



Town of Canaan Greenhouse Gas Inventory for Government Operations 2020-2021 Summary Report

BACKGROUND

The Town of Canaan Board approved Resolution #56 on November 9, 2020 to become a Climate Smart Community (CSC). An action item in the CSC Certification process is *PE2 Action: Government Operations GHG Inventory*.

This GHG Inventory for Government Operations Report summarizes the GHG emissions from the Town of Canaan's consumption of energy and materials within town-owned buildings, vehicle fleets, and outdoor lighting. Developing this GHG Inventory is the first step towards tangible climate action, the development of a Climate Action Plan (CAP) and enabling the Town to identify realistic goals and track progress towards reducing operation costs, energy use and GHG emissions.

DATA GATHERING AND METHODOLOGY

The town's CSC Task Force lead the GHG Inventory data collection effort, with the help of the Capital District Regional Planning Commission (CDRPC). The GHG Inventory spreadsheet used was developed by Climate Action Associates, LLC (CAA).

The inventory includes Scope 1 and Scope 2 GHG emissions from government operations, as defined below. The CSC optional Scope 3 [Other Indirect GHG emissions such as town employee commuting] is not included because the minimal amount of emissions generated (perhaps a fraction of a percent) by the small community of Canaan in this scope doesn't justify the work required to obtain this data. This scope is option in the DEC's Climate Smart Communities Program.

- **Scope 1:** Direct GHG emissions from government-owned vehicles and onsite fuel combustion (diesel, gasoline, propane and fuel oil) for Town Hall, Library and the Highway Garage.
- **Scope 2:** Indirect GHG emissions from purchased electricity.

Baseline Year

The inventory process requires the selection of a baseline year. Local governments examine the range of data they have over time and select a year that has the most accurate and complete

data for all key emission sources. It is also preferable to establish a base year several years in the past to be able to account for the emissions benefits of recent actions. A local government's emissions inventory should comprise all greenhouse gas emissions occurring during the selected baseline year. The data collected for this inventory represents years 2020-2021, using the average of the two years as a baseline. It is important to note that some Town facilities were closed or operated at a lower capacity during 2020 due to the Covid-19 pandemic, therefore using that year solely as a baseline would misrepresent the energy used by the Town.

Quantification Methods

Greenhouse gas emissions in this inventory are quantified using calculation-based methodologies. Calculation-based methodologies calculate emissions using activity data and emissions factors. To calculate emissions accordingly, the basic equation is used:

$$Activity\ Data \times Emissions\ Factor_{(Fuel, GHG)} = GHG\ Emissions_{(Fuel, GHG)}$$

Activity data refer to the relevant measurement of energy use or other greenhouse has-generating processes such as fuel consumption by fuel type, metered annual electricity consumption, and annual vehicle miles traveled. To obtain this data, the town gathered and reviewed all **electricity, propane, and fuel oil** bills for the **town's** accounts, as well as fuel records for gasoline and diesel used to power the **town's** vehicle fleet.

Calculations for this inventory were made using CAA's GHG Inventory Tool. Data was first measured in kWh for grid electricity and gallons for gasoline, fuel oil, diesel, and propane. Using the CAA tool, this data was multiplied by emission factors published by the EPA and EIA to convert the energy usage, or other activity data in quantified emissions.

Emissions Factors

Each GHG has an emission factor unique to each fuel. The electricity emission factor is based on the EPA eGRID subregion, which in this case is **NYUP (Upstate)**. The propane, heating oil/diesel, and gasoline emissions factors are taken from the EIA database on carbon dioxide emissions coefficients. The GHG emissions in this inventory are measured in metric tons of CO₂ equivalents (CO₂e).

