Town of New Castle

Climate Smart Communities Silver Certified

Inventory of 2021 Government Operations
Greenhouse Gas Emissions
Summary Report, April 2024

Town of New Castle
200 S. Greeley Avenue
Chappaqua, New York 10514
Credits and Acknowledgements

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Project Scope

This project was made possible by a grant from the New York State Department of Environmental Conservation (DEC) in coordination with the Hudson Valley Regional Council (HVRC). HVRC is providing support to Climate Smart Communities (CSC) participants through a Coordinators Program. This program is designed to help municipalities develop a plan to take local action to address climate change by reducing greenhouse gas emissions and adapting to current and future climate change impacts. HVRC’s assistance will facilitate the completion of New Castle’s Greenhouse Gas (GHG) Emissions Inventories and Climate Action Plans (CAP).

The Government Operations GHG Emissions Inventory is the first of three phases of this project. Subsequent phases will include the creation of a Community GHG Inventory which will be completed in the spring of 2024, followed by a combined Climate Action Plan.

Contributors

The CSC Task Force is very appreciative of the efforts of the many individuals who contributed their time, knowledge, and information to this inventory. Major contributors are:

- Kellan Cantrell for acting as liaison with the Town.
- Bart Carey for his knowledge of the Town infrastructure.
- James McHugh for providing the raw data related to the Town’s energy consumption and expenditure.
- Walter Quast for assistance in understanding facility mechanicals and energy supply.
- Melanie Patapis of HVRC for providing support and instruction on the use of the Climate Action Associates (CAA), LLC’s GHG Inventory Tool as well as invaluable guidance throughout the process.
Background

The Town of New Castle recognizes that GHG emissions from human activity causes climate change, the consequences of which pose substantial risks to the future health and well-being of our community, as well as globally. New Castle demonstrated its commitment to addressing the growing threat of climate change when in 2008, the Town became the first municipality in New York to register for the newly created Climate Smart Communities program by formally adopting the CSC pledge. In September 2021, New Castle received CSC Bronze Certification and in July 2022, the Town received CSC Silver Certification, the highest level available at that time. New Castle became only the eighth municipality in New York to attain this status.

The Town previously undertook a government operations greenhouse gas emissions inventory in 2009, performing analysis of 2005 data, setting it as its base year. The selection of emissions produced in 2005 mirrors the year chosen by the United States and many other countries as the base year for emission targets set by the Paris Accord. The completion of the latest inventory will provide some insight into the Town’s effectiveness in mitigating GHG emissions from various sources over most of the past two decades. It will permit the development of a new set of emission and cost reduction goals and will assist in determining ways in which those goals can be achieved.

This Government Operations GHG Emissions Inventory Report summarizes the emissions from the Town of New Castle’s consumption of energy within town-owned buildings, the Millwood Water Treatment Plant, the Town’s vehicle fleet, and public lighting. This data was generated from electric, natural gas, fuel oil, diesel, and gasoline usage for all Town-owned entities. The GHG emissions for all local government operations are measured in metric tons of CO2 equivalents (MTCO2e) and were calculated using emissions factors as determine by the United States Energy Information Administration (EIA) and the United States Environmental Protection Agency (EPA). These emissions factors were incorporated into the Climate Action Associates (CAA), LLC’s GHG Inventory Tool for use in subsequent calculations.

This report contains estimates of greenhouse gas emissions during 2021, resulting from activities and operations of the Town of New Castle. Government operations emissions have been categorized according to five primary sectors: Water Delivery Facilities, Wastewater Facilities, Buildings and Facilities, Vehicle Fleet, and Public Lighting. Emissions from Water Delivery Facilities and Wastewater Facilities are combined in the reported findings.
Key Findings

Emissions by Sector

In 2021, GHG emissions from the Town of New Castle’s government operations totaled 2,896 MTCO2e. Figure 1 provides a breakdown of government operations emissions by sector. Water Delivery Facilities\(^1\) combined with Wastewater Facilities account for the largest percentage of GHG emissions at about 53%. The Town’s Vehicle Fleet and Buildings and Facilities each produced around 21% of emissions and public lighting produced the least at 6%.

