Local Government and Community Greenhouse Gas Emissions Inventory

Baseline 2011, Compiled Spring 2014

Village of Cazenovia, New York

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Executive Summary

The Village of Cazenovia recognizes the importance of climate action planning to the long-term resilience and sustainability of the community and chose to adopt the Climate Smart Communities pledge in the spring of 2014. The Village was then selected by the Central New York Regional Planning and Development Board (CNY RPDB) to take part in the Climate Change Innovation Program (C2IP), a regional climate action program funded through the DEC's Climate Smart Communities program. Conducting a greenhouse gas (GHG) inventory represents the first step in effective climate action planning. The inventory assessed Village government operations and broader community emissions in 2011, which will serve as the baseline year for GHG reduction planning moving forward.

In 2011, Village government operations generated 234 metric tons of carbon dioxide equivalent ($MTCO_2e$). These emissions span four sectors, including buildings and facilities, streetlights and traffic signals, water delivery, and vehicle fleet. Community emissions totaled 16,445 $MTCO_2e$ in 2011. Community emissions were analyzed for four sectors residential energy use, commercial energy use, transportation, and solid waste.

The Village of Cazenovia, in accordance with ICLEI-Local Governments for Sustainability's Local Government Operations Protocol and U.S. Community Protocol, assessed emissions through the commonly used CACP software. This framework enables the Village to understand the emissions generated through processes and sources it can either directly or indirectly target for reduction through a number of existing channels. Additionally, the framework allows the Village to narrow the scope of the inventory analysis to areas where data is available, providing for a replicable process in the future.

The Village carbon footprint will expand or contract due to many factors, such as energy conservation measures, increased commercial development, reduced vehicle miles travelled, and efficiency upgrades. Through periodic assessments and forecasts, the Village will be able to determine emissions sources and target areas for reduction more efficiently. The Village will need to continue to monitor and evaluate its performance by conducting additional GHG assessments in the future. Lastly, emission forecasts can offer a planning tool moving forward, and will enable the Village to target areas for emissions reduction as part of other climate action efforts.

Introduction

Village of Cazenovia

Founded in 1793 by John Lincklaen, the Village of Cazenovia has long been a destination for travelers. Its sublime location on the shores of Cazenovia Lake along with its rich history makes it a special place to visit or call home. The Central New York Village is located 27 miles southeast of the City of Syracuse, New York and is located on the intersection of Highway 20 and Route 13. 2,835 occupants reside within the 1.6 square miles of the Village. Although the population of Cazenovia has grown over 8% since 2000, it still has a low population density of 1,750 people per square mile. In addition to the local residents, Cazenovia plays host to approximately 1,000 students that attend Cazenovia College. Located within the village boundaries, Cazenovia College has been an intricate part of the community since 1824.[1]

Figure 1: Zoning Map[2]

Figure 2: Surrounding Villages[3]

Background on climate change

New York State outlined projected climate impacts and vulnerabilities during the 2011 ClimAid assessment[4]. The ClimAid report projects changes to ecosystems, with the increased presence of invasive species and shifts in tree composition, while water quality and quantity may also be impacted due to changes in precipitation. Furthermore, there may be beneficial economic impacts, such as a longer recreation season in the summer, and a longer growing season for the agricultural sector due to rising temperatures. Scientific evidence suggests that the impacts of global climate change will be different in various regions, and will include temperature shifts, sea level rise, and human health risks.

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[1] Village of Cazenovia.2012.http://villageofcazenovia.com/
[2] Village of Cazenovia.2012.http://villageofcazenovia.com/
[3] Village of Cazenovia.2012.http://villageofcazenovia.com/
[4] NYS.2011.ClimAid.http://www.nyserda.ny.gov/Publications/Research-and-Development/Environmental/EMEP-Publications/Response-to-Climate-Change-in-New-York.aspx

Climate change is increasingly recognized as a global concern. Scientists have documented changes to the Earth's climate including the rise in global average temperatures, as well as sea levels, during the last century. An international panel of leading climate scientists, the Intergovernmental Panel on Climate Change (IPCC), was formed in 1988 by the World Meteorological Organization and the United Nations Environment Programme to provide objective and up-to-date information regarding the changing climate. In its 2007 Fourth Assessment Report, the IPCC states that there is a greater than 90 percent chance that rising global average temperatures, observed since 1750, are primarily a result of greenhouse gas (GHG)-emitting human activities.[5]

The rising trend of human-generated GHG emissions is a global threat. The increased presence of these gases affects the warming of the planet by contributing to the natural greenhouse effect, which warms the atmosphere and makes the earth habitable for humans and other species (See Figure 3).[6]

