Nyack

2018 Inventory of Community and Government Operations Greenhouse Gas Emissions

SEPTEMBER 21, 2023

Produced by the Nyack Climate Smart Committee
with Assistance from ICLEI – Local Governments for Sustainability USA

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Executive Summary

The Village of Nyack is a member of ICLEI, a consortium of local governments for sustainability. ICLEI has developed a tool called ClearPath that we used to calculate the greenhouse gas (GHG) emissions for both the Nyack Community and Government operations.

Recognizing that greenhouse gas 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, The Village has taken a number of steps over many years to reduce emissions and improve sustainability.

This report provides estimates of greenhouse gas emissions resulting from activities in Nyack as a whole in 2018, as well as emissions specifically from the Village's government operations. These inventories set a baseline to gauge our progress toward reducing the carbon emissions throughout the Village and will be used to prioritize actions in the Nyack 2030 Climate Action Plan. The Plan will be completed by the end of 2023.

In 2018, both the Community and the Village operations, had estimated Greenhouse Gas emissions totaling 38,458 CO2 equivalent Metric Tons. A Metric Ton (MT), is 1,000 kilograms or 2,205 lbs. These emissions are all attributed to human activity within the boundaries of the community. With a population of 7,188 in 2018, Nyack has a per capita CO2e of 5.4 MT. This is comparable to similar communities in New York State using the ICLEI ClearPath protocol.

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

The Village will conduct another inventory in 2025, using 2024 data, to measure its progress toward meeting the emission reduction goals and adjust our implementation accordingly.

Key Findings

The inventory addresses two domains: Community and Government Operations. Using ICLEI's ClearPath tool, Nyack has entered the data for 2018 as a baseline. Here are the preliminary results.

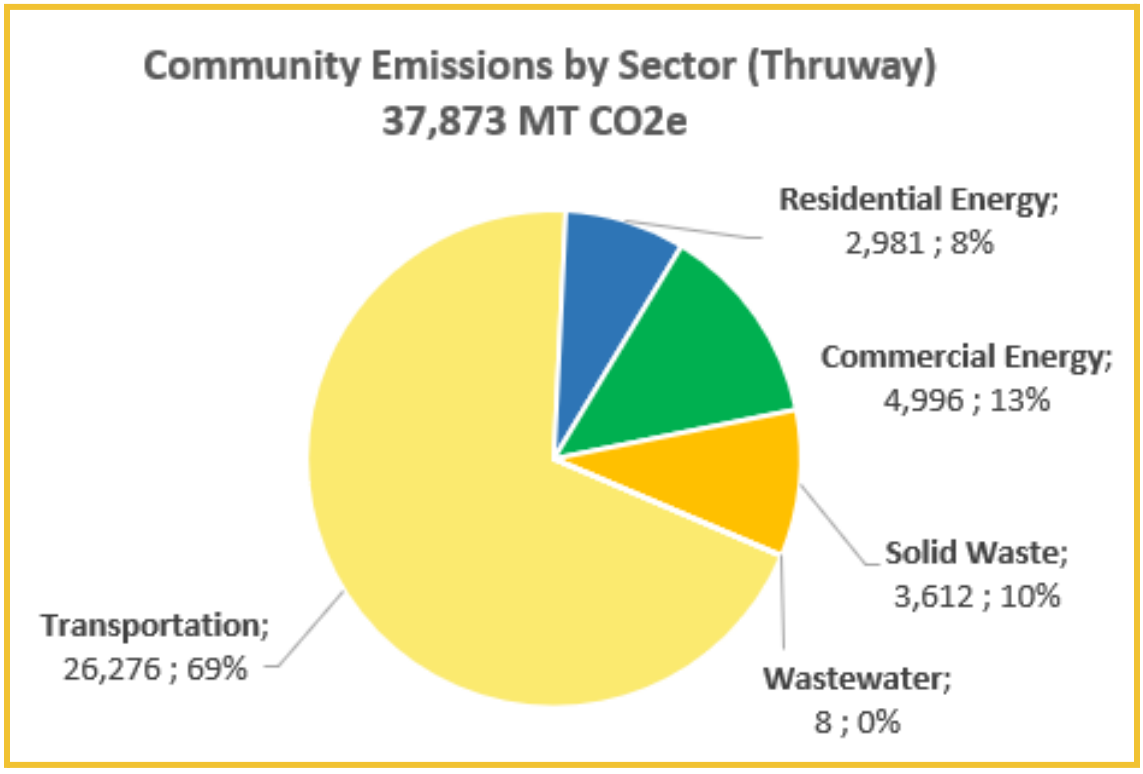
Community Emissions

The Community emissions total about 37,873 Metric Tons of CO2 equivalents.

