

TOWN OF WOODSTOCK

CLIMATE SMART TASK FORCE

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Application for 5 Points

January 17, 2021

PE10 Action: GHG Tracking system

5 Points

The Woodstock GHG Tracking Report is updated for the quantities of fossil fuels and electricity used in 2019 for governmental operations. This report also reflects the March 2020 update to the eGRID emission factors. Beginning with 2011, the tracking report provides a consistent and accurate year-by-year assessment of Woodstock's government carbon footprint.

Woodstock GHG Tracking System 2019 Recalibrated

In 2007, the Woodstock town board committed that town governmental operations would be carbon neutral by year-end 2017. The town achieved carbon neutrality in 2015 and was recognized for its accomplishment at the 2017 annual meeting of the New York State Association of Conservation Commissions. 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 collected for the town's 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 fuels are calculated using the protocol and 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.
- 3) Carbon emissions from 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.
- 4) A Quantrix model is used to summarize the town's carbon dioxide emissions, measured in metric tons. An Excel spreadsheet is used for graphics. (The graphics in this are based on the original estimates for CO₂, and will be upgraded to full LGOP compliance when the 2020 usage data becomes available.)

Woodstock Energy Costs and Consumption

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.

A table titled, “Energy Costs and Consumption,” is an exhibit that has been included since 2008. Below are the tables beginning with 2011 showing Woodstock’s governmental energy usage and expenditures submitted to the Office of the New York State Comptroller. These exhibits, which are available on April 1 of the following year, form the basis for Woodstock’s GHG tracking system.

| 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 | |

| TOWN OF Woodstock Energy Costs and Consumption For the Fiscal Year Ending 2018 | | | | |
|--|--------------------|--------------|------------------|------------------------------|
| Energy Type | Total Expenditures | Total Volume | Units Of Measure | Alternative Units Of Measure |
| Gasoline | \$44,011 | 20,800 | gallons | |
| Diesel Fuel | \$56,938 | 24,845 | gallons | |
| Fuel Oil | \$6,187 | 2,762 | gallons | |
| Natural Gas | | | cubic feet | |
| Electricity | \$123,529 | 823,883 | kilowatt-hours | |
| Coal | | | tons | |
| Propane | \$8,696 | 5,825 | gallons | |

TOWN OF Woodstock
Energy Costs and Consumption
For the Fiscal Year Ending 2017

| Energy Type | Total Expenditures | Total Volume | Units Of Measure | Alternative Units Of Measure |
|-------------|--------------------|--------------|------------------|------------------------------|
| Gasoline | \$35,654 | 19,988 | gallons | |
| Diesel Fuel | \$39,943 | 22,520 | gallons | |
| Fuel Oil | \$5,199 | 2,500 | gallons | |
| Natural Gas | | | cubic feet | |
| Electricity | \$111,186 | 764,419 | kilowatt-hours | |
| Coal | | | tons | |
| Propane | \$6,243 | 4,915 | gallons | |

TOWN OF Woodstock
Energy Costs and Consumption
For the Fiscal Year Ending 2016

| Energy Type | Total Expenditures | Total Volume | Units Of Measure | Alternative Units Of Measure |
|-------------|--------------------|--------------|------------------|------------------------------|
| Gasoline | \$32,539 | 20,724 | gallons | |
| Diesel Fuel | \$33,873 | 22,193 | gallons | |
| Fuel Oil | \$4,231 | 2,454 | gallons | |
| Natural Gas | | | cubic feet | |
| Electricity | \$110,398 | 732,875 | kilowatt-hours | |
| Coal | | | tons | |
| Propane | \$4,296 | 4,808 | gallons | |

TOWN OF Woodstock
Energy Costs and Consumption
For the Fiscal Year Ending 2015

| Energy Type | Total Expenditures | Total Volume | Units Of Measure | Alternative Units Of Measure |
|-------------|--------------------|--------------|------------------|------------------------------|
| Gasoline | \$36,118 | 19,780 | gallons | |
| Diesel Fuel | \$46,018 | 23,891 | gallons | |
| Fuel Oil | \$6,040 | 2,631 | gallons | |
| Natural Gas | | | cubic feet | |
| Electricity | \$121,430 | 747,877 | kilowatt-hours | |
| Coal | | | tons | |
| Propane | \$5,465 | 5,592 | gallons | |

PE10 – Woodstock GHG Emissions Tracking System

TOWN OF Woodstock
Energy Costs and Consumption
For the Fiscal Year Ending 2014

| Energy Type | Total Expenditures | Total Volume | Units Of Measure | Alternative Units Of Measure |
|-------------|--------------------|--------------|-----------------------|------------------------------|
| Gasoline | \$56,043 | 20,031 | gallons | |
| Diesel Fuel | \$76,735 | 23,739 | gallons | |
| Fuel Oil | \$12,610 | 3,504 | gallons | |
| Natural Gas | \$10,557 | 5,733 | cubic feet | gallons LP gas |
| Electricity | \$131,042 | 724,325 | kilowatt-hours | |
| Coal | | | tons | |

