Section 3

Subject Area Goals & Strategies

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3.1 Development & Evaluation of Goals & Strategies

The project team engaged in an extensive outreach campaign to develop the key elements of the Plan. From individual stakeholder discussions to large public meetings, the process was designed to have regional stakeholders and leaders partner with topical experts to develop a meaningful blueprint for progress. The process to develop and evaluate strategies is summarized in **Figure 3-1** and described in more detail below.

Gather/Consolidate/Categorize Input

This stage entailed a comprehensive series of meetings and workshops with stakeholders, regional leaders and the general public. Early on, participants were engaged to discuss the purpose and intent of the project, solicit general guidance and goals, and encourage networking within the region. At later meetings, participants worked with the consultant team to develop more specific Goals and Strategies to achieve the broader Vision. Discussions ranged from overcoming obstacles to advancing existing or potential initiatives. This stage also included an extensive review of other regional plans and industry best practices to collect relevant ideas for the Finger Lakes Region. Finally a Strategy Capture Form was made available on the project website and distributed at meetings to gather additional strategies, project ideas and projects.

Evaluation

Once the majority of ideas, both broad-based and specific, were collected, the consultant team processed the input and assembled it into a working plan. This process included consolidating and refining ideas, identifying strategic overlap between Subject Areas, and elevating the body of work to a set of implementable strategies that align with the Story of Place and the Five Capitals (Natural, Built/Manufactured, Human, Social and Financial)[1].

The refined set of Strategies and Projects were then evaluated based on a holistic set of criteria designed to illuminate the highest priorities for the region moving forward. The following criteria were used to evaluate Broad Strategies and Representative Projects:

- Benefits multiple Subject Areas:
  - Energy
  - Transportation
  - Land Use and Livable Communities
  - Waste and Materials Management
  - Water Management
  - Economic Development
  - Climate Change
  - Governance
  - Greenhouse Gas Emissions
  - Agriculture and Forestry
- Benefits multiple Capitals
  - Natural Capital
  - Built/Manufactured Capital
  - Human Capital
  - Social Capital
  - Financial Capital
- Benefits multiple communities (including outside of the region)
- Implementation feasibility
- Consistent with local and regional planning efforts
- Financial feasibility

[1] The Five Capitals, as presented in the model advanced by The Forum for the Future in the 1990s.

A detailed explanation of the evaluation criteria and how they were applied to Broad Strategies and projects is provided in **Appendix F: Subject Area Strategies**.

Recommendations

The resulting Plan recommendations, as outlined in Section 3, provide regional and local leaders and stakeholders a clear path for achieving the vision of a sustainable Finger Lakes Region. The recommendations are organized according to Subject Areas.

Some initiatives and strategies are relatively easy to implement, while others are more challenging and/or costly but also offer high benefit potential. The Plan outlines a focused set of strategies that unify the region through a shared identity and common goals and direct us towards the highest return on investment and a more sustainable future. The Representative Projects included in the Plan demonstrate support for the associated Broad Strategy and provide examples of implementation. Representative Projects are provided for illustration purposes only and are not intended to reflect recommendation for funding.

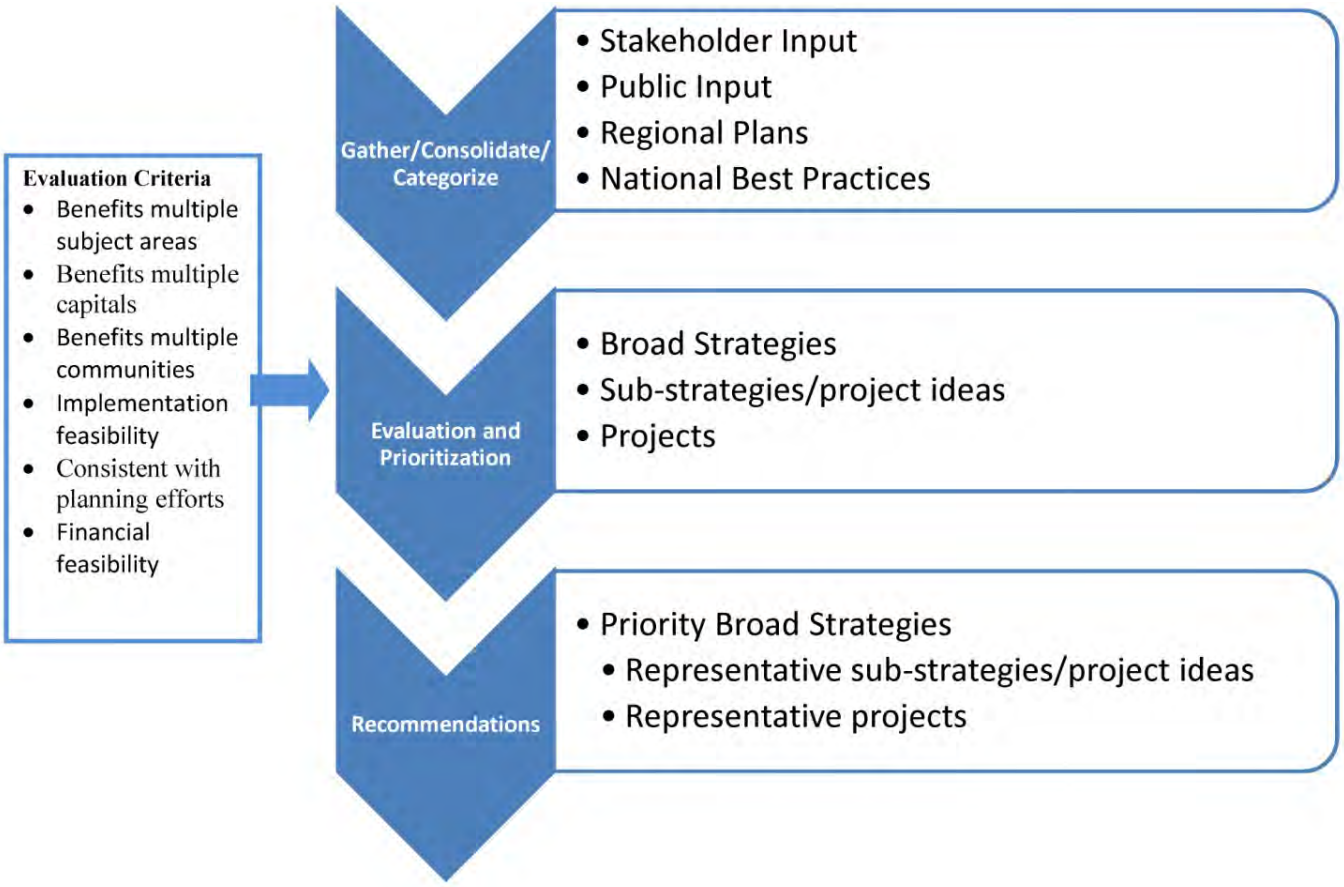

Figure 3-1: Process to Develop and Evaluate Strategies

3.2 Organization of Subject Area Sections

Section Elements

The remainder of Section 3 is organized by the following Subject Areas:

- Energy
- Land Use & Livable Communities
- Materials & Waste Management
- Water Management
- Economic Development
- Climate Change Adaptation
- Governance
- Greenhouse Gas Emissions
- Agriculture & Forestry

Overview

The Overview for each Subject Area includes the following elements:

- Connection to the Story of Place – a brief description of how the Subject Area is reflected in the region's history and the Story of Place framework, as described in Section 2.
- Existing Conditions: Assets and Sustainability Initiatives – a summary of existing conditions highlighting some of the region's assets and past or present initiatives that show that sustainability has and will continue to be a regional priority.
- Challenges, Variables, and Opportunities – identification of Subject Area challenges and variables that could affect the progress towards the Goal, which is stated later in the section; identification of opportunities that could be leveraged to advance progress towards that Goal.

Indicators and Targets

This section identifies the Indicators which provide a comprehensive framework for tracking progress towards the Subject Area Goal. For each Indicator, quantitative thresholds, or Targets, are identified that the region should strive to attain. Targets have been established for three time frames using 2010 values as a baseline: Short-Term (2020), Mid-Term (2035), and Long-Term (2050).

Sustainability Goal and Strategies

This section identifies the Subject Area sustainability Goal and outlines the Broad Strategies and Sub-strategies, which are action-oriented statements to be accomplished in pursuit of a Subject Area's Goal. For each Broad Strategy, the following information is provided:

- Broad Strategy title and introduction text
- Prioritization – a summary of how the strategy scored on the evaluation criteria outlined in Section 3.1
- Potential Stakeholders and Resources – identification of key stakeholders and potential funding sources
- Challenges and Sub-strategies – identification of potential barriers to implementation and proposed Sub-strategies to overcome those barriers.

Summary Sheets

The key elements of each Subject Area can be found in the Summary Sheets at the end of their respective sections. The fold-out Summary Sheets can be used as stand-alone "cut-sheets," providing the various stakeholders involved in implementing the Plan with a large-format quick reference guide, whereas the larger document provides greater detail on a given topic.

3.3 ENERGY

Overview

Connection to Story of Place

The region's Story of Place highlights the proud history of developing new ideas, products, and businesses that not only supply energy generation locally, but to locations outside of the region as well. Crowned the "Flour City" in the early 1800's, Rochester leveraged the abundance of water to provide power for the flour mills, creating a booming and lucrative industry for the City. The innovations in energy production and usage have continued to leverage the regions' renewable natural resources – water, wind, solar and geothermal resources. The abundance of farmland, food manufacturing and waste management facilities within the region has also encouraged the conversion of "waste" materials to an alternative energy source. These developments have contributed to the "democratization" of energy, making various sources available to the vast majority of citizens. They have also reinforced the region's identity as being a place of continuous innovation, which will be a key characteristic as we move towards a more sustainable future.

Existing Conditions: Assets and Sustainability Initiatives

The Finger Lakes Region has been a source of energy innovation and resourcefulness for decades. However, recent strides may set the region apart from other places. There have been advancements in several areas that include the following:

Renewable Energy Sources
Renewable energy sources are particularly of interest given their sustainability characteristics and relatively low long term costs and impacts. Among the renewable initiatives are:

- Wind Energy – Wind energy is a growing industry, with the region boasting four windfarms in Wyoming County and proposals for more windfarm projects in the nine-county area. Additionally, several companies such as Kodak are involved in renewable energy endeavors, both locally as well as supporting efforts outside the region. One Wayne County company installed an on-site wind turbine in 2002 that produces approximately 25% of its electrical needs.

- Solar Power – Solar power is being used in several Finger Lakes communities for street lighting, signage, and to power smaller elements, such as solar water heaters and solar landscape lighting. Larger scale systems exist as well, such as the 44 kilowatt (kW) system at Rochester's Arnett Branch Library and the 15kW system at the Rochester Public Market.
- Hydroelectric Power – Although limited, there are hydroelectric generation capabilities within the region.

Alternative Energy Sources
Generating energy from waste products is another significant area of growth in the Finger Lakes Region. The efforts are focused on, but not limited to the following:

- Alternative Fuels – The Finger Lakes Region is home to ethanol and biodiesel manufacturing, including New York's first state-of-the-art dry mill ethanol plant. This facility, located in the Town of Shelby, produces an estimated 50 million gallons of ethanol a year.
- Biomass – Complex biomass research and development is currently taking place at regional colleges and universities including the Rochester Institute of Technology's (RIT) Golisano Institute for Sustainability, University of Rochester's Energy Research Initiative, and Cornell University's Tech Farm. These academic institutions, along with private companies including Sweetwater Energy, Synergy Biogas, LLC (CH4 Biogas), Epiphergy, and Seneca Ag-Bio Green Energy Park are developing ways to take natural resources, food waste, agri-waste, other byproducts and capture energy from them. The region is also home to three landfills that have alternative energy initiatives. The Seneca Meadows, Mill Seat, and High Acres Landfills all convert landfill byproducts to electricity. High Acres and Mill Seat also use biosolids from wastewater treatment with municipal solid waste to enhance methane production and thus electricity generation. These facilities take landfill waste and convert it into an alternative energy resource.

Slightly less than 50% of the region's greenhouse gas (GHG) emissions are associated with energy production and consumption in the residential, commercial and industrial sectors. For a more detailed breakdown, refer to Section 3.11, GHG Emissions. There are three primary service providers in the region: RG&E, NYSEG and National Grid. There are also nine municipal service providers serving the villages of Arcade, Bergen, Castile, Churchville, Fairport, Holley, Penn Yan, Silver Springs and Spencerport.

The Finger Lakes Region generated 7 million megawatt-hours (MWh) of electricity in 2010, resulting in 1.6 MT CO_2e. Most of this energy, more than 5.9 million MWh, was generated without direct GHG emissions. 4.9 million MWh were generated at the R.E. Ginna Nuclear Power Plant, while an additional 1.0 million MWh were generated using renewable and alternative sources such as wind, hydro, and recovered landfill gas.

In the Finger Lakes, 11.2 million MWh of electricity were consumed, and 0.65 million MWh is lost during transmission within the region, therefore the region imports about 4.8 million MWh of electricity from other regions of the state, which can come from a mix of sources. **Figure 3-2** provides a breakdown of the electricity sources in the region, defining the total consumed by imported electricity or regional source.

The Finger Lakes Region is a prime location for the development and generation of all types of energy. The region has the ability to continue to build upon its innovations and use of natural and alternative energy resources to become one of the greatest energy sources in New York State. The nationally renowned research taking place at the aforementioned institutions is advancing the growth for new ideas and applications of technology to make the greatest and best use of our resources.

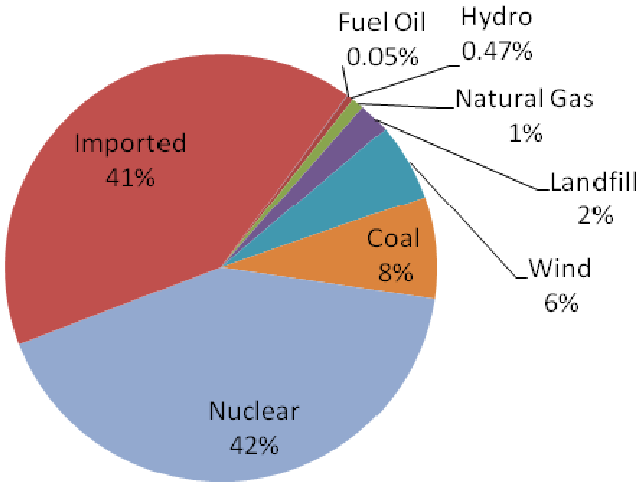

Figure 3-2: Electricity Sources (2010)

Challenges, Variables, and Opportunities

Several variables, including the success of other Subject Areas in this Plan, could affect the ability to implement the Energy strategies outlined below. Water is vital to driving hydroelectric power plants and cooling nuclear reactors. Likewise, land use planning, including planning and designing energy resources in close proximity to growth areas can reduce distribution lines, reduce transmission loss, and increase public transportation, each in turn making energy more efficient. Agriculture and forestry are expected to continue to play a larger and more significant role in the energy sector, particularly as energy resources for bio-fuels.

The natural, human, and institutional resources of the Finger Lakes Region make it uniquely positioned to advance alternative and renewable energy solutions.

There are certain challenges that come with successful implementation of strategies, that may need to be overcome in order to create a more energy sustainable region. Consumer education has the potential to change behaviors that can lead to a greater acceptance of new technologies. Financial support is a key ingredient to an energy efficiency program, particularly to support mid-size business and middle income residents. There will need to be a significant investment of time, consent and resources in order to implement some of the energy strategies identified. Another challenge is the need to provide training and technical resources to local municipalities to adopt and enforce energy policies in ways that are consistent with local needs and resources, so long as those regulations are not in conflict with a State regulation.

It should be noted that the Plan will have no impact or influence on the hydraulic fracturing analysis currently being conducted by New York State. The goal of this Plan is to provide a framework of strategies focused on greenhouse gas reduction and economic development that will help the region position itself to play a prominent role in shaping its energy and environmental policies of the future. More specifically, the Plan seeks to achieve this goal by promoting policies that balance the demand for energy resources alongside the need to reduce environmental impacts.

Indicators and Targets

During the first Energy Stakeholder Group meeting, potential Indicators were presented to the group and were open for discussion. Through a discussion on how the Vision relates to energy sustainability, the Energy Goal and several Indicators emerged as priorities for the group. First, there was a desire to improve our regional resiliency in case of disaster. This led to the creation of an Indicator focused on regional energy self-reliance, which was captured by increasing the regional energy generation per capita.

The Stakeholders, and most of the general public, voiced support for renewable energy which is tracked by renewable capacity in the region. Stakeholders also expressed a desire to examine the availability, accessibility and affordability of renewable energy. Lastly, the stakeholders felt that broadly capturing energy efficiency should be tracked and is therefore a key Indicator. Although the data associated with the last two Indicators is currently not tracked, it is recommended that a methodology for quantifying this be developed for future tracking.

Indicators

- Regional energy consumption per capita Total installed renewable energy capacity
- Regional energy generation per capita (self-reliance)

- Availability, accessibility, affordability of renewable energy
- Energy efficiency
- Percent of regional population living in areas with local energy codes exceeding state requirements, and/or regulations for benchmarking and retrofitting private buildings

The baseline values for these Indicators are shown in the Summary Sheet at the end of this section, as well as Targets for short (2020), mid (2035), and long-term (2050) timeframes. A table of representative Sub-strategies/Project Ideas and Representative Projects that contribute to the implementation of these Broad Strategies is also provided in the Summary Sheet.

Sustainability Goal and Strategies

Energy Goal

Increase the generation and distribution of regional renewable energies while using energy efficient and alternative energy resources, along with conservation methods, to decrease the reliance on fossil fuels and outside non-renewable energy sources to become a self-sustainable Region.

The following is a description of each Broad Strategy that supports the Energy Goal. Representative Sub-strategies are provided as examples of specific measurable activity that could be implemented to support the Broad Strategy. At the end of the Energy Section there is a Summary Sheet that provides a more comprehensive list of representative Sub-strategies/Project Ideas and Representative Projects that contribute to the implementation of these Broad Strategies.

Broad Strategy E1 | Develop, produce, and employ alternative energy (bio-energy, waste to energy).

In support of the goal to reduce the region's reliance on fossil fuels there is a need to develop, produce, employ and promote alternative energy. The abundance of farmland, food manufacturing and waste management facilities within the region has encouraged the conversion of "waste" materials to an alternative energy source. This is an area of continued growth for the region.

The effectiveness of this strategy will be measured through the following Indicators:

- Regional energy usage per capita (MMBtu)
- Regional energy generation per capita

Prioritization
This strategy was a high priority for the region since it aligns with the Story of Place by capitalizing on our natural resources and utilizing technology to make improvements in our lives. In addition, this strategy benefits multiple Capitals and Subject Areas by providing opportunities for economic development (jobs), making use of potential waste materials, reducing dependency on fossil fuels, and focusing on solutions for the waste associated with the agricultural and food production markets.

When evaluation criteria were applied, this strategy received strong scores in all areas except financial feasibility, which received a moderate score due to the investments necessary to grow alternative energy. There is a potentially high cost of developing and implementing the technology, however, the cost savings over time minimize life cycle costs.

This strategy is aligned with the following guiding principles:

- Improve accessibility (to energy), connectivity and mobility

- Preserve, protect and improve natural resources and acknowledge the link between natural systems
- Maintain, protect and improve the functionality and climate change/disaster resiliency of existing infrastructure systems and acknowledge the link between systems

Potential Stakeholders and Resources
Implementation of this strategy will require a continued commitment from both public and private sectors, including academic institutions, local and regional planning councils, local and regional planning boards and other approval agencies. Critical funding for these projects are expected to come from private investment, public benefit corporations and Federal and State agencies including the US Department of Energy, the New York Power Authority, the New York Department of Taxation & Finance, US Department of Agriculture (Rural Energy for America Program), and regional Industrial Development Agencies.

Challenges and Sub-strategies
The primary challenges to the implementation and success of projects associated with this Broad Strategy are largely the lack of current technology, and/or the cost associated with the implementation of the technology. Sub-strategies developed include supporting research and the deployment of pilot projects which will help demonstrate the applications, quantify the cost, and document any implementation challenges. In addition, a Sub-strategy for inventorying alternative energy production projects was developed to accurately capture what is already being done across the region and identify future opportunities.

Sub-strategy 1.1 | *Identify funding for and encourage implementation of projects that use food waste to produce energy.*

This Sub-strategy is aligned with the following Finger Lakes Regional Economic Development Council (FLREDC) Regional Strategies and Sector Strategies:

- Optimize business creation, retention and expansion
  - Increase the number of entrepreneurs through education/ training programs and recruitment, particularly those with domain experience in key sectors.
  - Develop systems that monitor and identify firms and sectors with high growth potential and proactively engage with these companies to connect them with the resources that will accelerate product development, access to new markets, and scale business models.
- Energy innovation
  - Create the resources and infrastructure that will accelerate R&D and commercialization of new energy technologies.

- Agriculture and Food Processing
  - Increase the value, diversity of agricultural products, and exports.

The region has a significant agriculture base and is home to many food manufacturing facilities which generate organic waste. In addition, large retail food stores also have to address organic waste from daily operations and food recalls. Recent trends on limiting or eliminating organics in landfills have contributed to the desire to find an alternative approach to food waste. Epiphergy, Sweetwater Energy, Synergy Biogas, LLC (CH4biogas), and Seneca Ag-Bio Green Energy Park are companies within the Finger Lakes region that use food waste, agri-waste, and other byproducts and capture energy from them.

- Epiphergy (an "energy epiphany"), a company in Pittsford, Monroe County, uses scalable, modular technology to produce ethanol fuel, animal feed, and organic fertilizer from plant-based organic materials.
- Sweetwater Energy, located in Rochester, Monroe County, was launched to develop technology that would allow farmers to produce ethanol from crops right on their farms. The company evolved to focusing on producing sugar from plant material which can be a

precursor for ethanol, as well as other biofuels, biochemicals and bioplastics. Using experience gained through operating a pilot facility to extract sugar from corn silage, Sweetwater has plans to open its first demonstration cellulosic plant in 2013.
- Synergy Dairy, in Covington, Wyoming County, is a biogas facility that produces renewable energy from manure and substrate. Biogas from the digester will generate up to 1.4 MWh of electricity.
- The Seneca Ag-Bio Green Energy Park is located in the former Seneca Army Depot in Seneca County. The Park includes a cluster of companies that convert agricultural byproducts and waste into biofuels and biomaterials. One of the companies, Seneca BioEnergy, LLC, produces biofuel from vegetable oils.

The implementation of this Sub-strategy falls primarily to the private sector. Entrepreneurs pursuing waste-to-energy projects will be supported by Sub-strategies 1.2 through 1.4 which provide support for research and development of new technologies, education of municipal officials and the general public and the development and adoption of policies that allow for the implementation of alternative energy projects.

An example of implementation of this Sub-strategy is the Seneca Ag-Bio Green Energy Park which is highlighted in the FLREDC Sector Strategy "Energy innovation." Similar to the FLREDC identification of the Seneca Ag-Bio Green Energy Park as a priority project and recommendation of an additional $950,000 in State support, there is a need to continue to identify and provide additional funding to support waste-to-energy projects.

Sub-strategy 1.2 | *Support research and development, deployment of pilot projects to validate technology and eventual commercialization of new alternative energy technology*

This Sub-strategy is aligned with the following FLREDC Regional Strategies and Sector Strategies:

- Optimize business creation, retention and expansion
  - Increase the number of entrepreneurs through education/ training programs and recruitment, particularly those with domain experience in key sectors.
  - Develop systems that monitor and identify firms and sectors with high growth potential and proactively engage with these companies to connect them with the resources that will accelerate product development, access to new markets, and scale business models.
- Strengthen academic and industry partnerships
  - Develop programs and shared resources that allow closer collaboration between academic and industry scientists.
  - Streamline and accelerate the maturation, transfer, and commercialization of university-based intellectual property; Build a regional ecosystem that more effectively harnesses university-based innovation, with a particular focus on fostering the creation and growth of early-stage companies.
- Energy innovation
  - Create the resources and infrastructure that will accelerate R&D and commercialization of new energy technologies.

An example of this Sub-strategy is RIT's Golisano Institute for Sustainability (GIS), which is interested in pursuing research where bio-gas from landfills and anaerobic digesters is used to power stationary fuel cells. The fuel cells would produce electricity and hydrogen from a sustainable feedstock fuel. The long-term potential exists to create hydrogen depots that could provide fuel for commercial fueling stations to sell to consumers driving hydrogen vehicles. Benefits from the project include greatly reduced GHG emissions from hydrogen vehicles, increased renewable electricity production, reduced VMT from the shipping of petroleum fuels and enhanced local job creation from establishment of a regional hydrogen distribution network. FLREDC requested $5 million in capital funds to enable RIT to equip

research labs at GIS with industry-focused test beds. RIT also requested $1.125 million from NYSERDA for equipment to test battery storage.

There is a need to continue to provide financial support for academic institutions and other organizations involved in research and development and deployment of pilot projects leading to commercialization of new alternative energy technologies.

Sub-strategy 1.3 | *Educate the public and municipal officials on the benefits of alternative energy generation and address the potential negative impacts.*

Although there are numerous outreach programs associated with energy efficiency and renewable energy, there is limited information available on the alternative energy, primarily waste to energy, and its benefits. Examples of education on alternative energy include the Monroe County website which provides information on local Green Projects including their participation in biofuel and waste to energy initiatives at landfills and information provided by non-profit organizations including Alliance for Clean Energy NY (ACE NY).

In an effort to highlight biofuel technology, a special outreach workshop was sponsored by the New York State Pollution Prevention Institute and Monroe County in October 2012. This workshop showed nearly 60 representatives of the food-service industry, higher education and local government learned how waste cooking oil can be converted into biodiesel fuel.

Additional education on alternative energy generation should continue to be made available through a number of resources including:

- Continuation and expansion of training and technical assistance offered through the Genesee/Finger Lakes Regional Planning Council's (G/FLRPC) biannual Regional Local Governments Workshop series, NYSP2I, and the Monroe County Department of Planning and Development biannual Land Use Decision-Making Program and other organizations.
- Expansion of county and municipal Renew My Community websites, currently focused on energy conservation and efficiency, to include alternative energy.
- Development of an energy page on the sustainable-fingerlakes.org website to provide a single resource for the region. This page would provide information on energy conservation, efficiency, and production through alternative and renewable resources. The development of this page would be the responsibility of the Regional Plan Coordinator as identified in Section 4, Plan Implementation. In addition to education materials, this page could provide links to state and federal incentive programs, county and municipal websites and institutional and non-profit resources.

Sub-strategy 1.4 | *Develop and promote the adoption of local policies that accommodate the development of on-site and community alternative and renewable energy generation.*

Municipalities should develop and adopt an energy policy to address issues of energy production, distribution and consumption. Local governments have at least four different roles that should be addressed in energy policies. Three roles are presented in this Sub-strategy and the fourth in Sub-strategy 1.5:

1. The municipality has the ability to control where alternative and renewable generation is allowed through zoning and local permitting and to leverage its oversight to influence investment in alternative and renewable energy.
2. Some local governments own their own utilities and offer significantly lower rates to their customers than their investor-owned counterparts, primarily because they have low-cost electric purchase contracts with the New York Power Authority (NYPA). Like other local government operations, not-for profit public power systems also pay no federal income tax and can issue tax-exempt bonds for capital expansion. Local ownership of the

utility also allows for location-appropriate expansion of alternative or renewable power generation.
3. Municipalities can purchase energy that was generated through alternative and renewable sources.

Education, training and technical support for municipalities developing and implementing policies should be provided by county planning departments, the G/FLRPC, regional education institutions and non-profit organizations.

Sub-strategy 1.5 | *Encourage counties, municipalities and local districts to conduct an inventory of potential alternative and renewable production and prioritize projects for implementation*

Municipalities can create their own energy to be used on-site from an alternative or renewable source. The energy created could fully power municipal facilities or offset peak-hour use. An example of alternative energy production is the partnership between Monroe County and Waste Management to operate the Mill Seat Landfill. Mill Seat's Landfill Gas Energy Facility was opened in 2007 and produces 6.4 MW of power through the utilization of methane gas generated from the landfill.

All municipalities and subdivisions (fire, school districts, etc.) should be encouraged to conduct an inventory of alternative and renewable energy generation opportunities. The goal would be to create a list of potential projects, including information on costs and MW production, which could then apply for partial funding from NYSERDA. Municipalities could use the NYSERDA subsidy to assist in financing Power Purchase Agreements (PPAs) that make the use of alternative energy cost competitive. An example of a development of an inventory is the Town of Williamson Energy Conservation and Sustainability Study which led to the subsequent installation of solar panels on the wastewater treatment plant.

The implementation of this Sub-strategy can occur at the county, municipal and district level. The inventory process should identify and prioritize alternative energy production potential and identify funding opportunities. However, State or other governmental funding is essential to making the installation of alternative and renewable energy generation cost-effective.

Broad Strategy E2 | Promote energy conservation and efficiency by developing educational programs, increasing participation in available state and federal incentive programs, and by adopting local and regional policies.

With energy consumption and generation needs in high demand, there is a need to continue to find ways to provide a larger supply of energy over a period of time. This strategy promotes the adoption of policies, provision of incentives and outreach programs that promote energy conservation and efficiency.

This Broad Strategy is aligned with the FLREDC Regional Strategy to “invest in community, industrial development & infrastructure” in particular its strategy to “enrich living environments by increasing access to affordable housing and mixed-income units, and promoting energy efficiency.” The FLREDC 2012 Progress Report states that it will continue to support, monitor, and promote projects that improve energy efficiency.

The effectiveness of this strategy will be measured through the following Indicators:

- Regional energy usage per capita (MMBtu)
- Energy efficiency

Prioritization
Encouraging energy conservation and efficiency through incentives and education is a very high priority for working toward the energy goal. Conservation measures are among the most cost-effective, requiring little or no capital investment. It

is also consistent with many communities' "Energy Smart" goals. This strategy received strong scores in all areas. Creating strong policies designed to reach local and regional targets is fundamental to the success of the region, and promoting education across the entire region is a key factor in achieving these energy goals.

This strategy is aligned with the following guiding principles:

- Preserve, protect and improve natural resources and acknowledge the link between natural systems
- Maintain, protect and improve the functionality and climate change/disaster resiliency of existing infrastructure systems and acknowledge the link between systems
- Reduce energy consumption

Potential Stakeholders and Resources
As noted in the representative Sub-strategies, a number of stakeholders may be involved in the implementation of this strategy from regional organizations to individual businesses and residents. Potential resources for this strategy include various NYSERDA programs, NYS Climate Smart Communities program, the Green LEED Bill (authorizes a municipality to provide a real property tax exemption for improvements meeting LEED certification), US Department of Agriculture's Rural Energy for America Program (REAP), amendments to the NYS Real Property Tax Law, local adoption of "above code programs" and continued commitment from regional colleges and universities to educate the populace in the importance of these endeavors.

Challenges and Sub-strategies
One of the biggest hurdles to this strategy is educating the public on the measures they can take to add to the region's energy efficiency. Changing behaviors requires repeated educational and marketing campaigns. As a result, the Sub-strategies have an education and awareness focus for residents, municipal officials, and business owners. In addition, developing municipal codes and policies that will mandate energy efficiency and conservation are also proposed as Sub-strategies.

Sub-strategy 2.1 | *Promote and incentivize energy auditing, commissioning, and the implementation of energy conservation and efficiency measures (e.g., lighting, motor, service hot water heating, and HVAC control).*

Promotion of energy efficiency measures and available incentives takes place through regional service providers, counties, municipalities, non-profit organizations and regional media outlets. Programs that are currently being promoted include but are not limited to the NYS Climate Smart Communities program, NYSERDA's Energy $mart programs (now known as Economic Development Growth Extension or EDGE), the many NYSERDA and utility-run energy efficiency incentive programs, and the NYSERDA ENERGY STAR programs.

NYSERDA has a broad range of energy efficiency programs serving all sectors (residential, commercial, industrial and agriculture). An example are the energy efficiency programs for small businesses and not-for-profits:

- Small Commercial Energy Assessments to identify opportunities and recommend improvements to improve efficiency
- Existing Facilities Program provides incentives to customers purchasing and installing energy efficient equipment such as lighting, HVAC and variable frequency drives
- Small Commercial Energy Efficiency Financing provides access to low-interest energy efficiency project financing.

Service providers, including NYSEG and RG&E, offer programs to commercial, industrial and municipal customers, including:

- Commercial and Industrial (C&I) Rebate Program for energy efficient equipment including lighting and controls; natural gas furnaces, boilers and controls; unitary HVAC;

HVAC chillers; and variable frequency drives (VFDs)
- Block Bidding Program offering savings for reduced electrical usage

For the agricultural community, NYSERDA administers the Agriculture Energy Efficiency Program (AEEP) which facilitates energy audits to identify energy efficiency measures and provides funding that pays for 75% of the implementation cost of electricity and gas efficiency projects on farms and at on-farm producers. The USDA's Rural Energy for America Program (REAP) provides assistance to agricultural producers and rural small businesses for energy efficiency and renewable energy projects.

Energy efficiency programs, promoted by NYSEG/RG&E, for residential customers include:

- Energysaver – a free, on-line tool providing information on ways to reduce energy costs and track savings
- Recycle program offering financial incentives to replace old refrigerators and freezers
- High efficiency Natural Gas Equipment Rebate Program

Education and promotion of these programs include materials on NYSERDA and service providers' websites. NYSERDA also offers a digital magazine, Comfort at Home, focused on New Yorkers using energy efficiently. Many counties and municipalities within the region participate in the "Renew My Community" Program, a public-private partnerships between a locality's Municipal Government or Industrial Development Agency (IDA) and Blue Springs Energy, LLC. The Renew My Community websites provide education and promotion of energy efficiency measures and the benefits of alternative and renewable energy. All nine counties in the region participate in the program which has developed the following websites:

1. GreenGeneseeCounty.org
2. RenewLivingston.org
3. GreenMonroe.org
4. RenewOntarioCounty.org
5. RenewOrleansCounty.org
6. RenewSenecaCounty.org
7. RenewWayne.org
8. RenewWyomingCounty.org
9. RenewYates.org

Other municipalities, institutions and non-profit organizations have developed their own programs and websites focused on energy conservation and other sustainability issues, examples include ColorBrightonGreen.org, The Green Dandelion (sustainability at the University of Rochester), CoolRochester.org, and the Alliance for Clean Energy New York (ACE NY). Monroe County also hosts an annual Monroe County Energy Expo that provides an opportunity for residents to learn steps to conserve energy. In the media, Rochester's WROC-TV, Channel 8, has a "Go Green" feature segment which highlights regional projects and promotes energy conservation and efficiency.

There is a need to continue to educate and promote these resources. There is also a need to consolidate information in a single location. Development of an energy page on the sustainable-fingerlakes.org website would provide a single resource for the region. This page would provide information on energy conservation, efficiency, and production through alternative and renewable resources. The development of this page would be the responsibility of the Regional Plan Coordinator as identified in Section 4, Plan Implementation. In addition to education materials, this page could provide links to state and federal incentive programs, county and municipal websites and institutional and non-profit resources.

Sub-strategy 2.2 | *Support research and development, deployment of pilot projects to validate technology and eventual commercialization of energy efficient technologies, including net zero.*

The implementation of this Sub-strategy is primarily by entrepreneurial enterprises and academic institutions. However, there is a need to provide financial support to these organizations. Similar to Sub-strategy 1.2 (alternative energy), this Sub-strategy is aligned with the following FLREDC Regional and Sector Strategies

- Optimize business creation, retention and expansion
- Strengthen academic and industry partnerships
- Energy Innovation

High Tech Rochester (HTR) is one of the entrepreneur resources highlighted in the FLREDC Strategic Plan. HTR is a non-profit whose mission is to be a catalyst for entrepreneurship and innovation-based economic development in the Finger Lakes Region. HTR provides a suite of services, including technology commercialization for very-early-stage opportunities, business incubation for high-growth-potential startups, and growth services for existing manufacturing companies seeking to improve their top- and bottom-line performance.

HTR was awarded $5 million from NYSERDA, to create a Proof-of-Concept Center dedicated to help grow entrepreneurs in high-tech, clean energy businesses. The HTR Proof-of-Concept Center, one of three in the state, will serve Western and Central NY while working with the University of Rochester, Rochester Institute of Technology, SUNY Buffalo and Cornell University. The NYSERDA award along with cost-sharing will support the center for a five year period.

The Finger Lakes Region is fortunate to have institutions, like the Golisano Institute for Sustainability (GIS) and the New York State Pollution Preventions Institute (NYS P2I) at RIT. These organizations, both supported by the FLREDC Strategic Plan, are already working to develop educational programs, pilot projects, and conduct research to promote energy efficiency and conservation.

Sustainability Hall, GIS' new facility of the RIT campus, is a state of the art laboratory for scientific discovery and experiential learning. Sustainability Hall has seven systems integration beds and eight sustainability technology support labs with computing and collaborative spaces to support research in a number of areas including Net Zero energy buildings. NYS P2I enables companies to reduce toxic chemical use, increase the efficient use of raw materials, energy, and water, and reduce emissions and waste generation.

Consistent with the FLREDC Strategic Plan, there is a continued need to provide resources to entrepreneurs and academic institutions to support the research and development, deployment of pilot projects to validate technology and eventual commercialization of technologies that promote energy efficiency. One potential resource is NYSERDA's Emerging Technologies and Accelerated Commercialization (ETAC) in the Residential Sector which seeks to address the barriers to market acceptance of underutilized emerging technologies by facilitating in-field demonstrations and the subsequent technology transfers. NYSERDA's website lists the following emerging technologies that are commercially-available but underutilized including solid state lighting, lighting controls, home energy management systems, smart-grid integration, micro-combined heat and power, and super insulation.

Sub-strategy 2.3 | *Develop and promote the adoption of codes and policies that promote energy conservation and efficiency.*

Development and adoption of energy policies may occur at the local municipal level but can also be implemented at the institution or business level. The NYS Climate Smart Communities Guide for Local Action includes information and resources to help New York communities develop policies to lower the energy intensity of their programs and projects. The guide includes recommendations for purchasing and building standards:

- Climate-Smart Purchasing – establishment of a policy for purchasing energy efficient products
  - Purchase or lease of only energy efficient equipment, and delivery and installation with power-management features enabled
  - Adoption of Energy Star and Federal Management Program equipment standards
- Green Building Standards and Policies - The New York State 2010 Energy Conservation and Construction Code establishes minimum performance levels for energy efficiency. The adoption of local green building standards will promote innovation and can provide incentives for better performance for both public and private buildings.

An example of the development of local policies at the municipal level is the work of the City of Rochester's Office of Energy & Sustainability. Representatives from every City department provide expertise to guide the development of City policies and practices that are consistent with its environmental mission. City policies and practices related to energy conservation and efficiency include:

- Commitment to the US Conference of Mayor's Climate Protection Agreement
- Memberships with ICLEI - Local Governments for Sustainability , Climate Communities and The Climate Registry
- Greening the City's fleet with highly efficient and alternative fuel vehicles
- Reducing overall energy consumption with HVAC upgrades, efficient lighting systems, US Green Building (LEED) standards, and employee education
- Purchase of energy generated by renewable sources
- Adoption of LEED standards for all City new construction and major rehab projects
- Working with private sector partners to facilitate green development

An example of implementation by a private business or institution is the RIT's policy that all new buildings be designed to Leadership in Energy and Environmental Design (LEED) specification with a minimum achievement of LEED Silver certification. RIT's successful implementation of this policy is highlighted by the 2010 LEED Platinum certification for the University Services Center. It was the first building in Monroe County to receive platinum certification and only the second such designated facility on a college or university campus in New York.

There is a need for the continued development and adoption of codes and policies that promote energy conservation and efficiency. Policies may be developed by counties, municipalities, institutions and private businesses throughout the region.

Broad Strategy E3 | Upgrade the existing conventional energy production and distribution system in a sustainable way.

The current energy production and distribution system experiences a notable amount of loss between what is generated and what is consumed. During 2010 in the Finger Lakes Region, 0.65 million MWh was lost during transmission; contributing to the need to import electricity from other regions of the state. Improvements to infrastructure and technology can focus on updating the existing production and distribution systems to maximize efficiency.

This Broad Strategy is aligned with the FLREDC Regional Strategy to "Invest in community,

industrial development & infrastructure." The effectiveness of this strategy will be measured through the regional energy usage per capita (MMBtu) Indicator.

Prioritization
Maximizing the efficiency of energy that is already produced and distributed within the region is a high priority. This is a cost-effective endeavor that has a relatively low cost, good application across the region, and is relatively easy to implement. This Broad Strategy received strong scores in all areas, including financial as funds have already been earmarked through the Energy Highway Blueprint to achieve those goals.

This strategy is aligned with the following guiding principles:

- Improve access (energy), connectivity and mobility
- Preserve, protect and improve natural resources and acknowledge the link between natural systems
- Maintain, protect and improve the functionality and climate change/disaster resiliency of existing infrastructure systems and acknowledge the link between systems

Potential Stakeholders and Resources
Implementation of this strategy ranges from infrastructure upgrades by utility service providers to small scale energy generation at a home or business. The primary resource for implementing this strategy is the New York Power Authority, which is in the process of awarding contracts for the development of programs that will improve or re-power older inefficient power plants, advance the development of smart grid technology, develop local and regional micro-grid platforms, and replace distribution elements to reduce transmission losses. These programs are highlighted in the New York Energy Highway Blueprint prepared by the New York Energy Highway Task Force as part of the 13 recommended actions summarized by the Task Force, and are expected to generate $5.7B in energy investments over the next 5-10 years. Funding has already been earmarked for this endeavor through the New York Power Authority. Another resource is NYSERDA's Renewable Portfolio. Private funding is also involved for small scale, on-site generation.

Challenges and Sub-strategies
The challenge to this strategy is that money for improving operations and efficiency of existing systems is not as easy to find as money for new facilities or technology. In addition, the transmission system crosses several distribution companies (utility companies) and is extremely large. The Sub-strategies generated to address these challenges focus on upgrading the transmission infrastructure to minimize losses across the grid and promoting more distributed generation so the power has to travel a smaller distance, thereby reducing potential losses.

Sub-strategy 3.1 | *Upgrade the transmission infrastructure to reduce loss.*

The implementation of this strategy falls to the service providers. A regional example of implementation is Rochester Gas & Electric Corporation's (RG&E) "Rochester Area Reliability Project." The $250 million upgrade to its electric transmission system involves 25.5 miles of new or rebuilt transmission lines in Chili, Gates and Rochester, plus a new substation in Chili. When complete, the project will boost local electric availability by 32%.

The continued implementation of this Sub-strategy is primarily by service providers but requires continued financial support from the New York Power Authority.

Sub-strategy 3.2 | *Increase the use of demand response programs to better manage supply and consumption.*

Demand response programs are designed to enable customers to contribute to energy load reduction during times of peak demand, providing both economic and environmental benefits. Participation in demand response programs saves the customer money by lowering energy use during

higher priced peak periods. Demand response may also prevent disruptions in supply. Contribution to energy load reduction could be accomplished through on-site generation or through a reduction in energy demand.

In New York State, Demand-Response incentive programs for large electric customers are administered by the New York Independent System Operator (NYISO). NYISO has four Demand Response programs: the Emergency Demand Response Program (EDRP), the Installed Capacity (ICAP) Special Case Resources (SCR) program, the Day Ahead Demand Response Program (DADRP) and the Demand Side Ancillary Services Program (DSASP).

These programs offer differing terms and payments, and are open to all types of customers. Participation requires a detailed understanding of the program criteria, including how fast you must reduce electricity demand, how much reduction you are committing to, the duration of the reduction period, and the payment terms.

These programs are currently promoted through the Renew My Communities, service provider and NYSERDA websites. To increase the use of the programs there needs to be continued promotion of demand response and energy efficiency programs, as well as the adoption of municipal policies to accommodate on-site alternative and renewable energy generation as outlined in Broad Strategy E2.

Sub-strategy 3.3 | *Promote distributed generation.*

Distributed generation allows collection of energy from multiple sources. Examples of distributed energy include solar panels on buildings, small wind turbines and bio-digesters. Distributed generation has the potential to reduce the amount of energy lost in transmission if it is being generated close to where it is used. It also offers greater security of supply which supports resiliency during extreme weather events. An example of distributed generation in the region is the three landfills that generate energy from landfill waste: Seneca Meadows (Waterloo), Mill Seat (Bergen), and High Acres (Fairport). Other examples include on-site solar power systems including the 44kW system at Rochester's Arnett Branch Library and the 15kW system at the Rochester public market.

The implementation of this Sub-strategy will primarily be by facility owners and operators including counties, municipalities and businesses. The promotion of distributed generation will be supported through the implementation of Broad Strategies E1 (alternative energy) and E4 (renewable energy).

Broad Strategy E4 | Develop, produce, and employ renewable energy (wind, hydroelectric, solar, and geothermal).

Improving and expanding renewable energy generation requires better financing options and local policies that allow for the development of on-site and community renewable energy generation. This could result in a reduction in the reliance and use of fossil fuels, better storage and capture mediums for renewable energy, and an increase in the use of wind, solar, hydroelectric, and geothermal (also referred to as ground-source heat pumps) power.

The effectiveness of this strategy will be measured through the following Indicators:

- Total installed renewable energy capacity (MMBtu)
- Availability, accessibility, affordability of renewable energy (DNA)
- Regional energy generation per capita

Prioritization
The development, production and employment of renewable energy has strong alignment with the elements of Story of Place as it works with natural resources to improve the Five Capitals. There is also applicability to multiple communities as the technology can be replicated across the region. This Broad Strategy received strong scores in all areas except financial feasibility, which received a moderate score due to the investments necessary to

grow renewable energy and public policies that are in conflict with some of the renewable energy sources. There is a potentially high cost of developing and implementing the technology, however, the cost savings over time minimize life cycle costs.

This strategy is aligned with the following guiding principles:

- Improve accessibility (to energy), connectivity and mobility
- Preserve, protect and improve natural resources and acknowledge the link between natural systems
- Maintain, protect and improve the functionality and climate change/disaster resiliency of existing infrastructure systems and acknowledge the link between systems

Potential Stakeholders and Resources
Implementation of this Broad Strategy will require a commitment from public and private stakeholders combined with a team approach to renewable energy. Resources from regional colleges, local and regional planning councils and planning boards, the actions of local and regional governments for policy change and public/private investors will all play a role in the success of this critical endeavor. The actual resources necessary for renewable energy generation are abundant within our region. Wind, sun, earth, and water are plentiful, as well as technologies to harness those resources. Funding for program development and expansion is available through a variety of NYSERDA programs, as well as the US Department of Agriculture's Rural Energy for America Program (REAP).

Challenges and Sub-strategies
Among the challenges to renewable energy are issues related to mitigating potential impacts to the environment and/or ecology, addressing municipal laws on the application of renewable energy technologies, and balancing visual and community impacts with the potential benefits. One of the Sub-strategies developed focuses on promoting the adoption of local policies that set standards and parameters for installing renewable energy generation technologies such as solar panels and windmills. In addition, there are several research and education Sub-strategies that look to identify and address benefits and impacts of these technologies.

Sub-strategy 4.1 | *Support research and development, deployment of pilot projects to validate technology and eventual commercialization of new renewable energy technology.*

The implementation of this Sub-strategy is primarily by entrepreneurial enterprises and academic institutions. However, there is a need to provide financial support to these organizations. Similar to Sub-strategy 1.2 (alternative energy) and 2.2 (energy efficient technologies), this Sub-strategy is aligned with the following FLREDC Regional and Sector Strategies:

- Optimize business creation, retention and expansion
- Strengthen academic and industry partnerships
- Energy Innovation
- Agriculture and Food Processing

There are a number of regional private companies, educational institutions and non-profit organizations conducting research and development of renewable energy generation technology. However, additional funding is needed to bridge the

gap between R&D and development of working prototypes to demonstrate proof of concept. Funding could be leveraged through Innovocracy and the High Tech Rochester (HTR). Innovocracy is an innovative crowd-source funding model to support early-stage technology development and commercialization. The funding model was created by a partnership with the University of Rochester, RIT, Cornell University, and Clarkson University. As previously mentioned, HTR, was awarded $5 million from NYSERDA, to create a Proof-of-Concept Center dedicated to help grow entrepreneurs in high-tech, clean energy businesses.

Consistent with the FLREDC Strategic Plan, there is a continued need to provide resources to entrepreneurs and academic institutions to support the research and development, deployment of pilot projects to validate technology and eventual commercialization of technologies that promote energy production from renewable resources.

Sub-strategy 4.2 | *Educate the public and municipal officials on the benefits of renewable energy generation and address the potential negative impacts.*

Consistent with Sub-strategy 1.3 (alternative energy) and 2.1 (energy efficiency), there is a need for consumer education to change behaviors that can lead to a greater acceptance of new technologies. There is also a need to provide training and technical resources to local municipalities to adopt energy policies that support renewable energy generation.

As noted previously, the Renew My Community websites provide education and promotion of the benefits of renewable energy. All nine counties and several municipalities in the region participate in the program. Information is also provided by renewable energy companies and local non-profit organizations and citizen groups including the Alliance for Clean Energy NY (ACE NY), the Center for Environmental Initiatives (CEI), and the Wayne County Sustainable Energy Network.

An example of a regional education program is the Solar Schools and Solar Learning program developed by Renewable Rochester and Wayne County BOCES. The program included the installation of a geothermal system, solar hot water system and Solar PV on a building at Wayne County BOCES in Williamson as learning tools for students. The program also included the development of the Wayne County Renewable Energy Trailer which serves as a learning center for renewable energy including solar, wind energy, and off-grid applications. Funding and support for this program was provided by the American Resource and Recovery Act (ARRA) and NYSERDA.

Education on alternative energy generation should continue to be made available through a number of resources including:

- Continuation and expansion of training and technical assistance offered through the G/FLRPC's biannual Regional Local Governments Workshop series, NYSP2I, and the Monroe County Department of Planning and Development biannual Land Use Decision-Making Program and other organizations.
- Expansion of county and municipal Renew My Community websites, currently focused on energy conservation and efficiency, to include alternative energy.
- Development of an energy page on the sustainable-fingerlakes.org website to provide a single resource for the region. As previously noted, this page would provide information on energy conservation, efficiency, and production through alternative and renewable resources.

Sub-strategy 4.3 | *Develop and promote the adoption of local codes and policies that accommodate renewable and alternative energy generation (community and on-site).*

Consistent with Sub-strategy 1.4 (alternative energy) and 2.3 (energy efficiency), municipalities should develop and adopt an energy policy to address issues of energy development including energy production, distribution and consumption. Local governments have at least four different roles

that should be addressed in energy policies. Three roles are presented in Sub-strategy 4.3 and the fourth in Sub-strategy 4.4:

1. The municipality has the ability to control where alternative and renewable generation is allowed through zoning and local permitting and to leverage its oversight to influence investment in alternative and renewable energy.
2. Local ownership of the utility also allows for location-appropriate expansion of alternative or renewable power generation.
3. Municipalities can purchase energy that was generated through alternative and renewable sources.

Education, training and technical support for municipalities should continue to be provided by county planning departments, the G/FLRPC, regional education institutions and non-profit organizations.

Sub-strategy 4.4 | *Encourage counties, municipalities and local districts to conduct an inventory of potential alternative and renewable production and prioritize projects for implementation.*

Consistent with Sub-strategy 1.5 (alternative energy), all municipalities and subdivisions (fire, school districts, etc.) should be encouraged to conduct an inventory that details renewable energy generation opportunities. The goal would be to create a list of potential projects, including information on costs and MW production, which could then apply for partial funding from NYSERDA. Municipalities could use the NYSERDA subsidy to assist in financing Power Purchase Agreement (PPAs) that make the use of renewable energy cost competitive.

There are numerous regional examples of identifying potential for and implementing renewable energy production including:

- City of Batavia, Genesee County, studied the potential for generating hydroelectric power from existing dams on the Tonawanda Creek to provide electricity to the City's ice arena and fire department, adjacent to the dams.
- Town of Avon, Livingston County, installed a geothermal system as part of the renovation of the Opera House block for town offices.
- Monroe County's installation of solar panels and wind turbines at the Greater Rochester International Airport.
- Town of Williamson, Wayne County, completed an Energy Conservation & Sustainability Study in 2010 that identified several power generation opportunities including the subsequent installation of solar panels at the town-owned wastewater treatment plant.
- Ontario County installation of solar panel array that provides a portion of the electricity to power the county transportation facility.

The implementation of this Sub-strategy can occur at the county, municipal and district level. The inventory process should identify and prioritize renewable energy production potential and identify funding opportunities. However, State and other government funding can play an important role in making the installation of alternative and renewable energy generation cost-effective.

Sub-strategy 4.5 | *Research the potential for and explore the use of innovative funding and financing options, including purchase power agreements (PPA), to encourage renewable energy production.*

There is a need to continue to research and explore funding and financing options to make the installation of alternative and renewable energy generation cost effective. In December 2012, Governor Andrew M. Cuomo made $250 million available for a broad range of renewable energy generation projects in support of the Energy Highway Blueprint that will upgrade and modernize New York's aging energy infrastructure. Funding for these renewable projects is administered by the New York State Energy Research and Development Authority (NYSERDA) through the state's Renewable Portfolio Standard (RPS), and is targeted to electric generation projects that use wind, hydroelectric, solar, biomass or other clean-energy resources. The state's RPS also provides a customer-sited program that promotes and provides incentives for on-site small scale technologies including photovoltaic (PV), fuel cell, anaerobic gas-to-electric digester and wind installations.

These incentive programs could be used to support financing of Purchase Power Agreements (PPAs). An example of a PPA for renewable energy generation is a project proposed by the City of Rochester, Monroe County, to investigate the requirements for siting a large (2 MW) solar PV generating facility on a parcel within a 20 acre portion of the City of Rochester's former Emerson St. Landfill. If the facility is considered viable, the City of Rochester will solicit competitive proposals under which a qualified private vendor would develop finance, construct, own, operate, and maintain the PV energy systems on the property. The City of Rochester would enter into a PPA with the private vendor for the purchase of the power generated by the system for a pre-determined period of time.

As part of the inventory of energy generation opportunities (Sub-strategies 1.5 and 4.4), counties, municipalities and local districts should research the potential to leverage innovative funding and financing.

Broad Strategy E5 | Develop and implement micro-grid technology that integrates the advantages of independent local production and distribution systems with the storage and distribution capacity of a large grid.

Production and distribution should be monitored, captured, and adjusted in times of surplus and made available in times of high demand. The Finger Lakes Region produces a large amount of energy. However, all of that energy is fed into the national grid system, which does not allow for localized storage, distribution, or flexibility. Microgrid systems that link multiple distributed power generation sources into a small network serving some or all of the energy needs of participating users can provide benefits including reduced energy costs, increased overall energy efficiency and improved environmental performance and local electric system reliability. A more sustainable Finger Lakes Region includes greater development and deployment of these technologies and systems.

As noted in the NYSERDA report Microgrids: An Assessment of the Value, Opportunities and Barriers to Deployment in New York State (September 2010), there is a need to address:

- Legal and Regulatory Issues
- Financing and Incentives
- Research & Development

The following three Sub-strategies support the NYSERDA recommendations to support research and development and provide financing and incentives. These Sub-strategies are aligned with the following FLREDC Regional Strategies and Sector Strategies:

- Optimize business creation, retention and expansion
  - Develop systems that monitor and identify firms and sectors with high growth

potential and proactively engage with these companies to connect them with the resources that will accelerate product development, access to new markets, and scale business models.

- Strengthen academic and industry partnerships
  - Develop programs and shared resources that allow closer collaboration between academic and industry scientists.
  - Streamline and accelerate the maturation, transfer, and commercialization of university-based intellectual property; Build a regional ecosystem that more effectively harnesses university-based innovation, with a particular focus on fostering the creation and growth of early-stage companies.
- Energy innovation
  - Create the resources and infrastructure that will accelerate R&D and commercialization of new energy technologies.

The effectiveness of this strategy will be measured through the following Indicators:

- Total installed renewable energy capacity (MMBtu)
- Regional energy generation per capita

Prioritization
The development and implementation of micro-grid technologies ranks very high in relation to benefitting multiple Subject Areas, benefitting multiple Capitals and benefitting multiple communities. This is because the Broad Strategy concentrates on regional self reliance and making use of our natural resources through improved technologies. However, this Broad Strategy received weak scores for implementation and financial feasibility due to the lack of current and future projects, cost of implementation, and lagging smart grid growth.

This strategy is aligned with the following guiding principles:

- Improve accessibility, connectivity and mobility (energy)
- Preserve, protect and improve the functionality and climate change/disaster resiliency of existing infrastructure systems and acknowledge the links between systems

Potential Stakeholders and Resources
Innovocracy provides funding to support early-stage technology development and commercialization. The Energy Highway Blueprint provides funding for an initial Smart Grid investment of $110M, with additional funding of $140M. The initiative to house a Federal Smart Grid Technology Hub within New York State will benefit all regions, including the Finger Lakes. These resources are expected to benefit regional energy technology firms, research and development institutions and municipalities and businesses implementing micro-grid technology.

Challenges and Sub-strategies
Micro-grid technology is relatively new and therefore less advanced. It is also high in cost when applied to a regional system. However, a Sub-strategy developed to help overcome this challenge would be to explore and develop innovative approaches to financing, ownership, and service models that will allow this to be more widely applied. Creating pilot projects that allow the

systems to be tested and looked at for cost-benefit ratios is also a Sub-strategy that would help overcome the associated challenges.

Sub-strategy 5.1 | *Support research and development of pilot projects to validate technology and eventual commercialization.*

The implementation of this Sub-strategy is primarily by entrepreneurial enterprises and academic institutions. However, municipalities may choose to implement pilot projects to validate and promote the technology. The City of Batavia's 2013 Brownfield Opportunity Area (BOA) Plan researched the potential for generating hydroelectric power from existing dams on the Tonawanda Creek that could provide electricity to support the City's ice arena and fire department located adjacent to the dams. The implementation of this project has the potential to have both municipal facilities' electricity needs fully self-sustaining on renewable hydroelectric power, enhance the economic viability of the ice arena, and the potential to create self-sufficient "place of refuge" as the ice arena's occupancy is 480 people. The implementation of this Batavia Community Hydroelectric Micro-grid would provide validation for and promotion of micro-grid technology.

Consistent with the FLREDC Strategic Plan, there is a continued need to provide resources to support research and development, deployment of pilot projects to validate micro-grid technology and eventual commercialization. As noted in previous Sub-strategies, R&D and pilot projects could leverage funding through Innovocracy and the High Tech Rochester (HTR).

Sub-strategy 5.2 | *Explore and develop innovative approaches to address micro-grid financing, ownership and service models.*

There are a number of different operating models for non-utility owned microgrids including: 1) energy produced is primarily for owner use; 2) energy produced is for both owner use and customer sales; and 3) energy produced is primarily sold to customers. Ownership models include having a single non-utility owner that installs and operates the system or a joint ownership/ cooperative model that includes multiple individuals or unrelated firms collectively owning and operating the microgrid to serve their own needs and potentially other customers under a contract. A model project that demonstrates the power of the micro-grid technology is the Wayne Industrial Sustainability Project (WISP) in the Town of Ontario. This is a group of businesses organized in a symbiotic relationship that generate and use renewable energy, allowing them to operate off-the-grid for extended periods of time.

