Campus Carbon Calculator Orientation

Familiar with GHG accounting concepts, but want an introduction to using the Campus Carbon Calculator? Start here.

Part 1. Downloading the Campus Carbon Calculator

First, download the User's Guide by clicking on the link at the top of the **download** page. To download the Campus Carbon Calculator (CCC), fill out the form and click "Download the Calculator."

| Cell Color Key |
|---|
| Input — Enter data here |
| Label — Do not change |
| Projected Value — Do not change |
| Computed Value — Do not change |
| Emissions Factor — Change only if you understand |

Part 2. Navigating the CCC

When you first open the CCC, you will probably get a security warning because the file contains macros. Confirm that you do want to open the file, and click the button in the yellow bar at the top of the screen to enable macros. These are necessary for proper Calculator functioning, and will help you navigate the Calculator.

The CCC is a large file, and takes a while to save. If your version of Excel is set to autosave every 5 minutes (which is the default), this can get very annoying and has the potential to crash Excel. To change the autosave settings (in Excel 2010), go to File -> Options -> Save. The second option on this page allows you to specify how frequently Excel will save AutoRecover information. Change this number to something more manageable, like 30 minutes. Remember while working in the CCC that if it seems to have frozen, it is probably just saving your data.

The first sheet displayed will be a User Agreement. Read the agreement and click the hyperlink text, and you will be brought to the Introduction sheet. Here you can enter basic information like the name of your institution, your contact information, and the state where your institution lives. Read the tips for navigating the CCC, and note the color coding system. It will be important to know what kind of cell you are dealing with when you get further into the Calculator.
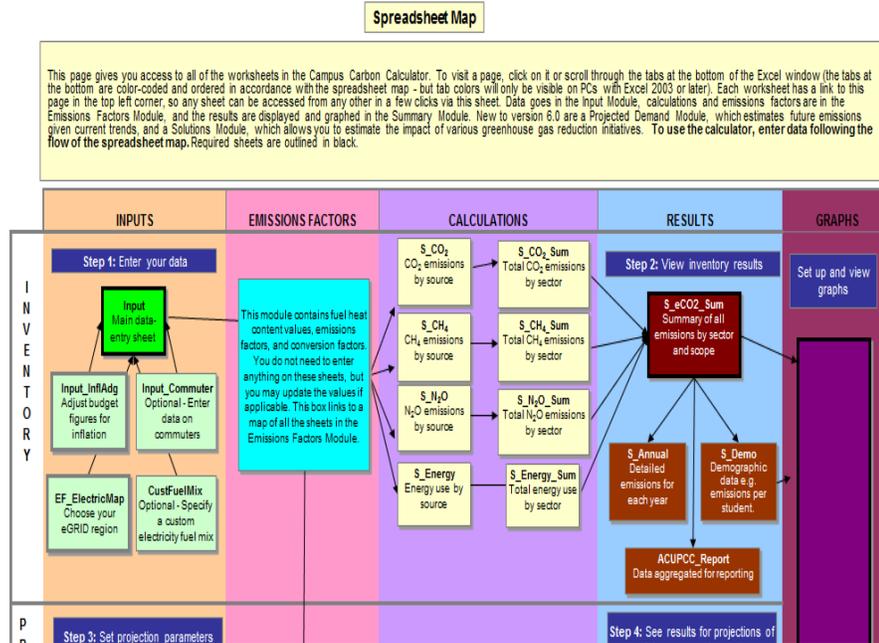
The next sheet is the Spreadsheet Map. This map illustrates the structure of the entire calculator. From here you can see that the calculator contains three major modules: Inventory, Projections, and Solutions.

In gray at the bottom is the Reference module, which contains a glossary, troubleshooting, and references for data used by the calculator.

Clicking on any box in the Spreadsheet Map will take you to that sheet. For now, click on Input (bright green box), where you will enter most of the data you've collected.

Part 3. Inputting Data

The first thing you'll see on the left-hand side of the Input sheet is a list of source types with checkboxes next to them. Here you can deselect any sources that are not relevant to your institution, to make the sheet easier to navigate. You can also deselect any sections you aren't currently working on. When you're ready to look at those sections, just recheck the boxes.

Institutional Data

Moving from left to right through the Input sheet, the next section is for Institutional Data. It may be tempting to just click in the appropriate cell and start typing, but remember from the color code that white cells should not be

edited. These cells contain the formulas that will do your calculations. Click the link at the top of the section, which will bring you to the sheet Input_InflAdj. Here, budget data (entered in the green cells) will be converted to 2005 dollars (white cells) for year-to-year consistency. The adjusted figures will automatically populate the appropriate cells in the Input sheet.

