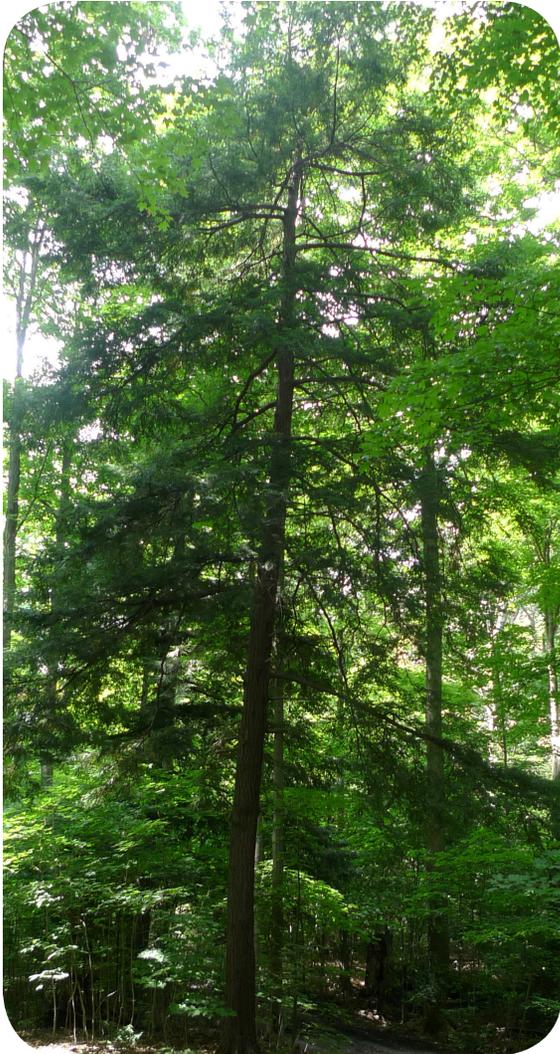


Town of Preble

Sustainability Plan

DRAFT APRIL 2014





Hemlocks, Preble

A MESSAGE FROM THE TOWN SUPERVISOR

Centuries ago, wood was the primary fuel. Five hundred years ago, Europe cut down virtually all its existing trees to harvest wood for building and for fuel. European nations began to panic. Then, discoveries in the New World provided additional raw materials. In the 1700s, coal was developed in England. This new fuel kicked off the Industrial Revolution. In 1859, the first modern day oil well was drilled near Titusville, PA. Since that time, we have been living in the age of hydrocarbons, which would include petroleum and natural gas.

Over the recent years, our society has realized that this fuel and the consumer society it has produced is not sustainable for the long run. A finite earth only has a limited amount of resources that are becoming harder to find. We also must deal with the pollution and ill health effects that burning hydrocarbons presents. I believe that we are at an inflection point in history. We are ready for something new. We are looking for a new technology that can produce clean, abundant,

and cheap power that will free mankind from the limitations of hydrocarbons. One hundred years ago, a brilliant scientist named Nikola Tesla gave us a glimpse of what that future technology might look like. Tesla was way ahead of his time, but society was not yet ready for his thinking.

In this transitional phase that we are living in now, we realize that burning more hydrocarbons to maintain economic growth is no longer viable. Our society, from the international level down to local towns, is rethinking the way we live and consume finite resources. We, as a society, are building more fuel efficient cars and homes. We're considering where the final destination of our trash will be. More people and institutions are composting. We are becoming more efficient with the energy resources that we currently use. We are thinking more about sustainability. We can all ask the question to ourselves; "is our present way of life sustainable for the next 1,000 years?" If the answer is no, then we all have work to do to help move in that direction.

Sincerely,

James Doring



Solar Panels on the Brock's barn, Preble

ACKNOWLEDGEMENTS

The Town of Preble and Cortland County wish to thank the following community members, organizations, and staff for their contributions to developing this Sustainability Plan.

TOWN STAFF

James Doring, Preble Town Supervisor

Debra Brock, Preble Town Board Member

Jeff Griswold, Highway Superintendent

SUSTAINABILITY PLAN ADVISORY COMMITTEE

Tarki Heath

Evelyn Petit

CNY REGIONAL PLANNING AND DEVELOPMENT BOARD

Chris Carrick, Energy Program Manager

Sam Gordon, Senior Planner

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

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

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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, created in 1966, that provides a range of services associated with the growth and development of communities in Cayuga, Cortland, Madison, Onondaga, and Oswego Counties.

DPW: Department of Public Works.

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.

MTCO_{2e}: Metric Tons of Carbon Dioxide Equivalent. MTCO_{2e} 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) 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 (Preble's Town 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, Preble 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 and can be found at www.icleiusa.org
- + 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





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 Town of Preble 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

Sustainable Agriculture: According to the USDA, "The term 'sustainable agriculture' (U.S. Code Title 7, Section 3103) means an integrated system of plant and animal production practices having a site-specific application that will over the long-term: Satisfy human food and fiber needs; enhance environmental quality and the natural resource base upon which the agriculture economy depends; make the most efficient use of non-renewable resources and on-farm resources

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

and integrate, where appropriate, natural biological cycles and controls; sustain the economic viability of farm operations; enhance the quality of life for farmers and society as a whole."

Developing the Plan

Preble's Sustainability Plan was developed by an advisory committee made up of Preble community members Evelyn Petit and Tarki Heath, Town Supervisor James Doring, Town Board member Debra Brock, and Highway Superintendent Jeff Griswold. The committee was provided technical assistance by the CNY RPDB, who hired an intern specifically to analyze 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 MT-CO₂e 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 informa-

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 was.

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>

tion on how the strategies were developed, including assumptions and references, refer to Appendix A: Action Strategy Summary Document.

Implementing the Plan

In order to implement the strategies in this plan and achieve Preble's sustainability goals, the advisory committee has determined the need for the creation of a permanent sustainability committee for the Town. The sustainability committee would be comprised of a group of Preble residents who are committed to Preble's sustainable future and are willing to volunteer their time to help implement the strategies explained in this plan.

The Town Board may choose to first create an exploratory committee of interested community members to gauge their success over the course of a decided time period. Depending upon the success of the exploratory committee, necessary changes and adaptations can be made and additional members can be added to create a permanent sustainability committee. The sustainability committee will ensure that Preble's sustainability goals noted in this plan will be carried out in the long run by helping to implement the strategies explained.

Progress towards the Sustainability Plan's goals can be measured over time by conducting subsequent GHG emissions inventories. Future inventories can be compared against the baseline year of 2011 to determine progress.

What is climate change?

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

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

Scientists have determined this relationship by studying Antarctic ice core samples that reveal the atmospheric carbon dioxide from 400,000 years ago to present day. Right now there is more carbon dioxide in the atmosphere than at any time in history, as measured by these samples,² and further atmospheric testing shows that we have extended to 402ppm atmospheric CO₂³, which is well

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

above any other measure in time.⁴ Scientists expect that this will lead to a gradual warming of the planet in most areas.

Potential Impacts of Climate Change within the Town of Preble

HUMAN HEALTH

Predicted climate changes have the potential to affect human health in several direct and indirect ways, some of them severe, which can greatly affect Preble community members.



Song Lake,
Preble

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.

Direct health impacts of climate change 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 the environment they need to thrive, and projections of warmer winters, hotter summers, and erratic precipitation patterns can cause increases in these types of diseases. For example, the projected changes in the Northeast's climate can encourage population growth of mosquitoes and ticks that carry West Nile virus and Lyme disease-causing bacteria, which can mean more frequent outbreaks of these diseases.

The more the climate changes, the greater is the potential for negative effects on society and ecosystems. The changes occurring in our climate require us to learn new information in order to adjust to unfamiliar health and safety pressures in our environment.

LAKES AND WETLANDS

There are four beautiful kettle lakes in Preble that were formed by the advancing and retreating of glacial ice during the last glacial period in North America. To the west of Preble, the same glacial process formed the Finger Lakes. The kettle lakes in Preble are the headwaters of the Tioughnioga



Fall trees by
Song Lake,
Preble

River which runs to the Susquehanna River and the Chesapeake Bay. Today, these lakes provide recreation and a solid tax base for the town. They are also surrounded by valuable wetlands that provide important and unique habitat for birds, turtles, frogs and other important species.

