

NJHEPS CO₂ Calculator Worksheet Overview

Fall 2011

Goals

- Gather CO₂ Data From Higher Ed in NJ
 - Simple, free tool
 - Consistent throughout the state
 - Easily available inputs
 - Useful Outputs Provide a Simple Metric
-
- Establish baseline
 - Motivate change
 - Track Results

The Worksheet

- Excel Spreadsheet
- White cells are for data entry.
- Calculated Results show as boldface on orange background.
- Calculations are not hidden.
- Mostly related to energy use.
- Allows accounting for recycling.
- Results are in both Metric and English units
- Date updates automatically

NJ CAMPUS GREENHOUSE GAS EMISSIONS REDUCTION WORKSHEET

College or University: _____
 Contact Person: _____ Phone Number: _____
 Title: _____ Date: September 8, 2011
 e-mail: _____

PART A:

STEP 1: INPUT DATA

ENTER BASELINE YEAR AND CHANGE YEAR:

	Baseline Year 2000	Change Year 2000
Total Electricity purchased and used by institution	KWH	
Total Electricity sold	KWH	
Net Electricity purchased (purchased - sold = net)	KWH	0 0
Emissions-free electricity purchased (e. g., wind power)	KWH	
Standard-emissions electricity purchased	KWH	0 0
Gasoline purchased	gallons	
#2 Oil purchased (combine vehicle diesel fuel & fuel oil)	gallons	
#6 Oil purchased	gallons	
Natural Gas purchased	dekatherms	
Alternative Energy Produced (Solar, etc - contact us at njheps@njheps.org for correct multiplier assistance)		

STEP 2: CALCULATE CO₂ PRODUCED (Calculations will generate automatically)

	Baseline Year 2000	Change Year 2000
Multiply: Baseline year and Change year Net electric KWH by PSEG protocol (tons/KWH)		
CO ₂ due to net electric purchased	tons	0 0
Multiply: gasoline gallons by 0.00982 (tons/gallon)		
CO ₂ due to gasoline combustion	tons	0 0
Multiply: #2 oil gallons by 0.01119 (tons/gallon)		
CO ₂ due to #2 oil combustion	tons	0 0
Multiply: #6 oil gallons by 0.01301 (tons/gallon)		
CO ₂ due to #6 oil combustion	tons	0 0
Multiply: gas dekatherms by 0.0585 (tons/dekatherm or million Btu)		
CO ₂ due to natural gas combustion	tons	0 0
Multiply: units of other sources (if not listed above) - Contact NJHEPS@njheps.org for correct multiplier assistance		
CO ₂ produced by other sources	tons	
Add: CO₂ produced by all sources above (elec, oil, gas)		
Total CO ₂ produced in Base year and Change year add steps 2.0 through 2.6 for each year	tons	0 0

STEP 3 CALCULATE TOTAL EMISSIONS REDUCTION DUE TO RECYCLING

	Baseline Year 2000	Change Year 2000
* Follow the link below to enter recycling data (in short tons) into the Project WARM calculator. The summary report will return GHG Emissions in metric tons. Enter <u>Baseline</u> solid waste in cell F54 and alternative (change year) solid waste in G54.	tons	
This reflects improved recycling/processing of waste and utilizes EPA's Project Warm.	short tons	0 0
http://www.epa.gov/climatechange/vvcd/waste/calculators/Warm_Form.html		
<i>These cells will auto-calculate Project WARM data into short tons</i>		

TOTAL CO₂ PRODUCED

	Baseline Year 2000	Change Year 2000
TOTAL Short tons CO ₂ PRODUCED	short tons	0 0
TOTAL Metric Tons CO ₂ PRODUCED	metric tons	0 0

Input Contact Information

- Name
- Title
- Email
- Phone number

NJ CAMPUS GREENHOUSE GAS EMISSIONS REDUCTION WORKSHEET	
College or University:	
Contact Person:	
Title:	
e-mail:	
	Phone Number: <input type="text"/>
	Date: <input type="text" value="September 8, 2011"/>

Gather The Following Records for the Baseline Year and the Study Year

- Electric Bills
- Fuel Purchase Records (natural gas, fuel oil, etc.)
- Fleet Vehicle Fuel Use (gasoline and diesel)
- Fiscal or Calendar Year is Acceptable - just be consistent.
- Any year after 2000 can be used for the “change year”. This should be *after* some project or projects.

