



**Greenhouse Gas Inventory
for Government Operations
2022 Summary Report**

BACKGROUND

On July 2, 2019, the Village of Warwick resolved to adopt the New York State Climate Smart Communities (CSC) pledge and to establish energy benchmark requirements for certain municipal buildings. The Village of Warwick intends to further assess how climate change will affect the Village of Warwick and its residents and to take further steps to reduce the Village's contributions to climate change.

The CSC program, administered by the New York State Department of Environmental Conservation (DEC), is a certification program that provides a robust framework to guide the actions local governments can take to reduce GHG emissions and adapt to the effects of climate change. The first step in this process is to perform a GHG Inventory for all buildings, vehicles and operations controlled by the local government. Using data from 2022, this GHG inventory provides a baseline for which the Village of Warwick can set emissions and operation costs reduction goals, determine ways in which those goals can be reached, and track progress.

This GHG Inventory for Government Operations Report summarizes the GHG emissions from the Village of Warwick's consumption of energy and materials within Village-owned buildings, the Water Treatment Plan, vehicle fleet, outdoor lighting, and other facilities. This data was generated from electric and natural gas bills for all Village owned buildings and operations, as well as fuel records for the Village's vehicle fleet. The GHG emissions for all local government operations are measured in metric tons of CO₂ equivalents (CO₂e) and were calculated using emissions factors by the US Energy Information Administration (EIA), US Environmental Protection Agency (EPA) and the Climate Action Associates (CAA), LLC's GHG Inventory Tool.

KEY FINDINGS

From June 2021 - May 2022, GHG emissions from the Village of Warwick's government operations totaled **323.52** CO₂e.

Figure 1 below shows the emissions for government operations broken down by sector.

The Village's Water Works system accounted for the largest percentage of GHG emissions at 33%. The second largest contributor is the Village's Wastewater Treatment Plant with 28.5% of emissions. The Administrative Facilities, which includes Village Hall and the DPW Garage, contributed to 26% of the emissions, and the Street & Park Lights at 12.4%.

The Inventory Results section of this report provides a detailed profile of emissions sources within the Village of Warwick. This data will also provide a baseline from which the Village will be able to compare future performance and demonstrate progress in reducing emissions.

June 2021 - May 2022 CO₂e

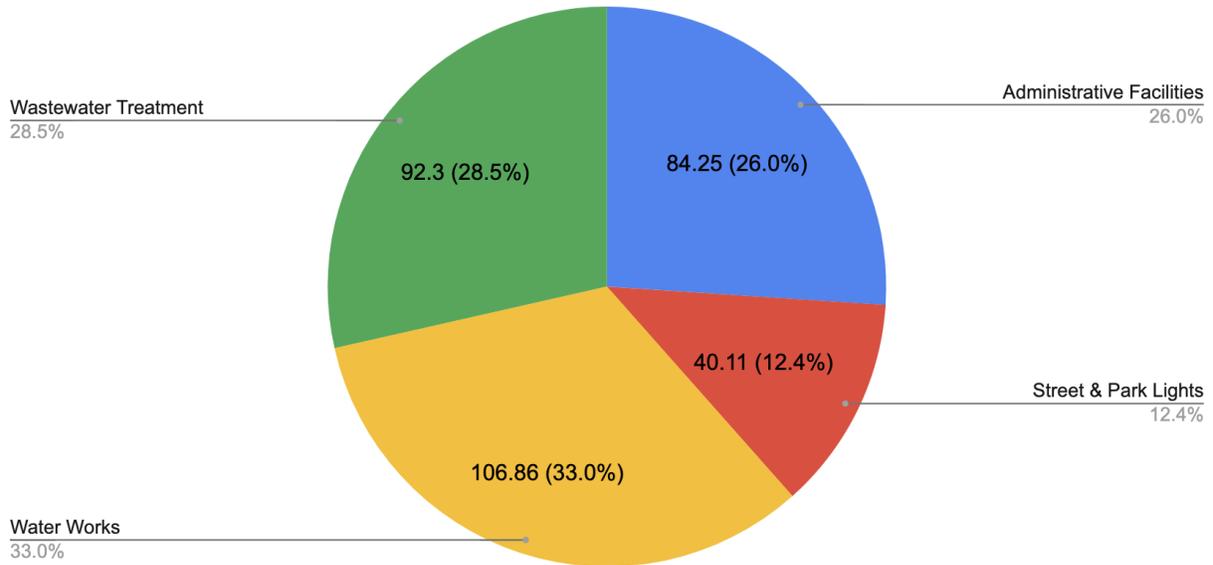


Figure 1: Village of Warwick Government Operations Emissions by Sector

DATA GATHERING AND METHODOLOGY

The first step toward achieving tangible greenhouse gas emission reductions requires identifying baseline emissions levels and sources and activities generating emissions in the community. The Village of Warwick is focusing first on government operations emissions to lead by example and will inventory community-wide emissions in a future report.

