

City of Oneida

Climate Action Plan

DECEMBER 2014



Central New York Regional Planning & Development Board



A MESSAGE FROM THE MAYOR



Mayor Smith, Oneida

Photo Credit: Madison County
Courier

Dear Friends,

The City of Oneida is proud to be part of the growing list of communities who have taken the beginning steps to act locally for climate protection. We recognize that future social and economic decisions must also include potential environmental impacts.

This plan outlines pathways that we as a community can work together on to reduce greenhouse gases and mitigate the effects of climate change. Implementing these strategies will be an opportunity to become a more sustainable, healthy, accessible and vibrant community.

We look forward to meeting the challenges of climate change as a community to enhance Oneida's quality of life for generations to come.

Alden M. Smith, Mayor
City of Oneida



Tree Planting, Oneida
Photo Credit: David Wright

ACKNOWLEDGEMENTS

The City of Oneida wishes to thank the following community members, organizations, and staff for their contributions to developing this Climate Action Plan:

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ACRONYMS EXPLAINED

Btu and MMBtu: British Thermal Units and Millions of British Thermal Units. A Btu is the amount of energy needed to cool or heat one pound of water by one degree Fahrenheit, and MMBtu represents 1 million Btu.

CAFE: Corporate Average Fuel Economy. CAFE standards have been set by the federal government for the years 2016 and 2025.

CAPPA: Climate and Air Pollution Planning Assistant. CAPPA is a tool provided by ICLEI – Local Governments for Sustainability to help local communities assess the effectiveness of certain emissions reduction strategies in their communities. CAPPA is the tool that was used for all of the calculations in this document.

CNY RPDB: Central New York Regional Planning and Development Board. The CNY RPDB is a public agency that provides a range of services associated with the growth and development of communities in Cayuga, Cortland, Madison, Onondaga, and Oswego Counties.

GHG: Greenhouse Gas. Greenhouse Gases are gases in the Earth's atmosphere, such as water vapor, methane, carbon dioxide, and nitrous oxide, that allow sunlight to enter the atmosphere but also trap heat in the atmosphere, causing rises in Earth's atmospheric temperatures.

ICLEI: ICLEI-Local Governments for Sustainability is a non-profit organization that provides tools to local governments to assist with greenhouse gas inventories and climate action planning.

kW: Kilowatt. kW is a unit of power equal to 1,000 watts.

kWh: Kilowatt hour. A kilowatt-hour (symbolized kWh) is a unit of energy equivalent to one kilowatt (1 kW) of power expended for one hour (1 h) of time.

MTCO₂e: Metric Tons of Carbon Dioxide Equivalent. MTCO₂e converts the warming potential of each greenhouse gas (i.e. carbon dioxide, nitrous oxide, methane, etc.) into one measurement.

NYSERDA: New York State Energy Research and Development Authority. NYSERDA is a public benefit corporation created in 1975. Its goal is to help New York meet its energy goals of reducing energy consumption, promoting the use of renewable energy sources, and protecting the environment. NYSERDA offers a variety of incentive programs to help New York residents achieve these goals.

PV: Photovoltaic. Solar PV systems convert sunlight directly into electricity.

VMt and DVMT: Vehicle Miles Traveled and Daily Vehicle Miles Traveled. Vehicle Miles Traveled (VMt) is the total number of miles driven by all vehicles within a given time period and geographic area. It is used by regional transportation and environmental agencies for planning purposes. VMt is influenced by factors such as population, age distribution, and the number of vehicles per household. However, the greatest factor by far is how land uses are arranged. Daily Vehicle Miles Traveled (DVMT) is the total number of miles driven by all vehicles within a geographic area in one day.

A NOTE FROM THE CENTRAL NEW YORK REGIONAL PLANNING AND DEVELOPMENT BOARD

This Climate Action Plan document was prepared for the City of Oneida by the Central New York Regional Planning and Development Board (CNY RPDB), a public agency that was established in 1966 by Cayuga, Cortland, Madison, Onondaga, and Oswego Counties under the provisions of Article 12B of the New York State General Municipal Law. The CNY RPDB provides a comprehensive range of services associated with the growth and development of communities in Central New York with a focus on the following program areas: Energy Management, Community Development, Economic Development, Environmental Management, Information and Research Services, Intergovernmental Coordination, and Transportation Planning. The CNY RPDB provided services to this project under the auspices of the United States Environmental Protection Agency's Climate Showcase Communities Program and the New York State Climate Smart Communities Program.

The purpose of this document is to (1) gather information on emission reduction projects and programs already being undertaken in the City; (2) give public officials, community leaders, and residents the information and support that is needed to advance sustainable programs in their communities; (3) identify opportunities for new emission reduction programs and initiatives; and (4) engage and encourage local participation in greenhouse gas emission reduction strategies.

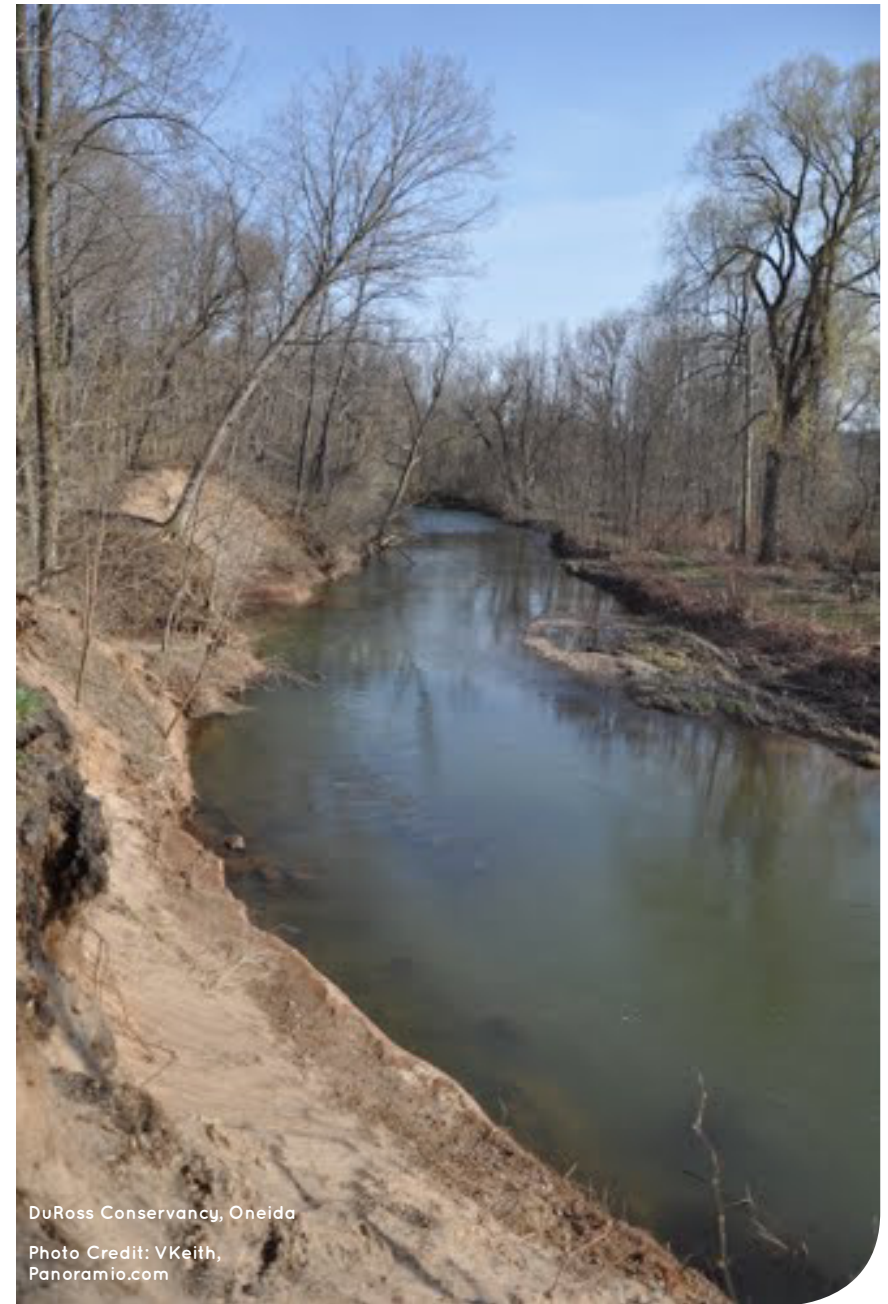
The City of Oneida Climate Action Plan is not intended to provide precise information about the potential emission reductions that can be achieved by specific recommendations, and cannot be used as a substitute for thorough project or program planning. Instead, this document provides estimates of emission reductions that are meant to help public officials, community leaders, and residents better decide which actions may be worthwhile for the community to pursue in the coming years. As such, this document is not meant to be fixed or prescriptive, but rather fluid and flexible.

FRAMEWORK FOR LOCAL CLIMATE PROTECTION

Climate Smart Communities Program

The New York State Department of Environmental Conservation (DEC)'s Climate Smart Communities Program is a partnership between state and local governments with the goal of reducing energy use and GHG emissions. The CNY RPDB is the Climate Smart coordinator for the 5 counties of Central New York, Cayuga, Cortland, Madison, Onondaga, and Oswego. This means that the CNY RPDB provides technical assistance for climate action planning efforts, including compiling GHG inventories and Climate Action Plans, as well as assisting with energy efficiency projects. The CNY RPDB's work as Climate Smart Communities coordinator is referred to as their Climate Change Innovation Program (C2IP).





Introduction

What is Sustainability?

Sustainability is commonly defined as meeting the needs of the present without compromising the needs of future generations.

Sustainability means meeting the needs of present generations without compromising the ability of future generations to meet their own needs. By following the sustainability goals outlined in this document, the City of Oneida strives to become a more sustainable community so that both present and future generations will be able to meet their needs.

Sustainability is based on the principle that water, materials, and resources necessary for survival and well-being are all dependent upon the natural environment. Sustainability allows for the social, economic, and other requirements of present and future generations to be met by creating and maintaining the conditions under which humans and nature can exist in productive harmony.¹

Developing the Plan

The City of Oneida's Climate Action Plan was developed by an advisory committee made up of Jon Rauscher, City Engineer; Margaret Milman Barris, FPM Remediations and City resident; Alan Cohen, Utica Schools and City

resident; Scott Ingmire, Madison County and City resident; and David Wright, Oneida City School and City resident. The committee was provided technical assistance by the CNY RPDB, who analyzed energy and emissions reduction strategies for the City utilizing data from the GHG inventory report. CNY RPDB provided information and suggestions to the advisory committee as to which energy efficiency strategies would be most successful in the City, how many MTCO₂e the strategies would prevent, co-benefits of the strategies, and other case studies explaining where the strategies have been implemented successfully. They also provided information about cost of implementation, possible funding sources, and payback period for the strategies. For more information on how the strategies were developed, including assumptions and references, refer to Appendix A: Action Strategy Summary Document.

Implementing the Plan

In order to implement the strategies in this plan and achieve the City's sustainability goals, the creation of a permanent sustainability committee for the City is highly recommended. The sustainability

Thinking Sustainably: New College at Oxford Example

Founded in the late 1300s, New College at Oxford was built with enormous oak beams in the great dining hall. In the late 1800s, the beams were discovered to be infested with beetles. The College Council was concerned when they heard the news; where would they be able to find oak beams of that size and caliber to replace the beetle-infested ones?

They decided to look into what types of trees were growing on the College lands to see if there were any oaks that could be used to replace the beams. Due to sustainable forestry practices, there were.

Planting stands of mixed broadleaf trees, like oak, hazel, and ash, is standard practice for sustainable woodland management. The hazel and ash are harvested every 20-25 years, while the oaks are left for 150 or more years to grow large so they can be used in major construction work, as beams for example.

New College was able to replace their beams using the oaks that had been growing on their lands for over 100 years for that exact purpose. They continue to grow many oaks on their land so that 150 years from now the beams can be replaced again.

¹ <http://epa.gov/sustainability/basicinfo.htm#sustainability>

Projected Climate Impacts in the Northeast¹

Temperature: Average temperatures across the Northeast have risen more than 1.5 degrees Fahrenheit since 1970, with even more significant changes in average winter temperatures, rising 4°F between 1970 and 2000.

Precipitation: The Northeast region is projected to see a 20 to 30% increase in winter precipitation, and, due to increases in temperatures, less winter precipitation will fall as snow and more will fall as rain.

Additionally, heavy, damaging rainfall events have already increased measurably across the Northeast in recent decades. For example, Hurricane Irene and Superstorm Sandy brought intense rains to the region in 2011 and 2012, causing widespread flooding.

Drought: Rising summer temperatures coupled with little change in summer rainfall are projected to increase the frequency of short-term (one to three month) droughts in the Northeast, therefore increasing stress on both natural and managed ecosystems.

¹ US EPA

<http://www.epa.gov/climatechange/impacts-adaptation/northeast.html>

committee would be comprised of a group of City residents who are committed to Oneida's sustainable future and are willing to volunteer their time to help implement the strategies explained in this plan. The CAP advisory committee can fill this role if the City chooses.

Progress towards the Climate Action Plan's goals can be measured over time by conducting subsequent GHG emissions inventories. Future inventories can be compared against the baseline year of 2010 to determine progress.

What is climate change?

Global concern with climate change is primarily focused on the amount of greenhouse gases in the atmosphere. Greenhouse gases, such as carbon dioxide, water vapor, and methane, among others, are an essential part of our atmosphere, and they serve a vital role in making our planet warm enough for life.

Greenhouse gases trap energy (in the form of long wave radiation) that is being emitted by the Earth, reflecting it back into the atmosphere to warm the planet. As the amount of carbon dioxide in the atmosphere has increased or decreased over time, the planet's temperature has changed in roughly the same proportion.

