NJHEPS CO$_2$ Calculator Worksheet Overview

Fall 2011

Goals

- Gather CO_2 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

Input Contact Information

- Name

- Title

- Email

- Phone number

NJ CAMPUS GREENHOUSE GAS EMISSIONS REDUCTION WORKSHEET		
College or University:		
Contact Person:	Phone Number:	
Title:	Date:	September 8, 2011
e-mail:		

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

		Baseline Year	Change Year
ENTER BASELINE YEAR AND CHANGE YEAR:		2000	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 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		Baseline Year	Change Year
ENTER BASELINE YEAR AND CHANGE YEAR:		2000	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)			

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.

  PLESE 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 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)			
CO2 due to net electric purchased	tons	0	0
Multiply: gasoline gallons by 0.00982 (tons/gallon)			
CO2 due to gasoline combustion	tons	0	0
Multiply: #2 oil gallons by 0.01119 (tons/gallon)			
CO2 due to #2 oil combustion	tons	0	0
Multiply: #6 oil gallons by 0.01301 (tons/gallon)			
CO2 due to #6 oil combustion	tons	0	0
Multiply: gas dekatherms by 0.0585 (tons/dekatherm or million Btu)			
CO2 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			
CO2 produced by other sources	tons		
Add: CO₂ produced by all sources above (elec, oil, gas)			
Total CO2 produced in Base year and Change year add steps 2.0 through 2.6 for each year	tons	0	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 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.			
http://www.epa.gov/climatechange/wycd/waste/calculators/Warm_Form.html	short tons	0	0
		These cells will auto-calculate Project WARM data into short tons	

Step 3: Emissions Credit For Recycling

- Using The EPA "Project WARM" website

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	20
Combustion	20
Recycling	20
Composting	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 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!

NJHEPS Results Summary

- Calculates results as both "short tons" and "metric tons".

- The difference between "Change Year" and "Baseline Year" is the annual CO_2 avoided.

TOTAL CO$_2$ PRODUCED			Baseline Year	Change Year
TOTAL Short tons CO$_2$ PRODUCED		short tons	0	0
TOTAL Metric Tons CO$_2$ PRODUCED		metric tons	0	0