TOWN OF Woodstock
Energy Costs and Consumption
For the Fiscal Year Ending 2013

| Energy Type | Total Expenditures | Total Volume | Units Of Measure | Alternative Units Of Measure |
|-------------|--------------------|--------------|------------------|------------------------------|
| Gasoline | \$61,075 | 20,576 | gallons | |
| Diesel Fuel | \$78,773 | 23,176 | gallons | |
| Fuel Oil | \$15,723 | 5,024 | gallons | |
| Natural Gas | | | cubic feet | |
| Electricity | \$113,179 | 729,123 | kilowatt-hours | |
| Coal | | | tons | |

TOWN OF Woodstock
Energy Costs and Consumption
For the Fiscal Year Ending 2012

| Energy Type | Total Expenditures | Total Volume | Units Of Measure | Alternative Units Of Measure |
|-------------|--------------------|--------------|------------------|------------------------------|
| Gasoline | \$67,263 | 21,786 | gallons | |
| Diesel Fuel | \$76,973 | 22,258 | gallons | |
| Fuel Oil | \$16,389 | 4,691 | gallons | |
| Natural Gas | | | cubic feet | |
| Electricity | \$108,017 | 639,570 | kilowatts | |
| Coal | | | tons | |

**TOWN OF Woodstock
Energy Costs and Consumption
For the Fiscal Year Ending 2011**

| Energy Type | Total Expenditures | Total Volume | Units Of Measure | Alternative Units Of Measure |
|-------------|--------------------|--------------|------------------|------------------------------|
| Gasoline | \$70,666 | 23,150 | gallons | |
| Diesel Fuel | \$80,595 | 23,500 | gallons | |
| Fuel Oil | \$21,750 | 6,767 | gallons | |
| Natural Gas | | | cubic feet | |
| Electricity | \$100,499 | 617,410 | kilowatts | |
| Coal | | | tons | |

Fossil Fuel Emissions

Fossil fuel emissions are calculated using the protocol described in LGOP and the default emission factors from Appendix G of LGOP. The details of the methodology used by Woodstock are explained in Pledge Element 2, PE2 Government Operations GHG Emissions.

