Village of Sleepy Hollow

2022 Inventory of Community Greenhouse Gas Emissions
Utilizing Emissions Data from 2019

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

Kenneth Wray, Mayor
Anthony Giaccio, Village Administrator
Kevin Smith, Superintendent, Department of Public Works
Sara DiGiacomo, Village Treasurer
Jackie Johnson, Accounts Payable

Sleepy Hollow Climate Smart Communities Task Force

Kirsten Hase-McLaughlin, Co-Coordinator
Sarah Smiley, Co-Coordinator
Dave Avrin
Gabi Bost
Kirsten Bourne
Gina Carey
Dan Convissor
Judi Knispel
Rachael Sokolowski
Sacha Spector
Char Weigel

ICLEI-Local Governments for Sustainability USA

Kale Roberts
Eli Yewdal

This report was prepared by Sarah Smiley and edited by Char Weigel. The authors would like to thank the Village staff and elected officials for providing much of the insight and local information necessary for the completion of this report, and for their commitment to strengthening Sleepy Hollow as a sustainable, resilient, and vibrant community.

Table of Contents

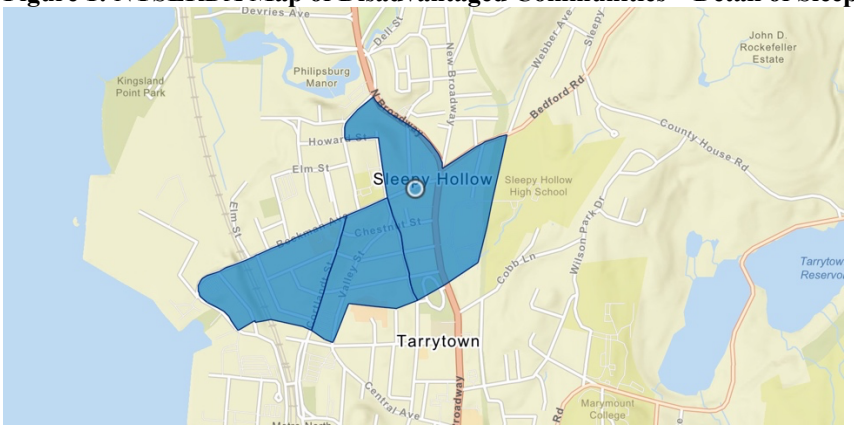
Executive Summary

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.

In recognition of the impact that each municipality can have on reducing its share of greenhouse gas emissions, the Village took the Climate Smart Communities (CSC) Pledge in 2014, committing itself to a course of climate action. Sleepy Hollow achieved Bronze level CSC certification in 2020, and is working toward Silver level certification. The Village has committed to increasing its use of renewable energy and reducing its energy consumption and use of fossil fuels in municipal operations, which can be affected through building, fleet, and lighting efficiency upgrades and solar energy installations, among other measures. Reducing energy consumption will save taxpayer money and reduce pollution. Village efforts can also serve as a model to residents and business owners within Sleepy Hollow, which are enhanced through educational community outreach. Conducting a community greenhouse gas inventory, along with an inventory of government operations emissions, sets the stage for the Village to conduct a Climate Action Plan, which the Village is embarking on in the first quarter of 2023.

As noted by New York State's Climate Justice Working Group (CJWG), climate change does not affect all New Yorkers equally[1]. The CJWG Draft Disadvantaged Communities Criteria indicate that much of downtown Sleepy Hollow qualifies as a disadvantaged community (see Figure 1). This fact further underscores the need for strong climate action by the Village to ensure that the underserved and vulnerable population in downtown Sleepy Hollow directly benefits from reduction in emissions.

