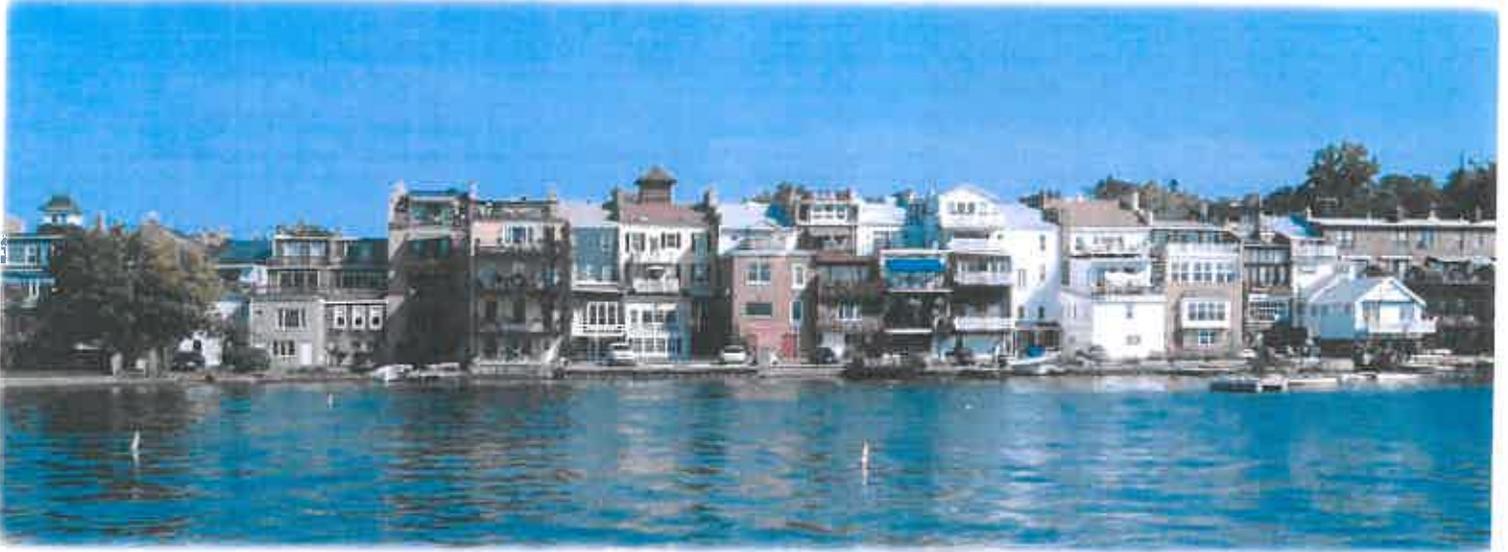


Village of Skaneateles Climate Action Plan

DRAFT JUNE 9, 2014





Guppy Falls, Skaneateles

A MESSAGE FROM THE MAYOR AND MUNICIPAL BOARD

Why a climate action plan?

As Stewards, we want to leave this world a better place for those that follow us.

Climate change is real and is happening at an increasing rate.

It is causing major impacts including: Greater variability in air and water temperatures, the arrival of invasive species such as the Ash Borer, more drought conditions and increases in rainfall and snow intensity that cause greater flooding and water pollution.

It is adversely affecting the world we all live in, the public health and our immediate environment.

The Climate Action Plan provides pathways by which we, both as a community and as individuals, can reduce the impacts on climate change.

Peter E. Moffa, P.E., BCCE

Chairman, Village of Skaneateles Municipal Board

Martin L. Hubbard, Mayor

Village of Skaneateles

ACKNOWLEDGEMENTS

The Village of Skaneateles wishes to thank the following community members, organizations, and staff for their contributions to developing this Climate Action Plan.

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Climate Action Plan Advisory Committee Meeting, Skaneateles

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

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

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

The Village of Skaneateles Climate Action Plan is not intended to provide precise information about the potential emission reductions that can be achieved by specific recommendations, and cannot be used as a substitute for thorough project or program planning. Instead, this document uses the best available information at this time to provide estimates of emission reductions that are meant to help public officials, community leaders, and residents better decide which actions may be worthwhile for the community to pursue in the coming years. As such, this document is not meant to be fixed or prescriptive, but rather fluid and flexible. Calculations and figures will need to be updated periodically as technology and cost figures change.

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ACRONYMS EXPLAINED

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

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

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

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

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

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

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

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

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

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

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

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

FRAMEWORK FOR LOCAL CLIMATE PROTECTION

CLIMATE SHOWCASE COMMUNITIES PROGRAM

The US Environmental Protection Agency (EPA)'s Climate Showcase Communities Program is designed to assist local governments in creating community-based greenhouse gas reduction projects related to energy production, residential and commercial energy efficiency, waste management, transportation, and land use. The goal of the program is to pilot projects that are replicable and cost-effective so that communities can reduce greenhouse gas emissions while improving environmental, economic, and social conditions. There are currently 50 communities throughout the US that are participating as part of the Climate Showcase Communities Program. CNY RPDB was selected as an awardee of the program, receiving \$497,793 in federal funding for their Climate Change Innovation Program (C2IP).

CENTRAL NEW YORK CLIMATE CHANGE INNOVATION PROGRAM

Through the Climate Change Innovation Program (C2IP), CNY RPDB is working with 7 municipalities to conduct GHG emission inventories, develop Climate Action Plans, host community engagement events, and implement clean energy demonstration projects. Each municipality was provided \$30,000 in order to implement demonstration projects (Skaneateles' Village Hall Retrofit) or to complete feasibility studies for clean energy projects. The C2IP began in February 2010 and was completed in December 2013 with the creation of DRAFT Climate Action Plans.

In order to participate in the program, Skaneateles agreed to:

- + Follow the 5 Milestone Process established by the Cities for Climate Protection campaign administered by ICLEI-Local Governments for Sustainability, which includes completion of a GHG inventory and completion of a Climate Action Plan
- + Adopt the Climate Smart Communities Pledge, which is a voluntary program administered by the NYS Department of Environmental Conservation (DEC) whereby communities pledge to reduce GHG emissions and subsequently receive notification of state and federal assistance to help them adopt technologies and programs by which to do so
- + Become a Pledge Driver for the US EPA's "Change the World, Start with Energy Star" campaign, which challenges people to make energy-efficient choices in their households and communities



Climate Showcase Communities
Local Climate and Energy Program





Ontario Christmas
Skaneateles



First Presbyterian Church,
Skaneateles



Boats docked at Skaneateles
Lake

Introduction

What is Sustainability?

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

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

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

Developing the Plan

Skaneateles' Climate Action Plan was developed by an advisory committee made up of Skaneateles community members Kathryn Carlson, Sue Dove, Dorothea Hughes, Bob Lotkowitz, Jim Lanning, Peter Moffa, Mary Sennett, and Carol Stokes-

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

Cawley. The committee was provided technical assistance by the CNY RPDB, who hired interns specifically to analyze energy and emissions reduction strategies for the village utilizing data from the GHG inventory report of the 2010 baseline year. CNY RPDB provided information and suggestions to the advisory committee as to which energy efficiency strategies would be most successful in the village, 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 monetary savings, payback periods, assumptions and references, refer to Appendix A: Action Strategy Summary Document.**

Implementing the Plan

In order to implement the strategies in this plan and achieve Skaneateles' sustainability goals, the plan should be implemented by the Village with the help of relevant

Thinking Sustainably: New College at Oxford Example

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

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

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

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

Projected Climate Impacts in the Northeast

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.

Source: US EPA

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

groups and stakeholders, such as Sustainable Skaneateles, the Village Chamber, and others.

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

What is climate change?

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

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

Scientists have determined this relationship by studying Antarctic ice core samples that reveal the atmospheric carbon dioxide from 400,000 years ago to present day. Right now there is more carbon dioxide in the atmosphere than at any time in history, as mea-

sured by these samples,² and further atmospheric testing shows that we have extended to 402ppm atmospheric CO₂,³ which is well above any other measure in time.⁴ Scientists expect that this will lead to a progressive warming of the planet in most areas.

This document does not provide an exhaustive summary of actual or anticipated effects of climate change in Central New York. Interested readers can refer to **Vision CNY-Central New York Regional Sustainability Plan** for more detailed information.

The Environmental Setting

The Village of Skaneateles has a temperate climate with an annual precipitation rate of approximately 47" per year. Precipitation rates are normally sufficient in the region to maintain municipal and industrial water supplies, transportation, and recreation resources, and provide enough moisture dur-

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

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

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



ing the growing season for lawns, gardens, shrubs, forests, and woodlands. Snowfall is moderately heavy with an annual average of approximately 100 inches.