As identified in Sub-strategy 1.5 (alternative energy) and 4.4 (renewable energy), all counties, municipalities and subdivisions (fire, school districts, etc.) should be encouraged to conduct an inventory of potential energy generation opportunities. This inventory should include the identification of micro-grid opportunities. NYSERDA's *Microgrids* report noted that from a regulatory perspective, the least problematic microgrids would be those that (1) operate on a single customer or property owner's site, (2) do not attempt to sell electricity to previously unaffiliated entities, and (3) do not need wires to cross property lines or public rights-of-way. Therefore, the evaluation of microgrid potential in the region should focus on academic and medical campuses as well as business and industrial parks. Depending on the setting, either single ownership or joint ownership/cooperative models should be explored.

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Energy

Subject Area Goal

Increase the generation and distribution of regional renewable energies while using energy efficient and alternative energy resources, along with conservation methods, to decrease the reliance on fossil fuels and non-renewable outside energy sources and to become a self-sustainable region.

Opportunities

- Various renewable/alternative energy sources that reduce dependence on fossil fuels
- Focus on sustainable demand/consumption, not just replacing fossil fuels with other sources
- Economic development—R&D, manufacturing, operations, etc., for renewable/alternative sources
- Reduced environmental impacts—cleaner air, cleaner water
- Waste-to-energy research and development (landfills, farms, etc.)
- Mutually beneficial relationship with other subject areas

Challenges

- Balancing renewable/alternative sources with environmental/ecological impact
- Consensus between municipalities, organizations, and the public
- Securing sufficient public and private investment
- Developing incentives (financial and otherwise) for voluntary guidelines and programs
- Achieving a viable cost/benefit ratio for new energy sources
- Visual and landscape blight of different energy installations
- Developing effective public policies
- Developing technology for energy storage and distribution
- Resistance to change
- Need for reliable, technology-neutral education resources to combat misinformation

Variables

- Success of other subject areas
- Unstable energy markets
- Public perception/acceptance of various energy sources and techniques
- Success of research and development efforts

Indicators and Targets

Indicators	Broad Strategies Measured	Baseline Value (2010)	Short-Term Target* (2020)	Mid-Term Target* (2035)	Long-Term Target* (2050)
Regional energy consumption per capita (#1A—NYSERDA Required) • *Electricity energy consumption per capita*	E1, E2, E3	186 MMBtu *31.36 MMBtu*	-10% *tracking purposes only*	-25% *tracking purposes only*	-35% *tracking purposes only*
Total installed renewable energy capacity (#1B—NYSERDA Common)	E4, E5	3,495,768 MMBtu (9% total demand)	+11% (20% of total demand)	+26% (35% of total demand)	+41% (50% of total demand)
Regional energy generation per capita	E1, E4, E5	19.6 MMBtu	+ 2% (21.62 MMBtu)	+ 5% (24.86 MMBtu)	+ 9% (28.17 MMBtu)
Availability, accessibility, affordability of renewable energy	E5	Data not available**	N/A	N/A	N/A
Energy efficiency	E2	Data not available**	N/A	N/A	N/A
Percent of regional population living areas with local energy codes exceeding state requirements, and/or regulations for benchmarking and retrofitting private buildings (#8C—NYSERDA Common)	E2	0%	+ 1%	+ 3%	+ 5%

*All % reductions or increases are related to the 2010 baseline values, not the previous target.
** Recommend that this data be tracked comprehensively in the region.

Energy

Subject Area Goal

Increase the generation and distribution of regional renewable energies while using energy efficient and alternative energy resources, along with conservation methods, to decrease the reliance on fossil fuels and non-renewable outside energy sources and to become a self-sustainable region.

Finger Lakes Regional Sustainability Plan

Priority Broad Strategies

Connection with criteria: ● Strong ◐ Moderate ○ Marginal

Broad Strategy	Benefits Multiple Subject Areas	Benefits Multiple Capitals	Benefits Multiple Communities	Implementation Feasibility	Consistent with Planning Efforts	Financial Feasibility
E1—**Develop, produce, and employ alternative energy (bio-energy, waste-to-energy).**	◐	●	●	●	●	●
E2—**Promote energy conservation and efficiency by developing educational programs, increasing participation in available state and federal incentive programs, and by adopting local and regional policies.**	●	●	●	●	●	◐
E3— **Upgrade the existing conventional energy production and distribution system in a sustainable way.**	◐	●	●	●	◐	●
E4—**Develop, produce, and employ renewable energy (wind, hydroelectric, solar, and geothermal).**	●	●	●	◐	◐	◐
E5—**Develop and implement micro-grid technology that integrates the advantages of independent local production and distribution systems with the storage and distribution capacity of a large grid.**	●	●	●	○	○	○

Broad Strategy E1—**Develop, produce, and employ alternative energy (bio-energy, waste-to-energy).**

Representative Sub-Strategies / Project Ideas

1.1 Identify funding for and encourage implementation of projects that use food waste to produce energy.
1.2 Support research and development, deployment of pilot projects to validate technology and eventual commercialization of new alternative energy technology.
1.3 Educate the public and municipal officials on the benefits of alternative energy generation and address the potential negative impacts.
1.4 Develop and promote the adoption of local policies that accommodate the development of on-site and community alternative and renewable energy generation.
1.5 Encourage counties, municipalities and local districts to conduct an inventory of potential alternative and renewable production and prioritize projects for implementation.

Representative Projects

- Epiphergy (an "energy epiphany")—a company developing sustainable alternatives to fossil fuels using plant-based organic materials to produce ethanol fuel, animal feed, and organic fertilizer.
- Acceleration of Renewable Energy Technology Adoption—NYS P2I research and development project for using agriculture and food waste in the production of methane, ethanol, or biodiesel.
- Finger Lakes Food Cluster Energy Integration Challenge—NYS P2I research and education initiative to holistically and systemically evaluate the best options for reducing the energy demand of food processors while evaluating alternative energy production, closed-loop and integrated energy systems.
- Genesee Community Digester—planning and engineering analysis for the development of a large digester, or multiple digesters, that would accept animal waste and waste from local yogurt, cheese and food manufactures as well as other food waste from the region. (Genesee County Comprehensive Plan)

Broad Strategy E2—**Promote energy conservation and efficiency by developing educational programs, increasing participation in available state and federal incentive programs, and by adopting local and regional policies.**

Representative Sub-Strategies / Project Ideas

2.1 Promote and incentivize energy auditing, commissioning, and the implementation of energy conservation and efficiency measures (e.g., lighting, motor, service hot water heating, and HVAC control).
2.2 Support research and development, deployment of pilot projects to validate technology and eventual commercialization of energy efficient technologies, including net zero.
2.3 Develop and promote the adoption of codes and policies that promote energy conservation and efficiency.

Representative Projects

- Genesee County Airport Terminal/ Hangar Replacement—replacement of facilities to relocate them out of the primary surface and address poor energy performance. Facilities will be designed meet a LEED Silver standard. (Genesee County Comprehensive Plan, FAA Airport Improvement Program)

Broad Strategy E3— **Upgrade the existing conventional energy production and distribution system in a sustainable way.**

Representative Sub-Strategies / Project Ideas

3.1 Upgrade the transmission infrastructure to reduce loss.
3.2 Increase the use of demand response programs to better manage supply and consumption.
3.3 Promote distributed generation.

Representative Projects

Broad Strategy E4—**Develop, produce, and employ renewable energy (wind, hydroelectric, solar, and geothermal).**

Representative Sub-Strategies / Project Ideas

4.1 Support research and development, deployment of pilot projects to validate technology and eventual commercialization of new renewable energy technology.
4.2 Educate the public and municipal officials on the benefits of renewable energy generation and address the potential negative impacts.
4.3 Develop and promote the adoption of local codes and policies that accommodate renewable and alternative energy generation (community and on-site).
4.4 Encourage counties, municipalities and local districts to conduct an inventory of potential alternative and renewable production and prioritize projects for implementation.
4.5 Research the potential for and explore the use of innovative funding and financing options, including purchase power agreements (PPA), to encourage renewable energy production.

Representative Projects

- Renewable Energy Generation Inventory—regional municipalities and subdivisions (fire, school districts, etc.) conduct a renewable energy generation inventory that details potential for wind, solar, biomass or other electricity production opportunities with the goal to create a list of potential projects.
- Emerson St. Landfill Solar Power Purchase Agreement—investigate the requirements for siting a large (2 MW) solar PV generating facility on a parcel within the City of Rochester's former Emerson St. Landfill. Upon completion, the City of Rochester would enter into a power purchase agreement (PPA) with a private vendor for the purchase of the power generated by the system.
- Livonia Energy Park—creation of municipal park with renewable energy production capacity going back to community grid.

Broad Strategy E5—**Develop and implement micro-grid technology that integrates the advantages of independent local production and distribution systems with the storage and distribution capacity of a large grid.**

Representative Sub-Strategies / Project Ideas

5.1 Support research and development of pilot projects to validate technology and eventual commercialization.
5.2 Explore and develop innovative approaches to address micro-grid financing, ownership and service models.

Representative Projects

- Wayne Industrial Sustainability Project (WISP)—businesses sharing and generating renewable energy with microturbines from natural gas, wind, shared thermal. (CEDS and WEDC Strategic Plan).
- Batavia Community Hydroelectric Microgrid—provide renewable electricity to fire department and ice arena, creating a self-sufficient "place of refuge."

3.4 TRANSPORTATION

Overview

Connection to Story of Place

As showcased in the Story of Place, transportation has been integral to the development of the region. Following a period of glacial cover, the retreating melt water was forced through the gap between the Adirondack and Catskill mountains forming the Mohawk Valley. Starting with the Mohawk Trail, this low, narrow corridor channeled travelers into and through the region and served as a gateway to the west. The natural corridor, along with the region's knowledge base and innovative spirit, supported the development of a host of new techniques to meet the challenges presented by the monumental task of constructing the Erie Canal. Today, the natural corridor continues to provide transportation access to and through the region via the NYS Thruway and parallel corridors (railroads, State Highways, and the Erie Canal).

Just as the natural landscape shaped transportation in the region, transportation has also shaped the development of the region. Historically, the development patterns found in the region have been closely tied to the dominant transportation mode of that era. Although the Mohawk Trail supported the earliest settlements of the Five (later six) Nations of the Iroquois, it was the opening of the Erie Canal that served as the impetus to the growth of Rochester and other communities along the canal corridor. The earliest settlements were compact with diverse land uses within reasonable walking distance. As railroad infrastructure expanded during the late 1800s, including the Buffalo, Rochester & Pittsburgh Railroad, Genesee Valley Canal Railroad, and the Lake Shore Railroad, the development pattern expanded with it. In the post-World War II era, private automobiles became the dominant mode of transportation. The implications of this major shift have had a substantial effect on individuals, communities, and the environment. The focus on private automobiles has resulted in transportation accounting for 37% of the greenhouse gas emissions in the region (see Section 3.11, GHG Emissions for more information).

Existing Conditions: Assets and Sustainability Initiatives

The regional transportation system is guided by the work of the Genesee Transportation Council (GTC), the designated Metropolitan Planning Organization (MPO) responsible for transportation policy, planning, and investment decisions in the Genesee-Finger Lakes Region. The GTC is responsible for maintaining the metropolitan transportation planning process to ensure the region qualifies for federal transportation funds. As part of the planning process, GTC produces and maintains the following major products:

- *Long-Range Transportation Plan* (GTC LRTP 2035) – a fiscally constrained plan that supports an integrated multimodal surface transportation system through preservation and maintenance and transportation system management and operations.
- *Unified Planning Work Program* (UPWP) – an allocation of transportation planning funds to advance the LRTP by identifying specific projects and programs.
- *Transportation Improvement Program* (TIP) – identification and schedule of specific transportation improvements that will receive transportation implementation funds over the next four to five years.

While the regional transportation system, post World War II, focused on the dominance of private automobiles, recent trends have shifted to a more comprehensive approach, including walking, biking, and public transit as well as the use of rail for freight and goods movement. However, given the diverse settings within the region, solutions to provide mobility and access can and should differ.

These considerations along with the desire to minimize environmental impacts due to transportation choices help to form a vision of a flexible and resilient transportation system that:

- Supports and promotes the use of alternative modes of transportation.
- Reduces emissions through the support and encouragement of clean fuel technology.
- Supports increased system management and operations.

This vision is currently supported by a number of initiatives, including, but not limited to, the following.

Alternative Modes
Alternative transportation modes have and continue to gain prominence in the region because they:

- Provide choices for those that cannot or choose not to drive a personal automobile
- Improve public health through opportunities that promote active lifestyles
- Address the needs of an aging population
- Increase connectivity and access

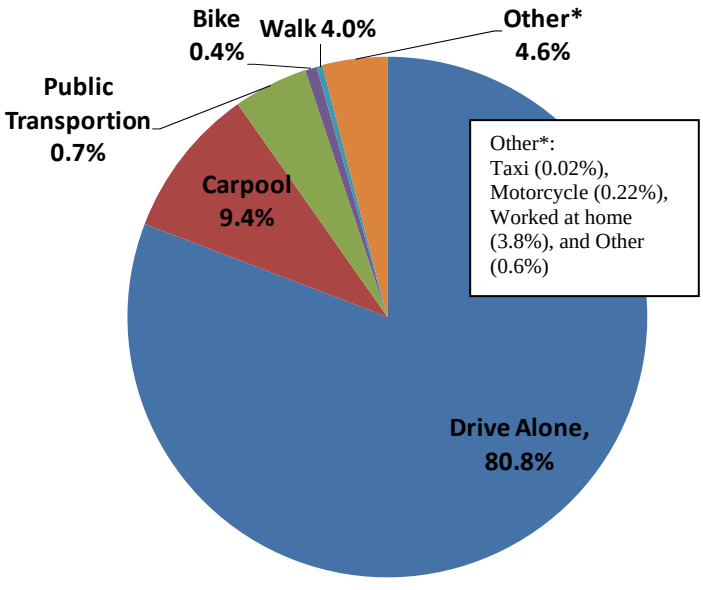


Figure 3-3: Regional Mode Share (2010)

As shown in **Figure 3-3**, approximately 15% of the region's trips are made by walking, biking, transit and carpooling. Public transportation accounts for approximately 1% of the region's trips. The GTC LRTP 2035 provides a summary of the region's public transportation system. The Rochester Genesee Regional Transportation Authority's (RGRTA) Regional Transit Service (RTS) operates primarily in Monroe County and accounted for nearly 95 percent of these 18 million trips. Over the past five years, growth in RTS ridership has consistently exceeded the national average. RGRTA also provides fixed route service in six other counties and dial-a-ride service (DAR) in all but Wayne County through the following services:

- Batavia Bus Service (B-Line or BBS) serves Genesee County
- Livingston Area Transportation Service (LATS)
- Orleans Transit Service (OTS)
- Seneca Transit Service (STS)
- Wayne Area Transportation Service (WATS)
- Wyoming Transportation Service (WYTS)

Ontario County operates the County Area Transit System (CATS) which provides fixed-route service complemented by DAR service in those communities not served by the fixed-route service. Linkages across county lines exist to varying degrees and various medical shuttles ensure that

residents can get to and from hospitals and health facilities throughout the region.

The GTC LRTP 2035 provides a summary of the region's bicycle and pedestrian network which supports over 4% of the region's trips. The highway and bridge network serves as the main component of the bicycle and pedestrian network. Typical bicycle space on highways and bridges consists of a minimum four-foot paved shoulder or curb offsets. Both provide delineated space for bicyclists but, because they are not intended solely for bicyclists, they are not designated (signed or marked) as bicycle lanes. Designated bicycle lanes are uncommon.

There are only three signed bicycle routes in the region: State Bicycle Route (SBR) 5 which runs east-west parallel to the Erie Canal; SBR 14 which runs north-south from the Seaway Trail in Sodus Point, Wayne County through Ontario and Yates Counties into the Southern Tier of New York State and Pennsylvania; and SBR 19 which runs north-south from the Seaway Trail/Lake Ontario State Parkway in Hamlin, Monroe County past Letchworth State Park into the Southern Tier of New York State and Pennsylvania. A field assessment of the suitability of highways for bicycling rated nearly two-thirds of highways as good and served as the basis for the 2009 Edition of the Greater Rochester Area Bicycling Map.

The Genesee-Finger Lakes Region has a strong commitment to developing multi-use trails. There are more than 340 miles of existing trails in the region, including 141 miles that have been completed or rehabilitated since 1993. The development of multi-use trails is guided by the GTC Regional Trails Initiative (RTI) and Priority Trails Advancement Program studies that determine the feasibility and preferred alignment for trails.

Several initiatives and studies have been conducted in the region to support and promote alternative modes including:

- roceasyride.org – an online trip planning tool (operational since April 2012) that helps users identify alternative transportation modes to save money and improve the environment by riding the bus, carpooling and bicycling.
- Livingston County Transportation Connectivity Plan – a county-wide planning study with the vision of developing sustainable transportation system that provides choices to improve livability and connectivity; protect and preserve the natural, rural and agricultural resources; and promote economic benefits.
- Bicycle and Pedestrian Master Plans – several municipalities have completed or plan to develop master plans focused on bicycling and walking and bridging the gaps between existing systems. These municipalities include the City of Rochester and Towns of Brighton, Chili, Penfield, and Perinton.
- Active Transportation Specialist – the non-profit Finger Lakes Health Systems Agency recently created this position to coordinate and participate in a variety of initiatives that promote walking, biking, and transit in Monroe County. The position has a particular focus on promoting healthy living through transportation choices, especially in targeted neighborhoods in the City of Rochester that have low car-ownership rates and where certain health indicators are highly concentrated.

Clean Fuel Technology

The region has made great strides in advancing clean fuel technology. Both Monroe County and the City of Rochester have been honored, in both 2011 and 2012, as one of North America's Top 100 Government Fleets by *Government Fleet* magazine. This honor recognizes the fleets' improved operational efficiency, fleet availability, lowered operating costs, and use of new technologies.

The Monroe County 'Green Fleet' was created in 2011 and consists 100% of vehicles that run on alternative fuels (E85, LPG or CNG) or are hybrid vehicles. The County operates the Green Fuel Station on Scottsville Road which provides 100% alternative fuels (E15 and E85 ethanol, biodiesel, hydrogen fuel cells, compressed natural gas (CNG) and liquid propane gas) and is partners with the City of Rochester in constructing two new green

fueling facilities on Mt. Read Boulevard and Lakeshore Boulevard in 2013. Monroe County has also partnered with RIT's Golisano Institute for Sustainability and General Motor's Chevrolet Project Driveway to evaluate alternative fuel technology.

The City of Rochester has 522 alternative fuel vehicles in its fleet, and partners with Monroe County for the fuel needed for these vehicles. The City also has an on-site CNG fueling station and dedicated CNG vehicles. Along with partnering with the County on the two facilities noted above, the City of Rochester will be installing 24 charging stations for electric vehicles as part of an effort to provide the infrastructure statewide. The City plans on purchasing plug-in hybrid vehicles within the next year and increasing the fleet of CNG vehicles to include heavy vehicles such as refuse trucks and street sweepers.

Several school districts have also introduced emission-reduction technology for diesel-fueled buses through NYSERDA's Clean Air School Bus Program. Participating school districts in the region include:

- Caledonia-Mumford
- Brockport Central
- Honeoye Falls-Lima
- Rochester City
- Webster Central
- Wheatland Chili
- Marion Central
- Palmyra-Macedon
- Penn Yan Central

Transportation System Management and Operations (TSMO)
Transportation agencies in the region emphasize the use of TSMO to maximize the effectiveness of the current transportation system at the lowest cost. TSMO programs and projects address non-recurring delay (e.g. crashes, weather) through improved incident response and deployment of resources. TSMO programs and projects also address recurring delay (e.g. peak demand) and increase safety by providing timely and accurate information to travelers. Existing TSMO initiatives include:

- Regional Traffic Operations Center (RTOC) – The Monroe County Department of Transportation Traffic Control System monitors current traffic flow and develops plans to move traffic through their traffic signals which, in turn, improves traffic times and reduces fuel consumption and the emission of pollutants. New York State Department of Transportation (NYSDOT) and NYS Police also operate out of the RTOC.
- Technology Initiatives Driving Excellence (TIDE) – The Rochester Genesee Regional Transportation Authority (RGRTA) has and continues to expand the use of TIDE, a comprehensive public transportation ITS initiative that includes bus operations and facilities management systems, bus sign controls, real time bus information, vehicle monitoring and diagnostics and automatic vehicle location system.

Challenges, Variables, and Opportunities

As stated previously, the region boasts many characteristics that make it a unique and desirable place to live and work. However, some of these characteristics contribute to the challenges that will have to be overcome to create a more sustainable transportation system. It will be difficult to change travel behavior when the roadway network provides

efficient access to destinations throughout the region, vehicle travel is relatively unconstrained, commute times are low, and parking is often subsidized. Change in consumer behavior will require promotion but also education on the social, environmental and public health benefits of a sustainable transportation system.

Another challenge will be to continue to provide education on the connection between land use and transportation and provide technical resources for local officials to consider the connection when reviewing potential development plans. In order to effectively protect the transportation system, there are mechanisms currently in place to ensure land use decisions consider the broader transportation implications, as well as any other applicable externalities, and include cooperation and partnerships between local and county governments. County and regional entities should continue to utilize and support these mechanisms to engage their neighbors in planning and land use/transportation decisions. To address this challenge, the Plan seeks to promote education, awareness, and municipal cooperation.

A significant challenge is the uncertainty around potential funding for transportation projects and programs through the life of the Plan. The region needs to maintain and update a large, complex, and aging transportation infrastructure. The highway and bridge network carries over 30 million vehicle miles (the number of vehicles multiplied by the distance they travel) daily on nearly 27,000 lane miles and over nearly 1,600 bridges, according to the GTC LRTP 2035. In addition, parts of the critical transportation infrastructure is vulnerable to natural and man-made hazards, including floods, ice events and snowstorms which impacts regional emergency response plans. The need for transportation maintenance and improvements will continue to grow and alternative and innovative funding and financing approaches will be needed for implementation.

As noted in the GTC LRTP 2035, the "global economic conditions and the cost of energy coupled with projected regional demographic trends requires that the mobility of an aging population and ensuring that the transportation system is a distinguishing factor in retaining and attracting businesses be primary considerations. Achieving this via a regional transportation system that allows people and freight to move safely, efficiently, and reliably with the limited revenues expected to be available will be a challenge."

Several variables could also affect the ability to implement this Plan. The current housing market is primarily comprised of single family homes in suburban areas with reliance on the personal automobile for mobility. As the region's demographics change and there is an associated change in consumer preferences, there is the potential for a positive effect on Plan implementation. However, if demand continues to be primarily for suburban, large lot development, it will be increasingly difficult to implement some of the transportation strategies.

Likewise, the ability to increase the use of rail for freight (currently 12%) will depend on the commodities market. A growth in agriculture, food processing, and manufacturing could support the use of rail while a decline in waste management freight could significantly reduce rail use.

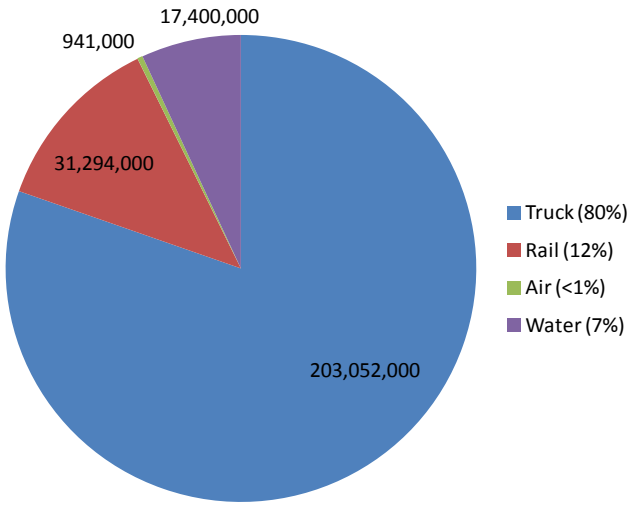


Figure 3-4: Freight Tons by Mode, All Commodities (2010)

Another significant variable is the cost of fuel and the affect it has on the consumer's choice when it comes to mode of transportation. The future of fossil fuel based transportation is rather uncertain, given the instability of international markets and the nations from which oil is extracted. While fossil fuel exploration efforts continue to rise, global production has stagnated and even declined in some regions. This uncertainty, among numerous other factors, should provide the impetus for advancing alternative fuel technology. In conjunction, the communities of the Finger Lakes Region must examine their land use policy choices to look for opportunities to enhance walking, biking and transit. These modes, while not practical for all people or all trips, need to have a more substantial presence given their comparatively low energy requirement and positive impacts on society and the environment.

The elements of a sustainable transportation system – accessibility, connectivity, affordability, and resiliency – are comprised of both technological advancements and personal/societal choices.

The shifting focus to multi-modal transportation design is recognition of how our transportation choices affect the environment, public health, economic development, and social equity. The elements of a sustainable transportation system – accessibility, connectivity, affordability, and resiliency – align with the Regional Guiding Principles outlined in this Plan. The reduction in GHG emissions associated with a reduction in vehicle miles travelled (VMT) and use of alternative fuels supports preservation and protection of the region's air and water quality. It is not enough to provide the components of a sustainable transportation system – public outreach is needed to educate people and market/promote available programs and services in order to encourage and accelerate the shift towards sustainability.

Indicators and Targets

The process for identifying potential transportation Indicators began with examining the desired end state of a sustainable transportation system. While the Transportation Stakeholder Group was interested in a system that encouraged the reduction of VMT and GHG emissions, it also identified the regional importance of the affordability and diversity of transportation options for individuals as well as municipalities and private entities. The resulting Indicators include:

Indicators

- Total percentage of people commuting via walking, biking, transit, and carpooling
- Vehicle miles travelled per capita
- Transportation energy consumption per capita
- % income spent on transportation
- Freight tonnage moved by truck versus rail

The baseline values for these Indicators are shown in the Summary Sheet at the end of this section, as well as Targets for short (2020), mid (2035), and long-term (2050) timeframes. A table of representative Sub-strategies/Project Ideas and Representative Projects that contribute to the implementation of these Broad Strategies is also provided in the Summary Sheet.

Sustainability Goal and Strategies

Transportation Goal

Provide an equitable transportation system that ensures safety, maximizes efficiency, addresses disaster resiliency, provides mode choice, and reduces dependence on fossil fuels.

The following is a description of each Broad Strategy that supports the Transportation Goal. Representative Sub-strategies are provided as examples of specific measurable activity that could be implemented to support the Broad Strategy. At the end of the Transportation Section there is a Summary Sheet that provides a list of representative Sub-strategies/Project Ideas and Representative Projects that contribute to the implementation of these Broad Strategies.

Broad Strategy T1 | Provide for and promote alternative modes of transportation.

In order to help make alternative modes of transportation – walking, biking, public transportation, carpooling, etc. – viable options for the public, the infrastructure needs to be complete (providing connections between destinations), affordable, and accessible. Services and programs need to be established that serve the needs of all potential users of the transportation system as well as promote the environmental, health and financial benefits of alternative modes.

This Broad Strategy is aligned with the following FLREDC Regional Strategy:

- Invest in Community, Industrial Development & Infrastructure
  - Invest in key projects that will address transportation bottlenecks that are barriers to growth; Strengthen transportation infrastructure through preservation and maintenance of the existing system.

The effectiveness of this Broad Strategy will be measured through the following Indicators:

- Total percentage of people commuting via walking, biking, transit, and carpooling
- Vehicle miles travelled per capita
- Transportation energy consumption per capita
- % of income spent on transportation

Prioritization
This strategy was prioritized since it was strongly aligned with the Vision and Regional Guiding Principles. The strategy directly supports the following Regional Guiding Principles:

- Improve accessibility, connectivity and mobility
- Protect, preserve and improve natural resources (by reducing the need for new infrastructure and reducing vehicle miles travelled and associated GHG emissions)
- Maintain, protect and improve the functionality and climate change/disaster resiliency of existing infrastructure systems and acknowledges the links between systems
- Improve public health (through active transportation)
- Reduce energy consumption

The strategy is consistent with numerous planning efforts including the GTC LRTP 2035, the FLREDC Strategic Plan, the Livingston County Transportation Connectivity Plan and numerous municipal bicycle and pedestrian plans.

Potential Stakeholders and Resources
The implementation of this strategy will involve multiple stakeholders including the Genesee Transportation Council (GTC), New York State Department of Transportation (NYSDOT), county planning and highway departments, service providers (transit agencies, ARC and private providers), municipal officials, school districts, major employers and advocacy organizations. Potential funding is available on the federal level through Moving Ahead for Progress in the 21st Century (MAP-21) and at the state level through NYS Consolidated Local Street & Highway Improvement Program and various NYSERDA funding programs. Additionally, funding sources include regional organizations such as the Greater Rochester Health Foundation (GRHF) and private funding sources, including the efforts of advocacy groups and large employers.

Challenges and Sub-strategies
The primary challenge to the success of this strategy is to change travel behavior when the roadway network provides efficient access to destinations throughout the region, vehicle travel is relatively unconstrained, commute times are low and parking is often subsidized. A Sub-strategy that has been developed to address this challenge is to collaborate with large employers, agencies, and municipalities to promote Transportation Demand (TDM) strategies including emphasizing the environmental and health benefits of active transportation.

Sub-strategy 1.1 | *Enhance and expand the bicycle and pedestrian infrastructure to close gaps and create connections between destinations.*

Bicycle and pedestrian infrastructure are key elements of the regional transportation system. As documented in the GTC *Long Range Transportation Plan for the Genesee-Finger Lakes Region 2035* (GTC LRTP 2035), the region has a strong commitment to developing bicycle and pedestrian infrastructure including multi-use trails. There are more than 340 miles of existing trails in the region. The development of multi-use trails is guided by the GTC Regional Trails Initiative (RTI) and Priority Trails Advancement Program studies that determine the feasibility and preferred alignment for trails. Over the past 15 years, $23.6 million in federal funds have been invested in multi-use trails and $14.7 million is programmed in the current Transportation Improvement Program (TIP) to develop more than 20 additional miles of multi-use trails. In addition, several municipalities have developed master plans focused on bicycling and walking and bridging the gaps between existing systems, including the City of Rochester and Towns of Brighton, Chili, Penfield, and Perinton. With very similar goals, Livingston County is developing a Transportation Connectivity Plan to consider multi-modal needs on a county-wide scale.

These plans consider on- and off-road pedestrian and bicycle facilities as well as supporting amenities such as bicycle parking and street furniture.

Another example of the implementation of this Sub-strategy is the H.E.A.R.T program. In 2012, the University of Rochester Medical Center, the Monroe County Department of Public Health and numerous community partners were awarded a five-year, $3.6 million Community Transformation Grant by the Centers for Disease Control and Prevention (CDC) to fund H.E.A.R.T. - community-wide initiatives to improve the health of area residents. H.E.A.R.T. stands for Health Engagement and Action for Rochester's Transformation. As part of this grant the Finger Lakes Health Systems Agency hired an Active Transportation Specialist, whose role it is to organize regional active transportation summits, support the Active Transportation Working Group's members and goals, and provide training and technical assistance to municipalities that want to incorporate active transportation into the comprehensive plan documents or prepare active transportation plans.

Municipalities should partner with the Active Transportation Specialist and GTC to continue the development and subsequent implementation of recommended actions from the GTC Regional Trails Initiative and municipal bicycle and pedestrian master plans.

Sub-strategy 1.2 | *Assess and, as necessary, adjust public transportation services to accommodate needs, demand, and market potential.*

As the needs, demand and market potential for public transportation changes, there is a need for public transportation providers to continuously assess and make necessary adjustments to routes, schedules and fares. These assessments should consider the large increase in the number of seniors and growing importance of universities and colleges. The GTC LRTP 2035 documents that the RGRTA has developed, and continues to refine, a nationally-recognized route analysis system to optimize routes and schedules. Regional Transit Service (RTS) routes and schedules are adjusted quarterly based on analyses of trip-level and stop-level ridership and fare data. RGRTA has developed strategic plans for public transportation for all of the counties in the region where they provide service. The evaluation of the Ontario County operated County Area Transit System (CATS) fixed route and dial-a-ride services was completed in 2010.

RGRTA should continue to assess and adjust RTS routes and schedules quarterly. RGRTA Strategic Plans for services in rural counties should be revisited and updated, as needed, and adjustments made to maximize the effectiveness of non-RTS service consistent with strategic plans. Ontario County should implement recommendations from the 2010 study and revaluate and modify services, as needed. In addition, county and local governments should continue to partner with transportation service providers to improve connections between existing RTS, other RGRTA, and Ontario CATS services.

Sub-strategy 1.3 | *Collaborate with large employers, agencies, and municipalities to promote Transportation Demand Management (TDM) strategies, including emphasizing the environmental and health benefits of active transportation.*

Transportation Demand Management (TDM) is a collection of strategies to reduce vehicle trips and encourage alternative modes of transportation which can contribute to improved access and mobility, reduced parking demand, cost savings to employers and employees (or universities and students), health benefits through increased active transportation options, and improved air quality through reduced greenhouse gas emissions. The GTC is actively engaged in marketing and promoting TDM strategies through the Greater Rochester Regional Commuter Choice Program (roceasyride.org).

RGRTA supports TDM through continuous assessment and enhancement of its service and promotion of its Employer Support Program's pre-tax purchase of transit passes and guaranteed ride home service. In addition, several large employers, including the Rochester Institute of Technology (RIT), have implemented their own TDM programs, often in partnership with a broader sustainability initiative. RIT recently completed a Comprehensive Parking and Transportation Strategy which includes promoting a rideshare program, bicycle program, and improved campus shuttle services with the intent of reducing the number of vehicles traveling to and parking on the campus during peak periods.

There is a need to continue to promote TDM through the Greater Rochester Regional Commuter Choice Program (roceasyride.org) and RGRTA. In addition, counties and municipalities should collaborate with large employers to encourage adoption of TDM programs. This effort should be supported by the addition of a TDM Fact Sheet on GTC's on-line resource center, the Thriving Communities Toolkit and sessions on TDM through the Genesee/Finger Lakes Regional Planning Council's (G/FLRPC) biannual Regional Local Governments Workshop series, the Monroe County Department of Planning and Development biannual Land Use Decision-Making Program and the Greater Rochester Active Transportation Symposium.

Sub-strategy 1.4 | *Promote and implement the Safe Routes to School (SRTS) program.*

Safe Routes to School (SRTS) is a national program that creates safe, convenient and fun opportunities for children to walk and bicycle to and from their schools. Walking or riding bicycles to school has fallen from 50% in 1969 to less than 15% today. The SRTS program has a goal to increase the health and safety of children, and improve environmental quality by making walking and bicycling safe ways to get to school and encourage more children to do so. To promote and encourage implementation of the SRTS program within the region, the GTC includes information on their on-line resource center; the Thriving Communities Toolkit. GTC also developed a Safe Routes to School Guidebook which identifies potential physical improvements and operational measures that can be implemented in the vicinity of schools. The City of Rochester provides a Safe Routes to School Mini-Grant Program that provides up to $2,500 to schools, PTAs, and community groups to establish or enhance SRTS programs in the city.

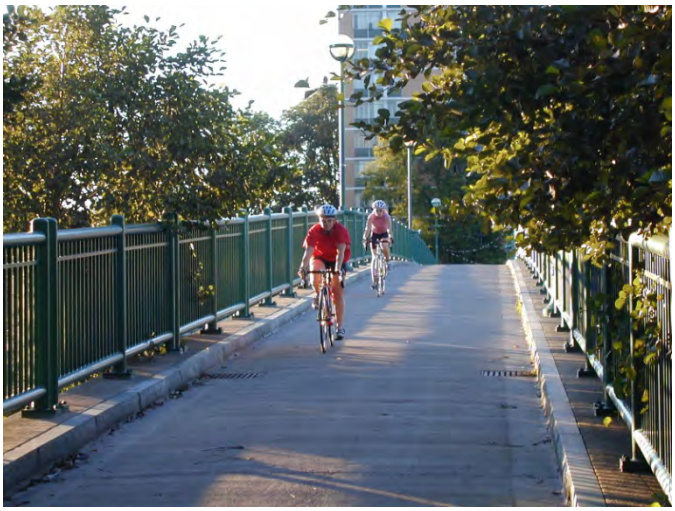
Implementation of this strategy may be done at the municipal, school, or community organization level. There is a need for GTC, county planning departments, municipalities and school districts to continue to promote SRTS, identify projects and additional funding sources for implementation throughout the region. Improvements that support SRTS should also be incorporated into the development of municipal bicycle and pedestrian master plans.

Sub-strategy 1.5 | *Evaluate the feasibility of broad car-sharing and bike-sharing programs.*

This Sub-strategy is aligned with the following FLREDC Regional Strategy:

- Optimize business creation, retention and expansion (car- and bike-share programs)
  - Increase the number of entrepreneurs through education/ training programs and recruitment, particularly those with domain experience in key sectors.

Car- and bike-sharing programs provide a mobility option for individuals or families that cannot afford to own or maintain a vehicle or bicycle, have a desire to lower their overall transportation costs, or do not need a vehicle or bicycle full time. Both programs can also help support the use of public transit and carpooling, providing a backup form of transportation if needed. Zipcar is an international, for-profit, membership-based car sharing company providing automobile rental to its members. In Rochester, Zipcar currently provides eight vehicles at the three University of Rochester campuses: Eastman Campus, Medical Center Campus, and River Campus, however, the program is currently limited to faculty, staff and students.



There is a need to evaluate the feasibility of car-sharing and bike-sharing programs that serve a broader section of the regional population. Studies could be conducted at the municipal, county or regional level. These studies should consider expansion of for-profit programs like Zipcar or the development of not-for-profit, community based car sharing programs modeled after CuseCar (Syracuse), IthacaCarshare and BuffaloCarshare.

The GTC's 2013-14 Unified Planning Work Program includes a Rochester Area Bike Sharing Program Study which will consider the type of bike-share model that would best fit the needs of the community. One potential option is to establish a contract with a for-profit company that provides bike stations for access to bikes. This is the type of system provided by Alta Bicycle Share which has systems in Boston and the Washington DC area. An alternative would be a smaller community not-for-profit like BuffaloBikeshare that uses the innovative Social Bicycles (SoBi) GPS-enabled system that does not require defined stations. To encourage implementation, municipalities will need to consider incentives such as providing parking for car-share vehicles in municipal lots and garages or providing a land lease to accommodate the infrastructure needed for bike-share programs.

Sub-strategy 1.6 | *Evaluate the feasibility for Bus Rapid Transit (BRT), light rail, or fixed transit service serving major employers/destinations.*

While these mass transit options have many similarities, there are also very distinct differences. Before any one option is supported or progressed, the feasibility of these options in comparison to each other should be researched and evaluated to determine which would be the most beneficial to the region. The evaluation should include defining each option, understanding their similarities, differences and benefits, identification of required and available rights-of-way, potential users to be served, as well as costs and funding opportunities.

A study to evaluate the feasibility of these transit options within the region should be conducted through a partnership of the GTC and RGRTA.

Broad Strategy T2 | Promote livability corridors.

In conjunction with the Land Use & Livable Communities Broad Strategy LU2 to "revitalize existing centers and prioritize the value of place making", directing growth and development to corridors and centers provides the opportunity to live, work and play in the same area. It also encourages the density required to make public transportation, active transportation, and the utilization of existing infrastructure more viable.

This Broad Strategy is aligned with the following FLREDC Regional Strategy:

- Invest in Community, Industrial Development & Infrastructure
  - Invest in key projects that will address transportation bottlenecks that are barriers to growth; Strengthen transportation infrastructure through preservation and maintenance of the existing system.

The effectiveness of this Broad Strategy will be measured through the following Indicators:

- Total percentage of people commuting via walking, biking, transit, and carpooling
- Vehicle miles travelled per capita
- Transportation energy consumption per capita
- % of income spent on transportation

Prioritization
Like the previous strategy, promotion of livability corridors directly supports the following Regional Guiding Principles:

- Improve accessibility, connectivity and mobility
- Preserve, protect and improve natural resources (by reducing the need for new infrastructure and reducing vehicle miles travelled and associated GHG emissions)

The strategy also supports an improvement in public health by encouraging and supporting active transportation. Promoting center-based development also retains individual community character and has the potential to promote economic growth and development of new jobs through reinvestment in existing centers. This strategy is consistent with the GTC LRTP 2035, the FLREDC Strategic Plan and the G/FLRPC Comprehensive Economic Development Strategy (CEDS).

Potential Stakeholders and Resources
The primary implementation of this strategy will be at the local level with the update of existing comprehensive plans and zoning and through private development. However, support may also be provided by county planning departments and the G/FLRPC.

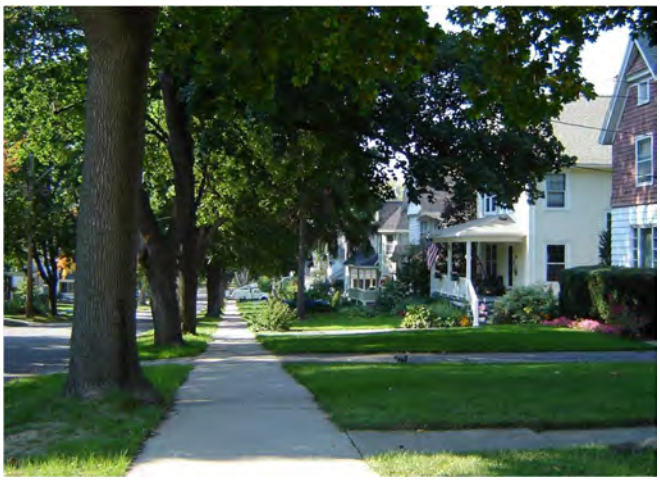
While development projects will be driven by the private sector, some infrastructure improvements could be funded on the federal level through MAP-21 and at the state level through NYS Consolidated Local Street & Highway Improvement Program. Funding for comprehensive planning and zoning updates may be partially supported with federal Community Development Block Grants, NYS County and Municipal Agricultural and Farmland Protection Planning Grants, NYS Brownfield Opportunity Area Grants, and NYS Department of State grants. The lack of funding sources for planning and zoning is, and will continue to be, a challenge for communities.

Challenges and Sub-strategies
The challenges to successfully implement this strategy include ensuring that local officials understand the connection between land use and transportation to ensure multiple modes are considered in the development of comprehensive plans and zoning and the review of site plans, as well as the current housing market focus on suburban large lot development. To address these challenges, Sub-strategy 2.1 has been created that, when implemented, will complement the GTC Thriving Communities Toolkit, an online resource center. It will also complement the financial and technical assistance provided by GTC for locally-led plans that integrate transportation and land use

planning. Although the Sub-strategy does not directly affect the housing market, it will indirectly influence development patterns through zoning.

Sub-strategy 2.1 | *Develop and implement a transportation technical assistance program to inform local planning and zoning boards about the need to support development that fully considers and integrates transportation needs.*

Transportation technical assistance is currently provided through the NYSDOT, the GTC, and county planning and transportation departments. GTC has developed and maintains the Thriving Communities Toolkit, an online resource center which provides fact sheets and resources on a variety of transportation topics. Training is provided through the G/FLRPC's biannual Regional Local Governments Workshop series, the Monroe County Department of Planning and



Development biannual Land Use Decision-Making Program and the Genesee-Finger Lakes Active Transportation Symposium (G-FLATS).

There is a need to continue and enhance the existing resources and training programs to provide information on how to fully integrate the connection between land use and transportation in planning, zoning and site plan review. One approach is the development of a transportation page on the sustainable-fingerlakes.org website to provide a single resource for the region. This page would provide information on the land use and transportation connection, the importance of the transportation system to economic development, alternative modes of transportation, and alternative fuels. In addition to education materials, this page could provide links to state, county, municipal, institutional and non-profit transportation resources.

The development of this page would be the responsibility of the Regional Plan Coordinator as identified in Section 4, Plan Implementation. Another potential approach to enhance existing resources would be to establish a Land Use and Transportation Tract in training programs and to make presentation materials available through the sustainable-fingerlakes.org website.

Sub-strategy 2.2 | *Identify and implement demonstration projects that fully consider and integrate transportation needs (e.g., transit supportive, walkable).*

Refer to the Governance and Land Use sections for more information on developing a vision for communities and the incorporation of corridor and nodal development patterns in planning and zoning regulations. Once the comprehensive plan and zoning regulations identify areas for mixed-use, corridor and nodal development patterns, the implementation of this strategy requires a partnership between private developers and municipal officials who review and approve site plans. An example of this type of development is Park Point, an off-campus living community adjacent to RIT that provides retail, dining and recreational uses. Park Point's mix of uses, nodal development pattern, pedestrian infrastructure and express shuttle to campus reduces the number of vehicle trips generated on-site.

Municipalities should encourage developers to design communities for all transportation modes, providing infrastructure to support and encourage walking, bicycling and public transportation. The implementation of successful demonstration projects should be documented as case studies on

GTC's Thriving Communities Toolkit and included in regional training programs.

Broad Strategy T3 | Leverage transportation system assets to encourage economic development.

The GTC's *Transportation Strategies for Freight and Goods Movement in the Genesee-Finger Lakes Region Final Report* (GTC Freight Study) states that "the competitiveness of a region's economy is inextricably linked to the strength of that region's transportation network" and a "top-notch, multimodal transportation network can be a region's gateway to prosperity."

This Broad Strategy is aligned with the following FLREDC Regional Strategies:

- Optimize business creation, retention and expansion
  - Develop systems that monitor and identify firms and sectors with high growth potential and proactively engage with these companies to connect them with the resources that will accelerate product development, access to new markets, and scale business models.
- Invest in Community, Industrial Development & Infrastructure
  - Invest in key projects that will address transportation bottlenecks that are barriers to growth; Strengthen transportation infrastructure through preservation and maintenance of the existing system.

The effectiveness of this Broad Strategy will be measured through the following Indicators:

- Vehicle miles travelled per capita
- Transportation energy consumption per capita
- Freight tonnage moved by truck and rail

Prioritization
This strategy aligns with the following Regional Guiding Principles:

- Improve accessibility, connectivity and mobility
- Preserve, protect and improve natural resources (by reducing the need for new infrastructure and reducing vehicle miles travelled and associated GHG emissions).

This Broad Strategy is consistent with the GTC LRTP 2035, the FLREDC Strategic Plan, the G/FLRPC CEDS, and the GTC Freight Study.

Potential Stakeholders and Resources
Implementation of this strategy may engage many stakeholders including but not limited to the GTC, county planning departments, economic development agencies, private industry, private operators and advocacy groups. Potential funding is available on the federal level through MAP-21, the Tiger Grants Program, the Rail Rehabilitation and Finance Program, the Rail Relocation and Improvement Grant Program, the Local Rail Freight Assistance Program, and the Department of Agriculture Rural Energy for America Program. There are also tax credit programs and Title 23, United States Code, Section 130 and 133 funds available for at-grade crossing improvements and helping to remove trucks from highways. At the state level, funding is available through the NYS Consolidated Local Street & Highway Improvement Program, the NYS Industrial Access Program, and various NYSERDA programs. Additionally, funding sources include regional organizations such as the GRHF and private funding sources, including private industry, private rail owners/operators and advocacy groups.

Challenges and Sub-strategies
The availability of revenues dedicated to transportation from all levels (local, state, and federal) and sectors (public and private) are insufficient to support the planning, building and operation of a transportation system that would meet the needs of all users. Although specific Sub-strategies have not been identified to address this challenge, there are numerous regional and state agencies that are working on financing and funding alternatives, many of which have been documented in the GTC Freight Study.

Sub-strategy 3.1 | *Educate the public and key stakeholders in the region about the importance of freight transportation.*

Freight is increasing in importance on the national transportation agenda and numerous national advocacy groups and organizations have been working to raise the profile of freight transportation needs. There is also a renewed interest at the state and regional level to consider freight and goods movement needs with changing global economic conditions, increasing energy costs and projected regional demographic trends. One of three primary objectives of the GTC Freight Study is to "help educate the public and key stakeholders about the importance of freight transportation."

In the study's SWOT Analysis and Needs Assessment, it was documented that there is an opportunity to:

> "Increase awareness about the importance of freight transportation to the region's economy. An education and marketing campaign could improve the image of freight transportation. Today, many who complain about freight's noise, emissions, and aesthetic impacts believe all trucks are coming from and going to "other places," not realizing that a large share of truck traffic has a local origin and/or destination. Marketing efforts by freight rail companies have emphasized the efficiency and environmental benefits of rail. Also, investments in passenger rail infrastructure could draw more people to the rails, presenting opportunities to educate people about freight rail."

The freight study identified that GTC will take the lead role in educating the public and transportation stakeholders with additional participants to include local governments, freight transportation system owners and operators, freight transportation advocates, economic development organizations, the business community, environmental and community representatives and elected officials and the public. It is anticipated that the education effort would include the incorporation of freight topics on the transportation page of the sustainable-fingerlakes.org website, fact sheets on GTC's Thriving Communities Toolkit and sessions on the importance of freight in regional training programs.

Sub-strategy 3.2 | *Develop efficient connections between modes of freight transportation.*

The ability to increase the use of rail for freight (currently 12%) will depend on the commodities market and the availability of efficient and convenient connections between modes of transportation. This strategy is aligned with the FLREDC Regional Strategy "Invest in community, industrial development & infrastructure" which includes "invest in key projects that will address transportation bottlenecks that are barriers to growth."

Although there are several existing transfer facilities and transloading sites in the region there is a need for additional connections. Existing facilities include the Lakeville Transfer Facility, the Batavia Transload Warehouse, the Ontario Midland Railroad transloading site in Newark and the Northeast Freight Transfer (NEFT) Finger Lakes Division transload operation within the former Seneca Army Depot. The GTC Freight Study identified the following infrastructure opportunities for connections between transportation modes:

- Building a rail intermodal transfer facility
- Expanding air cargo service by taking advantage of the Greater Rochester International Airport (GRIA) as an international port of entry
- Providing better connections to the Port of Oswego:
  - Potential for Port of Lyons/Lyons Industrial Park to receive barges along the Erie Canal via a connection to the Oswego Canal at Three Rivers (dredging would be required) and provide access to the intersection of Norfolk Southern's Olean line, the CSX main line, and Route 14 (which intersects I-90 at Thruway Exit 42)
  - Potential for better connections by CSX, a Class I railroad that runs through the region
- Better connection between the rail infrastructure at the Seneca Army Deport and the NYS Thruway that does not require trucks travelling through village centers
- Improvement to State Route 5 to accommodate increased truck traffic for future development at the Caledonia Industrial Development that contains a rail yard with connections to all Eastern Class I Railroads

The implementation of these improvements will be championed by the GTC and will require partnerships between the GTC, facility owners and operators, counties and municipalities.

Sub-strategy 3.3 | *Preserve and improve access to the freight transportation system for existing and emerging industries.*

This Sub-strategy is aligned with the FLREDC Regional Strategy "Invest in community, industrial development & infrastructure" which includes "strengthen transportation infrastructure through preservation and maintenance of the existing system."

In the GTC LRTP 2035, connectivity and access for freight transportation by truck, rail, air, and water is identified as a primary economic need for the region now and in the future. The "Preservation and Maintenance" section of the GTC LRTP 2035 identifies the need to "Reconstruct and rehabilitate rail infrastructure to allow for the efficient movement of freight into, out of, and within the region."

The plan goes on to state that the region's ability to take full advantage of its position in the larger mega-region is dependent on the ability of raw materials, intermediate inputs, and finished goods to be able to be delivered from and transported to domestic and international markets. The GTC Freight Study highlights a number of ways accomplish this:

- Identify possible locations for local businesses to access regional short line railroads at small cross dock and transload facilities throughout the region
- Take action to preserve rights-of-way on lines identified in the Regional Right-of-Way Preservation Study
- Improve the efficiency and lower costs associated with interchanges of rail cars between rail operators

The implementation of these improvements will be championed by the GTC and will require partnerships between the GTC, facility owners and operators, counties and municipalities. A representative project that supports implementation of this strategy is the improvements to the Genesee and Wyoming Railroad line between Dansville and Mount Morris to encourage economic development and serve as a connector between multiple modes given the proximity to I-390 and other major trucking routes.

Sub-strategy 3.4 | *Develop and promote recreational and cultural tourism projects.*

This Sub-strategy aligns with the FLREDC Sector Strategy "Tourism and the arts" which includes "invest in the development, promotion, and preservation of cultural, artistic, and historic assets."

Transportation infrastructure has the potential to accommodate and promote recreational and tourism activity in the region contributing the quality of life and economic development. Erie Canal Days events and festivals, along with canal rides and tours are examples of how the transportation system can be a cultural asset to the region. Another successful example of this Sub-strategy is the Parks & Trails New York partnership with the NYS Canal Corporation, Erie Canalway National Heritage Corridor and communities along the canal. This partnership is working to complete what will ultimately be a 524-mile continuous trail along New York's historic Erie, Oswego, Cayuga-Seneca, and Champlain canals. The Erie Canalway Trail, which traverses the region, is more than three-fourths complete. Recent additions and improvements to the trail within the region include:

- Construction of new trail segment from Palmyra to Newark, Wayne County – extension of this section to Lyons is still under development
- Reconstruction of trail from Long Pond Road in Greece to Lock 32 in Pittsford, Monroe County
- Trail improvements and linkages to the adjoining business district in the Hamlet of Bushnell's Basin, Town of Perinton, in Monroe County

As part of the development of comprehensive plans, municipalities should inventory existing recreational and cultural assets, and identify potential projects that would promote and encourage use of these assets. The comprehensive planning process should also identify potential partnerships and funding opportunities for project implementation. Refer to Section 3.5, Land Use and Livable Communities, for more information of the development of comprehensive plans.

Broad Strategy T4 | Maintain and improve the functionality, safety and efficiency of the existing transportation infrastructure.

According to the GTC LRTP 2035, preservation and maintenance recommendations encompass not only the maximization of existing assets, but also improvements to those assets. These improvements are necessary to meet the challenges of sustainability and climate change adaptation through the use of new materials and design elements that were not available when facilities were first built or last reconstructed. This applies not only to the highway and bridge infrastructure but includes public transportation vehicles and facilities, bicycle and pedestrian facilities, and rail infrastructure.

This strategy is aligned with the FLREDC Regional Strategy "Invest in community, industrial development & infrastructure" which includes a strategy to "strengthen transportation infrastructure through preservation and maintenance of the existing system."
The effectiveness of this strategy will be measured through the following Indicators:

- Total percentage of people commuting via walking, biking, transit, and carpooling
- Vehicle miles travelled per capita
- Transportation energy consumption per capita
- % of income spent on transportation
- Freight tonnage moved by truck and rail

Prioritization
Maintaining and improving the existing transportation system aligns with the following Regional Guiding Principles:

- Improve accessibility, connectivity and mobility
- Preserve, protect and improve natural resources and acknowledge the link between natural systems
- Maintain, protect and improve the functionality and climate change/disaster resiliency of existing infrastructure systems
- Reduce energy consumption

This Broad Strategy is consistent with the GTC LRTP 2035 and the FLREDC Strategic Plan.

Potential Stakeholders and Resources
Implementation of this strategy may engage many stakeholders including but not limited to the GTC, county planning and highway departments, service providers (transit agencies, ARC and private providers), municipal officials, as well as support and cooperation with major employers and advocacy organizations. Potential funding is available on the federal level through MAP-21 and at the state level through NYS Consolidated Local Street & Highway Improvement Program.

Challenges and Sub-strategies
While this is a strategy that is continuously on the minds of the local agencies tasked with maintaining the transportation system, a challenge will be to ensure that all users and modes are considered in all maintenance and improvement projects. A Sub-strategy to address this challenge is to implement the multi-modal and/or complete streets recommendations from GTC's Circulation, Access, and Parking Program plans and studies. The goals, and thereby the recommendations, of these studies focus on strengthening connectivity within communities, improving pedestrian and bicycle networks, improving safety for all users of the network, enhancing community character, and providing for growth.

Sub-strategy 4.1 | *Continue investment policies that prioritize preservation and maintenance projects.*

The GTC LRTP 2035 states "the preservation and maintenance of the existing infrastructure and services that comprise the regional transportation system is a primary need of all regional users and, therefore, all places in the region. Highways, bridges, buses, trails, and sidewalks should, at a minimum, continue to serve residents, businesses, and institutions in a safe, efficient, and reliable manner. While this will be a challenge given deterioration of existing infrastructure and vehicles relative to reasonably expected revenues, it is a challenge that must be met by transportation agencies and organizations at all levels." It goes on to note that "the current TIP includes projects of this type in both major population centers and areas where agriculture is the primary industry."

The implementation of this strategy is the responsibility of municipal and county highway/transportation departments, the GTC and NYSDOT as they develop and adopt new transportation policies and funding priorities.

Sub-strategy 4.2 | *Advance access management as part of rehabilitation and reconstruction projects.*

Access management is a collection of strategies to help vehicles turn in and out of sites safely while moving through-traffic along a road with a minimum of interruptions. Proper access management requires the coordination of land use and transportation planning to balance the movement of traffic, the preservation of community character, and access to property. Examples of access management techniques include:

- Regulation of land uses
- Limiting access points
- Providing connections between parcels of land
- Applying proper site driveway design and location criteria
- Using appropriate roadway design and traffic controls (signs, pavement markings, signals)

- Facilitating use of alternate modes of transportation (walking, bicycle, transit)

GTC has provided funding for and technical assistance to numerous communities to conduct multi-jurisdictional access management plans that have integrated transportation and land use planning. Access management recommendations noted in studies, including corridor studies along NYS Routes 5/20, Route 31, Route 414, and others, should be advanced as part of reconstruction and rehabilitation projects in the region.

GTC should continue to fund and provide technical assistance to communities to identify the need for access management. State, county and municipal departments of transportation and public works should incorporate recommended physical improvements into reconstruction and rehabilitation projects. The corresponding revisions to land use regulations is the responsibility of municipalities and should be incorporated into amendments to comprehensive plans and zoning codes. It is anticipated that resources for municipalities would include the development of a transportation page on the sustainable-fingerlakes.org website, fact sheets on GTC's Thriving Communities Toolkit and sessions on access management in regional training programs.

Sub-strategy 4.3 | *Identify and implement Complete Streets recommendations where appropriate.*

The concept of a "complete street" refers to a set of street design features that accommodate and facilitate convenient access and mobility by all users, regardless of mode of transportation and abilities. These features may include, but need not be limited to:

- Sidewalks, crosswalks, and pedestrian signalization
- Paved shoulders suitable for use by bicyclists, bicycle lanes, and share the road signage
- Road diets (reduction in the number of travel lanes)
- Bus pull-outs
- Raised crosswalks and other traffic calming measures

It is also important to recognize that the needs of users of the road network vary according to a rural, urban and suburban context.

This concept was given the force of law in New York with the passage of the Complete Streets Act in August, 2011 (S05411A/A08366) which took effect on February 15, 2012. It states that "the transportation plans of New York State should consider the needs of all users of our roadways including pedestrians, bicyclists, public transportation riders, motorists and citizens of all ages and abilities, including children, the elderly and the disabled…Therefore, it shall be the policy of the state to consider people of all ages and abilities and all appropriate forms of transportation when planning roadway projects."

