



TOWN OF NEW PALTZ
LOCAL GOVERNMENT OPERATIONS
GREEN HOUSE GAS INVENTORY

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CLIMATE SMART COMMUNITIES TASK FORCE March, 2019



Town of New Paltz Local Government Operations Green House Gas Inventory

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Town of New Paltz Local Government Operations Green House Gas Inventory

Foreword

Janelle Peotter, New Paltz Climate Smart Communities Task Force Chair, and Amanda Gotto, Climate Smart Communities Task Force Project Manager, would like to thank the Town of New Paltz personnel for their efforts and support in supplying the raw data used in this inventory:

Neil Bettez – Supervisor

Jean Galluci - Finance Officer

Kathy Preston - Assistant to Supervisor

We would also like to thank the Climate Action Planning Institute for their invaluable support in providing the Local Government Operations Green House Gas Inventory workbook and guidance on its use:

Europa McGovern - Planner/Clean Energy Communities Coordinator, Hudson Valley Regional Council

Jim Yienger - Managing Principal, Climate Action Associates LLC

Greg Mumby - Climate Action Associates LLC

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Acronyms

BTU: British Thermal Unit, measure of heat

CAP: Climate Action Planning Institute

CH₄: methane

CO₂: carbon dioxide

CO₂e: carbon dioxide equivalent, unit of greenhouse gas impact as related to 1 ton of carbon oxide

CSC: Climate Smart Communities

eGRID: EPA's Emissions & Generated Resource Integrated Database

EIA: US Energy Information Administration

EPA: Environmental Protection Agency

DPW: Department of Public Works

GHG: Greenhouse Gas

GWP: Global Warming Potential, measure of greenhouse gas impact

ICLEI: International Council for Local Environmental Initiatives

kWh: kilowatt-hour, measure of electricity usage

LGOP: Local Government Operations Protocol

MMBTU: million BTUs

MWh: megawatt-hour, 1000 kWh

N₂O: nitrous oxide

NYSDA: New York State Energy Research Development Authority

NYUP: New York Upstate, regional designation by EPA

Town of New Paltz Local Government Operations Green House Gas Inventory

Executive Summary

A greenhouse gas (GHG) emissions inventory is one of the first and most important steps in the local climate action process. A local government operations GHG inventory is an accounting, analysis, and report of the GHG emissions resulting from the day-to-day operations of a village, town, city, or county. It summarizes the GHG emissions from the consumption of energy and materials in government buildings, from wastewater and water treatment facilities, from municipal vehicle fleets, from government-owned outdoor lighting, and from other sources. All Climate Smart Communities should prioritize GHG inventories as a foundational step toward effective action. GHG inventories provide the data needed to set realistic goals and track progress toward reducing operating costs, energy use, and emissions. GHG inventory reports identify the largest energy users and sources of GHG emissions (e.g., by building, sector, or department). As a result, GHG inventories help local governments select actions that offer a good return on investment and should be highlighted in subsequent climate action planning. Over time, as a local government builds its capacity to conduct GHG inventories on a regular basis, the process helps to increase the ability of the local government to operate efficiently and use taxpayer resources effectively.

The key findings of this initial GHG inventory for the Town of New Paltz are:

- Total GHG emissions from all energy sources for all local government operations in the Town of New Paltz averaged 655.5 tons of CO₂e/year for the years 2016 and 2017.
- The total GHG emissions show an upward trend year after year.
- For the averaged baseline years of 2016-2017, the greatest source of GHG emissions are the vehicle fleet (Police Department and Department of Public Works) at 59% on average; the administration facilities (buildings, recreation facilities, Recycle/Reuse Center) at 36% on average; and streetlights/signals at 3% on average of the total Town GHG emissions/year.
- For the averaged baseline years of 2016-2017, the Police Department use of gasoline accounted for an average of 150 tons of CO₂e/year. The Police Building energy use accounted for an average of 40.1 tons CO₂e/year.
- For the averaged baseline years for 2016-2017, the Department of Public Works use of gasoline and diesel accounted for an average of 232 tons CO₂e. The DPW buildings energy use accounted for an average of 33.6 tons CO₂e.
- A large change in GHG emissions occurred when the Town Hall was moved from the old building to the temporary trailer units: 11.1 tons CO₂e/year (= 35,527 KWh) to 181.3 tons CO₂e/year (= 61,820 KWh).
- Another notable change occurred at the Justice Court, where electricity usage went from an average for 2013-2014 of 1,957 KWh (= 0.6 tons CO₂e/year) to an average for 2016-2017 of 30,604 KWh (= 9.5 tons CO₂e/year).

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Introduction

Climate Change

In 2011, the New York State Energy Research and Development Authority (NYSERDA) released the first comprehensive assessment of the projected effects of climate change on the state's critical systems and natural resources over the next century. *ClimAID: the Integrated Assessment for Effective Climate Change Adaptation Strategies in New York State* was compiled by more than 50 scientists to serve as a critical tool for planners, policymakers, farmers, local governments and residents planning for New York State's future.

The report provides projections of several key climate variables in seven geographic regions of New York, assesses the projected effects of climate change in eight sectors (water resources, coastal zone, ecosystems, agriculture, energy, transportation, telecommunications and public health), and provides recommendations for adapting to the predicted changes.

