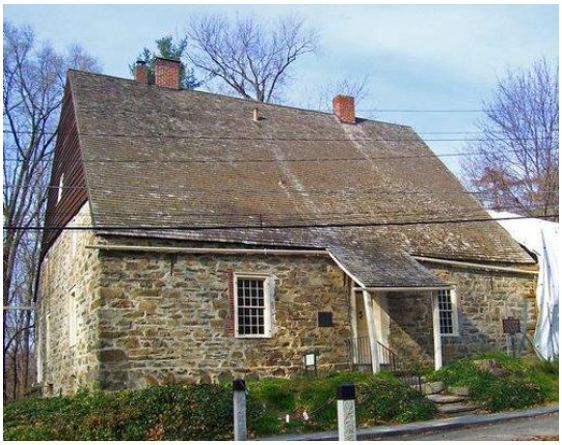
New Paltz, NY
Town and Village

2017 Inventory of Community-wide Greenhouse Gas Emissions



February 17th, 2022

Produced by the New Paltz Climate Smart Community Task Force

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Executive Summary

In 2017, New Paltz NY which is comprised of the Town and Village inclusive of Government, had estimated Greenhouse Gas emissions of 124,866 CO2 equivalent Metric Tons. A Metric Ton (MT), is 1000 kilograms or 2205 lbs. These emissions are all attributed to human activity within the boundaries of the community. The Town contributed 111,072 CO2e MT, which includes 52,745 CO2e MT (42%) from Thruway Vehicle Miles Traveled (VMT) in the Transportation category, and the Village contributed 13,794 CO2e MT (11%). Netting out the Thruway VMT emissions means the Town contributed 58,327 CO2e MT (47%), which means New Paltz as a source contribution was 72,121 CO2e MT. 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.

Table 1: Community GHG Inventory (2017)

GHG Category	CO2e (MT)*
Transportation	110,019
Residential Energy	7,582
Commercial Energy	3,317
Fugitive Emissions	930
Water & Wastewater	907
Agriculture	800
Gov Vehicle Fleet	492
Solid Waste	312
Water Treatment Facilities	240
Gov Buildings & Facilities	213
Gov Street Lights	52
Grand Total Emissions	**124,866**
Population of New Paltz	14,003
Per Capita Emmisions	8.9

* Metric Tons of Carbon Dioxide Equivalent

The emission Categories are shown below;

With a population of 14,003 this is a rate of 8.9 CO2e MT per capita and not untypical of other Communities, such as Ulster County that reported a per capita emission of 11 CO2e MT. The categories of Transportation, Residential Energy, and Commercial Energy are primary contributors with 96% of the total emissions. The other categories, while smaller, are not the less important based on meaningful actions that can be taken. Government contributed 998 CO2e MT and is less than 1% but has the ability to demonstrate progress in emission mitigation with direct actions.

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

New Paltz NY and Climate Change

The Nature Conservancy recognizes the northern Shawangunk Mountains as one of the "last great places" on earth with its support for 42 state rare species, eight state rare ecological communities, and three globally rare ecological communities in a largely forested landscape surrounded by residential housing and agricultural uses[1]. New Paltz NY is a community in the foothills of the Shawangunk Mountains and acts as a gateway for many visitors and residents who want to take in the natural splendor.

Over time, human and natural activities have produced emissions that have accumulated in the atmosphere and trap solar radiation. This phenomenon is known as the Greenhouse effect and the emissions as Greenhouse Gases (GHG). This accumulation of GHG is resulting in Global Warming and leads to different degrees of Climate Change that can impact ecosystems in dramatic and small ways. 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 New Paltz NY is no exception and the impacts continue to intensify with sea-level rise.

To begin to confront this basic quality of life issue, National and local communities are taking responsibility for reducing GHG emissions. In support of the local effort, this document is an inventory for New Paltz NY, scoped as both the Town and Village Communities and is inclusive of Government, of the GHG's that were emitted in 2017. This baseline inventory gives a categorized quantitative perspective of the Community and who we are. In addition, Appendix B describes some of the driving forces behind our GHG emissions. They must be understood to consider what kinds of actions are possible, and the degree of impact they would have to reduce GHG emissions and overall quality of life. Our efforts, along with all the other Communities in the world, will influence the sustainability of the ecosystems of the Shawangunk Mountains and a large part of what makes New Paltz a desirable place to both live and visit.