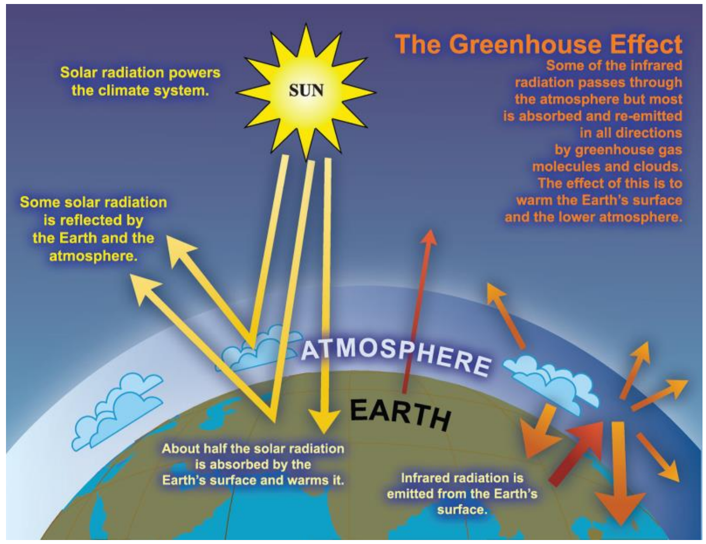

Figure 3: The Greenhouse Effect

Mitigation of GHGs is occurring in all sectors as a means of reducing the impacts of this warming trend. However, scientific models predict that some effects of climate change are inevitable no matter how much mitigative action is taken now. Therefore, climate mitigation actions must be paired with adaptation measures in order to continue efforts to curb emissions contributions to global warming, while adapting communities so that they are able to withstand climate change impacts and maintain social, economic, and environmental resilience in the face of uncertainty. Climate adaptation can take shape through infrastructure assessments and emergency planning, as well as through educational efforts to raise public awareness about potential climate change impacts. In New York State, regional climate change impact and vulnerability assessments will likely increase moving forward, but many local governments across the nation are already taking action to lessen climate impacts through GHG reduction measures and climate adaptation planning.

As scientific evidence of climate change grows, the need for climate action and adaptation will also increase. The goal of building community resilience in order to protect the health and livelihood of residents, as well as natural systems, must serve as a motivating factor in the assessment of greenhouse gas contributions and effective sustainability planning.

[5] NYS.2011.ClimAid.http://www.nyserda.ny.gov/Publications/Research-and-Development/Environmental/EMEP-Publications/Response-to-Climate-Change-in-New-York.aspx

[6] IPCC.2007.FourthAssessmentReport.http://www.ipcc.ch/publications_and_data/ar4/wg2/en/ch18s18-6.html

Inventory Methodology

Organization by Sector

A greenhouse gas inventory was performed for the Village of Cazenovia in which both the government operations and the community at large were analyzed to determine the area's emissions. Table 1 details the sectors that were analyzed within government and community operations for this inventory report. By analyzing both government and community emissions, the Village of Cazenovia can utilize the information generated to better understand where greenhouse gas emissions are coming from in their community. The Village of Cazenovia will then be able to focus on these areas in their Climate Action Plan to try to reduce emissions.

Government Operations	Community
Buildings and Facilities	Residential Energy Use
Vehicle Fleet	Commercial Energy Use
Water Delivery	Transportation
Streetlights and Traffic Signals	Solid Waste

Table 1: Sectors analyzed

Greenhouse Gases Covered

The three most prevalent greenhouse gases, and therefore the focus of this analysis, are carbon dioxide (CO_2), methane (CH_4) and nitrous oxide (N_2O). The units used to discuss these gases in aggregate is carbon dioxide equivalent (CO_2e), which is a conversion based on each gas' Global Warming Potential (GWP), or the impact of 1 unit of each gas in the atmosphere compared to 1 unit of CO_2 (see Table 2). Emissions measured in CO_2e can be categorized in various ways, including by scope, sector, and source.

Greenhouse Gas (GHG)	Global Warming Potential (GWP)
Carbon Dioxide (CO_2)	1
Methane (CH_4)	21
Nitrous Oxide (N_2O)	310

Table 2: Global Warming Potential of Greenhouse Gases

Organization by Scope

Government emissions can be organized into one of 3 scopes. Scope 1 refers to direct emissions; scope 2 refers to all indirect emissions generated by energy use within a municipality that is produced outside of the municipality (i.e. electricity); and scope 3 includes indirect emissions that did not fall into Scope 2, such as government employee transportation. Scopes 1 and 2 can be controlled easier by the government than Scope 3.

It is important to use the scope distinction, rather than just an aggregate emissions total, when evaluating the local government GHG footprint because other government inventories (such as Onondaga County or New York State) will likely account for the same emissions. If scope distinctions are not made, then there is the potential for double-counting certain sources in these aggregated reporting formats (such as electricity consumed by the Village (scope 2) and the same electricity generated by plants in the State (scope 1)).

Scope	Emissions Activity	Examples
1	All direct GHG emissions	Onsite governmental emissions, vehicle fleet emissions, onsite commercial, residential, and industrial emissions
2	All indirect GHG gases related to the consumption of purchased energy	Emissions related to purchased steam, heating, cooling, and electricity
3	All other indirect emissions not included in Scope 2	Emissions from wastewater and solid waste processes, employee commute, household waste, and commercial waste

Table 3: Emission Scope Distinctions

Calculation Tools

Fuel and energy use data associated with GHG emissions were collected for community and municipal operations within the Village of Cazenovia for the baseline year 2011 following ICLEI-Local Governments for Sustainability's Local Government Operations Protocol (LGOP) and the US Community Operations Protocol. Emissions were also forecasted for the year 2020 for both government and community operations based on population growth rates, current and projected energy use trends, and waste production trends. ICLEI's Clean Air Climate Protection (CACP) software was used to analyze energy use and convert information into emissions data, measured in metric tons of carbon dioxide equivalent ($MTCO_2e$). The software streamlines the process of converting different sources, units, and varieties of emissions into comparable energy use and emissions figures.

The results of this inventory will allow the Village to target sectors and sources that produce the greatest amount of emissions in their future Climate Action Plan.