Among ClimAID's most important findings:

Observed Climate Change

- Annual average temperatures have risen about 5 °F since 1900, with winter warming exceeding 4.4 °F.
- Sea level along New York's coastline has risen about a foot since 1900.
- Mean annual precipitation, intense precipitation and heavy downpours, and year-to-year variability have increased between 1900 and 2012.

Climate Projections

Without a dramatic decrease in the global generation of greenhouse gases like carbon dioxide, critical changes can be expected in New York's climate over the next century:

- Annual average temperatures in New York State will rise by 5.3 to 10.1 °F by the 2080s.
- Average regional precipitation will increase 4 to 15 percent by the 2080s, with most of the projected increase forecast in winter months. Larger increases are projected in the frequency, intensity, and duration of extreme precipitation events.
- Short-term droughts will become more frequent.
- The number and duration of extreme heat events will increase.
- Along the seacoast and tidal portion of the Hudson River (to the Federal Dam at Troy), sea level could rise to approximately 6 feet by 2100.

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Climate Change Effects

The projected changes in climate will have effects on New Yorkers and many New York State natural and economic resources:

Natural resources (ecosystems, agriculture and water resources)

- Increased flooding affecting ecosystems, communities and infrastructure.
- Reduced summer flows and lowered groundwater leading to water-use conflicts.
- Negative effects on native coldwater fish due to increased water temperatures.
- Widespread shifts in species composition in the state's forests and expansion of some invasive species into New York.
- Diminished recreational opportunities because of reduced snow cover and reduced water supply and quality.
- Lost agricultural and forest productivity from temperature stresses, summer drought and invasive species.

Coastal zone

- Sea level rise, leading to permanent inundation of low lying areas, increased beach erosion, reduction of coastal wetland area and species, and flood events that are more frequent and more destructive.

Infrastructure (energy, transportation, telecommunications)

- Disruption of water, transportation, communication and energy systems due to extreme weather.

Public health

- Expansion of vector-borne diseases affecting humans, livestock and wildlife.
- Heat waves leading to increased illness and deaths from heat stress.
- Increased levels of air pollution, causing asthma and other respiratory illness.

All of these effects will be felt most strongly in the local communities where New Yorkers live, work and play. Response to extreme events, especially coastal storms, riverine flooding, and extreme heat will require increasing investment of municipal resources.

A major impact on climate change are greenhouse gases. Greenhouse gases warm the Earth by absorbing energy and slowing the rate at which the energy escapes to space; they act like a blanket insulating the Earth. Greenhouse gases can remain in the atmosphere for different amounts of time, ranging from a few years to thousands of years. All of these gases remain in the atmosphere long enough to become well mixed, meaning that the amount that is measured in the atmosphere is roughly the same all over the world, regardless of the source of the emissions.

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The most common types of greenhouse gases are:

- Carbon dioxide (CO₂) - enters the atmosphere through burning of fossil fuels, solid waste, & wood products and also as a result of certain chemical reactions (e.g. manufacture of cement).
- Methane (CH₄) - emitted during the production/transport of coal, natural gas, and oil; also results from livestock & other agricultural practices and by the decay of organic waste in municipal solid waste landfills.
- Nitrous oxide (N₂O) - emitted during agricultural & industrial activities, as well as during combustion of fossil fuels and solid waste.
- Fluorinated gases - hydrofluorocarbons, perfluorocarbons, sulfur hexafluoride, & nitrogen trifluoride are synthetic, powerful greenhouse gases that are emitted from a variety of industrial processes.

Some greenhouse gases are more effective than others at making the planet warmer and "thickening the Earth's blanket." For each greenhouse gas, a Global Warming Potential (GWP) has been calculated to reflect how long it remains in the atmosphere, on average, and how strongly it absorbs energy. It is a measure of how much energy the emissions of 1 ton of a gas will absorb over a given period of time (usually 100 years), relative to the emissions of 1 ton of carbon dioxide (CO₂). The larger the GWP, the more that a given gas warms the Earth compared to CO₂ over that time period. GWPs provide a common unit of measure, to allow the addition of emission estimates of different gases (e.g., to compile a GHG inventory), and to allow comparisons of emission reduction opportunities.

The Town of New Paltz Green House Gas inventory was built on actual usage of direct emissions sources (i.e. propane, fuel oil, gasoline, and diesel; no natural gas was used) and indirect emission sources (i.e. electricity). No emissions of fluorinated gases were calculated in this initial inventory since there are no significant local government sources. All Greenhouse Gas emissions were converted to CO₂ equivalents (CO₂e) and reported in tons. For this report CH₄ = 28 CO₂e and N₂O = 298 CO₂e.

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Climate Smart Communities

The New York State Climate Smart Communities (CSC) program is an inter-agency effort of the New York State Department of Environmental Conservation (NYDEC), New York State Energy Research Development Authority (NYSERDA), New York State Department of State (DOS), New York State Department of Transportation (NYDOT), New York State Department of Health (DOH), and New York State Public Service Commission (PSC). The goals of the CSC program are to reduce greenhouse gas emissions, prepare for the impact of climate change, and save taxpayer money.

