Village of Tuxedo Park

Inventory of Greenhouse Gas Emissions For Year 2018

June 20, 2022

This report was prepared by James D. Hays and C. Schuyler Neuhauser of the Village of Tuxedo Park's CSC Task Force with Assistance from ICLEI

Credits and Acknowledgements

The authors thank members of the staff of the Village of Tuxedo Park and those of the Tuxedo Club and the Tuxedo Park School, listed below, for providing much of the information needed to complete this report. Eli Yewdall of ICLEI provided useful suggestions and expert advice. Mayor McFadden and members of Tuxedo Park's Board of Trustees provided financial assistance and encouragement. We also want to thank Randy St. John, manager of the Tuxedo Club, and Stuart Johnson, Head of the Tuxedo Park School, for their support of this study.

John Ledwith, Village of Tuxedo Park Building inspector

David Conklin, Village of Tuxedo Park Chief of Police

Jeff Voss, Village of Tuxedo Park Department of Public Works Superintendent

Elizabeth Doherty, Village of Tuxedo Park Clerk

Sheila Kobrick, Tuxedo Club Controller

Michael Murphy, Tuxedo Park School Chief Financial and Operating Officer

Eli Yewdall (he/his), Senior Program Officer - ICLEI USA

Table of Contents

List of Tables

List of Figures

Executive Summary

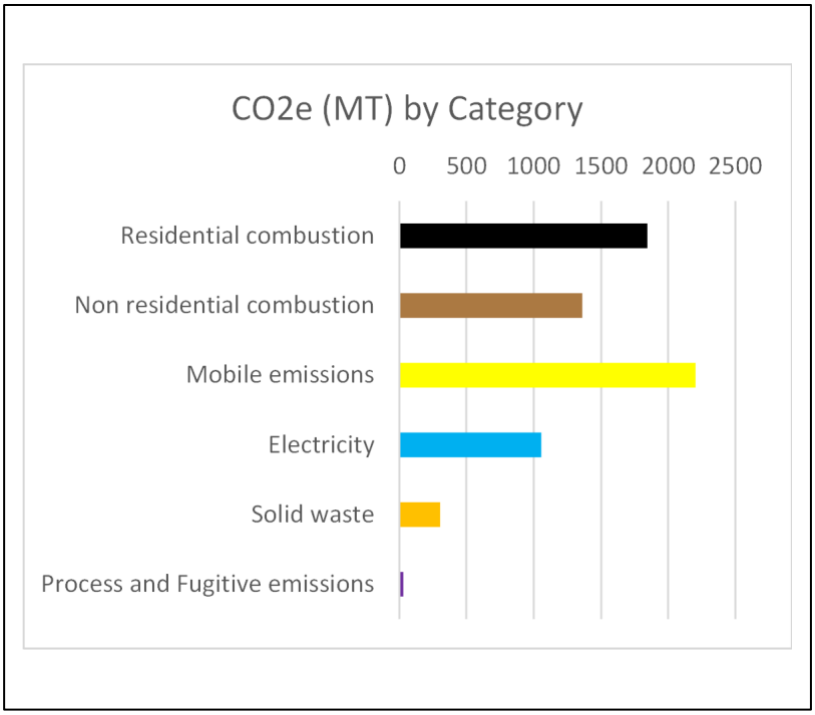
The Village of Tuxedo Park recognizes that greenhouse gas (GHG) emissions from human activity are causing profound climate change, the consequences of which pose substantial risks to our community. The Village is also aware that the removal of these emissions from the atmosphere by natural processes will take hundreds to thousands of years, while removal by artificial means is currently prohibitively expensive. As the effects of climate change are already being felt it is important that we, and other communities across the state, take steps to reduce greenhouse gas emissions (GHG) now. This report, provides estimates of greenhouse gas emissions resulting from activities in our Village during 2018 before the COVID pandemic, it is the first step in a long range plan to reduce our emissions. This effort is in line with our Village's tradition of environmental protection and sustainability.