Inventory Results

Government Emissions

Emissions by Source

Government Emissions from the Village of Cazenovia were also broken down by source. The four main sources are as follows: electricity, natural gas, gasoline and diesel. The largest amount of emissions for 2011 came from gasoline which was calculated to have produced 77 $MTCO_2e$. The next highest emitters in 2011 were natural gas and diesel which both produced 60 $MTCO_2e$. Electricity was the lowest emitter in 2011, producing 37 $MTCO_2e$.

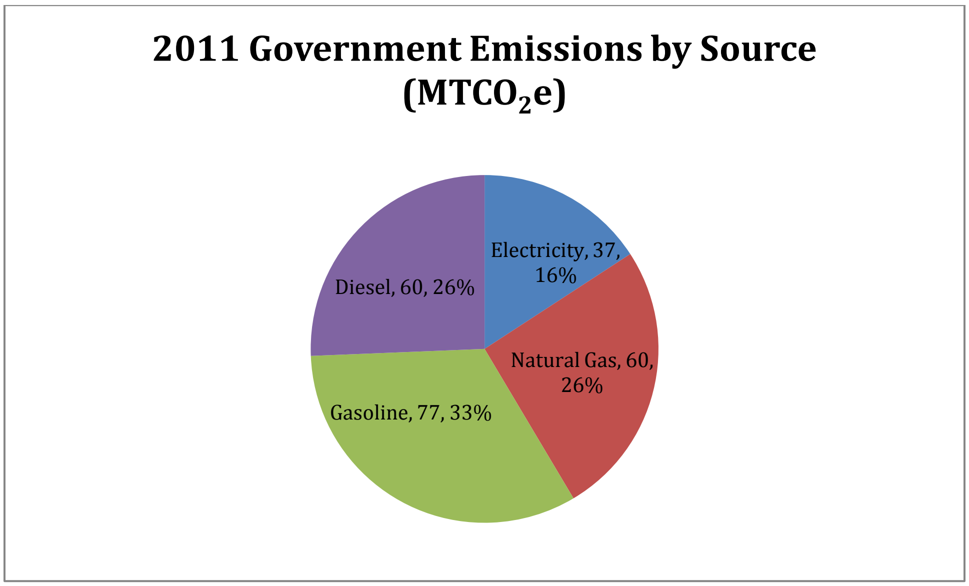

Figure 4: 2011 Government Emissions by Source

Emissions by Sector

In 2011, the Village of Cazenovia's government emissions totaled 234 $MTCO_2e$. Government emissions have been categorized into 4 sectors: buildings and facilities, streetlights and traffic signals, water delivery facilities and vehicle fleet. Vehicle fleet had the greatest amount of emissions for 2011, producing 137 $MTCO_2e$. Buildings and facilities emitted the second most emissions in 2011, producing 62 $MTCO_2e$, and streetlights and traffic signals emitted 26 $MTCO_2e$ in 2011. Water delivery facilities produced 9 $MTCO_2e$ in 2011, the lowest emitter that year.

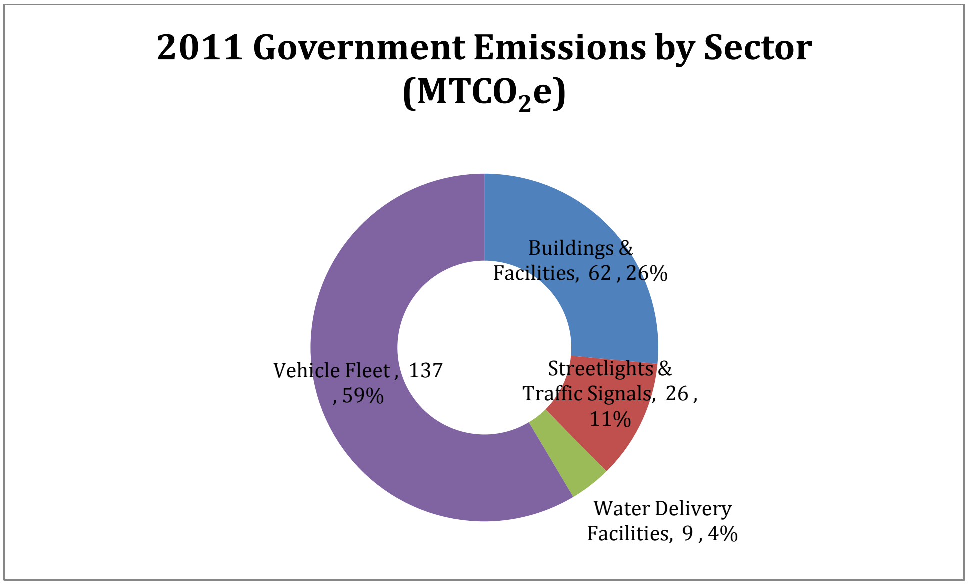

Figure 5: 2011 Government Emissions by Sector

Emissions by Scope

This report also categorized government emissions into scopes. In 2011, the Government emitted 197 MTCO2e in scope 1, and 37 MTCO2e in scope 2. Scope 3 was omitted from our report as it fell outside to boundaries that were set for this inventory.

By Scope	MTCO2e
Scope 1	197
Scope 2	37
Scope 3	-
Total	234

Table 4: 2011 Government Emissions by Scope

Community Emissions

Emissions produced through the community are usually outside the control of the local governments, although the local government's decisions and actions can have both direct and indirect impacts on the community. By evaluating community emissions, the local government can better understand which sectors within the community can be targeted to help reduce the community's emissions and overall carbon footprint.

