



## Ulster County 2021 Climate Smart Communities Recertification Documentation

### PE2 Action: Community Greenhouse Gas Emissions Inventory

**Background:** The [Mid-Hudson Regional Greenhouse Gas Emissions Inventory](#) (2012) results were included as part of Ulster County's initial Climate Smart Communities (CSC) certification materials submitted in 2016. In 2020-21, the County Department of the Environment completed a new community Greenhouse Gas Emissions (GHGI) inventory using the ICLEI-Local Governments for Sustainability [ClearPath](#) software.

The initial GHGI used 2010 as the baseline year, with the new GHGI using 2018. Although the methodology used to estimate community-scale greenhouse gas (GHG) emissions was not exactly the same across the two inventories, both GHGIs are intended to be compliant with available protocols (such as the New York State GHG Protocol and the [US Community Protocol](#)), and are therefore comparable to the greatest extent possible. The 2018 community GHGI estimates community GHG emissions of 1,823,672 MT CO<sub>2</sub>e, representing about an 11.2% reduction from the 2010 baseline of 2,052,894 MT CO<sub>2</sub>e. However it is not clear to what extent the differences in accounting and calculations across the various sectors may have contributed to the results.

Ulster County will use these GHGIs as part of its ongoing climate mitigation planning and initiatives, including development of a community-scale Climate Action Plan as a next step. The County is also participating in the 2020-21 ICLEI Integrated Climate Action Planning cohort with a group of municipalities country-wide, which will support integration of the County's climate adaption and mitigation efforts for both government operations and the broader community.

#### Documentation:

- Ulster County Community Climate Action webpage (GHGI available here): <https://ulstercountyny.gov/environment/climate-action>
- 2010 Community GHGI: Mid-Hudson Region Community GHG Inventory - Executive Summary for Ulster County
- Ulster County 2018 Inventory of Community-wide Greenhouse Gas Emissions
- Included as separate documents:
  - Appendix A: The detailed inventory report dataset from ICLEI's ClearPath software is attached as an excel file
  - Appendix B: The emissions factors and activity dataset from ICLEI's ClearPath software is attached as an excel file
  - Appendix C: Summary Report GHG Inventory for Forests and Trees Outside Forests, 2004 to 2013 - Ulster County, New York

# Ulster County

## Community GHG Inventory Executive Summary



## Climate Smart Communities

The Ulster County’s community greenhouse gas (GHG) inventory identified and quantified the sources of GHG emissions from community activities and established a baseline from which future emissions reductions and progress can be measured. New York State conducted regional GHG emissions inventories for the baseline year 2010, which included emissions for each community in the Mid-Hudson Region. **Table 1** lists Ulster County’s emission sectors and **Figure 1** shows GHG emissions associated with each sector. Mobile Energy (transportation) is Ulster County’s largest source of GHG emissions, comprising approximately 52% of 2010 community emissions, with the residential (20%) and commercial (16%) sectors representing the two other largest sources of GHG emissions.

2010 TOTAL COMMUNITY GHG EMISSIONS  
OF 2,052,894 MTCO<sub>2e</sub>

IS EQUIVALENT TO CO<sub>2</sub> EMISSIONS FROM

443,515

230,999,662



Passenger vehicles driven for one year



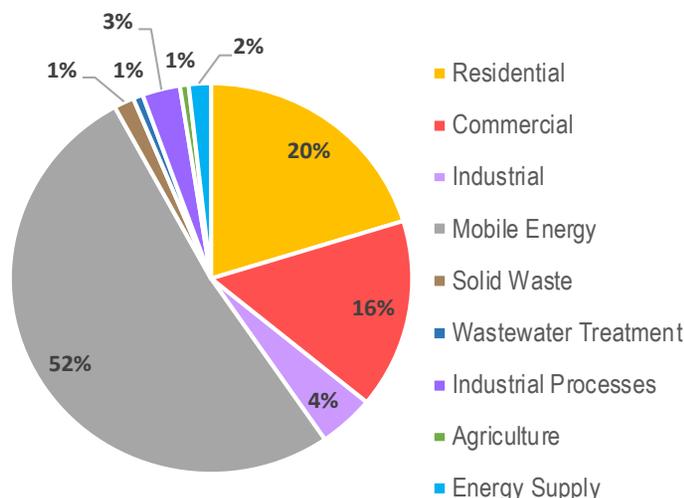
gallons of gasoline consumed

### Ulster County

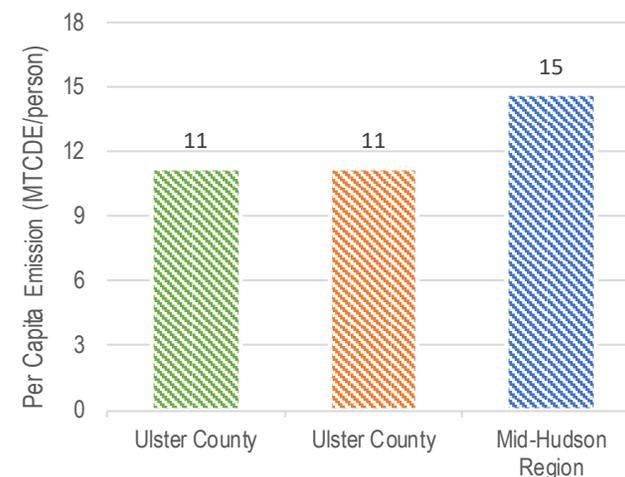
TABLE 1: Community GHG Inventory (2010)

GHG EMISSION SECTORS	MTCO <sub>2e</sub> *
Residential	451,256
Commercial	349,919
Industrial	100,290
Mobile Energy	1,151,440
Solid Waste	36,203
Wastewater Treatment	17,754
Industrial Processes	67,738
Agriculture	15,645
Energy Supply	39,744
<b>Total Emissions</b>	<b>2,052,894</b>
Population	182,493
Per Capita Emissions	11

FIGURE 1: Community GHG Emissions by Sector (2010)



HOW DO PER CAPITA EMISSIONS COMPARE TO COUNTY AND REGIONAL AVERAGES?



