616.55</b>	<b>605.71</b>	<b>458.10</b>
<b>Calculation</b>											
Waste Hauled by WMI	0.00	455.38	888.40	922.20	1,009.69	914.18	820.40	1,029.79	1,000.48	1,016.39	1,065.64
Tons Landfilled	1,107.10	557.72	146.35	129.37	142.54	195.12	193.04	185.85	160.95	139.06	107.89
LESS: Rubble and Sludge	138.05	148.57	156.39	127.25	136.22	178.90	198.32	194.05	165.79	135.72	133.45
Net MRA Waste (tons)	969.06	864.53	878.36	924.32	1,016.02	930.40	815.12	1,021.59	995.64	1,019.74	1,040.08
Waste Hauled Out of County	43.42	122.45	140.21	64.60	97.78	149.33	407.21	210.51	517.04	139.06	154.32
ADD: Net Recycled	522.64	537.85	677.55	882.30	934.78	1,030.59	876.08	835.91	616.55	605.71	458.10
LESS: Ash/Scrap Metal	0.00	0.00	128.67	321.46	278.77	329.05	213.92	36.40	0.00	0.00	0.00
<b>Gross Annual Tons Generated</b>	<b>1,535.12</b>	<b>1,524.84</b>	<b>1,567.44</b>	<b>1,549.77</b>	<b>1,769.80</b>	<b>1,781.27</b>	<b>1,884.48</b>	<b>2,031.61</b>	<b>2,129.22</b>	<b>1,764.50</b>	<b>1,652.50</b>
<b>Rates</b>											
Recycling Rate	34.05%	35.27%	43.23%	56.93%	52.82%	57.86%	46.49%	41.15%	28.96%	34.33%	27.72%
Source Reduction Credit	0.00%	0.00%	0.00%	0.00%	0.00%	1.00%	2.00%	2.00%	3.00%	4.00%	2.00%
<b>Adjusted Rate MRA Rate</b>	<b>34.05%</b>	<b>35.27%</b>	<b>43.23%</b>	<b>56.93%</b>	<b>52.82%</b>	<b>58.86%</b>	<b>48.49%</b>	<b>43.15%</b>	<b>31.96%</b>	<b>38.33%</b>	<b>29.72%</b>
<b>MRA Waste Generated</b>	<b>1,012.48</b>	<b>986.99</b>	<b>889.89</b>	<b>667.46</b>	<b>835.03</b>	<b>750.68</b>	<b>1,008.40</b>	<b>1,195.70</b>	<b>1,512.68</b>	<b>1,158.80</b>	<b>1,194.40</b>

# 2006 Recycling 46,800 tons



# 2006 Refuse and Recycling 165,300 tons





# Decision Point – Enhance Recycling Program

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- Set goal at 40% \*
  - Consider mandatory recycling
  - Enhance staff to focus on education and follow-up with businesses
  - Expand composting program to include food waste
  - County policy

\* Current State mandate is 20%, 2006 MRA is 29.72%

-OR-



# Decision Point - Zero Waste

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- Adopt Zero Waste policy\*
  - Mandate recycling
  - Establish development fund
  - Staff facility
  - Impose enforcement tools
    - Policing
    - Fines
    - Sanctions

\*50%-75% recycling/reuse rate



# Collection/Control

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# Decision Point – Collection/Control

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- Collection

- Flow control\*
- Contract routes
- Apply in towns

\* An issue if we co-compost or go with waste to energy, or go to mandatory recycling



# Legal Issues

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- Discuss legal opinion and spreadsheet

# Waste Collection and Fee Schedule – Legal Opinion

	Scenario 1	Scenario 2	Scenario 3	Scenario 4	Scenario 5	Scenario 6
Subscription	Yes	Yes	Yes	No	No	No
County contracts w/hauler	No	No	No	Yes	No	No
County creates franchises	No	No	No	No	Yes	Yes
Mandate all trash/recyclables	Yes	No	No	No	Yes	Yes
Charge tip fee	Yes	No	No	No	No	No
Pay at gate	Yes	No	No	No	No	No
Hauler bills customer for collection	Yes	Yes	Yes	No	Yes	Yes
County bills gate fee on tax bill	No	Yes	No	Yes	No	No
Hauler collect all and pays all	No	No	No	No	Yes	Yes
Works in towns	No	Yes	Yes	Could	No	No
Pay as you throw	No	No	Yes	No	No	No
Enterprise Fund	Yes	Yes	Yes	Yes	Yes	No
Current law okay	Yes	Yes	Yes	Yes	No	NO
GA Action	None	None	None	None	Need Authority re Franchise	Need Authority re Franchise



# Utilize and Dispose

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# What' Been Happening

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- In March 2005 the County secured the services of R.W. Beck to complete a comprehensive study on the County's waste management options. The scope of the report included:
  - Alternative recycling strategies
  - Estimates of current and future solid waste generation
  - Development of projected operating results of the system for both a six-year period from 2005 through 2010 and 20-year period from 2011 through 2031.