This inventory reports the emissions of three greenhouse gasses, Carbon dioxide (CO_2) Methane (CH_4) and nitrous oxide (N_2O). The emissions of methane and nitrous oxide are multiplied by appropriate factors to express their global warming potential relative to CO_2. The resulting products are summed with CO_2 emissions to provide metric tons (MT) of Carbon Dioxide equivalent (CO_2e), a metric ton is 1000 kilograms or 2,204.62 pounds. The data used to calculate emissions are from meter readings and fuel purchase invoices for village government operations, The Tuxedo Park School and the Tuxedo Club. Residential electricity use was obtained from State data sets. Fuel burned to heat residences and power vehicular traffic generated by Village residents was not available so emissions from these sources are estimated based on statewide average use.

The largest contributor (33%) are mobile emissions (on and off road vehicles); next is Residential combustion (28%), fuel used to heat residences, third is Non Residential combustion (16%), this includes emissions from Village Government Operations, The Tuxedo Club and The Tuxedo Park School, fourth is emissions from the generation of Electricity used by our Village (16%). Solid Waste and

Water and Waste Water management were responsible for the remaining 7% of emissions.

Figure 1: Communitywide Emissions by Sector



The report next discusses Climate change, the development of Inventory Methodologies, specifics of a Community Emissions, excluding Government Operations, followed by the specifics of Government Operations Emissions and those of the Tuxedo Club and the Tuxedo Park School followed by Conclusions. The Appendix gives detailed explanations of how emission calculations were made.

Climate Change and Tuxedo Park

Naturally occurring gases in our atmosphere, such as carbon dioxide, water vapor and methane, trap outgoing Earth radiation warming our planet. This process is called the greenhouse effect. Human activities, primarily the burning of fossil fuels, further increase the concentrations of these gasses, primarily carbon dioxide, causing the Earth's surface and lower atmosphere to warm further.

Long-term temperature measurements consistently show widespread evidence of planetary warming. Global annually averaged temperature has increased by about 1.8°F (1.0°C) from 1901 to 2016. Earth's climate will continue to change over this century and beyond. Past mid-century, how much the climate changes will depend primarily on global emissions of greenhouse gases and on the response of Earth's climate system to these emissions. With significant reductions in emissions, global temperature increase could be limited to 3.6°F (2°C) or less compared to preindustrial temperatures. Without significant reductions, annual average global temperatures could increase by 9°F (5°C) or more by the end of this century compared to preindustrial temperatures.[1]

The warming is not uniform, with higher rates in some regions than others. Dry regions are becoming drier, limiting agricultural production which in future can cause significant migrations of people and social instability and contributing to the development of forest fires. Warming of the ocean causes coral bleaching and the death of coral reefs. It also causes ocean water to expand, contributing to sea level rise. Rapid warming in the Arctic and parts of the Antarctic is causing glacial ice to melt, a major contributor to sea level rise, which in turn threatens coastal population centers and ecosystems.

[1] https://nca2014.globalchange.gov/report/regions/northeast

The impact of projected climate change on marine biota is profound engendering greater rates of extinction and reducing marine biological richness.[2]

Fifty-five million years ago an amount of CO_2 was injected into Earth's atmosphere, probably comparable to what we will inject if we burn through known fossil fuel reserves. The environmental consequences were profound and it took over 100,000 years for Earth processes to return conditions to the pre-injection state.[3] Clearly, it takes a long time for Earth processes to return fossil fuel produced CO_2 to Earth's sedimentary rocks from which it came. Artificially attempting this is extraordinarily expensive with current technology. As ice sheets are now melting, there is an urgent need to reduce CO_2 emissions.

Global climate change influences seasonal patterns and intensifies weather events, threatening the safety, quality of life, and economic prosperity of communities everywhere.[4]

The Northeastern United States will experience increasing temperatures and precipitation during future decades.[1] By 2035, the Northeast is projected to be more than 3.6°F (2°C) warmer on average than during the preindustrial era. This would be the largest increase in the contiguous United States and would occur as much as two decades before global average temperatures reach a similar milestone[3]. Increasing precipitation in the Eastern U. S. is causing the Great Lakes to rise while drought plagues western states. In New York State, since the 1950s, rain falling as downpours has increased by 70%. Future increases in rainfall intensity can be expected.[5] These rain events are of special concern to the Village of Tuxedo Park as such events e.g., tropical storms, which are increasing in intensity, may stall over our region, possibly causing our lakes to breach their

[2] Avoiding ocean mass extinction from climate change: J. L. Penn, C. Deutsch, Science 376,524,2022

[3] Atmospheric lifetime of fossil-fuel carbon dioxide: Archer et al. Annual reviews of Earth and Planetary Sciences; Vol 37, 2009.