PART A:		
STEP 1: INPUT DATA		
ENTER BASELINE YEAR AND CHANGE YEAR:		
	Baseline Year	Change Year
	2000	2000
Total Electricity purchased and used by institution	KWH	
Total Electricity sold	KWH	
Net Electricity purchased (purchased - sold = net)	KWH	0
Emissions-free electricity purchased (e. g., wind power)	KWH	
Standard-emissions electricity purchased	KWH	0
Gasoline purchased	gallons	
#2 Oil purchased (combine vehicle diesel fuel & fuel oil)	gallons	
#6 Oil purchased	gallons	
Natural Gas purchased	dekatherms	
Alternative Energy Produced (Solar, etc - contact us at njheps@njheps.org for correct multiplier assistance)		

Step 1: Input Data in cells for Baseline Year and the Study Year

- Utility electric purchased & sold
- Emissions-Free Electricity purchased
 - In addition to “standard” utility electricity
 - Not self-generated
- Fuel burned (natural gas, fuel oil, etc.)
- Fleet Vehicle Fuel Use (gasoline and diesel)
- Consult with NJHEPS if other fuels are used, e.g., wood, coal, biodiesel, etc.

PART A:																										
STEP 1: INPUT DATA																										
ENTER BASELINE YEAR AND CHANGE YEAR:																										
		<table border="1"> <thead> <tr> <th>Baseline Year</th> <th>Change Year</th> </tr> <tr> <th>2000</th> <th>2000</th> </tr> </thead> <tbody> <tr><td></td><td></td></tr> <tr><td></td><td></td></tr> <tr><td>0</td><td>0</td></tr> <tr><td></td><td></td></tr> <tr><td>0</td><td>0</td></tr> <tr><td></td><td></td></tr> <tr><td></td><td></td></tr> <tr><td></td><td></td></tr> <tr><td></td><td></td></tr> <tr><td></td><td></td></tr> </tbody> </table>	Baseline Year	Change Year	2000	2000					0	0			0	0										
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A Simple Way To Estimate Commuter Miles:

- Use a Zip-Code sort to determine the average distance the faculty and administrators commute.
- Use an average vehicle mileage, say 27 miles per gallon.
- Multiply:
**(number of staff) x (average round-trip commute miles) /
(27 miles per gallon)**
= total gallons of gasoline associated with commuting.

That number can be included in the “gasoline purchased” cell.

**PLEASE TELL NJHEPS IF COMMUTER MILES ARE
INCLUDED IN YOUR TOTAL**

Step 2: Review Emissions Output

- Units in this step are “short tons” not “metric tons”
- All emissions factors are fixed values based on ideal combustion except electric purchased.
- Purchased electric emissions factors are automatically imported to the calculation from a look-up table based on the “Change Year”. Each year the utility issues a new emissions factor based on their annual mix of generation. Multipliers are based on PSEG reported data.

- Consult NJHEPS if alternate energy sources are used.
- Summary Results for each year

STEP 2: CALCULATE CO ₂ PRODUCED (Calculations will generate automatically)		Baseline Year 2000	Change Year 2000
Multiply: Baseline year and Change year Net electric KWH by PSEG protocol (tons/KWH) CO ₂ due to net electric purchased	tons	<input type="text" value="0"/>	<input type="text" value="0"/>
Multiply: gasoline gallons by 0.00982 (tons/gallon) CO ₂ due to gasoline combustion	tons	<input type="text" value="0"/>	<input type="text" value="0"/>
Multiply: #2 oil gallons by 0.01119 (tons/gallon) CO ₂ due to #2 oil combustion	tons	<input type="text" value="0"/>	<input type="text" value="0"/>
Multiply: #6 oil gallons by 0.01301 (tons/gallon) CO ₂ due to #6 oil combustion	tons	<input type="text" value="0"/>	<input type="text" value="0"/>
Multiply: gas dekatherms by 0.0585 (tons/dekatherm or million-Btu) CO ₂ due to natural gas combustion	tons	<input type="text" value="0"/>	<input type="text" value="0"/>
Multiply: units of other sources (if not listed above) - Contact NJHEPS@njheps.org for correct multiplier assistance CO ₂ produced by other sources	tons	<input type="text"/>	<input type="text"/>
Add: CO₂ produced by all sources above (elec, oil, gas) Total CO ₂ produced in Base year and Change year add steps 2.0 through 2.6 for each year	tons	<input type="text" value="0"/>	<input type="text" value="0"/>