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[1] https://www.esri.com/news/arcnews/winter1112articles/what-makes-new-yorks-shawangunk-mountains-one-of-the-last-great-places.html

[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/

Local Government for Sustainability (ICLEI) Climate Mitigation Milestones

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

ICLEI provides a framework, tools, and methodology for local governments to identify and reduce greenhouse gas emissions, organized along Five Milestones, also shown in Figure 1:

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.

Figure SEQ Figure * ARABIC1 ICLEI Climate Mitigation 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 New Paltz NY for both Town and Village.

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 New Paltz Town and Village community for the 2017 calendar year, which includes operations of the New Paltz Town and Village government. Government operations is mostly a subset of the community inventory and less than 1% of the total emission. 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 U.S. Community Protocol for Accounting and Reporting Greenhouse Gas Emissions (Community Protocol) which is described below.

Three greenhouse gases are included in this inventory: carbon dioxide (CO_2), methane (CH_4) and nitrous oxide (N_2O). Many of 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[3] 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

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

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
- Agricultural emission from cattle livestock

Carbon dioxide represents the vast majority of the community emissions and is produced from burning fossil fuels such as coal, gasoline, diesel, and natural gas. Nitrous oxide accounts for a small percentage of the communitywide emissions, primarily from grid electricity (from fuel combusted to create electricity) and gasoline used for passenger vehicles. Methane accounts, also a small percentage of the 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.

Some categories have sources of emissions with limitation on the data with either no precise counts or restrictions on usage for privacy reasons. The categories where this was encountered were;

- Agriculture, where the Town of New Paltz has no Inventory of cattle livestock. Ulster County via the Department of Agriculture 2017 Survey does have an inventory, and this was use in a proportional manner to allocate cattle livestock for New Paltz. The Village of New Paltz has an ordinance on livestock and as such no allocation was made.
- Commercial, for Electric and Natural Gas usage, is privacy protected in the Utility Energy Reporting tool when rules apply. To address this deficiency of data this inventory used monthly average usage by account for Ulster County and applied this to the New Paltz Commercial accounts.
- Residential, for Propane and Fuel Oil usage, is based on the American Community Survey and NY State EIA date to allocate based on population for New Paltz.
- Process & Fugitive, also extrapolated from Ulster County data and based on number of New Paltz accounts that use Natural Gas.

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:

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.

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. This inventory is a purely source-based emissions

Base Year

The inventory process requires the selection of a base year with which to compare current emissions. New Paltz's community greenhouse gas emissions inventory utilizes 2017 as its baseline year based on the formation of the Climate Smart Community Task Force.

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 CO_2/kWh of electricity). For this inventory, calculations were made using ICLEI's ClearPath tool.

New Paltz NY GHG 2017 Emissions Inventory

The total New Paltz communitywide emissions for the 2017 inventory are shown in Table 2 and Figure 2.