Communities as diverse as the City of Rochester, the Town of Williamson and the Village of Clyde have adopted Complete Streets resolutions or policies. The City of Rochester's Bicycle Enhancement Program was established to implement the City's Complete Streets Policy and advance toward designation as a Bicycle Friendly Community (the City was designated a Bronze Level Bicycle Friendly Community in 2012). This

program is currently implementing recommendations from the *2011 Rochester Bicycle Master Plan* which evaluated and prioritized streets in the City for restriping to accommodate bike lanes as part of their annual street maintenance program.

In accordance with the law, complete street design features will be considered on projects that are funded with federal and state funds. Since the law does not provide any additional funding for complete street design features, funding decisions should be addressed early in planning stage. The GTC should continue to fund local and regional studies that develop feasible planning, design, and regulatory concepts to improve circulation, accessibility, parking, and safety for pedestrians, motorists, and cyclists (GTC's Circulation, Access, and Parking Program plans and studies).

Local governments are encouraged to adopt a complete streets resolution of policy or incorporate the concept into a comprehensive plan. Refer to Section 3.5, Land Use and Livable Communities, for more information. Local governments should also incorporate these principles in the planning for locally funded projects and the site plan review process. It is anticipated that resources for municipalities would include the development of a transportation page on the sustainable-fingerlakes.org website, fact sheets on GTC's Thriving Communities Toolkit and sessions on complete streets in regional training programs.

Sub-strategy 4.4 | *Improve the functionality of intersections and interchanges to increase safety, reduce delay and improve mobility.*

The GTC LRTP 2035 documents that recurring delays at intersections and interchanges has significant implications including increased emissions and reduced productivity. Improving these intersections or interchanges when reconstruction is needed can result in significant benefits to regional mobility and safety. There is also a need to address American with Disabilities Act (ADA) – non-compliance issues. Examples of improvements include:

- Dedicated turn-only lanes
- New and modification to existing signalization
- Introduction of roundabouts
- Realignment of roads entering an intersection
- Pedestrian and bicycle improvements (sidewalks, crosswalks, and curb cuts)

Representative projects noted in the GTC LRTP 2035 include the reconstruction of I-490/I-390/NYS Route 390 interchange, the current western terminus of NYS Route 531, the I-590/Winton Road interchange and the construction of roundabouts at the intersections of Ontario County Road 46 with County Road 10 and County Road 4. The innovative design incorporated into the completed projects at the I-590/Winton Road interchange and roundabouts in Ontario County reduces delay and congestion, thereby, reducing pollution and fuel consumption.

GTC should continue to identify and prioritize projects for funding that improve the functionality of intersections and interchanges. Local governments should incorporate pedestrian and other transportation considerations into ADA transition plans. In addition, consistent with the recommendations of the GTC LRTP 2035, GTC should develop a regional program to identify and prioritize ADA-related non-compliance issues with the transportation system. These projects could then be addressed as part of rehabilitation and reconstruction projects or as standalone improvements.

Sub-strategy 4.5 | *Identify and implement Transportation System Management and Operations (TSMO) projects in the areas of technology, coordination and demand.*

As documented in the summary of existing conditions, regional transportation agencies emphasize the use of TSMO to maximize the effectiveness of the current transportation system. This is accomplished through:

- Technology - using information and communication technology to monitor what is occurring on the transportation system and

make adjustments remotely (e.g. implementation of integrated/coordinated arterial signal timing systems)
- Coordination – coordination of information sharing, incident response and construction activities by leveraging the relationships among transportation, emergency management and law enforcement entities to coordinate on transportation infrastructure and services (e.g. Monroe County's Regional Traffic Operations Center)
- Demand – providing users with information to manage the demand placed on the system (e.g. the establishment of the Greater Rochester Regional Commuter Choice Program-roceasyride.org)

GTC should continue to identify and prioritize for funding TSMO projects and programs. Transportation agencies, emergency management and law enforcement entities should continue to collaborate and coordinate on transportation issues.

Broad Strategy T5 | Promote the development and adoption of alternative fuels and power sources.

As previously stated, the Finger Lakes Region GHG Inventory indicates that emissions associated with transportation activity accounts for 37% of the total GHG emissions – the most of all contributors. In addition to reducing vehicle miles travelled (VMT), a reduction in transportation related GHG emissions will require a reduction in the use of conventional fossil-based fuels; this will require broader access to alternative fuels and power sources as well as education and promotion of their use.

This strategy is aligned with the following FLREDC Regional Strategies and Sector Strategies:

- Optimize business creation, retention and expansion
  - Develop systems that monitor and identify firms and sectors with high growth potential and proactively engage with these companies to connect them with the resources that will accelerate product development, access to new markets, and scale business models.
- Strengthen academic and industry partnerships
  - Develop programs and shared resources that allow closer collaboration between academic and industry scientists.
  - Streamline and accelerate the maturation, transfer, and commercialization of university-based intellectual property; Build a regional ecosystem that more effectively harnesses university-based innovation, with a particular focus on fostering the creation and growth of early-stage companies.
- Invest in Community, Industrial Development & Infrastructure
  - Invest in key projects that will address transportation bottlenecks that are barriers to growth; Strengthen transportation infrastructure through preservation and maintenance of the existing system.
- Energy innovation
  - Create the resources and infrastructure that will accelerate R&D and commercialization of new energy technologies.

Prioritization
Promoting the use of alternative fuels and power sources associated with transportation uses aligns with the following Regional Guiding Principles:

- Improve accessibility, connectivity and mobility
- Preserve, protect and improve natural resources and acknowledge the link between natural systems
- Improve public health
- Promote robust, high quality economic and job growth (through the encouragement of research and development of alternative fuel technology within the region).

This strategy is consistent with the GTC LRTP 2035.

Many of the region's fleet owners and operators have already embraced the movement towards alternative fuel vehicles and have been recognized for their progress in advancing clean fuel technologies. Converting fleet vehicles to alternative fuel vehicles and continuing to install the infrastructure to support these vehicles should continue to be a priority. Noted previously, Monroe County's 'Green Fleet', the City of Rochester's alternative fuel fleet, and the Clean Air School Bus Programs in the region are examples of existing initiatives to transition towards alternative fuel vehicles.

Potential Stakeholders and Resources
The implementation of this strategy will involve multiple stakeholders including the GTC, NYSDOT, Genesee Region Clean Communities, fleet operators, private industry, research and development agencies/groups, private advocacy groups and the public.

Potential funding is available on the federal level from the Environmental Protection Agency (EPA) through a number of grant programs:

- Environmental Education Grants
- EPA National Center for Environmental Research
- Individual EPA Regions
- National Clean Diesel Campaign

The Federal Aviation Administration offers funding through the Voluntary Airport Low Emissions (VALE) Program and Zero Emission Vehicle Program for airports. The United States Department of Energy also offers funding through the Clean Cities Funding Opportunities. Funding on the state level is available through various NYSERDA programs. Additionally, funding sources include private entities that own and operate fleets and fuel infrastructure.

Challenges and Sub-strategies
There is great potential for further promoting the use of alternative fuel vehicles for personal transport. However, there are significant challenges as well. As the cost of gasoline continue to rise, the desire for alternative options becomes more desirable, but the price of alternative fuel vehicles is not at the point where purchasing one is an option for many. In addition, the lack of alternative fueling infrastructure is an impediment as it creates logistical concerns over the range of vehicles. Sub-strategies that promote the research and development of advanced technology vehicles within the region and that explore and develop financing options for making alternative fuels/vehicles more affordable have been identified to help address the challenge of encouraging the individual to make the change to alternative fuel vehicles.

Sub-strategy 5.1 | *Support research and development, deployment of pilot projects to validate technology and eventual commercialization of alternative fuel vehicle technology*

There are numerous examples of the implementation of this Sub-strategy in the region:

- RIT's Center for Sustainable Mobility has been researching alternative fuel technology since 2006 with a $4M grant from the U.S. Department of Transportation to assess the environmental and economic impact of

different alternative fuel and propulsion technologies on the U.S. public transportation system. Existing research examines emerging fuel technologies and their applications – biodiesel, ethanol, fuel cells, hydrogen and combinations of these – to determine their impacts on existing systems and forecast requirements for sustainable future transportation systems and infrastructure.

- Monroe County has partnered with RIT's Golisano Institute for Sustainability (GIS) and General Motors (GM) to evaluate and test multiple alternative fuel technologies and their feasibility in county operations. This partnership includes participation in GM's Chevrolet Project Driveway by driving and evaluating the performance of a hydrogen fuel cell Chevy Equinox and the development of the Green Fuel Station on Scottsville Road.
- The County of Monroe Industrial Development Agency (COMIDA) provided incentives for the expansion of General Motor's Fuel Cell Development Center in Honeoye Falls in 2001.

There is a need to continue to provide financial support for academic institutions and other organizations involved in research and development and deployment of pilot projects leading to commercialization of alternative fuel vehicle technology. This may include additional support for RIT's GIS, which is interested in pursuing research where bio-gas from landfills and anaerobic digesters is used to power stationary fuel cells. The fuel cells would produce electricity and hydrogen from a sustainable feedstock fuel.

The long-term potential exists to create hydrogen depots that could provide fuel for commercial fueling stations to sell to consumers driving hydrogen vehicles. The long term benefits from the project include greatly reduced GHG emissions from hydrogen vehicles, increased renewable electricity production, reduced VMT from the shipping of petroleum fuels and enhanced local job creation from establishment of a regional hydrogen distribution network.

Sub-strategy 5.2 | *Promote the awareness of alternative fuel technology and encourage their adoption in public and private fleets.*

Being honored for their efforts in advancing clean fuel technology with their fleet vehicle programs, the City of Rochester and Monroe County serve as models for this Sub-strategy. The Genesee Region Clean Communities, Inc. (GRCC) is a U.S. Department of Energy sponsored program designed to encourage the use of alternative fuel vehicles (AFVs) and their underlying support systems throughout the Greater Rochester area.

The GRCC should continue to promote alternative fuel technology and assist counties, municipalities and businesses in integrating alternative fuels into their fleets. As part of their fleet management, counties, municipalities and private businesses should develop a plan to transition to alternative fuel vehicles. In addition, case studies of the conversion of the Monroe County and City of Rochester fleets should be developed and made accessible on the transportation page of the sustainable-fingerlakes.org website.

Sub-strategy 5.3 | *Increase availability and geographic coverage of alternative fueling stations using electricity, hydrogen, bio-fuel, CNG, ethanol, LNG, or propane (including truck stop electrification facilities).*

There are several alternative fueling stations in the region. One example is Monroe County's alternative fuel station on Scottsville Road which includes a hydrogen fuel cell station, several grades of ethanol and B-20 biodiesel. Through intermunicipal agreements, the County shares the Green Fuel Station with Monroe Community College, Monroe County Water Authority, the City of Rochester and several local towns and villages.

Municipalities, institutions and businesses have provided electric vehicle charging stations for use by employees and visitors. In 2012, the Town of Penfield installed a free charging station at the Community Center and Library on Baird Road and

RIT's new GIS building, Sustainability Hall, provides charging stations for electric vehicles.

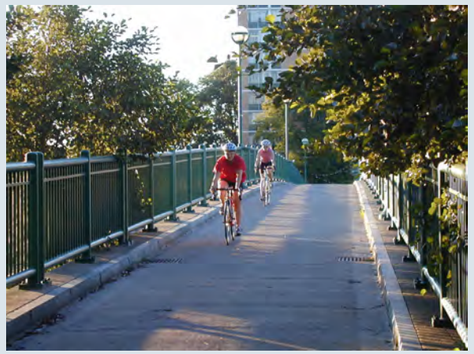
There is a need to continue to share resources through the development of intermunicipal agreements and partnerships among private businesses. There is also a need to increase the use of alternative fuel beyond fleets by increasing the availability and geographic coverage of alternative public fueling.

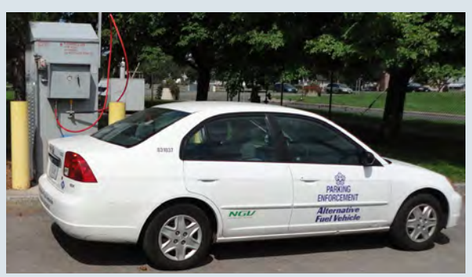
Municipalities, institutions and businesses should continue to identify opportunities for and the provision of electric vehicle charging stations for use by employees and visitors. An example of implementing this concept is the City of Rochester's plans to install 24 charging stations at seven highly-visible and busy locations around the City, including municipal parking garages, City Hall, the Port of Rochester and the Rochester Public Market. This is part of the state's broader effort to deploy 325 electric vehicle charging stations throughout the state.

Transportation

Subject Area Goal

Provide an equitable transportation system that ensures safety, maximizes efficiency, addresses disaster resiliency, provides mode choice and reduces dependence on fossil fuels.





Opportunities

- GHG emission reduction
- Improved public health through active transportation
- Outreach/promotion of available programs and services
- Increased resilience for individuals/ households when multiple modes are viable for their daily needs
- Expand on recent momentum in expanding bicycle infrastructure
- Human-scaled design supports local/small businesses
- Educating policy makers and the public about transportation-land use connection

Challenges

- Access to funding
- Minimal congestion discourages alternative modes
- Land use policies that promote auto-oriented, single-use development
- Struggling urban areas discourage people from locating in walkable/bikeable neighborhoods
- Current lack of critical mass to support transit modes beyond bus service
- Negative perception of public transit

Variables

- Availability of federal and state funding
- Fuel costs
- Housing market demand for large lot suburban homes versus denser mixed-use development
- Changes in rail commodities market

Indicators and Targets

Indicators	Broad Strategies Measured	Baseline Value (2010)	Short-Term Target* (2020)	Mid-Term Target* (2035)	Long-Term Target* (2050)
Total percentage of people commuting via walking, biking, transit, and carpooling (#2A—NYSERDA Required)	T1, T2, T4	15%	+2% (17% total)	+5% (20% total)	+10% (25% total)
Vehicle miles travelled per capita (#2B—NYSERDA Required)	T1, T2, T3, T4	9,472 miles	- 1%	-3%	-5%
Transportation energy consumption per capita	T1, T2, T3, T4, T5	73 MMBtu 635 gallons of gas	- 10%	-25%	-40%
% income spent on transportation	T1, T2, T4	25%	- 3%	-7%	-10%
Freight tonnage moved • Percent by truck • Percent by rail	T3, T4	• 80% • 12%	• maintain baseline • maintain baseline	• maintain baseline • maintain baseline	• 78% • 14%

*All % reductions or increases are related to the 2010 baseline values, not the previous target.

Transportation

Subject Area Goal

Provide an equitable transportation system that ensures safety, maximizes efficiency, addresses disaster resiliency, provides mode choice and reduces dependence on fossil fuels.

Finger Lakes Regional Sustainability Plan

Priority Broad Strategies

Connection with criteria: ● Strong ◐ Moderate ○ Marginal

	Benefits Multiple Subject Areas	Benefits Multiple Capitals	Benefits Multiple Communities	Implementation Feasibility	Consistent with Planning Efforts	Financial Feasibility
Broad Strategy T1—Provide for and promote alternative modes of transportation.	●	●	●	◐	●	◐

Representative Sub-Strategies / Project Ideas

1.1 Enhance and expand the bicycle and pedestrian infrastructure to close gaps and create connections between destinations.
1.2 Assess and, as necessary, adjust public transportation services to accommodate needs, demand, and market potential.
1.3 Collaborate with large employers, agencies, and municipalities to promote Transportation Demand Management (TDM) strategies, including emphasizing the environmental and health benefits of active transportation.
1.4 Promote and implement Safe Routes to School (SRTS) programs.
1.5 Evaluate the feasibility of broad car-sharing and bike-sharing programs.
1.6 Evaluate the feasibility for Bus Rapid Transit (BRT), light rail, or fixed transit service serving major employers/ destinations.

Representative Projects

- GTC Regional Trails Initiative update.
- Establish a Center City Circulator Service (Rochester) to serve daily commuters, visitors & tourists (GTC LRTP 2035).
- Construct the Rochester Intermodal Station for interregional rail & bus services at the site of the current Amtrak station (GTC LRTP 2035).
- Increase marketing and promotion of the Greater Rochester Regional Commuter Choice Program (roceasyride.org).
- Continue to conduct Active Transportation Summits to educate about & encourage active transportation options.

Broad Strategy T2—Promote livability corridors.	●	●	●	◐	●	◐

Representative Sub-Strategies / Project Ideas

2.1 Develop and implement a transportation technical assistance program to inform local planning and zoning boards about the need to support development that fully considers and integrates transportation needs.
2.2 Identify and implement demonstration projects that fully consider and integrate transportation needs (e.g., transit supportive, walkable).

Representative Projects

- Support Main Street revitalization projects that will emphasize local community engagement within their business attraction & revitalization efforts as well promoting center-based development. (G/FLRPC CEDS, FLREDC Strategic Plan, GTC LRTP 2035)
- Keuka Lake Waterfront project—consists of a mixed-use redevelopment of a 14.7-acre brownfield site at the north end of Keuka Lake & adjacent to historic Penn Yan. (FLREDC Strategic Plan)

Broad Strategy T3—Leverage transportation system assets to encourage economic development.	◐	◐	●	◐	●	●

Representative Sub-Strategies / Project Ideas

3.1 Educate the public and key stakeholders in the region about the importance of freight transportation.
3.2 Develop efficient connections between modes of freight transportation.
3.3 Preserve and improve access to the freight transportation system for existing and emerging industries.
3.4 Develop and promote recreational and cultural tourism projects.

Representative Projects

- Extend Erie Canalway Trail for 30 miles between towns of Lyons & Port Byron through the Montezuma National Wildlife Refuge. (FLREDC Strategic Plan)
- Construct a recreation trail that highlights the natural resources of Canandaigua Lake & will include access points, signage and waterway connections. (FLREDC Strategic Plan)
- Lyons Freight Village/Industrial Park—multi-modal, multi-business facility that will allow regional businesses to utilize the most cost effective transportation option for importing or exporting. (G/FLRPC CEDS, GTC Freight & Goods Movement Study)
- Determine feasibility of improvements noted in Seneca Army Depot Industrial Rail Facility Concept Plan. (G/FLRPC CEDS, GTC Freight & Goods Movement Study)
- Rebuild and repair Genesee & Wyoming Railroad rail line between Dansville and Mt. Morris to improve access to and encourage development of Dansville properties. (G/FLRPC CEDS, GTC Freight & Goods Movement Study)

Broad Strategy T4—Maintain and improve the functionality, safety and efficiency of the existing transportation infrastructure.	◐	◐	●	◐	●	◐

Representative Sub-Strategies / Project Ideas

4.1 Continue investment policies that prioritize preservation and maintenance projects.
4.2 Advance access management as part of rehabilitation and reconstruction projects.
4.3 Identify and implement Complete Streets recommendations where appropriate.
4.4 Improve the functionality of intersections and interchanges to increase safety, reduce delay and improve mobility.
4.5 Identify and implement Transportation System Management and Operations (TSMO) projects in the areas of technology, coordination and demand.

Representative Projects

- Replace the Portage Bridge on Norfolk Southern's Southern Tier rail line to eliminate a major weight & speed restriction. (GTC LRTP 2035, GTC Freight & Goods Movement Study, FLREDC Strategic Plan)
- NYS Route 96 Corridor, Victor, Ontario County—link traffic signals on the Route 96 corridor with the Regional Traffic Operations Center (RTOC) through fiber optic & wireless means. (GTC LRTP 2035)
- Technology Initiatives Driving Excellence (TIDE) for Regional Transit Service—continue the implementation of TIDE to improve operational efficiency & customer service. (GTC LRTP 2035)

Broad Strategy T5—Promote the development and adoption of alternative fuels and power sources.	◐	◐	●	◐	◐	◐

Representative Sub-Strategies / Project Ideas

5.1 Support research and development, deployment of pilot projects to validate technology and eventual commercialization of alternative fuel vehicle technology.
5.2 Promote the awareness of alternative fuel technology and encourage their adoption in public and private fleets.
5.3 Increase availability and geographic coverage of alternative fueling stations using electricity, hydrogen, bio-fuel, CNG, ethanol, LNG, or propane (including truck stop electrification facilities).

Representative Projects

- Install alternative fuel charging stations at service areas along the Thruway.
- Bio-Gas Powered Fuel Cell and Hydrogen Development Research—Golisano Institute for Sustainability to research potential for bio-gas from landfills and anaerobic digesters to power stationary fuel cells.
- Increase the number of truck stop electrification (TSE) facilities. (GTC LRTP 2035)

3.5 Land Use & Livable Communities

Overview

Connection to Story of Place

Settlement patterns in the Finger Lakes Region were shaped by the various elements outlined in the Story of Place. Fertile soils, forests and abundant waterways attracted settlers from eastern New York, New England, and Pennsylvania in the in the 1780's.

According to historical Census data, the region's population soared from about 1,000 in 1790 to 15,218 in 1800, and nearly 170,000 in 1810. By 1830, after the completion of the Erie Canal (1825), the region boasted over 261,400 residents. The region's earliest settlements were centered on its waterways. In locations such as Avon, Rochester and Seneca Falls, waterfalls offered means of powering mills. The region's small ports grew up along the Erie Canal, interspersed at the equivalent of a day's travel for a mule team.

The patterns and organizations of farms and farm communities of the Upper Midwest were first developed here. The large flat fields and abundant harvests called for new strategies for growing and distribution. Also, this region was the first where Europeans settled and farmed as free people rather than serfs, slaves, or indentured servants. They needed to invent new ways to organize and govern themselves. Innovations like The Grange (oldest American agricultural advocacy group), farm co-ops, and municipal home rule were the result.

Rochester, the region's largest community, prospered due to its location at the intersection of the Genesee River and the Erie Canal, along with the falls that could power industry. Other small towns and villages in the region developed as market towns (Main Streets) serving the local population and the residents of the rural agricultural land surrounding them. These hamlets, villages, and cities remain the historic, cultural, and social centers for the region's population. Following World War II, the increasing availability of automobiles made suburban growth possible, and Monroe and Ontario counties in particular saw strong suburban growth.

Existing Conditions: Assets and Sustainability

The Finger Lakes Region offers an exceptional quality of life. The region boasts a wealth of cultural and recreational activities, access to the highest quality and lowest cost health care system in the country and an abundance of fresh water. Housing costs are 30% below the national average for a diverse housing stock in good condition. The education system is excellent, with 10 high schools ranked among the best in the nation, and many highly ranked colleges and universities. The urban areas are among the least congested in the U.S., with an average commute of just 20 minutes.

The region's cultural center is the City of Rochester, host to museums of science and art, theatrical productions, the National Museum of Play at the Strong, Rochester Philharmonic

Orchestra, the George Eastman House and its International Museum of Photography and Film, and numerous festivals. The region is home to 20 New York State Parks, the most notable being Letchworth State Park nestled in southern Wyoming and Livingston Counties. The Monroe County parks system is extensive and home to many of the region's renowned festivals. Highland Park, designed by Fredrick Law Olmstead, with over 1,200 lilac bushes hosts the annual Lilac Festival which draws about 500,000 attendees.

One key factor to the livability of the region is directly related to the land. The region's scenic character and beautiful, varied landscape is one of its greatest competitive advantages. The Finger Lakes Region is synonymous with outdoor recreation, and its natural beauty is a tourism draw. The lakes, the Erie Canal, the Lake Ontario shoreline, the hills and gorges, its large cities, small towns, farms, vineyards and rural landscapes all contribute to the region's character, its economic base, and its quality of life.

The region currently has a fairly stable population of 1.2 million across its nine-counties. The area is diverse, being home to a number of urban areas, a large suburban population, and many smaller, rural

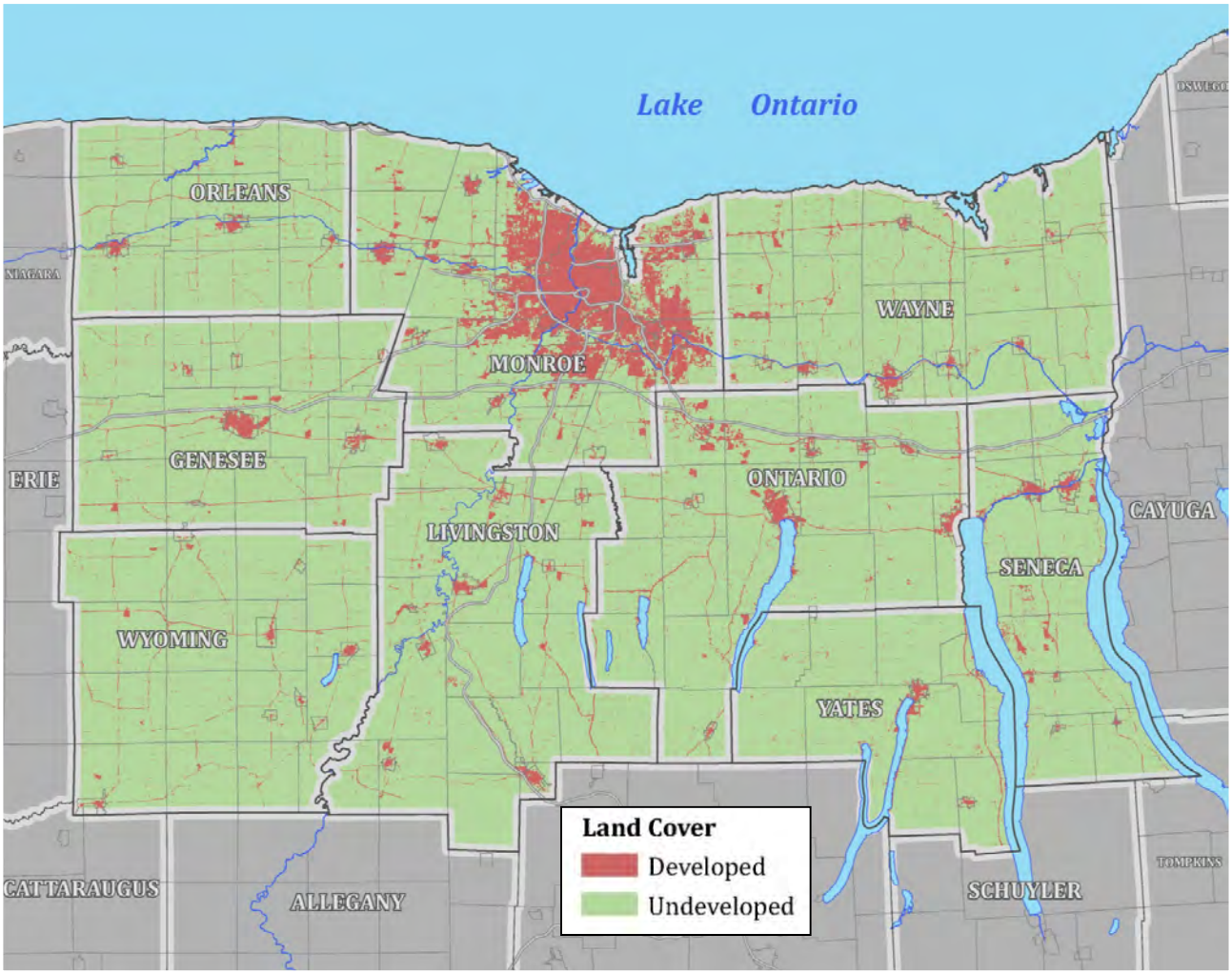


Figure 3-5: Developed and Undeveloped Lands (Source: National Land Cover Database)

communities. It has large expanses of open and agricultural land. Development densities vary across the region, with the highest density in Monroe County and lower densities in the more rural counties (see **Figure 3-5**).

Land development patterns vary over time and are dependent on market forces, demographic patterns and local land use policies. Since the mid-20th century, development patterns in the Finger Lakes region have resulted in job and housing growth concentrated at urban peripheries and not urban and rural centers.

Generalized Land Use Classifications
The GTC LRTP 2035 classified land areas based on their function and form (see **Figure 3-6**). The primary areas include:

Regional Urban Core
Comprised of the City of Rochester, this area includes the densest neighborhoods, the largest central business district, and major civic, cultural, and sports venues. The largest number of infill and redevelopment opportunities exists in the Regional Urban Core and the strength of this place is critical to the success of the overall region.

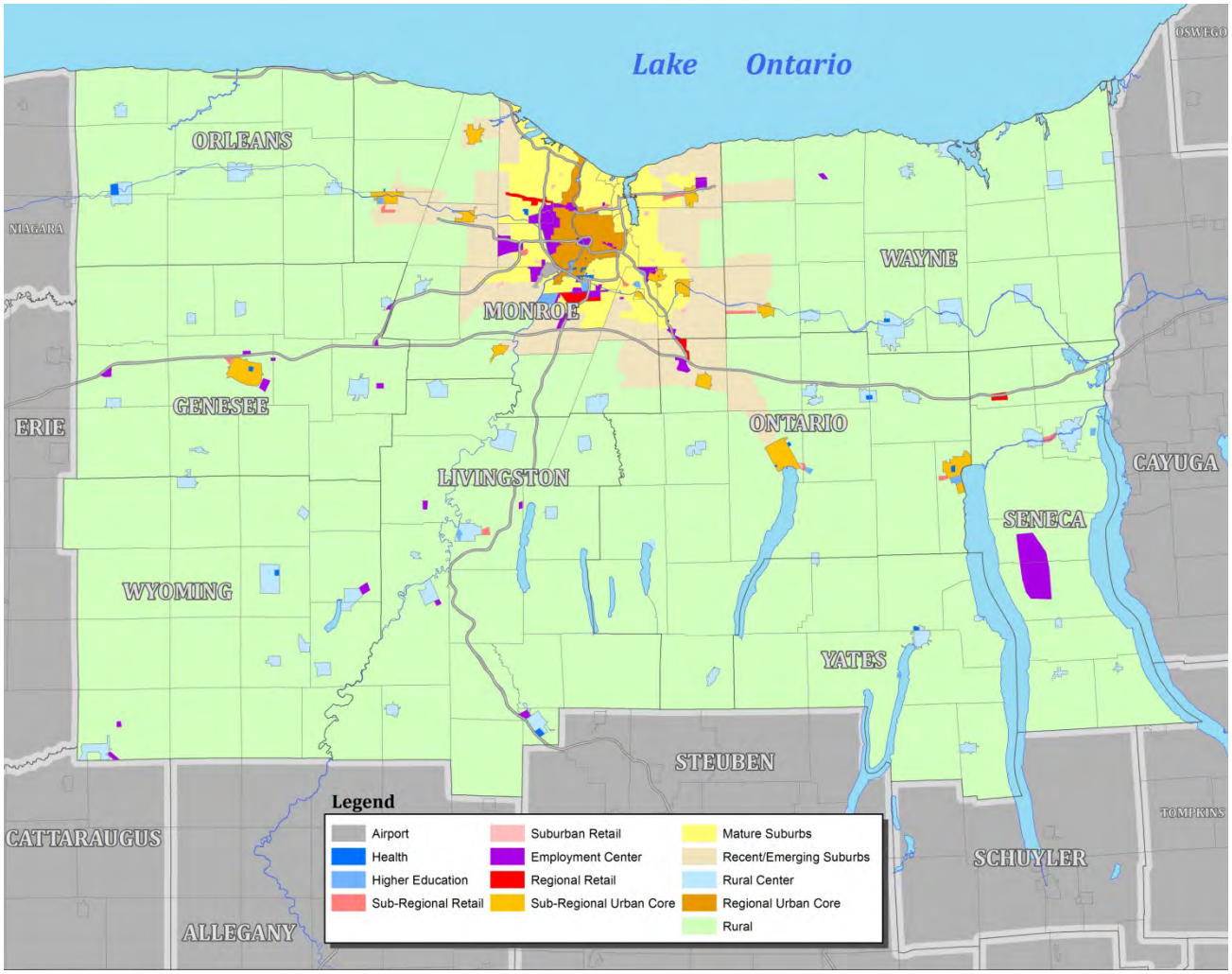


Figure 3-6: Generalized Land Use Classifications (Source: Genesee Transportation Council)

Sub-Regional Urban Cores - include the cities of Batavia, Genesee County; Canandaigua and Geneva, Ontario County; and the villages in the Census Bureau defined Rochester Urbanized Area. Development in these places includes mixed-use areas of population and employment that are less dense than the Regional Urban Core, but still include a concentration of historic, civic and cultural venues. Sub-Regional Urban Cores possess infill and redevelopment opportunities that can preserve and strengthen their neighborhoods and commercial districts.

Rural Centers
Includes villages and hamlets located outside the Census Bureau define Rochester Urbanized Areas. These Rural centers include mixed-use development and traditionally functioned as important service centers for the surrounding rural areas. As market trends have shifted, the level of commercial and civic uses they provide has decreased, and residents often must travel to other places for necessary employment, retail, and civic needs. Infill and redevelopment opportunities can help strengthen these areas, at a scale appropriate to their limited population and associated market opportunities. Examples of rural centers include Albion, Orleans County; Warsaw, Wyoming County; Seneca Falls, Seneca County and Penn Yan, Yates County.

Mature Suburbs
Includes areas in the Census Bureau-defined Rochester Urbanized Area that saw the earliest expansion of development (initially, residential) outside of the urban cores. Also known as "first ring suburbs," examples of mature suburbs include the towns of Irondequoit, East Rochester and Brighton in Monroe County. Population density is lower than in the urban cores but multi-family housing is more prevalent than in other places (including Recent/Emerging Suburbs). These areas are more mature, and typically have some neighborhood commercial areas and small businesses. Development tends to be more automobile-oriented. Infill and redevelopment opportunities exist, but to a lesser extent than in the urban cores. These areas are also good candidates for "placemaking" - redevelopment that introduces small convenience commercial areas and other mixed-uses to serve the residential neighborhoods, and retrofitting with sidewalks and other design changes to make them more walkable and attractive.

Recent/Emerging Suburbs
Includes the portions of towns in the Rochester Transportation Management Area that have seen the greatest amount of development over the last thirty years with residential development of a less dense character than the Urban Cores or Mature Suburbs. Examples of recent/emerging suburbs include the towns of Webster, and Perinton in Monroe County and Victor in Ontario County. The pattern of the spread of these suburbs is often linked to the extension of transportation infrastructure, such as Routes 531 and 490. Associated retail and commercial development in proportion to residential development has occurred in some but not all of these places, and is almost exclusively automobile-oriented. Uses are typically very segregated (e.g. separated residential neighborhoods, commercial office parks, shopping centers).

Rural Places
Includes towns with the lowest residential and employment densities and significant portions of their land devoted to critical agriculture and related agri-business uses. These areas are integral to the regional economy and food system, as well as forested lands and open space. Policies should discourage residential and associated retail and commercial development in rural places, and instead direct it toward rural centers. The majority of the region, outside Monroe County is classified as rural.

Employment Centers
Includes industrial and business parks that, due to their location and associated infrastructure (including transportation), have been and are planned to be developed to support the attraction and retention of large-scale employment opportunities. The largest employment center outside the urban core is the former Seneca Army

Depot in Seneca County. Other important destinations within the region include regional and sub-regional retail centers, colleges and major medical centers (hospitals, medical offices, clinics).

Sustainability Efforts

In 1940, 68% of the region's population lived in cities and villages (not counting hamlets). As of 2010, 36% of the region's population lived in existing centers (refer to **Table 3-1**). While the suburbs have continued to grow, the urban centers and rural villages experience the challenges that result from a decreasing population and tax base to support everyday life. As **Figure 3-7** illustrates, one result has been a concentration of poverty in these traditional centers, both urban and rural.

There are many initiatives in the region that promote more sustainable land development practices. There are efforts to revitalize many downtowns in the area in places such as Perry, Mount Morris, Geneseo, Canandaigua and Seneca Falls. These efforts are often public-private partnerships, working together to improve the built environment in support of social and economic benefits. Region-wide efforts to promote better stormwater management practices and agricultural protection plans support preservation of rural landscapes and their sustainable future. Communities as diverse as the City of Rochester, the Town of Williamson, and the Village of Clyde have adopted Complete Streets resolutions or policies, supporting the principle that roadways should also accommodate pedestrians, bicyclists and transit users. These and other policies help encourage active living and promote livable communities.

Table 3-1. Proportion of Residents Living in Existing Population Centers

County	Population		Households		Population in Centers*	
Genesee	60,079	4.9%	23,728	4.9%	25,753	42.9%
Livingston	65,393	5.4%	24,409	5.1%	29,420	45.0%
Monroe	744,344	61.2%	300,422	62.2%	260,730	35.0%
Ontario	107,931	8.9%	43,019	8.9%	36,939	34.2%
Orleans	42,883	3.5%	16,119	3.3%	14,513	33.8%
Seneca	35,251	2.9%	13,393	2.8%	14,277	40.5%
Wayne	93,772	7.7%	36,585	7.6%	31,142	33.2%
Wyoming	42,155	3.5%	15,501	3.2%	15,750	37.4%
Yates	25,348	2.1%	9,517	2.0%	7,887	31.1%
REGION	**1,217,156**	**100.0%**	**482,693**	**100.0%**	**436,411**	**35.9%**

* Centers are defined as all cities and villages, and certain Census Defined Places (CDPs) See attached list of Centers.

Source: *US Census Bureau, 2010*

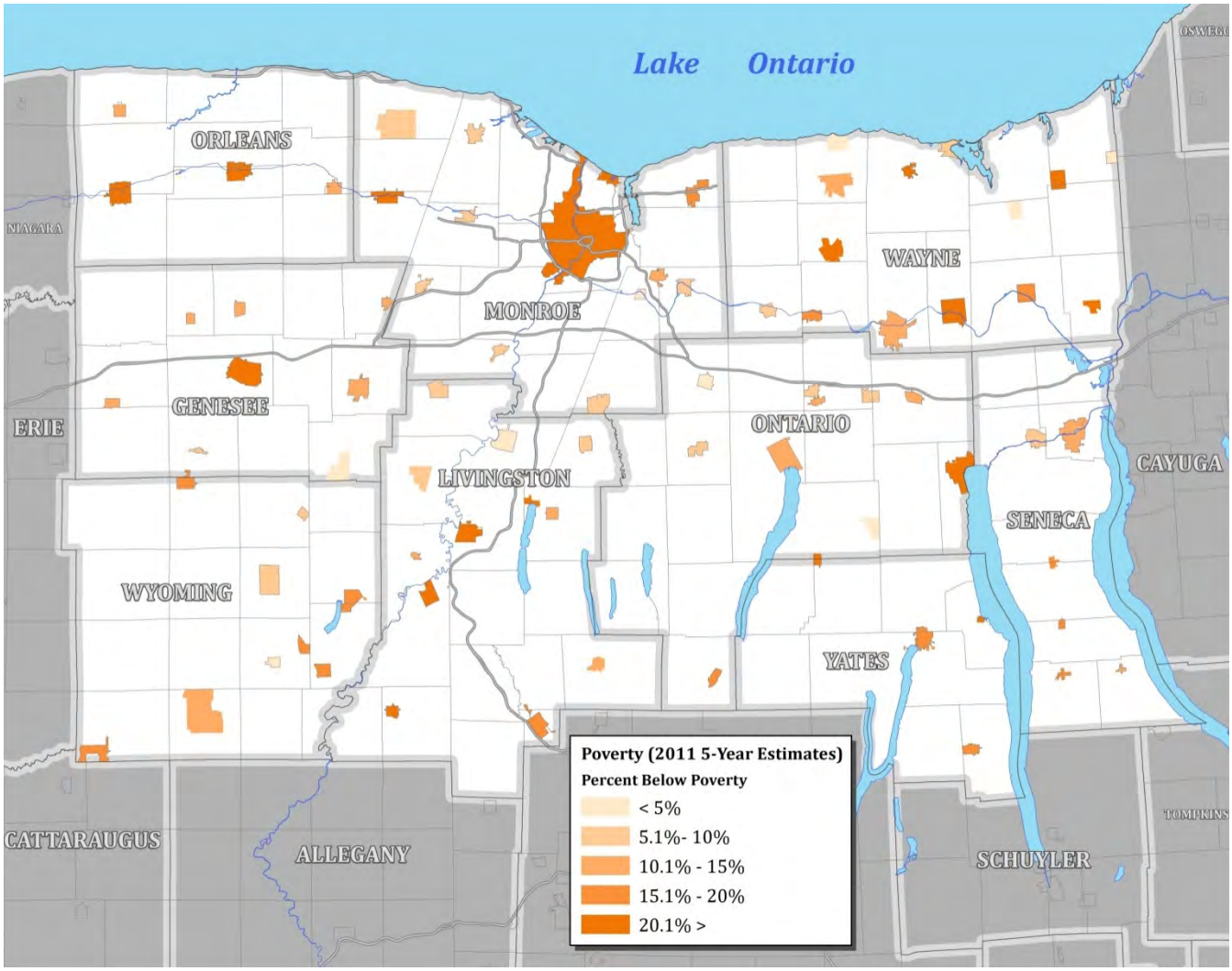


Figure 3-7: Poverty Concentration (Source: US Census, ACS 5-year estimate, 2007-2011)

Challenges, Variables, and Opportunities

The local communities in the Finger Lakes face a number of opportunities and challenges in their efforts toward more sustainable land use practices. Opportunities include the ability to protect local character, whether it is scenic rural landscapes, vibrant downtowns, or strong neighborhoods. Making sustainability more prominent in our land use decisions will support wiser fiscal choices, prioritizing investments in existing infrastructure and neighborhoods. It will also support 'place-making' initiatives, where our built environment is designed to make communities more attractive, appealing places to raise families, invest in businesses and enjoy a high quality of life.

As communities confront the opportunities and challenges of growth and development, they also come to recognize the value of improving their local planning, zoning laws and practices. The 190 cities, towns, and villages in the Finger Lakes Region have decision making authority at the local level under the New York Municipal Home Rule Law, which confers local control over property,

affairs, and governance, including the power to determine land use.

This local control tends to make dealing with issues that cross municipal boundaries more difficult, but it is also inherently democratic, placing the power over what happens in our communities in the hands of local residents. Home Rule allows municipalities significant discretion in developing their local comprehensive plans, land use regulations, and other land use controls, giving local governments the opportunity to incorporate more sustainable approaches to growth and development of their community.

Sustainable land use policies and practices reinforce community character, promote reinvestment in our built environment, and support compact development patterns and revitalization.

The process of developing a comprehensive plan entails building public support, and should promote accountability, equity, efficient and effective services, consistency, and livability. In adopting local land use policies and practices that reinforce the vision stated in their comprehensive plans, communities have the opportunity to reinforce community character, promote reinvestment in existing Main Streets and centers, and protect important natural features, helping the region continue to grow in a sustainable manner.

More creative techniques, such as form-based zoning, design standards and zoning overlays are tools that municipalities can use to support community goals for land use. Form-based codes, for example, focus more on the appearance of new development (e.g. building placement, form and design) rather than on allowed and prohibited uses. This approach gives localities greater flexibility in approving development that matches the community's vision, and controlling development that does not. These innovative techniques can support local goals such as the adaptive reuse of underutilized buildings, new housing models to accommodate changing family structures and better rural preservation techniques, such as conservation subdivisions.

There are challenges that constrain local municipalities' ability to address land use more sustainably. Many communities in the region do not have a comprehensive plan, or their Plans do not reflect today's realities. Keeping comprehensive plans up to date is one way to make sure policies reflect an accurate representation of the citizens' vision for their community.

Communities are always changing, and the tools we use to manage land use need to stay current. Zoning regulations in many communities are dated, and do not promote preferred development patterns. Controls put in place in order to protect communities from inappropriate mixes of uses (residential and industrial) can also prohibit beneficial mixes (residential and retail in downtowns), and result in single-use development patterns. Few zoning ordinances support compact, walkable, mixed-use communities – in other words, traditional neighborhoods. Parking requirements are often overly generous, while design standards may be insufficient.

In devising their comprehensive plans, zoning, subdivision, site plan, and other regulatory options, local governments need technical assistance, as outlined in Section 3.10, Governance. Local officials can benefit from training on how to develop more effective land use controls, how to incorporate more sustainable procedures and how to better enforce their provisions.

A significant challenge facing local governments is the lack of funding to prepare comprehensive plans or zoning updates. There is no source of assistance to help defray the investment in adopting better land use controls. Certain state programs, such as the Local Waterfront Revitalization Program or the

Brownfield Opportunity Area program can help a community plan comprehensively for a portion of the municipality, but these programs are intended for targeted areas of eligible communities, leaving many municipalities without any options.

A 2008 Department of State survey of NYS Land Use and Planning Regulations identified that local municipalities see emerging opportunities in areas of alternative energy, tourism, regional planning, connections between rural and urban areas, and agricultural and natural resource preservation. At the same time, property taxes, funding for water and sewer infrastructure, inadequate land use regulations, loss of active rural landscapes and growing cultural conflicts involving farmers and neighbors and urban versus rural values were raised as emerging challenges. The response to these issues must be rooted in the local context.

The region has the opportunity to direct growth in a more sustainable manner. Each community in the region has its own inherent value and character, whether it is a large city center, a small town village, an established suburb, or the rural countryside. Sustainable land use policies and practices reinforce community character, promote reinvestment in our built environment, and support compact development patterns and revitalization. These policies result in strong, vibrant communities, along with preservation of the open spaces, natural and scenic resources that make the Finger Lakes Region special and support its vitality.

Indicators and Targets

The Indicators for land use were chosen with the intent to easily measure progress toward a more sustainable approach. Stakeholder input had significant influence on the development of the Indicators. At meetings with stakeholders, attendees were asked to convey their vision for transportation, land use and livability for the future of the region, and to identify factors that could be used to measure the achievement of this vision. The Stakeholders felt that the availability of data was a key factor in choosing potential Indicators, in order to facilitate the ability to track and measure goal achievement. More in-depth discussions on land use focused heavily on the revitalization of centers and de-concentration of poverty. It was the opinion of the Stakeholders that the issue of equity was fundamental to the ability to attain a sustainable region. There was concern about the ability to effectively track and measure some of the data needed for the Indicators, particularly regarding the issue of what entity would be responsible for this action into the future. The Story of Place and the discussion of the Five Capitals elevated this discussion and brought to light the need for Indicators that could address the issues of concern and that could be more easily monitored.

Indicators

- Per capita land consumption
- Rate of poverty in population centers
- Proportion of residents living in existing population centers

The baseline values for these Indicators are shown in the Summary Sheet at the end of this section, as well as Targets for short (2020), mid (2035), and long-term (2050) timeframes. A table of representative Sub-strategies/Project Ideas and

Representative Projects that contribute to the implementation of these Broad Strategies is also provided in the Summary Sheet.

Sustainability Goal and Strategies

Land Use & Livable Communities Goal

Increase the sustainability and livability of the Finger Lakes Region by revitalizing the region's traditional centers, concentrating development in areas with existing infrastructure and services, and protecting agriculture and open space.

The following is a description of each Broad Strategy that supports the Land Use and Livable Communities Goal. Representative Sub-strategies are provided as examples of specific measurable activity that could be implemented to support the Broad Strategy. At the end of the Land Use & Livable Communities Section there is a Summary Sheet that provides a list of representative Sub-strategies/Project Ideas and Representative Projects that contribute to the implementation of these Broad Strategies.

Broad Strategy LU1 | Create healthy, safe and sustainable communities.

A sustainable region provides healthy, safe and vibrant communities where residents have access to a range of basic services. Urban, rural and suburban residents should have choices for transportation, housing, employment, shopping and recreational activities. Each resident should feel safe in their communities. They should have access to clean water, healthy food, quality education, and opportunities for active living, regardless of where in the region they live. These factors provide the baseline of livable communities.

This strategy is aligned with FLREDC Regional Strategy for "Investing in community, industrial development & infrastructure."

Prioritization
This Broad Strategy was evaluated as a high priority. Building sustainable communities aligns closely with the Vision and the following regional Guiding Principles:

- Improve accessibility, connectivity and mobility Improved public health
- Build sustainability capacity and understanding through outreach and education
- Reduce energy consumption (to reduce vehicle miles traveled and associated greenhouse gas emissions)

The intent of all the land use strategies is to promote and enhance local community character. Communities should assess their local comprehensive plans to ensure they incorporate sustainable land use approaches, are developed with community input, and recognize and reinforce community character.

This strategy is consistent with the FLREDC strategic plan progress report, Accelerating Our Transformation: Year 2. It is directly aligned with the following of four regional strategies:

- Invest in Community, Industrial Development & Infrastructure
  - Reinforce the identity, sense of place, and character of the area through downtown redevelopment, adaptive reuse of existing buildings and infrastructure, and historic preservation.
  - Foster the development of the region's industrial complexes and business parks for commercial or industrial use.
  - Enrich living environments by increasing access to affordable housing and mixed-income units, and promoting energy efficiency.
  - Seek to invest in water resource-related projects that enhance water access, retain water quality and increase water safety.
  - Improve access to credit and capital for revitalization and reinvestment.
  - Invest in key projects that will address transportation bottlenecks that are barriers

to growth; Strengthen transportation infrastructure through preservation and maintenance of the existing system.

This strategy is also supported by the GTC LRTP 2035 and implicitly in many local comprehensive plans.

Potential Resources
The implementation of this Broad Strategy falls most directly on individual municipalities. Other stakeholders would be involved, including the Genesee/Finger Lakes Regional Planning Council (G/FLRPC) and county planning offices that can provide technical assistance and support. The Genesee Transportation Council (GTC), local academic institutions and other educators can play a role, as can a wide range of advocacy organizations, such as ACT Rochester, as well as private businesses and private citizens.

Elements of this strategy could be fundable through Community Development Block Grants, subject to the requirements of that program. Several State programs, such as the NYS Brownfield Opportunity Area program, are a resource. Specific Sub-strategies may be fundable through New York State grant programs. For example, the development of green infrastructure is eligible for funding through the Environmental Facilities Corporation's Green Infrastructure Grant program, while NYS Parks offers grants to improve parks. Other potential funding sources include public-private partnerships, health organizations and foundations.

Challenges and Sub-strategies
A primary challenge to the success of this strategy is a lack of knowledge about sustainable practices. Several Sub-strategies have been developed to address this issue, including a recommendation to capitalize on the capacity at local educational institutions to raise public awareness of the value and importance of this issue; and a recommendation to continue to train local boards and officials to incorporate a more sustainable viewpoint in reviewing development proposals.

Sub-strategy 1.1 | *Increase the number of communities with new/updated comprehensive plans and zoning that incorporate climate change considerations and sustainability.*

New York State City Law §28-a, Town Law §272-a and Village Law 7-722 authorize local municipalities to develop and adopt comprehensive plans. Along with the power to regulate land use, the responsibility of undertaking comprehensive planning is considered to be among the most important powers and duties granted by the State Legislature to a city, town or village government to help promote health, safety and general welfare, with due consideration given to the needs of the people of the community.

A comprehensive plan sets forth vision for the future of a community, establishing goals, policies and recommendations to guide future growth in a manner and intensity that meets that vision. Therefore, it provides direction for local officials, and can foster cooperation among county, state and federal agencies when planning and implementing capital projects that can affect a community.

A comprehensive plan also provides a rational basis for decisions regarding zoning and other land use regulations. Although comprehensive plans and similar long range planning documents are commonly adopted by municipalities, plans can be developed at a county or regional level to provide overarching guidance for local communities that takes into account the relationships between communities.

Current and up-to-date planning documents are more likely to include policies and recommendations that support sustainability. As communities gain a greater understanding of the need to better manage growth and protect resources, as well as the benefits of working together to achieve their goals, new and/or updated comprehensive plans can represent a fundamental means for achievement. An example of this type of approach is Genesee County's Smart Growth Plan. The Plan is intended to encourage the revitalization

of villages and hamlet areas and protect valuable agricultural resources. The Plan has three goals:

1. Focus County resources to support economic development opportunities in the most promising locations
2. Encourage the revitalization of existing industrial areas, business districts, and residential neighborhoods in the City of Batavia and developed village areas
3. Protect farmland and the rural character of the countryside, and maintain the viability of agriculture

Comprehensive plans provide direction for community growth and identify appropriate areas for development and infrastructure investment. Up-to-date plans are more likely to address current and future needs and more sustainable approaches for growth.

Typically, comprehensive plans should be reviewed and, if necessary, amended every five to ten years to monitor implementation and ensure that they are keeping pace with the changes occurring in the community and region (e.g., population growth, infrastructure needs, development pressure, resource protection). Maintaining up-to-date comprehensive plans is the responsibility of local government officials. Town and Villages can utilize the technical assistance offered by county planning departments and the G/FLRPC for the preparation or amendment of comprehensive plans to promote more sustainability principles and approaches into these documents.

Sub-strategy 1.2 | *Use local academic institutions to raise public awareness of the value and importance of sustainability.*

This Sub-strategy is aligned with the FLREDC Regional Strategy to "Strengthen academic and industry partnerships."

There are a wealth of academic institutions in the region that can provide opportunities for ongoing education, public discussion and debate on the value and important of sustainability. Education is one of the best ways to embed sustainability into the local culture. Capitalizing on these academic resources to raise public awareness can help guide the future of the region's built environment.

An example of this is the Agriculture and Life Sciences Institute at Monroe Community College. This institute advocates on issues relating to land use, offers marketing education and provides academic instruction for existing and future agribusiness professionals, as well as landowners to apply knowledge to their specific area of interest. Their land use advocacy program also encompasses participatory assistance to farmers, landowners, municipalities and authorities through the interpretation of sustainable land use policy, comprehensive planning and regulations.

The implementation of this Sub-strategy is best accomplished through a partnership of public, private, and academic stakeholders. Municipal officials and private citizens can raise awareness of the resources available. The website created for this Plan (www.sustainable-fingerlakes.org) is another resource that can be used to better disseminate this information and raise public awareness of the value and importance of sustainability.

Sub-strategy 1.3 | *Invest in projects with green infrastructure to promote habitat restoration, improve water quality and reduce erosion.*

Green infrastructure is an approach that communities can choose to maintain healthy waters, provide multiple environmental benefits an d support sustainable places. Unlike single-purpose gray stormwater infrastructure that uses pipes to dispose of rainwater, green infrastructure uses vegetation and soil to manage rainwater where it falls. By weaving natural processes into the built environment, green infrastructure provides not only stormwater management, but also flood mitigation, air quality management and other environmental benefits. Green infrastructure offers resilient and affordable solutions that meet many of these objectives at once. This Sub-strategy aligns with Water Management Broad Strategy WM3.

The Rochester Museum and Science Center (RMSC) Green Innovations Project is undertaking a project that is focused on promoting cost effective green infrastructure to protect water quality and reduce reliance on expensive grey infrastructure through education of developers, municipal staff and the general public in green infrastructure practices. The purpose of this project is to create a single, high profile and accessible location where developers, municipal planners and the general public can see several different green infrastructure practices in action and be educated on their function and implementation. In this project, RMSC will design, install and operate a variety of full-scale, green infrastructure practices applicable to commercial development, such as porous asphalt and porous concrete, curb cuts/bioretention islands and bioretention/rain garden areas on its site in the City of Rochester in order to improve stormwater management and develop a regional green infrastructure educational center.

In addition, the I-Square development in the Town of Irondequoit, Monroe County, will utilize green infrastructure to support rainwater harvesting and reuse, porous pavement, rain gardens and green roofs as part of a larger redevelopment project. The I-Square development will revitalize 2.5 acres of empty storefronts, vacant office space and the rundown business district with new mixed-use retail, restaurants and professional space, and eco-friendly amenities.

As noted, green infrastructure is a more sustainable and affordable approach than standard systems for improving water quality, increasing habitat and managing stormwater flows. Implementation of this Sub-strategy will be most effective through partnerships of public and private entities and leveraging the technical resources of regional organizations including NYS P2I and the Stormwater Coalition of Monroe County. The public sector can implement green infrastructure projects on their own lands, but should also encourage greater use of this approach on the part of private developers for redevelopment and new development projects.

Sub-strategy 1.4 | *Develop a comprehensive system of sidewalk and trail networks and traffic calming measures linking major destinations and prioritizing human activity over traffic.*

Having a connected system of resources provides wide reaching benefits to communities and enables residents and visitors to the region easier access to cultural and natural resources. Such a system can result in healthier living (more recreational opportunities), as well as tourism and economic development.

This Sub-strategy coordinates with Transportation Broad Strategy T1 that supports alternative modes of transportation. Many communities are taking advantage of opportunities to create networks of trails and sidewalks, and undertake streetscaping and other improvements to calm traffic and improve the pedestrian environment. All of these efforts improve quality of life and make better, more sustainable communities.

Several communities in the region have completed or are planning on developing Bicycle and Pedestrian Master Plans that focus on bicycling and walking, and on bridging the gaps between existing systems. These include the City of Rochester and the Towns of Brighten, Chili, Penfield and Perinton. Another example is the Town of Ogden Heritage Trail and Park. This project involves the

construction a 1,600-foot extension of the Heritage Trail along the Erie Canal from the Village of Spencerport and the development of a canal side park (the first park in Ogden), including benches, shaded picnic tables and grills, visitor parking, and an 80-foot dock for boaters.

Municipalities should partner with the GTC to continue to develop and implement the recommended actions in the GTC Regional Trails Initiative, as well as municipal Bicycle and Pedestrian Master Plans.

Sub-strategy 1.5 | *Encourage creative strategies, such as farmers markets and small local markets, to provide access to affordable, healthy foods.*

One important factor for creating sustainable communities and improving public health is access and availability of affordable, healthy foods. There are neighborhoods and rural communities where residents, particularly low-income and seniors, have faced limited opportunities to purchase healthy food. Often without cars or convenient public transportation options, the residents in these areas must rely on expensive, fatty, processed foods that are sold at convenience and corner stores.

Areas that lack grocery stores are known as food deserts, and most exist in rural counties and in City of Rochester urban neighborhoods (in Rochester, more than 25,000 low-income residents live more than a mile from a grocery store). In some areas in the Finger Lakes, the problem is often not the cost of healthy food, but its accessibility. Residents, particularly in rural areas, may have to travel long distances to the grocery store, resulting in added expenses and vehicle miles traveled.

Policymakers and community advocates need to advance more innovative programs, policies and opportunities to provide access to affordable, healthy foods to residents in the Finger Lakes Region. Such policies could include encouraging the development of small groceries or corner stores in areas without convenient access to healthy foods, establishment of food banks and/or farmers markets, urban agriculture and community gardens. "Mobile markets" set up in vans similar to bookmobiles are another approach.

In the City of Rochester, the expansion of the Rochester Public Market is one example of an effort to improve access. This project helps provide greater access to healthy foods and strengthens the connection with the region's farmers and small businesses. In addition, Food Link (a Feeding America regional food bank), rescues and redistributes more than 13 million pounds of food annually to a network of 450 member agencies in a 10-county service area: Allegany, Genesee, Livingston, Monroe, Ontario, Orleans, Seneca, Wayne, Wyoming, and Yates Counties.

Access to healthy, affordable food is part of the strategy for keeping communities vital. Non-profit and community organizations have often taken the lead in implementing these types of programs. Governments can provide support and leadership, and make sure that local regulations do not present unnecessary barriers. Private enterprise, such as small grocers, can also be important partners.

Sub-strategy 1.6 | *Dedicate public safety resources to promote safe neighborhoods.*

Safety in our neighborhoods, as well as safety in our larger communities, is a high priority, and essential for establishing healthy, sustainable places. Crimes are often devastating to individual victims and usually disruptive to the community at-large. The impact of a high crime rate can make an area less attractive for people who are buying a home and lower not only the sale prices for those homes, but also property values in the neighborhood and community.