# What's Been Happening

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- The Commissioners decided to fully explore R.W. Beck's recommendations and approved resolution #658-06, directing the Department of Public Works to develop a solid waste management plan to meet the long term needs of the community focusing on:
  - Enhancing recycling efforts
  - Gaining control of the waste stream
  - Conducting a procurement for the purpose of obtaining contract terms and costs for a waste-to-energy facility including siting
  - Measuring the economic impact of the solid waste program and developing equitable methods of cost sharing
  - Exploring joint disposal efforts with nearby jurisdictions
  - Beginning the process of site selection for a future landfill



# What's Been Happening

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- A solid waste forum was held in Frederick County with speakers for surrounding jurisdictions, EPA and SWANA.
- The EAC has put together a recommendation on waste management in Carroll County.
- A waste stream study is being conducted by Mr. Richard Anthony to evaluate recycling opportunities.
- Proposals were received and evaluated to gain the most current information on a WTE facility.
- State of the art disposal systems were visited in seven European countries.
- Stakeholder meetings have been held with the haulers.



# Recent Disposal History

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- Between 1995 and 2005, most of the jurisdictions in Maryland enjoyed unusually low cost for transportation and disposal of municipal solid waste (MSW) in large, out of state mega-landfills.
- The situation began to change in 2004. Pennsylvania adopted a series of surcharges on landfills to stem the flow of out of state waste. As diesel fuel prices soared in 2005 and 2006, the cost of transportation became more expensive than the cost of disposal.



# More History

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- New York City began using landfill capacity in Pennsylvania and Virginia, and the increased demand quickly escalated the market price for disposal in these states.
- Vendors are insisting on fuel cost adjustments in addition to the standard inflation cost adjustments, as fuel prices increased.



# Current Situation

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- Not only are we facing increased cost for long hauling waste, a level of uncertainty of the cost will be introduced with the fuel adjustment charge.
- Unlike the inflation rates, fuel costs can swing up or down by several dollars per ton from month to month.



# Current Situation

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- Carroll has not yet felt the impact from these changes but expects a significant increase in transfer and disposal rates when the current contract with Waste Management is renegotiated, for the next five year term to begin in December 2008.



# Future Considerations

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- Carroll's waste is landfilled in Virginia. As these landfills fill up, greater travel distances to landfills in North Carolina, South Carolina and potentially Georgia will result in significant increases in waste transfer costs
- The environmental impact of transferring waste over long distances is adverse to reducing carbon dioxide and conserving fossil fuel.



# Concerns

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- Increased costs
- Uncertainty in rates
- Uncertainty in available space and acceptance of waste in out of state landfills
- Environmental impact of transferring waste



# Conclusion

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- Solid waste management is a complex issue.
- There is no one method or one solution to address the complexity.
- An integrated materials (waste) management system (IMMS), that looks at all aspects of the waste stream and systems is needed.



# Decision Points – Utilize & Landfill

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- Landfill in Carroll County
- Continue Transferring
- Regional WTE
- County WTE
- County Co-compost



# GIVEN

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- Northern continues to be used for at least 15% of waste stream consisting of C&D and sewage sludge.
- Residue means ash and material that did not otherwise get consumed.
- Recycling rate is 29.72% actual, and targeted at 50% with ash and metal.
- We assume aggressive recycling.
- Flow control is assumed in all calculations.



# Landfill in Carroll Option

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- Northern Life Ends- 2018
- Tip Fee-
  - 2012 = \$51
  - 2021 = \$65
  - 2031 = \$93
  - 2041 = 131

## ISSUES

Large carbon footprint, methane, environmental risk

Develop new landfill site begins now

Flow control not desirable



# Continue Transferring Option

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- Northern Life Ends - 2046
- Tip Fee -
  - 2012 = \$84
  - 2021 = \$119
  - 2031 = \$177
  - 2041 = \$263