Local governments initiate participation in the program by passage of a resolution to adopt the CSC pledge. The pledge describes ten areas of climate mitigation and adaptation action:

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

Any city, town, village, or county in New York State can take a stand by adopting the Climate Smart Communities pledge. To become a Registered Climate Smart Community, the municipality's governing body must adopt a resolution that includes all ten elements of the pledge and submit the resolution. Climate Smart Communities are free to develop their own specific programs within the ten action areas, and additional pledge elements or legislative findings may be added.

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The Town of New Paltz signed the CSC pledge in 2010. In addition to a number of environmentally focused actions since then, the Town and Village were awarded a joint DEC grant for CSC certification in 2016, and formed the joint CSC Task Force and appointed a Chair in 2018.

Purpose of Green House Gas Inventory

The purpose of conducting a local government operations GHG emissions inventory is to gain an understanding of the emissions sources, establish a baseline, and identify opportunities to reduce energy use and GHG emissions. A local government operations GHG inventory can lead to the following benefits:

Improved ability to manage energy use. A GHG inventory helps a local government identify the largest energy users and GHG emissions sources (e.g., by building, sector, or department), which will help to target energy efficiency strategies to the areas with the greatest opportunities.

Leading by example. Local governments can set an example for local businesses, the community, and their peers by developing a GHG inventory and helping others understand the results. The more others understand the benefits of measuring GHG emissions and implementing energy efficiency improvements, they will begin to take similar actions. The GHG inventory can also be the starting point to open up a dialogue and share best practices with local businesses and other organizations.

Increased Transparency. Publicly releasing the results of an inventory and explaining the results helps to increase transparency and accountability of local governments to their taxpayers to operate efficiently and use resources effectively.

Cost Savings. Energy efficiency improvement opportunities that arise from a GHG inventory can help to save taxpayer dollars. The expectation is that many energy efficiency improvements can pay for themselves within a few years or less, resulting in direct and measurable savings of both energy and costs.

Town of New Paltz Local Government Operations Green House Gas Inventory

Methodology

This inventory includes GHG emissions from the following government operations sources:

- Direct GHG emissions (Scope 1) – from government-owned vehicles (gasoline and diesel) and from onsite fuel combustion (propane and fuel oil)
- Indirect GHG emissions (Scope 2) – from purchased electricity
- Other (Scope 3) - indirect GHG emissions not included in Scope 2. These include emissions resulting from the extraction and production of purchased materials and fuels, transportation in vehicles not owned or controlled by the reporting entity, outsourced activities, and waste disposal. A common source of Scope 3 emissions that is often included in government operations inventories is employee commuting. For the purpose of this first-ever GHG inventory for the Town of New Paltz Scope 3 sources were not included.

Below is a summary of the steps that were involved in creating the Town local government operations GHG inventory:

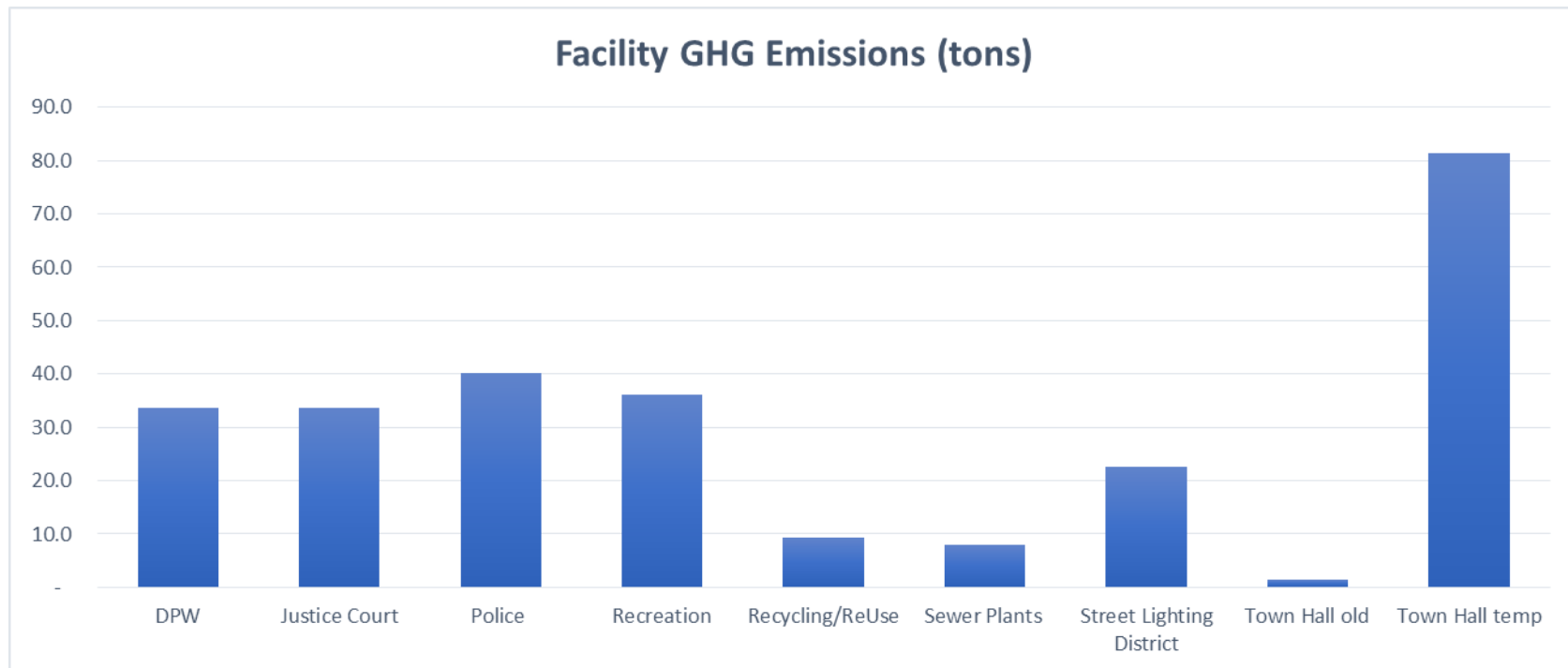
1. A CSC Task Force subteam (Janelle Peotter and Amanda Gotto) was put together to manage the GHG inventory process. The key Town contacts who provided support and data throughout the project were identified. An Excel data-collection template was provided by the Climate Action Process Institute (CAPI); these templates can be used for inventory updates going forward.
2. The CAPI protocol for collecting, calculating, and analyzing greenhouse gas emissions from Local Government Operations was chosen for the Town of New Paltz GHG inventory analysis. The CAPI GHG tool is compliant with the Local Government Operations Protocol (LGOP), a standardized set of guidelines for quantifying and reporting the GHG emissions associated with local government operations, as required by the CSC program.
3. To keep the inventory practical and cost-effective, data collection was focused on the largest sources of emissions (Appendix A) and most common greenhouse gases (carbon dioxide CO₂, methane CH₄, and nitrous oxide N₂O) for which the Town is responsible; an inventory that covers about 95% of GHG emissions is acceptable and complies with the LGOP.
4. Data on actual electricity, tank, and fleet fuel usage were obtained from the annual reports compiled by the Town Financial Officer. There was no use of natural gas by municipal facilities. The annual data for 2013, 2014, 2016, and 2017 were gathered and organized using the CAPI templates (Appendix B and Appendix C). All data were reviewed for completeness and accuracy.
5. While the 2016 -2017 data, being most recent, were averaged and will be used for the baseline going forward; the 2013-2014 data provided useful comparative information and allowed a look at multi-year trends.
6. The data were entered and GHG emissions calculated using the CAPI inventory tool. Calculations were reviewed to confirm accuracy. Factors, calculations, and sources can be found in Appendix D.

