

Town of Niles Climate Action Plan

OCTOBER 2015



View northeast from Rowe Rd.
Photo Credit: Amanda Mazzoni



Agricultural land, Duryea St.
Photo Credit: Amanda Mazzoni

ACKNOWLEDGEMENTS

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

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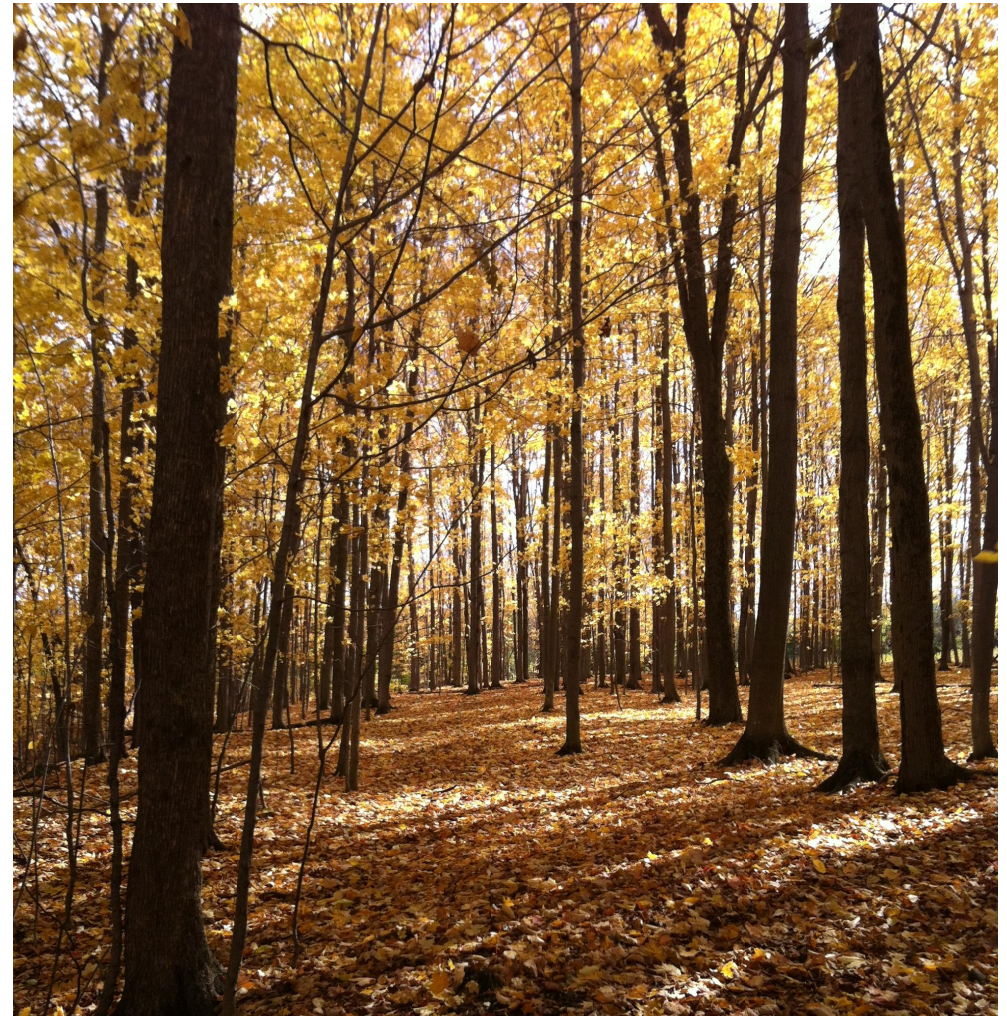
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Fall in the woods, Niles

Photo Credit: Charlie Greene

The Central New York Regional Planning and Development Board

The Central New York Regional Planning and Development Board (CNY RPDB) is 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.

A MESSAGE FROM THE SUPERVISOR

We would do well to consider the words of conservative author and poet T.S. Eliot, who pointed out that “a wrong attitude towards nature implies, somewhere, a wrong attitude towards God.”

President Reagan wisely stated that the Earth is what we leave to our children and that our great moral responsibility is to leave it to them either as we found it, or better than we found it. In 1988 President Reagan, when faced with warnings from climate scientists about a dangerous erosion of earth’s protective ozone layer from the use of chlorofluorocarbons (CFCs), responded by pushing through an international treaty to phase-out use of CFCs. We deserve that same kind prudent leadership from our leaders today.

How can people dismiss climate change as being completely outside the realm of ethics and compassion? The earth is a gift for which we must accept responsibility.

Climate change is about thermometers and temperatures. It’s about what’s been happening on our planet since the Industrial

Revolution. It’s Chemistry 101.

Now, can we talk about climate change, and our responsibility to leave the earth in good health for those who come after us?

As residents of Niles, we have direct experience that intense precipitation and heavy downpours are occurring more often. This is a change in our climate. Climate change affects communities around the globe. In August 2014 the Town of Niles joined a growing list of 167 New York State communities collaborating to create positive transformation. Local governments are responsible for public health, safety and local infrastructure. To fulfill their traditional responsibilities in the face of disruptive impacts from climate change, local governments need to plan for reducing their dependence on fossil fuels and for adapting to unpredictable changes in our weather.

The Niles Climate Action Plan chronicles these efforts for our community. The intent of the Niles Climate Action Plan is to convey goals that are important, and enable the residents of

Niles to begin using their resources effectively and to integrate climate protection into our daily activities. Thoughtfully developed policies and programs can maximize the benefits and minimize the costs of responding to climate change because:

1. Reducing energy costs and improving our ecological awareness will save taxpayer dollars for many years after the initial cost is paid.
2. Climate smart land use practices can lower the cost of infrastructure and public services.
3. Adapting buildings to climate change saves money and reduces pollutants at the same time.
4. The cheapest energy is energy that is not used.
5. The Climate Smart Communities Pledge demonstrates that local government is acting to protect the future of present-day citizens and of coming generations.

6. Ecologically aware and renewable energy products and services, and the workers who install and maintain these products will benefit as communities adopt more resilient practices.
7. Techniques and tools that immediately decrease environmental stress generate more jobs per dollar spent than fossil fuel dependent approaches, and these dollars are more likely to be retained in the local economy.

Many who acknowledge the reality of climate change adopt a hopeful belief that the deterioration of the environment produced by technology is a problem which technology will solve. Technology and efficiency are never value-neutral; they embody specific values. When a society's focus is on the increase of technical efficiencies, materialistic values are exaggerated while non-material values are neglected.

We must make a conscious effort to direct technological innovation toward the achievement of clearly defined societal goals

that reflect our shared values. As we strive for an ethical, humane and sustainable world, we must first clearly define our goals such as agreeable working conditions, agricultural stewardship, kind treatment of animals, a living wage, psychological well-being, minimum pollution, and the reduction in the use of our limited energy and material resources.

Critical examination of our core values and the achievement of a humane and sustainable world will require significant effort. Unless we undertake this critical challenge, technological innovation and efficiency improvements will result in environmental and societal collapse. Before assuming that renewable energy is the best solution to the problem of unsustainable fossil fuel use and global warming, it is necessary for us to carefully consider whether we are up to the task of putting into service a decentralized renewable energy system of adequate size to replace unsustainable fossil fuel use.

In modern industrialized societies, there is a strong taboo against challenging the faith in science and technology and their supposed

contribution to progress. Any questioning of that faith is seen as heresy.

Progress must be re-defined as increasing our awareness and understanding of how to adapt to our natural environment and live within its limits, and how to improve our well-being and happiness in non-materialistic ways.

It is futile to believe that technological freedom is more important than our ecological wellbeing. Science must always serve the interests of the people and our natural world rather than damaging them.

Charlie Greene, Niles Town supervisor,
September 22, 2015

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EXECUTIVE SUMMARY

A Climate Action Plan (CAP), often considered a blueprint for the future, evaluates how a community can reduce greenhouse emissions and adapt to climate change. The CAP also identifies the extent to which local actions support New York State's goal for a clean-energy economy. New York State's goal is to reduce greenhouse gas emissions by 80% (below the levels emitted in 1990) by the year 2050. To help reach this goal, local representatives have joined many other municipalities throughout the State to compile a CAP for Niles.

The CAP provides local goals for reducing energy use from municipal operations and from the Niles community as a whole and includes specific recommendations for categories such as transportation, solid waste disposal, and building energy efficiency. The objectives of the Climate Action Plan are to:

- (1) Present information on emission reduction projects and programs that are currently being implemented in Niles;
- (2) Provide municipal elected officials, community leaders, and residents with information and support to advance these and additional energy sustainability programs throughout the community;
- (3) Identify opportunities for new emission reduction programs and initiatives; and
- (4) Engage and encourage local participation in greenhouse gas emission reduction strategies.

A Climate Action Plan Advisory Committee comprised of municipal representatives and community leaders met during 2015 to discuss emission reduction goals and specific strategies for reaching them. The committee agreed on a goal to reduce municipal greenhouse gas emissions by 7.5% by the year 2025 and reduce community emissions by 8.9% from the GHG inventory baseline year (2010).

This CAP was prepared for Niles with guidance from the Central New York Regional Planning and Development Board (CNY RPDB). The CNY RPDB provided this assistance under the sponsorship of the New York State Climate Smart Communities Program.

The CAP 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, the document provides estimates of emission reductions for specific local recommendations. The report is designed to help public officials, community leaders, and residents decide which actions may be worthwhile for the community to pursue in the coming years and is intended to be a flexible framework for local climate protection.



Climate Smart Communities Program

The Climate Smart Community (CSC) program is a successful partnership between the New York State Department of Environmental Conservation and local governments. The program helps communities reduce greenhouse gas emissions, save taxpayer dollars, and advance community goals for health and safety, economic vitality, and energy independence. Over 160 municipalities in New York State (including the Town of Niles) are CSCs. The CNY RPDB is the Climate Smart Communities coordinator for five counties in Central New York (Cayuga, Cortland, Madison, Onondaga, and Oswego) and provides technical assistance for greenhouse gas inventories, climate action plans, and energy efficiency projects. The CNY RPDB's work as Climate Smart Communities coordinator is referred to as their Climate Change Innovation Program (C₂IP).



Agricultural field, Niles
Photo Credit: Michael Gorr

INTRODUCTION

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, keeping it in 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. There is currently more carbon dioxide in the atmosphere than at any time in history, as measured by these samples.¹⁵ Atmospheric testing shows that we have 402 parts per million (ppm) atmospheric CO₂¹⁶, which is

¹⁵ 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.

¹⁶ According to the Scripps Institute and NOAA, Mauna Loa Observatory

higher than at any other time in history.¹⁷ Scientists expect that this is leading to a gradual warming of the planet in most areas.

Developing the Plan

The Town of Niles' Climate Action Plan was developed by an advisory committee made up of Charlie Greene, Town Supervisor, Kathleen Gorr, Chair of CAP Advisory Committee and Town Board of Appeals, Don Klein, Board of Appeals, and Janet Stinson, Town Resident. The committee was provided technical assistance by the CNY RPDB, who analyzed energy and emissions reduction strategies for the town 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 town, 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

¹⁷ 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 420k yr. Pre-industrial Holocene levels (~280 ppmv) are found during all interglacials, with the highest values (~300 ppmv) found approximately 323k yr BP.

Thinking Sustainably: The Village of Minoa, NY

The Village of Minoa serves as a showcase for energy efficiency and environmental stewardship. In the winter of 2014-2015, the village worked with SmartWatt Energy to convert outdoor municipal lighting to light emitting diodes (LEDs), which will reduce the village's energy use, emissions, and operating costs. Over the years, Minoa has also invested in various upgrades at their wastewater treatment facility, including lighting upgrades and installing lighting occupancy sensors, installing energy efficient sensors and variable speed pumps, replacing aging motors with energy efficient motors, and creating a constructed wetland system to treat wastewater without the use of energy or chemicals. The village has also converted all holiday lighting to LED lights and performed energy efficient upgrades to lighting at the Fire Hall and several additional municipal facilities.

The Village of Minoa continues to explore additional methods of becoming more sustainable as a community. Energy efficiency goals and recommendations were presented in a Climate Action Plan that was adopted by village trustees in April 2015.

Climate Impacts in the Northeast¹⁵

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.

¹⁵ US EPA, <http://www.epa.gov/climatechange/impacts-adaptation/northeast.html>

assumptions and references, refer to Appendix C: Action Strategy Summary Document.¹⁸

Implementing the Plan

In order to implement the strategies in this plan and achieve Niles' sustainability goals, the creation of a permanent sustainability committee is highly recommended. The sustainability committee would be comprised of a group of town residents who are committed to Niles' sustainable future and are willing to volunteer their time to help implement the strategies explained in this plan. It is recommended that the Climate Action Plan committee continue to meet in this capacity and work towards implementation of the strategies within this plan.