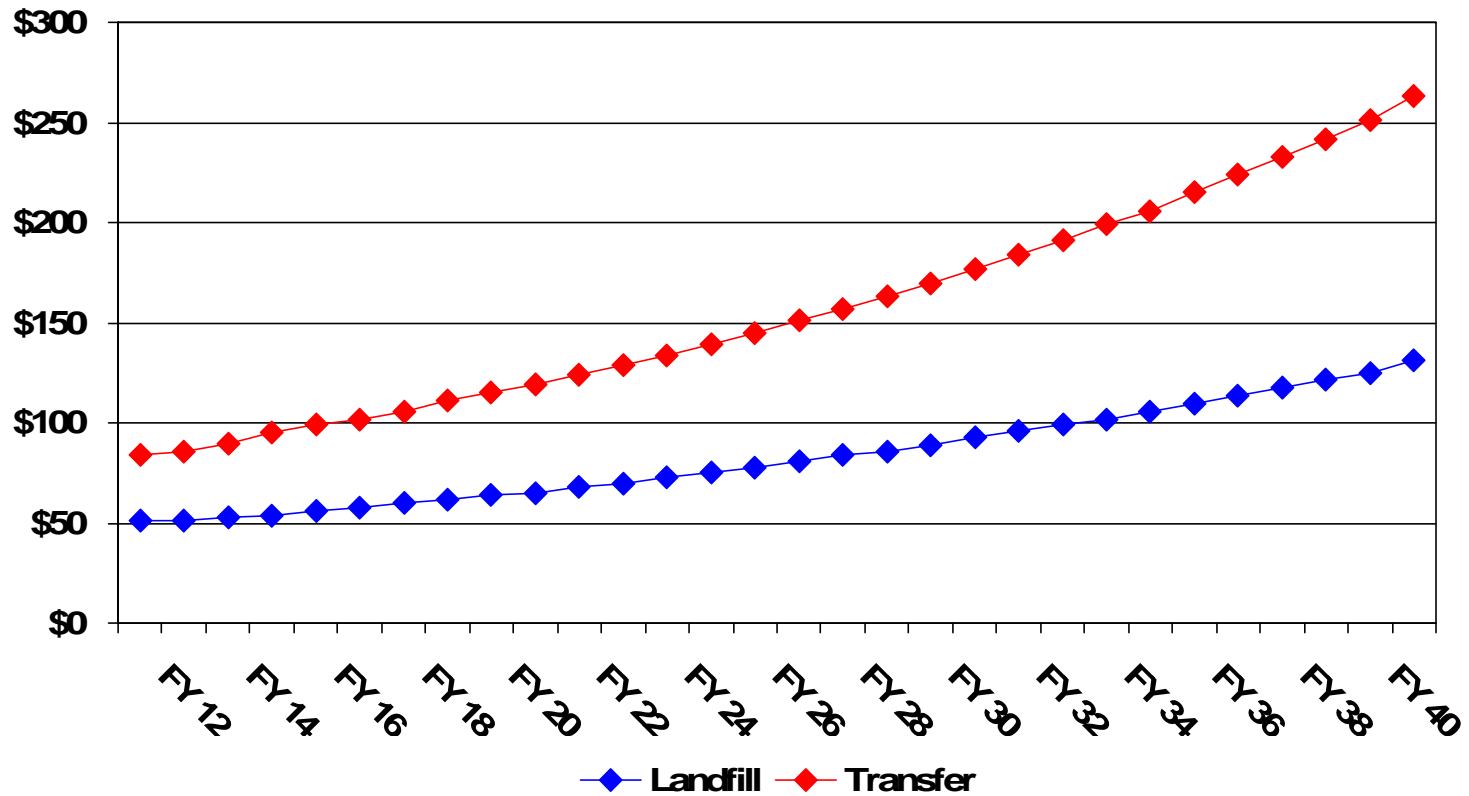
## ISSUES

Unreliable cost and locations

Develop new landfill site begins 2036

Flow control not desirable

# Landfill Tip Fee Compared to Transfer





# Regional WTE, Landfill Residue in Carroll County

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- Northern Life Ends - 2029
- Tip Fee -
  - 2012 = \$76
  - 2021 = \$84
  - 2031 = \$111
  - 2041 = \$145