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\(^1\) As a result of their joint agreement, 72% of consumption and cost from the Millwood Water Treatment Plant are allocated to the Town of New Castle with the remaining 28% allocated to the Village of Pleasantville. This report reflects only New Castle’s allocation.
Cost by Sector

Analysis of New Castle’s energy costs show that Water Delivery/Wastewater Facilities account for more than half the Town’s energy expenditures at about 57%, followed by buildings and facilities at 19%. The Vehicle Fleet and Public Lighting sectors each make up approximately 12% of the Town’s energy costs. Figure 2 shows the breakdown of Town expenditures on energy in 2021 which amounted to more than $1.2 million.

Electricity Usage by Sector

Another key finding of this report can be found in electricity usage by sector. As seen in Figure 3, about 75% of electricity utilized by the Town of New Castle is from the Water Delivery Facilities sector directly associated with the Millwood Water Treatment Plant and its infrastructure. Public Lighting used around 9%, Buildings and Facilities used 14%, and Wastewater Facilities used less than 2%.
The Inventory Results section of this report provides a detailed profile of emissions by sector, scope, and source within the Town. This data will also provide an updated GHG emissions profile from which the Town of New Castle will be able to compare future performance and demonstrate progress in emissions reduction. Analysis of the emissions reported for 2005 and 2021 is provided in the 2005 vs. 2021 Comparison section.
Methods and Sources

Approach
The first step towards achieving tangible greenhouse gas emissions reductions requires identifying baseline emissions levels, their sources, and the activities that generate emissions in the community. This project initially focuses on government operations emissions with an inventory community-wide emissions being performed in a future study.

ICLEI, an international organization focused on greenhouse gas modeling and reduction, has developed standards to measure GHG emissions, which when adopted for analysis and reporting provides consistent, accurate information without duplication across geopolitical borders. Their Local Government Operations Protocol (LGOP) provides the principles, approach, methodology, and procedures necessary for accurately analyzing and reporting on greenhouse gases. CAA’s GHG Inventory Tool utilized by this project adheres to these strict standards.

Emissions Scopes
For the government operations inventory, emissions are categorized by scope. Using the scopes framework helps prevent double counting of emissions information. Emissions are categorized into three scopes for government operations, as defined below:

- **Scope 1**: All direct emissions from facilities or equipment operated by the local government, usually through the combustion of fuel such as natural gas, propane, and fuel oil. Examples include emissions from fuel consumed by the Town’s vehicle fleet and heating/cooling systems in municipal buildings.

- **Scope 2**: Indirect GHG emissions from purchased electricity. This encompasses the use of electricity from the grid for ongoing operations. New Castle is included in the NYC/Westchester eGRID as defined by the United States Environmental Protection Agency.

- **Scope 3**: All other indirect GHG emissions not covered in Scope 2. Examples include contracted services, emissions caused by goods purchased by the local government, and emissions associated with disposal of government generated solid waste.

This inventory only accounts for Scope 1 and Scope 2 emissions, as they are the largest components of a government operations greenhouse gas analysis and are most easily influenced by local policy decisions. Under the DEC’s CSC program, tracking Scope 3 is encouraged but optional, so has not been included in this analysis.
Analysis Year

As mentioned previously in this report, the Town of New Castle’s first Government Greenhouse Gas inventory was conducted for 2005 emissions, thus serving as the base year. Ongoing analysis of the effectiveness of changes made to reduce GHG emissions then requires the selection of subsequent years for comparison purposes. When deciding which year to use for this GHG emissions analysis, the year 2021 was chosen because activities in the Town were normalizing after the COVID shutdown and it also was the most recent year of complete data available for analysis. Going forward it is recommended that GHG inventories be completed on a more regular basis to determine the Towns’ progress towards its climate-related goals.

Quantification Methods

Greenhouse gas emissions in this inventory are determined using calculation-based methodologies which utilize activity data and emissions factors to quantify emissions accordingly. The basic equation used is:

\[ \text{Activity Data} \times \text{Emissions Factor} = \text{GHG Emissions} \]

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\(^2\). To obtain this data, the Town gathered and reviewed all electric, natural gas, heating oil and propane bills, as well as fueling records for gasoline and diesel used to power the Town’s vehicle fleet, landscape equipment, and portable devices.