Facilities Master List

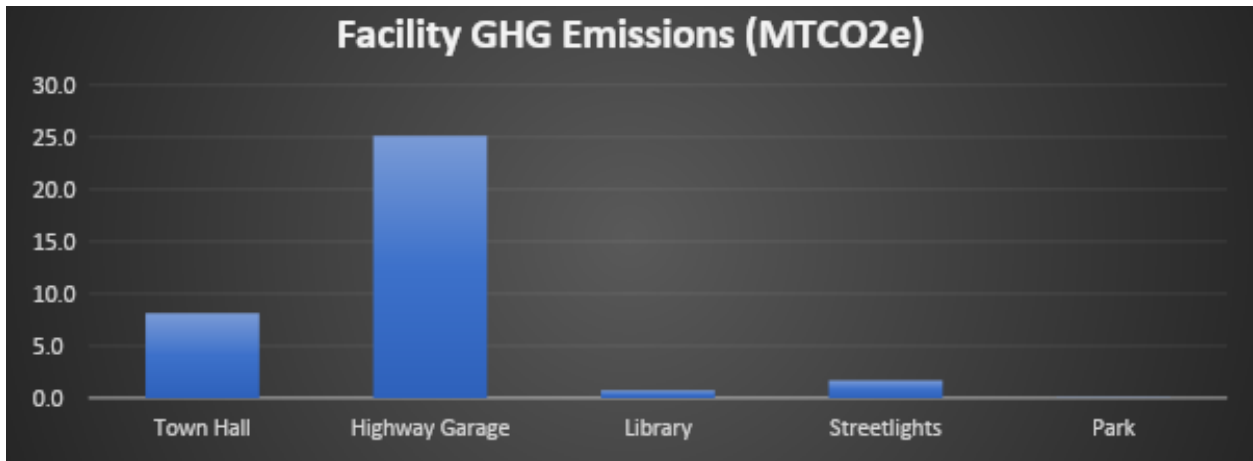
A key step in creating the GHG inventory is to compile a facility master list that includes the **town's buildings** (including streetlights) that use at least one form of energy. Each was assigned to a category to indicate the type of infrastructure and then similar facilities along with their energy use.

This table shows the Town buildings and energy providers included in the Canaan GHG Inventory:

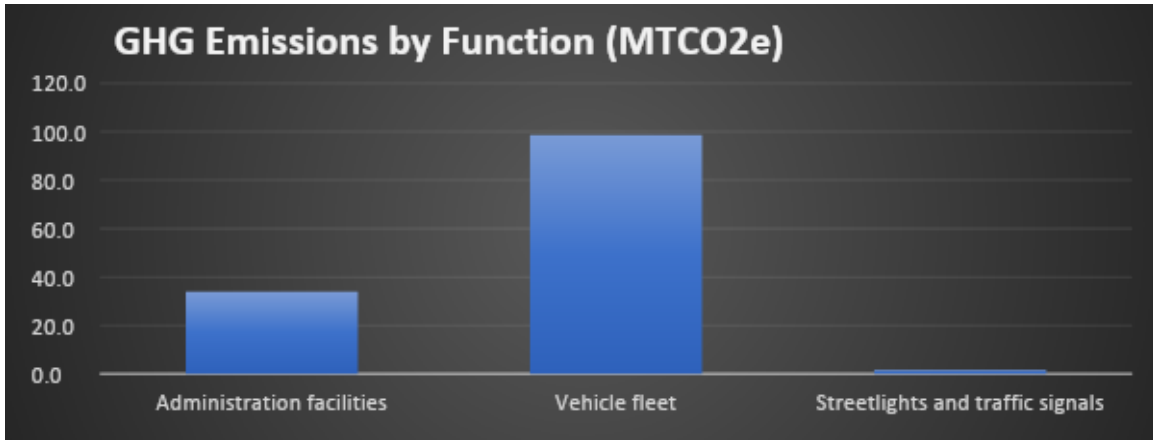
Town Building	Energy Providers
Highway Garage	NYSEG, Main Care, Kosco Heritage
Town Hall	NYSEG, Main Care
Park	NYSEG
Streetlights	NYSEG
Library	NYSEG, Main Care

