



## **Municipal Carbon Footprint**

For more information, see [www.sustainablejersey.com](http://www.sustainablejersey.com).

A Municipal Carbon Footprint measures the amount of greenhouse gas (GHG) emissions produced by local government operations in a given year. Creating a footprint is the first step to reducing municipal GHG emissions. The footprint will detail the sources of emissions so that actions can be focused on the largest emitters. The footprint will also enable a municipality to track its progress and determine if new policies are having an impact. Reporting your footprint can be a powerful tool for galvanizing public interest and support for new actions.

Completing a Municipal Carbon Footprint requires an accounting-like inventory of all the sources of GHG in your buildings, fleet, and operations.

### **Recommended prerequisite: Inventory and Audit All Buildings**

Completion of the Sustainable Jersey action “Inventory and Audit All Buildings” is recommended prior to undertaking this action as it requires collection of the same utility usage data that will be used to calculate the Municipal Carbon Footprint.

### **Recommended follow-up action: Community Carbon Footprint**

A Sustainable Jersey action and calculation spreadsheet is also available for a “Community Carbon Footprint” which combines the data from this “Municipal Carbon Footprint” action with community-wide data that include emissions from homes and businesses.

### **Who should lead and be involved with this action?**

You will need staff to gather data from bills and other records, and a staff member or volunteer to do some basic calculations that Sustainable Jersey provides. Reporting and acting on the data will require more policy minded participation from officials, staff, and volunteers. Depending on a local government’s organizational structure and accounting practices, this action may require participation and data collection from one or more of the following:

- Accounts payable

- Departmental records
- Engineering department
- Facility engineer
- Fuel vendors/suppliers
- Public Works
- Real estate department
- Utility provider

## **Timeframe**

Data collection and analysis may take a month to a year depending on the availability of data and staff resources.

## **Project Costs and Resource Needs**

The cost of developing a Carbon Footprint varies significantly. The footprint can be accomplished with elbow grease by municipal staff and/or volunteers at minimal cost; however, hiring a consultant to perform the task, or purchasing software to assess the results, could range between \$5,000 and \$20,000. Larger municipalities and cities with complex organizational structures may require more work.

## **Why is it Important?**

The greenhouse effect results from naturally occurring heat-trapping gases in the atmosphere, such as carbon dioxide, water vapor, and methane. Because human activities have now sharply increased the presence of greenhouse gases in the atmosphere, the earth is trapping more heat and is warming rapidly.

The Intergovernmental Panel on Climate Change (IPCC) is the major international scientific effort to understand climate change and what can be done. According to a 2007 report issued by the IPCC, "Warming of the climate system is unequivocal, as is now evident from observations of increases in global average air and ocean temperatures, widespread melting of snow and ice, and rising global average sea level."<sup>1</sup>

Global warming poses serious threats, such as rising sea levels, changes in rainfall patterns, severe droughts and floods, more intense and frequent hurricanes and other windstorms, and new pathways for disease. With vast assets in facilities, parks, roads, bridges, waterfronts, and water and sewage networks, climate change creates significant risks for local governments in New Jersey.

The Stern Review, *The Economics of Climate Change*, concluded that the risks of climate change could be substantially reduced if greenhouse gas levels in the

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<sup>1</sup> Intergovernmental Panel on Climate Change 2007 Synthesis Report, [http://www.ipcc.ch/pdf/assessment-report/ar4/syr/ar4\\_syr.pdf](http://www.ipcc.ch/pdf/assessment-report/ar4/syr/ar4_syr.pdf)

atmosphere can be stabilized between 450 and 550 ppm carbon dioxide equivalent (CO<sub>2</sub>e).<sup>2</sup> The Stern Review's conclusion is that "stabilization...requires that annual emissions be brought down to more than 80% below current levels."

This is the same target established by New Jersey's Global Warming Response Act, which calls for a reduction in greenhouse gas emissions to 1990 levels by 2020, approximately a 20 percent reduction, followed by a further reduction of emissions to 80 percent below 2006 levels by 2050.

Meeting greenhouse gas emission goals set by the state requires commitments at the local level. Creating a Municipal Carbon Footprint establishes a baseline upon which progress toward greenhouse gas reduction targets can be evaluated. It helps develop an understanding of GHG emissions appropriate for making well-informed decisions regarding local policies and actions to reduce such emissions.