[4] 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/

[5] https://nca2014.globalchange.gov/report/regions/northeast

dams and inflict great damage on our Village and communities downstream from us.

The consequences of climate change are profound and it represents a significant crisis that won't be solved by increasing the efficiency of existing systems; rather, it requires a transformation of our economy from one powered by fossil fuels to one powered by electricity, produced primarily by solar energy[6]. To accomplish this transformation, action is needed at all levels of government, an effort comparable in scale to the mobilization for World War II.

Fortunately, electrification brings increased efficiencies and consequent savings to municipalities and individuals[6]. Consequentially electrification is a path we should follow, even without the incentive of limiting damage from climate change.

New York State has responded to the climate crisis by passing the Climate Leadership and Community Protection Act (The Climate Act) of 2019. It is one of the most ambitious state climate acts in the country, calling for 100% carbon free electricity by 2040 and a net zero carbon economy by 2050.

By registering as a Climate Smart Community, The Village of Tuxedo Park has joined 356 communities across New York State, representing nearly half the population of the state, that are all committed to substantial reductions of greenhouse gas emissions by the middle of this century.

The Greenhouse Gas Inventory

To complete this inventory, The Village of Tuxedo Park utilized tools and guidelines from ICLEI - Local Governments for Sustainability (ICLEI), which provides direction for greenhouse gas emissions accounting and defines climate neutrality as follows:

The targeted reduction of greenhouse gas (GHG) emissions and GHG

[6] Electrify: An optimist's playbook for our clean energy future By Saul Griffith; MIT Press 2021, 228 p.

avoidance across the community in all sectors to 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[7].

Role of Local Government

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 2:

1. Conduct an inventory and forecast of local greenhouse gas emissions;
2. Establish a greenhouse gas emissions Science Based Target;[6]
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 marks the completion of ICLEI's Climate Mitigation Milestone One, and provides a foundation for future work to reduce greenhouse gas emissions in the Village of Tuxedo Park.

[7] https://icleiusa.org/us-community-protocol/

Figure 2: Climate Mitigation Milestones

Inventory Methodology

The Introduction to this report presented emissions from The Village of Tuxedo Park community as a whole for the year 2018. Now we report emissions from government operations and the rest of the community separately for the same year. The Commercial category in this report consists of The Tuxedo Club and The Tuxedo Park School.

This inventory includes emissions from five basic sources, which are:

- Use of electricity by the community
- Use of fuel in residential and commercial stationary combustion
- On-road and off-road vehicles
- Use of energy in potable water distribution and waste water treatment
- Generation and transportation of solid waste by the community.

It should also be noted that the quality of the calculated emissions varies. For the Village government, the Tuxedo Club and the Tuxedo Park School we use

measurements of fuel burned to heat buildings, power pumps and power vehicles. No comparable data are available for Village Residences or vehicular traffic generated by village residents. For these emissions we generated estimates for the former by scaling down statewide residential fuel used by fuel type based on population differences between New York State and the Village. For the latter, state surveys of vehicle miles traveled were scaled down to the Village based also on population differences (see Appendix Methodology Details).

Three greenhouse gases are included in this inventory: carbon dioxide (CO_2), methane (CH_4) and nitrous oxide (N_2O). The warming effect of the sum of these emissions is given as "carbon dioxide equivalent" (CO_2e) values, calculated using factors for Global Warming Potentials (GWP) multipliers for methane and nitrous oxide from the IPCC 5th Assessment Report (Table I). ClearPath's inventory calculators allow for input of the sector activity (i.e. kWh or VMT) and emission factors to calculate final CO_2e emissions.

Table 1: Global Warming Potential Values (IPCC, 2014). These multipliers are used to calculate the global warming effect of a given amount of methane or nitrous oxide relative to a similar amount of Carbon dioxide.

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

Quantifying Greenhouse Gas Emissions

Two categories of emissions are used in this 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". For example, the burning of fossil-fuels to heat buildings generates emissions within the community, while the use of electricity within the community creates emissions at a power plant outside the community.

