Local Government and Community Greenhouse Gas Inventory

City of Oneida, NY 2014

109 N. Main Street
Oneida, NY
13421

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1. Acknowledgements

The City of Oneida would like to acknowledge the contributions made to this report by the following:

City of Oneida, NY
Jon Rauscher – City Engineer

ICLEI-Local Governments for Sustainability

Central New York Regional Planning and Development Board
Chris Carrick – Energy Program Manager
Amanda Sopchak – Planner

State University of New York, College of Environmental Science and Forestry Student Team
Elias Bennett
Dylan Geppert
Zach Goldberg
Ryan O'Connor
Brennen O'Donnell
Caleb Rudge
Nicolas Sessler

2. Executive Summary

The City of Oneida, NY is located in central New York's Madison County. With a land area of 22 square miles, the City of Oneida is home to approximately 11,200 people. Performing a greenhouse gas (GHG) inventory will provide the City of Oneida with a baseline and projection of GHG emissions produced by the City. As Oneida has adopted the Climate Smart Communities Pledge, this data is essential for identifying areas in the community and municipal operations where reductions in GHG emissions can be made.

This GHG inventory analyzes both municipal operations (broken down into: buildings and facilities, streetlights and traffic signals, vehicle fleet, wastewater treatment facilities, wastewater treatment process emissions, and water delivery facilities) and community-generated emissions (broken down into: residential energy use, commercial energy use, industrial energy use, transportation, and waste), using data provided by the City of Oneida, National Grid, the Syracuse Metropolitan Transportation Council (SMTC), NYS Department of Transportation (NYS DOT), the Madison County Landfill, and the 2010 Census. Energy use data relating to carbon dioxide, methane, and nitrous oxide emissions were compiled and analyzed by ICLEI-Local Governments for Sustainability's CACP (Clean Air and Climate Protection) software, following ICLEI's guidelines.

In the 2010 baseline year, greenhouse gas emissions totaled 2,353 metric tons of carbon dioxide equivalent ($MTCO_2e$) for government operations and 106,831 $MTCO_2e$ for the community at large. Assuming all operational procedures continue as usual, the emissions forecasted for 2020 are 2,441 $MTCO_2e$ for municipal operations and 102,243 $MTCO_2e$ for the community. In order to better understand and better develop GHG emission reducing policies it is recommended that an audit of this nature be conducted periodically. An updated GHG emission inventory is recommended to ensure accurate planning for emission reduction targets.

3. Introduction

3.1. Climate Change

New York State outlined projected climate impacts and vulnerabilities during the 2011 ClimAid assessment.[1] 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.

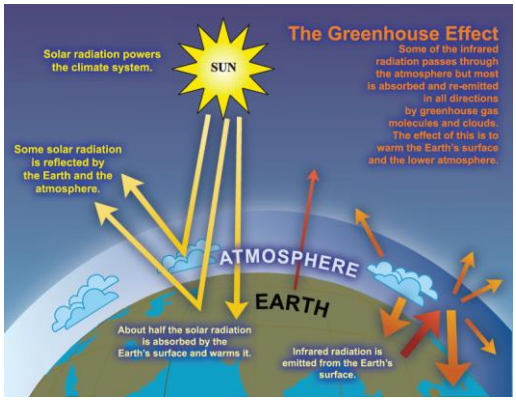

Figure 1: The Greenhouse Effect

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.**[2]

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 2).[3] These levels of greenhouse gasses have already been damaging to human society, and are expected to worsen as these gases continue to be emitted at a growing rate[4]. Mitigation of GHGs is occurring in all sectors as a means of reducing the impacts of this warming trend. 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

[1] NYS. 2011. ClimAid. http://www.nyserda.ny.gov/Publications/Research-and-Development/Environmental/EMEP-Publications/Response-to-Climate-Change-in-New-York.aspx
[2] NYS. 2011. ClimAid. http://www.nyserda.ny.gov/Publications/Research-and-Development/Environmental/EMEP-Publications/Response-to-Climate-Change-in-New-York.aspx
[3] IPCC. 2007. Fourth Assessment Report. http://www.ipcc.ch/publications_and_data/ar4/wg2/en/ch18s18-6.html
[4] IPCC. 2013. Fifth Assessment Report. http://www.climatechange2013.org/images/report/WG1AR5_Chapter02_FINAL.pdf

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.

3.2. Climate Smart Communities of New York State

New York State's Climate Smart Communities Program represents a partnership between New York State and local governments to reduce energy use and GHG emissions, and was created to "meet the economic, social and environmental challenges that climate change poses for New York's local governments".[5] This initiative focuses on getting communities aware of what climate change is, how it will affect them, how to limit any effect they have on stimulating climate change, and finally how to alleviate the impending problems that Climate Change will most likely cause the communities. The Climate Smart Communities Program includes ten steps in its pledge, as found below in Figure 2.

