Hastings-On-Hudson

Inventory of Government Operations
Greenhouse Gas Emissions
April, 2020

Produced by the Hastings-on-Hudson Climate Smart Task Force

With Assistance from ICLEI – Local Governments for Sustainability USA

Village of Hastings-on-Hudson
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Credits and Acknowledgements

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Executive Summary

The Village of Hastings-on-Hudson recognizes that greenhouse gas (GHG) emissions from human activity are catalyzing profound climate change, the consequences of which pose substantial risks to the future health, well-being, and prosperity of our community. To demonstrate its commitment to addressing the growing threat of climate change, in June of 2010 the Village of Hastings-on-Hudson became a registered Climate Smart Community by formally adopted the New York State Climate Smart Communities (CSC) pledge comprised of the following ten elements:

1. Build a climate-smart community;
2. Inventory emissions, set goals, and plan for climate action;
3. Decrease energy use;
4. Shift to clean, renewable energy;
5. Use climate-smart materials management;
6. Implement climate-smart land use;
7. Enhance community resilience to climate change;
8. Support a green innovation economy;
9. Inform and inspire the public;
10. Engage in an evolving process of climate action;

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 2016, this GHG inventory provides a baseline from which the Village can set emissions reduction goals, determine ways in which those goals can be reached, and track progress.

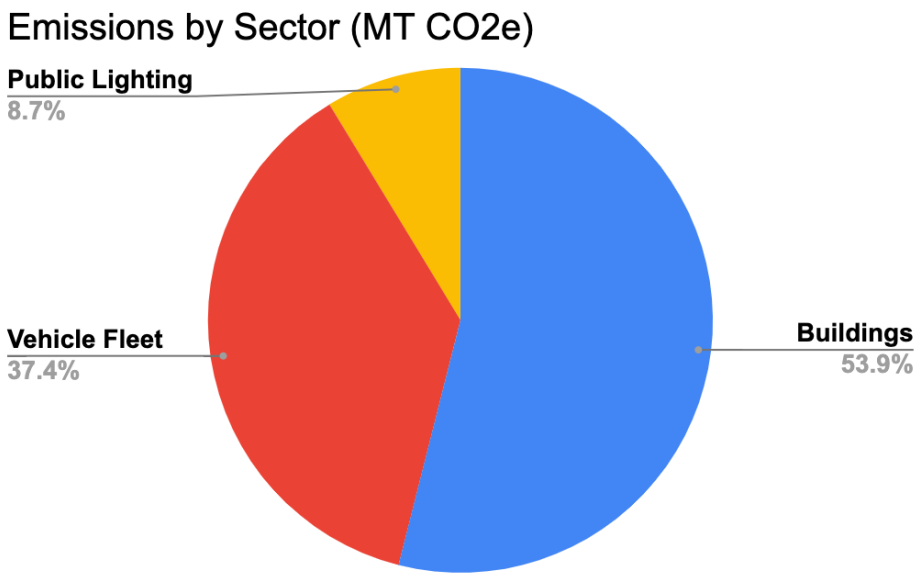
This report provides estimates of greenhouse gas emissions specifically from Hastings-on-Hudson's 2016 government operations. To create this inventory, data for the Village's fuel and electricity use was collected and reviewed. The data was generated from electric and natural gas bills for all Village-owned 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 emission factors published by the U.S. Environmental Protection Agency (EPA) and ICLEI's ClearPath software platform.

Key Findings

In 2016, GHG emissions from Hastings-on-Hudson's government operations totaled 864 MT CO2e. Figure 1 shows the emissions for government operations broken down by sector. Government buildings and facilities account for the largest percentage of GHG emissions at 54%. The second largest contributor is the Village's vehicle fleet sector with 37% of emissions. It is recommended that actions to reduce emissions in both of these areas should be a key part of the Village's climate action plan. Streetlights and traffic signals were responsible for the remainder of local government operation emissions at 9% of emissions.