The Village of Skaneateles is located at the northern end of Skaneateles Lake. The lake serves as a public and private drinking water supply for over 200,000 residents in the City of Syracuse and neighboring communities including the Villages of Skaneateles, Elbridge, Jordan and other municipalities in Onondaga County. The City of Syracuse draws water from the lake at an average daily flow of 42 million gallons per day. Water taken from the lake is filtered by coarse screens.

Based on high water quality, the NYS Department of Health has granted a waiver to both the City of Syracuse and the Village of Skaneateles which allows them to utilize the lake as a drinking water supply without a requirement to build a filtration plant. The only water treatment necessary is chlorination and fluoridation.

To protect this important resource, property located in the Skaneateles Lake watershed is subject to special stormwater regulations. The Skaneateles Lake Watershed Rules and Regulations, developed to protect the lake as a drinking water supply, include regulations to control erosion and sediment pollution. All construction activities within the watershed that expose 5,000 square feet or more of land must submit an erosion and sediment plan and a written description of their project to the City of Syracuse Water Department. The Skaneateles Lake Watershed Land Protection Program (SLWLPP) is another local initiative that focuses on preserving land in the watershed.

Potential Impacts of Climate Change within the Village of Skaneateles

Climate change is expected to influence Skaneateles by increasing air temperatures and the frequency of extreme weather events. The increased occurrence of storm events will contribute to flooding, stormwater runoff, and sediment loading to Skaneateles Lake and Creek. The Village committed to climate awareness and environmental protection by becoming a Climate Smart Community and has worked with the CNYRPDB for the past few years on projects associated with the Climate Change Innovation Program. The Skaneateles Lake Watershed Agricultural program (SLWAP), implemented in 1994, is also designed to help address the impacts of storm events by reducing runoff



Pier on Skaneateles Lake

and pollution loading from agricultural operations.

TEMPERATURE AND EXTREME WEATHER EVENTS

Storm intensity is influenced by air temperatures. As air temperature rises, the moisture in the atmosphere increases which contributes to a greater intensity and frequency of precipitation events. Warming air temperatures, as seen throughout New York State, are caused by emissions of heat-trapping gases in the atmosphere including pollution from fossil fuels. Warm temperatures in the atmosphere also cause higher levels of evaporation which intensifies the water cycle. As a result, storm events, seen around the globe as well as in Skaneateles, are more intense and result in higher levels of rainfall.

New York State experienced a 64% increase in extreme precipitation frequency between 1948 and 2011. The number of severe



Gazebo, Cuff Park, Skaneateles

storms is also expected to increase, with 100-year storms likely to occur every 80 years by the end of the century. According to meteorologists, the total annual amount of precipitation has been changing, as well as the distribution and intensity. Tropical Storm Lee resulted in significant damage for Central New York. In May 2012, Governor Cuomo formally requested that President Obama declare a major federal disaster for 26 counties in New York State, including Onondaga County. FEMA estimated more than \$38 million in infrastructure repair and debris removal.

Increased air temperatures will eventually increase the water temperature in Skaneateles Lake, although, due to the depth of the lake, this impact will not be as significant as with nearby shallower lakes such as Oneida.

PRECIPITATION RATES

In addition to experiencing an increase in heavy precipitation events, more winter precipitation in Central New York is falling as rain, resulting in a reduced snowpack. An earlier spring snowmelt is contributing to earlier peak tributary flows. Projections for future precipitation rates are less certain, however, than projections for temperature. Based on their 2011 report *Responding to Climate Change in New York State*, or ClimAID, NYSERDA's analyses for New York State suggest that precipitation levels may increase, especially during the winter months, but the nature of this change is uncertain. According to climate models, changes in precipitation patterns may continue to produce heavier events with hotter and drier periods in between. By the end of this century, the length of the winter snow season in portions of New York State is predicted to be reduced by half.

Because of the increased water temperature and reduced duration of ice cover on Lake Ontario, Skaneateles and other areas to the east and south of the lake will continue to experience heavier and more frequent lake-effect snow. Rising temperatures will also cause annual spring runoff due to snowmelt to occur earlier in the year. This is expected to decrease runoff water later in the year, causing stress for ecosystems that depend on the availability of water during the summer.



Sailboats on Skaneateles Lake

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 waterbodies and decrease the efficiency of wastewater treatment plants.

The greatest potential for flooding in Central New York typically occurs in the early spring during periods of heavy precipitation, warming temperatures, and rapid snowmelt. Low elevation areas (including FEMA flood zones and wetlands) in the Village are located along the eastern lake shoreline, along Skaneateles Creek, and in a localized area along the northern border of the Village.

FIGURE 1: VILLAGE OF SKANEATELES LAND USE

The threat of flooding in this area is minimal because the City of Syracuse Water Department regulates Lake water level at the outlet.

RECREATION

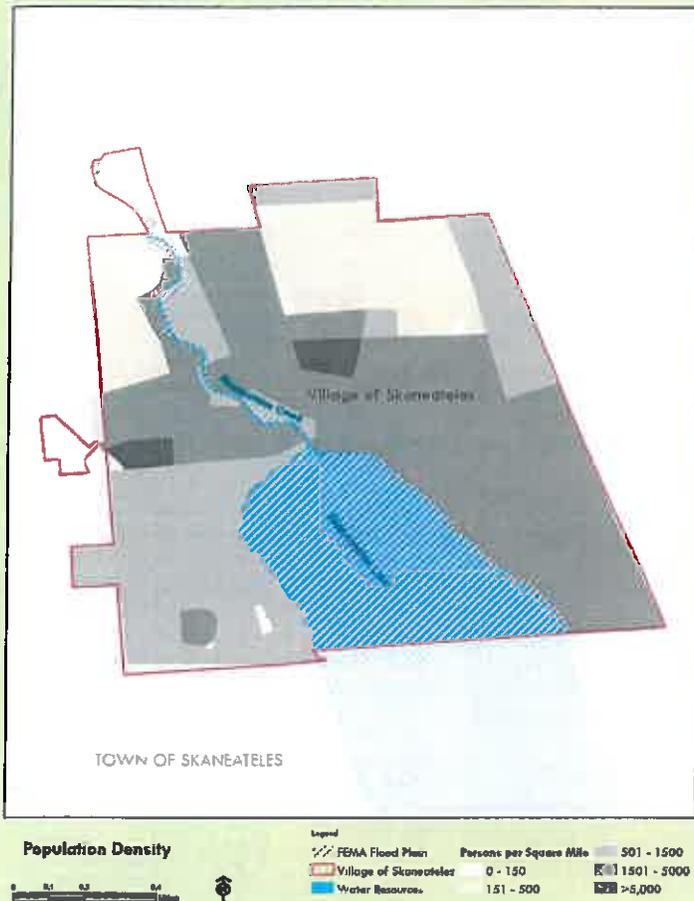
Climate change has the potential to negatively impact the area's outdoor recreation, in addition to the income generated for the local economy by recreational activities. For example, local ski areas in Central New York will be impacted by the shorter length of the winter season and the increasing variability of temperatures. If the duration and quality of the ski season declines, local retail stores and other businesses related to skiing will be negatively affected. Ski areas may also have to invest more heavily in snow production equipment as well as the energy used to run the equipment. This could increase operational costs and lift ticket prices for skiers.

New York State has an 8,000 mile snowmobiling trail system that also contributes to the local economy. Snowmobiling relies on natural snowfall which is forecasted to decrease with climate change. This has the potential to reduce business generated from retail stores and associated snowmobiling industries.

During the summer, water-based recreation includes swimming, boating, and fishing in Skaneateles Lake and in nearby tributaries. Higher air temperatures and a shorter duration of winter ice cover may increase lake water temperatures, which could cause a shift in cold water fisheries populations. Ac-



FIGURE 2: VILLAGE OF SKANEATELES POPULATION DENSITY



According to researchers at Cornell University, warming water temperatures may already be contributing to fish species modifications in nearby Oneida Lake which has a much shallower lake basin. Conditions may be causing an increased production of largemouth and smallmouth bass, gizzard shad, and other species near the northern extent of their range. Additionally, at the southern edge of their range, Burbot may be in decline. Brook trout, commonly found in New York State tributaries, are at risk due to changes in habitat resulting from climate change and the presence of invasive species.

In addition, warmer air and water temperatures and decreasing ice coverage may provide a longer growing season for nuisance aquatic plants and algae which could result in recreational use impairment.

HUMAN HEALTH

Continued changes in the local climate are affecting human health in Central New York. Direct health impacts of warming temperatures that have been documented throughout the country include increased illnesses and deaths from heat events, injuries and deaths from extreme weather events, and respiratory illnesses due to changes in air quality.

