

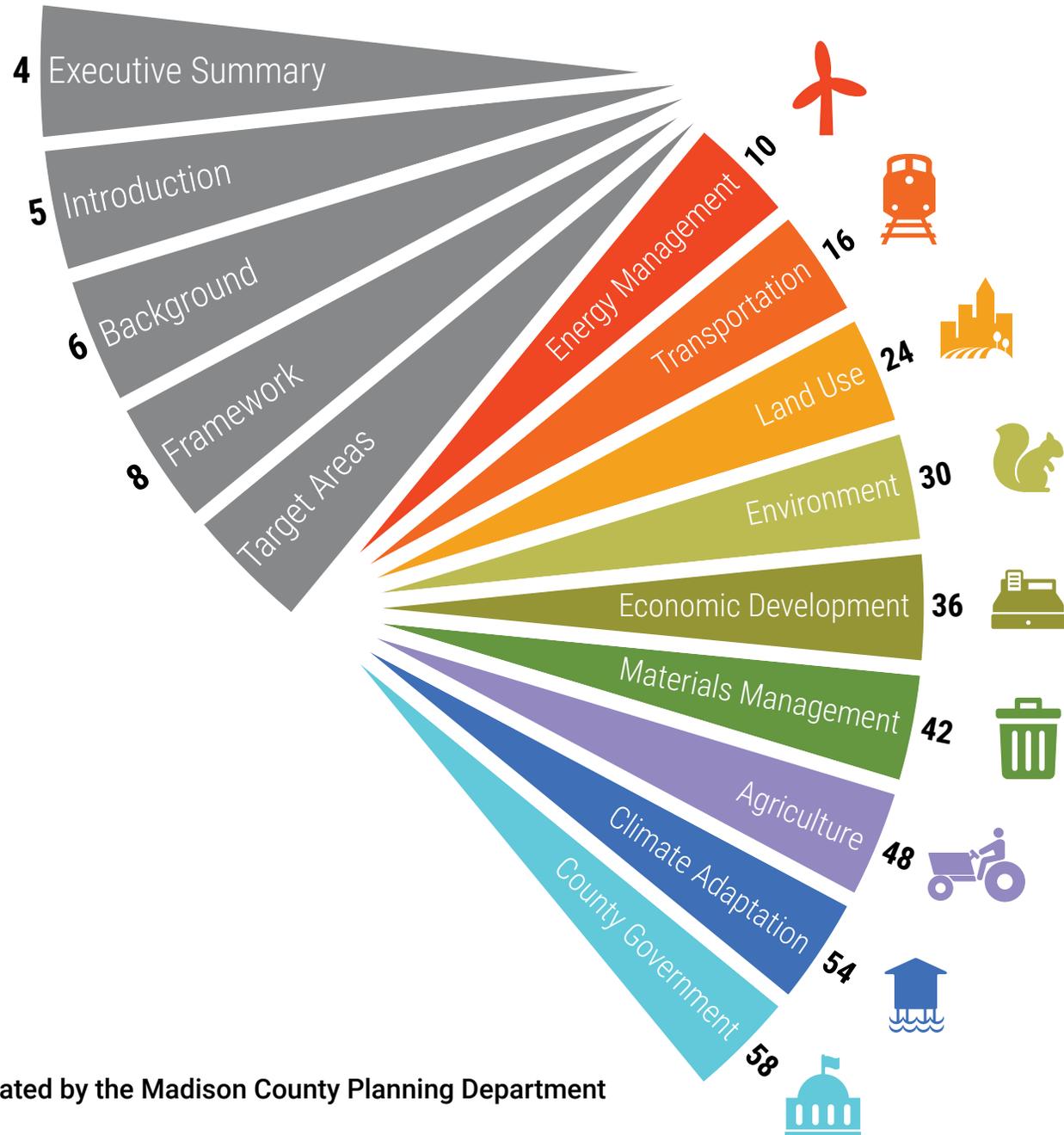
Energy and Sustainability Plan Madison County, NY



2016



Contents



Created by the Madison County Planning Department

A message from the County Chairman



The Madison County Energy and Sustainability Plan represents a coordinated effort to reduce Madison County's greenhouse gas emissions while increasing the economic vitality and quality of life in our communities. The Plan is part of Madison County's commitment to participate in New York State Climate Smart Communities program and includes the actions Madison County is committed to undertaking to further address the critical issue of sustainability.

John Becker

Chairman of the
Madison County Board of Supervisors

Executive Summary

The Energy and Sustainability Plan for Madison County was designed to use our 2013 Greenhouse Gas Inventory as a launchpad for emissions reduction goals and strategies. Participation in the 2010 Climate Change Innovation Program (C2IP), headed by the Central New York Regional Planning and Development Board (CNYRPDB), was the catalyst for the inventory and has led us down many paths toward improved energy efficiency, community education, and an overall improvement in our carbon footprint.

Paradigm shifts often require leadership by those who are willing to step outside of the box, take risks, and lead by example. When it comes to alternative energy, Madison County has been a leader in the State and Nation for many years. From housing the first commercial wind farms east of the Mississippi in 1999-2000, to our use of collected landfill methane to create electricity, to present day efforts to utilize large scale solar energy to power municipal operations, Madison County has taken that leadership role that has helped provide opportunities for its residents and those of neighboring municipalities.

Though some of the goals and tasks identified in this plan are already underway, many have yet to

be started. With proactive and forward thinking leadership at the County Board level, and staff that are willing to take the lead on implementation, Madison County is poised to make great strides in the energy and sustainability arena in the future. With an easily digestible level of background information and explanation, this document sets forth a roadmap that was intended to be easy to follow and straightforward to implement.

The Plan is broken down into nine goal areas which include: Energy Management, Transportation, Land Use, Environment, Economic Development, Materials Management/Waste, Agriculture, Climate Adaptation/Resiliency, and Madison County Government. These areas were in part chosen to mirror similar topic areas within the "Vision CNY Central New York Regional Sustainability Plan" prepared by the Central New York Regional Planning and Development Board in 2013. In addition, the emphasis is on specific goals and focus areas that were identified as priorities through partner surveys, Energy Committee Meetings, and topics of State and National importance. With this plan, and continued local, regional, and national support, Madison County can sustain and enhance its present levels of proactive energy policy.

Introduction

What is sustainability?

Sustainability is a strategy that recognizes all the assets of a community and acknowledges that communities gain more when those assets are leveraged together. Investing in green initiatives means designing communities with intention. It means that projects are held to a high standard to ensure they preserve and enhance the values and resources of our communities including preserving our working farmland to supporting livable places that are healthier and more economically viable. By continuing to pursue green initiatives, we demonstrate our dedication to looking beyond the status quo and recognize that each new endeavor is an opportunity to leverage all of our assets, including our vast natural resources, to create efficient, holistic growth that reduces costs and integrates economic development with community quality of life. Through advancing these technologies and initiatives, we are creating a momentum that is bringing new vitality to our communities and establishing Madison County as a leader.

The Madison County Energy and Sustainability Plan is the beginning of a journey toward a more sustainable Madison County. In these pages, the citizens of Madison County will find policies and programs that aim to reduce emissions, save energy and money, and help Madison County continue to be a beautiful and healthy place to live, work, and play.

Background

In 2010, Madison County applied for and was awarded a grant through the Central New York Regional Planning and Development Board's Climate Change Innovation Program (C2IP).

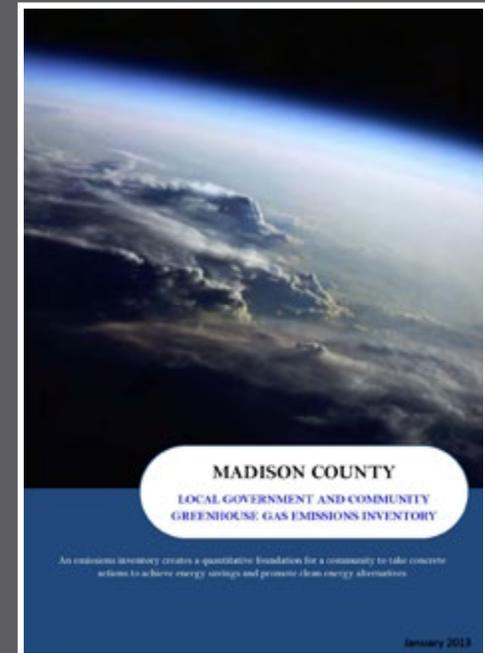
Regional Planning had been awarded a United States Environmental Protection Agency (EPA) Climate Showcase Communities Program grant and had developed the C2IP program for Central New York. The goal of the EPA's program is to "create replicable models of community action that generate cost-effective and persistent greenhouse gas reductions while improving the environmental, economic,

public health, or social conditions in a community". Regional Planning built the C2IP program around two main goals: improving energy performance in local government operations; and removing barriers for greenhouse gas management and the reduction of vehicle miles traveled through the development of effective local government programs, policies, and outreach in the areas of land use, transportation, and community master planning.

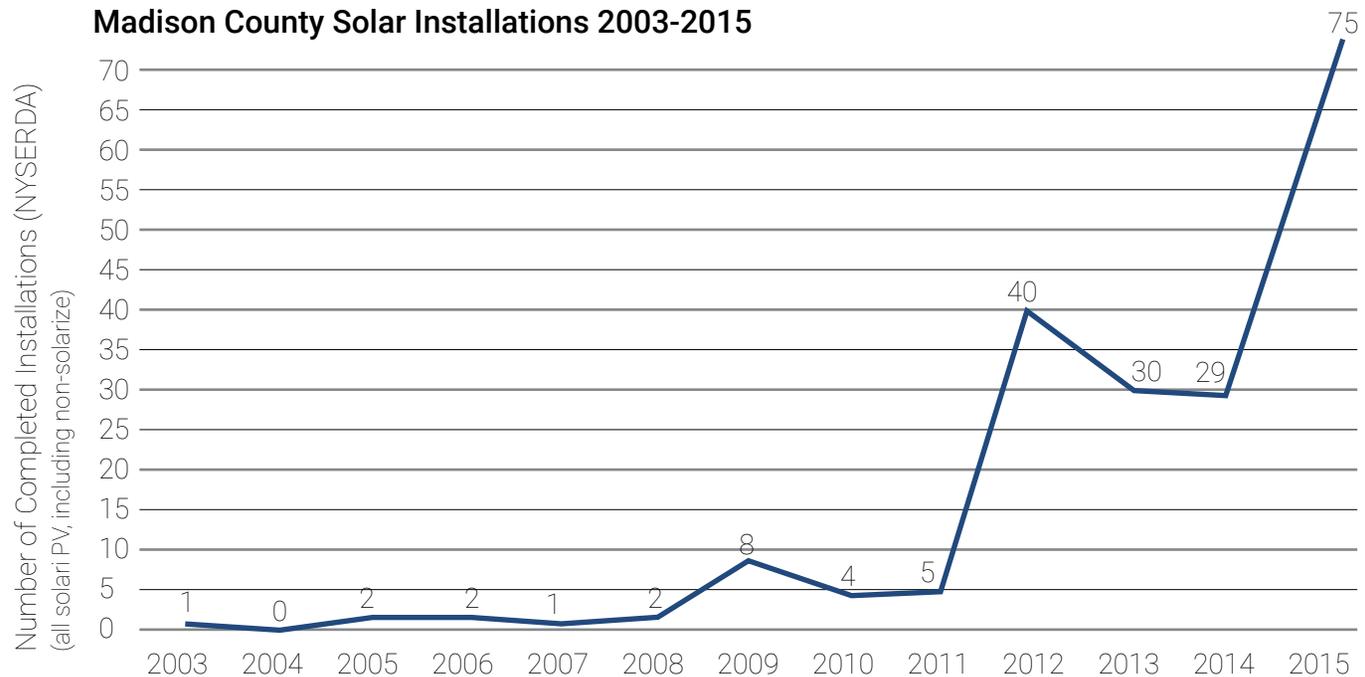


Madison County GHG Inventory Summary

Completed in January of 2013, the Greenhouse Gas (GHG) Inventory used 2010 data for its baseline and was developed using ICLEI's Clean Air and Climate Protection software in addition to a great investment of time and energy collecting government and community level energy consumption data. For the first time ever, Madison County now has a clear picture of both its energy use and cost as well as that of our community and citizens. Madison County emitted 777,338 metric tons of carbon dioxide equivalent (mtCO₂e) or 10.6 tons for each of Madison County's 73,442 residents. Energy consumption costs for Madison County government operations is about \$1.5 million a year and accounts for about 0.75% of total community-wide emissions. The plan itself goes into much greater detail in a number of sectors and provides a clear and concise baseline from which to develop this Energy and Sustainability Plan (ESP).



Madison County Solar Installations 2003-2015



For Madison County, this three year project included a number of facets, most notably the development of a Greenhouse Gas inventory and the Solarize Madison Program. The award included \$30,000 for the development or implementation of greenhouse gas mitigating technologies, to which Madison County developed (with partners including the Renewable Energy Training Center at Morrisville State College and CNYRP&DB) the Solarize Madison Program. Through a competitively bid process, we selected a Solar PV installation contractor that offered a unique and cost saving tiered pricing approach that gave participants greater cost savings as more participated in the installation of solar PV. The first 15 residential participants were offered a

\$2,000 incentive to further reduce the costs of solar installations.