Appendix G Default Emissions Factors Local Government Operations Protocol

| | | 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 |

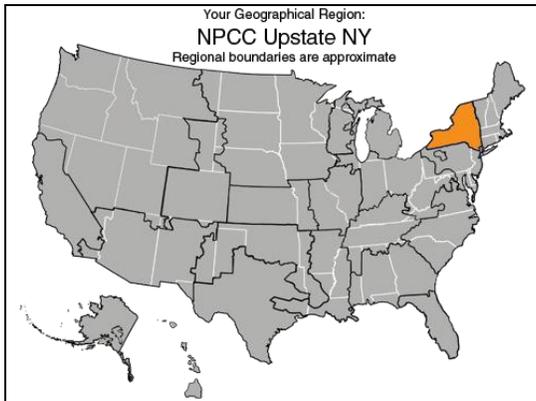
Fossil Fuels GHG Emissions

| | | | | Expenditures | Volume | Metric Tons CO2e equivalent | Metric Tons CO2 | Methane Kgm | Nitrous Oxide Kgm | Unit Price |
|------|---------|-----------------------|--------------------|--------------|--------|-----------------------------|-----------------|-------------|-------------------|------------|
| 2011 | Scope 1 | Stationary Combustion | Fuel Oil (gals) | \$21,750 | 6,767 | 69.5 | 69.1 | 10.1505 | 0.6767 | \$3.214 |
| | | | Propane (gals) | \$9,341 | 4,064 | 22.9 | 22.7 | 0.5689 | 0.4064 | \$2.299 |
| | | Mobile Combustion | Gasoline (gals) | \$70,666 | 23,150 | 203.3 | 203.3 | | | \$3.053 |
| | | | Diesel Fuel (gals) | \$80,595 | 23,500 | 239.9 | 239.9 | | | \$3.430 |
| | | | Kerosene (gals) | \$4,910 | 882 | 8.9 | 8.9 | | | \$5.570 |
| 2012 | Scope 1 | Stationary Combustion | Fuel Oil (gals) | \$16,389 | 4,691 | 48.2 | 47.9 | 7.0365 | 0.4691 | \$3.494 |
| | | | Propane (gals) | \$6,326 | 3,283 | 18.5 | 18.4 | 0.4596 | 0.3283 | \$1.927 |
| | | Mobile Combustion | Gasoline (gals) | \$67,263 | 21,786 | 191.3 | 191.3 | | | \$3.087 |
| | | | Diesel Fuel (gals) | \$76,973 | 22,258 | 227.3 | 227.3 | | | \$3.458 |
| | | | Kerosene (gals) | \$2,552 | 359 | 3.6 | 3.6 | | | \$7.115 |
| 2013 | Scope 1 | Stationary Combustion | Fuel Oil (gals) | \$15,723 | 5,024 | 51.6 | 51.3 | 7.5360 | 0.5024 | \$3.130 |
| | | | Propane (gals) | \$6,934 | 4,704 | 26.5 | 26.3 | 0.6586 | 0.4704 | \$1.474 |
| | | Mobile Combustion | Gasoline (gals) | \$61,075 | 20,576 | 180.7 | 180.7 | | | \$2.968 |
| | | | Diesel Fuel (gals) | \$78,773 | 23,176 | 236.6 | 236.6 | | | \$3.399 |
| | | | Kerosene (gals) | | | 0.0 | 0.0 | | | #DIV/0! |
| 2014 | Scope 1 | Stationary Combustion | Fuel Oil (gals) | \$12,610 | 3,504 | 36.0 | 35.8 | 5.2560 | 0.3504 | \$3.599 |
| | | | Propane (gals) | \$10,557 | 5,733 | 32.2 | 32.0 | 0.8027 | 0.5733 | \$1.841 |
| | | Mobile Combustion | Gasoline (gals) | \$56,043 | 20,031 | 175.9 | 175.9 | | | \$2.798 |
| | | | Diesel Fuel (gals) | \$76,735 | 23,739 | 242.4 | 242.4 | | | \$3.232 |
| | | | Kerosene (gals) | | | 0.0 | 0.0 | | | #DIV/0! |
| 2015 | Scope 1 | Stationary Combustion | Fuel Oil (gals) | \$6,040 | 2,631 | 27.0 | 26.9 | 3.9465 | 0.2631 | \$2.296 |
| | | | Propane (gals) | \$5,465 | 5,592 | 31.4 | 31.3 | 0.7829 | 0.5592 | \$0.977 |
| | | Mobile Combustion | Gasoline (gals) | \$36,118 | 19,780 | 173.7 | 173.7 | | | \$1.826 |