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 years to determine progress.

Global Weather Extremes

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 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 influence weather patterns around the globe.

¹⁸ Available at <http://www.cayugacounty.us/townofniles/>



Winter view across Dutch Hollow

Photo Credit: Charlie Greene

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 and increasing temperatures 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 from 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 increases the potential for strong storm events. The following pages present information on how these global conditions impact local climate characteristics in New York State and in Central New York.

NEW YORK STATE WEATHER CHARACTERISTICS

Central New York's climate is characterized by warm, dry summers and cold, snowy winters. Our 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. Although serious droughts are rare, 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 is a 600-page report that presents projected changes in climate for seven geographic regions in the State. It has served as a valuable resource for planners, policymakers, farmers, local governments and residents. The ClimAID report outlines the potential impacts of climate changes on eight sectors: water resources, coastal zones, ecosystems, agriculture, energy, transportation, telecommunications and public health, as well as steps that government, businesses, and private citizens can take to adapt to those impacts. 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

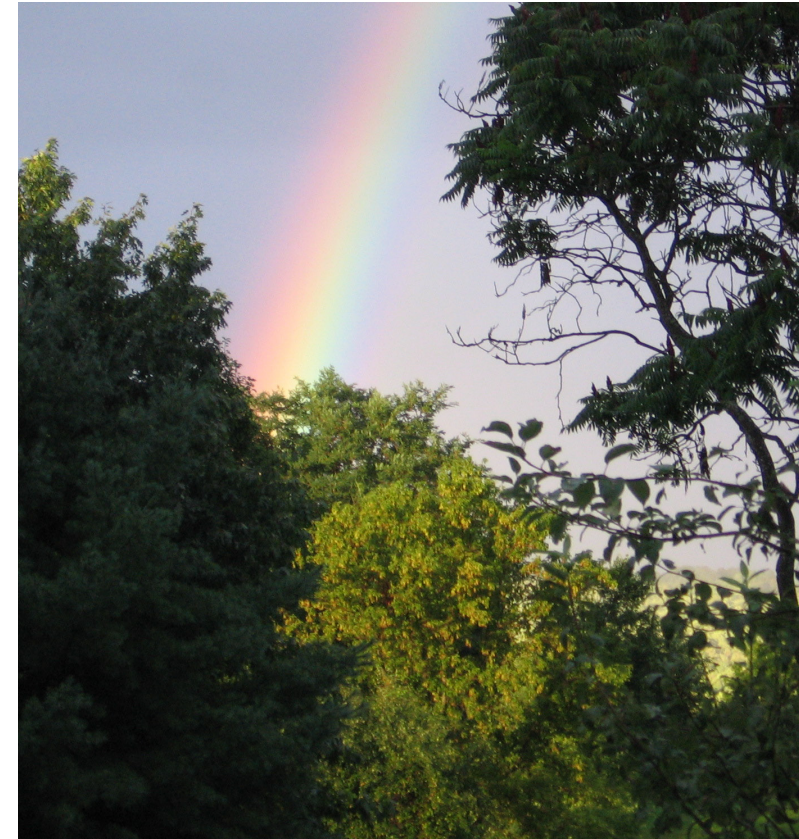
about a foot since 1900 and the frequency of intense precipitation and heavy downpours has increased in recent decades.

In 2014, NYSERDA released updated data and projections of climate changes throughout the State that will likely result in greater impacts on flooding, agriculture, winter tourism, and many other areas. The report applies up-to-date climate models and methods to evaluate potential changes to New York State's climate as a result of increasing greenhouse gas emissions. The results reinforce the importance of preparing New York for the realities of a changing climate. The study confirms and refines the following projections that had originally been presented in the ClimAID report:

- + Sea level could rise significantly, permanently flooding some areas and increasing the likelihood of damage to coastal infrastructure from storm surge, including roads and bridges.
- + Inland and upstate, heavy downpours and subsequent flooding are expected to increase. In the winter, more rainstorms in place of snow are expected.
- + While winters will be milder, summers are expected to see more extreme and longer heat waves, with more droughts as well¹⁹

Flooding is a growing concern throughout New York State, especially with the rise in urban development 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

¹⁹ "Responding to Climate Change in New York State: The ClimAID Integrated Assessment for Effective Climate Change Adaptation". 2014 www.nyserdera.ny.gov/ClimAID.



Rainbow, Niles

Photo Credit: Charlie Greene

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.

LOCAL CLIMATE CHARACTERISTICS

Niles is expected to experience a gradual increase in air temperature and a rise in the frequency of extreme weather events. According to Cooperative Extension, higher temperatures can lead to greater insect and disease pressures. The increased occurrence of storm events can contribute to flooding, stormwater runoff, and sediment loading to Skaneateles and Owasco lakes.

Niles committed to climate awareness and environmental protection by becoming a Climate Smart Community and has worked with the CNY RPDB for the past year on projects associated with the Climate Change Innovation Program. The Skaneateles Lake Watershed Agricultural program (SLWAP), implemented in 1994, is also designed to help communities address the impacts of storm events by reducing runoff and pollution loading from agricultural operations. Viticulture, the production of grapes, is an important part of the Finger Lakes wine industry which contributes to an estimated 50,000 jobs and a \$2.7 billion economic impact for the region. Vineyards and other businesses in the agricultural community are implementing long and short-term efforts to reduce greenhouse gas emissions that contribute to climate change and to protect field crops, grapes, orchards and livestock that serve as the foundation of the local economy.

Temperature and Precipitation

The average July temperature (80.7°F) in Cayuga County is lower than the national average of 86.5°F. The average year-round

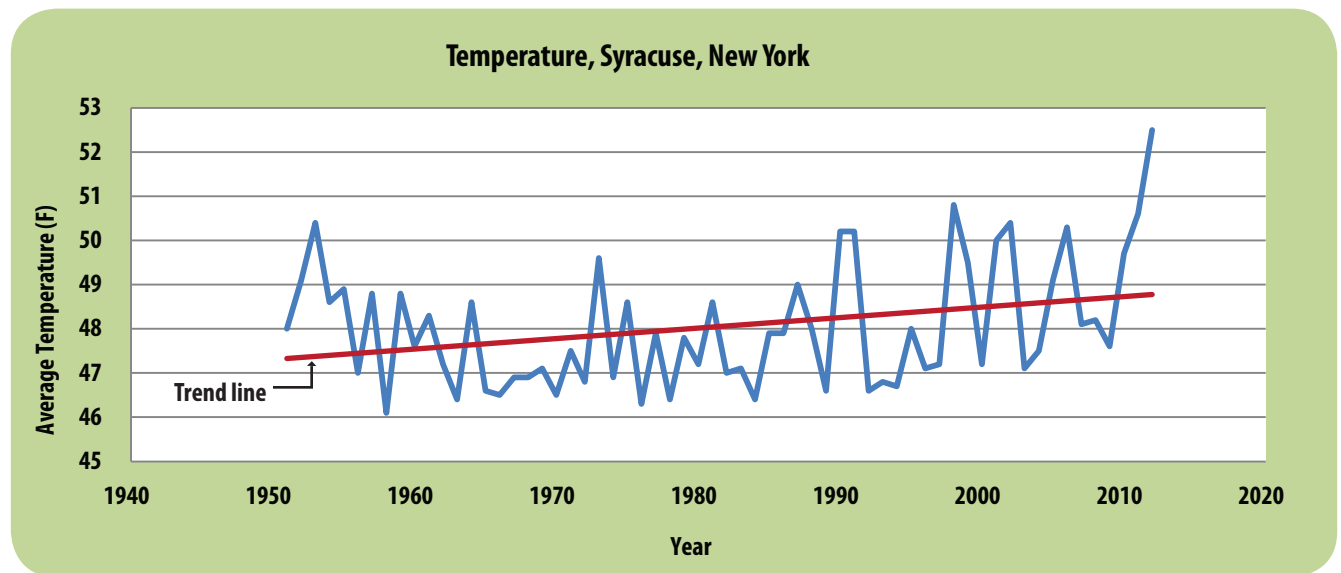


FIGURE 1- ANNUAL AVERAGE TEMPERATURE, SYRACUSE, NEW YORK.
SOURCE: NOAA NATIONAL WEATHER SERVICE FORECAST OFFICE

temperature is 46.6°F, which is lower than the New York State average of 48.2°F, and much lower than the national average of 54.4°F. During the summer and parts of spring and autumn, temperatures rise during the daytime and fall rapidly after sunset. The graph above shows the annual average temperatures in the City of Syracuse, the closest National Oceanic and Atmospheric Administration (NOAA) weather station, since 1951 (Figure 1). Since 1951, average annual temperatures have risen about 1.5°F.

The Finger Lakes region provides excellent air and water quality and ranks better than the national average. Cayuga county also ranks higher (54) than the national average (44) on

the comfort index. The comfort index is based on humidity during the hot month and is rated on a scale of 1 to 100. Higher numbers reflect a greater degree of comfort.

Niles and neighboring communities generally experience seasonable weather patterns that are characteristic of the northeastern U.S. cyclonic system. Cayuga County receives an average of 36.3 inches of rain each year. This is similar to the national average of 36.5 inches.

Long-term precipitation trends recorded at the Hancock International Airport weather station in Syracuse are displayed below in Figure 2. Annual precipitation has increased about 2.3 inches since 1951.

Ice Cover

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 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 declined by 71 percent.

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. Ice research is helping to determine the impacts on climate patterns, lake water levels, water movement patterns, water temperature structure, blue-green algae, 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 the lakes are also important components that can influence the thermal cycle in the lakes. Because of the importance that ice has on lake characteristics, lake communities in the Finger Lakes region are encouraged to compile ice-in and ice-out dates on an annual basis.

Extreme Weather Events

The relative intensity of local storm events is influenced by air temperature. As the air temperature rises, moisture in the atmosphere

increases which contributes to a greater intensity and frequency of precipitation events. The warming air temperatures that are seen throughout New York State are caused by emissions 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 Niles and around the globe are gradually becoming more extreme with stronger wind and higher levels of rainfall.

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. Meteorologists report that the total annual amount of precipitation is changing as well as the distribution and intensity of storm events.

Strong storm events in Central New York contribute to localized flooding, soil erosion, and stormwater runoff. These conditions can cause damage to roads, bridges, and other infrastructure in Niles. The role of agencies such as the Cayuga County Soil and Water Conservation District, the Cayuga County Water Quality Management Agency, and the

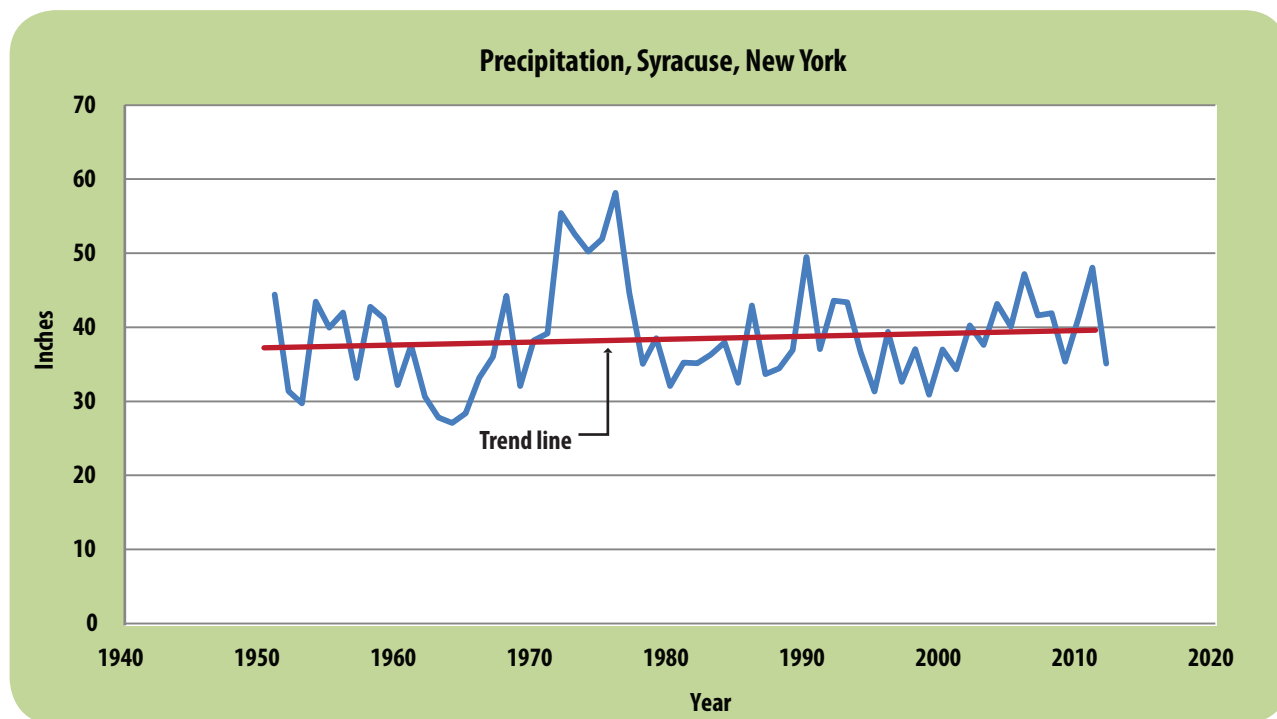


FIGURE 2- ANNUAL AVERAGE PRECIPITATION IN SYRACUSE, NEW YORK 1903-2008
SOURCE: NATIONAL WEATHER SERVICE FORECAST OFFICE

Natural Resource Conservation Service will become increasingly important in the coming years, especially in terms 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 water quality in local lakes and tributaries. 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 Niles' infrastructure costs; and creating green jobs.