Figure 1: NYSERDA Map of Disadvantaged Communities – Detail of Sleepy Hollow



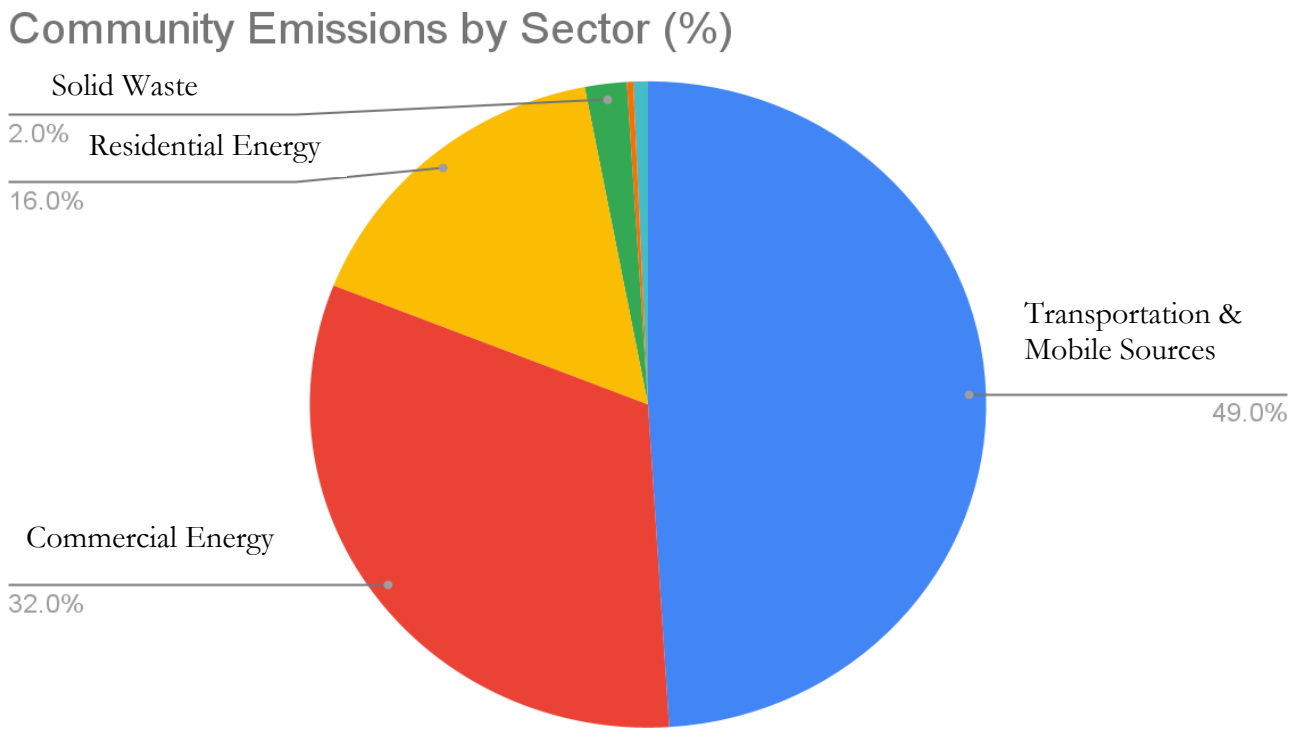
This report provides estimates of greenhouse gas emissions resulting from activities in Sleepy Hollow as a whole in 2019. Emissions from the Village's government operations are a subset of these emissions and are broken out separately in a Government Operations Inventory.

[1] New York State Department of Environmental Conservation. 2022, May. *New York State's Draft Disadvantaged Communities Criteria*. climate.ny.gov. https://climate.ny.gov/-/media/project/climate/files/LMI-dac-criteria-fact-sheet.pdf

Key Findings

Figure 2 shows communitywide emissions by sector. The largest contributor is transportation and mobile sources with 49% of emissions. The next largest contributors are commercial energy (32%) and residential energy (16%). Actions to reduce emissions in all of these sectors will be a key part of a climate action plan. Solid waste, fugitive emissions, and water & wastewater were responsible for the remaining 3% of emissions.

Figure 2: Community Emissions by Sector (%)



The Inventory Results section of this report provides a detailed profile of emissions sources within 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.

Climate Change Background

Naturally occurring gasses 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 gasses 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 gasses into the atmosphere. Collectively, these gasses intensify the natural greenhouse effect, causing global average surface and lower atmospheric temperatures to rise. Global climate change influences seasonal patterns and intensifies weather events, threatening the safety, quality of life, and economic prosperity of communities everywhere[2]. Many regions are already experiencing the consequences of global climate change, and Sleepy Hollow is no exception.

Human activities are estimated to have caused approximately 1.0°C of global warming above pre-industrial levels, with a likely range of 0.8°C to 1.2°C. Global warming is likely to reach 1.5°C between 2030 and 2052 if it continues to increase at the current rate.

According to the Fourth National Climate Assessment (2018)[3], the Northeast Region of the United States will experience less distinct seasons with milder winters and earlier spring conditions. Distinct seasons are a central part of the region's identity and impacts to it are altering our ecosystems and economic sectors such as tourism, agriculture and forestry. The region's changing climate also threatens public health through higher risk of infectious disease, degradation of air and water quality, and illness and death due to extreme heat. The region is already experiencing increased rainfall intensity, with further increases expected. More extreme weather events such as Superstorm Sandy in 2012 will threaten property, the natural landscape, infrastructure, and public safety. Sea level rise contributes to storm surges that extend further inland. This will exacerbate problems caused by aging infrastructure; Sleepy Hollow already experiences wastewater overflows into the Hudson River during heavy rains. One of Sleepy Hollow's most valuable assets is the Hudson River, which provides natural beauty and recreation, and drives economic development and tourism. Projected sea level rise of over six feet in the Hudson Valley by 2100 would threaten the community's shoreline and its economy, with the risk of flooding that would impact households, the rail line, wastewater treatment plants, and ecologically vital tidal wetlands.[4]