Note the small red triangles in the upper right-hand corner of some column headers. Hover over the triangles to display helpful notes about the column.

Once your budget data is entered, navigate back to the Input sheet to finish entering the rest of your Institutional Data (Population and Physical Size).

Scope 1 Emissions Sources

➢ **On-Campus Stationary Sources**

The section for On-Campus Stationary Sources is divided in half by a gray dashed line. The left side is for entering data from cogeneration plants, and the right side is for non-cogen data. Enter the amount of each fuel used in the units provided at the top of each column. Note that for cogeneration, you will also need to know the electric and steam output, and electric and steam efficiency, which might require some additional calculation and the help of your plant manager.

If your campus uses a fuel that is not listed, click on "Other" at the top of the last column in the section. This will bring you to to an emissions factor sheet, EF_Stationary, where you can enter the name and emissions factor for the fuel. This process of adding a non-listed fuel also applies to several other categories.

➢ **Direct Transportation Sources**

Enter the amount of fuel used by each type of vehicle in your organization's fleet.
At the end of this section there is a column where you can record electricity used by electric fleet vehicles. Data entered here will not be used in emissions calculations, and should also be reported in the appropriate section for electricity generation (On-Campus Stationary or Scope 2 Purchased Electricity).

➢ **Refrigerants & Chemicals**

This section is a bit different from the others. Since there are so many possible chemicals to choose from, it would not make sense to have a column for every one of them. Instead, each column can be assigned to a chemical of your choice. Clicking on the column header will display a drop-down button, and clicking on the button will show a list of chemicals to choose from.

If you choose "Other" from the list, you will have to go to the sheet EF_GWP to enter the chemical's name and 100-year GWP (global warming potential). Global warming potentials can be found [here](#).

➢ **Agricultural Sources**

The first part of this section deals with Fertilizer Application. Enter the pounds of synthetic fertilizer used and its nitrogen content (weighted if there are multiple mixtures). Next enter pounds of organic fertilizer and its nitrogen content (also weighted, if necessary).

The next part of the section is for Animal Husbandry, and may not apply to many institutions. Enter the number of each type of animal on campus.

Scope 2 Emissions Sources

The first source of Scope 2 emissions is Purchased Electricity. Since different fuels are used to produce electricity in different parts of the country, you will need to set the appropriate eGRID subregion for your location. Click the link to go to EF_ElectricMap.

This sheet contains two maps: one for pre-2006 eGrid regions and one for post-2006 regions. Find your location on both maps, and select the corresponding region code from the drop-down list for each time period.

If your institution purchases electricity that uses a different fuel mix than the standard regional mix, check the box that says "Use Custom Fuel Mix." This will reveal a link that will take you to the sheet CustFuelMix, where you can enter the percentage of each fuel type that contributes to your purchased electricity.

Next click the button labeled "Input Worksheet" to return to the sheet Input, where you can enter the amount of electricity consumed during the appropriate year(s).

The next two columns under Scope 2 are for purchased Steam and Chilled Water. Both require you to set the fuel mix and transmission losses by clicking the link at the top of the column, which will take you to the sheets EF_Steam and EF_Water, respectively. Enter the transmission loss in the first light blue column, and the percentages for each fuel in the light blue columns under the header "Generation Mix."
Note: There is no "Input Worksheet" button on these sheets, so you will have to scroll back to the Input sheet using the small arrow buttons in the far lower left-hand corner of the screen. Enter the energy consumed by Steam and Chilled Water production for the appropriate year(s).

Scope 3 Emissions Sources

➢ **Commuting**

The first section of Scope 3 is Commuting. By now you know that since these cells are white, there must be a special sheet for entering commuting data. Click the link to go to the sheet Input_Commuter.

Here you will enter all of the data you collected on commuting behavior. Pay close attention to the units asked for in each column, since they might not be the same as what you collected.

This sheet is broken down into three sections: Student, Faculty, and Staff. Go through each section from left to right and enter the information asked for in each column header.

