Village of Sleepy Hollow

2022 Inventory of Government Operations Greenhouse Gas Emissions

Utilizing Emissions Data from 2018

Photo by Margaret Fox

December 2022

Produced by Village of Sleepy Hollow Climate Smart Communities Task Force
With Assistance from ICLEI - Local Governments for Sustainability USA

Credits and Acknowledgements

Village of Sleepy Hollow

January 20, 2023

Dear Sleepy Hollow community,

As a village we celebrate our historical legacy while always looking forward. Our talented local residents innovate new ways to strengthen our connections, such as with the Wishing Wall community mural project and the annual Cultural Festival. We attract more visitors each year with our Halloween festivities and develop new opportunities like the music festival planned for 2024. We envision and implement big plans to revitalize the waterfront with the Edge-on-Hudson development and RiverWalk; and to increase access to our natural resources with the East Parcel development – "the Common" – and construction of a woodland trail network connected to Devries Park. To enjoy the fruits of these initiatives, and to ensure that Sleepy Hollow thrives in the years ahead, we must also incorporate climate action into all that we do.

Local governments play an important role in reducing the greenhouse gas emissions that are heating up the planet. By doing our part, and setting ambitious goals, we along with other villages, towns, and cities across the country can make a substantial impact. The Village government can serve as a model in reducing how much fossil fuel is used in our buildings and vehicles and by cutting waste. We can help educate residents on steps they can take to reduce their own carbon footprints, and implement policies to make it easier for them to do so.

This report you are about to read is a snapshot of the Village government's climate impact from the year 2018, which will serve as a springboard to improving our performance in the years ahead. We need to know where we're starting from so that we can set goals, measure progress, and create a roadmap for the work ahead. This endeavor will benefit our community in many ways, including saving money, making the air cleaner to breathe, and helping to preserve the beauty of our village for future generations.
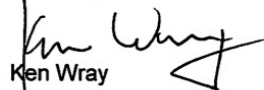
It is also important to note that many of our residents live in an area designated by New York State as a Climate Justice Disadvantaged Community zone, meaning that they are often overlooked in state climate policy initiatives and are more vulnerable to climate-related risks

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such as flooding, extreme heat, and health impacts such as asthma. As we form our own policies including a Climate Action Plan, we must make sure that all our residents benefit.

Thank you to the volunteers who serve on Sleepy Hollow's Climate Smart Task Force and Environmental Advisory Committee for all the work they do to care for our environment and push us to protect our future.

Sincerely,

Ken Wray
Mayor, Sleepy Hollow

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Executive Summary

The Village of Sleepy Hollow 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, wellbeing, and prosperity of our community. Furthermore, Sleepy Hollow has multiple opportunities to benefit by acting quickly to reduce community GHG emissions. Reducing emissions can result in lower energy and transportation costs, local job creation, better air quality and improved public health, and making the community a more attractive place to live and open a business.

In September 2014, the Village adopted the Climate Smart Community Pledge to become registered in the NYS Department of Environmental Conservation's Climate Smart Communities (CSC) program. The CSC program is a certification program that provides a framework for local governments to reduce greenhouse gas emissions and become more environmentally sustainable. In adopting the Climate Smart Pledge, Sleepy Hollow made the following commitments:

- Pledge to be a Climate Smart Community
- Set Goals, Inventory Emissions, Plan for Climate Action
- Decrease Community Energy Use
- Increase Community Use of Renewable Energy
- Realize Benefits of Recycling and Other Climate Smart Solid Waste Management Practices
- Reduce Greenhouse Gas Emissions Through Climate Smart Land-Use Tools
- Enhance Community Resilience and Prepare for the Effects of Climate Change
- Support Development of a Green Innovation Economy
- Inform and Inspire the Public
- Commit to an Evolving Process of Climate Action

In August of 2021, Sleepy Hollow become Bronze certified in the CSC program, and is working toward Silver certification. The Village has a dual role in climate leadership: stewarding its residents toward a more climate-healthy future and setting an example by what it can do itself through Village operations. The Village of Sleepy Hollow has begun the climate action planning process, starting with inventorying emissions. This report provides estimates of greenhouse gas emissions resulting from the Village's government operations in 2018. Data for this report was collected from utility electric and gas bills for Village owned buildings and from fuel reports for the Village fleet. The government operations inventory is mostly a subset of the community inventory (provided in a separate report). For example, data on commercial energy use by the

community includes energy consumed by municipal buildings, and community vehicle-miles-traveled estimates include miles driven by municipal fleet vehicles. Sleepy Hollow's CSC recertification process is well-timed because the Village is moving and replacing its Department of Public Works facility and therefore uniquely able to incorporate decisions that reduce emissions into that major project.