Increased temperatures will have a significant impact on the kettle lakes. Warming waters will reduce the ability for cold water fish to survive, while decreasing ice coverage will provide a longer season for nuisance plants and algae. Also, warm water species that previously could not survive the cold will be able to establish themselves, threatening the native species. This is already occurring with aquatic invasive species on the rise around the state.

While there are ways to mitigate some of these impacts, it will take vigilance and planning. Currently, Song Lake, Tully Lake, and Little York Lake all have active lake associations that are working with the NY State Federation of Lake Associations, the NYS Department of Conservation, the Cortland County Soil and Water Conservation Department, and the State University of NY College of Environmental Science and Forestry to address many and varied water quality issues in the area.

FORESTS AND WOODLANDS

Preble has abundant wetland and highland forests and woodlands. These regions create valuable watershed protections, soil conservation, wildlife habitat and carbon sinks.

It is well recognized that humans have been changing the northeast forested regions for over 400 years, with clear-cutting practices of the past significantly changing the landscape. However, there has been a resurgence of woodlands during the past century, and these regions are more important than ever. These carbon sinks help mitigate atmospheric CO₂ and provide natural green infrastructure to diminish storm water run-off, which is especially important as an increase in rain activity and intense storms are predicted for the northeast. In addition, there is a history of mudslides in the Tully Valley making the presence of established woodland increasingly important.

While tree killing insects and plant diseases are a natural part of the forest and woodland ecosystems, climate change is already



Agricultural landscape, Preble

shifting the pest species and aggressiveness of some invasive as well as native species. The impact of invasive species such as the Emerald Ash Borer and the Hemlock Woolly Adelgid are being seen and felt by neighboring communities. Dead or dying trees will need to be removed and replaced and management strategies need to be implemented well ahead of infestation. The destruction of hemlock in New England forests would affect recreational activities, including fishing (as pests kill trees along cold water streams, shade is no longer provided, therefore warming stream temperatures beyond what is ideal for trout).⁵ 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 preference over the long term with predictions that species diversity will decline. The sugar maple, beech, birch and ash are pro-

⁵ http://www.northeastclimateimpacts.org/pdf/miti/moser_et_al.pdf, p. 14

jected to decline and be replaced by mostly oak and hickory.

Preble's abundant forest and woodland will inevitably be impacted, just how severely is yet unknown. To help identify the impacts, the town will encourage participation in projects such as the NY State Invasive Species Task Force Projects, encourage the preservation and maintenance of current woodlands and forests, and assist in finding ways to include carbon offsets for future planning.

AGRICULTURE

Agricultural systems are expected to be impacted in significant ways by climate change. While it is difficult to predict exactly what the impacts of a changing climate might be in Preble, there are some general cautions that have been documented as concerns facing agricultural and rural open space systems in the Northeast more broadly. As an example, variations and unpredictability in precipitation patterns can reduce crop yields, and more severe storm events can cause agricultural run-off and erosion.

Additionally, increases in average temperatures may necessitate a shift in the types or varieties of crops produced while also putting a strain on dairy production. Cows are known to be extremely sensitive to heat: temperatures above 72°F cause declines in milk production and reproductive success.⁶ Therefore, as average annual temperatures rise, farmers will have to invest more heavily in cooling fans, air conditioning, and/or water to hose off animals, which can be espe-

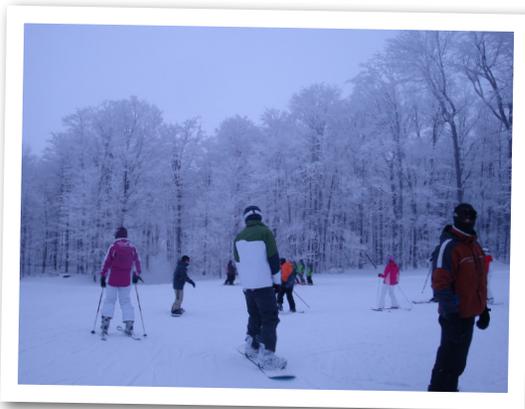
⁶ http://www.northeastclimateimpacts.org/pdf/miti/moser_et_al.pdf, p. 11

cially difficult investments on smaller farms like those in Preble.

It is most likely that the local response to the effects of global climate change will include both strategies to reduce emissions (called mitigation strategies) as well as adaptive strategies that have the potential to reduce negative impacts of climate change on Preble's agricultural community. In many cases, both mitigation strategies and adaptive strategies will have important co-benefits regardless of their impacts on climate related concerns.

OUTDOOR RECREATION

Preble is a bucolic area that boasts, among other things, four lakes (Tully, Song, Little York, and Goodale) and a ski area (Song Mountain) that are regularly used for recreation. Climate change has the potential to negatively impact this area's outdoor recreation significantly, as well as the income generated for the local economy by winter recreation in particular.



Skiers at Song Mountain, Preble

Skiing: Song Mountain, the local ski area, would be negatively impacted by the predicted shortening of the winter season and increasing variability of temperatures during the season. Song Mountain employs between 150-200 people during peak season. The mountain has a monetary benefit to the local economy in the form of payroll as well as property taxes. Song Mountain hosts an average of 75,000 skier visits each season in addition to having approximately 3,000 regular pass holders. If the duration and quality of the ski season declines, their business will be negatively affected, as well as the income for the Town of Preble. Song Mountain may have to invest more heavily in snow production equipment and energy to run the equipment, therefore significantly increasing operational costs and lift ticket prices for skiers.

Snowmobiling: Preble is part of an 8,000 mile snowmobiling trail system in New York State that contributes to the local economy. Song Mountain estimates that fully 50% of their restaurant/bar business during the winter comes from snowmobilers. The Preble Hotel also receives business from snowmobilers. Snowmobiling relies on natural snowfall which is forecasted to decrease with climate change, which would therefore reduce business generated in the Town from snowmobiling.

Ice Fishing: During the winter, the four lakes in Preble are seen dotted by people ice fishing. Climate change will bring thinner ice that will last for shorter durations of



Kayak Race, Song Lake, Preble

time. This would affect a number of people in the area who enjoy ice fishing during winter months.

Summer Recreation: Preble's lakes and streams are enjoyed throughout the seasons. In the summer, recreation includes swimming, boating, and fishing. The Girl Scout camp on Song Lake also brings young campers to the area. Currently, the lakes in Preble are home to a variety of cool and warm water fish, including perch, pickerel, bass, pike, bluegill, and others. The West Branch of the Tioughnioga has brook trout and brown trout as well as bass. Higher air temperatures and reduced winter ice will increase the water temperatures and cause a loss of cold water fisheries. This warmer water may also negatively impact Preble's lakes with an increase in algae and invasive plants which would reduce recreational swimming and boating opportunities.

What can be done in Preble?

The Town of Preble has chosen to adopt the NYS Department of Environmental Conservation (DEC)'s Climate Smart Communities Pledge, and has already begun reducing energy consumption and the resultant emissions from municipal operations.

In 2010, the Central New York Regional Planning and Development Board (CNY RPDB) selected the town of Preble 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 Town with \$30,000 of grant funding towards the development of a clean energy demonstration project. With additional technical assistance from the CNY RPDB, Preble was able to perform a retrofit of the Town Hall facility, including improvements to insulation and air sealing in the building, a lighting retrofit, window replacement, and the replacement

of a fuel oil-powered furnace with electric air-source heat pumps powered by a 9 kW solar photovoltaic rooftop system. Through this work the Town is anticipated to save approximately \$7,400 in utility costs in the first year of operation and realize a payback of just under 9 years.

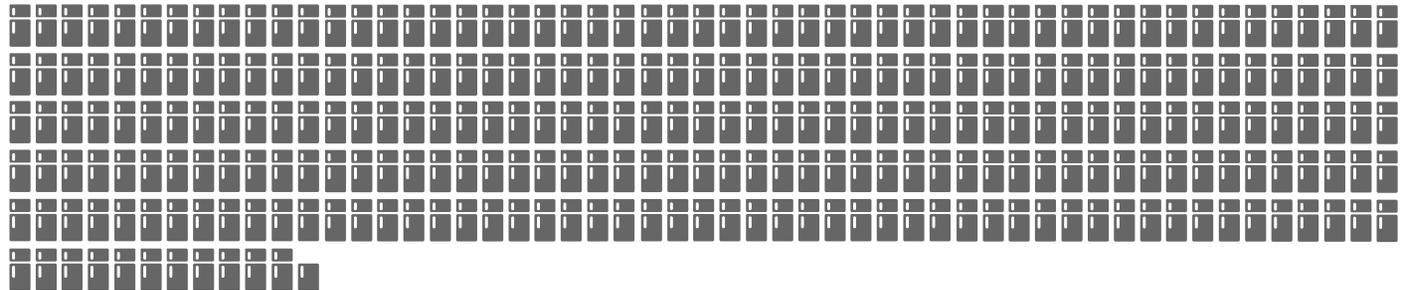
As a result of the project, the facility will completely eliminate its need for fossil fuel combustion on site. The total carbon emissions reduction for the project is projected to be 22.11 Tons of Carbon Dioxide Equivalent (CO₂e) annually. While Preble's Town Hall retrofit is commendable, the strategies noted in this document represent further efforts that can be made by the municipality as well as by the community members to reduce energy use and GHG emissions even further.