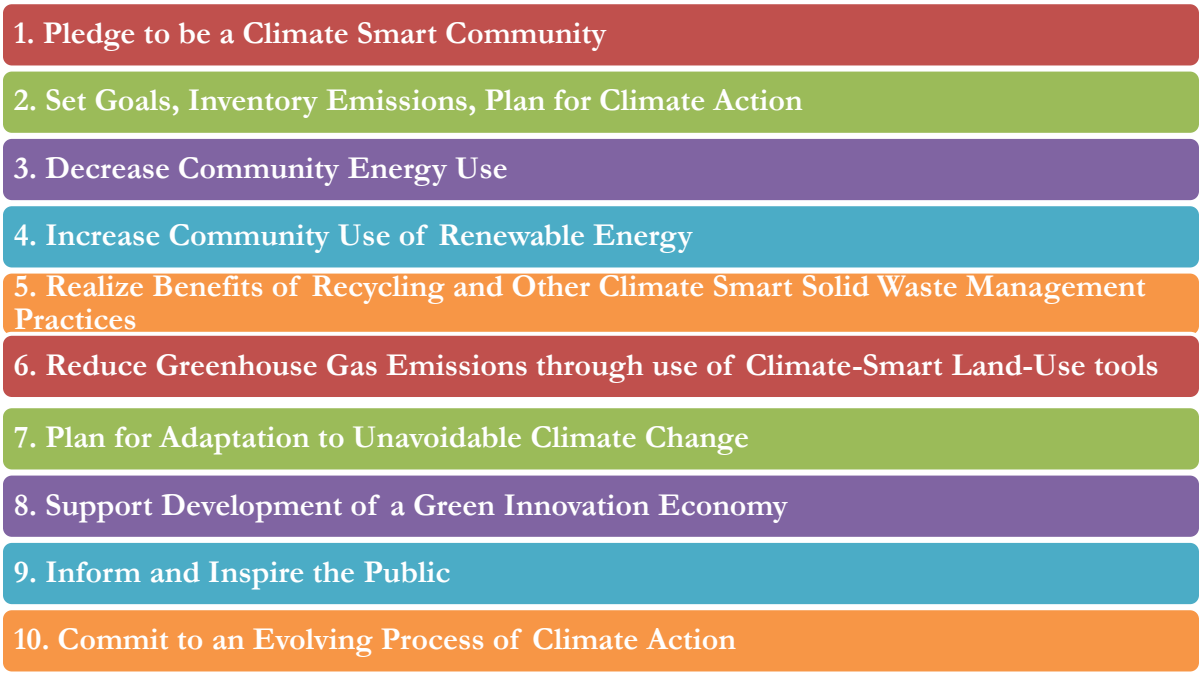

Figure 2: The Ten Steps of the Climate Smart Communities Program

[5] New York State Department of Environmental Conservation (NYSDEC), *Climate Smart Communities: Local Action to Combat Change*, 2014, Energy and Climate, Climate Change, http://www.dec.ny.gov/energy/50845.html

The City of Oneida chose to adopt the Climate Smart Communities pledge in the spring of 2014 and is well on their way to meeting the rest of these goals.

One of the first steps in the Climate Smart Communities Program is to inventory emissions within the community. Understanding where emissions are coming from and which sectors are producing the most emissions is necessary in order to reduce emission outputs. Using the data collected in this inventory, the City of Oneida will be able to create a Climate Action Plan, which will detail possible emission reduction strategies that the City can implement to reduce emissions, reduce energy use, and save money.

3.3. The City of Oneida

The City of Oneida, NY is located in Madison County, in Central NY, with a land area of 22 square miles. Oneida had a population of 11,406 people in 2010, which decreased by 1.3% to 11,263 in 2012.[6] The city uses natural gas, diesel fuel, gasoline, electricity, ethanol, and other energy sources to power both its municipal operations and community. All of these energy sources are converted into useful energy via combustion, which invariably releases greenhouse gasses (GHG). Energy consumption, decomposition of waste, and wastewater treatment are some of the sources of GHGs for the City of Oneida.

4. Inventory Methodology

Fuel and energy use data associated with GHG emissions were collected for community and municipal operations within the City of Oneida for the baseline year 2010 following ICLEI-Local Governments for Sustainability's *Local Government Operations Protocol* (LGOP)[7] and the *US Community Operations Protocol*.[8] Emissions were also forecasted for the year 2020 for both government and community operations based on population growth trends, 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 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 1). Emissions measured in CO_2e can be categorized in various ways, including by scope, sector, and source.

[6] *State and County Quickfacts.* United States Census Bureau, 27 Mar 2014. Web. 15 Apr 2014.
[7] ICLEI, 2011. *Local Government Operations Greenhouse Gas Emissions Inventory Instructions.*
[8] ICLEI, 2012. *U.S. Community Protocol for Accounting and Reporting of Greenhouse Gas Emissions.*

Gas (GHG)	Formula	GWP
Carbon Dioxide	CO_2	1
Methane	CH_4	21
Nitrous Oxide	N_20	310

Table 1: Global Warming Potential of Greenhouse Gases

4.1. Municipal Operations

Government emissions were categorized based on three scopes to determine accountability for greenhouse gas emissions. These scopes are laid out below, and in Table 2.

Scope 1	Scope 2	Scope 3
Direct emissions that are the result of local government operations and occur within the borders of the City of Oneida	**Indirect emissions that are consequence of activities taking place outside the borders of the City of Oneida**	**Emissions that relate to government operations but are outside municipal financial and operational control.**
Examples: • Stationary combustion • Mobile combustion from vehicle fleet • Process emissions from wastewater treatment facility	Examples: • Emissions from electricity used in municipality but produced outside of municipal boundaries	Examples: • Government employee commuting from outside of municipal boundaries into municipality

Table 2: Emission Scope Distinctions

Scope 1 emissions represent direct emissions that are within the control of the City of Oneida, for example stationary combustion that occurs within the City. Mobile combustion is another example of scope 1 emissions and involves greenhouse gases that are released from the government vehicle fleet. The wastewater treatment process also contributes to scope 1 emissions.

Scope 2 emissions are indirect and result from energy used within municipal boundaries but is produced outside municipal boundaries. One example is emissions from a facility located outside of Oneida that produces electricity purchased by the City of Oneida.

Scope 3 emissions represent other indirect emissions not included in Scope 2, such as government employees commuting from outside of the City into the City for work.

4.2. Community Operations

Energy used by residents, businesses, and industries were inventoried in this report, along with emissions from community-generated waste and emissions from community transportation. Emissions for the community of Oneida were the byproduct of four major categories of activities:

1. **Use of Electricity by the community** – This includes electricity usage that does not have a specific government purpose or is used in a government building, facility, or vehicle

2. **Use of fuel in residential and commercial stationary combustion** – Fuel use by the community was inventoried for residential, commercial, and industrial sectors[9] in Oneida.

3. **On-road vehicle travel** – Calculated from data derived from the New York State Department of Transportation (NYSDOT) Traffic Data Viewer tool and information collected by the Syracuse Metropolitan Transportation Council (SMTC).

4. **Generation of solid waste by community** – Emissions from the solid waste output by the City of Oneida were taken into account by analyzing data from the Madison County Landfill.