Flooding

Flooding is influenced by the intensity and

amount of precipitation, spring snowmelt, groundwater levels, and the concentration of impervious surfaces and compacted soils from urban development. These conditions limit groundwater recharge and increase surface runoff and 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. Further, with the exception of fire, floods are the most prevalent and widespread of all natural disasters, with approximately 75 percent of all presidentially declared disasters 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.

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 2014, the total assessed value of property located within designated FEMA flood zones in Niles represents 61.3% of the total assessed value of parcels throughout town (Table 1). Of the 1,246 land parcels in the Town, 41.1% is located in FEMA flood zones (Table 2).

TABLE 1- TOTAL ASSESSED VALUE (TAV) OF PARCELS INTERSECTING FLOOD PLAINS¹⁵

Municipality	TAV of Parcels Intersecting Flood Plain	# Acres of Parcels Intersecting Flood Plain	TAV of Municipality	TAV % Floodplain Parcels within the Municipality
Town of Niles	\$145,341,367	5,443	\$237,112,440	61.3%

¹⁵ Source: 2014 tax parcel data, Cayuga County

TABLE 2- PARCELS WITHIN 100-YEAR FLOODPLAIN¹⁵

Municipality	Parcels	Parcels in 100-Year Floodplain	% of Parcels in 100-Year Floodplain
Town of Niles	1,246	512	41.1%

¹⁵ Source: 2014 tax parcel data, Cayuga County

Snowfall

The average annual snowfall in nearby Skaneateles is 94.3 inches, which is higher than the New York State average of 57.9 inches.

Central New York experienced exceptionally heavy snowfall, icy roads, and low temperatures during the 2013-14 winter season. Cayuga County normally receives an average of 74.5 inches of snow each year. This is significantly higher than the national average of 25 inches. Figure 3 illustrates a 28.6 inch decrease in annual snowfall at the NOAA weather station in Syracuse since 1951.

The Town of Niles 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, Niles and other areas to the east and south of the lake are expected to experience heavier and more frequent lake-effect snowfall events.

Tourism and Recreation

Weather has a significant impact on the tourism

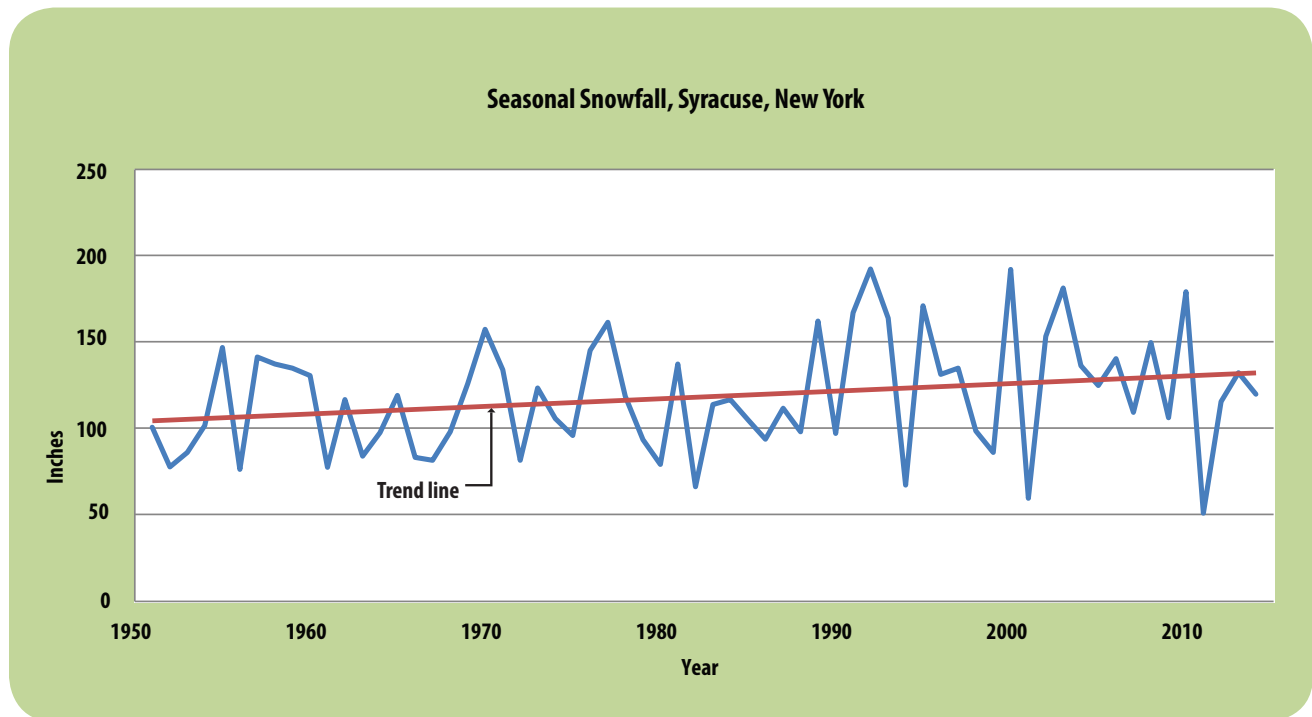


FIGURE 3- SEASONAL SNOWFALL IN SYRACUSE, NY, 1949-50 TO 2014-15
SOURCE: NATIONAL WEATHER SERVICE FORECAST OFFICE

and recreation sector throughout the Finger Lakes region. Seasonal weather patterns, especially precipitation rates, determine 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 predominant role in determining local economic vitality.

Frozen Ocean State Forest encompasses 754 acres of land in Niles. There are no trails in the forest and recreational activities are limited to hunting, fishing, trapping, primitive camping, and nature photography. Frozen Ocean is located on one of the highest points in the

county and the name is said to have originated from the fact that during the winter season, extremely cold winds sweep across the land turning the woods into endless stretches of frozen forest. Northern hardwood, hemlock, European and Japanese larch, Norway spruce, red pine and white spruce, provide a wide range of diverse habitats for wildlife.

The local warming trend is also 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.

Public Health

Changes in climate conditions are affecting

human health. Several health impacts of warming temperatures have been documented throughout the country such as increased illnesses and deaths from heat events, injuries and deaths from extreme weather events, and respiratory illnesses 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 can cause increases in certain types of diseases. For example, climate change in the Northeast is expected to result in the increased population rates of mosquitoes and ticks. As the population of these insect increases, 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 change is gradually shifting pest populations of some invasive as well as native species. Some warm-weather species that previously could not survive cold temperatures are now able to establish themselves, threatening populations of native species. This is already occurring with increasing invasive species populations throughout New York State. Early detection and a rapid response of new infestations of invasive species are the most effective ways that Niles can address this problem.

The Hemlock Woolly Adelgid, Asian Longhorn Beetle, Eurasian Watermilfoil, Hydrilla, 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.

Agriculture

Niles, characterized by a hilly topography with rolling uplands, is located between Owasco and Skaneateles Lakes. Dutch Hollow Brook and Bear Swamp Creek flow north through the center of the town. The highest elevation

is approximately 700 feet above Owasco Lake and the watershed slopes are gradual. Topography within the Skaneateles Lake watershed is more abrupt with steeper hills.

47% of the land in Niles is classified as agricultural. Farmers participate in numerous conservation activities to avoid surface and groundwater contamination and to reduce pollution runoff to nearby waterbodies. The Cayuga County Soil and Water Conservation District (SWCD) 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. Niles is working with the



Alpaca Farm, Niles

Photo Credit: Amanda Mazzoni

SWCD to identify priority erosion areas in the watershed and to design preventative measures to reduce stormwater runoff.

Farmland protection for Niles and neighboring communities in Cayuga County involves laws, policies and programs that support a strong local economy and that protect agricultural land use. Several methods of farmland protection strategies are found at the state, county and local levels. Examples of these tools include the County Agricultural District No. 5, agricultural value assessments, local and state right-to-farm laws, infrastructure support, economic development, conservation easements and land use planning that is sensitive to the needs of farms and agriculturally based businesses. The Cayuga Farmland Protection Plan is intended to evaluate existing farmland protection policies and laws, and propose ways to strengthen or add to them.

Cayuga County contains a single agricultural district that was created under Article 25AA of the New York State Agriculture and Markets Law. Agricultural District #5 was consolidated from six County Agricultural Districts in 2013. It contains 15,270 parcels and 360,866.75 acres, 64% of which is active viable agricultural land. Approximately 82% of the total land area in the county is within the Agricultural District. Valuable surface water resources including lakes, wetlands and high-quality groundwater can be found in Niles and throughout Cayuga County. Despite an abundant availability of water, certain areas of the county have experienced drought. Big Salmon Creek experienced several droughts, most recently in the 1990s, which alternated from year to



View of Dutch Hollow from the "Niles Alps"

Photo Credit: Charlie Greene

year with flood events. Several agricultural operations including large dairy farms depend on Big Salmon Creek for their water supply. If farms continue to expand in the southern areas of the county, some farmers may eventually be challenged by the availability of a reliable and abundant water source. The County Soil and Water Conservation District, Cornell Cooperative Extension and the Natural Resources Conservation Service are available to provide assistance to Niles

farmers in developing and implementing best management practices that can address pollution runoff, flooding and drought.

COMMUNITY CHARACTERISTICS

There is a growing recognition 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. 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.



Farm land, corner of Vanderstow and Harter Rd.

Photo Credit: Amanda Mazzoni

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

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, such as creating a community center in Niles, therefore have the potential to make a significant contribution to overall climate change mitigation.

Commuting to Work: The way that land uses and transportation infrastructure are developed within a community influences whether residents choose to walk, bike, drive, or use public transit. These travel choices directly affect the amount of transportation-related GHG emissions that are produced.

According to data from the U.S. Census Bureau, over 16% of the residents in Niles that work outside of the home commute to jobs in the Town of Moravia, and over 14% commute to jobs in the City of Auburn. Additional transportation destinations are found in Table 4.

Of the total working population in Niles, 80% drove alone to their jobs, 12% carpooled,

and 5% worked from home (Table 5). Single-passenger automobile trips constituted the vast majority. Preparation of a commuting analysis would help determine the need for organized carpooling opportunities. The largest percentage of workers (40.5%) commuted 30-59 minutes to work (Table 6). Carpooling, ridesharing, and similar efforts to reduce vehicle traffic will help to reduce greenhouse gas emissions.

Land Use

Additional carbon reductions could come from applying other types of land use planning and redevelopment. Recommendations for urban design in smaller communities such as Niles include the potential to install green infrastructure to reduce stormwater runoff. Support of localized food production and reliance on farmers markets will reduce shipping, storage, and packaging needs. These and other strategies that make use of land use and transportation alternatives could contribute significantly to overall GHG mitigation.