\*Metric Tons of Carbon Dioxide Equivalent

# Ulster County

## 2018 Inventory of Community-wide Greenhouse Gas Emissions



**March 2021**

**Produced by the Ulster County Department of the Environment**

With Assistance from ICLEI - Local Governments for Sustainability USA

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## Executive Summary

Ulster County recognizes that greenhouse gas (GHG) emissions from human activity are catalyzing profound climate change, the consequences of which pose substantial risks to the future health, wellbeing, and prosperity of our community. This report provides estimates of GHGs resulting from activities in Ulster County as a whole in 2018, and compares these to the 2010 community GHG inventory, which is used as the baseline to measure against.

Per [Executive Order 1-2019](#), the Ulster County government “shall support ways to decrease energy use, decrease greenhouse gas emissions and increase the use of green power across our community and sets a goal of decreasing community wide greenhouse gas emissions by 80% by 2050 (below 1990 levels) using the regional GHG emissions inventory as a baseline.”

The Inventory Results section of this report provides a detailed profile of emissions sources within Ulster County; information that will be key to guiding local reduction efforts. These data will also provide an annual reference against which the County will be able to compare future performance and demonstrate progress in reducing emissions.

# Climate Change Background

Naturally occurring gases dispersed in the atmosphere determine the Earth’s climate by trapping solar radiation. This phenomenon is known as the greenhouse effect. Overwhelming evidence shows that human activities are increasing the concentration of greenhouse gases and changing the global climate. The most significant contributor is the burning of fossil fuels for transportation, electricity generation and other purposes, which introduces large amounts of carbon dioxide and other greenhouse gases into the atmosphere. Collectively, these gases intensify the natural greenhouse effect, causing global average surface and lower atmospheric temperatures to rise. Global climate change influences seasonal patterns and intensifies weather events, threatening the safety, quality of life, and economic prosperity of communities everywhere<sup>1</sup>. Many regions are already experiencing the consequences of global climate change, and Ulster County is no exception.

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<sup>1</sup> International Panel on Climate Change. 2014. Climate Change 2014: Synthesis Report. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, R.K. Pachauri and L.A. Meyer (eds.)]. IPCC, Geneva, Switzerland, 151 pp. Retrieved from <https://www.ipcc.ch/report/ar5/syr/>

## Climate Hazards

Climate change is already impacting Ulster County and will likely accelerate in the future. According to the National Climate Assessment<sup>2</sup>, between 1895 and 2011, temperatures in the Northeast increased by almost 2°F (0.16°F per decade), and precipitation increased by approximately five inches, or more than 10% (0.4 inches per decade). Coastal flooding has increased due to a rise in sea level of approximately 1 foot since 1900. The Northeast has experienced a greater recent increase in extreme precipitation than any other region in the United States: between 1958 and 2010 the region saw more than a 70% increase in the amount of precipitation falling in very heavy events (defined as the heaviest 1% of all daily events).

Projected Climate Change: As in other areas, the amount of warming in the Northeast will be highly dependent on global emissions of heat-trapping gases. If GHG emissions continue to increase, warming of 4.5°F to 10°F is projected by the 2080s; if global GHG emissions were reduced substantially, projected warming still ranges from about 3°F to 6°F by the 2080s. Heat waves, heavy downpours, and sea level rise pose growing challenges to many aspects of life in the Northeast.

The New York State Energy Research & Development Authority's (NYSERDA) *ClimAID Report (2014 Supplement)*<sup>3</sup> includes projections for the following climate hazards in Region 2 – Port Jervis, where Ulster County is located:

- Precipitation is projected to increase by approximately -1 to +10 percent by the 2020s; 1 to 14 percent by the 2050s, and 2 to 18 percent by the 2080s. Although the increase in total annual precipitation is projected to be relatively small, larger increases are projected in the frequency, intensity, and duration of extreme precipitation events (defined as events with more than 1, 2, or 4 inches of rainfall) at daily timescales.
- The total number of hot days in New York State is expected to increase as this century progresses. The frequency and duration of heat waves, defined as three or more consecutive days with maximum temperatures at or above 90 °F, are also expected to increase.
- Sea level is projected to rise along the New York State coastline and in the tidal Hudson by 3-8 inches by the 2020s, 9-21 inches by the 2050s, and 14-39 inches by the 2080s. The high-end estimate for sea level rise by the 2080s is 58 inches.

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<sup>2</sup> *Third National Climate Assessment*. Available at: <https://nca2014.globalchange.gov/report>.

<sup>3</sup> *ClimAID 2014 Supplement - Updated Climate Projections Report*: Available at: <https://www.nyseda.ny.gov/About/Publications/Research-and-Development-Technical-Reports/Environmental-Research-and-Development-Technical-Reports/Response-to-Climate-Change-in-New-York>

A key next step in planning for the impacts of climate change in Ulster County will include identifying and assessing local vulnerabilities to these and other potential primary and secondary climate hazards, and developing strategies and tools to address them.