The Inventory Results section of this report provides a detailed profile of emissions sources within Hastings-on-Hudson. This information will be key to guiding local reduction efforts. This data will also provide a baseline from which the Village will be able to compare future performance and demonstrate progress in reducing emissions.

Figure 1: 2016 Hastings-on-Hudson Government Operations Emissions by Sector (MT CO2e)



Climate Change Background

Naturally occurring gases dispersed in the atmosphere determine the Earth's climate by trapping solar radiation. This phenomenon is known as the greenhouse effect. Overwhelming evidence shows that human activities are increasing the concentration of greenhouse gases and changing the global climate. The most significant contributor is the burning of fossil fuels for transportation, electricity generation and other purposes, which introduces large amounts of carbon dioxide and other greenhouse gases into the atmosphere. Collectively, these gases intensify the natural greenhouse effect, causing global average surface and lower atmospheric temperatures to rise.

Based on current and expected impacts, the Village of Hastings-on-Hudson should expect to experience greater frequency of heat waves, drought, and flooding of the Hudson and Saw Mill Rivers in the future. Other expected impacts in the New York area include frequent and damaging storms, increased wildfires, and the disruption of ecosystems, habitats, and agricultural activities.

Reducing fossil fuel use can potentially have many benefits in addition to reducing GHG emissions. More efficient use of energy decreases utility and transportation costs for residents and businesses. Retrofitting homes and businesses to be more efficient creates local jobs. In addition, money residents do not spend on energy is more likely to be spent on local businesses and will serve as an investment in the local economy. Reducing fossil fuel use will improve air quality, and increasing opportunities for walking and bicycling will improve residents' health.

Evidence of Human-Caused Climate Change

There is overwhelming scientific consensus that the global climate is changing, and that human actions, primarily the burning of fossil fuels, are the main cause of those changes. The Intergovernmental Panel on Climate Change (IPCC) is the scientific body charged with bringing together the work of thousands of climate scientists. The IPCC's Fourth Assessment Report states that "warming of the climate system is unequivocal."[1] Furthermore, the report finds that "most of the observed increase in global average temperatures since the mid-20th century is *very likely* due to the observed increase in anthropogenic GHG concentrations."

ICLEI Climate Mitigation Program

In response to the problem of climate change, many communities in the United States are taking responsibility for addressing emissions at the local level. Since many of the major sources of greenhouse gas emissions are directly or indirectly controlled through local policies, local governments have a strong role to play in reducing greenhouse gas emissions within their boundaries. Through proactive measures around land use patterns, transportation demand management, energy efficiency, green building, waste diversion, and more, local governments can dramatically reduce emissions in their communities. In addition, local governments are primarily responsible for the provision of emergency services and the mitigation of natural disaster impacts.

ICLEI provides a framework and methodology for local governments to identify and reduce greenhouse gas emissions, organized along Five Milestones:

1. Conduct an inventory and forecast of local government greenhouse gas emissions;
2. Establish a greenhouse gas emissions reduction target;
3. Develop a climate action plan for achieving the emissions reduction target;
4. Implement the climate action plan; and,
5. Monitor and report on progress.

This report represents the completion of ICLEI's Climate Mitigation Milestone One for government operations, and provides a foundation for future work to reduce government greenhouse gas emissions in the Village of Hastings-on-Hudson.

[1] IPCC, 2007: Climate Change 2007: Synthesis Report. Contribution of Working Groups I, II and III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, Pachauri, R.K and Reisinger, A. (eds.)]. IPCC, Geneva, Switzerland, pp. 104

Inventory Methodology

Approach

This inventory was developed using the approach and methods provided by the Local Government Operations Protocol (LGO Protocol) developed by ICLEI, the California Air Resources Board (CARB), the California Climate Action Registry, and The Climate Registry. The LGO Protocol serves as the national standard for measuring and reporting GHG emissions associated with local government operations. It provides the principles, approach, methodology, and procedures necessary to develop a complete, transparent, and accurate reporting of a local government's GHG emissions.

