



**TOWN OF SHANDAKEN
GOVERNMENT OPERATIONS GREENHOUSE GAS INVENTORY
2022 SUMMARY REPORT**



CREDITS AND ACKNOWLEDGEMENTS

This report was prepared by Bethia Waterman, chair of the Conservation Advisory Council and member of the Climate Smart Task Force, with assistance from Robert Drake, Town Councilman, Barbara Twerdak, Secretary/Bookkeeper and Cara Grant, Highway Secretary.

Melanie Patapis, Climate Smart Communities Coordinator at the Hudson Valley Regional Council provided invaluable assistance and support to us throughout the process of creating a Greenhouse Gas Inventory and Report.

BACKGROUND

The Town of Shandaken recognizes that greenhouse gas (GHG) emissions from human activity are causing climate change, the consequences of which pose substantial risks to the future health and well-being of our community. To demonstrate its commitment to addressing the growing threat of climate change, in 2016 the Town of Shandaken became a registered Climate Smart Community by formally adopting the New York State Climate Smart Communities (CSC) pledge. In 2022 Shandaken passed a local law creating a Conservation Advisory Council and a Climate Smart Community Task Force.

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 2018, this GHG inventory provides a baseline for which the Town of Shandaken 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 Town of Shandaken's consumption of energy and materials within town-owned buildings, vehicle fleet, outdoor lighting, and other facilities. This data was generated from electric, propane fuel oil and propane bills for all Shandaken owned buildings and operations, as well as fuel records for the town'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

In 2018 GHG emissions from Shandaken's government operations totaled 408.95 CO₂e. Figure 1 shows the emissions for government operations broken down by sector. The vehicle fleet is the largest emitter accounting for the largest percentage of GHG emissions at 65%. The second largest contributor is the Town's Administrative Buildings with 19% of total emissions. Phoenicia Water Delivery comprises 12% and the other source is Lights and Streetlights at 4%

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

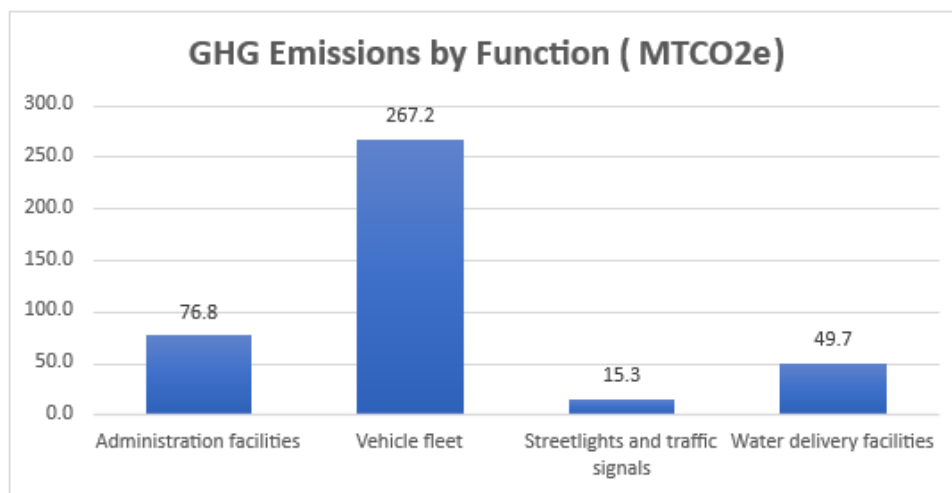


Figure 1. 2018 Town of Shandaken GHG Emissions by Sector (MTCO₂e)

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 Town of Shandaken 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 Bethia Waterman 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 Town of Shandaken'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 encouraged, but 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. We chose the year 2018 because it was a pre-covid year with reliable data.

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:

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

Activity data refer to the relevant measurement of energy use or other greenhouse gas-generating processes such as fuel consumption by fuel type, metered annual electricity consumption, and annual vehicle miles traveled. To obtain this data, the Town of Shandaken gathered and reviewed all bills for the Town's NYSEG accounts propane and fuel oil, 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, 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 (MTCO₂e).

Facilities Master List

A key step in creating the GHG inventory is to compile a facility master list that includes the Shandaken's eight buildings, outdoor lighting, streetlights, and vehicle fleet, 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.