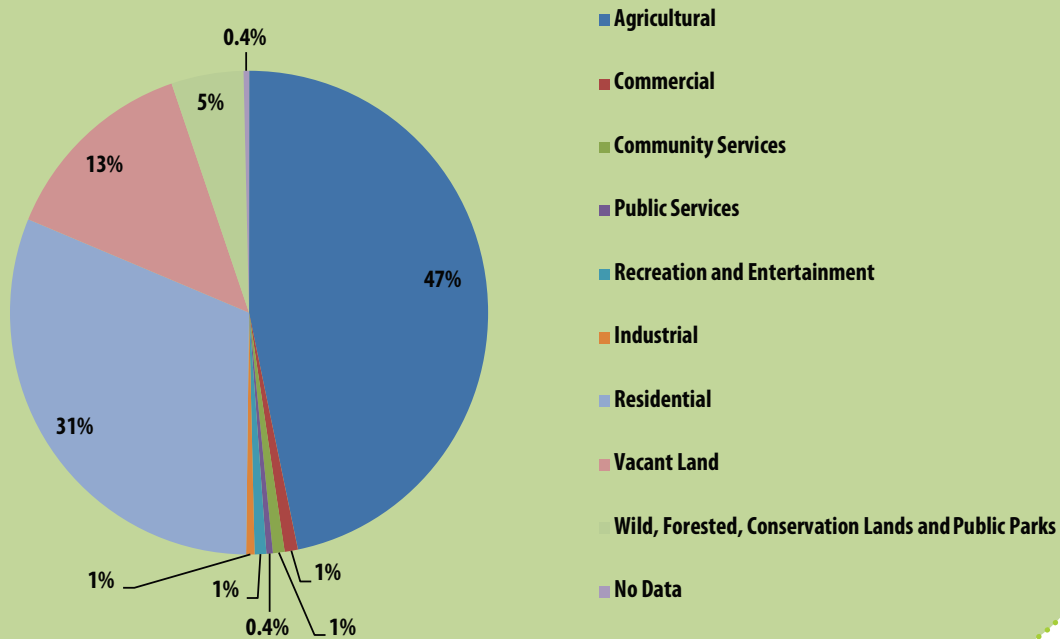
Land use categories for the Town of Niles are summarized in Figures 4 and 5. The category called 'wild, forested, conservation lands and public parks' includes land tracts with merchantable timber, state-owned forest land, county-owned reforested land, public parks, and wetlands. The category called 'Vacant'

TABLE 4- COMMUTING DESTINATIONS FROM NILES, NY¹⁵

Municipality	Estimated percentage of Niles Residents Commuting to Destination
Moravia Town, Cayuga County	16.3%
Auburn City, Cayuga County	14.1%
Lansing Town, Tompkins County	6.6%
Syracuse City, Onondaga County	6.4%
Ithaca Town, Tompkins County	4.7%
Cortlandville Town, Cortland County	3.6%
Skaneateles Town, Onondaga County	3.6%
De Witt Town, Onondaga County	3.0%
Niles Town, Cayuga County	2.8%
Dryden Town, Tompkins County	2.8%
Groton Town, Tompkins County	2.8%
Owasco Town, Cayuga County	2.5%
Oswego City, Oswego County	2.5%
Cortland City, Cortland County	2.2%
Ithaca City, Tompkins County	2.2%
Ledyard Town, Cayuga County	1.7%
Clay Town, Onondaga County	1.7%
Aurelius Town, Cayuga County	1.4%
Sennett Town, Cayuga County	1.1%
Cicero Town, Onondaga County	1.1%
Elbridge Town, Onondaga County	1.1%
Lysander Town, Onondaga County	1.1%
Other	14.7%

15 Source: onthemap.ces.census.gov, 2013

FIGURE 4- NILES LAND USE TYPES



includes non-productive and abandoned agricultural land, and residential vacant land.

Examining existing land use patterns and transportation infrastructure provides insight into ways a community can reduce GHG emissions. Some of the factors that influence travel behavior include the jobs/housing ratio and proximity of uses.

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 2013, there were approximately 171 jobs in Niles and 432 households and the jobs/housing ratio was approximately 0.396. This demonstrates that there were more households than job opportunities in the community.

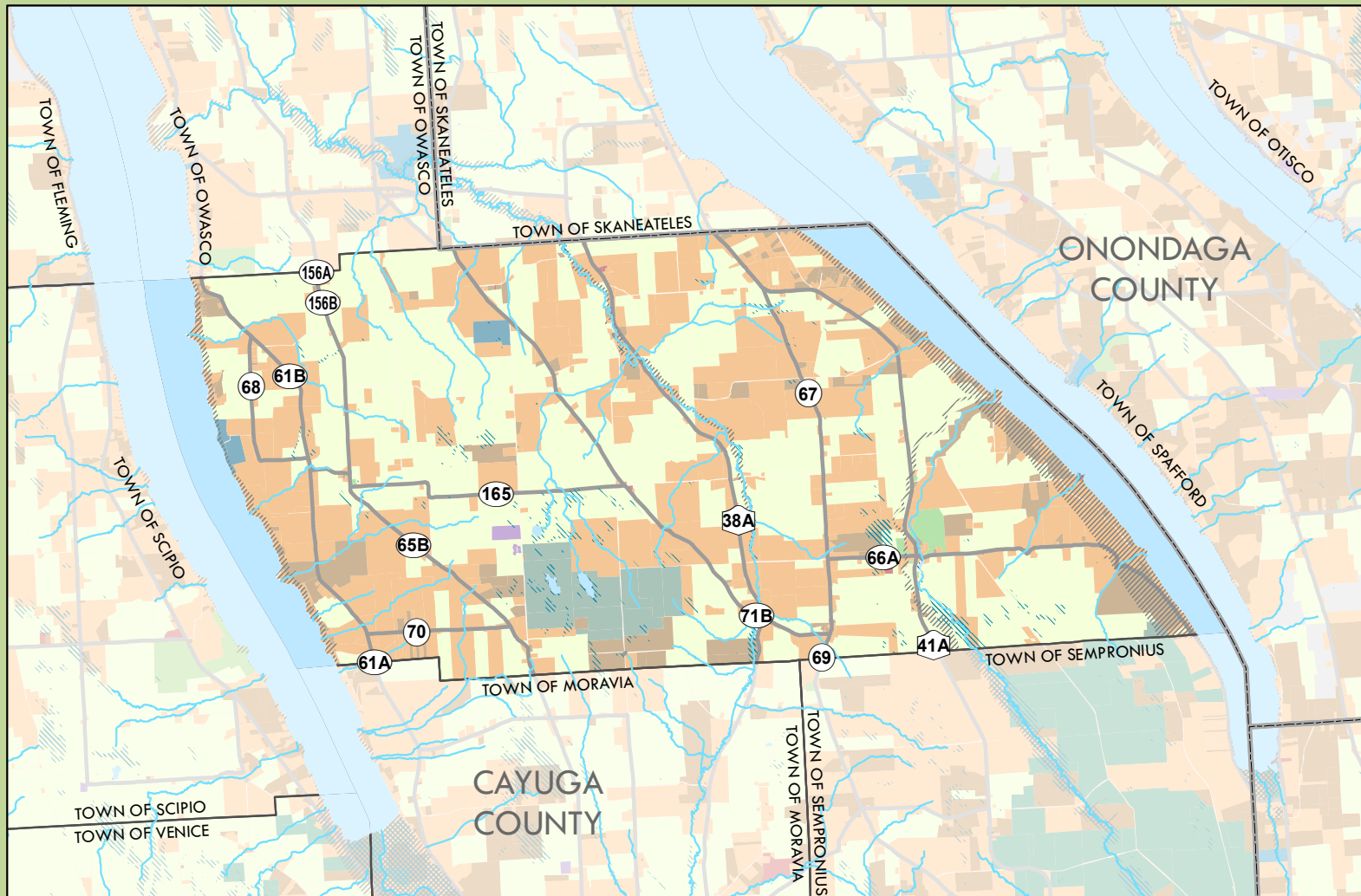
Proximity of uses refers to the distance between neighborhood commercial services and residents' homes. The number of residential homes that are located within ¼ mile of commercial properties in Niles was calculated and then used as a basis for the development of CAP recommendations. This provided insight into the effectiveness of the community's existing zoning and land use

TABLE 5- TRANSPORTATION TO WORK IN NILES¹⁵

Transportation to Work	Number of Workers	Percentage
Car, truck, van - drove alone	343	80%
Car, truck, van - carpooled	50	12%
Worked from home	21	5%
Walk to work	10	2%
Public transportation (excluding taxicab)	4	1%
Taxicab, motorcycle, bicycle, or other means	0	0%
TOTAL	428	100

¹⁵ Source: American Community Survey, 2009-2013

FIGURE 5- TOWN OF NILES LAND USE



Land Use
Town of Niles

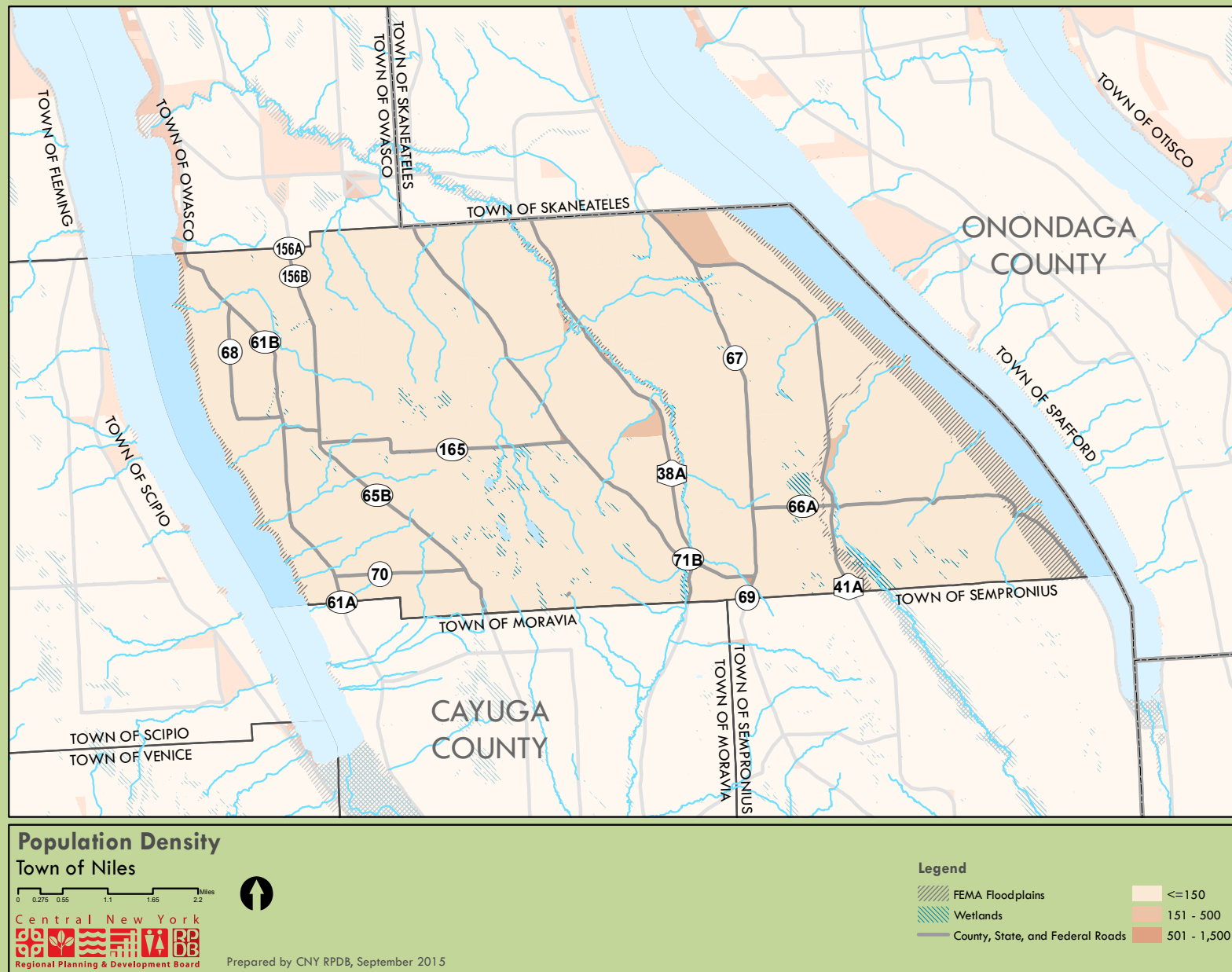


Prepared by CNY RPDB, September 2015

Legend

- | | | |
|----------------------------------|--------------------|-------------------------------------|
| FEMA Floodplains | No Data | Recreation and Entertainment |
| Wetlands | Agricultural | Residential |
| County, State, and Federal Roads | Commercial | Vacant Land |
| | Community Services | Conservation Lands and Public Parks |
| | Public Services | |

FIGURE 6- TOWN OF NILES POPULATION DENSITY



pattern from the pedestrian perspective. Of the 796 residential parcels in Niles, 63 (9%) are located within ¼ mile of a commercial parcel. Although some residential areas are distant from commercial services, overall, the existing land use pattern creates some opportunities for pedestrian and bicycle travel.

TABLE 6- COMMUTE TIMES TO WORK FROM THE TOWN OF NILES¹⁵

Commute Times	Workers	Percentage
Less than 15 minutes	81	20.9%
15-29 minutes	124	32.0%
30-59 minutes	157	40.5%
60-89 minutes	25	6.4%
90+ minutes	1	0.3%
TOTAL	388	100%

¹⁵ Source: American Community Survey, 2009-2013



Duryea St. looking west
Photo Credit: Amanda Mazzoni

Greenhouse Gas Inventory Summary

As part of the Climate Change Innovation Program, an inventory of the town's municipal and community Greenhouse Gas (GHG) emissions was conducted in 2015 with the assistance by CNY RPDB staff. The 2015 inventory report examined emissions generated in the Town of Niles in 2010, which serves as the baseline year for the Climate Action Plan.