The program was so successful that we had a total of 29 installations in the first year and Madison County went from being the 24th most expensive County for installing Solar PV in New York, to the cheapest County in all of New York State. The program continued into 2013 and focused on solar PV as well as solar hot water. The 2013 program resulted in 115kW of installed solar PV and 19 installed hot water systems. In 2015 Madison County participated in SolarizeCNY, a regional solarize program in Madison, Oswego, Cayuga, Oneida, and Onondaga counties. 344 systems were installed in the 5 county region through SolarizeCNY in 2015.

Framework

The Energy and Sustainability Plan is both a short and long term vision for attainment of the County's energy future. The plan highlights energy goals, develops action plans to meet those goals, and identifies needed resources for attainment. At the government level, it has been determined (using 2010 baseline data) that the County spends nearly \$1.5 million a year on electricity, natural gas, and transportation fuels combined. The bulk of those dollars are spent on running the buildings and fueling vehicles. The resulting greenhouse gas emissions are primarily a result of gasoline and diesel fuel consumption, with a smaller percentage coming from electricity and natural gas emissions. With regard to both emissions and cost, there are numerous opportunities for Madison County to reduce carbon emissions and save money by proactively developing and implementing strategies focused on our energy consumption.

Not all the focus for the plan needs to hinge upon energy efficiency, renewables, and cost savings. There are vast community and local benefits that can be attained by linking the Energy and Sustainability Plan to existing plans that Madison County has developed in the past few years. Energy efficiency and quality of life benefits can be realized by developing smart growth principles at the local level, creating healthy and livable communities, and planning for efficient use of our natural resources. Additionally, jobs and economic development can benefit by focusing efforts on creating a clean-tech and green jobs economy.

The following plans have been developed for the County and the Region:

Central New York Region

Central New York Regional Sustainability
Plan VisionCNY - 2013

CNY Regional Economic Development Plan
2012

Madison County

Agriculture and Farmland Protection Plan
2005

Health Improvement Planning Report
2013

Madison County Hazard Mitigation Plan
2009

Coordinated Transportation Plan
2015

Water Quality Strategy
2011

Primer for Smart Growth
2011

Economic Development Strategy
2012

Community Health Improvement Plan
2013

NY Rising Community Resilience Plan
2014

Though not expressly intended as greenhouse gas reduction strategies, many of these plans have components that have energy reducing outcomes.

Many of the economic development, land use planning, agriculture, health improvement, and environmental protection strategies for improving

the quality of life for those living in Madison County have energy efficiency and greenhouse gas reduction benefits as well. Implementation of these goals should be a priority and will have multiple positive benefits which include energy efficiency and greenhouse gas reductions.



Planning Process for the Energy Sustainability Plan

“Encourage county government and local organizations/ businesses to adopt a renewable energy and related economic development policy that would require that a certain percentage (e.g. 50%) of Madison County’s total non-transit energy use come from renewable energy sources by the year 2015.”

Health Improvement Planning Report -2009

“Through ride sharing and coordination, the County will reduce the costs to participating agencies and will also reduce the fleet of vehicles operating on our roadways. This will reduce the consumption of fossil fuels and will result in better local air quality.”

Coordinated Transportation Plan - 2010

“Renewable energy is an opportunity to diversify the use of farmland to make it more profitable and remain in production.”

Primer for Smart Growth - 2011

“Encourage non-agricultural development, including expansion the of sewer and water systems, to take place within Villages, the City of Oneida, and other settled areas already developed rather in agricultural areas.”

Agriculture and Farmland Protection Plan -2005

“Undertake community-based alternative energy initiatives at the ARE Park—i.e. wind farm, central heat and power plant, micro-hydro, and solar.”

Economic Development Strategy - 2012

Energy Management

Energy Management is the monitoring of energy generation and consumption to reduce emissions and save money.

Energy is used in Madison County to provide light, power, and heat to homes, businesses, farms, facilities, appliances, gadgets, pools, outdoor lighting and more, but what is the source of that energy? If it is a fossil fuel what steps can be done to transition to a cleaner

or renewable source? How can energy be conserved to save money and lower emissions? Similarly how can the demand for energy be used to create economic opportunities here within Madison County?

As of 2010, Madison County is home to facilities with a total electricity generation capacity of approximately **77.6 mW**.

The combustion of fossil fuels to generate electricity is the largest single source of CO2 emissions in the country, accounting for about **40%** of total US CO2 emissions.

Residential households are the second largest emitter in Madison County (behind transportation). The residential sector generated **140,562 mtCO₂e** or 18% of county-wide GHG emissions in 2010. In comparison, the commercial and industrial buildings comprise about 13% and 2% of county-wide GHG emissions respectively.

Madison County Greenhouse Gas Inventory

In the United States, buildings account for **70%** of total electricity used.



Goals + tasks

1 Generate more electricity within the county boundaries

- + Explore feasibility of a Madison County Public Utility
- + Perform a study of the grid infrastructure in Madison County

2 Increase use of renewables and green building practices

- + Participate in the 2016 Solarize CNY program
- + Educate homeowners, businesses, and farms on renewables and green building practices and include information on Federal and State incentives available
- + Develop a resource guide for local municipalities to distribute when developers or home owners come in for building permits.
- + Continue to update and showcase renewable energy projects and green building elements (such as LEED certified buildings) through Madison County's Green Guide
- + Explore the use of Power Purchase Agreements and remote net metering as options to proliferate the use of renewables
- + Educate local government officials, planning and zoning boards, and code enforcement officers on renewable energy technologies, green building codes and practices.

3 Increase Energy Efficiency

- + Educate homeowners, businesses, and farms on energy efficiency such as through the CNY Energy Challenge and include information on Federal and State incentives available
- + Incentivize energy efficiency such as through a volume purchasing program or promotion of existing NYSERDA program
- + Work with municipalities to join MEGA
- + Encourage municipalities to join NYS DEC Climate Smart Communities
- + Investigate the County's participation in Property Assessed Clean Energy (PACE) Financing as a way to help businesses and non-profits finance energy efficiency and green energy projects



Energy Management

Energy use makes modern life possible. Energy Management is the monitoring of energy generation and consumption to reduce emissions and save money. While the concepts of energy management can be applied to many facets, building energy is the sector with the most immediately achievable and affordable reduction opportunities: In the United States, commercial and residential buildings account for 40% of total U.S. energy consumption and 70% of total electricity use.¹ Alternatively, investing in energy conservation and innovation can create energy assets as well as new jobs.

Electricity

Compared to other states, New York State can boast that a higher percentage of its electricity comes from clean(er) energy sources with the dominant sources being nuclear (38.8%) and natural gas (34.6%) followed by hydroelectric (19.5) and other renewables (5%). Coal fired plants represent only (2%) of electricity generation in New York.²

Very little electricity is currently generated within the boundaries of Madison County (some exceptions include the 3 commercial wind farms, the gas-to-energy project at the County landfill, and “behind-the-meter” solar installations); instead, Madison County relies on other places to supply its electricity needs. The New York Power Authority is one of New York

State’s leading suppliers of electricity, operating 16 generating facilities. Four utility companies deliver electricity to Madison County customers: National Grid, NYSEG, Oneida-Madison Electric Company, and Hamilton Municipal Utility. Those serviced by National Grid and NYSEG pay a small “systems benefit charge” on their utility bill that is pooled by NYSERDA to fund energy efficiency programs and incentivize renewable energy use across the state.

Stationary Combustion

Many in Madison County heat their homes and businesses through stationary combustion which is the onsite combustion of a fuel to generate heat and/or steam for the building. For instance, for homes in the Madison County, the primary sources for heating are natural gas (42.4%) and fuel oil (23.4%) followed by electricity (12.4%), propane (10.4%), other (9.2%).³ The primary natural gas providers are National Grid and NYSEG. Propane and fuel oil are provided through various small regional suppliers.

Figure 1 shows the primary energy sources in Madison County while Figure 2 provides a list of the larger in-County energy generation sources.

Where does Madison County go from here? With the idea of “reduce, then produce,” a sensible energy management policy seeks to first maximize energy efficiency and then look to generate power with low-carbon fuels and renewable resources.

1. US EIA, New York State Profile and Energy Estimates, September 2014, <http://www.eia.gov/state/?sid=ny#tabs-4>

2. Ibid

3. US E U.S. Census, Physical Housing Characteristics for occupied housing units, 2009-2013 American Community Survey 5-Year Estimates

Figure 1
Madison County Energy Profile Map

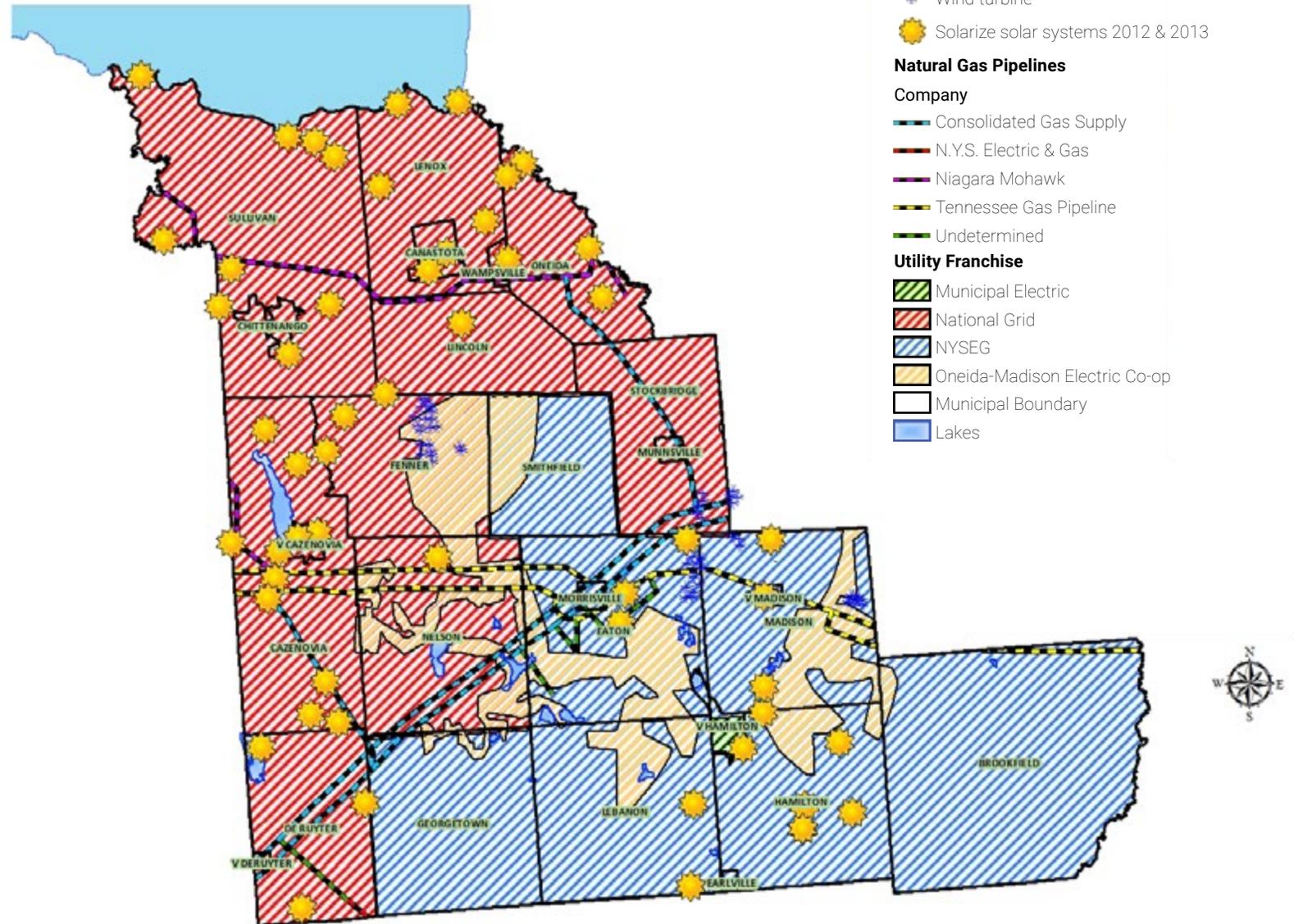


Figure 2

In-County Energy Generation

Source	Name Plate Rating (MW)	2013 Net Energy (GWh)
Wind	Fenner Wind Farm	30.0
	Madison Wind Farm	11.5
	Munnsville Wind Farm	34.5
Methane	Gas-to-Energy at Madison County Landfill	1.6
Total	77.6	184.8

Source: NYISO Table III-2: Existing Generating Facilities

The main goals for this target area seek to create or support programs and initiatives that will promote energy efficiency as well as renewable energy in both existing and new buildings.

Energy Efficiency

Energy efficiency is the most cost-effective measure for greenhouse gas reductions. Generous utility rebates and federal tax incentives make investing in energy efficiency increasingly attractive.