Figure 1 shows community-wide emissions by sector. The largest contributor is Transportation with 69% of total emissions. It's important to note that transportation emissions include the small section of Thruway traffic running through Nyack. Although short in length, the volume of vehicles that use the Thruway has a significant impact on Nyack's emissions in this sector.

Local traffic accounts for only 10.8% of the total VMT and emissions in the transportation sector, while the Thruway traffic accounts for 89.2%. The Village has little control over the Thruway traffic, but will see emissions reductions as drivers move to electric vehicles, take advantage of new public transportation options, and engage in more remote work.

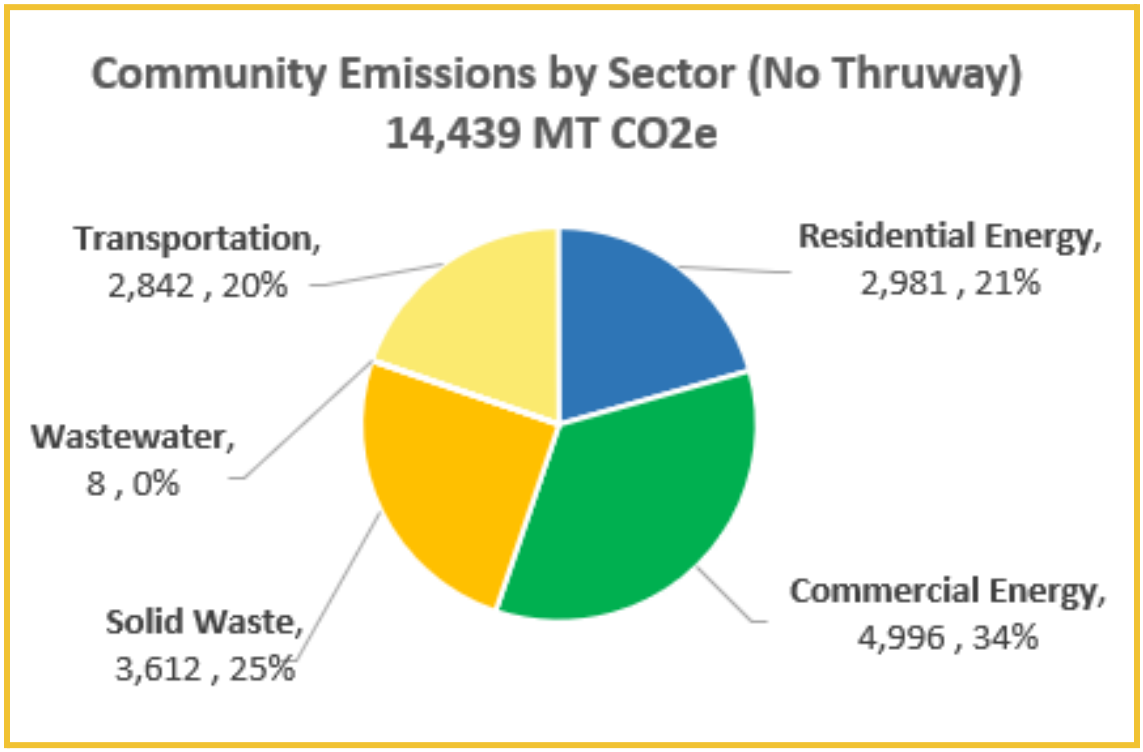
Figure 1



The next largest contributors are Commercial Energy (13%), Solid Waste (10%), and Residential Energy (8%). Actions to reduce emissions in all of these sectors will be a key part of a climate action plan. Water/Wastewater is responsible for the remaining (less than 0.05%) of emissions.

Figure 1a provides a breakdown of the community emissions without emissions generated by the Thruway traffic. Local transportation related emissions are now 2,842 MT or 20% of total emissions. Building related emissions for both residential and commercial buildings represent the largest portion (55%) of total emission.