### **Climate Action Planning**

Many communities in the United States have started to take responsibility for addressing climate change at the local level. Reducing fossil fuel use in the community can have many benefits in addition to reducing greenhouse gas emissions. More efficient use of energy decreases utility and transportation costs for residents and businesses. Retrofitting homes and businesses to be more efficient creates local jobs. In addition, money not spent on energy is more likely to be spent at local businesses and will add to the local economy. Reducing fossil fuel use improves air quality and increasing opportunities for walking and bicycling improves residents' health. In 2021, the Ulster County government is launching its [Green New Deal](#) initiative and a climate adaptation planning project. These activities will include community stakeholder engagement in a climate action discussion to inform a community climate action plan.

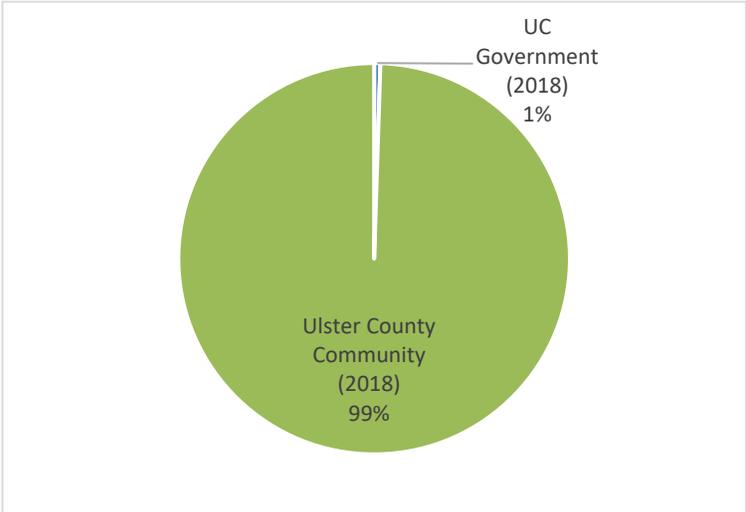
# Inventory Methodology

## Understanding a Greenhouse Gas Emissions Inventory

The first step toward achieving tangible greenhouse gas emission reductions requires identifying baseline emissions levels and sources and activities generating emissions in the community. This report presents emissions from the Ulster County community, which includes operations of the Ulster County government. Government operations is mostly a subset of the community inventory, as shown in Figure 1. For example, data on commercial energy use by the community includes energy consumed by municipal buildings, and community vehicle-miles-traveled estimates include miles driven by municipal fleet vehicles.

As local governments have continued to join the climate protection movement, the need for a standardized approach to quantify GHG emissions has proven essential. This inventory uses the approach and methods provided by the *U.S. Community Protocol for Accounting and Reporting Greenhouse Gas Emissions* (Community Protocol) which is described below. As needed, the methodology provided by the *U.S. Community Protocol* has been supplemented by the *New York Community and Regional GHG Inventory Guidance, Version 1.0*.<sup>4</sup>

**Figure 1 Relationship of Community and Government Operations Emissions**



<sup>4</sup> Available here: [https://climatesmart.ny.gov/fileadmin/csc/documents/GHG\\_Inventories/ghgguide.pdf](https://climatesmart.ny.gov/fileadmin/csc/documents/GHG_Inventories/ghgguide.pdf)

Three greenhouse gases are included in this inventory: carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>) and nitrous oxide (N<sub>2</sub>O). Many of the charts in this report represent emissions in “carbon dioxide equivalent” (CO<sub>2</sub>e) values, calculated using the Global Warming Potentials (GWP) for methane and nitrous oxide from the *IPCC 5<sup>th</sup> Assessment Report*:

**Table 1 Global Warming Potential Values (IPCC, 2014)**

Greenhouse Gas	Global Warming Potential
Carbon Dioxide (CO <sub>2</sub> )	1
Methane (CH <sub>4</sub> )	28
Nitrous Oxide (N <sub>2</sub> O)	265

## Community Emissions Protocol

Version 1.2 of the U.S. *Community Protocol for Accounting and Reporting GHG Emissions*<sup>5</sup> was released by ICLEI in 2019 and represents a national standard in guidance to help U.S. local governments develop effective community GHG emissions inventories. It establishes reporting requirements for all community GHG emissions inventories, provides detailed accounting guidance for quantifying GHG emissions associated with a range of emission sources and community activities, and provides a number of optional reporting frameworks to help local governments customize their community GHG emissions inventory reports based on their local goals and capacities.

## Quantifying Greenhouse Gas Emissions

### Sources and Activities

Communities contribute to greenhouse gas emissions in many ways. Two central categorizations of emissions are used in the community inventory: 1) GHG emissions that are produced by “sources” located within the community boundary, and 2) GHG emissions produced as a consequence of community “activities”.

Source	Activity
Any physical process inside the jurisdictional boundary that releases GHG emissions into the atmosphere	The use of energy, materials, and/or services by members of the community that result in the creation of GHG emissions.

By reporting on both GHG emissions sources and activities, local governments can develop and promote a deeper understanding of GHG emissions associated with their communities. A purely source-based emissions inventory

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<sup>5</sup> ICLEI. 2012. *US Community Protocol for Accounting and Reporting Greenhouse Gas Emissions*. Retrieved from <http://www.iclei.org/tools/ghg-protocol/community-protocol>

could be summed to estimate total emissions released within the community's jurisdictional boundary. In contrast, a purely activity-based emissions inventory could provide perspective on the efficiency of the community, even when the associated emissions occur outside the jurisdictional boundary.

## Baseline Year

The inventory process requires the selection of a base year with which to compare current emissions. Ulster County's community GHG inventory utilizes 2010 as its baseline year. The 2010 Mid-Hudson Regional GHG Inventory was the first community wide GHG inventory completed for Ulster County and serves as the best reference point for comparing recent year emission and tracking progress against Ulster County government GHG emissions goals.