Many communities in the United States have started to take responsibility for addressing climate change at the local level. 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

---

[2] International Panel on Climate Change. 2014. Climate Change 2014: Synthesis Report. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, R.K. Pachauri and L.A. Meyer (eds.)]. IPCC, Geneva, Switzerland, 151 pp. Retrieved from https://www.ipcc.ch/report/ar5/syr/

[3] Dupigny-Giroux, L.A., E.L. Mecray, M.D. Lemcke-Stampone, G.A. Hodgkins, E.E. Lentz, K.E. Mills, E.D. Lane, R. Miller, D.Y. Hollinger, W.D. Solecki, G.A. Wellenius, P.E. Sheffield, A.B. MacDonald, and C. Caldwell, 2018: Northeast. In *Impacts, Risks, and Adaptation in the United States: Fourth National Climate Assessment, Volume II* [Reidmiller, D.R., C.W. Avery, D.R. Easterling, K.E. Kunkel, K.L.M. Lewis, T.K. Maycock, and B.C. Stewart (eds.)]. U.S. Global Change Research Program, Washington, DC, USA, pp. 669–742. doi: 10.7930/NCA4.2018.CH18. Retrieved from https://nca2018.globalchange.gov/chapter/18/.

[4] Scenic Hudson. 2019. A Regional Response to Climate Change: Scenic Hudson's Role in the Hudson Valley's Transition to Renewable Energy. Retrieved from https://scenichudson.org/wp-content/uploads/2019/10/A-Regional-Response-to-Climate-Change-2019-2.pdf.

residents and businesses. 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 also improves residents' health.

Sustainability and Climate Mitigation Initiatives

The Village of Sleepy Hollow is taking steps toward mitigating climate change concurrently with preparing a formal climate action plan. To reduce emissions from residential energy use, in October 2018 the Village joined Westchester Power's Community Choice Aggregation (CCA) program, which uses the community's aggregated purchasing power (in conjunction with other participating municipalities) to negotiate electricity rates and opted for 100% renewable energy supply to increase the amount of renewable energy on the electricity grid. In 2021 the Village also co-sponsored Energy Smart Homes, a community education campaign to promote ground source and air source heat pumps and home energy efficiency. To both reduce emissions and serve as a model, Sleepy Hollow adopted a resolution in July of 2022 to prioritize non-fossil fuel heating systems in government buildings, which will be demonstrated in in the decision to make an already-planned new Department of Public Works building operate solely on electricity. The Village is also planning to install solar on the roof of the same government building in addition to a solar carport in a separate municipal parking lot. As part of the July 2022 resolutions, the Village committed to converting its streetlights to LEDs, which will begin in the first quarter of 2023 and will provide energy savings and reduced emissions from grid electricity. In 2022 Sleepy Hollow began a composting program through an education campaign and by collecting residents' food scraps at three separate locations within the Village to reduce the amount of solid waste it sends to an incinerator. Sleepy Hollow is also implementing traffic calming measures to make it safer to get around on foot or bike, which can help reduce transportation emissions by encouraging other forms of transportation and is participating in the Route 9 Active Transportation Project, a multi-village initiative to make Route 9 a more complete street for all forms of transportation.

Sleepy Hollow is working on multiple projects to conserve and enhance natural areas and increase community access to nature and outdoor recreation. The Village planted over one hundred trees in 2022 in parks and the downtown area which will help sequester carbon dioxide as well as provide shade to counter rising temperatures and the urban heat island effect. The Village is improving Devries Park with ecological restoration and invasive species management along the Pocantico River, plus increased vegetation and forest trails that will enhance connectivity to other green spaces in the Village. Sleepy Hollow Common, a new park under development, will also enhance connectivity and provide ecological conservation and restoration including wetlands to treat stormwater runoff, dry and wet meadows, bioswales and pollinator gardens, in addition to open spaces for passive and active recreation and community gatherings. To reduce the impact of stormwater runoff on the watershed, Sleepy Hollow will be implementing a mitigation project at Fremont Pond in 2023.