Key Findings

Figure 1 shows local government operations emissions. The largest contributor in this set is the Vehicle Fleet with 39.7% of emissions. The next largest contributor is the Buildings and Facilities sector with 31.9% of emissions. Actions to reduce emissions in both of these sectors will be a key part of a climate action plan. Public Lighting and Water Distribution & Wastewater Treatment were responsible for the remainder of local government operations emissions, with 16.6% of emissions and 11.8% of emissions, respectively.

The Inventory Results section of this report provides a detailed profile of emissions sources within the Village of Sleepy Hollow; information that is key to guiding local reduction efforts. These data will also provide a baseline against which the Village will be able to compare future performance and demonstrate progress in reducing emissions.

Figure 1: Sleepy Hollow Government Operations Emission by Sector (%)

Water & Wastewater Treatment 11.8%

Public Lighting 17.6%

Vehicle Fleet 39.7%

Buildings & Facilities 31.9%
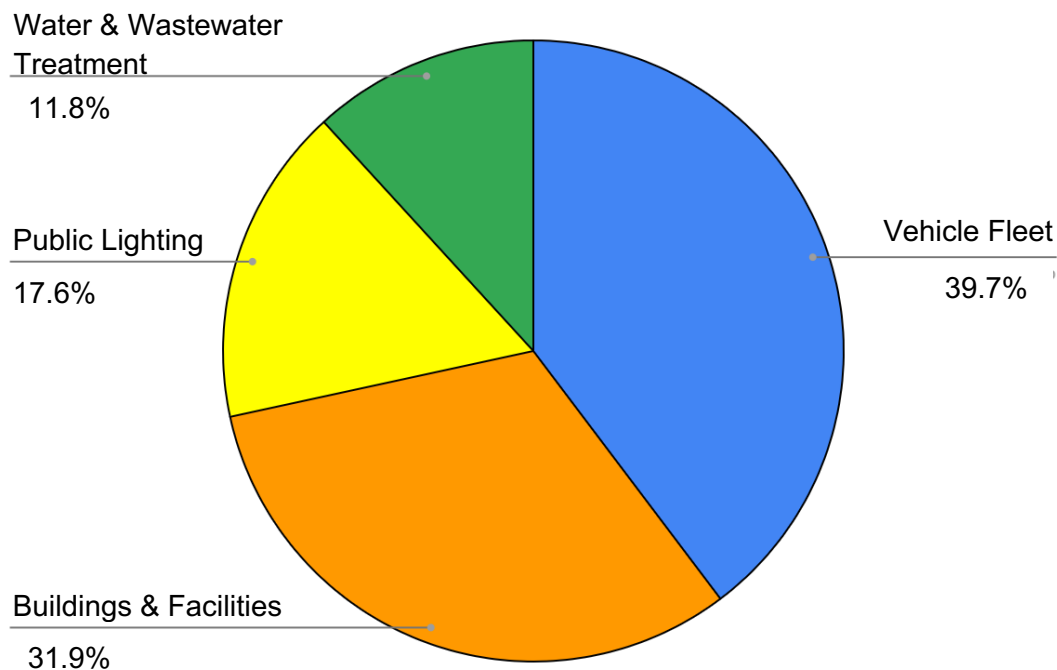
Climate Change Background

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.

Sleepy Hollow will be impacted by increased frequency of severe storms, flooding of the Hudson River as well as inland flooding, heat waves, and drought. The risk to Village residents is further amplified by the fact that a large portion of residents live in a Climate Justice Disadvantaged Community zone. This designation acknowledges communities that are disproportionately impacted by climate change and air pollution and have less access to clean energy.[1] Other expected impacts in the region include increased risk of wildfires, milder winters with less distinct seasons, and damage to agriculture and ecosystems.