Emissions by Source

In 2011, natural gas produced the greatest amount of emissions (7,765 $MTCO_2e$), followed by electricity and gasoline. As evident in the figure below, the rest of the sources of emissions are much less significant than the top three. After gasoline, the next largest source of GHG emissions was diesel with 711 $MTCO_2e$.

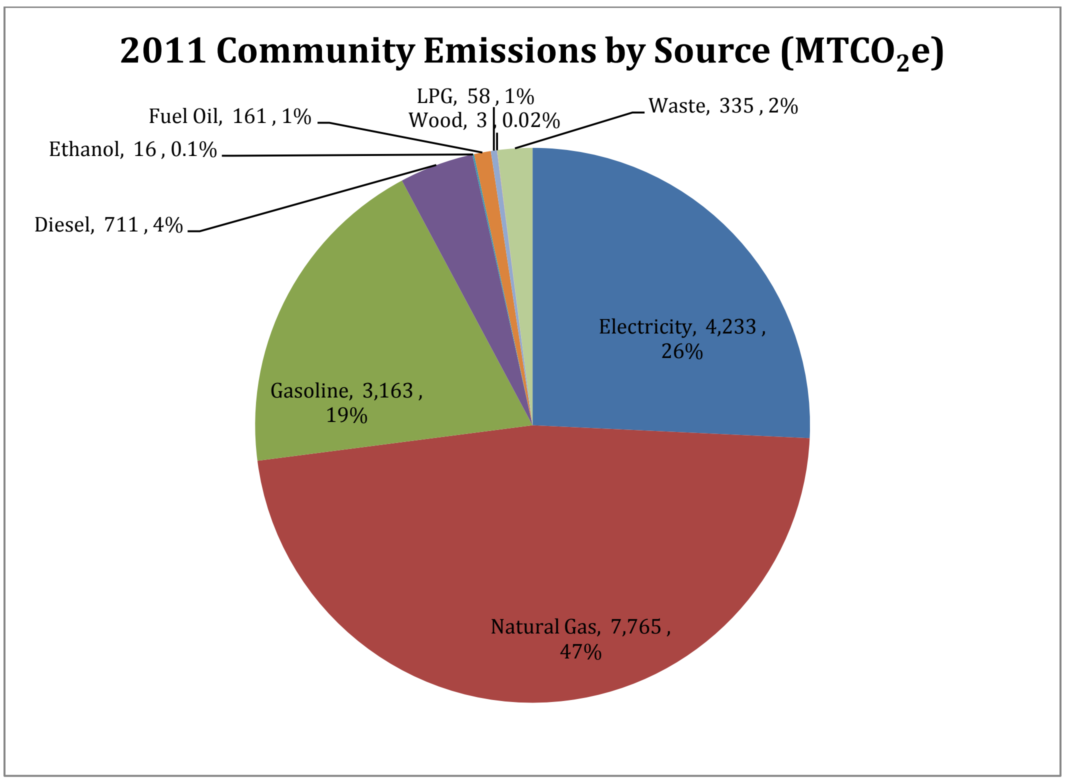

Figure 6: 2011 Community Emissions by Source

Emissions by Sector

Community emissions were broken down into four sectors: residential energy use, commercial energy use, transportation, and solid waste.[7] In 2011, the Village of Cazenovia community emitted a total of 16,445 $MTCO_2$ with a total energy use of 270,896 million BTUs (MMBtu). Of the sectors

[7] Industrial energy use was also analyzed, although there was no industrial energy use within the limits of the Village of Cazenovia as categorized by National Grid.

studied, residential and commercial energy use produced the most emissions, and the lowest emitting sector was the solid waste at 335 $MTCO_2e$ (Fig 6). Transportation also produced a significant amount of the community's emissions (3,890 $MTCO_2e$). Transportation sector emissions were calculated using information from the New York State Department of Transportation (NYSDOT) Traffic Data Viewer tool and information collected by the Syracuse Metropolitan Transportation Council (SMTC).

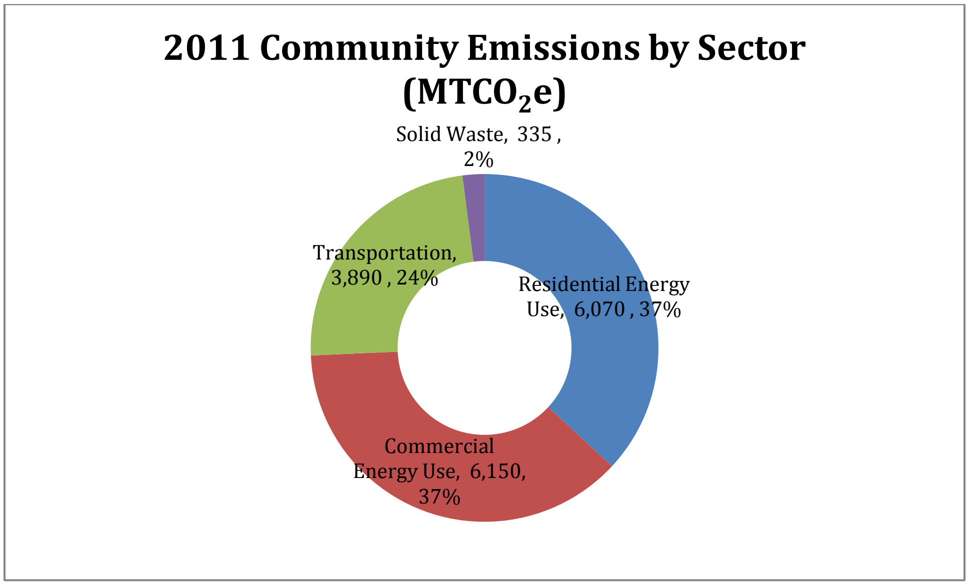

Figure 7: 2011 Community Emissions by Sector

The community's energy use reflects the emissions by sector, following the same pattern (Fig. 7)