Table 3 Town of New Paltz NY Communitywide 2017 GHG Emissions Inventory

Category	Fuel Type	Usage	Units	CO2e (MT)
Transportation & Mobile Sources	Diesel	17,603,950	Miles	23,019
	Gasoline	233,881,050	Miles	87,000
Transportation & Mobile Sources Total		**251,485,000**	**Miles**	**110,019**
Residential Energy	Distillate Fuel Oil No. 2	42,273	Gallons	3,147
	Electric	27,913	MWh	3,749
	Natural Gas	4,439	MMBtu	236
	Propane	7,247	MMBtu	450
Residential Energy Total				**7,582**
Commercial Energy	Electric	15,220	MWh	2,044
	Natural Gas	23,938	MMBtu	1,273
Commercial Energy Total				**3,317**
Process & Fugitive Emissions	CFC		na	868
	Natural Gas	-	MMBtu	62
Process & Fugitive Emissions Total				**930**
Water & Wastewater	**none**		**na**	**907**
AFOLU	**none**	**-**	**na**	**800**
Vehicle Fleet	Diesel	18,332	Gallons	191
	Gasoline	33,257	Gallons	301
Vehicle Fleet Total		**51,589**	**Gallons**	**492**
Solid Waste	Diesel	298	Tons	19
	none		na	293
Solid Waste Total		**298**	**Tons**	**312**
Water & Wastewater Treatment Facilities	Distillate Fuel Oil No. 2	13,741	Gallons	140
	Electric	747,194	MWh	100
Water & Wastewater Treatment Facilities Total				**240**
Buildings & Facilities	Distillate Fuel Oil No. 2	12,456	Gallons	127
	Electric	519,396	MWh	70
	Propane	2,817	MMBtu	16
Gov Buildings & Facilities Total				**213**
Gov Street Lights & Traffic Signals	**Electric**	**221,692**	**MWh**	**52**
Grand Total				**124,866**

Table 2: Transportation GHG Inventory (2017)		
	Miles	CO2e (MT)*
Town	110,973,761	48,498
Town Thruway	120,450,000	52,745
Village	20,061,239	8,776
Total	251,485,000	110,019

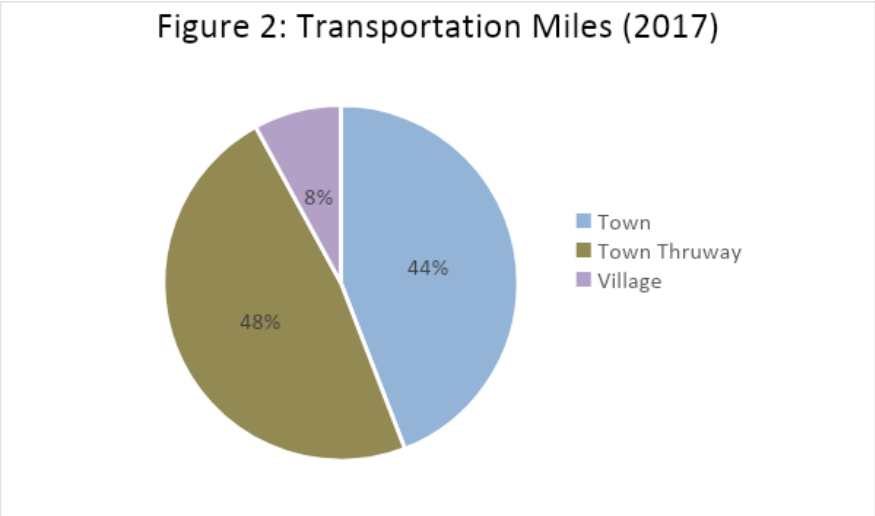
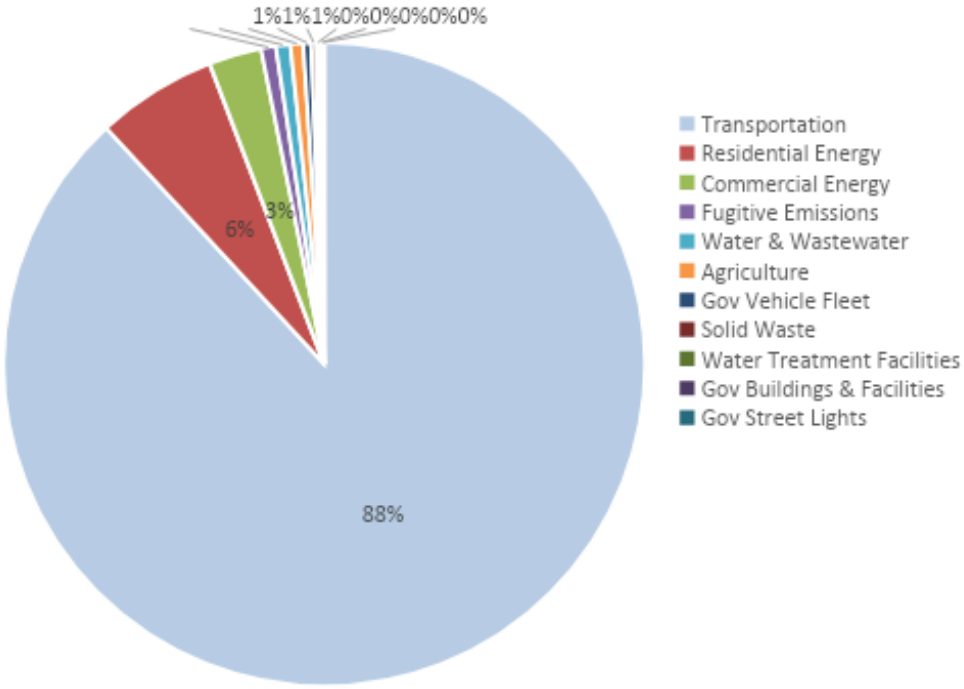