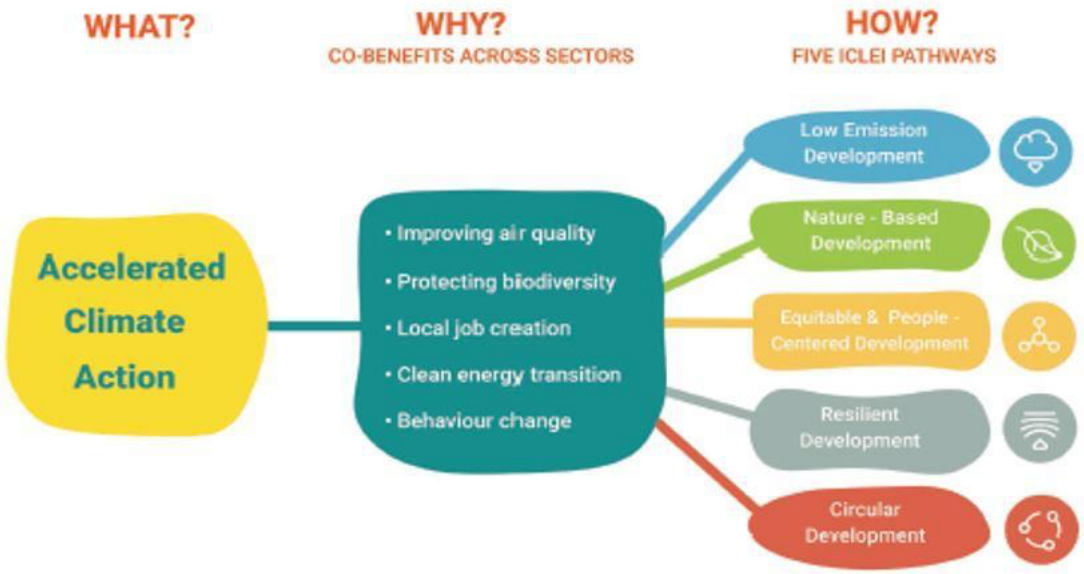
GHG Inventory as a Step Toward Carbon Neutrality

Facing the climate crisis requires the concerted efforts of local governments and their partners, which are closest to their community members and are dealing with the impacts of climate change. Cities, towns and counties are well placed to define coherent and inclusive plans that address integrated climate action — climate change adaptation, resilience and mitigation. Existing targets and plans need to be reviewed to bring in the necessary level of ambition and outline how to achieve net-zero emissions by 2050 at the latest. Creating a roadmap for climate neutrality requires Sleepy Hollow to identify priority sectors for action, while considering climate justice, inclusiveness, local job creation and many other impacts that can also

deliver on sustainable development. To complete this inventory, Sleepy Hollow utilized tools and guidelines from ICLEI-Local Governments for Sustainability (ICLEI), which provides authoritative direction for greenhouse gas emissions accounting and defines climate neutrality as follows:

> The targeted reduction of greenhouse gas (GHG) emissions and GHG avoidance in government operations and across the community in all sectors to an absolute net-zero emission level at the latest by 2050. In parallel to this, it is critical to adapt to climate change and enhance climate resilience across all sectors, in all systems and processes. To achieve ambitious emissions reduction, and more toward climate neutrality, Sleepy Hollow will need to set a clear goal and advance rapidly following a holistic and integrated approach. The opportunity for our community is that climate action can also lead to a wide range of co-benefits, such as by creating socio-economic opportunities, reducing poverty and inequality, and improving the health of people and nature.

The Village's 2023 Climate Action Plan initiative is a tangible indicator of the Village's commitment to doing the work that will help unlock these benefits.



ICLEI Climate Mitigation Milestones

In response to the climate emergency, 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, as well as influencing regional emissions through partnerships and advocacy. 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, also shown in Figure 3:

1. Conduct an inventory and forecast of local greenhouse gas emissions;

2. Establish a greenhouse gas emissions Science Based Target[5];
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.

Figure 3: ICLEI Framework of Five Milestones

This report represents the completion of ICLEI's Climate Mitigation Milestone One and provides a foundation for future work to reduce greenhouse gas emissions in Sleepy Hollow.

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 the Sleepy Hollow community as a whole including the Village government operations. Emissions from the operations of the Sleepy Hollow government are broken out into its own inventory and report, published concurrently with this report. The government operations inventory is mostly a subset of the community inventory. 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.

[5] Science-Based Targets are calculated climate goals, in line with the latest climate science, that represent your community's fair share of the ambition necessary to meet the Paris Agreement commitment of keeping warming below 1.5°C. To achieve this goal, the Intergovernmental Panel on Climate Change (IPCC) states that we must reduce global emissions by 50% by 2030 and achieve climate neutrality by 2050. Equitably reducing global emissions by 50% requires that high-emitting, wealthy nations reduce their emissions by more than 50%.

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 U.S. Community Protocol for Accounting and Reporting Greenhouse Gas Emissions (Community Protocol) which is described below.

Three greenhouse gasses are included in this inventory: carbon dioxide (CO_2), methane (CH_4) and nitrous oxide (N_2O). The charts in this report represent emissions in "carbon dioxide equivalent" (CO_2e) values, calculated using the Global Warming Potentials (GWP) for methane and nitrous oxide from the IPCC 5th Assessment Report:

Table 1 Global Warming Potential Values (IPCC, 2014)

Greenhouse Gas	Global Warming Potential
Carbon Dioxide (CO_2)	1
Methane (CH_4)	28
Nitrous Oxide (N_2O)	265

Community Emissions Protocol

Version 1.2 of the U.S. Community Protocol for Accounting and Reporting GHG Emissions[6] was released by ICLEI in 2019 and represents a national standard in guidance to help U.S. local governments develop effective community GHG emissions inventories. It establishes reporting requirements for all community GHG emissions inventories, provides detailed accounting guidance for quantifying GHG emissions associated with a range of emission sources and community activities, and provides a number of optional reporting frameworks to help local governments customize their community GHG emissions inventory reports based on their local goals and capacities.