Renewables

Madison County has become a leader when it comes to renewables. Home to three commercial wind farms, including the first one in New York State, Madison County generates 178.3 GWh of energy from wind every year. Moreover, Madison County was the first place in New York State to

implement a Solarize program and through this program the amount of solar PV installed in the county quadrupled. According to NYSERDA, there are currently 178 solar PV systems installed in Madison County. The Madison County landfill was the first municipal landfill in the country to install a solar cap which generates 45,000 kWh of electricity per year and is used to power the on-site recycling center. In 2014, a 50 kW solar system purchased through a Solar Power Purchase Agreement (PPA) was installed at the Madison County landfill. Through the NY Sun Initiative Madison County was also able to secure funding for a larger solar PPA: a 2 MW solar array is planned to be installed at the landfill in summer 2016.

In addition, Madison County has partnered with Morrisville State College to explore the use of the

county's many flowing creeks and streams to proliferate the use of micro-hydro powered systems (including a system installed at the County's Oxbow Falls Park) as well as the use of cow manure from the County's many farms to create methane digesters. A great example of using methane gas to create energy is at the Madison County Landfill where the gas-to-energy system captures 73% of the methane off gas from the landfill and converts it to electricity; the result is 6.5 GWh of electricity produced annually.

Green Design

Design and construction of new buildings or major renovations of existing ones, provides an opportunity to implement energy-saving measures immediately. The standard for green design is Leadership in Energy and Environment Design (LEED). LEED is an internationally-recognized building certification system and provides building owners and operators with a framework for identifying and implementing practical and measurable green building design, construction, operations, and maintenance solutions. Energy efficiency and use of clean energy alternatives are key components in LEED. By following and implementing the best practices identified through LEED, building owners can reduce energy and water bills by as much as 40%.⁴ Examples of buildings in Madison County that are LEED certified include the Trudy Fitness Center at Colgate University, Sheila Johnson Design Center on the Morrisville State College campus (pictured here), and

the New York State Police Barracks in Oneida, NY.

Overall, Madison County has made great strides to ensure that energy use is well managed. Madison County will continue to take on opportunities to increase in-county energy generation through renewables as well as initiatives to further educate residents, businesses, and farms on ways to reduce energy consumption.



Trudy Fitness Center, Colgate University



Sheila Johnson Design Center, Morrisville State College

Transportation

More than one-quarter of total U.S. greenhouse gas emissions come from the transportation sector, making transportation the second largest source of greenhouse gas emissions in the United States after the electric power sector (source: U.S. EPA). Transportation energy use and emissions are determined by four factors: the type of fuels or energy sources, the vehicles, the distance traveled, and the overall system infrastructure. Through transportation decisions that discourage sprawl and accommodate multi-modal transportation options, local communities influence commute distance and mobility choice. By supporting alternative fuel sources, communities can also play a role in the transition away from petroleum fueled vehicles.



Transportation is the highest contributing sector to GHG emissions in Madison County with over half (**54%**) of the community's greenhouse gas emissions originating from transportation.

Madison County's Greenhouse Gas Inventory

Replacing
1 mile of driving with
1 mile of bicycling
can prevent the production
of nearly
1 pound of CO₂ (0.88 lbs).

Madison County owns
and maintains approx-
imately **20%** of the
2,134 miles of roads
through the county.

Americans use cars for almost { **70** percent of all trips shorter than 1 mile and
90 percent of trips shorter than 2 miles

Goals + tasks

1 Expand multi-modal transportation network

- + Continue working with the Old Erie Canal Community Working Group to promote use of and cohesiveness of the Erie Canalway Trail through Chittenango, Canastota, Wampsville, and Oneida
- + Provide training and resources to help municipalities encourage new development to include sidewalks, bike paths and design that facilitates connectivity
- + Enhance coordination between transportation providers in Madison County including OFA, CRIS-CAT, MTS, etc.
- + Identify roads and bridges where wider shoulders, bike lanes, etc. are needed and prioritize that need
- + Find funding to update and reproduce the Trails of Madison County Maps
- + Construct and promote the Oneida Rail Trail in partnership with the City of Oneida
- + Promote and implement Complete Streets concepts and policies

2 Promote and encourage non-vehicle trips

- + Promote biking through events such as National “Ride to Work Month” incorporated with bike safety education
- + Work with employers to encourage their new employees to live close to work

3 Reduce the impact of vehicle travel; support the transition away from fossil fuels

- + Increase use of alternative fuels
- + Research the feasibility of developing a network of electric vehicle charging stations
- + Limit idling



Much of the existing transportation infrastructure in the United States was developed with an emphasis on vehicle mobility, but largely powered by fossil fuels, motorized transportation has environmental, health, and economic trade offs including traffic congestion, air pollution, and dependence on foreign oil. Efforts to transition from fossil fuels and reduce miles traveled can help curb emissions associated with the transportation sector.

At the national, state, and local level there is a renewed emphasis on creating a more balanced transportation system, one that accounts for multi-modal travel options. In 2011 New York State adopted the NYS Complete Streets law, a policy that mandates roads be designed and built for all users,

including bicyclists, public transportation, motorists, and pedestrians. An important consideration for this section is the direct correlation between transportation energy use and land use (addressed in the next section). For example, compact, mixed use neighborhoods can more effectively support reaching destinations by foot or bike while areas with separated land uses limit non-motorized travel options.

Commuting Patterns

According to the U.S. Census, the mean commute time to work in Madison County is 23.4 minutes, the second highest in the Central New York area (figure 3). When it comes to the mode of transportation, the

Figure 3

Commute Characteristics by County

County	Oswego	Madison	Chenango	Cayuga	Cortland	Onondaga
Mean Travel Time to Work	24.1	23.4	21.9	20.9	20.8	19.1
<u>Mode of Transportation</u>						
Drive alone	80.02%	78.17%	77.17%	79.16%	78.11%	79.64%
Walk	4.75%	5.07%	4.66%	4.60%	5.60%	4.16%
Bike	0.16%	0.44%	0.31%	0.25%	0.43%	0.48%
Carpool	10.32%	9.10%	11.87%	11.28%	9.36%	9.11%
Public Transit	0.68%	0.50%	0.55%	1.29%	0.84%	2.67%

Source: U.S. Census

breakdown of workers who choose to drive, walk, bike, carpool or use public transit is similar across all six counties, with the predominant mode being driving alone which is currently the mode of choice for around 80% of workers.

The Bureau of Transportation Statistics has found that work trips are longer than trips for other purposes, making up 25.3% of total miles traveled but only 18.7% of total trips. On the other hand, trips for shopping, personal errands, and social or recreational purposes comprise 45% of daily trips taken and these are typically shorter trips that could be conducive to bicycling and walking. In fact, 25% of all trips made in the United States are shorter than 1 mile, yet statistics show that 70% of these trips are made by car. Moreover, of the 40% of trips that are less than two miles, nine out of ten are made by car. Non-motorized forms of transportation are viable and efficient options for these short trips. In order to help shift vehicle trips, especially shorter trips, to non-motorized modes local communities have to provide accessible, safe, and convenient means to bike and walk. Another key component to changing travel behavior is education such as through bike safety classes or programming to promote walking or biking. Examples include events that piggy-back off of National Bike Month in May or Walk to School Day celebrated nationwide in October.

Current Transportation System

Madison County and its local communities continue to advance multi-modal efforts and promote energy

efficiency of the overall transportation system. The transportation system within Madison County includes a number of facilities including streets, sidewalks, trails, bike routes, and mass transit.

Road network

Madison County's road network includes 2,134 miles of roads with the majority owned and maintained by the Towns (35.4%) followed by the State (32.3%), County (20.4%), Private (4.5%), Village (3.8%), City of Oneida (2.6%) and Federal (1.1%). As the roads are owned and maintained by various jurisdictions limited information is currently available to describe the amount and extent of facilities (e.g. sidewalks, crosswalks and road shoulders) available to accommodate pedestrians and bicyclists along



As part of the reconstruction of the County bridge along N. Court St. in 2015, Madison County included expanded 5-ft shoulders to better accommodate walkers, bikers, and snowmobilers.

these roads. One goal of this plan is to better understand the overall road infrastructure within the County through the lens of multi-modal travel to identify needs, prioritize improvements, and inform connectivity opportunities.

Transit

Several transportation services operate within the county including a public provider (Madison Transit System), non-profit providers (examples include

CRIS-CAT, Heritage Farm, Madison Cortland ARC), for profit (for example taxi companies), and human service agencies (Office for the Aging). With the variety of providers, there may be opportunities to reduce overlap to save money and miles traveled. In an effort to better coordinate these services, Madison County developed The Madison County Coordinated Public Transit-Human Services Transportation Plan which was completed in 2010 and updated in 2015. This plan is guided by a Coordinated Transportation



Plan Steering Committee made up of representatives from County government, municipal governments, local service agencies, hospitals, elder care facilities, institutions of higher education, private consultants, and transit operators. The recent focus of the plan is to explore developing Mobility Management within the County, such as through a central mobility manager, as a way to improve efficiency as well as coordination and capacity of all providers to create a more cohesive network to enhance transportation access for Madison County residents.

Trails

Approximately 183 miles of trails exist throughout Madison County (not including over 300 miles of snowmobile trails). Nearly half of the 183 miles of trails are found within three state forests within the Town of Brookfield. With trails there is an important distinction between those that are primarily used for recreation (such as a loop trail in a more isolated area) and those that can also provide viable off-road transportation options (usually more linear in nature and adjacent to communities and other destinations). This section is focused on the latter type due to the potential for these trails to replace vehicle trips. Some of the larger trail systems in Madison County that can double as a means for transportation include: the Link Trail (40 miles) which spans nearly the entire length of Madison County from north to south, the Erie Canalway Trail (14 miles) which connects the villages of Chittenango, Canastota, Wampsville, and the City of Oneida and links them to the rest of the state-wide Erie Canalway



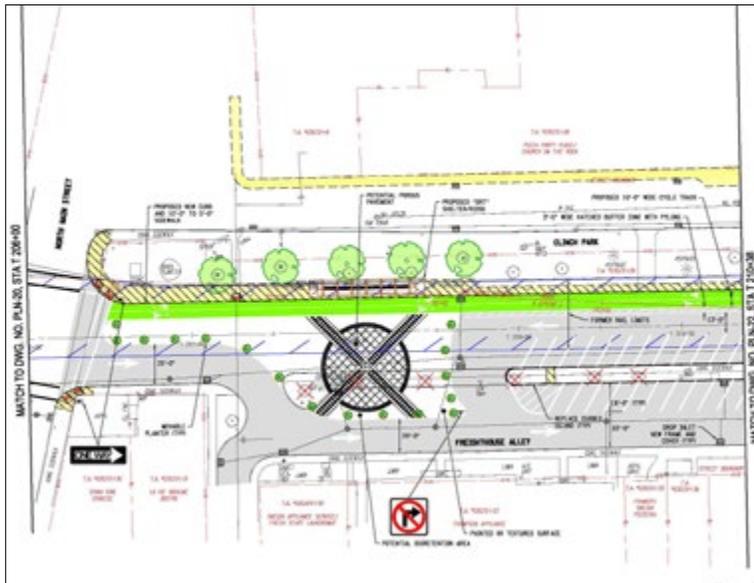
Erie Canalway Trail near Chittenango



Volunteers install a trailhead for the Oneida Rail Trail (ORT)



Official opening of a half-mile section of the ORT in Oneida



Conceptual plans for the trail and pedestrian plaza in downtown Oneida



Conceptual rendering of the ORT by the County Complex in Wampsville

Land Use

The purpose of land use planning is to improve the welfare of people and their communities by creating more convenient, equitable, healthful, efficient, and attractive places for present and future generations. (American Planning Association)

The layout, type, and development pattern of growth in a village, town, or city directly impacts its economic vitality, livability, health, and environmental and cultural resources. Development decisions influence where people choose to live, how they can move around,

what activities are available to them, and how they interact and connect with the people and places around them. Land use is also tied to a community's ability to protect natural resources and impacts the level of energy that needs to be consumed for daily activities.

The breakdown of major land use categories in Madison County is as follows:

Agriculture	36%
Residential	29%
Vacant Land	24%

Farming, including dairy and to a lesser degree beef farms, is the dominant industry in Madison County and approximately **11%** (82,787 mtCO₂e) of the county's greenhouse gas emissions come from livestock.

Madison County's GHG Inventory

The Smart Growth Network's Measuring Sprawl and Its Impact report, a multi-dimensional analysis of sprawl in 83 metro areas nationwide, ranked Central New York as the **16th** most sprawled region in the U.S.

Compared to 1980, more people now live in the towns in Madison County than the villages and city.

To date, **12** municipalities in Madison County have adopted the NYS Unified Solar Permit.