KEY FINDINGS

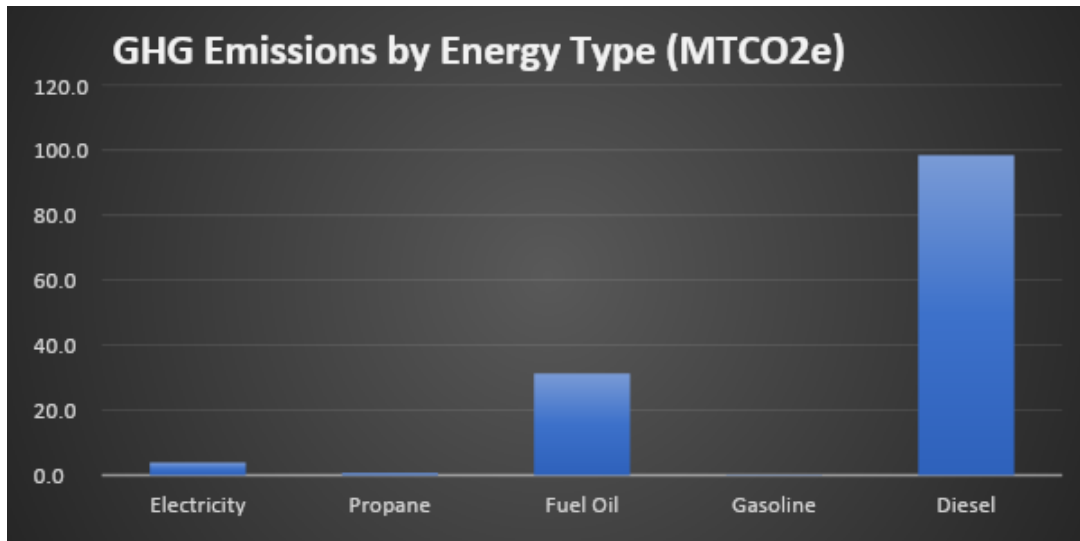
The average GHG emissions produced by the Town of Canaan’s municipal operations from 2020-2021 was 134.35 tons. The largest energy user and source of GHG emissions in Canaan is the vehicle fleet, which produces an average of 98.6 tons of GHG emissions annually and contributes to 73% of the Town’s total GHG emissions. The highest administrative facility use is by the Highway Garage with 25.1 tons on average.



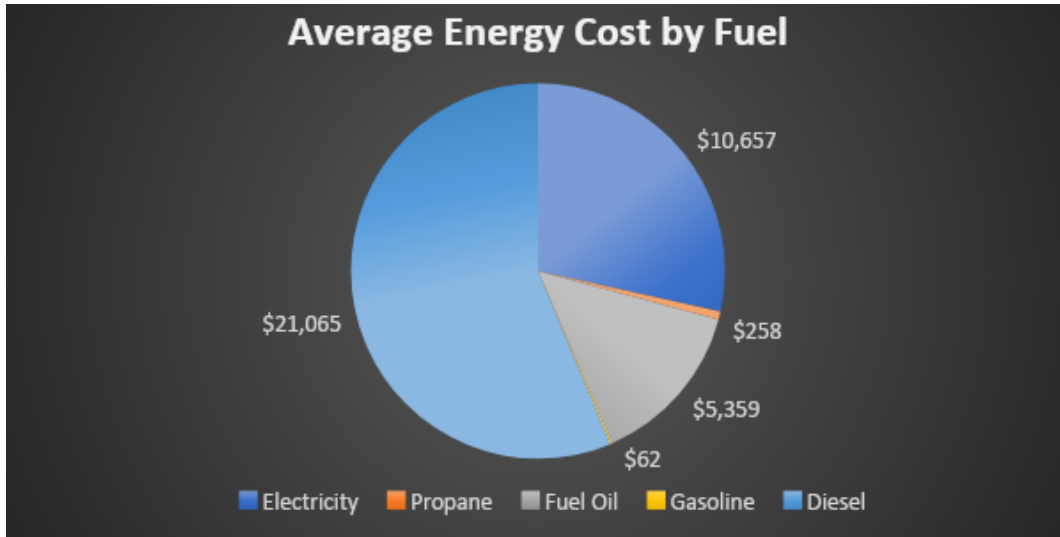
As noted above, energy used by vehicle fleets averaged 98.6 tons of GHG emissions – mainly from diesel, as gasoline use by the town is negligible. The chart below illustrates how vehicle fleet emissions compare to other facilities by function.