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Results

GHG Emissions by Facility for Electricity, Propane, and Fuel Oil

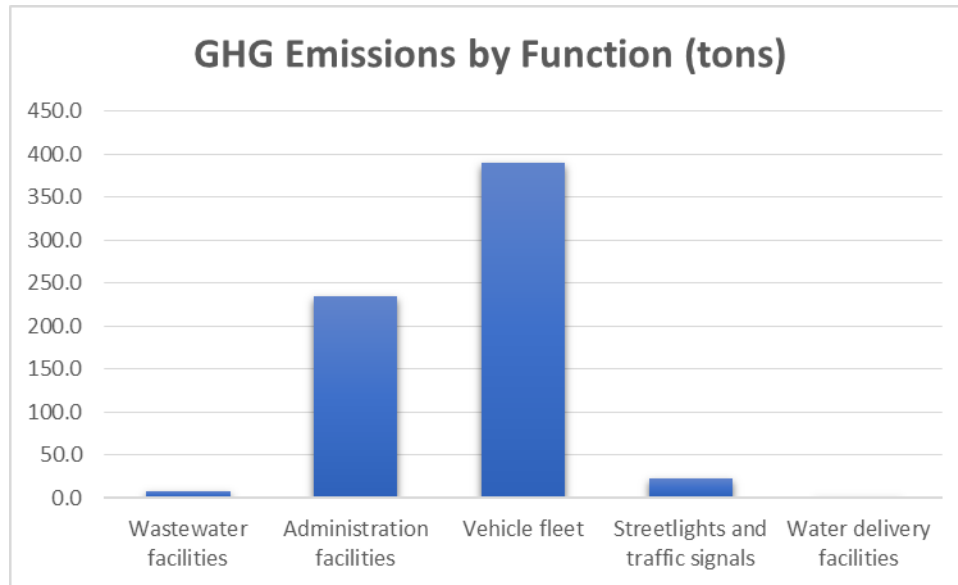
The total GHG emissions from electricity, propane, and fuel oil for Town facilities averages 227.7 tons CO₂e for 2016 - 2017. The temporary Town Hall accounts for 31% of the total average, the Police building accounts for 15% of the total average, and the Department of Public Works garage and Justice Court each account for about 13% of the total average GHG emissions.



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Total GHG Emissions by Function for All Energy Sources

The total GHG emissions from all sources for all functions is an average of 655.53 tons CO₂e for 2016-2017. The vehicle fleet (Police and DPW) account for 59.4% of GHG emissions, followed by administration facilities at 35.9%.