Goals + tasks

1 Promote smart growth

- + Continue to educate and train local planning and zoning boards on smart growth best practices
- + Implement use of the Smart Growth Audit Tool developed in collaboration with the US EPA throughout our local communities
- + Encourage communities to update or create their first Comprehensive Plan
- + Explore the feasibility of Madison County becoming a STAR Community member
- + Diversify members on local Planning and Zoning Boards

2 Promote active and vibrant community centers, increase the percentage of the population in city and village centers as compared to towns

- + Launch a county-wide Main Street Committee for the village and city to participate in to help promote infill and direct reinvestment into our existing community centers
- + Encourage more mixed use development with a range of housing choices
- + Help to ensure that people who wish to live in village and city centers are able by completing a housing study to better understand housing needs

3 Support activities that maintain or increase the level of farmland

- + Work with municipalities that have no zoning to implement at least basic zoning that protects their most rich, prime farmland
- + Encourage communities to create Farmland Protection Plans
- + Update the 2005 Madison County Agriculture and Farmland Protection Plan in 2016
- + Support value-added agricultural products through grant assistance and programming



Municipalities and Population

Madison County consists of 661 square miles and is divided into 15 towns, 10 villages, and 1 city. The three most populous places are the City of Oneida (11,393), Town of Sullivan (10,136), and the Village of Chittenango (5,081). The densest municipalities in the county include: Village of Morrisville (3.36 people/acre), Village of Chittenango (3.2 people/acre), Village of Cazenovia (2.85 people/acre) (Figure 5).

Land Use in Madison County:

Madison County is predominately characterized as rural but other land uses include historic hamlets and villages and even some suburban residential development and commercial strips. Land use in the county is comprised of 36% agricultural use, 29% residential use, 24% vacant land, 7% wild, forested, conservation lands and public parks, 1% commercial services, 1% community services, 0.7% recreation and entertainment, 0.4% public services, and 0.3% industrial use.

Natural Features

The county contains over 19 water bodies; the three largest being Cazenovia Lake, DeRuyter Reservoir, and Tuscarora Lake. Thirty-seven percent (157,380 acres) of land in the county participates in the New York State Ag District program. Recently, the farms in the county have been at the forefront of the hop resurgence. 9.4% of the land in the county is state land; the vast majority of state land is in the southern half of the county.

Growth and Development

Madison County's total population has continued to increase from 1980-2010 but an increasing amount of that growth has occurred in the towns (Figure 6), an indication of sprawl and increased land consumption. Most villages, the community centers of these towns, actually lost people from 1980 to 2000. While most villages did not lose people in 2010, the towns still grew more and overall trends show that growth in towns (i.e. places outside city/villages) has gradually increased compared to growth in community centers: the percentage of people living in towns is now 55.1% compared to 51% in 1980 and the percentage of people living in the city/villages is 44.9% compared to 49% in 1980.

Figure 6

Population	1980	1990	2000	2010
in City & Villages	31,895	32,492	31,173	32,976
in Towns	33,255	36,628	38,288	40,466
Total	65,150	69,120	69,441	73,442
% in City & Villages	49.0%	47.0%	44.9%	44.9%
% in Towns	51.0%	53.0%	55.1%	55.1%

Existing Regulations and Land Use Controls in Place

Due to the significant impact and interconnectedness of land use decisions, it is crucial that communities adopt effective and sustainable land use policies. As a home-rule state, the majority of land use decisions in New York are made at the local level. Local communities have a variety of tools that can be implemented to regulate land use with some of the most basic and fundamental being comprehensive planning, development of zoning ordinances, and adoption of subdivision and site plan regulations. Figure 7 shows that a majority of communities in Madison County have adopted the use of these land use tools; however there are some communities that have yet to implement some or all of these land use controls.

Renewables and Land Use

Several communities have also addressed renewable energy systems within their land use ordinances. For those that want to install alternative energy systems, such as wind, solar, or geothermal it becomes much easier to do so when the permit process is clear. One example is the NYS Unified Solar Permit, created to streamline the permit process for small-scale, roof-mounted solar PV systems. To date in Madison County, the City of Oneida, the towns of Lenox, Lebanon, Hamilton, Lincoln, Cazenovia, Fenner, Nelson, Georgetown, and the villages of Morrisville, DeRuyter and Canastota have adopted the NYS Unified Solar Permit.

Smart Growth

One concept that Madison County has identified and uses to assist local communities with the development of their land use policies is “Smart Growth.” The ten principles identified with Smart Growth, are proven best practices that are meant to help communities get the results they want

Ten Smart Growth Principles

- 1 Mix land uses**
- 2 Take advantage of compact design**
- 3 Create a range of housing opportunities and choices**
- 4 Create walkable communities**
- 5 Foster distinctive, attractive communities with a strong sense of place**
- 6 Preserve open space, farmland, natural beauty, and critical environmental areas**
- 7 Strengthen and direct development toward existing communities**
- 8 Provide a variety of transportation options**
- 9 Make development decisions predictable, fair and cost effective**
- 10 Encourage community and stakeholder collaboration**

from growth and development. To help apply these concepts to Madison County, A Healthy Design for Madison County: Primer for Smart Growth was released in September 2011.

Overall, communities in Madison County understand that an important element of using energy more efficiently requires responsible land use and transportation planning. Through initiatives that are in line with Smart Growth principles, Madison County will continue to help local municipalities develop, update and implement innovative land use regulations to ensure sustainable development.



Figure 7
Land Use Planning in Madison County

	Comp Plan	Zoning Ordinances	Subdivision Regulations	Site Plan Review	Planning Board
CITY					
Oneida	Y	Y	Y	Y	Y
Brookfield	Y	N	Y	Y	Y
Cazenovia	Y	Y	Y	Y	Y
DeRuyter	N	Y	Y	Y	Y
Eaton	Y	Y	Y	Y	Y
Fenner	Y	Y	Y	Y	Y
Georgetown	N	N	Y	N	Y
Hamilton	Y	Y	Y	Y	Y
Lebanon	Y	N	Y	Y	Y
Lenox	Y	Y	Y	Y	Y
Lincoln	Y	Y	Y	Y	Y
Madison	Y	N	Y	Y	Y
Nelson	Y	Y	Y	Y	Y
Smithfield	Y	Y	Y	Y	Y
Stockbridge	N	Y	Y	Y	Y
Sullivan	Y	Y	Y	Y	Y
TOWNS					
Canastota	Y	Y	Y	Y	Y
Cazenovia	Y	Y	Y	Y	Y
Chittenango	Y	Y	Y	Y	Y
DeRuyter	N	N	N	N	N
Earlville	N	N	N	N	Y
Hamilton	Y	Y	Y	Y	Y
Madison	Y	N	N	N	N
Morrisville	Y	Y	Y	Y	Y
Munnsville	N	N	N	N	N
Wampsville	N	Y	Y	Y	Y
VILLAGES					

Environment

The environment is comprised of both the natural and manmade landscape in which we live as individuals and a society. It is dynamic and responsive, and because our actions influence the health and functionality of its many working systems, stewardship is the of the great responsibilities that citizens of Madison County share.

Madison County contains unique environmental features both large and small. In **1905** the ovate amber snail (*Novisuccinea chittenangoensis*) was discovered near Chittenango Falls. This species is not found anywhere else on earth.

14 inland lakes are located in Madison County, and of these **6** were created and **3** were altered in the mid 1800s to supply water to the Erie and Chenango Canals.

Madison County has a population density of about **111** of people per square mile.

Madison County is located at the headwaters of these **3** major drainage basins:

Susquehanna River **304 mi²**
Seneca-Oneida-Oswego Rivers **324 mi²**
Mohawk River **31 mi²**

7% of the land in Madison County is located within the 100 year floodplain.



Goals + tasks

1 Clean up brownfield sites

- + Identify, assess for contamination, and prioritize sites for cleanup and secure funding

2 Improve efficiency of water and wastewater systems in the County

- + Conduct energy analyses at local wastewater plants
- + Utilize existing and emerging technologies to use water as an energy source including investigating micro-hydro options for power
- + Work with various agencies to collaboratively fund energy efficient system upgrades

3 Keep development out of flood plains

- + Revisit and update local flood control regulations
- + Work with the City of Oneida on options for redeveloping the “Flats” area
- + Work with FEMA to modernize the Madison County flood maps
- + Educate municipal officials, landowners and others about the negative impact of flood plain development

4 Prioritize environmentally sensitive lands for conservation

- + Continue work to identify suitable lands for protection under State programs
- + Continue to promote and assist with seeking grant funds from NYS Ag & Markets Purchase of development rights program
- + Undertake a collective effort to identify, map and prioritize environmentally sensitive lands for conservation

5 Promote green infrastructure projects in Madison County

- + Utilize existing funding sources- seek grant funding for public works and local projects
- + Consider demonstration projects to highlight emerging and existing green practices
- + Educate local highway and DPW about best practices and green infrastructure options



Madison County is a rural agriculturally dominated County in upstate New York. It is bisected in the north by the Old Erie Canal and the topography here is quite flat, which historically made the area conducive to canal and railroad construction, agriculture, and human habitation. A number of the notable villages (and the only City, Oneida) thrived during the Canal and railroad era of the late 19th and early 20th centuries. The southern part of Madison County is dominated by rolling hills, vast open spaces and farmland, and a number of small quaint villages.

From a watershed perspective, the northern part of Madison County falls within the Lake Ontario watershed while most of the southern part of the County serves as the headwaters to the Chesapeake Bay. Typical for much of upstate New York, Madison County is dotted with a number of older villages that sprung up in a time when canals and railroads were the transportation means of choice. At 661 square miles and with a population of 73,442, Madison County has a population density of about 111 people per square mile.

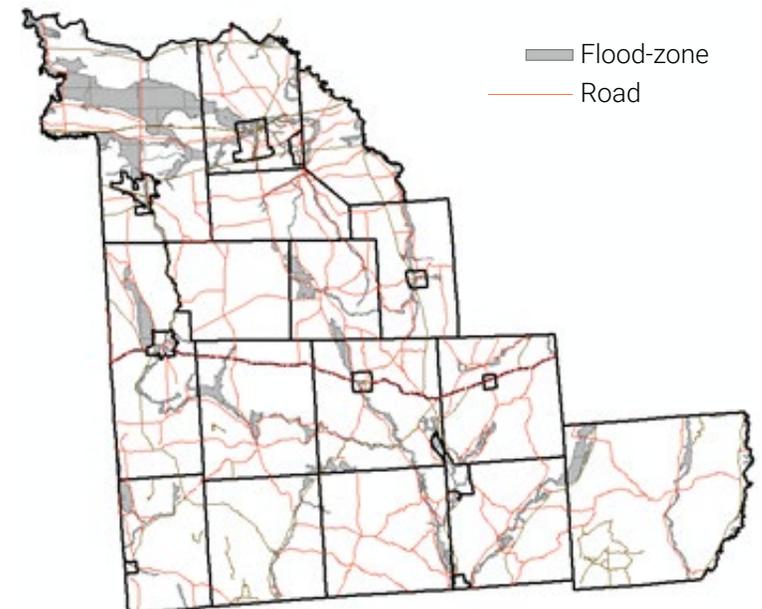
The County has a number of lakes and man made reservoirs that provide not only fish and wildlife habitat, but recreational resources and thriving summer and year round communities.

Serving as the headwaters for two major watersheds, Madison County is not prone to frequent and wide reaching flood events, though we have experienced a number of intense rainfall events in recent years that have caused much damage both to the man-

made and natural environment. FEMA mapped 100 year flood-zones cover rather broad areas (the City of Oneida, and the mucklands area for example) in the northern portions of the County, while southern portions of the County tend to have more narrow floodplains that occur within the glaciofluvial valleys common south of route 20 (figure 8). Madison County was particularly hard hit by flooding in the summer of 2013, with a major event hitting the “Flats” of Oneida in late June and a subsequent event hitting central and southern Madison County days later in early July. In fact, the Oneida event resulted in

Figure 8

FEMA One Hundred Year Flood-zones



the highest stream gauge recordings ever on Oneida Creek, which has been monitored by the USGS since the gauge was installed in 1949.

Cleanup of Brownfield Sites

Though mostly absent of large industrial manufacturing centers, the County has had various industries over the years that have created some latent brownfield issues. Although there may not be the concentration of brownfield sites often found in urban areas, our landscape is dotted with small former manufacturing sites, abandoned auto repair and fueling stations, abandoned methamphetamine lab facilities, flood contaminated and abandoned homes, and many other potential brownfield sites that may be impacted by both petroleum and hazardous substances. From tax foreclosure lists, local knowledge, and some field reconnaissance, sites have been identified that are in need of assessment, and many more likely exist. These sites are found at the gateways to our communities, in prime locations on our main streets as well as in rural agricultural areas. These environmentally impaired sites have been abandoned or avoided for years, leaving scarred holes in otherwise vibrant and quaint community centers. They have potentially ongoing impacts to the precious resources of safe water relied upon by residents and businesses.

Madison County has a number of decentralized potential brownfield sites that have caused blight both in rural areas and on main streets in community centers. These sites can be cleaned up and re-

purposed, thereby supporting infill development and limiting further expansion into greenspace areas.

By identifying sites throughout the County and working with local communities, these sites can be put back into productive use. Performing site assessments for contamination can help community leaders prioritize the order in which these sites should be remediated. In many cases, Environmental Protection Agency (EPA) Brownfield Assessment Grants are available to help with this effort. Following site assessments, remediation funds are available through the EPA and Department of Environmental Conservation (DEC) for putting these sites into a position where they can once again be utilized and enjoyed by the community.

Water and Wastewater Efficiency

In many cases, wastewater treatment plants are the largest single users of electrical power in a municipality. Technological advances, grant funding, and system efficiencies can be investigated as a means to reduce electrical consumption.