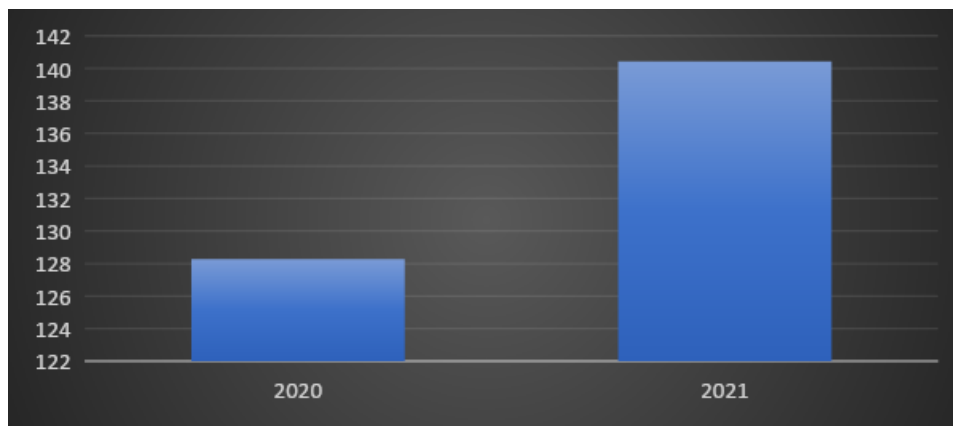
Diesel also outweighs all other energy types as far as GHG emissions tons are concerned, at about 73% of the town’s GHG emissions. The chart below shows the breakdown of emissions by energy type.



The Town spends an average of \$37,400 annually on energy for facilities and operations. When assessing cost of energy, diesel contributes to 56% of the Town’s energy cost - outweighing fuel oil, propane, gasoline and electricity. The average annual costs for each are broken down in the charts below.



GHG emissions were 128.3 tons in 2020 and 140.4 tons in 2021 – a increase of 12 tons. Administrative Facilities decreased from 39.9 to 31.2 during this time frame, and vehicle fleet emissions increased from 89.7 to 107.5. These variances may have been due to the COVID-19 pandemic, building improvements, or a combination of the two.



ACCOMPLISHMENTS AND FURTHER OPPORTUNITIES TO REDUCE GREENHOUSE GASES

Developing a GHG emissions baseline enables the Town to set goals and targets for future reduction of GHG emissions.

The Town has been proactive in reducing GHG emissions and energy costs. They conducted a ASHRAE Level II Energy Study in 2022 to evaluate their facilities. To date, **lighting in all the town hall has been retrofitted with LED lighting.** Further conversion to electrified sources of energy or moving these emissions to “Scope 2” will allow the Town to offset GHGs with renewable energy, such as on-site solar arrays. The library is being converted to heat pumps in the winter

of 2023. Electrification of the Town Hall heating with heat pumps has been explored by the Town as well as part of their energy audit, as well as items like insulation and temperate setbacks.

The majority of Town GHG emissions come from diesel, so converting the fleet, especially heavy duty vehicles to EV will accomplish a large emissions reduction.

Town street lighting retrofit can reduce energy use by as much as 65%, per NYSERDA's LED Street Light High-Impact Action¹ guidance. The opportunity to convert these streetlights to LED with NYSEG is being pursued by the town, and reductions should be apparent in future GHG inventories.

Climate Action Planning is a next step for the Town to identify reduction targets and strategies/funding to achieve these targets.

¹ LED Street Lights: A High-Impact Action for the Clean Energy Communities Program. NYSERDA. <https://www.nyserdera.ny.gov/-/media/Files/Programs/Clean-Energy-Communities/LED-Street-Lights/CEC-LED-Street-Lights-Step-by-Step-Guidance.pdf>. Page 3.