Reducing fossil fuel use in the community can have many benefits in addition to reducing greenhouse gas emissions. More efficient use of energy decreases utility and transportation costs for residents and businesses and reduces those costs in the Village's budget. Retrofitting homes and businesses to be more efficient creates local jobs. In addition, money not spent on energy is more likely to be spent on local businesses and add to the local economy. Reducing fossil fuel use improves air quality and increasing opportunities for walking and bicycling improves 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."[12]

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[1] New York State. 2022. Climate Act. *Climate Justice Working Group*. climate.ny.gov. https://climate.ny.gov/resources/climate-justice-working-group/

[2] **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, 104 pp.**

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. They also have a unique opportunity to set precedents for residents on responsible action to mitigate the impact of climate change.

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 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 greenhouse gas emissions in Sleepy Hollow.

Figure 2: ICLEI Climate Mitigation Milestones

Inventory Methodology

Understanding a Greenhouse Gas Emissions Inventory

The first step toward achieving tangible greenhouse gas emission reductions requires identifying baseline emissions levels and sources and activities generating emissions in the community. This report presents emissions from operations of the Village of Sleepy Hollow government. The government operations inventory is mostly a subset of the community inventory, which is being published in a separate report. For example, data on commercial energy use by the community includes energy consumed by municipal buildings, and community vehicle-miles-traveled estimates include miles driven by municipal fleet vehicles.

As local governments have continued to join the climate protection movement, the need for a standardized approach to quantify GHG emissions has proven essential. This inventory uses the approach and methods provided by the Local Government Operations Protocol (LGO Protocol), which is described below.

Local Government Operations Protocol

In 2008, ICLEI, the California Air Resources Board (CARB), and the California Climate Action Registry (CCAR) released the LGO Protocol.[3] The LGO Protocol serves as the national standard for quantifying and reporting greenhouse emissions from local government operations. The purpose of the LGO Protocol is to provide the principles, approach, methodology, and procedures needed to develop a local government operations greenhouse gas emissions inventory.

Quantifying Greenhouse Gas Emissions

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:

- **Scope 1:** All direct emissions from a facility or piece of equipment operated by the local government. Examples include tailpipe emissions from local government, 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.

- **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 report only includes Scope 1 and Scope 2 emissions. They are the most essential components of a government operations greenhouse gas analysis as they are the most easily affected by local policy making. Scope 3 data were not available for this inventory, and are not required by the CSC program, although tracking Scope 3 emissions is encouraged.

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[3] **Local Government Operations Protocol. http://www.icleiusa.org/programs/climate/ghg-protocol/ghg-protocol**

Baseline Year

The inventory process requires the selection of a baseline year with which to compare current emissions. Sleepy Hollow's community greenhouse gas emissions inventory utilizes 2018 as

its baseline year. This year was chosen because it was the first year for which a complete set of data could be compiled.

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 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. Please see appendices for a detailed listing of the activity data used in composing this inventory.

Known emission factors are used to convert energy usage or other activity data into associated quantities of emissions. Emissions factors are usually expressed in terms of emissions per unit of activity data (e.g. lbs CO_2/kWh of electricity). For this inventory, calculations were made using the ClearPath software tool provided by ICLEI.

Government Operations Emissions Inventory Results

Emissions by Sector

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. Table 1 and Figure 2 show Sleepy Hollow's government operations emissions broken down by sector, while the remainder of this section breaks down these emissions in further detail within each sector.

Table 1: Government Operations Emissions by Sector

Sector	Metric Tons (CO2e)
Vehicle Fleet	428
Buildings & Facilities	344
Public Lighting	179
Water & Wastewater Distribution	127
Total Emissions	1,078