A strategy to increase wastewater processing efficiency begins with conducting energy analyses at local wastewater plants. It may be possible to utilize existing and emerging technologies to use wastes as energy sources, for example, micro-hydro electric power could be an option for powering facilities. Plant operators and community leaders can also work with NYSERDA, National Grid, and NYSEG to collaboratively fund energy efficient system upgrades.

Keep Development out of the Floodplain

As we have seen both locally and regionally, moderate to severe flood events seem to have become more prevalent in recent years. Climatic changes appear to be influencing the frequency and intensity of flood events, and predictions suggest that trend may continue or worsen. Madison County has been hit by a number of recent storm events (such as the flooding in 2013), that have fit with this pattern. Building within the 100 year floodplain should be strongly discouraged in Madison County.

Madison County can begin to address the projected increase in storm intensity by revisiting local flood control regulations, many of which are decades old, and updating them to reflect changes. Working with FEMA to create updated and modernized flood maps will be essential to this process, and to a generally increased understanding of the conditions present in the county. There is a need to work together with the City of Oneida to establish alternative options



2013 Flood in The Flats neighborhood of Oneida | photo: syracuse.com

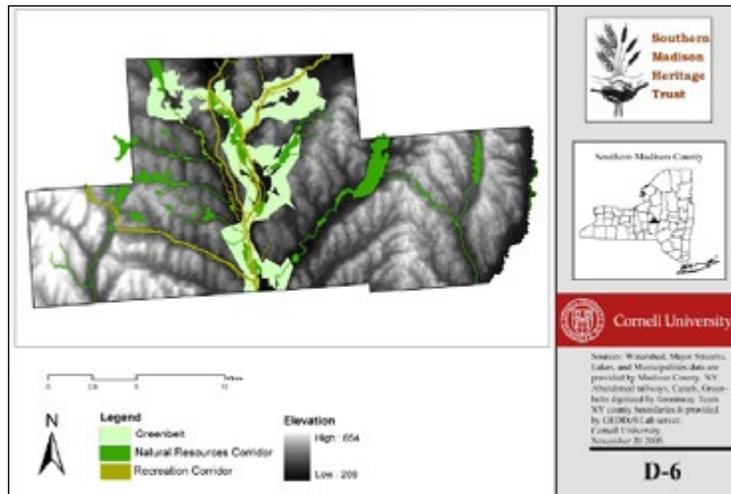
for redeveloping the “Flats” area in light of recent flood events and the ongoing FEMA buyout process. Finally, there is a need to educate municipal officials, landowners, and others about the negative impact of floodplain development so that future disasters can be avoided or mitigated.

Prioritize Environmentally Sensitive Lands for Conservation

Madison county is blessed with a wide variety of parks, state forests, a wildlife management area, and purchase of development rights lands, land trust properties, and other forms of protected lands. These areas have many aesthetic, recreational, ecosystem, and climatic benefits to our local and regional quality of life. Though many of these important and unique areas are already protected, it has been decades since efforts have been undertaken to map, investigate and prioritize other potential areas of importance for conservation.

Madison County should continue to work with DEC and the Unit Management Planning process to identify lands that might be suitable for protection under State programs. The County should also continue to promote and assist with seeking grant funds from the NYS Ag and Markets Purchase of Development Rights program. Finally, by undertaking a collective effort to identify, map, and prioritize environmentally sensitive lands for conservation, we will ensure that our conservation efforts preserve the health and beauty that define the county.

Figure 9
Southern Madison County Greenway Plan



Promote Green Infrastructure Projects

Green infrastructure uses vegetation, soils, and natural processes to manage water and create healthier environments. For the scale of Madison County, green infrastructure refers to the connectivity of natural areas that provide habitat, flood protection, clean air, and clean water. As the impacts of development and climate change effect localities, green infrastructure can help build resiliency, reduce energy use, and minimize water demands.

The County should utilize existing funding sources (FL-LOWPA) and seek grants for the use of green infrastructure in public works and local infrastructure projects. The success of green infrastructure projects can be greatly increased when the projects incorporate education measures that

help both the public and professionals to understand the benefits and processes that green infrastructure entails. Demonstration projects that are visible and highlight emerging and existing green infrastructure practices should be considered. Opportunities to educate local highway and DPW staff on best practices and Green Infrastructure options should be investigated and pursued. Local examples of greenway plans exist (such as that developed by the Southern Madison Heritage Trust, in figure 9) and can be expounded upon.

Implement the County's NY Rising Resiliency Plan

In response to severe flooding and storm damage in 2013, Madison County was included in the New York State's Rising Community Reconstruction Program in 2014. A local team, aided by the Department of State and its consultants, created a project specific plan to address recent storm damage and future resiliency projects.

The County should work to ensure the State provides the promised \$3 million in funding for the plan's implementation. Many County and local departments would collectively benefit from working with Madison County's new Office of Emergency Management to further develop and implement ideas and projects identified in the plan.

Economic Development

Economic Development creates the conditions for economic growth and improved quality of life by expanding the capacity of individuals, firms, and communities to maximize the use of their talents and skills to support innovation, lower transaction costs, and responsibly produce and trade valuable goods and services. It requires effective, collaborative institutions focused on advancing mutual gain for the public and private sectors.
(US Economic Development Administration)

One of the most prominent themes of Madison County's Economic Development Strategy is developing green energy sources as economic assets that can strengthen local

economic development. By focusing on clean energy innovation, Madison County will set the stage for both sustained economic prosperity and a healthy natural environment.

In 2012 the market value of Madison County Farm Products was **\$86 million**.

In the US, food travels an average of **1,500** miles to get to the end consumer mostly by air and truck, increasing our dependence on transportation fuels.

The Madison County Economic Development Strategy estimates that Madison County experiences **\$43 million** annually in "retail leakage", defined as resident purchases made outside of the county.

According to the Madison County Agriculture and Farmland Protection Plan, in Madison County the 4 major employment sectors are manufacturing, education, health care, and retail, and the fastest growing industries are management, finance and insurance, and arts and recreation.



Goals + tasks

1 Promote the use of local goods

- + Continue to promote and strengthen the Buy Madison Program
- + Develop local outlets for sale of local products and produced goods
- + Develop a “Farm to School” program
- + Support the Growing Upstate Food Hub
- + Provide networking opportunities for local businesses and producers

2 Strengthen and grow our green economy

- + Use the ARE Park as a catalyst for green energy projects and creation of green jobs
- + Target green jobs and the clean energy sector to locate here in Madison County

3 Use energy sources as catalysts for attracting businesses

- + Utilize Madison County’s Public Utility Service as a means to distribute green power
- + Develop large scale solar with availability to local business parks
- + Utilize the Solid Waste Facility’s agricultural and household plastic collection efforts to attract a plastics to oil industry at the ARE Park
- + Continue to promote green energy options to local farms and businesses
- + Reach out to commercial entities in future Solarize campaigns
- + Pursue grants and funding

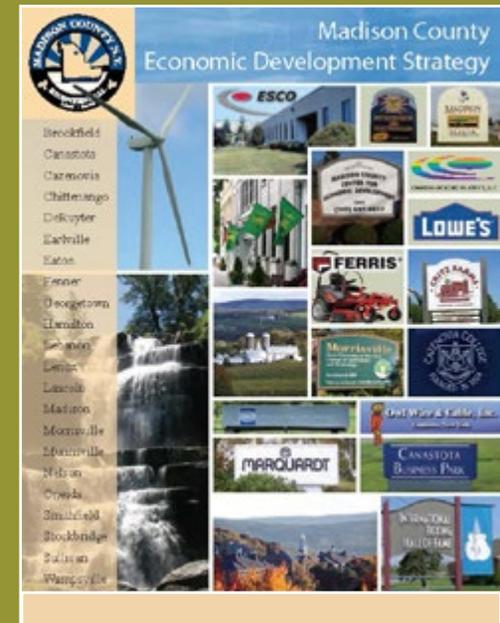


The 2012 Madison County Economic Development Strategy notes the County's strong green energy base, with such projects as: 76 MW of commercial scale wind, the Solid Waste department's gas to energy project and solar landfill cap, micro hydro and solar at the County's parks, the Solarize Madison program, and more. Potential resources also include the County's vast forest land and agricultural land as possible sources for biomass feedstock for green energy options. The Strategy calls for the County to focus on a variety of energy projects including: a focus on community based energy projects at the County's Agriculture and Renewable Energy (ARE) business park; a focus on both woody and

herbaceous energy resources within the County for biomass feedstocks; investigation into micro-hydro potential, both on local streams and from the 6+ canal authority dams in Madison County; and to make available low cost electric power through local municipal or cooperative electric providers in the County as an incentive to spur local businesses.

The County is in the process of developing its ARE Park on property surrounding the County's existing Solid Waste Facility. The goal is to develop the space to take advantage of the variety of onsite resources that already exist, which include: electricity produced from the capture of landfill methane; spinoff industry

Madison County completed and adopted an Economic Development Strategy in 2012. This document took a comprehensive look at the local, regional, national, and global economies with an emphasis on developing forward thinking strategies for local implementation. The plan focused on a number of priority areas including: governance; infrastructure and real estate development; business retention, expansion, and entrepreneurial development; business attraction; manufacturing and producer services; agriculture; retail and tourism; energy; and education and workforce training. Of particular relevance to this section was the focus on energy and energy related economic development opportunities.





The use of excess heat from the County's Gas-to Energy facility will be used in the drying kilns at Johnson Brothers Lumber, a business recently located with the ARE Park.

utilizing available wastes (plastics to oil for example); waste heat produced by the methane gas to energy facility, and the vast acres of land resources that are now owned by the County and will be soon shovel ready for development. In addition to energy related development, the ARE park also hopes to bring together the agricultural sector and the increased attention on local food to make Madison County's farms more profitable and diversified.

Encourage Residents & Businesses to Buy Local

Our food travels an average of 1500 miles, mostly by air and truck, increasing our dependence on transportation fuels. By buying locally, residents and businesses in Madison County can conserve the energy that is used for transport. An increase in purchasing of goods, services, and foods locally will result in a significant reduction in greenhouse gas

emissions. Additionally, this keeps dollars circulating in our community, supports local businesses and keeps sales tax dollars within the County for the provision of a wide variety of local services.

One way that Madison County can contribute to a cleaner, healthier local economy by continuing to promote and strengthen the Buy Madison Program. The program provides networking opportunities for local shops, restaurants and inns, to connect with one another and utilize locally grown or made



This poster is displayed at Buy Madison businesses.



products. This strategy helps small businesses benefit from stronger integration with local production, community and economic systems. As a corollary to the Buy Madison Program, local businesses and government can work to develop more local outlets for the sale of farm products and locally produced goods with the specific goal of benefitting the county's agricultural sector. Other projects that support local farmers include developing a "Farm to School" program with local farms and school districts and supporting the Growing Upstate Food Hub as an outlet for local farms to sell and add value to their products.

Growing a Green Economy

Madison County has a strong history of supporting and promoting green energy projects. From the first commercial wind farm east of the Mississippi to the first municipal use of a solar producing landfill cap, the County has supported innovative green solutions to many issues. We need to continue with such

projects and focus on others that take advantage of our green energy resources and translate them into local jobs.

By using the ARE Park as a catalyst for green energy projects and green jobs and by using Madison County's green initiatives as a catalyst for attracting other green industries, we can build on our legacy of economic and environmental innovation.

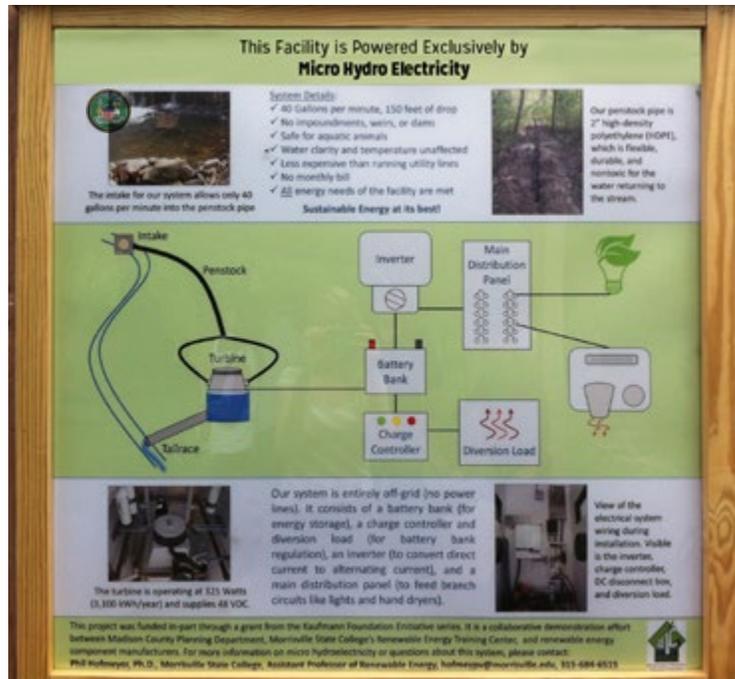


Green Energy Brings Business

Energy costs can have a direct link to business profitability and can be one of the underlying factors in siting new facilities. With New York State ranking as the 4th most expensive State in the Nation for electricity costs, we have to find innovative and green energy solutions that provide costs savings and green benefits to set us apart from other areas in order to attract business and jobs. Madison County has long been a leader in green energy development,

which positions us well as a standout in the State.