Figure 2 shows the distribution of communitywide emissions by sector.

Figure 2: Community GHG Emissions by Category (2017)



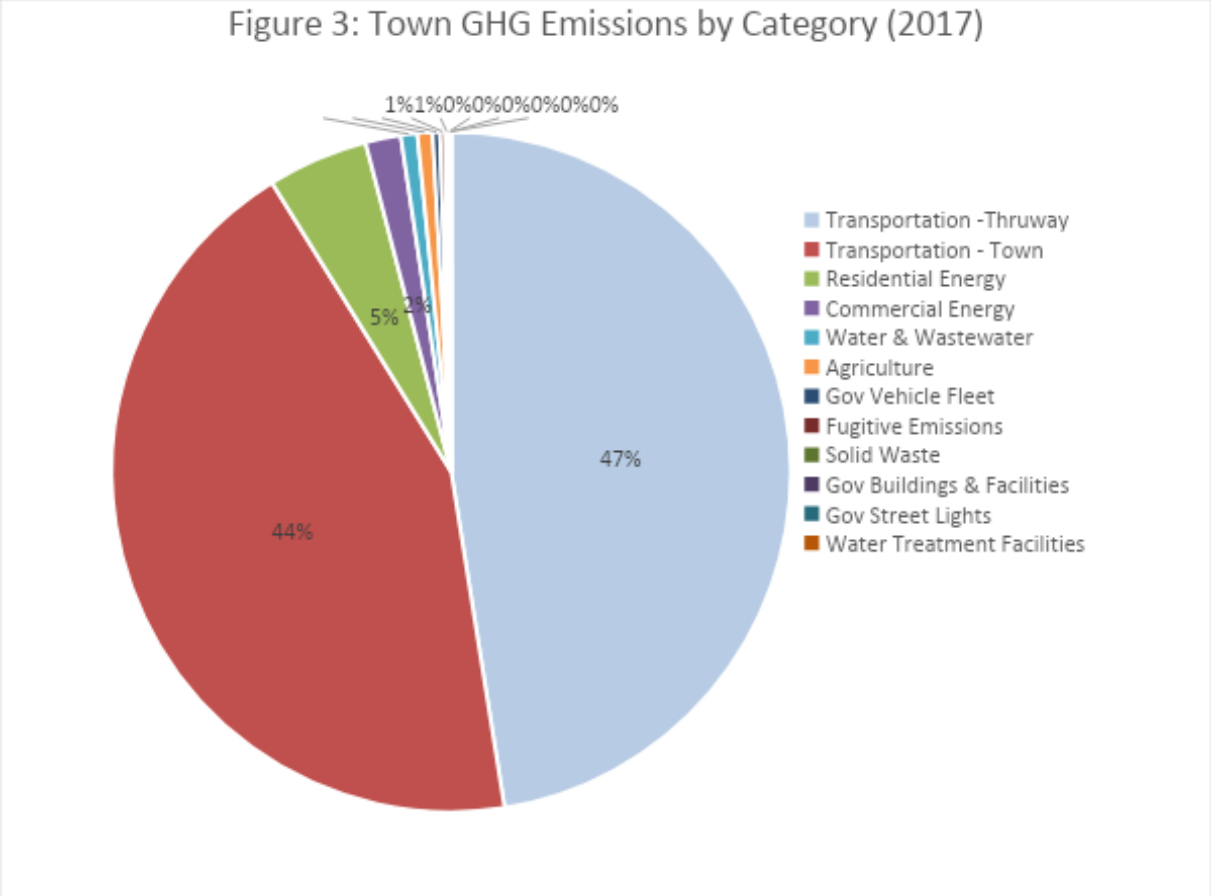
Town of New Paltz NY GHG 2017 Emissions Inventory