In 2011, a GHG inventory report was compiled to detail energy use and the sources of emissions in Preble. This Sustainability Plan uses the data provided in the GHG in-

ventory report to address strategies that both municipal operations and community members can take to reduce energy use and GHG emissions by 2020. Specifically, using 2011 as the base year, the emissions reduction target for municipal operations is 90% while the emissions reduction goal for community members is 20%.

Guided by the strategies explored in this Sustainability Plan, Preble 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 Preble's resources for the future.

The Town Hall retrofit will result in an energy savings of 268 MMBtu; equivalent to the amount of power it takes to run 276 ½ of Energy Star's most efficient refrigerators for a year.



TOWN HALL RETROFIT

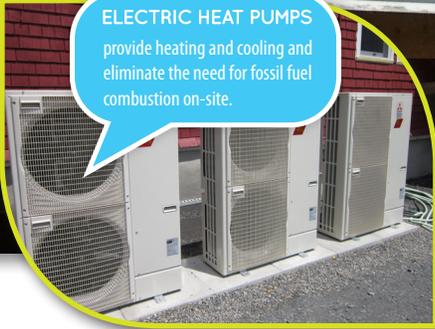
AT A GLANCE



9KW SOLAR PHOTOVOLTAIC PANELS
will generate approximately \$2,000 worth of electricity per year.



NEW ENERGY EFFICIENT WINDOWS
reduce air leakage making it easier to heat and cool the building

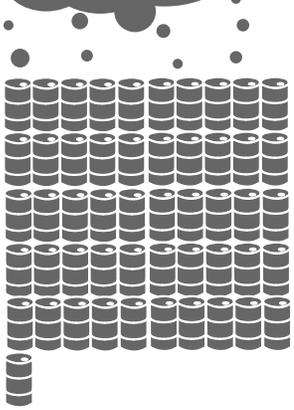


ELECTRIC HEAT PUMPS
provide heating and cooling and eliminate the need for fossil fuel combustion on-site.



NEW ATTIC INSULATION AND AIR SEALING
reduce air leakage making it easier to heat and cool the building

The Preble Town Hall retrofit will contribute to an annual emissions savings of 22.11MTCO₂e; equivalent to removing about 51 barrels of oil consumed each year.



GHG Inventory Summary

As part of the Climate Change Innovation Program, an inventory of Preble's municipal and community greenhouse gas (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 inventory report examined emissions generated in Preble in 2011, which serves as the baseline year for this Sustainability Plan.

The inventory report found that in 2011 Preble Town municipal operations generated a total of 151 metric tons of carbon dioxide equivalent (see figure 5), which were broken up into 3 sectors: buildings and facilities (63 MTCO₂e, 42%), streetlights and traffic signals (4 MTCO₂e, 3%), and vehicle fleet (84 MTCO₂e, 55%). Preble community emissions totaled 37,307 MTCO₂e (see figure 6), which were broken up into 4 sectors: residential energy use (3,766 MTCO₂e, 10%),

commercial energy use (838 MTCO₂e, 2%), transportation (31,792 MTCO₂e, 85%), and waste (garbage) (911 MTCO₂e, 3%).

Emissions from agricultural livestock and their waste were also addressed as an information item in the report, which noted that approximately 2,323 MTCO₂e were emitted by livestock manure (methane and nitrous oxide released from animal waste) and 5,925 MTCO₂e were emitted by enteric fermentation (methane released during dairy cow digestion processes) in Preble in 2011.

Preble's Sustainability Plan uses the data gathered in the GHG inventory report as a baseline for analyses to determine which energy efficiency strategies will be most effective in the town. The strategies suggested in this document can help Preble to reduce emissions, energy use, and dollars spent on municipal and community operations further by 2020.

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 1- Preble Municipal Emissions by Sector MTCO₂e (2011 Baseline)

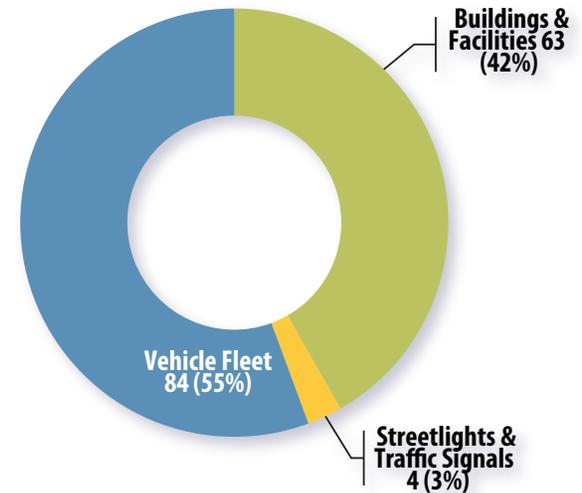


Figure 2- Preble Community Emissions by Sector MTCO₂e (2011 Baseline)

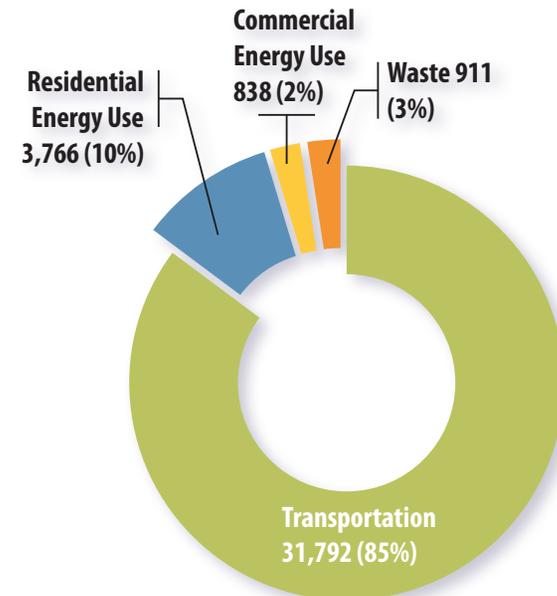
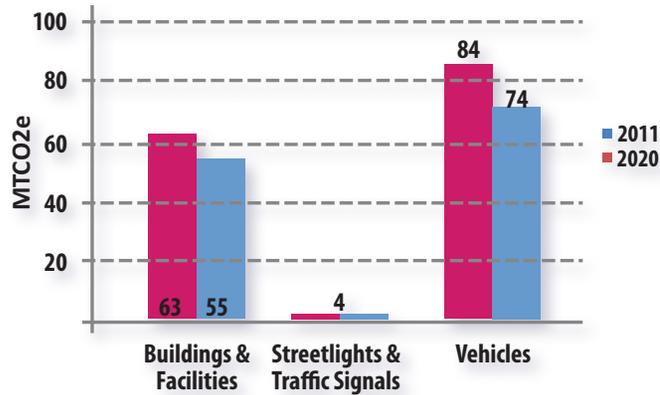
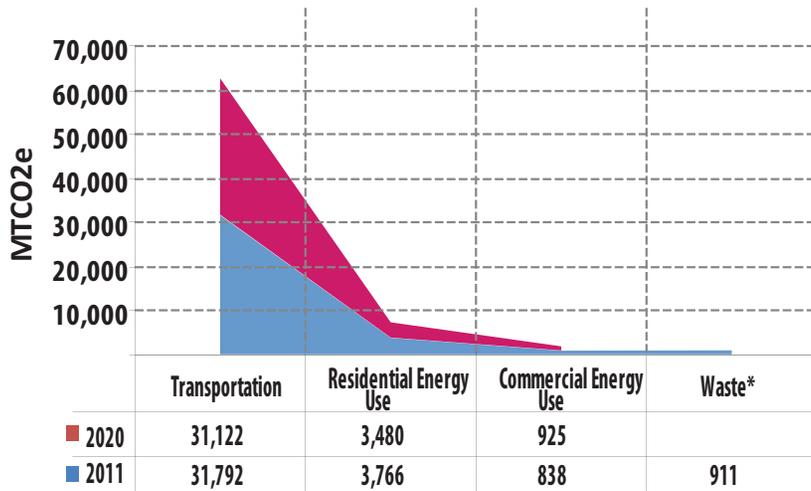