Energy use data collected for both government operations and the community at large were entered into ICLEI's Clean Air and Climate Protection (CACP) 2009 software program. The CACP program served as an accounting system for greenhouse gas emissions. As sector and demographic data was input into the software, emissions data was produced. Graphs were then created to outline results.

[9] In 2010, there was no energy use by the industrial sector in the City according to National Grid's classification system.

5. Results

5.1 Municipal Operations

2010 Emissions by Source

In 2010, emissions from municipal operations totaled 2,353 $MTCO_2e$. The largest source of emissions for government operations in the City of Oneida came from electricity, which produced 989 $MTCO_2e$ (42% of the total), followed by 786 $MTCO_2e$ from natural gas (33%), 309 $MTCO_2e$ from gasoline (13%), 229 $MTCO_2e$ from diesel (10%), and 40 $MTCO_2e$ from other sources (2%).

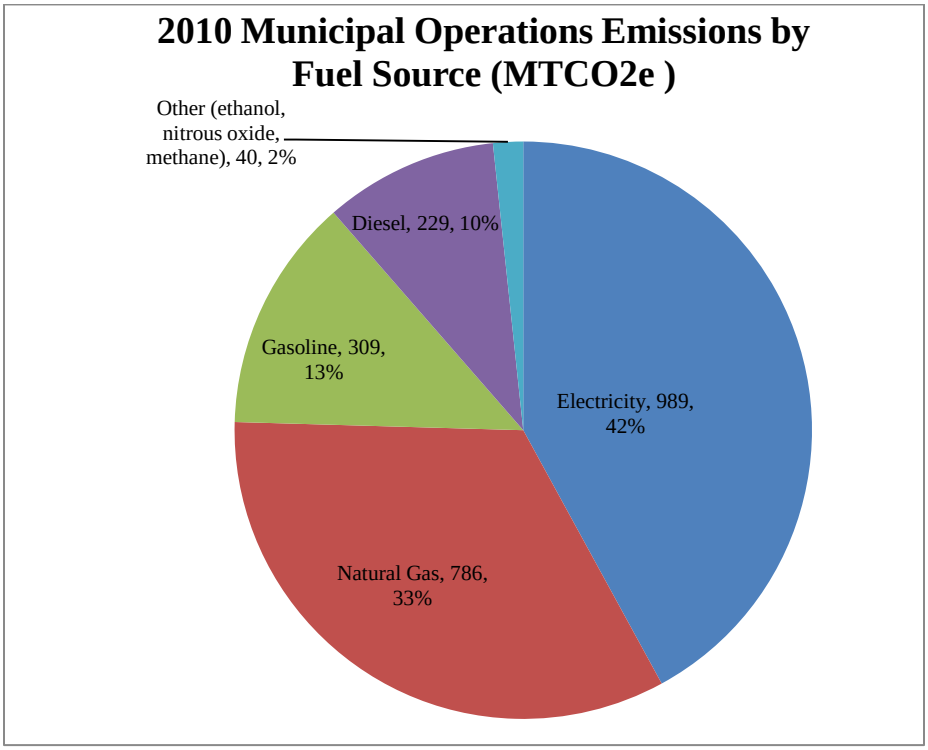

Figure 3: 2010 Municipal Operations Emissions by Source

2010 Emissions by Scope

In 2010, municipal operations emitted 1,364 $MTCO_2e$ (58%) emissions from scope 1 and 989 $MTCO_2e$ (42%) emissions from scope 2. Scope 3 emissions were not included in this inventory report.

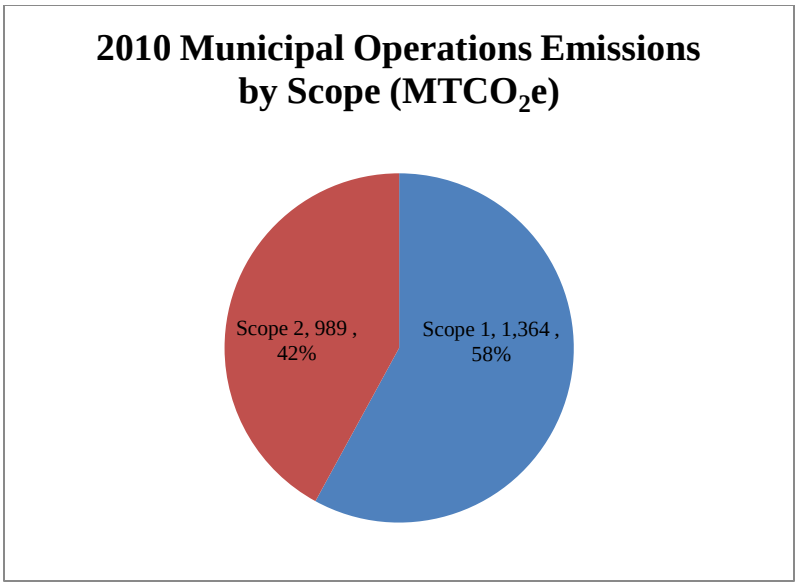

Figure 5: 2010 Municipal Operations Emissions by Scope

2010 Emissions by Sector

In 2010, energy use in the Buildings and Facilities sector produced the largest amount of emissions at 1,031 $MTCO_2e$ (44%), followed by Vehicle Fleet with 539 $MTCO_2e$ (23%). Wastewater Treatment Facilities[10] produced 508 $MTCO_2e$ (21%), Streetlights and Traffic Signals emitted 143 $MTCO_2e$ (6%), Water Delivery Facilities produced 93 $MTCO_2e$ (4%), and Wastewater Treatment Processes produced 39 $MTCO_2e$ (2%).

[10] Wastewater Treatment Facilities refers to emissions produced by energy used by wastewater treatment facilities, such as electricity and natural gas use. Wastewater Treatment Processes refers to emissions produced by wastewater as it is treated, such as Nitrous Oxide and Methane that is released during treatment.