GHG Emissions from all energy sources by function

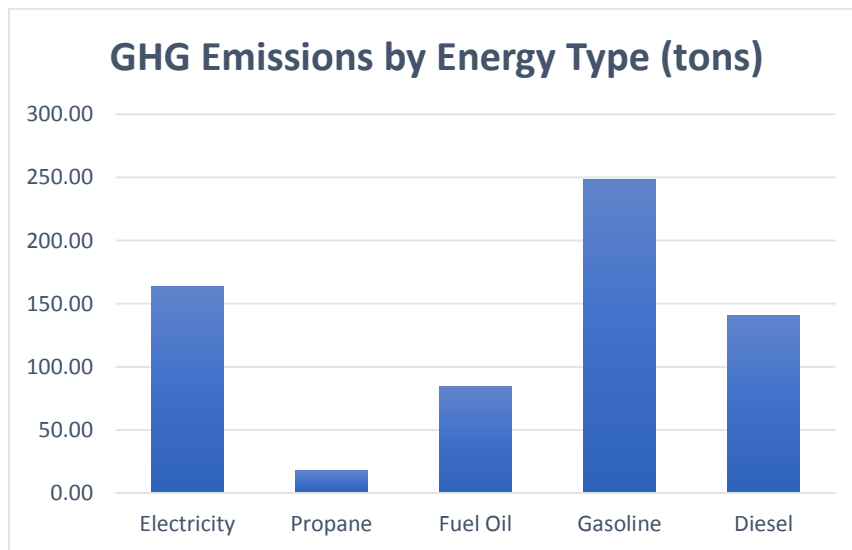
	2013	2014	2016	2017	Average 2016-2017
All Municipal Operations	580.44	638.03	645.52	665.53	655.53
Wastewater facilities	7.6	8.2	8.1	8.0	8.1
Administration facilities	139.8	178.7	243.2	227.7	235.4
Vehicle fleet	411.4	428.1	371.2	407.8	389.5
Streetlights and traffic signals	21.7	23.0	23.1	22.0	22.5

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GHG Emission % By Function	2013	2014	2016	2017	Average 2016-2017
Wastewater facilities	1%	1%	1%	1%	1%
Administration facilities	24%	28%	38%	34%	36%
Vehicle fleet	71%	67%	58%	61%	59%
Streetlights and traffic signals	4%	4%	4%	3%	3%

GHG Emissions by Energy Type

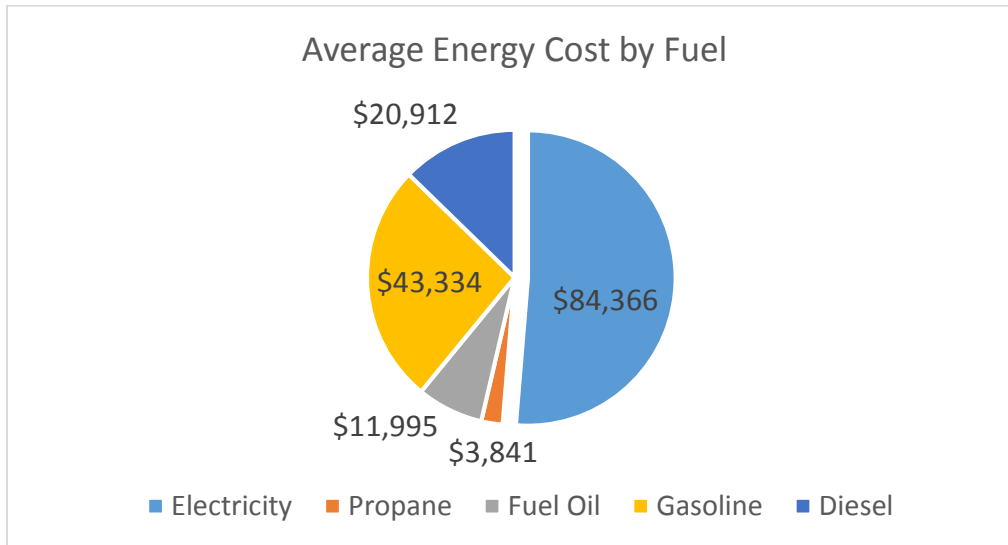
Gasoline accounts for approximately 38% on average of total GHG emissions, followed by electricity at 25% and diesel at 22%.



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Energy Costs by Fuel Type

The energy costs for all sources averages \$164,448 for 2016-2017. Electricity accounts for 51% of energy costs, followed by gasoline at 26% and diesel at 13%.



Average GHG emissions (tons CO2e) and average costs by energy type.

	2013	2014	2016	2017	Average GHG 2016-2017	Ave Energy Cost 2016-2017
All Energy Sources	580.4	638.0	645.5	665.5	655.5	\$164,448
Electricity	113.92	112.47	161.01	165.98	163.50	\$84,366
Propane	15.61	23.28	18.21	17.48	17.85	\$ 3,841
Fuel Oil	39.56	74.23	95.09	74.22	84.66	\$11,995
Gasoline	252.27	261.45	237.78	259.32	248.55	\$43,334
Diesel	159.09	166.60	133.42	148.53	140.98	\$20,912

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Annual Trends in GHG Emissions

Annual GHG Emission Trends by Function, tons CO2e

Function	2013	2014	2016	2017
All Municipal Operations	580.44	638.03	645.51	665.53
Administration Facilities	139.78	178.75	243.15	227.65
Vehicle Fleet	411.36	428.05	371.20	407.85
Streetlights & Signals	21.73	22.99	23.08	21.99
Wastewater Facilities	7.58	8.24	8.09	8.44