Quantifying Greenhouse Gas Emissions

Emissions Scopes

For the government operations inventory, emissions are categorized by scope. Using the scopes framework helps prevent double counting. Scope 1, Scope 2 and Scope 3 emissions are explained below:

- **Scope 1:** All direct emissions from a facility or piece of equipment operated by the local government, usually through stationary fuel combustion. Examples include emissions from fuel consumed by the Village's vehicle fleet and emissions from a furnace in a local government building.

- **Scope 2:** Indirect emissions associated with the consumption of purchased or acquired electricity, steam, heating, and cooling. This essentially refers to operations powered by grid electricity.

- **Scope 3:** All other indirect or embodied emissions not covered in scope 2. Examples include contracted services, embodied 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 Scope 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 emissions is encouraged, but optional. Scope 3 emissions data was not available for this inventory, however, the Village hopes to ensure that the necessary data is available for government operations GHG inventories moving forward. Some examples of Scope 3 data that the Village could track include solid waste generated by the Village, as well as accounting for the number of miles travelled by Village employees as part of their daily commute.

Baseline Year

The inventory process requires the selection of a baseline year. For this inventory, the year 2016 was chosen in order to provide an accurate portrayal of emissions prior to the Village taking major actions to substantially reduce emissions. This choice was made also due to the fact that it was the first year in which complete data was available.

Quantification Methods

Greenhouse gas emissions can be quantified in two ways:

- Measurement-based methodologies refer to the direct measurement of greenhouse gas emissions (from a monitoring system) emitted from a flue of a power plant, wastewater treatment plant, landfill, or industrial facility.
- Calculation-based methodologies calculate emissions using activity data and emission factors. To calculate emissions accordingly, the basic equation below is used: *Activity Data x Emission Factor = Emissions.*

All emissions sources in this inventory are quantified using calculation based methodologies. Activity data refers to the relevant measurement of energy use or other greenhouse gas-generating processes such as fuel consumption for vehicles, natural gas consumption, and metered annual electricity consumption. To obtain this data, we gathered and reviewed all electricity and natural gas bills for the Village's Con Edison and Power Authority of the State of New York (PASNY) accounts, as well as fuel records for gasoline used to power the Village's vehicle fleet.

Calculations for this inventory were made using ICLEI's ClearPath software platform. Data was first measured in kWh for grid electricity, one million British thermal units (MMBTU) for natural gas, and gallons for gasoline and diesel used for vehicles. Using the ClearPath tool, this data was multiplied by emission factors published by the EPA in order to convert the energy usage, or other activity data, into quantified emissions. Different emission factors were used based on the fuel type, vehicle class, and eGRID subregion, which in this case is the NYCW (NPCC NYC/Westchester) subregion.

The GHG emissions in this inventory are measured in metric tons of CO2 equivalents (CO2e). In order to measure all greenhouse gases, especially non-CO2 gases, in a common term that indicates their relative strength of the greenhouse effect they have in the atmosphere, the ClearPath tool applies multipliers, referred to as Global Warming Potentials (GWP), to all greenhouse gases emitted. This ensures results are presented in consistent and uniform terms. The GWP values used in this inventory are those published in the IPCC's 5th Assessment Report.