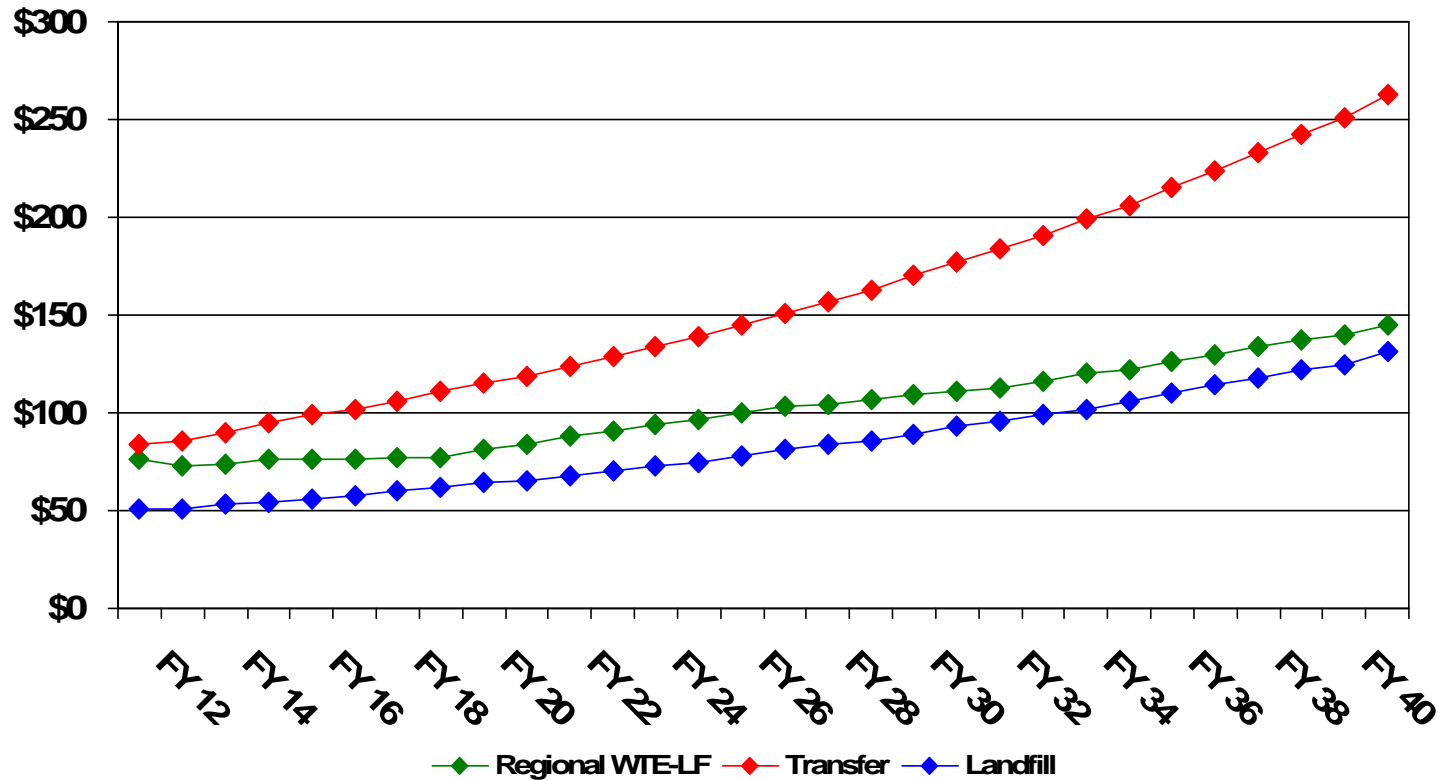
## ISSUES

Begin developing new landfill site 2019

Shared Facility = Shared Risk

Flow control necessary vs. out of county waste

# Regional WTE-LF Tip Fee Compared to Transfer and Landfill in Carroll





# Regional WTE, Transfer Residue

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- Northern Life Ends - 2042
- Tip fee -
  - 2012 = \$84
  - 2021 = \$99
  - 2031 = \$141
  - 2041 = \$203