Strengthening and improving our centers is tied to public safety, as safety is one of the three key elements (services, safety and schools) that people consider when deciding where to locate. Efforts to revitalize centers will not be successful if there are real or perceived issues of safety.

Community leaders need to consider policies and programs aimed at creating safer living

environments and improving public safety. Policies and recommendations, such as Crime Prevention by Environmental Design, could be incorporated into comprehensive plans to address this issue. Crime Prevention by Environmental Design is a multi-disciplinary approach for deterring criminal behavior through urban design and the planning to help create new, and reform older, communities to help citizens and business owners feel safe at all hours. Planning for safer communities can lead to strengthened community centers.

Public safety is one of a number of the Finger Lakes region issues tracked by ACT Rochester, a community indicators program of Rochester Area Community Foundation. ACT Rochester identifies community resources and initiatives for public safety including:

- Mapping of data and trends to understand the location and patterns of crime in communities
- Building trust between local youth and the police
- Enhancing patrols in city neighborhoods and commercial areas through the Project Impact program
- Working with youth to prevent violence and crime through the Pathways to Peace program
- Working on fire prevention through the Juvenile Firesetter program
- Involving residents in actual field activities to reduce crime through the PAC-TAC program
- Recognizing citizens' efforts to improve their communities through the Rochester Police Department's and Ontario County Sheriff's Department's Do the Right Thing program, and the Irondequoit Police Department's Making a Difference in Irondequoit Award.

Stronger and safer community centers can lead to development and redevelopment and increased investment. Implementation of this Sub-strategy would be the responsibility of local officials and leaders, with assistance from the Counties and State. Local community development organizations, such as neighborhood watch groups, can also be instrumental in achieving this Sub-strategy.

Broad Strategy LU2 | Revitalize existing centers and prioritize the value of place making.

Revitalizing existing downtown centers, both urban (cities) and rural (villages and hamlets) fosters recognition of the region's Story of Place. These cities, villages, and hamlets are the historic settlements that made up the region. Most were developed in an era before the automobile. Their nodal development pattern, scale and mix of uses facilitates and promotes walking, biking, and transit.

Redirecting growth and development to centers can help address the disinvestment and blight experienced in some of these areas. It also helps create demand for the adaptive reuse of historic buildings and other structures in downtowns. These downtowns are surrounded by residential neighborhoods that supply a diversity of housing accommodating a range of ages, incomes and family types. Similarly, the region has many developed suburban areas with existing infrastructure that could benefit from 'place-making' to establish identifiable 'town centers', and promote livability and sustainability.

This Broad Strategy aligns with the FLREDC Regional Strategy "Invest in Community, Industrial Development & Infrastructure" and in particular its strategies to:

- Reinforce the identity, sense of place, and character of the area through downtown redevelopment, adaptive reuse of existing buildings and infrastructure, and historic preservation
- Foster the development of the region's industrial complexes and business parks for commercial or industrial use

Prioritization
This Broad Strategy scored well because center-focused development supports the Guiding Principles:

- Improves accessibility, connectivity and mobility.
- Improves public health
- Maintains, protects and improves existing infrastructure
- Promotes high quality economic growth (encourages economic development by leveraging the assets of the existing infrastructure).
- Reduce energy consumption (reducing vehicle miles traveled).

Potential Stakeholders and Resources
Again, primary implementation of this strategy will be led by local municipalities, with support from counties and the Genesee/Finger Lakes Regional Planning Council. The private sector will take the lead on most development projects, although often support from local and regional governmental partnerships will be needed to facilitate these efforts, as the experience of many large scale projects illustrates.

Funding for comprehensive planning and zoning updates can be partially funded with federal Community Development Block Grants and the NYS Brownfield Opportunity Area program. Projects can be funded through NYS Department of Homes and Community Renewal programs, including New York Main Street program; the Urban Initiative program and the Rural Area Revitalization program.

Partners for downtown redevelopment projects include business associations, chambers of commerce, non-profits and visitor bureaus. In some municipalities in the region, non-profits and quasi-governmental entities, such as heritage districts, are also potential partners. In most cases, this support will be in-kind services and partnerships, and not financial assistance. Other potential funding sources include public-private partnerships and foundations.

Challenges and Sub-strategies
There are a number of challenges to successful implementation of this strategy. Redevelopment tends to be more difficult, and can be more expensive, than development on greenfield sites. Re-using existing structures and concentrating development in areas where there is existing infrastructure is more sustainable; however, infill projects are often complex. There may be issues of brownfield contamination, land assembly issues or added costs associated with demolitions. Often, current zoning ordinances do not support the desired redevelopment goals, and matching the traditional development patterns of the surrounding neighborhood may require numerous variances. Access to credit is an issue, particularly for mixed-use buildings, and underwriting standards often limit creative approaches to redevelopment. Changing market trends, particularly for retail development, means downtowns may need to re-invent themselves.

Various Sub-strategies have been identified to help address these challenges. Encouraging ‘buy local’ campaigns, for example, can help Main Streets stay competitive in an era where consumers are likely to go to regional malls or the internet for their shopping. Investing in the ‘public realm’ (streetscapes, plazas, parks, etc.) to make centers more attractive and appealing is an important strategy. It facilitates ‘place-making’ and it can be an effective means of encouraging more private sector investment in both urban and rural downtowns, and can also be used to help retrofit suburban areas.

Sub-strategy 2.1 | *Encourage the adaptive reuse and/or historic preservation of existing buildings.*

The region has a wealth of attractive historic buildings, as well as other existing structures that are underutilized. Reusing these buildings is a more sustainable approach than new construction and can help keep established “Main Streets” vital. Municipalities can establish historic districts or assist with obtaining National Register of Historic Places designation. These designations confer tax

incentives for the preservation of historically significant buildings.

An example of this Sub-strategy is the Perry Main Street Association's program in the Village of Perry, Wyoming County. This group has focused on revitalizing Main Street in the Village through a variety of techniques, such as establishing a new National Register Downtown Historic District and various rehabilitation projects. A creative approach they take is a community investment corporation, known as Perry New York LLC, a for-profit group consisting of citizens who directly invest in the revitalization of the Village center. Perry New York LLC has redeveloped the Rufus Smith building as an anchor building for downtown and the building is now fully occupied. Their collaborative approach has made change in Perry a reality.

This Sub-strategy will require both public and private sector cooperation. Through education and outreach, municipalities should promote the use of innovative approaches like Perry's community investment corporation. Case studies of successful approaches could be highlighted on the Land Use and Livability page of the sustainable-fingerlakes.org website.

Sub-strategy 2.2 | *Take advantage of state brownfield programs to remediate brownfields.*

One impediment to revitalizing existing centers is the presence of brownfields - areas where there has been actual or suspected contamination from prior users. Communities should take advantage of available state programs to remediate and redevelop these properties for new uses. For specific properties, the NYSDEC has programs that help with site clean-ups.

The NYS Department of State has the Brownfield Opportunity Area program that takes a more comprehensive, area-wide approach to planning for redevelopment of former brownfields. An example of this strategy is the Former Vacuum Oil Refinery Brownfield Cleanup and Redevelopment (NYSDOS BOA). The City of Rochester is completing a land use and environmental planning process for this former Standard Oil Company of NY site located just south of downtown on the Genesee River across from the University of Rochester. The City is planning for cleanup and redevelopment of the long-under utilized 28 acre site, the center of a 150 acre Brownfield Opportunity Area and stretches over a mile of underdeveloped waterfront. The City is completing the BOA Nomination Study with the NYS Department of State and plans to proceed with several implementation actions in 2013.

The BOA process is identifying viable opportunities for waterfornt public access, recreation, and open space; private mixed-use and commercial redevelopment; and transportation improvments. This property represents a substantial economic and community development opportunity.

Remediation of brownfields can be a complex and expensive undertaking, and requires many partners. Local governments take the lead in planning for BOAs, but planning for a BOA involves a wide range of stakeholders, including private property owners, since many sites are privately owned. For clean-up of specific sites, public private partnerships may be the most effective approach, and public sector participation can help spur private investment.

Sub-strategy 2.3 | *Adopt zoning regulations and design standards to support infill development and create better places.*

Communities should ensure their zoning regulations and design standards support high quality development. Often, regulations unintentionally make infill development more difficult, due to frontage, minimum lot size, setback and other dimensional requirements that do not match surrounding development. Most communities have not yet adopted design standards that provide better guidance to developers about the style of development preferred in the community.

The Village of Arcade, Wyoming County, conducted an analysis of their zoning in their Strategic Plan for Downtown and identified a number of similar issues. New zoning regulations

in a 'traditional neighborhood' design would allow new buildings to be more in character with the historic downtown and encourage design that supports more activity in the downtown. The City of Saratoga Springs (outside the region) has adopted zoning districts for their downtown that explicitly focus on "high-quality design and materials consistent with the historic downtown form" and that promote "an active pedestrian oriented public realm."

Local land use regulations are the responsibility of individual municipalities. Counties can provide advice on 'best practices'. As discussed further in the section on Governance, there are a number of organizations, such as the New York Planning Federation and the G/FLRPC, who provide technical assistance on these issues.

Sub-strategy 2.4 | *Encourage "buy-local" campaigns to help support local businesses.*

Money spent at locally owned stores provides a better boost to the local economy, because more of the money remains in the community, in local taxes, payroll and expenditures. A "buy local" campaign helps encourage expenditures at local stores, which improves downtown centers and provides jobs. Local business leaders are also more likely to be local community leaders. Building support for local businesses and increasing local revenues helps to strengthen centers and improve economic vitality. It can also help to optimize small-scale business creation, retention and expansion, which is in line with the FLREDC Strategies.

An example of this Sub-strategy is downtown Canandaigua's 3/50 Project (Ontario County). This campaign asks participants to spend $50 monthly at three locally-owned stores in order to generate more sales for local businesses. Another example is the successful Shop In Livingston marketing campaign, which included the development of a cohesive brand identity and a series of advertisements urging residents in Livingston County to support local businesses. Additionally, Seneca County conducts an annual Finger Lakes Cork and Fork event. This two-day event offers participants an opportunity to sample and buy locally-made products from area farms, wineries, chefs, restaurants and other food producers in an effort to promote and support local businesses and industries.

Implementation of this strategy would be the responsibility of local community leaders and business development organizations, such as chambers of commerce. Financial and technical

assistance could be provided by the Counties and/or State.

Sub-strategy 2.5 | *Adopt a 'fix it first' policy for infrastructure investment.*

There is State and National focus on prioritizing the state of good repair for existing infrastructure, and the region explicitly has this policy for transportation funding, as noted in the GTC LRTP 2035. The region's roads, bridges, sewer and water lines are aging and in need of capital investment in order to remain viable. Spending scarce capital dollars on new infrastructure, which increases future operations and maintenance costs, is not fiscally sustainable. A 'fix it first' policy promotes infill and targets development and investment to areas with existing utility services, helping to revitalize our communities.

The National Governors Association has adopted a fix it first policy, targeting infrastructure investments to improve State economies and invigorate existing communities. Their analysis suggests this type of policy results in more efficient spending, increased economic competitiveness and enhance quality of life. This is also a principle of New York State under the State's Public Infrastructure Policy Act. Local, County and State agencies responsible for capital planning need to adopt this approach.

Sub-strategy 2.6 | *Consider public sector land banking, demolitions, land assembly, real property tax incentives and improved access to credit and capital to encourage private sector investment in centers.*

Public sector actions can help spur private sector investment. Communities should consider which strategic actions they can take to help revitalize their centers. What to prioritize varies by community, but various tools include targeted demolitions to clear land for redevelopment; tax incentives to reduce the cost of new private investment; and assistance with access to credit through means such as revolving loan funds.

This type of activity is being used successfully across the region. The Village and Town of Albion Comprehensive Plan (Orleans County) provides a range of tools and techniques, such as real property tax incentives and New York Main Street funding, to revitalize downtown and improve local conditions. As another example, the City of Geneva operates a revolving loan fund to support local businesses, and PathStone was funded under the latest round of FLREDC grants to establish a regional small business revolving loan fund.

Identifying the exact mix of incentives that will be the most effective in each community requires cooperation between the public sector and the private sector. Local municipalities, industrial development agencies, local development corporations and Main Street organizations are the types of stakeholders who will implement this Sub-strategy. Partnerships with the private sector will involve stakeholders such as business owners, property owners, banks and chambers of commerce.

Sub-strategy 2.7 | *Invest in improvements to the public realm (streetscapes, plazas, parks) in strategic areas to promote private sector investment.*

Strategic public sector investments to the public realm (the streets, parks, plazas, town squares, and other public spaces) can create a better environment for businesses, spur private sector investment, and

help revitalize communities. These improvements also tend to calm traffic and enhance facilities for pedestrians, such as sidewalks and crosswalks, making communities safer and more walkable. A number of communities in the Finger Lakes Region are making public improvements in streetscapes and other public spaces. Communities that received funding through the FLREDC for streetscape improvements include the Villages of Holley, Avon, Nunda, Victor, and Attica.

Implementation of this policy falls to Local, County and State governments. Main Street programs can also play an important role.

Sub-strategy 2.8 | *Invest in the development, promotion and preservation of cultural, artistic and historic assets.*

This Sub-strategy is aligned with the Tourism and Arts Sector strategy of the FLREDC. The FLREDC Strategic Plan also supports investments that improve recreation and cultural activities as a means of enhancing quality of life in the region.

Cultural, artistic and historic assets such as museums, galleries, historic sites and other civic institutions add vitality to centers and contribute to regional quality of life in both urban and rural centers. With the importance of tourism to the Finger Lakes Region, they also contribute to the economic health of the region. The Finger Lakes Region benefits from many of these types of facilities, and is beginning to establish creative linkages between them. For example, the Erie Canalway jointly promotes facilities in canal towns across the region and beyond.

Many communities are investing in cultural and historic resources. One example is the Finger Lakes Cultural and Natural History Museum in Branchport. This project involves the repurposing of a former elementary school, along with the construction of new facilities to establish a destination museum focusing on the environmental and cultural story of the Finger Lakes Region. The Finger Lakes Museum will generate additional visitation to the region, and also help promote the Story of Place for the region to residents and visitors.

Municipalities should work together with local non-profits, arts organizations, and the State to help implement this Sub-strategy. Financial support for capital project and/or programming; assistance with promotion; and assistance with grants are ways to invest in these assets.

Broad Strategy LU3 | Support and preserve rural centers and the character of rural areas.

Closely related to the revitalization of centers is the protection of rural character. Growth directed toward centers (including near rural hamlets and villages) alleviates pressure for development in the region's rural areas, helping to preserve valuable farmland, open lands, and natural resources. Open space has its own inherent value. It provides ecological, environmental, scenic, and agricultural benefits. Given the importance of agriculture and tourism in the Finger Lakes Region, open space also has direct impacts on local economies.

Land use policies should seek to protect important open spaces, and manage new development in a manner that respects the character of rural areas. The extension of new infrastructure, particularly roads and sewer, into rural areas, should be discouraged unless there are compelling reasons where it is merited. Many communities, looking narrowly at the issue of tax base, fail to appreciate the importance and value of undeveloped land. An explicit understanding of these benefits will help promote a greater sense of stewardship over rural assets for the region and refocus efforts on revitalizing centers.

This strategy is aligned with the following FLREDC Regional and Sector strategies:

- Invest in Community, Industrial Development & Infrastructure
- Agriculture and Food Processing
- Tourism and the Arts

Prioritization
The preservation of rural character aligns with the following Regional Guiding Principles:

- Respect local planning efforts and retain individual community character
- Preserve, protect and improve natural resources
- Promote robust, high quality economic growth (across a number of sectors, such as agriculture and tourism)

Protection of natural resources is also an important means of helping to improve the resiliency of the region for disaster mitigation. Protection of rural character will not directly affect greenhouse gas emissions, but rural landscapes do serve an important role in carbon capture. It protects public health and improves the connectivity of environmental features, such as habitats. Because this Broad Strategy aligns well with these principles, it scored well in the evaluation.

Potential Stakeholders and Resources
In addition to local governments, other partners in this endeavor include land trusts, conservation organizations, environmental groups and the agricultural community. The Finger Lakes Land Trust provides technical assistance, outreach and events to raise awareness and public support for this issue. Other non-profits organizations and interest groups, such as Parks & Trails NY and the American Farmland Trust are also potential resources.

Some funds are available through NYS Department of Environmental Conservation's Environmental Protection Fund. Eligible activities include conservation easements, support of land trusts and purchase of open space. The NYS Department of Agriculture and Markets funds Agricultural and Farmland Protection Plans and implementation activities for those plans, such as improved land use regulations.

Challenges and Sub-strategies
A significant challenge to effective stewardship over the region's rural character is the need for education on the costs and benefits of development and the identification of tools that balance these issues. From a sustainability perspective, the cost benefit analysis needs to consider the fiscal, environmental and social/cultural implications of development. Fiscal considerations include the additional tax base but also the cost to provide additional municipal services. The evaluation of environmental and social considerations should consider the benefit of additional services to the community and job creation potential. It also needs to consider both the environmental impacts of the development and the opportunity costs of undeveloped land.

An inventory of lands and parcels of significant ecological and/or scenic value can help policy makers better understand which parcels have the greatest resource value. The value of these resources should include the potential for carbon sequestration, protection of water quality and reduced reliance on expensive grey infrastructure, and the scenic value which define the region's character, while benefitting residents and regional tourism. Tools to balance these issues are presented in the land use Sub-strategies as well as in the sections on Governance, Water Quality and Agriculture & Forestry.

Sub-strategy 3.1 | *Implement land use tools such as purchase of development rights (PDR), transfer of development rights (TDR), conservation easements and other incentives to preserve agricultural lands, open spaces corridors, cultural and historic assets and natural features.*

Several communities in the region have adopted land use tools to preserve agriculture, open space, and community character. Tools such as purchase of development rights (PDR) enable communities to acquire the development rights for lands with significant resource value to remain undeveloped. Transfer of development rights (TDR) programs

allow landowners to transfer the right to develop from one parcel to another. TDR can be used to shift development from agricultural or resource-rich areas to designated growth zones closer to municipal services. An example of a PDR is the "Greenprint for Pittsford's Future," which has been hailed as a national model for community conservation. This plan, adopted in 1996, will preserve 67% of the undeveloped lands remaining in Pittsford including 1,200 acres of prime and unique farmland. The Greenprint has won the following honors:

- Outstanding Planning Project, Planning Implementation, American Planning Association, New York Upstate Chapter, 1996
- Current Topics Award for Preservation of Places, American Planning Association National Planning Awards, 1998
- Alexander Calder Conservation Award, The Conservation Fund, 1999

Conservation easements are legal agreements that restrict the amount and type of development on a parcel. They can protect lands with significant resource or agricultural value. The implementation of this Sub-strategy is the responsibility of local municipalities, with financial and technical support provided by the Counties and/or State. Land banks and conservation organizations are also valuable partners.

Sub-strategy 3.2 | *Inventory lands and parcels of significant ecological and/or scenic value (hillsides, forested lands, shorelines), and prioritize and coordinate with local land conservancies to protect highest value lands.*

Inventorying important resources within a municipality provides the community with a better understanding of existing assets in order to balance development with environmental protection. An example of this strategy is the Natural Resources Inventory (NRI) being conducted by the Town of Victor, Ontario County. The NRI is a statistical survey of land use and natural resource conditions and trends. The intent of the NRI is to:

- Facilitate Green Infrastructure-based land use planning
- Provide a process to catalogue and describe natural resources in the Town
- Provide a natural resource guide for use in implementing the Town's Comprehensive Plan

Phase I of the NRI documented the County's geology, water resources, soils, plantscape, and open space. Phase II focused on describing co-occurrence of five distinct natural resources. Phase III, to take place in 2013, will include a wildlife habitat identification and assessment; steep slope appraisal; open space index; and development of a NRI reference manual.

These natural resource assets are essential for the tourism based economic activity. Local community leaders and municipal officials would be responsible for developing these resource inventories, with assistance from local resident volunteers. Financial and technical assistance could be provided by the Counties and/or State.

Sub-strategy 3.3 | *Educate the public about the ecological and economic value of natural systems for sustainability and resiliency.*

Sustainable development practices avoid having adverse effects on natural systems. They avoid development in wetlands, wildlife habitat areas, or flood prone areas. They incorporate measures to protect local flora and fauna and water quality. Educational programs that integrate an understanding of ecology and environmental stewardship into planning and design knowledge and practices can help promote greater use of these sustainable practices. The result will be sustainable development located in the right places that protects important natural resources.

An example of a project that supports this Sub-strategy is the Strategy for a Sustainable Keuka Lake. This project is designed to advance the Keuka Lake Watershed Land Use Planning Guide through the development of resources for municipalities, including model laws, land use training and public outreach, the creation of a water quality internship program, watershed, zoning, infrastructure and viewshed mapping, and an agricultural assessment. The guide includes recommendations aimed at focusing new public and private investment in designated growth areas, protecting working agricultural land and undeveloped open spaces from poorly designed development projects, and ensuring that any new development that does take place in the watershed is environmentally sound and respectful of the character and scale of existing development conditions.

Another example is the Finger Lakes Institute (FLI) which is dedicated to the promotion of environmental research and education about the Finger Lakes and surrounding environments. In collaboration with regional environmental partners and state and local government offices, the Institute fosters environmentally-sound development practices throughout the region, and disseminates accumulated knowledge to the public.

A variety of entities could be involved with educational programs, such as local governments, educational institutions and local interest groups, such as conservation clubs. Because tourism in the Finger Lakes Region is closely tied to its natural beauty, this Sub-strategy is aligned with the Tourism and Arts Sector Strategy of the FLREDC. The FLREDC Strategic Plan also supports investments that improve recreation and cultural activities as a means of enhancing quality of life in the region.

Sub-strategy 3.4 | *Educate policy makers about true fiscal costs of development, including operations and maintenance.*

Communities pay a high price for unplanned growth. New development results in immediate additional tax revenues, but also increases the demand for public services. Scattered development can result in increased demands for costly services in a pattern that makes it less efficient to provide these services. Policy makers often do not understand the fiscal costs associated with development. It is important to consider not only the capital costs of installing additional infrastructure, but on-going operations and maintenance costs, including future repair or replacement costs when the systems reach the end of their expected life cycle. The American Farmland Trust undertakes Cost of Community Services studies that use a case study approach to analyze the fiscal contributions of existing local land uses. These studies provide a snapshot in time of costs versus revenues for each type of land use to help local officials make informed land use and policy decisions.

Local policy makers need to seek out better information about the costs of development, and looking at the full life cycle of costs. This is often

beyond the capability of local governments. Counties and the State could provide some assistance, as can groups such as the American Farmland Trust.

Broad Strategy LU4 | Encourage diversity of our communities to bring about a greater mixture of uses, people, ages and incomes.

To promote a sustainable, resilient region, there should be a greater emphasis on enhancing diversity, including a mixture of uses, people, ages, and incomes. By supporting a "finer grain" of development, we encourage "complete" communities where people have access to a range of housing and transportation choices, good jobs, healthy food, nearby parks and recreation, cultural amenities, public services, and opportunities for civic engagement. They also support the cultural, recreational, and civic amenities that help enhance quality of life. The issue of diversity also addresses the need for accommodations for people of all ages in a region that are aging. Diversity strengthens the fabric of local communities, making them more vital, resilient places.

This strategy is aligned with the FLREDC Regional Strategy to:

- Invest in Community, Industrial Development & Infrastructure
  - Enrich living environments by increasing access to affordable housing and mixed-income units, and promoting energy efficiency.

Prioritization
The diversity Broad Strategy aligns with the Regional Guiding Principles in that it enhances both human and social capital, builds networks and partnerships and brings people together through a shared identity and common goals. It promotes a more equitable distribution of costs and benefits and can lead to higher quality economic growth. More diverse communities are more likely to have access to jobs and services locally, meaning commutes can be shorter, reducing the greenhouse gas impacts of transportation. Housing programs improve the building stock, reducing the greenhouse gas emissions from residential energy consumption. Diversity helps reduce concentrations of poverty, resulting in a healthier economy and better access to job opportunities.

Potential Stakeholders and Resources
Local governments can partner with many stakeholders for implementation of this strategy. NYS Department of Homes and Community Renewal (DHCR) provides funding for affordable housing and streetscape improvements. Their New York Main Street program, the Urban Initiatives program and the Rural Area Revitalization Projects program support are potential funding sources. Federal Community Development Block Grants are a resource for areas that qualify. The NYS Office for the Aging provides technical assistance on issues related to an aging population, including resources on land use regulations. Additional resources include local housing organizations, community development corporations (CDCs), and non-profits such as ACT Rochester.

Challenges and Sub-strategies
Changing demographics in the Finger Lakes region represent a challenge to individual communities. The population is aging and the built environment is not necessarily designed to accommodate evolving needs. Sub-strategies to encourage mixed-use development, enable greater housing choice and support aging in place are designed to address this issue.

Sub-strategy 4.1 | *Develop specific vision plans for community centers, focused on good urban design and access to parks, transportation choices, cultural assets, jobs and services to develop "complete communities".*

Community visioning is the process of developing consensus on the desirable future for a community, and determining what is necessary to achieve it. A vision plan or statement is a strategic framework that captures what community members most value about their community, and the shared image of what they want it to become. Visioning can be part of the community-wide comprehensive planning process or a stand-alone exercise aimed at improving a specific part of a community, such as a downtown center, to guide future growth and investment. Visioning plans or statements can inspire community members to work together and provide community leaders and local boards the long-term-comprehensive perspective necessary to make rational and sustainable decisions on community issues as they arise. Community vision statements are typically crafted through a collaborative process that involves a wide variety of community residents, stakeholders and elected officials.

Vision planning aligns with the strategies of the FLREDC because they can support and result in targeted development or redevelopment and infrastructure investment. Vision planning can result in stronger, more sustainable communities because they incorporate broad based input and commitment.
An example of this strategy is the community vision statement and conceptual framework established for the Village of Fairport as part of its 2007 Comprehensive Plan. Through interviews and a community survey, a vision was established around the following focus areas to identify issues to be addressed, opportunities to be capitalized on, and assets to protect:

- Neighborhood preservation & housing, including options for seniors
- Canal district
- Parks, recreation & open space
- Transportation & infrastructure
- Government, community services, & facilities

Implementation of this strategy would be the responsibility of local municipalities. Technical assistance could be provided by the G/FLRPC, New York Planning Federation and the Rochester Regional Community Design Center.

Sub-strategy 4.2 | *Work with non-profit housing organizations to provide programs, such as home repair assistance, tool libraries, housing education and energy-efficiency programs to enable lower-income homeowners to stay in their homes and maintain them in good condition.*

Keeping communities strong and diverse is a key factor to their overall health and sustainability. It is important to provide the resources necessary to enable homeowners the ability to repair and improve their properties to allow them to remain in their homes, maintain the integrity and value of their properties and keep their neighborhoods vital. This approach promotes vital, income-diverse neighborhoods. An example of this strategy is working with PathStone, a private, not-for-profit regional community development and human service organization. PathStone's Rochester office provides the following services:

- Weatherization Assistance Program
- NYSERDA Assisted Home Energy Performance
- Handyman/Mini-repair Program
- Rehabilitation Assistance
  - HOME Canandaigua
  - HOME Orleans
  - HOME Rochester

County Offices for the Aging also often offer community service programs such as weatherization and access to HEAP (Home Energy Assistance Program).

Implementation will be accomplished through a coalition of government, non-profit, and community groups.

Sub-strategy 4.3 | *Update municipal comprehensive plans, adopt flexible zoning regulations and encourage "Universal Design" to accommodate mixed-uses, affordable housing, seniors and youth programs to encourage diversity.*

In order to achieve a more sustainable future, local regulatory policies, practices, and processes should be flexible and promote sustainability, equity, and innovation. Diversity promotes greater resilience, by providing a wider range of choices in terms of housing type and price. This approach promotes development that addresses the needs of more residents, businesses, and other users and results in more vital, diverse neighborhoods. An example of this Sub-strategy is the Town of Greece's Multiple-Family Residential Senior Citizen District, which is intended to provide a variety of housing options for senior citizens. It allows one-family, two-family, and multiple-family dwellings, adult day-care centers and senior citizen residential facilities. With limits, it also allows some non-residential uses.

This Sub-strategy is the responsibility of local government officials. Cities, Towns, and Villages can utilize the technical assistance offered by the G/FLRPC for the preparation or amendment of comprehensive plans and the adoption of more flexible zoning regulations. They can also partner with county planning offices and other stakeholders to promote more sustainability principles and approaches into these documents.

Sub-strategy 4.4 | *Eliminate funding and regulatory barriers that constrain the ability to do mixed-use development.*

It is often difficult to accomplish mixed-use development due to funding and regulatory barriers. One barrier is that local zoning codes often do not easily accommodate mixed-uses, because they establish distinct districts that separate land uses (residential, commercial), and do not allow the flexibility of more than one type of use. Updating the local zoning code to allow appropriate mixes in targeted locations can facilitate redevelopment of downtown areas.

For example, allowing residential apartments over retail storefronts is a traditional development pattern that is not always allowed under older zoning codes. While existing businesses may be 'grandfathered,' new development may be prohibited. Approaches such as form-based codes concentrate more on the appearance ('form') of development, and do not have as many restrictions on use.

Mixed-use districts also provide greater flexibility to accommodate different uses. The Town of Greece, Monroe County, developed the Dewey Avenue Mixed-Use District to "foster a combination of appropriately scaled land uses and activities" with the intent of revitalizing this traditional "Main Street" area of the Town. The new zoning is designed to increase the vitality of the area by establishing better connections between businesses and residents. It also includes provisions to improve walkability and smooth traffic flow, as well as improve the aesthetics of the Dewey Avenue corridor.

This Sub-strategy is the responsibility of local municipalities, who can seek technical assistance from the G/FLRPC, as well as county governments.

Sub-strategy 4.5 | *Support programs, such as home-care, respite care and assistance with home modifications that facilitate aging in place.*

As the population of the region ages, there are accommodations that can be taken to make it easier for residents to remain in their homes (aging in place). Respite care, social programs, and in-home services such as health care aides, assistance with housekeeping, and Meals on Wheels allow older residents to maintain their independence. In the Finger Lakes Region, programs such as the Community Place in Rochester offer care management services in support of older residents, helping to link people with the services (healthcare, housekeeping, social, etc.) that they need to continue living independently. Community Place also provides socialization programs, such as Senior Companion Program and Foster Grandparenting to improve seniors' quality of life. County Offices for the Aging provide respite care, transportation assistance, and other services in some areas of the region.

Local social service agencies, County and State Offices for the Aging, and community-based organizations are important partners for implementation.

Sub-strategy 4.6 | *Invest in strong local school systems to attract and retain young families.*

Attracting and retaining young families helps keep communities diverse and vital. Access to a good education and the quality of the local school system is an important component of their decision about where to live. Programs that promote strong local school systems will help alleviate the concentration of poverty seen in many of the region's centers and support the development of the future regional workforce.

Programs such as the Rochester Education Foundation provide programs and resources to improve the quality of educational offerings in disadvantaged areas. Donations of books, money, and musical instruments increase the resources available. These programs recognize that strong schools will benefit the wider region by creating more economic opportunities for students.

Collaboration between local school boards and local municipal officials is needed to accomplish this Sub-strategy, with the support of New York State.

Land Use and Livable Communities

Subject Area Goal

Increase the sustainability and livability of the Finger Lakes region by revitalizing the region's traditional centers, concentrating development in areas with existing infrastructure and services, and protecting undeveloped lands from urban encroachment.

Opportunities

- Protection of farmland and rural/scenic character
- Revitalization of cities, villages, and rural hamlets
- Cost savings on infrastructure and service delivery
- Reverse disinvestment in existing neighborhoods, infrastructure
- Pendulum beginning to swing back to desire for authentic, close-knit, walkable communities
- Human-scaled design supports local/small businesses, diversity of housing and cultural amenities, transportation options
- More equitable/efficient/sustainable tax structures
- Educating policy makers and the public about transportation-land use connection

Challenges

- Home rule limits effectiveness of regional planning
- Inefficient land use pattern results in high energy consumption and high cost of maintaining infrastructure/services
- Land use policies that promote auto-oriented, single-use development
- Competing priorities of adjacent communities
- Struggling urban areas discourage people from locating in walkable/bikeable neighborhoods
- Access to funding for comprehensive plans, zoning codes, design standards, etc.
- Conventional development costs are largely externalized and thus overlooked in favor of short-term benefits
- Development pressure threatens long-term viability of farms needed for sustainable food system

Variables

- Fuel costs
- Land values based on evolving housing demand and tax structures
- Demographic trends
- State/federal funding dedicated to local/regional planning initiatives
- Local land use policies

Indicators and Targets

Indicators	Broad Strategies Measured	Baseline Value (2010)	Short-Term Target* (2020)	Mid-Term Target* (2035)	Long-Term Target* (2050)
Per capita land consumption (#3A—NYSERDA Required)	LU1, LU3	0.25 acres	maintain baseline	-3%	-5%
Rate of poverty in population centers	LU1, LU2, LU4	22%	maintain baseline	-3%	-5%
Proportion of residents living in existing population centers	LU1, LU2	36%	maintain baseline	+ 2% (38%)	+ 4% (40%)

*All % reductions or increases are related to the 2010 baseline values, not the previous target.

Land Use and Livable Communities

Subject Area Goal

Increase the sustainability and livability of the Finger Lakes region by revitalizing the region's traditional centers, concentrating development in areas with existing infrastructure and services, and protecting undeveloped lands from urban encroachment.

Priority Broad Strategies

Connection with criteria: ● Strong ◐ Moderate ○ Marginal

	Evaluation Criteria					
	Benefits Multiple Subject Areas	Benefits Multiple Capitals	Benefits Multiple Communities	Implementation Feasibility	Consistent with Planning Efforts	Financial Feasibility
Broad Strategy LU1—**Create healthy, safe and sustainable communities.**	●	●	●	◐	●	◐
Broad Strategy LU2—**Revitalize existing centers and prioritize the value of place making.**	●	◐	●	◐	●	◐

Broad Strategy LU1—Create healthy, safe and sustainable communities.

Representative Sub-Strategies / Project Ideas

1.1 Increase the number of communities with new/updated Comprehensive Plans and zoning that incorporate climate change considerations and sustainability.

1.2 Use local academic institutions to raise public awareness of the value and importance of sustainability.

1.3 Invest in projects with green infrastructure to promote habitat restoration, improve water quality and reduce erosion.

1.4 Develop a comprehensive system of sidewalk and trail networks and traffic calming measures linking major destinations and prioritizing human activity over traffic.

1.5 Encourage creative strategies, such as farmers markets and small local markets, to provide access to affordable, healthy foods.

1.6 Dedicate public safety resources to promote safe neighborhoods.

Representative Projects

- Lyons to Port Byron Canalway Trail—extend Erie Canalway Trail along a 30-mile segment between Lyons and Port Byron, improving continuity of the trail system. (FLREDC Strategic Plan)
- FoodLink Food Hub—increased capacity in food processing, storage and distribution to improve regional food supply to institutions and local corner stores. (FLREDC Strategic Plan)
- Rochester Public Market—enhancements to the public market, strengthen ties to region's farmers, increases access to healthy foods for City resident. (FLREDC Strategic Plan)
- GardenAerial Project—create an "eco-district" with landscaping along the gorge in Rochester's High Falls neighborhood. Project includes landscaped pedestrian bridges overlooking High Falls, trail extensions, public education and community engagement.
- Community Green "Living Classroom" and curriculum development—educational outreach for K-12 students with hands on exposure to sustainability.

Broad Strategy LU2—Revitalize existing centers and prioritize the value of place making.

Representative Sub-Strategies / Project Ideas

2.1 Encourage the adaptive reuse and/or historic preservation of existing buildings.

2.2 Take advantage of state brownfield programs to remediate brownfields.

2.3 Adopt zoning regulations and design standards to support infill development and create better places.

2.4 Encourage "buy-local" campaigns to help support local businesses.

2.5 Adopt a 'fix it first' policy for infrastructure investment.

2.6 Consider public sector land banking, demolitions, land assembly, real property tax incentives and improved access to credit and capital to encourage private sector investment in centers.

2.7 Invest in improvements to the public realm (streetscapes, plazas, parks) in strategic areas to promote private sector investment.

2.8 Invest in the development, promotion and preservation of cultural, artistic and historic assets.

Representative Projects

- Midtown Redevelopment and Tower—mixed, office, residential, hotel and retail space. Includes reestablishing the traditional street grid and the adaptive reuse of Midtown Tower as a cornerstone of downtown revitalization. (FLREDC Strategic Plan)
- Penn Yan/ Keuka Lake Waterfront Development—mixed –use redevelopment of a former brownfield into 170,000 square feet of retail, office, restaurant, residential and hotel uses at the northern end of Keuka Lake, adjacent to the historic village of Penn Yan. (FLREDC Strategic Plan)
- Finger Lakes Museum—redevelopment of a former elementary school in Branchport and construction of additional facilities to establish a destination museum focusing on the environmental and cultural story of the Finger Lakes region. (FLREDC Strategic Plan)
- I-Square—redevelopment of vacant and under-utilized lands in Irondequoit into a mixed use "town center" development. (FLREDC Strategic Plan)
- Eastman Business Park—redevelopment of 1,200 acres (former Eastman Kodak facility) in the City of Rochester and Monroe County as a national center of manufacturing and commerce.
- Former Vacuum Oil Refinery Brownfield Clean-up and Redevelopment—brownfield remediation and redevelopment of 28 acre site on the Genesee River in the City of Rochester with waterfront public acres, recreation and open space, mixed use commercial redevelopment and transportation improvements.
- Smart Genesee Zoning Reform Pilot Project –comprehensive planning and development of model land use regulations to promote sustainable principles, mixed-uses, walkable neighborhoods, farmland protection and environmental sustainability. (Genesee County Comprehensive Plan)

Finger Lakes Regional Sustainability Plan

Land Use and Livable Communities

Subject Area Goal

Increase the sustainability and livability of the Finger Lakes region by revitalizing the region's traditional centers, concentrating development in areas with existing infrastructure and services, and protecting undeveloped lands from urban encroachment.

Finger Lakes Regional Sustainability Plan

Priority Broad Strategies, continued

Connection with criteria: ● Strong ◐ Moderate ○ Marginal

Broad Strategy	Benefits Multiple Subject Areas	Benefits Multiple Capitals	Benefits Multiple Communities	Implementation Feasibility	Consistent with Planning Efforts	Financial Feasibility
LU3—**Support and preserve rural centers and the character of rural areas.**	●	◐	●	◐	●	◐
LU4—**Encourage diversity of our communities to bring about a greater mixture of uses, people, ages and incomes.**	◐	◐	●	◐	●	◐

Broad Strategy LU3—Support and preserve rural centers and the character of rural areas.

Representative Sub-Strategies / Project Ideas

3.1 Implement land use tools such as purchase of development rights (PDR), transfer of development rights (TDR), conservation easements and other incentives to preserve agricultural lands, open spaces corridors, cultural and historic assets and natural features.

3.2 Inventory lands and parcels of significant ecological and/or scenic value (hillsides, forested lands, shorelines), and prioritize and coordinate with local land conservancies to protect highest value lands.

3.3 Educate the public about the ecological and economic value of natural systems for sustainability and resiliency.

3.4 Educate policy makers about true fiscal costs of development, including operations and maintenance.

Representative Projects

- Canandaigua Lake Water Trail—recreational trail to highlight the natural resources of Canandaigua Lake and promote active living. (FLREDC Strategic Plan)
- Promotion and protection of Canandaigua Lake—watershed improvements, such as new wetlands, stormwater management techniques and measures to control stream bank erosion to protect rural resources; also includes watershed education programs and a Watershed Program Manager. (Funded: CFA 2011)
- Strategy for a Sustainable Keuka Lake—updates to the Keuka Lake Watershed Land use Planning Guide to develop model land use regulations, training and public outreach; creation of a water quality internship program; mapping of important resources and an agricultural assessment. (Funded through CFA 2011)

Broad Strategy LU4—Encourage diversity of our communities to bring about a greater mixture of uses, people, ages and incomes.

Representative Sub-Strategies / Project Ideas

4.1 Develop specific vision plans for community centers, focused on good urban design and access to parks, transportation choices, cultural assets, jobs and services to develop "complete communities."

4.2 Work with non-profit housing organizations to provide programs, such as home repair assistance, tool libraries, housing education and energy-efficiency programs to enable lower-income homeowners to stay in their homes and maintain them in good condition.

4.3 Update municipal Comprehensive Plans, adopt flexible zoning regulations and encourage "Universal Design" to accommodate mixed uses, affordable housing, seniors and youth programs to encourage diversity.

4.4 Eliminate funding and regulatory barriers that constrain the ability to do mixed-use development.

4.5 Support programs, such as home-care, respite care and assistance with home modifications that facilitate aging in place.

4.6 Invest in strong local school systems to attract and retain young families.

Representative Projects

- Senior and affordable housing projects—27 projects funded throughout the region through 2011 CFA.

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3.6 Materials & Waste Management

Overview

Connection to Story of Place

The connection of materials or waste management to the Story of Place is within the trend of continuously innovating – finding solutions to a local problem that are relevant to a larger world. Innovation is evident in the region's approach to addressing organic waste. The region's agricultural and food processing industry generates a higher volume of organic waste. Although some of this waste can be treated and the nutrient rich material reapplied to the soil as fertilizer, too much land application of certain nutrients could impact water quality. The regional importance of preserving and protecting water quality and trends to discourage organics in landfills have contributed to the need to look at alternatives to address organic waste.

The innovation that has taken place around this local need is varied. Epiphergy, Sweetwater Energy, SYNERGY Biogas, LLC (CH4biogas), and Seneca Ag-Bio Green Energy Park are companies within the region that use food waste, agri-waste, and other byproducts and capture energy from them. The research, knowledge, and experience gained by these companies will be applicable far beyond the Finger Lakes Region.

The desire to develop alternatives to waste extends beyond just organic materials. The region also boasts three landfills that have alternative energy initiatives. The Seneca Meadows, Mill Seat, and High Acres Landfills all convert landfill byproducts to electricity. High Acres and Mill Seat also use biosolids from wastewater treatment with municipal solid waste to enhance methane production and thus electricity generation.

Existing Conditions: Assets and Sustainability Initiatives

Over many years, the Finger Lakes Region has become a leader in waste and materials management, as well as resource recovery. The region hosts a wide range of sustainable initiatives and practices which promote the reduction, reuse, recycling, and composting of materials, while creating jobs, diversity, and regional independence. Activities such as composting, material exchange programs and sustainable energy recovery ensure that the region's available resources are utilized to the maximum capacity through an array of venues.

Through education and outreach, and public-private services, the principles of materials and waste management are widely adapted throughout the region. Having centralized material transfer stations, as well as private services, allows every individual to manage their materials and waste responsibly. Educational opportunities allow for residents to enhance their understanding of best materials and waste management practices, enabling reduction and diversion on various levels throughout the region. Communication, coordination, and collaboration among municipalities, community organizations, and universities ensure that these practices are widely available and utilized.

An example of the region's success in materials management is represented by the continued commitment in Monroe County. In 1992, Monroe County passed a recycling law that requires all residents, businesses, industries, and institutions to

recycle. In 2011, Ecopark opened. Ecopark is an innovative partnership between Monroe County and Waste Management of New York that provides residents with a "one-stop drop-off" site that accepts household hazardous waste, pharmaceuticals, and recyclables. The Ecopark "Prospector" is a search tool intended to find local businesses and services that can reuse, recycle, or dispose of things responsibly, keeping these materials from the region's waters and landfills.

In response to the New York Solid Waste Management Act of 1988, many counties developed a regional approach to materials/waste management. The GLOW Region Solid Waste Management Committee was formed through an Intermunicipal Agreement by the counties of Genesee, Livingston, Orleans, and Wyoming. Orleans County ended participation in 2003 but the other counties continue to participate and fund the GLOW. Similarly, the Western Finger Lakes Solid Waste Management Authority was established through a cooperative effort of Ontario, Yates, Wayne and Seneca counties. A recent example is the 2011 development of the Ontario County Solid Waste Management Plan, which was developed within the framework of the NYS DEC's *Beyond Waste: A Sustainable Material Management Strategy (2010)*. The state plan sets out a twenty-year goal of reducing the average amount of waste that New Yorkers dispose of from 4.1 to 0.6 pounds per person, per day.

Other regional initiatives include the Western New York Materials Exchange (MAT-EX). The MAT-EX website also allows businesses to locate and exchange unwanted/ unusable products that would otherwise end up in a landfill. This exchange currently serves Genesee, Livingston, Monroe, Seneca, and Wayne counties. The grassroots, non-profit *freecycle.org* has a Genesee Valley Group which moderates a website for individual posting of materials to be reused.

The region also supports and promotes several materials management education and outreach programs including the Monroe County Recycling Patch for Scouts, the national campaign America Recycles, and Nike's Reuse a Shoe Program.

Despite these efforts, it is estimated that in 2010 the Finger Lakes Region generated approximately 8,455,238 tons of solid waste or 6.95 tons per capita (this includes biosolids, construction and demolition debris, municipal solid waste, non-hazardous solid waste, and tires).

Challenges, Variables, and Opportunities

Numerous stakeholders and residents have expressed concern that the Finger Lakes Region suffers an environmental and social injustice in respect to the amount of waste the region imports, and that externality costs relating to this are not accurately accounted for. The region imports far more waste than other regions in New York State and it has one of the largest landfills in the country. All this adds a dimension of complexity that need to be addressed through implementation of a sustainability strategy.

Another challenge for the region is securing capital for infrastructure and programmatic investments and this will continue to be difficult in a struggling economy. Still an additional barrier is overcoming the perception that a more sustainable approach to waste could diminish the current business of waste management within the region.

Change is difficult to inspire, particularly at the personal or household level, and significant lifestyle changes take time to be realized on a large scale. One potential approach to address the challenge of lifestyle changes would be a move to single-stream recycling programs, although it too has some drawbacks. In single-stream, both the collection and processing systems are designed to handle this fully co-mingled mixture of recyclables, with materials being separated for reuse at a materials recovery facility. While this approach may increase participation it also has potential disadvantages that need to be addressed including contamination of some recyclable materials, which can reduce their resale value, and also result in some recyclables ending up in a landfill. This can reduce consumer confidence in the program and negatively affect diversion rates.

An opportunity for the region is to use Sustainable Materials Management (SMM) as an additional roadmap and foundation piece for improving regional economic development, increasing environmental enhancement activities, and helping to meet energy and carbon abatement goals. SMM, articulated in the NYS DEC *Beyond Waste: A Sustainable Material Management Strategy* (2010), is an approach to dealing with waste that considers techniques beyond simply managing waste at the "end of the pipe". SMM examines opportunities for reducing waste before it enters the stream, as well as redesigning products so as to reduce their "footprint" within the larger waste management process. Applying SMM strategies across the supply chain, a process focusing on the premise of materials, resources, and asset management instead of traditional solid waste management, fulfills human needs while using fewer materials, reducing toxics, and recovering more of the materials used.

Sustainable Materials Management is a foundation piece for improving regional economic development, increasing environmental enhancement activities, and helping to meet energy and carbon abatement goals.

As part of SMM, the region has the opportunity to develop the "highest and best use" for each component of the discard stream, and to consider these items as material resources (assets) instead of waste items. An SMM approach should be focused on the following actions that recognize the region's strengths, capitalize on opportunities, attempt to neutralize threats, and also circumvent limitations:

- Increase the understanding of, and reduce the lifecycle impacts across the materials (discards) supply chain
- Discover, realize, and recover the value ("highest and best use" evaluative process) in all elements of the materials stream, thus informing better materials management choices
- Develop programs that lead to using less material inputs (reduce, reuse, recycle, and compost), and less toxic and more renewable materials
- Identify, from a process standpoint, where services can be substituted for products

Indicators and Targets

Three meetings were held with a variety of stakeholders to discuss materials and waste management issues. Stakeholders working on the Materials and Waste Management component of the Plan recognize historic regional strengths particularly related to a longstanding culture of innovation, and as such, identified a renewed opportunity to apply SMM principles across the regional materials and discard supply chain. Input from the Stakeholders was critical for understanding, clarifying, and interpreting Indicators for this subject area.

Indicators

- Total solid waste generated per capita
- Solid waste diverted (i.e., not landfilled or exported) per capita

The baseline values for these Indicators are shown in the Summary Sheet at the end of this section, as well as Targets for short (2020), mid (2035), and long-term (2050) timeframes. A table of representative Sub-strategies/Project Ideas and Representative Projects that contribute to the implementation of these Broad Strategies is also provided in the Summary Sheet.

Sustainability Goal and Strategies

Materials & Waste Management Goal

Decrease the generation of discards, increase the recovery and reuse of materials currently in the discard stream, manage materials using a highest-and-best-use framework, and create economic opportunities and improved environmental stewardship as a result.

The following is a description of each Broad Strategy that supports the Materials and Waste Management Goal. Representative Sub-strategies are provided as examples of specific measurable activity that could be implemented to support the Broad Strategy. At the end of the Materials and Waste Management Section there is a Summary Sheet that provides a more comprehensive list of representative Sub-strategies/Project Ideas and Representative Projects that contribute to the implementation of these Broad Strategies.

Broad Strategy MM1 | Reduce the amount of solid waste generated in the region.

In order to achieve a key component of Sustainable Materials Management (SMM), it is vital to reduce the amount of discards (solid waste) generated within the Finger Lakes Region. While much of the discarded material is generated from internal sources, a large portion is imported from outside of the region. Targeting this incoming material for reduction at the source, as well as deploying new management methods at disposal facilities will allow the region to define “highest and best use” for these recoverable resources.

Prioritization
This strategy is one of three to receive highest priority as it is strongly aligned with the Regional Guiding Principles and Vision. In addition to

benefitting materials and waste management within the region, this strategy helps:

- Preserve, protect and improve natural resources (by reducing leachate and minimizing land use needed for material storage).
- Improves public health
- Build partnerships between local governments, the private sector, regional institutions, and the public
- Reduces energy consumption

The strategy also has a short implementation timeframe, allowing efforts to begin immediately.

Potential Stakeholders and Resources
The implementation of this strategy will involve all county governments, local municipalities, NYS Department of Environmental Conservation (DEC), local manufacturers, and various regional organizations and individuals. Potential funding is available on the federal level through the US Environmental Protection Agency's Source Reduction Assistance Grants, and Pollution Prevention (P2) Grant Program, and the US Department of Agriculture Rural Development Technical Assistance and Training Grants, and Solid Waste Management Grant Program. On the state level, funding is available through the Local Government Efficiency Grant Program (NYS Department of State), the Municipal Waste Reduction and Recycling Program (NYS DEC) and the Environmental Investment Program (NYS Empire State Development).

However, reliance on federal and state funding sources is not desirable; as such, other local innovative financing, materials revenue generation, and cost reduction/avoidance efforts will need to be further developed and deployed, as noted below.

Challenges and Sub-strategies

A primary barrier to implementation of this Broad Strategy is addressing the amount of material being imported into the region. An additional challenge (rather, it can be an opportunity) is targeting discards generated within the region directly at their source. The Sub-strategies were developed overcome these barriers, for example Sub-strategy 1.3 explores banning food scraps and yard trimmings from entering the disposal system and initiating *Beyond Waste* programs.

Sub-strategy 1.1 | *Develop innovative approaches to: 1) reduce packaging, 2) incorporate sustainable materials in packaging, and 3) develop reusable packaging.*

This Sub-strategy is aligned with the following FLREDC Regional Strategies and Sector Strategies and leverages regional education and research institutions:

- Optimize business creation, retention, and expansion
  - Strengthen and expand (both in terms of capacity and geographic reach) the region's network and acceleration facilities as well as business support and networking services.
  - Develop systems that monitor and identify firms and sectors with high growth potential and proactively engage with these companies to connect them with the resources that will accelerate product development, access to new markets and scale business models.
- Advanced Manufacturing
  - Foster public/academic/industry collaboration to meet the R&D, process improvement, workforce, and management needs of manufacturers.

An example of how this Sub-strategy is being implemented is the research and development in sustainable packaging. The Rochester Institute of Technology (RIT) is home to one of the most extensive packaging laboratories in the northeastern United States. In addition to academic support, the laboratory provides full commercial package testing services to a range of companies in package development consulting, materials testing, and distribution simulation. The lab works to develop innovative and functional sustainable packaging

designs to reduce package volume and the amount of nonrenewable packaging materials.

In order to continually promote this strategy, collaboration is needed among the region's counties, municipalities, commercial/industrial businesses, institutions and residents. Institutions such as the New York State Pollution Prevention Institute (NYSP2I) could develop new technologies for sustainable packaging and local governments can create policies requiring the adoption of sustainable packaging practices for businesses and residents in the region. These efforts support commercial and industrial businesses by accelerating the development of packaging products and providing access to new green markets.

Sub-strategy 1.2 | *Develop innovative approaches to source reduction policy incentives.*

This Sub-strategy is aligned with the following FLREDC Regional Strategies and Sector Strategies and leverages regional education and research institutions:

- Optimize business creation, retention, and expansion
  - Strengthen and expand (both in terms of capacity and geographic reach) the region's network and acceleration facilities as well as business support and networking services.
- Agriculture and Food Processing
  - Support the creation and expansion of food processing companies in the region through incentives and academic-private partnerships to gain manufacturing efficiencies and access to new markets.

An example of this Sub-strategy is Ontario County's 2011 Solid Waste Management Plan. This Plan developed within the framework of NYS DEC's *Beyond Waste: A Sustainable Materials Management Strategy*, sets out to greatly reduce the amount of municipal solid waste generated per person per day. The *Beyond Waste* strategy states a twenty-year goal from the current 4.1 pounds to 0.6 pounds per person, per day. This effort can be replicated in each county within the region, resulting in not only a reduction of total solid waste generated, but decreased greenhouse gas emissions and reduced energy demands.

Successful implementation of this strategy requires strong government leadership to create educational material and policies that encourage businesses and residents to reduce their waste generation. This strategy supports the development and expansion of waste management/recycling businesses.

Sub-strategy 1.3 | *Explore feasibility of banning disposal of food scraps and yard trimmings.*

Food scraps from pre- and post-consumer sources and yard trimmings make up nearly 30% percent of the solid waste stream. Instead of these items entering the waste stream, alternative and relatively low-cost, easy to implement sustainable solutions are available for these materials. Other communities ban yard trimmings (such as Oswego County), and others across the state are considering the same approach and may include food scraps as well (such as New York City).
This is a policy initiative that would need to be created by each county and monitored by waste management and recovery facilities within the region.

Broad Strategy MM2 | Increase the percentage of materials reused (upcycled), recycled, and composted within the region.

This Sub-strategy is aligned with the following FLREDC Regional Strategies and Sector Strategies:

- Optimize business creation, retention, and expansion (recycling industry)
  - Address local and state barriers to growth and competitiveness, including exploring ways to reduce the cost of doing business by strengthening regional planning efforts, developing cooperative agreements, and streamlining services.
  - Strengthen and expand (both in terms of capacity and geographic reach) the region's network and acceleration facilities as well as business support and networking services.
  - Develop systems that monitor and identify firms and sectors with high growth potential and proactively engage with these companies to connect them with the resources that will accelerate product development, access to new markets and scale business models.
- Strengthen Academic and Industry Partnerships
  - Develop programs and shared resources that allow closer collaboration between academic and industry scientists.
  - Streamline and accelerate the maturation, transfer, and commercialization of university-based intellectual property; Build a regional ecosystem that more effectively harnesses university-based innovation, with a particular focus on fostering the creation and growth of early-stage companies.
- Advanced Manufacturing
  - Foster public/academic/industry collaboration to meet the R&D, process improvement, workforce, and management needs of manufacturers.
- Agriculture and Food Processing
  - Support the creation and expansion of food processing companies in the region through incentives and academic-private partnerships to gain manufacturing efficiencies and access to new markets.

In addition to primary discard diversion efforts focused on reducing the material discarded, many materials within the region have potential for diversion from traditional disposal facilities through reuse (upcycling), recycling, and composting strategies. These efforts, which already occur in the region, can be further developed to divert a larger amount of materials, following the "highest and best use" framework (where each item in the discard stream is analyzed for its best management approach regarding how it should be handled in the region). This provides regional self-reliance, enhances the local economy, and serves as a long-term solution. This Broad Strategy aligns with the Energy Broad Strategy E1. The effectiveness of this strategy will be measured through the solid waste diverted Indicator.

Prioritization

This strategy received highest priority as a result of its alignment with the Regional Guiding Principles and Vision:

- Promotes robust, high quality economic growth (by establishing new markets and jobs)
- Reduces energy consumption(by eliminating some needs for the production of new materials)
- Preserve, protect and improves natural resources and acknowledges the link between natural systems (by requiring less virgin materials and enhancing soil health through compost)
- Builds sustainability capacity and understanding through outreach and education
- Builds partnerships among local governments, the private sector, regional institutions, and the public.

Challenges and Sub-strategies

Barriers to implementation of this Broad Strategy include the need for regional stakeholders to align with a common definition of "highest and best uses" for the individual components of the region's

materials. A related barrier includes the lack of incentives and regulations that would highly promote this "highest and best use" and alignment effort. The Sub-strategies have been developed to address these challenges.

Sub-strategy 2.1 | *Reuse efforts should include the development and enhancement of materials exchange programs.*

This Sub-strategy has already been initiated in the region through the Western New York Materials Exchange (MAT-EX). The MAT-EX website also allows businesses to locate and exchange unwanted/unusable products that would otherwise end up in a landfill. This exchange currently serves Genesee, Livingston, Monroe, Seneca, and Wayne counties. Another example is the Ecopark "Prospector," a search tool intended to find local businesses and services that can reuse, recycle, or dispose of things responsibly, keeping these materials from the region's waters and landfills.

County departments responsible for waste management and the GLOW Region Solid Waste Management Committee should coordinate to expand existing programs and partner with the Environmental Services Unit of the NYS Department of Economic Development to develop additional approaches to meet this Sub-strategy.

Sub-strategy 2.2 | *Recycling efforts should include expanding and enhancing existing programs, increasing recycling infrastructure, and further developing local markets.*

An example that supports this Sub-strategy is Monroe County's single-stream materials recovery facility. Single stream recycling is a system in which all recyclable paper, plastic, metal, glass, and other recyclable materials are collected in one storage container by residents and brought to a facility comingled. This system opposes traditional recycling in which different materials are sorted into designated containers and handled separately throughout the collection process. Materials are then sorted out at the single stream facility.

Single stream recycling is anticipated to increase residential participation in recycling programs due to a more user-friendly system, higher hauler efficiency as collection costs are reduced due to single compartment trucks and increased diversion as more materials are entering the recycling stream. There are concerns about higher disposable residue at the back-end of the single-stream process, and this challenge will need to be addressed by local materials managers.

Ensuring the success of this Sub-strategy requires a working partnership between the county departments responsible for waste management, the GLOW Region Solid Waste Management Committee and local economic development agencies. Partnering with the Environmental Services Unit of the NYS Department of Economic Development can help the region develop additional approaches to meet this Sub-strategy.

Sub-strategy 2.3| *Composting efforts should include a region-wide system to capture pre- and post-consumer food scraps, encouragement of on-site and backyard composting, and appropriate applications for composting and digestion of biosolids and other organic discards with potential energy recovery opportunities.*

This Sub-strategy is aligned with the following FLREDC Sector Strategies:

- Energy Innovation
  - Encourage energy companies to expand and relocate to the region through the development of shovel-ready sites and other incentives.
  - Create the resources and infrastructure that will accelerate R&D and commercialization of new energy technologies.
- Agriculture and Food Processing
  - Increase the value, diversity of agricultural products, and exports.
  - Support the creation and expansion of food processing companies in the region through incentives and academic-private

partnerships to gain manufacturing efficiencies and access to new markets.