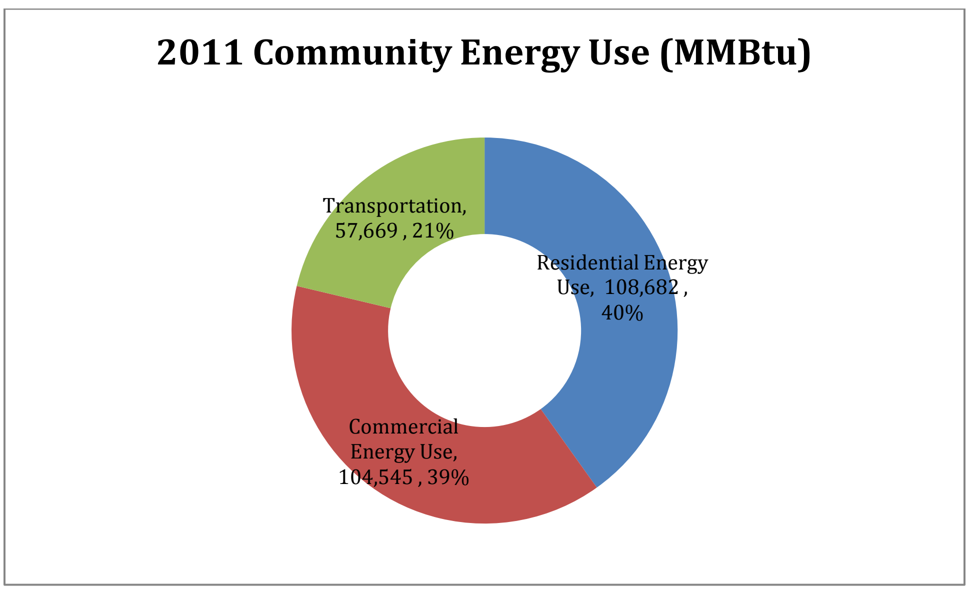

Figure 8: 2011 Community Energy Use by Sector

Emission Forecast

Emissions forecasts for the year of 2020 were calculated for both government and community operations using emissions data from the 2011 baseline year.

Government Operations Forecast

The government operations forecast was calculated using a single rate compounding equation $FV=PV(1+i)^n$, where FV= forecast year emissions, PV= baseline year emissions, i= average annual population growth, and n= the difference in years between baseline and forecast year (9 years). To account for changes in population, the equation uses the average annual population growth rate for the Village of Cazenovia. Emissions in the Village of Cazenovia are forecasted to total 255 $MTCO_2e$ in 2020, with modest increases in each sector due to population growth.

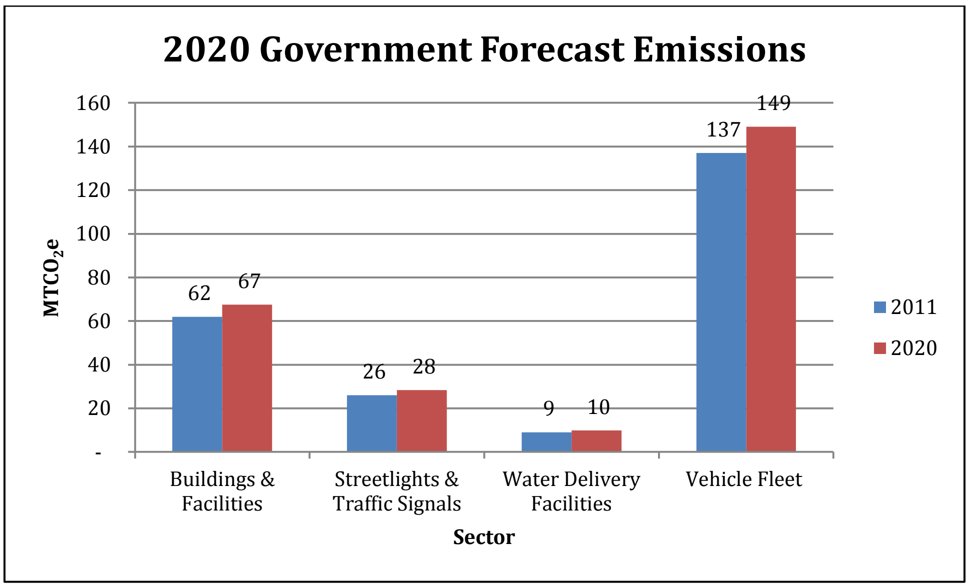

Figure 9: 2020 Government Forecast Emissions

Community Forecast

The community emissions forecast was calculated using energy use trends and waste production trends in the Village. Community emissions are expected to total 17,603 $MTCO_2e$ in 2020 with slight increases in each sector due to energy use trends, population growth rates, and waste production trends.