| | | | Diesel Fuel (gals) | \$46,016 | 23,891 | 243.9 | 243.9 | | | \$1.926 |
| | | | Kerosene (gals) | | | 0.0 | 0.0 | | | #DIV/0! |
| 2016 | Scope 1 | Stationary Combustion | Fuel Oil (gals) | \$4,231 | 2,454 | 25.2 | 25.1 | 3.6810 | 0.2454 | \$1.724 |
| | | | Propane (gals) | \$4,296 | 4,808 | 27.0 | 26.9 | 0.6731 | 0.4808 | \$0.894 |
| | | Mobile Combustion | Gasoline (gals) | \$32,539 | 20,724 | 182.0 | 182.0 | | | \$1.570 |
| | | | Diesel Fuel (gals) | \$33,873 | 22,193 | 226.6 | 226.6 | | | \$1.526 |
| | | | Kerosene (gals) | | | 0.0 | 0.0 | | | #DIV/0! |
| 2017 | Scope 1 | Stationary Combustion | Fuel Oil (gals) | \$5,199 | 2,500 | 25.7 | 25.5 | 3.7500 | 0.2500 | \$2.080 |
| | | | Propane (gals) | \$6,243 | 4,915 | 27.6 | 27.5 | 0.6881 | 0.4915 | \$1.270 |
| | | Mobile Combustion | Gasoline (gals) | \$35,654 | 19,988 | 175.5 | 175.5 | | | \$1.784 |
| | | | Diesel Fuel (gals) | \$39,943 | 22,520 | 229.9 | 229.9 | | | \$1.774 |
| | | | Kerosene (gals) | | | 0.0 | 0.0 | | | #DIV/0! |

Fossil Fuels GHG Emissions (Continued)

| | | | | Expenditures | Volume | Metric Tons CO2e equivalent | Metric Tons CO2 | Methane Kgm | Nitrous Oxide Kgm | Unit Price |
|------|---------|-----------------------|--------------------|--------------|--------|-----------------------------|-----------------|-------------|-------------------|------------|
| 2018 | Scope 1 | Stationary Combustion | Fuel Oil (gals) | \$6,187 | 2,762 | 28.4 | 28.2 | 4.1430 | 0.2762 | \$2.240 |
| | | | Propane (gals) | \$8,690 | 5,825 | 32.8 | 32.6 | 0.8155 | 0.5825 | \$1.492 |
| | | Mobile Combustion | Gasoline (gals) | \$44,011 | 20,800 | 182.6 | 182.6 | | | \$2.116 |
| | | | Diesel Fuel (gals) | \$56,938 | 24,845 | 253.7 | 253.7 | | | \$2.292 |
| | | | Kerosene (gals) | | | 0.0 | 0.0 | | | #DIV/0! |
| 2019 | Scope 1 | Stationary Combustion | Fuel Oil (gals) | \$5,985 | 2,814 | 28.9 | 28.7 | 4.2212 | 0.2814 | \$2.127 |
| | | | Propane (gals) | \$5,870 | 4,786 | 26.9 | 26.8 | 0.6701 | 0.4786 | \$1.226 |
| | | Mobile Combustion | Gasoline (gals) | \$39,991 | 20,390 | 179.0 | 179.0 | | | \$1.961 |
| | | | Diesel Fuel (gals) | \$49,396 | 23,555 | 240.5 | 240.5 | | | \$2.097 |
| | | | Kerosene (gals) | | | 0.0 | 0.0 | | | #DIV/0! |
| 2020 | Scope 1 | Stationary Combustion | Fuel Oil (gals) | | | 0.0 | 0.0 | 0.0000 | 0.0000 | #DIV/0! |
| | | | Propane (gals) | | | 0.0 | 0.0 | 0.0000 | 0.0000 | #DIV/0! |
| | | Mobile Combustion | Gasoline (gals) | | | 0.0 | 0.0 | | | #DIV/0! |
| | | | Diesel Fuel (gals) | | | 0.0 | 0.0 | | | #DIV/0! |
| | | | Kerosene (gals) | | | 0.0 | 0.0 | | | #DIV/0! |