### **What to do, and how to do it ("How to")**

To establish a Municipal Carbon Footprint, also known as a Greenhouse Gas Inventory, data are collected in three areas (known as "scopes"), one of which is optional for receiving Sustainable Jersey points. The required data reporting scopes are:

- Scope 1: direct emissions from stationary combustion of fuels like natural gas, heating oil, coal, and diesel and mobile combustion of fuels in fleet transportation sources (e.g., cars, trucks, off-road equipment), and
- Scope 2 or indirect emissions from consumption of purchased or acquired electricity.
- The optional reporting category (Scope 3) deals with emissions related to solid waste disposal and recycling. It is optional because reliable data is not always available at the local level, and because this scope has the smallest impact on your total footprint. However, if data is available we recommend that you attempt to measure it.

Below we have listed the requirements for earning points for this action:

In order to earn points, your submission must meet the following standards:

1. You must have calculated your Municipal Carbon Footprint within the 3 year period prior to submission for Sustainable Jersey certification.
2. The Municipal Carbon Footprint should: Establish a Baseline Year; calculate emissions from Scope 1 direct emissions from stationary combustion of fuels like

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<sup>2</sup> Nicholas Stern, *The Economics of Climate Change*. Cambridge, U.K.: Cambridge University Press, 2007, p. xvi.

natural gas, heating oil, coal, and diesel; calculate emissions from Scope 2 indirect emissions from consumption of purchased or acquired electricity, and calculate emissions from Scope 1 direct emissions from mobile combustion of fuels in vehicle fleet (e.g., cars, trucks, off-road equipment). (Optional) Calculate emissions from waste related activities.

A spreadsheet is provided to assist with calculations and is available to download at: <http://www.sustainablejersey.com/editor/doc/p4!151.xls>.

It includes the following three worksheets:

- Worksheet 1, "Municipal Carbon Footprint," is used to enter your data on usage totals and then calculate emissions. It will produce the total carbon footprint from local government activities and will be used in all 5 steps.
- Worksheet 2, "Electric, Gas & Heating Oil," should be reproduced for each municipal facility to determine usage of electricity, natural gas, and heating oil during the selected baseline year. It will be used in Steps 2 and 3.
- Worksheet 3, "Vehicle CH<sub>4</sub> & N<sub>2</sub>O," should be used to calculate the emissions of methane and nitrous oxide from all vehicles in the municipal fleet. It will be used in Step 4.

Below, we have provided extensive guidance and recommendations for implementing the action. You do not need to follow this guidance exactly as long as your finished product meets the requirements

### **Step 1: Establish a Baseline Year**

A baseline is the reference point against which you will measure greenhouse gas emissions increases and decreases over time. To select a baseline year, determine the earliest year for which ALL the required data (see list of data needs below) can be assembled to complete an emissions report. If you are planning to conduct a Community Carbon Footprint in addition to the Municipal Carbon Footprint, consider community data collection requirements and data availability when selecting a baseline year.

Note: For municipalities serviced by PSEG, the baseline year should be 2008 – the earliest year for which PSEG can provide complete municipal-wide energy use data. In general, check with your local utility provider for the earliest year for which energy data is kept at the municipal level.

### **Required data for Municipal Carbon Footprint**

The following information must be gathered in order to complete Worksheet 1: Municipal Carbon Footprint:

- Fuel used in combustion for stationary sources (buildings, not vehicles) (therms of natural gas, gallons of heating oil, etc) during the baseline year for each municipal facility.
- For each stationary combustion fuel type, annual usage in the baseline year divided into four categories of municipal operations:
  - Building & Facilities
  - Street Lights & Traffic Signals
  - Water & Wastewater Treatment Facilities
  - Other
- Monthly kilowatt-hours of electricity consumption for each municipal facility.
- Annual kilowatt-hours of electricity consumption divided into four categories of municipal operations:
  - Building & Facilities
  - Street Lights & Traffic Signals
  - Water & Wastewater Treatment Facilities
  - Other
- Annual fuel consumption of vehicle fleet during the baseline year in gallons of each fuel type including diesel, motor gasoline, compressed natural gas (CNG), etc (*If this information is not available, estimates must be made using mileage data*).
- Annual mileage of each vehicle type during baseline year (*there are 30 possible vehicle types determined by model year and vehicle characteristics*).