Inventory Results

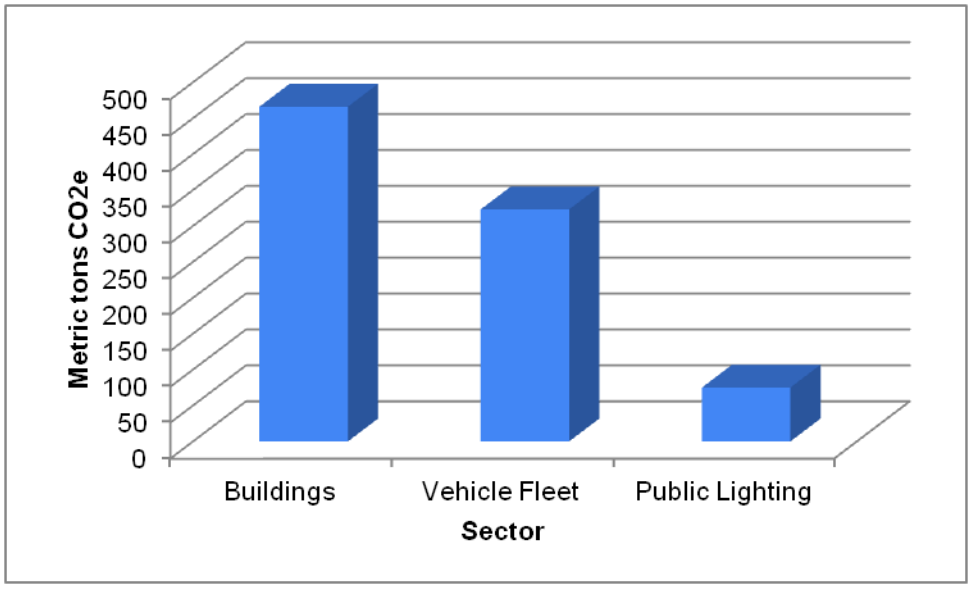
Emissions by Sector

In developing emissions reduction policies, it is often useful to look at emissions broken down by sector, as each sector will require a particular set of strategies to reduce emissions. Table 2 and Figure 4 show Hastings-on-Hudson's government operations emissions broken down by sector, while the remainder of this part of the report breaks down these emissions in further detail within each sector.

Table 1: 2016 Government Operations Emissions by Sector

Sector	Metric Tons CO2e
Buildings and Facilities	466
Vehicle Fleet	323
Public Lighting	75
Totals	**864**

Figure 2: 2016 Government Operations Emissions by Sector (MTCO2e)



Buildings & Facilities

Buildings and facilities were the largest sector of government operations emissions. Table 2 shows building emissions by Village department building. Table 2 does not include an additional 10 metric tons of CO2e from grid transmission and distribution losses. With these emissions included, the total buildings related emissions are 466.

Table 2: 2016 Emissions from Each Building (MT CO2e)

Department Building	Metric Tons CO2e	Total Building Sector Emissions (%)
Village Hall & Library	186	41%
Community Center	106	23%
Fire	97	21%
DPW	34	7%
Pool	33	7%
Totals	**456**	

Figure 3: 2016 Emissions from Each Building (MT CO2e)

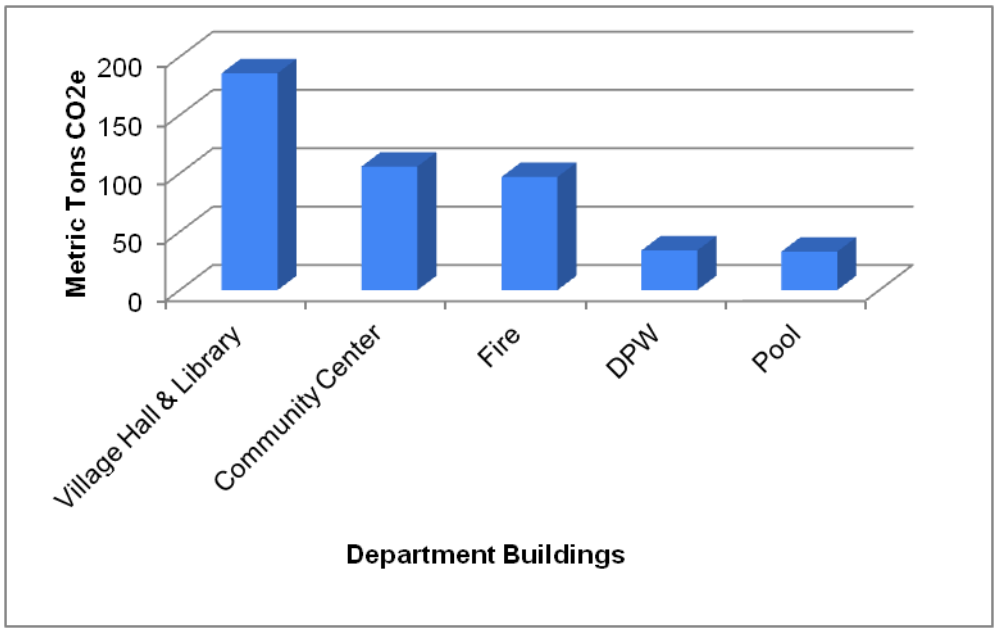


Table 3 shows building emissions by Fire House. This information will be helpful for Fire Chiefs to use in identifying energy reduction strategies.