Indirect health impacts of climate change include illnesses and deaths that result from climate related changes in ecosystems and infectious agents. Food, water, and animal-borne diseases are governed by environmental conditions, and projections of warmer winters, hotter summers, and unpredictable precipitation patterns can cause increases in certain types of diseases. For example, projected 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. The more local climate conditions change, the greater is the potential for negative effects on society and ecosystems. The changes currently occurring in our climate require us to learn new information in order to adjust to unfamiliar health and safety pressures in our environment.

INVASIVE SPECIES

While insects and diseases are a natural part of the aquatic and terrestrial ecosystems, climate change is shifting the pest species and aggressiveness of some invasive as well as native species. Some warm weather species that previously could not survive the cold 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 followed by a rapid response of new infestations of invasive species is the most effective way that the Skaneateles community can help. Skaneateles Lake faces an ongoing threat of aquatic invasives such as the Round goby, Hydrilla, and Asian clam. The Hemlock Woolly Adelgid, Asian Longhorn Beetle and Emerald Ash Borer, are invasive tree pests that are currently threatening 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 along coldwater streams, shade is no longer provided, and stream water temperatures increase beyond what is ideal for trout. The negative economic impact of the EAB has been estimated in the billions in additional costs to state and local governments as well as landowners.

Warmer climates will also change species growth over the long-term and species diversity is expected to decline. The sugar maple, beech, birch and ash are projected to experience declining populations and be replaced by oak and hickory.



Colgateville Falls, Skaneateles

What can be done in Skaneateles?

The Village of Skaneateles has chosen to adopt the NYS Department of Environmental Conservation (DEC)'s Climate Smart Communities Pledge, and municipal operations have already begun reducing their energy use and GHG emissions.

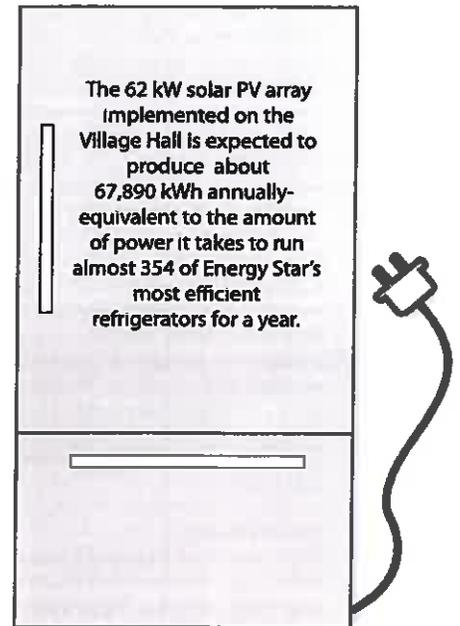
In 2010, the Central New York Regional Planning and Development Board (CNY RPDB) selected the Village of Skaneateles as a participant in the Central New York Climate Change Innovation Program (C2IP) funded through a grant from the US Environmental Protection Agency (EPA)'s Climate Showcase Communities Grant Program.

The CNY RPDB provided the Village with \$30,000 of grant funding towards the development of a clean energy demonstration project. With additional technical assistance from the CNY RPDB, Skaneateles was able to perform a retrofit of an abandoned fire hall facility into a new net-zero energy Village Hall facility, including advanced envelope and air sealing, upgrading the HVAC equipment, installing a geothermal heat pump system, installing LED lighting, and installing a 62 kW solar photovoltaic rooftop system. While Skaneateles' Village Hall retrofit is commendable, the strategies noted in this document represent further efforts that can

be made by the municipality as well as by the community residents to reduce energy use and GHG emissions even further.

In 2012, a GHG inventory report was compiled to detail energy use and the sources of emissions in Skaneateles in 2010. This Climate Action Plan uses the data provided in the GHG inventory report to address strategies that both government operations and community members can take to reduce energy use and GHG emissions by 2030. Specifically, using 2010 as the base year, the emissions reduction target for Skaneateles municipal operations is 50%, and the emissions reduction target for community emissions is 20%.

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

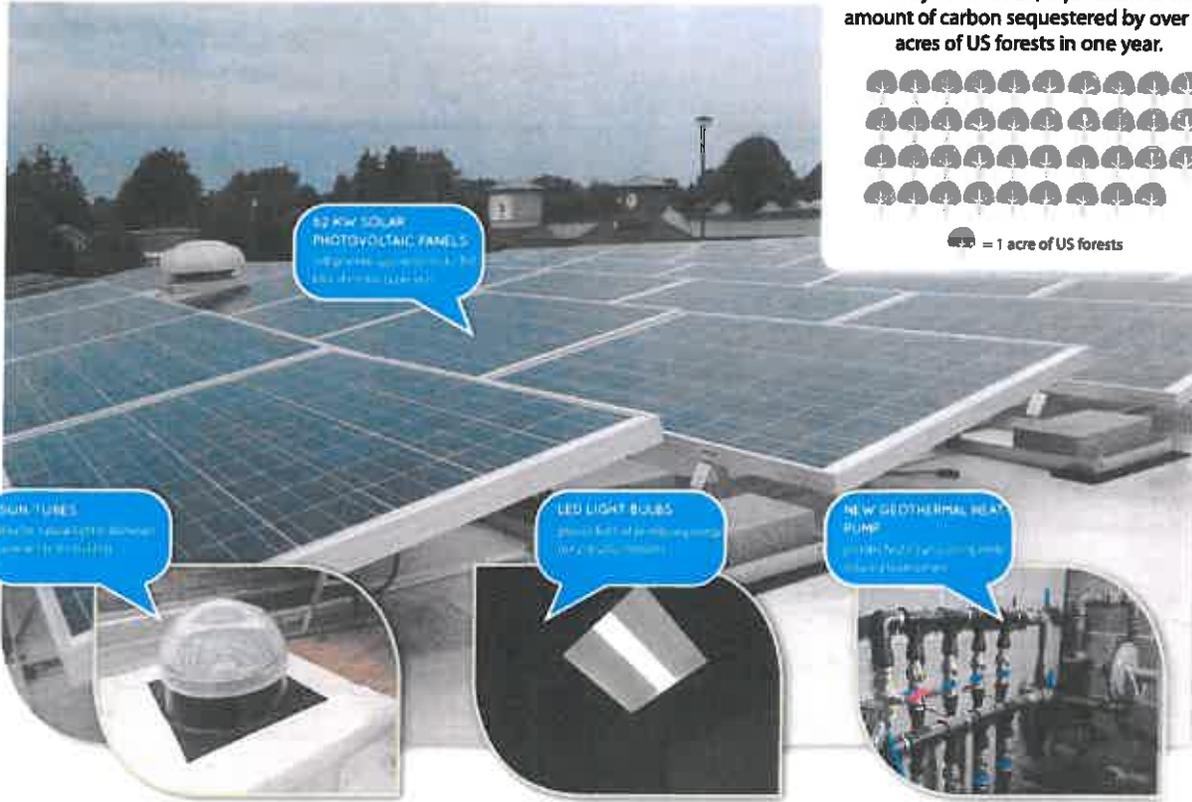


VILLAGE HALL RETROFIT AT A GLANCE

The Village Hall retrofit will reduce emissions by 48 MTCO₂e; equivalent to the amount of carbon sequestered by over 39 acres of US forests in one year.



🌳 = 1 acre of US forests



62 KW SOLAR PHOTOVOLTAIC PANELS
will generate approximately 80,000 kWh of energy annually.

SUN TUBES
provide natural light to interior spaces while reducing energy use.

LED LIGHT BULBS
provide 80% of lighting energy savings while reducing heat output.

NEW GEOTHERMAL HEAT PUMP
will reduce heating and cooling energy use by 50%.

GHG Inventory Summary

As part of the Climate Change Innovation Program, an inventory of Skaneateles' municipal and community GHG emissions was conducted in 2012 with the assistance of a student team from the State University of New York College of Environmental Science and Forestry with additional oversight and technical review by CNY RPDB staff. The 2012 inventory report examined emissions generated in Skaneateles in 2010, which serves as the baseline year for the Climate Action Plan.

The inventory report found that in the 2010 base year, Skaneateles government operations generated a total of 828 metric tons of carbon dioxide equivalent (MTCO₂e) emissions, which were broken up into 8 sectors: buildings and facilities (123 MTCO₂e, 15%), streetlights and traffic signals (53 MTCO₂e, 6%), vehicle fleet (238 MTCO₂e, 29%), water delivery (78 MTCO₂e, 10%), wastewater facilities (152 MTCO₂e, 18%), waste

(9 MTCO₂e, 1%), wastewater treatment processes (168 MTCO₂e, 20%), and employee commute (7 MTCO₂e, 1%).