Scientists have determined this relationship by studying Antarctic ice core samples that

reveal the atmospheric carbon dioxide from 400,000 years ago to present day. Right now there is more carbon dioxide in the atmosphere than at any time in history, as measured by these samples,² and further atmospheric testing shows that we have extended to 402ppm atmospheric CO₂,³ which is well above any other measure in time.⁴ Scientists expect that this will lead to a gradual warming of the planet in most areas.

Potential Impacts of Climate Change within the City of Oneida

GLOBAL WEATHER CHARACTERISTICS

Regions throughout the world are experiencing dramatic weather extremes. A primary influence on wind and precipitation variability can be attributed to the natural climate cycles of El Nino and La Nina that

² Visit http://www.antarctica.ac.uk/press/journalists/resources/science/ice_cores_and_climate_change_briefing-sep10.pdf to learn more about the Antarctic ice core findings with accompanying graphs for temperature and CO₂.

³ According to the Scripps Institute and NOAA, Mauna Loa Observatory

⁴ In January 1998, the collaborative ice-drilling project between Russia, the United States, and France at the Russian Vostok station in East Antarctica yielded the deepest ice core ever recovered, reaching a depth of 3,623 m (Petit et al. 1997, 1999). The extension of the Vostok CO₂ record shows the present-day levels of CO₂ are unprecedented during the past 420 kyr. Pre-industrial Holocene levels (~280 ppmv) are found during all interglacials, with the highest values (~300 ppmv) found approximately 323 kyr BP.

originate in the equatorial Pacific region. The cycles influence the direction and characteristics of jet streams, causing them to meander in the northern and southern hemispheres. The heat and water vapor that enter the atmosphere from these cycles influence weather patterns around the globe.

Another significant influence on weather patterns can be attributed to human activity. The long-term accumulation of greenhouse gases in the atmosphere is trapping heat, resulting in temperature increases in both terrestrial and aquatic ecosystems. The average surface temperature worldwide has increased approximately one degree Fahrenheit within the past four decades. As a result of this warming trend, Arctic sea ice has lost approximately 40% of its summer sea ice since the 1980s and autumn ocean temperatures have risen 3.6 to 9°F. As the ocean temperature increases, more moisture is released into the atmosphere. During the past twenty-five years, scientists have measured a 4% average rise in water vapor in the air column which, in turn, increases the occurrence of strong storm events. The following sections present information on how these global conditions impact climate characteristics in New York State and in Central New York.

NEW YORK STATE WEATHER CHARACTERISTICS

The climate in Central New York is characterized by warm, dry summers and



I Love My Park Day, Oneida

Photo Credit: Scott Inglmire

cold, snowy winters. The weather patterns are influenced by topography, prevailing westerly wind direction, and proximity to Lake Ontario. Frost can be expected from early October until late May and the growing season is approximately 18 to 20 weeks long. Serious droughts are rare but most growing seasons do experience limited periods of low soil moisture.

In 2011, the New York State Energy Research and Development Authority (NYSERDA) released a comprehensive assessment of the projected effects of climate change in New York State's critical systems and natural resources over the next century. *ClimAID: the Integrated Assessment for Effective Climate Change Adaptation Strategies in New York State* was compiled by more than 50 scientists and currently serves as an important tool for planners, policymakers, farmers, local governments and residents. According to the report, the annual average temperature in New York has risen approximately 2.4°F since 1970, with winter

warming exceeding 4.4°F. Sea level along New York's coastline has risen about a foot since 1900 and the frequency of intense precipitation and heavy downpours has increased in recent decades.

Flooding is a growing concern throughout New York State, especially with the rise in urban development and subsequent impervious surfaces, and the increased frequency of storm events. Although some areas are more prone to flooding than others, there are no areas in the State that are completely exempt from flood hazards. There are over 52,000 miles of river and streams in New York State, and along their banks there are 1,480 communities that are designated as flood prone. An estimated 1.5 million people live in these flood prone areas and many more work, travel through, or use recreational facilities located in these areas.

Ice cover on the Great Lakes: The amount and duration of ice cover on Lake Ontario and other Great Lakes is variable from year to year. Despite the anomaly of winter weather conditions during the 2013 and 2014, scientists have documented an overall decrease in ice extent since the early 1970s. From 1973 to 2010, annual ice coverage on the Great Lakes has declined by 71 percent, relative to 1973. Ice characteristics on the Great Lakes are important to monitor because of the influence on hydropower generation, commercial shipping, the fishing industry and other societal impacts. Scientists

at the Great Lakes Research Laboratory are observing long-term changes in ice cover as a result of global warming, and their research is helping to determine the impacts on climate patterns, lake water levels, water movement patterns, water temperature structure, and spring plankton blooms. Ice coverage and duration influence lake water temperatures, as incoming solar radiation needs to melt the ice before it warms the lake water. However, weather conditions, lake depth, and heat storage capacity in lakes are also important components that can influence the thermal cycle in the lakes.

LOCAL WEATHER CHARACTERISTICS

Temperature and Precipitation: The City of Oneida generally experiences seasonable weather patterns that are characteristic of the northeastern U.S. cyclonic system. During the summer and parts of spring and autumn, temperatures rise during the daytime and fall rapidly after sunset. The average temperature is 46.6°F, which is lower than the New York average temperature of 48.2°F, and much lower than the national average temperature of 54.4°F.

Central New York experienced exceptionally heavy snowfall, icy roads, and low temperatures during the 2013-14 winter months. The U.S. Department of Agriculture determined that Cortland, Madison and Oswego counties suffered sufficient production losses during a period of cold weather (from December 1, 2013 through



Flooding of Oneida Creek, Oneida

Photo Credit: Executive Chamber provided photo for Syracuse.com

March 14, 2014) to warrant a Secretarial disaster designation. The designation made farm operators in both primary and contiguous counties eligible for assistance from the Farm Service Agency if eligibility requirements were met. This assistance included FSA emergency loans.

Snowfall: The City of Oneida is influenced by “lake effect” snowfall which is caused by a differential between cold air temperatures and warmer water temperatures found in Lake Ontario. As cold air flows over the warm water, the bottom layer of air over the surface of the water is heated from below. Since warm air is lighter and less dense than cold air, the heated air rises and cools. As it cools, the moisture from the lake condenses and forms clouds. When enough moisture condenses, snow bands develop over the region downwind of Lake Ontario. The greater the temperature contrast between the cold air and the warm water, the heavier the resulting lake effect snow fall will be.

Because of the increased water temperature and reduced duration of ice cover on Lake Ontario, the City of Oneida and other areas to the east and south of the lake will continue to experience heavier and more frequent lake-effect snowfall events.

Extreme Weather Events: The relative intensity of local storm events is influenced by air temperature. As air temperature rises, moisture in the atmosphere increases. This, in turn, contributes to an increase in the intensity and frequency of precipitation events. Warming air temperatures observed throughout New York State are influenced by emission of heat-trapping gasses in the atmosphere including pollution from fossil fuels. Warming air temperatures cause higher levels of oceanic evaporation which intensifies the water cycle throughout the globe. As a result, storm events in Oneida and around the globe are gradually becoming more extreme with stronger wind speed and higher rainfall totals.

Meteorologists report that the total annual amount of precipitation is changing as well as the distribution and intensity of storm events. According to the ClimAID report, New York State experienced a 64% increase in extreme storm frequency between 1948 and 2011. The increased number of severe storms is expected to gradually continue, with 100-year storms likely to occur every 80 years by the end of the century. Strong storm events contribute to localized flooding, soil erosion, and stormwater

runoff. These conditions can cause damage to roads, bridges, and other infrastructure in Oneida.

The role of agencies such as the Madison County Soil and Water Conservation District and the Natural Resource Conservation Service will become increasingly important in the coming years, primarily because of their work with stream bank stabilization, erosion and sediment control, and stormwater management. Incorporating green infrastructure and enhancing stormwater management helps to reduce the threat of flooding and improves the quality of local water resources. In addition to improving air and water quality, green infrastructure is a cost-effective approach that can provide additional community benefits such as reducing energy use and mitigating climate change, improving habitat for wildlife, reducing the City's infrastructure costs, and promoting economic growth.

Flooding: Flooding characteristics in the City of Oneida are influenced by the intensity and amount of precipitation, spring snowmelt, groundwater levels, elevation, proximity to Oneida Creek, and the concentration of impervious surfaces and compacted soils from urban development. These combined conditions influence groundwater recharge and surface runoff which impact the level of flooding. According to the Federal Emergency Management Agency (FEMA), floods have caused a greater loss of life and property and have disrupted more people

in the United States than the impact of all other natural hazards combined. FEMA reports that floods kill more people than any other form of severe weather, with damages exceeding \$3.5 billion annually. With the exception of fire, floods are the most prevalent and widespread of all natural disasters, and approximately 75 percent of all presidentially declared disasters are the result of flooding.

The frequency of localized downpours in Central New York has increased over the past fifty years and this trend is expected to continue. Heavy precipitation events increase the potential for localized flooding and stormwater runoff. Heavy rain events also increase pollution loading to local waterbodies and can decrease the efficiency of wastewater treatment plants.

The City of Oneida experienced a record-setting flood in June 2013 which displaced families and caused extensive damage to 214 homes. Many of the homes remain vacant in 2014. Although the majority of homeowners decided to rebuild, many families have signed up for a State buyout of their properties because of the extent of the flood damage. The dramatic impact from the storm was caused by a combination of the rainfall amount (2.4 inches throughout the watershed) and the intensity (i.e. the rate at which it fell). The City has experience other significant flooding events – especially those recorded in 1922, 1936, 1950, 1959, 1972, and 1973.



Harmon Field, Oneida

Photo Credit: City of Oneida

Within the past 25 years, rainfall events in Central New York have occurred twice as often as they have in previous years. Based on the flooding frequency, City officials are now developing plans for greater protection of the local community. These include the potential relocation of the wastewater treatment plant, updated evacuation plans, and an evacuation warning system.

The term 'assessed value' refers to the dollar value assigned to a home or property by local government in order to calculate property taxes. According to tax parcel data from 2012, the total assessed value of property located within designated FEMA flood zones in the City of Oneida represents 14% of the total assessed value of parcels throughout city (Table 1). Of the 4,429 land parcels in the City, 17% are located in FEMA flood zones (Table 2).

Recreation: Oneida residents have access to recreational waterways, such as the Erie Canal and Oneida Creek which flows

north to Oneida Lake. The City is located on the New York State Canalway Trail System, boasting over 260 miles (420 km) of multi-use recreational trails. Weather has a significant impact on the tourism and recreation sectors in Central New York. Seasonal weather patterns, especially rain and snowfall totals, influence lake water levels for boating, the rate of erosion and pollution loading of nutrients and sediment, snow cover for skiing, and waterfowl breeding rates for sport hunting. Weather influences the duration and types of outdoor recreation activities that take place and plays a principal role in the local economic vitality.

Gradual warming trends are expected to impact Central New York's recreation opportunities by reducing the length of the

ski season, which could decrease business income generated from retail stores and associated ski industries. In addition to skiing, New York State maintains 8,000 miles of snowmobiling trails that also contribute to the local economy. Skiing and snowmobiling rely on snowfall and cold temperatures which are expected to decrease with climate change. In response to this warming trend, resorts are now promoting diverse services and year-round events.

Fishing and boating along Oneida Creek and in nearby lakes are popular water-based activities. Higher air temperatures and a shorter duration of winter ice cover may increase surface water temperatures, which will likely cause a gradual shift in coldwater fisheries. According to researchers at Cornell

University, warming water temperatures may already be contributing to fish species modifications in Oneida Lake. A slight increase in lake water temperature is thought to be causing an increased production of largemouth and smallmouth bass, gizzard shad, and other species near the northern extent of their range. Additionally, at the southern edge of their range, Burbot may be in decline. Brook trout, commonly found in New York State tributaries, are at risk due to changes in habitat resulting from climate change and the presence of invasive species.

The local warming trend is providing a longer growing season for agricultural crops and backyard gardens and is providing a boost to water-based summer recreation such as boating and swimming. However,

TABLE 1- TOTAL ASSESSED VALUE (TAV) OF PARCELS INTERSECTING FLOOD PLAINS¹

| Municipality | TAV of Parcels Intersecting Flood Plain | # Acres of Parcels Intersecting Flood Plain | TAV of Municipality | TAV % Floodplain Parcels within the Municipality |
|----------------|---|---|---------------------|--|
| City of Oneida | \$86,004,078 | 3,196 | \$618,956,507 | 14% |

¹ Source: 2012 tax parcel data, Madison County

TABLE 2- PARCELS WITHIN 100-YEAR FLOODPLAIN IN THE CITY OF ONEIDA¹

| Municipality | Parcels | Parcels in 100-Year Floodplain | % of Parcels in 100-Year Floodplain |
|----------------|---------|--------------------------------|-------------------------------------|
| City of Oneida | 4,429 | 761 | 17.18% |

¹ Source: 2012 tax parcel data, Madison County

the combined effect of warmer air and water temperatures and decreasing ice coverage will likely cause an increase in the growth of nuisance aquatic plants and algae which would impair recreational opportunities.

Human and Animal Health: Warming temperatures throughout the country are increasing human health impacts such as asthma due to changes in air quality. Food, water, and animal-borne diseases affecting humans, livestock, and wildlife are governed by environmental conditions. Projections of warmer winters, hotter summers, and unpredictable precipitation patterns are expected to increase certain types of diseases. For example, long-term climate change in the Northeast is expected to result in increased population rates of mosquitoes and ticks. As the populations of these insects increase, it could result in more frequent outbreaks of West Nile Virus and Lyme disease-causing bacteria.