FIGURE 3- EMISSION FORECAST:
MUNICIPAL OPERATIONS



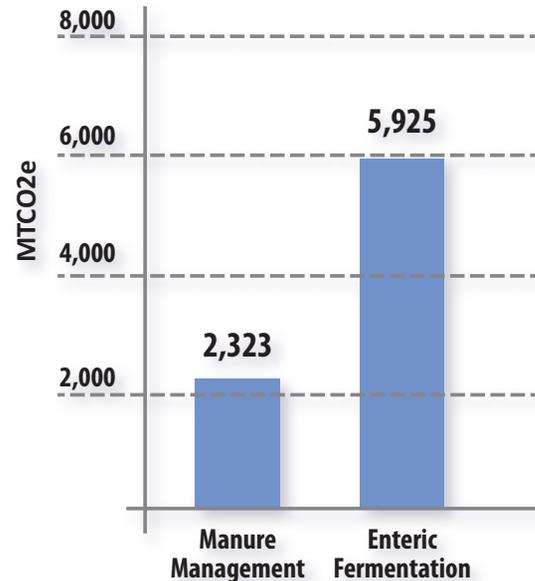
The GHG inventory report also forecasted emissions for Preble in 2020. The report explained that Preble municipal emissions were expected to total 133 MTCO₂e in 2020, with 8 MTCO₂e reduction in buildings and facilities emissions and 10 MTCO₂e reductions in vehicle fleet emissions, due to population decline and anticipated efficiencies in transportation and energy use sectors.

FIGURE 4- EMISSION FORECAST:
COMMUNITY



The community forecast showed similar reductions, and were expected to total 35,527 in 2020, with 670 MTCO₂e reductions in transportation, 286 MTCO₂e reductions in residential energy use, and an increase of 87 MTCO₂e in commercial energy use due to a slight increase in commercial production.

FIGURE 5- INFORMATION ITEM:
AGRICULTURAL EMISSIONS

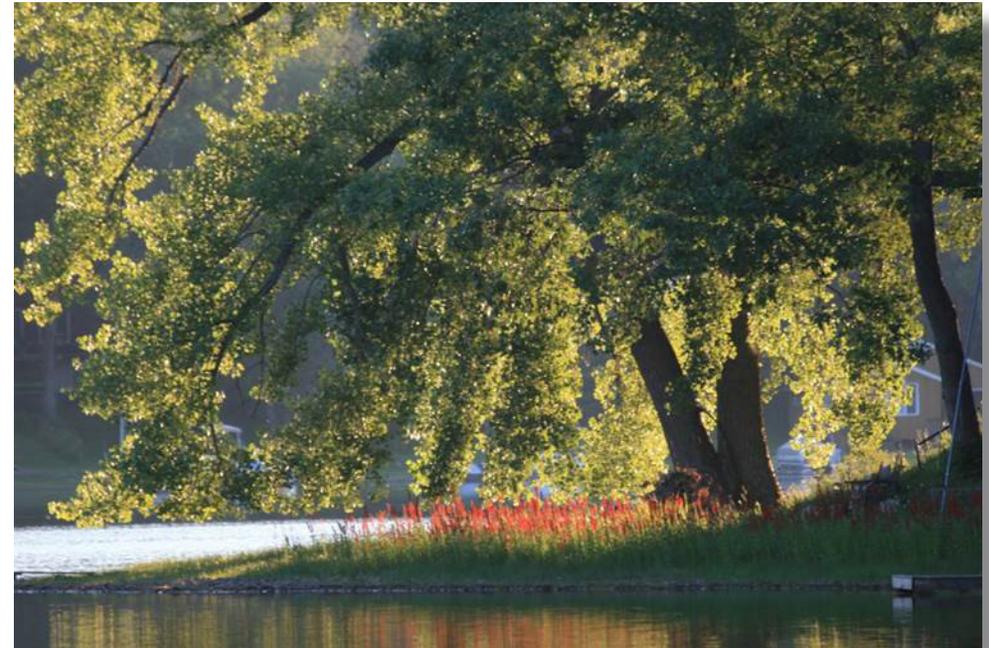


Emissions from agricultural livestock and their waste were also addressed as an information item in the report, which noted that approximately 2,323 MTCO₂e were emitted by livestock manure (methane and nitrous oxide released from animal waste) and 5,925 MTCO₂e were emitted by enteric fermentation (methane released during dairy cow digestion processes) in Preble in 2011.

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 town's emissions for both municipal operations as well as at the community-wide scale. The team utilized a software known as CAPP (Climate and Air Pollution Planning Assistant) version 1.5¹ 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 Town'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 6-8.**



Shore of Song Lake, Preble

¹ Climate action planning tool developed by ICLEI-Local Governments for Sustainability