The inventory report found that in the 2010 base year, town municipal operations generated a total of 177 metric tons of carbon dioxide equivalent (MTCO₂e), which were broken up into 3 sectors: buildings and facilities (26 MTCO₂e, 15%), streetlights and traffic signals (0.1 MTCO₂e, 0.1%), and vehicle fleet (151 MTCO₂e, 85%).

Community emissions totaled 6,126 MTCO₂e, which were broken up into 4 sectors:

residential energy (2,212 MTCO₂e, 36%), commercial energy (41,187 MTCO₂e, 20%), transportation (2,286 MTCO₂e, 37%), and waste (441 MTCO₂e, 7%).

Agricultural emissions totaled 2,478 MTCO₂e, with 1,972 MTCO₂e (80%) attributed to manure management (methane and nitrous oxide released from animal waste) and 506 MTCO₂e (20%) created by enteric fermentation (methane released during daily livestock digestion processes).

The Town of Niles' Climate Action Plan uses the data gathered in the 2015 GHG inventory report as a baseline for analyses to determine which energy efficiency strategies will be most effective. The strategies presented in this document are based on goals that will help Niles to reduce emissions, energy use, and dollars spent on municipal and community operations by the year 2025.

FIGURE 7- TOWN OF NILES MUNICIPAL EMISSIONS BY SECTOR MTCO₂E (2010 BASELINE)

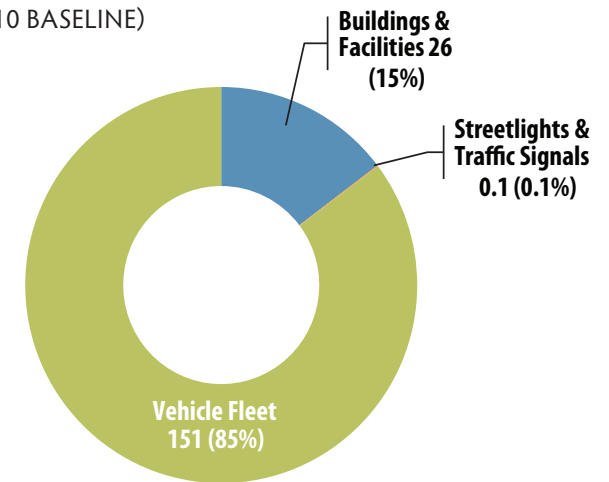


FIGURE 8A- TOWN OF NILES COMMUNITY EMISSIONS BY SECTOR MTCO₂E (2010 BASELINE)

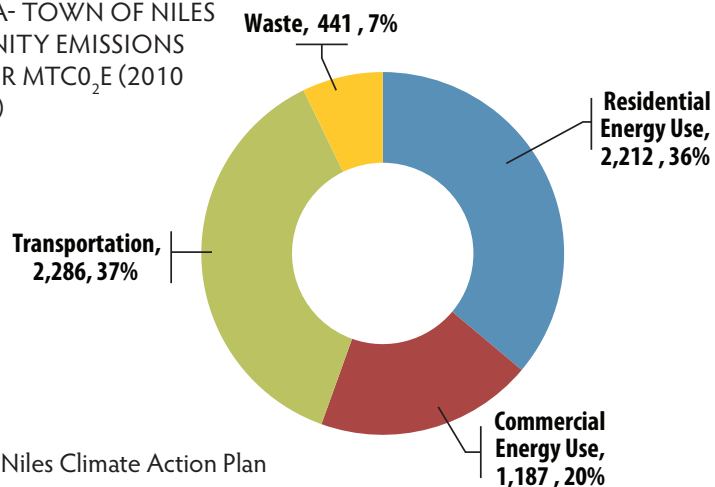


FIGURE 8B- TOWN OF NILES AGRICULTURAL EMISSIONS MTCO₂E (2010 BASELINE)

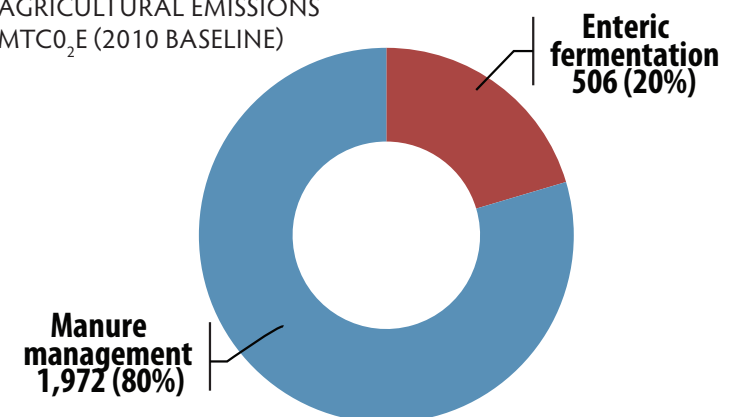
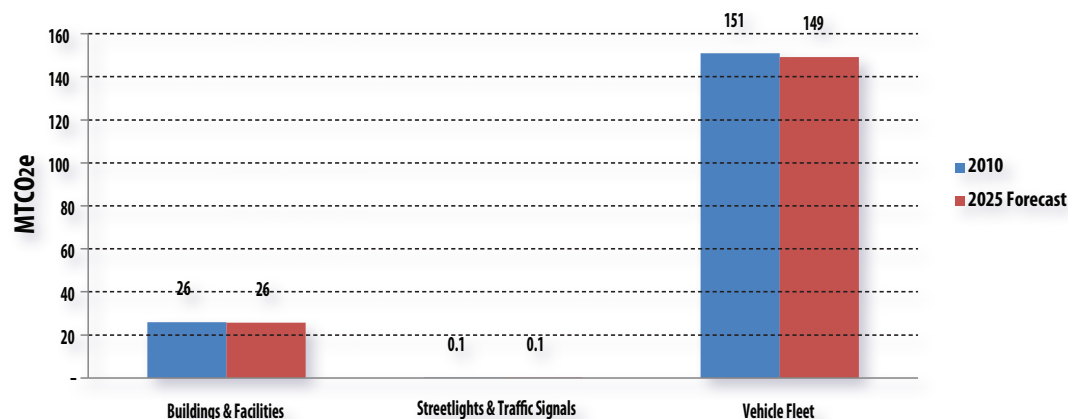


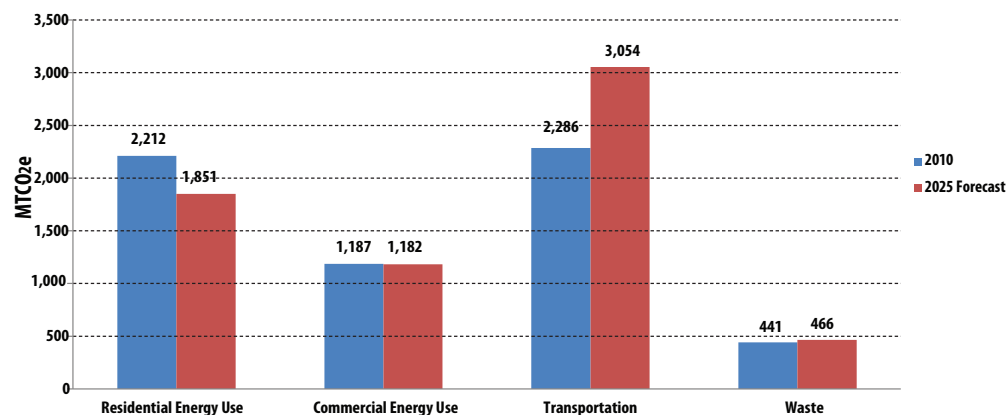
FIGURE 9- EMISSION FORECAST:
MUNICIPAL OPERATIONS



The GHG inventory report also forecasted emissions for the Town of Niles in 2025. The report explained that town municipal emissions are expected to total 175 MTCO₂e in 2025, with a 2 MTCO₂e decrease in vehicle fleet emissions. The other two sectors are expected to decrease slightly as well, but less than 1 MTCO₂e each.

Community emissions are expected to total 6,553 MTCO₂e in 2025, with a 361 MTCO₂e decrease in the residential sector, a 5 MTCO₂e decrease in the commercial sector, a 768 MTCO₂e increase in the transportation sector, and a 25 MTCO₂e increase in the waste sector.

FIGURE 10- EMISSION FORECAST:
COMMUNITY



1 Metric Ton of Carbon Dioxide Equivalent =



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

Progress with Climate Action in Niles

The Niles community has been proactive in adapting to climate change and has taken steps to reduce greenhouse gas emissions. The town, along with more than 160 other municipalities in New York State, signed a municipal resolution to become a Climate Smart Community. The town worked with the CNY Regional Planning and Development Board to complete a greenhouse gas inventory in July 2015. The following narrative provides a brief summary of several additional initiatives to protect the community against storm events, excessive heat, and other climate influences.

The goal of the Cayuga County agricultural community is to provide viable and sustainable farms and agriculture-related businesses that support the local economy. A well-defined agricultural strategy is presented in a document called the *Cayuga County Agriculture and Farmland Protection Plan*. Energy conservation and environmental stewardship are components of county goals. According to the Plan,

“Our farms, businesses, institutions and governments strengthen our agriculture’s economic viability through improved farm management and technology; generation of on-farm energy; increased access to quality agricultural education and training for farmers, farmworkers and the general public; enhanced support of new and young farmers; outreach to increase the awareness of agriculture as vital to our communities; implementation of sound environmental stewardship practices and encouragement of agriculture-friendly land use policies.”

Researchers should continue water quality sampling on Owasco and Skaneateles lakes. Water quality is influenced by storm events, streambank erosion, and nutrient runoff from agricultural and other land uses within the watershed. Detailed sampling (called segment analysis) should continue to help identify non-point sources of pollution.

The Skaneateles Lake Association, Owasco Watershed Lake Association, Finger Lakes Land Trust, and Cayuga County Water Quality Management Agency are all working to preserve natural resources in the Central New York area, including reducing the impacts of flooding and other extreme weather events, encouraging agricultural best management practices (BMPs), and conserving natural areas.

A comprehensive approach to emergency management can save lives and minimize property damage while identifying activities, functions, and expertise necessary to deal with emergencies. The *Cayuga County Comprehensive Emergency Management Plan* was developed to ensure that the County can efficiently and effectively manage weather emergency and disaster situations. The Plan is a management tool based on four categories: preparedness, risk reduction (prevention and mitigation), response, and recovery. This approach helps Niles and other municipalities deal efficiently with emergencies or disasters. Public awareness of emergency situations and the ability of the public to appropriately react in a prompt and effective manner is extremely important. Additional information on how



View of Skaneateles Lake from Dewitt St.

Photo Credit: Amanda Mazzoni

to prepare for an emergency or disaster is available at the following websites:

- + Department of Homeland Security and Emergency Services, New York State Aware / Prepare Website
- + New York Alert, NY-Alert
- + FEMA Ready Alerts, <http://www.ready.gov/alerts>
- + Emergency Management literature, New York State Emergency Management Preparedness Brochure
- + National Weather Service storm awareness materials, National Weather Service Preparedness

According to climate researchers, continued emissions of greenhouse gases will cause further warming with changes anticipated in all components 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." Their findings are based on numerous independent scientific analyses and observations of the climate system, paleoclimate archives, theoretical studies of climate processes and simulations using climate models. The Summary for Policymakers of the IPCC Working Group I assessment report



Farmland, Rockefeller Rd., Niles
Photo Credit: Amanda Mazzoni

was approved in September 2013 by the member governments of the IPCC meeting in Stockholm, Sweden.

Unprecedented human intervention will be required in the coming decades to reduce the extent of climate change. This can be done by avoiding the potential consequences (referred to as **mitigation**), or making changes to accommodate those effects that are unavoidable (referred to as **adaptation**).

Much of the mitigation policy discussion to-date has centered on reducing greenhouse gas (GHG) emissions through fuel substitution, fuel efficiency for vehicles, and energy efficiency for buildings and industries.

Climate Adaptation vs. Mitigation

Mitigation Strategies

The mitigation recommendations that are found in this Climate Action Plan were based on the findings from the town's greenhouse gas inventory. CNY RPDB staff and the advisory committee worked throughout 2015 to analyze potential mitigation strategies for reducing the town's emissions for both municipal operations and the community-at-large. CNY RPDB utilized a software tool developed by ICLEI-Local Governments for Sustainability known as CAPPA (Climate and Air Pollution Planning Assistant) version 1.5 to calculate potential GHG reductions as well as cost savings for each mitigation strategy. CAPPA 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. CAPPA provides a starting point for two major tasks: determining an achievable emissions reduction target and selecting mitigation strategies to include in a local municipal operations and community emissions reduction plan, commonly called a climate action plan. CAPPA 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 CAPPA, a variety of mitigation strategies were identified and analyzed to determine their potential for achieving emissions reductions either at the municipal operations level or the community scale. The CNY RPDB also explored the potential impacts of an external large scale factor on the community's emissions profile: New Federal CAFE Standards that will increase the average



View looking northwest from Harter Rd.