### **Optional data**

The following information must be gathered in order to complete optional Step 5, emissions from waste-related activities:

- Tons of waste generated in each of 34 categories.
- For each waste category, tons recycled, tons landfilled, and tons combusted.

NOTE: You can acquire a list of all natural gas and electric service providers for your municipality here: [http://www.njua.com/html/find\\_your\\_utility\\_companies.cfm](http://www.njua.com/html/find_your_utility_companies.cfm).

### **Step 2: Calculate emissions from Scope 1: direct emissions from stationary combustion of fuels like natural gas, heating oil, coal, and diesel.**

Follow these three steps and enter the data into the worksheet to calculate the emissions:

For more information, please refer to Chapter 6: Facilities- 6.1 Stationary Combustion of the Local Government Operations Protocol. Available for download at [http://www.climateregistry.org/resources/docs/protocols/grp/GRP\\_3.1\\_January2009.pdf](http://www.climateregistry.org/resources/docs/protocols/grp/GRP_3.1_January2009.pdf)

- A. Determine the annual consumption of each fuel combusted at your facilities;
- B. Calculate the total carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>), and nitrous oxide (N<sub>2</sub>O) emissions for each fuel;

C. Convert CH<sub>4</sub> and N<sub>2</sub>O emissions to CO<sub>2</sub> equivalent (CO<sub>2</sub>e) and determine total CO<sub>2</sub>e emissions.

A. To determine the annual consumption of each fuel combusted at your facilities.

Identify all fuels combusted at your facilities. Determine annual consumption for each fuel by reading individual meters or from utility bills, fuel receipts or purchase records.

Total Annual Fuel Consumption =  
Annual Fuel Purchases - Annual Fuel Sales + Fuel Stock at Beginning of Year - Fuel Stock at End of Year

Reproduce a copy of Worksheet 2, "Electric, Gas & Heating Oil," for each municipal facility/category. Complete relevant sections to calculate total fuel consumption for the selected baseline year.

Compile the annual usage of each facility into four municipal operations categories:

- \*Building & Facilities
- \*Street Lights & Traffic Signals
- \*Water and Wastewater Treatment Facilities
- \*Other

Enter the annual usage of each fuel type in each of these operations categories under Step 2 in Worksheet 1, "Municipal Carbon Footprint."

B. To calculate the total CO<sub>2</sub>, CH<sub>4</sub>, and N<sub>2</sub>O emissions for each fuel.

**For natural gas and heating oil, emissions of CO<sub>2</sub>, CH<sub>4</sub>, and N<sub>2</sub>O will automatically be calculated by Worksheet 1, "Municipal Carbon Footprint." For more information about how these emissions are calculated, see below.**

For other fuel types in use, emissions data must be gathered from the Energy Information Administration website:

<http://www.eia.doe.gov/oiaf/1605/excel/Fuel%20Emission%20Factors.xls>

The formulas are set up to use the following emissions factors as defined by the U.S. Energy Information Administration:

Emissions from Natural Gas

116.9773 pounds of CO<sub>2</sub> per Million BTU  
0.000005 metric tons CH<sub>4</sub> per Million BTU  
0.0000001 metric tons N<sub>2</sub>O per Million BTU

Emissions from Heating Oil

173.7242 pounds of CO<sub>2</sub> per Million BTU  
0.00001 metric tons CH<sub>4</sub> per Million BTU

0.0000006 metric tons N<sub>2</sub>O emissions per Million BTU

Note that the Energy Information Administration provides carbon dioxide emissions in pounds. Therefore, CO<sub>2</sub> emissions must be converted to metric tons (1 pound (lb) = 0.0004535927 metric tons) to be added to the total CO<sub>2</sub> equivalent emissions. Similarly, emissions factors for methane and nitrous oxide are provided in grams (g) per Million BTU. Therefore, the calculation of these emissions should include conversion from grams to tons (1 gram = 1.0 × 10<sup>-6</sup> metric tons).

C. Convert CH<sub>4</sub> and N<sub>2</sub>O emissions to CO<sub>2</sub> equivalent (CO<sub>2</sub>e) and determine total CO<sub>2</sub>e emission.

**Worksheet 1, “Municipal Carbon Footprint,” will automatically convert methane (CH<sub>4</sub>) and nitrous oxide (N<sub>2</sub>O) emissions to metric tons of CO<sub>2</sub> equivalents.**

The method of calculation is also outlined below.