FIGURE 6: TOTAL POSSIBLE REDUCTIONS BY 2020

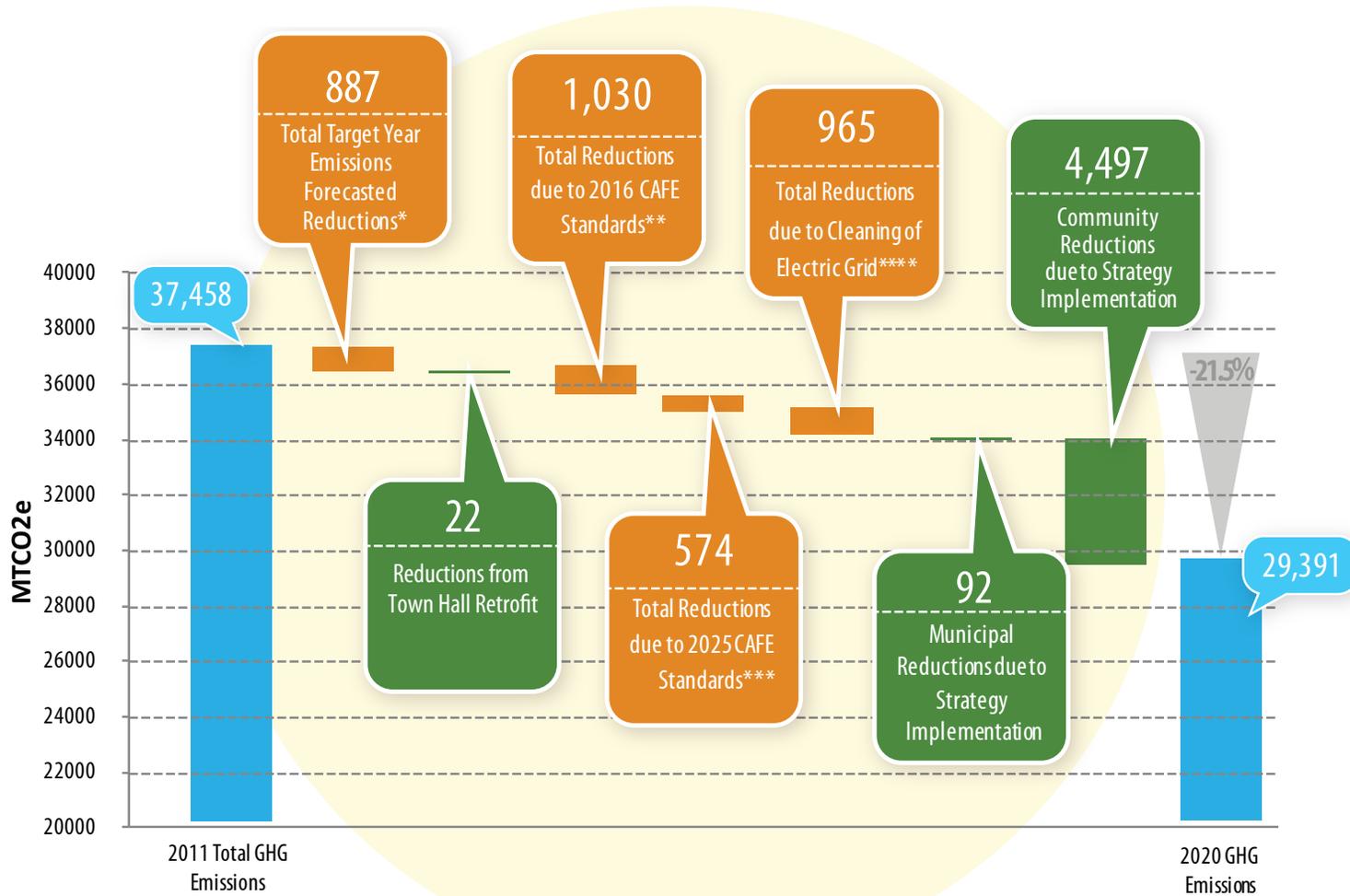
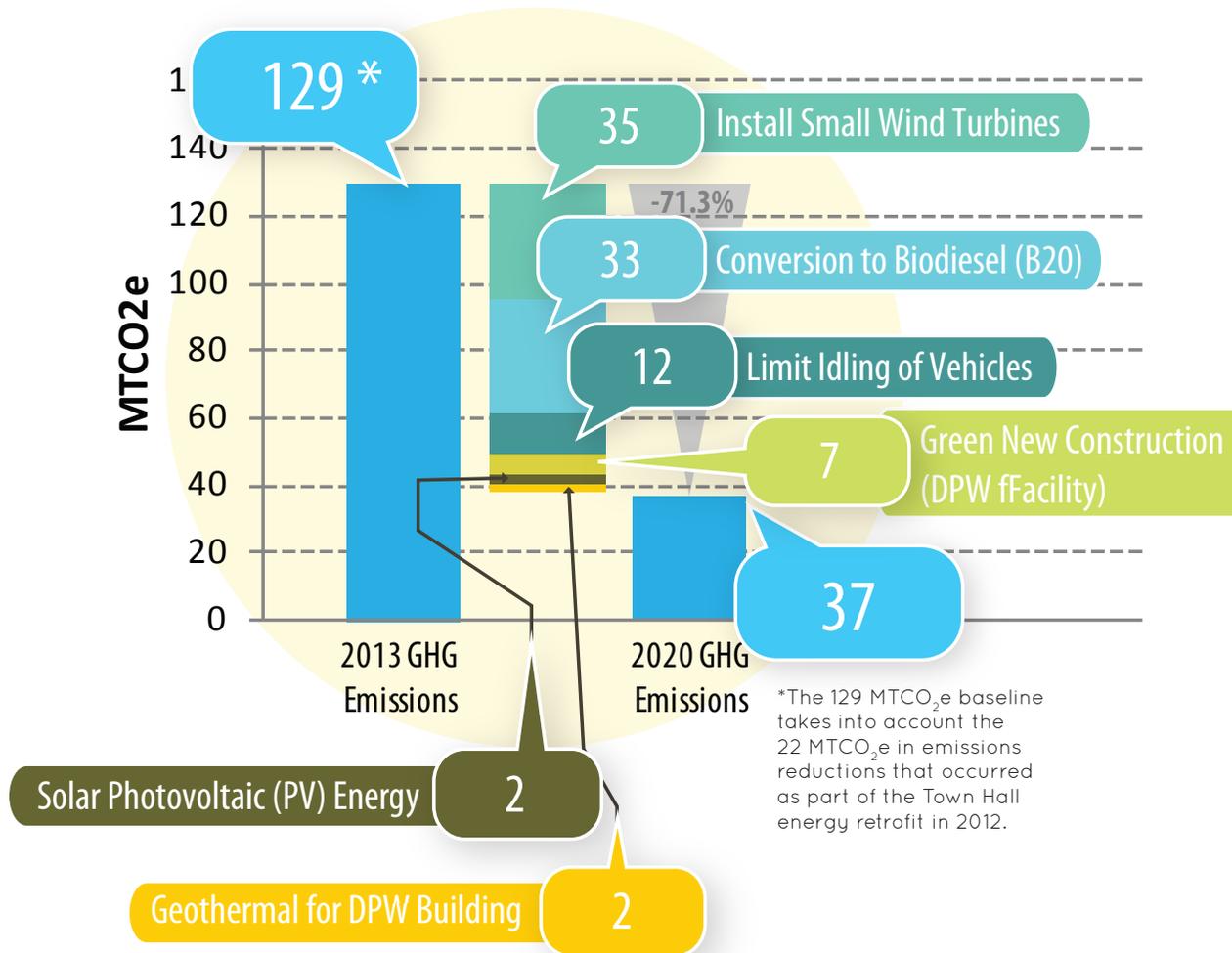


Figure 6- Total Possible Reductions by 2020

Figure 6 summarizes the results of the Preble GHG inventory, a 2020 emissions forecast based on current trends, impacts from the strengthening of Federal CAFE standards, the cleaning of the grid in Upstate New York, 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 Preble actions are shown in green while changes in emissions that will occur regardless of this Plan are shown in orange. It is projected that Preble’s total GHG emissions in 2020 could be reduced by 21.5% if the Town implements all of the recommended community-wide and municipal operations measures.

*2011 GHG inventory reported a forecast of 18 MTCO₂e reductions from Municipal operations and 869 MTCO₂e reductions from the Community due to population decline.
 **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. Reductions included in graph reflect calculated reductions by 2020.
 ****Since the 2011 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 2011, the changes in the electric grid alone have caused reductions of 965 MTCO₂e.

FIGURE 7: POTENTIAL MUNICIPAL REDUCTIONS FROM STRATEGY IMPLEMENTATION



Key:

1,093 Utilize Hybrid Vehicles

Illustrates emissions reductions in MTCO₂e

Emissions reduction strategy name

Figure 7- Potential Municipal Reductions from Strategy Implementation

Preble’s 2011 baseline municipal emissions as recorded by the GHG inventory report, potential reductions due to suggested strategies, and potential emissions in 2020 should each of the suggested strategies be implemented. It is estimated that there will be a 71.3% reduction in municipal emissions if all suggested strategies are implemented.