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. 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).

Activity Data x Emission Factor = Emissions

For this inventory, calculations were made using ICLEI's ClearPath tool.

Community Emissions

The communitywide emissions for the 2018 inventory excluding Government operations are shown in Table 2 and Figure 3.

Table 2: Community wide Emissions Inventory excluding government operations

Sector	Fuel or source	2018 Usage	Usage unit	2018 Emissions ($MTCO_2e$)
Residential energy	Electricity	6302	MWh	726
	#2 Fuel Oil	13508	MMBTU	1647
	Propane	3186	MMBTU	198
Residential energy total				**2571**
Commercial energy	Electricity	1532613	KWh	177
	#2 Fuel Oil	83152	Gallons	854
	Propane	34,085	Gallons	192
Commercial energy total				**1223**
Industrial energy	Natural gas			
	[Non-utility Fuel]			
Industrial energy total				
On-road transportation	Diesel	362,904	VMT	529
	Gasoline	3,477,282	VMT	1523
Off-Road	Gasoline	7614	Gallons	45

	Diesel	185	Gallons	2
	[Fuel Type]			
			Transportation total	**2097**
Solid Waste	Waste Generated	472	Tons	303
			Solid waste total	**303** Water Treatment Energy Usage
Water and wastewater	Water Treatment Energy Usage			
	Wastewater Treatment			
	Nitrogen Discharge			12
			Water and wastewater total	12
Process & Fugitive Emissions				
			Fugitive total	**24**
VILLAGE OF TUXEDO PARK TOTAL EMISSIONS EXCLUDING GOVERNMENT OPERATIONS				**6218**

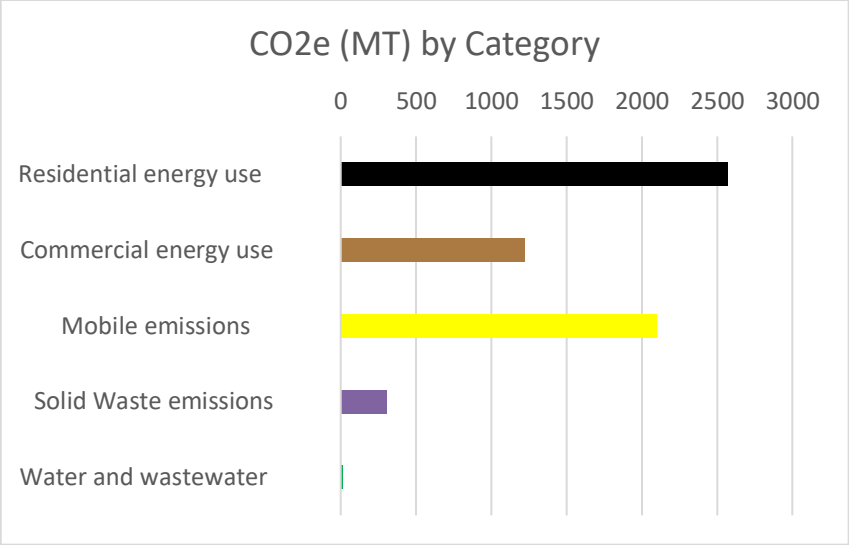


Figure 3: Community emissions excluding government operations Residential 41%, Mobile 34%, Commercial 20%, Solid Waste 5%.

Next Steps

Based on the inventory results, the following areas have the greatest potential for emissions reduction:

- Electricity generation contributes 726 MT of CO_2e (CO_2 equivalent) used by the residential and Commercial community in 2018, 16% of total emissions. This could be eliminated if the Village adopts a Community Choice Aggregation (CCA) agreement at no cost to the community but accompanied by potential cost savings.
- Vehicular traffic generates 2097 MT of CO_2e, 36% of total emissions. Conversion of vehicles to electric vehicles could reduce this.
- Combined residential and commercial fuel oil and propane use generate the largest source of emissions. This will be a challenge to reduce but heat pumps can generate long term savings and should be a major priority for the years 2030 to 2050.