Skaneateles community emissions totaled 29,167 MTCO₂e, which were broken up into 5 sectors: residential energy use (14,780 MTCO₂e, 51%), commercial energy use (6,833 MTCO₂e, 23%), industrial energy use (2,436 MTCO₂e, 8%), transportation (4,546 MTCO₂e, 16%), and waste (572 MTCO₂e, 2%).

Skaneateles' Climate Action Plan uses the data gathered in the 2012 GHG inventory report as a baseline for analyses to determine which energy efficiency strategies will be most effective in the village. The strategies suggested in this document can help Skaneateles to reduce emissions, energy use, and dollars spent on municipal and community operations further by 2030.

1 MTCO₂e =

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

FIGURE 3- SKANEATELES MUNICIPAL EMISSIONS BY SECTOR MTCO₂E (2010 BASELINE)

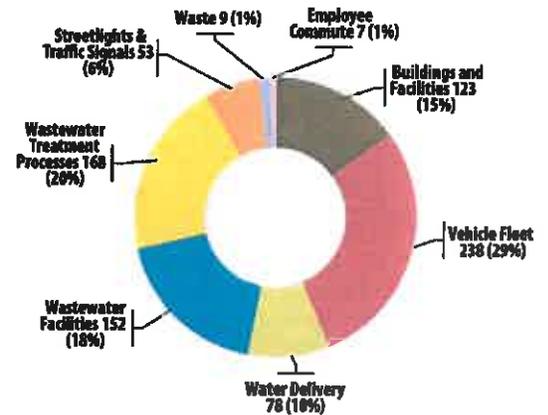
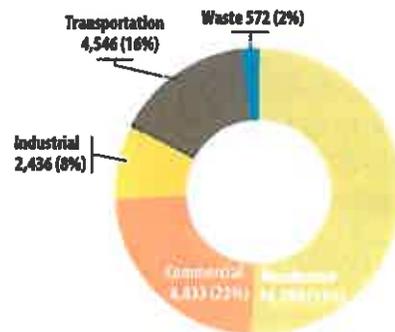
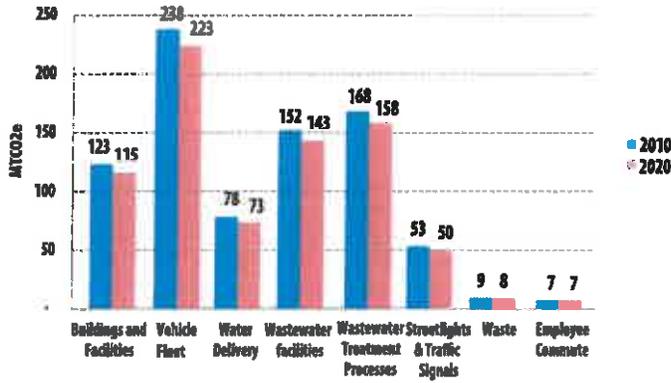


FIGURE 4- SKANEATELES COMMUNITY EMISSIONS BY SECTOR MTCO₂E (2010 BASELINE)



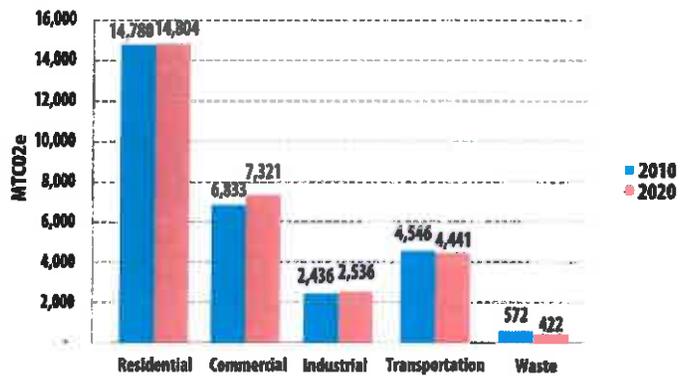
**FIGURE 5- EMISSION FORECAST:
MUNICIPAL OPERATIONS**



The GHG inventory report also forecasted emissions for Skaneateles in 2020. The report explained that Skaneateles government emissions were expected to decline to a total of 777 MTCO₂e in 2020 due to the declining village population, with 8 MTCO₂e decrease in buildings and facilities emissions, 3 MTCO₂e decrease in streetlights & traffic signals, 5 MTCO₂e decrease in water delivery, 9 MTCO₂e decrease in wastewater facilities, 15 MTCO₂e decrease in vehicle fleet emissions, 10 MTCO₂e decrease in wastewater treatment processes, and 1 MTCO₂e decrease in waste.

The community forecast showed only slight changes, and were expected to total 29,524 in 2020, with 24 MTCO₂e increase in residential energy use, 488 MTCO₂e increase in commercial energy use, 100 MTCO₂e increase in industrial energy use, 105 MTCO₂e decrease in transportation, and 150 MTCO₂e decrease in waste.

**FIGURE 6- EMISSION FORECAST:
COMMUNITY**



Strategies Overview

CNY RPDB staff worked with a team of interns throughout the spring and summer of 2013 to analyze potential strategies for reducing the village's emissions for both municipal operations as well as at the community-wide scale. The team utilized a software tool developed by ICLEI-Local Governments for Sustainability known as CAPP (Climate and Air Pollution Planning Assistant) version 1.5 to calculate potential GHG reductions as well as cost savings for each strategy. CAPP is an Excel-based decision-support tool designed to help U.S. local governments explore and identify potential opportunities to reduce greenhouse gas emissions and other air pollution emissions. CAPP provides a starting point for two major tasks: determining an achievable emissions reduction target and selecting strategies to include in a local municipal-operations or community-scale emissions-reduction plan, commonly called a climate action plan. CAPP users can compare the relative benefits of a wide variety of emissions reduction and clean air measures, and identify those most likely to be successful for their community based on its priorities and constraints.

Utilizing CAPP, a variety of strategies were identified and analyzed to determine their potential for achieving emissions reductions either at the municipal operations level or the community scale. The analysis team also explored the potential impacts of two external large scale factors on the village's emissions profile: New Federal CAFE Standards that will increase the average fuel economy of vehicles sold in the U.S. through 2025 and changes taking place within the electric generation sector that are leading to overall emissions reductions, including the decommissioning of coal fired power facilities, fuel switching to natural gas, and increased investment in renewable or alternative energy generation (i.e., solar and wind). **The results of these analyses are summarized in Figures 7-9.** In most cases, if there were multiple potential strategies addressing a singular target area (e.g. vehicle fuel sources: electric, diesel, hybrid, natural gas), the strategy that was the most cost effective with the largest emissions reduction impact was chosen to be included in the final summary. For more information about specific strategies and calculations, please refer to **Appendix A: Action Strategy Summary Document.**



View of Skaneateles Lake from the Village

FIGURE 7: TOTAL POSSIBLE REDUCTIONS BY 2030

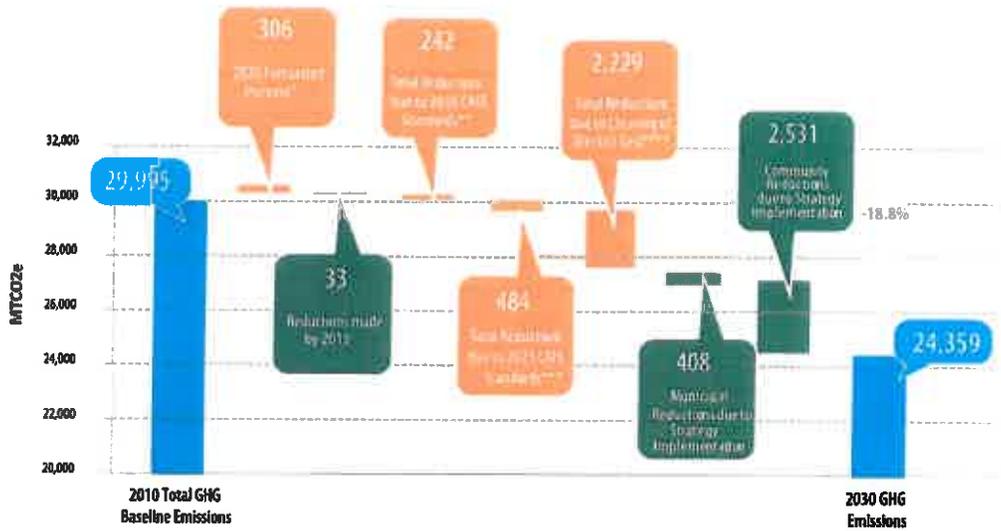
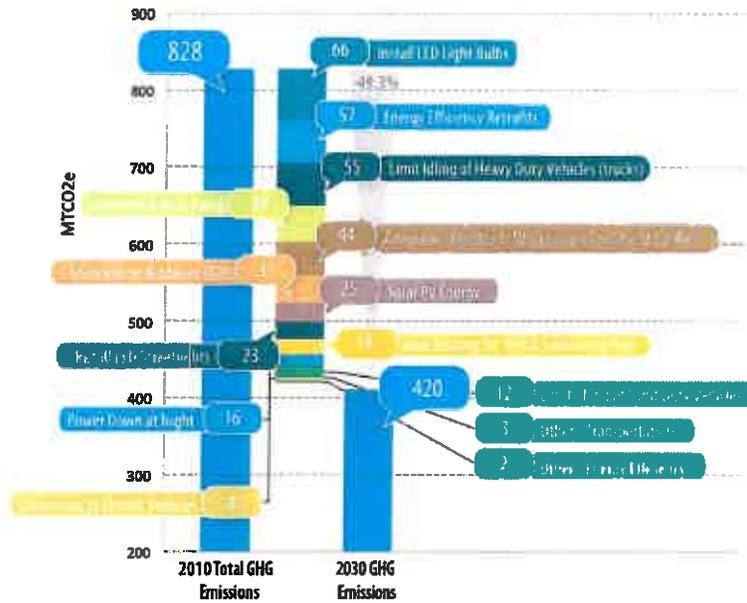