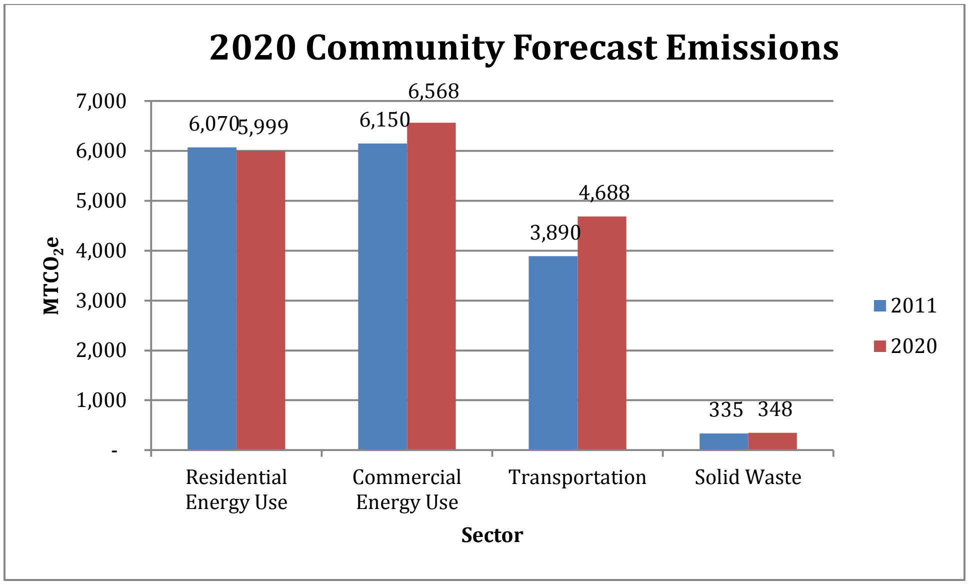

Figure 10: 2020 Community Forecast Emissions

Conclusion

It is evident that the Village of Cazenovia holds the desire to adopt sustainable practices through the use of climate action planning, and the GHG inventory conducted in this report serves as the basis for climate action planning. This is the foundation to the next step in the Climate Smart Communities process, developing and adopting a Climate Action Plan.

The Village of Cazenovia government operations generated a total of 234 $MTCO_2e$ in 2011. The four sectors that account for these emissions are buildings and facilities, streetlights and traffic signals, water delivery and vehicle fleet. Community emissions were also calculated from the residential energy use, commercial energy use, transportation and solid waste sectors. These emissions totaled 16,445 $MTCO_2e$ in 2011. It is prudent for the Village to understand that these emissions levels should be monitored and updated periodically. This inventory should serve as an aid in understanding the various sources of emissions and the steps the Village could take to reduce them.

Through the completion of the GHG inventory, the Village has achieved their first step towards emissions reduction. The information gathered in the GHG inventory will provide a benchmark for planning purposes with the goal of setting an emissions reduction target and developing a Climate Action Plan. The Central New York Regional Planning and Development Board (CNY RPDB) will assist the Village of Cazenovia in creating a Climate Action Plan that will allow the village to reduce emissions, energy use and energy costs.

Appendix A: Community Protocol Compliance

ICLEI protocol-compliant inventories must include a table illustrating included and excluded emissions sources and activities, along with final emissions figures. The table below depicts the included and excluded emissions sources and activities and final emissions figures for this inventory and uses ICLEI's notation keys found in the U.S. Community Protocol, Appendix B.

						IE- Included Elsewhere	SI- Local government significant influence	
Emissions Report Summary Table (2011 baseline year)						NE- Not estimated	CA- community-wide activities	
						NA- not applicable		
Include estimates of emissions associated with the 5 basic emissions generating activities						NO- not occurring		
Emissions Type	**Source or Activity**	**Activity Data**	**Emissions Factor & Source**	**Accounting Method**	**Included (SI, CA**	**Excluded (IE, NA, NO, NE)**	**Emissions (MTCO2e)**	**Notes/Explanations/Comments**
Built Environment								
Use of fuel in residential stationary combustion (nat. gas- MMBtu)	source and activity	86,344	53.02 kg CO_2/MMBtu; 1 g CH4/MMBtu; 0.1 g N2O/MMBtu; EPA Mandatory Reporting Rule (MRR)	Collected data from National Grid and put into CACP	CA		4,590	
Use of fuel in residential stationary combustion (fuel oil, wood, LPG- MMBtu)	source and activity	1,102	Averaged distillate fuel oil #1, 2,4 EF= 74.5 kg CO_2/MMBtu; LPG= 62.98 kg CO_2/MMBtu; EPA Mandatory Reporting Rule (MRR)	Used ICLEI's US Community Protocol Appendix C (Built Environment), BE 1.2	CA		68	
Use of fuel in commercial stationary combustion (nat. gas- MMBtu)	source and activity	59,733	53.02 kg CO_2/MMBtu; 1 g CH4/MMBtu; 0.1 g N2O/MMBtu; EPA Mandatory Reporting Rule (MRR)	Collected data from National Grid and put into CACP	CA		3,175	
Use of commercial stationary combustion (fuel- MMBtu)	source and activity	2,400	Coal/coke mixed commercial sector= 93.4 kg CO_2/MMBtu; Averaged distillate fuel oil #1, 2,4 EFs= 74.5 kg CO_2/MMBtu; LPG= 62.98 kg CO_2/MMBtu; EPA Mandatory Reporting Rule (MRR)	Used ICLEI's US Community Protocol Appendix C (Built Environment), BE 1.3	CA		154	
Industrial Stationary combustion sources (nat. gas- MMBtu)	source and activity		53.02 kg CO_2/MMBtu; 1 g CH4/MMBtu; 0.1 g N2O/MMBtu; EPA Mandatory Reporting Rule (MRR)		NA			
Industrial Stationary combustion sources (fuel- MMBtu)	source and activity				NA			
Electricity								
Power generation (natural gas use- therms)	source				NA			
use of electricity by the community (MWh)	activity	18,649	eGrid 2009 subregion factors (EPA)	Collected data from National Grid and put into CACP	CA		4,233	
District Heating/Cooling								
District Heating/Cooling facilities in community	source				NA			
Use of district heating/cooling by community	activity				NA			
Industrial process emissions in the community	source		EPA GHGRP data reported here: ghgdata.epa.gov		NA			
Refrigerant leakage in the community	source				NE			
Transportation and other Mobile Sources								
On-road passenger vehicles								
on-road passenger vehicles operating within the community (VMT)	source	7,321,811	CACP (Version 3.0) & EPA MRR emission factors for gasoline and diesel (varies by vehicle class for N2O & CH4): LGOP gasoline EF=8.78 kgCO_2/gal; diesel EF= 10.21 kgCO_2/gal	Used formula: AADT x Road Length x 365 days per year = AVMT. For roads without AADT counts, used "Minimum Maintenance Standards Regulation 239/02," which meant taking length of roadway without AADT counts, multiplying by a factor of 6 for rural roads, and then dividing the sum by total roadway length to receive an average AADT count.	CA		3,890	
on-road passenger vehicle travel associated with community land uses (VMT)	activity				NE			
On-road freight vehicles								
on-road freight and service vehicles operating within the community boundary	source				NE			
on-road freight and service vehicle travel associated with community land uses	activity				NE			
On-road transit vehicles operating within the community boundary	source				NE			
Transit Rail								
transit rail vehicles operating within the community boundary	source				NE			
use of transit rail travel by community	activity				NE			
Inter-city passenger rail vehicles operating within the community boundary	source				NE			
Freight rail vehicles operating within the community boundary	source				NE			
Marine								
Marine vessels operating within community boundary	source				NA			
use of ferries by community	activity				NA			
Off-road surface vehicles and other mobile equipment operating within community boundary	source				NE			
Use of air travel by the community	activity				NE			