Figure 3: Government Operations Emissions by Sector

Government Operations Emissions by Sector (MtCO2e)
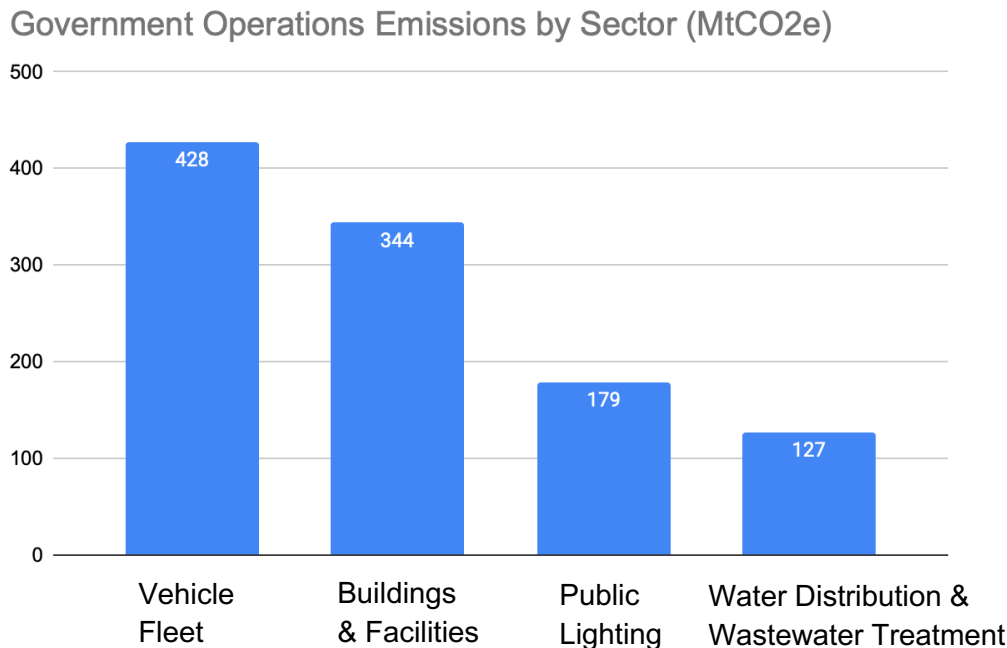
Vehicle Fleet

The Village's vehicle fleet was the largest source of emissions. Data was collected from the Department of Public Works' vehicle reports which listed fuel consumption and annual mileage by vehicle. To improve accuracy, the vehicle reports should more clearly identify vehicles and create a more transparent, standardized method for inputting mileage and fuel consumption. Vehicles should also be identified by department so that the Village can more easily identify areas for improving the fleet's efficiency. This report only shows emissions from Village-owned vehicles and does not include emissions from vehicles of contractors hired by the Village.

The data is separated by vehicle and fuel type. Figure 4 shows that Heavy Trucks are the largest source of vehicle emissions (42%), followed by Off-Road Vehicles (21%), Passenger Vehicles (20%), and Light Trucks (17%). Figure 5 breaks this down further to differentiate trucks between diesel and gasoline fuel, as well as types of off-road vehicles (Small vs. Large Utility). Table 2 shows vehicle emissions by fuel type.

The Village's vehicle fleet serves a number of essential functions, such as emergency response, sanitation, construction, street repair, and landscaping and must satisfy specific technical requirements to address those specialized functions. The information in this report can help the departments identify opportunities for cutting emissions through fuel efficiency standards, usage practices and electrification, while still satisfying specific technical requirements.