Photo Credit: Amanda Mazzoni

fuel economy of vehicles sold in the U.S. through 2025. The results of these analyses are summarized in the following pages and in Figures 11-13.

Adaptation Strategies

The U.S. Environmental Protection Agency refers to the term "adaptation" as the adjustment or preparation of natural or human systems to a changing environment which moderates harm or exploits beneficial opportunities. Examples of community adaptation to extreme weather include development of early storm warning systems, air-conditioned cooling shelters, and policies that discourage people from building in flood prone areas. This type of initiative

will require comprehensive, community-wide planning that addresses all climate risk factors that may be associated with storm events, flooding, snowfall, and wind damage.

The scale of intervention required to reduce and adapt to the effects of climate change will require action at all levels of government and society. International accords to limit overall carbon emissions will involve national governments. Setting carbon emission targets and standards by industry or sector, or fuel efficiency standards for vehicles, falls within the traditional purview of federal and state governments. New York State, for example,

has set aggressive energy and climate 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, coinciding with an increase in the frequency and intensity of storm events are expected to impact transportation infrastructure, human health, agricultural practices, forest diversity, and migratory patterns of invasive species. Adapting to climate change will provide opportunities for Niles to improve the health and resilience of the community and will provide long-term protection of natural resources. Niles local government is leading by example by reviewing options to reduce energy usage in municipal facilities through alternative fuels for transportation fleets and renewable energy sources. Local officials and the CNY RPDB are meeting with community leaders to review building codes and standards, and to explore options to educate the public about adaptation measures and alternative energy choices.

Recommendations for climate mitigation and adaptation that are presented in the following pages are designed to help the Niles community prepare for current and anticipated changes in climate conditions and to assist decision-makers in identifying opportunities to improve community resilience. The suggested actions will protect people, homes, buildings and natural



View from Cream Hollow Rd. looking northeast

Photo Credit: Amanda Mazzoni

systems by reducing risks from environmental hazards such as extreme heat and storm events. These are actions that the community can take to reduce its emissions and promote energy efficiency through vehicle fuel efficiency, alternative transportation, land use planning, and other strategies. The Niles community is encouraged to update these recommendations each year as additional data becomes available.

TRANSPORTATION

According to the Town of Niles' GHG Inventory Report, transportation accounted for 85% of government emissions and 37% of community emissions in the town in

2010. This Climate Action Plan addresses one main transportation emissions reduction goal: increase options for low-carbon transportation.



Mitigation Strategy Goals for 2025

Increase options for Low-Carbon Transportation

Reduce VMT through development of community center: 64 MTCO₂e annual reductions.

This strategy assumes a 5% reduction in VMT.

Telecommuting: 63 MTCO₂e annual reductions.

This strategy assumes that 5% of people with primary jobs in Niles telecommute.

Utilizing efficient methods of transportation would reduce the amount of vehicle miles traveled (VMT) and the amount of gasoline and diesel use which would therefore reduce emissions, fuel costs, and reliance on foreign fossil fuels. Having paths for people to walk on and encouraging community members 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.

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.

Community members and groups currently travel to Auburn and other nearby towns and villages for group meetings and recreation opportunities. The town should consider implementing recreational

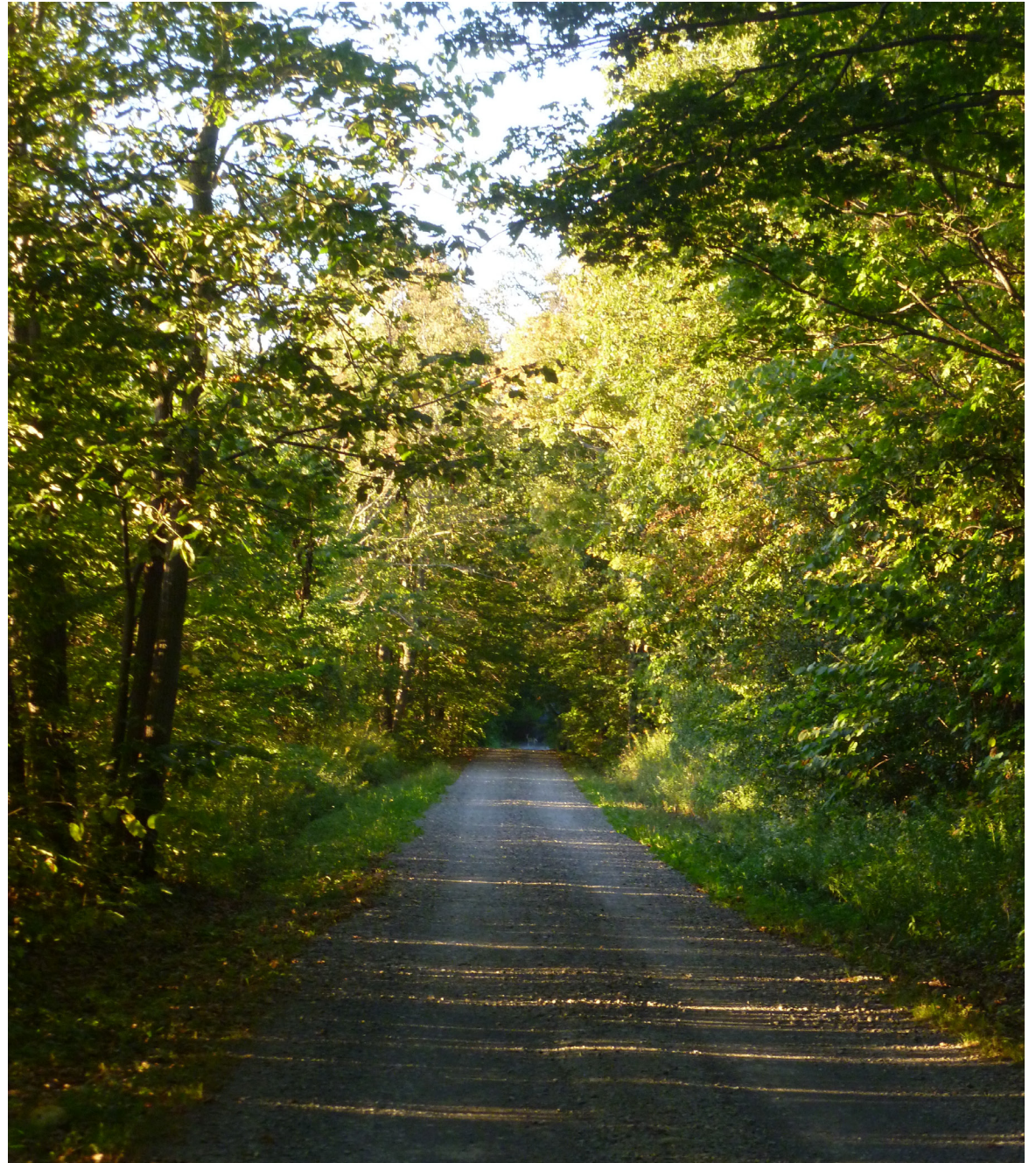
activities (i.e. playground, baseball diamond) and encouraging meetings to occur at the Town Hall facility to cut down on residents' vehicle miles traveled. Developing the Town Hall into a community center would reduce VMT and local air pollutants while bringing residents together and creating a sense of community. The town is already working to make the basement a more usable meeting space.

Municipal operations use a few diesel-powered vehicles, but the committee did not feel like VMT or energy use from these vehicles could be reduced. Trips are made only when necessary, and the larger, diesel-powered vehicles cannot be replaced at this time with smaller, alternative-fuel vehicles and still provide the same services. The town should consider investigating new options for reducing emissions from the vehicle fleet as technology advances. While the vehicles currently in use are all relatively new, the town should also be sure to replace any vehicles at the end of their useful life with more efficient vehicles.

Adaptation Strategies

Niles can reduce the amount of transportation-related GHG emissions by establishing local carpooling and ridesharing program or encouraging residents to buy smaller cars. The town could provide a cost benefit analysis to show financial savings and emission reduction comparisons.

Vehicle emissions could also be reduced by reducing the number of student drop-off and pick-up trips to and from school by providing education and incentive programs to encourage carpooling and bus ridership. The school can make sure to use smaller school buses when only a few students are being transported to and from school and events.



Case Rd., Niles

Photo Credit: Amanda Mazzoni

ENERGY EFFICIENCY

According to town's GHG Inventory Report, emissions from municipal buildings/facilities accounted for 15% of total municipal emissions and streetlights and traffic signals accounted for 0.1%, while residential energy use accounted for 36% of the community's emissions and commercial energy

use accounted for 20% of the community's total GHG emissions in the Town of Niles 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.

Niles Town Hall

Photo Credit: Amanda Mazzoni



Mitigation Strategy Goals for 2025

Increase energy efficiency and reduce emissions from buildings

Home weatherization: 129 MTCO₂e annual reductions.

This strategy assumes 10% of households weatherize their homes.

Promote loans/incentives for energy efficiency: 59 MTCO₂e annual reductions.

This strategy assumes 10% of households undergo a retrofit with the assistance of loans/incentives.

Energy efficiency and composting education for residents and agricultural businesses: 45 MTCO₂e annual reductions.

This strategy assumes 10% of households participate in an educational program, including farmers who use information learned to reduce energy use and emissions at their farms.

Lighting occupancy sensors: 5 MTCO₂e annual reductions.

This strategy assumes 10,000 square feet of commercial buildings install sensors.

Energy audits and retrofits of existing municipal facilities: 2 MTCO₂e annual reductions.

This strategy assumes a 10% energy savings at the Town Hall.

Convert municipal lighting to T-8: 0.2 MTCO₂e annual reductions.

This strategy assumes all 96 bulbs at the Town Hall are converted.

Energy efficiency education can be crucial in working to reduce emissions from buildings and facilities. Being familiar with actions that can be taken to increase building efficiency and reduce emissions, such as the ones listed above, is the first step in carrying out those actions. 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 farmers can be targeted in a similar educational program and/or energy challenge competition.

Buildings in Niles may also not be equipped with the most recent energy efficient technologies, causing the town 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 town'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.

The town has already replaced all T-12 bulbs with T-8 bulbs at the Town Hall facility that has saved the town money and reduced emissions.

Adaptation Strategies

Niles can modify local laws to incorporate measures for adaptation to climate change, such as evaluating the use of Property Assessed Clean Energy (PACE) financing as a way for commercial property owners to pay for energy upgrades, on-site renewable projects and water conservation measures, and establish/maintain strong building codes regarding energy use.



Residence, Niles

Photo Credit: Michael Gorr

National DSIRE Database

Incentives available for renewable energies are constantly changing. 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.

Mitigation Strategy Goals for 2025

Increase use of renewable energy

Residential solar: 70 MTCO₂e annual reductions.

This strategy assumes 280 kW of solar PV is installed.

Geothermal: 45 MTCO₂e annual reductions.

This strategy assumes 20 new homes built install geothermal.

Wind energy: 35 MTCO₂e annual reductions.

This strategy assumes 100 kW of wind energy is installed.

Municipal solar: 11 MTCO₂e annual reductions.

This strategy assumes 43 kW of solar PV is installed.

Commercial solar: 9 MTCO₂e annual reductions.

This strategy assumes 35 kW of solar PV is installed.

Geothermal at DPW garage

Micro-hydraulic power

“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)

By installing renewable energies like solar, Niles 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 and farmers may 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 offered in Madison County in 2012-2013, the Solarize Syracuse program offered in Syracuse in 2014. These programs are an effective way of combining public and private funds for renewable energy. The CNY RPDB and municipalities throughout Central New York are currently offering a bulk-purchasing program for residents and businesses, known as **Solarize CNY**.

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 renewable energy tax credits for residential and commercial solar PV, wind, and geothermal installations. Educational and technical assistance programs can also promote renewable energies. Local governments can offer information clearinghouses and connect consumers with renewable energy installers.

NYSERDA, New York Power Authority (NYPA) and City University of New York (CUNY) developed a NYS Unified Solar Permit that helps to reduce costs for solar projects by streamlining municipal permitting processes and supports the growth of clean energy jobs across the state. The unified solar permit is part of Governor Cuomo’s NY-Sun initiative to quadruple in 2013 the amount of solar capacity in New York that was added during 2011.

Adoption of a standardized residential/small business solar permit is a key element to help New York municipalities remove barriers to local economic development in the growing solar industry. The standardized permit cuts costs by creating a uniform permitting process in municipalities across the state. Installers in New York State have had to work with different permits and permitting processes in each of the State’s 1,550 municipalities, which increased the complexity of permitting and have caused project delays and added costs. It is recommended that the Town of Niles adopt the unified solar permit to reduce soft costs associated with solar installations.