Solid Waste								
Solid Waste								
Operation of solid waste disposal facilities in community	source		Process emissions reported to the EPA GHGRP annually; stationary combustion emissions accounted for in the energy use sector		NA			
generation and disposal of solid waste by the community	source and activity	1,814.39		Community Protocol Appendix E (Solid Waste Emission Activities and	CA		335	
Water and Wastewater								
Potable Water- Energy Use								
Operation of water delivery facilities in the community	source		CACP 3.0 eGrid 2009 electricity emission factors; and natural gas emission factors= 53.02 kg CO2/MMBtu; 1 g CH4/MMBtu; 0.1 g N2O/MMBtu		IE			
Use of energy associated with use of potable water by the community	activity				IE			
Use of energy associated with generation of wastewater by the community	activity		CACP 3.0 eGrid 2009 electricity emission factors; and natural gas emission factors=53.02 kg CO2/MMBtu; 1 g CH4/MMBtu; 0.1 g N2O/MMBtu		NE			
Centralized Wastewater Systems- Process Emissions								
Process emissions from operation of wastewater treatment facilities located in community	source		Method WW.8= EF without nitrification or denitrification= 3.2 g N_2O/person equivalent/year; Method WW.12a= EF for stream/river discharge= 0.005 kg N_2O-N/kg sewage-N discharged		NA			
process emissions associated with generation of wastewater by community	activity				NA			
Use of septic systems in community	source and activity				NA			
Agriculture								
Domesticated animal production	source				NE			
Manure decomposition and treatment	source				NE			
Upstream Impacts of Community-wide Activities								
Upstream impacts of fuels used in stationary applications by community	activity				NE			
upstream and transmissions and distribution impacts of purchased electricity used by the community	activity				NE			
upstream impacts of fuels used for transportation in trips associated with the community	activity				NE			
upstream impacts of fuels used by water and wastewater facilities for water used and wastewater generated within the community boundary	activity				NE			
Upstream impacts of select materials (concrete, food, paper, carpets, etc.) used by the whole community (additional community-wide flows of goods & services will create significant double counting issues)	activity				NE			
Independent Consumption-Based Accounting								
Household consumption (e.g., gas & electricity, transportation, and the purchase of all other food, goods and services by all households in the community)	activity				NE			
Government consumption (e.g., gas & electricity, transportation, and the purchase of all other food, goods and services by all governments in the community)	activity				NE			
Lifecycle emissions of community businesses (e.g., gas & electricity, transportation, and the purchase of all other food, goods and services by all businesses in the community)	activity				NE			

Appendix B: Estimation Method for Vehicle Miles Traveled

The New York State Department of Transportation (NYSDOT) Traffic Data Viewer and information collected by the Syracuse Metropolitan Transportation Council (SMTC) provided data on the Annual Average Daily Traffic (AADT) going through the Village of Cazenovia.[8] Internal GIS data was utilized to generate road lengths within the Village boundary, and these lengths were multiplied with the traffic counts to derive estimates for daily vehicle miles travelled (DVMT). DVMT was then multiplied by 365 days per year to derive annual vehicle miles traveled (AVMT). These estimates were entered into CACP to calculate emissions using the following fuel allocations: 7% diesel, 83% gasoline, and 10% ethanol (to account for the 10% ethanol in most modern gasoline blends).