Table 3: 2016 Building Emissions by Fire Department Building (MT CO2e)

Fire Department Building	Metric Tons CO2	Total Fire Building Sector Emissions (%)
Hook & Ladder Co.	31	32%
Uniontown Hose Co.	24	25%
Protection Engine Co.	16	16%
Riverview Manor Hose Co.	14	14%
Ambulance Corps.	12	12%
Totals	**97**	

Figure 4: 2016 Building Emissions by Fire Department House (MT CO2e)

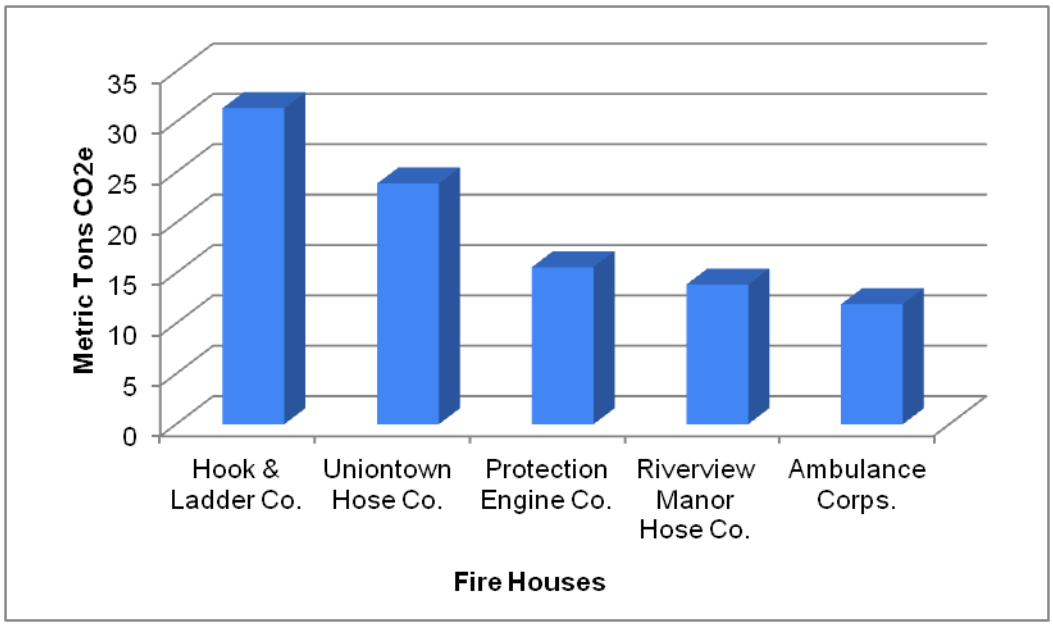


Table 4: 2016 Buildings Emissions by Source (MT CO2e)

Source	Metric Tons CO2e	Total Building Emissions Source (%)
Electricity	220	48%
Natural Gas	157	34%
Oil	79	17%
Totals	**456**	

Vehicle Fleet

After buildings and facilities, the Village's vehicle fleet was the next largest source of government operation emissions, with a total of 323 MT CO2e. Table 5 shows vehicle emissions broken down by department and Table 6 shows vehicle emissions from each fuel type used.