An example of efforts supporting this Sub-strategy is the GLOW Region Solid Waste Management Committee's Backyard Composting Education Demonstration Sites. These three sites are located at Genesee County Park, Letchworth State Park, and Beaver Meadow Audubon Center. Each site consists of 10-11 homemade and manufactured composters, signage explaining how composting works, and a "Take One" box containing a packet of designs and information. Residents can examine the composters to get an idea of what size and type might work best for them.

On a business level, Cayuga Compost (located outside the region in Trumansburg) provides a food waste collection and composting service to local businesses to divert their food scraps from the waste stream and turn it into high quality compost. Cayuga Compost provides companies with 60-gallon containers for compostable materials. The containers are picked up each week and replaced with empty ones. This service offers potential removal cost savings for area restaurants, caterers, school districts, municipalities, institutional food services, wineries and grocery stores.

Efforts to support the composting and digestion of biosolids and other organic waste include responsibly adopting emerging technologies in the waste management and energy field and applying best-use-first approaches on a site-specific basis. Examples of such technologies include municipal sludge composting and drying which produces a nutrient rich product and eliminates costly alternatives to sludge management, on-farm digesters which provide a manure management plan that also produces electricity and bedding material and proper land application of bio solids to reduce negative impacts to the environment.

A local example for this effort is the Synergy Biogas project in Wyoming County. The site is the largest on-farm digester in New York State, handling daily manure from 2,000 milking cows as well as local food grade organic waste which is transported to the site. Biogas from the digester fuels a generator that produces 1.4 MW/h of renewable electricity (10,000 MWh/year, enough to power 1,000 homes). This process results in GHG emission reductions of 7,000 tons CO_2/year. The process also produces 20,000 yd^3 of bedding for the dairy farm.

Harvestable energy is a byproduct of digestion and landfill systems. The efficiency of waste to energy management and conversion can be increased through introduction of new technologies and research. Landfills and large farms throughout the region would benefit from more efficient gas to energy technologies, therefore benefitting the thousands of homes and businesses throughout the region by increasing local self-reliance through new material management practices.

There is a need to support and partner with organizations to develop new technologies and programs to meet this Sub-strategy. Organizations may include NYS P2I, RIT'S Golisano Institute for Sustainability, Monroe Community College's Agriculture and Life Sciences Institute, Cornell Waste Management Institute and the Environmental Services Unit of the NYS Department of Economic Development can help the region develop additional approaches to meet this strategy.

Sub-strategy 2.4 | *Encourage building deconstruction and subsequent material reuse and recycling, as opposed to building demolition.*

One example of this approach is the ReStore of the Flower City Habitat for Humanity. The goal of Flower City Habitat is to help build houses and to keep as much home improvement waste out of landfills as possible. The Habitat ReStore accepts used building materials, which are then resold to raise funds to help build houses.

Another example is Pioneer Millworks located in Farmington, New York. This company reclaims wood from bran and industrial buildings being demolished and gives the wood new life as flooring, cabinetry and other products.

An important aspect of this Sub-strategy is education and promotion of existing businesses and organizations that reuse and recycle building materials (refer to Broad Strategy MM4). Municipalities should also consider the adoption of Green Building policies to encourage material reuse and recycling. Partnering with organizations such as the NYS Construction Materials Management Center and Environmental Services Unit of the NYS Department of Economic Development can help the region develop additional approaches to meet this strategy. A potential approach may be to attract a gypsum board recycler to the region. Currently accessibility and proximity to wallboard recyclers is limited. There are three gypsum wallboard recyclers in the Northeast region—Holbrook, Massachusetts; Newington, New Hampshire; and Tonawanda, New York. Additional gypsum recyclers are located in Reinholds and Turbotville. There is a need to research the demand for and potential benefit of gypsum recycler in the region.

Sub-strategy 2.5 | *Develop innovative approaches to material diversion policy initiatives.*

There are a host of innovative diversion initiatives for discarded materials that can be deployed to support the Sub-strategy, particularly in the area of source reduction. One is provision of a Service Opportunity Analysis (SOA) service, which works at the sources of waste (in manufacturing facilities, warehouses, institutions, offices, etc.) to identify process changes that could be implemented relating to reducing the production of discarded materials. This includes providing intensive consulting services from accredited companies to organizations to help reduce discards through process steps in each organization.

SOA is part of a construct referred to as Industrial Ecology, which recognizes that sustainability initiatives related to manufacturing, industrial, and related processes and their resulting products is core to a healthy and functional ecosystem. This approach supports the recognition that by-products of these processes should be treated as assets and inputs to new, productive processes, thereby continuing the paradigm of moving away from the concept of waste. It's about "optimizing and economizing flows and exchanges in material and energy to increase the circularity of the material and energy economies." Highest-and-best-use, lifecycle analysis, supply-chain management (integrated), lean approaches to manufacturing, and other tools are used to promote Industrial Ecology. Continued support of RIT's Golisano Institute for Sustainability is one way to implement this Sub-strategy.

Broad Strategy MM3 | Address financial barriers through new revenue and business models.

In order to make SMM a viable option in comparison to traditional discard management activities, new financial incentives and business models must be presented to the region's stakeholders. This strategy results in an increase of economic activity and opportunities by utilizing materials to enhance the local economy. A number of innovative Sub-strategies have been identified. However, these strategies have yet to be implemented in the region. Successful implementation of this strategy would be measured through the solid waste diverted Indicator.

Prioritization
This strategy also received the highest priority as a result of its alignment with the Regional Guiding Principles and Vision to:

- Promote robust, high quality economic growth
- Reduce energy consumption
- Build sustainability capacity and understanding through outreach and education
- Build partnerships between local governments, the private sector, regional institutions and the public
- Promote an equitable distribution of costs and benefits.

Potential Stakeholders and Resources
The implementation of this strategy will involve all county governments, local municipalities, economic development councils, academic institutions, and technical assistance providers, all of whom will work with New York State government agencies to establish a uniform system. Potential funding is available through the federal and state funding programs noted for Broad Strategy MM1 above, but with the same caveat as noted above: other innovative financing mechanisms need to be developed, as discussed for this strategy.

Challenges and Sub-strategies
The process of addressing the financial barriers of entry into sustainable materials management encompasses diverse Sub-strategies. One of the challenges to implementation is noted in the Ontario County's 2011 Solid Waste Management Plan when evaluating Pay-as-you-throw (PAYT) programs. PAYT programs would require the participation of private local haulers and transfer stations. To be effective the program would need to incentivize residents and businesses to reduce their waste but haulers have indicated that their overhead costs are such a high percentage of the service that they are not able to offer customers a reduction in cost for smaller quantities especially in rural areas.

Sub-strategy 3.1 | *Development of a "green fee" system to provide a reliable source of revenue to help fund SMM programs.*

Gaining popularity among colleges throughout the United States, green fees are typically minimal fees added to college tuition charges to help support environmental services and programs on the college's campus, similar to how the more common athletic fee would be used towards the college's athletics program. However, the green fee model can be duplicated for the regions' municipalities, transfer stations, landfills, and hauling companies as fees for services that are already provided which will further promote materials' reduction and diversion.

According to The College Sustainability Report Card, Hobart and William Smith Colleges is the only university within the region to currently enact a green fee in the form of a $5 green surcharge on parking tickets, which is redirected to support alternative transportation. In addition to supporting on-going programs, the funds from green fees can be dedicated to capital projects that enhance SMM throughout a served territory. For example, municipalities that offer collection services can raise money through a green fee applied on the monthly collection bill. The funds generated can then go towards creating a new recycling facility that diverts a greater amount of material from entering the traditional waste stream.

Municipalities and universities throughout the region should explore the feasibility and potential benefits of instituting a green fee system. While there are many examples of best practices to choose from, municipalities would need technical assistance and guidance on legal issues to implement this strategy. Technical resources may include municipal consulting firms, local institutions (such as NYSP2I), and state/federal agency funding and technical assistance programs. The Environmental Finance Center (EFC) at Syracuse University, serving EPA's Region 2 (New York), can also assist and help municipalities understand what "fee" options they have, and how they could implement them. The EFC has access to databases of other communities that are considering or have enacted similar fees.

Sub-strategy 3.2 | *Encourage carbon credit policies which focus on "highest and best use" of materials from a carbon reduction standpoint.*

Carbon credits can be defined in two ways: 1) a certificate showing that a government or company has paid to have a certain amount of carbon dioxide removed from the environment, or 2) a purchased permit which allows the holder to emit one ton of carbon dioxide into the environment. The purpose of this policy is to place a value on the reduction or offset of greenhouse gas emissions that may result from waste reduction and diversion efforts. If local governments and companies are required to obtain

permits in order to produce or discard materials, a monetary incentive is created to lessen waste and divert more materials as recycling, reusing, and composting produce far less emissions than landfilling and incinerating.

The potential to establish a carbon credit initiative for the region should be explored. As with Sub-strategy 3.1, technical assistance for municipalities and companies would be needed. Technical resources include carbon credit consulting businesses and regional offices/representatives of NYS's Climate Smart Communities Program.

Sub-strategy 3.3 | *Address low tipping fees which do not include all externality costs.*

A tipping fee is a charge applied for a given amount of discarded material to be received at a waste management facility. Currently, low tipping fees at the region's waste management facilities enable large waste shipments from long distances outside the region to be an economically feasible option for customers who would pay a larger tipping fee at facilities closer to their location. Some tipping fees are much lower than average because they do not factor the external costs of waste management such as high growth rates of the regions landfills that cause higher amounts of greenhouse gas emission and leachate, transportation cost/fuel usage/emissions and increased land use.

To address low tipping fees, the region's waste management facilities could partner to establish a fair charge, which properly factors such externalities and ensures regionally sustainable materials management for future generations. Creating higher tipping fees may cause outside customers to search for alternative facilities or reduce their waste in general. This decision would affect stakeholders other than disposal facilities within the region, so a transparent approach with opportunity for public input is a necessity.

Sub-strategy 3.4 | *Tax packaging which is not reusable, recyclable, or compostable.*

By taxing product packaging that cannot be reused, recycled, or composted, both manufacturers and consumers are incentivized to manufacture and purchase products with packaging that will not enter the discard stream. A consumer example of this Sub-strategy is seen in grocery stores throughout the United States, as these stores are taxing for each plastic bag used to bag the shopper's groceries. Alternatively, the shopper could purchase a reusable bag, which reduces their shopping taxes as well as the material and energy used to create the packaging. Additionally, funds that are collected from these taxes can be used towards further research and development of sustainable packaging materials.

Businesses within the region are mainly responsible for the success of this Sub-strategy, which could be promoted by local governments and individuals. The businesses could offer sustainable packaging to aid in waste diversion and reduction or non-sustainable packaging with taxes, allowing the consumer to drive market decisions.

Sub-strategy 3.5 | *Implement Pay-As-You-Throw programming.*

Pay-as-You-Throw (PAYT) programs are also known as variable-rate pricing systems, in which residents are charged for the collection of municipal waste based on the amount which is thrown away. Traditionally, residents pay for collection of discarded materials through taxes or flat fees, regardless of how much discards are generated. Implementing PAYT programs in the region will urge residents to be more aware of the amounts and types of discards they produce versus flat fee charges. Additionally, these programs encourage residents to divert more discarded material through recycling, reuse, and composting due to monetary incentives.

In the Village of Weedsport, New York (outside the region), residents purchase $1 tags to attach to each 33-gallon trash bag for collection. Since the system was instituted in 1999, municipal solid waste generation in the Village has been reduced by 50%, from about 16 tons per week to 8 tons per week.

This reduction in discarded material enables the Village to accept discards from neighboring towns at their facility.

County departments responsible for waste management, the GLOW Region Solid Waste Management Committee and municipalities throughout the region should institute PAYT programming with guidance from the NYS DEC.

Sub-strategy 3.6 | *Develop financing opportunities for pilot projects that validate new discard reduction and diversion technology, as well as the benefits of implementation.*

Strong partnerships among the region's institutions, industries, and state and federal environmental agencies are vital for the success of this Sub-strategy. The majority of large-scale pilot projects, in general, rely on a form of government funding for the success of the program. For sustainable materials management projects, government funding is available through the US Environmental Protection Agency, US Department of Agriculture Rural Development, NYS Environmental Facilities Corp, NYS Department of State, NYS Empire State Development, and NYSDEC.

An example of funding and partnership in action is the New York State Pollution Prevention Institute (NYSP2I) headquartered at RIT, which funds various sustainable materials management pilot projects throughout the state with funding support from the NYSDEC. Local industries then benefit from the product development of these projects.

Broad Strategy MM4 | Promote comprehensive sustainable materials management education, awareness, and research services.

Public education and programming is a vital component to ensure that future generations will continue to follow and advance SMM practices. Enhanced education programs and initiatives must be provided for the general public, local governments, businesses, and institutions within the region regarding discard management regulations and requirements, the cost of traditional waste management, the benefits of SMM, and strategies to effectively reduce, reuse, recycle, and compost materials throughout the region.

This broad strategy is aligned with the FLREDC Regional Strategy to "Strengthen Academic and Industry Partnerships", especially through developing programs and resources that "allow closer collaboration between academic and industry scientists" and streamlining and accelerating the "maturation, transfer, and commercialization of university-based intellectual property" which "more effectively harnesses university-based innovation".

Prioritization
Promoting SMM education, awareness, and research services supports the Regional Guiding Principles to:

- Build sustainability capacity and understanding through outreach and education
- Build partnerships between local governments, the private sector, regional institutions and the public
- Promote robust, high quality economic growth.

Potential Stakeholders and Resources
The implementation of this strategy will involve academic institutions, K-12 schools, county governments, local municipalities, and regional planning boards. Potential funding is available through the federal and state funding programs noted for Broad Strategy MM1 above, and includes the US EPA's Community Action for a Renewed Environment (CARE) Grant, and Environmental Education Grant Programs. In addition, potential research funding is available on the federal level through the US EPA's Office of Solid Waste and

Emergency Response Innovations Initiative, and the US Small Business Innovation Research (SBIR) Program. However, the same caveat as noted above applies here: other local, innovative financing mechanisms need to be developed beyond these federal and state programs.

Challenges and Sub-strategies
Barriers to implementation of this Broad Strategy include the need for behavioral modification and obtaining regional support and funding for SMM research and outreach. The following education Sub-strategies have been identified to address these barriers.

Sub-strategy 4.1 | *Utilize the expansion of SMM markets and initiatives to create collaborative services and economic development opportunities.*

Developing local markets requires a working partnership between the county departments responsible for solid waste management and local economic development agencies. Examples of these types of partnerships elsewhere in the State include counties such as Onondaga and Oswego in Central New York who partner with their local economic developers, as well as efforts by Monroe County to do the same in the Finger Lakes Region. Additionally, state resources such as the NYS Construction Materials Management Center in Syracuse, and the NYS Department of Economic Development, Environmental Services Unit – who is charged with recycling market development for the state – should be engaged. The Cornell Waste Management Institute is also a recognized asset regarding development of composting markets, and should be involved.

Sub-strategy 4.2 | *Leverage, support, and promote regional organizations that provide research and education around efficient materials use, reduction of discards, and energy efficiency.*

This Sub-strategy is aligned with the following FLREDC Regional and Sector Strategies:

- Strengthen Academic and Industry Partnerships
  - Develop programs and shared resources that allow closer collaboration between academic and industry scientists.
  - Streamline and accelerate the maturation, transfer, and commercialization of university-based intellectual property.
  - Build a regional ecosystem that more effectively harnesses university-based innovation, with a particular focus on fostering the creation and growth of early-stage companies.
- Business Services
  - Foster closer cooperation among the region's companies and institutions of higher education to accelerate technology transfer and align workforce-training programs with the skill sets required by the sector.

There is a need to continue to support research and development in SMM. RIT's Golisano Institute for Sustainability is one of the region's organization providing research and education in this area. An associate professor at RIT was a recipient of a recent Faculty Early Career Development (CAREER) Program Award from the National Science Foundation that will support an investigation into potential environmental impacts of reusing, recycling, and disposing of lithium-ion batteries after they have been used in electric vehicles. The project will develop a range of materials management scenarios that comprehend how rapidly electric vehicle technology is adopted, how long the batteries are expected to last, and the materials from which the batteries are made. It is anticipated that educational materials related to the project will be incorporated into courses at GIS, form the basis of case studies for New York State's growing battery industry, and help increase public awareness of electric vehicle and battery technology.

The New York State Pollution Prevention Institute's (NYSP2I) R&D Program focuses on applied research that provides immediate solutions to various materials management and pollution prevention issues. These projects keep New York

State companies competitive in the marketplace by bringing innovative pollution prevention technologies to market. Some projects funded by this effort include *Computational Imaging-based Sorting Technologies for Recycling*, RIT; *A Low Cost Bioreactor Module for Treatment of Food Wastes and Simultaneous Electricity Production*, Rensselaer Polytechnic Institute; *Development of a Sustainable Cement Using Conch Shell Waste*, Clarkson University. This research also provides a strong education component for the region.

As noted in the existing conditions assessment, Monroe County has been a pioneer in educating and promoting sustainable materials management practices starting with the 1992 recycling law. They have several programs that they support including Monroe County Recycling Patch for Scouts, the national campaign America Recycles, and Nike's Reuse a Shoe Program. The County also has a Recycling Education Campaign, which includes television advertisements and recycling education outreach at local public events. The program is funded entirely by revenue generated from operation of the Monroe County Recycling Center (MCRC)

Another example of education is the GLOW Region Solid Waste Management Committee's participation in America Recycles, a national program that promotes composting, buying recycled content products, and recycling. The program, which began in 1997 as America Recycles Day, asks people to sign pledge cards to show their commitment to recycling. By doing so they are eligible to win local, regional, and state prizes. GLOW has participated in the program since its start by running advertisements in local pennysavers and papers and by giving away composters.

An additional approach to education and promotion is the development of a SMM page on the sustainable-fingerlakes.org website to provide a single resource for the region. This page would provide information on what materials are currently being recycled as well as links to materials exchange programs, service providers and non-profit organizations. The development of this page would be the responsibility of the Regional Plan Coordinator as identified in Section 4, Plan Implementation.

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Materials and Waste Management

Subject Area Goal

Decrease the generation of waste, increase the recovery and reuse of materials currently in the discard stream, manage materials using a highest-and-best-use framework, and create economic opportunities and improved environmental stewardship as a result.

Opportunities

- Shift perception from "waste management" to "sustainable materials management"
- Energy production for small scale operations and the larger grid
- Product packaging advancements
- Increased composting, both large and small scale
- Change perception of waste to recognize various reuse and recycle outcomes
- Collaboration with agricultural and industrial operations

Challenges

- Reduce the lifecycle impacts across the materials supply chain
- Lack of local or regional waste tracking systems
- Prioritizing investment in reduction, reuse, recycling and composting over disposal
- Mitigating impacts of imported waste
- Inspiring sustainable choices—greatest impacts come from collective decisions of households

Variables

- Fluctuating levels of imported waste
- Technologic advances for reuse/recycle/disposal of materials
- Transportation/fuel costs

There is significant alignment between the strategies identified for Materials and Waste Management, Water Management, and Agriculture and Forestry. Refer to other subject areas for additional strategies that may benefit Materials and Waste Management.

Indicators and Targets

Indicators	Broad Strategies Measured	Baseline Value (2010)	Short-Term Target* (2020)	Mid-Term Target* (2035)	Long-Term Target* (2050)
Total solid waste generated (#4A—NYSERDA Common)*** • Total per capita • Total for region *By category:* • Municipal Solid Waste • Industrial Non-Hazardous Waste • C&D Debris • Bio-Solids • Tires	MM1	6.95 tons 8,455,238 tons 5,392,542 tons 217,688 tons 2,809,957 tons 22,214 tons 13,378 tons	-15% | | tracking purposes only | |	-25% | | tracking purposes only | |	-35% | | tracking purposes only | |
Solid waste diverted (i.e., not landfilled or exported) per capita (#4B—NYSERDA Common)	MM2, MM3, MM4	Data not available**	35% reduction of total solid waste generated (1st Indicator)	50% reduction of total solid waste generated (1st Indicator)	55% reduction of total solid waste generated (1st Indicator)

*All % reductions or increases are related to the 2010 baseline values, not the previous target.
** Baseline data currently not available. It is recommended that in the short-term, a method to collect this data be developed.
***The baseline calculation noted here is higher than the GHG emissions calculations since it also includes construction and demolition waste.

Materials and Waste Management

Subject Area Goal

Decrease the generation of waste, increase the recovery and reuse of materials currently in the discard stream, manage materials using a highest-and-best-use framework, and create economic opportunities and improved environmental stewardship as a result.

Finger Lakes Regional Sustainability Plan

Priority Broad Strategies

Connection with criteria: ● Strong ◐ Moderate ○ Marginal

Broad Strategy	Benefits Multiple Subject Areas	Benefits Multiple Capitals	Benefits Multiple Communities	Implementation Feasibility	Consistent with Planning Efforts	Financial Feasibility
MM1—**Reduce the amount of solid waste generated in the region.**	●	●	●	●	◐	◐
MM2—**Increase the percentage of materials reused (upcycled), recycled, and composted within the region.**	●	◐	●	●	◐	●
MM3—**Address financial barriers through new revenue and business models.**	●	●	●	◐	◐	◐
MM4—**Promote comprehensive sustainable materials management education, awareness, and research services.**	◐	◐	●	●	◐	●

Broad Strategy MM1—**Reduce the amount of solid waste generated in the region.**

Representative Sub-Strategies / Project Ideas

1.1 Develop innovative approaches to: 1) reduce packaging, 2) incorporate sustainable materials in packaging, and 3) develop reusable packaging.
1.2 Develop innovative approaches to source reduction policy incentives.
1.3 Explore feasibility of banning disposal of food scraps and yard trimmings.

Representative Projects

- Solid waste generation reduction assistance for Finger Lakes businesses—the New York State Pollution Prevention Institute (NYSP2I) will provide sustainable production assistance, green product and process development assistance, and sustainable supply chain assistance to companies across the Finger Lakes region to reduce environmental footprint, manufacturing costs and increase process efficiencies.

Broad Strategy MM2—**Increase the percentage of materials reused (upcycled), recycled, and composted within the region.**

Representative Sub-Strategies / Project Ideas

2.1 Reuse efforts should include the development and enhancement of materials exchange programs.
2.2 Recycling efforts should include expanding and enhancing existing programs, increasing recycling infrastructure, and further developing local markets.
2.3 Composting efforts should include a region-wide system to capture pre- and post-consumer food scraps, encouragement of on-site and backyard composting, and appropriate applications for composting and digestion of biosolids and other organic discards with potential energy recovery opportunities.
2.4 Encourage building deconstruction and subsequent material reuse and recycling, as opposed to building demolition.
2.5 Develop innovative approaches to material diversion policy initiatives.

Representative Projects

- Revised curbside pick-up program—Provide proper bins for recyclable and compostable materials, also increasing efficiency in vehicle fleet.
- Limit Your Waste Challenge—A community challenge limiting families to one trash bag per week, encouraging families to limit their waste though recycling, composting, and decreasing overconsumption.
- Sustainable Rochester 20/20—Revitalization of Rochester's 36 residential neighborhoods; applying sustainable construction and design standards comprehensively to all projects, involving reuse and sustainable deconstruction.

Broad Strategy MM3—**Address financial barriers through new revenue and business models.**

Representative Sub-Strategies / Project Ideas

3.1 Development of a "green fee" system to provide a reliable source of revenue to help fund SMM programs.
3.2 Encourage carbon credit policies which focus on "highest and best use" of materials from a carbon reduction standpoint.
3.3 Address low tipping fees which do not include all externality costs.
3.4 Tax packaging which is not reusable, recyclable, or compostable.
3.5 Implement Pay-As-You-Throw programming.
3.6 Develop financing opportunities for pilot projects that validate new discard reduction and diversion technology, as well as the benefits of implementation.

Representative Projects

Broad Strategy MM4—**Promote comprehensive sustainable materials management education, awareness, and research services.**

Representative Sub-Strategies / Project Ideas

4.1 Utilize the expansion of SMM markets and initiatives to create collaborative services and economic development opportunities.
4.2 Leverage, support, and promote regional organizations that provide research and education around efficient materials use, reduction of discards, and energy efficiency.

Representative Projects

- Pre- and post-consumer organics management education programs—Programs for both public and businesses sectors to learn about proper organic waste management practices.
- Material generation and disposal reporting system for non-residential sectors—Web-based software system for non-residential waste generators to report data on materials they generate and dispose of off-site. (CNY Regional Sustainability Plan)

3.7 WATER MANAGEMENT

Overview

Connection to Story of Place

The Finger Lakes region is both literally and figuratively defined by its water resources. During the last ice age, the glacier's southern-most extents created the topographic ridges that serve as the watershed boundaries of our lakes. To the south of these boundaries, water drains toward the Chesapeake Bay. To the north of these boundaries, water drains through the Finger Lakes toward Lake Ontario. As the glacial sheets retreated, their melt water was trapped along their southern edges. This trapped water was not able to drain along its present day route through Lake Ontario and the St. Lawrence River. For a period of time, this melt water was forced through what is now the Mohawk Valley, carving a deep but gradual path toward the Hudson River. This gradual outlet through the Mohawk Valley would later provide an ideal route for the Erie Canal.

The Finger Lakes Region's water resources, in the form of rainfall, reservoirs, and power generation, supported an original economy of agriculture and manufacturing. The construction of the Erie Canal provided a means for the region to transport its agricultural and manufacturing goods to market in New York City. This had a profound effect on both the region and the state as it helped the City of New York begin to prosper. The canal was a triggering agent for growth in the region building upon the water powered mills of the Flour City. While the day to day use of the Erie Canal has faded over time, the importance of the region's water resources – both quality and quantity – remains as they have an integral role in the region's agriculture and tourism.

The region's name, Finger Lakes Region or often the Genesee-Finger Lakes Region, highlights the significance of its water resources.

Existing Conditions: Assets and Sustainability Initiatives

Today, the region's water resources have a significant role:

- Electric energy generation is the primary consumer of the region's water withdrawals (78%).
- Residents rely on the natural reservoirs for safe, reliable drinking water. While population growth has not been dramatic in the region, the availability of water is not a hindrance to growth as it can be in other parts of the country.
- Agriculture and agri-businesses rely on rainfall and irrigation from the natural reservoirs to support their products.
- Water is also used to support manufacturing and mining.
- Tourists and residents are attracted to safe, accessible water for recreational purposes - swimming, fishing, and boating.

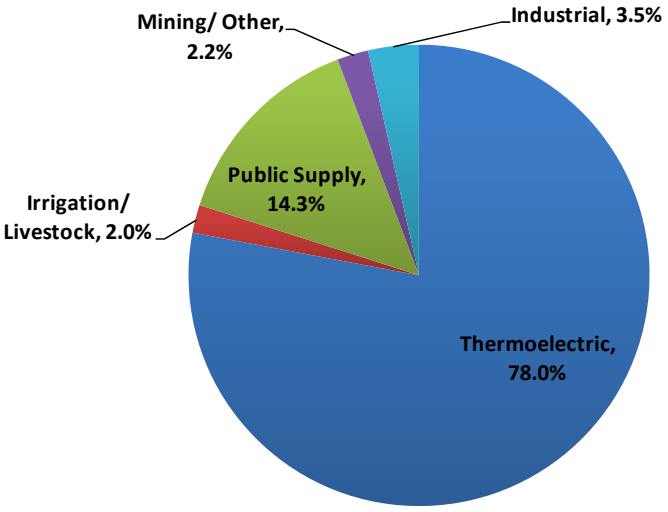

Figure 3-8: Water Withdrawals in the Region (2005 USGS Water Use County Data)

The region is commonly identified with the pattern of eleven lakes known as the Finger Lakes. Eight of the eleven lakes are within the Finger Lakes Region (see **Figure 3-9**) specifically identified by regional planning efforts as well as this project. From west to east, they are:

1. Conesus Lake
2. Hemlock Lake
3. Canadice Lake
4. Honeoye Lake
5. Canandaigua Lake
6. Keuka Lake
7. Seneca Lake
8. Cayuga Lake

Figure 3-9 shows both the Genesee River and Finger Lakes watershed boundaries. Owasco, Skaneateles and Otisco lakes are located to the east in the Central New York Region. In addition to the Finger Lakes, the region has the following major waterbodies:

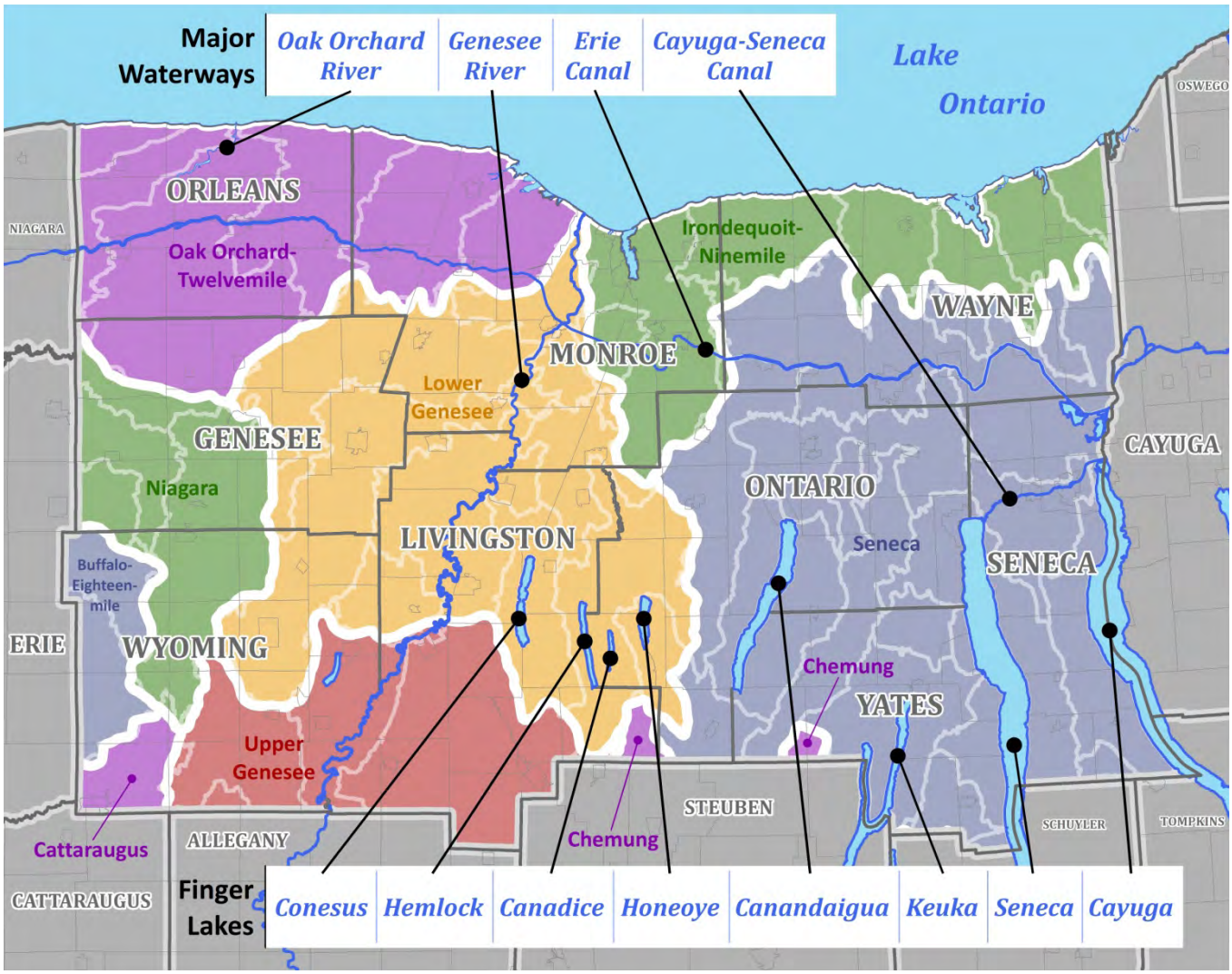

Figure 3-9: Watersheds, Subwatersheds, and Major Waterbodies

- Lake Ontario
- Genesee River
- Oak Orchard River
- Erie Canal
- Cayuga-Seneca Canal

The region also has several smaller surface water bodies – Silver Lake, Sodus Bay, Irondequoit Bay, and multiple creeks. Additional water resources include groundwater and infrastructure systems for water supply and wastewater.

During the past few decades, water quality monitoring has increased and the region has shown a renewed interest in protecting its valuable water resources. NYSDEC monitors surface water quality in compliance with the Clean Water Act Section 303(d). NYSDEC identifies the sources of impairment for any water bodies that do not meet the applicable standards. There are currently 49 impaired waters in the region. Within the Finger Lakes, the greatest concern is the concentration of phosphorus and nitrogen.

The BEACH Act of 2000 requires that coastal and Great Lakes states and territories report to the United States Environmental Protection Agency on beach monitoring and notification data for their coastal recreation waters. Each summer, bathing beaches on Lake Ontario are monitored for bacteriological indicator levels. In 2010, 17% of the region's beach water quality samples exceeded state thresholds. With regard to the individual Finger Lakes, the focus has been on the presence of invasive species and the concentrations of pollutants, particularly phosphates and nitrates.

Watershed Management Planning

Several entities have formed to promote the protection of water resources and, where applicable, develop management plans for water bodies and watersheds. These organizations include the Great Lakes Compact (Great Lakes-St. Lawrence River Basin Water Resources Compact), Stormwater Coalition of Monroe County, Canal Recreation Commission, Conesus Lake Watershed Council (CLWC), Canandaigua Lake Watershed Council, Honeoye Lake Task Force, the Cayuga Lake Watershed Intermunicipal Organization, the Niagara Orleans Regional Alliance, the Black Creek Watershed Coalition, and the Oatka Creek Watershed Committee. Several of these intermunicipal organizations have been successful in both planning and implementation through the development of intermunicipal agreements. In addition, several of the aforementioned watershed organizations are members of the Finger Lakes Regional Watershed Alliance (FLRWA). The FLRWA was formed to tap into the collective expertise and objectives of the various smaller watershed organizations in order to establish a broader regional voice and to coordinate mutually beneficial initiatives.

These coalitions highlight the fact that water resources cross municipal boundaries as depicted in the map of watersheds and sub-watersheds. One example is the Stormwater Coalition of Monroe County which includes 29 municipalities working together to comply with federal standards and improve water quality. The Stormwater Coalition implements several programs including public education, training for municipal employees and the land development community, demonstration projects, technical assistance with permits, investigations of illegal discharges, and assessments of municipal facilities.

Another example of an intermunicipal coalition is the Seneca Lake Watershed Management Plan Advisory Committee. The Seneca Lake watershed is the largest in the region, encompassing

approximately 457 square miles, 40 municipalities and five counties, extending beyond the region's boundaries. The watershed management plan process includes outreach and education, the development of a Memorandum of Understanding for intermunicipal cooperation and a review of local laws.

Water Management Education/Resources
Recognizing the need to implement the recommendations of watershed planning efforts, the G/FLRPC conducted an assessment of ordinances and practices in municipalities within three watersheds. This information was used to develop the publication entitled *Protecting Water Resources through Local Regulation: A Manual for New York Municipalities*. In addition, G/FLRPC conducted a series of workshops to stress the importance of local development controls as a means for addressing non-point sources of pollution, as well as to provide information and examples of local laws and controls appropriate to a variety of local circumstances. The Plan encourages the continued efforts and success of these organizations to support and guide the implementation of recommendations at the local level. Additional support for these efforts is provided by the Watershed Improvement District Authorization Act, passed in June 2012, which authorizes towns to create local funding mechanisms to protect rivers, lakes, streams and ground water aquifers.

Promoting a better understanding of the value of our water environment will encourage respect of a resource that can easily be taken for granted.

Challenges, Variables, and Opportunities

There will be several challenges to implementing strategies outlined in this Plan. The region is divided into many municipalities, each with their own sets of codes and standards. These municipal boundaries are drawn irrespective of watershed boundaries (see **Figure 3-9**). In order to effectively protect water quality, management practices should be consistent throughout the watersheds of those water bodies.

Because land use policy and development regulations are implemented at the local level, there is a need for individual municipalities to continue to work to implement the strategies identified by the work of the regional coalitions. There is a need to continue to provide education and training to local planning and zoning boards and elected legislative bodies. This would include the continuation and expansion of training and technical assistance offered through the G/FLRPC's biannual Regional Local Governments Workshop series, NYSP2I, the Stormwater Coalition of Monroe County, the Monroe County Department of Planning and Development biannual Land Use Decision-Making Program, and other organizations. To address this challenge, the Plan seeks to promote education, awareness, municipal cooperation and the availability of resources and technical assistance.

An additional challenge will be to protect, promote, and understand the value of our water reservoirs, watercourses, and built infrastructure. Although fresh water is plentiful and there has been continued reinvestment in infrastructure to ensure system integrity, it is still important to protect and promote the value of the region's water resources. Several participants in the Regional Leaders Forum highlighted the value of water and that water conservation is one of their top sustainability focus areas.

Several variables could affect the ability to implement this Plan, including an increase in demand, decrease in the supply, a natural disaster involving water, or the failure of a component of the built infrastructure. Generally, if some event heightens the awareness of the vulnerability of the region's water or increases the perceived value of water, the implementation of this portion of the

Plan should be easier. Conversely, if the perceived value of water decreases, it would be more difficult to gather support for additional efforts. The Plan promotes the inventory of water resources, tracking of water quality and education and promotion of the value of this resource. In addition, the Plan promotes the maintenance and improvement of the existing water infrastructure.

From an aesthetic and recreational perspective the water resources are already highly valued. However, this is also a challenge since the valuation tends to drive up land values in the areas on and around the water. There is a need to continue to provide public access to this regional resource to maintain and improve the quality of life for residents as well as support tourism and economic development. An example of this is the *Irondequoit Bay Harbor Management Plan* which serves as an addendum to the Local Waterfront Revitalization Plans (LWRPs) adopted by the Towns of Irondequoit, Penfield and Webster. The Plan addresses resource protection, water surface conflicts, public access and economic development.

In the Finger Lakes, improving and protecting the water environment will improve and protect the region's identity. Promoting a better understanding of the value of our water environment will encourage respect of a resource that can easily be taken for granted. Producing fresh, clean water requires energy. Conserving water and efficiently delivering it will also conserve energy.

Indicators and Targets

The Water Management Stakeholder Group steered the establishment of Indicators and Targets using the Regional Guiding Principles as a foundation for their work. The identification of Indicators and Targets took place over the course of the first three Stakeholder meetings. The focus of Stakeholder Group discussions was on ecosystem viability and natural conservation, water quality, water conservation, the importance of intermunicipal cooperation and implementation of consistent management practices. The group identified water use and water quality as the two most significant factors to measure and track progress towards the Water Management Goal. With regard to water quality, the Group felt it was important that the Indicators be tailored to reflect the factors most important to the region including beach water quality and the concentration of phosphates and nitrogen in the Finger Lakes.

Indicators

- Water demand per capita (per 1,000 people)
- Total number of impaired waters
- % of beach water quality samples exceeding state thresholds
- Number of impaired waters with established Total Maximum Daily Load (TMDL) requirements
- Concentrations of pollutants in the Finger Lakes

The baseline values for these Indicators are shown in the Summary Sheet at the end of this section, as well as Targets for short (2020), mid (2035), and long-term (2050) timeframes. A table of representative Sub-strategies/Project Ideas and Representative Projects that contribute to the implementation of these Broad Strategies is also provided in the Summary Sheet.

Sustainability Goal and Strategies

Water Management Goal

Improve and protect the water environment with respect to quality, quantity, and availability; promote and understand the value of our water reservoirs, watercourses, and built infrastructure; maximize the social, economic, and ecological potential of our water resources toward equitable sharing of their benefits for both the short and long terms.

The following is a description of each Broad Strategy that supports the Water Management Goal. Representative Sub-strategies are provided as examples of specific measurable activity that could be implemented to support the Broad Strategy. At the end of the Water Management Section there is a Summary Sheet that provides a more comprehensive list of representative Sub-strategies/Project Ideas and Representative Projects that contribute to the implementation of these Broad Strategies.

Broad Strategy WM1 | Inventory, monitor and educate to create a better understanding of the region's water resources.

A significant focus of sustainable water management is understanding the existing water quality and educating policy makers and the public on the importance of protecting and improving this valuable resource.

This Broad Strategy aligns with the FLREDC Regional Strategy to:

- Invest in Community, Industrial Development & Infrastructure
  - Seek to invest in water resource-related projects that enhance water access, retain water quality and increase water safety.

Prioritization
This strategy was prioritized since it is strongly aligned with the Vision and Regional Guiding Principles, including direct support of the following Principles:

- Preserve, protect, and improve natural resources and the link between natural systems
- Improve public health
- Build sustainable capacity and understanding through outreach and education

This Broad Strategy should benefit 4 Subject Areas: Energy, Water Management, Agriculture & Forestry, and Climate Change Adaption and it will also enhance all Five Capitals, as outlined in Section 3.1. Implementation will be straight forward, but will require diligent follow-through. The financial feasibility is strong in that this strategy will not be particularly expensive, but will require consistency in approach. Finally this strategy will continue to support and improve partnerships between local governments, the private sector, and institutions like the New York State Pollution Prevention Institute (NYSP2I).

Potential Stakeholders and Resources
The implementation of this strategy will involve multiple stakeholders including local planning boards, county planning departments, county Environmental Management Councils (EMC), the Genesee/Finger Lakes Regional Planning Council (G/FLRPC), watershed management coalitions, water authorities, and non-profit organizations. Potential funding sources include the Environmental Protection Fund, water authorities, and non-profit organizations. Research and outreach organizations, including the NYS Water Resources Institute (WRI) at Cornell University and the New York State Pollution Prevention Institute (NYSP2I) at Rochester Institute of Technology, may also support implementation and funding.

Challenges and Sub-strategies
The primary challenge to this strategy is collecting the data and maintaining a repository of information to provide a better understanding of the

region's resources and help to prioritize projects, programs and outreach efforts. The two Sub-strategies identified above were developed to mitigate this challenge.

Sub-strategy 1.1 | *Develop a Natural Resources Inventory (NRI) to identify high priority water resources and prioritize protection and natural resource projects.*

This Sub-strategy is aligned with the following FLREDC Regional Strategy:

- Strengthen Academic and Industry Partnerships
  - Develop programs and shared resources that allow closer collaboration between academic and industry scientists.
  - Streamline and accelerate the maturation, transfer, and commercialization of university-based intellectual property; build a regional ecosystem that more effectively harnesses university-based innovation, with a particular focus on fostering the creation and growth of early-stage companies.

A natural resources inventory (NRI) of water resources might include lists of impaired waters and their sources of impairments, locations of water resource problems not identified by environmental agencies, a log of complaints received from citizens, a list of waterbodies with high perceived value and the potential threats to that value, and waterbodies/locations where environmental agencies have written citations. An NRI can be a valuable tool for local governments to use when evaluating the sustainability of development projects and can be used to prioritize water quality improvements projects.

Inventories may be developed by local planning boards, county planning departments, county Environmental Management Councils (EMC), or watershed management coalitions. The inventory may be a standalone project or it could be included as part of a comprehensive or watershed planning effort. Examples of this Sub-strategy include the NRI developed by the Livingston County EMC and the Genesee Green Roadmap project being conducted by Genesee County.

Natural resources inventories are best conducted at the county or regional levels, with input from local officials, environmental agencies, educational institutions, and interested parties. It is important to receive input from a variety of sources in order to best capture the wide range of information.

Sub-strategy 1.2 | *Continue to implement monitoring programs over time and use this data in education and outreach efforts.*

This Sub-strategy is aligned with the following FLREDC Regional and Sector Strategies:

- Strengthen Academic and Industry Partnerships
  - Develop programs and shared resources that allow closer collaboration between academic and industry scientists.
- Tourism and the Arts
  - Strengthen and support the development of the Finger Lake's diverse water resources and recreational tourism opportunities, allowing greater access and promoting year-round use.

Implementation of this Sub-strategy would include tracking and recording trends of USGS compiled "Water Use County Data" (water consumption by various uses – domestic, industrial, irrigation, etc); data on water quality (concentrations of various pollutants in waterbodies); and invasive species data. These types of data can be used to track water

quality and provide indications that water quality might be threatened. Examples of this Sub-strategy include Monroe County Water Authority's *Annual Water Quality Report*, the Annual Monitoring Program through the Conesus Lake Watershed Council, the Center for Environmental Initiatives (CEI) water quality monitoring efforts, and the work of the Finger Lakes Partnership for Regional Invasive Species Management (PRISM).

Participants may include water authorities, educational institutions, county planning departments, county EMCs, watershed management coalitions, and non-profit organizations. One education/outreach effort is the development of a water page on the sustainable-fingerlakes.org website to provide a single resource for the region. This page would provide information on the NRI as well as links to information on water monitoring programs. The development of this page would be the responsibility of the Regional Plan Coordinator as identified in Section 4, Plan Implementation.

Sub-strategy 1.3 | *Quantify the current state of the water balance in the Finger Lakes Region (e.g., repository of rainfall/runoff data models).*

This Sub-strategy is aligned with the following FLREDC Regional Strategy:

- Strengthen Academic and Industry Partnerships
  - Develop programs and shared resources that allow closer collaboration between academic and industry scientists.
  - Streamline and accelerate the maturation, transfer, and commercialization of university-based intellectual property; build a regional ecosystem that more effectively harnesses university-based innovation, with a particular focus on fostering the creation and growth of early-stage companies.

As an example, the Town of Skaneateles (in Onondaga County, outside the region) requires all development applicants to update the town's master hydrologic model as part of the project review process. If a model does not exist, the applicant is required to create a new model. The result is a constantly improving set of information, at no cost to the town. The collection and management of available information as well as information prepared by others can provide stakeholders with a valuable informational and planning tool.

Rainfall-runoff models are being prepared constantly by municipalities, developers, educational institutions, and other agencies. Many of these models are public information, being prepared with taxpayer funding or as part of applications for permits. The collection and combination of this information into an encompassing data set would minimize the duplication of this information for watershed-wide study, planning, and design efforts. An encompassing data set could be used by the region to better understand and manage the water environment. Because land-use and site plan approval is administered at the local level, the most effective implementation of this Sub-strategy should focus on cooperation of towns, villages, and cities.

Broad Strategy WM2 | Promote regional standardization of regulations and management.

There is a need for regional collaboration to promote the standardization of water resource management practices across villages, cities, towns

and counties. Water resource management strategies should consider all water-related assets and opportunities as well as challenges and variables. Water resource management strategies should also consider their relationship to each of the tenets of sustainability.

Prioritization
Like the first Broad Strategy, this strategy was prioritized since it benefits multiple Subject Areas and capitals and is strongly aligned with the Vision and the following regional Guiding Principles:

- Preserve, protect, and improve natural resources and the link between natural systems
- Improve public health
- Build sustainable capacity and understanding through outreach and education
- Build partnerships between local governments, the private sector, regional institutions and the public
- Bring the Finger lakes Region together through a shared identity and common goals

Potential Resources
The implementation of this strategy will involve multiple stakeholders including watershed management coalitions, local planning boards, county planning departments, and the G/FLRPC. The Department of State provides technical and financial assistance for the preparation and implementation of Local Waterfront Revitalization Programs and watershed management plans through the Environmental Protection Fund Local Waterfront Revitalization Program, Clean Water/Clean Air Bond Act, and Great Lakes Coastal Watershed Restoration Program. The establishment of a Watershed Protection Improvement District is a potential dedicated, local funding source. Research and outreach organizations, including the NYS Water Resources Institute (WRI) at Cornell University and the NYSP2I at the Rochester Institute of Technology, may also support implementation and funding.

Challenges and Sub-strategies
There is a need to provide training and technical resources to support local municipalities as they implement the strategies identified by the work of the regional coalitions. To address this challenge, the second Sub-strategy was developed to promote education, awareness, municipal cooperation and the availability of resources and technical assistance.

Sub-strategy 2.1 | *Continue to support the development, update and implementation of watershed management plans.*

This Sub-strategy is aligned with the following FLREDC Regional and Sector Strategies:

- Invest in Community, Industrial Development & Infrastructure
  - Seek to invest in water resource-related projects that enhance water access, retain water quality and increase water safety.
- Tourism and the Arts
  - Strengthen and support the development of the Finger Lake's diverse water resources and recreational tourism opportunities, allowing greater access and promoting year-round use.

The Department of State's Intermunicipal Watershed Management Program provides municipalities with professional expertise and funding to develop and implement watershed management plans to protect and restore water quality and related resources. The Intermunicipal Watershed Management Program focuses on identifying connections between land use and water quality to reach consensus on actions to protect water resources while facilitating economic development and guiding growth to the most appropriate locations.

As noted in the Water Management Existing Conditions section, eight entities have been formed within the region to support the development and implementation of watershed management plans. A successful example of this Sub-strategy is the Conesus Lake Watershed Council (CLWC) which was awarded the 2011 New York Upstate Chapter of the American Planning Association's Planning Excellence Award for Implementation of their watershed management plan. It is important to note that watersheds cross municipal boundaries. The effective creation, implementation, and long-term maintenance of watershed management plans requires cooperation between the local municipalities that ultimately approve land-use decisions.

The continued implementation of these plans occurs at the municipal level, and needs to be consistent from municipality to municipality in order to be effective. This can be aided with inter-municipal agreements, coalitions, memoranda of understanding, and other cooperative arrangements, but ultimately depends on "buy-in" and supportive actions of local municipalities.

A proposed implementation of this Sub-strategy would be the creation of a Genesee River Institute. This would involve convening a group representing agencies, universities, and organizations that are involved in water quality management, floodplain management, emergency mitigation, recreation, public education, and economic development with an interest in the Genesee Region watershed. This group would be charged with founding the Genesee River Institute, modeled in part on the Finger Lakes Institute in Geneva, NY. The Finger Lakes Institute (FLI) is dedicated to the promotion of environmental research and education about the Finger Lakes and surrounding environments. In collaboration with regional environmental partners and state and local government offices, the Institute fosters environmentally-sound development practices throughout the region, and disseminates accumulated knowledge to the public.

Sub-strategy 2.2 | *Provide training and technical resources to support local government in the implementation of land use regulations to protect water resources and mitigate flooding.*

This Sub-strategy is aligned with the FLREDC Specific Strategy "Tourism and the Arts" which includes "strengthen and support the development of the Finger Lakes' diverse water resources and recreational tourism opportunities, allowing greater access and promoting year-round use.

This could be accomplished through a deliberate effort to include relevant sessions in training seminars that are conducted as part of regional initiatives. A recent example includes the "Environmental Considerations for Development in the Keuka Watershed, Land Use in the Keuka Watershed" training that was provided during the Second Annual Workshop and Training Program, Penn Yan on March 26, 2012. The workshop, sponsored by the Keuka Lake Watershed Land Use Leadership Alliance (LULA) and The Keuka Watershed Improvement Cooperative (KWIC), was a free of charge, three-hour accredited workshop and training program for planning and zoning board members in the municipalities surrounding Keuka Lake. Topics covered include: making decisions for land use in the Keuka Watershed; open space preservation and conservation in the Keuka Watershed; and environmental considerations for development in the Keuka Watershed. The Genesee/Finger Lakes Regional Planning Council (G/FLRPC) has also provided extensive training seminars for various water-related purposes at various locations.

There is a need to continue to provide training sessions and resources on watershed planning through the G/FLRPC's biannual Regional Local Governments Workshop series, the Monroe County Department of Planning and Development biannual Land Use Decision-Making Program and other organizations like watershed alliances. Another example of this Sub-strategy could include the enhancement of sustainable-fingerlakes.org to include a water page with educational material including links to other regional watershed management plans and the Finger Lakes Regional Watershed Alliance.

Sub-strategy 2.3 | *Promote community vision planning to focus development in existing centers and preserve open space.*

This Sub-strategy is aligned with the FLREDC Specific Strategy "Tourism and the Arts" which includes "strengthen and support the development of the Finger Lake's diverse water resources and recreational tourism opportunities, allowing greater access and promoting year-round use."

New impervious surfaces are not beneficial to the water environment. In lieu of creating new impervious surfaces as part of development, the re-use of existing impervious surfaces supports several areas of focus in this plan. Because land-use and site plan approval is administered at the local level, the most effective implementation of this Sub-strategy should focus on cooperation of towns, villages, and cities. To promote livability corridors and nodal development, programs and incentives should be established to make developing existing centers a more viable option for public and private investors.

An example of this strategy is the effort to preserve and strengthen the Eastman Business Park (EBP), identified as a transformational priority project in the FLREDC 2012 Progress Report. EBP occupies approximately 1,200 acres in the City of Rochester and Monroe County. As Eastman Kodak emerges from bankruptcy the sustainability of EBP as a national center of manufacturing and commerce hinges on the continued operation of the unique utility infrastructure present (railroad, dedicated power generation, water and wastewater processing and treatment facilities), the creation of economic conditions needed to both attract and retain tenants and buyers, and successful transition of environmental obligations and permitting requirements.

Identification and resolution of issues that may be barriers to the EBP's sustainability and viability is essential. Reinvestment in the comprehensive existing available utility infrastructure and redevelopment of the industrial and commercial land within EBP is needed to ensure that one of the nation's premier industrial redevelopment sites achieves its potential to be attractive to high tech and manufacturing companies. Municipalities should continue to identify opportunities to focus development in areas where there is existing infrastructure.

EASTMAN Business Park

Community vision planning should be performed by local municipalities, given that they are the entities that ultimately make land-use decisions. This vision planning will be even more effective if it can be done amongst several adjacent municipalities, to encourage a more collaborative, balanced, and thorough approach.

Broad Strategy WM3 | Preserve existing ecosystem services and promote green infrastructure to reduce reliance on grey infrastructure.

Uncontrolled stormwater runoff creates an increased reliance on built infrastructure. Higher volumes of faster moving water result in increased costs to treat potable water, increased costs to convey water around valuable infrastructure, and increased costs to treat inflow and infiltration to sanitary sewers. There is a need to improve watershed quality, increase habitat, and reduce stormwater flows to treatment facilities.

This Broad Strategy is aligned with the following FLREDC Regional and Sector strategies:

- Invest in Community, Industrial Development & Infrastructure
  - Seek to invest in water resource-related projects that enhance water access, retain water quality and increase water safety.
- Tourism and the Arts
  - Strengthen and support the development of the Finger Lake's diverse water resources and recreational tourism opportunities, allowing greater access and promoting year-round use.

Prioritization
This strategy was prioritized since it benefits multiple Subject Areas and capitals and is strongly aligned with the Vision and the following regional Guiding Principles:

- Preserve, protect, and improve natural resources and the link between natural systems
- Improve public health
- Build sustainable capacity and understanding through outreach and education
- Reduce energy consumption

The treatment of stormwater requires a significant amount of energy. Through the implementation of green infrastructure, the demand for treatment will be reduced and will therefore require less energy.

Potential Stakeholders and Resources
As noted in the Sub-Strategies, implementation of this Broad Strategy will include a number of stakeholders: watershed management coalitions, the Monroe County Stormwater Coalition, local planning boards, county planning departments, the Genesee/Finger Lakes Regional Planning Council (G/FLRPC) and private developers. It will also require funding through the New York Environmental Protection Fund and innovative partnerships with NYSP2I, the Center for Environmental Initiatives (CEI), Rochester Museum and Science Center and the Golisano Institute for Sustainability (GIS).

Challenges and Sub-strategies
The primary challenge to this strategy is the need to provide education and outreach at all levels. The two Sub-strategies outlined above have been developed to mitigate this challenge. One primary education component is to be able to implement pilot projects that validate new technology. Outreach to educate stakeholders on best management practices is critical to their wide scale implementation on.

Sub-strategy 3.1 | *Encourage Net Zero pervious surfaces.*

As stated previously, new impervious surfaces are not beneficial to the water environment. Based on available research, the minimization of new impervious surfaces, or the specific prohibition of the increase of impervious surfaces should slow long-term degradation of water quality in many waterbodies. Because land use and site plan approval is administered at the local level, the most effective implementation of this Sub-strategy should focus on cooperation of towns, villages, and cities.

An example of progress towards the implementation of this Sub-strategy is the long-term recommendations of the Shipbuilders Creek Stormwater Assessment and Action Plan, a pilot plan of the Monroe County Stormwater Action Plan, written under the direction of the Stormwater Coalition of Monroe County. The Plan

recommends that the towns of Webster and Penfield adopt a stormwater ordinance that requires new development to incorporate better site design principles including infiltration and recharge of stormwater runoff, in accordance with the NYS Stormwater Management Design Manual.

This type of regulation should be performed by local municipalities, given that they are the entities that ultimately make land-use decisions. These regulations will be even more effective if it can be done in concert with adjacent municipalities and supported by their respective counties, to encourage a more collaborative, balanced, and thorough approach.

Sub-strategy 3.2 | *Provide financial incentives to increase green infrastructure or reduce the amount of stormwater runoff.*

As previously noted, current NYSDEC stormwater regulations encourage the use of green infrastructure. Funding, to implement green infrastructure projects, is available through the New York state Environmental Facilities Corporation (EFC) Green Infrastructure Grant Program (GIGP). The Town of Williamson secured this funding for a project which included a 60 kW solar (photovoltaic) array, 1200 square feet of green roof, and the installation of a below-ground storage tank and yard hydrant to recycle rainwater.

This GIGP state funding stream is well-established, and should continue to be utilized and promoted by utility providers. The creation of new funding streams would promote the increased installation of these practices. As an example, Onondaga County (outside the region) provides stand-alone funding to local municipalities and businesses for green infrastructure projects as part of their "Save the Rain" program.

This type of program can be performed by local municipalities, counties, regional entities, and the state. When these types of programs are initiated by higher levels of government, they are often better organized, better funder, and stand a better chance of becoming sustained.

Sub-strategy 3.3 | *Explore use of natural systems for wastewater treatment.*

This Sub-strategy is aligned with the FLREDC Regional Strategy "Invest in Community, Industrial Development & Infrastructure" which includes "seek to invest in water resource-related projects that enhance water access, retain water quality and increase water safety."

This Sub-strategy involves support for regional institutions involved in the research and development and implementation of pilot projects to validate effectiveness. Green infrastructure is a network of natural and engineered systems that mimic natural processes to provide ecosystem services. Stormwater runoff is managed by maintaining or restoring natural hydrology and allowing stormwater to infiltrate and be used by plants. In August 2010, the New York State

Stormwater Management Design Manual was updated to incorporate green infrastructure requiring it consideration for new development. Research funding sources include the NYS Department of Environmental Conservation. An example of research in this area was the funding by NYSP2I of the Evaluation of a Green Courtyard: Stormwater Reduction and Treatment to Mitigate Impact of Atmospheric Discharges of Aluminum Industry (fluoride and aluminum).

Implementation of green infrastructure may be undertaken by all levels of government as well as private property owners. Wastewater treatment is typically regulated by counties. As a result, most efforts related to wastewater treatment will be most effective when the counties are involved. Support from local municipalities and regional entities such as the Stormwater Coalition of Monroe County would be both appropriate and helpful.