Note: The trip distribution data should be entered as percentages of the *total student(or faculty or staff) population* using each mode. If you conducted a survey, your trip distribution percentages may be percentages of *commuting students(or faculty or staff)* only. For example,

> 75% of your student body commutes to campus. You surveyed only the commuter students, and found that 63% of them drive alone, 20% take the bus, and 17% carpool. In order to find the percentage of the total student population that uses each mode, multiply that mode's percentage by 0.75 (the percentage of students who commute):

> > a.   0.75 * 63% = 47.25% of all students drive alone
> > b.   0.75 * 20% = 15% of all students take the bus
> > c.   0.75 * 17% = 12.75% of all students carpool

> In this scenario, it is assumed that the remaining 25% of students either walk or ride a bike. If you do not have specific data on the distribution of trips between walking and biking, you can either estimate or simply enter 25% in one column or the other. Since these activities do not produce emissions, the column you choose will not affect your calculations.

➢   **Directly Financed Outsourced Travel, Study Abroad Travel, and Student Travel to/from Home**

For each mode of travel, enter the total miles traveled for the appropriate year.

Student travel to/from home is optional. Your institution may not consider these emissions to fall within its operational boundaries, since the decision to attend a school far from the student's home is up to the student.

➢ **Solid Waste**

Enter the amount of waste sent to each type of disposal destination. For Incinerated Waste, only enter waste that is not incinerated on campus for electricity production.

➢ **Wastewater**

Enter the amount of water that went to a Septic System or that was treated in your institution's Central Treatment System. Choose the appropriate column depending on the type of treatment system used (Aerobic, Anaerobic, or Anaerobic Digestion).

➢ **Paper**

This section is similar to the Refrigerant section, in that you choose from a drop-down list to determine the type of paper reported in each column. Click where it says "Uncoated Freesheet" (which is the default for all columns) to reveal the drop-down button. Select the type of paper you want, and then enter the percentage of recycled content in the cell below.

Enter the pounds of that type of paper purchased in each relevant year, then repeat in the next column for a new paper type.

➢ **Offsets**

This section is separated into two sections. Offsets with Additionality are emissions offset by projects that would not have happened as part of "business as usual." Non-Additional Renewable Energy Certificates are offsets purchased as required by law or regulation.

Enter the total offsets for each category, using the appropriate units from the column header.

Part 4. Calculations

Once you've entered all of your data, the workbook will do all of the calculations for you. If you'd like some clarification of what's happening behind the scenes, continue reading for a primer on emissions factors.

*What are emissions factors, and how are they applied to my data?*

According to the EPA, an emission factor can be defined as follows:

> An emission factor is a representative value that relates the quantity of a pollutant released to the atmosphere with an activity associated with the release of that pollutant. These factors are usually expressed as the weight of pollutant divided by a unit weight, volume, distance, or duration of the activity emitting the pollutant (e. g., kilograms of particulate emitted per megagram of coal burned).
> (http://www.epa.gov/air/aqmportal/management/emissions_inventory/emission_factor.htm)

When a fuel is burned, there is a fixed ratio between the number of molecules of fuel and the number of molecules of the products of combustion.

$$CH_4 + 2O_2 \longrightarrow CO_2 + 2H_2O$$

In this example, one molecule of methane reacts with two molecules of oxygen to produce one molecule of CO2 and two molecules of H2O.
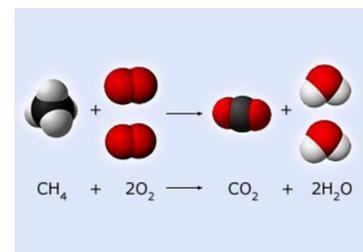
Emission factors also take into account the units of weight or volume that are typically used for a given fuel, and the desired units for emissions (usually metric tons of CO2).

So in general, the calculator goes through the following steps by applying emissions factors to your input:

- Convert from input unit to molecules of fuel
- Convert from molecules of fuel to molecules of GHG emitted
- Convert from molecules of GHG emitted to mass of GHG emitted in metric tons

Part 5. Calculator Outputs

The CCC displays the results of your inventory in several ways:

- By GHG and source, in the sheets labeled "S_[GHG]"
- By GHG and sector, in the sheets labeled "S_[GHG]_Sum"
- As a summary of all emissions as CO2 equivalents, in the sheet "S_eCO2_Sum"
- As an annual summary of emissions by sector in the sheet "S_Annual"
- Normalized by various institutional metrics in the sheet "S_Demo"
- As a summary of ACUPCC-required data in the sheet "ACUPCC_Reporting"

The sheet "GraphControl" allows you to produce an almost endless number of graphs based on your input.

The easiest way to find the sheet you want is to go to the Spreadsheet Map: