TOWN OF WOODSTOCK
CLIMATE SMART TASK FORCE

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Application for 16 Points January 16, 2021

GHG Inventory for 2019
Town of Woodstock Government Operations
Local Government Operations Protocol (LGOP)
3rd Revision

Introduction

Thank you for recognizing Woodstock's efforts in achieving carbon neutrality. The town is proud of its accomplishments. It was Al Gore's 2006 film, *An Inconvenient Truth*, that inspired the Woodstock Environmental Commission to inaugurate a net-zero carbon initiative to achieve carbon neutrality. The film portrayed that increased carbon dioxide emissions from the burning of fossil fuels is driving global warming, and Woodstock wanted to do its part by reducing its emissions. On March 13, 2007, the Woodstock Town Board adopted Resolution 103-2007, Declaring Woodstock a Carbon Neutral Community, and establishing an objective of "no net emission of carbon dioxide and other greenhouse gases by the end of 2017."

Woodstock achieved carbon neutrally in 2015, and The New York State Association of Conservation Commissions, at its 2017 annual meeting, conferred an Environmental Project Award on Woodstock for its carbon neutral initiative.

Woodstock's net-zero carbon initiative preceded by two years DEC's launch of the Climate Smart Communities program[1] and Governor Paterson's Executive Order No. 24,[2] "Establishing a Goal to Reduce Greenhouse Gas Emissions Eighty Percent by the Year 2050 and Preparing a Climate Action Plan." On November 10, 2010, Governor Paterson released, as required by Executive Order No, 24, a preliminary New York State Climate Action Plan.

In 2009, the Environmental Commission released the Woodstock Green Guide, a community resource to complement the town's carbon neutral initiative. The resources and topics contained in

[1] Press Release, "NYS DEC Launches Climate Smart Communities Initiative," NYS DEC, February 18, 2009
[2] Governor David Paterson, Executive Order No. 24, "Establishing a Goal to Reduce Greenhouse Gas Emissions Eighty Percent by the Year 2050 and Preparing a Climate Action Plan," August 6, 2009, New York Codes, Rules and Regulations,

the Guide illustrated the holistic nature of the initiative and suggested actions that would contribute to carbon neutrality. The Green Guide was the foundation document for the town's climate actions during the first years of the carbon neutral initiative, and it wasn't until 2012 that it became necessary to document the town's carbon emissions.

750 KW Solar Array Proposal

In 2012, the Town Board considered a proposal for a 750 KW solar array that was sized to satisfy all the town government's electricity requirements. As it was explained, "Not only would this solar array save the planet, but it will save the town money. This is something the town can't afford not to do. It's an obligation to our grandchildren and future generations."

Fortunately the Town Board didn't understand how much electricity the town used, what this electricity cost, or the GHG emissions associated with electricity. While investigating these questions, the board learned there was a lot about solar energy it didn't understand: net metering, remote net metering, volumetric crediting, monetary crediting, behind the meter, demand charges, delivery charges, supply charges, basic service charges, capacity factors, etc.

Pursuing these questions resulted in the town's first inventory of carbon dioxide emissions from governmental operations. Beginning with 2011, complete and accurate records of the town's use and cost of fossil fuels and electricity have been compiled. Yearly reports on the town's progress towards carbon neutrality were submitted to the town board and released to the public. These reports were the basis for Woodstock's first submission to Climate Smart's PE2 Action: Government Operations GHG Inventory.

Version 2, Climate Smart Communities Program

On April 22, 2014, Governor Andrew Cuomo announced a revised and updated Climate Smart Communities Program that introduced the bronze, silver, and gold award levels [3] along with a three hundred page Certification Manual that described the actions climate smart communities could take, the standards they must meet, and the procedures for submitting documentation for certification at the bronze, silver, or gold award levels.

The actions taken by the town to achieve carbon neutrality seemed to parallel DEC's Climate Smart Communities program, and the town was encouraged to apply for recognition. On June 21, 2016, Woodstock Town Board Resolution 150-2016 adopted the New York State Climate Smart Communities Pledge, and on October 15, 2019, "Woodstock Supervisor McKenna established the Woodstock Climate Smart Community Task Force, appointed the Environmental Commission as members, and charged the task force to develop a comprehensive approach to reducing greenhouse gas emissions and increase energy efficiencies, as well as related topics."

Woodstock submitted its first application for the April 3, 2020 CSC certification cycle.

[3] Press Release, "Governor Cuomo Announces Climate Smart Communities Certification Program," Pressroom, Office of the Governor, New York State, April 22, 2014

Woodstock Carbon Neutral Reports

The GHG inventory documented in this report is the fourth version of Woodstock's 2019 emissions inventory, and it is intended to be in strict compliance with the Local Government Operations Protocol (LGOP) for documenting GHG emissions. [4]

Beginning with 2011, yearly reports about Woodstock's progress on achieving carbon neutrality have been issued. In addition to carbon dioxide emissions, the reports included the full range of actions related to the town government's energy usage. Issues concerning construction, problems encountered, new opportunities, programs and suggestions, etc. were included. The reports reflected the year's accomplishments, problems, and opportunities, and recommended actions for the following year. The annual report is the foundation document for the town's climate action plan.

First CSC Submission Rejected

The GHG emissions documented in the town's annual carbon neutral reports were extracted, reformatted, and submitted for PE2 Action: Government Operations GHG Inventory. DEC rejected Woodstock's submission.

The reviewer noted that Woodstock's reports are not conventional government operation GHG inventory (GHGI) reports. Although the report included charts of yearly carbon dioxide emissions, numbers and units of measure, such as metric tons, million metric tons, CO2 equivalents, joules, BTUs, etc., were avoided because the town's decision makers and volunteers generally lack a strong background in chemistry.

The DEC reviewer suggested that the data supporting Woodstock's carbon neutrality effort may not align with CSC requirements. Woodstock tracked only carbon dioxide, not other GHGs, with an understanding that by reducing the use of fossil fuels, all GHGs emissions would be diminished. DEC insisted that methane and nitrous oxide emissions needed to be reported, along with an estimate of carbon dioxide equivalent.

The reviewer found no evidence of LGOP in Woodstock's submission. The California Air Resources Board (ARB) issued a 237 page document defining the Local Government Operations Protocol (LGOP), which is designed to provide a standardized set of guidelines for local governments to quantify and report GHG emissions. The Climate Smart Communities Program requires that local government report GHG emissions in conformance with LGOP.

Changing tracking systems is highly disruptive. Since 2011, Woodstock has been building a detailed database of energy consumption and costs that allows year to year comparisons of the town's progress on achieving its climate goals. Woodstock's goal is to reduce fuel consumption and costs, and there's a great advantage to use a tracking system based on the town's financial reporting system that provides yearly fuel costs and consumption data in a consistent and auditable format.

The reviewer also questioned why the reports provided by Woodstock didn't mention GHGs from landfills, waste water treatment, and refrigerants.

[4] California Air Resources Board, "Local Government Operations Protocol for the Quantification and Reporting of Greenhouse Gas Emissions Inventories," Version 1.1, May 2010

Second CSC Submission

The purpose of the second submission was to align Woodstock's GHG inventory with DEC practice and LGOP by including the component greenhouse gas emissions: carbon dioxide, methane, and nitrous oxide, and to calculate the CO2e effective emissions. The procedure followed the guidelines issued by the California Air Resources Board. Woodstock's second CSC submission was accepted and supported Woodstock achieving Bronze level certification.

Third CSC Submission

This document is Woodstock third submission under PE2 Action: Government Operations GHG Inventory. The purpose of this submission is to present Woodstock's GHG inventory in strict conformance with LGOP.

The LGO Protocol is an unprecedented collaboration between ICLEI, the California Air Resources Board, the California Climate Action Registry, and The Climate Registry. The leading organizations in local GHG accounting collaborated on a single protocol, which is now the official standard for all local governments that wish to prepare and report GHG emissions. The LGO Protocol was formally approved by the boards of ICLEI USA, the California Climate Action Registry and the California Air Resources Board. Woodstock has about ten years of data detailing the use of fossil fuels and electricity in government operations, and it's necessary to recalibrate all the emissions estimates to be in conformance with LGOP.

New York's CSC program recommends that inventories adhere to ICLEI's US Community Protocol for Accounting and Reporting of Greenhouse Gas Emissions (US Community Protocol).[5] This national standard advises communities to include a variety of direct and indirect sources they can control or influence with local and regional policy. Woodstock's energy usage data extends back to 2011, the first year LGOP would apply and allow recalibration of Woodstock's historical usage.

Local Government Operations Protocol (LGOP)

The Local Government Operations Protocol (Protocol) provides standardized guidelines for local governments to quantify and report GHG emissions. The Protocol provides the principles, approach, methodology, and procedures to develop a local government operations GHG emissions inventory. By following the LGO Protocol, local governments can be confident that their work will adhere to the latest in GHG accounting, and that their efforts will be compatible with programs of the collaborating partners and with other entities that adopt the LGO Protocol. ICLEI adopted the LGO Protocol as the basis for its Five Milestones for Climate Mitigation.[6] The objective of this protocol is to provide a consistent set of methodologies for US governmental inventories to facilitate benchmarking between local governments as well as completing the Five Milestones for Climate Protection.

[5] Climate Action Associates LLC, *New York Community and Regional GHG Inventory Guidance*, Version 1, September 2015, Available at https://climatesmart.ny.gov/fileadmin/csc/documents/GHG_Inventories/ghgguide.pdf

[6] The proven Five Milestones framework offers a systematic approach for analyzing baseline greenhouse gas emissions, developing an emissions reduction target, developing and implementing a climate action plan, and monitoring emissions reduction progress. Available at https://icleiusa.org/programs/emissions-management/5-milestones/

GHG Emission Scopes

To account for direct and indirect emissions, and to provide transparency and a guiding framework for the inventory tool, GHG estimates are categorized according to three scopes. The following scopes are defined by the Local Government Operations Protocol:

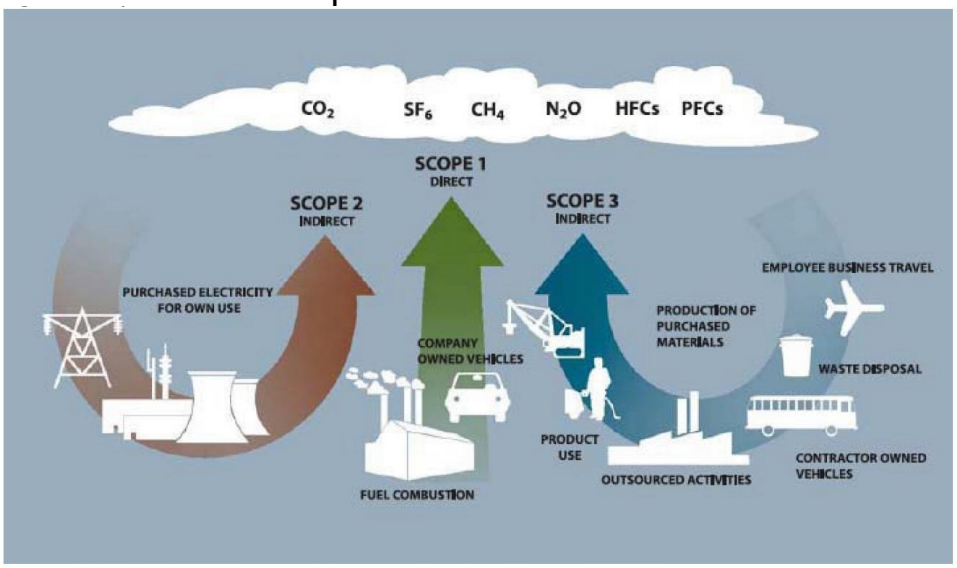
Scope 1: All direct GHG emissions (with the exception of direct CO2 emissions from biogenic sources).

Scope 2: Indirect GHG emission associated with the use of purchased or acquired electricity, steam, heating, or cooling.

Scope 3: All other indirect emissions not covered in Scope 2, such as emissions resulting from the extraction and production of purchased materials and fuels, transport-related activities in vehicles not owned or controlled by the reporting entity (e.g., employee commuting and business travel), outsourced activities, waste disposal, etc.

Under the LGOP and New York's CSC program, accounting for Scope 3 emissions is optional. Woodstock will not include Scope 3 emissions in its reports.

Scope of GHG Emissions



Source: *WRI/WBCSD GHG protocol Corporate Standard, Chapter 4 (2004).*

Scope 1: Sources of Direct Emissions

Direct GHG emissions are emissions from sources within the local government's organizational boundaries that the local government owns or controls. These emissions are further subdivided into emissions from four separate types of sources:

- **Stationary combustion** to produce electricity, steam, heat or power using equipment in a fixed location (found in most local government sectors);
- **Mobile combustion** means emissions from the transportation of materials, products, waste, and employees resulting from the combustion of fuels in company owned or controlled mobile combustion sources (e.g., cars, trucks, buses, trains, airplanes, ships, etc.).

- **Process emissions** from physical or chemical processing, other than fuel combustion (e.g., from the manufacturing of cement, aluminum, adipic acid, ammonia, etc.); and
- **Fugitive emissions** that are not physically controlled but result from intentional or unintentional releases, commonly arising from the production, processing, transmission, storage, and use of fuels and other substances, often through joints, seals, packing, gaskets, etc. (e.g., I-IFC5 from refrigeration leaks, SF6 from electrical power distributors, and CH4 from solid waste landfills).

Scope 2: Indirect Emissions (Electricity)

Scope 2 is a special category of indirect emissions and refers only to indirect emissions associated with the consumption of purchased or acquired electricity, steam, heating, or cooling. Indirect GHG emissions are emissions that are a consequence of activities that take place within the organizational boundaries of the reporting entity, but that occur at sources owned or controlled by another entity. Scope 2 emissions physically occur at the facility where electricity is generated. Emissions that occur at a power plant as a result of electricity used by a local government's administrative buildings represent the local government's indirect emissions.

Some local governments also choose to purchase green power or renewable energy certificates (RECS). According to section 6.2.4 of the LGOP, a local government "may not deduct these purchases from your Scope 2 emissions because doing so would constitute double counting. This is because the renewable energy portion of a utility's power supply is already accounted for in the region's eGRID factor." The LGOP encourages local governments to disclose information about these activities in their inventory report, but not to include them in the calculations as this would lead to double counting.

Scope 3 Emissions

In addition to the Scope 1 and 2 emission sources, a number of additional emission sources of potential policy relevance to local government operations can be measured and reported. These include emission sources related to local government operations, but for which local governments do not have financial or operational control.

Scope 3 emissions include all other indirect emissions not covered in Scope 2, such as emissions resulting from the extraction and production of purchased materials and fuels, transport-related activities in vehicles not owned or controlled by the local government (e.g., employee commuting and business travel), outsourced activities, waste disposal, etc.

Government Sectors

Together the three scopes provide a comprehensive accounting framework for managing and reducing direct and indirect emissions. Along with scopes, emissions are also categorized into local government sectors under this Protocol. The local government sectors are:

- Buildings and other facilities
- Streetlights and traffic signals
- Water delivery facilities
- Port facilities
- Airport facilities
- Vehicle fleet

- Transit fleet
- Power generation facilities
- Solid waste facilities
- Wastewater facilities
- Other process and fugitive emissions

The local government sectors are meant to create a framework that is based on internationally recognized GHG accounting terms (i.e., Scope 1, Scope 2, stationary combustion, mobile combustion, etc.) and is policy relevant to local governments.

Operational Control

LGOP encourages local governments to utilize operational control when defining their organizational boundary because it most accurately represents the emission sources that local governments can influence and have the authority to introduce and implement operating policies Using the operational control approach, a local government accounts for 100 percent of emissions from operations over which it has operational control.

Report to the Office of the NY State Comptroller

New York government entities are required to file a yearly financial report with the Office of the State Comptroller. Pursuant to Section 21, Subdivision 10A of Town Law, the Supervisor shall submit to the Town Board, the Town Clerk and the New York State Comptroller within sixty days after the close of the fiscal year a copy of the Annual Report, as required by law, and the Town Clerk shall publish within ten days in the official newspapers the fact that such annual report is available for inspection in the Town Clerk's office.

TOWN OF Woodstock
Energy Costs and Consumption
For the Fiscal Year Ending 2019

Energy Type	Total Expenditures	Total Volume	Units Of Measure	Alternative Units Of Measure
Gasoline	$39,991	20,390	gallons	
Diesel Fuel	$49,396	23,555	gallons	
Fuel Oil	$5,985	2,814	gallons	
Natural Gas			cubic feet	
Electricity	$121,884	808,484	kilowatt-hours	
Coal			tons	
Propane	$5,870	4,786	gallons	

Table showing energy consumption and costs from the town's annual financial report for the fiscal year 2019. The town's carbon emissions are calculated based on these quantities.

Method of Calculation

Woodstock began systematically tracking its carbon emissions in 2011 using a four part process, which is briefly discussed below.

1) Woodstock's GHG tracking system is based on energy use and cost data required for the yearly financial report to the Office of the NY State Comptroller. The energy consumption and cost report documents all of Woodstock's Scope 1 and Scope 2 GHG sources.

2) Carbon emissions for fossil fuel usage are calculated using the default emission coefficients published by the California Air Resources Board, "Local Government Operations Protocol for the Quantification and Reporting of Greenhouse Gas Emissions Inventories," Version 1.1, May 2010.

Appendix G Default Emissions Factors
Local Government Operations Protocal

		Emission Factor kg CO2/Gallon	Methane kg/gallon	Nitrous Oxide kg/gallon
Stationary Combustion	Distillate Fuel Oil #2 (Heating Fuel)	10.21	0.0015	0.0001
	Propane	5.59	0.0001	0.0001
Mobile Combustion	Gasoline	8.78		
	Distillate Fuel Oil #2 (Diesel)	10.21		
GWP		1	21	310

3) Carbon emissions for the town's electrical usage are calculated using the EPA's Power Profiler and emission values from eGRID for the Upper New York Region, adjusted for the contribution of local hydroelectric generation. The eGRID reports contain the GHG emissions for grid generated electricity. There's no need to calculate CO2e for electricity because it's included in eGRID.

eGRID Emissions by Version

	CO2 lbs/MWh	Methane lbs/GWh	Nitrous Oxide lbs/GWH	CO2e lbs/MWh	Fiscal Year
eGRID2018	253.1	18.0	2.0	253.9	2019
eGRID2016	294.7	21.0	3.0	295.9	2018
eGRID2014V2	365.7	30.7	4.1	367.6	2017
eGRID2014	377.2	32.3	4.4	379.2	2016
eGRID2012	408.80	15.59	3.83	410.31	2015
eGRID2010	545.79	16.30	7.24	548.37	2014
eGRID2009	497.92	15.94	6.77	500.35	2013
eGRID2009 1	497.92	15.94	6.77	500.35	2012
eGRID2009 2	497.92	15.94	6.77	500.35	2011

4) A Quantrix model is then used to summarize the town's carbon dioxide emissions, measured in metric tons. An Excel spreadsheet is used for graphics.

Summary of GHG Emissions, Woodstock Government Operations, 2019

GHG Emissions Summary
Local Government Operations Protocol
Woodstock, NY
Year:'2019'
Sector:Woodstock Totals

			Volume	Metric Tons CO2e equivalents	Metric Tons CO2	Methane Kgm	Nitrous Oxide Kgm
Scope 1	Stationary Combustion	Fuel Oil (gals)	2,814	28.8	28.6	4.2212	0.2814
		Propane (gals)	4,786	27.7	27.6	0.6701	0.4786
	Mobile Combustion	Gasoline (gals)	20,390	181.3	181.3	0.0000	0.0000
		Diesel Fuel (gals)	23,555	239.3	239.3	0.0000	0.0000
Scope 2	Grid Electricity (kWh)		764,484	88.0	87.8	6.3822	0.7091
	Hydro Electricity (kWh)		44,000	0.0	0.0	0.0000	0.0000
	Sum of Scope 2 (Electricity)		808,484	88.0	87.8	6.3822	0.7091
Total by Year				565.2	564.5	11.2734	1.4692

Fugitive Emissions

Possible sources of fugitive emissions in Woodstock include:

Decommissioned Woodstock Landfill: Landfill gas (LFG) is a natural byproduct of the decomposition of organic material in landfills. LFG is composed of roughly 50 percent methane (the primary component of natural gas), 50 percent carbon dioxide (CO2) and a small amount of non-methane organic compounds. When municipal waste is first deposited in a landfill, it undergoes an aerobic (with oxygen) decomposition stage when little methane is generated. Then, typically within less than one year, anaerobic conditions are established and methane-producing bacteria begin to decompose the waste and generate methane. Although production of these gases generally reaches a peak in five to seven years, a landfill can continue to produce gases for more than 50 years.

Biosolids are used to create a special topsoil to cover decommissioned landfills. This topsoil contains microorganisms that convert methane into carbon dioxide, a much less potent greenhouse gas. This can reduce greenhouse gas emissions from landfills by as much as 95%. Woodstock's landfill was properly capped and closed about twenty years ago, and does not represented a significant source of fugitive emissions.

Waste Water Treatment Facility: Chapter 10 of LGOP describes the fugitive emissions related to waste water treatment. Woodstock has neither the technical capability nor desire to devote resources to estimate methane and nitrous oxide emissions from the waste water treatment facility.

Town Owned Septic Tanks: The Woodstock On-Site Sewer Districts contain about 750 septic tanks that are the town's responsibility. Chapter 10 of LGOP describes the fugitive emissions related to septic tanks. Woodstock has neither the technical capability nor desire to devote resources to estimate methane and nitrous oxide emissions from the septic tanks.

Refrigerants: The town has several sources of possible fugitive emission of refrigerants. Most of the major town building use either ground-source geothermal or air-source heat pumps for heating and cooling. These are relatively new systems, and have scheduled routine maintenance to keep good working order and to make seasonal adjustments. All existing window air conditioners are scheduled for removal. The police vehicles are equipped with air conditional, but these vehicles are replaced on a five year rotation. The town does not consider it emits measurable quantities of refrigerants.

Chapter 13 Local Government Operations Standard Inventory Report

A standardized form was developed that mirrors the guidance in the Protocol and provides a common mechanism for reporting emissions quantified under this protocol. The Standard Inventory Report is intended for use by all local governments utilizing this protocol.

Emissions should be reported by sector of local government operations. The standard report includes eleven sectors which are defined below. LGOP notes that not all local governments provide the same services and will have zero emissions to report in some sectors. Those sections of the report should be marked with a "not applicable" (N/A), so it is clear that there are no emissions in that sector.

Woodstock does not have airport or marine port facilities, and has left them off of the report rather than marking them N/A. Woodstock does not operate a transit fleet or a power generating station and has left these sectors off of the report.

13.2 Report Template
Local Government Operations Standard Inventory Report

The attached Woodstock GHG emission reports follow the template described in Chapter 13 of LGOP.

GHG Emissions Summary
Local Government Operations Protocol
Woodstock, NY
Year:'2019'

				Expenditures	Volume	Metric Tons CO2e equivalent	Metric Tons CO2	Methane Kgm	Nitrous Oxide Kgm	Methane CO2e	Nitrous Oxide CO2e
Buildings & Other Facilities	Scope 1	Stationary Combustion	Fuel Oil (gals)	$2,938	1,384	14.2	14.1	2.0762	0.1384	0.0436	0.0429
			Propane (gals)	$5,837	4,758	26.8	26.6	0.6661	0.4758	0.0140	0.1475
		Mobile Combustion	Gasoline (gals)			0.0					
			Diesel Fuel (gals)			0.0					
			Kerosene (gals)			0.0					
	Scope 2	Grid Electricity (kWh)			326,984	37.7	37.5	2.7298	0.3033		
		Hydro Electricity (kWh)			44,000						
		Sum of Scope 2 (Electricity)	Σ	$51,909	370,984	37.7	37.5	2.7298	0.3033		
	Total by Year		Σ	$60,685		78.6	78.3	5.4721	0.9175		
Water District	Scope 1	Stationary Combustion	Fuel Oil (gals)			0.0	0.0	0.0000	0.0000	0.0000	0.0000
			Propane (gals)	$32	28	0.2	0.2	0.0039	0.0028	0.0001	0.0009
		Mobile Combustion	Gasoline (gals)			0.0					
			Diesel Fuel (gals)			0.0					
			Kerosene (gals)			0.0					
	Scope 2	Grid Electricity (kWh)			136,341	15.7	15.7	1.1382	0.1265		
		Hydro Electricity (kWh)									
		Sum of Scope 2 (Electricity)	Σ	$16,861	136,341	15.7	15.7	1.1382	0.1265		
	Total by Year		Σ	$16,893		15.9	15.8	1.1421	0.1293		
Waste Water Treatment Facility	Scope 1	Stationary Combustion	Fuel Oil (gals)	$3,047	1,430	14.7	14.6	2.1450	0.1430	0.0450	0.0443
			Propane (gals)			0.0	0.0	0.0000	0.0000	0.0000	0.0000
		Mobile Combustion	Gasoline (gals)			0.0					
			Diesel Fuel (gals)			0.0					
			Kerosene (gals)			0.0					
	Scope 2	Grid Electricity (kWh)			241,400	27.8	27.7	2.0153	0.2239		
		Hydro Electricity (kWh)									
		Sum of Scope 2 (Electricity)	Σ	$22,665	241,400	27.8	27.7	2.0153	0.2239		
	Total by Year		Σ	$25,712		42.5	42.3	4.1603	0.3669		
Lighting Districts	Scope 1	Stationary Combustion	Fuel Oil (gals)			0.0	0.0	0.0000	0.0000	0.0000	0.0000
			Propane (gals)			0.0	0.0	0.0000	0.0000	0.0000	0.0000
		Mobile Combustion	Gasoline (gals)			0.0					
			Diesel Fuel (gals)			0.0					
			Kerosene (gals)			0.0					
	Scope 2	Grid Electricity (kWh)			59,759	6.9	6.9	0.4989	0.0554		
		Hydro Electricity (kWh)									
		Sum of Scope 2 (Electricity)	Σ	$29,749	59,759	6.9	6.9	0.4989	0.0554		
	Total by Year		Σ	$29,749		6.9	6.9	0.4989	0.0554		

January 12, 2021

GHG Emissions Summary
Local Government Operations Protocol
Woodstock, NY
Year:'2019'

					Expenditures	Volume	Metric Tons CO2e equivalent	Metric Tons CO2	Methane Kgm	Nitrous Oxide Kgm	Methane CO2e	Nitrous Oxide CO2e
Vehicles	Scope 1	Stationary Combustion	Fuel Oil (gals)				0.0	0.0	0.0000	0.0000	0.0000	0.0000
			Propane (gals)				0.0	0.0	0.0000	0.0000	0.0000	0.0000
		Mobile Combustion	Gasoline (gals)		$39,991	20,390	179.0	179.0				
			Diesel Fuel (gals)		$49,396	23,555	240.5	240.5				
			Kerosene (gals)				0.0	0.0				
	Scope 2	Grid Electricity (kWh)					0.0	0.0	0.0000	0.0000		
		Hydro Electricity (kWh)										
		Sum of Scope 2 (Electricity)		M		0	0.0	0.0	0.0000	0.0000		
	Total by Year			M	$89,388		419.5	419.5	0.0000	0.0000		
Woodstock Totals	Scope 1	Stationary Combustion	Fuel Oil (gals)		$5,985	2,814	28.9	28.7	4.2212	0.2814	0.0886	0.0872
			Propane (gals)		$5,870	4,786	26.9	26.8	0.6701	0.4786	0.0141	0.1484
		Mobile Combustion	Gasoline (gals)		$39,991	20,390	179.0	179.0				
			Diesel Fuel (gals)		$49,396	23,555	240.5	240.5				
			Kerosene (gals)				0.0	0.0				
	Scope 2	Grid Electricity (kWh)				764,484	88.0	87.8	6.3822	0.7091		
		Hydro Electricity (kWh)				44,000	0.0	0.0				
		Sum of Scope 2 (Electricity)		M	$121,184	808,484	88.0	87.8	6.3822	0.7091		
	Total by Year			M	$222,426		563.4	562.8	11.2734	1.4692		

January 12, 2021

Appendix – LGOP Methods of Calculation

The Local Government Operations Protocol (LGOP)[1] provides many choices for calculation of GHG emissions; a recommend approach and several alternative approaches. In all cases, Woodstock used LGOP's recommend approach which is based on hard data about electricity usage and fossil fuel consumption. Described below are described the methods used by Woodstock to calculate GHG emissions.

Scope 1 – Stationary Combustion
LGOP Chapter 6.1

The recommended approach for calculating emissions from stationary combustion is to use activity data and default emission factors by fuel type and the following six step procedure:

1. Determine annual consumption of each fuel combusted at your facilities;
2. Determine the appropriate CO_2 emission factors for each fuel;
3. Determine the appropriate CH_4 and N_2O emission factors for each fuel;
4. Calculate each fuel's CO_2 emissions;
5. Calculate each fuel's CH_4 and N_2O emissions; and
6. Convert CH_4 and N_2O emissions to CO_2 equivalent and determine total emissions.

Step 1: Annual Consumption of Each Fuel Combusted

Woodstock uses a tracking system that uses the data collected for the town's yearly financial report to the Office of the State Comptroller. The "Energy Consumption and Cost Report" documents all of Woodstock's Scope 1 & 2 GHG sources. Fuel usage and cost by building and location is compiled by the town's accounting system. Woodstock uses the LGOP recommended activity data and emission factors in its calculations of GHG emissions for stationary combustion.

	RECOMMENDED	ALTERNATE
ACTIVITY DATA	Known fuel use ☑[12] (meter readings/utility bills)	Proxy year data
		Fuel estimates based on comparable facilities and square footage

	RECOMMENDED	ALTERNATE
EMISSION FACTOR	Default by fuel type ☑	N/A

Step 2: Select the Appropriate CO_2 Emission Factor for Each Fuel

The Protocol provides default emission factors for a wide variety of fuels in Appendix G, Table G.1. Emission factors are provided in units of CO_2 per unit energy and CO_2 per unit mass or volume. Woodstock uses the emission factors provided in Appendix G, Table G.1.

[1] California Air Resources Board, "Local Government Operations Protocol for the Quantification and Reporting of Greenhouse Gas Emissions Inventories," Version 1.1, May 2010

Step 3: Select the Appropriate CH_4 and N_2O Emission Factors for Each Fuel

Estimating CH_4 and N_2O emissions depend not only on fuel characteristics, but also on technology type and combustion characteristics, usage of pollution control equipment, and maintenance and operational practices. Due to this complexity, estimates of CH_4 and N_2O emissions from stationary sources are much more uncertain than estimates of CO_2 emissions, and CH_4 and N_2O also account for much smaller amounts of emissions from stationary combustion than CO_2. Appendix A, Tables G.3 and G.4 provide default emission factors by fuel type and sector. [2,3]

Appendix G Default Emissions Factors
Local Government Operations Protocal

		Emission Factor kg CO2/Gallon	Methane kg/gallon	Nitrous Oxide kg/gallon
Stationary Combustion	Distillate Fuel Oil #2 (Heating Fuel)	10.21	0.0015	0.0001
	Propane	5.59	0.0001	0.0001
Mobile Combustion	Gasoline	8.78		
	Distillate Fuel Oil #2 (Diesel)	10.21		
	Kerosene	10.15		
GWP		1	21	310

Step 4: Calculate Each Fuel's CO_2 Emissions

To determine CO_2 emissions from combustion, multiply fuel use from Step 1 by the CO_2 emission factor from Step 2, and then convert kilograms to metric tons.

Step 5: Calculate Each Fuel's CH_4 and N_2O Emissions

To determine CH_4 emissions from combustion, multiply fuel use from Step 1 by the CH_4 emission factor from Step 3, and then convert kilograms to metric tons. Repeat the procedure to calculate total emissions of N_2O.

Equation 6.7	Converting to CO_2e and Determining Total Emissions
CO_2 Emissions (metric tons CO_2e) =	CO_2 Emissions (metric tons) × 1 (GWP)
CH_4 Emissions (metric tons CO_2e) =	CH_4 Emissions (metric tons) × 21 (GWP)
N_2O Emissions (metric tons CO_2e) =	N_2O Emissions (metric tons) × 310 (GWP)
Total Emissions (metric tons CO_2e) =	$CO_2 + CH_4 + N_2O$ (metric tons CO_2e)

Step 6: Convert CH_4 and N_2O Emissions to Units of CO_2 equivalent

The IPCC global warming potential factors provided in Equation 6.7 (and Appendix E) [4] are used to convert CH_4 and N_2O emissions to units of CO_2 equivalent. The sum of emissions for all three gases determines the total GHG emissions from stationary combustion.

[2] Ibid. Page 203
[3] Ibid. Page 206
[4] Ibid. Page 198

Scope 1 – Stationary Combustion
GHG Emissions by Fuel

Table of calculated GHG emissions from stationary combustion

Yearly Data for CO_2, CH_4, N_2O, CO_2e

				Volume	Metric Tons CO2e equivalents	Metric Tons CO2	Methane Kgm	Nitrous Oxide Kgm	Methane CO2e	Nitrous Oxide CO2e
2011	Scope 1	Stationary Combustion	Fuel Oil (gals)	6,767	69.2	68.8	10.1505	0.6767	0.2132	0.2098
			Propane (gals)	4,064	23.5	23.4	0.5689	0.4064	0.0119	0.1260
2012	Scope 1	Stationary Combustion	Fuel Oil (gals)	4,691	48.0	47.7	7.0365	0.4691	0.1478	0.1454
			Propane (gals)	3,283	19.0	18.9	0.4596	0.3283	0.0097	0.1018
2013	Scope 1	Stationary Combustion	Fuel Oil (gals)	5,024	51.4	51.0	7.5360	0.5024	0.1583	0.1557
			Propane (gals)	4,704	27.3	27.1	0.6586	0.4704	0.0138	0.1458
2014	Scope 1	Stationary Combustion	Fuel Oil (gals)	3,504	35.8	35.6	5.2560	0.3504	0.1104	0.1086
			Propane (gals)	5,733	33.2	33.0	0.8027	0.5733	0.0169	0.1777
2015	Scope 1	Stationary Combustion	Fuel Oil (gals)	2,631	26.9	26.7	3.9465	0.2631	0.0829	0.0816
			Propane (gals)	5,592	32.4	32.2	0.7829	0.5592	0.0164	0.1734
2016	Scope 1	Stationary Combustion	Fuel Oil (gals)	2,454	25.1	24.9	3.6810	0.2454	0.0773	0.0761
			Propane (gals)	4,808	27.9	27.7	0.6731	0.4808	0.0141	0.1490
2017	Scope 1	Stationary Combustion	Fuel Oil (gals)	2,500	25.6	25.4	3.7500	0.2500	0.0788	0.0775
			Propane (gals)	4,915	28.5	28.3	0.6881	0.4915	0.0145	0.1524
2018	Scope 1	Stationary Combustion	Fuel Oil (gals)	2,762	28.2	28.1	4.1430	0.2762	0.0870	0.0856
			Propane (gals)	5,825	33.8	33.6	0.8155	0.5825	0.0171	0.1806
2019	Scope 1	Stationary Combustion	Fuel Oil (gals)	2,814	28.8	28.6	4.2212	0.2814	0.0886	0.0872
			Propane (gals)	4,786	27.7	27.6	0.6701	0.4786	0.0141	0.1484
2020	Scope 1	Stationary Combustion	Fuel Oil (gals)		0.0	0.0	0.0000	0.0000	0.0000	0.0000
			Propane (gals)		0.0	0.0	0.0000	0.0000	0.0000	0.0000

Scope 2 – Indirect Emissions (Electricity)
LGOP Chapter 6.2

LGOP recommends using actual meter readings to determine electricity consumption, and to use the default emission factors taken from the subregion eGRID reports. Beginning in 2011, Woodstock has collected the Central Hudson utility bills for all its meters and lighting districts, which provides a complete, ten year record of electricity use for every meter and facility. Woodstock used the specific emission factors from the eGRID reports for the Upstate New York Subregion (UPNY).

To calculate Scope 2 emissions from electricity use, follow these three steps:

1. Determine your annual electricity use from each facility;
2. Select the appropriate emission factors that apply to the electricity used; and
3. Determine your total annual emissions in metric tons of carbon dioxide equivalent.

Step 1: Determine Annual Electricity Consumption

Reporting Scope 2 emissions from electricity consumption begins with determining annual electricity use at each facility. The preferred sources for determining annual electricity use are the monthly electric bills or electric meter records. Both sources provide the number of kilowatt hours (kWh) or megawatt hours (MWh) of electricity consumed.[5]

Woodstock created a database of all Central Hudson utility bills received since January 2011, providing detail kWh usage for every facility. The totals are checked yearly against Central Hudson's online records for consistency and accuracy.

	RECOMMENDED	ALTERNATE
ACTIVITY DATA	Known electricity use ☑ (metered readings/utility bills)	Estimated electricity use for leased space ☑
		Proxy year electricity use data
		Estimated electricity use based on comparable facilities and square footage ☑
		Installed wattage (streetlights only)

	RECOMMENDED	ALTERNATE
EMISSION FACTOR	Verified utility-specific emission factor ☑ -or- eGRID subregion default emission factor[13] ☑	Utility-specific emission factor

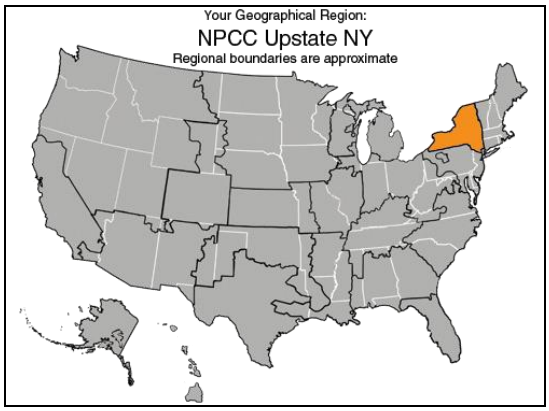
Step 2: Select Appropriate Emission Factors

The Emissions and Generation Resource Integrated Database (eGRID) is a comprehensive inventory of environmental attributes of electric power systems. As the primary source of data for the United States electric power sector, eGRID is based on all available data from all electricity generating

[5] Ibid. Pages 39-41

plants in the United States that provide power to the electric grid and report data to the U.S. government.

Electricity emission factors represent the amount of GHGs emitted per unit of electricity consumed. It is usually reported in units of pounds of GHG per kWh or MWh. There are two options for recommended electricity emission factors under this Protocol. Woodstock chose the second option and uses the eGRID emission factors for the Upstate New York Subregion.



The EPA's Emissions & Generation Resource Integrated Database (eGRID) documents carbon dioxide, methane, nitrogen oxides, sulfur dioxide, and nitrous oxide emissions from electric generation by geographic region.

eGRID Database – Upstate New York

The eGRID database is periodically updated to account for changes in the generation profile and fuel sources. Carbon dioxide emissions in upstate NY have been declining due to of the retirement of coal-fired power plants. Because of substantial hydroelectric and nuclear resources, EPA's Upstate NY sub-region has the lowest level of emissions from electric generation in the country.

There is a lag between when eGRID data is collected and when EPA makes it public. The following tables identify the eGRID version and the year its emission factors were used by Woodstock.

Emission Factors by eGRID Version for Upstate New York Subregion

	CO2 lbs/MWh	Methane lbs/GWh	Nitrous Oxide lbs/GWH	CO2e lbs/MWh
eGRID2018	253.1	18.0	2.0	253.9
eGRID2016	294.7	21.0	3.0	295.9
eGRID2014V2	365.7	30.7	4.1	367.6
eGRID2014	377.2	32.3	4.4	379.2
eGRID2012	408.80	15.59	3.83	410.31
eGRID2010	545.79	16.30	7.24	548.37
eGRID2009	497.92	15.94	6.77	500.35

Step 3: Determine Total Annual Emissions

To determine annual emissions, multiply annual electricity use (in MWh) from Step 1 by the emission factors for CO_2, CH_4, and N_2O from Step 2. There's no need to calculate the CO_2e emission factor because eGRID provides this factor directly.

Units for methane and nitrous oxide have been converted to kilograms to allow comparison with fossil fuel emissions. A check sum for electricity emissions was calculated to insure the LGOP protocol yields the same CO_2e amount as identified by the eGRID dataset.

Scope 2 – Electricity, GHG Emissions by Year

Yearly Data for CO_2, CH_4, N_2O, CO_2e from Electricity

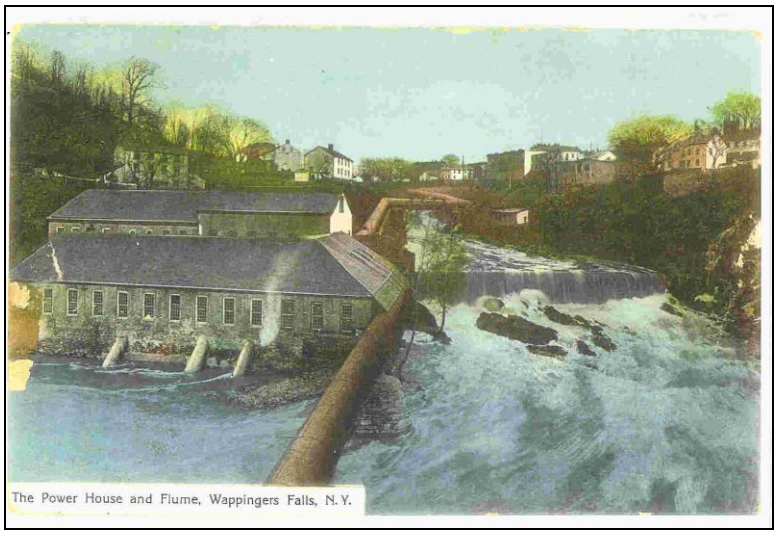
			Volume	Metric Tons CO2e equivalents	Metric Tons CO2	Methane Kgm	Nitrous Oxide Kgm
2011	Scope 2	Grid Electricity (kWh)	617,410	140.1	139.4	4.5645	1.9386
		Hydro Electricity (kWh)					
		Sum of Scope 2 (Electricity)	617,410	140.1	139.4	4.5645	1.9386
2012	Scope 2	Grid Electricity (kWh)	639,570	145.2	144.4	4.7283	2.0082
		Hydro Electricity (kWh)					
		Sum of Scope 2 (Electricity)	639,570	145.2	144.4	4.7283	2.0082
2013	Scope 2	Grid Electricity (kWh)	729,123	165.5	164.7	5.3904	2.2894
		Hydro Electricity (kWh)					
		Sum of Scope 2 (Electricity)	729,123	165.5	164.7	5.3904	2.2894
2014	Scope 2	Grid Electricity (kWh)	724,325	180.2	179.3	5.4759	2.4322
		Hydro Electricity (kWh)					
		Sum of Scope 2 (Electricity)	724,325	180.2	179.3	5.4759	2.4322
2015	Scope 2	Grid Electricity (kWh)	747,877	139.2	138.7	5.4076	1.3285
		Hydro Electricity (kWh)					
		Sum of Scope 2 (Electricity)	747,877	139.2	138.7	5.4076	1.3285
2016	Scope 2	Grid Electricity (kWh)	732,875	126.1	125.4	10.9800	1.4847
		Hydro Electricity (kWh)					
		Sum of Scope 2 (Electricity)	732,875	126.1	125.4	10.9800	1.4847
2017	Scope 2	Grid Electricity (kWh)	764,419	127.5	126.8	10.8843	1.4536
		Hydro Electricity (kWh)					
		Sum of Scope 2 (Electricity)	764,419	127.5	126.8	10.8843	1.4536
2018	Scope 2	Grid Electricity (kWh)	805,383	108.1	107.6	7.8443	1.1206
		Hydro Electricity (kWh)	18,500	0.0	0.0	0.0000	0.0000
		Sum of Scope 2 (Electricity)	823,883	108.1	107.6	7.8443	1.1206
2019	Scope 2	Grid Electricity (kWh)	764,484	88.0	87.8	6.3822	0.7091
		Hydro Electricity (kWh)	44,000	0.0	0.0	0.0000	0.0000
		Sum of Scope 2 (Electricity)	808,484	88.0	87.8	6.3822	0.7091
2020	Scope 2	Grid Electricity (kWh)		0.0	0.0	0.0000	0.0000
		Hydro Electricity (kWh)					
		Sum of Scope 2 (Electricity)	0	0.0	0.0	0.0000	0.0000

eGRID Version by Fiscal Year

Fiscal Year	eGRID Version	eGRID Release	**Upstate NY CO_2 lbs./MWh[6]**
2019	eGRID2018	9-Mar-20	**253.1**
2018	eGRID2016	15-Feb-18	**294.1**
2017	eGRID2014 version 2	27-Feb-17	**366**
2016	eGRID2014	13-Jan-17	**377**
2015	eGRID2012	8-Oct-15	**409**
2014	eGRID2010	24-Feb-14	**546**
2013	eGRID2009	10-May-12	**498**
2012	eGRID2009	10-May-12	**498**
2011	eGRID2009	10-May-12	**498**

Hydroelectric Power

Sarah & Harry Terbush, owners/operators of the Natural Power Group, Inc., consisting of the Wallkill Hydroelectric, Salisbury Mills Hydroelectric, and Wappingers Falls Hydroelectric plants, announced that their Central Hudson long term power purchase agreement will end in 2018 and they will be offering hydroelectric power directly to retail accounts under terms available for community generated electricity.



Wappingers Falls Hydroelectric Plant

A major advantage of this offering is that the hydroelectric generators are in place, currently operating, and can supply power without issues of financing or construction. Small hydroelectric plants up to 5MW of installed capacity that are free from exclusive utility contracts can sell power direct to retail customers through the CDG program.

[6] Environmental Protection Agency, "Power Profiler," Available at https://www.epa.gov/energy/power-profiler#/

Existing resources that do not qualify for Tier 1 under the Clean Energy Standard will not get the environmental value from the CDG program; however the other components in the stack (energy, capacity, DRV and LSRV) are available.[7] The Natural Power Group's hydroelectric plants do not qualify for Tier 1 RECs.

Natural Power Group, a Wallkill NY company is an early adopter of this new program, by currently enrolling subscribers for the Wallkill hydroelectric facility, which generates 2 million kWh annually. In 2018, the Woodstock Town Board signed contracts with the Natural Power Group (NPG) for power sourced from the Wappingers Falls and Wallkill hydroelectric generating facilities under the terms of Community Distributed Generation (CDG). Under these contracts, Woodstock will receive over 90% of its electric power for governmental usage from zero-carbon sources. It's expected that carbon dioxide emissions from town governmental operations will drop to a level 30% below 2011 by 2021.

Woodstock signed two contracts with the Natural Power Group, a Community Distributed Generator (CDG). The contract for the Wallkill plant was signed in May 2018 for 37,000 kWh, and then upgraded in 2019 to 44,000 kWh. A second contract for the Wappingers Falls plant was signed in December 2018 for 681,000 kWh. Combined, these two contracts account for over 90% of Woodstock's electricity usage.

Zero-Emission Hydroelectric Power

The table below summarizes the usage, source, and carbon dioxide emissions for Woodstock's electric supply.

kWh		2018	2019	2020 (est)
Woodstock Usage		823,883	808,484	810,000
Wallkill Hydro	(Note 1)	18,500	44,000	70,000
Wappinger Falls Hydro	(Note 2)			678,000
Total Hydroelectric		18,500	44,000	748,000
Central Hudson (Grid)	(Note 3)	805,383	764,484	62,000
Metric Tons CO2	(Note 4)	108	88	7

Note 1: Only six months of the contracted 37,000 kWh was delivered in 2018. Credit for the full 44,000 kWh contracted amount was received in 2019. To cover usage by the EV charging station at the Rock City Rd Restrooms in 2020, the town increased its Wallkill subscription to 70,000 kWh.
Note 2: Because of a rupture in the penstock at Wappingers Falls, no power was delivered in 2019.

Note 3: Amount of electricity sourced from the grid after deducting hydroelectric power.
Note 4: Hydroelectric power has zero carbon dioxide content. Power sourced from the grid in 2018 had a carbon dioxide content of 294.7 lbs./MWh, based on EPA's upstate New York region eGRID2016. In 2019, power sourced from the grid had a carbon dioxide content of 253.1 lbs./MWh.

Woodstock does not purchase "green power," "renewable power," or "renewable energy certificates" from an electric utility or an independent power provider. The contract with Natural Power Group is for kWh of hydroelectric generation. Because of their age, the hydroelectric plants do not qualify as renewable generators.

[7] Dana Hall, Attorney at Law, "Small Hydropower as a Community Distributed Generation Resource in New York State," March 20, 2018, Available at http://danahallfirm.com/small-hydropower-as-a-community-distributed-generation-resource-in-new-york-state/

Scope 1 – Mobile Combustion
LGOP Chapter 7.1

Emissions from mobile combustion can be estimated based on the vehicle's fuel use and miles traveled. CO2 emissions, which account for the majority of emissions from mobile sources, are directly related to the quantity of fuel combusted and thus can be calculated using fuel consumption data. Methane and nitrous oxide emissions are dependent on the emission control technologies employed in the vehicle and distance traveled.

Overwhelmingly, vehicles are responsible for most of Woodstock's GHG emissions, but vehicles offer a special challenge because their emissions are dependent on the effectiveness of the vehicles' emission control systems. Calculating emissions of methane and nitrous oxide requires data on vehicle characteristics that takes into account emission control technologies and vehicle miles traveled.

Because of this distinction, LGOP guidance on calculating CO2 is provided separately from guidance on calculating CH4 and N20. Woodstock does not have complete vehicle data to calculate methane and nitrous oxide emissions. This is especially true of highway trucks that use diesel fuel. Woodstock will follow the recommended approach that only considers CO2 emissions as described in LGOP Section 7.1 for mobile combustion emissions.

7.1.1 Mobile Combustion CO_2 Emissions

Below are the recommended and alternate activity data and emission factors for calculating Scope 1 CO2 emissions from mobile combustion. The following sections detail how to calculate emissions based on the activity data and emission factors. The recommended approach requires data on actual fuel consumption by fuel type and using national default emission factors for each fuel type.

	RECOMMENDED	ALTERNATE
ACTIVITY DATA	Known fuel use ☑	Fuel estimates based on detailed annual mileage and vehicle fuel economy ☑
		Fuel estimates based on annual mileage and vehicle fuel economy
		Fuel estimates based on dollars spent
		Proxy year fuel use data

	RECOMMENDED	ALTERNATE
EMISSION FACTOR	Default by fuel type (national) ☑	Published emission factor by fuel type (state- or region-specific)

Calculating CO2 emissions using this approach involves three steps:

1. Identify total annual fuel consumption by fuel type;
2. Determine the appropriate emission factor; and
3. Calculate total CO_2 emissions.

Step 1: Identify total annual fuel consumption by fuel type.

Woodstock collects and summarizes all receipts and purchases for fuel, and a complete and accurate record of fuel consumption. The two major fuels are gasoline and diesel.

Step 2: Determine the appropriate CO2 emission factor for each fuel.

Woodstock uses the Protocol recommended widely-accepted national averages as the emission factor of choice from Appendix G, Table G.11.

Appendix G Default Emissions Factors
Local Government Operations Protocal

		Emission Factor kg CO2/Gallon	Methane kg/gallon	Nitrous Oxide kg/gallon
Stationary Combustion	Distillate Fuel Oil #2 (Heating Fuel)	10.21	0.0015	0.0001
	Propane	5.59	0.0001	0.0001
Mobile Combustion	Gasoline	8.78		
	Distillate Fuel Oil #2 (Diesel)	10.21		
	Kerosene	10.15		
GWP		1	21	310

Step 3: Calculate total CO2 emissions and convert to metric tons

To determine CO2 emissions from mobile combustion, first multiply fuel use from Step 1 by the CO2 emission factor from Step 2, and then convert kilograms to metric tons. Repeat the calculation for each fuel type, then sum (see Equation 7.2).

The following table summarizes these calculations.

Equation 7.2	**Calculating CO_2 Emissions From Mobile Combustion**
Fuel A CO_2 Emissions (metric tons) = Fuel Consumed (gallons) × Emission Factor (kg CO_2/gallon) ÷ 1,000 (kg/metric ton)	
Fuel B CO_2 Emissions (metric tons) = Fuel Consumed (gallons) × Emission Factor (kg CO_2/gallon) ÷ 1,000 (kg/metric ton)	
Total CO_2 Emissions (metric tons) = CO_2 from Fuel A (metric tons) + CO_2 from Fuel B (metric tons) + … (metric tons)	

Scope 1 – Mobile Combustion, CO_2 Emissions by Fuel Yearly Data for CO2, CH4, N2O, CO2e

				Volume	Metric Tons CO2e equivalent	Metric Tons CO2	Methane Kgm	Nitrous Oxide Kgm
2011	Scope 1	Mobile Combustion	Gasoline (gals)	23,150	203.3	203.3		
			Diesel Fuel (gals)	23,500	239.9	239.9		
			Kerosene (gals)	882	8.9	8.9		
2012	Scope 1	Mobile Combustion	Gasoline (gals)	21,786	191.3	191.3		
			Diesel Fuel (gals)	22,258	227.3	227.3		
			Kerosene (gals)	359	3.6	3.6		
2013	Scope 1	Mobile Combustion	Gasoline (gals)	20,576	180.7	180.7		
			Diesel Fuel (gals)	23,176	236.6	236.6		
			Kerosene (gals)		0.0	0.0		
2014	Scope 1	Mobile Combustion	Gasoline (gals)	20,031	175.9	175.9		
			Diesel Fuel (gals)	23,739	242.4	242.4		
			Kerosene (gals)		0.0	0.0		
2015	Scope 1	Mobile Combustion	Gasoline (gals)	19,780	173.7	173.7		
			Diesel Fuel (gals)	23,891	243.9	243.9		
			Kerosene (gals)		0.0	0.0		
2016	Scope 1	Mobile Combustion	Gasoline (gals)	20,724	182.0	182.0		
			Diesel Fuel (gals)	22,193	226.6	226.6		
			Kerosene (gals)		0.0	0.0		
2017	Scope 1	Mobile Combustion	Gasoline (gals)	19,988	175.5	175.5		
			Diesel Fuel (gals)	22,520	229.9	229.9		
			Kerosene (gals)		0.0	0.0		
2018	Scope 1	Mobile Combustion	Gasoline (gals)	20,800	182.6	182.6		
			Diesel Fuel (gals)	24,845	253.7	253.7		
			Kerosene (gals)		0.0	0.0		
2019	Scope 1	Mobile Combustion	Gasoline (gals)	20,390	179.0	179.0		
			Diesel Fuel (gals)	23,555	240.5	240.5		
			Kerosene (gals)		0.0	0.0		
2020	Scope 1	Mobile Combustion	Gasoline (gals)		0.0	0.0		
			Diesel Fuel (gals)		0.0	0.0		
			Kerosene (gals)		0.0	0.0		