## ISSUES

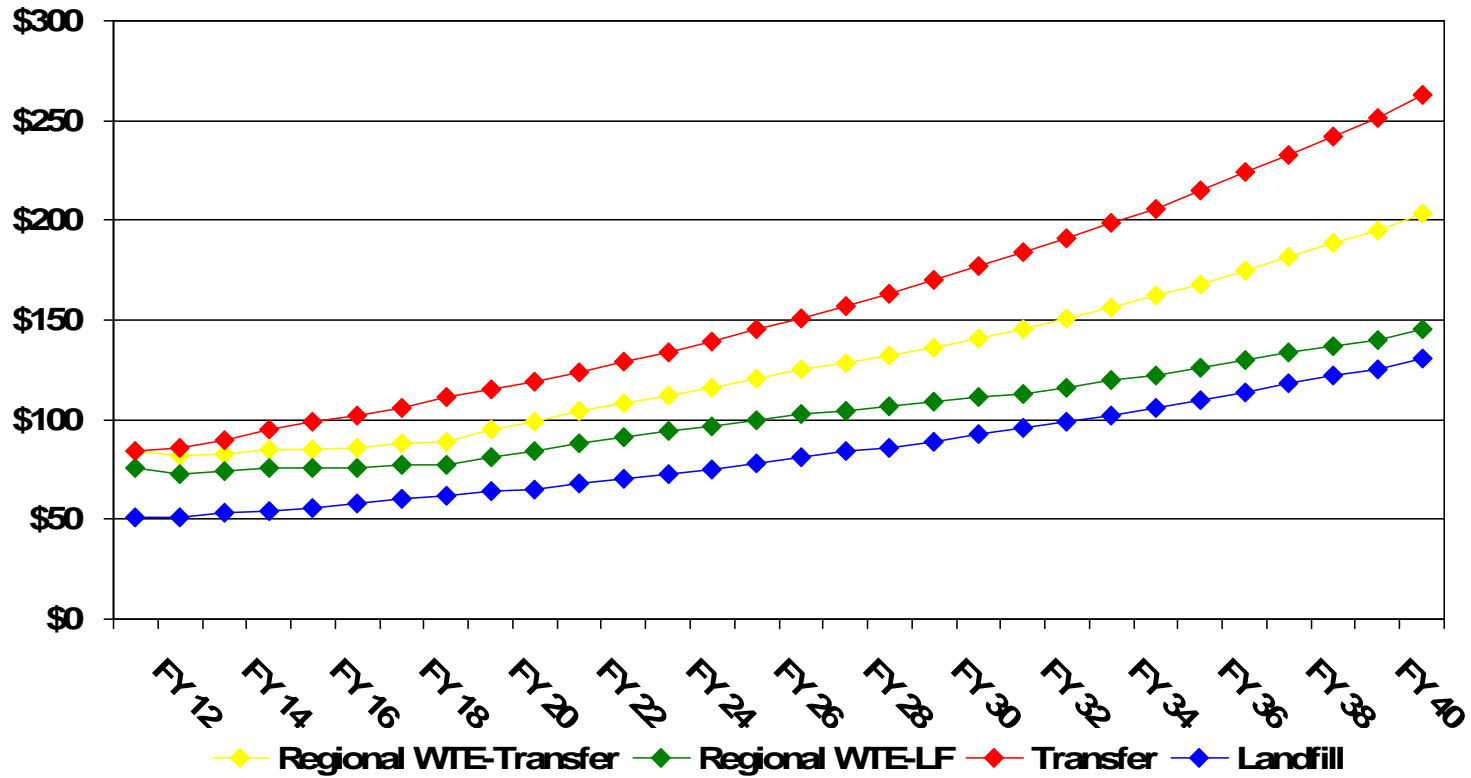
Transport cost

Develop new landfill site begins 2032

Shared Facility = Shared Risk

Flow control necessary vs. out of county waste

# Regional WTE-LF or Transfer Residue Compared to Transfer and Landfill





# CC WTE, Landfill Residue in Carroll County

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- Northern Life Ends - 2029
- Tip Fee -
  - 2012 = \$99
  - 2021 = \$105
  - 2031 = \$132
  - 2041 = \$166