FIGURE 8: POTENTIAL COMMUNITY REDUCTIONS FROM STRATEGY IMPLEMENTATION

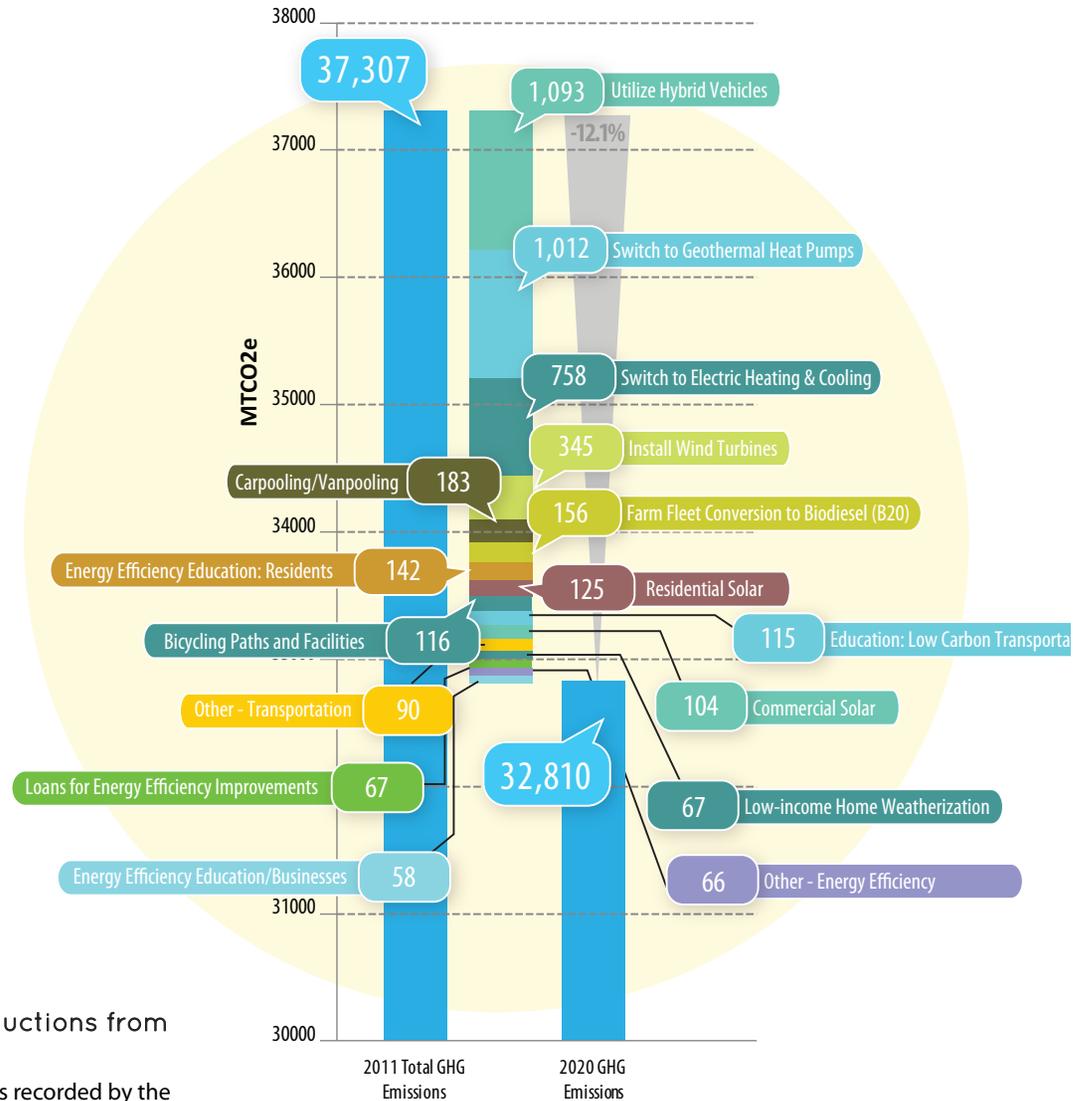


Figure 8- Potential Community Reductions from Strategy Implementation

Preble's 2011 baseline community emissions as recorded by the GHG inventory report, potential reductions due to suggested strategies, and potential emissions in 2020 should each of the suggested strategies be implemented. It is estimated that there will be a 12.1% reduction in community emissions if all suggested community reduction strategies are implemented.

TRANSPORTATION

According to Preble's GHG Inventory Report, the municipal vehicle fleet accounted for 84 MTCO₂e, 55% of municipal emissions. Community transportation also accounted for 31,792 MTCO₂e, 85% of community emissions in Preble in 2011. Therefore, the largest amount of

GHG reductions is possible and necessary in this sector. This Sustainability Plan addresses three main transportation emissions reduction goals: increase use of alternative fuels; increase options for low-carbon transportation; and reduce vehicle idling time.



Song Mountain
from snowmobile,
Preble

Increase use of alternative fuels

- **Promote conversion of community vehicle fleet to hybrid vehicles through education and outreach: 1,093** MTCO₂e annual reductions

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

- **Promote conversion of farm vehicles to biodiesel (B20) through education and outreach: 156** MTCO₂e annual reductions

This strategy assumes that one diesel vehicle per farm is converted to biodiesel.

- **Municipal conversion of diesel fleet to biodiesel (B20): 33** MTCO₂e annual reductions

This strategy assumes that 25% of the municipal diesel vehicle fleet is converted to biodiesel.

Increase Options for Low-Carbon Transportation

- **Promote and educate community about carpooling/vanpooling: 183** MTCO₂e annual reductions

This strategy assumes that 5% of the community takes advantage of carpooling.

- **Municipal expansion of bicycling paths and facilities: 116** MTCO₂e annual reductions

This strategy assumes that each person 16 years and older switches one trip per week from car to bicycle.

- **Education for citizens about low-carbon transportation options: 115** MTCO₂e annual reductions

This strategy assumes that 10% of house holds participate.

- **Increase bus service range: 41** MTCO₂e annual reductions

This strategy assumes that 5% of the population 16 and older switches from car to bus transport.

- **Municipal expansion of walking-friendly environments: 1** MTCO₂e annual reductions

This strategy assumes that 50 trips per week are switched from cars to walking.

Reduce vehicle idling time

- **Promote shorter idling of farm fleet vehicles through education and outreach: 48** MTCO₂e annual reductions

This strategy assumes that one vehicle per farm stops idling completely.

- **Limit idling of municipal vehicles: 12.3** MTCO₂e annual reductions

This strategy assumes that municipal vehicles reduce idling time by 50%.

Increase use of alternative fuels

According to the 2011 GHG Inventory Report, municipal operations in Preble consumed approximately 756 gallons of gasoline and 8,075 gallons of diesel in 2011, while the community consumed approximately 2,803,369 gallons of gasoline and 233,497 gallons of diesel. These fuels are not only non-renewable fossil fuels; they also produce significantly more carbon emissions than alternative fuels, such as electricity and biodiesel. Conversion to alternative fuels can therefore be extremely effective when trying to reduce emissions from the transportation sector.

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. 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 Preble's emissions and provide other benefits to community members as well.

“LOCALLY, WE HAVE JUST REPLACED OUR 2006 JOHN DEERE LOADER WITH A 2013 CAT THAT IS THE SAME SIZE. WE HAVE REALIZED A 10% – 15% DECREASE IN FUEL CONSUMPTION, WHILE AT THE SAME TIME EXPERIENCING THE HEALTH AND ENVIRONMENTAL BENEFITS. (BLACK SMOKE NO LONGER BILLOWS FROM THE EXHAUST STACK EVERY TIME THE ENGINE IS ACCELERATED.)” – Jeff Griswold, Preble Highway Superintendent

Increase Options for Low-Carbon Transportation

Increasing options for low-carbon transportation would reduce the amount of vehicle miles traveled (VMT), reducing gasoline and diesel use which would therefore reduce Preble’s emissions, fuel costs, and reliance on foreign fossil fuels. According to a 2010 University of Washington Study, the best way to reduce VMT in a rural setting is by combining trips. The study also notes other strategies that can be successful in rural areas like Preble, including: shifting to walking/biking; increasing car/vanpooling; travel less through telecommuting; reducing discretionary trips; compressing the workweek; road pricing; and compact transit oriented development.

Similarly, the Climate Action Plan for San Luis Obispo County, California (an agricultural community) mentions a goal of reducing VMT associated with commuting by agricultural workers. Their plan suggests implementing and publicizing a vanpool program for agricultural workers using available grant money to purchase vans. Similar actions can be encouraged and implemented in the Town of Preble to increase low-carbon transport, including expansion of park-and-ride areas.

A new report from the Rails-to-Trails Conservancy explains that contrary to popular belief, rural Americans are just as likely to use biking and walking as modes of transportation as city-dwellers. The report notes that:

In terms of total trips, rural Americans bike at a rate of between 74 percent and 104 percent of the overall national rate, depending on the type of community in which they live.

The share of work trips made by bicycle in small towns is nearly double that of urban centers. Within

small towns of 2,500 to 10,000 residents, people walk for work purposes at a rate similar to the urban core communities.

Federal investment in biking and walking benefits rural areas as much or more than urban centers. Rural areas receive almost twice as much funding per capita as urban areas from the federal Transportation Enhancements program

Among a list of travel priorities, rural Americans selected sidewalks more often than any other transportation need and nine out of 10 cited the importance of pedestrian friendly communities.

This means that expanding biking and walking infrastructure as low-carbon transportation options in Preble could also be implemented successfully, reducing emissions and fuel costs at the same time.

There are many possible low-carbon transportation options that could be successful in the Town of Preble. 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.

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, heavy duty vehicles used for agricultural purposes on a farm are an exception to the rule and therefore present an area that can be improved upon. Limiting the idling of vehicles decreases emissions, fuel costs, and reliance on foreign fossil fuels, while also improving local air quality.

BUILDINGS

According to Preble's GHG Inventory Report, emissions from municipal buildings/facilities accounted for 63 MTCO₂e, 42% of total municipal emissions, while the community's residential and commercial energy use accounted for 10,604

MTCO₂e, 12% of the community's total GHG emissions in Preble in 2011. This Sustainability Plan addresses two main energy/efficiency emissions reduction goals: increase energy efficiency in buildings; and increase use of renewable energy.

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

Electric Heat Pump System at Preble Town Hall

Increase energy efficiency and reduce emissions from buildings

- **Promote and educate community about high efficiency HVAC units, such as electric heating/cooling: 758** MTCO₂e annual reductions

This strategy assumes 25% of households switch from fuel oil to electric heating/cooling.

- **Promote energy efficient education targeted at residents through the CNY Energy Challenge Team program: 142** MTCO₂e annual reductions

This strategy assumes 10% of households participate.

- **Municipal weatherization of low-income homes: 67** MTCO₂e annual reductions

This strategy assumes 10% of homes are weatherized.