Table A shows all data sources used for the Government Operations GHG Inventory.

<table>
<thead>
<tr>
<th>Energy Type</th>
<th>Data Source</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electricity</td>
<td>NYPA Reporting</td>
<td>22 accounts (meters)</td>
</tr>
<tr>
<td>Electricity</td>
<td>ConEd Billing</td>
<td>13 accounts (meters)</td>
</tr>
<tr>
<td>Electricity</td>
<td>ChapPAC CEC Energy Study</td>
<td>1 account(^3)</td>
</tr>
<tr>
<td>Natural Gas</td>
<td>ConEd Reporting/Comptroller</td>
<td>3 accounts</td>
</tr>
<tr>
<td>Fuel Oil</td>
<td>Comptroller</td>
<td>8 tanks</td>
</tr>
<tr>
<td>Gasoline and Diesel</td>
<td>DPW Fleet Fueling Report</td>
<td>108 vehicles, 11 portable fueling accounts(^4)</td>
</tr>
</tbody>
</table>

\(^2\) While this study does not utilize miles traveled to determine any GHG emissions, it would be relevant to Scope 3 employee commute emissions calculations.

\(^3\) Chappaqua Performing Arts Center electric data reports a complete calendar year but spans 2021 and 2022.

\(^4\) Cans and containers for fuel used by landscape equipment, generators, etc.
Calculations for this inventory were made using CAA’s GHG Inventory Tool. Data was measured in kWh for grid electricity, therms for natural gas, and gallons for gasoline, fuel oil, diesel, and propane. The CAA tool utilized emission factors published by the EPA and EIA to convert energy consumption data into quantified emissions in the form of MTCO2e.

**Facilities Master List**

A master list was created that includes all Town owned and run buildings, facilities, lighting, and vehicles.\(^5\) Each was assigned to a sector to correspond to its ICLEI reporting category along with all information pertaining to its energy consumption and associated expenditures. The four sectors identified are:

- **Buildings and Facilities**, which includes the DPW Offices and Yard, the New Castle Recycling Center, ChapPAC, the Community Center, the Art Center, Amsterdam Park, and Town Hall, along with the Police Department’s Glendale Radio Tower

- **Water Delivery/Wastewater Facilities**, which includes all facilities dealing with water including the Millwood Treatment Plant, its associate pump stations, and water towers as well as one wastewater pump facility

- **Public Lighting**, which includes streetlights, traffic signals, parking lots, and lighting in parks

- **Vehicle Fleet**, which includes all modes of internal combustion powered transportation employed by the Town of New Castle

**Emissions Factors**

Emissions factors are unique to specific types of fuel. The electricity emissions factor for New Castle is based on the EPA eGRID subregion NYC/Westchester. The 2021 emissions factor for electricity in this region is 371 kilograms of CO2e per megawatt hour (kg/MWh). The natural gas, propane, heating oil/diesel, and gasoline emissions factors are obtained from the EIA database on Carbon Dioxide Emissions Coefficients, which is not regionally dependent. Natural gas factors are specified in kg/million BTUs (kg/MMBtu) while propane, distillates, and gasoline are in kg/gallon. GHG emissions in this inventory are measured in metric tons of CO2 equivalents (MTCO2e). A carbon dioxide equivalent or CO2 equivalent, abbreviated as CO2-eq is a metric measure used to compare the emissions from various greenhouse gases on the basis

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\(^5\) Data for two generators, one propane and one diesel, was not available so is not included in this analysis. New Castle does not own or manage any facilities which utilize large amounts of refrigerants, nor does it have a municipally owned landfill either active or closed.
of their global-warming potential (GWP), by converting amounts of other gases to the equivalent amount of carbon dioxide with the same global warming potential.
Inventory Results

Emissions by Sector

The development of emissions reduction policies often rely on a particular set of strategies for each sector as the traits of underlying energy consumption may be similar. In Buildings and Facilities this may be HVAC systems or in Public Lighting the types of light bulbs utilized. Figure 4 shows the emissions for government operations broken down by sector.