Figure 7 summarizes the results of the Skaneateles GHG inventory, a 2020 emissions forecast based on current trends, impacts from the strengthening of Federal CAFE standards, the cleaning of the electric grid in Upstate New York, as well as the reductions associated with the Climate Action Strategies that were analyzed for the Village separated into community-wide measures as well as municipal operations measures. Reductions due to Skaneateles actions are shown in green while changes in emissions that will occur regardless of this Plan are shown in orange. It is projected that Skaneateles' total GHG emissions in 2030 could be reduced by 18.8% if the Village implements all of the recommended community-wide and municipal operations reductions. For more detailed information about potential emissions reductions, please refer to Appendix A: Action Strategy Summary Document.

*2010 GHG inventory reported a forecasted increase of 306 MTCO_{2e} due to an increase in commercial energy use.
 **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.
 ****Since the 2010 base year, the electric grid for Upstate New York has become cleaner by using a higher percentage of cleaner burning and/or renewable energy sources. Therefore, since 2010, the changes in the electric grid alone have caused reductions of 2,229 MTCO_{2e}.

FIGURE 8: POTENTIAL MUNICIPAL REDUCTIONS FROM STRATEGY IMPLEMENTATION



Key:

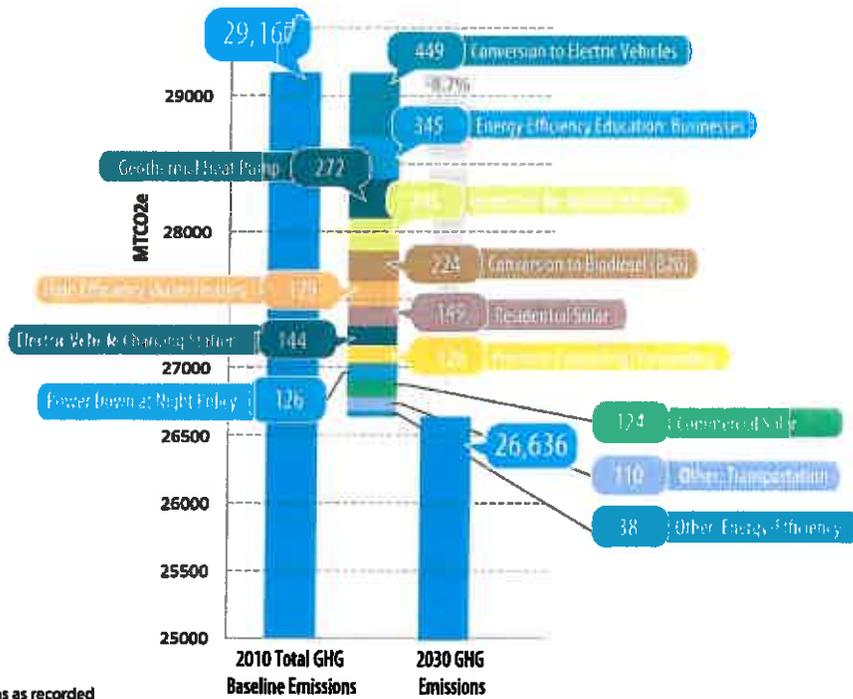
449 Conversion to Electric Vehicles

— Emissions reduction strategy name

— Illustrates emissions reductions in MTCO2e

Skaneateles' 2010 baseline municipal emissions as recorded by the GHG inventory report, potential reductions due to suggested strategies, and potential emissions in 2030 should each of the suggested strategies be implemented. It is estimated that there will be a 49.3% reduction in municipal emissions if all suggested strategies are implemented. For more detailed information about these strategies, please refer to **Appendix A: Action Strategy Summary Document**.

FIGURE 9: POTENTIAL COMMUNITY REDUCTIONS FROM STRATEGY IMPLEMENTATION



Skaneateles' 2010 baseline community emissions as recorded by the GHG inventory report, potential reductions due to suggested strategies, and potential emissions in 2030 should each of the suggested strategies be implemented. It is estimated that there will be an 8.7% reduction in community emissions if all suggested community reduction strategies are implemented. For more detailed information about these strategies, please refer to Appendix A: Action Strategy Summary Document.

Emissions Reduction Strategy Analysis

TRANSPORTATION STRATEGIES

Total implementation costs: \$4,354,861

Annual cost savings: \$206,686

Payback: 21.07 years

Annual returns on investments: 4.75%

Potential emissions reductions: 1,407 MTCO₂e

ENERGY EFFICIENCY STRATEGIES

Total implementation costs: \$4,365,362

Annual cost savings: \$320,586

Payback: 13.62 years

Annual returns on investments: 7.34%

Potential emissions reductions: 1,514 MTCO₂e

NATURAL RESOURCE STRATEGIES

Total implementation costs: \$6,600

Annual cost savings: \$602

Payback: 10.96 years

Annual returns on investments: 9.12%

Potential emissions reductions: 18 MTCO₂e

For this Plan, the Village investigated 17 emissions reduction strategies related to the transportation sector, including strategies for increasing options for low-carbon transportation, increasing use of alternative fuels, and reducing vehicle idling time. Strategies are listed in the chart on the proceeding pages as well as in the transportation section on pages 28-29. Based on a preliminary analysis, if all of the transportation emissions reduction strategies investigated are implemented in the Village, it would cost the Village and community members a total of \$4,354,861 and annual cost savings would be about \$206,686, which would yield a payback of just over 21 years with 4.75% annual returns on investments. Transportation strategies would yield an estimated emissions reduction of 1,407 MTCO₂e.

The Village also investigated 17 emissions reduction strategies related to the energy efficiency sector, including strategies for increasing energy efficiency and reducing emissions from buildings and increasing use of renewable energy. Strategies are listed in the chart on the proceeding pages as well as in the energy efficiency section on pages 30-31. Based on a preliminary analysis, if all of the energy efficiency emissions reduction strategies investigated are implemented in the Village, it would cost a total of \$4,365,362 and annual cost savings would be about \$320,586, which would yield a payback of 13.62 years with 7.34% annual returns on investments. Energy efficiency strategies would yield an estimated emissions reduction of 1,514 MTCO₂e.

Finally, the Village investigated an emissions reduction strategy related to the natural resources sector, specifically promoting tree planting for carbon storage and heat mitigation. Information about this strategy can be found in the chart on pages 26-27 and in the natural resources section on page 32. Based on a preliminary analysis, if this strategy is implemented in the Village, it would cost about \$6,600 and annual cost savings would be about \$602, which would yield a payback of about 11 years with 9.12% annual returns on investments. Natural resource strategies would yield an estimated emissions reduction of 18 MTCO₂e.



Summary of Strategies table

For this Climate Action Plan, various emissions reduction strategies were analyzed using the best available information to determine which strategies may be desirable to implement in the Village of Skaneateles. Strategies were analyzed that relate to the transportation, energy efficiency, and natural resource sectors. The emissions reduction strategies included in this report and their preliminary analyses are listed in the strategy implementation chart on pages 26-27. For more detailed information about individual strategies, including how implementation costs, annual cost savings, and emissions reductions were calculated, please refer to **Appendix A: Action Strategy Summary Document**.

The strategy implementation chart on pages 26-27 illustrates all of the strategies analyzed for this Plan, their generalized costs, GHG reductions, and payback periods. The chart also explains possible implementation methods of each strategy and additional benefits, or co-benefits, of implementing each strategy.