The NYSDOT relies on actual and estimated traffic counts for their model, which may result in slight over or under estimations in the average daily traffic data. Additionally, the counts do not distinguish between origin and destination; therefore, these counts represent all vehicle trips that begin, end, and travel through the Village of Cazenovia, therefore resulting in slight overestimations of Village VMT.

Also, the NYSDOT tracks traffic counts for main arteries only; therefore, additional calculations for AADT were needed to estimate AVMT for local/collector roads. The total length of roads in Cazenovia with traffic counts is 3.437 miles, while 11.259 miles of roads do not have AADT counts available.

According to the *Minimum Maintenance Standards Regulation 239/02*, a set of guidelines produced by the Association of Municipalities of Ontario to help local communities estimate traffic volume, while conducting an AADT count, it is possible to estimate the traffic volume for dead-ends and cul-de-sacs to avoid resource intensive counts. This can be done by counting the number of houses on the roadway and multiplying by a factor of 6 for rural areas and 10 for urban areas.

This method was applied to the Village of Cazenovia for the roads without AADT counts. It was determined that there are 970 occupied households in the Village of Cazenovia, according to the 2010 US Census. It was assumed that all 970 homes are on roadways that do not have a count, since most houses are on local/collector roads and almost all local/collector roads in Cazenovia did not have an AADT count. By multiplying 970 homes by 6, a combined AADT count of 5,820 was calculated for all 11.259 miles of roads without AADT counts available. In order to calculate VMTs, an average AADT value was needed, and derived by dividing by 5,820 by the 11.259 miles of uncounted roadway. This gave an average AADT value of 517, which was applied to all roadways that did not have a count.

There is some error involved in this method. For instance, the method is meant to be applied to dead end streets and cul-de-sacs, but this study applied it to all roads in Cazenovia without AADT counts available. In addition, there may have been some double counting if homes in Cazenovia are located on roads that have AADT counts available. However, counting the

[8] NYS DOT Traffic Data Viewer, http://gis.dot.ny.gov/tdv/

number of houses on each road that did not have an AADT count would have been time consuming, and this VMT calculation is supposed to serve as a general reference for the Village, not as an exact figure. Although this method involves some error, it is the best estimation of traffic volume given the availability of data.

BEGINDESC	ENDDESC	TDV_ROUTE	AADT	LENGTH (MILES)	LENGTH IN V. CAZ (MILES)	RATIO OF LENGTH IN V. CAZ	DVMT
CARRIAGE LN CAZENOVIA	CR 67 ERIEVILLE RD	US20	8304	3.480	0.003	0.001	27.542
CR 17 EAST LAKE RD	END 13/20 OLAP CAZENOVIA	US20, NY13, NELSON STREET	13183	0.420	0.420	1.000	5,540.854
END 13/20 OLAP CAZENOVIA	CARRIAGE LN CAZENOVIA	US20, NELSON STREET	9726	0.479	0.479	1.000	4,659.814
END 13/20 OLAP CAZENOVIA	CR 26 BINGLEY	NY13	769	2.660	0.713	0.268	547.974
END 13/80 OLAP	START 13/20 OLAP	NY13	2816	6.000	0.503	0.084	1,417.707
RT 92	START 13/20 OLAP CAZENOVIA	US20	10216	0.700	0.447	0.639	4,566.358
SR 20	N LAKE RD	E LAKE RD, CR 17	2028	3.602	0.702	0.195	1,423.579
START 13/20 OLAP CAZENOVIA	CR 17 EAST LAKE RD	US20, NY13, NELSON STREET	11056	0.170	0.170	1.000	1,874.512
						Total DVMT:	20,058.340
						Days per year:	365.000
						Total Annual VMT (AVMT):	7,321,294.110

Table 5: 2011 Village of Cazenovia Traffic Data for Road Segments with Available AADT

# occupied housing units:	970
Total AADT for roads not accounted for above:	5,820
Days per year:	365
Average AADT for roads not accounted for above:	517
Total Annual VMT for manually calculated roads:	**2,124,300**

Table 6: 2011 Village of Cazenovia Traffic Data for Road Segments without Available AADT

AVMT for road segments with available AADT and for road segments without available AADT were then added to generate total AVMT for the Village of Cazenovia, 7,321,811.041 miles in 2011.

Appendix C: Estimation Method for Community Waste Sector

Waste generated in the Village of Cazenovia is sent to the Madison County Landfill for disposal. Waste information for the Village of Cazenovia was compiled using the landfill's 2010 Annual Report. Because waste data is not broken down by municipality, additional calculations were needed to determine approximate tons of waste generated by the Village of Cazenovia.

First, total tons of waste processed at the landfill was determined by viewing Madison County Landfills' 2010 annual report for the facility. Tons of waste disposed per person per year was then calculated by dividing Madison County's total population by the total tons of waste processed at the facility. Finally, tons of waste disposed by the Village of Cazenovia was determined by multiplying the Village's population by the tons of waste disposed per person, calculated in the previous step. See table 7 for more information.

Inventory Year	County Population	Village of Cazenovia population	Total tons waste processed at the landfill	Tons of waste disposed per person	Tons of waste disposed from Village of Cazenovia
2011	73,442	2,835	47,002.68	0.64	1,814.39

Table 7: Village of Cazenovia Community Waste Calculation

This information was then put into ICLEI's CACP software using the "Managed Landfill" waste disposal technology category and using the LGOP's estimates for waste share by type.[9]

[9] Found on page 32 of Appendix E, Solid Waste Emission Activities and Sources, of the US Community Protocol.