## 2010 Mid-Hudson Regional GHG Inventory

New York State conducted regional GHG emissions inventories for the baseline year 2010, which included emissions for each community in the Mid-Hudson Region<sup>6</sup>. To align the methods used with those used by other regions in New York State, the State convened the NYGHG Working Group to develop a standard New York GHG Protocol (NYGHG Protocol). The Inventory was developed based on the latest methods determined by the NYGHG Working Group at the time, as well as the latest data provided to that group. As inventory protocols were not finalized for all sources, and several data sources requested through the NYGHG Working Group were not available in time for publication, the 2010 Inventory is not directly comparable to new 2018 Inventory completed using ICLEI's ClearPath software. The 2010 Inventory generally used similar data sources, methodology, and calculations for the largest emissions sectors however, as compared to the 2018 Inventory, and therefore will continue to serve as a useful reference point for quantifying and tracking Ulster County community GHGs over time.

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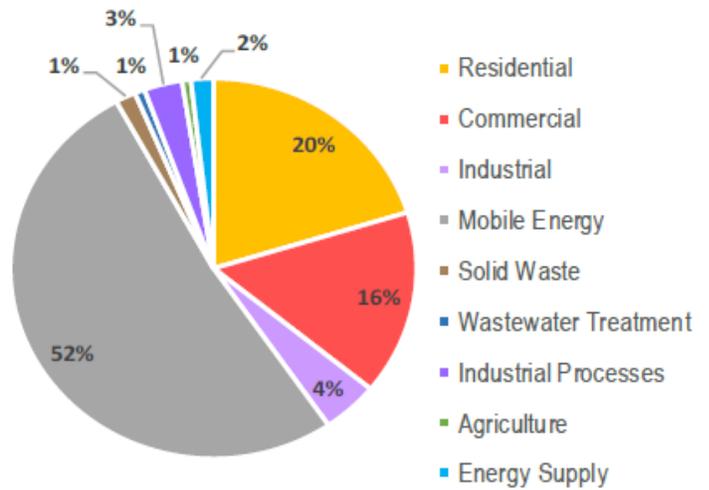
<sup>6</sup> *Mid-Hudson Regional Greenhouse Gas Emissions Inventory Final Report for Mid-Hudson Tier II Regional Greenhouse Gas Emissions (GHG) Inventory (2012)*. Available at:

[https://climatesmart.ny.gov/fileadmin/csc/documents/GHG\\_Inventories/midhudghginventory.pdf](https://climatesmart.ny.gov/fileadmin/csc/documents/GHG_Inventories/midhudghginventory.pdf)

**Figure 2** lists Ulster County’s emission sectors and shows the GHG emissions associated with each sector, with total community GHG emissions estimated at 2,052,895 MT CO<sub>2</sub>e in 2010. Mobile Energy (transportation) was Ulster County’s largest source of GHG emissions, comprising approximately 52 percent of 2010 community emissions, with residential (20%) and commercial (16%) the next largest sources.

**Figure 2: Ulster County 2010 Community GHG Inventory**

GHG EMISSION SECTORS	MTCO <sub>2</sub> e*
Residential	451,256
Commercial	349,919
Industrial	100,290
Mobile Energy	1,151,440
Solid Waste	36,203
Wastewater Treatment	17,754
Industrial Processes	67,738
Agriculture	15,645
Energy Supply	39,744
<b>Total Emissions</b>	<b>2,052,894</b>
Population	182,493
Per Capita Emissions	11



\*Metric Tons of Carbon Dioxide Equivalent

## 2018 Ulster County Community GHG Inventory

### Quantification Methods

Greenhouse gas emissions can be quantified in two ways:

- Measurement-based methodologies refer to the direct measurement of greenhouse gas emissions (from a monitoring system) emitted from a flue of a power plant, wastewater treatment plant, landfill, or industrial facility.
- Calculation-based methodologies calculate emissions using activity data and emission factors. To calculate emissions accordingly, the basic equation below is used:

$$\text{Activity Data} \times \text{Emission Factor} = \text{Emissions}$$

Most emissions sources in this inventory are quantified using calculation-based methodologies. 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. Please see appendices for a detailed listing of the activity data used in composing this inventory.

Known emission factors are used to convert energy usage or other activity data into associated quantities of emissions. Emissions factors are usually expressed in terms of emissions per unit of activity data (e.g. lbs CO<sub>2</sub>/kWh of electricity). For this inventory, calculations were made using ICLEI's ClearPath tool.