The data for this sector was obtained and broken down based on Hastings-on-Hudson's DPW Activity Summary Report by account. We were able to break down emissions by department and fuel type. The Village tracked fuel use for each vehicle, as well as annual miles travelled for each vehicle. In order to improve accuracy and provide a better representation of vehicle emissions in future inventories, the Village should begin to track Scope 3 vehicle emissions. In addition, the Village should track amount spent on fuel or total fuel cost by vehicle.

Table 5 shows vehicle emissions by department building. This information will be helpful for Department Heads to identify strategies for reducing vehicle fuel use.

Table 5: 2016 Vehicle Emissions by Department Building (MT CO2e)

Department Building	Metric Tons CO2	Total Building Sector Emissions (%)
HoH DPW	164	51%
HoH Police	92	29%
HoH Fire	53	16%
HoH Parks	13	4%
Total	**124**	

Figure 5: 2016 Vehicle Emissions by Department (MT CO2e)

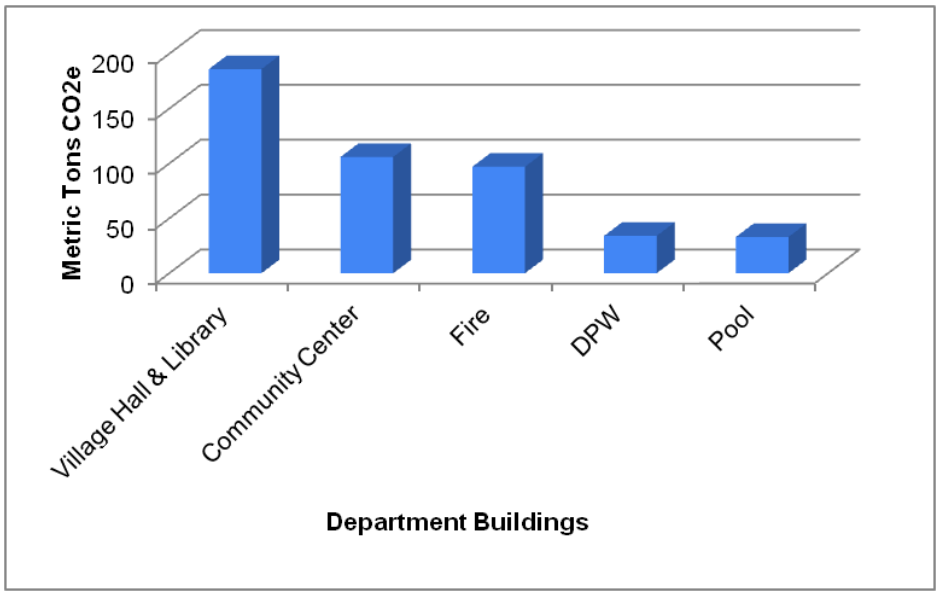


Table 6: 2016 Vehicle Emissions by Scope and Emission Type (MT CO2e)

Source	Metric Tons CO2e	Total Fleet Sector Emissions (%)
Gasoline	160	50%
Diesel	163	50%
Total	**323**	