Annual GHG Emission Trends by Fuel Type, tons CO2e

Fuel Type	2013	2014	2016	2017
Electricity	113.92	112.47	161.01	165.98
Propane	15.61	23.28	18.21	17.48
Fuel Oil	39.56	74.23	95.09	74.22
Gasoline	252.27	261.45	237.78	259.32
Diesel	159.09	166.60	133.42	148.53

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Conclusions

Key Findings

- Total GHG emissions from all energy sources for all local government operations in the Town of New Paltz averaged 655.5 tons of CO₂e/year for the baseline years 2016 - 2017.
- The total GHG emissions for all municipal functions show an upward trend year after year.
- For the averaged baseline years of 2016-2017, the greatest source of GHG emissions are the vehicle fleet (Police Department and Department of Public Works) at 59% on average; the administration facilities (buildings, recreation facilities, Recycle/Reuse Center) at 36% on average; and streetlights/signals at 3% on average of the total Town GHG emissions/year.
- For the averaged baseline years of 2016-2017, the Police Department use of gasoline accounted for an average of 150 tons of CO₂e/year; the Police Building energy use accounted for an average of 40.1 tons CO₂e/year.
- For the averaged baseline years for 2016-2017, the Department of Public Works use of gasoline and diesel accounted for an average of 232 tons CO₂e/year; the DPW buildings energy use accounted for an average of 33.6 tons CO₂e/year.
- A large change in GHG emissions occurred when the Town Hall was moved from the old building to the temporary trailer units: 11.1 tons CO₂e/year (= 35,527 KWh used) to 181.3 tons CO₂e/year (= 61,820 KWh used).
- Another notable change occurred at the Justice Court, where electricity usage went from an average for 2013-2014 of 1,957 KWh (= 0.6 tons CO₂e/year) to an average for 2016-2017 of 30,604 KWh (= 9.5 tons CO₂e/year).

Next Steps

CSC Task Force subteam and Town Finance Officer to

- Collect and enter 2018 energy data
- Plan for collection of Scope 3 data such as solid waste sent out, fugitive emissions, employee commuting, etc.

Town Board, after reviewing results and analyses of this GHG Inventory report, to

- Accept the final 2019 Town of New Paltz GHG Inventory report & post it on the Town website
- Create a Climate Action Plan, with the support of the CSC Task Force subteam, to

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- Determine an overall aspirational GHG reduction target and timeline
- Identify priority areas for GHG reduction
- Outline steps to achieve the GHG reductions
- Create a draft Climate Action Plan
- Accept the final Climate Action Plan in a resolution
- Share the Climate Action Plan with the community
- Implement Climate Action Plan initiatives including seeking funding as applicable
- Monitor progress and update the GHG inventory as actions are completed, or at least every 5 years

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Appendices

Town of New Paltz Local Government Operations Green House Gas Inventory

Appendix A: Facility Master List

Facility/ Group Name	Individual Facility Name	ICLEI GHG Reporting Sector	Energy Source used by the facility or facility group					
			Electricity	Nat Gas	Fuel Oil	Propane	Kerosene	Wood
DPW	Highway Garage	Administration Facilities	yes	--	yes	--	--	--
DPW	Salt Shed	Administration Facilities	yes	--	--	--	--	--
Justice Court	Justice Court	Administration Facilities	yes	--	yes	--	--	--
Police	Police Building	Administration Facilities	yes	--	yes	yes	--	--
Recreation	Clearwater Park	Administration Facilities	yes	--	--	--	--	--
Recreation	Community Center	Administration Facilities	yes	--	--	yes	--	--
Recreation	Pool	Administration Facilities	yes	--	--	--	--	--
Recreation	Sports Park	Administration Facilities	yes	--	--	--	--	--
Recreation	Youth Center	Administration Facilities	yes	--	yes	--	--	--
Recycling/ReUse	ReUse Center	Administration Facilities	yes	--	--	yes	--	--
Recycling/ReUse	Recycling Center	Administration Facilities	yes	--	--	--	--	--
Sewer Plants	Sewer Plant 5	Wastewater facilities	yes	--	--	--	--	--
Sewer Plants	Sewer Plant 6, N Ohioville	Wastewater facilities	yes	--	--	--	--	--
Sewer Plants	Sewer Plant 6, Rte 299	Wastewater facilities	yes	--	--	--	--	--
Street Lighting District	Street Lighting District	Streetlights and traffic signals	yes	--	--	--	--	--
Town Hall old	Town Hall old	Administration Facilities	yes	--	--	--	--	--
Town Hall temp	Town Hall 1	Administration Facilities	yes	--	--	--	--	--
Town Hall temp	Town Hall 2	Administration Facilities	yes	--	yes	--	--	--

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Appendix B: Raw Data from Energy Provider Accounts