GHG Emissions from Electric Generation



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.¹ Upstate New York is one of the regions tracked in eGRID. By Googling ‘EPA Power Profiler’ and entering a ZIP code, the carbon dioxide emissions and fuel composition of power in any geographic region can be found.

¹ Environmental Protection Agency, “Emissions & Generation Resource Integrated Database (eGRID)”, Available at <https://www.epa.gov/energy/emissions-generation-resource-integrated-database-egrid>

eGRID Naming Conventions and Release Dates

| Previous Naming Convention | Current Naming Convention | Data Year(s) | Edition | Release Date(s) |
|----------------------------|---------------------------|--------------|------------|--|
| eGRID96 | eGRID1996 | 1996 | First | 12/1/1998 |
| eGRID97 | eGRID1997 | 1996-1997 | Second | 12/1/1999 |
| eGRID2000 | eGRID1998 | 1996-1998 | Third | 3/1/2001 9/1/2001 |
| eGRID2002 | eGRID1999 eGRID2000 | 1996-2000 | Fourth | v1- 12/2002 v2- 4/2003 v2.01- 5/2003 |
| eGRID2006 | eGRID2004 | 2004 | Fifth | v1- 12/21/2006 v2- 4/2007 v2.1- 5/2007 |
| eGRID2007 | eGRID2005 | 2005 | Sixth | v1- 10/16/2008 v1.1- 1/2009 |
| eGRID2010 | eGRID2007 | 2007 | Seventh | 2/23/2011 |
| eGRID2012 | eGRID2009 | 2009 | Eighth | 5/10/2012 |
| eGRID2014 | eGRID2010 | 2010 | Ninth | 2/24/2014 |
| | eGRID2012 | 2012 | Tenth | 10/8/2015 |
| | eGRID2014 | 2014 | Eleventh | v1- 1/13/2017 v2- 2/27/2017 |
| | eGRID2016 | 2016 | Twelfth | 2/15/2018 |
| | eGRID2018 | 2018 | Thirteenth | 1/28/2020 v2 - 3/9/2020 |

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 with the retirements of coal-fired power plants. Because of substantial hydroelectric and nuclear resources, EPA’s Upstate NY sub-region has the lowest level of emissions in the country from electric generation.

| Fiscal Year | eGRID Version | eGRID Release | Upstate NY CO ₂ lbs./MWh ² |
|-------------|---------------------|---------------|--|
| 2019 | eGRID2018 Version 2 | 9-Mar-20 | 253.1 |
| 2018 | eGRID2016 | 15-Feb-18 | 294.1 |

² Environmental Protection Agency, “Power Profiler,” Available at <https://www.epa.gov/energy/power-profiler/>

PE10 – Woodstock GHG Emissions Tracking System

| | | | |
|------|------------------------|-----------|------------|
| 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 |