Invasive and Endangered Species: While insects and diseases are a natural part of the aquatic and terrestrial ecosystems, climate warming is thought to be causing a gradual shift in pest populations of invasive and native species. Some warm-weather invasive species that previously could not survive the cold winter temperatures in New York State are now able to establish themselves, thereby threatening populations of native species. Early detection and a rapid response of new infestations of invasive species are the most effective ways that the City of Oneida and



Mount Hope Reservoir, Oneida

Photo Credit: Jennifer Meyers,
The Post-Standard

other Central New York communities can address this problem.

The Hemlock Woolly Adelgid, Asian Longhorn Beetle and Emerald Ash Borer are invasive tree pests that pose a threat to Central New York. They have the potential to damage local tree populations and the communities and industries that rely on them. The destruction of hemlock in New England forests affects recreational activities such as fishing. As pests kill trees adjacent to streams, shade is no longer provided and stream water temperatures increase beyond what is ideal for coldwater fish, such as trout.

“Endangered species” refer to at-risk populations such as the ovate amber snail. Chittenango Falls State Park, located on Route 13 in Madison County, is the only known site for the snail. An area within the park is sectioned off to protect it from human impacts, but continued monitoring of the

population is needed to determine if the snail is influenced by warming temperatures.

Climate Adaptation in the City of Oneida

The Oneida community and county agencies have been proactive in reducing greenhouse gas emissions and adapting to climate change. The list found below provides a summary of recent accomplishments.

- + The City joined more than 130 other municipalities in New York State that have signed municipal resolutions to become Climate Smart Communities;
- + The City Hall building and the Armory have undergone LED lighting retrofits. This measure has reduced energy use in municipal buildings, resulting in reduced municipal costs and emissions;
- + The City Hall building has been retrofitted with lighting occupancy sensors and a reflective roof which reduces energy use and emissions;
- + The City received grant funding for roof upgrades at the Kallet Civic Center and is considering reflective roofing and/or solar options on the roof. Both of these measures are designed to reduce energy use, costs, and emissions;
- + A Shade Tree Commission has been established with an appointed representative from each ward. Commission representatives are responsible for determining the needs of the City in connection with the tree planting program and for providing information to the Common Council on the selection, planting

and maintenance of trees. The City of Oneida has been designated a *Tree City USA* by the National Arbor Day Foundation.

- + Madison County is in the process of finishing its Community Resiliency Plan for flood hazard mitigation through the NY Rising program. This Plan is scheduled to be finished in early fall 2014 and will guide the Madison County Multi-Jurisdictional Hazard Mitigation Plan updates.
- + The Madison County Multi-Jurisdictional Hazard Mitigation Plan is currently being updated with assistance from national, state and local agencies. By identifying vulnerabilities and assessing local risks, the county increased its capacity for planning for hazard avoidance and mitigation. The plan was written to improve the overall understanding of local hazards, thereby leading to more sustainable and disaster-resistant communities. Recommendations included in the plan are designed to protect human health and reduce potential impacts on infrastructure.
- + The Madison County Soil and Water Conservation District develops erosion and sediment control plans, assists with stormwater facility permitting, works on streambank restoration to reduce erosion and sedimentation, and provides assistance in the identification of green infrastructure opportunities.
- + In the event of a long-term power failure or other disaster, the County Office of Emergency Preparedness contacts local fire departments to request that they check on at-risk individuals.



Balloon Fest, Oneida

Photo Credit: Scott Ingmire

The City of Oneida is currently working on plans for the following additional projects:

- + The Oneida Rail Trail (ORT) is a proposed 11.3-mile non-motorized, multi-use trail located in the City of Oneida. The ORT will preserve and utilize existing rail beds to create a cultural corridor along the New York Central, West Shore Division, and New York Ontario & Western rail lines. These rail beds once ran through the heart of downtown Oneida and connect to the Village of Wampsville to the west and the City of Sherrill to the southeast. The ORT will link three communities, multiple neighborhoods, businesses, offices, parks, tourist destinations, education facilities, and other trails including the Old Erie Canal Towpath to create a new economic engine in the area and source of community pride. The City has already opened the first 1 mile section of the trail and has received funding to complete the next three miles of the trail. SUNY ESF students are also getting involved by helping design portions of the trail, including the 3-mile section that has been funded.

The students are also assisting in public outreach and planning of the flats area where the worst of the flooding took place in 2013.

- + 'Bicycle Friendly Businesses' are businesses that support the Oneida Rail Trail and would like to support bicyclists as they ride through the City. These businesses may offer special incentives or discounts for your patronage. It is a goal of the rail trail project to create more of these businesses throughout Oneida.
- + A 'complete streets' design is being developed that will incorporate pedestrian and bicycling infrastructure and green infrastructure.
- + Lighting retrofits are being considered for the wastewater treatment facility similar to those completed at City Hall and the Armory.
- + Street light conversions from 400W to 175W metal halide bulbs or LED bulbs are being planned.
- + Streetscape designs and tree plantings throughout the downtown region are being developed.
- + Boilers in the Armory and Kallet Civic Center are being replaced in the fall of 2014 for increased efficiency thanks to a \$250,000 grant from the Dormitory Authority State of New York (DASNY).
- + Methane (currently flared at the wastewater treatment plant) is being considered for a boiler system. The cogeneration system is not effective with the amount of methane that is currently produced.
- + The City is considering a LEED-certified construction project for the Department of Public Works garage which is being relocated.

Recommendations for Additional Climate Adaptation

According to climate researchers, continued emissions of greenhouse gases will cause further warming with ongoing changes anticipated within all parts of the global ecosystem. Reducing the rate of climate change will require substantial and sustained decrease of greenhouse gas emissions. These are the key conclusions from an assessment by the Intergovernmental Panel on Climate Change (IPCC) that was released in January 2014. 259 scientists from 39 countries around the world further stated that, "Warming of the climate system is unequivocal and since the 1950s, many of the observed changes are unprecedented over decades to millennia."

Human intervention to reduce the rate or extent of climate change can be accomplished in two ways: by avoiding the potential consequences through emissions reduction (referred to as **mitigation**), or making changes to adjust to climate impacts that are unavoidable (referred to as **adaptation**). Many of the mitigation policy discussions in the City of Oneida have focused on reducing greenhouse gas (GHG) emissions through fuel efficiency for vehicles and on energy efficiency for buildings and businesses. The mitigation recommendations that are found in this Climate Action Plan are based on the findings from the City's greenhouse gas inventory.

Adaptation strategies require community-wide planning that addresses local conditions associated with storm events, flooding, snowfall, and wind damage. Climate adaptation strategies include, for example, development of early storm warning systems, air-conditioned cooling shelters, stormwater

control, and policies that discourage people from building in flood prone areas.

The level of intervention required to reduce and adapt to the effects of climate change will require action at all levels of government and society. In June 2014, the EPA released a new policy statement on climate change adaptation to help the nation prepare for and respond to the impacts of a changing climate. The policy states that the EPA will continue to work with states, tribes, and local communities to increase their resilience to extreme weather events and prepare for the impacts of climate change. EPA's policy is consistent with the President's Climate Action Plan, which calls on the federal government to strengthen the adaptive capability of its programs and operations.

Setting carbon emission targets and standards by industry or sector, or fuel efficiency standards for vehicles, falls within the responsibility of federal and state governments. New York State, for example, has set aggressive climate adaptation and mitigation goals, including meeting 30% of the state's electric needs with renewable energy sources by 2030, and reducing greenhouse gas (GHG) emission by 80% (below 1990 levels) by 2050.

A primary goal for Central New York, as presented in *Vision CNY: Central New York Regional Sustainability Plan*, is to reduce CO₂ emissions, increase use of alternative energy such as solar and wind, and adapt to a changing climate by improving community resilience, protecting infrastructure, and

protecting natural systems. A gradual increase in high and low temperature extremes and an increase in the frequency and intensity of storm events in Central New York are likely to impact transportation infrastructure, human health, agricultural practices, forest diversity, and migratory patterns of invasive species. Adapting to climate change will provide opportunities for the City of Oneida and other communities to improve the resilience of the community while protecting natural resources. The City is leading by example by researching options to reduce energy usage in municipal facilities through alternative fuels for transportation fleets and renewable energy sources. Local officials and the CNYRPDB have met with community leaders to review building codes and standards, analyze public transportation options to reduce commuting time, and to explore options to educate the public about adaptation measures and alternative energy choices.

The policy recommendations for climate adaptation that are presented in the following table were developed with local input. They are designed to help the Oneida community prepare for anticipated changes in climate conditions and to assist decision-makers in identifying opportunities to improve community resilience. The table provides a summary of actions that the community can take to protect people, homes, buildings and natural systems by reducing risks from environmental hazards such as extreme heat and storm events. City officials are encouraged to update these recommendations each year as additional data becomes available.

TABLE 3- CLIMATE ADAPTATION RECOMMENDATIONS FOR THE CITY OF ONEIDA

| Focus Areas and Recommendations | Actions |
|---|---|
| Monitoring, Assessment and Data Collection: Provide for the routine collection of temperature, precipitation, storm frequency, endangered and invasive species, and public health information in order to evaluate the impact of climate changes on local conditions | <ul style="list-style-type: none"> • Assess the economic impacts of climate change through revenue potential from tourism and recreation • Work with Project Watershed (Isaac Walton League) to document invertebrate population trends along Oneida Creek • Continue to conduct flood and erosion studies along flood prone areas in the City, such as the sediment transport study on Oneida Creek, hydrological study of Oneida Creek, and stream bank stabilization project at Maxwell Field that are already in process. |
| Infrastructure Design and Maintenance: Protect and upgrade local infrastructure for cost savings, as well as stormwater and flood control | <ul style="list-style-type: none"> • Assess the condition of local infrastructure and document climate vulnerabilities in the areas of energy, water, transportation, and telecommunications • Adjust angle of City light bulbs to downward position to reduce lighting of the night sky • Work with the Madison County Soil and Water Conservation District to improve the capacity of stormwater collection systems and to maximize soil infiltration and groundwater recharge • Inventory and prioritize road culvert and shoulder ditch repairs • Install green infrastructure measures (rain gardens, porous pavement, and rain barrels), especially in priority areas such as the flats drainage area • Encourage downspout disconnection, bioinfiltration, and rainwater harvesting in the City's residential and business communities to reduce stormwater runoff to Oneida Creek • Maintain/expand Oneida's hiking and biking trails to enhance open space preservation and soil infiltration |
| Public Health: Establish mechanisms to reduce or eliminate the negative effects of climate change on public health | <ul style="list-style-type: none"> • Work with the Madison County Health Department to document trends in asthma, Lyme disease, and heat-related illnesses that may be influenced by a warming climate • Improve local capacity for health preparedness, response, and recovery programs, such as the development of a extreme-heat response plan and designation of a community location with air conditioning during heat events • Notify the community regarding heat events, air quality, and other climate related health risks |
| Regional collaboration and communication: Ensure that emergency operations are current and maintain open lines of communications between local agencies | <ul style="list-style-type: none"> • Update the City of Oneida community's inventory of emergency operations and public notification lists • Collaborate with national, state, and local agencies to facilitate data collection, sharing, and synthesis of flood and storm event preparedness information • Reconfirm channels of communication with local police and fire departments, the local power utility, and media outlets • Review the potential use of Hyper-Reach with IPAWS, a government partnership between federal and local emergency responders that is designed to reach non-residents in a municipality for a more complete coverage during emergencies • Re-establish local protocols for sharing equipment during emergencies • Update land hazard maps and inventories of infrastructure and at-risk communities • Work with Madison County officials to update the County's Hazard Mitigation Plan every five years and post the Plan on municipal and agency websites • Establish a road watch program to alert the public of flooded areas and tree damage during storm events |
| Local Laws and Planning: Modify local laws to incorporate measures for adaptation to climate change | <ul style="list-style-type: none"> • Re-evaluate building and zoning codes to discourage/prevent new development in flood-prone and high hazard areas • Evaluate the use of PACEⁱⁱ as a way for commercial property owners to pay for energy upgrades, on-site renewable projects, and water conservation measures • Incorporate climate adaptation into City planning documents |

ⁱⁱ Property Assessed Clean Energy (PACE) is a way for commercial property owners to pay for energy efficiency upgrades, on-site renewable energy projects, and water conservation measures. PACE funding is provided or arranged by a local government for 100% of a project's costs, and is repaid with an assessment over a term of up to 20 years. PACE financing is available for all types of commercial and industrial properties and may be available to non-profits and government facilities as well. PACE projects are affixed to the property and save money for the property owner. PACE is voluntary. In communities that adopt PACE, assessments are only paid by participating owners and only for their own projects. PACE programs are locally based. For additional information, visit www.pacenow.org.