# 2018 Community Emissions Inventory Results

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

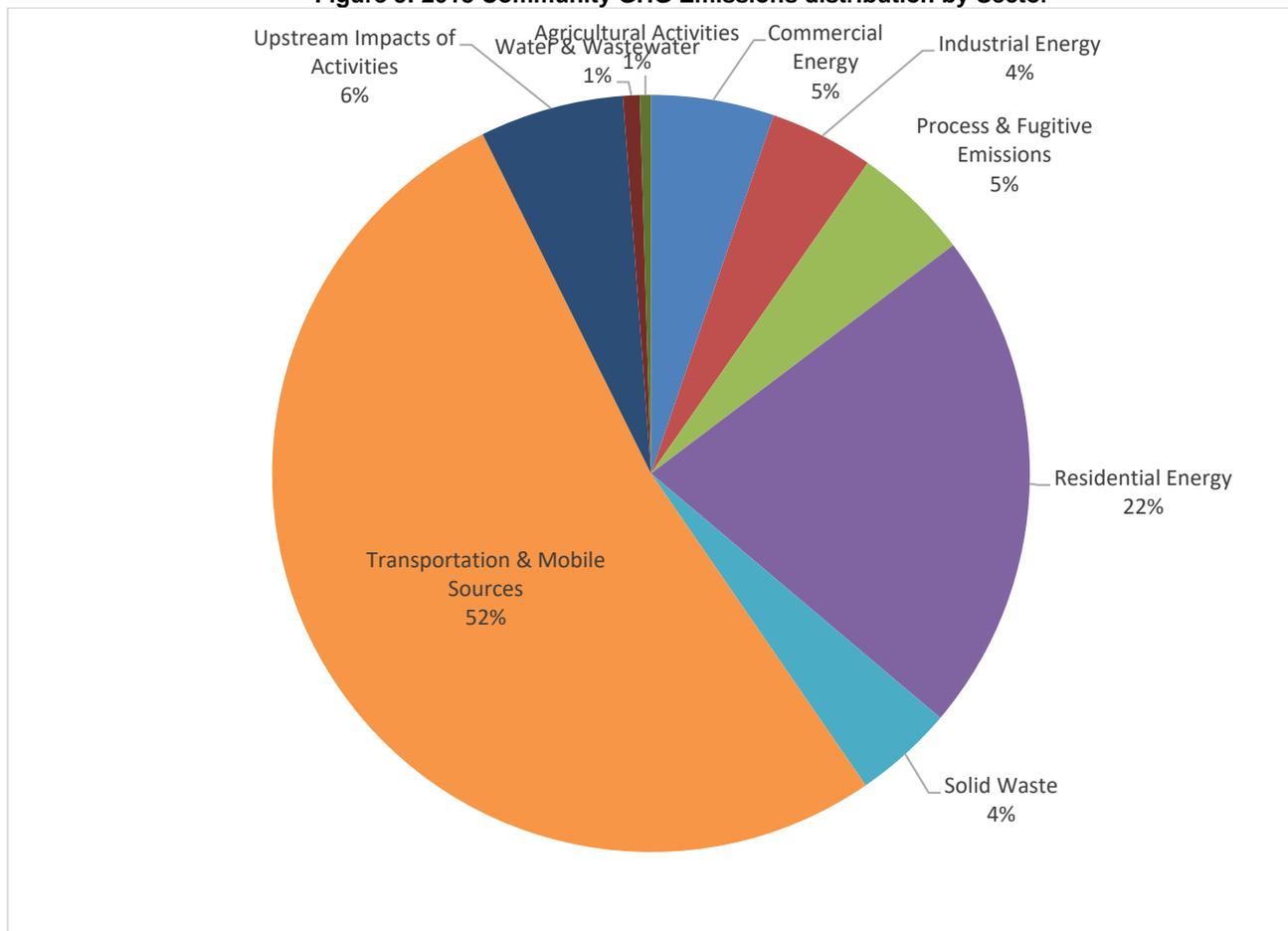
**Table 2 Communitywide Emissions Inventory**

Sector	Fuel or source	2018 Usage	Usage unit	2018 Emissions (MTCO <sub>2</sub> e)
Residential energy	Electricity	1,233,888	MWh	142,234
	Natural Gas	1,095,696	MMBtu	58,276
	Propane	429,164	MMBtu	26,633
	Fuel oil (Distillate Oil #2)	2,208,712	MMBtu	164,453
<b>Residential energy total</b>				<b>391,596</b>
Commercial energy	Electricity	269,235	MWh	31,036
	Natural gas	747,003	MMBtu	39,730
	Fuel Oil	1,352,887	Gallons	13,901
	Propane	1,955,033	Gallons	11,041
<b>Commercial energy total</b>				<b>95,707</b>
Industrial energy	Electricity	N/A	N/A	N/A
	Natural gas	N/A	N/A	N/A
<b>Industrial energy total</b>				<b>81,102</b>
On-road transportation	Gasoline	N/A	N/A	839,046
	Diesel	N/A	N/A	112,470
Transit	Gasoline & Diesel	N/A	N/A	1,580
<b>Transportation total</b>				<b>953,095</b>
Solid Waste	MSW (via UCCRA, generated in-county) - Landfill disposal	101,379	Tons	66,219
	MSW (via UCCRA, generated in-county) - Transport to landfill	101,379	Tons	6,784
	MSW (via UCCRA, generated in-county) - Landfilling process emissions	101,379	Tons	1,662.6
	Other MSW (via UCCRA) - Transport to landfill	29,201.21	Tons	1,954
	Biosolids - Landfill disposal	3,680	Tons	2404
	Biosolids - Transport to landfill	3,680	Tons	190
	Biosolids - Landfilling Process Emissions	3,680	Tons	60
<b>Solid waste total</b>				<b>77,319</b>
Upstream impacts of activities	Electricity consumption	1,503.123	MWh	54,227
	Natural gas consumption	921,350	MMBtu	22,587
	Fuel oil consumption	17,358,046	Gallons	35,153
	Propane consumption	429,164	MMBtu	46
<b>Upstream impacts of activities total</b>				<b>112,013</b>
Water and wastewater	Fugitive Emissions from Septic Systems (population based)	106,238		12,908

	Process N2O Emissions (population based)	71,335		76
<b>Water and wastewater total</b>				<b>12,983</b>
Agricultural Activities	Livestock (enteric fermentation)			6,000
	Livestock (manure treatment & handling)			2,000
	Agricultural Soils (fertilizers & plant residues) * <i>fertilizer use data not available</i>			610
<b>Agricultural Activities total</b>				<b>8,610</b>
Fugitive	Natural gas leakage (T&D losses)	N/A	N/A	19,475
	ODS	N/A	N/A	66,521
	Sulfur Hexaflouride	N/A	N/A	5,251
<b>Fugitive total</b>				<b>91,247</b>
<b>Total communitywide emissions</b>				<b>1,823,672</b>

Figure 3 shows the distribution of communitywide emissions by sector. Transportation & Mobile Sources is the largest contributor, followed by residential energy and upstream impacts of activities.

