



An Adjusted Baseline for the Aerobic Composting Protocol

This presentation is supported by a report titled: “An Evaluation of the Use of an Adjusted Baseline Approach for GHG Offset Generation for Composting Facilities in Alberta”.

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Presentation Outline - Approach

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Methodology and Approach

1. Data Review and Classification

- Assumptions
- Review of data

2. Diverted and Disposed Organic Waste

- Development of a potential adjusted baseline approach
- Discussion of limitations

3. Revision of the Alberta protocol

- Using the diversion rate calculated above

4. Application of an Adjusted Baseline

- Discussion of issues/implications

Data Review and Classification

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Assumptions

- MSW
- Managed waste stream
- Organics diverted/disposed
- All diverted organics/woody waste composted
- Excludes
 - Waste managed on-site
 - Agricultural
 - Forestry
 - Backyard composters

Data Review and Classification

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Review of data

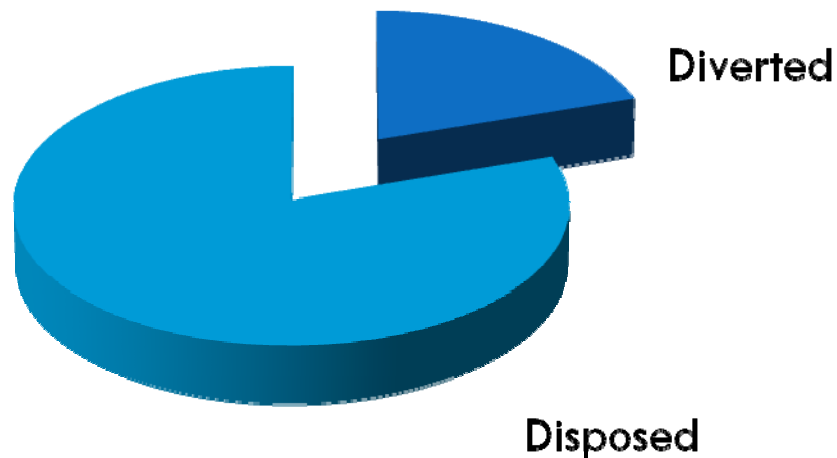
- *Stats Canada: Waste Management Industry Survey (WMIS)*
 - Includes
 - Managed waste stream
 - Organics diverted to central composting programs
 - Excludes
 - Waste managed/processed on-site by the generator
 - Waste transported directly from the generator to a secondary processor (i.e. pulp/paper)
 - Backyard composters
 - Contaminated soil used at disposal facility
 - Illegal dumping
- *NRCan Report: Projection of GHG Emission Implications (2006)*
 - Consolidated data from WMIS and relevant waste characterization data / studies

Diverted and Disposed Material

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Calculation Methodology

- Three step process that involved the calculation of:
 - ▣ A percent organic diversion rate
 - ▣ A percent organic disposal rate
 - ▣ Percent of organics diverted vs. total organic generated



Diverted Material

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Organic Waste Diverted from MSW (WMIS)

- Proportion of diverted waste that is organic:

Year	Organics Diverted (tonnes)	Total Diverted (tonnes)	% Diverted that is organic
2000	131,064	422,595	31.0%
2002	261,069	690,517	37.8%
2004	290,959	755,908	38.5%

Extrapolated to 2001:

34.4% of diverted waste is organic

Diverted Material

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Organic Waste Diverted from MSW (WMIS, 2002)

- Proportion of waste that is diverted from landfill:

	Generated (tonnes)	Disposed (tonnes)	Diverted (tonnes)	% Diverted
Residential	1,159,697	866,398	320,536	9.0%
Non-residential	2,320,238	2,023,896	369,981	10.3%
Total	3,580,811	2,890,294	690,517	19.3%

Diverted Material

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Calculation of the % Organic Diversion Rate:

- Proportion of waste generated that is organic and diverted

$$\% \text{ Organic Diversion Rate} = \% \text{ Diverted}_i * \text{Organics } \% \text{ of Diverted}$$

	% Diverted _i	Organics % of Diverted	% Organic Diversion Rate _i
Residential	9.0%	34.4%	3.1%
Non-Residential	10.3%		3.6%
Total	19.3%		6.6%

Disposed Material

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Organic Waste Disposed from MSW (WMIS)

- Proportion of waste generated that is disposed:

	Source	Quantity of Waste (tonnes)	% Disposed
Disposed	Residential	866,398	24.2%
	Non-Residential	2,023,896	56.5%
	Total	2,890,294	80.7%
Generated	Total	3,580,811	100.0%

Disposed Material

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Proportion of disposed waste that is organic:

Considerations:

- Residential
 - NRCan: Calgary/Edmonton waste characterization + Rural BC
 - Stats Can: Canada-wide residential waste composition data
- ICI
 - Dependant on business activities
 - Same as above due to limited data availability (following NRCan)
 - Wood/soil and organics
- C&D
 - Alberta C&D Waste Characterization study (2000) – surveys/audits
 - Wood
 - Organics negligible

Disposed Material

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Organic Waste Disposed from MSW (WMIS)

- Proportion of disposed waste that is organic:

Source	% Organic	Average % Organic
Residential	44.8-50%	47.4%
Non-Residential	-	34.5%
<i>ICI</i>	35%	-
<i>C&D</i>	34%	-

Source	Quantity of Waste (tonnes)	% Organic	Quantity of Organics (tonnes)	% Disposed Organic
Residential	866,398	47.4%	410,673	14.2%
Non-Residential	2,023,896	34.5%	703,804	24.3%
Total	2,890,294	-	1,108,917	38.5%