Figure 4: Percentage of Vehicle Emissions by Vehicle Type
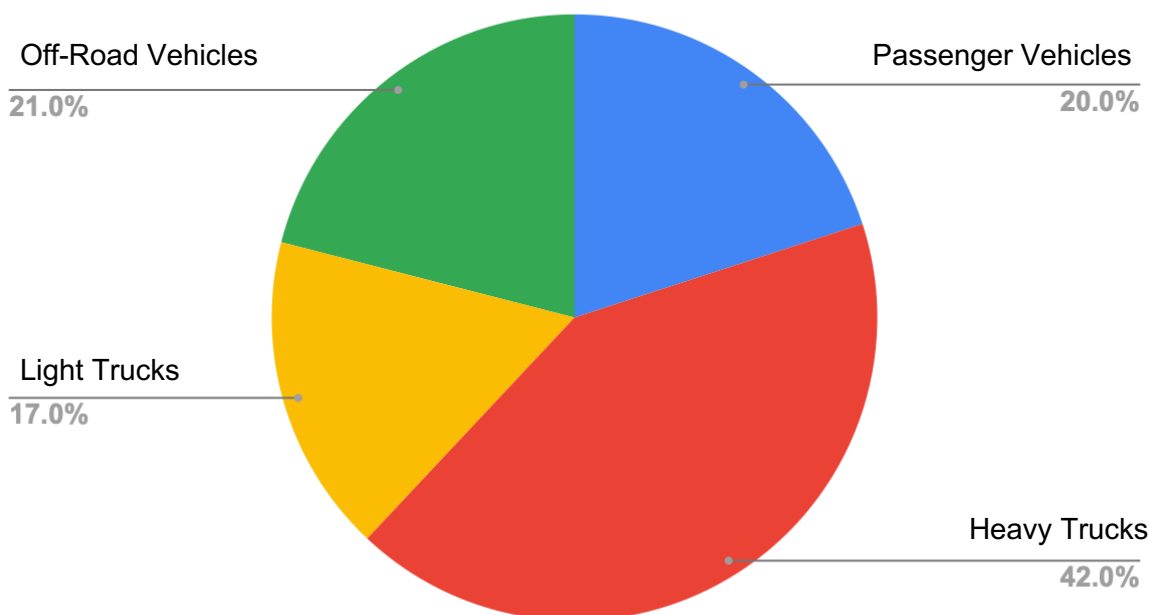

Emissions by Vehicle Type

Off-Road Vehicles 21.0%

Passenger Vehicles 20.0%

Light Trucks 17.0%

Heavy Trucks 42.0%

Figure 5: Vehicle Emissions by Vehicle & Fuel Type

Emissions by Vehicle & Fuel Type (MtCO2e)

Vehicle & Fuel Type	Emissions
Heavy Trucks - Diesel	123
Passenger Vehicles - Gasoline	84
Light Trucks - Gasoline	74
Heavy Trucks - Gasoline	56
Off-Road Large Utility - Diesel	41
Off-Road Small Utility - Gasoline	28
Off-Road Large Utility - Gasoline	12
Off-Road Small Utility - Diesel	9
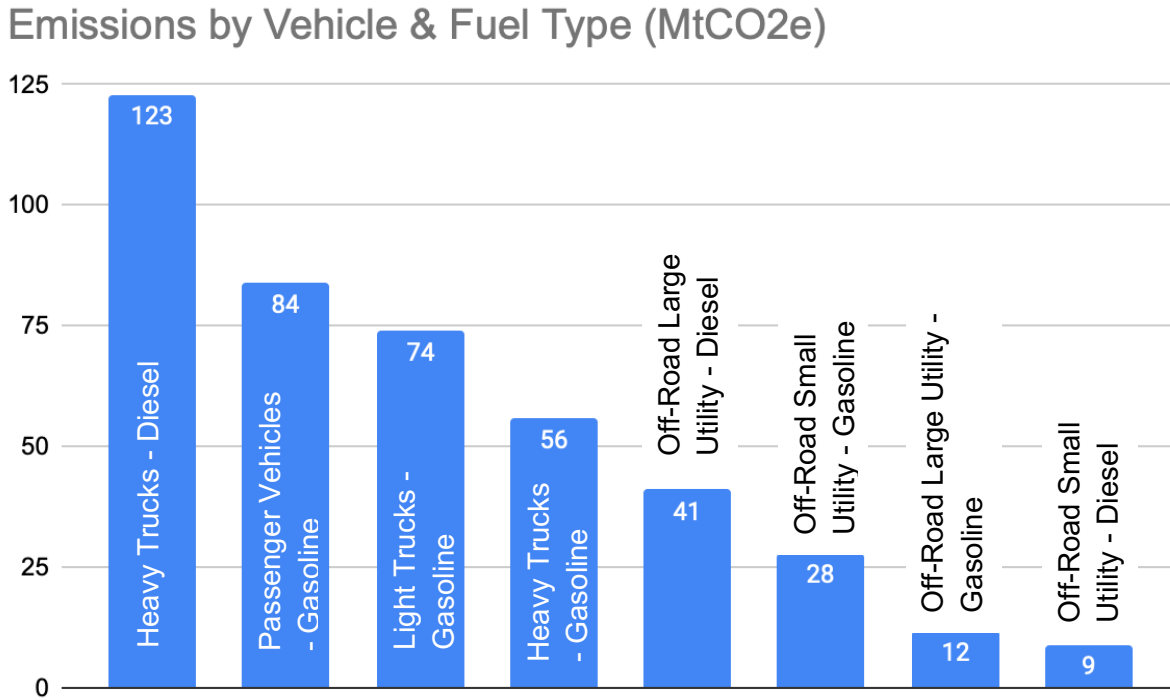
Table 3: Vehicle Emissions by Fuel Source