The CSC Task Force appointed Tom McKnight, Village Trustee, to lead the GHG Inventory data collection effort, with the help of Hudson Valley Regional Council (HVRC). The GHG Inventory spreadsheet used was developed by Climate Action Associates, LLC.

Emissions Scopes

For the government operations inventory, emissions are categorized by scope. Using the scopes framework helps prevent double counting. There are three emissions scopes for government operations emissions, as defined below:

- **Scope 1:** All direct emissions from a facility or piece of equipment operated by the local government, usually through fuel (natural gas, propane, and fuel oil) combustion. Examples include emissions from fuel consumed by the Village's

vehicle fleet and emissions from a furnace in a municipal building.

- **Scope 2:** Indirect GHG emissions from purchased electricity. This refers to operations powered by grid electricity.
- **Scope 3:** All other indirect GHG emissions not covered in scope 2. Examples include contracted services, emissions in goods purchased by the local government and emissions associated with disposal of government generated waste.

This inventory only accounts for Scope 1 and 2 emissions, as they are the most essential components of a government operations greenhouse gas analysis and are most easily affected by local policy making. Under the DEC's CSC program, tracking Scope 3 is optional.

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 Village of Warwick is using Fiscal Year 2022 (June 2021-May 2022) as its baseline, given the availability of data and to ensure the baseline more accurately reflects current energy consumption patterns.

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:

$$\text{Activity Data} \times \text{Emissions Factor}_{(Fuel, GHG)} = \text{GHG Emissions}_{(Fuel, GHG)}$$

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 Village of Warwick gathered and reviewed natural gas and electric bills for the Village's O&R accounts, as well as fuel records for gasoline and diesel used to power the Village's vehicle fleet.

Calculations for this inventory were made using CAA's GHG Inventory Tool. Data was first measured in kWh for grid electricity, therms for natural gas, 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 natural gas, 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 of all municipal facilities that each use at least one form of energy.

- 2 Administrative Facilities (i.e., Village Hall, DPW Barn)
- 16 Water Works facilities
- 10 Wastewater Treatment facilities
- 23 Park and Street Light zones

Each was assigned to a category to indicate the type of infrastructure and then similar facilities along with their energy use.

INVENTORY RESULTS

For developing emissions reduction policies, it is often most useful to look at emissions broken down by sector, as each sector will have a particular set of strategies to reduce emissions. Figure 1 above shows the emissions for government operations broken down by sector. Figure 2 breaks down the data further by showing Consumption as well as GHG Emissions.

Facility / Group Name	Consumption		GHG Emissions (MTCO2e)	
	Electricity (kWh)	Natural Gas (therms)	Electricity	Natural gas
Administrative Facilities	75,892	14,095	8.00	76.22
Street & Park Lights	379,457	0	40.10	0.00
Water Works	539,520	9,215	57.00	49.83
Wastewater Treatment	556,533	6,188	58.90	33.46

Figure 2: Village of Warwick's Consumption and GHG Emissions data by sector

The Village also tracks vehicle fleet fuel consumption by fuel type. For the same period, June 2021 - May 2022, the Village's fuel Consumption and GHG Emissions are captured in Figure 3 below.

Consumption		GHG Emissions (MTCO2e)	
Gas	Diesel	Gas	Diesel
9,743	5,932	89	62

Figure 3: Village of Warwick's Consumption and GHG Emissions for Vehicle Fleet, by fuel type

OPPORTUNITIES TO REDUCE GREENHOUSE GASSES

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

The Village has been proactive to reduce GHG emissions and energy costs. For example, the Village has replaced > 50% of streetlights with LEDs, resulting in significant energy and cost savings. The majority of office lights have been replaced with energy efficient options as well. The Village will continue to pursue areas for improvement around reducing energy consumption and lowering costs to taxpayers, and these improvements will be documented in the Village's Climate Smart Communities (CSC) Certification submission.

After implementing proposed projects and identifying other Climate Action Plan (CAP) priorities / actions, total GHG emissions will inevitably be reduced.

The next steps are to set an emissions reduction target, and to develop a climate action plan that identifies specific quantified strategies that can cumulatively meet that target. In the meantime, the Village of Warwick will continue to track key energy use and emissions indicators on an ongoing basis. DEC recommends conducting a new inventory at least every five years to measure emissions reductions progress.

This inventory shows that it will be particularly important to focus on the **Water Works** and the **Wastewater Treatment Plant**. Future emissions reductions strategies for the Village to consider for its climate action plan include increasing energy efficiency and renewable energy investments, as well as vehicle fuel efficiency. Other key data points to collect and track might include waste and wastewater emissions, water delivery rates, as well as solid waste collection rates.

[Report submitted by Tom McKnight, Village Trustee, on November 29, 2022]