Disposed Material

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Calculation of the % Organic Disposal Rate:

- Proportion of waste generated that is organic and disposed

$$\% \text{ Organic Disposal Rate} = \% \text{ Disposed}_i * \text{Organics } \% \text{ of Disposed}$$

	% Disposed _i	Organics % of Disposed	% Organic Disposal Rate _i
Residential	24.2%	38.5%	9.3%
Non-Residential	56.5%		21.8%
Total	80.7%		31.1%

Diverted and Disposed Material

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Calculation of the % Organic Disposal Rate:

- Proportion of waste generated that is organic and disposed

$$\% \text{ Organics Diverted} = \frac{\% \text{ Organic Diversion Rate}}{(\% \text{ Organic Diversion Rate} + \% \text{ Organic Disposal Rate})}$$

- % Organics Diverted vs. total waste generated in 2001 was calculated = **17.5%**.

Revision of the Composting Protocol

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- Change to SS B6 Decomposition Methane Collection / Destruction
 - Use of a discounted value for the Mass Diverted variable (i.e. Actual Mass diverted – 17.5%)

$$\text{Emissions}_{\text{Baseline}} = \text{Emissions}_{\text{Decomposition and Methane Collection / Destruction}}$$

where:

$$\text{Emissions}_{\text{Decomposition, Collection and Destruction}} = (\text{Mass}_{\text{Diverted (Adjusted Baseline)}} * \text{MCF} * \text{DOC} * \text{DOC}_F * \text{F} * 16/12 - \text{R}) * (1 - \text{OX})$$

$$\text{Mass}_{\text{Diverted (Adjusted Baseline)}} = \text{Mass}_{\text{Diverted}} * (1 - \% \text{Organics}_{\text{Diverted}})$$

Approach - Limitations

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- Data availability
 - ▣ Lack of waste characterization data
- Biosolids
 - ▣ Not generally landfilled / permit required
- Wood waste
 - ▣ C&D and ICI wood waste – compostable?
 - ▣ Analysis assumes yes to be conservative

Application of an Adjusted Baseline

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Issues and Implications

- Significant offsets may still be claimed
 - Important as offsets an important factor to allow industry development
 - Can encourage projects that may not be economically viable otherwise
 - Industry development desirable due to environmental benefits
- Relatively small baseline adjustment
 - Unlikely to discourage potential projects (there was some activity before offset credits were available)
 - Does not imply that composting projects are economically viable without financial incentives (large fraction of 2001 composting levels due to two large facilities with economies of scale)

Application of an Adjusted Baseline

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- No penalization for early movers
 - Could send a signal that early action may receive lower rewards based on future GHG government policy decisions
 - Disincentive to pro-active participation in GHG projects

- Avoids diversion of waste materials to “new” facilities
 - Full GHG value counted but no new environmental benefit
 - i.e. If throughput reduced by 75% and diverted to a new facility - new facility would be able to claim offsets for this 75% despite there being no net reduction in GHG emissions.

Application of an Adjusted Baseline

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- If diverted waste is shifted from endpoints
 - Could render older facilities uncompetitive
 - Forced closure
 - Reduced throughput

 - i.e. For a facility with
 - 100,000 tonnes of GHG's at \$10/tonne
 - A 17.5% discount would reduce claimable offsets by \$175,000
 - For early adopters this would mean \$825,000 of incremental revenue

Application of an Adjusted Baseline

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- Environmental Integrity
 - Equivalent to the current approach where:
 - 82.5% of organic waste eligible to claim offsets
 - 17.5% already composted in 2001 and ineligible
 - If 100% of projects were eligible offsets could exceed the amount allowable
 - Adjusted baseline approach:
 - Limits the max quantity of offsets that may be claimed
 - For 100% participation (i.e. all organics diverted and claiming offsets) - total offset credits would not exceed the actual tonnes reduced
 - 17.5% (i.e. early movers) allowed to participate
 - Activity level in 2001 accounted for by subtracting it from the baseline

Application of an Adjusted Baseline

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Justification

- Composting similar to tillage management:
 - ▣ Adopted over a significant temporal range
 - ▣ Diversion rates increasing yearly
 - ▣ Large fraction of organics still not diverted
- Positive message to potential proponents: promotes early adoption of GHG emission reductions
- Simplified means for proponents to determine baseline regardless of historical activities

Application of an Adjusted Baseline

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Justification

- ▣ Transparent approach
- ▣ Consistency across all projects
- ▣ Conservative
 - Assumes all diverted organics composted
- ▣ Addresses the issue of diversion of material to new facilities
- ▣ Reduces transaction costs
 - Project proponents not required to prove source material was previously landfilled / not composted

Implications for Other Biomass Protocols

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- Would follow the same general premise
 - Discounting of the mass of diverted waste used in the baseline
- Not appropriate
 - Other biomass protocols apply largely to forestry/agricultural waste
 - Diversion rates already significant (80-90%)
 - Waste not already diverted likely marginal
 - May requires financial incentives for its use
 - Discounting emissions by 80-90% would limit the diversion of these materials

Conclusions

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- In Alberta in 2001: 17.5% of organic MSW waste generated was diverted from landfill
- Value was used to develop an adjusted baseline approach
- Adjusted baseline approach is recommended
 - Allows early movers to claim offsets
 - Deduction will not significantly limit future projects
 - Consistent / conservative estimate of the baseline
- An adjusted baseline could be applied to other biomass protocols
 - High diversion rates mean it would be prohibitive to project /offset development