Some strategies which foster continued leadership include utilizing Madison County's long dormant Public Utility Service as a means to distribute green power locally, as well as utilizing solid waste facilities, agricultural and household plastic collection efforts to attract a plastics oil industry at the ARE Park. We should also focus on developing large scale solar and making it available to businesses locating at the ARE Park or other business parks. Finally, Madison County should continue to promote green energy options (solar, micro-hydro, etc.) to local farms and businesses and reach out to more commercial entities in future Solarize Campaigns.



Poster showing Micro Hydroelectric system, Oxbow Falls County Park



Windmills, Madison

Materials Management

Materials Management is defined as paying attention to where materials come from, how efficiently they are used and consumed, and what happens to them after a product's end of life. Strategies of materials management include reducing, reusing, and recycling materials to help save money, energy, and natural resources while simultaneously providing economic development opportunities. No longer just perceived as garbage to be thrown out, "waste" - that is paper, plastic, even food - can be reused or repurposed for new products or even into fuel.

At present, just over **1/2** of all U.S. garbage is buried in landfills, **1/3** is recycled and the rest is incinerated to produce electricity, a process known as waste-to-energy.

In 2010, **0.73** tons of solid waste per capita was generated in CNY while in Madison County **.65** tons of solid waste per capita was generated.

Vision CNY: Central New York Regional Sustainability Plan

In 2012, Americans threw out roughly **35 million tons** of food. That's almost 20 percent more food than the United States tossed out in 2000, 50 percent more than in 1990, and nearly three times what Americans discarded in 1960, when the country threw out a now seemingly paltry **12.2 million tons**.

US EPA

Americans, while making up only **5%** of the world's population, produce almost **25%** of its garbage.

Edward Hume

'Garbology: Our dirty love affair with trash'



Goals + tasks

1 Reduce

- + Continue to work to reduce waste streams including food waste
- + Encourage the purchase of items that can be recycled
- + Promote cradle to cradle products or products that use resources efficiently and are made to be recycled or reused

2 Reuse

- + Encourage large employers and schools to implement composting programs
- + Continue to find new markets for waste materials such as the plastics-to-oil initiative
- + Implement the goals set in Madison County's Comprehensive Solid Waste Management Plan

3 Recycle

- + Continue to increase recycling of post-consumer waste through education campaigns and convenient public receptacles
- + Increase recycling and reuse of construction and demolition materials
- + Continue to effectively manage the County's Solid Waste and Recycling Facilities
- + Continue to use the Landfill and Recycling Facility for Economic Development including the development of the Agricultural Economic Development Park
- + Investigate opportunities to use products and processes that generate less emissions
- + Work with State and Federal partners to encourage product stewardship that holds manufacturers accountable for end-of-life management



Background

When it comes to sustainability of goods and materials, the best way to minimize waste is through good design before they are produced and consumed. Cradle-to-cradle is a phrase used to emphasize the importance of thinking of the entire life cycle of a product: its central premise is that products should be conceived from the very start with intelligent design and the intention that they would eventually be recycled either as technical or biological nutrients (technical nutrients can be recycled or reused with no loss of quality, and biological nutrients composted or consumed). In New York State a Product Stewardship program has begun which places responsibility for end-of-life

management on the manufacturer to reduce waste volume and toxicity.

While local communities have less control over technological advances or manufacturing practices, communities can strive to consciously source materials and products that are sustainably produced and designed to be reutilized. Education can help encourage mindful purchases and prevent wasteful over consumption and premature disposal of working/non-expired items. When an item has finally reached the end of its useful life, programs can be implemented to reuse and recycle.

Madison County continues to be on the forefront to reduce waste production, increase recycling, and dispose of waste in a more environmentally friendly

Figure 10
Madison County Solid Waste and Recycling Tonnage 1995-2015

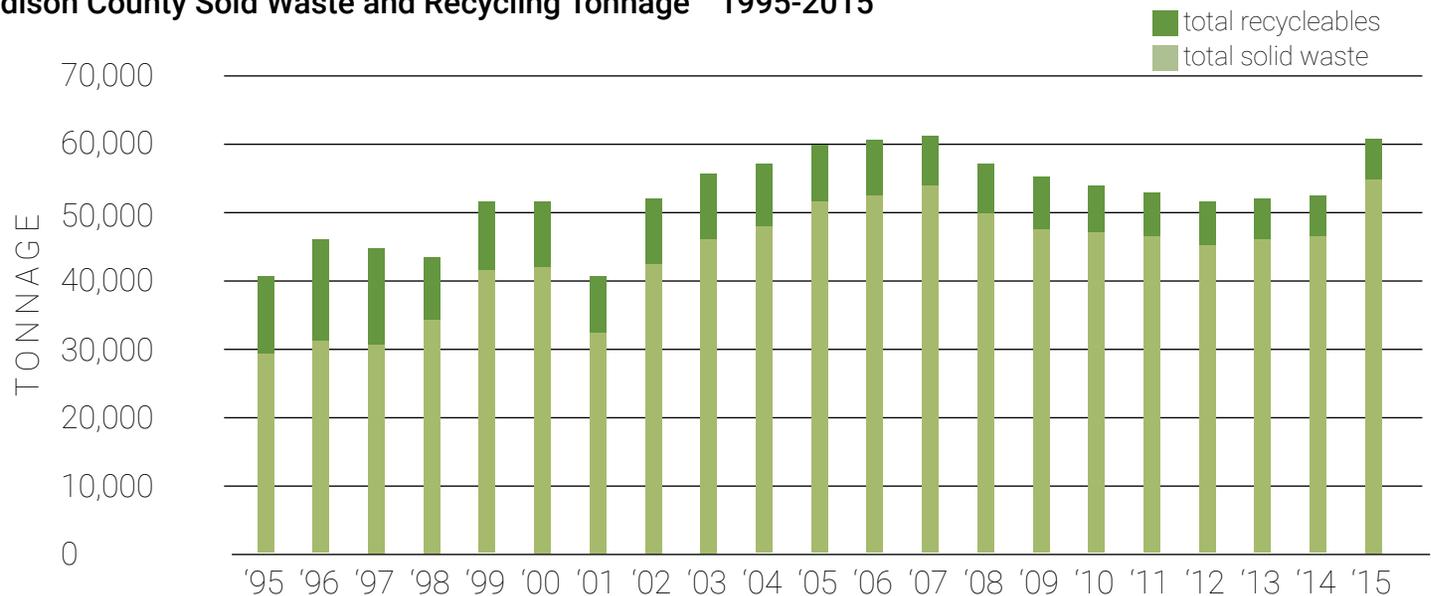
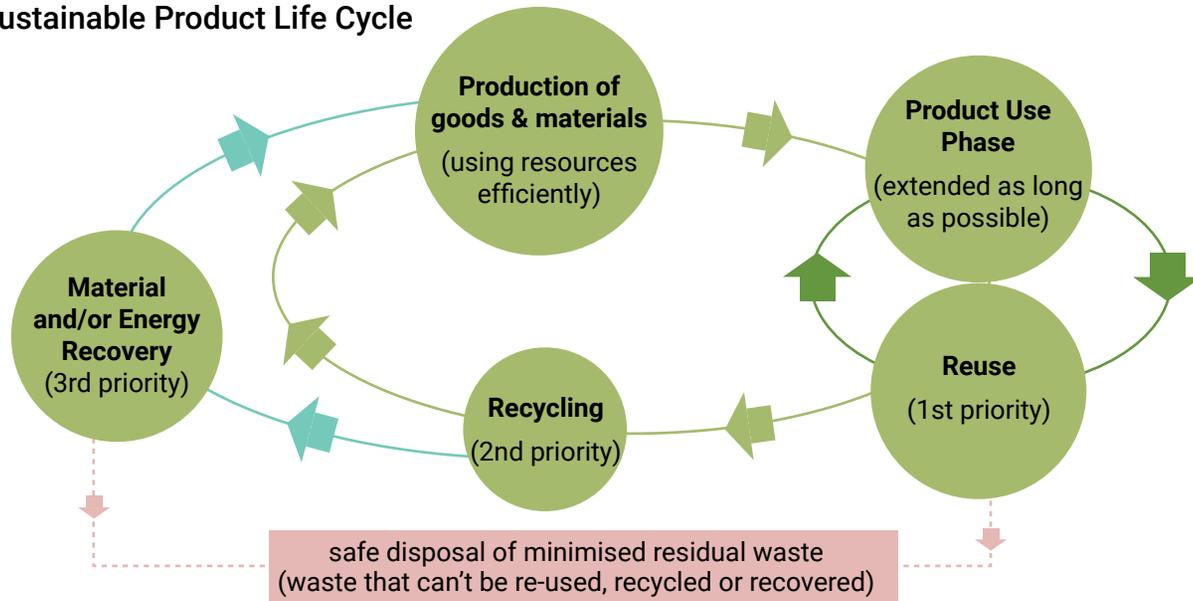


Figure 11
Sustainable Product Life Cycle



way. Madison County’s integrated solid waste management system consists of one central sanitary landfill in the Town of Lincoln, three transfer stations (located in the Towns of Hamilton, Cazenovia, and Sullivan), a central materials recovery facility (MRF) located adjacent to the landfill site, and four yard waste and recyclables drop-off locations (at the three transfer stations and the sanitary landfill). This section provides an overview of the solid waste and recycling facilities and programs in place in Madison County. For more details, refer to Madison County’s Comprehensive Solid Waste Management Plan.

In 2015 the Madison County Solid Waste Facility received 60,508 tons of waste, 11.1% (5,545 tons) was recycled while the remainder went to the landfill. The table on the opposite page shows the trend of

solid waste and recycling in Madison County over the last 20 years. While Madison County has a lower per capita waste rate than the region, 0.65 tons per person compared to 0.73 tons per person in the Central New York Region, total tonnage of solid waste in Madison County has increased since 1995. Total tons recycled has also decreased since 1995, but that is only part of the story: factors such as an increased value for scrap metal means people resell (reuse) this material rather than send it to the landfill where it would be recycled. Moreover, many large retailers directly sell or reuse their recyclables rather than send them to the County to be recycled. That said, the numbers indicate that there is always room for improvement when it comes to waste reduction and recycling.

Reduce

The most important facet to materials management is to reduce unnecessary or wasteful consumption. When it comes to excessive packaging, disposable items, and wasted food, it is convenient to roll it out as garbage by the side of the road for pick up each week or to drop it off at one of the three transfer stations. It is almost as if these items disappear, but in reality these items are using energy and depleting natural resources to be produced and upon being thrown out are creating environmental challenges (even if they make it to a landfill or are recycled). Recycling and reusing these materials after the fact is helping to decrease waste, but shifting from a throwaway ethic and reducing waste from the start would have the most positive impact.

One of the biggest areas to improve is to reduce the amount of food thrown out. Food waste is not separated out at the County solid waste facility so exact data is not currently available. However, according to the National Resources Defense Council, producing food in the U.S. uses up 10% of the country's total energy budget, takes up 50% of its land and requires 80% of all U.S. freshwater consumed each year and yet, 40 percent of food in the United States today goes uneaten.

Reuse

The County has embarked on several innovative reuse initiatives including the operation of a ReUse Store to divert useable household items from the landfill and the conversion of yard waste into mulch,

available free to County residents. The County is using the landfill itself to generate energy and attract business through the Agriculture and Renewable Energy (ARE) Park. The ARE Park includes a 1.6 megawatt landfill gas to energy facility which captures the methane – the byproduct of organic material breaking down in the landfill- to generate electricity. New reuse efforts include exploring the feasibility of converting non-recyclable plastics to oil. The County should also revisit food composting (a pilot project was conducted in 1994 and 1995 but a lack of funding prevented a long-term food waste-composting program from being adopted) such as encouraging backyard composting and helping to establish school composting programs.

Recycle

Madison County has a very comprehensive recycling program and has been a leader in New York State's recycling efforts since the first plastic bottle was accepted for recycling in July of 1990. Since that time, the list of items that are now recyclable in Madison County has grown to include televisions, computer monitors, mercury and products containing mercury, plastic bags, license plates, pizza boxes and more. In 2004, Madison County adopted a local law mandating the source separation of recyclable materials (co-mingling recyclables with trash is prohibited) and established a hauler licensing program that requires anyone collection trash generated in the County to provide recycling services. Moreover, the transfer stations are pay-as-you-throw to encourage waste reduction while there

is no charge for residents to drop off recyclables.

Construction and demolition waste has proven more difficult to recycle. According to Vision CNY: Central New York Regional Sustainability Plan, construction and demolition waste (C&D) is the second largest material stream in NYS at 36% of the total and is made up of uncontaminated waste from the construction, remodeling, repair, and demolition of utilities, structures, and roads and includes land clearing debris. Efforts to reduce this waste stream

should be continued to be pursued. One method to improve recycling of C&D materials identified in the County's Solid Waste Management Plan is to encourage the separating of portions of the waste stream at the source.

An important factor to any recycling program is education. The County will continue to place a priority on recycling education such as through landfill and recycling center tours, media campaigns, and through the Recycling Coordinator position.