					Energy Data Roll-Ups				Energy Cost Roll-Ups			
Facility/ Group Name	Individual Facility Name	Vendor/ services	Energy Source	Units	2013	2014	2016	2017	2013	2014	2016	2017
Recreation	Clearwater Park	Central Hudson	Electricity	kWh	4426	668	2031	1672	\$ 687.84	\$ 180.85	\$ 631.00	\$ 582.06
Recreation	Community Center	Kimlin	Propane	gal	1057.5	1391.6	*	*	\$3,635.54	\$4,165.87	*	*
Recreation	Community Center	Central Hudson	Electricity	kWh	12191	13705	20907	13638	\$3,323.50	\$3,737.91	\$3,672.07	\$3,197.63
Recreation	Community Center	Porco	Propane	gal	*	*	1355.5	1044.9	*	*	\$1,303.78	\$1,420.05
DPW	Highway Garage	Central Hudson	Electricity	kWh	38424	38333	36441	37016	\$6,063.65	\$7,159.24	\$5,288.99	\$5,278.05
DPW	Highway Garage	Heritage	Fuel Oil	gal	178.9	2874.5	*	*	\$ 705.07	\$9,862.82	*	*
DPW	Highway Garage	Bottini	Fuel Oil	gal	*	*	2029.2	1583.9	*	*	\$2,767.50	\$2,926.07
Justice Court	Justice Court	Central Hudson	Electricity	kWh	1865	2049	30773	30435	\$ 303.98	\$ 333.92	\$ 4,571.80	\$ 5,107.09
Justice Court	Justice Court	Bottini	Fuel Oil	gal	*	*	2410.8	1881.7	*	*	\$ 3,486.34	\$ 3,476.22
Justice Court	Justice Court	Heritage	Fuel Oil	gal	1975.67	1867.51	*	*	\$7,793.35	\$6,407.68	*	*

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Facility/ Group Name	Individual Facility Name	Vendor/ services	Energy Source	Units	2013 Usage Roll-Up	2014 Usage Roll-Up	2016 Usage Roll-Up	2017 Usage Roll-Up	2013 Cost Roll-Up	2014 Cost Roll-Up	2016 Cost Roll-Up	2017 Cost Roll-Up
Police	Police Building	Central Hudson	Electricity	kWh	96636	95835	99344	92700	\$11,335.32	\$12,972.15	\$11,236.14	\$ 9,795.10
Police	Police Building	Heritage	Fuel Oil	gal	702.95	1148.88	*	*	\$ 2,770.41	\$ 3,941.96	*	*
Police	Police Building	Bottini	Fuel Oil	gal	*	*	486.4	379.6	*	*	\$ 672.27	\$ 701.27
Police	Police Building	Kimlin	Propane	gal	860.36	1153.88	985.9	710.9	\$ 2,957.81	\$ 3,454.25	\$ 1,184.72	\$ 1,828.81
Recreation	Pool	Central Hudson	Electricity	kWh	57662	48027	48238	44915	\$ 7,990.22	\$ 7,113.74	\$ 5,793.22	\$ 5,644.43
Recycling/ ReUse	Recycling Center	Central Hudson	Electricity	kWh	8540	9578	10436	9236	\$ 999.44	\$ 567.01	\$ 676.92	\$ 1,371.04
Recycling/ ReUse	ReUse Center	Bottini	Propane	gal	596.87	1206	593.3	1061.5	\$ 2,051.96	\$ 3,239.43	\$ 534.56	\$ 1,410.97
Recycling/ ReUse	ReUse Center	Central Hudson	Electricity	kWh	1932	2082	2566	3820	\$ 569.69	\$ 452.64	\$ 511.28	\$ 813.38
DPW	Salt Shed	Central Hudson	Electricity	kWh	1256	7504	4089	7717	\$ 440.64	\$ 532.79	\$ 809.15	\$ 1,157.89
Sewer Plants	Sewer Plant 5	Central Hudson	Electricity	kWh	71	84	82	73	\$ 297.65	\$ 300.64	\$ 322.43	\$ 297.51
Sewer Plants	Sewer Plant 6, N Ohioville	Central Hudson	Electricity	kWh	23612	25680	25253	25223	\$ 3,922.31	\$ 4,844.72	\$ 3,811.74	\$ 3,655.69
Sewer Plants	Sewer Plant 6, Rte 299	Central Hudson	Electricity	kWh	566	597.7	541	422	\$ 476.31	\$ 490.75	\$ 468.79	\$ 459.85
Recreation	Sports Park	Central Hudson	Electricity	kWh	39	77	163	82	\$ 764.83	\$ 784.14	\$ 457.30	\$ 428.22
Street Lighting District	Street Lighting District	Central Hudson	Electricity	kWh	69530	73573	73852	70380	\$22,805.99	\$24,132.00	\$23,116.04	\$24,119.35

Town of New Paltz Local Government Operations Green House Gas Inventory

Facility/ Group Name	Individual Facility Name	Vendor/ services	Energy Source	Units	2013 Usage Roll-Up	2014 Usage Roll-Up	2016 Usage Roll-Up	2017 Usage Roll-Up	2013 Cost Roll-Up	2014 Cost Roll-Up	2016 Cost Roll-Up	2017 Cost Roll-Up
Town Hall temp	Town Hall 1	Central Hudson	Electricity	kWh	**	**	67840	90080	**	**	\$ 9,435.23	\$ 11,629.91
Town Hall temp	Town Hall 2	Central Hudson	Electricity	kWh	**	**	79680	86040	**	**	\$10,619.57	\$ 10,388.18
Town Hall temp	Town Hall 2	Bottini	Fuel Oil	gal	**	**	3071.4	2397.4	**	**	\$ 4,235.81	\$ 4,428.92
Town Hall old	Town Hall old	Central Hudson	Electricity	kWh	38515	32538	2101	6565	\$ 6,096.49	\$ 6,148.65	\$ 912.22	\$ 707.71
Recreation	Youth Center	Central Hudson	Electricity	kWh	9280	9576	10906	11117	\$ 1,531.55	\$ 1,731.61	\$1,698.31	\$ 1,764.76
Recreation	Youth Center	Heritage	Fuel Oil	gal	660.6	710.9	*	*	\$ 2,605.58	\$ 2,439.19	*	*
Recreation	Youth Center	Bottini	Fuel Oil	gal	*	*	459.6	358.7	*	*	\$ 633.84	\$ 662.66