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 |

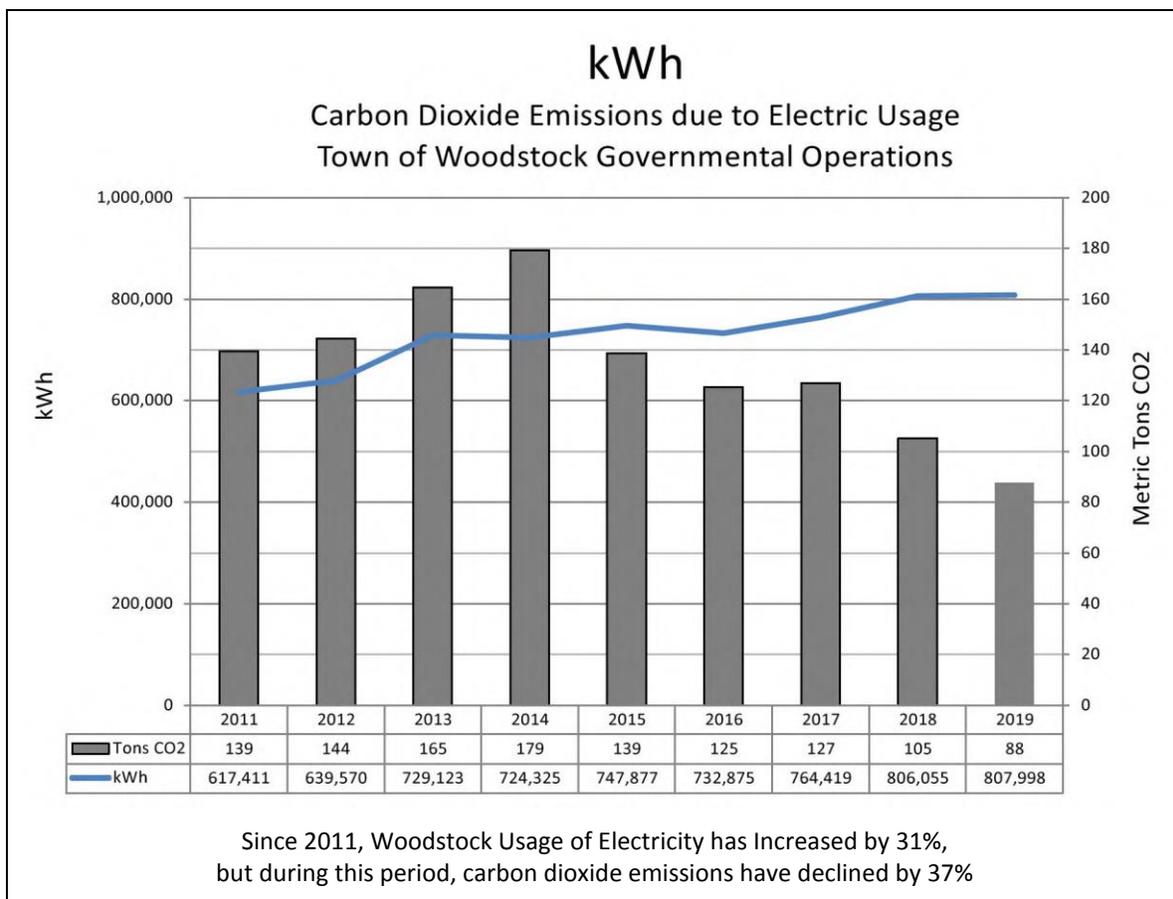
GHG Emissions due to Electricity

| | | | Expenditures | Volume | Metric Tons CO2e equivalent | Metric Tons CO2 | Methane Kgm | Nitrous Oxide Kgm |
|------|---------|---------------------------------------|--------------|---------|-----------------------------------|--------------------|----------------|----------------------|
| 2011 | Scope 2 | Grid Electricity (kWh) | \$100,499 | 617,410 | 140.1 | 139.4 | 4.5645 | 1.9386 |
| | | Hydro Electricity (kWh) | | | | | | |
| | | Sum of Scope 2 (Electricity) Σ | \$100,499 | 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) Σ | \$108,017 | 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) Σ | \$113,179 | 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) Σ | \$131,042 | 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) Σ | \$121,430 | 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) Σ | \$110,398 | 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) Σ | \$111,186 | 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) Σ | \$123,529 | 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 | | |
| | | Sum of Scope 2 (Electricity) Σ | \$121,184 | 808,484 | 88.0 | 87.8 | 6.3822 | 0.7091 |
| 2020 | Scope 2 | Grid Electricity (kWh) | | | 0.0 | 0.0 | 0.0000 | |
| | | Hydro Electricity (kWh) | | | | | | |
| | | Sum of Scope 2 (Electricity) Σ | | 0 | 0.0 | 0.0 | 0.0000 | 0.0000 |

Woodstock Carbon Dioxide Emissions due to Electricity

Since 2011, the town’s electrical usage for governmental operations has grown by 31%, and during this period, carbon dioxide emissions attributable to electrify have dropped by about 37%. Woodstock’s increase in electricity usage has been driven by geothermal and air-sourced heat pumps used for heating and cooling the town’s buildings. After the renovation of the town offices on Comeau, usage is expected to reach 900,000 kWh by 2021.

Closing of upstate coal-fired generators and the town’s contracts for hydroelectric power from the Natural Power Group, a local operator of hydroelectric generators, has reduced the town’s carbon dioxide emissions attributed to electricity. It is expected carbon dioxide emissions due to electricity will be substantially eliminated in 2021.



Adjustments for Zero-Carbon Hydroelectric Power

In 2018, the Woodstock Town Board signed contracts with the Natural Power Group (NPG) for power sourced from the Wappingers Falls and Walkill 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.

PE10 – Woodstock GHG Emissions Tracking System

Woodstock has two Community Distributed Generation (CDG) contracts with the Natural Power Group. 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.