To understand the chart, it is important to first study the Key to Ballpark Rankings table, which explains what each number represents in the Ballpark Rankings columns. The numbers 1-5 represent different meanings for the cost, GHG reductions, and payback columns, with 1 representing the lowest cost of implementation, the lowest GHG reduc-

tion potential, and the shortest payback and 5 representing the highest cost of implementation, the highest GHG reduction potential, and the longest payback.

X's shown in certain columns depict possible implementation methods and additional benefits of implementing a strategy. For example, an x under the Green Job Creation column means that implementing a certain strategy has the potential to create green jobs as well as create emissions reductions and save money over the long-term.

STRATEGY IMPLEMENTATION CHART

Issue	Strategy	Ballpark Rankings (see key below)			Possible Implementation Methods				Additional Benefits			
		Cost (1M)	GHG Reductions (t/yr)	Payback (yr)	Policy	Program	Source Priority	Behavioral/Outreach	Green Job Creation	Quality of Life	Energy Conservation	Other
Transportation: Municipal	1. Installation of bicycle paths and facilities	1	1	1		x	x	x		x		x
	2. Complete Streets	N/A	N/A	N/A	x	x	x	x	x	x	x	x
	3. Conversion to electric vehicles	1	1	3		x	x					x
	4. Heavy Duty Idling reduction	1	2	1	x							x
	5. Increase bus ridership	1	1	1		x		x		x		x
	6. Conversion to biodiesel	1 ^A	1	N/A	x	x		x		x		x
Transportation: Community	9. Promote carpooling and vanpooling	1	1	1								
	10. Installation of bicycle paths and facilities	1	1	3		x	x	x		x		x
	11. Safe Routes to School	1	1	1				x		x		x
	12. Increase bus ridership	1	1	1		x		x		x		x
	13. Establish parking and lane incentives for hybrid vehicles	2	1	3	x			x		x		x
	14. Electric vehicle charging stations	3	1	5		x	x	x	x	x		x
	15. Conversion to biodiesel	1 ^A	1	N/A	x	x		x		x		x
	16. Conversion to electric vehicles	3	4	1		x	x					

^AWhile there would be no initial investment costs of using B20 biodiesel, conversion to biodiesel would be an annual cost of \$3,908 in increased fuel costs for municipal operations and \$1,271.15 for the community.

Key to Ballpark Rankings

Est. Total Costs	Est. Total GHG Impact	Est. Payback Time
1 = less than \$250,000	1 = 0-20% of goal	1 = less than 1 year
2 = \$250,000 - \$999,999	2 = 20-34.9% of goal	2 = 1-4.9 years
3 = \$1 million - \$4,999,999	3 = 35-49.9% of goal	3 = 5-9.9 years
4 = \$5 million - \$99,999,999	4 = 50-74.9% of goal	4 = 10-14.9 years
5 = \$100 million or more	5 = 75-100% of goal	5 = 20 years or more

Issue	Strategy	Ballpark Rankings (see key below)			Possible Implementation Methods				Additional Benefits			
		Cost (\$)	GHG Reduction (t/yr)	Payback (yrs)	Policy	Program	Local Problem	Wider Community	Green Job Creation	Quality of Life	Local Conservation	Other
Transportation: Community, continued	17. Reduce idling for school buses	1	1	1	x							x
	18. Heavy Duty Idling reduction	1	1	1	x							x
Energy/Efficiency: Government	1. Geothermal heat pump	3	2	5			x		x	x		x
	2. Anaerobic digester at wastewater treatment facility	2	2	5			x		x	x		x
	3. Install LED streetlights	2	1	5		x	x	x				x
	4. Efficiency retrofits to existing facilities	1	2	5		x	x	x	x	x	x	x
	5. Install high-efficiency water heaters	1	1	2			x					x
	6. Install solar PV energy	2	1	3		x	x	x	x			x
	7. Install LED light bulbs	1	2	3		x	x	x				x
	8. Power Down at Night policy	1	1	1	x			x				x
Energy/Efficiency: Community	9. Solar hot water for YMCA swimming pool	1	1	3			x	x		x		x
	10. Energy efficiency education targeted at businesses	1	1	1		x		x		x	x	x
	11. Install high-efficiency water heaters	1	1	2			x					x
	12. Power Down at Night policy	1	1	1	x			x				x
	13. Install LED light bulbs	1	1	3		x	x	x				x
	14. Efficiency retrofits to existing facilities	1	1	4		x	x	x	x	x	x	x
	15. Commercial solar PV energy	2	1	5		x	x	x	x			x
	16. Geothermal heat pump	3	1	5			x		x	x		x
17. Residential solar PV energy	3	1	5									
Other	1. Promote tree planting	1	1	5		x	x	x	x	x		x

TRANSPORTATION

According to Skaneateles' GHG Inventory Report, transportation accounted for 29% of government emissions and 15.6% of community emissions in Skaneateles in 2010. This Climate Action Plan

addresses three main transportation emissions reduction goals: increase options for low-carbon transportation; increase use of alternative fuels; and reduce vehicle idling time.



Increase Options for Low-Carbon Transportation

Promote carpooling and vanpooling for community members: 126 MTCO₂e annual reductions; payback 0 years.

This strategy assumes that 20% of community members traveling 10 miles or greater to work carpool.

Installation of bicycling paths and facilities, community reductions: 48 MTCO₂e annual reductions; payback 0.2 years.

This strategy assumes 966 weekly trips at an average of 2 miles in length are converted from car to bicycle.

Safe routes to school: 27 MTCO₂e annual reductions; payback 0 years.

This strategy assumes all 598 students are covered by the program.

Increase community bus ridership: 12 MTCO₂e annual reductions; payback 0 years.

This strategy assumes that 5% of community members who live outside but work in the Village convert to bus transportation.

Installation of bicycling paths and facilities, municipal reductions: 3 MTCO₂e annual reductions; payback 0 years.

This strategy assumes 40% of trips at an average of 3 miles in length are converted from car to bicycle.

Increase municipal employee bus ridership: 0.325 MTCO₂e annual reductions; payback 0 years.

This strategy assumes 10% of municipal employees' trips are converted to bus transport.

Complete streets*

Increase use of alternative fuels

Community conversion to electric vehicles: 449 MTCO₂e annual reductions; payback 11.1 years.

This strategy assumes 20% community vehicles are converted to electric.

Establish parking and lane incentives for hybrid vehicles: 245 MTCO₂e annual reductions; payback 7.3 years.

This strategy assumes that 20% of the community vehicle fleet is converted to hybrids.

Promote community conversion to biodiesel: 224 MTCO₂e annual reductions; payback N/A.

This strategy assumes 2% of diesel trucks and 100% of school buses switch from diesel to biodiesel fuel.

Electric vehicle charging stations: 114 MTCO₂e annual reductions; payback 29.3 years.

This strategy assumes 25 charging stations are implemented by 2030.

*This strategy is included as an informational item and therefore does not have associated emissions reductions or strategy implementation levels listed.

Promote and implement municipal conversion to biodiesel: 34 MTCO₂e annual reductions; payback N/A.

This strategy assumes 25 vehicles switch from diesel to biodiesel fuel.

Municipal conversion to electric vehicles: 4 MTCO₂e annual reductions; payback 6.4 years.

This strategy assumes 2 vehicles are converted to electric.

Reduce vehicle idling time

Municipal idling reduction of heavy duty vehicles (trucks): 55 MTCO₂e annual reductions; payback 0 years.

This strategy assumes 22 vehicles reduce idling by 1 hour per day.

Municipal idling reduction of light duty vehicles: 12 MTCO₂e annual reductions; payback 0 years.

This strategy assumes 25 vehicles reduce idling by 25 minutes per day.

Community idling reduction of heavy duty vehicles (trucks): 12 MTCO₂e annual reductions; payback 0 years.

This strategy assumes that 15 community vehicles reduce idling by 25 minutes per day.

Reduce idling for school buses: 11 MTCO₂e annual reductions; payback 0 years.

This strategy assumes all 25 buses reduce idling time by 0.5 hours each day.

Options for Low-Carbon Transportation

Increasing options for low-carbon transportation would reduce the amount of vehicle miles traveled (VMT), reducing gasoline and diesel use which would therefore reduce Skaneateles' emissions, fuel costs, and reliance on foreign fossil fuels.

Complete Streets is the idea that new streets are constructed (or existing streets are updated) to allow for access to a variety of modes of transportation, shifting the focus from cars to alternative forms of transportation. Complete streets therefore encompasses multiple strategies, including but not limited to: expanding bicycling infrastructure, promoting carpooling/vanpooling, and Safe Routes to School. Therefore, Complete Streets should be viewed as an inclusive concept that will create more comprehensive roadways that will encourage low-carbon transportation options.