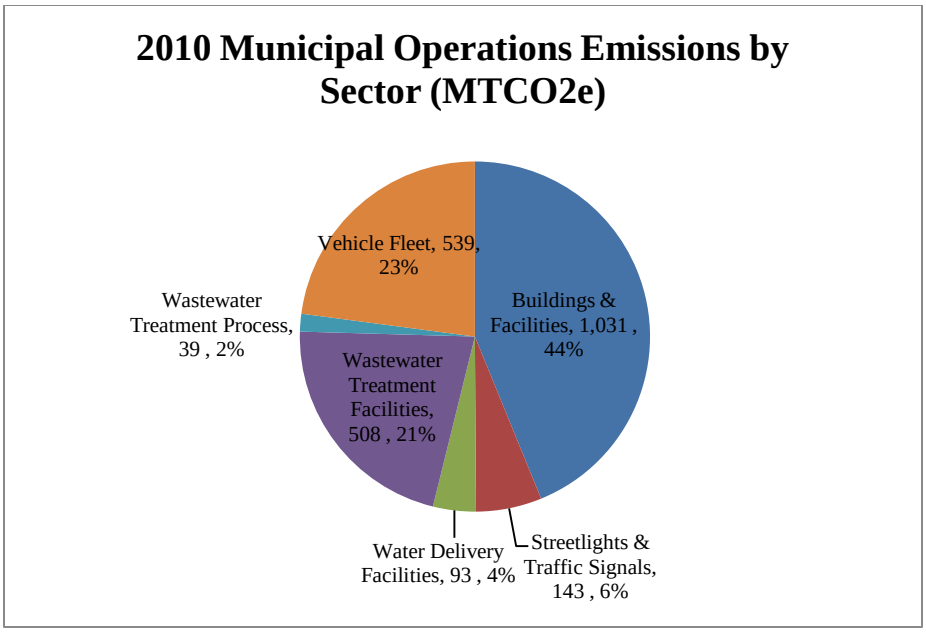

Figure 4: 2010 Municipal Operations Emissions by Sector

2010 Energy Use by Sector

The following chart depicts energy consumption by the City of Oneida municpal operations in 2010, measured in Millions of Btu (MMBtu). In 2010, 18,469 MMBtu (49% of all energy consumed by the City of Oneida) was used by Buildings & Facilities, followed by 7,724 MMBtu by the Vehicle Fleet (21%), 7,637 MMBtu by the Wastewater Treatment Facilities (20%), 2,149 MMBtu by Streetlights and Traffic Signals (6%), and 1,404 MMBtu Water Delivery Facilities (4%).

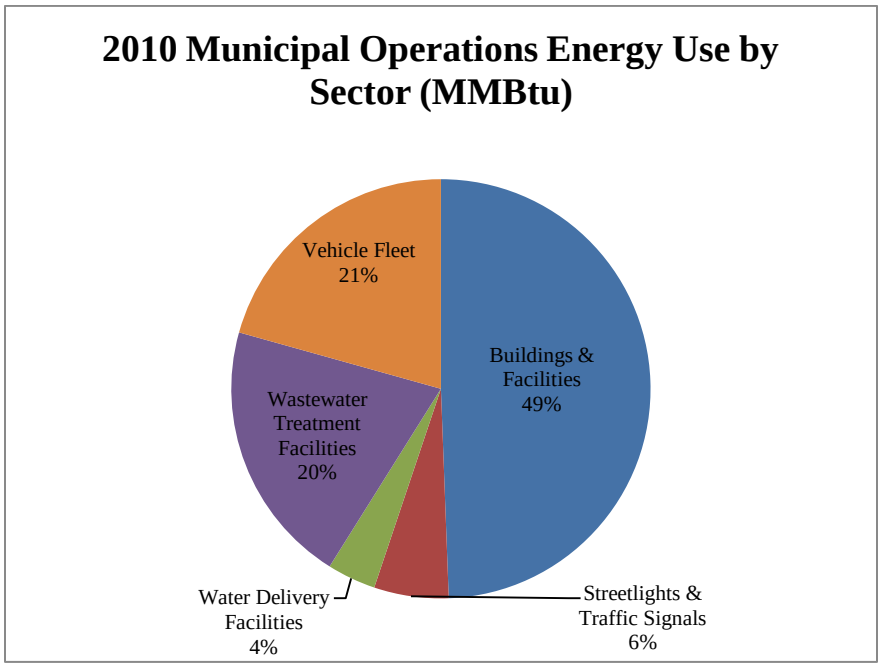

Figure 6: 2010 Municipal Operations Energy Use by Sector

2020 Municipal Operations Emissions Forecast

The following graph depicts emissions in Oneida as inventoried in the 2010 baseline year and a 2020 forecast based on 2010 emissions and population growth trends. The 2020 projected emissions total 2,441 $MTCO_2e$, an increase of 4% compared to the 2010 baseline year. The largest emitting sector is projected to continue to be the Buildings & Facilities (1,070 $MTCO_2e$), followed by the Vehicle Fleet sector (559 $MTCO_2e$), Wastewater Treatment Facilities (527 $MTCO_2e$), Streetlight & Traffic Signals (148 $MTCO_2e$), Water Delivery Facilities (96 $MTCO_2e$), and Wastewater Treatment Processes (40 $MTCO_2e$).