Step 3: Emissions Credit For Recycling

- Allows institution to take credit for improved solid waste handling and recycling
- Not necessary for functionality of the worksheet
- Requires input from EPA “Project WARM” website
 - Uses recycling data input for both years
 - http://www.epa.gov/climatechange/wycd/waste/calculators/Warm_Form.html
- Represents CO2 *equivalents* in short tons.

STEP 3 CALCULATE TOTAL EMISSIONS REDUCTION DUE TO RECYCLING		Baseline Year	Change Year
		2000	2000
<p>* Follow the link below to enter recycling data (in short tons) into the Project WARM calculator. The summary report will return GHG Emissions in metric tons. Enter Baseline solid waste in cell F54 and alternative (change year) solid waste in G54.</p>	tons	<input type="text"/>	
<p>This reflects improved recycling/processing of waste and utilizes EPA's Project Warm.</p>	short tons	0	
<p>http://www.epa.gov/climatechange/wycd/waste/calculators/Warm_Form.html</p>		0	
		These cells will auto-calculate Project WARM data into short tons	

Step 3: Emissions Credit For Recycling

- Using The EPA “Project WARM” website

Climate Change - Waste

Waste Reduction Model (WARM)

NEW VERSION: Updated August 2010

(Version 11, 8/10)

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. The Web-based version of WARM was last updated August 2010.

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. For information on the definition of each of the WARM material types as well as data source and year of underlying life-cycle data, please see the [WARM materials definitions list](#).

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

Material	Baseline Scenario				Tons Generated	Alternative Scenario				
	Tons Recycled	Tons Landfilled	Tons Combusted	Tons Composted		Tons Source Reduced	Tons Recycled	Tons Landfilled	Tons Combusted	Tons Composted
Aluminum Cans	<input type="text"/>	<input type="text"/>	<input type="text"/>	N/A	0	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	N/A
Steel Cans	<input type="text"/>	<input type="text"/>	<input type="text"/>	N/A	0	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	N/A
Copper Wire	<input type="text"/>	<input type="text"/>	<input type="text"/>	N/A	0	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	N/A
Glass	<input type="text"/>	<input type="text"/>	<input type="text"/>	N/A	0	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	N/A
HDPE	<input type="text"/>	<input type="text"/>	<input type="text"/>	N/A	0	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	N/A
LDPE	<input type="text"/>	<input type="text"/>	<input type="text"/>	N/A	0	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	N/A
PET	<input type="text"/>	<input type="text"/>	<input type="text"/>	N/A	0	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	N/A

Step 3: Emissions Credit For Recycling

- EPA “Project WARM” website
 - Input all known waste management data
 - Step 1&2 Inputs for Baseline and Alternate Year

Steps 1 and 2. Baseline and Alternative Scenarios

Material	Baseline Scenario				Tons Generated	Alternative Scenario				
	Tons Recycled	Tons Landfilled	Tons Combusted	Tons Composted		Tons Source Reduced	Tons Recycled	Tons Landfilled	Tons Combusted	Tons Composted
Aluminum Cans	20	100	10	N/A	130	10	50	50	10	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

Step 3: Emissions Credit For Recycling

- EPA “Project WARM” website
 - Step 3 Input Landfill Characteristics, revise if known.