## ISSUES

Begin developing new landfill site 2019

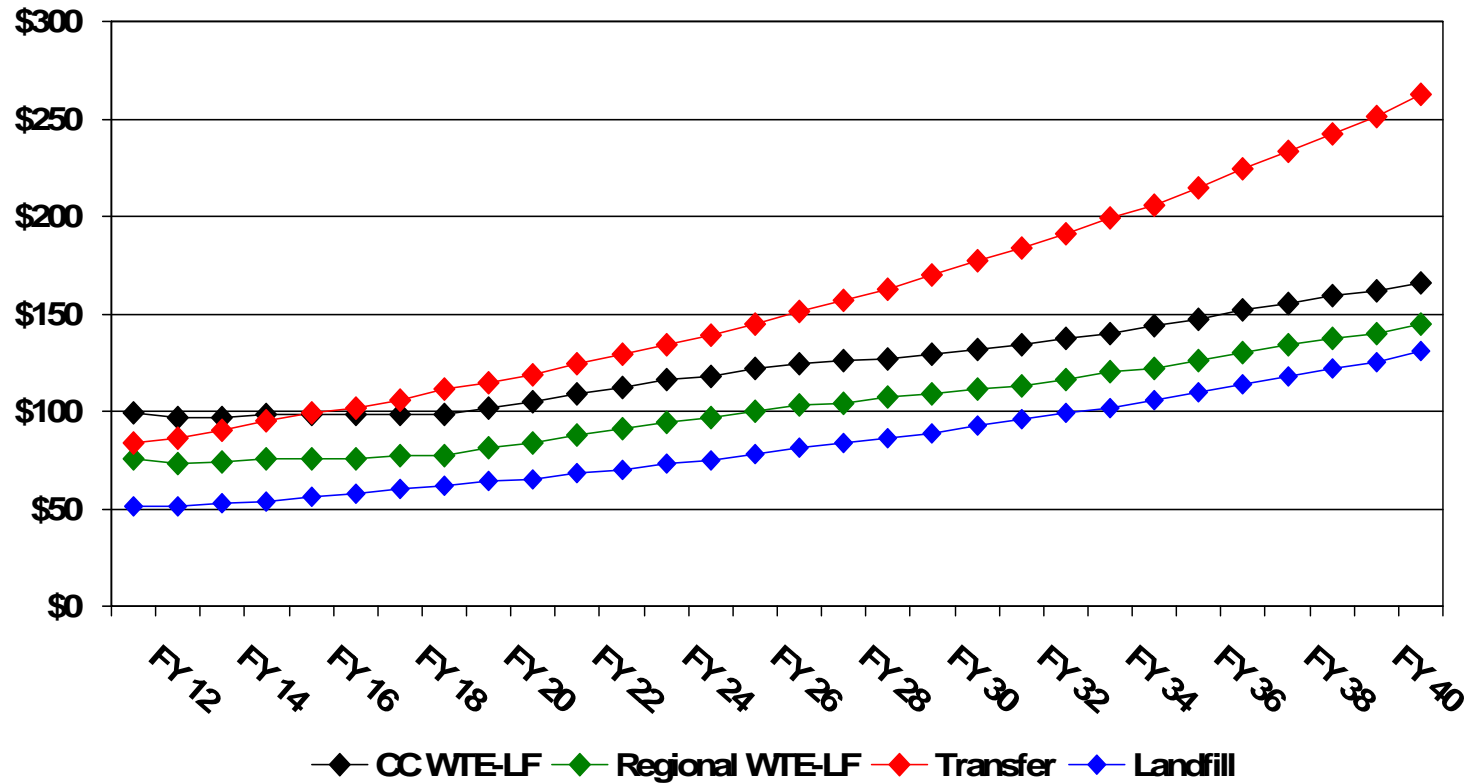
On our own

Flow control necessary vs. out of county waste

Road access

End lease with tenant at Hoods Mill

# CC WTE and Regional WTE-LF Compared to Transfer and Landfill





# CC WTE, Transfer Residue

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- Northern Life Ends - 2042
- Tip Fee -
  - 2012 = \$105
  - 2021 = \$119
  - 2031 = \$158
  - 2041 = \$219