Government Operations Emissions

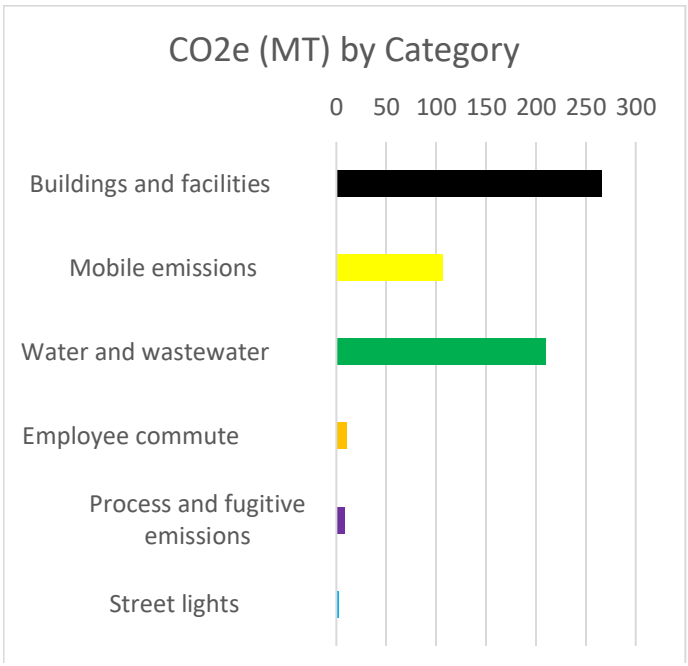
Government operations emissions for 2018 are shown in Table 3 and Figure 4.

Table 3: Local Government Operations Inventory

Sector	Fuel or Source	2018 Usage	Usage unit	2018 Emissions ($MTCO_2e$)
Buildings & Facilities	Electricity	44074	kWh	6.9
	Natural Gas	3931	Therms	21
	Propane	592	Gallons	3.4
	#2 Fuel Oil	3651	Gallons	38
Buildings & Facilities total				**69**
Street Lights & Traffic Signals	Electricity	22775	KWh	2.6
Street Lights & Traffic Signals total				**2.6**
Vehicle Fleet	Gasoline (on-road)	10360	Gallons	91
	Diesel (on-road)	2491	Gallons	26
Vehicle Fleet total				**117**
Employee Commute	Gasoline passenger	15266	VMT	6.4
	Gasoline light truck	11517	VMT	4.9
	Hybrid Gasoline			
	PHEVs			
Employee Commute Total				11.3
Solid Waste	Waste Generation			Entered in Community inventory
	Compost			

Solid waste total				
Water and wastewater	Electricity to distribute potable water	590712	KWh	69.1
	#2 Fuel oil	8360	Gallons	76.2
	Propane	2678	Gallons	15.1
	Nitrogen discharge			20
Water and wastewater total				**180.4**
Process & Fugitive Emissions	Vehicular refrigerant	**0.00604**	**MT**	**9**
Process & Fugitive Emissions total				**9**
Total government emissions				**389**

Figure 4: Local Government Operation Emissions include buildings and facilities 44%, Water and Waste water management 35%, Mobile 18%, Employee commuting 2%, process and fugitive 1% and street lights 0.4%.



Next Steps

Community Choice Aggregation will reduce village government operations electricity sourced from fossil fuel burning generators by 154 $MTCO_2e$. This represents 2.6% of total Village emissions and when combined with savings to the community outside village government brings the total savings from CCA to more than 18%. Electrifying the Village fleet of vehicles would save another 107 $MTCO_2e$ representing a further savings of nearly 2%, bringing total emissions savings to nearly 20%.The Village should explore heating and cooling government buildings with heat pumps which could yield significant further savings over time.