Water Delivery/Wastewater Facilities

As outlined in Key Findings, the Water Delivery/Wastewater Facilities accounted for over half of the Town’s total government operations emissions, totaling 1,529 MTCO2e or 53%. Most of the emissions from this sector are from electricity usage in the water filtration, purification, and delivery systems. The remainder is generated from the combustion of fuel oil for heating. The Millwood Water Treatment Plant and its associated equipment along with Wastewater Facilities accounted for 76.9% of the Town’s electricity usage as well as 37.9% of the fuel oil.
Vehicle Fleet

The Town of New Castle’s Vehicle Fleet sector was the second largest GHG emitter at 611 MTCO2e or 21.1% of government operations emissions. Figure 5 shows that the Highway Department accounted for 32.7% of emissions in this category, followed by the Police Department at 28.8%. The Water Department at 12.4%, the Recycling Center at 11.6%, and Recreation and Parks at 11.4% contribute nearly equal amounts of emissions from their fleets. The Building Department and Town Hall vehicles contribute 1.7% and 1.3%, respectively. Emissions are generated from both gasoline and diesel fuel consumption.

![Figure 5: Fleet GHG Emissions by Department](image)

Buildings and Facilities

Buildings and facilities accounted for 20.5% of government operations emissions by the Town of New Castle, generating 595 MTCO2e in 2021. The Department of Public Works, which includes the New Castle Recycling Center⁶, is responsible for the most emissions at 237 MTCO2e (39.9%), followed by Recreation and Parks at 187 MTCO2e (31.3%) for their four facilities (ChapPAC, Community Center, Art Center, and Amsterdam Park), and Town Hall at 171 MTCO2e (28.7%).

⁶ The Recycling Center is also utilized by Recreation and Parks for landscaping equipment storage and maintenance.
Figure 6 shows emissions produced by these buildings through the consumption of electricity and fuel for heating.

Public Lighting
Finally, the last sector included in the government operations emission analysis is Public Lighting which accounted for 5.6% of GHG emissions. In 2017, the Town completed replacement of all the street and parking lot lighting with LEDs, thus reducing energy consumption by those devices of up to 90%.

Emissions by Source

Electricity
Looking at emissions by source (energy type), Figure 7 shows that electricity is the largest emitter in New Castle’s government operations at 1,755 MTCO2e. This is mostly attributable to power consumption by the Millwood Water Treatment Plant and associated equipment for lighting, pumps, ultraviolet treatment, and other operations. The Water Delivery/Wastewater sector is responsible for 76.9% of all electricity usage by the Town. Figure 3, Electricity Usage by Sector which appears in Key Findings, details this usage.

Fuel Oil
Fuel oil, used mainly for heating systems, is the second largest emitter with total emissions of 448 MTCO2e (15.5%). In this sector, again, the Millwood Water Treatment Plant is the single
largest consumer at 37.9%. Other facilities utilizing fuel oil are ChapPAC, the Art Center, and the Department of Public Works buildings.

**Gasoline and Diesel**

The combined emissions generated by gasoline and diesel fuel used to power the fleet accounts for 611 MTCO2e or about 21.1% of overall municipal operations. These totals include the New Castle fleet consisting of 108 vehicles and portable fuel for landscape equipment and generators.

**Natural Gas**

The lowest emitting source is natural gas which accounted for 82 MTCO2e (2.8%). Only three buildings in Town utilize natural gas for heating: Town Hall, the Community Center, and one water treatment satellite location.

![Figure 7: GHG Emissions by Energy Source](image)

**Cost by Source**

In addition to tracking energy consumption and generating emissions estimates, this report analyzes the costs of energy for governmental operations. During 2021, New Castle’s internal operations expenditures were approximately $1,214,000 across all energy sources for its
buildings, streetlights, water facilities, and vehicles. As seen in Figure 8, 77.6% percent of these energy expenses, totaling approximately $942,400, were the result of electricity purchases. Additionally, approximately $146,100 (12.1%) was spent on gasoline and diesel for the fleet with $125,500 (10.3 %) spent on natural gas and fuel oil for heating the Town’s buildings. In addition to reducing harmful greenhouse gases, any future reductions in energy consumption will reduce these costs.