The total Town emissions for the 2017 inventory are shown in Table 3 and Figure 3.

Table 3 Town of New Paltz NY Communitywide 2017 GHG Emissions Inventory

Category	Fuel Type	Units	Usage	CO2e (MT)
Transportation & Mobile Sources	Gasoline	Miles	215,224,098	80,060
	Diesel	Miles	16,199,663	21,183
Transportation & Mobile Sources Total			231,423,761	101,243
Residential Energy	Electric	MWh	20,063	2,694
	Distillate Fuel Oi	Gallons	31,250	2,327
	Propane	MMBtu	4,232	263
	Natural Gas	MMBtu	630	34
Residential Energy Total				5,317
Commercial Energy	Electric	MWh	8,456	1,136
	Natural Gas	MMBtu	13,756	732
Commercial Energy Total				1,867
Water & Wastewater	none	na		873
AFOLU	none	na	-	800
Vehicle Fleet	Gasoline	Gallons	26,794	243
	Diesel	Gallons	13,198	137
Vehicle Fleet Total			39,992	380
Process & Fugitive Emissions	CFC	na		248
	Natural Gas	MMBtu	-	28
Process & Fugitive Emissions Total				276
Solid Waste	none	na		151
	Diesel	Tons	153	10
Solid Waste Total				160
Buildings & Facilities	Distillate Fuel Oi	Gallons	6,601	68
	Electric	MWh	435,033	58
	Propane	MMBtu	2,817	16
Buildings & Facilities Total				142
Street Lights & Traffic Signals	Electric	MWh	70,380	9
Water & Wastewater Treatment Fac	Electric	MWh	25,718	3
Grand Total				**111,072**

Figure 3 shows the distribution of Town emissions by sector.



