The Climate ↔ Food Waste Connection

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Calculating GHGs from Waste

- Waste is not a single point-source of emissions
- Emissions occur along the entire life-cycle

- In climate inventory terms these are referred to as Scope 3 emissions

Streamlined Life Cycle Methodology

- Begins at a “waste generation” reference point
- Focus on GHGs emitted, carbon stored, or utility energy displaced at following stages:
  - Raw material acquisition (upstream)
  - Manufacturing (upstream)
  - Waste management (downstream)
  - Transportation of raw material and waste

Where are the GHG savings?

- Most of the emissions savings are from avoided landfill methane emissions
  - Next version will have new assumptions about landfill and methane capture as well as decay rates for materials
- Some carbon storage in soils from compost
  - We are looking into new research in this area

Emissions

- GHG emissions from composting
  - Transportation of materials to composting faciltiy
  - Mechanical turning of compost pile
  - Determined that CH4 from compost pile essentially zero
- GHG “savings” from use of compost
  - Carbon storage to depleated soils
    - Use CENTURY model
- In landfills biogenic emissions not included
  - Paper, yard trimming, food scraps

Carbon Storage

Landfill carbon storage

- Some materials are not completely decomposed by anaerobic bacteria, so some of the carbon in these materials is stored in the landfill
- Counted as an anthropogenic sink since this carbon storage would not normally occur under natural conditions
- Included in factors for **food scraps**, corrugated cardboard, magazines/third-class mail, newspaper, office paper, phonebooks, textbooks, lumber, fiberboard, grass, leaves, branches

Emission factors

- Food Scraps
  - Landfill, Nat'l Avg (44%): 0.71MTCO2E
  - Landfill, No recovery: 1.43 MTCO2E
  - Landfill, Flare: 0.33 MTCO2E
  - Landfill, Recovery (75%): 0.17 MTCO2E

  - Compost: -0.2 MTCO2E

Other Categories of Organic Waste

- Yard Waste
- Grass
- Leaves
- Branches
- Mixed Organics

- Paper products – no composting factor currently

WARM v10

Climate Change Home

What You Can Do Home

Waste Home

Basic Information

Publications

Tools

Stakeholder Success Stories

WAste Reduction Model (WARM)

NEW VERSION: Updated November 2009

(Version 10, 11/09)

EPA created WARM to help solid waste planners and organizations track and voluntarily report greenhouse gas emissions reductions and energy savings from several different waste management practices. WARM Online was last updated November 2009.

Use this worksheet to describe the baseline and alternative MSW management scenarios that you want to compare. Please follow the steps below to enter your material tonnage information in the input boxes in the tables, and select appropriate landfill and waste transport characteristics.

Tips:

- If the listed material is not generated in your community/organization or you do not want to analyze it, leave it blank or enter 0.
- Make sure that the total quantity generated equals the total quantity managed.
- If you have any questions, consult the WARM User's Guide.

Steps 1 and 2. Baseline and Alternative Scenarios

	Baseline Scenario					Alternative Scenario				
Material	Tons Recycled	Tons Landfilled	Tons Combusted	Tons Composted	Tons Generated	Tons Source Reduced	Tons Recycled	Tons Landfilled	Tons Combusted	Tons Composted
Aluminum Cans				N/A	0					N/A
Steel Cans				N/A	0					N/A
Copper Wire				N/A	0					N/A
Glass				N/A	0					N/A
HDPE				N/A	0					N/A
LDPE				N/A	0					N/A
PET				N/A	0					N/A
Corrugated Cardboard				N/A	0					N/A
Magazines / third-class mail				N/A	0					N/A
Newspaper				N/A	0					N/A
Office Paper				N/A	0					N/A
Phonebooks				N/A	0					N/A

Food Scraps

- If you have any questions, consult the WARM User's Guide.

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	Baseline Scenario					Alternative Scenario				
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Steel Cans				N/A	0					N/A
Copper Wire				N/A	0					N/A
Glass				N/A	0					N/A
HDPE				N/A	0					N/A
LDPE				N/A	0					N/A
PET				N/A	0					N/A
Corrugated Cardboard				N/A	0					N/A
Magazines / third-class mail				N/A	0					N/A
Newspaper				N/A	0					N/A
Office Paper				N/A	0					N/A
Phonebooks				N/A	0					N/A
Textbooks				N/A	0					N/A
Dimensional Lumber				N/A	0					N/A
Medium Density Fiberboard				N/A	0					N/A
Food Scraps	N/A	10			10		N/A			10
Yard Trimmings	N/A				0		N/A			
Grass	N/A				0		N/A			
Leaves	N/A				0		N/A			
Branches	N/A				0		N/A			
Mixed Paper (general)				N/A	0	N/A				N/A
Mixed Paper (primarily residential)				N/A	0	N/A				N/A
Mixed Paper (primarily from offices)				N/A	0	N/A				N/A

Results

WARM Summary close or Esc Key

Energy Analysis — Summary Report

(Version 10, 11/09)

Analysis of GHG Emissions from Waste Management

GHG Emissions from Baseline Waste Management Scenario (MTCO2E):	7
GHG Emissions from Alternative Waste Management Scenario (MTCO2E):	-2
Total Change in GHG Emissions: (MTCO2E):	**-9**

	Baseline Scenario					Alternative Scenario						
Material	**Tons Recycled**	**Tons Landfilled**	**Tons Combusted**	**Tons Composted**	**Total MTCO2E**	**Tons Source Reduced**	**Tons Recycled**	**Tons Landfilled**	**Tons Combusted**	**Tons Composted**	**Total MTCO2E**	**Change (Alt - Base) MTCO2E**
Food Scraps	N/A	10	0	0	7	0	N/A	0	0	10	-2	-9

Note: A negative value indicates an emission reduction; a positive value indicates an emission increase.

a) For an explanation of the methodology used to develop emission factors, see EPA report: Greenhouse Gas Emissions from Management of Selected Materials in Municipal Solid Waste (EPA530-R-98-013) — available on the Internet at http://www.epa.gov/climatechange/wycd/waste/reports.html Please note that some of the emission factors used to generate these results do not

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EPA's Waste Reduction Model http://www.epa.gov/warm