The community inventory in this report includes emissions from the five Basic Emissions Generating Activities required by the Community Protocol. These activities are:

- Use of electricity by the community
- Use of fuel in residential and commercial stationary combustion equipment
- On-road passenger and freight motor vehicle travel
- Use of energy in potable water and wastewater treatment and distribution
- Generation of solid waste by the community

The community inventory also includes:

- Fugitive emissions from natural gas leakage

Quantifying Greenhouse Gas Emissions

Sources and Activities

Communities contribute to greenhouse gas emissions in many ways. Two central categorizations of emissions are used in the community inventory: 1) GHG emissions that are produced by "sources" located

[6] ICLEI. 2012. US Community Protocol for Accounting and Reporting Greenhouse Gas Emissions. Retrieved from http://www.icleiusa.org/tools/ghg-protocol/community-protocol

within the community boundary, and 2) GHG emissions produced as a consequence of community "activities".

Source	Activity
Any physical process inside the jurisdictional boundary that releases GHG emissions into the atmosphere	The use of energy, materials, and/or services by members of the community that result in the creation of GHG emissions.

By reporting on both GHG emissions sources and activities, local governments can develop and promote a deeper understanding of GHG emissions associated with their communities. A purely source-based emissions inventory could be summed to estimate total emissions released within the community's jurisdictional boundary. In contrast, a purely activity-based emissions inventory could provide perspective on the efficiency of the community, even when the associated emissions occur outside the jurisdictional boundary. The division of emissions into sources and activities replaces the scopes framework that is used in government operations inventories, but that does not have a clear definition for application to community inventories.

Base Year

The inventory process requires the selection of a base year with which to compare current emissions. Sleepy Hollow's community greenhouse gas emissions inventory utilizes 2019 as its baseline year, because it is the most recent year for which the necessary data are available. As noted in the Inventory Results below, some sectors within the inventory utilize 2018 as its baseline year, due to the data which was provided by the Village government in conjunction with data for the government operations inventory, which utilized 2018 as the baseline. For sectors that depended on outside sources, there was more complete data available for the 2019 baseline year.

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

The 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. Data was measured in therms for natural gas, metric million british thermal units (MMBTU's) for No. 2 fuel oil, megawatt hours (MWh) for grid electricity, kilowatt hours (KWh) for electricity used in potable water distribution and wastewater treatment, short tons for mass of solid waste, and vehicle miles traveled and fuel type for on-road transportation. 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 ICLEI's ClearPath tool.

Community Emissions Inventory Results

Community Profile

To forecast future emissions and gauge progress in emissions reductions goals, it is helpful to know the population of the community as of the baseline year. Future population growth due to the mixed-use development called Edge-on-Hudson should be taken into account when forecasting future emissions. The Village is aiming to decrease emissions while it will see significant population growth, and with it more energy use, etc. Therefore, it might be helpful to consider emissions on a per capita basis* to measure progress, while also utilizing any tool at the Village's disposal to mitigate the emissions from the development.