Figure 1a

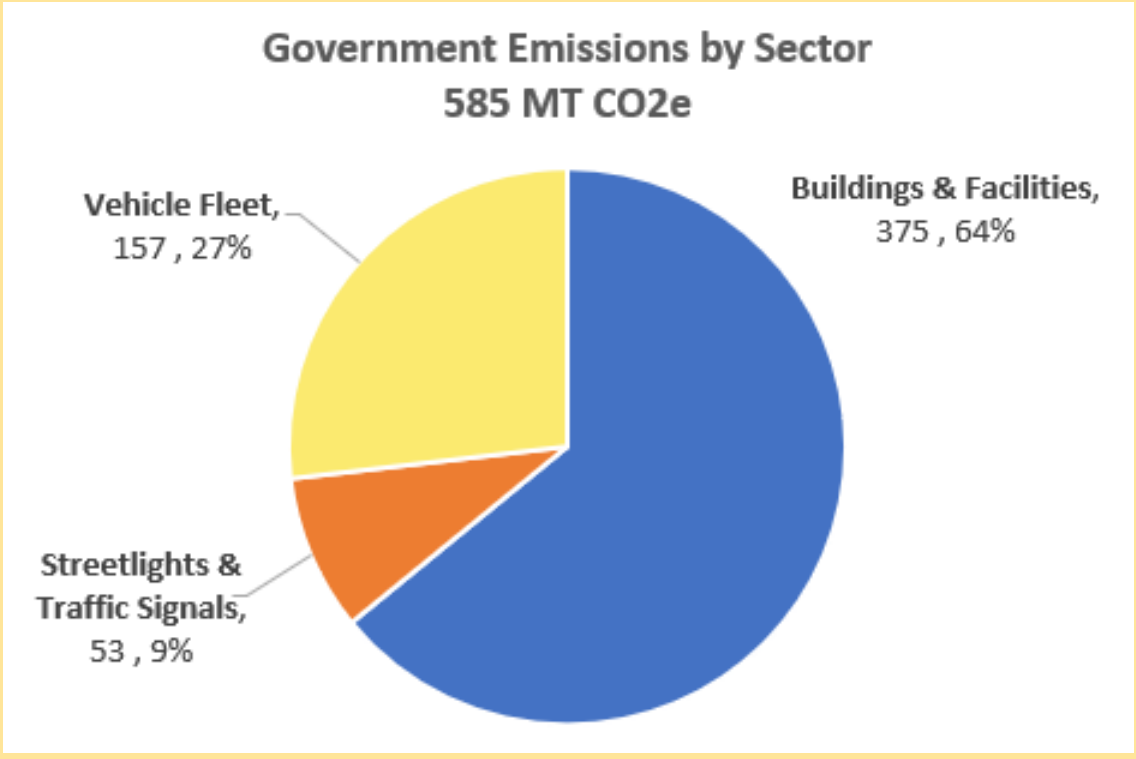


Governmental Emissions

The Village government's operations generated 585 Metric Tons of CO2e in 2018.

Figure 2 shows local government operations emissions by sector. The Buildings and Facilities sector accounts for a vast majority (64%) of these emissions. The next largest contributor is the vehicle fleet (27%), followed by Street Lights and Traffic Signals (9%). Actions to reduce emissions from these sectors will be a key part of any future climate action plan developed by Nyack Climate Smart Committee.

Figure 2



Other Emissions

Certain components of our local carbon footprint such as air travel, consumer purchases, and diet are not included in these inventories. The ICLEI model records the emissions in the location they are produced and not by the location of the individual who used it.

Introduction to Climate Change

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, threatening the safety, quality of life, and economic prosperity of global communities. Although the natural greenhouse effect is needed to keep the earth warm, a human enhanced greenhouse effect with the rapid accumulation of GHG in the atmosphere leads to too much heat and radiation being trapped. The Intergovernmental Panel on Climate Change (IPCC) 5th Assessment Report confirms that human activities have unequivocally caused an increase in carbon emissions[1]. Many regions are already experiencing the consequences of global climate change, and Nyack 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. (high confidence) Warming from anthropogenic emissions from the pre-industrial period to the present will persist for centuries to millennia and will continue to cause further long-term changes in the climate system, such as sea level rise, with associated impacts (high confidence), but these emissions alone are unlikely to cause global warming of 1.5°C (medium confidence). Climate-related risks for natural and human systems are higher for global warming of 1.5°C than at present, but lower than at 2°C (high confidence). These risks depend on the magnitude and rate of warming, geographic location, levels of development and vulnerability, and on the choices and implementation of adaptation and mitigation options (high confidence)[2].

According to the fourth National Climate Assessment, the northeast U.S. will experience potentially devastating impacts from seasonal changes and hazards occurring at unprecedented magnitudes. The New York Metropolitan area, including Nyack, is at particular risk for coastal hazards, such as flooding and hurricanes that will continue to intensify with sea-level rise. In addition, climate change will continue to produce warmer seasons and extreme temperatures that threaten many sectors within Nyack and the greater region, most notably public health and tourism .

The Northeast's coast and ocean support commerce, tourism, and recreation that are important to the region's economy and way of life. Warmer ocean temperatures, sea level rise, and ocean acidification threaten these services. The adaptive capacity of marine ecosystems and coastal communities will influence ecological and socioeconomic outcomes as climate risks increase.

[1]IPCC, 2021: Summary for Policymakers. In: Climate Change 2021: The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change [MassonDelmotte, V., P. Zhai, A. Pirani, S. L. Connors, C. Péan, S. Berger, N. Caud, Y. Chen, L. Goldfarb, M. I. Gomis, M. Huang, K. Leitzell, E. Lonnoy, J. B. R. Matthews, T. K. Maycock, T. Waterfield, O. Yelekçi, R. Yu and B. Zhou (eds.)]. Cambridge University Press. In Press.