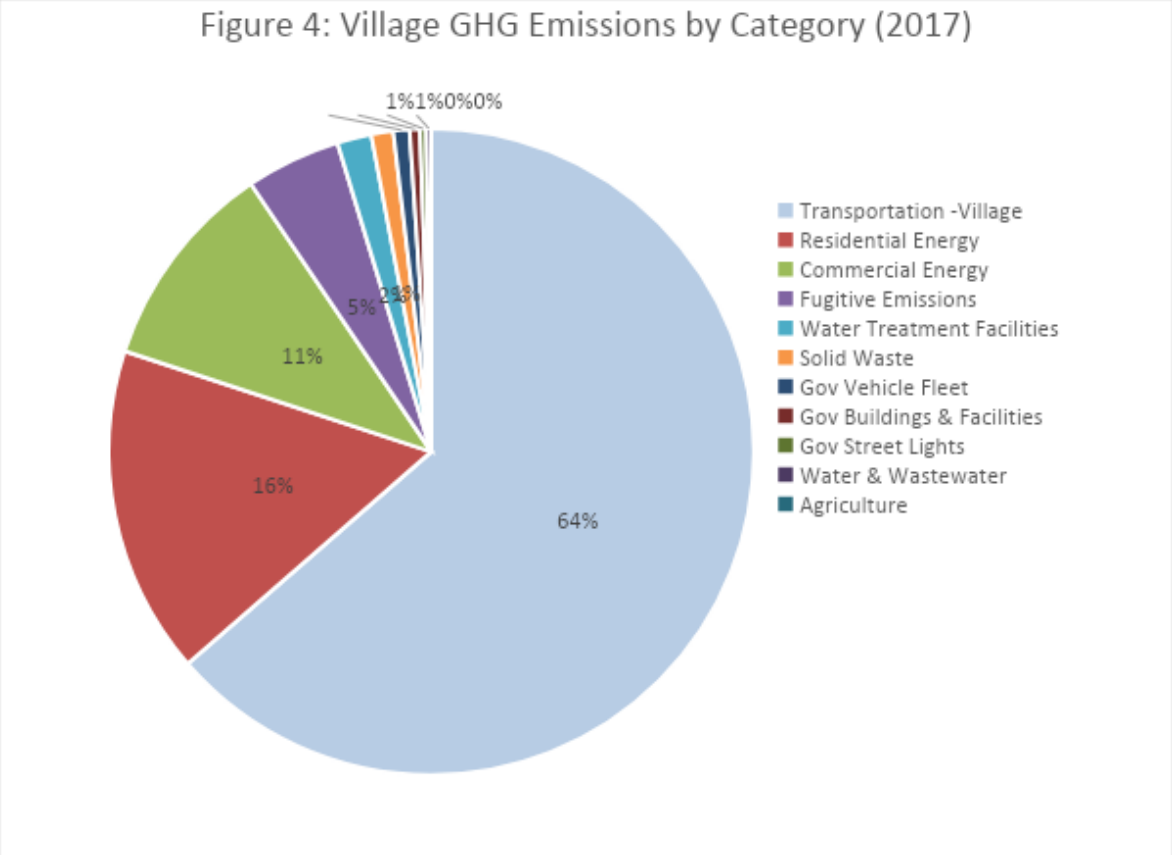
Village of New Paltz NY GHG 2017 Emissions Inventory

The total Village emissions for the 2017 inventory are shown in Table 4 and Figure 4.

Table 4 Village of New Paltz NY Communitywide 2017 GHG Emissions Inventory

Category	Fuel Type	Units	Usage	CO2e (MT)
Transportation & Mobile Sou	Gasoline	Miles	18,656,952	6,940
	Diesel	Miles	1,404,287	1,836
Transportation & Mobile Sources Total			20,061,239	8,776
Residential Energy	Electric	MWh	7,850	1,054
	Distillate Fuel Oil No. 2	Gallons	11,023	821
	Natural Gas	MMBtu	3,809	203
	Propane	MMBtu	3,015	187
Residential Energy Total				2,265
Commercial Energy	Electric	MWh	6,764	908
	Natural Gas	MMBtu	10,182	542
Commercial Energy Total				1,450
Process & Fugitive Emission:	CFC	na		620
	Natural Gas	MMBtu	-	34
Process & Fugitive Emissions Total			-	654
Water & Wastewater Treatm	Distillate Fuel Oil No. 2	Gallons	13,741	140
	Electric	MWh	721,476	97
Water & Wastewater Treatment Facilities Total				237
Solid Waste	none	na		143
	Diesel	Tons	145	9
Solid Waste Total			145	152
Vehicle Fleet	Gasoline	Gallons	6,463	58
	Diesel	Gallons	5,134	54
Vehicle Fleet Total			11,597	112
Buildings & Facilities	Distillate Fuel Oil No. 2	Gallons	5,855	60
	Electric	MWh	84,363	11
Buildings & Facilities Total			90,218	71
Street Lights & Traffic Signal	Electric	MWh	151,312	43
Water & Wastewater	none	na		34
Grand Total				**13,794**

Figure 4 shows the distribution of Village emissions by sector.