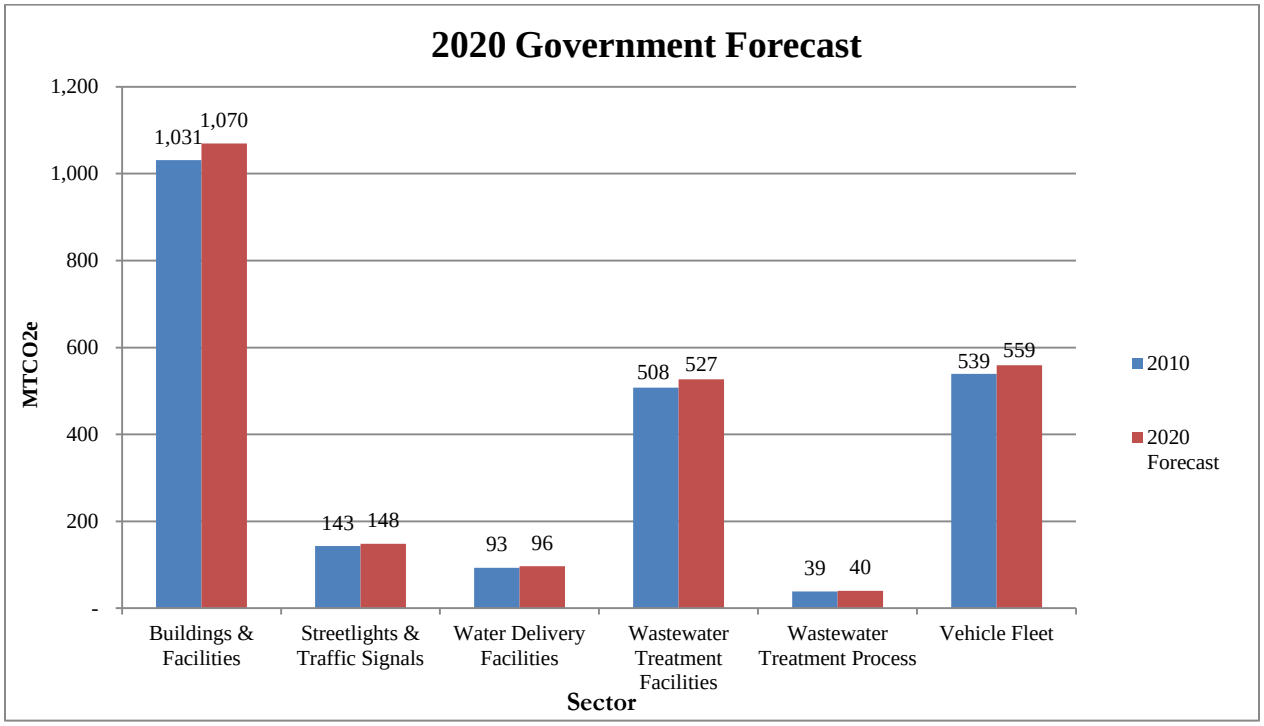

Figure 7: 2020 Government Forecast

5.2 Community Operations

2010 Emissions by Source

In 2010, community emissions totaled 106,831 $MTCO_2e$. Gasoline was the largest source of emissions, producing 39,258 $MTCO_2e$ (37%). Natural Gas and Electricity were also large emitters, creating 36,076 $MTCO_2e$ (34%) and 17,132 $MTCO_2e$ (16%), respectively.

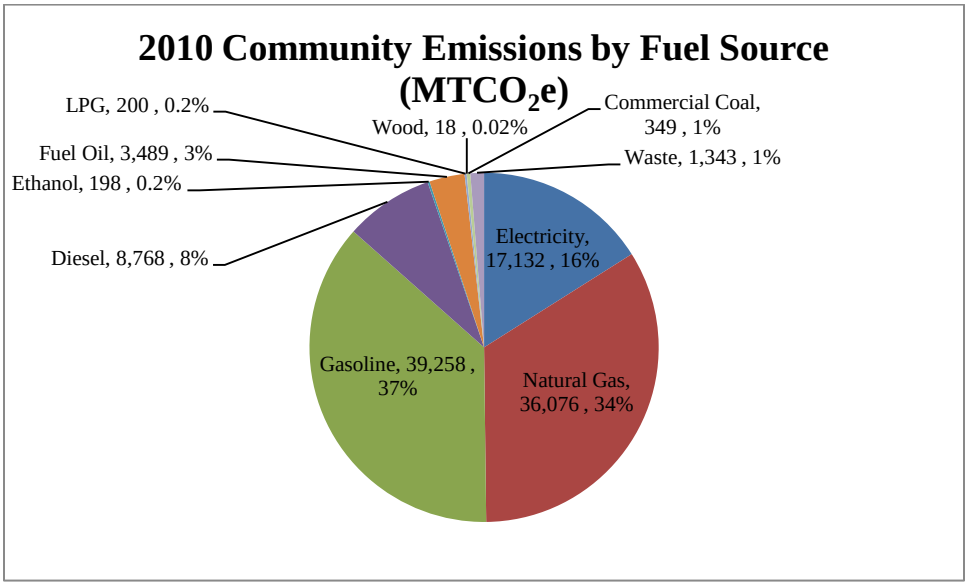

Figure 8: 2010 Community Emissions by Source

2010 Emissions by Sector

In 2010, the largest percentage of community emissions was produced by the Transportation sector, which produced 48,224 $MTCO_2e$ (45%). The Commercial Energy Use sector produced 36,597 $MTCO_2e$ (34%), and the Residential Energy Use sector produced 20,667 $MTCO_2e$ (20%). The Waste sector produced the smallest amount of emissions, creating 1,343 $MTCO_2e$ (1%).