Figure 8: Energy Cost by Energy Source

<table>
<thead>
<tr>
<th>Energy Source</th>
<th>Cost</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electricity</td>
<td>$942,400</td>
<td>77.6%</td>
</tr>
<tr>
<td>Fuel Oil</td>
<td>$103,500</td>
<td>8.5%</td>
</tr>
<tr>
<td>Natural Gas</td>
<td>$22,000</td>
<td>1.8%</td>
</tr>
<tr>
<td>Diesel</td>
<td>$53,100</td>
<td>4.4%</td>
</tr>
<tr>
<td>Gasoline</td>
<td>$93,000</td>
<td>7.7%</td>
</tr>
</tbody>
</table>
2005 vs. 2021 Comparison

Completed in 2009, the GHG Inventory for 2005 allows us to perform a comparison between that year and the results of this study of 2021 emissions for energy emission Scopes 1 and 2. Changes in emissions by sector and source can be quantified and the differences analyzed. Figures 9 and 10 below illustrate the change for each sector, source, and scope between these two years.

Comparison Emissions by Sector

Total GHG emissions generated by Town government operations across all sectors declined 18.9% between the two inventory reporting years. Within individual sectors, both declines and increases were seen with the greatest percentage decline of 29.4% from the Vehicle Fleet while the Public Lighting sector saw an increase of 16.9%. The Water Delivery/Wastewater Facilities sector saw the largest absolute decline, emitting 305 less MTCO2e. Total emissions across all sectors declined by 675 MTCO2e. Figure 9 and Table B present these results.

![Figure 9: 2005 vs 2021 Comparison Governmental Operations Emissions Change by Sector](image)

### Table B: Governmental Operations Emissions by Sector

<table>
<thead>
<tr>
<th>Category</th>
<th>2005 Inventory</th>
<th>% 2005 Emissions</th>
<th>2021 Inventory</th>
<th>% 2021 Emissions</th>
<th>Emissions Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water/Wastewater</td>
<td>1834.0</td>
<td>51.3%</td>
<td>1529.0</td>
<td>52.8%</td>
<td>-16.6%</td>
</tr>
<tr>
<td>Fleet</td>
<td>865.0</td>
<td>24.2%</td>
<td>610.7</td>
<td>21.1%</td>
<td>-29.4%</td>
</tr>
<tr>
<td>Buildings</td>
<td>734.0</td>
<td>20.6%</td>
<td>594.9</td>
<td>20.5%</td>
<td>-19.0%</td>
</tr>
<tr>
<td>Public Lighting</td>
<td>138.0</td>
<td>3.9%</td>
<td>161.3</td>
<td>5.6%</td>
<td>16.9%</td>
</tr>
<tr>
<td><strong>Totals</strong></td>
<td><strong>3,571.0</strong></td>
<td>100.0%</td>
<td><strong>2,895.9</strong></td>
<td>100.0%</td>
<td><strong>-18.9%</strong></td>
</tr>
</tbody>
</table>
Water Delivery/Wastewater Facilities
The Millwood Water Treatment Plant with its associated infrastructure such as pumps and water towers saw a slight increase in its emissions as a percentage of the Town’s total from 51.3% to 52.8%. The water system is by far the largest contributor to New Castle’s GHG emissions. The Plant consumes approximately 76.9% of the total electricity and 37.9% of the fuel oil used by the Town. Through a federal grant, in 2011 a solar wall was added to the Millwood Water Treatment Plant building which provides heated air to supplement the HVAC system, thus reducing fuel oil consumption.