Global Warming Potential (GWP) factors represent the ratio of the heat-trapping ability of each greenhouse gas relative to that of carbon dioxide. For example, the GWP of methane is 25 because one metric ton of methane has 25 times more ability to trap heat in the atmosphere than one metric ton of carbon dioxide. To convert emissions of non-CO<sub>2</sub> gases to units of CO<sub>2</sub> equivalent, multiply the emissions of each gas in units of mass (e.g., metric tons) by the appropriate GWP factors in the following table.

Common Name	Formula	GWP
Carbon Dioxide	CO <sub>2</sub>	1
Methane	CH <sub>4</sub>	25
Nitrous Oxide	N <sub>2</sub> O	298

Source: Global Warming Potentials (GWP) from the IPCC’s Fourth Assessment Report [http://www.ipcc.ch/publications\\_and\\_data/ar4/wg1/en/ch2s2-10.html](http://www.ipcc.ch/publications_and_data/ar4/wg1/en/ch2s2-10.html)

CO<sub>2</sub> Emissions (metric tons CO<sub>2</sub>e) = CO<sub>2</sub> Emissions (metric tons) × 1 (GWP)

CH<sub>4</sub> Emissions (metric tons CO<sub>2</sub>e) = CH<sub>4</sub> Emissions (metric tons) × 25 (GWP)

N<sub>2</sub>O Emissions (metric tons CO<sub>2</sub>e) = N<sub>2</sub>O Emissions (metric tons) × 298 (GWP)

Total Emissions (metric tons CO<sub>2</sub>e) = CO<sub>2</sub> + CH<sub>4</sub> + N<sub>2</sub>O (metric tons CO<sub>2</sub>e)

**Step 3: Calculate emissions from Scope 2 indirect emissions from consumption of purchased or acquired electricity.**

Follow these two steps:

For additional information please refer to Chapter 6: Facilities – 6.2 Electricity Use of ICLEI’s Local Government Operations Protocol.

[http://www.climateregistry.org/resources/docs/protocols/grp/GRP\\_3.1\\_January2009.pdf](http://www.climateregistry.org/resources/docs/protocols/grp/GRP_3.1_January2009.pdf)

A. Determine the annual electricity use for each local government owned and operated facility and operation.

B. Calculate the total CO<sub>2</sub>e emissions.

A. To determine the annual electricity use for each local government owned and operated facility and operation.

Collect monthly utility bills and record the monthly kilowatt-hours (electricity) consumed for each municipal facility during the baseline year. Record this data in the appropriate section of Worksheet 2, “Electric, Gas and Heating Oil,” reproduced for each municipal facility.

This methodology was adapted from the Climate Registry’s *Electricity Calculation Tool*, 2008, available at

[http://www.theclimateregistry.org/downloads/Electricity\\_Calculation\\_Tool.xls](http://www.theclimateregistry.org/downloads/Electricity_Calculation_Tool.xls).

Compile the annual electricity consumption of each facility into four municipal operations categories:

\*Building & Facilities

\*Street Lights & Traffic Signals

\*Water and Wastewater Treatment Facilities

\*Other

Enter the annual electricity consumption in each of these categories under Step 3 in Worksheet 1, “Municipal Carbon Footprint.”

B. Calculate the Carbon dioxide equivalent (CO<sub>2</sub>e) emissions for electricity use.

**Worksheet 1, “Municipal Carbon Footprint,” will automatically calculate the emissions of CO<sub>2</sub>e once the annual kilowatt-hours of electricity consumption are entered for each operations category.**

The following factor has been used in the calculations:

1312 lbs of CO<sub>2</sub>e per MWh

This factor was provided by the NJ Department of Environmental Protection and is based on the 2008 average mix figure of 1219.54 lbs of CO<sub>2</sub> (source: PJM Environmental Information Services, Inc. Generation Attribute Tracking System <https://gats.pjm-eis.com/>), augmented to account for line losses and to include N<sub>2</sub>O and CH<sub>4</sub> emissions from power plants.