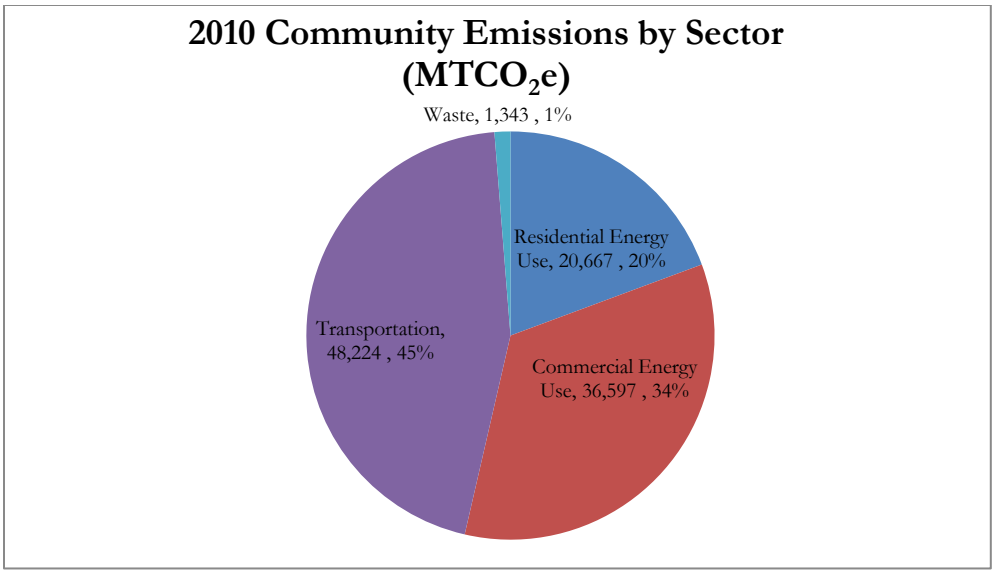

Figure 9: 2010 Community Emissions by Sector

2010 Energy Use by Sector

The following chart depicts energy consumption by community operations in 2010, measured in Millions of Btu (MMBtu). In 2010, 714,849 MMBtu (42% of all energy consumed) was used by the Transportation sector, 635,453 MMBtu (37%) was used by the Commercial Energy Use sector, and 356,747 MMBtu (21%) was used by the Residential Energy Use sector.

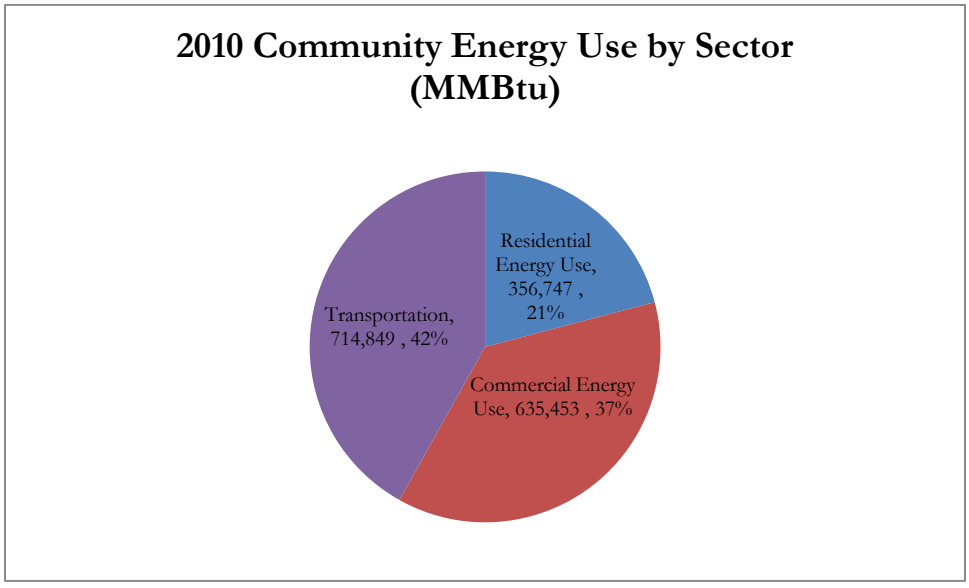

Figure 10: 2010 Community Energy Use by Sector

2020 Community Operations Emissions Forecast

The following graph depicts community emissions in Oneida as inventoried in the 2010 baseline year and a 2020 forecast based on 2010 emissions, population growth trends, energy use trends,

and waste production trends. In the year 2020, emissions are projected to total 102,243 $MTCO_2e$. The largest emitting sector is projected to continue to be Transportation (59,311 $MTCO_2e$), followed by Commercial Energy Usage (27,073 $MTCO_2e$), Residential Energy Usage (14,441 $MTCO_2e$), and Waste (1,418 $MTCO_2e$).

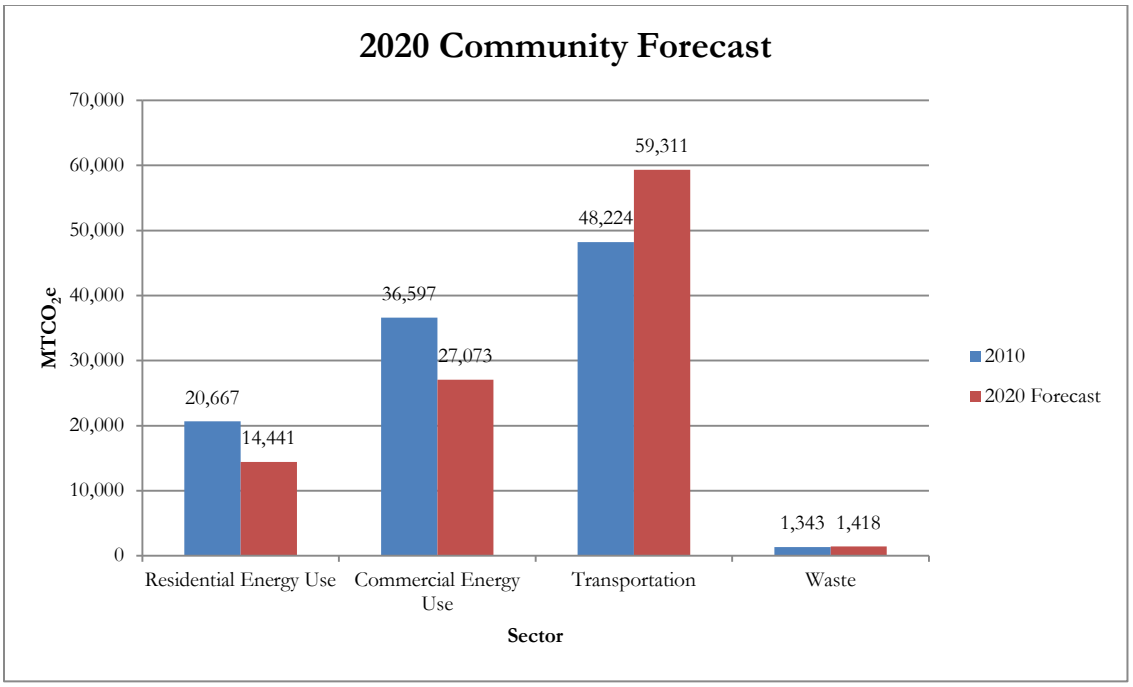

Figure 11: 2020 Community Emissions Forecast

6. Conclusion

In 2010, greenhouse gas emissions from the City of Oneida totaled 2,353 $MTCO_2e$ for government operations and 106,831 $MTCO_2e$ for the community at large. Assuming all operational procedures continue as usual, the emissions forecasted for 2020 are 2,441 $MTCO_2e$ for municipal operations and 102,243 $MTCO_2e$ for the community. In order to better understand and better develop GHG emission reducing policies, it is recommended that an audit of this nature be conducted periodically. An updated GHG emission inventory is recommended to ensure accurate planning for emission reduction targets.