Table 2: Sleepy Hollow Demographics

Estimated 2019 Population	10,046
Estimated 2019 Number of Households	3,758

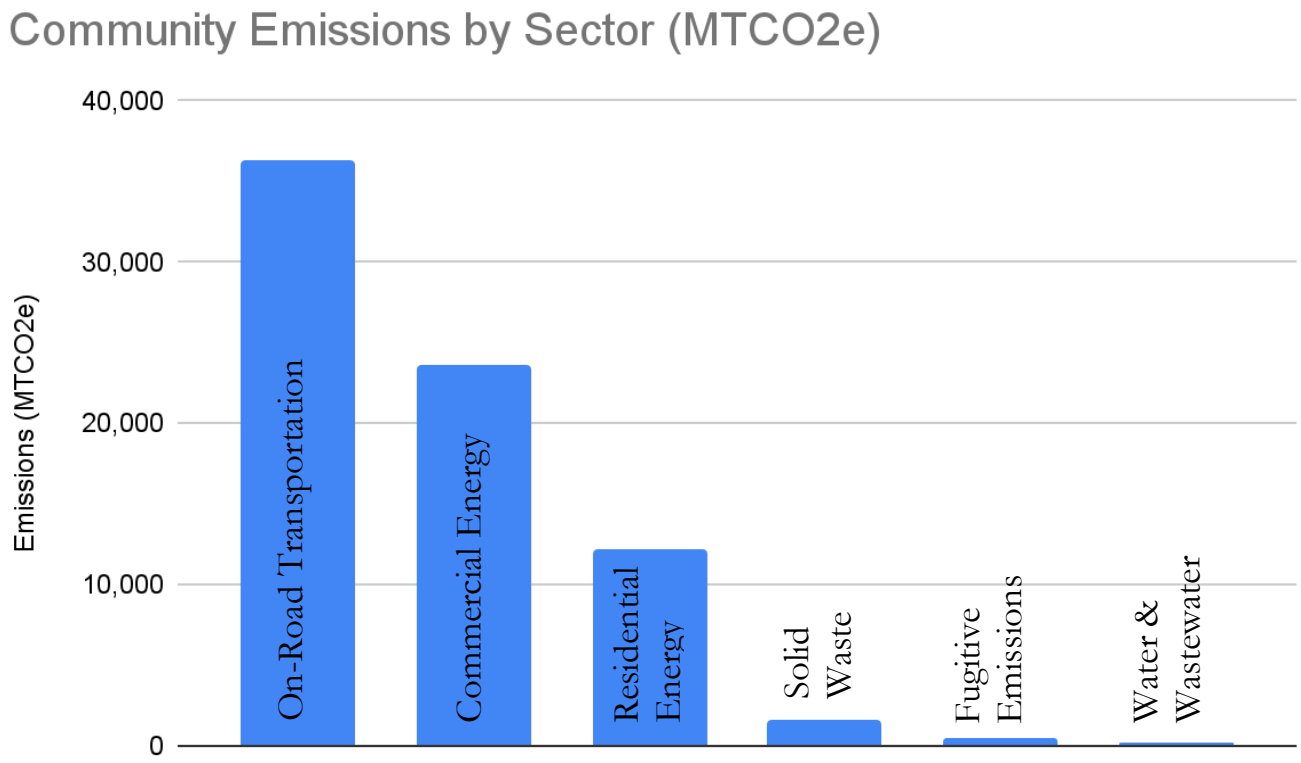
The total communitywide emissions for the 2019 inventory are shown in Table 3 and Figure 4.

Table 3 Communitywide Emissions Inventory

Sector	Fuel or Source	Activity Data Quantity & Unit	Emissions (Metric Tons CO2e)
Residential Energy (2019 data)	Electricity	16,840 MWh	4,566.5
	Natural Gas	446,453 Therms	2,374.5
	Fuel Oil (Distillate Oil #2)	71,177 MMBTUs	5,299.6
		Residential Energy Total	12,241
Commercial Energy (2019 data)	Electricity	34,429 MWh	9,336.1
	Natural Gas	2,683,331 Therms	14,272
		Commercial Energy Total	23,608
On-Road Transportation (2019 data)	Gasoline	63,431,551 Vehicle Miles Traveled	26,442
	Diesel	6,581,198 Vehicle Miles Traveled	9,944.8
		Transportation Total	36,387
Solid Waste	Waste Generated (processed at Waste-to-Energy Facility) (2019 data)	4337 tons	1,503.2
	Yard Waste (processed at composting facility) (2018 data)	1010.26 tons	70.34
		Solid Waste Total	1,573.54
Potable Water Distribution (2018 data)	Electricity	430,230 KWh	116.67
Wastewater Treatment (2018 data)	Electricity	537,871 KWh	145.85
Fugitive Emissions (2019 data)	Natural Gas Leakage from Gas Distribution System	3,129,784 Therms	543
		Total Community-Wide Emissions	74,615
		*Emissions Per Capita	7.427

Figure 4 shows the distribution of communitywide emissions by sector. On-Road Transportation is the largest contributor, followed by Commercial Energy and Residential Energy.

Figure 4: Community Emissions by Sector



This inventory will serve as the baseline for creating a Climate Action Plan, during which process the Sleepy Hollow community will identify and prioritize opportunities within each sector for reducing greenhouse gas emissions. While reducing emissions across all sectors is important, and each offers different benefits to the community, this inventory can help direct resources to the areas that will provide the most significant results in terms of climate change mitigation. The following sections provide more detail on the different emissions sources.

<u>On-Road Transportation</u>

On-Road Transportation is the largest source of emissions, accounting for 36,387 MTCO2e and 49% of the community's total emissions. The emissions are calculated using Annual Vehicle Miles Traveled (VMT). There is no data source specific to the vehicle miles traveled within the borders of Sleepy Hollow. Instead, a population-based proportion of Annual VMT for all of Westchester County was used to approximate the number of Annual VMT that was attributable to the residents of Sleepy Hollow. The Westchester County data was collected from the NY Metropolitan Transportation Council Regional Transportation Plan (adopted September 9, 2019), which was provided by the Westchester County Department of Transportation. VMT by Vehicle Type was calculated using the EPA's state inventory tool, provided in Excel form by ICLEI. This determined the number of VMT that was attributable to gasoline and diesel vehicles.