[2]IPCC, 2018: Summary for Policymakers. In: Global Warming of 1.5°C. An IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty [Masson-Delmotte, V., P. Zhai, H.-O. Pörtner, D. Roberts, J. Skea, P.R. Shukla, A. Pirani, W. Moufouma-Okia, C. Péan, R. Pidcock, S. Connors, J.B.R. Matthews, Y. Chen, X. Zhou, M.I. Gomis, E. Lonnoy, T. Maycock, M. Tignor, and T. Waterfield (eds.)]. World Meteorological Organization, Geneva, Switzerland, 32 pp.

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 residents and businesses. Retrofitting homes and businesses to be more efficient creates local jobs. In addition, when residents save on energy costs, they are more likely to be spent at local businesses and add to the local economy. Reducing fossil fuel use improves air quality, and increases opportunities for walking and bicycling thereby improving residents' health.

Greenhouse Gas Inventory as a Step Toward Carbon Neutrality

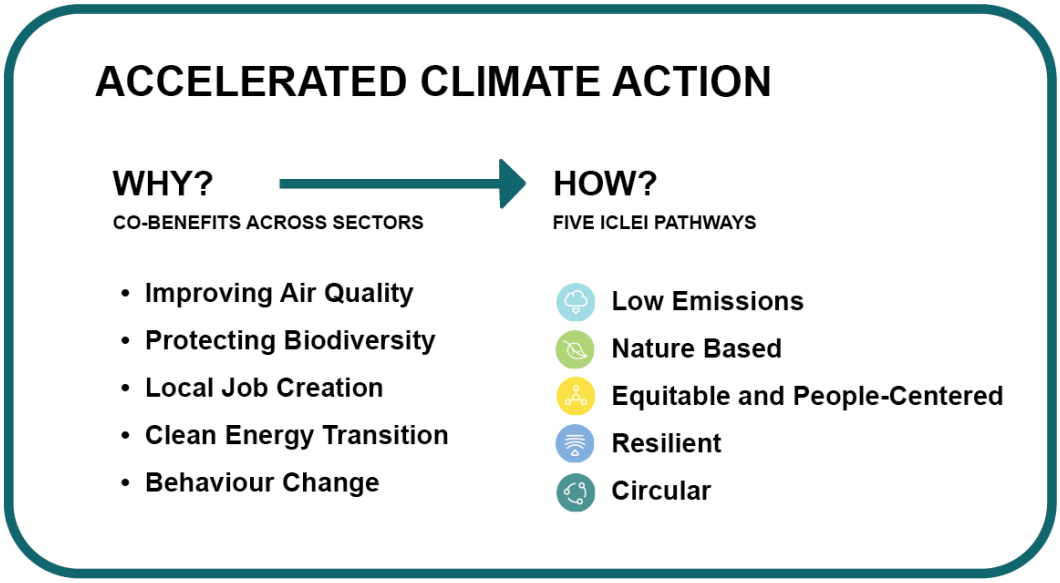
Facing the climate crisis requires the concerted efforts of local governments and their partners, those who are close to the communities directly dealing with the impacts of climate change.

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 Nyack to identify priority sectors for action, while considering climate justice, inclusiveness, local job creation and other benefits of sustainable development.

To complete this inventory, Nyack 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 move toward climate neutrality, Nyack will need to set a clear goal and act rapidly following a holistic and integrated approach. Climate action is an opportunity for our community to experience a wide range of co-benefits, such as creating socio-economic opportunities, reducing poverty and inequality, and improving the health of people and nature.



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[3];
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, and provides a foundation for future work to reduce greenhouse gas emissions in Nyack.

Figure 3

[3] 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%.

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 both the Nyack community as a whole, and from operations of the Nyack government. The government operations inventory is mostly a subset of the community inventory, as shown in Figure 4. For example, data on community vehicle-miles-traveled estimates include miles driven by municipal fleet vehicles.

Figure 4

As local governments continue 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) and the Local Government Operations Protocol for Accounting and Reporting Greenhouse Gas Emissions (LGO Protocol), both of which are described below.

Three greenhouse gasses are included in this inventory: carbon dioxide (CO2), methane (CH4) and nitrous oxide (N2O). Many of the charts in this report represent emissions in "carbon dioxide equivalent" (CO2e) values, calculated using the Global Warming Potentials (GWP) for methane and nitrous oxide from the IPCC 5th Assessment Report as illustrated in Table 1.