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

The CNY RPDB is also currently offering a bulk solar purchasing program for municipalities that the Town of Niles has submitted information to participate in if the conditions are right. This program will bundle solar installations from multiple local municipalities into a single Request For Proposals (RFP), allowing solar installers to offer lower installation prices than if each municipality were to pursue options individually. The CNY RPDB will choose the solar installer and complete the up-front leg-work for the municipalities to help save municipal time and money.

Geothermal energy is also a renewable energy possibility in the town. While the DPW garage building was built only a few years ago, it currently uses propane for heating. The building was built with radiant heat plumbing with the idea that it might eventually be converted to a geothermal heating system. The town should consider a conversion to geothermal at the end of the useful life of the current boiler.

Microhydraulic power is another possibility in the town. Industry professionals would have to measure the head and flow of water bodies in Niles, such as Dutch Hollow Brook or Bear Swamp Creek, before determining whether this type of system would work in the town. If applicable, the town could then possibly create a renewable energy cooperative or municipal power authority and use the renewable power to benefit town residents by providing cheaper, renewable energy.



Windmill, Duryea Street, Niles

Photo Credit: Amanda Mazzoni

WASTE

In 2010, 6% of the community's GHG emissions came from waste. Waste from the town is disposed of at the Auburn Landfill. As

the waste decomposes, it releases greenhouse gases that can be reduced by reducing the waste stream through composting.



Mitigation Strategy Goals for 2025

Decrease the waste stream

Kitchen composting: 0.3 MTCO₂e annual reductions.

This strategy assumes that food waste is reduced by 25% and is included in the educational strategy noted previously.

Waste generated in the Town of Niles is sent to the Auburn Landfill for disposal. On town clean-up days, the Town of Niles collects and disposes of old electronics for free to assist with the disposal of electronic waste. The decomposition of waste sent to landfill creates GHG emissions and other pollutants that can be reduced by decreasing the waste stream through composting.

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. The Town of Niles could implement a similar small-scale community composting site such as this or encourage community members to compost at home.

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.



Mitigation Strategy Goals for 2025

Plant trees for carbon storage and energy savings

Tree planting: 19 MTCO₂e annual reductions.

This strategy assumes 20% of households plant 1 tree (86 trees).

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 town is interested in pursuing the National Grid tree program, known as "10,000 Trees...and

Growing," for planting trees throughout the town. This program provides a \$50 contribution per tree planted, encouraging planting of low-growing trees under overhead electric primary or secondary distribution lines to reduce line clearance tree pruning and minimize storm related tree disruptions and damages. Planting trees would benefit the town by reducing emissions, as trees sequester carbon in the atmosphere, as well as providing an aesthetically pleasing landscape in the town.

Adaptation Strategies

One action Niles can take to adapt to a changing environment is to encourage landowners to plant buffer strips along lake and stream shorelines. A buffer strip is an area of land with vegetation that helps to control pollutant (nutrients and sediment) loading to a waterbody. Buffer strips are especially important in agricultural communities such as Niles because they slow water runoff, trap sediment, and promote soil infiltration. Buffer strips can trap fertilizers, pesticides, pathogens, and heavy metals before they enter lake or stream. They also help stabilize streamside soil and reduce the water tem-

perature. More information about buffer strips can be obtained from Cayuga County Soil and Water Conservation District and Cornell Cooperative Extension.

Farmers in Niles should continue to implement management practices to protect surface and ground water quality. Agricultural Best Management Practices should be installed to reduce nutrient and sediment loading from agriculturally-rich watersheds. The County Soil and Water Conservation District, Cornell Cooperative Extension and the Natural Resources Conservation Service are available to provide assistance to the Niles farming community in developing and implementing best management practices.

Niles can protect and expand trees and woodland ecosystems to increase climate change mitigation potential. Planting living snow fences (evergreens planted at distances of at least 100 feet upwind of problem stretches of a road) can reduce snow drifts and travel hazards for drivers. Road segments should be prioritized and landowners contacted for participation.

The town can also plant and maintain trees and other vegetative buffers along Dutch Hollow Brook in order to reduce the flow of contaminants (primarily sediments and nutrients) from entering the lakes, to reduce shoreline erosion, and to maintain cooler water temperatures through shading. Land owners in Niles are also encouraged to remove snags and ice jams along Dutch Hollow Brook. Snags can be caused by an accumulation of plant and woody debris that blocks a flowing stream. Removing the snags can restore flow capacity and reduce the threat of flooding.

Niles can encourage the US Forest Service and Cayuga County Cooperative Extension to monitor changes in tree composition and health and plant low pollen tree species in the town in order to minimize human health issues. The town can encourage National Grid to manage tree density to reduce overcrowding and susceptibility to stress and disease. The town should remove tree and vegetative growth along power lines and remove dead or dying trees and replace them with heat and invasive tolerant species.

Finally, Niles should ensure the resilience of natural systems and resources through open space conservation and smart growth strategies. The town can protect open space through conservation land grants, landowner incentives, regulation, fee acquisition, and the purchase of conservation easements, and promote smart growth principals. The Finger Lakes Land Trust (FLLT) is currently working to preserve open space and natural areas in the Finger Lakes region of New York. FLLT has created over 30 public nature preserves and helped landowners conserve their properties, saving over 17,000 acres of land from development.



Owasco Lake from Rockefeller Road

Photo Credit: Amanda Mazzoni

ADDITIONAL ADAPTATION STRATEGIES

These strategies are additional actions Niles can take to become more resilient in the face of a changing climate. Four

key strategy areas are explained here, including infrastructure, public health, education, and emergency operations.



Infrastructure

One of Niles' adaptation goals is to protect and upgrade local infrastructure to achieve cost savings, as well as stormwater and flood control. There are various actions Niles can take to address this goal, such as assessing the condition of local infrastructure and documenting climate vulnerabilities in the areas of energy, water, transportation, and telecommunications. Niles can also reduce the threat of flooding by working with the Cayuga County Soil and Water Conservation District to: improve the capacity of stormwater collection systems and to maximize soil infiltration and groundwater recharge.

Niles can continue to inventory and prioritize road culvert and shoulder ditch repairs, and can encourage install green infrastructure measures (i.e. rain gardens, porous pavement, and rain barrels), and encourage downspout disconnection, bioinfiltration, and rainwater harvesting in residential and farm communities to reduce stormwater runoff.

The town can also re-evaluate building codes to discourage/prevent new development in flood-prone and high hazard areas.

Public Health

Niles should also establish ways to reduce or eliminate the negative effects of climate change on public health. Adaptation strategies Niles can pursue in this area include: working with the Cayuga County Health Department to document trends in asthma, Lyme disease, and heat-related illnesses that may be influenced by a warming climate; improving 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; and notifying the community regarding heat events, air quality, and other climate related health risks.

Education

Education is an important part of climate adaptation as well. Niles can implement a comprehensive public outreach and stakeholder engagement campaign to build awareness of climate change that includes some of the suggestions noted below.

The town can train local building officials, planning boards, and elected official on flood hazards, risk

reduction strategies, implementation of floodplain development regulations, post-flood reconstruction, and how to address flood hazards during planning board reviews. The town can also train local building officials and the construction industry on flood proofing techniques for retrofitting existing flood prone development, encourage homeowners to sign up for NYSERDA energy audits, and encourage the local school districts to develop and implement climate education programs.

The town can also provide emergency preparedness guidelines and topographic maps and information on the town websites, including recommendations for people living and working in flood prone areas, 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. The town can also distribute brochures, fact sheets, and posters that show ways in which farmers and residents can prepare for and adapt to climate change and incorporate climate adaptation principals on town and agency websites in order to increase the awareness of severe weather risks,

storm preparedness, and safety practices for homes and farms.

The town can also sponsor workshops to teach residential and farmers how to calculate their Energy Use Intensity (EUI), and sponsor workshops to teach homeowners, local planning boards, elected officials, code enforcement officers, county agencies, farmers, citizen associations and real estate agents about storm preparedness, watershed land use influences, and floodplain management.

Finally, the town can educate the public and elected officials on the value of prevention and early detection of invasive species by working with the Cayuga County Soil and Water Conservation Service, the Cayuga County Water Quality Management Agency, the Skaneateles Lake Association, the Owasco Watershed Lake Association, the Owasco Lake Watershed Management Council, and the Natural Resource Conservation Service to monitor the introduction and spread of invasive species. The town can also participate in Cornell Cooperative Extension's Emerald Ash Borer control strategy and in the New York State Invasive Species Task Force.

Emergency Operations

Ensuring that emergency operations are current and maintaining open lines of communications between local agencies is also a significant part of successfully adapting to climate change. The town could update the community's inventory of emergency operations and public notification lists and collaborate with national, state, and local agencies to facilitate data collection, sharing, and synthesis of flood and storm event preparedness information. Niles can also reconfirm channels of communication with local police and fire departments, the local power utility, and media outlets.

The town can 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 the town for a more complete coverage during emergencies and re-establish local protocols for sharing equipment during emergencies.

Niles can update land hazard maps and inventories of infrastructure and at-risk communities and work with Cayuga County officials to update the County's Hazard Mitigation Plan every five years and provide public access to the Plan by adding it to municipal and agency websites. The town can also provide for the routine collection of temperature, precipitation, storm frequency, endangered and invasive species, and public health information in order to evaluate

the long-term impacts of climate change on local conditions.

Finally, Niles can establish a road watch program to alert the public of flooded areas and tree damage during storm events. Niles can update local maps that display low elevation areas in the town that may be susceptible to flooding and display this information on the town website.

All of these additional adaptation strategies will allow Niles to be a resilient and sustainable community in the long-term, despite the effects of climate change.



Horse pasture, Niles

Photo Credit: Amanda Mazzoni

Total possible reductions = 687 MTCO₂e

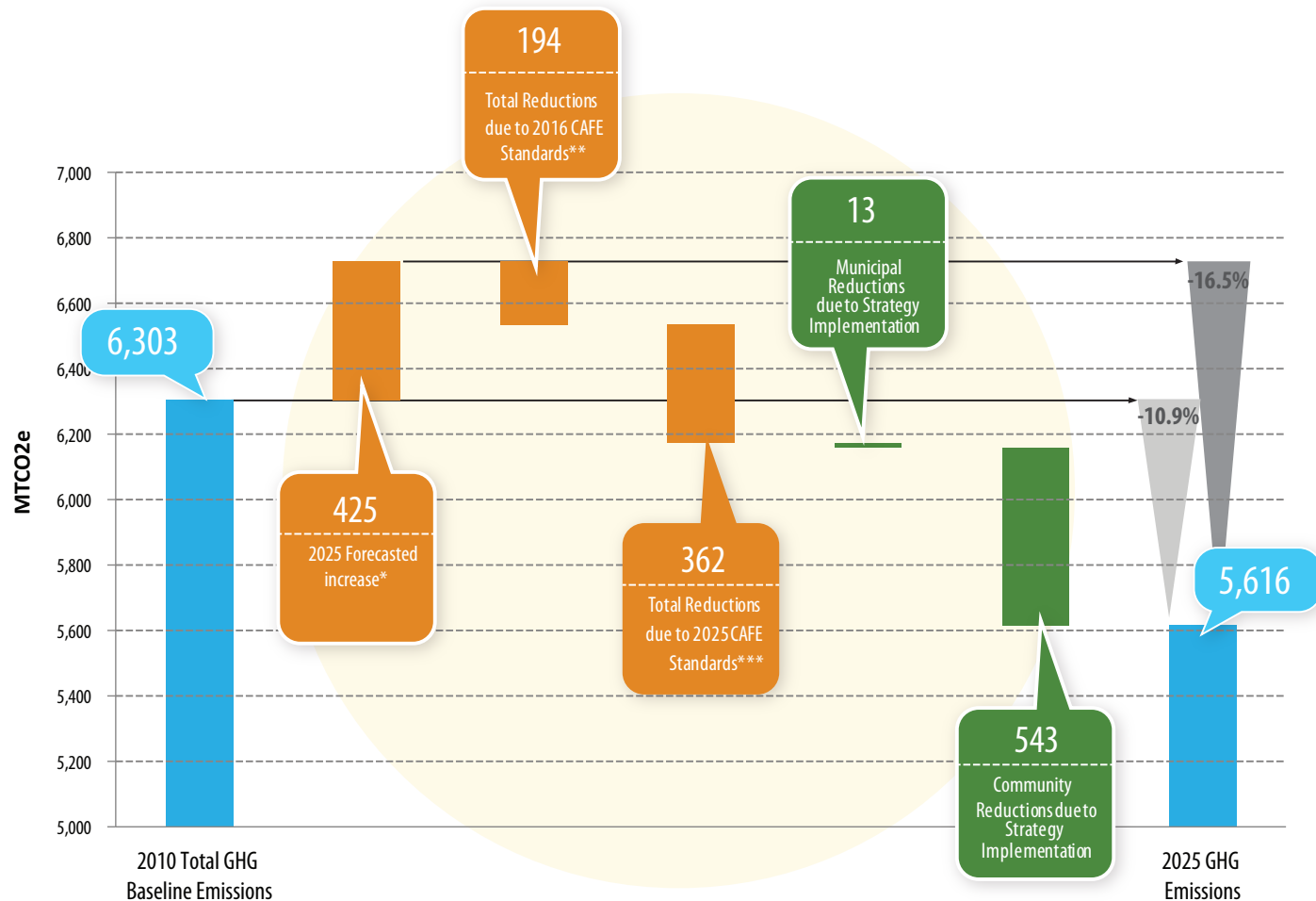


FIGURE 11- TOTAL POSSIBLE REDUCTIONS BY 2025

Figure 11 summarizes the results of the Town of Niles' GHG inventory, a 2025 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 town separated into community-wide measures as well as municipal operations measures. Reductions due to Niles' actions are shown in green while changes in emissions that will occur regardless of this Plan are shown in orange. It is projected that Niles' total GHG emissions in 2025 could be reduced by 10.9% from the 2010 baseline if the town implements all of the recommended community-wide and municipal operations measures. There would be a 16.5% reduction from 2025 forecasted emissions as well.