Pine Grove Middle School in East Syracuse successfully implemented a school-wide composting program. Student volunteers act as “compost hosts,” and put on a skit to help younger kids determine what can be composted during lunch.

Agriculture

For visitors and residents of Madison County, it's not hard to see the important role that farming plays here. While the agriculture economy is dominated by the beef and cow dairy industry, farms here also produce a diversity of products including grains, vegetables, beans, flowers and nursery items, hops, and a growing array of value-added delights including cheese, breads, deli products, beer and spirits.

What can be done to build on the strengths of Madison County's rich agricultural heritage? Research and new technologies point to methods that can help farmers increase efficiency by improving tillage and grazing practices. Buy

local and farm to school movements can help to integrate local products into markets within the county and region. Emerging industries, such as biomass production, are a way for farmers to grow into the future.



Estimates for biomass production capacity ranged from 231,680 oven dried tonnes per year to 951,502 odt per year. At the lowest estimate, that is enough biomass to supply a **35 MW** heat and power facility and at the highest, it is enough to provide enough power for much of the region.

The average farm size in Madison County is **224** acres.

Madison County is home to **838** Farms as of 2012.

Managed grazing can result in estimated **30-50%** reductions in farm fuel use when done properly.

Goals + tasks

1 Encourage public-private partnerships and infrastructure to support processing, preservation and storage of locally produced foods

- + Support the Growing Upstate Food Hub

2 Help farmers implement sustainable practices

- + Educate and support the use of micro-hydro systems and micro-digesters
- + Research the benefits of feeding low methane emissions diets to cattle

3 Improve soil management practices

- + Research the benefits of various soil management practices on emissions
- + Research the benefits of nitrogen management soil practices
- + Increase the utilization of managed grazing for beef and dairy

4 Implement a “Farm to School” program

- + Utilize the Madison County Agricultural Economic Development program to link farms with local school districts
- + Develop education programs highlighting the importance of farms and farm systems

5 Foster development of a viable biomass agricultural industry on marginal lands

- + Work with regional partners on developing viable markets
- + Work with public sector partners to site a small scale combined heat and power plant

6 Further implement conservation tillage on local farms

- + Work with Soil and Water Conservation District to make specialized tillage equipment available to local farmers
- + Provide conservation tillage education opportunities to interested local farmers



Recently, the USDA released the [2012 Census of Agriculture](#), which includes data and reports on various areas of the agricultural sector, with specific focus on county level data. Madison County saw a 13% increase in the number of farms between 2007 and 2012, to a total of 838 farms and the land in farms remained almost exactly the same as 2007. These numbers show that Madison County

continues to have a strong and diverse agricultural base.

Out of a recommendation from the [2005 Agricultural Plan](#), Madison County hired an Agricultural Economic Development Specialist, with the goal of providing momentum and focus for various avenues of agricultural expansion in Madison County. The position has developed and aided a number of initiatives including: Open Farm Day, CNY Bounty, Kriemhild Dairy, hops and local farm brewery projects, the Growing Upstate Food Hub, and much more. Recently, the County has seen an upswing in the number of new and unique farm endeavors, including a number of farmstead breweries (hard cider and beer), a growing number of hops farms, its first winery, and value added dairy operations. Additionally, with corn and soybean prices as high as they have been the past 4-5 years (\$5-\$6 corn and \$12 soybeans), we have witnessed the conversion of some formerly abandoned fields back into productive agriculture.



Farm to School

“Farm to school” programs are gaining popularity all over the Country. According to a recently completed farm to school study by the USDA, in 2011-2012, over \$385 million was spent by schools on local food. The survey also showed that nationally, 44% of school districts have an existing farm to school program in place, and 13% more were working to bring programs on line in the near future.



There is great potential to incorporate this national trend into the agricultural economy of Madison County. The Madison County Agricultural Economic Development program could be utilized to link farms with local school districts. There could also be an emphasis on developing education programs for local schools that highlight the importance of farms and local farm systems.

Managed Grazing for Beef and Dairy

A goal of 25% adoption of managed grazing by Madison County beef and dairy farms is attainable. Managed grazing can have numerous energy,

environmental, and herd health benefits on both beef and dairy farms. Energy savings are attained by a number of factors, including decreased tillage requirements, less frequent planting, less fuel consumption to harvest corn and hay, less manure to move and store, and more. Managed grazing can result in estimated 30-50% reductions in farm fuel use when done properly.

Strategies to promote this method include continuing to fund the Grazing Specialist Position at the Madison County SWCD and seeking outside funds for the implementation of additional managed grazing programs.



Biomass Industry

In 2009, a study by SUNY College of Environmental Science and Forestry intern and student Alice Brumbach shed light on the available agricultural lands in Madison County for potential as biomass crop production areas. Estimates of production capacity ranged from 231,680 oven dry tonnes/year (odt/year) to 951,502 odt/year. At the lowest estimate, that is enough biomass to supply a 35 MW heat and power facility and at the highest, it is

enough to provide enough power for much of the region.

Investigation and implementation of developing a biomass industry in Madison County could start with identifying regional partners including Morrisville State College, SUNY College of Environmental Science and Forestry, and the CNY Regional Planning and Development Board to work on developing viable markets for biomass crops. Furthermore, work could be done with public sector partners to site a small

scale Combined Heat and Power (CHP) plant in the County that utilizes biomass produced locally.

Conservation Tillage on Local Farms

A conservation tillage demonstration program was started in the Oneida Lake Watershed of Madison County in 2007 with funds from the Great Lakes Basin Program for Erosion and Sediment Control. The concept was to provide equipment and planting demonstrations to show that this tillage practice

can reduce labor and fuel costs, improve soil tilth and organic matter, reduce soil erosion, and improve water quality.

Madison County should work with the Soil and Water Conservation District to continue to make specialized tillage equipment available to local farmers and provide additional education opportunities for local farms interested in learning more about the potential for this practice to reduce fuel use and save money in their operations.



Climate Adaptation

The 21st United Nations Conference of Parties or COP21 simply defines adaptation as: Measures taken by states to reduce the impact of climate change (rising sea levels, drought, etc.), such as building dykes in coastal zones or restricting development in hazardous areas.

Technological advances have made us better able to understand natural conditions and weather patterns which affect every aspect of our lives. As information about present and projected climate conditions becomes available, we can look with a new perspective

on the way our neighborhoods, towns and rural areas have developed. In light of new data and analysis tools, we should ask: What can be done now that will ensure the safety of our valued assets, and keep us out of harm's way in the event of future natural disasters?

Madison County is predominantly rural with forest comprising **41%** of all land cover.

The Oneida Creek Stream Gauge recorded a stream height of **17.2 feet** during the June 2013 flood.

In August of 2003 heavy rains in DeRuyter and Cazenovia caused flooding and gravel accumulation which filled culverts and pushed water into the roadways. **\$700,000** in damages resulted from this overnight storm.

220 homes in the Oneida Flats neighborhood were evacuated in June 2013, when heavy rainfall caused widespread flooding.



Goals + tasks

1 Implement the Madison County NY Rising Resiliency Plan

- + Develop a county wide stream maintenance program
- + Update Madison County's Hazard Mitigation Plan
- + Focus on enhanced emergency management within Madison County
- + Implement Specific projects as identified in the Resiliency Plan

2 Increase emphasis on Floodplain Management

- + Educate local Planning, Zoning, and Code Officials about floodplain management
- + Update local floodplain ordinances
- + Work with FEMA and others to prioritize flood map modernization for Madison County (LiDAR was flown in 2015)

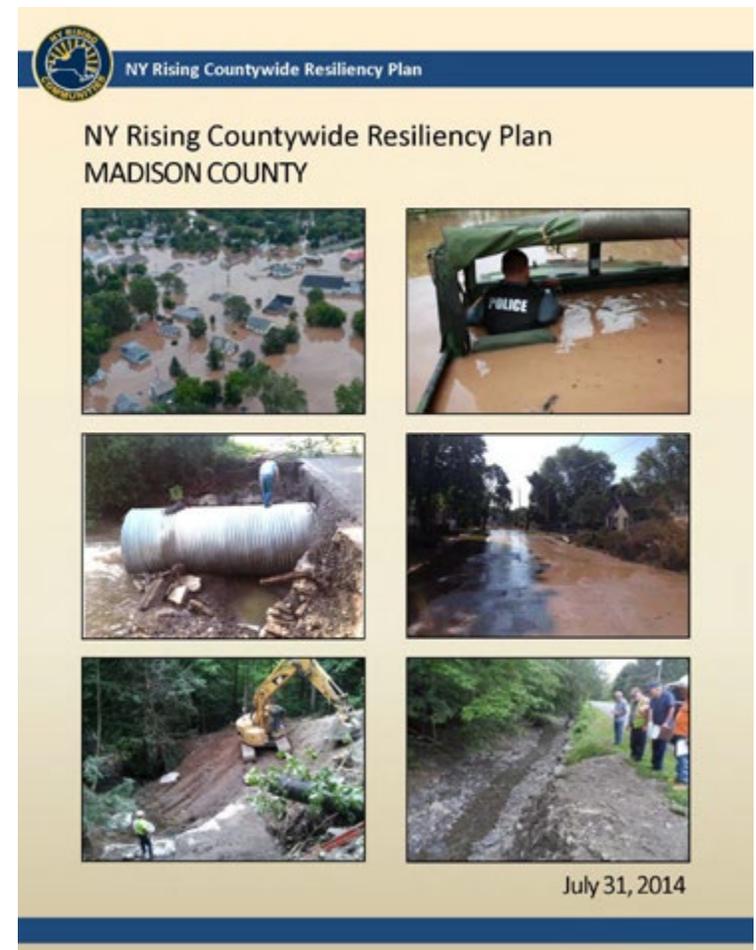


In the summer of 2013, portions of Madison County were hit with intense rainfall events that met or exceeded the 100 year storm and caused millions of dollars of damage. The magnitude of the damage resulted in a Federal Disaster declaration along with 7 other counties in New York State. In the summer of 2014, the deadliest tornado in New York State since 1950 hit in Madison County and resulted in deaths of four people in the Town of Smithfield. Changes in weather patterns are apparent, and as a result, Madison County (with the guidance of New York State) prepared a [NY Rising Resiliency Plan](#) in 2014 to plan, recover from, and prepare for these changes. The Vision developed in the plan is as follows:

“The communities of Madison County are dedicated to enhancing our rural charm, natural beauty, and strong community values, while preserving our family farms, growing our friendly neighborhoods and supporting our locally owned businesses by embracing smart growth strategies. Our focus is on recovery from the summer storms of 2013 and reducing future risk from natural disasters. We will rebuild stronger, smarter and safer, to ensure the long term resiliency of our people, property and natural resources.”

Madison County’s 2014 Resiliency Plan was developed through a broad based approach with the goal of identifying implementation strategies across a host of categories. The strategies cover these areas: Community Planning and Capacity Building, Economic Development, Health and Social Services, Housing, Infrastructure, and Natural and

Cultural Resources. Sections III and IV of the Plan outline specific strategies and projects in each of these 6 categories. Rather than republish the work that has already been done, Madison County hereby incorporates the goals, strategies, and projects outlined in the Resiliency Plan into this Sustainability Plan.





County Government

Sustainability at the government level is an important sector to focus on as local governments have the opportunity to lead by example. Moreover, local governments have their own buildings and operations and thus direct control over the carbon footprint of those facilities.

Madison County government owns and maintains several buildings and facilities, operates a vehicle fleet, and employs 500 full-time workers. Madison County continues to set the bar high and lead by example when it comes

to innovative practices to reduce its carbon footprint. Moving forward, how can Madison County continue to efficiently manage its resources as well as weave sustainability initiatives into its operations?

0.75% of the county's total emissions come from Madison County government operations, according to Madison County's Greenhouse Gas Inventory

In 2014 Madison County Government's largest sources of emissions were:

County operated vehicle fleet	47%
County-owned buildings	27%
Employee commute	20%

The annual cost for energy in 2014 for Madison County buildings and facilities was **\$528,754**. This came from the consumption of 4,260,792 kWh of electricity and 148,046 therms of natural gas



Goals + tasks

1 Improve energy efficiency measures

- + Continue to collect and monitor energy consumption for buildings and vehicle fleet
- + Switch lighting to LEDs
- + Continue to showcase green technologies at the landfill, county parks, and other county owned and operated facilities
- + Examine the feasibility of Climate Smart Communities Certification through NYS DEC

2 Increase the use of renewables

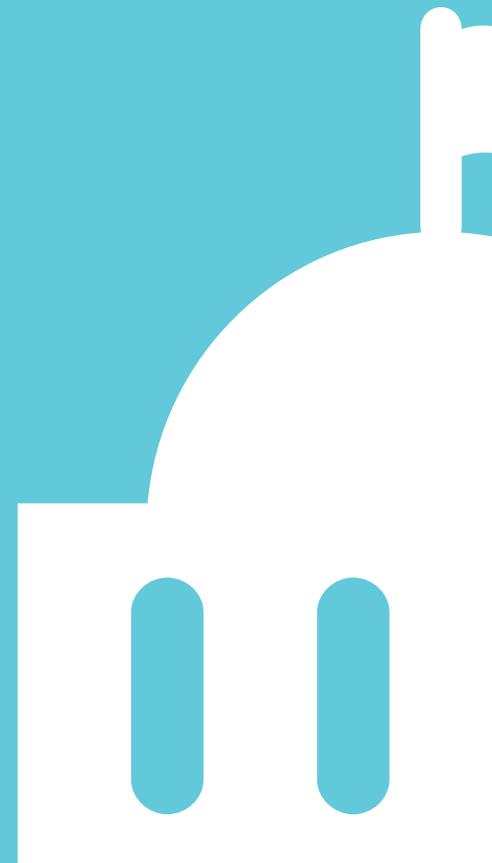
- + Work to produce 100% of the total energy used by Madison County buildings

3 Vehicle fleet and employee commute

- + Explore alternatives such as biofuel or natural gas for the County vehicle fleet
- + Investigate options to curtail the fuel used for employee commute
- + Work with the City of Oneida on the Oneida Rail Trail project including allowed use of Madison County property to connect the trail through Wampsville

4 Buy locally sourced materials and products

- + Implement a local purchasing policy
- + Encourage employees to buy local and participate in the Buy Madison campaign



Energy Consumption

Madison County monitors energy consumption at its buildings and facilities to understand exactly where energy is being used and to help identify opportunities to become more efficient. The tables below reflect County government electricity and

natural gas consumption as well as combined associated costs from 2010-2014.