The population-based proportion offers a good high-level reference to compare the emissions from this sector to other sectors, but it would be difficult to attribute changes over time to mitigation measures

taken by Sleepy Hollow. In order to assess progress, VMT data on local roads within Sleepy Hollow from the NYS Department of Transportation can be used as a benchmark because the data would reflect local changes to traffic. The following roads were selected for this purpose based on which roads had data available for the baseline year 2019:

- Clinton Street (between Beekman Avenue & Cortlandt Street)
- Palmer Avenue (between Bellwood Avenue & Kingsland Park)

These roads also reflect different areas within the Village of Sleepy Hollow, as can be seen in Figures 5, and 6.

Figure 5: Map of Clinton Street

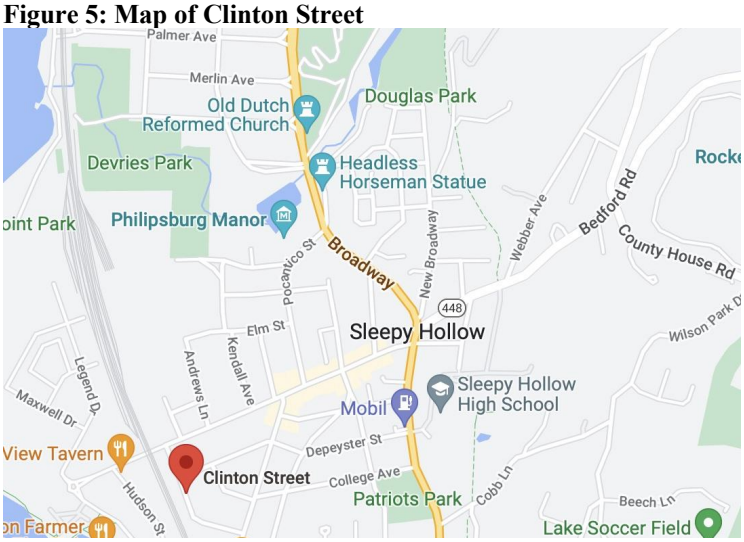
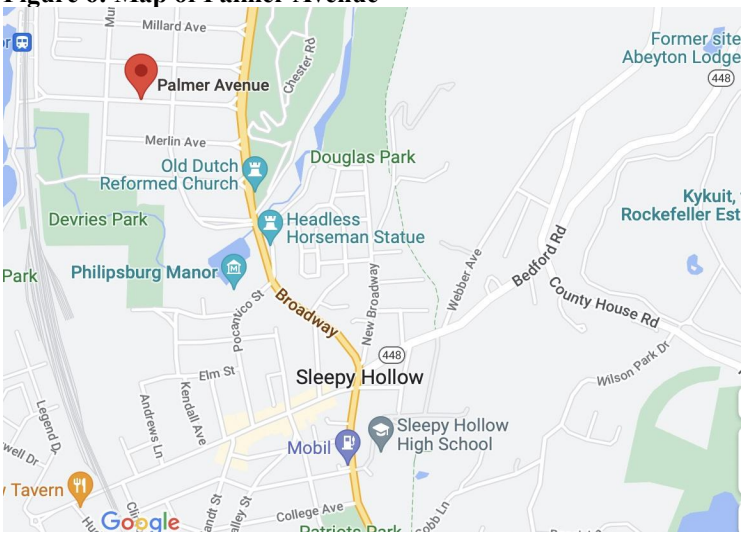


Figure 6: Map of Palmer Avenue



In order to estimate the emissions from traffic on these roads, the Annual Average Daily Traffic provided in the DOT report was converted to Annual Vehicle Miles Traveled, then multiplied by the emissions factor in ClearPath. The results are shown in Table 4. Palmer Avenue is a means to travel to the Philipse Manor train station or Kingsland Park (local destinations) and Clinton Street is a road in downtown Sleepy Hollow that is used for local destinations within the Village or the neighboring village, Tarrytown.