- **Promote and educate community about incentives/loans for energy efficiency improvements from funding agencies, such as NYSERDA: 67** MTCO₂e annual reductions

This strategy assumes that 10% of homes take advantage of incentives/loans for energy efficiency improvements.

- **Energy efficient education targeted at businesses: 58** MTCO₂e annual reductions

This strategy assumes 10 businesses participate.

- **Promote and educate community about the use of energy efficient appliances: 40** MTCO₂e annual reductions

This strategy assumes 25% of households update their appliances to energy efficient models.

- **CFL bulb giveaway: 18** MTCO₂e annual reductions

This strategy assumes that one bulb per household is switched from incandescent to CFL.

- **Municipal green new construction of DPW building: 7** MTCO₂e annual reductions

This strategy assumes that the new DPW building is built with 25% higher efficiency standards.

- **Encourage green and reflective roofing***

- **Municipal encouragement to building code officers to apply high efficiency measures***

*These strategies are included as informational items and therefore do not have associated emissions reductions or strategy implementation levels listed.

Increase use of renewable energy

- **Encourage and educate community about switching to renewable energies such as geothermal heating/cooling: 1,012** MTCO₂e annual reductions; and/or **small wind energy: 345** MTCO₂e annual reductions; and/or **solar photovoltaic (PV) energy: 125** MTCO₂e annual reductions.

This strategy assumes installation of geothermal heating/cooling in 25% households, ten 100 kW capacity wind turbines, and/or 504 kW capacity solar PV panels.

- **Encourage and educate farmers about solar PV energy: 104** MTCO₂e annual reductions

This strategy assumes installation of a 140 kW solar PV array at three farms.

- **Municipal use of small wind energy: 35** MTCO₂e annual reductions; and/or **solar photovoltaic (PV) energy: 3** MTCO₂e annual reductions; and/or **geothermal heating/cooling for new DPW building: 2** MTCO₂e annual reductions

This strategy assumes installation of a 100 kW capacity wind turbine, an 11 kW capacity solar PV array, and/or 1,400 square feet of geothermal heating/cooling.

“THERE CAN BE NO SUSTAINABLE DEVELOPMENT WITHOUT SUSTAINABLE ENERGY DEVELOPMENT.”

—Margot Wallstrom, European Union Environmental Commissioner (2004)

Increase energy efficiency and reduce emissions from buildings

Because Preble currently uses fuel oil as the primary energy source in buildings, the majority of buildings can reduce their GHG emissions by switching out fuel oil-fired furnaces with more efficient forms of heating, ventilation, and air conditioning (HVAC) units, even if they are somewhat non-renewable, like electricity. 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.

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. Community members can also take smaller steps to make buildings more efficient, such as replacing older, less efficient appliances and light bulbs with newer, more efficient ones.

Another key to increasing energy efficiency in buildings in Preble is to encourage building code officers to apply high efficiency measures during new construction or building retrofits by providing incentives or educational support. The Town could mandate that building code officers receive education on building science so that they can be helpful in communicating best practices to residents and property owners within the Town.

The majority of heating in Preble (60% of households) is currently accomplished by using fuel oil-fired furnaces. In 2011, Preble's municipal operations utilized approximately 254 gallons of fuel oil while the community used about 337,575 gallons of fuel oil. Burning fuel oil produces significantly more greenhouse gas emissions than utilizing other energy sources, especially renewable energies. By installing renewable energies such as geothermal, wind, and/or solar at the local level, Preble can ensure that their energy is provided by clean and local renewable energy sources, therefore reducing greenhouse gas emissions, energy cost, reliance on fossil fuels, and even improving air quality.

Increase use of renewable energy

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 County¹. These programs are an effective way of combining public and private funds for renewable energy. NYSERDA provides incentives for the installation of solar PV and wind turbines based on system size. Additionally, there are state and federal 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.

¹ Visit www.solarizenewyork.org for more information

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 dsire-usa.org to learn more about current incentive opportunities.

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

Preble has already installed a 9 kW solar PV rooftop system as part of their Town Hall retrofit. The Town Hall building has eliminated its need for fossil fuel combustion on site and now produces more renewable, locally-produced energy than it uses.

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.

WASTE

In 2011, 3% of the community's GHG emissions, 911 MTCO₂e, came from waste. When organic matter like wood, paper, food, and yard wastes is placed in landfills, it decomposes anaerobically, producing

methane. Methane is a greenhouse gas 21 times as powerful as carbon dioxide. Collecting and composting this organic waste prevents the emissions it would have produced in a landfill.



Organics
Composting

Promote composting

- **Encourage and educate community about organics and yard waste composting: 8** MTCO₂e annual reductions

This strategy assumes 300 lbs. per person will be diverted each year.

- **Municipal provision of chipping and composting option***

***These strategies are included as informational items and therefore do not have associated emissions reductions or strategy implementation levels listed.**

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 landfills, 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. A similar composting and chipping site will become available in Preble through the Department of Public Works for community members to drop off organic materials and pick up mulch and compost in return.

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

- **Encourage community tree planting:** **.25** MTCO₂e annual reductions

This strategy assumes 10% of households plant one tree each year.

- **Municipal tree planting project:** **.02** MTCO₂e annual reductions

This strategy assumes municipal operations plant 5 trees each year.

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 Cortland County Soil and Water Conservation District offers an annual Spring Tree Seedling and Ground Cover Sale, generally beginning in January and ending in April. New-York grown conifers, hardwoods, shrubs, and ground covers can be purchased at low-costs during the sale, and the planted greenery helps to prevent erosion and provide shading of homes.

“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

AGRICULTURE

The practice of agriculture is a key component of Preble's present economy and open-space character, and agricultural lands currently comprise the majority of parcels in the town. The Town of Preble Comprehensive

Plan and the Towns of Homer, Preble and Scott Agriculture and Farmland Protection Plan previously established goals for the protection and enhancement of the Town of Preble's agricultural and natural resources.



Knapp Farm, Preble

Agricultural Protection

- **Research the benefits of anaerobic digesters on farms and/or community biodigester: 2,171** MTCO₂e annual reductions
This strategy assumes 25% of farms participate.
- **Research the benefits of feeding low-methane emission diets to cattle***
- **Research the benefits of various soil management practices on emissions***
- **Research the benefits of nitrogen management practices***
- **Local food market***

***These strategies are included as informational items and therefore do not have associated emissions reductions or strategy implementation levels listed.**

While it is important to preserve Preble's agricultural heritage, it is also important to recognize that agriculture is a significant source of GHG emissions. Agricultural activities are the single largest source of all nitrous oxide emissions and contribute to approximately 35% of all methane emissions nationwide.

According to Preble's 2011 GHG emissions inventory report, "The estimated emissions from agricultural ac-

tivity in the Preble community totaled 5,925 MTCO₂e for enteric fermentation (methane released during dairy cow digestion processes) and 2,323 MTCO₂e for manure management (methane and nitrous oxide released from animal waste) in 2011." Agricultural related emissions were included in the GHG inventory as an information item due to the difficulty of accurately measuring emissions levels from agricultural operations. At the same time, the increased potency of GHGs like methane make the agricultural sector worth detailed consideration. It should be noted that efforts to reduce agricultural emissions, like the utilization of methane digesters for handling manure waste, have significant co-benefits. Digesters are an especially effective tool for manure management for large dairy facilities; and digesters provide a substantial financial benefit. Possible strategies for reducing agricultural emissions are explored as informational items due to the uncertainty of quantifying emissions reductions in the agricultural sector.

Agricultural systems are expected to be impacted significantly by climate change as well. It is most likely that the local response to the effects of global climate change will include both strategies to reduce emissions (called mitigation strategies) as well as adaptive strategies that have the potential to reduce negative

impacts of climate change on Preble's agricultural community. In many cases, both mitigation strategies and adaptive strategies will have important co-benefits regardless of their impacts on climate related concerns.

As an example, this document examines the strategy of implementing a community anaerobic digester using manure from farms and possibly food and yard waste from the town. Because dairy farms in Preble are generally small operations, a community digester on the county-wide scale, similar to the Cayuga Regional Digester facility¹ (by which the county Soil and Water Conservation District takes care of transporting manure and post-digestion materials to and from the regional facility), may be the most effective. That way, emissions could be greatly reduced and farmers could take advantage of higher quality fertilizer produced from the digestion process without any additional financial or time commitments for the farmers themselves. The county Soil and Water Conservation District would benefit through the sale of electricity, carbon credits, heat, and post-digestion solids produced at the regional facility. Other types of manure management, such as handling manure as a solid, depositing it on pasture rather than storing it in a liquid-based system such as a lagoon, reduc-

¹ Visit <http://www.cayugaswcd.org/> for more information



ing storage time, and covering storage ponds to capture and use/burn methane, would also reduce GHG emissions and have beneficial impacts on the health of surface and subsurface water systems as well, including the sole source aquifer.