Complete Streets can be achieved through a variety of policies: ordinances and resolutions; rewrites of design manuals; inclusion in comprehensive plans; internal memos from directors of transportation agencies; policies adopted by city and county councils; and executive orders from elected officials, such as Mayors or Governors. This strategy also results in increased walking and biking as well as economic stimulation.

Preliminary Focus (streets that become state roads outside of the Village):

1. Fennel St.
2. State Street Rd.
3. Onondoga St.
4. East St.
5. Kane Ave.
6. E. & W. Genesee St.

Secondary Focus:

1. W. and E. Elizabeth St.
2. Jordan St.
3. Orchard Rd.
4. All other streets (1000 ft. or less)

There are many possible low-carbon transportation options that could be successful in the Village of Skaneateles. These low-carbon transportation options can benefit community members in a variety of ways, including reducing greenhouse gas emissions, fuel costs, and reliance on foreign fossil fuels, improving physical well-being, and revitalizing the community.

Increase use of alternative fuels

According to Skaneateles' GHG Inventory Report, transportation accounted for 29% of government emissions and 15.6% of community emissions in Skaneateles in 2010. These fuels are not only non-renewable fossil fuels; they also produce significantly more carbon emissions than alternative fuel options, such as biodiesel, electric and hybrid vehicle technology. Conversion to alternative fuels can therefore be extremely effective when trying to reduce emissions from the transportation sector.

According to EPA's eGRID 2009, electricity in Upstate New York is currently powered by coal (14.5%), oil (0.9%), gas (18.9%), other fossil (0.4%), biomass (1.6%), hydro (30.8%), nuclear (30.6%), and wind (2.4%) powers. Therefore, about 1/3 of the energy coming from the electric grid is considered renewable, with almost 2/3 coming from non-fossil fuel sources, making electricity a much better option in terms of greenhouse gas emissions than gasoline or diesel fuels. The Village has already begun to encourage conversion to electric vehicles through its plans to implement four electric vehicle charging stations at the municipal building for

the use of the general public. The school bus fleet and/or postal delivery fleet could look into electrification of vehicles as well.

Not only will using alternative fuels reduce greenhouse gas emissions, it will also reduce US dependence on imported fuels and reliance on fossil fuels in general. Electric and hybrid vehicles are also less expensive to operate and have significantly lower fuel costs than conventional gasoline-powered vehicles. Biodiesel, on the other hand, can be created by using recycled agricultural and cooking oils and can be suitable for conventional diesel engines without retrofit up to a blend of B20 (20% biodiesel).

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

Reduce vehicle idling time

Idling refers to when a vehicle is left running when not in use. Limiting the idling of vehicles decreases fuel use and greenhouse gas emissions by decreasing the amount of time vehicles are burning fuel uselessly. In New York State, it is illegal for many diesel-powered vehicles to idle for longer than 5 consecutive minutes; however, whether or not this rule is being followed is uncertain. Limiting the idling of vehicles decreases emissions, fuel costs, and reliance on foreign fossil fuels, while also improving local air quality.

ENERGY EFFICIENCY

According to Skaneateles' GHG Inventory Report, emissions from municipal buildings/facilities accounted for 15% of total municipal emissions, wastewater facilities accounted for 18%, and streetlights and traffic signals accounted for 6%, while residential energy use accounted for 51% of the community's emissions, commercial energy use accounted for 23% of the community's emissions,

and industrial energy use accounted for 8% of the community's total GHG emissions in 2010. Therefore, the largest amount of GHG reductions is possible and necessary in this sector. This Climate Action Plan addresses two main energy/efficiency emissions reduction goals: increase energy efficiency in buildings; and increase use of renewable energy.



Increase use of renewable energy

Municipal installation of geothermal heat pump: 422 MTCO₂e annual reductions; payback 16.2 years.

This strategy assumes 7,996 square feet of government buildings are heated by geothermal.

Install residential solar PV energy: 149 MTCO₂e annual reductions; payback 34 years.

This strategy assumes 600 kW are installed.

Install commercial solar PV energy: 124 MTCO₂e annual reductions; payback 25 years.

This strategy assumes 500 kW are installed.

Community installations of geothermal heat pumps: 272 MTCO₂e annual reductions; payback 35.2 years.

This strategy assumes 5% of homes in the Village install geothermal.

Anaerobic digester at wastewater treatment facility: 44 MTCO₂e annual reductions; payback 62.9 years.

This strategy assumes the entire Village population is served by the Wastewater Treatment Plant.

Install municipal solar PV energy: 25 MTCO₂e annual reductions; payback 19 years.

This strategy assumes an additional 100 kW are installed.

Solar hot water for YMCA swimming pool: 19 MTCO₂e annual reductions; payback 17 years.

This strategy assumes the YMCA swimming pool converts to solar pool heating.

Increase energy efficiency and reduce emissions from buildings

Promote energy efficiency education targeted at businesses: 345 MTCO₂e annual reductions; payback 0.6 years.

This strategy assumes 80% of businesses in the Village participate and achieve a 10% energy savings.

Community installation of high-efficiency water heaters: 179 MTCO₂e annual reductions; payback 2.5 years.

This strategy assumes 42% of water heaters are replaced with more efficient ones.

Create power down at night policy; community reductions: 126 MTCO₂e annual reductions; payback 0.4 years.

This strategy assumes that 230,868 square feet of commercial buildings reduce energy use by 35% because of this policy.

Install LED light bulbs at municipal facilities: 66 MTCO₂e annual reductions; payback 0.8 years.

This strategy assumes 1,000 LED light bulbs are installed.

Complete energy efficiency retrofits to existing municipal facilities: 57 MTCO₂e annual reductions; payback 10.6 years.

This strategy assumes all of the government buildings besides the Village Hall undergo an energy-efficiency retrofit that reduces energy use by 25%.

Install LED streetlights: 23 MTCO₂e annual reductions; payback 49.3 years.

This strategy assumes all 339 municipally-owned street lights are replaced with LED streetlights.

Create power down at night policy; municipal reductions: 16 MTCO₂e annual reductions; payback 0.5 years.

This strategy assumes government buildings reduce energy use by 35% because of this policy.

Community installation of LED light bulbs: 10 MTCO₂e annual reductions; payback 6.9 years.

This strategy assumes each home replaces 1 bulb with an LED bulb.

Complete energy efficiency retrofits to existing community facilities: 10 MTCO₂e annual reductions; payback 16.7 years.

This strategy assumes 50% of community buildings undergo a retrofit that reduces energy use by 25%.

Install high-efficiency water heaters at municipal facilities: 2 MTCO₂e annual reductions; payback 2.6 years.

This strategy assumes 3 water heaters are replaced with more efficient ones.

**"THERE CAN BE NO SUSTAINABLE DEVELOPMENT WITHOUT SUSTAINABLE ENERGY DEVELOPMENT."
—MARGOT WALLSTROM, EUROPEAN UNION ENVIRONMENTAL COMMISSIONER (2004)**

Increase use of renewable energy

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

Many residents or businesses would like to use renewable energies, but the large up-front cost is an obstacle. The local government can help overcome this barrier by offering low-interest loans or organizing group buying programs to negotiate lower prices, such as the Solarize Madison program in Madison County. These programs are an effective way of combining public and private funds for renewable energy. Additionally, there are state and federal tax credits for residential and commercial solar PV 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.

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.

A 62 kW solar PV rooftop system was installed as part of the Village Hall retrofit. The Village Hall building is now the first net-zero government building in New York State, thanks in part to the solar PV array.

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

Increase energy efficiency and reduce emissions from buildings

Energy efficiency education can be crucial in working to reduce emissions from buildings and facilities. Without the knowledge of actions that can be taken to increase building efficiency and reduce emissions, it is less likely that important actions, such as the ones listed above, will be taken. Many households in the Village of Skaneateles have already participated in the Central New York Energy Challenge Team Program, educating community members on actions they can take at home to reduce energy use and emissions. A possible next step is to target businesses in a similar educational program.

Many buildings waste a significant amount of energy when lights are left on at night when they are not in use. Creating a policy of turning lights and other electronics off throughout buildings at the end of the work day reduces electricity wasted during non-business hours, therefore reducing GHG emissions from buildings and facilities. Lighting is typically the largest electricity user in commercial buildings; therefore, a "Power Down at Night" policy can use a combination of education and technology, like timers and motion sensors, to reduce energy use and building emissions. Buildings like Skaneateles High School and the YMCA can participate in these types of programs to significantly reduce energy use in the Village.