Table 4: Emissions from On-Road Transportation on Two Local Roads

Road Name & Length	Annual Vehicle Miles Traveled	Emissions (MTCO2e)
Palmer Avenue (0.27 miles)	61,495 miles	28 MTCO2e
Clinton Street (0.21 miles)	78,183 miles	32 MTCO2e

Commercial Energy

The next largest source of emissions was the use of electricity and gas by commercial buildings, accounting for 23,608 metric tons, or 32% of total Village emissions. Table 5 shows the percentage of total Commercial Energy emissions by fuel type. Grid Electricity is an Activity because emissions are generated outside the Village, and Gas is a Source because the emissions are generated directly by the fuel combustion within buildings in Sleepy Hollow. Data for this sector was taken from NYSERDA's Utility Energy Registry (utilityregistry.org) which manages data supplied by utility companies. The commercial building stock is growing in Sleepy Hollow due to the Edge-on-Hudson development, and the degree to which that development can use alternatives to gas such as ground source or air source heat pumps will determine the degree to which the village can mitigate the growth of emissions in this sector. It is worth noting that one large commercial property, Phelps Hospital, is retrofitting one of its buildings to use heat pumps, and was awarded a grant from NYSERDA to conduct a feasibility study for a community heat pump system to service its eight other buildings. If the hospital is able to implement such a system, it could be a significant step to reducing the village's current amount of commercial energy emissions, as well as serve as a model for other buildings in the community.

Table 5: Commercial Energy Emissions by Source or Activity

Source or Activity	Emissions	% of Commercial Energy Emissions
Grid Electricity	9,336	40%
Gas	14,272	60%

Residential Energy

Residential Energy is the next largest source of emissions, accounting for 12,241 metric tons, or 16% of total Village emissions. Table 6 shows the breakdown of emissions by Source or Activity. According to 2019 census data, 910 households in Sleepy Hollow used Fuel Oil, which was multiplied by the average fuel use per household in NYS. This sector includes sources within the Village (fuel combusted in buildings) as well as activity generating emissions outside the Village (grid electricity). Data was collected from NYSERDA's Utility Energy Registry (utilityregistry.org).

Table 6: Residential Energy Emissions by Source or Activity

Source or Activity	Emissions (MTCO2e)	% of Residential Energy Emissions
Grid Electricity	4,566.5	37.3%
Gas	2,374.5	19.4%
Fuel Oil	5,299.6	43.3%

Solid Waste

Solid Waste is the fourth largest source of emissions, accounting for 1,573.54 metric tons of emissions, or 2% of total Village emissions. Table 7 shows the breakdown of solid waste sources. Solid waste that was sent to an incinerator accounted for 96% of solid waste emissions, with yard waste sent to a composting facility accounting for 4%. In addition to emissions that contribute to global warming, the waste incinerator creates air pollution that impacts the air quality of the surrounding community and the region as a whole.

Table 7: Solid Waste Emissions by Activity

Activity	Emissions (MTCO2e)	% of Solid Waste Emissions
Solid Waste (incinerated)	1,503.2	96%
Yard Waste (composted)	70.34	4%

Fugitive Emissions

The next largest source of emissions is Fugitive Emissions, accounting for 0.7% of total emissions. Fugitive emissions are methane leaks from the local gas distribution system, which are calculated in the ClearPath tool by entering the total number of therms of natural gas used by the community. ClearPath uses a leakage rate of 0.3%, taken from the Environmental Defense Fund's Leakage Rate Modeling Tool. While not one of the largest sources of emissions, it is important to remember that gas used to heat homes and commercial buildings generates additional emissions beyond what is directly generated on-site, due to the leaks in the pipelines that distribute the gas to the buildings. These gas leaks have negative impacts on air quality, which impacts health, the natural environment, and contributes to global warming.

Potable Water Distribution and Wastewater Treatment

The next largest source of emissions is Potable Water Distribution and Wastewater Treatment, accounting for 0.3% of emissions. The Village has a water pump station used to distribute drinking water, and the emissions from this sector are generated by the grid electricity used to operate the pump station. Emissions were calculated using data from Westchester County Annual Report on Wastewater Treatment (2018), attributing a portion of electricity used based on Sleepy Hollow's population, which was added to the electricity used by Sleepy Hollow to operate its sewer pump station, which transports the wastewater to the County's wastewater treatment center in Yonkers. Table 8 shows the breakdown between emissions from potable water distribution and wastewater treatment.

Table 8: Emissions from Potable Water Distribution and Wastewater Treatment

Source or Activity	Emissions (MTCO2e)	% of Water Distribution/Treatment Emissions
Potable Water Distribution (Grid Electricity)	116.67	44%
Wastewater Treatment (Grid Electricity)	145.85	56%

Conclusion

This inventory, together with the completed Government Operations 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 build upon the Village's current climate initiatives with a robust climate action plan that identifies specific quantified strategies that can cumulatively meet that target. Based on the inventory results, to tackle the biggest source of emissions Sleepy Hollow should prioritize strategies focused on transportation, commercial energy, and residential energy. It will be helpful to continue to track energy usage and emissions on an ongoing basis. Based on ICLEI's recommendation, the Village will update its Greenhouse Gas inventories within two to five years to assess progress resulting from any actions implemented. Taking actions to reduce emissions from these and the other sectors will help Sleepy Hollow do its part to mitigate the climate crisis, and simultaneously create benefits in energy savings, public health, and a more connected, vibrant community.