| Focus Areas and Recommendations | Actions |
|--|--|
| Natural Resources: Ensure the resilience of natural systems and resources through open space conservation and smart growth strategies | <ul style="list-style-type: none"> •Protect open space through conservation land grants, landowner incentives, fee acquisition, and the purchase of conservation easements, and promote smart growth principals •Update local maps that display low elevation areas in the City that are susceptible to flooding. Display this information on the City's website, along with preparedness guidelines; maps should display varying levels of flood hazard potential •Remove branches, ice jams, and other debris from Oneida Creek to reduce the potential for flooding |
| Trees: Protect and expand urban trees and woodland ecosystems to increase climate change mitigation potential | <ul style="list-style-type: none"> •Plant living snow fences (evergreens planted at distances of at least 100 feet upwind of problem stretches of a road) to reduce snow drifts and travel hazards for drivers •Plant and maintain trees and other vegetative buffers along the Oneida Creek shoreline in order to reduce flooding, to reduce the flow of pollutants from entering Oneida Creek, to reduce shoreline erosion, and to maintain cooler water temperatures through shading •Maintain the City Tree Commission for ongoing tree maintenance •Work with the US Forest Service and Madison County Cooperative Extension to monitor changes in tree composition and health •Plant low pollen tree species in the City recreation areas and parks in order to minimize human health issues •Manage tree density to reduce overcrowding and susceptibility to stress and disease •Remove tree and vegetative growth along power lines •Remove dead or dying trees and replace them with heat and invasive tolerant species |
| Transportation: Reduce the amount of transportation-related GHG emissions | <ul style="list-style-type: none"> •Prepare a commuting analysis to evaluate the need for organized carpooling and ride-share opportunities such as "Uber", "Sidekick", and "Lift" •Use smaller school buses when only a few students are being transported to and from school events |
| Waste Management: Increase waste management efficiency | <ul style="list-style-type: none"> •Work with the Madison County Solid Waste Department (J. Zecca) to research food composting and recycling options for the school and local restaurants |
| Invasive Species: Protect local trees and water resources by controlling the introduction and spread of invasive species | <ul style="list-style-type: none"> •Educate the public and elected officials on the value of prevention and early detection of invasive species •Work with the Madison County Soil and Water Conservation Service and the Natural Resource Conservation Service to monitor the introduction and spread of invasive species •Participate in Cornell Cooperative Extension's Emerald Ash Borer control strategy and in the New York State Invasive Species Task Force |
| Public Outreach and Education: Implement a comprehensive public outreach and stakeholder engagement campaign to build awareness of climate change | <ul style="list-style-type: none"> •Develop and implement climate education programs for all grade levels in the Oneida City School District •Train local building officials, planning boards, and elected officials on flood hazards, risk reduction strategies, implementation of floodplain development regulations, post-flood reconstruction, and how to address flood hazards during planning board reviews •Train local building officials and the construction industry on flood proofing techniques for retrofitting existing flood prone development •Add topographic maps and information about flood preparedness on City websites •Incorporate climate adaptation information on City and agency websites in order to increase the awareness of severe weather risks, storm preparedness, and safety practices for homes and businesses. Provide emergency preparedness guidelines for people living and working in flood prone areas such as actions to take if a flash flood warning is issued, relevant emergency websites and information sources, items to include in a disaster/flood supply kit, how to protect properties from flood damage, and guidelines for developing a Family Disaster Plan •Distribute brochures, fact sheets, and posters that show ways in which businesses and residents can prepare for and adapt to climate change •Sponsor a workshop to teach residential and business owners how to calculate their Energy Use Intensity (EUI)ⁱⁱⁱ •Sponsor workshops to teach homeowners, local planning boards, elected officials, code enforcement officers, county agencies, businesses, citizen associations and real estate agents about Emerald Ash Borer, storm preparedness, watershed land use influences, and floodplain management |

ⁱⁱⁱ Energy Use Intensity (EUI) is the number of BTUs, kWh or other value per square foot

LAND USE

There is a growing acknowledgement by scientists and policy analysts that a substantial part of the global warming challenge may be met through the design and development of cities and towns. The form and function of human settlements can either reduce or increase the demand for energy, and can also influence how energy is produced, distributed, and used. Planning and urban design measures can substantially reduce the number and distance of vehicle trips by organizing human activity in compact communities with a range of housing types, providing reliable transit to and from employment, and placing services within easy walking distance of home.



Bicyclists, Oneida Rail Trail

Photo Credit: Scott Ingmire

National studies show that a GHG reduction of up to ten percent may result from a change in land use approach alone, and additional reductions will result from employing other strategies such as investments in transit, encouraging development around transit stops, and parking charges. By one estimate, approximately two-thirds of all development in the nation by 2050 will be new or will have been redeveloped since 2007, suggesting that combined land use and transportation strategies could be quite influential in mitigating the increases in GHGs.

TRANSPORTATION

There is a growing theory by scientists and policy analysts that a substantial part of the global warming challenge could be met through a change in the design of cities and towns and that the form and function of municipalities can reduce the demand for energy by influencing how energy is produced, distributed, and used. Urban planning, for example, can reduce the number and distance of vehicle trips by designing compact communities with reliable transportation to and from employment, and by placing services within easy walking distance from home. Research has shown that miles driven are reduced by between 20 and 40 percent in compact urban development compared to miles driven in the auto-dependent suburbs that have prevailed in North America since the Second World War. Transportation contributes

about 33 percent of energy-related greenhouse gas (GHG) production in the United States, and single-occupant automobile travel makes up about half of that activity.

The vast majority of vehicles burn carbon fuels and are expected to continue to do so for some time, even with aggressive fuel substitution and efficiency measures. Strategies that reduce travel by encouraging compact and walkable home and working environments therefore have the potential to make a significant contribution to overall climate change mitigation.

Commuting to work: The manner in which land uses and transportation infrastructure are developed within a community influences whether residents decide to walk, bike, drive, or use public transit on their daily commute to work.

These travel choices directly affect the amount of transportation-related GHG emissions that are produced. Single-passenger automobile trips to and from Oneida generate substantially more GHG emissions per mile than public transit and carpooling. 51% of the workers that commute spend less than 15 minutes traveling to their jobs. Additional commute times to work from the City of Oneida are presented in Table 4.

Of the total number of people that held jobs between 2008-2012, approximately 77% drove alone and 12% carpoled. 5% walked to work, 2% biked or used taxi, motorcycle or

other means, and 2% worked from home (Table 5). Single-passenger automobile trips constitute the vast majority of means of transportation to work. Carpooling, ridesharing, and similar efforts to reduce vehicle traffic will help to reduce greenhouse gas emissions in the City of Oneida. The preparation of a commuting analysis could help determine the need for organized carpooling opportunities.

Most of the workers that live in Oneida (55%) work in the City. Others commute to nearby municipalities such as Lenox (15%) and DeWitt (6%). The average commuting destinations and percentages are summarized below in Table 6.

LAND USE

Additional carbon reductions could come from applying other types of land use planning and redevelopment. Using the critical mass of buildings and activities in cities, it is possible to develop practical and efficient heating and cooling systems (district energy systems). This approach shows great promise in reducing the carbon footprint of urban development. Other energy conservation benefits may result from common-wall and vertical living structures found in multifamily city locations.

TABLE 4- COMMUTE TIMES TO WORK FROM THE CITY OF ONEIDA, AVERAGE 2008-2012¹

| Commute Time to Work | Number of Workers | Percentage |
|----------------------|-------------------|------------|
| Less than 15 minutes | 2,514 | 51% |
| 15-29 minutes | 1,401 | 28% |
| 30-59 minutes | 825 | 17% |
| 60-89 minutes | 113 | 2% |
| 90+ minutes | 109 | 2% |
| TOTAL | 4,962 | 100% |

¹ Source: ACS 2008-2012

TABLE 5- TRANSPORTATION TO WORK IN THE CITY OF ONEIDA, 2008-2012 APPROXIMATE AVERAGE¹

| Transportation to Work | Number of Workers | Percentage |
|--|-------------------|------------|
| Car, truck, van - drove alone | 3,939 | 77% |
| Car, truck, van - carpoled | 619 | 12% |
| Public transportation (excluding taxicab) | 16 | 0% |
| Walked | 275 | 5% |
| Worked from home | 120 | 2% |
| Taxicab, motorcycle, bicycle, or other means | 114 | 2% |
| TOTAL | 5,082 | 100% |

¹ Source: American Community Survey

Urban design in smaller cities such as Oneida offers potential opportunities for green infrastructure to reduce stormwater runoff, reduce heating loads, and support localized food production and farmers markets that reduce shipping, storage, and packaging needs. These and other strategies that make use of transportation alternatives could contribute significantly to overall GHG mitigation.

34% of the land in the City is classified as residential and 25% is classified as agricultural. Additional land use categories are summarized in Figures 1 and 2.

GHG EMISSIONS REDUCTION THROUGH LAND USE AND TRANSPORTATION

Examining existing land use patterns and transportation infrastructure provides insight into ways a community can reduce GHG emissions. Factors most

directly influencing travel behavior include diversity of uses, proximity of uses, density, pedestrian and bicycle conditions, transit accessibility, parking, and streetscape design. Each of these topics is discussed on the following pages.

Diversity of use: Diversity of use refers to the degree to which residential, commercial, industrial, institutional, and recreational uses are located together. Increasing the diversity of

TABLE 6- CITY OF ONEIDA COMMUTING DESTINATIONS 2006-2010 AVERAGE¹

| Destination | Average number of residents commuting to destination | Percentage |
|--|--|------------|
| Hamilton, Madison County, New York | 50 | 1.4% |
| Easton, Madison County, New York | 55 | 1.5% |
| Stockbridge, Madison County, New York | 55 | 1.5% |
| Cazenovia, Madison County, New York | 65 | 1.8% |
| Sullivan, Madison County, New York | 160 | 4.4% |
| Syracuse, Onondaga County, New York | 210 | 5.8% |
| DeWitt, Onondaga County, New York | 240 | 6.5% |
| Lenox, Madison County, New York | 555 | 15.3% |
| City of Oneida, Madison County, New York | 1,985 | 54.9% |
| Other | 239 | 6.6% |

¹ Source: CTPP 2006-2010



Rail Trail Opening, Oneida

Photo Credit: Scott Ingmire

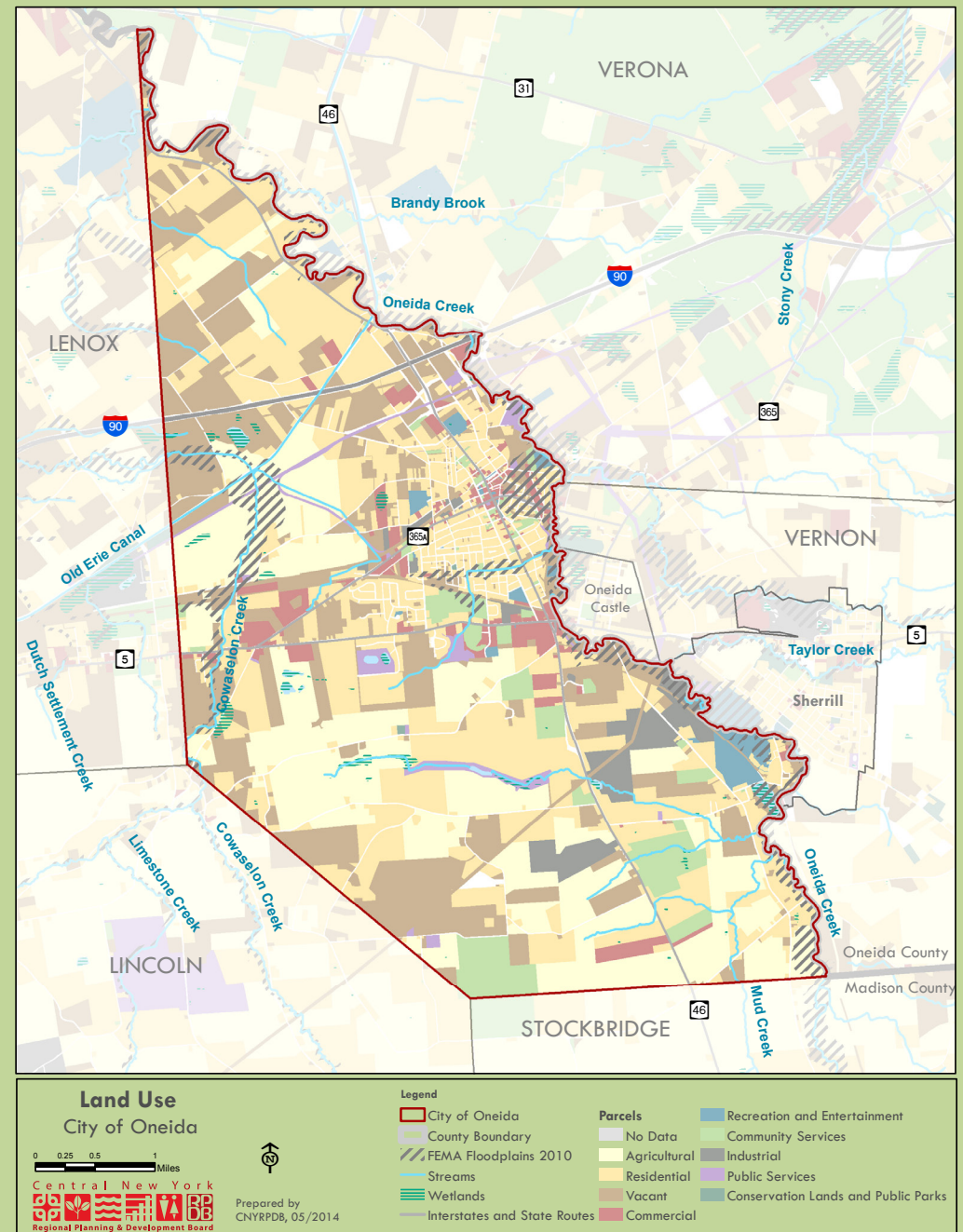
Research has shown that per capita energy consumption and GHG emissions are 2 to 2.5 times higher in low-density developments than in high-density areas.

FIGURE 1- CITY OF ONEIDA LAND USE

neighborhood-serving, and specifically job-rich, uses within a community could help reduce transportation-related GHG emissions. Increased diversity reduces travel distances and facilitates more walking and cycling trips. Improving the mix of uses within a community can also reduce commute distances, particularly if affordably priced housing is located in areas with a high number of jobs and employees can commute to work using alternative modes.