**Step 4: Calculate emissions from Scope 1 direct emissions from mobile combustion of fuels in vehicle fleet (e.g., cars, trucks, off-road equipment).**

Emissions from mobile combustion can be estimated based on vehicle fuel use and miles traveled data. CO<sub>2</sub> emissions, which account for the majority of emissions from mobile sources, are directly related to the quantity of fuel combusted and thus can be calculated using fuel consumption data. CH<sub>4</sub> and N<sub>2</sub>O emissions depend more on the emission control technologies employed in the vehicle and distance traveled. Calculating emissions of CH<sub>4</sub> and N<sub>2</sub>O requires data on vehicle characteristics (which takes into account emission control technologies) and vehicle miles traveled. Because of this distinction, guidance on calculating CO<sub>2</sub> is provided separately from guidance on calculating CH<sub>4</sub> and N<sub>2</sub>O.

**Follow these four steps and enter the data into the worksheet to calculate the emissions:**

For additional information please refer to Chapter 7: Vehicle Fleet of ICLEI's Local Government Operations Protocol.

[http://www.climateregistry.org/resources/docs/protocols/grp/GRP\\_3.1\\_January2009.pdf](http://www.climateregistry.org/resources/docs/protocols/grp/GRP_3.1_January2009.pdf)

- A. Identify total annual fuel consumption by fuel type\*;
- B. Calculate the total CO<sub>2</sub> emissions for each fuel;
- C. Calculate the total CH<sub>4</sub> and N<sub>2</sub>O emission for each fuel;
- D. Convert CH<sub>4</sub> and N<sub>2</sub>O emissions to CO<sub>2</sub> equivalent (CO<sub>2</sub>e) and determine total CO<sub>2</sub>e emission.

**\*If you do not have fuel use data, but have detailed information about your fleet and annual mileage by vehicle, you may estimate your fuel consumption using the following steps:**

- \*Identify the vehicle make, model, fuel type, and model years for all the vehicles you operate;
- \*Identify the annual distance traveled by vehicle type;
- \*Determine the fuel economy of each vehicle; and
- \*Convert annual mileage to fuel consumption.

- A. To identify total annual fuel consumption by fuel type:

Find the annual fuel consumption for every type of fuel used (gasoline, diesel, biodiesel, etc). This number includes bulk purchases and stored fuel, as well as any other fuel purchased throughout the year. Use the following equation to determine annual fuel usage for a given fuel type:

Total annual fuel consumption (gallons) =  
Total annual fuel purchases  
+ Amount stored at beginning of the year  
- Amount stored at end of the year

Or, fuel consumption can be determined with annual mileage data. Identify the vehicle make, model, model years, and fuel type for all local government owned and operated vehicles. Then add up annual mileage for each vehicle type. Convert the annual mileage into fuel consumption by determining vehicle fuel economies and using the following formula developed by the Environmental Protection Agency (EPA):

U.S. Environmental Protection Agency, <http://www.fueleconomy.gov/feg/findacar.htm>.

$$\begin{aligned} &\text{Total annual fuel consumption (gallons)} = \\ &\text{Total miles} \\ &\div [(\text{Fuel Economy City mpg} * .55) + (\text{Fuel Economy Highway mpg} * .45)] \end{aligned}$$

The EPA estimates that 45% of mileage is from time spent on a highway, and 55% of accrued mileage is from time spent driving in a town or city. You may choose to make a different estimate of your fleet's behavior.

Sum the total annual fuel consumption for each vehicle type to calculate the total usage for each fuel type. Enter these data into Worksheet 1.

B. Calculate the total CO<sub>2</sub> emissions for each fuel and convert to metric tons.

**Worksheet 1 will automatically calculate CO<sub>2</sub> emissions for gasoline, diesel and CNG vehicle fuels.**

For other types of vehicle fuels, specify the fuel in Worksheet 1 under Step 4, and enter the total usage in gallons. See the Fuel Emission Factors spreadsheet provided by the Energy Information Administration at <http://www.eia.doe.gov/oiaf/1605/excel/Fuel%20Emission%20Factors.xls>. The emissions factors in Kilograms CO<sub>2</sub> Per Million Btu should be selected from the right hand column of "Table 2. Carbon Dioxide Emission Factors for Transportation Fuels." The emissions will be calculated automatically in the Worksheet once the emission factor and gallons of usage are entered.

For more information about how these emissions are calculated, see below.