Sub-strategy 3.4 | *Improve on-site wastewater treatment systems.*

Aging or improperly designed/installed septic systems can result in pollution of both groundwater and surface water. The improvement of poorly performing on-site wastewater systems would directly benefit the water environment. As an example, the counties of Schuyler, Steuben, Chautauqua and Cattaraugus (all outside the region) were awarded funding from the NY Homes and Community Renewal (HCR) to improve substandard and failing septic systems.

Wastewater treatment is typically regulated by counties. As a result, most efforts related to wastewater treatment will be most effective when the counties are involved. Support from local municipalities and regional entities such as the Stormwater Coalition of Monroe County would be both appropriate and helpful.

Sub-strategy 3.5 | *Support invasive species management programs.*

Invasive species present a constant and changing danger to the region's water resources. Invasive species can disrupt the balance of an ecosystem through their competitive and adaptive advantages. Some threats are well-know, such as those associated with zebra mussels, several species of weeds, and some types of carp. As new species are introduced to the region's water environment, additional unknown threats are possible.

Efforts to support this Sub-strategy could begin with the support of the Finger Lakes PRISM (Partnership for Regional Invasive Species Management). PRISM is a cooperative partnership of diverse stakeholders from throughout the central region of New York State. The PRISM seeks to reduce the impacts of invasive species on Central New York through prevention, early detection and rapid response, public outreach and education, and in specific instances, through focused ecologically sound control and management activities. The Finger Lakes PRISM covers 17 New York counties: Broome, Cayuga, Chemung, Chenango, Cortland, Livingston, Madison, Monroe, Onondaga, Ontario, Schuyler, Seneca, Tompkins, Tioga, Steuben, Wayne, and Yates. The Conesus Lake

Watershed Council initiated the development of an Invasive Species Management Plan which is meant to serve as a reference for problem solving and decision making throughout the invasive species management process. The Management Plan focuses on prevention, monitoring, and early detection and rapid response to invasive species in Conesus Lake.

Local municipalities, counties, regional entities, and watershed management organizations should support efforts like those of PRISM and the Conesus Lake Watershed Council.

Sub-strategy 3.6 | *Promote the implementation of best management practices for water quality (i.e. highway and agriculture).*

This Sub-strategy is aligned with the FLREDC Regional Strategy "Invest in Community, Industrial Development & Infrastructure" which includes "Seek to invest in water resource-related projects that enhance water access, retain water quality and increase water safety."

An example of this Sub-strategy is the work of the Water Education Collaborative (WEC). WEC is a coalition of organizations that work together to increase water quality to help protect and improve water quality in the streams and other water bodies of the Genesee Region watershed with the ultimate goal of protecting Lake Ontario. A primary focus of the WEC's message is to encourage best management practices to household pollutants out of these storm drains. The WEC's award winning H2O Hero campaign is designed to raise awareness and educate the community on how our everyday activities impact our water quality, since more than 80% of water pollution problems stem from residential areas, not industrial areas.

The implementation of Agricultural Best Management Practices in the region is promoted through the NYS Soil & Water Conservation Committee's Agricultural Environmental Management (AEM) program. There is a need to continue to support the efforts of county soil and water conservation districts by continuing the AEM Base Funding Program and the Agricultural Nonpoint Source Abatement & Control Grant Program.

The implementation of this strategy will involve multiple stakeholders including watershed management coalitions, the Stormwater Coalition of Monroe County, local planning boards, county planning departments, and the G/FLRPC. Educational material and case studies of best management practices could also be included on the water page of the sustainable-fingerlakes.org.

Sub-strategy 3.7 | *Implement stream and riparian restoration projects identified in watershed management plans.*

An example of this Sub-strategy is the proposed project along South Lake Road near Canandaigua Lake in the Town of Middlesex in Yates County. Multiple sites and projects have been identified on South Lake Road where erosion and bank restoration, and improved drainage are required to mitigate flooding in steep slope areas. The Town of Middlesex has completed an engineering study that identifies areas of concern, proposes improvements, and estimated costs. This project is identified in the Yates County Hazard Mitigation Plan.

The implementation of this strategy will involve multiple stakeholders including watershed management coalitions, the Monroe County Stormwater Coalition, local planning boards, county planning departments, and the G/FLRPC.

Broad Strategy WM4 | Through water conservation, ensure adequate timing and flow of water in streams, rivers, lakes and aquifers for sustainable use for people, industry, energy and nature.

Treating wastewater and potable water requires large amounts of energy and energy production requires vast amounts of water. However, moving

water can provide energy (hydropower). The focus of this Broad Strategy is to make the relationship of energy and water more beneficial to the region.

Prioritization
Like the other Water Management Broad Strategies, this strategy was prioritized since it benefits multiple Subject Areas and capitals and is strongly aligned with the Vision and the following regional Guiding Principles:

- Preserve, protect, and improve natural resources and the link between natural systems
- Improve public health
- Build sustainable capacity and understanding through outreach and education
- Reduce energy consumption

There is a cyclical relationship between energy and water. Energy is needed to pump, transport, and treat drinking water and wastewater and water is needed in energy production. Therefore water conservation efforts will contribute to a reduction in energy demand and a reduction in energy demand will reduce water consumption.

Potential Stakeholders and Resources
Stakeholders in the implementation of this Broad Strategy will include water-related utilities, private industries, and research and development and outreach organizations including GIS, FAME, MACNY and NYSP2I.

Potential funding is available through various NYSERDA programs, the Green LEED Bill and private funding sources, including businesses and residents implementing energy efficiency and water conservation programs.

Challenges and Sub-strategies
The primary challenge to this strategy is the need to provide water conservation education and outreach at all levels. The first Sub-strategies outlined above, as well as two additional Sub-strategies on education and promotion in the summary table has been developed to mitigate this challenge. One primary education components is to be able to implement pilot projects that validate new technology. Outreach to educate stakeholders on best management practices is critical to their wide scale implementation.

Sub-strategy 4.1 | *Support organizations that can improve water-related energy practices.*

This Sub-strategy is aligned with the following FLREDC Regional Strategy:

- Strengthen Academic and Industry Partnerships
  - Develop programs and shared resources that allow closer collaboration between academic and industry scientists.
  - Streamline and accelerate the maturation, transfer, and commercialization of university-based intellectual property; build a regional ecosystem that more effectively harnesses university-based innovation, with a particular focus on fostering the creation and growth of early-stage companies.

Within the industry sector, there is interest in reducing water consumption through advanced manufacturing and improvements to the existing infrastructure, however seed funding and pilot projects are needed to validate the technology and support implementation.

There is a need to leverage, support and promote regional organizations that provide research and education in energy efficiency and water conservation as they relate to industry practices.

Organizations that have been and will continue to be involved in the implementation of this strategy include the RIT's Golisano Institute for Sustainability (GIS), Finger Lakes Advanced Manufacturer's Enterprise (FAME), Manufacturers Association of Central New York (MACNY), and New York State Pollution Prevention Institute (NYSP2I).

Sub-strategy 4.2 | *Decrease energy use by water-related utilities.*

This Sub-strategy is aligned with the FLREDC Regional Strategy "Invest in Community, Industrial Development & Infrastructure" which includes "seek to invest in water resource-related projects that enhance water access, retain water quality and increase water safety."

Energy is needed to pump, transport, and treat drinking water and wastewater. The generation of energy at many of today's power plants requires cooling water. Therefore, a reduction in energy demand by water related utilities will support water conservation efforts. New and improving technologies provide opportunities to improve efficiency. Close monitoring and continual evaluation of equipment and practices will identify the best opportunities for upgrades. The Town of Williamson implemented this strategy at the town-owned wastewater treatment plant. The Town installed solar panels to lower dependency on non-renewable energy sources and installed a green roof and water storage to recycle rainwater for non-potable uses. The project was an implementation measure of the Town's Sustainability Plan that is designed to lower operating costs and reduce the Town's carbon footprint.

This Sub-strategy can be implemented by utility providers, which can be counties, local municipalities, and authorities.

Sub-strategy 4.3 | *Generate renewable energy from used water.*

This Sub-strategy is aligned with the following FLREDC Regional and Sector Strategies:

- Invest in Community, Industrial Development & Infrastructure
  - Seek to invest in water resource-related projects that enhance water access, retain water quality and increase water safety.
- Energy Innovation
  - Encourage energy companies to expand and relocate to the region through the development of shovel-ready sites and other incentives; create the resources and infrastructure that will accelerate R&D and commercialization of new energy technologies.

Used water contains varying amounts of energy. Where used water contains enough energy, it is possible to capture and use this energy. As an example, the City of Syracuse (outside the region) used EFC GIGP funding to install a 50 kW packaged hydraulic microturbine, generator, and an electrical wiring/control system to continuously produce electricity from hydrokinetic forces (excess head) in the water pipeline.

This Sub-strategy can be implemented by utility providers, which can be counties, local municipalities, and authorities.

Sub-strategy 4.4 | *Promote and educate businesses and residents on water reuse and reducing water use.*

This Sub-strategy is aligned with the FLREDC Regional Strategy to "Invest in Community, Industrial Development & Infrastructure" which includes "seek to invest in water resource-related projects that enhance water access, retain water quality and increase water safety."
If the volume of potable water use can be reduced, GHG emissions resulting from water treatment, treatment costs, and withdrawals from the region's natural reservoirs can be reduced. The education of the public can be strengthened through the distribution of information similar to the publication: *Protecting Water Resources Through Local Controls and Practices: An Assessment Manual for New York Municipalities* that was published by the G/FLRPC in June of 2006.

The Finger Lakes Region is fortunate to have institutions, including RIT's Golisano Institute for Sustainability and NYS P2I, which are already working to develop educational programs, pilot projects, and conduct research to promote water conservation. The Stormwater Coalition of Monroe County implements several programs including public education, training for municipal employees and the land development community. At the state level, NYSDEC offers Environmental Education Lesson Plans. All of the lesson plans, available for grades Pre-K through 12, offer information on water topics including conservation.

There is a need to promote the availability of existing resources and provide financial support for their enhancement. Promotion could include links to these existing resources through the water page of sustainable-fingerlakes.org.

Broad Strategy WM5 | Maintain and improve the functionality and efficiency of the water supply and wastewater infrastructure systems.

The renewal and replacement of infrastructure assets is a constant and on-going task; therefore, asset management for water and wastewater systems is essential for long-term system reliability.

Prioritization
Like the Water Management Broad Strategy W4, this strategy was prioritized since it benefits multiple Subject Areas and capitals and is strongly aligned with the Vision and Regional Guiding Principles:

- Preserve, protect, and improve natural resources and the link between natural systems
- Maintain, protect and improve the functionality and climate change/disaster resiliency of existing infrastructure systems and acknowledges the links between systems
- Reduce energy consumption

In addition to protection and enhancement of the natural system through water conservation, this strategy also supports the protection and improvement of the built infrastructure.

Potential Stakeholders Resources
The strategy will primarily be implemented through regional water and sewer authorities. A potential funding source is the Clean Water State Revolving Fund (CWSRF) Engineering Planning Grant program through the New York State Department of Environmental Conservation in cooperation with the New York State Environmental Facilities Corporation. The USDA Rural Development financial programs also support public facilities and services including water and sewer systems. Its Water and Environmental Programs (WEP) provides loans, grants and loan guarantees for drinking water, sanitary sewer, solid waste and storm drainage facilities in rural areas and cities and towns of 10,000 or less.

Challenges and Sub-strategies
There is a need to continuously maintain and improve the aging infrastructure systems. The first Sub-strategy identified the need to develop, implement and update asset management programs. This is the critical first step which will identify and prioritize necessary improvements. The second Sub-strategy is an example of the types of implementation projects that may be identified through asset management programs.

Sub-strategy 5.1 | *Develop, implement and update asset management programs.*

This Sub-strategy is aligned with the FLREDC Regional Strategy "Invest in Community, Industrial Development & Infrastructure" which includes "seek to invest in water resource-related projects that enhance water access, retain water quality and increase water safety."

Asset management provides a desired level of service at the lowest life-cycle cost. There is a need to develop, implement and update asset management programs with good data—including asset age, condition and criticality, life-cycle costing, proactive operations and maintenance and capital replacement plans based on cost-benefit analyses. The implementation of these programs will also support water conservation through leak reduction and energy efficiency.

This Sub-strategy can be implemented by utility providers, which can be counties, local municipalities, and authorities.

Sub-strategy 5.2 | *Continue to implement improvements in infrastructure systems to reduce water loss in transport.*

This Sub-strategy is also aligned with the FLREDC Regional Strategy "Invest in Community, Industrial Development & Infrastructure" which includes "seek to invest in water resource-related projects that enhance water access, retain water quality and increase water safety."

This Sub-strategy is an example of an implementation measure that may be identified and prioritized through an asset management program. This strategy would be carried out by regional water and sewer authorities. Water and sewer authorities throughout the region are continuously reinvesting in their aging infrastructure including the installation of liners and water main replacements. An example of these types of improvements is the Monroe County Water Authority's Water Main Rehabilitation and Replacement projects. Several projects are anticipated to be completed in 2013 including Hamlin Center Road, Park Road, and Cheese Factory Road.

This Sub-strategy can be implemented by utility providers, which can be counties, local municipalities, and authorities. The effectiveness of this strategy will be evident in reduced water demand.

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Water Management

Subject Area Goal

Improve and protect the water environment with respect to quality, quantity, and availability; promote and understand the value of our water reservoirs, watercourses, and built infrastructure; maximize the social, economic, and ecological potential of our water resources toward equitable sharing of their benefits for both the short and long terms.

Opportunities

- Maximizing water's benefits in a way that ensures its preservation
- Preserving natural state of wetlands and other waterbodies mitigates storm impacts
- Deepen the knowledge of Region's water resources
- Equitable distribution of costs and benefits of water resources
- Rewarding developers for enhanced designs that mitigate impacts
- Increase in tourism with increased quality of waterbodies
- Greater municipal cooperation
- Balancing water needs of agricultural operations with minimizing residential development in rural areas

Challenges

- Mitigating impacts and removal of invasive species
- Poorly-designed development and agricultural operations that increase runoff and pollutants in waterbodies
- Watershed boundaries and river/stream corridors rarely coincide with political boundaries
- Promoting a better understanding of the value of the water environment to encourage respect of a resource that can easily be taken for granted
- Need to maintain and improve existing infrastructure to ensure system integrity

Variables

- Erratic weather as it relates to replenishing waterbodies and water table
- Competing interests in St. Lawrence Seaway
- Highly-mobile society constantly threatens to introduce new invasive species
- Market forces for other resources impact demand for and quality of water
- Changing pollutants challenge capabilities of water treatment facilities

There is significant alignment between the strategies identified for Materials and Waste Management, Water Management, and Agriculture & Forestry. Refer to other subject areas for additional strategies that may benefit Water Management.

Indicators and Targets

Indicators	Broad Strategies Measured	Baseline Value (2010)	Short-Term Target* (2020)	Mid-Term Target* (2035)	Long-Term Target* (2050)
Water demand per capita (per 1,000 people) by sector (#5A—NYSERDA Common) • Total withdrawals fresh • Public supply fresh • Domestic from public supply • Irrigation total fresh	W1, W4, W5	0.866 Mgal/day • 0.677 Mgal/day • 0.097 Mgal/day • 0.084 Mgal/day • 0.008 Mgal/day	maintain baseline | tracking purposes only |	-10% | tracking purposes only |	-15% | tracking purposes only |
Total number of impaired waters (#5B – NYSERDA Common)	W1, W2, W3	49 impaired waters	-10%	-15%	-25%
% of beach water quality samples exceeding state thresholds	W1, W2, W3	17%	- 2% (15%)	-4% (13%)	-7% (10%)
Number of impaired waters with established total maximum daily load requirements	W1, W2, W3	5 (3 as of 2010) % of state mandated maximum	maintain baseline	-40% (3)	-80% (1)
Concentrations of pollutants in the Finger Lakes • Total phosphates • Total nitrogen	W1, W2, W3	• 13.5 µg/L—90% • 0.4 mg/L—4%	50% of State-mandated maximums at each lake	40% of State-mandated maximums at each lake	25% of State-mandated maximums at each lake

*All % reductions or increases are related to the 2010 baseline values, not the previous target.

Water Management

Subject Area Goal

Improve and protect the water environment with respect to quality, quantity, and availability; promote and understand the value of our water reservoirs, watercourses, and built infrastructure; maximize the social, economic, and ecological potential of our water resources toward equitable sharing of their benefits for both the short and long terms.

Connection with criteria: ● Strong ◐ Moderate ○ Marginal

	Evaluation Criteria					
	Benefits Multiple Subject Areas	Benefits Multiple Capitals	Benefits Multiple Communities	Implementation Feasibility	Consistent with Planning Efforts	Financial Feasibility
Broad Strategy WM1—Inventory, monitor and educate to create a better understanding of the region's water resources.	◐	●	●	◐	●	●

Representative Sub-Strategies / Project Ideas

1.1 Develop a Natural Resources Inventory (NRI) to identify high priority water resources and prioritize protection and natural resource projects.
1.2 Continue to implement monitoring programs over time and use this data in education and outreach efforts.
1.3 Quantify the current state of the water balance in the Finger Lakes Region (e.g., repository of rainfall/ runoff data models).

Representative Projects

- Wayne County Comprehensive Shoreline Management Project—Elevation site assessment and task analysis of built environment and development of cost estimates for repairing and relocating facilities. Will serve as the basis to modify comprehensive plans.

Broad Strategy WM2—Promote regional standardization of regulations and management.	◐	●	●	○	●	●

Representative Sub-Strategies / Project Ideas

2.1 Continue to support the development, update and implementation of watershed management plans.
2.2 Provide training and technical resources to support local government in the implementation of land use regulations to protect water resources and mitigate flooding.
2.3 Promote community vision planning to focus development in existing centers and preserve open space.

Representative Projects

- Preparation of a Strategy for a Sustainable Kueka Lake—Advance the Kueka Lake Watershed Land Use Planning Guide by developing resources for municipalities, including model laws, land use training and public outreach; creation of a water quality internship program; watershed, zoning, infrastructure and viewshed mapping; an agricultural assessment; and will update the Planning Guide for the Kueka Lake Land Use Leadership Alliance. (FLREDC Strategic Plan, Yates County Hazard Mitigation Plan)

Broad Strategy WM3—Preserve existing ecosystem services and promote green infrastructure to reduce reliance on grey infrastructure.	◐	●	◐	◐	●	◐

Representative Sub-Strategies / Project Ideas

3.1 Encourage net zero pervious surfaces.
3.2 Provide financial incentives to increase green infrastructure or reduce the amount of stormwater runoff.
3.3 Explore use of natural systems for wastewater treatment.
3.4 Improve on-site wastewater treatment systems.
3.5 Support invasive species management programs.
3.6 Promote the implementation of best management practices for water quality (e.g., highway and agriculture).
3.7 Implement stream and riparian restoration projects identified in watershed management plans.

Representative Projects

- Implement the recommendations of the Great Lakes Compact—The interstate compact among the U.S. states of Illinois, Indiana, Michigan, Minnesota, New York, Ohio, Pennsylvania and Wisconsin that details how the states manage the use of the Great Lakes Basin's water supply.
- Rochester Museum and Science Center (RMSC) Green Innovations—Create a single high profile and accessible location where developers, municipal planners, and the general public can see several different green infrastructure practices in action and be educated in their function and implementation.
- Genesee Community Digester Project—A large digester, or multiple digesters, that would accept animal waste from multiple farms while combining it with the waste from local food manufactures and other food waste from the region. The project would reduce the risk of well water contamination due to current land application of farm and food manufacturing waste, while providing an additional source of renewable energy. This project could be located in the site of the old Town of Batavia Landfill, a former Superfund site. Funding is needed for planning, a complete engineering analysis, and site work. (Genesee County Comprehensive Plan)

Broad Strategy WM4—Through water conservation, ensure adequate timing and flow of water in streams, rivers, lakes and aquifers for sustainable use for people, industry, energy and nature.	◐	●	●	○	●	○

Representative Sub-Strategies / Project Ideas

4.1 Support organizations that can improve water-related energy practices.
4.2 Decrease energy usage by water-related utilities.
4.3 Generate renewable energy from used water.
4.4 Promote and educate businesses and residents on water reuse and reducing water use.

Representative Projects

- Williamson WWTP Improvements—The Town of Williamson installed solar panels to lower dependency on non-renewable energy sources at the town-owned wastewater treatment plant. This project was an implementation measure of the Town's sustainability plan that is designed to lower operating costs and reduce the town's carbon footprint. In addition the town installed 1,200 square feet of green roof and water storage to recycle rainwater for non-potable uses.

Broad Strategy WM5—Maintain and improve the functionality and efficiency of the water supply and wastewater infrastructure systems.	○	◐	●	◐	◐	◐

Representative Sub-Strategies / Project Ideas

5.1 Develop, implement, and update asset management programs.
5.2 Continue to implement improvements in infrastructure systems to reduce water loss in transport.

Representative Projects

- Cultivate industry partnerships with wastewater treatment plants—Explore the possibility of forming public/ private partnerships to manage this infrastructure.
- Genesee Street Water Transmission Main Replacement Project—Replace 5,000 linear feet of cast iron water supply pipe that serves the entire Village of Clyde. (FLREDC Strategic Plan)

3.8 Economic Development

Overview

Connection to the Story of Place

The Finger Lakes Region has a long history of functioning as a connector between the East Coast and the Upper Mid-west due to the existence of the navigable pass through the Appalachian Mountains via the Mohawk Valley. As a result of this role, people, ideas and ecology have moved through this region throughout its history. It has served as more than just a connective corridor however, with its fertile basin enticing many people to stay and settle. This continuous flow and mixing of different perspectives, ideas and cultures has helped the region develop a unique capability to collaborate and innovate, bringing these broad insights to higher levels of development in ways that have benefitted the region and far beyond its bounds. Particular regional strengths include innovation and leadership in the areas of materials science, energy, agriculture, civil rights and governance.

Existing Conditions: Assets and Sustainability Initiatives

The following metrics, as noted in the FLREDC Strategic Plan indicate that the historical leadership innovation remains today:

- The region boasts an Innovation Index score that is higher than state and national averages as noted in the G/FLRPC's Comprehensive Economic Development Strategy (CEDS)
- The region was recently recognized as one of 35 national "innovation hubs" by The Atlantic magazine (as noted in the FLREDC Strategic Plan)
- The region's standing as a national leader in per capita intellectual property and degrees in higher education.

Some examples of ongoing efforts consistent with this spirit of innovation that demonstrate the region's sustainability values include:

- Golisano Institute for Sustainability (GIS) – as part of the Rochester Institute of Technology (RIT), GIS was established as a platform for corporations, institutions, and government entities to explore and develop sustainable systems and solutions within a variety of disciplines.
- Eastman Business Park – revitalization efforts at the former Kodak Park include attracting a cluster of clean-tech (renewable energy) companies and the planned NY-BEST Commercialization Center, a manufacturing consortium for battery and energy storage technology.
- Seneca AgBio Green Energy Park – located at the former Seneca Army Depot, this manufacturing cluster is focused on innovative programs for agricultural processing and renewable energy production.

It is the spirit of innovation and leadership that has progressed the region from a small number of leading and outstanding manufacturing firms to an increasingly successful and diverse knowledge based economy. The region currently supports 533,000 jobs with the majority (82%) in the private sector. The resulting regional economy is among the strongest in the state as demonstrated by the following:

- Between 1980 and 2010, the region experienced approximately a 21% employment increase during a period of essentially flat population growth
- The Brookings Institute has ranked Rochester among the top 20 strongest-performing economic areas in the country for the last 3 years

Additionally, the region is blessed with a wealth of outstanding educational and research institutions. Eighteen higher education institutions continue to produce a highly-educated workforce, innovative technologies and research that may be leveraged to serve the businesses and residents of the region and beyond. In 2010, the Bureau of Labor Statistics Quarterly Census of Employment documented more than 25,000 people employed in educational services.

The Finger Lakes Region remains New York State's top agricultural region, a legacy from its geological circumstance, with fertile soils second only to the mid-west plains. The Role of Agriculture in the New York State Economy, Report 21-2010 of the Office of the State Comptroller, provides an overview of the region's significant role in agriculture. The Finger Lakes made $1.2 billion in agricultural sales in 2007, which represented 27.9 percent of the total farm sales in New York. According to the U.S. Department of Agriculture, 5 of the top 10 NY counties in agricultural sales are in the Finger Lakes: Wyoming, Genesee, Wayne, Ontario, and Livingston. The region also has a bounty of fresh water resources and its natural assets, beauty, historical significance and cultural institutions make it a destination for tourists world-wide.

Challenges, Variables, and Opportunities

There are a number of challenges that will need to be overcome to ensure successful economic development, including the need to:

- Continue to embrace the region's transformation from an economy based on a small number of leading and outstanding manufacturing firms to an increasingly diverse knowledge-based economy, as noted in the FLREDC Strategic Plan.
- Continue to build partnerships among local governments, the private sector, and regional institutions to bring the region together, both urban and rural, through a shared identity and common goals.
- Address the challenges highlighted in the FLREDC Strategic Plan including aging infrastructure, urban and rural poverty, poorly performing schools, lack of capital to create and grow businesses and a business climate hindered by taxation and regulation that deter investment.
- Balance the need for affordable, accessible, abundant energy sources against the need to preserve and protect natural assets, community health and quality of life.

These challenges manifest themselves in the fact that the Upstate NY region, of which the Finger Lakes Region is a subset, trails all other regions tracked nationally in terms of private venture capital investment according to a Price Waterhouse Coopers database. To be leading in innovation and trailing in investment certainly indicates an opportunity for growth.

Ultimately, the success of this economic development approach through time depends on how effectively the region can invest in its human capital—the leadership, creative thinking, knowledge, and capacity for collaboration that will be required. It will be vitally important to engage communities in dialog that enables them to internalize and evolve these concepts so that they can carry them forward through implementation.

In order to be successful, it will be necessary to embed the framework of this Plan into all elements of planning and execution throughout the region. There is a need to educate all members of the regional community regarding the necessity and benefits of such a change, the new opportunities and potential that will emerge, and the role that each stakeholder may play through their own daily actions that will contribute toward the Plan's vision for a sustainable region.

The opportunity going forward is to broaden the view of what is considered in investment identification and prioritization. As a means of building more sustainability into the region's economic decisions and strategies, this Plan uses several lenses through which proposed actions can be viewed.

Embedding sustainability and distinctiveness into all that we do results in enduring economic prosperity, health and well-being for all constituents.

The first lens is the Story of Place: to focus on the distinctiveness that is unique to this place, to unlock potential, and lead to economic opportunities that are difficult for others to mimic. The next step is to move beyond the notion that economic vitality and sustainability are mutually exclusive. On the contrary, only through embedding sustainability and distinctiveness into all that we do can we achieve enduring economic prosperity, health, and well-being for all constituents possible. This takes into account the lens of the Five Capitals (Human, Social, Natural, Built, and Financial).

Most conventional economic activity focuses primarily on adding value to Financial and Built/Manufactured Capital. However, the Five Capitals model also accounts for how value gets added to Human, Social, and Natural Capital as a means to move an economy toward enduring prosperity. Because this framework describes an interconnected system, investments that degrade any one form of capital will eventually degrade all of the others.

Another lens has to do with how well an investment serves as a solution multiplier. That is, can an investment to address one need, community, or constituency be designed in such a way that it addresses many others? An example of this comes out of the work that was done on climate change and disaster resiliency as part of this Plan. Investment is encouraged in self-sufficient "places of refuge" for each community/neighborhood that could provide critical resources, shelter, and aid under normal and extreme conditions. In support of these refuges, localized networks for critical services (e.g., micro-grids for energy, water, sewage, solid waste treatment, district heating, etc.) would be set up to complement existing centralized systems, providing new revenue sources and reducing environmental impacts. In other words, use the need to create better disaster preparedness as a means to build new, more sustainable infrastructure.

The Economic Development Goal and Strategies align with the Regional Guiding Principles to preserve, protect and improve natural resources; maintain, protect and improve infrastructure systems; build sustainable capacity and understanding through outreach and education; build partnerships and bring the region together through a shared identity and common goals in a way that promotes robust, high quality economic growth.

Indicators and Targets

The Indicators and Targets were developed through a collaborative process involving the Economic Development Stakeholder Group. For the purposes of consistency across regional sustainability plans, the Housing + Transportation Affordability Index and the Jobs created by sector (government, private, agricultural, unclassified) Indicators were supported

by the Stakeholder Group. In addition to these Indicators, the process involved the identification and development of Indicators that would enable the region to track progress along the vision of developing an economy based on the distinctiveness of the region. These Indicators are intended to capture progress the region makes toward innovation/commercialization in the sectors where the region has unique strengths and capabilities.

Indicators

- Housing + Transportation Affordability Index - % of income spent on transportation
- Jobs created by sector
  - Government
  - Private
  - Agriculture
  - Unclassified
- Successful commercialization of technologies and associated jobs
- Increased venture capital investment
- Jobs created by sector
  - Food Manufacturing
  - Alternative Energy
  - Materials Science

The baseline values for these Indicators are shown in the Summary Sheet at the end of this section, as well as Targets for short (2020), mid (2035), and long-term (2050) timeframes. A table of representative Sub-strategies/Project Ideas and Representative Projects that contribute to the implementation of these Broad Strategies is also provided in the Summary Sheet.

Sustainability Goal and Strategies

Economic Development Goal

Transform the economic landscape through embedding the region's uniqueness (the Story of Place), the Five Capitals (Human, Social, Natural, Built, and Financial)[2], and resiliency into all policy and investment decisions.

The following is a description of each Broad Strategy that supports the Economic Development Goal. Representative Sub-strategies are provided as examples of specific measurable activity that could be implemented to support the Broad Strategy. At the end of the Economic Development section there is a Summary Sheet that provides a more comprehensive list of representative Sub-strategies/Project Ideas and Representative Projects that contribute to the implementation of these Broad Strategies.

Broad Strategy ED1 | Embed the framework of this Plan into all planning, execution, and measurement activities throughout the region.

This Broad Strategy is based on a key premise – that regions that best maintain their economic viability and vitality during economic ups and downs share three characteristics:

- They know who they are, and they don't try to be someone else.
- They can convey this distinctiveness through narrative.
- They embed that distinctive character into everything they do (economic development, urban planning, branding, infrastructure investment).

[2] The Five Capitals, as presented in the model advanced by The Forum for the Future in the 1990s.

Place-sourced economies have the potential to leverage a region's distinctiveness, unique circumstances, assets, and capabilities to create enduring prosperity for all stakeholders. Too many regions chase hot sectors and trends, which rise and fall, are inherently competitive, and result in winners and losers. By contrast, economies based on those attributes that make a region unique, thus differentiating the role it plays in the larger economic web, are difficult to compete against. A place-sourced regional brand can attract and retain like-minded businesses and talent, accelerating momentum of overall development.

The Finger Lakes Regional Sustainability Plan is aligned with the vision from the FLREDC 2011 Strategic Plan – *Accelerating Our Transformation*:

> The Finger Lakes region will accelerate its transformation to a diverse, knowledge-based economy by building on strengths that include renewable natural resources, a talented and highly educated workforce, a historic commitment to innovation and philanthropy, leadership as the state's top agricultural region, international recognition as a center for optics and photonics, and national leadership in per capita intellectual property and degrees in higher education. We will expand a successful history of collaboration between public and private institutions to optimize our region's performance in advanced manufacturing, the arts, tourism, and basic and applied research in medicine, science, engineering, and technology. Through these efforts, we seek to become a national leader in innovation and commercialization with the long-term goals of increasing job creation at a rate that exceeds national levels and enhancing the region's quality of life to attract and retain business and our citizens.

This Broad Strategy leverages the unique innovative capabilities of the region and focusing on what is unique about the region (i.e. natural assets, agricultural strengths, expertise in optics and materials science). The strategy broadens the FLREDC vision to incorporate sustainable considerations into these activities.

Prioritization

This Broad Strategy achieved priority via the evaluation criteria due to its ability to carry forward and align the framework of this Plan into the activities that drive investment in the region. Unique, place-sourced economies play to the strengths of the region, aligning strongly with the FLREDC's economic development plans, although the clearer definition that the Story of Place provides coupled with the broader considerations of the Five Capitals will both focus strategic investments and encourage them to realize their broader potential impact. This strategy is aligned with all of the Guiding Principles:

- Improve accessibility, connectivity and mobility
- Preserve, protect and improve natural resources and acknowledge the link between natural systems
- Maintain, protect and improve the functionality and climate change/disaster resiliency of existing infrastructure systems and acknowledge the links between systems
- Improve public health
- Reduce energy consumption
- Promote an equitable distribution of cost and benefit
- Respect local planning efforts and retain individual community character
- Build partnerships between local governments, the private sector, regional institutions and the public
- Build sustainability capacity and understanding through outreach and education
- Promote robust, high quality economic growth
- Bring the Finger Lakes Region together through a shared identity and common goals

Potential Stakeholders and Resources

The Plan is intended to be used by citizens, businesses, institutions, and governing bodies in all planning and investment decisions.

Challenges and Sub-strategies
The primary challenge to this involves cultural and systemic change. The region will have to resist the temptation to pursue "employment at all costs" opportunities and focus on those truly unique to the region. The Sub-strategies that have been developed to mitigate this challenge include the development and use of evaluation and tracking forms for projects requesting funding.

Sub-strategy 1.1 | *Expand representation in regional and municipal planning entities to include expertise from all Five Capitals (Financial, Human, Social, Natural & Built).*

Conventional economic development focuses primarily on financial return on investment and jobs created without a full understanding if the increased economic activity will have a negative impact on the natural or built environment or the region's social and human capital. To fully address the sustainability issues that are necessary for long-term prosperity and quality of life for all, there is a need to make social, ecological and human capital considerations fundamental to the planning, execution and measurement mechanisms that determine where the region's investment dollars are directed. The best way to ensure this happens is to bring these perspectives into the process from inception.

The closest example of this being done in the region is the City of Rochester's Office of Energy & Sustainability which works to ensure that the City maintains and enhances its long-standing commitment to preserving, protecting, and restoring its natural resources. Representatives from every City department provide expertise to guide the development of City policies and practices that are consistent with its environmental mission.

County and municipal planning departments and regional planning organizations should engage representatives from all Five Capitals to help inform planning activities, policy development and decision making. Greater diversification of the make-up of these planning entities will help interject broader perspective and criteria in the development and evaluation of economic priorities. This will help ensure that the community has the opportunity to identify, promote and support the projects that truly contribute toward transforming the Finger Lakes into an economically vibrant and sustainable region.

Sub-strategy 1.2 | *Incorporate the Indicators and Targets identified in this plan into the tracking and reporting of all investments.*

There is a need to monitor the performance of all investments to provide learning and assess their ability to support achievement of the targets identified in this plan. Measured progress toward the targets will provide evidence that the region is moving toward achievement of the Plan's vision. Lack of progress may indicate the need for greater focus on execution of the Plan's strategies or that alternative strategies may need to be developed. This Sub-strategy is implemented through the role of the Regional Plan Coordinator. As recommended in Section 4 – Implementation, the Regional Plan Coordinator will be responsible for establishing, scheduling and coordinating tracking of the Indicators. It is anticipated that county and municipal planning departments will assist with the tracking of targets.

Sub-strategy 1.3 | *Develop project evaluation forms that contain the complete project criteria used in this plan for all projects applying for economic development support and funding.*

To ensure that proposed projects support the region's sustainability vision, this Plan needs to be used as the framework through which projects will be evaluated. As part of the Consolidated Funding Application (CFA) process, particularly for funding through the Cleaner Greener Communities (CGC) Program, applicants would complete a Sustainability Evaluation Form for review and consideration by the FLREDC. The form would include the following Regional Sustainability Plan's evaluation criteria (described in detail in **Appendix F**):

- Benefits multiple Subject Areas:
  - Energy
  - Transportation
  - Land Use and Livable Communities
  - Waste and Materials Management
  - Water Management
  - Economic Development
  - Climate Change
  - Governance
  - Greenhouse Gas Emissions
  - Agriculture and Forestry
- Benefits multiple Capitals
  - Natural Capital
  - Built/Manufactured Capital
  - Human Capital
  - Social Capital
  - Financial Capital
- Benefits multiple communities (including outside of the region)
- Implementation feasibility
- Consistent with local and regional planning efforts
- Financial feasibility

This holistic set of criteria will illuminate the highest priorities for the region moving forward.

Broad Strategy ED2 | Identify, recruit and support entrepreneurial enterprises that have the potential to innovate consistent with the Story of Place, add value to all Five Capitals[3] (Financial, Human, Social, Natural & Built) and have broad commercialization potential.

This Broad Strategy is at the core of the distinctiveness of the Finger Lakes Region. The long-demonstrated capability to innovate to solve a local need, creating solutions that have broad market appeal is the central pattern unveiled through the Story of Place. The creative capacity of this region is the economic engine that will lead to a prosperous future. In this way, the Story of Place echoes the FLREDC Plan's vision statement that there is a historic commitment to innovation and philanthropy. Given this history, if this region can come up with smart, workable ways to address its own sustainability needs, there is good reason to expect that those solutions will be an exportable basis for future economic growth. Activities that identify, encourage, attract and support such innovation and maintain a steady stream innovation pipeline will help realize this potential. This strategy will help focus and prioritize investments that have the greatest opportunity to pull the region toward the vision of a distinctive economy.

This strategy supports the FLREDC vision to transform the region to a diverse, knowledge-based economy by building on strengths that include a talented and highly educated workforce, a historic commitment to innovation, leadership as the state's top agricultural region, international achievement as a center for optics and photonics, and national leadership in per capita intellectual property, exports, and degrees in higher education. It is aligned with the following FLREDC Regional Strategies:

- Optimize business creation, retention, and expansion
  - Address local and state barriers to growth and competitiveness, including exploring ways to reduce the cost of doing business by strengthening regional planning efforts, developing cooperative agreements, and streamlining services.
  - Strengthen and expand (both in terms of capacity and geographic reach) the region's network and acceleration facilities as well as business support and networking services.
  - Expand access to seed, early-stage, venture, and public/private capital.
  - Increase the number of entrepreneurs through education/training programs and recruitment, particularly those with domain experience in key sectors.
  - Develop systems that monitor and identify firms and sectors with high growth potential and proactively engage with these

[3] The Five Capitals, as presented in the model advanced by The Forum for the Future in the 1990s.

companies to connect them with the resources that will accelerate product development, access to new markets and scale business models.

- Strengthen Academic and Industry Partnerships
  - Develop programs and shared resources that allow closer collaboration between academic and industry scientists.
  - Streamline and accelerate the maturation, transfer, and commercialization of university-based intellectual property; Build a regional ecosystem that more effectively harnesses university-based innovation, with a particular focus on fostering the creation and growth of early-stage companies.

Prioritization
This strategy achieved priority as a result of its potential to leverage the innovative capacity of the region and focus that investment toward accelerating the regional economy toward distinctiveness. The FLREDC Strategic Plan has identified many of the core areas of expertise. Integrating sustainable considerations within these strength areas will lead to more comprehensive and valuable solutions that may have broader market appeal. Bringing the Five Capitals into consideration will ensure that the regional sustainability plan Vision and Guiding Principles are achieved, particularly the principle to "promote robust, high quality economic growth."

Potential Stakeholders and Resources
Implementation of this strategy includes entrepreneurs and the network of organizations developed to support them including:

- Golisano Institute for Sustainability at RIT
- University of Rochester Health Sciences Center for Computational Innovation
- High Tech Rochester

- FLREDC proposed Finger Lakes Business Accelerator Cooperative

Potential sources of funding include the Rochester Angel Network, Innovocracy, and Excell Partners.

Challenges and Sub-strategies
The primary challenge to this strategy will be having the discipline to focus the investment toward projects that truly align with this criterion and avoid diversion of funding toward projects that dilute the identity and brand of the region.

One source of funding would be Phase 2 of the Cleaner Greener Communities (CGC) program. Identification of additional funding resources and developing the support networks necessary to execute will be another challenge.

Sub-strategy 2.1 | *Promote and identify funding for regional organizations that encourage and support entrepreneurship, technology transfer and small businesses focused on sustainability issues.*

The intent of this Sub-strategy is to support the innovative nature of the region in order to stimulate economic vitality centered on solving the problems the region faces (many of which are faced throughout the rest of the country and the world). Connecting initial start up ventures with the technical resources and capital they need to survive, develop and commercialize their concepts has been identified as fundamental to restoring economic vitality to the region. Existing efforts to create this support infrastructure include High Tech Rochester (HTR), the Finger Lakes Business Accelerator Cooperative, Rochester BioVenture Center, the Finger Lakes Health Collaborative, the Finger Lakes Food Processing Cluster Initiative, the Golisano Institute for Sustainability, the NY BEST Consortium, Excell Partners, and Innovacracy.

An example of the implementation of this Sub-strategy, in particular providing support for entrepreneurs focused on sustainability issues, is the High Tech Rochester (HTR) Proof-of-Concept Center. HTR, highlighted in the FLREDC Plan, is a non-profit whose mission is to be a catalyst for entrepreneurship and innovation-based economic development in the Finger Lakes Region. HTR provides a suite of services, including technology commercialization for very-early-stage opportunities, business incubation for high-growth-potential startups, and growth services for existing

manufacturing companies seeking to improve their top- and bottom-line performance. HTR was awarded $5 million from NYSERDA, to create a Proof-of-Concept Center dedicated to help grown entrepreneurs in high-tech, clean energy businesses. The HTR Proof-of-Concept Center, one of three in the state, will serve Western and Central NY while working with the University of Rochester, Rochester Institute of Technology, SUNY Buffalo and Cornell University. The NYSERDA award along with cost-sharing will support the center for a five year period

While these organizations exist and are supported by the FLREDC, there is a need to focus investment on sustainability issues. This can be accomplished by using the evaluation forms identified in Sub-strategy 1.3 when allocated resources to organizations and projects.

Sub-strategy 2.2 | *Increase collaboration between educational institutions, and existing businesses to support innovation of products and services aligned with the Finger Lakes Regional Sustainability Plan.*

The region has a wealth of outstanding educational institutions. Leveraging the research and academic support they offer to support R&D and innovation collaboratively with the businesses of the region has the potential to spawn new economic growth while addressing sustainability goals. RIT's Golisano Institute and its various centers for sustainable manufacturing and resource management, the University of Rochester's Health Sciences Center for Computational Innovation and the Finger Lakes Regional Center for Advance Optics Manufacturing and Cornell Agriculture and Food Technology Park are examples of current initiatives that collaborate with private industry to accelerate innovation and knowledge transfer to the economic benefit of the region.

There is a need to continue to provide financial support for academic institutions and other organizations involved in research and development and deployment of pilot projects leading to commercialization of new alternative energy technologies.

Broad Strategy ED3 | Invest in critical infrastructure to foster economic expansion and advance sustainable initiatives (access, function, resiliency).

Intelligent, prioritized infrastructure investment is essential to support quality of life, resilience and economic vitality. Investment opportunities that enrich all three components leveraging one expense are the most desirable. Local governments are increasingly challenged to find the resources to maintain and expand infrastructure, making it critical that investment decisions provide multiple benefits.

Additionally, there is a need to recognize that the infrastructure of today may not be best suited to serve the region into the future. Interconnected, distributed networks of systems that can stand alone in times of severe weather or other disruptions can minimize economic loss and risk to life while providing more efficient and effective functionality. Infrastructure investment actions need to accelerate this evolution by transforming with a vision toward a new model whenever elements are reconstructed.

This strategy aligns with the FLREDC Regional Strategy to:

- Optimize business creation, retention, and expansion
  - Address local and state barriers to growth and competitiveness, including exploring ways to reduce the cost of doing business by strengthening regional planning efforts, developing cooperative agreements, and streamlining services.
  - Strengthen and expand (both in terms of capacity and geographic reach) the region's network and acceleration facilities as well as business support and networking services.
- Invest in Community, Industrial Development & Infrastructure
  - Reinforce the identity, sense of place, and character of the area through downtown redevelopment, adaptive reuse of existing buildings and infrastructure, and historic preservation.
  - Foster the development of the region's industrial complexes and business parks for commercial or industrial use.
  - Enrich living environments by increasing access to affordable housing and mixed-income units, and promoting energy efficiency.
  - Seek to invest in water resource-related projects that enhance water access, retain water quality and increase water safety.
  - Improve access to credit and capital for revitalization and reinvestment.
  - Invest in key projects that will address transportation bottlenecks that are barriers to growth; Strengthen transportation infrastructure through preservation and maintenance of the existing system.

Prioritization
Investing in the critical infrastructure that enables economic prosperity, improves quality of life and the resiliency of the communities throughout the region is a vital element in enabling the Plan's Vision and Guiding Principles, particularly:

- Improve accessibility, connectivity and mobility
- Maintain, protect and improve the functionality and climate change/disaster resiliency of existing infrastructure systems and acknowledge the links between systems
- Promote robust, high quality economic growth
- Reduce energy consumption

Depending on the type of infrastructure invested in negative impacts to the natural systems could be alleviated and inefficiencies can be reduced. The greatest potential is innovation in the type of infrastructure of the region in a manner that improves resiliency in addition to the other desired effects. This could stimulate innovative solutions that are translatable beyond the region and safeguard human wellbeing in the event of extreme weather. Strategic infrastructure investments are a priority in the FLREDC Strategic Plan as well.

Potential Stakeholders and Resources
Traditionally, federal and state funding has provided the means for infrastructure investment. In recent years, these sources have fallen well short of that needed to maintain and transform to smarter infrastructure. New mechanisms like public private partnerships, economic development funding, increased taxation and fees will need to be considered. There are federal dollars available to improve the storm resiliency of communities. It is possible to leverage this funding to drive innovation toward a new infrastructure model resulting in benefits to communities as well as economies.

Challenges and Sub-strategies
Communities are challenged to find the funding needed to maintain the condition of existing infrastructure, let alone invest in strategic infrastructure or expansion. New models of infrastructure funding like public private partnerships will need to emerge. Limited funding needs to be focused where it will leverage the greatest impacts for the region.

One Sub-strategy developed to help address this issue is to develop regional condition, capacity and vulnerability assessments and inventories for all

critical infrastructure. This information is the foundation for informed prioritization and investment decision-making.

Sub-strategy 3.1 | *Develop regional condition, capacity and vulnerability assessments and inventories for all critical infrastructure.*

In order to be able to understand the current vulnerabilities and their disruptive potential in terms of economic loss and human health and well-being, it is necessary to assemble this information. Once gathered, the region may begin to prioritize and plan for mitigation and accommodation strategies in the event of extreme weather events, etc. Additionally, this knowledge can be incorporated into the infrastructure planning and investment decisions of the region to begin the transformation toward more resilient infrastructure, comprised of distributed, independent, yet interconnected, systems.

As documented in the FLREDC 2012 Update, the Genesee Transportation Council has recommended the creation of a Digital Infrastructure and Transportation Asset Inventory which will enable regional governments, businesses, and economic development agencies to more effectively plan and prioritize transportation projects and site selection for business relocation and expansion. This Plan also identifies the need for similar inventories and assessments in the different subject areas, including: Energy (Sub-strategies 1.5, 4.4); Transportation (Sub-strategy 3.4); and Water Management (Sub-strategy 1.1).

There is a need for state, regional, county and municipal departments and organizations to coordinate the development and update of these inventories and identify the funding needed for implementation. There is also a need to establish a repository for this information so priority and investment decisions can be made from a regional perspective.

Sub-strategy 3.2 | *Accelerate the development and adoption of independent, local networks of critical infrastructure (communications, energy, water, wastewater, micro-grid, etc.).*

Large, centralized infrastructure is vulnerable to large-scale outages and is less efficient than distributed, independent networks of systems. Such networks improve the disaster and economic resilience of the region while stimulating economic innovation while developing this new paradigm, and enabling greater incorporation of renewable energy generation. This independence also helps to create distributed places of refuge that are currently lacking in the rural areas of the region. Infrastructure needs to serve many purposes, not just the support of commerce and economic activity. It needs to enable connectedness, accessibility, education and place-making as well as support life and the creation of places of refuge. Strategic infrastructure includes natural infrastructure as well as built infrastructure and both must work in systematic harmony.

There are various examples of distributed energy generation throughout the region including wind, landfill energy, bio fuels, hydroelectric and solar. The next step is to advance transformation of the existing grid system to a network of independent systems that may stand alone if needed, yet be interconnected for purposes of energy sharing and redundancy. A model project that demonstrates the power of the micro-grid technology is the Wayne Industrial Sustainability Project (WISP) in the Town of Ontario. This is a group of businesses organized in a symbiotic relationship that generate and use renewable energy, allowing them to operate off-the-grid for extended periods of time.

Consistent with the FLREDC Plan, there is a continued need to provide resources to support research and development, deployment of pilot projects to validate micro-grid and other technologies and eventual commercialization. Municipalities can support this strategy by conducting inventories of potential networks of critical infrastructure and prioritizing implementation. An example of a municipality's

role is the City of Batavia's 2013 Brownfield Opportunity Area (BOA) Plan which studied the potential for generating hydroelectric power from existing dams on the Tonawanda Creek that could provide electricity to support the City's ice arena and fire department located adjacent to the dams. The implementation of this project has the potential to have both municipal facilities' electricity needs fully self-sustaining on renewable electricity generated from the Tonawanda Creek, enhance the economic viability of the ice arena, and the potential to create a self-sufficient "place of refuge" at the ice arena (occupancy - 480 people).

Sub-strategy 3.3 | *Invest in ecological resource-related projects that enhance ecological systems, improve water access, retain water quality, and increase water safety.*

This Sub-strategy aligns with the following Regional and Sector Strategies:

- Invest in Community, Industrial Development & Infrastructure-Seek to invest in water resource-related projects that enhance water access, retain water quality and increase water safety."
- Agriculture and Food Processing - Increase the value, diversity of agricultural products, and exports.
- Tourism and the Arts - Strengthen and support the development of the Finger Lake's diverse water resources and recreational tourism opportunities, allowing greater access and promoting year-round use.

Ecological resources are widely valued throughout the region and recognized as the core value and attraction assets that support the quality of life that residents and visitors to the region seek. In order to preserve them for future generations, it is vital to invest in their protection and enhancement. Some of the existing initiatives that seek to address these issues include the Wayne County Comprehensive Shoreline Management Project, Green Genesee Roadmap, Strategy for a Sustainable Keuka Lake, Promotion and Protection of Canandaigua Lake and creation of a County-wide Drainage District for Orleans County.

Strategies supporting ecological resource-related projects are identified within each subject area. The inclusion of this Sub-strategy recognizes the value of the ecological resources to our region's agricultural and tourism economy. The FLREDC and county economic development agencies should encourage and provide financial support for these types of initiatives.

Broad Strategy ED4 | Expand and align training and education initiatives to target strategic sectors and meet the needs of existing and emerging industries.

The region is experiencing a disconnect between employer needs and workforce capabilities, resulting in difficulties finding suitable human resources and missing opportunities to increase employment in the region. More effective alignment of education curriculum is needed toward the development of training programs to develop resources that meet local employer needs. Additionally, it is critical to continue to re-train displaced or under-employed members of the workforce to enable them to return as contributing members of the economy.

In the immediate term, this should be aligned with current employer needs in order to optimize employment and diminish the burden on social support systems. Over time, the focus should shift to support the strategic innovation businesses that align with the uniqueness of this region to ensure that local community members benefit from this emerging economy.

This strategy aligns with the FLREDC Regional and Sector strategies to:

- Optimize business creation, retention, and expansion
  - Address local and state barriers to growth and competitiveness, including exploring ways to reduce the cost of doing business

by strengthening regional planning efforts, developing cooperative agreements, and streamlining services.
    - Strengthen and expand (both in terms of capacity and geographic reach) the region's network and acceleration facilities as well as business support and networking services.
- Align Workforce Development Efforts with Sector Needs
    - Expand opportunities for the region's employees and spur the creation of high-skill, high-wage jobs; Strengthen and develop education and training programs needed to provide employees with the skill sets for key growth industries; Address regional workforce shortages in healthcare, agriculture, information technology, manufacturing, and other key fields.
- Business Services
    - Foster closer cooperation among the region's companies and institutions of higher education to accelerate technology transfer and align workforce training programs with the skill sets required by the sector
- Advanced Manufacturing
    - Foster public/academic/industry collaboration to meet the R&D, process improvement, workforce, and management needs of manufacturers.
- Agriculture and Food Processing
    - Increase the value, diversity of agricultural products, and exports.
    - Support the creation and expansion of food processing companies in the region through incentives and academic-private partnerships to gain manufacturing efficiencies and access to new markets.

Prioritization
This strategy directly and positively impacts the Indicators relating to increased employment by better aligning regional employment needs with the skills and knowledge needed to fill those needs. This addresses the Vision and following Guiding Principles:

- Build partnerships between local governments, the private sector, regional institutions and the public
- Build sustainability capacity and understanding through outreach and education
- Promote robust, high quality economic growth

This region has shown strong performance toward retraining and integrating displaced workers into an evolving economy in the past as demonstrated by the increases in employment during a period of flat population growth and significant decline by very large private sector employers.

Potential Stakeholders and Resources
Stakeholders involved in this strategy include educational institutions, workforce investment boards and economic development organizations. Economic development workforce training funding and realignment of existing educational programs and curriculum is the likely source of funding. Potential partnerships with regional employers could also be developed to help fill their needs.

Challenges and Sub-strategies
Funding for these educational programs is the primary challenge. There is an opportunity to shift and realign existing educational curriculum and programs to better prepare students and community members for regional employment needs.

One example of a Sub-strategy that has been developed to address this opportunity is to foster closer cooperation among the region's companies and institutions of higher education to accelerate technology transfer and align workforce training programs with the skill sets required by the sector.

Sub-strategy 4.1 | *Connect private industry with the educational system to stimulate early awareness and interest in manufacturing and agriculture career opportunities and align programs to deliver qualified candidates. This includes the development of education and re-training networks to enable displaced or under-employed workers to fill strategic regional employment needs.*

This Sub-strategy is aligned with the FLREDC strategy to:

- Strengthen Academic and Industry Partnerships
  - Develop programs and shared resources that allow closer collaboration between academic and industry scientists.
  - Streamline and accelerate the maturation, transfer, and commercialization of university-based intellectual property; Build a regional ecosystem that more effectively harnesses university-based innovation, with a particular focus on fostering the creation and growth of early-stage companies.

The region, like many in the Northeast, is experiencing a disconnect between local employer needs and the skills available in the local workforce. As the business environment quickly evolves, there is a need and an opportunity to retrain displaced workers and realign our educational and vocational programs to better align with local opportunities.

An example of engaging the educational system is the Genesee County Economic Development Center's Certificate Program in Advanced and Nano-Tech Manufacturing Concepts. The program was developed in a partnership with Genesee Community College and the Rochester Institute of Technology, to serve as a model for future programs and to prepare our local workforce for advanced manufacturing and high tech jobs. The project provides benefit to both program participants and advanced manufacturing companies.

An example of stimulating early awareness is the Finger Lakes Advanced Manufacturers Enterprise (FAME). FAME is a partnership to foster prosperity through manufacturing networking and preparing youth for careers in manufacturing. FAME works to address hiring and training issues; pipeline issues; and manufacturing perception issues within the region. Currently FAME has partnered with 51 advanced manufacturers and engaged over 590 youth.

An example of retraining is the region's three Workforce Investment Boards (WIBs). The mission of the WIBs is to align human potential with opportunities in the workplace. The WIBs operate under the Workforce Investment Act of 1998. Programs provide a variety of activities to assist adults and dislocated workers through core, intensive and training services. The three boards are:

- Genesee/Livingston/Orleans/Wyoming Workforce Investment Board (GLOW WIB
- Finger Lakes Workforce Investment Board (FL WIB) – Ontario, Seneca, Wayne and Yates counties.
- Rochester/Monroe County Workforce Investment Board (Rochester Works)

The region also has several organizations that provide training in specific markets including the Monroe Community College Agriculture and Life Sciences Institute, the Finger Lakes Food Processing Cluster, and the Finger Lakes Community College Viticulture and Wine Technology Facility.

There is a need to continue to support and promote these education and training programs.

Broad Strategy ED5 | Protect, enrich and market the unique natural, cultural, agricultural, and destination assets of the region.

The Finger Lakes Region is blessed with a wealth of unique natural, cultural, historical and agricultural assets. These assets need to be protected and enriched in order to remain the tourism attraction that contributes economically to the region. These same assets are vital in providing residents the quality of life that is part of the reason they have chosen to make and build their lives here and invisibly provide a myriad of "free services" including clean air, water and fertile soils. They provide the core wealth of the region.

This Sub-strategy aligns with the following FLREDC Sector Strategies:

- Agriculture and Food Processing
  - Increase the value, diversity of agricultural products, and exports.
  - Support the creation and expansion of food processing companies in the region through incentives and academic-private partnerships to gain manufacturing efficiencies and access to new markets.
- Tourism and the Arts
  - Invest in the development, promotion, and preservation of cultural, artistic, and historic assets.
  - Develop, network, and promote the region's growing wine, culinary, agricultural, and for micro-chip enterprises.
  - Strengthen and support the development of the Finger Lake's diverse water resources and recreational tourism opportunities, allowing greater access and promoting year-round use.
  - Build on a positive destination image by leveraging partnerships and promotions of the region's high profile events, and healthcare and educational assets for business development, expansion, and retention.

Prioritization
This strategy deals with the fundamental wealth and quality of life assets of the region. Ecological health underlies human health and enduring economic prosperity. The historic and cultural assets of the region are unique and unparalleled. This strategy supports the Guiding Principles of:

- Improve accessibility, connectivity and mobility
- Preserve, protect and improve natural resources and acknowledge the link between natural systems
- Maintain, protect and improve the functionality and climate change/disaster resiliency of existing infrastructure systems and acknowledge the links between systems
- Improve public health
- Build sustainability capacity and understanding through outreach and education
- Promote robust, high quality economic growth
- Bring the Finger Lakes Region together through a shared identity and common goals

Potential Stakeholders and Resources
Resources may include federal, state and local government funding for natural, cultural and historical assets. User fees for parks, cultural/historical amenities, private contributors and supporters, angel investors, regulatory fees are all potential sources of funding.

Challenges and Sub-strategies
The challenges are the reconciliation of current notions that economic growth can only exist with the sacrifice of the natural world to some extent. Education is needed regarding the true value of natural systems and the economic value and quality of life benefits they provide.

One Sub-strategy that has been developed to improve this is to strengthen and support the development of the Finger Lakes' diverse water resources and recreational tourism opportunities, allowing greater access and promoting year-round use.

Sub-strategy 5.1 | *Develop, network, and promote the region's growing wine, culinary, agricultural, and food microenterprises.*

These unique regional assets must be preserved and enhanced in order to realize their potential to sustain the quality of life that they provide the region and continue to drive the economy through tourism and agricultural products. The opportunity to seize a leadership position in the transformation to more sustainable methods of food production and processing is one that this region is well positioned to exploit.

An example of how this Sub-strategy is currently being implemented is the New York Wine & Culinary Center located in Canandaigua. The Center's mission is to foster an understanding and appreciation of New York wine and food through educational programming and partnerships. The Center features Finger Lakes Region wineries in the tasting room, the Upstairs Bistro, and educational classes. An example of specialty product marketing include the Ontario County Agricultural Enhancement Board's Agriculture Adventure Trail website, which serves as a marketing resource for local specialty products such as maple products, herbs, jellies, honey, garlic, grapes, apples, and more.