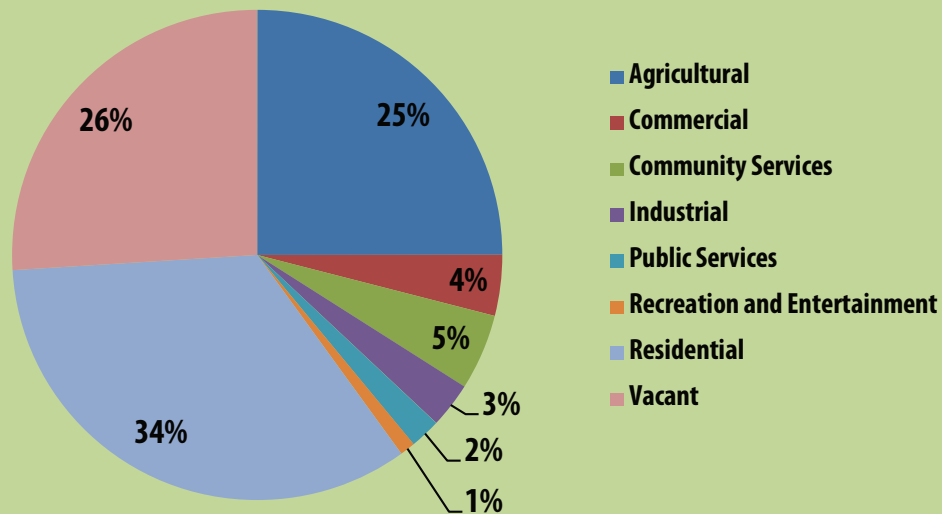
A jobs/housing ratio is commonly used to evaluate the diversity of land uses within a community by describing the relationship between employment opportunities and housing supply. A ratio of 1.0 describes a balance between jobs and housing. A ratio above 1.0 indicates that there are more jobs than housing, while a ratio below 1.0 describes an undersupply of jobs relative to housing. In 2011, there were approximately 6,188 jobs in Oneida and 7,439 households and so the jobs/housing ratio was approximately 0.8.

Proximity of uses: Proximity of uses refers to the distance between neighborhood commercial services and residents' homes. Two methods were used to evaluate the proximity of residences to commercial uses in Oneida and to support the recommendations in the Climate Action Plan. The first



Urban design research demonstrates that most people will walk to destinations that are within ¼ mile or a 5-minute leisurely walk. Neighborhoods are considered to be pedestrian-friendly if residents' homes are within ¼ mile of a diverse array of commercial and civic uses.

FIGURE 2-CITY OF ONEIDA LAND USE TYPES



measured proximity of residences to commercial centers and the second measured proximity of residences to neighborhood services.

Proximity to commercial centers: This method examined how many residential parcels are located within ¼ mile of commercial districts. This provided insight into the effectiveness of the community's existing zoning and land use pattern from the pedestrian perspective. Although some residential portions of Oneida are distant from commercial services, overall, the existing land use pattern creates many opportunities for pedestrian and bicycle travel. Of the 5,538 total residential parcels, 95% are located within ¼ mile of commercial parcels.

Proximity to neighborhood services: The second method of proximity analysis identified eleven categories of neighborhood services (schools, libraries, drugstores, grocery stores, medical facilities, post offices, nursery schools, parks, nursing homes, hardware stores, and restaurants), mapped the locations of these services within Oneida, and then examined how many of these distinct uses are within a ¼ mile walking distance of individual residential

parcels. The analysis determined that 76% of the residential parcels are located within ¼ mile of three or more amenities. Residents with low levels of pedestrian access to neighborhood-serving uses are more likely to drive to purchase their daily goods and services.

Density: Density refers to the number of housing units, people, or jobs in a given area. Higher densities refer to an increased number of services, shops, schools, and public buildings located within a neighborhood which increases the availability of transit and pedestrian infrastructure. These conditions tend to reduce the need for vehicle ownership and increase the use of alternative modes. Residential density is normally measured in terms of housing units per acre. Oneida has a relatively high to moderate residential density of 1.03 based on 2010 data, which is further explained in Table 7 and Figure 3.

Infill development refers to the use of vacant land within a built-up area for additional construction. This term is often associated with community redevelopment or growth management programs or as a component of smart growth. Infill development focuses on the reuse of underutilized buildings and



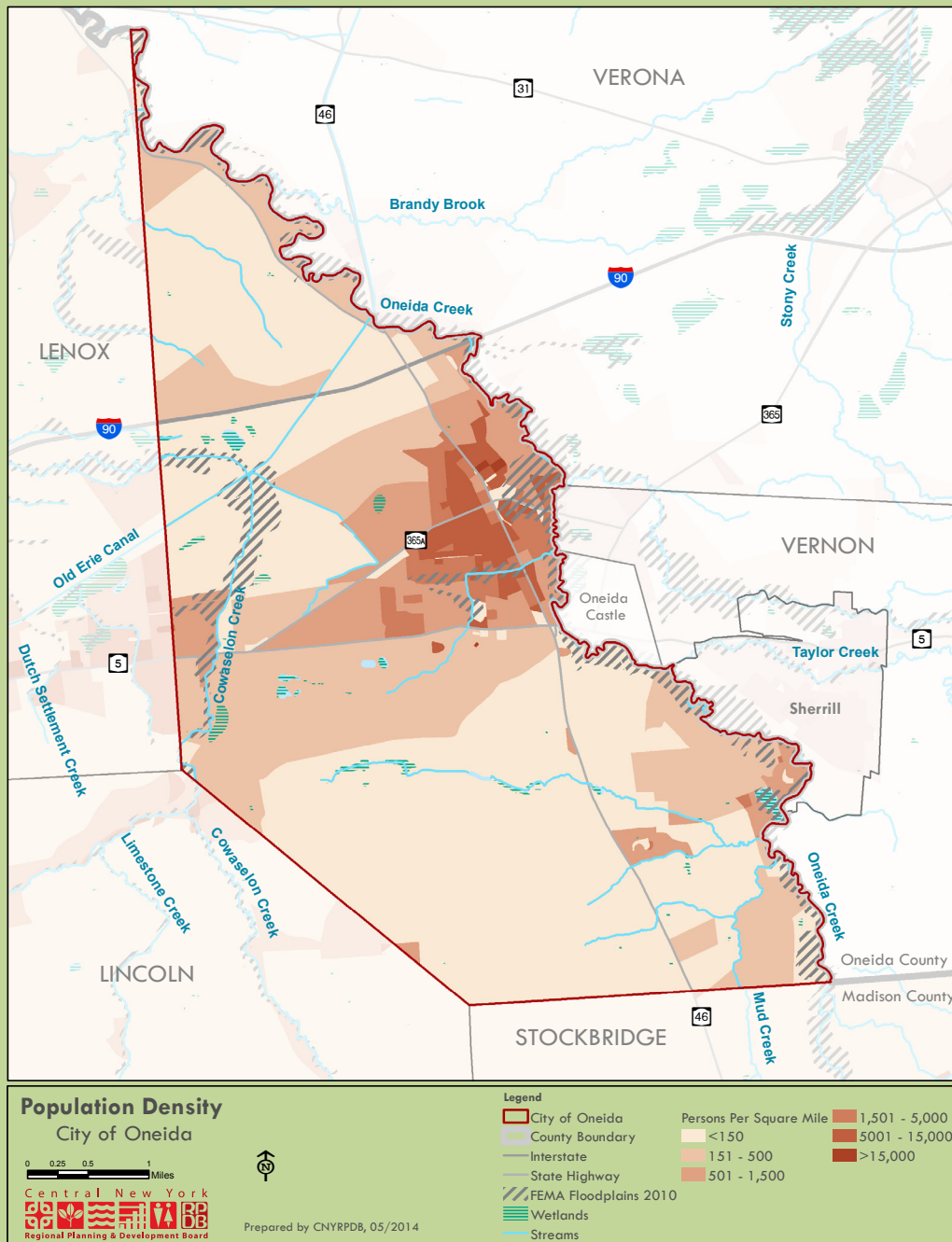
Public Pool, Oneida

Photo Credit: Scott Ingmire

TABLE 7- RESIDENTIAL DENSITY IN THE CITY OF ONEIDA

| | |
|---|-------|
| Number of residential parcels in the community | 5,538 |
| Single-family residential parcels | 4,831 |
| Single-family residential density (the number of single-family parcels divided by the acreage of all residential parcels) | 3.64 |
| The average residential density (houses per acre) | 1.03 |
| Number of two and three-family (multiple-residential) parcels | 764 |
| Average density of multiple-residential parcels | 7.60 |
| Number of parcels with apartment buildings | 132 |
| Density of apartment buildings | 2.03 |
| Percent of residential land use that is classified as low-density | 27% |
| Percent of residential land use that is classified as medium-density | 62% |
| Percent of Town's residential land use that is classified as high-density | 11% |

FIGURE 3- CITY OF ONEIDA POPULATION DENSITY



sites where buildings are constructed on vacant property or between existing buildings. 26% of the land in the City of Oneida is classified as vacant. Potential opportunities for infill development should be evaluated, especially in the western areas of the City.

Pedestrian and bicycle conditions:

Well-developed pedestrian and bicycle infrastructure and pedestrian-friendly design are essential if walking and biking are to be important travel modes in a community. Highly connected sidewalks and bicycle infrastructure reduce travel distances between destinations and improve access and safety. Pedestrian and bicycle infrastructure refers to sidewalks, crosswalks, traffic calming devices, bike lanes, and racks/storage facilities.

The City of Oneida has a well-connected and complete network of sidewalks and their overall condition is considered by most to be acceptable. The responsibility and expense of maintaining sidewalks in a safe condition is the responsibility of the abutting property owners. Property owners are encouraged to repair or replace fronting sidewalk that is poor condition to promote a safe walkable

community. Occasional problems arise when the sidewalks become unsafe and impassible due to snow accumulation. In severe cases, poorly maintained walkways cause people to walk in the roadway.

Transit accessibility: Transit accessibility refers to the ease with which people can access public transit service and the quality of that service. Residents and employees are more likely to use public transit if traveling by bus or train is relatively time-competitive with driving, if transit stations are accessible to pedestrian and cyclists, and if the transit experience is pleasant.

Bus transportation options in the City of Oneida are limited in terms of scope and frequency. The County Planning Department oversees the Madison Transit System (MTS) which is operated by Birnie Bus. MTS provides limited bus service for four routes that operate Monday through Friday. One of these routes services the City of Oneida, Wampsville, and Bouckville.

Parking: This category refers to the supply, price, and regulation of parking facilities in a community. Inexpensive and abundant parking increases

automobile ownership and use. Large parking lots also reduce walking and public transit convenience and use. Limiting the availability of parking spaces and imposing fees in city environments can reverse this condition by reducing the number of cars on the road and increasing use of alternative modes of transportation.

Streetscape design: Streetscape design refers to the scale and design of streets, sidewalks, and adjacent uses. Urban design research demonstrates that people walk more and drive less in pedestrian-oriented commercial districts than in automobile-dominated commercial centers. Street designs that reduce vehicle traffic speeds, improve walking and cycling conditions, and enhance the pedestrian experience encourage use of alternative modes. The City of Oneida has installed pedestrian-friendly design features such as street trees, benches, decorative street lights, and pedestrian crossings.



Welcome Bicyclists, Kallet Theater, Oneida

Photo Credit: Scott Ingmire

People are generally willing to walk ½-mile to a light rail station or ¼-mile to a bus stop. A ¼-mile walk takes the average person around 10 minutes.

GHG Inventory Summary

As part of the Climate Change Innovation Program, an inventory of the City's municipal and community GHG emissions was conducted in 2014 with the assistance of a student team from the State University of New York College of Environmental Science and Forestry with additional oversight and technical review by CNY RPDB staff. The 2014 inventory report examined emissions generated in the City of Oneida in 2010, which serves as the baseline year for the Climate Action Plan.

The inventory report found that in the 2010 base year, City government operations generated a total of 2,353 metric tons of carbon dioxide equivalent (MTCO₂e), which were broken up into 6 sectors: buildings and facilities (1,031 MTCO₂e, 44%), streetlights and traffic signals (143 MTCO₂e, 6%), vehicle fleet (539 MTCO₂e, 23%), water delivery facilities (93 MTCO₂e, 4%), wastewater treatment facilities (508 MTCO₂e, 21%), and wastewater treatment process (39 MTCO₂e, 2%).

Community emissions totaled 106,831 MTCO₂e, which were broken up into 4 sectors: residential energy use (20,667 MTCO₂e, 20%), commercial energy use (36,597 MTCO₂e, 34%), transportation (48,224 MTCO₂e, 45%), and waste (1,343 MTCO₂e, 1%).

The City of Oneida's Climate Action Plan uses the data gathered in the 2014 GHG inventory report as a baseline for analyses to determine which energy efficiency strategies will be most effective in the city. The strategies suggested in this document can help Oneida to reduce emissions, energy use, and dollars spent on municipal and community operations further by 2025.