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.

Woodstock Total GHG Emissions

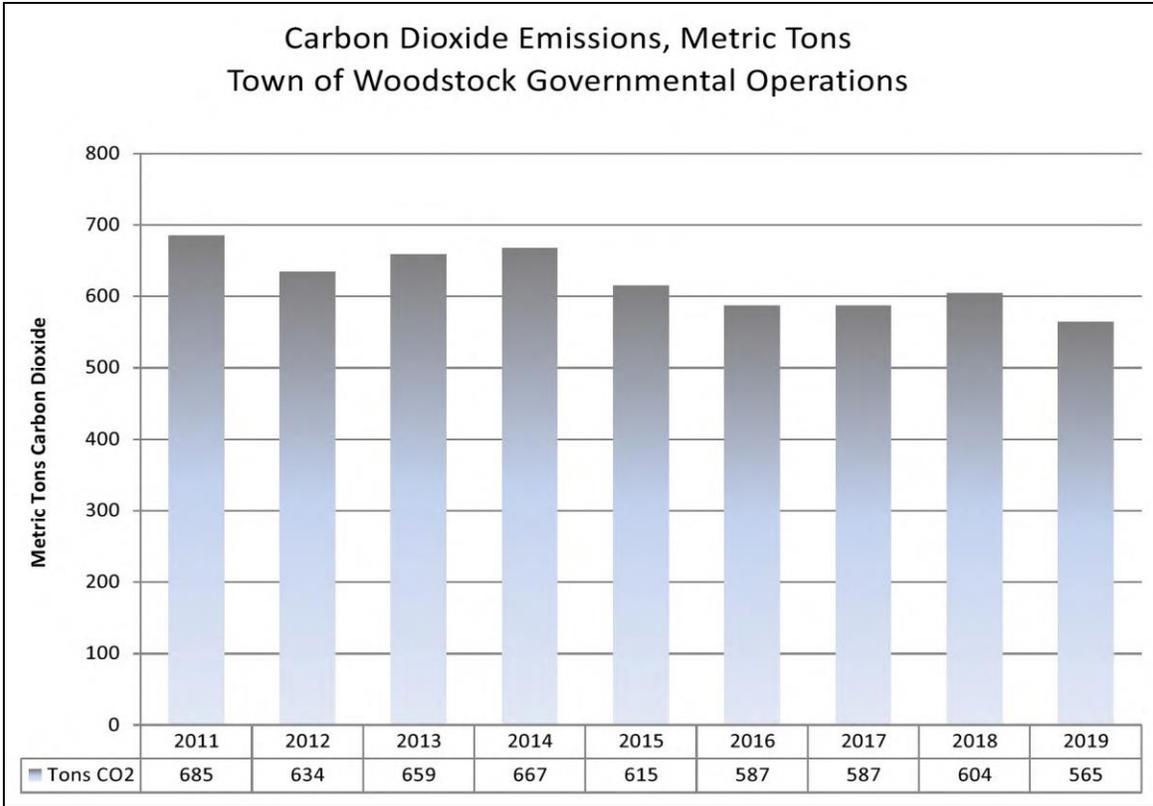
| | | | | Expenditures | Volume | Metric Tons CO2e equivalent | Metric Tons CO2 | Methane Kgm | Nitrous Oxide Kgm |
|------------------------|------------------------|---------------------------------------|-----------------------|-----------------|----------|-----------------------------|-----------------|-------------|-------------------|
| 2011 | Scope 1 | Stationary Combustion | Fuel Oil (gals) | \$21,750 | 6,767 | 69.5 | 69.1 | 10.1505 | 0.6767 |
| | | | Propane (gals) | \$9,341 | 4,064 | 22.9 | 22.7 | 0.5689 | 0.4064 |
| | | Mobile Combustion | Gasoline (gals) | \$70,666 | 23,150 | 203.3 | 203.3 | | |
| | | | Diesel Fuel (gals) | \$80,595 | 23,500 | 239.9 | 239.9 | | |
| | | | Kerosene (gals) | \$4,910 | 882 | 8.9 | 8.9 | | |
| | Scope 2 | Grid Electricity (kWh) | | \$100,499 | 617,410 | 140.1 | 139.4 | 4.5645 | 1.9386 |
| | | Hydro Electricity (kWh) | | | | | | | |
| | | Sum of Scope 2 (Electricity) Σ | | \$100,499 | 617,410 | 140.1 | 139.4 | 4.5645 | 1.9386 |
| | Total by Year Σ | | | \$287,762 | | 684.6 | 683.4 | 15.2839 | 3.0217 |
| | 2012 | Scope 1 | Stationary Combustion | Fuel Oil (gals) | \$16,389 | 4,691 | 48.2 | 47.9 | 7.0365 |
| Propane (gals) | | | | \$6,326 | 3,283 | 18.5 | 18.4 | 0.4596 | 0.3283 |
| Mobile Combustion | | | Gasoline (gals) | \$67,263 | 21,786 | 191.3 | 191.3 | | |
| | | | Diesel Fuel (gals) | \$76,973 | 22,258 | 227.3 | 227.3 | | |
| | | | Kerosene (gals) | \$2,552 | 359 | 3.6 | 3.6 | | |
| Scope 2 | | Grid Electricity (kWh) | | | 639,570 | 145.2 | 144.4 | 4.7283 | 2.0082 |
| | | Hydro Electricity (kWh) | | | | | | | |
| | | Sum of Scope 2 (Electricity) Σ | | \$108,017 | 639,570 | 145.2 | 144.4 | 4.7283 | 2.0082 |
| Total by Year Σ | | | \$277,520 | | 634.0 | 632.9 | 12.2244 | 2.8056 | |
| 2013 | Scope 1 | Stationary Combustion | Fuel Oil (gals) | \$15,723 | 5,024 | 51.6 | 51.3 | 7.5360 | 0.5024 |
| | | | Propane (gals) | \$6,934 | 4,704 | 26.5 | 26.3 | 0.6586 | 0.4704 |
| | | Mobile Combustion | Gasoline (gals) | \$61,075 | 20,576 | 180.7 | 180.7 | | |
| | | | Diesel Fuel (gals) | \$78,773 | 23,176 | 236.6 | 236.6 | | |
| | | | Kerosene (gals) | | | 0.0 | 0.0 | | |
| | Scope 2 | Grid Electricity (kWh) | | | 729,123 | 165.5 | 164.7 | 5.3904 | 2.2894 |
| | | Hydro Electricity (kWh) | | | | | | | |
| | | Sum of Scope 2 (Electricity) Σ | | \$113,179 | 729,123 | 165.5 | 164.7 | 5.3904 | 2.2894 |
| Total by Year Σ | | | \$275,684 | | 660.8 | 659.5 | 13.5849 | 3.2622 | |
| 2014 | Scope 1 | Stationary Combustion | Fuel Oil (gals) | \$12,610 | 3,504 | 36.0 | 35.8 | 5.2560 | 0.3504 |
| | | | Propane (gals) | \$10,557 | 5,733 | 32.2 | 32.0 | 0.8027 | 0.5733 |
| | | Mobile Combustion | Gasoline (gals) | \$56,043 | 20,031 | 175.9 | 175.9 | | |
| | | | Diesel Fuel (gals) | \$76,735 | 23,739 | 242.4 | 242.4 | | |
| | | | Kerosene (gals) | | | 0.0 | 0.0 | | |
| | Scope 2 | Grid Electricity (kWh) | | | 724,325 | 180.2 | 179.3 | 5.4759 | 2.4322 |
| | | Hydro Electricity (kWh) | | | | | | | |
| | | Sum of Scope 2 (Electricity) Σ | | \$131,042 | 724,325 | 180.2 | 179.3 | 5.4759 | 2.4322 |
| Total by Year Σ | | | \$286,987 | | 666.7 | 665.4 | 11.5345 | 3.3559 | |