There is a need to continue to support and promote these programs and develop similar programs throughout the region. Another way to promote the region's growing wine, culinary, agricultural, and food microenterprises is to highlight them on an economic development page on the sustainable-fingerlakes.org website. The development of this page would be the responsibility of the Regional Plan Coordinator as identified in Section 4, Plan Implementation.

Sub-strategy 5.2 | *Strengthen and support the development of the Finger Lakes' diverse water resources and recreational tourism opportunities, allowing greater access and promoting year-round use.*

This strategy is exemplified by the Finger Lakes Museum. The museum is a natural and cultural resource dedicated to the enjoyment, education and stewardship of the Finger Lakes region – and to fresh water conservation. A recent example of the implementation of this Sub-strategy is when the FLREDC joined with Canal Corporation in March 2013 to unveil several design components of the Seneca Falls Boater Amenities and Canalside Improvements project. The project, which will improve access to and from the Canal in downtown Seneca Falls, which will help to attract more families and visitors, and provide a boost in tourism.

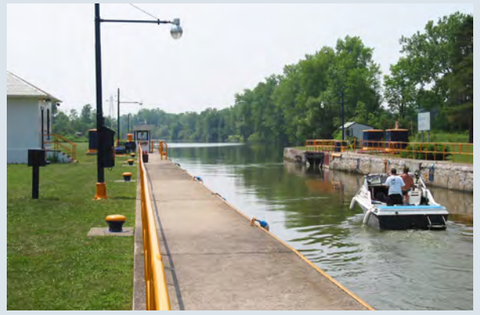
The FLREDC has identified additional water projects as priorities, including the Keuka Lake and Canandaigua Waterfront Developments. Projects of this type have the potential to benefit the region positively and should be considered in the light of innovative, sustainable technologies, rather than conventional solutions.

Economic Development

Subject Area Goal

Transform the economic landscape through embedding the region's uniqueness (the Story of Place), the Five Capitals*, and resiliency into all policy and investment decisions.

*Human, Social, Natural, Built/Manufactured, Financial



Opportunities

- Embed the Story of Place into the region's decision-making framework
- Strong relationships between communities and colleges/universities
- Build on momentum established by FLREDC Strategic Plans to promote regional thinking
- Build economic foundation on unique attributes rather than economic trends
- Develop local solutions that will benefit places beyond our boundaries
- Wealth of educational institutions serve as incubators of ideas/innovation
- Highly-skilled labor force

Challenges

- Need cautious approach to "hot sectors" and economic trends
- Moving beyond conventional models based exclusively on financial bottom line
- Current economic climate often leads to short-sighted policies and solutions
- Continuing to transition from a small number of large manufacturing firms to multiple small-scale businesses
- Concentration of poverty and continued disinvestment in urban areas
- Extremely mobile society results in high competition with other regions, states, and countries

Variables

- Trendy sectors at the national / global scale
- Unstable financial sector and access to capital
- State government and state economy-related impacts

Indicators and Targets

Indicators	Broad Strategies Measured	Baseline Value (2010)	Short-Term Target* (2020)	Mid-Term Target* (2035)	Long-Term Target* (2050)
Housing + Transportation Affordability Index—% of income spent on transportation (#6A—NYSERDA Required)	ED1, ED2, ED3, ED4, ED5	52%	- 1% (51%)	- 2% (50%)	- 4% (48%)
Jobs created by sector (#6B – NYSERDA Common) • Government • Private • Agriculture • Unclassified	ED1, ED2, ED3, ED4, ED5	532,997 jobs (total) • 90,180 jobs • 436,199 jobs • 6,122 jobs • 496 jobs	+ 10%***	+ 12.5%	+ 15%
Successful commercialization of technologies and associated jobs	ED1, ED2	Data not available**	N/A	N/A	N/A
Increased venture capital investment	ED1, ED2	Data not available**	N/A	N/A	N/A
Jobs created by sector • Food manufacturing • Alternative energy • Materials science	ED1, ED2, ED3, ED4, ED5	• 6,972 jobs • Data not available** • Data not available**	maximum 5% decrease N/A N/A	+ 5% N/A N/A	+ 10% N/A N/A

*All % reductions or increases are related to the 2010 baseline values, not the previous target.
** Baseline data currently not available. It is recommended that in the short-term, a method to collect this data be developed.
***Reflects the approximate growth rate expressed by the FLREDC goal of 50,000 jobs by 2016. However, the 2011 baseline data used by FLREDC (691,000 jobs) differs significantly from the 2010 baseline data used in this Plan (532,997 jobs).

Economic Development

Subject Area Goal

Transform the economic landscape through embedding the region's uniqueness (the Story of Place), the Five Capitals*, and resiliency into all policy and investment decisions.

*Human, Social, Natural, Built/Manufactured, Financial

Finger Lakes Regional Sustainability Plan

Priority Broad Strategies

Connection with criteria: ● Strong ◑ Moderate ○ Marginal

	Evaluation Criteria					
	Benefits Multiple Subject Areas	Benefits Multiple Capitals	Benefits Multiple Communities	Implementation Feasibility	Consistent with Planning Efforts	Financial Feasibility
Broad Strategy ED1—Embed the framework of this plan into all planning, execution and measurement activities throughout the region.	●	●	●	●	○	●

Representative Sub-Strategies / Project Ideas

1.1 Expand representation in regional and municipal planning entities to include expertise from all five Capitals (Financial, Human, Social, Natural & Built).
1.2 Incorporate the indicators and targets identified in this plan into the tracking and reporting of all investments.
1.3 Develop project evaluation forms that contain the complete project criteria used in this plan for all projects applying for economic development support and funding.

Representative Projects

Broad Strategy ED2—Identify, recruit and support entrepreneurial enterprises that have the potential to innovate consistent with the Story of Place, add value to all five Capitals (Financial, Human, Social, Natural & Built) and have broad commercialization potential.	●	●	●	●	●	◑

Representative Sub-Strategies / Project Ideas

2.1 Promote and identify funding for regional organizations that encourage and support entrepreneurship, technology transfer and small businesses focused on sustainability issues.
2.2 Increase collaboration between educational institutions, and existing businesses to support innovation of products and services aligned with the Finger Lakes Regional Sustainability Plan.

Representative Projects

- Finger Lakes Business Accelerator Cooperative—interconnected network of business support services and incubation facilities, spanning all nine counties. (FLREDC Strategic Plan)
- Seneca AgBio Green Energy Park—a cluster of companies that convert agricultural byproducts and waste into biofuels and biomaterials. (FLREDC Strategic Plan)
- NY-BEST Commercialization Center—a consortium of companies and universities aimed at facilitating the creation and deployment of the next generation of energy storage technologies. (FLREDC Strategic Plan)
- Regional Sustainable Innovation Fund—funding to catalyze the deployment of new, innovative, sustainable technologies and products designed and manufactured by New York State companies
- Integrating the sustainable production and innovation entrepreneurial ecosystem of the region—"Connect the dots" between existing funding initiatives so that unseen opportunities can materialize for the benefit of the regional and state economy.

Broad Strategy ED3— Invest in critical infrastructure to foster economic expansion and advance sustainable initiatives (access, function, resiliency).	●	◑	●	●	●	◑

Representative Sub-Strategies / Project Ideas

3.1 Develop regional condition, capacity and vulnerability assessments and inventories for all critical infrastructure.
3.2 Accelerate the development and adoption of independent, local networks of critical infrastructure (communications, energy, water, wastewater, micro-grid, etc.).
3.3 Invest in ecological resource-related projects that enhance ecological systems, improve water access, retain water quality, and increase water safety.

Representative Projects

- Mill Seat Landfill bioreactor—install innovative methane-to-energy systems that will extend the lifespan of the landfill.
- Lyons Industrial Park development (highway, rail, possible water access), multi modal transportation and logistics site. (GTC Regional Freight Plan)
- Replace the Portage Bridge on Norfolk Southern's Southern Tier rail line to eliminate a major weight & speed restriction. (GTC LRTP 2035, GTC Freight & Goods Movement Study, FLREDC Strategic Plan)

Broad Strategy ED4—Expand and align training and education initiatives to target strategic sectors and meet the needs of existing and emerging industries.	◑	◑	●	●	●	◑

Representative Sub-Strategies / Project Ideas

4.1 Connect private industry with the educational system to stimulate early awareness and interest in manufacturing and agriculture career opportunities and align programs to deliver qualified candidates. This includes the development of education and re-training networks to enable displaced or under-employed workers to fill strategic regional employment needs.

Representative Projects

- Golisano Institute for Sustainability at RIT—program embodying the principles of sustainability in product development. (FLREDC Strategic Plan)
- Multiple Pathways to Middle Skills Jobs—a partnership to create seamless career pathways for secondary education students and post-secondary unemployed workers. (FLREDC Strategic Plan)
- Finger Lakes Community College Viticulture and Wine Technology Facility—designed to help meet the urgent and growing demands for skilled workers by the region's vineyards. (FLREDC Strategic Plan)

Broad Strategy ED5—Protect, enrich and market the unique natural, cultural, agricultural, and destination assets of the region.	○	○	●	●	●	●

Representative Sub-Strategies / Project Ideas

5.1 Develop, network, and promote the region's growing wine, culinary, agricultural, and food microenterprises.
5.2 Strengthen and support the development of the Finger Lakes' diverse water resources and recreational tourism opportunities, allowing greater access and promoting year-round use.

Representative Projects

- Value-Added, Direct-to-Market Grants Program—provide funding that enables farms to build new structures, buy equipment, renovate buildings, and access working capital. (FLREDC Strategic Plan)
- Little Theatre Renovation—improvements that will preserve the theater as premier venue for independent/foreign films. (FLREDC Strategic Plan)
- Finger Lakes Boating Museum—waterfront improvements and construction of Museum and Visitors Center on Seneca Lake in Geneva. (FLREDC Strategic Plan)

3.9 Climate Change Adaptation

Overview

Connection to the Story of Place

The Finger Lakes Story of Place highlights the region's ability to effectively use and develop local resources and systems that provide benefits to all members of the community ("democratizing"), and to withstand extreme conditions (including natural events, such as blizzards, and economic downturns). Historically and in the current day, people and organizations in the region innovatively solve local problems ("eddying local need") as well as advance the state of knowledge and practice ("continuously innovating") across the country and internationally.

The communities in the Finger Lakes Region have historically made use of the resources at hand, such as energy generated from water mills, to provide the capabilities they need to live and work, and to improve the quality of life. The region has impressive resources to meet current and future needs, including educational and cultural institutions, local manufacturing and agriculture expertise, financial organizations, and a wealth of ecosystems. The communities in the Finger Lakes Region have developed strong community organizations and relationships. The focus of the strategies for climate change adaptation and disaster resiliency in this Plan is to further enhance those strengths and capabilities, and to build on current programs, projects, and initiatives that reduce the likelihood and magnitude of impacts from extreme events.

Existing Conditions: Assets and Sustainability Initiatives

The National Weather Service summarizes the Rochester and the Genesee valley as a fairly humid, continental type climate, which is strongly modified by the proximity of the Great Lakes. Precipitation is rather evenly distributed throughout the year in quantity, but frequency is much higher during the winter months. Snowfall is heavy, but is highly variable over short distances. Winters are generally cold, cloudy, and snowy across the region but are changeable and include frequent thaws and rain as well. About half of the annual snowfall comes from the "lake effect" process and is very localized. Areas east of Rochester receive the most snow from this process. Total season snowfall ranges from 70 inches south of the City to about 90 inches in Rochester to over 120 inches along the lake shore east of the City. About 50 inches of this total result from general snowfall; the rest is due to the lake effect. Ontario Lake does modify the extreme cold as the mercury falls below zero on only about six nights in an average winter. The last frosts usually occur by April 30 near Ontario Lake but as late as mid-May south of the NYS Thruway.

About half of the annual snowfall (70-120 inches) comes from the "lake effect" process and is very localized.

The spring months are statistically the driest months due in part to the stabilizing effect of the Great Lakes. Summers are warm and sunny across the region. The average temperature is in the 70 to 72 degree (Fahrenheit) range. Rain can be expected every third or fourth day, almost always in the form of showers and thunderstorms. There usually are several periods of uncomfortably warm and muggy weather in an average summer, with nine days reaching the 90-degree mark. The growing season is relatively long for the latitude, averaging about

180 days. The long growing season, combined with ample spring moisture and abundant summer sunshine is beneficial for the many fruit orchards and wineries, especially near the Lake Ontario shore and the Finger Lakes.

Mild and dry conditions predominate through September and much of October, but colder air masses cross the Great Lakes with increasing frequency starting in late October, and result in a drastic increase in cloud cover across the region in late October and early November. First frosts may not occur until late October and it is followed by the first lake effect snows usually by mid-November. General snow cover is typically established after mid-December.

In 2010, the average annual participation was 37.5 inches. Monthly variations ranged from a low of 1.56 inches in April to a high of 5.95 inches in June. The average snowfall for the 2010-2011season was 127 inches, approximately 90% of snowfall was in the months of December through February.

Severe weather is not common, but a few cases of damaging winds and small tornadoes occur each year, typically south of the NYS Thruway. Other extreme events include flash floods, lake effect snow storms and occasional ice storms. The most severe example of an ice storm occurred March 3rd through 4th, 1991. The freezing rain resulted in ice coated trees and power lines. There were numerous reports of damage from the weight of the ice. Ice buildups ranged from 1-2 inches over the hardest hit areas. Over the western fringes of the storm area, the coating of ice was followed by 4-6 inches of heavy, wet snow. At its peak, nearly 325,000 customers were without electricity. Virtually all schools and businesses were shut down Monday and Tuesday (March 4th and 5th) in the affected areas. In the City of Rochester, schools were closed for the entire week. High water in flooded basements was commonplace when sump pumps were unable to work due to power failures. Governor Mario Cuomo declared eighteen counties state disaster areas. State agencies were authorized to provide manpower and equipment in helping residents affected by the storm. Utility crews were brought in from Ohio, Pennsylvania, and Canada to aid in the restoration of power which was not accomplished entirely until March 16th. President Bush signed an order declaring 12 counties federal disaster areas with storm damages exceeding $375 million.

The New York State Climate Adaptation Study (ClimAID) projects a potential temperature increase of 3 to 5.5 degrees by 2050, with a potential 10% increase in precipitation for the Western New York/Great Plains region (which includes the Finger Lakes Region). That study also projects an increased number of degree days above 60 degrees (Fahrenheit) prior to last frost, which can increase the vulnerability of crops to late freezes.

The study also predicts an increase in the number of extreme events. The number of days per year with a maximum temperature exceeding 95 degrees is expected ton increase from 0.8 to between 3 and 9. The number of heat waves per year, averaging 4 to 5 days on length, is expected to increase from 0.8 to between 2 and 4 per year. The number of days per year with a minimum temperature at or below 32 degrees is expected to decrease from 133 to between 90 and 103 days per year.

The occurrence of extreme events in a given year will continue to be characterized by high variability; in some cases, the pattern of changes will only become evident after many years, or even decades, are averaged. Some of the extreme events, including frozen precipitation (snow, ice, and freezing rain), that have a large impact in the Finger Lakes Region cannot be quantitatively projected into the future at local scales due to the high degree of uncertainty. Due to the decrease in seasonal ice cover on the Great Lakes, at a rate of 8 percent per decade over the past 35 years, models suggest this will lead to increased lake effect snow in the next couple of decades. However by mid-century, lake-effect snow will generally decrease as temperatures below freezing become less frequent.

The impacts of climate change for this region could be separated into: 1) extreme events, and 2) increased and/or variable temperatures. Enhancing the ability of the communities to adapt to climate change impacts includes improving the resiliency of these communities to many different types of disruptions, ranging from weather events to economic changes. For extreme events, a major concern is the proximity of assets and critical infrastructure systems to areas subject to floods or other natural disasters, such as valleys and river crossings. For example, **Figure 3-10** shows the share of Livingston County's transportation system that is vulnerable to flooding.

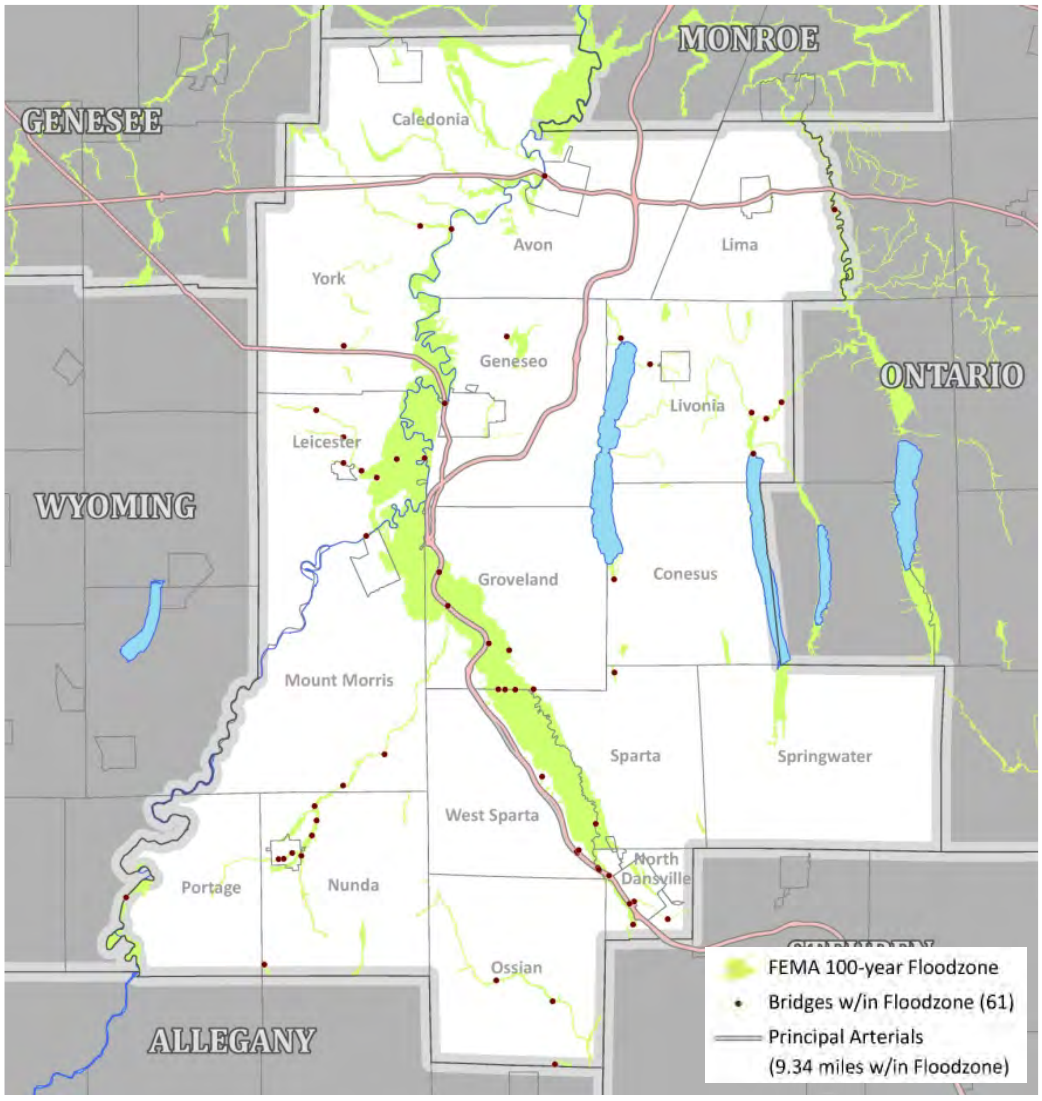


Figure 3-10: Infrastructure Exposed to Extreme Flooding (Livingston County example)

Agriculture assets (fields, orchards, forests) and community establishments (public buildings and commercial properties) in the region are likewise vulnerable to extreme conditions. During these events, these assets could be significantly damaged – or destroyed – with the loss of shelter, critical services (power, water, transport, communications), and/or

livelihood. Another difference with pending climate change impacts is the cumulative effect. For instance, multiple heavy rains can supersaturate soils and cause landslides and other damage. This region has weathered these types of events over the years, but new or changed settlements may alter the vulnerability.

The region has emergency systems in place and continuously plans for the potential impacts of extreme weather events and other disasters. One example is the state of the art Livingston County 911 system that has been a pioneer in dispatching innovations. The Livingston County 911 system was one of the first accredited 911 systems in the United States, meeting and exceeding minimal standards set by the 911 Coordinators' Association in conjunction with the State Sheriff's Association. It was the first in the state to do Enhanced 911 call taking, which allows the dispatcher to see the name and address of the incoming caller. It was one of the first to establish a duplicate-or-joint system, in place in Hampton Corners, and ready to go on line at any necessary moment. It was the second in the state to become capable of tracking cellular 911 calls in motion. Another capability of the Livingston call center is issuing general alerts to the community, such as an amber (child abduction) alert to the media, retail stores, government offices, and other points of public interaction. The Livingston system also has transfer capability to dispatchers who can communicate in foreign languages and there are features to serve the hearing impaired.

All nine counties have developed Hazard Mitigation Plans. Hazard mitigation describes actions that help reduce or eliminate long term risks associated with natural hazards and disasters. Hazard mitigation activities may occur both before and/or after disasters. These activities are designed to break the cycle of repetitive cycle of damage by reducing a community's vulnerability to hazardous conditions. Municipalities and counties have identified specific needs or projects in their Hazard Mitigation Plans to improve disaster resiliency, such as upgrading 911 response systems to ensure public safety, and have further noted that they can accelerate their progress by teaming with neighboring communities or organizations that are working on similar concepts. For instance, several counties mentioned coordination among the counties to compile lists of medical personnel available to help in emergencies. Together, these communities can more quickly and easily develop and implement these improvements through sharing resources, expertise, and capabilities to develop regional solutions.

The GTC LRTP 2035 identifies the need to adapt transportation facilities and programs to be more resistant and resilient. The plan identifies the vulnerability of critical infrastructure to impacts resulting from more severe and intense weather events, including storms and corresponding flooding, needs to be conducted so that the reconstruction and replacement of these facilities includes design features and operations and management capabilities that account for these impacts. Another example of planning for extreme weather events and other disasters is the GTC's initiative on diversion route planning in the event that a transportation facility is closed.

Challenges, Variables, and Opportunities

One significant challenge to the region is the potential effect of climate change on agriculture. The risks for increased and/or highly variable temperatures are particularly important for agriculture and forestry, influencing many aspects such as pollination timing (and availability of pollinators), growing times and conditions, and

stress-tolerant plants and animals. For livestock, the heat itself can cause harm to the animals, and forests may become more vulnerable to pests as well as heat stress. Smaller farms, which are abundant in this region, may face more economic hardship in variations of yield and/or cost of adapting to climate change by switching to new/different crops or livestock.

Increased and/or variable temperatures may also affect energy use, which in turn may affect water use for cooling energy production facilities. If high temperatures and drought coincide (as they have in many regions during 2012), the energy production facilities may not have sufficient water to increase production, leading to localized brownouts or blackouts, which have direct economic and quality of life impacts.

A critical aspect of climate change adaptation and resiliency for local communities is the potential increase in the frequency and magnitude of extreme weather events.

Most communities have identified "places of refuge" for people to gather to obtain shelter and aid during an emergency; many of these refuges are located in central community buildings, but may lack the equipment, systems, and resources to provide critical services for more than a few days.

An opportunity for the region is to develop adaptation measures for extreme events that include ensuring the availability (and proximity) of critical infrastructure services and places of refuge during extreme conditions. For example, local on-site provision of these services could improve overall sustainability, save lives, and preserve livelihoods. In addition, strengthening and renewing the built and natural systems to more easily absorb frequent and severe extreme weather conditions, including precipitation and variable temperatures, can improve the health of the citizens and the viability of the communities.

Potential opportunities to improve sustainability and disaster resiliency can provide value in several dimensions. For the individual farms, businesses, and communities, the strategies could provide direct economic value through avoided costs (e.g. damage or destruction of assets), reduced operations costs, and/or additional revenue (new product/service). For example, several options could convert the solid organic waste streams from local farms and communities into local energy production for normal and extreme conditions, and provide additional revenue through the extraction of valuable elements. These approaches offer economic development potential and strengthen the region's natural systems by reducing storm water runoff with organic wastes that compromise water resources and at the same time produce energy from alternative sources with lower greenhouse gas emissions.

A critical aspect of climate change adaptation and resiliency for local communities is the potential increase in the frequency and magnitude of extreme weather events – such as drought, very heavy rainstorms, ice storms or snowfalls occurring more often. The recommended strategies outlined in this Plan would be tremendously beneficial to local communities, even if these projections do not materialize and the frequency of extreme events returns to "normal" rates seen in previous decades.

Indicators and Targets

The selection of Indicators was guided by the content of the Hazard Mitigation Plans developed by each county in the region, and from discussions at the Stakeholder meetings. One Indicator is the explicit consideration of climate change impacts in the Hazard Mitigation Plans, following guidance from the New York State Office of Emergency Management. Other Indicators reflect the considerations that appear throughout the Hazard Mitigation Plans, and were often the topic of discussion during the meetings, on the importance of developing and implementing measures that preserve lives and livelihoods in the region through upgrading the critical infrastructure systems, local built facilities, and natural environments in the region.

Indicators

- The degree to which climate change and adaptation is discussed within required Hazard Mitigation Plans
- Reduction in Agricultural economic losses attributable to temperature, drought, flooding
- Reduction in number of residents put at risk from loss of critical infrastructure services for more than 1 day

The baseline values for these Indicators are shown in the Summary Sheet at the end of this section, as well as Targets for short (2020), mid (2035), and long-term (2050) timeframes. A table of representative Sub-strategies/Project Ideas and Representative Projects that contribute to the implementation of these Broad Strategies is also provided in the Summary Sheet.

Sustainability Goal and Strategies

Climate Change Adaptation Goal

Improve performance of community assets (buildings and infrastructure systems, natural systems, and agriculture and business systems) under normal and extreme conditions.

The following is a description of each Broad Strategy that supports the Climate Change Adaptation Goal. Representative Sub-strategies are provided as examples of specific measurable activity that could be implemented to support the Broad Strategy. At the end of the Climate Change Adaptation section there is a Summary Sheet that provides a more comprehensive list of representative Sub-strategies/Project Ideas and Representative Projects that contribute to the implementation of these Broad Strategies.

Broad Strategy CC1 | Enhance mutual aid and support among neighboring communities, counties, and regions to share, develop, and create capabilities, resources, and special assets.

Municipalities and counties have identified specific needs or projects in their Hazard Mitigation Plans to enhance mutual aid and support to mitigate risks and respond during and after extreme events, and to develop capabilities across jurisdictions. Together, these communities can more quickly and easily develop and implement these improvements through sharing resources, expertise, and capabilities to develop regional solutions. The potential benefits can include improving community disaster resiliency, reducing community costs (e.g., municipal budget) for disaster mitigation, preparation and response, and saving lives and protecting livelihoods.

Prioritization
The mutual aid and support Broad Strategy enhances both human and social capital and aligns with the following Regional Guiding Principles:

- Build partnerships between local governments, the private sector, regional institutions and the public
- Maintain, protect and improve the functionality and climate change/disaster resiliency of existing infrastructure systems and acknowledge the links between systems
- Preserve, protect and improve natural resources and acknowledge the link between natural systems

It strongly builds on ongoing programs and initiatives throughout the region, which increases its implementation and financial feasibility.

Potential Stakeholders and Resources
The New York State Fire Mobilization and Mutual Aid Plan is maintained by the office of Fire Prevention and Control, which manages the provision of statewide mutual aid for large-scale fire incidents and natural disasters. County Fire Coordinators serve as local contact point for mutual aid within the state. Models of Mutual Aid funding are emerging. One example is the Illinois Public Works Mutual Aid Network, founded in 2009. The IPWMAN is an all-hazards, all-disciplines approach to sharing resources between various Public Works entities in Illinois and is deployed as a statewide mutual aid system for all public works agencies in Illinois with 160+ agencies involved. In many cases, mutual aid assistance is disputed on financial grounds by the involved parties, as the receiving party is undergoing economic hardship from disaster recovery. IPWAN's response is that the responding party will provide personnel, equipment, and materials for the first five days of the event without reimbursement.

Challenges and Sub-strategies
The challenges in the implementation of this strategy are the relative prioritization of programs for the participating towns, counties, and organizations, and the need to develop new ways to collaborate and share information. Another challenge is the potential financial hardship associated with the provision of mutual aid assistance. The Sub-strategies that address these challenges seek to develop long-term processes that can continually build, develop, and disseminate capabilities, resources, and special assets.

Sub-strategy 1.1 | *Continue to develop and provide education and training for municipal officials and first responders.*

Each county's Office of Emergency Management should lead the implementation of this Sub-strategy. These offices are responsible for the development of plans and provision of training for emergency response staff. They are also responsible for providing public information and education through resource literature, public awareness campaigns and public-service announcements.

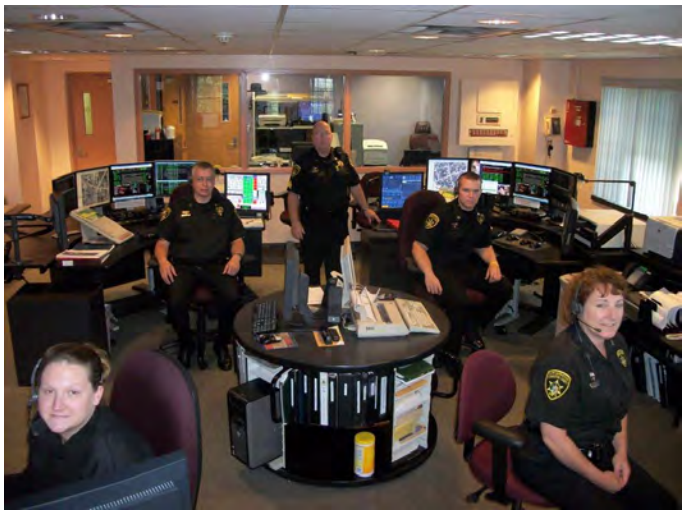
Training opportunities are sponsored by local government, academic institutions, professional organizations and nonprofit community partners, including the Genesee/Finger Lakes Regional Planning Council, the Monroe County Department of Planning and Development, the NYS Conference of Mayors and other municipal officials, NYS DEC, the Association of Towns, the Association of Counties, local universities and colleges, and the American Red Cross. Although training resources are available, local training funds are limited and additional funds are needed to offset training and overtime costs.

Sub-strategy 1.2 | *Develop processes to identify and share critical resources (e.g., listing of willing and trained medical personnel, strategic location of special response equipment for easy deployment).*

There are many examples of municipalities and counties having the need for similar resources. This is evident in the Wyoming County Multi-Jurisdictional All-Hazard Mitigation Plan which recommends the development of a joint water supply between the Town and Village of Perry and the Town of Covington. Another example is a

recommendation in the Yates County Multi-Jurisdiction Hazard Mitigation Plan to "research cooperative buying and storage programs for deicing materials and construction of sand and salt facilities…consider the use of products that would be more effective and economical than sand or gravel."

In addition to cooperative efforts within Yates County, there is the potential to partner across counties to address similar issues. The Monroe County Pre-Disaster Mitigation Plan also includes a project to identify, develop, and assess new means and methods for de-icing roads as part of the Town of Henrietta's Highway "Snow & Ice Control" program. The need to share critical resources may even cross regional boundaries, as evident in Monroe County historically providing aid to the Southern Tier counties with ambulances, special operations tactical teams from the Fire Service and 911 Dispatchers deployed in Task Forces and Strike Teams through request from the NYS 85 Fire Mobilization Plan, the NYS Department of Health, and local emergency managers for assistance with specific assets.



Each county's Office of Emergency Management (OEM) should lead the implementation of this Sub-strategy by identifying opportunities for shared critical resources and developing processes for implementation, including cooperative agreements. To facilitate the efforts of the OEM, each municipality should identify their resource needs.

Broad Strategy CC2 | Upgrade existing assets and modify municipal and business practices to better withstand extreme conditions.

A critical aspect of climate change adaptation and resiliency for local communities is the potential increase in the frequency and magnitude of extreme weather events – such as drought, very heavy rainstorms, ice storms or snowfalls occurring more often. Adaptation measures for extreme events might include ensuring the availability and accessibility of critical infrastructure services during extreme conditions through strengthening the built and natural environments.

This Broad Strategy aligns with the FLREDC Regional Strategy to "Invest in Community, Industrial Development & Infrastructure."

Prioritization
Upgrading existing community assets enhances both human and social capital and aligns with the following Regional Guiding Principles:

- Maintain, protect and improve the functionality and climate change/disaster resiliency of existing infrastructure systems and acknowledge the links between systems
- Promote robust, high quality economic growth (by leveraging the assets of the existing infrastructure)
- Preserve, protect and improve natural resources and acknowledge the link between natural systems

Potential Stakeholders and Resources
This approach involves all levels of government, businesses and private property owners. The NY Department of Emergency Management provides funding to local and county organizations to assess vulnerable critical infrastructure. The NYS DOT and US DOT provide funding for assessing

transportation infrastructure. The EPA conducts water and wastewater needs assessments - and may provide funding to local/county organizations. There may also be an opportunity to leverage funding through the NYS Department of Health to assess water infrastructure and the NYS Department of Environmental Conservation to assess wastewater and solid waste infrastructure.

The Clean Water State Revolving fund, a state and federal program that provides low interest loans for water infrastructure projects, has been used to build new sanitary sewer systems in areas where septic systems were failing or were in danger of failing. In the case of the Village of Fairport, FEMA/SEMO committed over $1 million in grant funding annually with a $200,000 dollar match from the Village of Fairport for their power line undergrounding program.

Challenges and Sub-strategies

The challenges to implementing this strategy are primarily related to effective prioritization among the community assets (such as critical infrastructure systems, buildings, and agricultural resources) and key potential investment sites. Due to limited financial resources, processes are often directed first to emergency repair rather than long-term performance. Individual communities, partnering with regional entities, need to coordinate and negotiate on the process to identify assets that are critical for life-safety and economic activity. They should then allocate financial, technical, and organizational resources to achieve the improved performance objectives.

Several Sub-strategies have been identified to help address these challenges. Developing critical capacity (including research, training, and deployment) for multiple strategies can provide immediate benefits as well as long-term performance improvements; for example, new advances in materials and systems can be used for emergency repairs and at the same time improve long-term resiliency. Upgrading existing assets to more effectively and efficiently utilize resources provides direct economic benefits through cost savings as well as reducing the level of needed resources during and after an extreme event.

Sub-strategy 2.1 | *Upgrade existing facilities (e.g. utilities, buildings, transportation infrastructure) to ensure their availability and accessibility during extreme conditions and reduce resource use.*

An example of increasing resiliency during extreme events is the Village of Fairport relocation of Fairport Electric system's assets which included a continuing effort to underground electrical wiring and protecting over 1,000 homes. Another local infrastructure upgrade occurred in East Rochester, where the Village's public works department removed much of its aging sanitary sewer system and replaced it where necessary. County Hazard Mitigation Plans also identify numerous storm mitigation, bridge repairs, and highway repairs throughout the region.

Municipalities should work with each county's OEM to identify the need for and prioritize projects to upgrade existing infrastructure. This Sub-strategy should also be implemented at the institutional or business level. An example is the University of Rochester's efforts to upgrade its facilities to more effectively use resources. The University's 2011 Sustainability Report Card, documented that it has reduced GHG emissions by 15 percent since 2005, and installed energy-efficient lighting, energy-management systems, and water conservation measures throughout the campus.

Sub-strategy 2.2 | *Research, develop and evaluate innovative approaches to regenerate natural systems to improve the performance of built systems.*

This Sub-strategy is aligned with the FLREDC strategy to:

- Strengthen Academic and Industry Partnerships
  - Streamline and accelerate the maturation, transfer, and commercialization of university-based intellectual property; Build a regional ecosystem that more effectively harnesses university-based innovation, with a particular focus on fostering the creation and growth of early-stage companies.

Strengthening and renewing the built and natural systems to more easily absorb frequent and extreme weather conditions can improve the health of the citizens and the viability of communities. Several communities are implementing stream corridor restoration and stabilization projects, wetland restoration projects, sediment and erosion control programs and watershed management to reduce the risks of flooding. One example is the recommendation in the Livingston County Multi-Jurisdictional All-Hazard Mitigation Plan to "introduce erosion controls/stream and bank stabilization measures along specific flood prone watercourses, including Mud Creek, Mill Creek and Canaseraga Creek." A similar example is the recommendation in the Yates County Hazard Mitigation Plan to implement floodplain management improvements along the Keuka Outlet in Torrey.

Municipalities should work with each county's OEM to identify the need for research, development and deployment of pilot projects that regenerate natural systems.

Broad Strategy CC3 | Create self-sufficient "places of refuge" in each community/ neighborhood for critical resources, shelter and aid under normal and extreme conditions.

Most communities have identified "places of refuge" for people to gather to obtain shelter and aid during an emergency; many of these refuges are located in central community buildings (such as schools or civic buildings), but may lack the equipment, systems, and resources to provide critical services for more than a few days. Creating self-sufficient "places of refuge" reduces these risks to the community members, and can strengthen the core of community during normal conditions through the provision of everyday services, such as medical care, education and training.

This Broad Strategy aligns with the FLREDC Regional Strategy to "Invest in Community, Industrial Development & Infrastructure" and Sector Strategy "Energy Innovation."

Prioritization
The self-sufficient "places of refuge" aligns with the following Regional Guiding Principles:

- Improve accessibility, connectivity and mobility
- Improve public health (by promoting active transportation)
- Maintain, protect and improve the functionality and climate change/disaster resiliency of existing infrastructure systems and acknowledge the links between systems

- Promote robust, high quality economic growth (by leveraging the assets of the existing infrastructure)

Potential Stakeholders and Resources
The implementation of this strategy requires a coordinated effort at all levels of government. NYSERDA's current funding opportunities website offers a wealth of localized energy related grants, RFP's, and RFQ's. These grant opportunities include cost evaluation and capital subsidies for combined-heat and power (CHP) systems that are intended to make structures and neighborhoods self-sufficient, like the FlexTech Program Opportunity Notice (PON 1746). In reference to Monroe County's Fire Station backup generators, the County utilized Fire Act Grant to purchase backup generators for fire stations in 2007. The development of All-Hazard Mitigation Plan may be funded in part by a grant through the Hazard Mitigation Grant Program (HMGP) through the Federal Emergency Management Agency and the New York State Emergency Management Office. Matching funds are typically provided by the county Office of Emergency Management with representatives from the county and municipalities contributing significant in-kind time and effort.

Challenges and Sub-strategies
The challenges to implementing this strategy are related to the coordination among the different organizations and jurisdictions responsible for public health and safety, particularly accessing the financial and technical resources needed. The specific Sub-strategies address these challenges. Focusing on critical on-site services for life-safety can help prioritize these investments, and co-locating these "places of refuge" in local historical/cultural centers can make effective and efficient use of existing assets.

In addition, linking to existing centralized systems (such as the electricity grid) as well as on-site services (e.g., medical services) provides redundancy for life-safety during extreme conditions as well as an opportunity to provide financial benefit during normal conditions through the sale of on-site generated services through the existing market mechanisms.

Sub-strategy 3.1 | *Provide on-site critical services that include energy production, water and wastewater treatment, and solid waste treatment/processing (especially organic waste), as well as food, medical and emergency services.*

Although there are identified places of refuge in the region, they are currently not self-sustaining. A proposed project by the City of Batavia is an example of implementation of this Sub-strategy. The City's 2013 Brownfield Opportunity Area (BOA) Plan researched the potential for generating hydroelectric power from existing dams on the Tonawanda Creek that could provide electricity to support the City's ice arena and fire department located adjacent to the dams. The implementation of this project has the potential to have both municipal facilities' electricity needs fully self-sustaining on renewable hydroelectric power, enhance the economic viability of the ice arena, and the potential to create a self-sufficient "place of refuge" as the ice arena's occupancy is 480 people.

As part of the update of Hazard Mitigation Plans, counties should inventory existing and potential places of refuge and identify opportunities of how these facilities could be upgraded to be self-sustaining.

Sub-strategy 3.2 | *Link on-site critical services to the regional centralized systems (e.g., electricity grid) to offset community/municipal costs, and provide new sources of revenue.*

An example of this Sub-strategy being implemented outside the region is the Long Island Power Authority's (LIPA) Solar Initiative Feed-in Tariff (FIT) program. This program provides fixed payments for electricity produced by approved photovoltaic systems over a fixed period of time. The program operates under a sell-all arrangement, where the full amount of energy production from the facility is sold to the utility (e.g., no on-site use).

Energy Sub-strategies 1.5 and 4.4 encourage counties, municipalities and local districts to conduct an inventory of potential alternative and renewable production and prioritize projects for implementation. This Sub-strategy expands the inventory to identify opportunities at places of refuge that would provide a source of revenue to the community during average conditions and would serve as an on-site resource during extreme events. This Sub-strategy includes the need to study the feasibility of a feed-in-tariff approach.

Broad Strategy CC4 | Create localized networks for critical services (e.g., local food sources, micro-grids for energy, water, sewage, solid waste treatment, district heating, etc.) to complement existing centralized systems (at a larger scale than the "places of refuge").

In addition to providing on-site services in places of refuge, there is also a need to create localized networks at a larger scale since places of refuge cannot accommodate all members of the community. For farms and businesses, the following Sub-strategies could provide direct economic value through avoided costs (e.g. damage or destruction of assets) or additional revenue (new product/services) and increase the redundancy and robustness of the overall infrastructure systems during extreme conditions. Networks that use local waste streams, such as manure or biomass, can reduce costs and increase revenue as well as strengthen the region's natural systems by reducing storm water runoff that compromise water resources and ecosystem health. The solutions could also improve the health, safety and well-being of the people who live and work in the communities, businesses, and farms, as well as regenerate the natural systems.

This Broad Strategy aligns with the FLREDC Regional Strategy to "Invest in Community, Industrial Development & Infrastructure" and Sector Strategy "Energy Innovation."

Prioritization
The localized networks Broad Strategy aligns with the following Regional Guiding Principles:

- Maintain, protect and improve the functionality and climate change/disaster resiliency of existing infrastructure systems and acknowledge the links between systems
- Promote robust, high quality economic growth (by leveraging the assets of the existing infrastructure)
- Preserve, protect and improve natural resources and acknowledge the link between natural systems

Potential Stakeholders and Resources
This strategy could involve all levels of government, businesses and private property owners. The NYS Department of Agriculture & Markets, the USDA Rural Development NY, USDA Natural Resources Conservation Services and Rural Energy for America Program, NYS Soil and Water Conservation Committee, NYSERDA, and Empire State Development all offer grants that are complimentary to localized networks of energy production, specifically systems for anaerobic digesters deployed on farms. For example, the

Value Added Producer Grant Program (VAPG) targets projects in agricultural, energy, economic development with proven technologies and provides between $33 and $40M USD in grants annually, it is published in the Federal Register annually.

Additionally, the USDA Rural Business Cooperative Services issues $23M+ in awards annually in the Renewable Energy and Energy Efficiency Program (REEG). For example, Spring Valley Dairy received funding from the New York State Department of Agriculture and Markets and the New York State Energy Research and Development Authority for the installation of a manure activation system, covered storage and gas collection and utilization systems.

Challenges and Sub-strategies

The challenges for the successful implementation of this strategy are the relatively early stage of technical development of this field and the related emerging market mechanisms (and regulations) governing multi-nodal systems. Several different approaches exist for creating, operating, and maintaining localized networks, including Power Purchase Agreements (PPAs) and Energy Service Contracts (ESCO), and the economic efficiency of the investments is strongly affected by the volatility of the markets, such as the local, national, and international energy markets.

The Sub-strategies that address these challenges include creating these networks in rural as well as urban areas, where the availability and low cost of the factor inputs (such as manure) provide significant economic advantages. Developing technical and regulatory options guiding the operation of these localized networks during extreme conditions (such as "islanding" a facility to use its own energy production during extreme conditions) can protect lives and reduce property damage. Developing the market as a whole can provide new revenue sources for the participants and the community.

Sub-strategy 4.1 | C*reate and deploy localized networks in rural as well as urban and suburban settlements, using local inputs.*

An example of implementation of this Sub-strategy is the biogas facility at a Synergy Dairy in Covington, Wyoming County. The biogas facility, owned by Synergy LLC, will produce renewable energy from manure and substrate. The facility will digest manure from the approximately 2000 milking cows at Synergy dairy along with manure from another dairy in the immediate area and food grade organic waste transported to the site. Biogas from the digester will fuel gensets with capacity to generate up to 1.4 MWh of electricity. In addition to producing electricity, the facility will reduce greenhouse gas emissions by the equivalent of 10,000 tons of CO2 each year, produce 16,000 cubic yards of bedding for the dairy and reduce manure odors. Another example is the Wayne Industrial Sustainability Project (WISP) in the Town of Ontario. This is a group of businesses organized in a symbiotic relationship that generate and use renewable energy, allowing them to operate off-the-grid for extended periods of time.

The implementation of this Sub-strategy falls primarily to the private sector. It is supported by the following Energy Broad Strategies that provide support for research and development of new technologies, education of municipal officials and the general public and the development and adoption of policies that allow for the implementation of alternative energy projects:

- E1 | Develop, produce, and employ alternative energy (bio-energy, waste to energy).
- E4 | Develop, produce, and employ renewable energy (wind, hydroelectric, solar, and geothermal).
- E5 | Develop and implement micro-grid technology that integrates the advantages of independent local production and distribution systems with the storage and distribution capacity of a large grid.

Sub-strategy 4.2 | *Develop market and financial mechanisms to use localized networks as a new revenue source for participants/providers.*

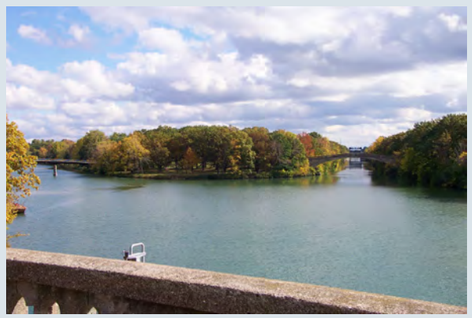
This Sub-strategy supports the FLREDC Sector Strategy "Agriculture and Food Processing - increase the value, diversity of agricultural products, and exports."

There is a need to develop market and financial mechanisms to use localized networks as a revenue source, including the establishment of Power Purchase Agreements (PPAs). The implementation of this Sub-strategy will fall primarily to the private sector. The implementation of energy production on farms should be supported by organizations like the Monroe County Community College Agricultural and Life Sciences Institute and the Cornell Cooperative Extension.

Climate Change Adaptation

Subject Area Goal

Improve performance and resiliency of community assets (buildings and infrastructure systems, natural systems, and agriculture and business systems) under normal and extreme conditions.



Opportunities

- More dynamic community centers and other local assets
- Ample intellectual, social, financial, natural, and economic resources
- Stronger relationships and networks resulting from community investment and resiliency pursuits
- Using educational institutions for research/education related to improved systems
- Re-purposing historic buildings to increase density and improve service delivery
- Leveraging assets and sharing resources across municipal borders

Challenges

- Improving resiliency of food supply
- Continued debate over causes of and responses to climate change
- Funding sources for infrastructure and systems investments
- Supplying services and resources in an emergency to rural areas
- Home rule creates inefficiencies and logistical challenges for inter-municipal coordination

Variables

- Potential increase in extreme weather events
- Food supply affected by variable temperatures, drought, and extreme weather events
- Available resources and capacity of local governments

Indicators and Targets

Indicators	Broad Strategies Measured	Baseline Value (2010)	Short-Term Target* (2020)	Mid-Term Target* (2035)	Long-Term Target* (2050)
The degree to which climate change and adaptation is discussed within required hazard mitigation plans (#7C—NYSERDA Common)	CC4	0 out of 9 county plans	9 out of 9 county plans	9 out of 9 county plans	9 out of 9 county plans
Reduction in agricultural economic losses attributable to temperature, drought, flooding	CC4	Data not available**	N/A	N/A	N/A
Reduction in number of residents put at risk from loss of critical infrastructure services for more than one day	CC1, CC2, CC4	Data not available**	N/A	N/A	N/A

*All % reductions or increases are related to the 2010 baseline values, not the previous target.
** Baseline data currently not available. It is recommended that in the short-term, a method to collect this data be developed.

Climate Change Adaptation

Subject Area Goal

Improve performance and resiliency of community assets (buildings and infrastructure systems, natural systems, and agriculture and business systems) under normal and extreme conditions.

Connection with criteria
● Strong ◐ Moderate ○ Marginal

	Evaluation Criteria					
	Benefits Multiple Subject Areas	Benefits Multiple Capitals	Benefits Multiple Communities	Implementation Feasibility	Consistent with Planning Efforts	Financial Feasibility
Broad Strategy CC1—**Enhance mutual aid and support among neighboring communities, counties, and regions to share, develop, and create capabilities, resources, and special assets.**	●	●	●	●	●	●

Representative Sub-Strategies / Project Ideas

1.1 Continue to develop and provide education and training, for municipal officials and first responders.

1.2 Develop processes to identify and share critical resources (e.g., listing of willing and trained medical personnel, strategic location of special response equipment for easy deployment).

Representative Projects

- Resilient Communications and Emergency Response—use Eco-IT and renewable energy systems tied to back-up power generation.
- Finger Lakes Climate Change Adaptation Leadership and Resilience Council—provide a 12-month process that aligns regional stakeholders and yields a pragmatic and defined outcome for continuing research, education, and training on climate change adaptation.

Broad Strategy CC2—**Upgrade existing assets and modify municipal and business practices to better withstand extreme conditions.**	●	●	●	●	●	◐

Representative Sub-Strategies / Project Ideas

2.1 Upgrade existing facilities (e.g. utilities, buildings, transportation infrastructure) to ensure their availability and accessibility during extreme conditions and reduce resource use.

2.2 Research, develop and evaluate innovative approaches to regenerate natural systems to improve the performance of built systems.

Representative Projects

- Wayne County Comprehensive Shoreline Management Program— Elevation site assessment and task analysis of built environment and development of cost estimates for repairing and relocating facilities. Will serve as the basis to modify comprehensive plans.
- New York Green's "Green Genesee Road Map" pilot project—a blueprint for sustainable land use and development practices that should be replicated for other counties throughout the region.
- Plan Bv7—a sustainable approach to water level regulation in Lake Ontario and the St. Lawrence River that will take steps to restore the shoreline habitats of the lake and river.

Broad Strategy CC3—**Create self-sufficient "places of refuge" in each community / neighborhood for critical resources, shelter and aid under normal and extreme conditions.**	●	●	●	●	●	◐

Representative Sub-Strategies / Project Ideas

3.1 Provide on-site critical services that include energy production, water and wastewater treatment, and solid waste treatment/processing (especially organic waste), as well as food, medical and emergency services.

3.2 Link on-site critical services to the regional centralized systems (e.g., electricity grid) to offset community/municipal costs, and provide new sources of revenue.

Representative Projects

- Batavia Community Hydroelectric Microgrid—provide renewable electricity to fire department and ice arena, creating a self-sufficient "place of refuge."

Broad Strategy CC4—**Create localized networks for critical services (e.g., local food sources, micro-grids for energy, water, sewage, solid waste treatment, district heating, etc.) to complement existing centralized systems (at a larger scale than the "places of refuge").**	●	●	●	◐	●	◐

Representative Sub-Strategies / Project Ideas

4.1 Create and deploy localized networks in rural as well as urban and suburban settlements, using local inputs.

4.2 Develop market and financial mechanisms to use localized networks as a new revenue source for participants/providers.

Representative Projects

Finger Lakes Regional Sustainability Plan

3.10 GOVERNANCE

Overview

Connection to Story of Place

Democratic principles and innovation in governance is woven throughout the Finger Lake Region's Story of Place. The Five Nations of the Iroquois established the first democratic confederacy in the Americas in the Finger Lakes region. The wampum belt of the Great Law depicts an organization that is at once political and social. Benjamin Franklin and Thomas Jefferson were both aware of the Iroquois system and used it to help shape the U.S. Constitution. The Iroquois eagle atop the Tree of Peace and the bundle of five arrows became the eagle clutching thirteen arrows on the great seal of the U.S. The famous first words "We the People" derives from the first lines of the Iroquois Thanksgiving Address.

These ideals of equality and freedom reappeared repeatedly in the transformational and innovative social movements that grew in the region: abolitionism, women's rights, religious revivals, and even Memorial Day which commemorates the common soldier. Women involved in the movement for women's rights took inspiration from their Iroquois friends, who at that time represented the only role models for strong women in central roles of social and political leadership. The religious revivals fostered a host of new sects and religions and laid the basis for many social movements that took root locally and eventually spread throughout the nation and beyond.

Existing Conditions: Assets and Sustainability Initiatives

Governance underlies all aspects of the Finger Lakes Regional Sustainability Plan, directly influencing the region's physical environment, energy usage and progress toward sustainability. Local laws, policies, and decisions influence all Subject Areas and affect a wide range of issues, such as land use, zoning, housing development, building and energy codes, water quality, wastewater and stormwater management, solid waste management, infrastructure development, hazard mitigation, economic development, and capital improvements.

Implementation of the recommendations in this Plan will rely, in large part, on local governing bodies, as it is the collective decisions and actions of the city, town, village, and county leadership that will determine how effectively the region will be able to achieve its goals. A conscious approach to local planning, decision-making, and leadership is required to support and promote sustainable principles that will benefit the region as a whole.

The nine-county Finger Lakes Region includes 190 cities, towns, and villages that have decision making authority at the local level pursuant to the New York Municipal Home Rule Law. Under this law, each municipality has power over property, affairs and governance, including the right to adopt

local laws and regulate land use and zoning. Hence, the communities in the Finger Lakes Region have legislative bodies who have individually adopted a number of laws and regulations that govern the growth, development and infrastructure investment in these areas.

Counties and state agencies often have the primary responsibility for funding, constructing and maintaining the linear infrastructure systems. In the same way that many of these man-made linear systems cross municipal boundaries, so do natural systems, such as rivers, wetlands and wildlife corridors. For these reasons, certain decisions made at the local level must consider how they affect or are interrelated with manufactured and natural systems at the county or regional level.

There are a number of resources available to help local governments understand the importance of local decisions and gain the assistance required to improve their planning tools, implement recommendations and provide services.

Technical Assistance
Training is offered through G/FLRPC's biannual Regional Local Governments Workshop series, the biannual Monroe County Land Use Decision Making Program, and other workshops.

Technical assistance is available though county and regional planning agencies, the New York Planning Federation, the NYS Department of State's Division of Local Government Services, NYSDEC, and the NYS Department of Agriculture and Markets.

Regional planning organizations include:

- Finger Lakes Regional Economic Development Council (FLREDC) – established in 2011, as one of 10 Regional Councils charged with developing long-term strategic plans for economic growth across New York State. These councils are public-private partnerships made up of local experts and stakeholders from business, academia, local government, and non-governmental organizations. The FLREDC prepared the Finger Lakes Strategic Plan, *Accelerating Our Transformation* in 2011. This plan was followed by a 2012 update, *Accelerating Our Transformation: Year 2*, which was awarded Best Plan in the State that year. The FLREDC Strategic Plan is a resource for local decision making as it is focused on improving regional connections, achieving greater efficiencies and lowering costs among Finger Lakes governments, towns and villages. The Plan also seeks to accelerate job creation and reinforce the quality of life in the region.
- Genesee/Finger Lakes Regional Planning Council (G/FLRPC), which offers primary program components, such as:
  - Local, Regional and Water Resources Planning
  - Regional Economic Development Planning – District Organization for the federal Economic Development District and develops the Comprehensive Economic Development Strategy (CEDS)
  - Data, Technology and Resource Center
- Genesee Transportation Council (GTC) – the U.S. Department of Transportation's designated Metropolitan Planning Organization (MPO), which is responsible for the transportation policy, planning and investment decision making required to receive federal transportation funding. GTC has supported local planning through the development of the region's Long Range Transportation Plan and Transportation Strategies for Freight and Good Movement in the Genesee-Finger Lakes Region.

County and Multi-jurisdictional Coalitions
Additionally, local officials benefit from planning efforts by counties and multi-jurisdictional coalitions. Acknowledging the importance of agriculture to the region, Genesee, Livingston, Monroe, Ontario, Seneca, Wayne, Wyoming and Yates counties have adopted Agriculture and Farmland Protection Plans. All nine counties have implemented Agricultural District programs.

Acknowledging the importance of the protection of water quality, the region has benefitted from the

work of the Stormwater Coalition of Monroe County, Conesus Lake Watershed Council (CLWC), Canandaigua Lake Watershed Council, Honeoye Lake Task Force, Cayuga Lake Watershed Intermunicipal Organization, and the Niagara Orleans Regional Alliance. These organizations have developed Watershed Management Plans for Conesus, Canandaigua, Honeoye, Cayuga, and Keuka lakes.

Hazard Mitigation Plans have also been developed for all counties within the region. Once again, while these organizations that cross municipal boundaries are a tremendous resource to the region, it is ultimately the cities, towns, and villages that must buy in to recommended strategies, as local governments have the greatest authority and ability to impact sustainability-related issues.

Intermunicipal Cooperation Agreements
Cooperative agreements have also resulted in shared services and highlight the potential benefit that can be achieved by identifying efficiencies and reducing costs through efforts such as joint purchasing and streamlining service delivery. These efficiencies allow for reinvestment in the community and region, ultimately contributing to the quality of life. Common areas of cooperation include:

- Maintenance of highway
- Parks
- Sharing of equipment
- Fuel and other commodity purchase and storage
- Mutual aid for public safety services
- Recreation programming

Examples of this type of cooperation include:

- Partnership between Monroe County and the City of Rochester in constructing two new green fueling facilities on Mt. Read Boulevard and Lakeshore Boulevard in 2013.
- The GLOW Region Solid Waste Management Committee (through an Intermunicipal Agreement by the counties of Genesee, Livingston, and Wyoming) provides a regional approach to materials/waste management.
- The regional Traffic Operations Center (RTOC) is a joint venture of the Monroe County Department of Transportation, Monroe County Airport Authority, NYSDOT and the NYS Police. The facility brings together traffic and emergency responders and houses the Traffic Control Center.

Challenges, Variables, and Opportunities

Local land use decisions and regulations, as well as the availability of infrastructure, affect the way each community develops. With 190 communities in the region making laws and planning, it can be a challenge for communities to work together on the many issues that cross municipal borders. Though training is offered through the G/FLRPC's biannual Regional Local Governments Workshop series, the biannual Monroe County Land Use Decision Making Program, and other workshops, many members of local planning and zoning boards and, more particularly elected legislative officials, serve without the adequate knowledge necessary to deal with complex legal procedures and technical issues pertaining to land use planning and development. Many communities also lack the money to undertake the preparation or update of local plans, as well as the professional skills.

To address these challenges, there is a need to continue to provide training and technical resources to municipal officials and promote cooperation and partnerships across municipal boundaries. Training and outreach curriculums for local officials and leaders should address the integration of agriculture and farmland protection, natural resource protection, and environmental planning to evaluate the potential for local policies, programs or practices that can help communities work together to address these concerns.

Implementing the Sustainability Plan will rely, in large part, on local governing bodies – it is the collective decisions and actions of the city, town, village and county leadership that will determine how effectively the region will be able to achieve its goals.