**Figure 3: 2018 Community GHG Emissions distribution by Sector**



### Forests – Emissions & Removals

Nature based GHG accounting associated with land use and land use change is not required in the *U.S. Community Protocol* reporting framework, however it is important to consider in community GHG accounting. Land

management practices can result in significant GHG emissions or removals (sequestration), as can land use change over time.

The US Community Protocol's Land Emissions and Removals Navigator (LEARN) tool<sup>7</sup> was used to calculate GHG emissions and removals from forests in Ulster County and to generate the *Summary Report GHG Inventory for Forests and Trees Outside Forests, 2004 to 2013 Ulster County, New York* (Appendix C). The land cover change data is from the National Land Cover Database, 2004 and 2013, and although there are significant uncertainties in the estimates included in the report, the overall importance of forests and other land uses and land management practices in GHG accounting is a known entity.

#### Key Report Findings:

- Over the period 2004 to 2013, emissions from forests and trees were 104,963 MT CO<sub>2</sub>e per year.
- Over the period 2004 to 2013, **the Net GHG balance of forests and trees was -1,478,214 MT CO<sub>2</sub>e per year.**
- Roughly 81% of Ulster County's total land base of 300,591 hectares (742,776 acres) is forest. Many areas outside of forests are also covered by trees, including an average of nearly 23.6 percent tree canopy on lands outside of forest areas
- Over the same period, annual CO<sub>2</sub> removals from forests and trees were -1,583,176 t CO<sub>2</sub>e per year. (Carbon removals are represented by negative values.)
- Total GHG emissions for Ulster County across all sectors could be reduced if additional forests/trees were added to its land base, and/or if losses of trees were reduced further.

Ulster County's forests function as a net carbon sink, sequestering an estimated 1,478,214 MT CO<sub>2</sub>e annually. This represents a theoretical offset of about 81% against the County's 1,823,672 MT CO<sub>2</sub>e annual community GHG emissions.

Ulster County's 2008 Open Space Plan<sup>8</sup> identified 236,499 (32%) of the County's total acreage of 742,769 as protected open space. This protected open space includes other land uses, in addition to forests, and will continue to sequester a significant amount of carbon in perpetuity, while the portion of open space which is not protected may be threatened by future land use change. In considering this, the potential for GHG emissions sequestration, in concert with other key considerations, could be used as part of the criteria for identifying and planning for the "Priority Conservation Areas" and "Priority Growth Areas" outlined in the Open Space Plan. Maps

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<sup>7</sup> Available at: <https://icleiusa.org/learn/>.

<sup>8</sup> Available at: <https://ulstercountyny.gov/planning/open-space-plan>, from *Final Mapbook* Map 1: Protected Open Space.

identifying GHG sequestration potential could also potentially be included in the next planned update to the Natural Resources Inventory, which the Open Space Plan is built upon.

### Consumption-based GHG Inventory

A consumption-based GHG inventory offers an alternative approach to accounting for community scale GHG emissions and is different than a traditional production-based inventory which accounts only for GHG emissions that are produced within the geographic boundary of the community being measured. Although the production-based inventory outlined above in this report is the standard approach used for GHG emissions accounting and is compliant with the *U.S. Community Protocol*, the Protocol also includes *Appendix I: Consumption-Based Emissions (2013)* for accounting of consumption-based emissions. Berkeley’s *CoolClimate Data*<sup>9</sup> for Ulster County were used for this consumption-based inventory, as recommended in the Protocol’s *Appendix I: Consumption-Based Emissions*.

The consumption-based inventory (Table 3) estimates that Ulster County’s annual GHG emissions are 3,142,002 MT CO<sub>2</sub>e, which is about 58% higher than the production-based total of 1,823,672. This discrepancy reiterates the potential significance of accounting for all of the GHG emissions associated with the goods and services consumed within a community.

**Table 3**

<b>GHG Emissions Sector</b>	<b>Annual Household Emissions (%)</b>	<b>Annual Household Emissions (MT CO<sub>2</sub>e)</b>	<b>Ulster County Total Emissions (MT CO<sub>2</sub>e)</b>
Transport	33%	14.96	1,036,947.31
Housing	26%	11.80	817,780.29
Food	16%	7.45	516,404.59
Services	13%	5.88	407,540.83
Goods	12%	5.24	363,329.15
<b>Total</b>		<b>45.33</b>	<b>3,142,002.17</b>