THE TUXEDO CLUB

Table 4 Tuxedo Club Emissions

Sector	Fuel or Source	2018 Usage	Usage unit	2018 Emissions ($MTCO_2e$)
Buildings & Facilities	Electricity	1241366	kWh	143
	Natural Gas			
	Propane	32733	Gallons	184
	#2 Fuel Oil	44905	Gallons	462
Buildings & Facilities total				**789**
Vehicle Fleet	Golf Gasoline (off-road)	2614	Gallons	67
	Golf Diesel (off-road)	4238	Gallons	43
	Main Club (off-road) Diesel	185	Gallons	2
Vehicle Fleet total				**112**
Solid Waste	Golf Club	36.5	Tons	24
	Main Club	100	Tons	64
Solid waste total				**88**
Process & Fugitive Emissions	N_2O emissions from Sceptic system at Golf Club			**12.3**
Process & Fugitive Emissions total				**12.3**
Total Tuxedo Club emissions				**1001**

THE TUXEDO PARK SCHOOL

Table 5 Tuxedo Park School Emissions

Sector	Fuel or Source	2018 Usage	Usage unit	2018 Emissions ($MTCO_2e$)
Buildings & Facilities	Electricity	257618	kWh	30
	Natural Gas			
	Propane	378	Gallons	8
	#2 Fuel Oil	38246	Gallons	392
Buildings & Facilities total				**430**

Conclusions

This report provides quantitative measurements of Greenhouse Gas Emissions for the village of Tuxedo Park for the year 2018. Data used to calculate these emissions were collected by staff of the Village of Tuxedo Park, The Tuxedo Park School and The Tuxedo Club. The data that these emission calculations are based on are available from James Hays.(jimhays@ldeo.columbia.edu.

In 2009 the State of New York conducted a GHG emissions inventory for the lower Hudson Valley and published it in 2012[8]. This report calculated emissions at the municipal level. We compare in Table 6 that 2009 inventory, for the Village of Tuxedo Park with our 2018 estimated emissions. Total emissions for 2009 are similar to those calculated for 2018 but Commercial stationary energy is significantly less while emissions from electricity generation is much more. We trust our emissions calculations for Stationary Commercial `energy and Electricity generation as these are based on billing data. For Mobile emissions the 2009 estimate used Countywide data for Vehicle miles traveled. Countywide vehicle miles traveled data were not available for the 2018 estimates.

8. Mid-Hudson Regional greenhouse Gas Emissions Inventory: Prepared for NYSERDA by ICF International 2012

Table 6. Comparison of 2009 Tuxedo Park GHG emissions inventory with that of 2018, units are $MTCO_2$

	Stationary Residential	Stationary Commercial	Mobile	Solid waste	Other	Electricity	Total MTCO2e
2009	1708	1510	2991	212	231	122	**6843**
2018	1845	1356	2329	391	33	1054	**7008**

The 2018 inventory allows the Village of Tuxedo Park to develop strategies for reducing GHG emissions before the end of this decade. Creating a Community Choice Aggregation Agreement (CCA) for renewable electricity for the entire Village could reduce emissions by 16%. Replacing the Village fleet of vehicles with electric Vehicles over time would reduce emissions by another 4 or 5 percent. To attain our goal of a 50% reduction in greenhouse gas emissions by the end of this decade will require the replacement of some current heating systems with heat pumps and cars with electric vehicles. The report did not have a reliable way of directly measuring the fuel burned to heat village residences or that used to power vehicles that are owned by or serve Village residents. The Village should explore ways to use the new traffic counter at the Front Gate to better measure traffic flow within the Village in future inventories.

This report is the beginning of a lengthy project to reach carbon neutrality by 2050. We are joined in this effort by 356 communities across New York State. Together we can make a difference but only if all members of our community accept the challenge. Already some residents are heating their homes with geothermal energy and the number of electric cars and hybrids are growing. These neighbors deserve credit for leading the way and will likely be rewarded with long term cost savings.

Appendix: Methodology Details

Electricity and Natural Gas

Monthly electricity and natural gas usage for residential customers was obtained from the NYSERDA energy portal[9]. For commercial customers (Tuxedo Park School, Tuxedo Club) and Village Government operations, usage measurements were scanned from Orange and Rockland Utilities billing receipts. No data gaps were encountered.

Table 7: Energy Data Sources

Electricity emission factors were obtained from EPA's eGRID[10].

Year	CO_2 (lbs./MWh)	CH_4 (lbs./GWh)	N_2O (lbs./GWh)
2018	253.11	18.0	2.0

Fuel oil and Propane

No records of Fuel oil or Propane deliveries to residences were obtained from Village of Tuxedo Park suppliers, so estimates of fuel oil use were based on New York statewide average household usage by fuel type (EIA).[11] The number of residences using each fuel type in New York State and Tuxedo Park were obtained from American Community survey (ACS).[12] The number of residences in Tuxedo Park were multiplied by the statewide average usage by fuel type to obtain the annual usage estimate. For the Tuxedo Park School, Tuxedo Club and Government operations, gallons of Fuel oil and Propane burned were obtained from billing data and multiplied by the appropriate emission factors to obtain emission estimates.