Table 1: Global Warming Potential Values (IPCC, 2014)

Greenhouse Gas	Global Warming Potential
Carbon Dioxide (CO2)	1
Methane (CH4)	84
Nitrous Oxide (N2O)	264

Community Emissions Protocol

Version 1.2 of the U.S. Community Protocol for Accounting and Reporting GHG Emissions[4] 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 the following activities:

- Wastewater processing
- Fugitive emissions from natural gas leakage

Carbon dioxide represents the vast majority (90.3%) of the community emissions and is produced from burning fossil fuels such as coal, gasoline, diesel, and natural gas. Methane accounts for about 9.3% of community-wide emissions, and comes primarily from grid electricity (from fuel combusted to create electricity), gasoline used for passenger vehicles, the methane-to-energy plant, flaring of digester gas, and leakage from the local natural gas distribution system. Nitrous oxide accounts for less than 0.5% of communitywide emissions, primarily from grid electricity (from fuel combusted to create electricity) and gasoline used for passenger vehicles.

Local Government Operations (LGO) Protocol

In 2010, ICLEI, the California Air Resources Board (CARB), and the California Climate Action Registry (CCAR) released Version 1.1 of the LGO Protocol.[5] The LGO Protocol serves as the national standard for quantifying and reporting greenhouse emissions from local government operations. The purpose of the

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

[5] ICLEI. 2008. Local Government Operations Protocol for Accounting and Reporting Greenhouse Gas Emissions. Retrieved from http://www.icleiusa.org/programs/climate/ghg-protocol/ghg-protocol

LGO Protocol is to provide the principles, approach, methodology, and procedures needed to develop a local government operations greenhouse gas emissions inventory.

The following activities are included in the LGO inventory:

- Energy and natural gas consumption from buildings & facilities
- Wastewater treatment processes
- On-road transportation from vehicle fleet

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 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.

The data gathered in this inventory illustrate a source based approach. As noted, air travel, consumer purchases, and dietary considerations are not captured in the inventory.

Base Year

The inventory process requires the selection of a base year with which to compare current emissions. Nyack's community greenhouse gas emissions inventory utilizes 2018 as its baseline year, because it is the most recent year for which the necessary data are available when the project was started prior to the pandemic.

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

Most 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 CO2/kWh of electricity). For this inventory, calculations were made using ICLEI's ClearPath tool.

Community Emissions Inventory Results

The total community-wide emissions for the 2018 inventory are shown in Table 2 and Figure 5. Table 2 provides the usage within each sector and the respective associated C02 equivalent. These values correspond to the distribution in Figure 5.

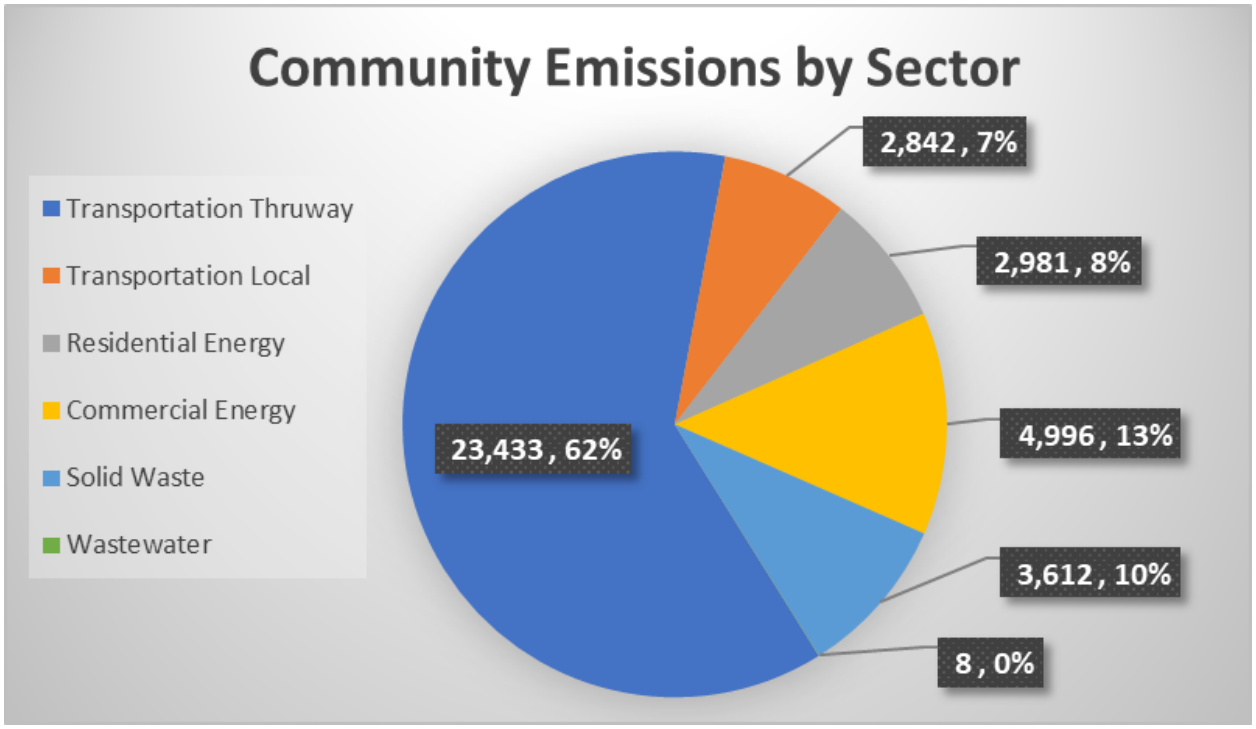
Table 2: Community-wide Emissions Inventory