Fuel Source	Metric Tons (CO2e)	Percent of Total Vehicle Emissions
Diesel	173	40%
Unleaded Gasoline	255	60%

Buildings & Facilities

Buildings and facilities were the second largest sector of government operations emissions. Table 4 and Figure 6 show building emissions by scope and emissions type. Two of the facilities, a temporary office at the East Parcel development, and an emergency facility, are not heavily used and produce few emissions. The five other buildings (Village Hall, DPW, Senior Center, the two firehouses, and to a lesser extent, the Ambulance Corp building) present the best opportunities for cutting energy consumption.

Table 4: Government Emissions from Buildings

Building	Metric Tons CO2e	Percent of Building Emissions
28 Beekman Ave (Village Hall/Police Station)	154	45%
DPW (38 River St)	85	25%
Senior Center (55 Elm St)	34	10%
Cortlandt St Firehouse	28	8%
Lawrence Ave Firehouse	27	8%
Ambulance Corp (Andrews Lane)	11	3%
60 Continental St (East Parcel Office - temporary)	3	<1%
25 Sleepy Hollow Rd (Emergency Facility)	2	<1%

Emissions from Sleepy Hollow's government buildings are produced from electricity use and the use of gas for heating. Table 5 provides an overview of emissions attributed to electricity and gas, and Figure 6 shows a breakdown of emissions from each building by source. Gas usage is the largest source of emissions, followed by electricity use. This information presents a starting point for identifying targets for reducing emissions from government buildings and facilities. An energy audit would provide more detailed information, and as the Village looks at equipment replacement in its facilities, there is an opportunity to replace them with more efficient equipment that relies on electricity instead of gas. The Village has already committed to installing solar on its new DPW building and is going to prioritize HVAC equipment that does not rely on fossil fuels, such as ground source and air source heat pumps. Increasing efficiency through envelope improvement and more efficient equipment would also reduce energy costs. In 2018, utility costs for Village buildings were $95,463 for electricity and $47,582 for gas.

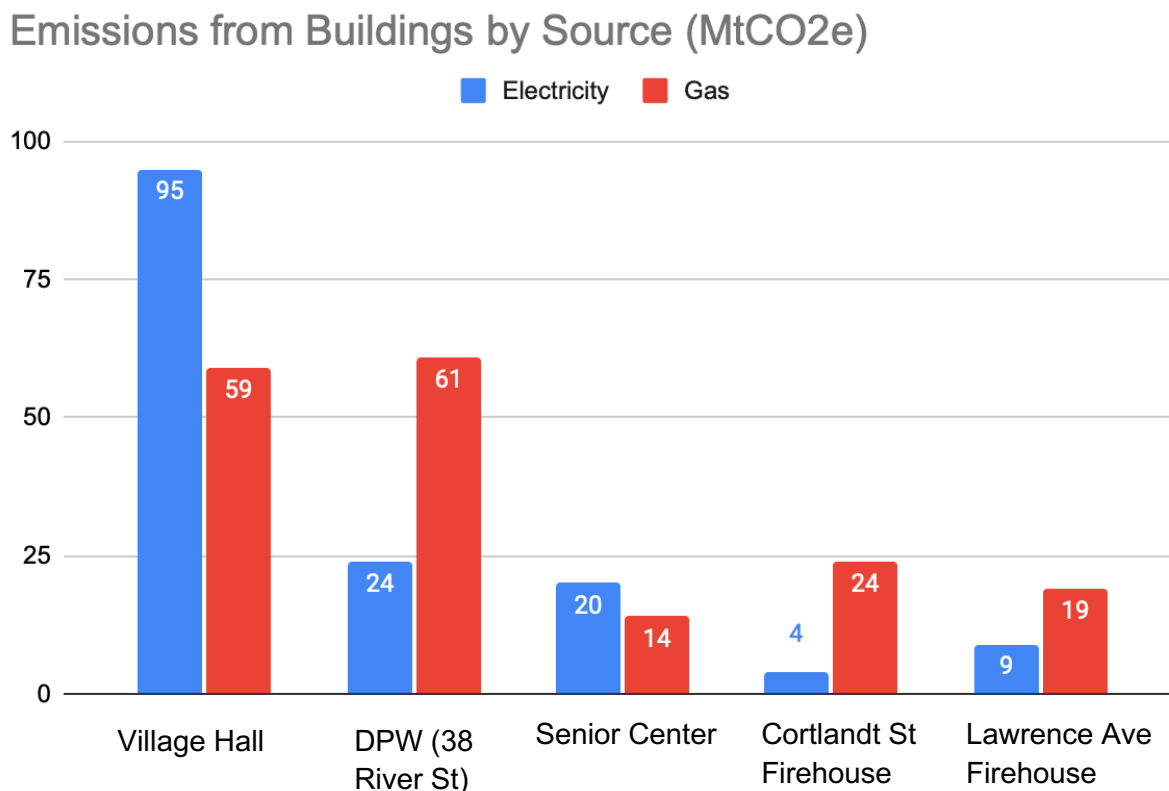**Figure 6: Emissions from Buildings by Source (MtCO2e)**