- 1 MTCO₂e =**
-  CO₂ emissions from 112 gallons of gasoline consumed
 -  CO₂ emissions from 2.3 barrels of oil consumed
 -  CO₂ emissions from 41.7 propane cylinders used for home barbeques
 -  Carbon sequestered by almost 1 acre of U.S. forests in one year

FIGURE 4- CITY OF ONEIDA
MUNICIPAL EMISSIONS BY SECTOR
MTCO₂E (2010 BASELINE)

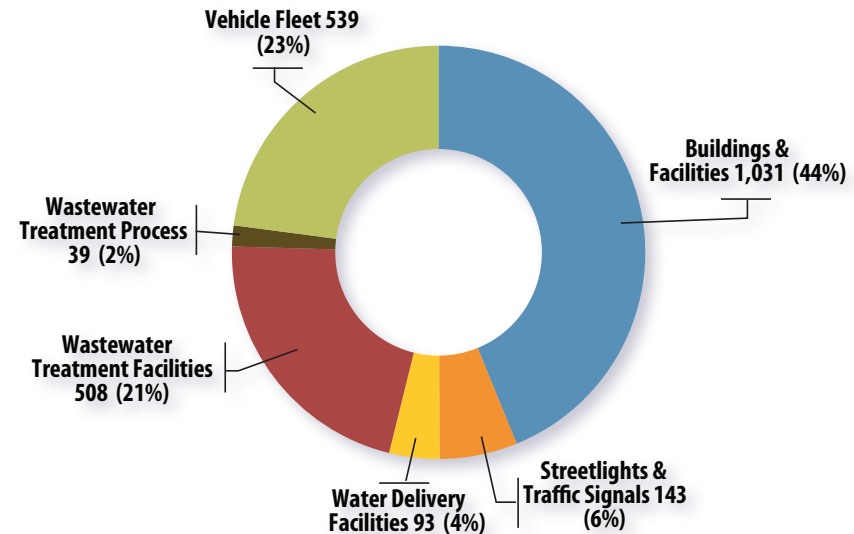


FIGURE 5- CITY OF ONEIDA
COMMUNITY EMISSIONS BY SECTOR
MTCO₂E (2010 BASELINE)

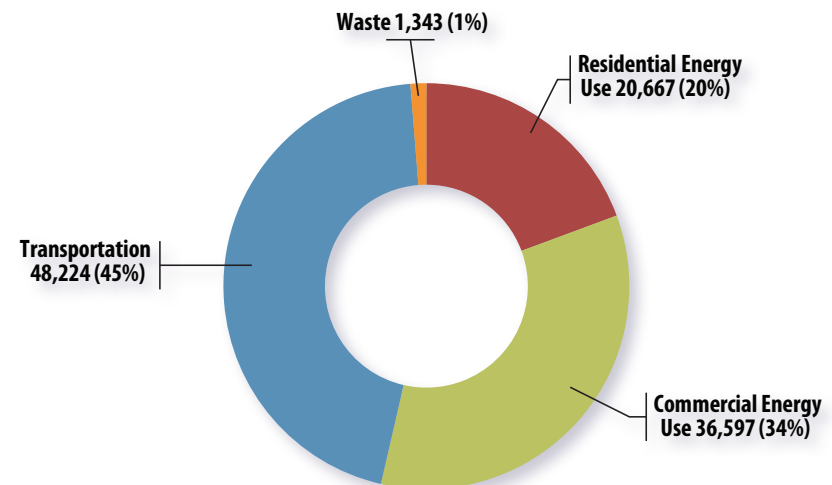
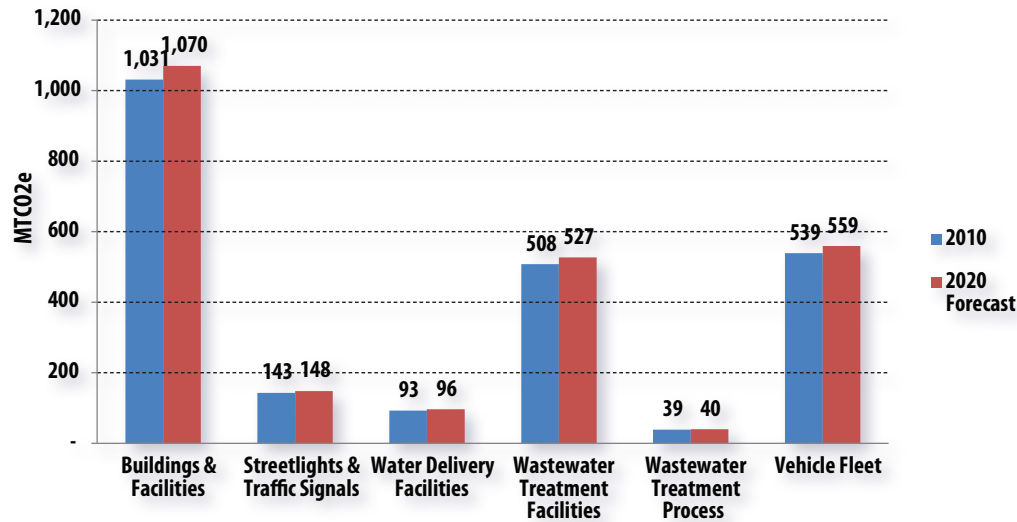


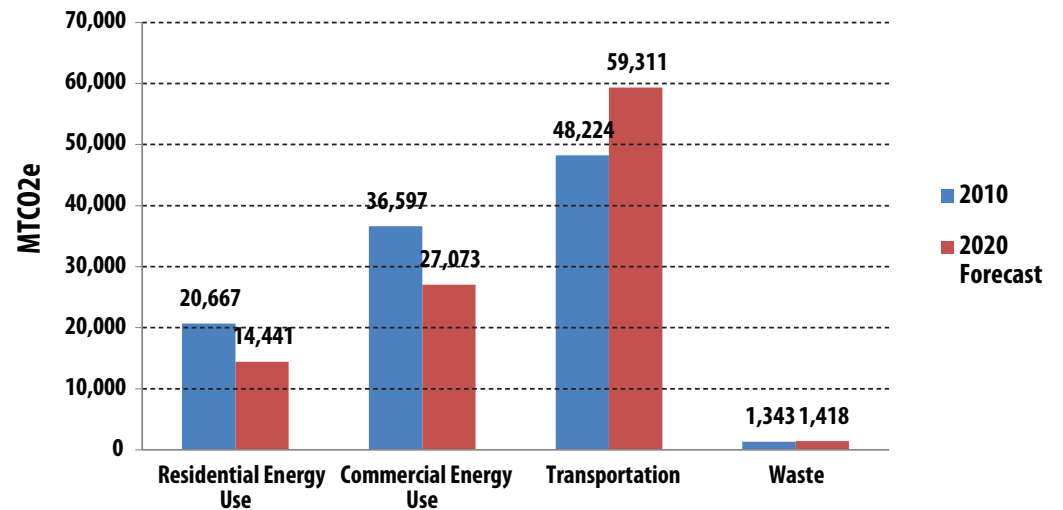
FIGURE 6- EMISSION FORECAST:
MUNICIPAL OPERATIONS



The GHG inventory report also forecasted emissions for the City of Oneida in 2020. The report explained that City government emissions were expected to total 2,441 MTCO₂e in 2020, with 39 MTCO₂e increase in buildings and facilities emissions, 5 MTCO₂e increase in streetlights & traffic signals, 3 MTCO₂e increase in water delivery facilities, 19 MTCO₂e increase in wastewater treatment facilities, 1 MTCO₂e increase in wastewater treatment process emissions, and 20 MTCO₂e increase in vehicle fleet emissions compared to 2010.

Community emissions are expected to total 102,243 in 2020, with 6,226 MTCO₂e decrease in residential energy use, 9,524 MTCO₂e decrease in commercial energy use, 11,087 MTCO₂e increase in transportation, and 75 MTCO₂e increase in waste.

FIGURE 7- EMISSION FORECAST:
COMMUNITY



Strategies Overview - What else can we do?

In 2014, the Central New York Regional Planning and Development Board (CNY RPDB) selected the City of Oneida as a participant in the Central New York Climate Change Innovation Program (C2IP) funded through the NYS Department of Environmental Conservation (DEC)'s Climate Smart Communities program. The City of Oneida chose to adopt the NYS Department of Environmental Conservation (DEC)'s Climate Smart Communities Pledge, and municipal operations have already begun reducing their energy use and GHG emissions through various measures, noted in previous sections of this document.

Through the Climate Smart Communities program, the CNY RPDB and a student team from SUNY ESF provided the City with technical assistance in compiling a greenhouse gas inventory in the spring of 2014. The inventory was compiled to detail energy use and the sources of emissions in the City in a baseline year of 2010.

This Climate Action Plan uses the data provided in the GHG inventory report to suggest strategies that both government operations and community members can take to reduce energy use and GHG emissions by 2025. Specifically, **the emissions reduction target for municipal operations in the City of Oneida is a**

20% reduction from the 2010 baseline by 2025, and target reductions from the community is a 15% reduction from the 2010 baseline by 2025.

CNY RPDB staff worked throughout 2014 to analyze potential strategies for reducing the City's emissions for both municipal operations and the community-at-large. The team utilized a software tool developed by ICLEI-Local Governments for Sustainability known as CAPP (Climate and Air Pollution Planning Assistant) version 1.5 to calculate potential GHG reductions as well as cost savings for each strategy. CAPP is an Excel-based decision-support tool designed to help U.S. local governments explore and identify potential opportunities to reduce greenhouse gas emissions and other air pollution emissions. CAPP provides a starting point for two major tasks: determining an achievable emissions reduction target and selecting strategies to include in a local municipal-operations or community-scale emissions-reduction plan, commonly called a climate action plan. CAPP users can compare the relative benefits of a wide variety of emissions reduction and clean air measures, and identify those most likely to be successful for their community based on its priorities and constraints.

Utilizing CAPP, a variety of strategies were identified and analyzed to determine their potential for achieving emissions reductions either at the municipal operations level or the community scale. The analysis team also explored the potential impacts of an external large scale factor on the City's emissions profile: New Federal CAFE Standards that will increase the average fuel economy of vehicles sold in the U.S. through 2025. **The results of these analyses are summarized in Figures 8-10.**

The strategies noted in the proceeding pages of this document represent further efforts that can be made by the municipality as well as by the community members to reduce energy use and GHG emissions.

Guided by the strategies explored in this Climate Action Plan, the City of Oneida has the potential to reduce energy use and GHG emissions significantly. By implementing the strategies noted in this document, community members will not only be able to reduce GHG emissions, they will also be able to reduce their overall energy costs, be more comfortable in their own homes, reduce reliance on non-renewable, foreign sources of energy, and conserve Oneida's resources for the future.

Total possible reductions = 29,231 MTCO₂e

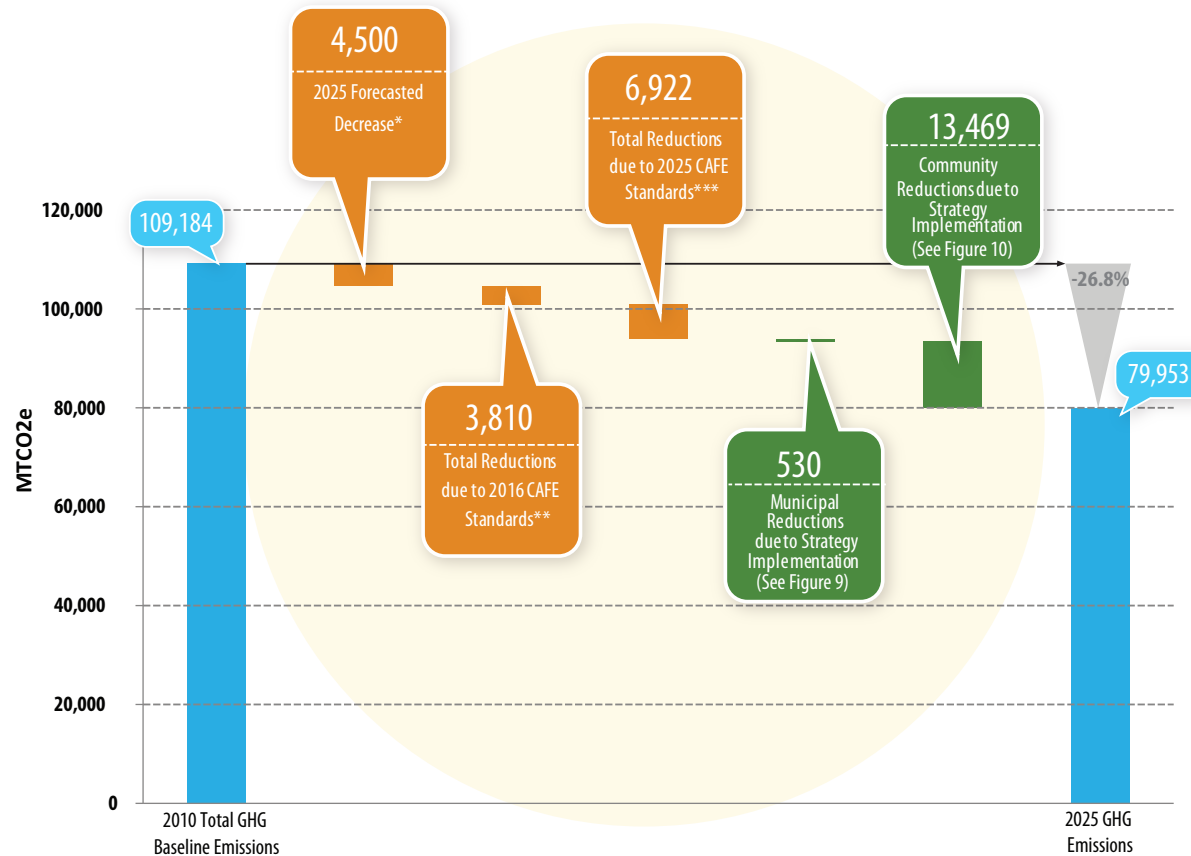


FIGURE 8- TOTAL POSSIBLE REDUCTIONS BY 2025

Figure 8 summarizes the results of the City of Oneida GHG inventory, a 2020 emissions forecast based on current trends, impacts from the strengthening of Federal CAFE standards, as well as the reductions associated with the Climate Action Strategies that were analyzed for the Village separated into community-wide measures as well as municipal operations measures. Reductions due to Oneida actions are shown in green while changes in emissions that will occur regardless of this Plan are shown in orange. It is projected that Oneida's total GHG emissions in 2025 could be reduced by 26.8% if the City implements all of the recommended community-wide and municipal operations measures.

*2014 GHG inventory reported a forecasted a decrease of 4,500 MTCO₂e from the 2010 baseline to 2025 due to increases in emissions from transportation.