For a more in depth analysis of the County's energy use, refer to the Madison County Local Government and Community [Greenhouse Gas Inventory](#).

Figure 12
Total Energy Costs 2010-2014

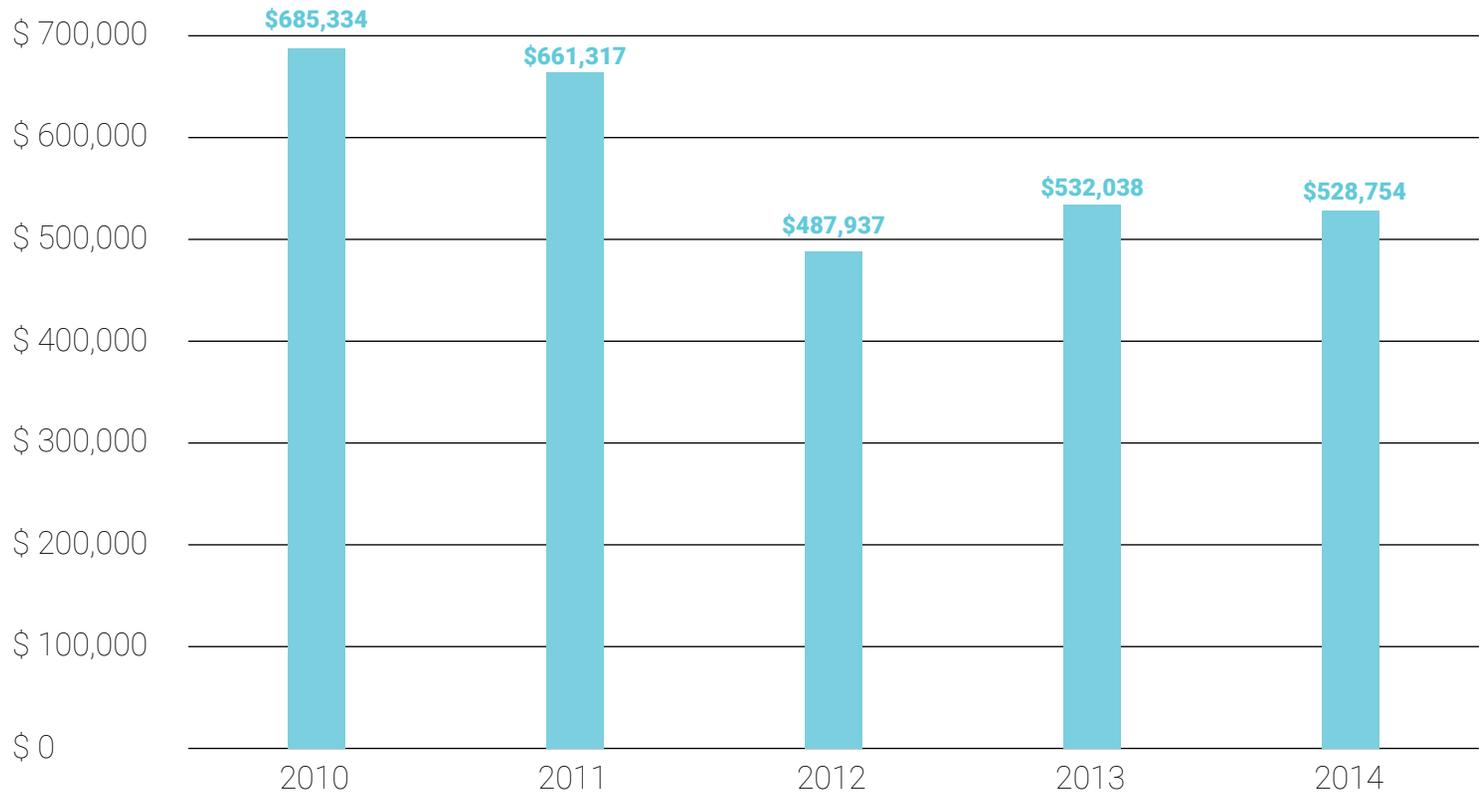


Figure 13

Electricity Use in kWh 2010-2014

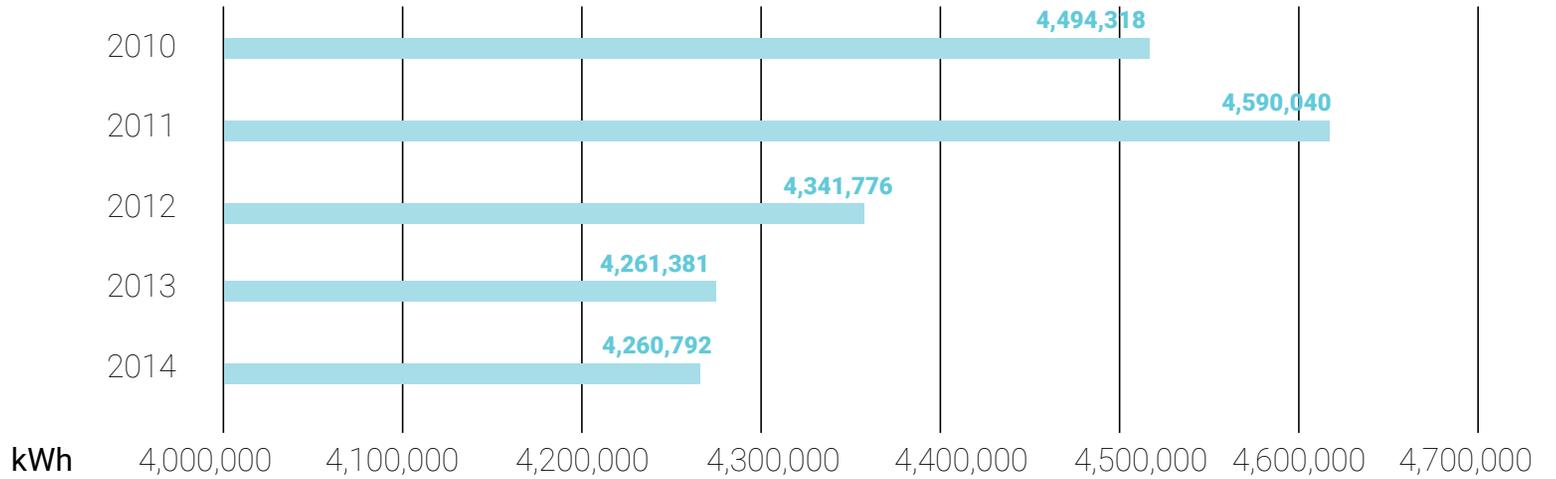
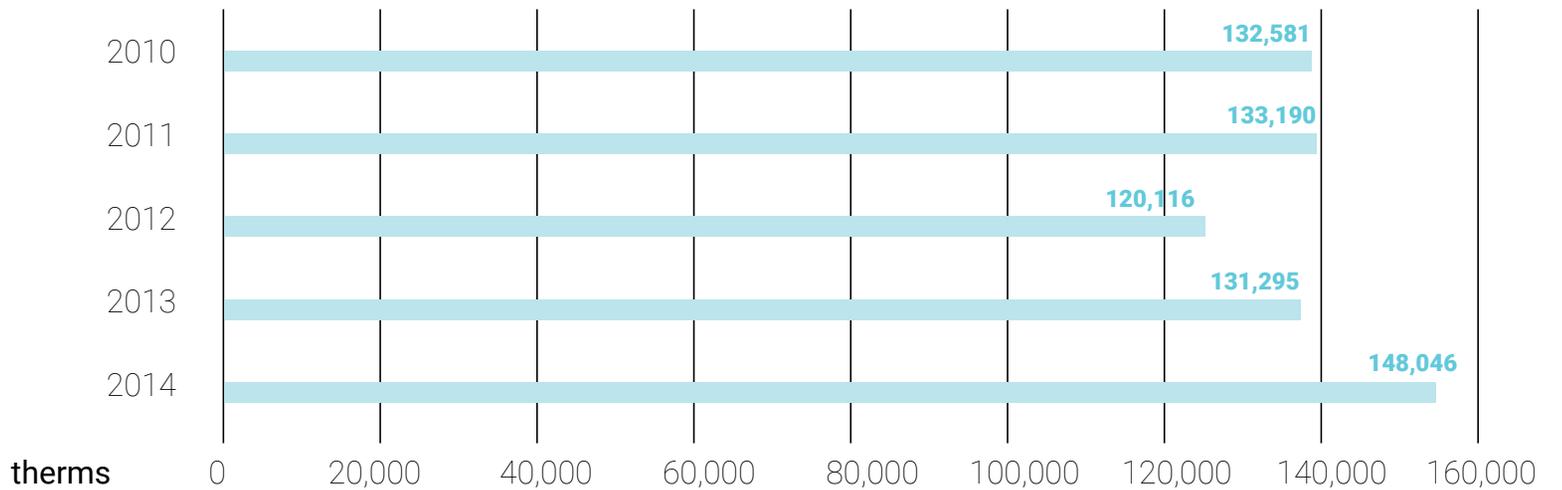


Figure 14

Natural Gas Use in Therms 2010-2014



Renewables

To offset consumption and provide energy savings, Madison County government continues to increase the use of renewable energy to power buildings and services. Projects which have led to direct reductions in energy consumption at County facilities include:

- First municipality in the country to place a solar array over its landfill; the 40 kW system powers the County's recycling center.
- Solar PV and micro-hydro used at County parks; the energy produced powers amenities at the parks including a drinking fountain and restroom facility.
- 50 kW solar array installed at the landfill through the County's first Power Purchase Agreement (PPA); this system powers the operations building at the landfill.

Madison County is currently working to install a 2 MW solar array at the landfill through a PPA. Under a PPA structure the County only pays for the energy produced by the system; there is no upfront capital costs to the County. The solar power produced through this 2 MW system will be remote net metered to provide power to County buildings located in Wampsville. The project will provide cost savings by offsetting approximately 60% of the County's energy consumption with clean, renewable energy.

MCPLUS

Recently, the County has been exploring ways to utilize its public utility service in order to better leverage energy resources which includes goals to produce and keep power locally, advance renewable energy, and provide cost savings to County tax payers. Madison County enacted the public utility service in 1984, but it remained inactive until recently. In early 2015, the County Board of Supervisors established the Public Utility Service Committee consisting of 5 appointed town supervisors to oversee the public utility service which is now being called the Madison County Public Utility Service (MCPLUS). MCPLUS could also provide additional coordination and guidance across County government facilities to identify opportunities to further reduce consumption and lessen energy costs.

Vehicle Fleet

The County currently has about 200 vehicles in its vehicle fleet as well as 70 pieces of equipment (loaders, forklifts, etc) that combined consumed 93,506 gallons of gasoline and 135,165 gallons of diesel in 2014.

Employee Commute

According to the County's Greenhouse Gas Inventory 17.7% of employees travel more than 20 miles to work each way with the average employee round trip being 21.9 miles. While this is not in Madison County's direct control, the County could work to establish incentives to promote living closer to work

to decrease carbon emissions (see Transportation). The County also continues to work with the City of Oneida to create the Oneida Rail Trail (ORT), a portion of the trail will directly link the County complex in Wampsville to the City of Oneida. The off-road trail network provided by the Oneida Rail Trail will provide a viable transportation alternative to those living in the City of Oneida.

Materials

The County should strive to buy supplies and materials locally whenever possible. Other communities have adopted Local Purchasing Policies to help achieve this goal. A Local Purchasing Policy is a documented commitment to give preference to locally produced goods and services, purchased from a local and independent business, over those produced more distantly.

The County can also encourage employees to buy local for personal purchases through the Buy Madison Program, the County's buy local program. The county-wide program supports local businesses and educates consumers about the positive impacts of keeping purchases within the County. Not only does buying locally support jobs and keep more money here locally, but shopping where one lives reduces the amount of driving required for goods and services, lessening traffic and air pollution.