Public Lighting

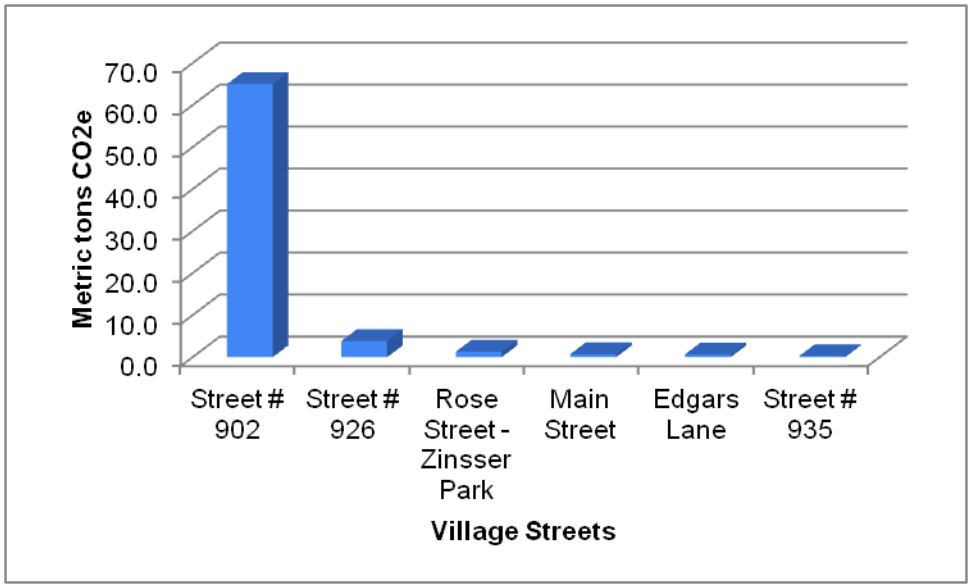
Like most local governments, Hastings-on-Hudson operates a range of public lighting including traffic signals, street lighting, parking lot lighting, park lights, and holiday lighting. The Village tracks street lighting and traffic signal lighting owned by the Village, as opposed to those owned by the County. In order to improve accuracy and provide a better representation of CO2 in future inventories, the Village should isolate data for each type of lighting to better account for the consumption of each specific type of use. Table 7 shows emissions from Hastings-on-Hudson's public lighting totaled 72 MT CO2e. Table 7 does not include an additional 3 metric tons of CO2e from grid transmission and distribution losses. With these emissions included, the total lighting related emissions are 75. Streetlights were the largest contributor to public lighting emissions, although, as of 2016, the Village had not yet converted all of Hastings-on-Hudson's streetlights and traffic signals to Light Emitting Diodes or LEDs. As a result, future GHG inventories should show a significant reduction in energy use and emissions from the public lighting sector.

Table 7 shows public lighting emissions and energy cost by street. Street #902 was the largest contributor to lighting emissions since it had not incorporated Light Emitting Diodes or LEDs at that time. Newer technologies, in particular LEDs, create an opportunity to significantly reduce energy use by all types of public lighting, and may offer a very good payback time on investment.

Table 7: 2016 Public Lighting Emissions by Location (MT CO2e)

Street Lighting	Metric Tons CO2e	Total Lighting Sector Emissions (%)
Street # 902	65.0	90%
Street # 926	3.9	5%
Rose Street - Zinsser Park	1.3	2%
Main Street	0.8	2%
Edgars Lane	0.7	1%
Street # 935	0.3	0%
Totals	**72**	

Figure 6: 2016 Public Lighting Emissions by Location (MT CO2e)



Conclusion

This inventory marks completion of Milestone One for government operations (i.e. "Conduct an inventory and forecast of local greenhouse gas emissions") of the Five Milestones for Climate Mitigation that are part of the ICLEI Framework. 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, Hastings-on-Hudson will continue to track key energy use and emissions indicators on an on-going basis. ICLEI recommends conducting a new inventory at least every five years to measure emissions reduction progress.

Future, emissions reduction strategies for the Village of Hastings-on-Hudson to consider for its climate action plan include increasing energy efficiency and renewable energy investments and infrastructure, as well as vehicle fuel efficiency. Other key data points to collect and track might include: waste and wastewater emissions, water delivery rates, government employee vehicle trips and employee commuter miles, as well as solid waste collection rates. Many local government operations generate solid waste, much of which is eventually sent to a landfill. Typical sources of waste in local government operations include paper and food waste from offices and facilities, construction waste from public works, and plant debris from parks departments.

This inventory shows that it will be particularly important to focus on energy efficiency in Village facilities and buildings and fuel use. The Village should also incorporate the suggestions mentioned throughout this report for tracking additional information into departmental protocols to ensure future GHG inventories are as complete and accurate as possible. Both ICLEI and the Hastings-on-Hudson Climate Smart Task Force recommend conducting a new inventory at least every five years to measure emissions reduction progress. Through these efforts and others the Village of Hastings-on-Hudson can achieve additional benefits beyond reducing emissions, including saving money and improving the economic vitality and quality of life in the Village.