* switched service provider in 2015

**Town Hall moved to temporary facility (buildings 1&2) in 2015

Town of New Paltz Local Government Operations Green House Gas Inventory

Appendix C: Fleet Fuel Data

Facility/Group Name	Year	Department	Gasoline Gallons	\$ Gasoline	Diesel Gallons	\$ Diesel
DPW	2013	DPW Vehicles	10304.5	\$31,485.35	13628.00	\$43,078.67
Police	2013	Police Vehicles	15434.2	\$54,791.36	0	0
Town Hall	2013	Clerk Vehicle	326.5	\$ 1,158.98	0	0
Recycling/ReUse	2013	Recycle Vehicles	0	0	507.50	\$ 1,604.37
DPW	2014	DPW Vehicles	10100.3	\$29,225.63	14736.70	\$43,709.31
Police	2014	Police Vehicles	16724.5	\$49,170.03	0	0
Town Hall	2014	Clerk Vehicle	189.0	\$ 555.61	0	0
Recycling/ReUse	2014	Recycle Vehicles	0	0	66.42	\$ 197.00
DPW	2016	DPW	10419.70	\$16,167.24	11455.10	\$17,253.17
Police	2016	Police	14112.45	\$25,441.63	0	0
Town Hall	2016	Clerk Vehicle	35.87	\$ 77.97	0	0
Recycling/ReUse	2016	Recycle Center	0	0	400.00	\$ 656.44
DPW	2017	DPW	9930.00	\$17,810.21	12171.10	\$21,547.91
Police	2017	Police	16863.50	\$27,170.66	0	0
Recycling/ReUse	2017	Recycle Center	0	0	1026.60	\$ 2,365.84

Town of New Paltz Local Government Operations Green House Gas Inventory

Appendix D: Factors, Calculations, and Sources

Emission Factors for Fuels		Units
Electric CO2	625	lb/MWh
Electric CH4	0.02482	lb/MWh
Electric N2O	0.01119	lb/MWh
Liquid Propane CO2	61.46	kg/MMBtu
Liquid Propane CH4	3.0	g/MMBtu
Liquid Propane N2O	0.6	g/MMBtu
Heating Oil CO2	10.2	kg/gallon
Heating Oil CH4	0.0015	kg/gallon
Heating Oil N2O	0.0001	kg/gallon
Gasoline CO2	8.78	kg/gallon
Diesel CO2	10.21	kg/gallon

Global Warming Potentials (CO2equivalents)

CO2 = 1; CH4 = 28 CO2e; N2O = 298 CO2e

Conversion Factors for MMBtus

1 gal diesel = 0.1396 MMBtu (from EIA)

1 kWh = 0.003412 MMBtu (from EIA)

1 gal gasoline = 0.124262 MMBtu (from EIA)

1 gal propane = 0.0916 MMBtu (Center Point Energy website)

Other Conversion Factors

1 kg = 0.001 metric tons

Town of New Paltz Local Government Operations Green House Gas Inventory

1 g = 0.000001 metric tons

1 kWh = 0.001 MWh

1 metric ton = 2204.62 lbs

Calculations Used

The following calculations with NYUP eGRID factors (2007) were used:

Electric CO₂ calculation = (MWh*720.8lbs CO₂/MWh)

Electric CH₄ calculation = (MWh*0.02482lbs/MWh)

Electric N₂O calculation = (MWh*0.01119lbs/MWh)

Default factors for #2 fuel oil (from LGOP p. 203 and 206) were used:

Fuel Oil CO₂ calculation = (gal*10.21kg CO₂/gal)

Fuel Oil CH₄ calculation = (gal*0.0015kg CH₄/gal)

Fuel Oil N₂O calculation = (gal*0.0001kg N₂O/gal)

Fuel Oil BTU calculation = (gal*0.138 MMBTU/gal)

CO₂equivalent was calculated as:

CO₂e (metric tons) = (CO₂ metric tons*1) + (CH₄ metric tons *28) + (N₂O metric tons *298), where GWP CH₄ = 28 and GWP N₂O = 298

Sources:

http://www.eia.gov/kids/energy.cfm?page=about_energy_conversion_calculator-basics

<http://www.centerpointenergy.com/services/energymarketing/learningcenter/energyconversionfactors/>

<http://nyscrda.ny.gov/Publications/Research-and-Development/Environmental/EMEP-Publications/Response-to-Climate-Change-in-New-York.aspx>

Source of raw electric, fuel oil, propane, gasoline, and diesel data: Town of New Paltz annual compiled accounts for 2013, 2014, 2016, and 2017

LGOP referenced here is Local Governments Operations Protocol Version 1.1 (released May 2010).