As GHG accounting tools and methods are refined, the City should consider the inclusion of additional emission sources. The institutionalization of inventory data collection processes and tracking will enable the City to repeat this analysis more easily and achieve greater efficiency.

The information gathered in this 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 City of Oneida in creating a Climate Action Plan that will allow the City to reduce emissions, energy use, and energy costs.

7. 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 signif
Emissions Report Summary Table (2010 baseline year)						NE- Not estimated	CA- community-wide activi
						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)**
Built Environment							
Use of fuel in residential stationary combustion (nat. gas- MMBtu)	source and activity	242,353	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		12,883
Use of fuel in residential stationary combustion (fuel oil, wood, LPG- MMBtu)	source and activity	21,989	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		1,639
Use of fuel in commercial stationary combustion (nat. gas- MMBtu)	source and activity	436,314	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		23,193
Use of commercial stationary combustion (fuel- MMBtu)	source and activity	33,937	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		2,417
Industrial Stationary combustion sources (nat. gas- MMBtu)	source and activity	NA	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			NA		
Electricity							
Power generation (natural gas use- therms)	source	NA			NA		
use of electricity by the community (MWh)	activity	27,122,960	eGrid 2009 subregion factors (EPA)	Collected data from National Grid and put into CACP	CA		17,132
District Heating/Cooling							
District Heating/Cooling facilities in community	source	NA			NA		
Use of district heating/cooling by community	activity	NA			NA		
Industrial process emissions in the community	source	NA	EPA GHGRP data reported here: ghgdata.epa.gov		NA		
Refrigerant leakage in the community	source	NA			NE		
Transportation and other Mobile Sources							
On-road passenger vehicles							
on-road passenger vehicles operating within the community (VMT)	source	90,351,032	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 CACP (Version 3.0) & EPA MRR emission factors for gasoline and diesel (varies by veh	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, a	CA		48,224
on-road passenger vehicle travel associated with community land uses (VMT)	activity	NA			NE		
On-road freight vehicles							
on-road freight and service vehicles operating within the community boundary	source	NA			NE		
on-road freight and service vehicle travel associated with community land uses	activity	NA			NE		
On-road transit vehicles operating within the community boundary	source	NA			NE		
Transit Rail							
transit rail vehicles operating within the community boundary	source	NA			NE		
use of transit rail travel by community	activity	NA			NE		
Inter-city passenger rail vehicles operating within the community boundary	source	NA			NE		
Freight rail vehicles operating within the community boundary	source	NA			NE		
Marine							
Marine vessels operating within community boundary	source	NA			NA		
use of ferries by community	activity	NA			NA		
Off-road surface vehicles and other mobile equipment operating within community boundary	source	NA			NE		
Use of air travel by the community	activity	NA			NE		

Solid Waste							
Solid Waste							
Operation of solid waste disposal facilities in community	source	NA	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	7,291.49		Used ICLEI's US Community Protocol Appendix E (Solid Waste	CA		1,343
Water and Wastewater							
Potable Water- Energy Use							
Operation of water delivery facilities in the community	source	NA	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	NA			IE		
Use of energy associated with generation of wastewater by the community	activity	NA	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	NA	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 dischargedMethod WW.8= EF without nitrification or denitrification= 3.2 g N_2O/person equiv		IE		
process emissions associated with generation of wastewater by community	activity	NA			NA		
Use of septic systems in community	source and activity	NA			NA		
Agriculture							
Domesticated animal production	source	NA			NE		
Manure decomposition and treatment	source	NA			NE		
Upstream Impacts of Community-wide Activities							
Upstream impacts of fuels used in stationary applications by community	activity	NA			NE		
upstream and transmissions and distribution impacts of purchased electricity used by the community	activity	NA			NE		
upstream impacts of fuels used for transportation in trips associated with the community	activity	NA			NE		
upstream impacts of fuels used by water and wastewater facilities for water used and wastewater generated within the community boundary	activity	NA			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	NA			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	NA			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	NA			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	NA			NE		

8. 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 City of Oneida.[11] Internal GIS data was utilized to generate road lengths within the City 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 City of Oneida, therefore resulting in slight overestimations of City 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 Oneida with traffic counts is 36.791 miles, while 63.816 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 City of Oneida for the roads without AADT counts. It was determined that there are 4,479 occupied households in the City of Oneida, according to the 2010 US Census. It was assumed that all 4,479 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 Oneida did not have an AADT count. By multiplying 4,479 homes by 6, a combined AADT count of 26,874 was calculated for all 63.816 miles of roads without AADT counts available. In order to calculate VMTs, an average AADT value was needed, and derived by dividing 26,874 by the 63.816 miles of uncounted roadway. This gave an average AADT value of 421, 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 Oneida without AADT