Sector	Fuel or source	2018 Usage	Usage unit	2018 Emissions ($MTCO_2e$)
Residential energy	Electricity (Orange & Rockland)	17,236	MWh	1,995
	Natural Gas (Orange & Rockland)	184,421	Therms	986
Residential energy total				**2,981**
Commercial energy	Electricity (Orange & Rockland)	41,141	MWh	4,761
	Natural Gas (Orange & Rockland)	43,740	Therms	234
Commercial energy total				**4,995**
Industrial energy	Electricity	N/A		
	Natural gas	N/A		
Industrial energy total				**N/A**
On-road transportation	Gasoline (passenger vehicles)	45,818,487	VMT	18,966
	Diesel (passenger vehicles)			
	Diesel (freight trucks)	4,888,117	VMT	7,310
Transit	Diesel			
	Gasoline			
Aviation	Jet A (Jet Kerosene)			
	Aviation Gasoline			
Off-Road	Diesel			
	Gasoline			
Waterborne	Diesel			
	Gasoline			
Rail	[Fuel Type]			
Transportation total				**26,276**
Solid Waste	Waste Generated	3,858	Tons	3,612
Solid waste total				**3,612**
Process & Fugitive Emissions	Fugitive Emissions from Natural Gas Distribution			8
Process & Fugitive Total (Water & Wastewater)				**8**
Total community-wide emissions				**37,873**

As noted, Figure 5 shows the distribution of community-wide emissions by sector. Transportation is the largest contributor, followed by Solid Waste & Residential Energy. This figure separates local transportation from Thruway traffic.

Emissions from vehicles using the Thruway account for 89% of all transportation emissions and 62% of all community emissions. Local vehicle miles represent 11% of total transportation emissions and 7% of all community emissions. This is a significant distinction as the Village determines strategies for reducing its carbon emissions.

Figure 5



Next Steps:

This inventory should be used to focus and prioritize actions to reduce emissions. Based on the inventory results, the following high impact areas would provide the greatest potential for emissions reduction:

- On-Road Electric Vehicles Adoption
- Grid Decarbonization
- Residential and Commercial Building Electrification
- Residential and Commercial Building Efficiency

The Climate Action Plan calls for the completion of another GHG inventory in 2025 using 2024 data in order to assess progress resulting from any actions implemented. The detailed methodology section of this report, as well as notes and attached data files in the ClearPath tool and a master data Excel file provided to the Nyack, will be helpful to complete a comparable future inventory.

Government Operations Emissions Inventory Results

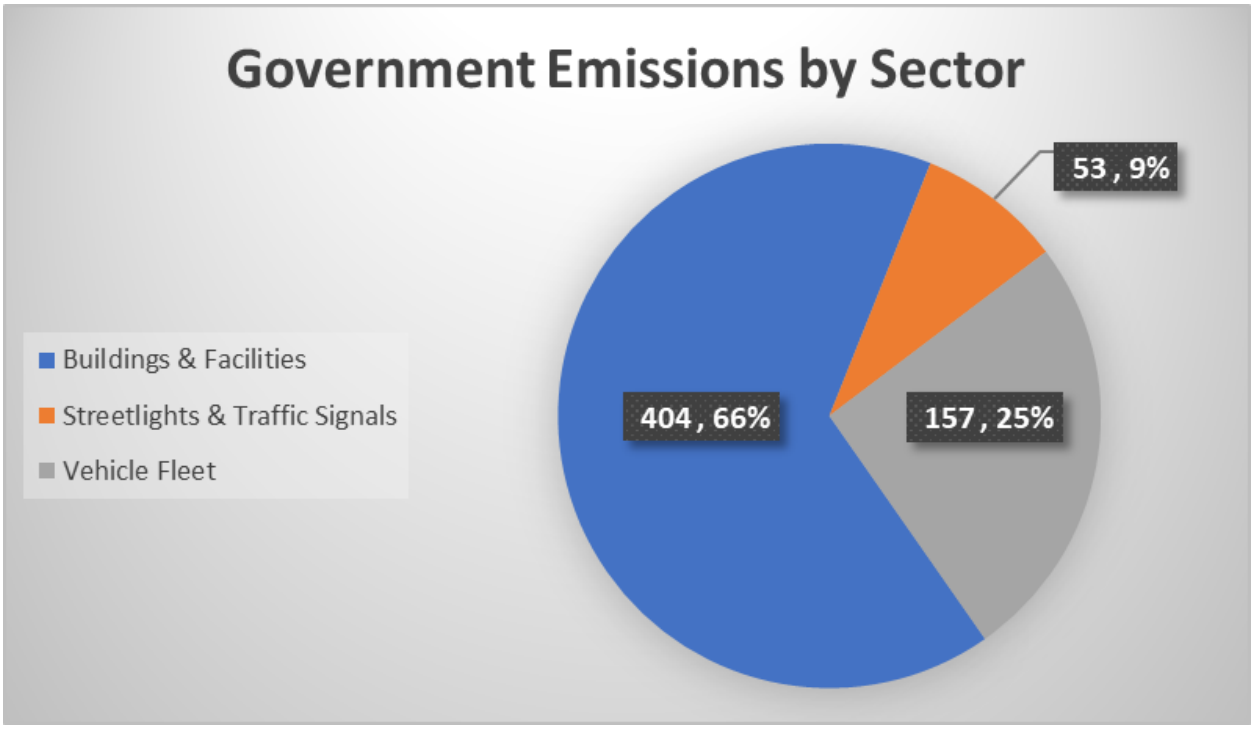
Government operations emissions for 2018 are shown in Table 3 and Figure 6.