**2010 Federal CAFE (Corporate Average Fuel Economy) standards have been set at 34.1 miles per gallon by 2016.

***2012 Federal CAFE standards raises average fuel economy to up to 54.5 mpg for the model year 2025.

Total possible municipal reductions = 530 MTCO₂e

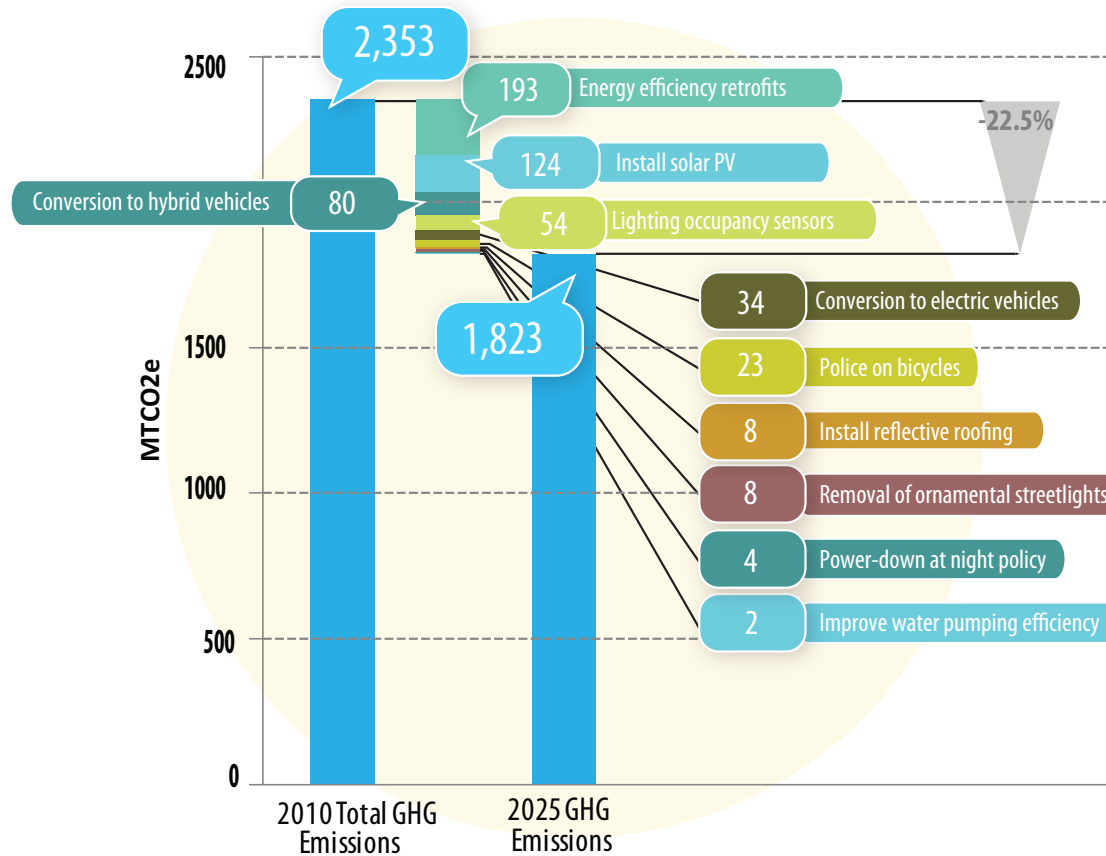


FIGURE 9- POTENTIAL MUNICIPAL REDUCTIONS FROM STRATEGY IMPLEMENTATION

Oneida's 2010 baseline municipal emissions as recorded by the GHG inventory report, potential reductions due to suggested strategies, and potential emissions in 2025 should each of the suggested strategies be implemented. It is estimated that there will be a 22.5% reduction in municipal emissions if all suggested strategies are implemented.

Key:

4,812

Expand Bicycling Paths/Facilities

Emissions reduction strategy name

Illustrates emissions reductions in MTCO₂e

Total possible community reductions = 13.469 MTCO₂e

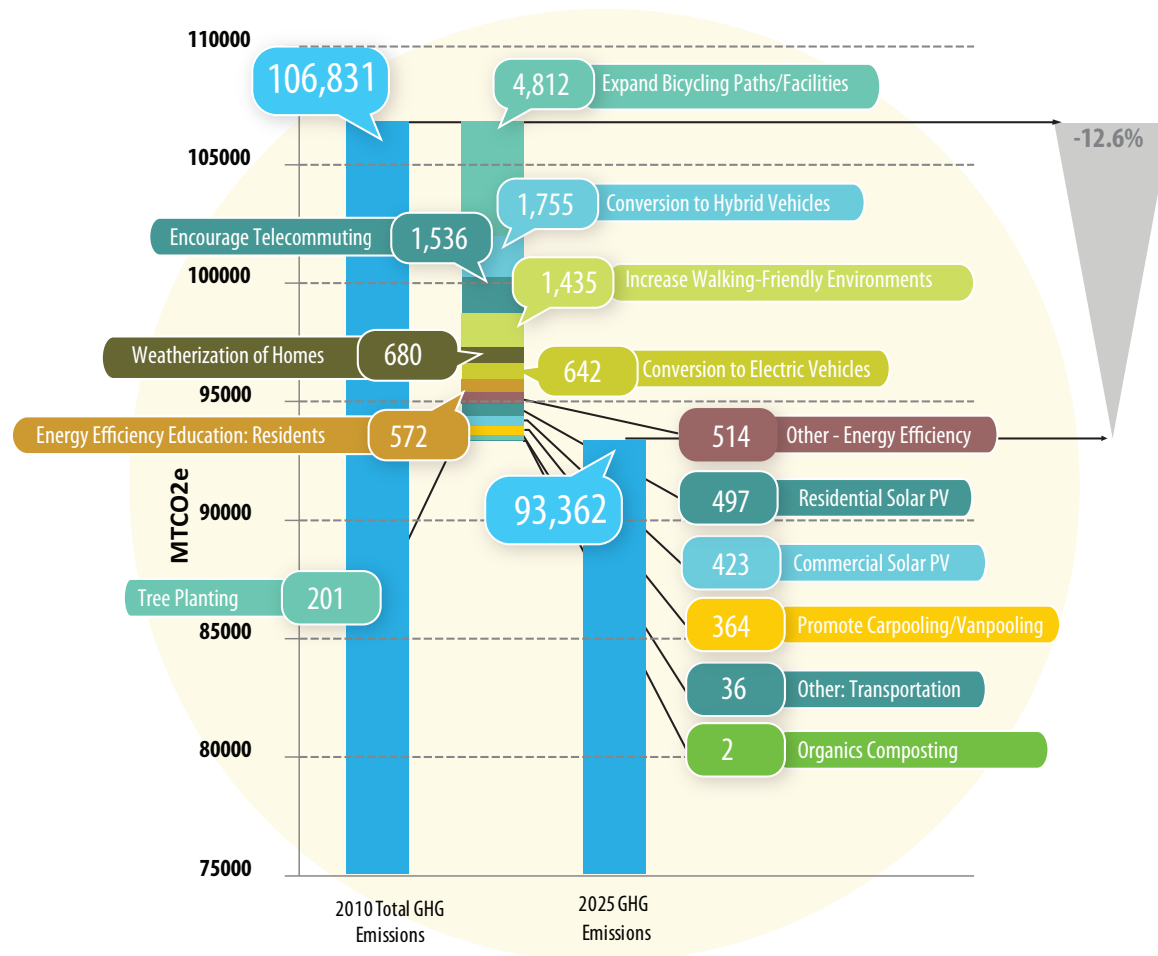


FIGURE 10- POTENTIAL COMMUNITY REDUCTIONS FROM STRATEGY IMPLEMENTATION

Oneida's 2010 baseline community emissions as recorded by the GHG inventory report, potential reductions due to suggested strategies, and potential emissions in 2025 should each of the suggested strategies be implemented. It is estimated that there will be a 12.6% reduction in community emissions if all suggested community reduction strategies are implemented.

TRANSPORTATION

According to the City of Oneida's GHG Inventory Report, transportation accounted for 23% of government emissions and 45% of community emissions in the City in 2010. This Climate Action

Plan addresses two main transportation emissions reduction goals: increase options for low-carbon transportation and increase use of alternative fuels.



Madison County Transit

Photo Credit: Scott Ingmire

1. Increase Options for Low-Carbon Transportation

Expand bicycle infrastructure: 4,812 MTCO₂e annual reductions.

This strategy assumes 25% of trips 2 miles or less are switched from car to bicycle.

Increase telecommuting: 1,536 MTCO₂e annual reductions.

This strategy assumes a 5% increase in telecommuting.

Expand pedestrian infrastructure: 1,435 MTCO₂e annual reductions.

This strategy assumes 5% of trips 1 miles or less are switched from car to walking.

Promote carpooling/vanpooling: 364 MTCO₂e annual reductions.

This strategy assumes 15% of people of people with jobs outside of the City are offered carpool opportunities with a 10% reduction in commute vehicle trips.

Increase bus ridership: 12 MTCO₂e annual reductions.

This strategy assumes a 10% increase in bus ridership.

Police on bicycles: 23 MTCO₂e annual reductions.

This strategy assumes 2 vehicles of the police force switches from car to bicycle.

2. Increase use of Alternative Fuels

Conversion of community vehicle fleet to electric vehicles: 642 MTCO₂e annual reductions.

This strategy assumes 5% of the community vehicle fleet is converted to electric vehicles.

Conversion of community vehicle fleet to hybrid vehicles: 1,755 MTCO₂e annual reductions.

This strategy assumes 15% of the community vehicle fleet is converted to hybrid vehicles.

Implement electric vehicle charging stations: 24 MTCO₂e annual reductions.

This strategy assumes 5 charging stations are implemented.

Municipal vehicle conversion to hybrid vehicles: 80 MTCO₂e annual reductions.

This strategy assumes 10 government vehicles are converted to hybrid vehicles.

Municipal vehicle conversion to electric vehicles: 34 MTCO₂e annual reductions.

This strategy assumes 3 government vehicles are converted to electric vehicles.

1. Increase Options for Low-Carbon Transportation

Increasing options for low-carbon transportation would reduce the amount of vehicle miles traveled (VMT), reducing gasoline and diesel use which would therefore reduce Oneida's emissions, fuel costs, and reliance on foreign fossil fuels. Encouraging employees to use bicycles and to walk instead of driving will allow municipalities to reduce VMT. E-mail, video conferencing, and telephones can replace face-to-face meetings, eliminating the need to travel and saving valuable work time.

Bicycling as a mode of transportation creates no GHG emissions, and by expanding bicycling infrastructure in the community, community members can better take advantage of this form of transportation. The City could also implement a police on bicycles program whereby police officers use bicycles as modes of transport rather than cars. Not only would this reduce fossil fuel use and therefore GHG emissions, studies have also shown police on bicycles to be more effective than police in cars because police are viewed as more approachable, better able to connect with the public, and better able to observe what is happening. Police on bicycles can also pursue suspects in places where cars can't go.

High quality low-carbon forms of transportation provide multiple co-benefits besides energy savings and emission reductions, including congestion reductions, road and parking facility cost savings, consumer savings and affordability, improved mobility for non-drivers, support for strategic land development objectives (i.e. reducing sprawl), and improved public fitness and health.

2. Increase use of Alternative Fuels

According to Oneida's GHG Inventory Report, transportation accounted for 23% of government emissions and 45% of community emissions in Oneida in 2010. These fuels are not only non-renewable fossil fuels; they also produce significantly more carbon emissions than alternative fuel options, such as electric and hybrid vehicle technology. Conversion to alternative fuels can therefore be extremely effective when trying to reduce emissions from the transportation sector.

According to EPA's eGRID 2009, electricity in Upstate New York is currently powered by coal (14.5%), oil (0.9%), gas (18.9%), other fossil (0.4%), biomass (1.6%), hydro (30.8%), nuclear (30.6%), and wind (2.4%) powers. Therefore, about 1/3 of the energy coming from the electric grid is considered renewable, with almost 2/3 coming from non-fossil fuel sources, making electricity a much better option in terms of greenhouse gas emissions than gasoline or diesel fuels.


Not only will using alternative fuels reduce greenhouse gas emissions, it will also reduce US dependence on imported fuels and reliance on fossil fuels in general. Electric and hybrid vehicles are also less expensive to operate and have significantly lower fuel costs than conventional gasoline-powered vehicles.

Increasing the use of alternative fuels would greatly reduce Oneida's emissions and provide other benefits to community members as well.

ENERGY EFFICIENCY

According to the City's GHG Inventory Report, emissions from municipal buildings/facilities accounted for 44% of total municipal emissions, wastewater treatment facilities accounted for 21%, and streetlights and traffic signals accounted for 6%. Residential energy use accounted for 20% of the community's

emissions, and commercial energy use accounted for 34% of the community's total GHG emissions in the City of Oneida in 2010. This Climate Action Plan addresses two main energy/efficiency emissions reduction goals: increase energy efficiency in buildings; and increase use of renewable energy.



"WE ARE LIKE TENANT FARMERS CHOPPING DOWN THE FENCE AROUND OUR HOUSE FOR FUEL WHEN WE SHOULD BE USING NATURE'S INEXHAUSTIBLE SOURCES OF ENERGY – SUN, WIND AND TIDE...I'D PUT MY MONEY ON THE SUN AND SOLAR ENERGY. WHAT A SOURCE OF POWER! I HOPE WE DON'T HAVE TO WAIT UNTIL OIL AND COAL RUN OUT BEFORE WE TACKLE THAT." – Thomas Edison in conversation with Henry Ford and Harvey Firestone (1931)

Oneida Healthcare Facility

Photo Credit: Oneida Healthcare

1. Increase energy efficiency and reduce emissions from buildings

Home weatherization: 680 MTCO₂e annual reductions.