## ISSUE

On our own

Transport cost

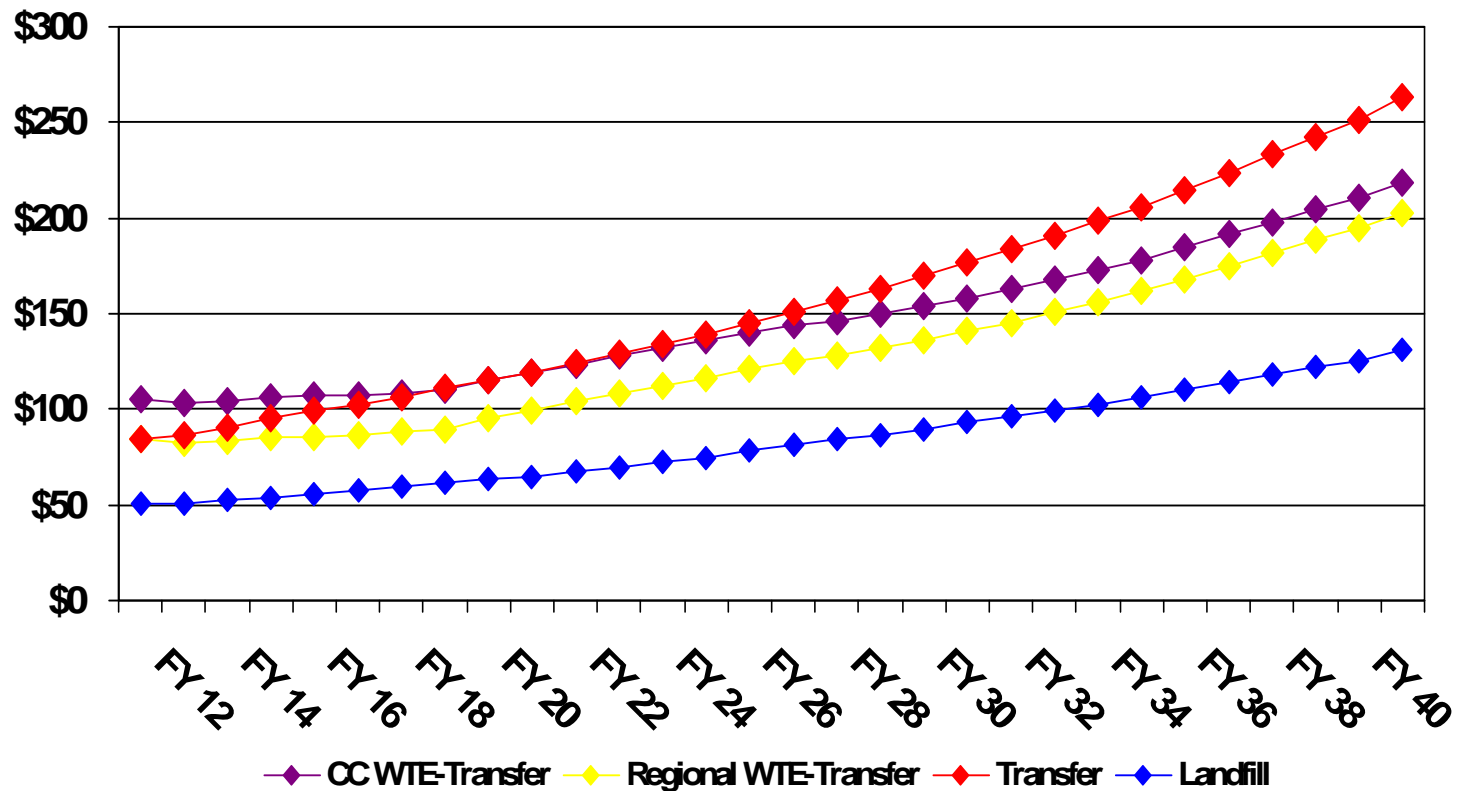
Develop new landfill site begins 2032

Flow control necessary vs. out of county waste

Road access

End lease with tenant at Hoods Mill

# CC WTE & Regional WTE-Transfer Compared to Transfer and Landfill





# Co-compost at Landfill

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- Northern Life Ends - 2023
- Tip Fee -
  - 2012 = \$111
  - 2021 = \$122
  - 2031 = \$146
  - 2041 = \$181

## ISSUES

Develop new landfill site begins 2013

Relocate co-compost operation to new landfill

Flow control

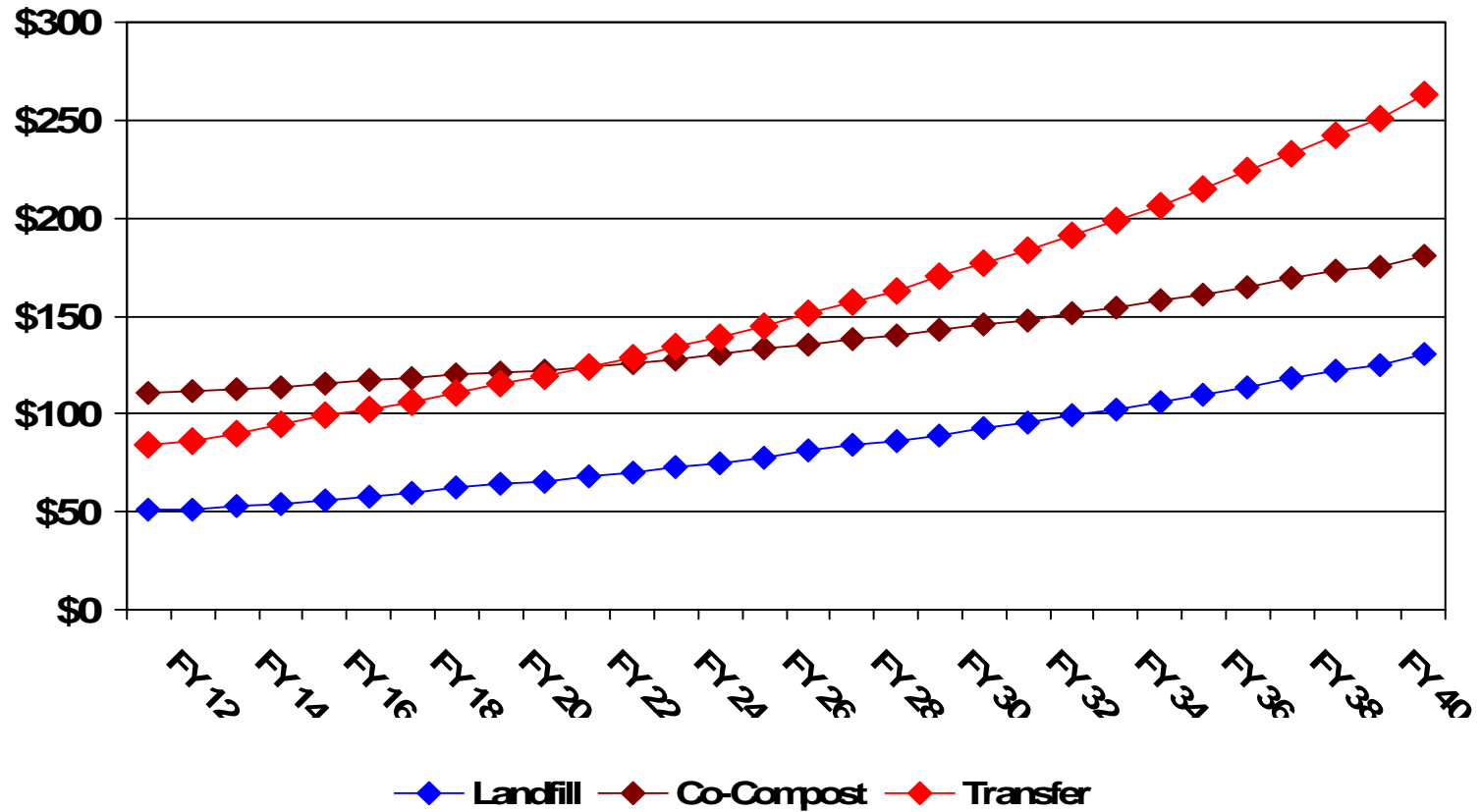
Footprint at Northern a potential problem