The general formula is:

$$\text{Fuel A CO}_2 \text{ Emissions (metric tons)} = \text{Fuel Consumed (gallons)} \times \text{Emission Factor (kg CO}_2\text{/gallon)} \div 1,000 \text{ (kg/metric ton)}$$

The following emissions factors are already incorporated into Worksheet 1:

CO<sub>2</sub> emissions from motor gasoline = 19.54 lbs CO<sub>2</sub> per gallon

CO<sub>2</sub> emissions diesel fuel = 22.37 lbs CO<sub>2</sub> per gallon

CO2 emissions natural gas = 120.36 lbs CO2 per 1000 cubic feet

Source: Fuel Emission Factors provided by the Energy Information Administration  
<http://www.eia.doe.gov/oiaf/1605/excel/Fuel%20Emission%20Factors.xls>.

C. To calculate the total CH4 and N2O emission for each vehicle type:

Methane and nitrous oxide emissions must be calculated based on mileage, not on gallons of fuel consumption. Emissions vary based on type of vehicle and model year.

**Use Worksheet 3, “Vehicle CH4 & N2O,” to enter annual mileage during baseline year for each vehicle type.** Note that there are 30 vehicle types so completion of this section requires detailed information on the model years and baseline year mileage of all vehicles in the municipal fleet. (The information is collected as part of the “Green Fleets” action). Estimates are permitted where exact figures cannot be obtained.

**Worksheet 3 will automatically calculate CH4 and N2O emissions based on the following formulas:**

Vehicle Type A CH4 Emissions (metric tons) = Annual Distance (miles) X Emission Factor (g CH4/mile) / 1,000,000 g/metric ton.

Vehicle Type A N2O Emissions (metric tons) = Annual Distance (miles) X Emission Factor (g N2O/mile) / 1,000,000 g/metric ton.

D. Convert CH4 and N2O emissions to CO2 equivalent (CO2e) and determine total CO2e emission.

**Enter the Metric Tons of CH4 and N2O calculated on Worksheet 3 into Step 4 of Worksheet 1, “Municipal Carbon Footprint.” Worksheet 1 will automatically convert these emissions to metric tons of CO2 equivalents. See section C of Step 2 for method of calculation.**

**Step 5: (Optional) Calculate emissions from waste-related activities.**

Local governments are often responsible for providing solid waste services to their communities. This may include activities like collecting and transporting waste, sorting waste, managing recycling and composting programs and facilities, and managing landfills. However, experience indicates that it is often very challenging for local governments to find reliable data on the amount of waste generated from local government operations. As a result, Step 5 is optional.

Local governments that wish to calculate emissions from waste related activities are encouraged to use the EPA’s Waste Reduction model (WARM) for calculating the

lifecycle emissions from waste generation. This tool is available as an excel spreadsheet or a web-based calculator:

**US Environmental Protection Agency: Waste Reduction Model**

[http://www.epa.gov/climatechange/wycd/waste/calculators/Warm\\_home.html](http://www.epa.gov/climatechange/wycd/waste/calculators/Warm_home.html)

The web-based calculator will require input of an alternative management scenario as well as existing waste management figures. However, the numbers entered in the alternative management scenario will not affect the output needed for the Municipal Carbon Footprint. Identical figures may be entered in this section so that the calculator will move to the next step.

The calculator will ask for tons of waste generated in each of 34 categories. For each waste category, it will be necessary to indicate tons recycled, tons landfilled, and tons combusted.

For output, select  
“Metric Tons of Carbon Dioxide Equivalent (MtCO<sub>2</sub>e)”

Choose  
“create summary”

Note the figure of  
“GHG Emissions from Baseline Waste Management (MtCO<sub>2</sub>e)”

**Add this figure to Step 5 of Worksheet 1, “Municipal Carbon Footprint.”**

**What to submit to get credit/points**

In order to earn points, your submission must meet the following standards:

1. You must have calculated your Municipal Carbon Footprint within the 3 year period prior to submission for Sustainable Jersey certification.
2. The Municipal Carbon Footprint should: Establish a Baseline Year; calculate emissions from Scope 1 direct emissions from stationary combustion of fuels like natural gas, heating oil, coal, and diesel; calculate emissions from Scope 2 indirect emissions from consumption of purchased or acquired electricity, and calculate emissions from Scope 1 direct emissions from mobile combustion of fuels in vehicle fleet (e.g., cars, trucks, off-road equipment). (Optional) Calculate emissions from waste related activities.
3. To satisfy the action for establishing a Municipal Carbon Footprint, you will need to provide the reporting and verification requirements specified in this action. Data must be collected for the Scope 1 and Scope 2 emissions of three greenhouse gases from local government operations. A spreadsheet file is provided with worksheets that will assist in

calculating the Municipal Carbon Footprint. Submit the completed spreadsheet to Sustainable Jersey.