National DSIRE Database

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

Finally, many buildings in Skaneateles are not equipped with the most recent energy efficient technologies, causing the Village 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 Village's buildings and facilities. The Village Hall has already undergone a comprehensive energy efficiency retrofit, including upgrading the HVAC equipment, performing a lighting retrofit, and installing a 62 kW solar photovoltaic rooftop system. The building is now the first net-zero municipal building in New York State. Similarly, the YMCA is in the process of making plans to retrofit their facility, including potentially utilizing Combined Heat and Power (CHP) technologies.

The initial cost of retrofitting heating units may seem daunting; however, the local government 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.

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.



Promote tree planting for carbon storage and heat mitigation

Promote Tree Planting: 18 MTCO₂e annual reductions; payback 11 years.

This strategy assumes 600 trees are planted by 2030.

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.

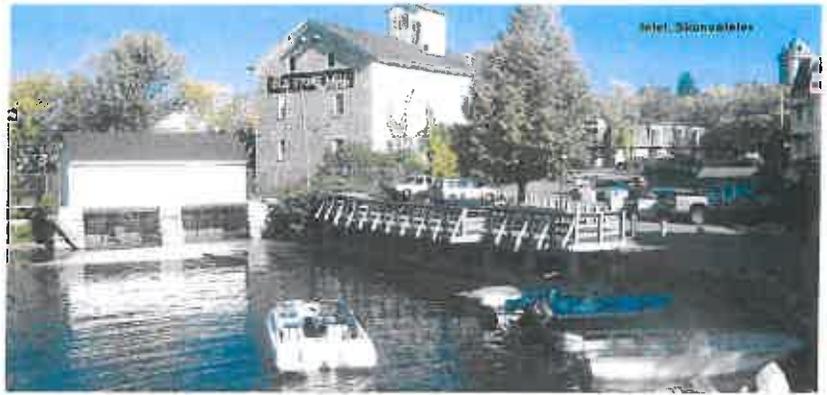
The Village of Skaneateles recently completed an inventory of all of the trees within the Village, noting both the types of tree and their locations. This tree inventory can be used to determine the best locations for further tree plantings.

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

CLIMATE ADAPTATION

According to climate researchers, "Continued emissions of greenhouse gases will cause further warming and changes in all components of the climate system. Limiting climate change will require substantial and sustained reductions 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."



The findings discussed above 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 was approved in September 2013 by the member governments of the IPCC meeting in Stockholm, Sweden. The U.S. Environmental Protection Agency refers to the term "adaptation" as the adjustment or preparation of natural or human systems to a new or changing environment which moderates harm or exploits beneficial opportunities.¹ A reduction of greenhouse gas emissions can be achieved through an increased understanding and endorsement of climate adaptation strategies. Community responses to extreme weather (early storm warning systems, air-conditioned cooling shelters, and policies that discourage people from building in flood prone areas) will require comprehensive, community-wide planning that addresses all risk factors.

¹ EPA 2012: <http://epa.gov/climatechange/glossary.html>

A primary goal for Central New York, as presented in *Vision CNY: Central New York Regional Sustainability Plan*, is to adapt to a changing climate and improve the resilience of the region's communities, infrastructure, and 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 Skaneateles to improve the health and resilience of the community and will provide long-term protection of the natural environment.

The policy recommendations for climate adaptation that are presented in the following table (pages 32 and 33) are designed to help the Skaneateles community prepare for current and anticipated changes in climate conditions and to assist decision-makers

in identifying opportunities to improve community resilience.

The table provides a summary of actions that the community can take to protect people, homes, buildings and natural systems by reducing risks from environmental hazards such as extreme heat and storm events. The recommendations also provide ways to reduce the Village's energy costs and to improve the quality of life for Village residents.

Planning for future weather impacts will enable Skaneateles to be better prepared and resilient. Long-term monitoring and evaluation of adaptation efforts is also important in order to document the efficiency of different strategies and how they can be improved. In addition, the Village is encouraged to build climate adaptation into existing planning documents.

CLIMATE ADAPTATION RECOMMENDATIONS FOR THE VILLAGE OF SKANEATELES

FOCUS AREAS AND RECOMMENDATIONS

ACTIONS

Monitoring, Assessment and Data Collection: Provide for the routine collection of temperature, precipitation, and storm event data and public health information

Infrastructure Design and Maintenance: Protect local infrastructure to facilitate stormwater and flood control

Public Health: Establish mechanisms to reduce or eliminate the negative effects of climate change on public health

Community and Regional Collaboration: Develop and support regional partnerships that promote research, public awareness of climate change issues, and strategies that enhance the resiliency of the region, its residents and its institutions

- Monitor climate impacts on human health such as heat-related illnesses
- Assess the economic impacts of climate change through revenue potential from tourism and recreation
- Assess the effectiveness of current adaptation and preparedness strategies
- Document ice in/ice out dates on Skaneateles Lake each year
- Work with Project Watershed to document annual invertebrate populations in Skaneateles Creek
- Work with the US Forest Service and Cooperative Extension to monitor changes in woodland composition
- Assess the condition of local infrastructure and document vulnerabilities in the areas of energy, water, transportation, and telecommunications
- Assess public perceptions of climate change through measured outcomes
- Continue to support the Village's Rain Catchers Program, designed to reduce flooding and stormwater runoff
- Improve the capacity of stormwater collection systems and infrastructure measures (rain gardens, porous pavement, rain barrels, and French storm drains) along Skaneateles Creek to maximize soil infiltration and groundwater recharge
- Ensure that storm event control measures are in place for the Village's public sewer system
- Encourage downspout disconnection, bioinfiltration, and rainwater harvesting in the residential and business communities of the Village to reduce stormwater runoff
- Work with the Onondaga County Soil and Water Conservation District on a shoreline stabilization projects along Skaneateles Lake and Creek and install green infrastructure measures to reduce stormwater runoff
- Improve local capacity for health preparedness, response, and recovery programs such as extreme-heat response plans that include community centers with air conditioning
- Expand capacity for monitoring, disease surveillance, and disease outbreak investigation and control
- Provide alerts for the public regarding heat events and other potential health risks
- Create current land hazard maps and inventories of infrastructure and at-risk communities in the Village
- Evaluate efficiency of communication channels and regional preparedness during extreme weather events
- Evaluate measures to reduce dependency on individual vehicle use and research opportunities to expand public transit

FOCUS AREAS AND RECOMMENDATIONS

ACTIONS

Local Laws and Planning: Modify local laws to incorporate measures for adaptation to climate change; build climate adaptation considerations into comprehensive plans and other local decision-making processes

Natural Resources: Ensure the resilience of natural systems and resources through open space conservation and smart growth strategies

Forest Ecosystems: Protect and expand forest ecosystems to increase climate change mitigation potential

Invasive Species: Control the introduction and spread of invasive species

Outreach and Education: Implement comprehensive public outreach and stakeholder engagement campaigns to build awareness of climate change impacts

- Modify zoning to discourage/prevent new development in flood-prone areas or high hazard areas
- Establish strong building codes regarding energy use, including movement to performance-based codes
- Draft landscape ordinances to accommodate the use of heat and drought tolerant plants
- Identify and remove local barriers to green infrastructure
- Ensure that climate adaptation is incorporated in local documents such as the Village/Town Comprehensive Plan
- Protect open space through conservation land grants, landowner incentives, regulation, fee acquisition, purchase of conservation easements, and support of smart growth principals
- Protect wetlands, floodplains, and wildlife habitat to strengthen capacity of natural systems to respond to weather events, stream flow changes, and potential flooding
- Continue to support the Skaneateles Tree Advisory Board. Forested regions in and around Skaneateles provide valuable watershed protection, soil conservation, wildlife habitat and carbon sinks. Forested carbon sinks help mitigate atmospheric CO₂ and provide natural green infrastructure to diminish storm water run-off. This is especially important as an increase in rain activity and intense storms are predicted for Skaneateles.
- Plant low pollen tree species to minimize health issues
- Plant local/native species with a tolerance for higher temperatures
- Manage woodland density to reduce overcrowding and susceptibility to stress
- Monitor the introduction of new aquatic and terrestrial invasive species
- Continue to support the Skaneateles Lake Eurasian Water Milfoil Eradication Foundation and the Skaneateles Lake Association Aquatic Invasive Species Program
- Continue the focus on prevention and early detection of aquatic and terrestrial invasive species in order to maintain the ecological health of the lake and upland regions
- Participate in Cornell Cooperative Extension's EAB control strategy and in the NY State Invasive Species Task Force
- Remove dead or dying trees and replace them with heat and invasive tolerant species
- Maintain well-defined tree management strategies to reduce the threat of future infestations
- Incorporate climate adaptation principles into the Skaneateles website
- Distribute brochures, fact sheets, and posters that include ways municipalities and homeowners can prepare for and adapt to climate change
- Develop and enhance climate education programs for all grade levels in the Skaneateles Central School District



VILLAGE OF SKANEATELES
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