1. Town Hall
2. Highway Department
3. Shandaken Museum
4. Pine Hill Library
5. Police Department
6. Recycling Center
7. Ambulance
8. Phoenicia Water Delivery System

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 shows the emissions for government operations broken down by sector, while the remainder of this section breaks down these emissions in further detail within each sector.

The Highway Department's vehicle fleet was the largest sector of government operations emissions. After the vehicle fleet, the Town's buildings were the next largest source of government operations emissions.

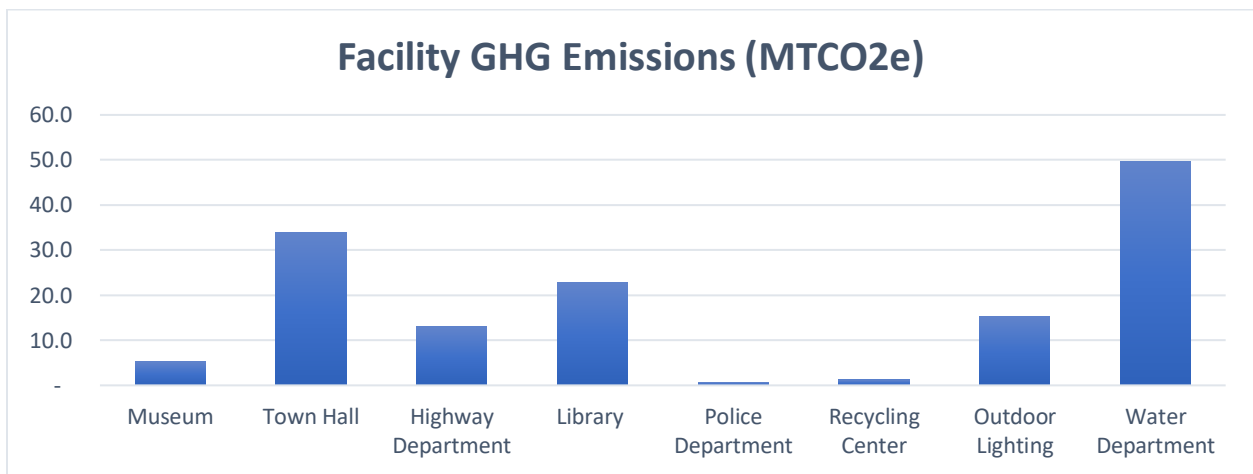


Figure 2. 2018 Town of Shandaken Facility GHG Emissions (MTCO2e)

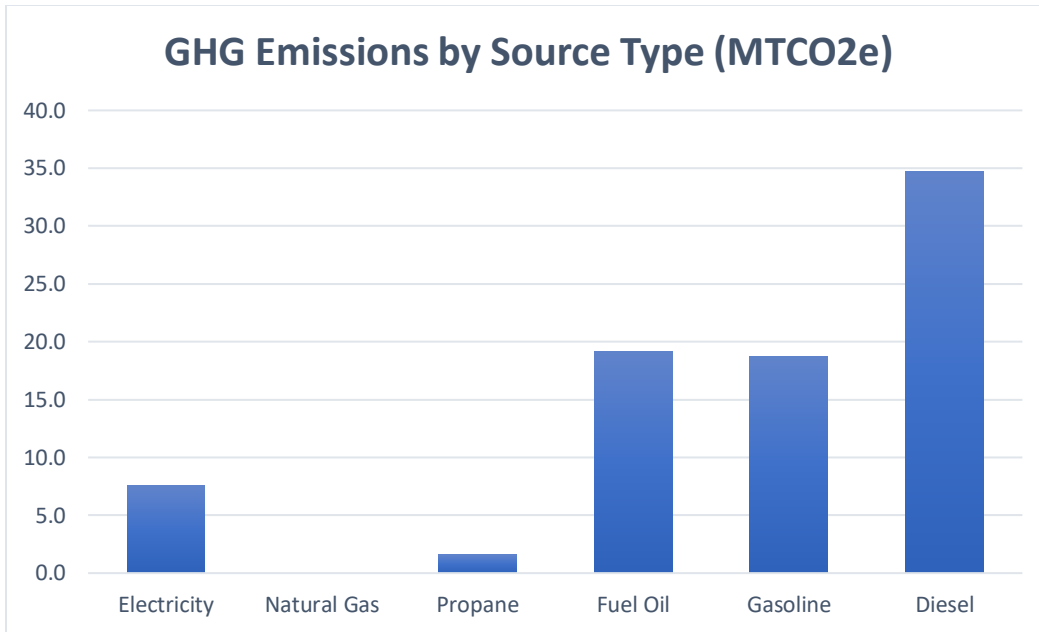


Figure 3. 2018 Town of Shandaken GHG Emissions by Energy Type (MTCO₂e)