Introducing a local market, coop, or community grocery store in rural areas has been successful in various settings and can be done in Preble to reduce VMT, vitalize the community, introduce a local market for farmers, and increase economic prosperity in the area. Encouraging the sale and purchase of local foods would reduce the amount of VMT in various ways, such as reducing miles traveled from local farms to grocery stores or markets to sell goods, as well as reducing miles traveled to grocery stores or markets to purchase goods.

Other examples of agricultural emissions reduction strategies explored in this Sustainability Plan include: researching the benefits of possible dietary changes for farm animals, soil management practices, and nitrogen management practices; converting farm fleet vehicles to bio-diesel (B20); energy efficiency education targeted at farm businesses; installing solar PV panels on roofs of farm buildings and/or on farm land; installing green/reflective roofing on farm buildings; and offering loans for energy efficiency improvements on farm buildings and equipment.

By incorporating Preble's agricultural heritage into this Sustainability Plan, the farming community can continue to prosper while at the same time reducing energy use, costs, and GHG emissions.

Thinking Sustainably:

The Knapp Family

Despite the challenges associated with being a farmer, the Knapp family has endured since 1895 when the first generation Knapp farmer moved to Preble. However, the Knapp family can boast even greater accomplishments than standing the test of time. They have chosen to use the most sustainable farming practices that they can, and therefore are contributing to Preble's sustainable future.

Peter Knapp is a fourth-generation dairy farmer with about 300 acres of farmland who milks about 60 cattle and has around 60 young stock. He uses sustainable farming practices every day such as soil sampling, animal grazing, and manure management on his land to ensure the productivity of his farm now and in the future.

Peter uses soil sampling to determine which kinds and how much fertilizer is needed to produce his crops, mainly corn and alfalfa used for feed. He also uses manure management practices to ensure fertility of his soils while limiting synthetic fertilizer use. These practices not only minimize farmstead run-off and synthetic inputs, they also save Peter money. "It's all about economics," Peter says, "saving money and doing the best you can."

Paul and Maureen Knapp, Peter's brother and sister-in-law, have also gone above and beyond to be sustainable on their farm. Cobblestone Valley Farm made the transition to certified organic management in 2001. Paul and Maureen produce certified organic milk, strawberries, broilers, and turkeys.

Grass fed Beef, pork, and a small laying flock are managed organically, but not certified. All products except the milk are marketed directly from the farm. The majority of their 350 tillable acres are devoted to growing organic feed for their animals. Cobblestone Valley is certified by Northeast Organic Farming Association of New York (NOFA-NY), an independent agency which is certified by USDA. Organic standards ensure that the farm does not use any synthetic inputs, including chemical fertilizers, hormones, or antibiotics, while also looking to prevent animal and plant disease by keeping the soil as biologically active as possible. Additionally, they need to maintain a 50-foot buffer zone be-

tween their organic farm and any neighboring conventional farms. In 2012, Paul and Maureen were recognized by NOFA-NY as Farmers of the Year for their outstanding stewardship of the land and their contributions to the New York organic community.

Paul and Maureen believe that maintaining healthy soil is extremely important in producing a quality product because "healthy soil equals healthy plants, equals healthy food, equals healthy people." Because soil health is so important, Paul and Maureen make compost on-farm with a compost turner, using dairy manure along with lake weed from Tully and Little York Lakes, used bedding, and sawdust.

Paul and Maureen feel that there are many benefits to farming organically. "It just makes sense," says Maureen, "if you can do it that way, why not do it that way?" Their farm is part of Organic Valley Cooperative, which sets its own milk prices, so they always know how much they will get for their milk, and are able to budget accordingly. This is not typical of non-organic dairy farmers who experience monthly variations on the price they get for milk. Many of Paul and Maureen's customers agree that their organic products taste better than conventional products; people drive for miles and pay extra to purchase Thanksgiving turkeys, for example, that were raised at Cobblestone Valley Farm.

"Our biggest issue in trying to expand our farming operations has been finding enough capable labor," Maureen explained. As in many businesses, farming requires a specific skill set, yet also requires manual labor, long hours, and minimal time off. That mix is not easily found, and so most farms struggle to find experienced workers to keep the farm running smoothly. The most important advice Maureen would give to other farmers considering making the switch to organic production is to, "spend time with somebody who is already doing it to see the benefits and potential pitfalls ahead of time." An internship would be ideal, as it would greatly shorten the learning curve of beginning organic farmers.

The Knapp family exemplifies sustainability through their farming practices that have demonstrated both economic and environmental success over time, and the Knapps continue to contribute to Preble's sustainable future each day.

STRATEGY IMPLEMENTATION CHART

Issue	Strategy	Ballpark Rankings (see key below)			Possible Implementatino 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: Municipal	1. Conversion to biodiesel	1 ^A	4	N/A	x			x				x
	2. Limit idling of heavy duty vehicles	1	2	1	x			x		x		x
	3. Limit idling of other vehicles	1	1	1	x			x		x		x
Transportation: Community	1. Conversion of farm fleet vehicles to biodiesel	1 ^A	1	N/A		x		x				x
	2. Promote Carpooling/Vanpooling	1	1	1		x		x		x		x
	3. Utilize hybrid vehicles	2	2	1		x	x	x		x		x
	4. Limit idling of heavy duty vehicles (farm vehicles)	1	1	1				x		x		x
	5. Educate citizens about low-carbon transportation options	1	1	1		x		x		x		x
	6. Expand bicycling infrastructure	1	1	2		x	x	x	x	x		x
	7. Expand bus service in range	1	1	1		x	x		x	x		x
	8. Increase walking friendly environments	3	1	5			x	x	x	x		x
Energy/Efficiency: Municipal	1. Require green building for new construction	1	1	1	x		x		x	x	x	x
	2. Geothermal heating/cooling pumps	1	1	4			x	x	x	x		x
	3. Install solar PV panels	1	1	3			x	x	x			x
	4. Install small wind turbines	2	4	5			x	x	x	x		x

^AWhile there would be no initial investment costs of using B20 biodiesel, conversion to biodiesel would be an annual cost of \$999.79 in increased fuel costs for municipal operations and \$4782.94 for the community.

Key to Ballpark Rankings		
Est. Total Costs	Est. Total GHG Impact	Est. Payback Time
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

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		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	5. Low-income home weatherization	2	1	4		x	x	x	x	x	x	x
	6. Switch fuel oil heating to electric	3	2	3		x	x	x		x		x
	7. Install solar PV panels	3	1	4		x	x	x	x			x
	8. Geothermal heating/cooling pumps	3	2	3		x	x	x	x	x		x
	9. Install small wind turbines	1	1	1		x	x	x	x	x		x
	10. High efficiency appliances	1	1	2			x	x		x		x
	11. Promote incentives/loans for energy efficiency improvements	2	1	5		x		x	x	x	x	x
	12. Energy efficiency education through Energy Challenge Team program	1	1	1		x		x		x		x
	13. Install green/reflective roofing	N/A	1	N/A		x	x	x	x	x	x	x
14. Distribute free CFL bulbs	1	1	1		x		x				x	
Energy/Efficiency: Commercial	15. Energy efficiency education targeted at businesses	1	1	1		x		x	x	x	x	x
	16. Install solar PV panels	3	1	4		x	x	x	x	x		x
	17. Community anaerobic digester	N/A	N/A ^{ΔΔ}	N/A		x	x	x	x	x		x
	18. Investigate feeding cows low methane emissions diet	N/A	N/A	N/A				x				x
	19. Investigate various soil management practices	N/A	N/A	N/A				x			x	x
	20. Investigate nitrogen management practices	N/A	N/A	N/A				x				x
Waste	1. Organics (kitchen) composting	N/A	1	N/A		x		x				x
	2. Yard waste composting	N/A	1	N/A		x		x				x
Other	1. Tree planting	1	1	2		x	x	x				x

^{ΔΔ}Potential emissions reductions from implementing a community anaerobic digester = approximately 2,1717 MTCO₂e. Agricultural emissions were not included in the baseline emissions data and are therefore calculated separately here.



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