This strategy assumes 20% of homes are weatherized.

Conversion to LED light bulbs: 21 MTCO₂e annual reductions.

This strategy assumes 1 bulb is converted per household.

Promote loans/incentives for energy improvements in homes: 240 MTCO₂e annual reductions.

This strategy assumes 20% of homes make efficiency improvements.

Energy efficiency education for businesses: 98 MTCO₂e annual reductions.

This strategy assumes 10% of businesses in the City participate.

Promotion of residential energy conservation through CNY Energy Challenge Team program: 572 MTCO₂e annual reductions.

This strategy assumes 10% of households participate in the program.

Commercial installation of lighting occupancy sensors: 5 MTCO₂e annual reductions.

This strategy assumes 10,000 square feet install occupancy sensors.

Commercial Power-Down at Night policy: 5 MTCO₂e annual reductions.

This strategy assumes 10,000 square feet of buildings participate.

Commercial building retrofits: 5 MTCO₂e annual reductions.

This strategy assumes 4,000 square feet of commercial buildings are retrofitted.

Government building retrofits: 193 MTCO₂e annual reductions.

This strategy assumes half (98,415 square feet) of government buildings are retrofitted.

Municipal installation of lighting occupancy sensors: 54 MTCO₂e annual reductions.

This strategy assumes half (98,415 square feet) of government buildings install occupancy sensors.

Municipal Power-Down at Night policy: 54 MTCO₂e annual reductions.

This strategy assumes half (98,415 square feet) of government buildings participate.

Municipal reflective roofing: 8 MTCO₂e annual reductions.

This strategy assumes the City Hall and Kallet buildings install reflective roofing. City Hall has already done so since the GHG inventory.

Improve water pumping efficiency: 2 MTCO₂e annual reductions.

This strategy assumes that water pumping efficiency improves by 20% through various upgrades and upkeep.

Remove City-owned ornamental streetlights: 8 MTCO₂e annual reductions.

This strategy assumes that the 86 City-owned lights are removed.

***LED Streetlights**

This strategy assumes 10% of homes using fuel oil convert to geothermal.

Municipal solar: 124 MTCO₂e annual reductions.

This strategy assumes 500 kW of solar PV is installed.

Residential solar: 497 MTCO₂e annual reductions.

This strategy assumes 1,998 kW of solar PV is installed.

Geothermal heat pump: 140 MTCO₂e annual reductions.

2. Increase use of renewable energy

Commercial solar: 423 MTCO₂e annual reductions.

This strategy assumes 1,700 kW of solar PV is installed.

1. Increase energy efficiency and reduce emissions from buildings

Energy efficiency education can be crucial in working to reduce emissions from buildings and facilities. Without the knowledge of actions that can be taken to increase building efficiency and reduce emissions, it is less likely that important actions, such as the ones listed above, will be taken. Participating in the Central New York Energy Challenge Team Program is a great way to educate community members on actions they can take at home to reduce energy use and emissions, and businesses can be targeted in a similar educational program and/or energy challenge competition.

Many buildings in Oneida are also not equipped with the most recent energy efficient technologies, causing the City and community members to use more energy than is necessary. Retrofitting existing facilities through measures like replacing appliances and light bulbs with more efficient ones, increasing insulation, and upgrading HVAC systems can greatly improve energy efficiency and therefore reduce emissions from the City's buildings and facilities.

The initial cost of retrofitting heating units may seem daunting; however, the local government, NYSERDA, and the CNY RPDB can offer assistance and support to make retrofits easier by providing educational materials, low-interest loans, and guidance on where to find potential grants or incentives to help cover costs. Improving energy efficiency can help to reduce criteria air pollutants as well as greenhouse gas emissions and increases energy and water cost savings.

Each of these actions can significantly reduce GHG emissions in the City of Oneida, reducing energy costs, reliance on fossil fuels, and even improving air quality.

2. Increase use of renewable energy

By installing renewable energies like solar at the local level, Oneida can ensure that their energy is provided by clean and local renewable energy sources, therefore reducing greenhouse gas emissions, energy cost, and reliance on fossil fuels.

Many residents or businesses would like to use renewable energies, but the large up-front cost is an obstacle. The local government can help overcome this barrier by offering low-interest loans or organizing group buying programs to negotiate lower prices, such as the Solarize Madison program in Madison County. These programs are an effective way of combining public and private funds for renewable energy. The New York State Energy Research and Development Authority (NYSERDA) provides incentives for the installation of solar PV based on system size. Additionally, there are state and federal tax credits for residential and commercial solar PV. Educational and technical assistance programs can also promote renewable energies. Local governments can offer information clearinghouses and connect consumers with renewable energy installers.

An increasingly popular way for a local government to overcome the financial hurdles of installing a photovoltaic system is through the "solar services model" also known as a Power Purchase Agreement (PPA). Through this type of arrangement the owner of a property can provide the space for a power producer to install the system. The property owner then agrees to buy the power produced from that system at a set rate that is competitive with grid electricity. Since the power producer retains ownership of the equipment, there are no installation and maintenance costs to the consumer of the electricity produced. This is

National DSIRE Database

Because incentives available for renewable energies are constantly changing, it is important to remain familiar with which incentives are currently available. The Database of State Incentives for Renewables & Efficiency, or DSIRE, is a website that offers comprehensive information on incentives and policies that support renewables and energy efficiency in the United States. Established in 1995, DSIRE is currently operated by the N.C. Solar Center at N.C. State University, with support from the Interstate Renewable Energy Council, Inc. DSIRE is funded by the U.S. Department of Energy. Visit dsireusa.org to learn more about current incentive opportunities.

particularly attractive to government entities that are unable to take advantage of tax-based incentives for renewable energy.

Increasing the use of renewable energy reduces emissions while also providing clean, locally-produced energy that will save money spent on utility bills over time.

"THERE CAN BE NO SUSTAINABLE DEVELOPMENT WITHOUT SUSTAINABLE ENERGY DEVELOPMENT."
—Margot Wallstrom, European Union Environmental Commissioner (2004)

WASTE

Emissions generated from waste from the City totaled MTCO_2e in 2010. Emissions reduction strategies have been incorporated into this

Climate Action Plan to show additional areas that the City can address to reduce overall emissions.



Organics Composting

Photo Credit: Peachy Green

1. Increase composting

Organics (kitchen) waste composting: 2 MTCO_2e annual reductions.

This strategy assumes 60 lbs. of food waste generated per person is composted.

Yard waste composting: 0.4 MTCO_2e annual reductions.

This strategy assumes 23 lbs. of yard waste generated per person is composted.

1. Increase Composting

Waste generated in the City of Oneida is sent to the Madison County Landfill for disposal. As waste breaks down in the landfill it creates GHG emissions and other pollutants that can be reduced by decreasing the waste stream.

Composting is one strategy the City can implement to reduce the waste stream. Composting produces fertilizer that can be used for farms or gardens, returning nutrients to the soil that were removed with food production and reducing the need for synthetic fertilizers. Composting also reduces the volume

of material sent to the landfill, reducing disposal costs.

Composting is something that can be done at individual households or at the community scale. New York State's "Beyond Waste" Plan advances food scrap recycling as a key environmental strategy to help communities increase their waste diversion rates, and community composting sites, such as the Amboy Compost Site in Camillus, New York, have effectively composted yard and food waste for years.

NATURAL RESOURCES

Planting trees in strategic ways to shade buildings can reduce energy used to cool buildings. Trees that are properly planted with energy savings in mind can reduce the amount

of energy (electricity, natural gas, or other fuel) used to cool and heat buildings. This not only reduces associated emissions, but also saves money.



Playing by solar panels, Oneida

Photo Credit: David Wright

1. Promote tree planting for carbon storage and heat mitigation

Promote Tree Planting: 201 MTCO₂e annual reductions.

This strategy assumes 896 trees are planted by 2025.

1. Promote tree planting

The shade from a single well-placed mature tree reduces annual air conditioning use from two to eight percent (in the range of 40-300 kWh), and peak cooling demand from two to ten percent (as much as 0.15-0.5 kW), therefore reducing GHG emissions. The Arbor Day Foundation provides information on its website explaining how to plant trees to conserve energy most effectively.

Tree planting can also reduce storm water runoff, decreasing the amount of water that needs to be treated at wastewater treatment facilities. Finally, tree planting increases the aesthetic appeal of homes, increasing property values.

“THE BEST FRIEND OF EARTH AND OF MAN IS THE TREE. WHEN WE USE THE TREE RESPECTFULLY AND ECONOMICALLY, WE HAVE ONE OF THE GREATEST RESOURCES ON THE EARTH.” – FRANK LLOYD WRIGHT

STRATEGY OVERVIEW SUMMARY CHART

| Issue | Strategy | Ballpark Rankings (see key below) | | | Possible Implementation Methods | | | | Additional Benefits | | | |
|---------------------------------|--|--------------------------------------|-------------|---------------|------------------------------------|---------|---------------------|------------------------|-----------------------|--------------------|-----------------------|-------|
| | | GHG Reductions (1-5) | Costs (1-5) | Payback (1-5) | Policy | Program | Capital Projects | Education/ Outreach | Green Job creation | Quality of Life | Water Conservation | Other |
| Transportation: Municipal | 1. Conversion to hybrid vehicles | 1 | 1 | 1 | | | x | | | x | | x |
| | 2. Conversion to electric vehicles | 1 | 1 | 2 | | | x | | | x | | x |
| | 3. Police on bicycles | 1 | 1 | 1 | | x | x | x | | | | x |
| Transportation: Community | 1. Expand bicycling infrastructure | 3 | 1 | 1 | | | x | | x | x | | x |
| | 2. Conversion to hybrid vehicles | 2 | 3 | 2 | | | x | x | x | | | x |
| | 3. Increase telecommuting | 2 | 1 | 1 | | x | | | | x | | x |
| | 4. Expand pedestrian infrastructure | 1 | 2 | 1 | | | x | x | x | x | | x |
| | 5. Conversion to electric vehicles | 1 | 2 | 2 | | | x | x | x | | | x |
| | 6. Promote carpooling/vanpooling | 1 | 1 | 1 | | x | | x | | x | | x |
| | 7. Electric vehicle charging facilities | 1 | 2 | 5 | | | x | x | x | | | x |
| Energy/Efficiency: Municipal | 1. Retrofits to existing facilities | 2 | 2 | 3 | | | x | | x | x | x | x |
| | 2. Install municipal solar PV | 1 | 2 | 3 | | | x | | x | | | x |
| | 3. Lighting occupancy sensors | 1 | 1 | 1 | | | x | | | | | x |
| | 4. LED streetlights | N/A | N/A | N/A | | | x | | x | | | x |
| | 5. Reflective roofing | 1 | 1 | 2 | | | x | | x | x | | x |
| | 6. Power-Down at Night Policy | 1 | 1 | 1 | x | | | x | | | | x |
| | 7. Improve water pumping energy efficiency | 1 | 1 | 3 | | | x | x | x | | x | x |

*Note: Payback calculations do not include maintenance costs

| Issue | Strategy | Ballpark Rankings (see key below) | | | Possible Implementation Methods | | | | Additional Benefits | | | |
|-----------------------------------|---|--------------------------------------|-------------|---------------|------------------------------------|---------|---------------------|------------------------|-----------------------|--------------------|-----------------------|-------|
| | | GHG Reductions (1-5) | Costs (1-5) | Payback (1-5) | Policy | Program | Capital Projects | Education/ Outreach | Green Job creation | Quality of Life | Water Conservation | Other |
| Energy/Efficiency: Residential | 1. Weatherization of homes | 1 | 1 | 5 | | x | x | x | x | x | x | x |
| | 2. Energy efficiency education for residents | 1 | 1 | 1 | | x | | x | | x | x | x |
| | 3. Install residential solar PV | 1 | 1 | 3 | | x | x | x | x | x | | x |
| | 4. Promote loans/incentives for energy improvements | 1 | 1 | 5 | | | x | x | | x | x | x |
| | 5. Geothermal heat pump | 1 | 1 | 4 | | | x | x | x | x | | x |
| | 6. Conversion to LED bulbs | 1 | 1 | 2 | | | x | x | | x | | x |
| Energy/Efficiency: Commercial | 1. Install commercial solar PV | 1 | 1 | 4 | | | x | x | x | x | | x |
| | 2. Energy efficiency education for businesses | 1 | 1 | 1 | | x | | x | | x | x | x |
| | 3. Lighting occupancy sensors | 1 | 1 | 1 | | | x | | | | | x |
| | 4. Power-Down at Night policy | 1 | 1 | 1 | x | x | | x | | | | x |
| | 5. Retrofits to commercial buildings | 1 | 1 | 4 | | | x | | x | x | x | x |
| Waste | 1. Organics (kitchen) composting | 1 | 1 | 1 | | x | | x | | x | | x |
| | 2. Kitchen waste composting | 1 | 1 | 1 | | x | | x | | x | | x |
| Natural Resources | 1. Tree planting | 1 | 1 | 1 | | | x | | | x | | x |

| Key to Ballpark Rankings | | |
|-------------------------------|-----------------------|----------------------|
| Est. Total Costs | Est. Total GHG Impact | Est. Payback |
| 1 = Less than \$250,000 | 1 = 0-9.9% of goal | 1 = Less than 1 year |
| 2 = \$250,000-\$999,999 | 2 = 10-24.9% of goal | 2 = 1-4.9 years |
| 3 = \$1 million-\$24,999,999 | 3 = 25-49.9% of goal | 3 = 5-9.9 years |
| 4 = \$25 million-\$99,999,999 | 4 = 50-74.9% of goal | 4 = 10-19.9 years |
| 5 = \$100 million or more | 5 = 75-100% of goal | 5 = 20 years or more |



CITY OF ONEIDA
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