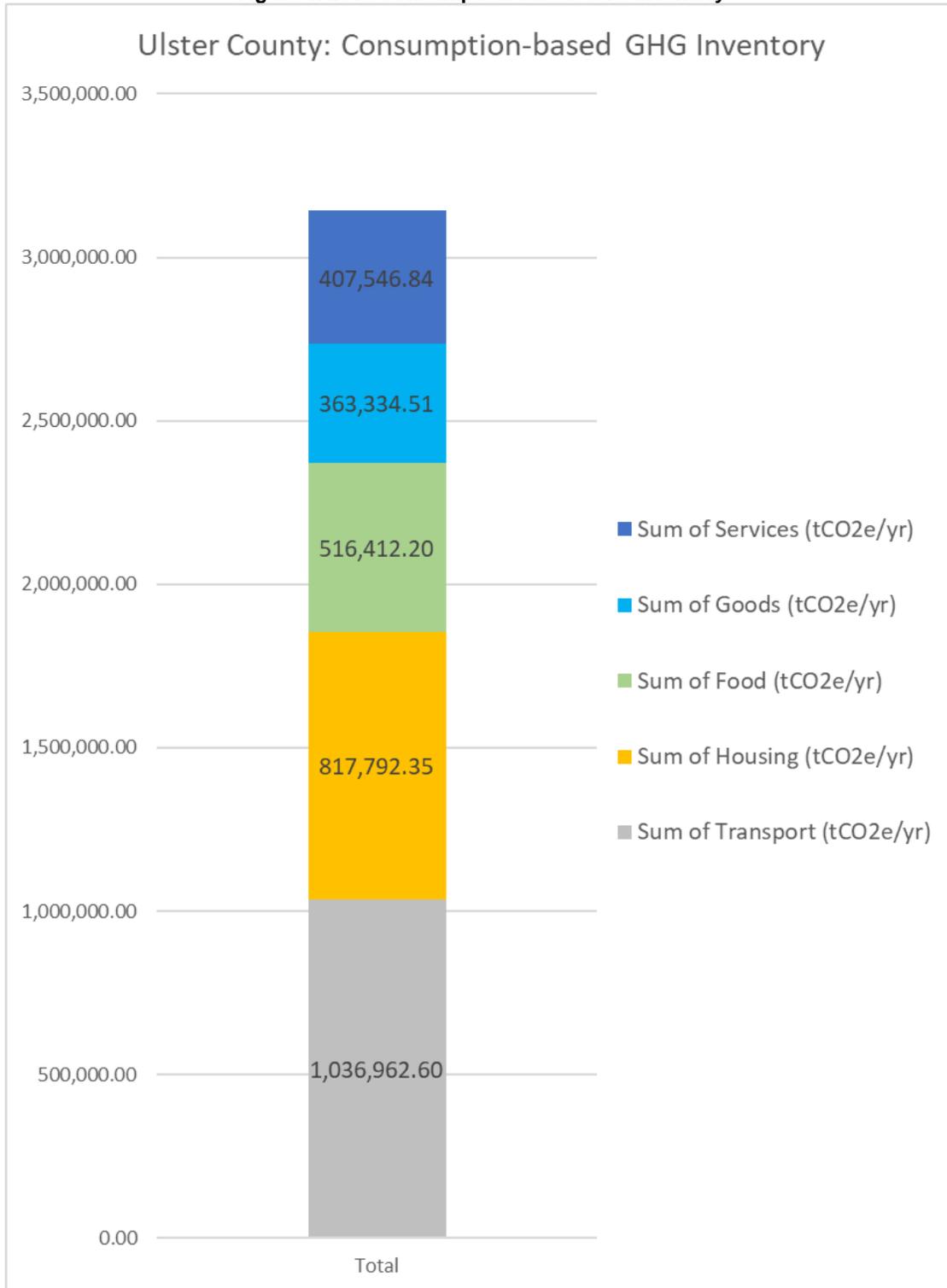
The consumption-based inventory accounts for GHG emissions that occur as a result of the food, goods, and services consumed by community residents, and includes household transportation and heating. This approach accounts for GHG emissions at the point of consumption, attributing all GHG emissions occurring in the course of production and distribution of goods and services – this includes upstream impacts – to the final consumers of those goods and services. This can present a more actionable approach to community GHG emissions accounting

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<sup>9</sup> Available for download at: <https://coolclimate.org/data>. Data are from the following paper: Christopher M. Jones and Daniel M. Kammen, *Spatial Distribution of U.S. Household Carbon Footprints Reveals Suburbanization Undermines Greenhouse Gas Benefits of Urban Population Density*. *Environ. Sci. Technol.*, 2013, dx.doi.org/10.1021/es4034364.

and can help community residents plan for changes to their household’s consumption habits in order to reduce their individual carbon footprints.

**Figure 4: 2018 Consumption-based GHG Inventory**



# Conclusion

This inventory serves as an update to the 2010 Mid-Hudson Regional GHG inventory with improved methodology due to the application of ICLEI's *U.S. Community Protocol for Accounting and Reporting GHG Emissions*. The County will continue to track key energy use and emissions indicators on an on-going, annual basis to update and improve this inventory while increasing compliance with the accounting and reporting methods detailed in the U.S. Community Protocol. As additional sources of community emissions data are developed, the County will implement adjustments to its 2010 baseline year inventory.

The next step is to develop a climate action plan that identifies specific, quantified strategies that can cumulatively meet Ulster County's community GHG reduction target as well as supporting the State's Climate Act (CLCPA) goals.

# Appendices: Detailed Reports and data from ICLEI ClearPath

## Inventory Calculations

The 2018 inventory was calculated following the *US Community Protocol* and ICLEI's ClearPath software. As discussed in Inventory Methodology, the *IPCC 5th Assessment* was used for global warming potential (GWP) values to convert methane and nitrous oxide to CO<sub>2</sub> equivalent units. ClearPath's inventory calculators allow for input of the sector activity (i.e. kWh or VMT) and emission factor to calculate the final CO<sub>2</sub>e emissions.

## Appendix A

The detailed inventory report dataset from ICLEI's ClearPath software is attached as an excel file (APPENDIX A).

## Appendix B

The emissions factors and activity dataset from ICLEI's ClearPath software is attached as an excel file (APPENDIX B).

## Appendix C

*Summary Report GHG Inventory for Forests and Trees Outside Forests, 2004 to 2013 - Ulster County, New York* (APPENDIX C).