Woodstock Total GHG Emissions (Continued)

| | | | | Expenditures | Volume | Metric Tons CO ₂ e equivalent | Metric Tons CO ₂ | Methane Kgm | Nitrous Oxide Kgm | | |
|----------------------|----------------------|------------------------------|--------------------------|-----------------|---------|--|--------------------------------|----------------|----------------------|---------|--------|
| 2015 | Scope 1 | Stationary Combustion | Fuel Oil (gals) | \$6,040 | 2,631 | 27.0 | 26.9 | 3.9465 | 0.2631 | | |
| | | | Propane (gals) | \$5,465 | 5,592 | 31.4 | 31.3 | 0.7829 | 0.5592 | | |
| | | Mobile Combustion | Gasoline (gals) | \$36,118 | 19,780 | 173.7 | 173.7 | | | | |
| | | | Diesel Fuel (gals) | \$46,016 | 23,891 | 243.9 | 243.9 | | | | |
| | | | Kerosene (gals) | | | 0.0 | 0.0 | | | | |
| | Scope 2 | Grid Electricity (kWh) | | | | 747,877 | 139.2 | 138.7 | 5.4076 | 1.3285 | |
| | | Hydro Electricity (kWh) | | | | | | | | | |
| | | Sum of Scope 2 (Electricity) | | | Σ | \$121,430 | 747,877 | 139.2 | 138.7 | 5.4076 | 1.3285 |
| | | Total by Year | | | Σ | \$215,069 | | 615.3 | 614.4 | 10.1370 | 2.1508 |
| | 2016 | Scope 1 | Stationary Combustion | Fuel Oil (gals) | \$4,231 | 2,454 | 25.2 | 25.1 | 3.6810 | 0.2454 | |
| Propane (gals) | | | | \$4,296 | 4,808 | 27.0 | 26.9 | 0.6731 | 0.4808 | | |
| Mobile Combustion | | | Gasoline (gals) | \$32,539 | 20,724 | 182.0 | 182.0 | | | | |
| | | | Diesel Fuel (gals) | \$33,873 | 22,193 | 226.6 | 226.6 | | | | |
| | | | Kerosene (gals) | | | 0.0 | 0.0 | | | | |
| Scope 2 | | Grid Electricity (kWh) | | | | 732,875 | 126.1 | 125.4 | 10.9800 | 1.4847 | |
| | | Hydro Electricity (kWh) | | | | | | | | | |
| | | Sum of Scope 2 (Electricity) | | | Σ | \$110,398 | 732,875 | 126.1 | 125.4 | 10.9800 | 1.4847 |
| | | Total by Year | | | Σ | \$185,337 | | 586.9 | 585.9 | 15.3341 | 2.2109 |
| 2017 | | Scope 1 | Stationary Combustion | Fuel Oil (gals) | \$5,199 | 2,500 | 25.7 | 25.5 | 3.7500 | 0.2500 | |
| | Propane (gals) | | | \$6,243 | 4,915 | 27.6 | 27.5 | 0.6881 | 0.4915 | | |
| | Mobile Combustion | | Gasoline (gals) | \$35,654 | 19,988 | 175.5 | 175.5 | | | | |
| | | | Diesel Fuel (gals) | \$39,943 | 22,520 | 229.9 | 229.9 | | | | |
| | | | Kerosene (gals) | | | 0.0 | 0.0 | | | | |
| | Scope 2 | Grid Electricity (kWh) | | | | 764,419 | 127.5 | 126.8 | 10.8843 | 1.4536 | |
| | | Hydro Electricity (kWh) | | | | | | | | | |
| | | Sum of Scope 2 (Electricity) | | | Σ | \$111,186 | 764,419 | 127.5 | 126.8 | 10.8843 | 1.4536 |
| | | Total by Year | | | Σ | \$198,225 | | 586.2 | 585.2 | 15.3224 | 2.1951 |
| | 2018 | Scope 1 | Stationary Combustion | Fuel Oil (gals) | \$6,187 | 2,762 | 28.4 | 28.2 | 4.1430 | 0.2762 | |
| Propane (gals) | | | | \$8,690 | 5,825 | 32.8 | 32.6 | 0.8155 | 0.5825 | | |
| Mobile Combustion | | | Gasoline (gals) | \$44,011 | 20,800 | 182.6 | 182.6 | | | | |
| | | | Diesel Fuel (gals) | \$56,938 | 24,845 | 253.7 | 253.7 | | | | |
| | | | Kerosene (gals) | | | 0.0 | 0.0 | | | | |
| 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) | | | Σ | \$123,529 | 823,883 | 108.1 | 107.6 | 7.8443 | 1.1206 |
| | | Total by Year | | | Σ | \$239,355 | | 605.5 | 604.7 | 12.8028 | 1.9793 |

Woodstock Total GHG Emissions (Continued)

| | | | | Expenditures | Volume | Metric Tons CO2e equivalent | Metric Tons CO2 | Methane Kgm | Nitrous Oxide Kgm |
|----------------------|---------------|------------------------------|--------------------------|-----------------|-----------|-----------------------------------|--------------------|----------------|----------------------|
| 2019 | Scope 1 | Stationary Combustion | Fuel Oil (gals) | \$5,985 | 2,814 | 28.9 | 28.7 | 4.2212 | 0.2814 |
| | | | Propane (gals) | \$5,870 | 4,786 | 26.9 | 26.8 | 0.6701 | 0.4786 |
| | | 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) | | Σ | \$121,184 | 808,484 | 88.0 | 87.8 | 6.3822 |
| | Total by Year | | Σ | \$222,426 | | 563.4 | 562.8 | 11.2734 | 1.4692 |
| | 2020 | Scope 1 | Stationary Combustion | Fuel Oil (gals) | | | 0.0 | 0.0 | 0.0000 |
| Propane (gals) | | | | | | 0.0 | 0.0 | 0.0000 | 0.0000 |
| Mobile Combustion | | | Gasoline (gals) | | | 0.0 | 0.0 | | |
| | | | Diesel Fuel (gals) | | | 0.0 | 0.0 | | |
| | | | Kerosene (gals) | | | 0.0 | 0.0 | | |
| Scope 2 | | Grid Electricity (kWh) | | | | 0.0 | 0.0 | 0.0000 | |
| | | Hydro Electricity (kWh) | | | | | | | |
| | | Sum of Scope 2 (Electricity) | | Σ | | 0 | 0.0 | 0.0 | 0.0000 |
| Total by Year | | Σ | \$0 | | 0.0 | 0.0 | 0.0000 | 0.0000 | |



Beginning in 2011, Woodstock’s total carbon dioxide emissions have dropped from 685 to 565 metric tons in 2019, a 18% reduction in CO2 emissions from governmental operations