Emissions from Buildings by Source (MtCO2e)

Table 5: Building Emissions by Source

Source	Metric Tons CO2e	Percent of Building Emissions
Electricity	157	47%
Gas	177	53%

Public Lighting

Like most local governments, Sleepy Hollow operates a range of public lighting including traffic signals, street lighting, and other outdoor lighting. Table 6 shows public lighting emissions and energy cost by lighting type. Public lighting accounted for 190 metric tons of CO2e, and Street lighting was the largest contributor to lighting sector emissions. "Other Public Lighting" refers to traffic signals and lighting for parks and parking lots. New technologies, in particular Light Emitting Diodes or 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. In June of 2022, Sleepy Hollow committed to converting all streetlights to LEDs.

Table 6: Public Lighting Emissions by Source

Source	Metric Tons CO2e	% of Total Lighting Emissions	Energy Costs
Streetlights	135	75%	$124,499
Other Public Lighting	44	25%	$24,138

Wastewater Transportation

Wastewater collection and transportation is an essential public service provided by Sleepy Hollow. The Village does not own or operate its own wastewater treatment plant but uses a pump station to transport the wastewater to the treatment plant in Yonkers. Table 7 shows emissions from the electricity used to operate the sewer pump station.

Potable Water Delivery

Distribution of potable (safe to drink) water is another essential service provided by Sleepy Hollow and is also energy intensive. Table 7 shows emissions from the electricity used to operate the water pump station.

Table 7: Emissions from Water Supply Distribution and Wastewater transportation

Source	Metric Tons CO2e	%of Total Emissions
Potable Water Pump Station	117	92%
Sewer Pump Station	10	8%

Conclusion

This inventory marks completion of Milestone One of the Five ICLEI Climate Mitigation Milestones. The next steps are to forecast emissions, set an emissions-reduction target, and create a robust climate action plan that identifies specific quantified strategies that can cumulatively meet that target. The Village was awarded a state grant to hire a consultant to implement the Climate Action Plan process, which will begin in the first quarter of 2023. This process will involve extensive community engagement around the impacts of the climate crisis and developing solutions that will support a sustainable, vibrant community. The Climate Action Plan will utilize this Government Operations GHG Inventory, along with the Community-wide GHG Inventory, as a baseline for setting targets and identifying strategies for reducing emissions. Concurrently, the CSC Task Force will work with the Village to update the Village's fleet inventory and develop a fleet efficiency policy to address the Village's largest source of government operations emissions. The Task Force will also request that the Village track its energy and fuel use in its buildings and develop a system for collecting all energy data to ensure continuity and ease in updating its inventory reports. The NYS Department of Environmental Conservation recommends conducting an emissions inventory at least every five years.