Marketing vs. landfill product

Odor issues at Northern

Assumption: Non-compostable MSW is 30% of total and the finished product will be land filled.

# Co-Compost Compared to Transfer and Landfill





# What We Learned in Europe

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- All seven countries visited take an integrated approach to waste management relying on recycling and energy recovery.
- Thermal treatment was reported by all Country representatives to be the most reliable technology over the past 40 years.
- Many of the WTE facilities in Europe generate thermal energy (steam or high temperature hot water) in addition to electricity.
- Architectural considerations are very important. In Paris, for example, a group of local residents and business leaders helped choose the building design.
- The European Union has taken significant steps to reduce landfill gas emissions by banning organic wastes from entering landfills.



# What We Learned in Europe

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- Biosolids (wastewater treatment plant sludge) are co-fired with MSW in some WTE facilities, and increase the energy output of the facility
- Composting yard waste is a useful and successful method of managing this portion of the waste stream
- Sorting, processing and marketing construction and demolition waste is an efficient method of managing this portion
- An integrated waste system in Europe is typically 45% recycling, 45% combustions for energy and 10% landfilling.
- Regional projects, with multiple jurisdictions participating result in the most economical project with greatest energy recovery



# Recommendations

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# Integrated Materials Management Strategy - Recycling

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- Enhance recycling effort to 40% diversion (50%) with WTE
  - Increase investment in education
  - Add support staff
  - Lead by example
  - Ease processes for collecting e.g. containers
  - Encourage market development and innovation



# Integrated Materials Management Strategy - Collection

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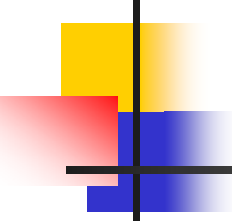
- Our first attempt at flow control/collection should be as non-intrusive as possible:
  - Continue with subscription collection outside the municipalities
  - Mandate all MSW and recyclables collected be delivered to Northern Landfill
  - Haulers continue to bill customers for collection and tip fee



# Integrated Materials Management Strategy – Utilize MSW

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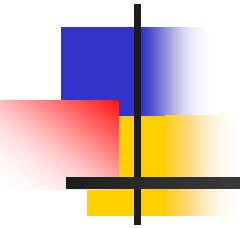
- Expand yard waste program to include compostable food waste
- Select Waste to Energy as the preferred disposal method for non-recyclable and non-compostable MSW



# Integrated Materials Management Strategy – Landfill

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- Use Carroll County landfill minimally
  - Ban construction and demolition debris
  - Incinerate sewage sludge
- Recover landfill air space by mining and incinerating or composting as much as possible



THANK YOU