Vehicle Fleet
A comparison of fuel consumption cannot be made as the 2005 inventory does not differentiate fuel oil from diesel fuel and does not specify the number of gallons of gasoline consumed. The overall decrease in emissions by the Vehicle Fleet of 29.4% was most likely attributable to the increase in efficiency mandated by the federal government through more stringent Corporate Average Fuel Economy (CAFÉ) standards for internal combustion vehicles as well as a possible reduction in miles traveled. A small contributing factor was the addition of one electric vehicle (EV) used for parking enforcement and another hybrid vehicle used by the Town Hall staff.

Buildings and Facilities
The decrease in emissions from the Buildings and Facilities sector is likely partly attributable to the increased efficiency of HVAC equipment and other devices such as computers and copiers. The retrofitting of 57% of lighting fixtures in Town-owned buildings to LEDs likely also contributed favorably. The largest factor in the decline is the reduction in the emissions factor for electricity by 42.9% between the two years due to decarbonization of the electric grid. Declines in emissions from existing buildings were likely greater than the 19.0% figure reported as the total GHG emissions includes the acquisition of the Chappaqua Performing Arts Center which accounts for 24.0% or 143 MTCO2e of the 2021 emissions from the Buildings and Facilities sector.

Public Lighting
This sector includes energy usage by the Consolidated Lighting District, Chappaqua Train Station, some lighting in the Millwood hamlet, and various parking lots. An increase in emissions of 16.9% was seen between the two inventories. Most of the streetlighting which is part of this sector was converted from either incandescent or high-pressure sodium to LED, with the project being completed in 2017. Reductions in cost for the Consolidated Lighting District of approximately 24% were seen during this period. This most likely contributed to a decrease in overall usage but was more than offset by the addition of other lighting such as at the Millwood Park ballfield and possibly greater use of other lighted fields.
Comparison of Emissions by Scope/Source

Emissions across all sources and scopes declined between the 2005 and 2021 inventories with emissions from the use of gasoline reduced by 297 MTCO2e or 46.2%. Distillates follow closely with a 233 MTCO2e reduction or 24.6%. Electricity saw only a 7.3% decline despite a 42.9% reduction in emissions factor due to a 62.4% increase in consumption.

Figure 10: 2005 vs 2021 Comparison Governmental Operations Emissions Change by Source/Scope

Table C: Governmental Operations Emissions by Source/Scope

<table>
<thead>
<tr>
<th>Category</th>
<th>2005 Inventory</th>
<th>2021 Inventory</th>
<th>2005 vs 2021</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>MTCO2e</td>
<td>Gross Consumption</td>
<td>MTCO2e</td>
</tr>
<tr>
<td>Nat Gas</td>
<td>89</td>
<td>16,604</td>
<td>81.8</td>
</tr>
<tr>
<td>Gasoline</td>
<td>642</td>
<td>n/a</td>
<td>345.4</td>
</tr>
<tr>
<td>Distillates</td>
<td>947</td>
<td>84,554</td>
<td>713.6</td>
</tr>
<tr>
<td>Scope 1</td>
<td>1,678</td>
<td>8,594</td>
<td>1,140.8</td>
</tr>
<tr>
<td>Scope 2</td>
<td>1,893</td>
<td>2,912,308</td>
<td>1,755.1</td>
</tr>
<tr>
<td>Totals</td>
<td>3,571</td>
<td>2,895.9</td>
<td></td>
</tr>
</tbody>
</table>

| Scope 1 Total | 1,678 | 1,140.8 | -32.0% | |
| Scope 2 Total | 1,893 | 1,755.1 | -7.3%  | |

7 Calculated based on MTCO2e and stated emissions factor in the 2005 Inventory Report
8 2005 Inventory Report emissions factors versus 2022 EIA Carbon Dioxide Emissions Coefficients
Natural Gas
As shown in Table C, comparing the 2005 results to 2021, declines in emissions due to natural gas were 8.1%. These declines were in part moderated by the transition of the New Castle Community Center from fuel oil to natural gas in 2020. This is the smallest source category which is comprised completely of building heating.

Gasoline
Gasoline saw the largest decrease in emissions by percentage at 46.2%. It is likely that increases in fuel efficiency in gasoline-powered vehicles and possibly less miles driven accounted for these reductions. The addition of one electric vehicle and one hybrid vehicle also may have had a small impact.