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

counts available. In addition, there may have been some double counting if homes in Oneida are located on roads that have AADT counts available. However, counting the 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 City, 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 ONEIDA (MILES)	DVMT
GENESEE ST	ONEIDA ST	BROAD ST	4,831	1.249	1.249	6,034.016
COBB ST	SR 316	CANAL RD, CR 76	1,180	1.019	1.019	1,202.786
N COURT ST	COBB ST	CANAL RD, CR 76	1,428	1.699	1.338	1,910.228
MAIN ST	MADISON ST	CEDAR ST	758	0.304	0.304	230.728
NORTH MAIN ST	NORTH LAKE ST	EAST ELM ST	1,054	0.235	0.235	247.205
MAIN ST	SCONONDOA ST	EAST WALNUT ST	1,470	0.693	0.693	1,018.739
FITCH ST	CITY LINE	ELM ST, CR 14	1,063	0.450	0.450	478.307
N COURT ST	FITCH ST	ELM ST, CR 14	2,178	1.580	1.403	3,055.921
INTER 34 - RT 13	ONEIDA CO. LINE / ONEIDA CITY LINE	I90, NYS Thruway	33,628	5.395	2.752	92,551.118
CHAPEL ST	COUNTY LINE	KENWOOD AVE, CR 51	1,917	0.381	0.381	729.706
COUNTY LINE	CHAPEL ST	KENWOOD AVE, CR 51	870	0.150	0.150	130.639
MADISON ST	GLADWELL AVE	LAKE ST	1,078	0.549	0.549	591.908
SR 46	WILLIAMS ST	LAKE ST NORTH	0	0.170	0.170	0.000
WILLIAMS ST	ONEIDA OUTER D/L	LAKE ST NORTH	544	0.220	0.220	119.675
MAIN ST	SOUTH LAKE ST	MADISON ST	2,831	0.209	0.209	590.971
CREEK RD	SR 46	MT HOPE AVE, CR 100	475	3.288	2.820	1,339.556
GLADWELL AVE	OUTSIDE DIST	NORTH LAKE ST	605	0.769	0.769	465.142
NYC RAILROAD T	WEST ELM ST	NORTH WILLOW ST	2,699	0.320	0.320	862.762
CR 76 CANAL RD	ONEIDA CL / LENOX TL	NY316	2,411	2.509	2.509	6,049.922
RT 46	CR 76 CANAL RD	NY316	3,684	0.210	0.210	773.308
RT 5	STONE ST	NY365A	10,366	1.141	1.141	11,823.252
STONE ST	RT 46 ONEIDA	NY365A	9,893	1.221	1.221	12,076.583
RT 46 ONEIDA	ONEIDA CO LINE (MIDDLE OF BRIDGE)	NY365A	6,993	0.530	0.530	3,708.458
RT 316	ONEIDA CO LINE (MIDDLE OF BRIDGE)	NY46	4,899	0.050	0.050	245.391
CR 44 UNION ST	RT 5	NY46	6,795	1.793	1.793	12,183.775
ONEIDA S CITY LINE	CR 44 UNION ST	NY46	5,328	1.503	1.503	8,005.906
RT 5	LENOX AVE/ RT 365A	NY46, MAIN ST	11,224	1.122	1.122	12,592.542
LENOX AVE/ RT 365A	ONEIDA ST	NY46, MAIN ST	7,167	1.683	1.683	12,061.703
ONEIDA W CITY LINE	RT 365A FIVE CORNERS	NY5	16,308	0.639	0.639	10,422.932

SENECA ST	ROUTE 46 JUNCTION	NY5	15,942	0.509	0.509	8,118.942
RT 365A FIVE CORNERS	CITY OF ONEIDA (HIGH)	NY5	11,605	0.989	0.989	11,472.935
CITY OF ONEIDA (HIGH)	SENECA ST	NY5	13,140	0.979	0.979	12,858.804
ROUTE 46 JUNCTION	ONEIDA CO LINE (MIDDLE OF BRIDGE)	NY5	15,204	0.100	0.100	1,518.728
MAIN ST	BROAD ST	ONEIDA ST	1,576	0.080	0.080	125.796
NY46	MIDDLE RD	PETERBORO RD, CR 34	769	1.050	0.909	699.232
MIDDLE RD	MADISON/ONEIDA CL	PETERBORO RD, CR 34	1,779	0.207	0.207	367.684
GENESEE ST	LENOX AVE	SAYLES ST	1,840	0.762	0.762	1,402.926
SOUTH LAKE ST	DEVERAUX ST	SCONONDOA ST	3,853	0.436	0.436	1,680.833
DEVERAUX ST	ONEIDA CREEK	SCONONDOA ST	3,207	0.030	0.030	95.537
GENESEE ST	STONE ST	SENECA ST	3,720	0.841	0.841	3,128.483
LENOX AVE	NYC RAILROAD T	SOUTH WILLOW ST	2,679	0.040	0.040	107.348
SR 365A	Inner/Outer Distr line	STONE STREET	1,585	0.080	0.080	126.784
SENECA STREET	MAIN STREET	STONE STREET	1,954	0.180	0.180	351.564
Inner/Outer Distr line	BIRCHWOOD DRIVE	STONE STREET	1,217	0.300	0.300	364.966
BIRCHWOOD DRIVE	SENECA STREET	STONE STREET	898	0.650	0.650	583.628
TOWN LINE	SR 5	UPPER LENOX AVE, CR 97	2,584	1.172	1.172	3,028.551
OUTSIDE DIST L	NORTH WILLOW S	WEST ELM S	1,094	0.630	0.630	689.209
NORTH WILLOW S	NORTH MAIN ST	WEST ELM ST	2,315	0.465	0.465	1,076.568

247,535.92

365

Total AVMT: 90,350,610.72

Table 3: 2010 City of Oneida Traffic Data for Road Segments with Available AADT

# occupied housing units:	4,479
Total AADT for roads not accounted for above:	26,874
Days per year:	365
Average AADT for roads not accounted for above:	421
Total Annual VMT for manually calculated roads:	**9,809,010**

Table 4: 2010 City of Oneida 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 City of Oneida, 90,351,031.843 miles in 2010.

9. Appendix C: Estimation Method for Community Waste Sector

Waste generated in the City of Oneida is sent to the Madison County Landfill for disposal. Waste information for the City of Oneida 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 City of Oneida.

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 City of Oneida was determined by multiplying the City's population by the tons of waste disposed per person, calculated in the previous step. See table 5 for more information.

Inventory Year	County Population	City of Oneida population	Total tons waste processed at the landfill	Tons of waste disposed per person	Tons of waste disposed from City of Oneida
2010	73,442	11,393	47,002.68	0.64	7,291.49

Table 5: City of Oneida 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.[12]

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