[9]https://www.nyserda.ny.gov/All-Programs/Programs/Clean-Energy-Communities/Community-Energy-Use-Data
[10]https://www.epa.gov/energy/emissions-generation-resource-integrated-database-egrid
[11]https://www.eia.gov/state/seds/sep_use/notes/use_print.pdf Table CT4
[12]https://factfinder.census.gov/

Transportation

No Vehicle Miles Traveled (VMT) data are available for the Village of Tuxedo Park nor for Orange County. Because our goal is to obtain emissions based on travel generated by the community including commuting, deliveries etc., so statewide VMT data[13] was scaled to Tuxedo Park based on population. The Environmental Protection Agency state inventory tool[14] was used to allocate emissions to different vehicle types, allowing the calculation of percent VMT to various vehicle and fuel types, which are applied to total estimated Village of Tuxedo Park VMT (Table 8).

Table 8: Transportation Data Sources

Fuel	% of VMT	
Gasoline	90.7	
Diesel	9.3	
Vehicle type	**% of Gasoline VMT**	**% of Diesel VMT**
Passenger car	75.8	3.5
Light truck	22.0	8.4
Heavy truck	1.5	88.1
Motorcycle	0.7	0

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 for the year 2018 are shown in Table 9.

[13] https://www.fhwa.dot.gov/policyinformation/statistics/2018/vm2.cfm
[14] https://www.epa.gov/statelocalenergy/download-state-inventory-and-projection-tool

Table 9: MPG and Emissions Factors by Vehicle Type

Fuel	Vehicle type	MPG	CH_4 g/mile	N_2O g/mile
	Passenger car	24.37	0.0186	0.0093
Gasoline	Light truck	17.87	0.0201	0.0167
Gasoline	Heavy truck	5.37	0.086	0.0664
Gasoline	Motorcycle	24.38	0.019	0.0093
Diesel	Passenger car	24.38	0.001	0.001
Diesel	Light truck	17.87	0.001	0.002
Diesel	Heavy truck	6.31	0.005	0.005

Waste Water

Wastewater electricity use was reported under Government Operations. The N_2O release related to the operation of the Village wastewater treatment plant (WWTP) includes both process and fugitive emissions: according to ICLEI, process N_2O refers to "Total annual N2O emitted by WWTP processes", while fugitive emissions refer to those emitted from "treated wastewater that flows out from a treatment facility or industrial plant and is discharged into waterways, lakes, or the ocean". For the Golf Club septic system fugitive emissions calculation, we used a population-based calculation based on the average number of daily golfers in season (83), the season length based on a water withdrawal report (April to October), and the average number of employees at private golf facilities (52) according to GGA Partners.

Potable Water

Energy used in the distribution of potable water is reported in the Government Operations Inventory. It was compiled from monthly billing receipts from Orange and Rockland Utilities and there are no gaps for the year 2018.

Solid Waste

Residential and Government Operations solid waste tonnage removed from the Village in 2018 was provided by Sterling Carting. American Waste Services provided similar data for the Tuxedo Club. No information was available for the Tuxedo Park School. Tuxedo's solid waste is hauled to the Keystone Sanitary Landfill in Pennsylvania, a round trip distance of 162 miles. The CO_2e reported here includes calculated emissions produced by the waste from the land fill and emissions from transportation of the waste.

Fugitive Emissions

No Fugitive emissions from Natural Gas are reported as there is very little Natural Gas used in our community. Fugitive emissions from vehicle refrigerants are included as are fugitive emissions from the Golf Club sceptic system and the Village's sewer plant (see Waste Water above).

Employee Commute

Employees working **in 2018** for the Village Department of Public Works and office staff were surveyed in 2021. Police personal had changed so radically that it was not possible to obtain information for 2018, however, information for 2021 was collected but is not included in this report. VMT for the surveyed employees and their vehicle models and mpg were used to generate emissions data.