Table 3: Local Government Operations Inventory

Sector	Fuel or source	2018 Usage	Usage unit	2018 Emissions ($MTCO_2e$)
Buildings & Facilities	Electricity	4,371	MWh	241
	Natural Gas	2,484	MMBtu	134
Buildings & Facilities total				**375**
Street Lights & Traffic Signals	Electricity	465,516	kWh	53
Street Lights & Traffic Signals total				**53**
Vehicle Fleet	Gasoline (off-road)		Gallons	
	Diesel (off-road)	9,100	Gallons	94
	Gasoline (on-road)	7,123	Gallons	63
	Diesel (on-road)		Gallons	
Vehicle Fleet total				**157**
Transit Fleet	Diesel			
	Gasoline			
Transit Fleet total				**N/A**
Employee Commute	Gasoline			
	Electric			
	Hybrid Gasoline			
Employee Commute Total				**N/A**
Solid waste total				**N/A**
Water and wastewater total				**N/A**
Process & Fugitive Emissions	Fugitive Emissions from Natural Gas Distribution			
Process & Fugitive Emissions total				**N/A**
Total government emissions				**585**

Figure 6 shows the distribution of emissions among the three sectors included in the inventory. Buildings and Facilities represents the majority of emissions, followed by Vehicle Fleet and Street Lights and Traffic Signals.

Figure 6



Next Steps:

Since 2018, the Village has undertaken a number of measures to reduce its greenhouse gas emissions including but not limited to replacing street lights with LED fixtures, joining a CCA to obtain renewable electricity for residential and small commercial users, and participating in a food scrap program through Orangetown.

However, more needs to be done. The local government operations emissions inventory points to a need for action to promote clean transportation alternatives, electrify and decarbonize the electricity used in Nyack's government buildings and facilities, and the installation of solar. In accordance with the high impact actions identified by ICLEI, strategies involving transportation, conversion of the municipal fleet to electric vehicles, and building efficiencies should be prioritized to reduce the emissions in this domain.

Conclusion

This inventory marks the 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 existing recommendations in the 2015-1016 Sustainable Nyack Action Plan, the 2016 Nyack Comprehensive Master Plan, and 2018 Greater Nyack Bicycle and Pedestrian Master Plan with a more robust climate action plan that identifies specific quantified strategies that can cumulatively meet that target.

The Intergovernmental Panel on Climate Change (IPCC) states that to meet the Paris Agreement commitment of keeping warming below 1.5°C we must reduce global emissions by 50% by 2030 and reach climate neutrality by 2050. Equitably reducing global emissions by 50% requires that high-emitting, wealthy nations reduce their emissions by more than 50%. More than ever, it is imperative that countries, regions, and local governments set targets that are ambitious enough to slash carbon emissions between now and mid-century.

Science-Based Targets are calculated climate goals, in line with the latest climate science, that represent a community's fair share of the global ambition necessary to meet the Paris Agreement commitment. To achieve a science-based target, community education, involvement, and partnerships will be instrumental. Although the Paris Agreement calls for a 50% reduction, Nyack has set a target of 75% for 2030. We recognize that the science is telling us we need ambitious targets that incorporate a fair share of consideration of our historic contributions to global GHGs. The understanding means we should continue to identify strategies that get us well beyond our ambitious goal of 75% reduction by 2030.