Government of New Paltz NY GHG 2017 Emissions Inventory

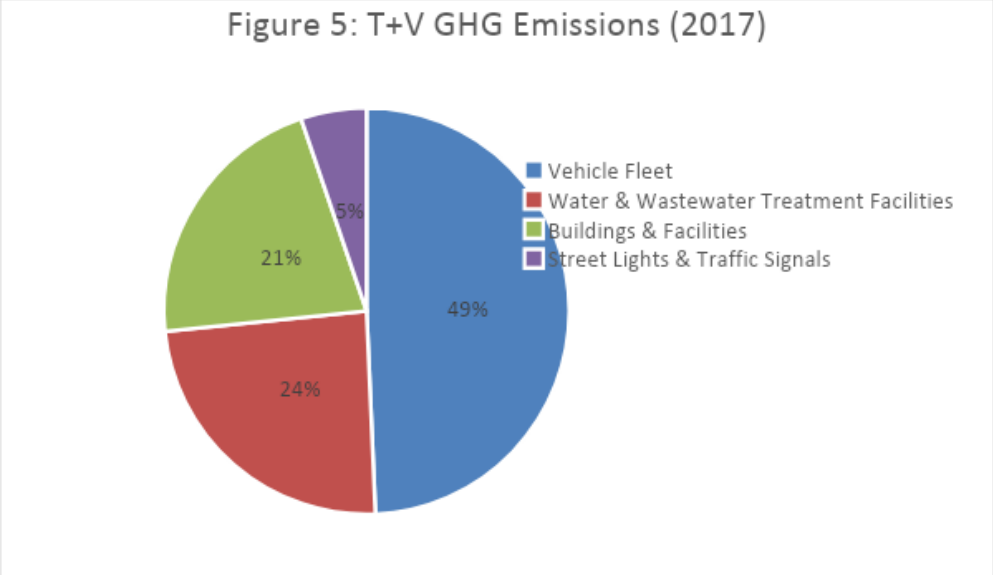
The total Government emissions for the 2017 inventory are shown in Table 5 and Figure 5.

Table 5 Town and Village Government of New Paltz NY 2017 GHG Emissions Inventory

Category	Municality	Fuel Type	Units	Usage	CO2e (MT)
Vehicle Fleet	Town	Gasoline	Gallons	26,794	243
		Diesel	Gallons	13,198	137
	Village	Gasoline	Gallons	6,463	58
		Diesel	Gallons	5,134	54
Vehicle Fleet Total				51,589	492
Water & Wastewater Treatm	Town	Electric	MWh	25,718	3
	Village	Distillate Fuel Oil No. 2	Gallons	13,741	140
		Electric	MWh	721,476	97
Water & Wastewater Treatment Facilities Total					240
Buildings & Facilities	Town	Distillate Fuel Oil No. 2	Gallons	6,601	68
		Electric	MWh	435,033	58
		Propane	MMBtu	2,817	16
	Village	Distillate Fuel Oil No. 2	Gallons	5,855	60
		Electric	MWh	84,363	11
Buildings & Facilities Total					213
Street Lights & Traffic Signal	Town	Electric	MWh	70,380	9
	Village	Electric	MWh	151,312	43
Street Lights & Traffic Signals Total				221,692	52
Grand Total					**998**

Municality	Category	CO2e (MT)
Town	Vehicle Fleet	380
	Buildings & Facilities	142
	Street Lights & Traffi	9
	Water & Wastewater	3
Town Total		**535**
Village	Water & Wastewater	237
	Vehicle Fleet	112
	Buildings & Facilities	71
	Street Lights & Traffi	43
Village Total		**463**
Grand Total		**998**

Figure 5 shows the distribution of communitywide emissions by sector.



Next Steps

This inventory marks completion of Milestone One of the Five ICLEI Climate Mitigation Milestones. The next steps are;

1. Village and Town Boards should establish GHG Emission targets that are consistent with New York State targets. Which on July 18, 2019, the Climate Leadership and Community Protection Act (Climate Act) was signed into law. New York State's Climate Act is among the most ambitious climate laws in the world and requires New York to reduce economy-wide greenhouse gas emissions 40 percent by 2030 and no less than 85 percent by 2050 from 1990 levels. The law creates a Climate Action Council charged with developing a scoping plan of recommendations to meet these targets and place New York on a path toward carbon neutrality

2. The Climate Smart Community Task Force should establish a formal tracking system for Projects and Actions, with GHG Category association, that contribute to GHG mitigation and adaptability to Climate Change and actively manage the list of Projects and Actions in collaboration with the Town and Village Boards. The tracking should include Projects and Actions that have been "Rejected", "Implemented", and all states in between.