Step 3. Landfill Characteristics

The emissions from landfilling depend on whether the landfill where your waste is disposed has a landfill gas (LFG) control system. If you do not know whether your landfill has LFG control, select "National Average," which calculates emissions based on the proportions of landfills with LFG control in 2008. If your landfill does not have a LFG system, select "No LFG Recovery." If a LFG system is in place at your landfill, select "LFG Recovery" and click one of the indented buttons to indicate whether LFG is recovered for energy or flared. Note that the Web-based WARM calculator assumes that the "LFG Recovery" option includes bulk MSW decay rates ($k=0.04$) for average landfill moisture conditions and "typical" landfill gas collection system operation. These assumptions are the default assumptions in the WARM Excel version.

- National Average
- No LFG Recovery
- LFG Recovery
 - Recover for energy
 - Flare

Step 3: Emissions Credit For Recycling

- EPA “Project WARM” website
 - Step 4 Input Distance waste is transported, revise if known.

Step 4. Waste Transport Characteristics

Emissions that occur during transport of materials to the management facility are included in this model. You may use default transport distances, 20 miles, or provide information on the transport distances for the various MSW management options.

Use default distance
 Define distance

Management Option	Distance (miles)
Landfill	<input type="text" value="20"/>
Combustion	<input type="text" value="20"/>
Recycling	<input type="text" value="20"/>
Composting	<input type="text" value="20"/>

Step 3: Emissions Credit For Recycling

- EPA “Project WARM” website
 - Step 5, Output
 - Use Metric Tons of Carbon Dioxide Equivalent
 - Press “Create Summary” button

Step 5. Results Output

Metric Tons of Carbon Dioxide Equivalent (MTCO2E)
 Metric Tons of Carbon Equivalent (MTCE)
 Units of Energy (million BTU)

[View Emission/Energy Factors](#) based on your selection above.

The following inputs are optional and may be used to customize your summary report.

Organization:

Name:

Reporting Period: / / To / /

Step 3: Emissions Credit For Recycling

- EPA “Project WARM” website
 - Copy Output from the WARM Summary table to the NJHEPS Spreadsheet using **Total MTCO2E** for baseline and alternate years
 - Note: These may be negative numbers. That’s good!

WARM Summary close or Esc Key

GHG Emissions Analysis – Summary Report Print Summary

(Version 11, 8/10)

Analysis of GHG Emissions from Waste Management

GHG Emissions from Baseline Waste Management Scenario (MTCO2E): -268

GHG Emissions from Alternative Waste Management Scenario (MTCO2E): -760

Total Change in GHG Emissions: (MTCO2E): -493

Material	Baseline Scenario					Total MTCO2E	Alternative Scenario					Change (Alt - Base) MTCO2E
	Tons Recycled	Tons Landfilled	Tons Combusted	Tons Composted	Tons Source Reduced		Tons Recycled	Tons Landfilled	Tons Combusted	Tons Composted	Total MTCO2E	
Aluminum Cans	20	100	10	N/A	-268	10	50	60	10	N/A	-760	-493

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/wywd/waste/reports.html> Please note that some of the emission factors used to generate these results do not match those presented in the report due to recent additions and/or revisions.

b) Emissions estimates provided by this model are intended to support voluntary GHG measurement and reporting initiatives.

[EPA Home](#) | [Privacy and Security Notice](#) | [Contact Us](#)
http://www.epa.gov/climatechange/wywd/waste/calculators/Warm_Form.html
[Print As-Is](#)

Last updated on Thursday, April 14, 2011

	Baseline Year	Change Year
tons	-268	-760
short tons	-295	-838
<i>These cells will auto-calculate Project WARM data into short tons</i>		
	Baseline Year	Change Year

NJHEPS Results Summary

- Calculates results as both “short tons” and “metric tons”.
- The difference between “Change Year” and “Baseline Year” is the annual CO₂ avoided.

TOTAL CO ₂ PRODUCED		<u>Baseline Year</u>	<u>Change Year</u>
TOTAL Short tons CO ₂ PRODUCED	short tons	0	0
TOTAL Metric Tons CO ₂ PRODUCED	metric tons	0	0