*2014 GHG inventory reported a forecasted an increase of 425 MTCO₂e from the 2010 baseline to 2025 due to increases in emissions from transportation, commercial energy use, and waste.
 **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 from mitigation strategies = 13 MTCO₂e

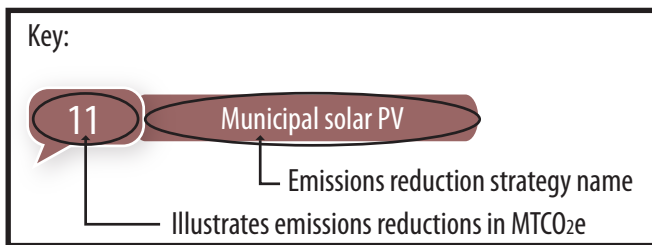
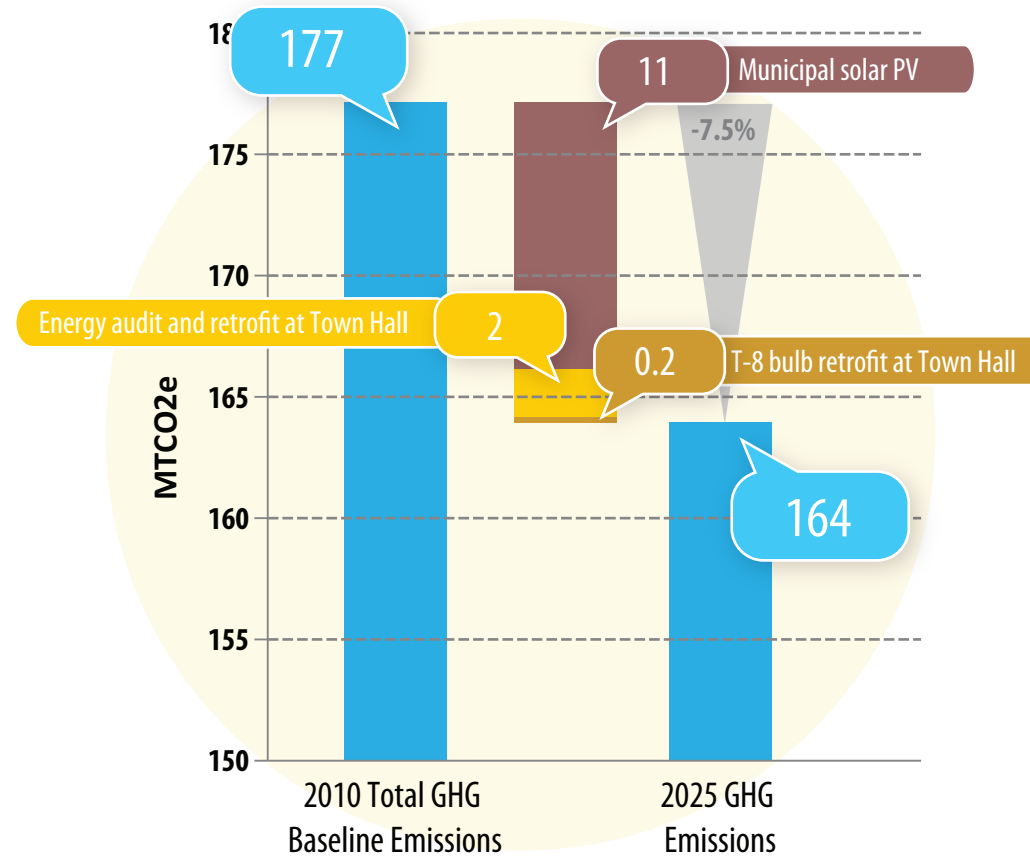


FIGURE 12- POTENTIAL MUNICIPAL REDUCTIONS FROM STRATEGY IMPLEMENTATION

Niles' 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 7.5% reduction in municipal emissions if all suggested strategies are implemented.

Total possible community reductions from mitigation strategies = 543 MTCO₂e

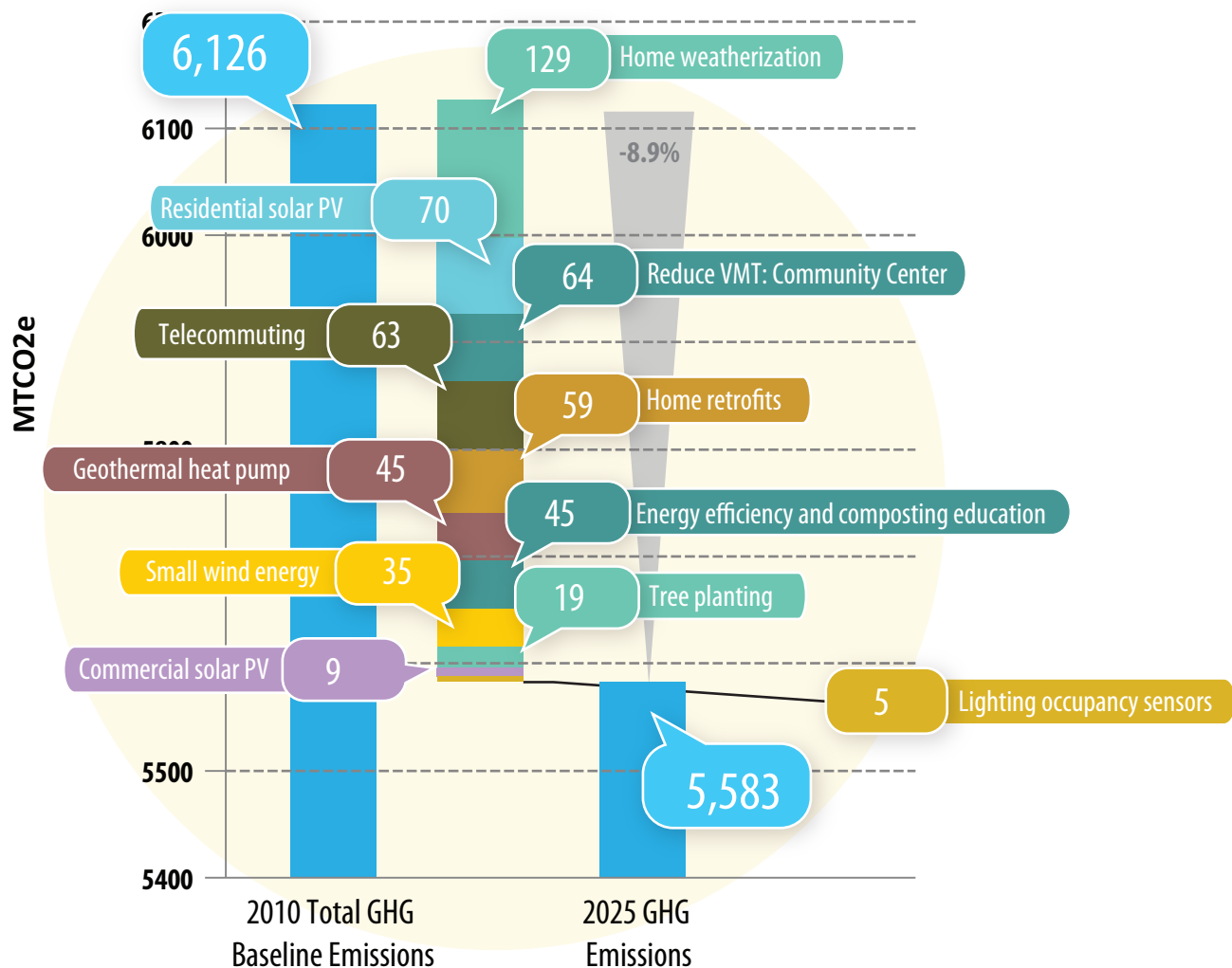


FIGURE 13- POTENTIAL COMMUNITY REDUCTIONS FROM STRATEGY IMPLEMENTATION

Niles’ 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 8.9% reduction in community emissions if all suggested community reduction strategies are implemented.

Concluding Remarks

The Niles Greenhouse Gas Inventory and Climate Action Plan provided an opportunity for the town to develop energy efficiency and emission reductions strategies. The planning effort encouraged local participation and brought together representatives from local government, citizens, and other key stakeholders to evaluate regional strengths and goals. The process provided a chance to gather information on sustainable community and economic development projects, to give community leaders support to advance sustainable projects, and to identify goals for new sustainable programs and initiatives.

Participants in the planning process worked for about 6 months to identify goals and strategies to improve the environment and address climate change through energy management, infrastructure, land use, and transportation. As a blueprint for the future, the Climate Action Plan efficiently summarizes an action-oriented guide containing strategies to ensure that Niles meets the needs of current and future generations. In addition, the document will now provide State and local officials with the information needed for long-term commitments and investments in economic, social, and environmental resilience.

Our thanks go to the local leaders and community members for a job well-done. Town officials are encouraged to now focus on implementation of these recommendations, to review the progress made on an annual basis, and to re-evaluate emission reduction goals. In this way, Niles will continue to protect natural resources, reduce emissions, become more resilient to climate change, and serve as a prominent showcase for energy efficiency and environmental stewardship.



View of Skaneateles Lake

Photo Credit: Michael Gorr

APPENDIX A: 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.

APPENDIX B: STRATEGY IMPLEMENTATION CHART

Issue	Strategy	Ballpark Rankings (see key below)			Implementation Methods				Additional Benefits			
		Costs (1-5)	GHG Reductions (1-5)	Payback (1-5)	Policy	Program	Capital Projects	Education/Outreach	Green Job creation	Quality of Life	Water Conservation	Other
Transportation: Community	1. Reduce VMT through development of community center	*	2	*			x	x		x		x
	2. Increase telecommuting	1	2	1	x	x		x		x		x
Energy/Efficiency: Municipal	1. Solar PV	1	5	3		x	x	x	x	x		x
	2. Energy audits and retrofits to existing facilities	1	2	5			x		x	x	x	x
	3. Lighting upgrades from T-12 to T-8 at Town Hall	1	1	2			x			x		x
	4. Geothermal	*	*	*			x	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

Issue	Strategy	Ballpark Rankings (see key below)			Implementation Methods				Additional Benefits			
		Costs (1-5)	GHG Reductions (1-5)	Payback (1-5)	Policy	Program	Capital Projects	Education/Outreach	Green Job creation	Quality of Life	Water Conservation	Other
Energy/Efficiency: Residential	1. Home weatherization	1	2	2		x	x	x	x	x		x
	2. Residential solar PV	2	2	3		x	x	x	x	x		x
	3. Promote loans for energy efficiency improvements	2	1	3			x	x	x	x	x	x
	4. Geothermal heat pump	1	1	4			x	x		x		x
	5. Energy efficiency and composting education	1	1	1		x		x		x	x	x
	6. Small wind generation	1	1	3			x		x	x		x
	7. Micro-hydraulic power	*	*	*			x		x	x		x
Energy/Efficiency: Commercial	1. Commercial solar PV	1	1	1		x	x	x	x	x		x
	2. Lighting occupancy sensors	1	1	1			x			x		x
Waste	1. Kitchen composting	1	1	*				x				x
Natural Resources	1. Tree planting	1	1	2		x	x	x		x		x

*Values are uncertain at present



Climate Smart
Communities



TOWN OF NILES
5923 NEW HOPE ROAD, MORAVIA, NY 13118