## PE2 Action: Community GHG Inventory

16 Points



BRONZE PRIORITY



SILVER PRIORITY

### A. Why is this action important?

Understanding the sources of greenhouse gas (GHG) emissions and establishing a GHG baseline are critical first steps in the local climate action process. A community GHG inventory is an accounting, analysis, and report of the GHG emissions resulting from transportation fuels, waste, energy usage in buildings, and other sources within a given geographic boundary.

Government operations typically account for less than three percent of a community's emissions. It is therefore important to understand how the industries, businesses, schools, homes, and vehicles in the entire community are contributing to climate change. Community GHG inventories provide the data needed to set realistic goals and track progress toward reducing costs, energy use, and emissions. By identifying the largest sources of emissions in the community, GHG inventories help local governments focus policies and incentives on the most important sectors. All Climate Smart Communities should prioritize completing a community GHG inventory as a foundational step that enables the community to establish a baseline against which to measure progress over time.

### B. How to implement this action

Community inventories should include all GHG emissions that occur physically within the boundary and, to the extent possible, those that occur indirectly regardless of location because of community activity or consumption. Therefore, GHG sources are labeled as one of the following:

- Direct emissions that occur physically within a boundary, such as those emitted by burning natural gas or fuel oil in homes, schools, and businesses (known as Scope 1)
- Indirect emissions from utility energy generation plants based on the amount of electricity (or other utilities such as hot water or steam) consumed within the boundary, regardless of where the plants are located (known as Scope 2)
- Other indirect, upstream, or lifecycle emissions attributed to community activity regardless of where they occur (known as Scope 3)

A municipality may not earn Climate Smart Communities (CSC) certification points for an inventory that covers only the county or region within which the municipality is located; the municipality must submit an inventory that corresponds with its municipal boundaries.

In general, the CSC program recommends that inventories adhere to ICLEI's [US Community Protocol for Accounting and Reporting of Greenhouse Gas Emissions \(US Community Protocol\)](#). This national standard advises communities to include a variety of direct and indirect sources they can control or influence with local and regional policy. While the US Community Protocol provides a methodology tailored to US communities, those communities interested in reporting to international registries such as [carbonn Climate Registry](#) should also consult the [Global Protocol for Community-Scale Emissions](#).

Fortunately, there is also guidance that is specific to New York State (NYS). The [2015 New York Community and Regional Greenhouse Gas Inventory Guidance](#) is a collection of methods and data sources applicable to the state that was created by the NYS GHG Working Group. The guide can be considered a compendium guide to the US Community Protocol, but it can also be used as a standalone guide. It does not cover all sources discussed in the US Community Protocol but includes enough information to complete a basic GHG inventory suitable for most regions or communities. In some cases,

the NYS GHG Working Group recommendations differ from the US Community Protocol. For example, the US Community Protocol recommends that communities use electricity (Scope 2) emission factors developed by the US EPA Emissions & Generation Resource Integrated Database ([eGRID](#)). It is acceptable under the CSC program to either use eGRID or follow the guidance that NYSERDA currently has in place regarding Scope 2 emissions factors.

Community inventories that comply with the New York Community and Regional Greenhouse Gas Inventory Guidance, US Community Protocol, or the Global Protocol for Community-Scale Emissions are eligible for points under the CSC Certification Program.

### C. Time frame, project costs, and resource needs

Conducting a community GHG emissions inventory can take between three to six months, depending on the availability and quality of the data. Community GHG emissions inventories usually take less time than local government operations inventories because community inventories rely heavily on estimates of community-wide energy use and other activities, rather than on the large quantity of direct data that is required for local government operations inventories. The cost of producing a community inventory may include paying a consultant or an intern, or possibly covering the cost of staff time. In addition, some local governments choose to pay for the use of a community GHG inventory tool. However, free tools for community inventories are available. One example is the community module of the [US EPA Local GHG Inventory Tools](#). Contact [climatesmart@dec.ny.gov](mailto:climatesmart@dec.ny.gov) with questions about other free tools.

### D. Which local governments implement this action? Which departments within the local government are most likely to have responsibility for this?

This action is applicable to all types of local governments. Planning departments or offices that lead climate and/or sustainability efforts are often responsible for managing the creation of GHG inventories. If local leaders choose to host a community event to share the findings, a public relations officer or communications staff could be involved as well.

### E. How to obtain points for this action

A community GHG inventory report that is consistent with the requirements described here is eligible for a total of 16 points.

### F. What to submit

Submit a copy of a community GHG inventory report that was completed within five years prior to the application date.

The report must include a section describing the methodology and how it complies with established protocols. The inventory report can be a standalone document, or it can be integrated into another report or plan.

Provide evidence that the report was released to the public; for example, it could be posted on a government website or made available for review at a local library.

All CSC action documentation is available for public viewing after an action is approved. Action submittals should not include any information or documents that are not intended to be viewed by the public.

### G. Links to additional resources or best practices

- [US EPA Local GHG Inventory Tools](#): Download free tools and sign up for updates.
- [Global Protocol for Community-Scale Greenhouse Gas Emission Inventories \(GPC\) - An Accounting and Reporting Standard for Cities, 2014](#)
  - For an overview of the GPC, see <https://ghgprotocol.org/greenhouse-gas-protocol-accounting-reporting-standard-cities>
- [Utility Energy Registry \(UER\)](#) - The UER offers streamlined, public access to utility-reported data on community-level electricity and natural gas consumption. All UER data is free and open source.
- [ICLEI - Local Governments for Sustainability USA, Inc.](#): ICLEI has a comprehensive GHG tool called [ClearPath](#) for conducting GHG inventories, forecasts, monitoring, and climate action planning at the community or government operations scale. Membership in ICLEI involves an annual fee based on municipal size and

includes access to ClearPath.

#### **H. Recertification requirements**

The recertification requirements are the same as the initial certification requirements.