Distillates
Fuel oil for heating and diesel fuel to power fleet vehicles are the two components of the distillates source category. This category showed a significant decrease in emissions of 24.6% probably related to increased efficiency in HVAC equipment and fleet vehicles but mostly due to a consumption decrease of 18.5% or over 15,000 gallons. The conversion of the New Castle Community Center from fuel oil to natural gas contributed to the savings.

Electricity
Finally, electric consumption, which accounted for over 60.6% of emissions in 2021, showed a decrease in emissions of 7.3% between 2005 and 2021. This decrease in emissions was achieved despite an overall increase of 1,818,500 kWh in usage, due to the decarbonization of the electric grid.
Summary

The completion of this Government Operations GHG Emissions Inventory provides a comprehensive view of the Scope 1 and Scope 2 emissions for the Town of New Castle’s governmental operations broken down by sector, source, and scope. The granularity provided by this report and its associated data will enable the analysis of the Town’s emissions at a level suitable for the development of an effective plan for substantive carbon reductions.

Although increasing population, expansion of services, and the acquisition of the Chappaqua Performing Arts Center have caused increased consumption in some areas, overall emissions have seen a drop. During the period spanning the 2005 and 2021 inventories, the Town has undertaken initiatives which have actively reduced its carbon footprint. These include:

- Transitioning streetlights to LED bulbs
- Upgrading 57% of light fixtures in Town-owned buildings to LED
- Adding an electric vehicle and a hybrid vehicle to the fleet
- Converting the HVAC system at the New Castle Community Center from fuel oil to natural gas
- Installing a solar wall for heating at the Millwood Water Treatment Plant

However, most of the decrease in GHG emissions seen in the nearly two decades between inventories is related to passive reductions achieved by the decarbonization of the electric grid, increased vehicle fuel efficiency and other similar factors. As a result of the implementation of the Climate Leadership and Community Protection Act (CLCPA), these passive reductions will continue to support declines in GHG emissions by transitioning to a zero-emissions electric grid by 2040. To achieve the aggressive goals set by the CLCPA, it will also require both the Town and residents to adopt more efficient heating/cooling systems in conjunction with building envelope and insulation improvements while eliminating the use of fossil fuels.

Moving forward there are many opportunities for New Castle to implement meaningful active reduction programs at a municipal level, thus reducing its carbon footprint, including:

- Rooftop solar
- Solar canopies in parking areas
- Geothermal or air source heating and cooling systems

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9 A complete list of changes within government operations affecting GHG emissions generation was unavailable except for Town Hall.
- Fleet transition to EVs
- Transition to electric landscaping equipment
- Zero waste events hosted by the Town
- Decreased solid waste generation
- Greener procurement policies

Although this inventory provides an excellent snapshot of the Town’s Scope 1 and Scope 2 emissions at a moment in time, GHG emissions must be monitored on a continuing basis to assess the effectiveness of measures implemented to reduce its carbon footprint. Data for the analysis of Scope 1 and Scope 2 emissions are readily available; therefore, it is recommended that a Government Operations GHG Emissions Inventory be performed for these areas annually. Scope 3 emissions, which have been omitted from this report, include employee commute, government-generated waste, and material procurement, should be incorporated at least once every five years.

This Government Operations GHG Emissions Inventory is the first of several phases of this project. Subsequent phases will include a Community GHG Inventory and a Climate Action Plan. The Climate Action Plan will include emissions reduction targets and will identify specific quantifiable strategies that can cumulatively meet those goals. In the meantime, the Town of New Castle will continue to track key energy use and emissions indicators on a regular basis.

Future emissions reductions strategies for the Town of New Castle to consider for its Climate Action Plan include increasing energy efficiency and renewable energy investments, as well as vehicle fuel efficiency and/or electrification. Other key data points to collect and track include water and wastewater emissions, water delivery rates, government employee vehicle trips and employee commuter miles, as well as solid waste generation. These efforts and others will result in additional benefits to the Town of New Castle beyond reducing emissions, resulting in a better quality of life, increased economic activity, and monetary savings.