In addition, Nyack will continue to track key energy use and emissions indicators on an on-going basis. It is recommended that communities update their inventories on a regular basis, especially as plans are implemented to ensure measurement and verification of impacts. Regular inventories also allow for "rolling averages" to provide insight into sustained changes and can help reduce the change of an anomalous year being incorrectly interpreted. This inventory shows that decarbonizing and electrifying the residential, commercial, and governmental buildings as well as community-wide transportation patterns will be particularly important to focus on. Through these efforts and others, the Village of Nyack can achieve environmental, economic, and social benefits beyond reducing emissions.

Appendix: Methodology Details

Energy

The following tables show each activity, related data sources, and notes on data gaps.

Table 4: Energy Data Sources

Activity	Data Source	Data Gaps/Assumptions
Community-wide		
Residential, commercial, and industrial electricity consumption	O&R Utility	None
Residential, commercial, and industrial natural gas consumption	O&R Utility	Sept 2018 gas consumption withheld. Used average of prior two months and subsequent two months to determine consumption for Sept.
Residential [Non-utility Fuel] Consumption		
Residential [Non-utility Fuel] Consumption		
Residential [Non-utility Fuel] Consumption		
Local Government Operations		
Electricity consumption	O&R Utility	Some month's usage was combined with other months.
Natural gas consumption	O&R Utility	Some month's usage was combined with other months.

Table 5: Emissions Factors for Electricity Consumption

Year	CO_2 (lbs./MWh)	CH_4 (lbs./GWh)	N_2O (lbs./GWh)
2018	294.7	21	3

Transportation

Table 6: Transportation Data Sources

Activity	Data Source	Data Gaps/Assumptions
Community-wide		
Vehicle miles traveled	1-Google EIE VMT Data 2-NYSTraffic Volume Report Local Roads	These data included NYS Thruway miles. The Plan segregates the Thruway from local miles.
Transit ridership	N/A	
Local Government Operations		
Government vehicle fleet	Village Insurance Inventory	
Employee commute	N/A	

For vehicle transportation, it is necessary to apply average miles per gallon and emissions factors for CH4 and N2O to each vehicle type. The factors used are shown in Table 6.

Table 7: MPG and Emissions Factors by Vehicle Type

Fuel	Vehicle type	MPG	CH_4 g/mile	N_2O g/mile
Gasoline	Passenger car	23.86	0.0187	0.011
Gasoline	Light truck	17.34	0.0201	0.017
Gasoline	Heavy truck	5.36	0.086	0.066
Gasoline	Motorcycle	N/A		
Diesel	Passenger car	N/A		
Diesel	Light truck	17.34	0.001	0.0015
Diesel	Heavy truck	6.023	0.0051	0.0048

Wastewater

Table 8: Wastewater Data Sources

Activity	Data Source	Data Gaps/Assumptions
Community-wide & Local Government Operations		
Nitrogen Discharge	Questionnaire sent to Orangetown sewage plant. Michael Weber, Chief Operator.	
Digester Gas Combustion/Flaring		
Energy used in wastewater facilities	N/A	

Potable Water

Table 9: Potable Water Data Sources

Activity	Data Source	Data Gaps/Assumptions
Community-wide		
Gathered data from Nyack Water Plant Operator	Nyack Water Treatment Plant Supervisor provided needed data to complete the inventory.	The Nyack Water Department treats and supplies potable water to the Village. The Water Department also maintains the infrastructure to deliver water to residents and businesses throughout the Village.
	Kevin Smith, Supervisor	
Local Government Operations		
The government operations inventory did not separate emissions for water treatment.		

Solid Waste

Table 10: Solid Waste Data Sources

Activity	Data Source	Data Gaps/Assumptions
Community-wide		
Solid Waste Management & Recycling Programs.	Rockland County Solid Waste Management Authority. RC Solid Waste management Plan	The GHGI proportions Nyack's share of Rockland County waste diversions and landfill using Nyack's population as a percentage of Rockland's total population.
Local Government Operations		
Solid waste from Government Operations are included in the community waste numbers.		

Fugitive Emissions

Table 11: Fugitive Emissions Data Sources

Activity	Data Source	Data Gaps/Assumptions
Community-wide		
Nyack did not calculate fugitive emissions for this inventory.		
Landfill combustible gas and flaring were accounted for in the solid waste calculations.		
Local Government Operations		

Inventory Calculations

The 2018 inventory was calculated following the US Community Protocol and ICLEI's ClearPath software. As discussed in Inventory Methodology, the IPCC 5th Assessment was used for global warming potential (GWP) values to convert methane and nitrous oxide to CO2 equivalent units. ClearPath's inventory calculators allow for input of the sector activity (i.e. kWh or VMT) and emission factor to calculate the final CO2e emissions.