3. Town and Village Boards, with the support of the Climate Smart Community Task Force, Commit updating the inventory at least every five years to measure emissions reduction progress from the implemented Projects and Actions and the overall efforts of New York State and the United States of America

In addition, New Paltz should continue to track key energy use and emissions indicators on an on-going basis at the Government level to minimize the energy costs for New Paltz Taxpayers. Overall, the GHG inventory shows that communitywide transportation patterns will be particularly important to focus on. Through these efforts and others, New Paltz can achieve additional environmental, economic, and social benefits beyond reducing emission and raise the quality of living in New Paltz

Appendix A: Methodology Details

Energy

The following table shows each activity related to energy consumption, data source, and notes on data gaps.

Table 4 Energy Data Sources

Activity	Data Source	Data Gaps/Assumptions
Communitywide		
Residential, commercial, and industrial electricity consumption	https://utilityregistry.org/app/#/	Privacy/Use UC usage data by Account for Commercial
Residential, commercial, and industrial natural gas consumption	https://utilityregistry.org/app/#/	Same
Residential fuel oil and propane	American Community Survey and Federal EIA Usage by State	Extrapolated for New Paltz

Table 5 Emissions Factors for Electricity Consumption

Year	CO_2 (lbs./MWh)	CH_4 (lbs./GWh)	N_2O (lbs./GWh)
2019 https://www.epa.gov/egrd-data	232.3	17.0	2.0

Transportation

Table 6 Transportation Data Sources

Activity	Data Source	Data Gaps/Assumptions
Communitywide		
Vehicle miles travelled	NYS DOT 2010 VMT	
Transit ridership	na	

For vehicle transportation, it is necessary to apply average miles per gallon and emissions factors for CH_4 and N_2O 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	23.86023	0.0187	0.011
Gasoline	Light truck	23.86023	0.0201	0.017
Gasoline	Heavy truck	5.356603	0.0333	0.0134
Diesel	Passenger car	23.86023	0.005	0.001
Diesel	Light truck	23.86023	0.001	0.0015
Diesel	Heavy truck	6.023285	0.0051	0.0048

Wastewater

Activity	Data Source	Data Gaps/Assumptions
Communitywide		
Nitrogen Discharge	Town and Village	
Digester Gas Combustion/Flaring		
Energy used in wastewater facilities	Monthly Billing	

Solid Waste

Activity	Data Source	Data Gaps/Assumptions
Communitywide		
Solid Waste	New Paltz Transfer Station Annual Reports	

Fugitive Emissions

Activity	Data Source	Data Gaps/Assumptions
Communitywide		
NG Leakage	UC Data	Extrapolated for NP
ODS	UC Data	Extrapolated for NP

Inventory Calculations

The 2017 inventory was calculated following the US Community Protocol and ICLEI's ClearPath software. As discussed in Inventory Methodology, the IPCC 5th Assessment Report was used for global warming potential (GWP) values to convert methane and nitrous oxide to CO_2 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 CO_2e emissions.

Appendix B: Key Natural and Artificial Resources of New Paltz

New Paltz has a rich history that has been influenced by key natural resources such as the Hudson River, Wallkill River, and the Shawangunk Mountains and has good proximity to the cities of Poughkeepsie, New York City, Kingston, and Albany.

These natural resources have been exploited for the well being of our community and artificial (man-made) resources like Agriculture, SUNY New Paltz, Rt. 87, Rt 299 Wallkill Bridge, Resorts and Parks have been created over time that serve our economic and quality of life needs. Our history, outdoor recreation, and education services draw many people to New Paltz and consequently Commercial Services have also grown to support Students, Residents, and Visitors.

Together these Natural and Artificial Resources encourage population growth, commerce, and visitors from around the world. This same growth, however, also endangers the Natural Resources and strains the capacity of the artificial ones. To contend with this reality, New Paltz has put greater focus on Preservation, Land Use and Development to strike a balance in protecting the Natural Resources and achieving a quality of life for its residents.