A spreadsheet is provided to assist with calculations and is available to download at: <http://www.sustainablejersey.com/editor/doc/p4!151.xls>.

It includes the following three worksheets:

- Worksheet 1, “Municipal Carbon Footprint,” is used to enter your data on usage totals and then calculate emissions. It will produce the total carbon footprint from local government activities and will be used in all 5 steps.
- Worksheet 2, “Electric, Gas & Heating Oil,” should be reproduced for each municipal facility to determine usage of electricity, natural gas, and heating oil during the selected baseline year. It will be used in Steps 2 and 3.
- Worksheet 3, “Vehicle CH<sub>4</sub> & N<sub>2</sub>O,” should be used to calculate the emissions of methane and nitrous oxide from all vehicles in the municipal fleet. It will be used in Step 4.

Submit the following documentation to verify the action was completed to the above standards. (Log in to the password protected webpage where you submit your online application for certification to write in the text box and upload documents).

In the text box, please provide a short narrative (300 words max) to summarize what you accomplished and the general steps needed to accomplish it.

1. In “Upload File 1,” submit the documents that substantiate the numbers you input in the worksheet that calculated the carbon footprint. This will include all energy usage numbers that you have collected as well as their sources.

2. In “Upload File 2,” submit the results from the Carbon Footprint calculator located here: <http://www.sustainablejersey.com/editor/doc/p4!151.xls>.

**IMPORTANT NOTES:** Please excerpt relevant information from large documents. Please remember that your submissions will be viewable by the public as part of your certified report.

### **Spotlight: What NJ towns are doing**

#### **Maplewood’s CO<sub>2</sub> Inventory**

<http://maplewoodisgreen.org/carbon-footprint>

### **Resources**

#### **Technical Resources**

#### **Energy Information Administration Fuel Emission Factors**

<http://www.eia.doe.gov/oiaf/1605/excel/Fuel%20Emission%20Factors.xls>

**EPA Guidance on Mobile Combustion Sources**

[http://www.epa.gov/stateply/documents/resources/mobilesource\\_guidance.pdf](http://www.epa.gov/stateply/documents/resources/mobilesource_guidance.pdf)

**Intergovernmental Panel on Climate Change Fourth Assessment Report**

[http://www.ipcc.ch/publications\\_and\\_data/ar4/wg1/en/ch2s2-10.html](http://www.ipcc.ch/publications_and_data/ar4/wg1/en/ch2s2-10.html)

**Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990 – 2007**

<http://www.epa.gov/climatechange/emissions/usinventoryreport.html>

**Local Government Operations Protocol for the quantification and reporting of greenhouse gas emissions inventories, January 2009**

[http://www.climateregistry.org/resources/docs/protocols/grp/GRP\\_3.1\\_January2009.pdf](http://www.climateregistry.org/resources/docs/protocols/grp/GRP_3.1_January2009.pdf)

**General Resources**

**CACP- Clean Air and Climate Protection Software**

[www.cacpsoftware.org](http://www.cacpsoftware.org)

**California Climate Action Registry**

[www.climateregistry.org](http://www.climateregistry.org)

**The Climate Registry**

<http://www.theclimateregistry.org/>

**Energy Information Administration**

<http://www.eia.doe.gov/>

**ICLEI – Local Governments for Sustainability USA (ICLEI USA)**

[www.icleiusa.org](http://www.icleiusa.org)

**Intergovernmental Panel on Climate Change**

<http://www.ipcc.ch/index.htm>

**Mayors Climate Protection Center**

<http://usmayors.org/climateprotection/about.htm>

**National Conversation on Climate Action**

<http://www.climateconversation.org/>

**State of New Jersey – Global Warming**

<http://www.state.nj.us/globalwarming/index.shtml>

**U.S. EPA - Clean Energy-Environment Municipal Network**

<http://www.epa.gov/cleanenergy/energy-programs/state-and-local/local.html>