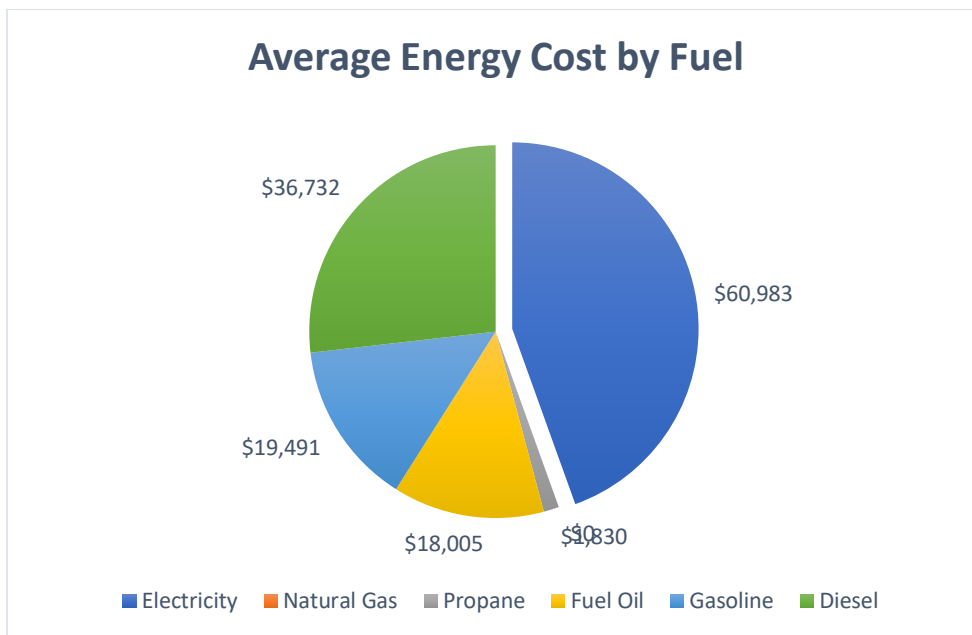


Figure 4. Average Energy Cost by Fuel in 2018

OPPORTUNITIES TO REDUCE GREENHOUSE GASES

Developing a GHG emissions baseline enables the Town of Shandaken to set goals and targets for future reduction of GHG emissions. The Town has been proactive to reduce GHG emissions and energy costs. It has completed LED listing updates and LED retrofits on all 208 streetlights.

Town Buildings

The Pine Hill Library has recently had an energy audit done on their building. The results of this audit are being reviewed by the library staff. There may be an opportunity to reduce greenhouse gas emissions by replacing the oil furnace with heat pumps. The Shandaken Historical Museum would benefit from a similar audit and review.

Shandaken Town Hall is in the floodplain on the banks of Esopus Creek. Currently, the Town Supervisor is investigating the feasibility of adapting the building to meet floodplain building requirements. If the feasibility study concludes that the building can be adapted, rooftop solar panels, weatherization, and heat pumps could be installed. If the study concludes that the building cannot be retrofitted, a new building in a different location will be considered.

Vehicle Fleet

The Town is considering the purchase of an electric passenger vehicle for use by Town officials and the installation of an electric vehicle charging station.

When the Town Highway Department replaces obsolete highway vehicles, they choose more fuel-efficient vehicles, but currently there are no electric vehicles that can tackle the jobs required in the mountainous terrain.

Additional opportunities to reduce GHG emissions include replacing any indoor or outdoor lighting that has not already be upgraded to LED and purchasing electric power from a cleaner grid with renewable sources. After implementing these 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 Town of Shandaken 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 vehicle fleet and building emissions. Future emissions reductions strategies for Shandaken 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 emissions, water delivery rates, government employee vehicle trips and employee commuter miles.