Greenhouse Gas Inventory

Air pollution from fossil fuels, like carbon dioxide and methane, causes climate change. A first step to figuring out where to focus your town's clean energy efforts is to do an inventory of where your pollution is coming from, or a Greenhouse Gas Inventory.

What is a Greenhouse Gas Inventory?
A Greenhouse Gas (GHG) Inventory estimates the amount of greenhouse gas emissions from a town or city, as well as by power plants that supply electricity to the town's customers. An inventory usually lists the energy use and resulting emissions of municipal buildings, residences, and businesses. Emissions come from categories like:
- Electricity
- Building heat (oil and natural gas) in commercial, residential and municipal buildings
- Transportation (gasoline and diesel)
- Waste, or garbage

Why is it important to know where our greenhouse gas pollution is coming from?
It is important to do an inventory in order to get a baseline estimate of the energy use and GHG emissions within your community, so that GHG emission reduction targets can then be set. This will help your town figure out where you can have the most impact.

This is just one tool in a toolkit for involving town officials and residents in making your town more sustainable.

What are the steps for doing a GHG Inventory?
1. Pull together a team and divide up the work.
2. Figure out the scope of your inventory. (Are you looking only at municipal operations or at the community as a whole?)
3. Identify the base year. (You can use Mass Save's data from 2013.)
4. Identify sources of data for inventory (see below).
5. Collect and categorize data.
6. Calculate base year emissions.
7. Think about how to use this data. How can you involve your community in next steps?
8. Once you have a clear idea of where your climate change causing pollution is coming from now, you need to make a plan! Check out our fact sheet on how to make a climate action plan.

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Data Sources

- An easy tool is the Local Energy Action Dashboard by the Metropolitan Area Planning Council (MAPC) with estimates based on the year 2015 for residential, commercial, and industrial electricity, gas, and heating oil. This includes emissions calculations and compares your town with neighbors! For more detailed and do-it-yourself data you can use the options below.

- Electricity
    - Utility Companies (National Grid, Eversource) are the main places to get data on electricity usage for towns. This can be broken down by residential and commercial use.
    - Mass Save has a data tool. Click on your town on the map, and you will get data (only for 2013) on residential and commercial electricity and natural gas usage.
    - If your town or city has a Community Choice Aggregation program, the utilities are required to give your community data on electricity use.
    - In order to get data on municipal buildings, look at the town's utility bills. It is helpful to separate out the municipal energy use, in order to compare emissions from municipal, commercial, and residential buildings.

- Building heat (oil and/or natural gas)
    - Utilities can provide data on gas usage (see Mass Save link above). The number of homes or businesses using natural gas can be subtracted out from the total number of homes or businesses to get an estimate of heating oil use.
    - There is U.S. Census data on type of home heating fuel. Click on the link below, put in the town or city, and then click on "Physical Housing Characteristics" under "2014 American Community Survey."
    - Find heating oil and gas usage for 2015 Local Energy Action Dashboard above.

- Transportation
    - For car emissions data, you can contact the Metropolitan Area Planning Council. They have compiled data from the Registry of Motor Vehicles, and can give you the number of cars owned, the years of the cars, and the miles driven.

- Waste
    - Data on the amount of waste being landfilled or incinerated, and the associated emissions, can be obtained from the waste diversion facility itself. You can use this EPA calculator to calculate emissions from waste.

- Calculating emissions
    - The EPA has an online tool to calculate carbon dioxide emission equivalents for burning gasoline and using electricity, heating oil and natural gas
    - Local Governments for Sustainability (ICLEI) also has an online tool for calculating GHG emissions called ClearPath, and it is free for all local governments to use.

Success Stories

Lexington

Sustainable Lexington had a team of five people and two volunteer interns conducting their inventory. They used 2012 as a base year, and got emissions data for electricity, heat, transportation, waste disposal, and food production/consumption. All of the data was local except for food. They also later added data from natural gas leaks, which added 10% to the town's total emissions.

The inventory revealed that 66% of the town's emissions were coming from buildings, and that almost a third of total emissions were from industry. The inventory also showed that only 2% of emissions were from municipal buildings. Mark Sandeen (from Sustainable Lexington and MCAN) presented this information to the town so that they could move forward on setting reduction targets and taking action. Actions that Lexington is taking include setting up Community Choice Aggregation and writing a plan for the town to go Net Zero.

Brookline

The inventory in Brookline was completed primarily by Alan Leviton, a retired engineer active in MCAN and in Climate Change Action Brookline. He used 2009 as the base year, and calculated emissions for electricity, heat, and transportation.
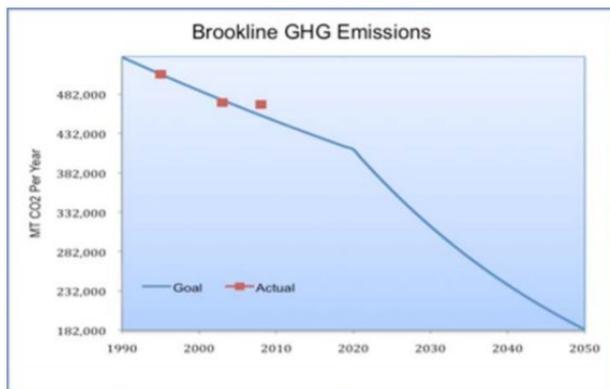
To help get data from the utilities, he contacted Representative Frank Smizik, who sits on the House Committee on Global Warming and Climate Change. Representative Smizik put him in touch with sources at Eversource and National Grid who helped provide Alan with the data on electricity and natural gas usage that he needed.

Alan used U.S. Census data to get the percentages of homes in Brookline that use oil and natural gas, as well as DOE data on BTUs per square foot for oil and natural gas, to calculate emissions for oil and natural gas heat. The inventory showed that, similar to Lexington, municipal buildings produced only 2% of emissions, while commercial buildings produced 25-30%, and residential buildings produced 60-70%. The inventory also showed that electricity use generated about one third of all emissions.

Based on these findings, the town focused on reducing emissions from residential buildings, including a big push for Mass Save audits and weatherization, increasing the number of homes with solar panels with Solarize Mass, and setting up a Community Choice Aggregation program that provides 25% of energy from renewables.