There is an opportunity to establish a more sustainable approach to governance and address how local decisions affect natural and manufactured systems within and across municipal boundaries. It can be accomplished by improving planning at the basic level and introducing more sustainable policies into local planning. This is particularly important for suburban and rural areas, where greenfield development is more prevalent, to ensure that these areas are developed in a more sustainable manner, following smart growth principles.

Comprehensive planning is an opportunity and essential means for embedding sustainable policies and practices into the local decision making realm. Many communities in the Finger Lakes Region have adopted municipal comprehensive plans. These plans typically contain an overall vision for the future and recommendations aimed at guiding growth in the community. The region currently has at least 147 county and municipal comprehensive plans; however, only 31 of them have been updated in the last five years. Hence, there are a number of communities in the region that do not have planning documents that address their needs, and many more that have plans that may no longer reflect present day realities and/or the desires of local citizens.

All of these resources and opportunities are aimed at helping municipal governments plan more sustainably and build stronger relationships to achieve the goals of this Regional Sustainability Plan. The assessment of challenges and opportunities was useful for the identification of Indicators and Targets for achieving more sustainable governance practices in the region.

Indicators and Targets

In the evaluation of land use and livability in the Finger Lakes Region, it became apparent that Governance played a strong role in how communities developed and utilized resources. In the evaluation of Governance and the development of Indicators for this component of the Plan, Stakeholder input had significant influence. The Governance Indicators emerged primarily through the discussions on land use and livability, transportation, water management and energy with a focus on planning across municipal boundaries and establishing consistent policies and regulations. The Stakeholders felt there was a need for improved planning and implementation of regulations that addressed sustainability in order to achieve greater regional coordination and cooperation. These interests are reflected in the Governance Indicators.

Indicators

- Number of Communities with comprehensive plans less than 5 years old
- Number of Climate Smart Communities

The baseline values for these Indicators are shown in the Summary Sheet at the end of this section, as well as Targets for short (2020), mid (2035), and long-term (2050) timeframes. A table of representative Sub-strategies/Project Ideas and Representative Projects that contribute to the implementation of these Broad Strategies is also provided in the Summary Sheet.

Sustainability Goal and Strategies

Governance Goal

Strive to achieve a more sustainable region and more vibrant communities through the promotion and establishment of stronger intermunicipal relationships and planning.

The following is a description of each Broad Strategy that supports the Governance Goal. Representative Sub-strategies are provided as examples of specific measurable activity that could be implemented to support the Broad Strategy. At the end of the Governance section there is a Summary Sheet that provides a more comprehensive list of representative Sub-strategies/Project Ideas and Representative Projects that contribute to the implementation of these Broad Strategies.

Broad Strategy G1 | Promote the development of local and regional sustainability initiatives to serve as a dynamic means of supporting the goals of the Regional Sustainability Plan across all Subject Areas.

The Finger Lakes Regional Sustainability Plan is intended as a means for improving the economic and environmental health, and quality of life of the region to achieve a more sustainable future. The Plan must be embedded into the culture and embraced by local and regional officials to establish the framework necessary to guide future planning and investment-related decisions aimed at sustainability. These efforts can lead to the establishment of sustainable policies, programs and practices.

Prioritization
This Broad Strategy is of high importance because governance affects every element of the regional Sustainability Plan. For the region to achieve its goals for a sustainable future it will require the promotion and implementation of new and innovative initiatives that are founded in a comprehensive approach to planning. The future of all 190 communities in the region should be shaped by up to date comprehensive plans that reflect the issues and opportunities in each area, and include sustainable policies and practices that support the Plan.

Additionally, this Broad Strategy promotes the importance of training to help local officials understand the benefits of sustainable land use and planning, and the need to incorporate sustainability measures and policies into comprehensive and other long range planning documents.

This strategy is aligned with the following Guiding Principles:

- Respect local planning efforts and retain individual community character
- Build partnerships between local governments, the private sector, regional institutions and the public
- Build sustainability capacity and understanding through outreach and education
- Bring the Finger Lakes Region together through a shared identity and common goals

Potential Stakeholders and Resources
The implementation of this strategy will require commitment on the part of local officials to work toward a more sustainable future through better comprehensive planning. There are currently limited resources available for the development of comprehensive plans; however there are resources available for other planning efforts including:

- Community Development Block Grants
- NYS Brownfield Opportunity Area program
- NYS Department of Homes and Community Renewal programs, including New York Main Street program
- Urban Initiative program
- Rural Area Revitalization program.
- NYS Environmental Protection Fund Local Waterfront Revitalization Program
- Clean Water/Clean Air Bond Act
- Great Lakes Coastal Watershed Restoration Program.

Challenges and Sub-strategies
The primary challenge to the success of this strategy is securing sources of funding to help communities undertake the preparation and updating of comprehensive plans and other long range planning documents and initiatives. Another challenge is helping local communities understand the importance and benefits of comprehensive planning and other initiatives, including the introduction of sustainable land use policies, for advancing their future. This is a constructive means of utilizing the power of home rule that can be accomplished in association with other municipalities.

Sub-strategies that support the Broad Strategy include the incorporation of sustainability measures into local and regional plans; increasing the number of communities that participate in the State's Climate Smart Communities program; and the creation of local or county entities, such as sustainability offices that could provide stewardship for this Plan and the efforts of local communities to achieve their sustainability goals is another recommended Sub-strategy.

Sub-strategy 1.1 | *Increase participation in the Climate Smart Communities program.*

The NYS Climate Smart Communities (CSC) program is an unprecedented state-local partnership to reduce greenhouse gas emissions, save taxpayer dollars and advance sustainable community goals for health and safety, economic vitality, energy independence and quality of life. Six New York state agencies, the DEC, NYSERDA, DOT, DOH, the Department of State and the Public Service Commission, jointly sponsor the Climate Smart Communities program.

The CSC program is designed to provide several resources to Climate Smart Communities, including:

- Technical assistance through a CSC Coordinator. Climate Action Associates (CAA) is the designated support contractor to provide technical assistance to in areas outside the pilot regions (this includes the Genesee-Finger Lakes Region). CAA can answer technical questions about the program, including how to participate and benefit from the resources available. CAA will provide case studies and technical implementation assistance, and coordinate information sharing with other communities where possible
- Toolkit of leading practices which is being developed by the Environmental Analysis and Communication Group, based out of the Bloustein School of Planning and Public Policy at Rutgers University. The toolkit will highlight practices for Climate Smart Communities to reduce greenhouse gas emissions through local land use, zoning, transportation planning, infrastructure investment and green infrastructure development, and the adoption of progressive building codes related to energy efficiency, renewable energy, land-use planning, and site improvement standards
- Access to the Climate Smart Communities webinar series
- The *Climate Smart Communities Guide to Local Action* which contains overviews of possible community actions, how-to's and case studies to help communities implement the CSC pledge including conducting a GHG inventory and developing a Climate Action Plan

Currently, only three communities in the region participate in this program: the City of Rochester, the Town of Irondequoit, and the Village of Victor. Counties and municipalities throughout the region should consider adopting and implementing the CSC pledge.

Sub-strategy 1.2 | *Incorporate sustainability measures into local and regional level planning documents, such as comprehensive plans, farmland and agriculture protection plans, stormwater and watershed management plans, transportation plans and economic development plans.*

This Sub-strategy is aligned with the following FLREDC Regional and Sector strategies:

- Invest in Community, Industrial Development & Infrastructure
- Agriculture and Food Processing
- Tourism and the Arts

Current and up to date planning documents are more likely to include policies and recommendations that support sustainability. As communities gain a greater understanding of the need to better manage growth and protect resources, as well as the benefits of working together to achieve their goals, new and/or updated plans can represent a fundamental means for achievement. An example of this type of approach is Genesee County's Smart Growth Plan. The Plan is intended to encourage the revitalization of villages and hamlet areas and protect valuable agricultural resources. The Plan has three goals:

1. Focus County resources to support economic development opportunities in the most promising locations.
2. Encourage the revitalization of existing industrial areas, business districts, and residential neighborhoods in the City of Batavia and developed village areas.
3. Protect farmland and the rural character of the countryside, and maintain the viability of agriculture.

Local and regional planning documents should be reviewed and updated every five years. As plans are revised, they should incorporate sustainability measures consistent with the Framework of this Plan. The implementation of this Sub-strategy will include municipalities, counties, watershed organizations, the Genesee Transportation Council (GTC), the Genesee/Finger Lakes Regional Planning Council (G/FLRPC), and the FLREDC.

Sub-strategy 1.3 | *Create municipal sustainability offices or entities at the local, county and/or regional level to provide stewardship over this Plan.*

To help local officials and the public understand and embrace the benefits of sustainability, and to provide a solid foundation for sustainability and the Finger Lakes Regional Sustainability Plan in the region, it is important to provide proper tools and resources. Having regional or local entities to assist with this effort is one way to ensure success and implementation. Sustainability offices could carry out the mission of this Plan and help communities, businesses and the public gain the knowledge and information required achieve the Plan's Vision.

An example of a sustainability office is the City of Rochester's Office of Energy & Sustainability which works to ensure that the City maintains and enhances its long-standing commitment to preserving, protecting, and restoring its natural resources. Representatives from every City department provide expertise to guide the development of City policies and practices that are consistent with its environmental mission including:

<u>Climate protection activities</u>

- Commitment to the US Conference of Mayor's Climate Protection Agreement
- Memberships with ICLEI - Local Governments for Sustainability , Climate Communities and The Climate Registry

- Greening the City's fleet with highly efficient and alternative fuel vehicles
- Reducing overall energy consumption with HVAC upgrades, efficient lighting systems, US Green Building (LEED) standards, and employee education
- Purchase of energy generated by renewable sources

Protection and restoration of natural resources activities

- Leadership participation in the Great Lakes & St. Lawrence Cities Initiative
- Preventing and monitoring beach pollution
- Nationally recognized urban forestry program
- 3,500+ acres of parkland
- More than 18 miles of off-road and unpaved trails
- Aggressive and successful brownfield cleanup and redevelopment program
- Stewardship of a pristine watershed that includes Hemlock and Canadice Lakes

Recycling and reuse activities

- Residential curbside collection
- Materials Give Back Program
- Purchasing policy that emphasizes and encourages green products

Construction and zoning activities

- Revision of the Zoning Code to emphasize sustainable development
- Adoption of LEED standards for all new construction and major rehab projects by the City
- Working with private sector partners to facilitate green development

Counties and municipalities should consider the development of sustainability offices or designate sustainability staff within existing planning departments. Like the City of Rochester model, these offices should address a wide range of sustainability issues consistent with the Framework of this Plan. In addition, Section 4, Plan Implementation identifies the need to designate a Regional Plan Coordinator to:

- Inform and provide assistance to implement the Plan
- Evaluate the Plan's progress and provide periodic updates
- Continue to engage Stakeholder Groups to continue work started as part of this Plan
- Maintain the project website, sustainable-fingerlakes.org and continue to accept and evaluate Strategy Capture Forms
- Coordinate with the FLREDC to ensure alignment between the Finger Lakes Regional Sustainability Plan and updates to the FLREDC Strategic Plan: Accelerating Our Transformation

There is a need to provide funding to establish and support the efforts of sustainability offices.

Sub-strategy 1.4 | *Provide training and technical resources to municipal officials and local boards to promote more sustainable policies and decision making.*

This Sub-strategy is aligned with the FLREDC Regional Strategy to "Align Workforce Development Efforts with Sector Needs" and Sector Strategy "Business Services - foster closer cooperation among the region's companies and institutions of higher education to accelerate technology transfer and align workforce training programs with the skill sets required by the sector."

Local boards and municipal officials who are responsible for policy and investment decisions need a better understanding of sustainable issues across all subject areas and the relationships among them. This understanding will help to protect important natural resources, protect community character, and improve the quality of life in the region. Training and the provision of technical resources can help local officials improve their decision making.

The New York Planning Federation and the NYS Department of State, as well as the NYS Department of Environmental Conservation and other State agencies provide training and assistance and are developing a stronger focus on

sustainability and climate. An example of this focus on sustainability is the resources available through the Climate Smart Communities program. Within the region, technical assistance is offered by the G/FLRPC, GTC and county planning departments. Training is provided through the G/FLRPC's biannual Regional Local Governments Workshop series, the Monroe County Department of Planning and Development biannual Land Use Decision-Making Program and other organizations.

As noted in other subject areas, there is a need to continue and enhance the existing resources and training programs with a focus on sustainability and specific issues faced by the region. One approach is the enhancement and maintenance of the sustainable-fingerlakes.org website to provide a single sustainability resource for the region. A separate page should be developed for the following:

- Story of Place
- Energy
- Transportation
- Land Use & Livable Communities
- Materials & Waste Management
- Water Management
- Economic Development
- Climate Change Adaptation
- Governance
- GHG Emissions
- Agriculture & Forestry

In addition to addressing each subject area, the website should also provide for the development of whole-systems thinking which acknowledges and respects the strength of diverse and collaborative systems working alongside each other to yield multiple benefits, and healthy, resilient systems. In addition to education materials, the website could provide links to state, county, municipal, institutional and non-profit resources. The development of this page would be the responsibility of the Regional Plan Coordinator as identified in Section 4, Plan Implementation. A potential approach to enhance training would be to establish a Sustainability Tract in training programs and to make presentation materials available through the sustainable-fingerlakes.org website.

Broad Strategy G2 | Encourage regional cooperation and coordination.

Continued regional cooperation and coordination are necessary to help municipalities address the many issues that cross municipal borders, including infrastructure and natural systems. As people live their lives, they share infrastructure and resources with little regard to municipal boundaries. Improved regional cooperation and coordination opens up avenues for greater government efficiency, improved land use decisions, reduced costs and cost sharing, and consistent policies. Better coordination of regional planning efforts can also result in resiliency, flexibility and the ability to more readily adapt to change.

Prioritization
Regional coordination and cooperation is a priority in an effort to bring about a more sustainable and comprehensive approach for addressing land use and other issues that cross municipal boundaries. By working together and with other regional entities, local communities can achieve better land use decisions and investments, and be more flexible and resilient, with greater capability to adapt to change.

This strategy is aligned with the following Guiding Principles:

- Respect local planning efforts and retain individual community character
- Build partnerships between local governments, the private sector, regional institutions and the public
- Bring the Finger Lakes Region together through a shared identity and common goals

Potential Stakeholders and Resources
As with the first Broad Strategy for governance, implementation of this strategy will require commitment on the part of local officials to work toward a more sustainable future through improved

coordination and cooperation. Technical assistance and resources must be provided by county planning departments and regional and state agencies.

Challenges and Sub-strategies
The greatest challenge to this strategy is political will to work together. There have to be demonstrated benefits and the awareness (and existence) of available resources to provide incentives for greater coordination and cooperation, and get communities to work together. Sub-strategies identified for this Broad Strategy include the incorporation of the major findings and recommendations of this Plan into decision making undertaken by the regional Economic Development Council. As the FLREDC is charged with overseeing, supporting and promoting economic development across the region and state, the coordination of these two important planning efforts will help to ensure that future economic development projects will be undertaken in a sustainable manner and in keeping with the goals of this Plan.

Sub-strategy 2.1 | *Incorporate major findings and recommendations from the Regional Sustainability Plan into decision-making on the part of the Finger Lakes Regional Economic Development Council (FLREDC), regional authorities, counties and municipalities.*

The Sustainability Plan supports all of the strategies from the FLREDC with particular alignment with the following:

<u>Regional Strategies</u>
- Optimize business creation, retention, and expansion
- Strengthen Academic and Industry Partnerships
- Align Workforce Development Efforts with Sector Needs
- Invest in Community, Industrial Development & Infrastructure

<u>Sector Strategies</u>
- Energy Innovation
- Business Services
- Agriculture and Food Processing
- Tourism and the Arts

The Finger Lakes Regional Sustainability Plan is intended to be used as a framework to help the region discover, understand, and continue to build-upon that which makes it unique. The Framework of this Plan should be embedded into all planning and investment-related decisions by the FLREDC, regional authorities, counties and municipalities, to improve the region's economic and environmental health, and therefore overall quality of life.

Sub-strategy 2.2 | *Encourage cooperation and better coordination of planning and zoning across municipal boundaries to achieve consistent development patterns and protect the natural and built environment.*

Comprehensive and land use planning and the adoption of zoning take place at the local level. However, there is often a need to take an intermunicipal approach to achieve consistency and protect natural resources and infrastructure. A regional example of an intermunicipal approach is the collaboration of the Seneca Lake watershed community which encompasses 40 municipalities and five counties, including parts of Chemung, Ontario, Schuyler, Seneca, and Yates Counties. The watershed community has shown strong support for watershed planning; various partnerships and stakeholders have been cooperatively operating since the mid-1990s. Representatives from the watershed communities, counties and regional planning boards are participating in the development of the Seneca Lake Watershed Management Plan. The Plan will serve as a long-term strategy for the protection and restoration of water quality and ensure compatible land use and development.

Counties and municipalities should continue to identify the need and opportunity for intermunicipal cooperation and coordination. These efforts should be supported by county planning departments, existing intermunicipal coalitions/alliances, the GTC, the G/FLRPC, and the FLREDC.

Governance

Subject Area Goal

Strive to achieve a more sustainable region and more vibrant communities through the promotion and establishment of stronger inter-municipal relationships and planning.

Opportunities

- More equitable, efficient and sustainable tax structures
- Educating policy makers and the public about the connections between transportation and land use
- To incorporate sustainability into technical training for local officials

Challenges

- Municipal Home Rule tends to limit the effectiveness of regional planning
- Land use policies promote auto-oriented, single-use development
- Competing priorities of adjacent communities
- Outdated, or lack of, comprehensive plans and other long range planning documents

Variables

- Availability of funding for regional and local planning initiatives
- Political will

Indicators and Targets

Indicators	Broad Strategies Measured	Baseline Value (2010)	Short-Term Target* (2020)	Mid-Term Target* (2035)	Long-Term Target* (2050)
Number of communities with Comprehensive Plans less than 5 years old	G1	31 communities (16%)**	+ 4% (20%)	+ 18% (35%)	+ 48% (65%)
Number of Climate Smart Communities	G1	3 communities (2%)**	+ 23% (25%)	+ 48% (50%)	+ 73% (75%)

*All % reductions or increases are related to the 2010 baseline values, not the previous target.
** The Finger Lakes Region includes 190 cities, towns and villages that have decision making authority at the local level.

Governance

Subject Area Goal

Strive to achieve a more sustainable region and more vibrant communities through the promotion and establishment of stronger inter-municipal relationships and planning.

Priority Broad Strategies

Connection with criteria
● Strong ◐ Moderate ○ Marginal

	Evaluation Criteria					
	Benefits Multiple Subject Areas	Benefits Multiple Capitals	Benefits Multiple Communities	Implementation Feasibility	Consistent with Planning Efforts	Financial Feasibility
Broad Strategy G1—Promote the development of local and regional sustainability initiatives to serve as a dynamic means of supporting the goals of the Regional Sustainability Plan across all Subject Areas.	●	●	●	●	◐	●

Representative Sub-Strategies / Project Ideas

1.1 Increase participation in the Climate Smart Communities program.

1.2 Incorporate sustainability measures into local and regional level planning documents, such as comprehensive plans, farmland and agriculture protection plans, stormwater and watershed management plans, transportation plans and economic development plans.

1.3 Create municipal sustainability offices or entities at the local, county and/or regional level to provide stewardship over this Plan.

1.4 Provide training and technical resources to municipal officials and local boards to promote more sustainable policies and decision making.

Representative Projects

- Town of Perry Comprehensive Planning Approach—Develop an integrated farmland protection plan and energy policy in conjunction with the comprehensive plan, incorporating the recommendations of the farmland protection plan and energy policy into the comprehensive plan.
- Wayne County Lakeshore Management Project—This project will utilize LIDaR imaging and GIS analysis to identify areas most at risk of severe weather events. It will allow for the creation of climate adaptation plans and enable municipalities to modify land use laws to incorporate climate change criteria for new development.

Broad Strategy G2—Encourage regional cooperation and coordination.	◐	◐	●	◐	◐	◐

Representative Sub-Strategies / Project Ideas

2.1 Incorporate major findings and recommendations from the Regional Sustainability Plan into decision-making on the part of the Finger Lakes Regional Economic Development Council (FLREDC), regional authorities, counties and municipalities.

2.2 Encourage cooperation and better coordination of planning and zoning across municipal boundaries to achieve consistent development patterns and protect the natural and built environment.

Representative Projects

- Finger Lakes Regional Sustainability Plan—Undertake revisions to, and implement the recommendations, of the Finger Lakes Regional Sustainability plan on an ongoing basis.
- Finger Lakes Climate Change Adaptation Leadership and Resilience Council—This project is aimed at aligning regional leadership and resources toward research, education and training to solve local problems; and develop processes to identify and share critical resources.

Finger Lakes Regional Sustainability Plan

GHG Emissions

3.11 Greenhouse Gas Emissions

Overview

This section provides an overview of greenhouse gas (GHG) Emissions within the Finger Lakes Region. Opportunities, challenges and specific strategies are captured within the other Subject Areas.

A regional GHG inventory is a collection of data summarizing the sources of GHG within and specific to a region and quantifying the GHG emissions that result from these sources. The inventory provides specific information to use in prioritizing local efforts to reduce GHG emissions. As part of the planning effort, a Tier II GHG inventory was conducted for the region and is provided in **Appendix B2: Tier II GHG Inventory**. The Tier II analysis completed for this project uses a "bottom up" approach, using local utility use and other specific regional data when available. Data sources for each sector are defined in the discussion below.

To establish a uniform method for the development of the regional GHG inventories, NYSERDA established the GHG Inventory Protocol Working Group made up of members from all regional teams in the state, as well as representatives of New York State agencies such as the Department of Transportation (DOT), Department of Environmental Conservation (NYSDEC), and NYSERDA. The Protocol Working Group established the NYGHG Protocol for the Cleaner, Greener Communities Program and reporting template. Valuable lessons were learned through the NYGHG Protocol development process. Most importantly, energy use, transportation priorities, and data availability vary significantly across the state, and this work provides key information to manage the variety. To be useful, this data needs to be collected and analyzed in a consistent, transparent, and replicable fashion.

The Finger Lakes regional GHG inventory used data from 2010 for the baseline year, in order to coincide with the most recent U.S. Census. The inventory includes an evaluation of the following sectors: electricity generation and consumption; direct stationary energy consumption; transportation; industrial process sources; energy transmission losses; solid waste and wastewater management; and agriculture and forestry. The results of the Tier II GHG inventory for the Finger Lakes are summarized below.

The total Finger Lakes Region GHG emissions for 2010 were estimated at 16.2 million metric tons (MT) of carbon dioxide equivalents (CO_2e). A breakdown of the emissions by sector is provided below.

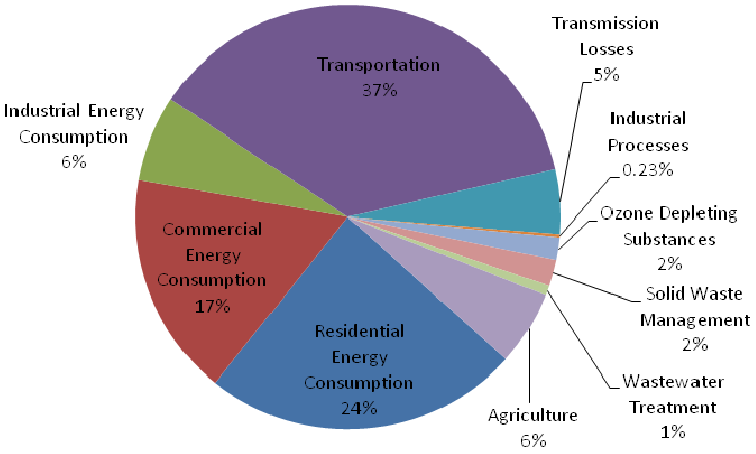


Figure 3-11: Tier II GHG Emissions by Source – 16.2 Million MT CO2e (2010)

Electricity Generation and Consumption

Electricity is categorized and tabulated in two separate ways in the GHG inventory: *generation* and *consumption*. *Generation* refers to the

electricity created at power plants in the region, and the direct GHG emissions are calculated based on the specific type of fuel used. *Consumption* refers to electricity used in the region, and these emissions are considered indirect and calculated from sales data provided by supply companies and average emission factors. The difference between generation and consumption, allowing for the transmission and distribution losses from regional consumption, represents electricity that is imported from or exported to other regions.

The Finger Lakes Region generated 7 million megawatt-hours (MWh) in 2010, resulting in 1.6 MT CO_2e. Most of this energy, more than 5.9 million MWh, was generated without direct GHG emissions. 4.9 million MWh were generated at the R.E. Ginna Nuclear Power Plant, while an additional 1.0 million MWh were generated using renewable and alternative energy sources such as wind, hydro, and recovered landfill gas.

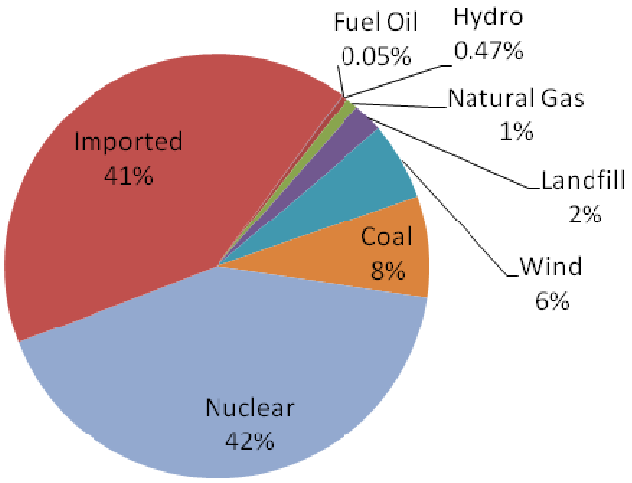


Figure 3-12: Electricity Sources (2010)

In the Finger Lakes, 11.2 million MWh of electricity were consumed, and 0.65 million MWh is lost during transmission within the region, therefore the region imports about 4.8 million MWh of electricity from other regions of the state, which can come from a mix of sources. **Figure 3-12** provides a breakdown of the sources of electricity in the region, defining the total consumed by imported electricity or regional source.

According to the NYGHG Protocol method, GHG emissions from electricity consumption are rolled up into the regional total. In 2010, 2.5 million MT CO_2e of GHG emissions are attributed to the region's use of electricity. This represents 16% of all the GHG emissions generated in the region or 33% of building energy use. Electricity consumption is distributed among the following sectors: industrial (22%), commercial (38%), and residential (40%).

Direct Stationary Energy Consumption

Direct consumption of other fuels includes the use of natural gas, distillate and residual fuel oil, propane, liquid natural gas, wood or bio-mass, primarily for heating buildings and water. This energy use in residential, commercial, and industrial facilities amounted to 99 million MMBtu's of energy, and 5.2 million MT CO_2e, or 32% of Finger Lakes regional GHG emissions.

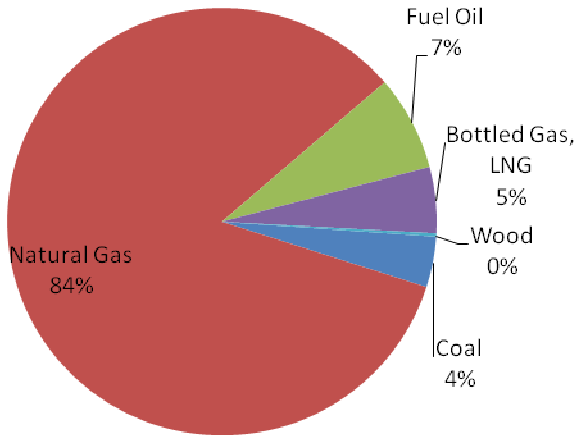


Figure 3-13: Percentage of GHG Emissions from Direct Stationary Consumption, by Fuel Type

Direct Stationary Consumption by Fuel Type (2010)

Because accurate and complete Tier II direct energy use data are not available for the region, direct consumption of stationary fuels are calculated using a Tier I, or "top down" approach, with energy data collected from 2010 state-wide fuel-use data from the EIA State Energy Data System (SEDS) and allocated to each county in the residential, commercial, and industrial sectors using different allocation methods, chosen to best represent energy usage at the regional level throughout the state.

Residential energy use is allocated using 2010 heating degree days (HDD), the percentage of household energy use by type as defined by the three-year average of the American Community Survey (ACS), and the number and size of houses as reported in the 2010 U.S. Census. Commercial energy use is allocated using 2010 HDD, the percentage of energy use by type as defined by the residential sector, the number of employees by business type as reported by the New York State Data Center, and the average energy per worker, per square foot of space for each type of business reported by the EIA Commercial Building Energy Consumption Survey (CBESC). Industrial energy use is not based on an allocation method. Reported energy use is collected from NYSDEC's Title V Air Quality Permitting information.

Energy Transmission Losses

GHG emissions are also attributed to losses in energy resulting from transmission, either through the loss of power through the generation of heat in the case of electricity, or from direct emission losses of natural gas. These emissions are associated with the amount of electricity or natural gas consumption, but per the NYGHG Protocol have been considered separately. These emissions represent 5% of GHG emissions in the Finger Lakes Region.

Industrial Process Sources

Emissions resulting from industrial processes or fugitive system emissions are also considered separately from building and facility emissions. These emissions include emissions from industry, namely glass production in the region, as well as fugitive refrigerants and lubricants such as SF6 and hydrochlorofluorocarbon (HCFC) and chlorofluorocarbon (CFC). This category represents a small percentage (2%), of emissions in the region.

Transportation

Energy consumption from the operation of vehicles and mobile sources includes a broad range of uses. All mobile sources result in 6.0 million MT CO_2e, or 37% of regional GHG emissions. On-road vehicle travel represents the majority of transportation total emissions, while emissions from aircraft, rail, and marine vessels represent a small percentage of this category. Non-road mobile sources such as construction equipment, landscaping equipment, and recreational vehicles (including boats and snowmobiles) are included as well. On-road GHG emissions are calculated using 2009 vehicle miles travelled (VMT) in the region, and other activity estimates also use the latest data available to represent annual numbers, which come from 2002-2010. In accordance with the NYSGHG Protocol, fuel consumption for on-road and rail sources was estimated using VMT and fuel efficiency data from NYSDOT and NYSERDA. Energy used by aircraft, commercial vessels, and off-road vehicles and equipment is estimated using emission-modeling software: Emission and Dispersion Modeling System (EDMS) Version 5.1.3 for aircraft; EPA's 2008 National Emission Inventory (NEI) database for marine vessels; and EPA's NONROAD model runs conducted by NYSDEC using 2007 data and the 2005 version of NONROAD. **Figure 3-14** shows the percentage of transportation GHG emissions by activity.

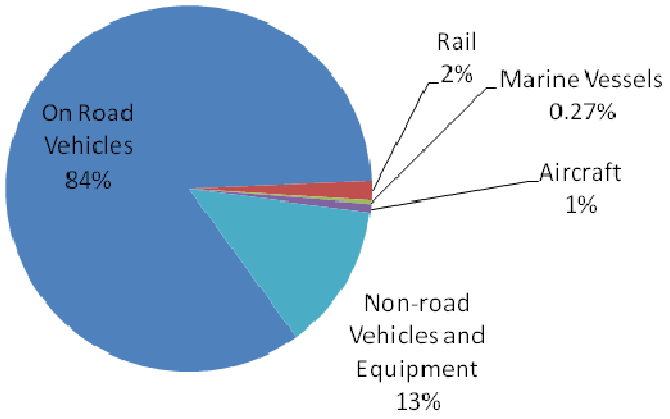


Figure 3-14: Estimated Annual Transportation GHG Emissions (6 Million MT CO2e)

Agriculture

GHG emissions from manure management, livestock populations, and fertilizer applications are primarily methane and nitrogen dioxide. These operations represent 5.6% of regional GHG emissions.

Forestry

Forests in rural areas and even in some urban areas can represent a source for carbon absorption. While this source is a complex and difficult sector to estimate accurately, the GHG inventory provides an assessment of current carbon sink values of existing rural and urban forests within the region. Research into the amount of carbon stored in trees and forests has been used to estimate the total CO_2e stored in the region's forests and also the annual amount of GHG emissions absorbed by urban trees. Total forest carbon is estimated based on types and amount of forest land in the region. It is estimated that 173 million MT CO_2e is sequestered in the Finger Lakes regional forests. In addition, urban trees can provide an important carbon sink in the region. Urban forest carbon is calculated based on the estimated density of trees and the amount of urban space in the region. Urban trees sequester 0.25 million MT CO_2e of GHG emissions annually in the Finger Lakes.

Solid Waste and Wastewater Management

Unlike energy use emissions, which are mostly carbon dioxide (CO_2), emissions from waste and wastewater management consist primarily of methane and nitrogen dioxide, resulting from the breakdown of organic materials. Most waste-related methane emissions are controlled by methane capture for energy production or flaring. Waste and wastewater result in only a small amount of GHG emissions in our region (2% and 0.7%, respectively). Most landfill methane, more than 75%, is captured and used to generate electricity in the region, reducing the climate impacts of the methane by preventing its release into the atmosphere and replacing other GHG-emitting fuels used for electricity generation. For the GHG Inventory, current annual emissions from regional landfills was reported, but GHG emissions attributed to the amount of waste generated within the region during 2010 was included in the regional totals.

Indicators and Targets

GHG Emissions (CO2e) per capita and absolute for the region is the Indicator for this Subject Area. The Finger Lakes Region 2010 Baseline GHG Emissions is 13.28 MT CO2e per capita. This is consistent with the 1990-2008 statewide average of 13.7 MT CO2e per capita which is lower than the national average of 24.4 MT CO2e (New York State Climate Action Council, "New York State Climate Action Council Interim Report 11-9-10, Chapter 3 Inventory of New York State's Greenhouse Gas Emissions," November 11, 2010). The two largest contributors to regional GHG Emissions are energy consumption – residential, commercial and industrial (47%) and transportation (37%). The Planning Team guided the development of GHG Emissions reduction Targets based on the potential to reduce energy demand associated with residential, commercial and

industrial sectors (generation and consumption) and transportation (vehicle miles travelled and use of alternative fuels).

Indicators

- CO2e emitted (total and per capita)
- CO2e emitted by emission source (see **Figure 3-11**)

The target values for CO2e emissions are as follows:

- Short-term target (2020) – 10% reduction
- Mid-term target (2035) – 25% reduction
- Long-term target (2050) – 35% reduction

Sustainability Goal and Strategies

Greenhouse Gas Emissions Goal

Reduce greenhouse gas emissions from both large-scale and small-scale sources and both point and non-point sources, utilizing a variety of strategies within each Subject Area outlined in this Sustainability Plan.

Broad Strategies, Sub-strategies, and Representative Projects designed to reduce greenhouse gas emissions are provided within the other Subject Area sections.

3.12 Agriculture & Forestry

Overview

Connection to Story of Place

The fertility of soils throughout the Lake Ontario coastal plain not only enabled the settlement of the area, but also served as a primary driver of its development as a center of agricultural commerce. Two ancient seas covered the region. Deposition of the skeletal remains of millions of sea creatures living in the warm shallow waters of these seas created the limestone layers throughout the region. Meanwhile, the material that eroded from the mountains formed the characteristic layers of shale. The limestone helps to buffer the pH of the normally acidic soils, and the shale provides excellent drainage. Both of these factors account for the region's prime agricultural soils. Almost all of the local wineries are planted in shale soils.

The rich soils in the region supported a large and agriculturally native population up through the time of the Revolutionary War. However, the extent and importance of this rich pocket of soils is significant when considering there are only a few comparable pockets of good soil along the east coast. The majority of good soils on the continent are in the upper Midwest and throughout the Great Plains, which were largely unpopulated during the first century of America's existence. All of the best soils along the eastern seaboard were claimed early on by wealthy plantation owners, royal land grants, or corporations. So the coastal plain of Lake Ontario represented the first large expanse of high quality soils available to common people in the newly established United States. These extensive fertile farmlands enabled the growth of a prosperous farming middle class much like the one that grew soon after in Ohio and the Upper Midwest. The patterns and organizations of farms and farm communities of the Upper Midwest were also first developed here. The large flat fields and abundant harvests called for new strategies for growing and distribution. They needed to invent new ways to organize and govern themselves. Innovations like The Grange (oldest American agricultural advocacy group), farm co-ops, and municipal home rule were the result.

The region's geological history also bears directly on the development of its forest resources, as glaciation and glacial retreat created opportunities for the introduction and evolution of woody species from other areas. The notions of eddying and innovation continue in these sectors; other regions of the country are looking to models developed within the Finger Lakes for their own use, from the Town of Seneca's land use ordinances, to Geneva's New York State Agricultural Experiment Station, to the growth of the region's farm markets and food processing cluster.

Existing Conditions: Assets and Sustainability Initiatives

Agriculture and forestry are critically important sources of economic development and ecological services within the Finger Lakes Region. Their influence is unmistakable, as the appearance of both working and undeveloped lands (including some 1,518,285 acres of agricultural land and 1,095,243 acres of forest – roughly 49% and 35% of the region, respectively) defines the visual character of this area. The large expanses they occupy contribute to the rural social dynamic while their products are ingrained in the daily lives of residents.

Beyond their contribution to the regional character, these two sectors are also essential components of long-term environmental, economic, and social sustainability. From carbon capture, to water quality, biodiversity, and employment, agriculture and forestry bring substantial advantages to the region as it seeks to maximize opportunity and equity while safeguarding its natural resources. An example of this is the Hemlock-Canadice State

Forest, approximately 6,700 acres in Livingston and Ontario counties. In 1896, the City of Rochester began acquiring properties adjacent to Hemlock Lake to protect its public water supply. Realizing the value forest cover provides, a tree planting program began in the early 1900s to transition from the former agriculture use. In 2010, the land was transferred to NYS DEC. The Central and Western New York offices of the Nature Conservancy have supported the protection of this area through the purchase of additional property including the Eagle Crest Preserve.

Among the advantages of the region's agriculture and forestry are the breadth and depth of both sectors. The Finger Lakes Region remains New York State's top agricultural region, a legacy from its geological circumstance, with fertile soils second only to the plains of the Midwest. The Role of Agriculture in the New York State Economy, Report 21-2010 of the Office of the State Comptroller, provides an overview of the region's significant role in agriculture. The Finger Lakes made $1.2 billion in agricultural sales in 2007, which represented 27.9% of the total farm sales in New York. Five of the top 10 NY counties in agricultural sales are in the Finger Lakes: Wyoming, Genesee, Wayne, Ontario, and Livingston. Wyoming County was the second highest county in the state for 2007 agricultural sales.

Agricultural producers range from large to small operations, growing a wide variety of products for both local consumption and export. There are approximately 3,900 crop operations and 2,700 animal operations throughout the region. In 2007, Wyoming County led the State in the sale of cattle and calves, as well as milk and other dairy products and corn for silage. Wayne County was New York State's top producer of fruits, tree nuts, and berries. Not only was Wayne County the State's top producer of apples in 2007, it ranked third in the nation. Genesee County was the State's top producer of vegetables, melons, potatoes and sweet potatoes. Yates County was one of the State's top three counties for the production of grapes.

While fewer forestry operations exist, the extent of the forest resource is substantial (1,095,243 acres of forest or 35% of the region) and provides protection for the region's water resources. The region's forest resources include:

Livingston County

- Canaseraga State Forest
- Hemlock-Canadice State Forest
- Ossian State Forest
- Sonyea State Forest

Ontario County

- Hemlock-Canadice State Forest

Seneca County

- Finger Lakes National Forest

Yates County

- Italy Hill State Forest

From grapes and milk to lumber and firewood, the region's agricultural and forestry products are staples of the regional economy, and their niche products show promise for continued growth. These producers have a history of adapting to the conditions they face, whether that means matching crop types to soil types or responding to short- and long-term changes in the marketplace. The

qualities of diversity and adaptability can only serve to strengthen future efforts toward greater resilience in the face of climate change.

One example of that adaptation is evident in the shift toward a food system that values locally-produced, high-quality foods, fibers, and feed. Renewed attention toward locally-sourced products is creating new opportunities for development while strengthening economic and social connections in both rural and urban communities.

Existing sustainability initiatives related to agriculture and forestry can be found in many counties within the region. These include, but are not limited to:

- Countywide agriculture and farmland protection plans
- State-certified Agricultural Districts
- Farm-to-table initiatives
- Purchase of Development Rights (PDR) programs

Challenges, Variables, and Opportunities

Although these sectors may be well-positioned to help the region achieve a sustainable future, they are not without their risks and vulnerabilities. Industry consolidation has created an atmosphere of instability, especially for smaller operations struggling to make ends meet. Uncertainty about the future of the sector continues to prevent new operators from entering the market, and contributes to the conversion of land as aging operators make their exit from it. Although the potential for large new markets (e.g. carbon or pollutant trading) could represent immense opportunity for the agricultural and forestry sectors, their development has been sluggish at best.

The agricultural and forestry sectors are presently experiencing large-scale shifts, influenced by variables in nearly every facet of both production and consumption. The production landscape is in the midst of a transformation: costs continue to climb; technologies are rapidly evolving; and the availability of capital and a quality workforce are in a constant state of flux. Consumption patterns fluctuate even more quickly: consumer tastes and demands vary between seasons and geographic area; markets continue to emerge and decline; and new products must respond to new demands. Some of these are long-term trends, while others are just beginning to materialize. However, all of them (and many more) are shaping the state of agriculture and forestry at both the national and local levels. Given the interconnected nature of these sectors in relation to the environmental, economic, and social well-being of the Finger Lakes Region, it is increasingly important to consider how the future of these sectors will respond to regional changes regarding climate, the economy, and demographics.

No efforts to pursue meaningful, systematic sustainability would be complete or successful without accounting for the future of the region's farms and forests, as well as the livelihood of those that depend on them.

Additional challenges faced by agricultural and forestry industries include increasing frequency of disruptive weather patterns, lack of public understanding regarding the functional and financial requirements of both production and conservation, and market pressures that do not necessarily align with the well-being of the community as a whole. Lastly, as with other Subject Areas, there is a pressing need for local policies and regulations that recognize that natural resources cross municipal boundaries.

Each of these challenges has the potential to reduce certainty, increase risk, constrain operational efficiencies, and degrade both the quality and quantity of environmental, human, and capital resources.

There is an opportunity for the region's agricultural and forest resources found to play a substantial role in determining the most appropriate courses of action by which to protect the region's environment and promote robust economic growth. Indeed, no efforts to pursue meaningful, systematic sustainability would be complete or successful without accounting for the future of the region's farms and forests, as well as the livelihood of those that depend on them.

Indicators and Targets

The Agriculture & Forestry Stakeholder Group participated in a visioning exercise at their first meeting. The results of this exercise were then used as the foundation to develop the Subject Area Goal and identify Indicators to measure progress toward that goal. Some of the key elements from the visioning exercise include the economic viability of agriculture, the importance of protecting the region's water resources, and the need to preserve existing and incentivize new forests.

Indicators

- Acres of agricultural land in non-agricultural use
- Direct farm sales per capita (as a percent of at home food expenditures)
- Use of external inputs
- Diversity of production (Shannon's Diversity Index)
- Ratio of percent of forests by tree size class
- Amount of biomass in live trees
- Number of forest interior Indicator bird species (survey blocks containing at least 3 Indicator species)
- Invasive Species Index (custom index tracking three species: European Woodwasp, Hemlock Woolly Adelgid, and Emerald Ash Borer)
- Wildfire occurrences

The baseline values for these Indicators are shown in the Summary Sheet at the end of this section, as well as Targets for short (2020), mid (2035), and long-term (2050) timeframes. A table of representative Sub-strategies/Project Ideas and Representative Projects that contribute to the implementation of these Broad Strategies is also provided in the Summary Sheet.

Sustainability Goal and Strategies

Agriculture & Forestry Goal

Increase the viability, accessibility, and ecological contribution of farms and forests, while decreasing waste and dependence on external inputs.

The following is a description of each Broad Strategy that supports the Agriculture and Forestry Goal. Representative Sub-strategies are provided as examples of specific measurable activity that could be implemented to support the Broad Strategy. At the end of the Agriculture and Forestry section there is a Summary Sheet that provides a more comprehensive list of representative Sub-strategies/Project Ideas and Representative Projects that contribute to the implementation of these Broad Strategies.

Broad Strategy A1 | Support the continued development of an efficient and productive regional food system.

The abundance of agricultural resources throughout the region, combined with the popular image of agriculture as a simpler, more traditional lifestyle, belies the complexity of a highly integrated system that influences every resident in each of the nine counties. Most people know at least something about this system, as the familiar annual pattern is repeated: growers grow, distributors distribute, consumers consume, and so on. Yet the processes of planting, growing, harvesting, shipping, processing, marketing, retailing, preparing, and ultimately consuming food and fibers (not to mention complying with regulations, preparing for the next season, etc.) are rarely as simple as most would assume. Gaps in the supply chain, service delays, and other system disruptions can in turn

influence product price and availability, food security, environmental quality, employment, and economic development. A well-integrated, efficient, and productive regional food system benefits everyone in that chain, and aligns with the Regional Guiding Principles of building multi-sector partnerships and sustainability capacity, and promoting high-quality economic growth.

Prioritization
Of all the Broad Strategies developed for agriculture and forestry this is among the two most highly prioritized since it has the potential to benefit all manner of stakeholders throughout each county, it takes advantage of a number of the region's core strengths (i.e. multiple "Capitals" as described by the Story of Place), and because it will assist in leveraging several key regional investments and projects.

This strategy is aligned with the following Guiding Principles:

- Improve accessibility (to local foods), connectivity and mobility
- Improve public health
- Promote robust, high quality economic growth
- Bring the Finger Lakes Region together through a shared identity and common goals

Potential Stakeholders and Resources
This strategy will require efforts on behalf of private sector facilities, agricultural sector stakeholders, public economic development agencies, and local, state, and federal agricultural agencies (i.e. county agricultural development programs, the NYS Department of Agriculture and Markets, and the USDA). Funding opportunities may be identified through these agencies, as well as through public health programs. A number of private foundations, such as the Surdna Foundation's Sustainable Environments Program, also fund initiatives related to regional food supply infrastructure.

Challenges and Sub-strategies
There are several challenges to advancing this Broad Strategy. These challenges can be addressed by more specific Sub-strategies. For example, the lack of regional capacity for processing and distribution can be addressed by supporting the expansion of processing and distribution facilities, and/or other value-added opportunities. The limited market connections between producers and consumers can be addressed by increasing regional farms' sales to institutional buyers and direct sales to consumers. Lastly, the lack of public knowledge regarding farm-to-table options can be addressed by supporting the development and/or expansion of multi-farm networks of Community Supported Agricultural operations.

Sub-strategy 1.1 | *Support the expansion of regional processing and distribution facilities, and/or other facilities that add value to regional food products.*

This Sub-strategy is aligned with the following FLREDC Regional Strategies and Sector Strategies:

- Optimize business creation, retention and expansion
  - Increase the number of entrepreneurs through education/ training programs and recruitment, particularly those with domain experience in key sectors
  - Develop systems that monitor and identify firms and sectors with high growth potential and proactively engage with these companies to connect them with the resources that will accelerate product development, access to new markets, and scale business models.
- Agriculture and Food Processing
  - Increase the value, diversity of agricultural products, and exports.
  - Support the creation and expansion of food processing companies in the region through incentives and academic-private partnerships to gain manufacturing efficiencies and access to new markets.

The food processing "cluster" is growing rapidly throughout the region, involving a wide variety of businesses throughout the food supply chain: farms, transportation, manufacturers, food processors,

energy providers, distributors, and retailers. These interests are brought together through efforts such as the Rochester Institute of Technology's Center for Integrated Manufacturing Studies (RIT-CIMS) Finger Lakes Food Processing Cluster Initiative. CIMS received a *Jobs and Innovation Accelerator Challenge* grant from the U.S. Department of Commerce Economic Development Administration (DOC EDA), U.S. Department of Labor Employment and Training Administration (DOL ETA), and U.S. Small Business Administration (SBA) to develop and support the Initiative. The NYSDEC is also providing funding support through the New York State Pollution Prevention Institute (NYSP2I). Combined Initiative funding totals over $1.9M to support three programs developed for the Initiative to align with the sponsoring agency objectives

The Advancement Program, supported by the DOC EDA and NYSP2I was developed to help businesses become more competitive and support regional economic growth, in part through sustainable business practices. The Training Program, sponsored by DOL ETA, was designed to build the cluster's workforce to meet the demands of the businesses in the growing cluster. The Small Business Assistance Program, sponsored by SBA, promotes inclusion of small businesses in high unemployment or low-income areas of the region and provides additional assistance to these companies.

There is a need for further implementation of this Sub-strategy through collaboration between local municipalities and higher education institutions to identify additional funding including from New York State Empire State Development, Agriculture and Markets.

Sub-strategy 1.2 | *Increase food security for individuals and households at risk of hunger*.

This Sub-strategy is aligned with the following FLREDC Regional Strategies and Sector Strategies:

- Invest in Community, Industrial Development & Infrastructure
  - Enrich living environments by increasing access to affordable housing and mixed-income units, and promoting energy efficiency.
- Agriculture and Food Processing
  - Increase the value, diversity of agricultural products, and exports.
  - Support the creation and expansion of food processing companies in the region through incentives and academic-private partnerships to gain manufacturing efficiencies and access to new markets.

There are several organizations in the region actively addressing this Sub-strategy. One of these organizations, Foodlink, serves as the regional food bank, which rescues and redistributes more than 13 million pounds of food annually to a network of 450 member agencies in a 10-county region (all of the Finger Lakes Region and Allegany County). Foodlink fights hunger with the following approaches:

- Food Banks
- Nutrition education
- Workforce development (training)
- Green infrastructure including urban farming

The continued implementation of this Sub-strategy will involve a number of different stakeholders including non-profit organizations, volunteers, and residents at risk.

Sub-strategy 1.3 | *Increase regional farms' sales to regional institutional buyers.*

This Sub-strategy is aligned with the following FLREDC Regional Strategies and Sector Strategies:

- Optimize business creation, retention and expansion
  - Develop systems that monitor and identify firms and sectors with high growth potential and proactively engage with these companies to connect them with the

resources that will accelerate product development, access to new markets, and scale business models

- Agriculture and Food Processing
  - Increase the value, diversity of agricultural products, and exports.
  - Support the creation and expansion of food processing companies in the region through incentives and academic-private partnerships to gain manufacturing efficiencies and access to new markets.

Institutional buyers – schools, hospitals, universities, business campuses, etc. – represent a very large marketplace for Finger Lakes agricultural products. Organizations such as Cornell Cooperative Extension and the American Farmland Trust are working to reduce barriers to institutional sales in the area. For example, Cornell Cooperative Extension of Ontario County's Farm to Cafeteria program connects farmers with institutional buyers, and provides training workshops for food service workers to increase their utilization of locally-grown foods. Continued focus on similar initiatives with increased collaboration between local not-for-profit agencies and local institutions would support implementation of this strategy.

Sub-strategy 1.4 | *Increase regional farms' direct sales to consumers through such means as multi-farm Community Supported Agriculture programs and increased access to local food retailers.*

This Sub-strategy is aligned with the following FLREDC Regional Strategies and Sector Strategies:

- Optimize business creation, retention and expansion
  - Develop systems that monitor and identify firms and sectors with high growth potential and proactively engage with these companies to connect them with the resources that will accelerate product development, access to new markets, and scale business models
- Agriculture and Food Processing
  - Increase the value, diversity of agricultural products, and exports.

There has been a shift toward a food system that values locally-produced, high-quality foods. This is evident in the numbers of local farmer markets, Community Supported Agriculture (CSA) programs, and locally produced foods in retail stores. Implementation of this Sub-strategy is occurring with The Good Food Collective, a project of Headwater Foods, a Community Food Enterprise creating a value-filled, year-round supply chain of local, sustainable foods. The Good Food Collective is a multi-farm Community Supported Agriculture (CSA) project offering membership programs that connect people to local, sustainable foods and some of the best farmers in our area.

There is a need for counties and municipalities to continue to support organizations and programs that increase regional farms' direct sales to consumers. One approach is the development of an Agriculture & Forestry page on the sustainable-fingerlakes.org website to provide a single resource for the region. This page would provide information on the benefits of agriculture to the region as well as links to information on resources on CSA programs. The development of this page would be the responsibility of the Regional Plan Coordinator as identified in Section 4, Plan Implementation.

Broad Strategy A2 | Increase adoption of distributed bio-energy production technologies to increase production of renewable energy from farm and forest products and product waste.

The adoption of distributed bio-energy production highlights one of the many ways in which the agricultural sector as a whole is evolving. Currently, agricultural and forestry operations are a highly underutilized resource for renewable energy production within the Finger Lakes Region and elsewhere. However, as new technologies are developed and regulatory frameworks respond to changing environmental conditions, these sectors are poised to take advantage of their productive capacity and waste streams to become significant contributors to the region's energy production portfolio.

This Broad Strategy is aligned with the following FLREDC Regional Strategies and Sector Strategies:

- Optimize business creation, retention and expansion
  - Expand access to seed, early-stage, venture, and public/private capital
  - Increase the number of entrepreneurs through education/training programs and recruitment, particularly those with domain experience in key sectors
  - Develop systems that monitor and identify firms and sectors with high growth potential and proactively engage with these companies to connect them with the resources that will accelerate product development, access to new markets(bio-energy on farms) and scale business models
- Strengthen Academic and Industry Partnerships
  - Develop programs and shared resources that allow closer collaboration between academic and industry scientists
  - Streamline and accelerate the maturation, transfer, and commercialization of university-based intellectual property; build a regional ecosystem that more effectively harnesses university-based innovation, with a particular focus on fostering the creation and growth of early-stage companies.
- Align Workforce Development Efforts with Sector Needs
  - Expand opportunities for the region's employees and spur the creation of high-skill, high-wage jobs; strengthen and develop education and training programs needed to provide employees with the skill sets for key growth industries; address regional workforce shortages in healthcare, agriculture, information technology, manufacturing, and other key fields
- Energy Innovation
  - Encourage energy companies to expand and relocate to the region through the development of shovel-ready sites and other incentives; create the resources and infrastructure that will accelerate R&D and commercialization of new energy technologies.
- Agriculture and Food Processing
  - Increase the value, diversity of agricultural products, and exports.

Prioritization

Like the first Broad Strategy described previously, this Broad Strategy is also prioritized very highly, as bio-energy technologies are expected to have transformative impacts on the agricultural sector, in terms of both the economy and the environment. Although some of these technologies already exist within the marketplace, there is a great potential for increased adoption and innovation, both of which would result in new opportunities throughout the Finger Lakes agricultural sector. This Broad Strategy also leverages several important institutional relationships within the region, specifically those related to research and development of the technologies, as well as commercialization and manufacturing.

This strategy is aligned with the following Guiding Principles:

- Improve accessibility (to energy), connectivity and mobility

- Maintain, protect and improve the functionality and climate change/disaster resiliency of existing infrastructure systems and acknowledge the links between systems

Potential Stakeholders and Resources
This strategy will require efforts on behalf of agricultural sector stakeholders, utility providers, economic development agencies, and other local public sector representatives. Funding may be available through agencies such as NYS Department of Agriculture & Markets, NYSERDA, USDA, US Environmental Protection Agency, and/or the US Department of Energy.

Challenges and Sub-strategies
There are several challenges to advancing this Broad Strategy. These challenges can be addressed by more specific Sub-strategies. For example, the limitations of existing technology to meet operational and financial needs of regional producers can be addressed by advancing the availability and affordability of scalable plug-and-play bio-energy production systems, and by providing standards for selling excess power into the grid. The uncertain and varied local regulatory environment can be mitigated by establishing local policy frameworks and incentives for community-scale bio-energy generation/distribution. The uncertainty within the market regarding the purchase of energy produced on the farm can be addressed through purchase agreements for the sale of bio-energy produced by the agricultural and forestry sectors to the power grid.

Sub-strategy 2.1 | *Advance the availability and affordability of scalable plug- and-play bio-energy production systems, and provide standards for selling excess power into the grid.*

Scalable plug-and-play bio-energy production systems are modular units that feature standardized, interoperable connections between the point of generation and the point of use (e.g. a vehicle or the power grid). These "turn-key" facilities are designed to maximize convenient, decentralized energy production to fit the needs of individual owners.

An example of implementing this Sub-strategy is the work being conducted by the New York State Pollution Prevention Institute (NYS P2I). NYS P2I is analyzing methods for converting organic waste into renewable fuels through various pathways including anaerobic digestion, biodiesel production and fermentation. The research includes testing of various processes and efforts to optimize production to increase commercialization.

Collaboration between research institutions, local private farm owner/operators and Rochester Gas and Electric (RG&E) would contribute to realizing affordable bio-energy production systems with the option of selling excess power back to the grid.

Sub-strategy 2.2 | *Assist farm operators in analyzing energy demand, as well as opportunities for efficiency and potential energy production.*

The agricultural sector has a unique set of needs related to energy consumption, and an equally unique set of opportunities with regard to energy production. When all opportunities for energy efficiency and production are adequately analyzed, many farm operators find new and innovative ways to become more sustainable. Connecting farmers to existing programs such as Cornell's Small Farms Program and the Northeast Sustainable Agriculture Research and Education initiative will be important to advancing this strategy. These programs help to connect farmers with renewable energy installers. Additionally, the local United States Department of Agriculture Natural Resource Conservation Service can provide technical assistance and resources such as farm energy audits through the Innovation Center for U.S. Dairy.

Sub-strategy 2.3 | *Establish local policy frameworks and incentives for community-scale bio-energy production and distribution.*

Community-scale production involves facilities with enough capacity to supply bio-energy for public consumption, either to retail consumers, neighborhoods (e.g. heating districts), or entire communities. Communities should examine local policies and other issues of preparedness that may

inhibit or encourage bio-energy production at this scale. By identifying and resolving potential policy inconsistencies or process inefficiencies in advance, local (county, town, and village) regulations may become more effective in facilitating community-scale bio-energy production projects.

An example of a municipality establishing policy frameworks is the Town of Covington, Wyoming County. The Town supported the development at the biogas facility at a Synergy Dairy. The biogas facility, owned by Synergy LLC, will produce renewable energy from manure and substrate. The facility will digest manure from the approximately 2000 milking cows at Synergy Dairy along with manure from another dairy in the immediate area and food grade organic waste transported to the site. Biogas from the digester will fuel gensets with capacity to generate up to 1.4 MWh of electricity. In addition to producing electricity, the facility will reduce greenhouse gas emissions by the equivalent of 10,000 tons of CO2 each year, produce 16,000 cubic yards of bedding for the dairy and reduce manure odors.

Sub-strategy 2.4 | *Develop purchase agreements for the sale of bio-energy produced by the agricultural and forestry sectors to the power grid.*

Several utility providers, both within and outside of the Finger Lakes region, have developed business models for increasing the utilization of renewable energy by offering their customers the option to direct their power purchases toward a specific renewable source. In and around the Finger Lakes region, both Rochester Gas & Electric (RG&E) and New York State Electric & Gas (NYSEG) have wind power purchase options, while National Grid offers a number of renewable options. A similar program for the purchase of bio-energy generated by agricultural and forestry products or byproducts would help provide consistent demand for farmers seeking opportunities to sell power into the grid. One example outside of the region can be found in Green Mountain Power's "Cow Power" program, which allows customers to direct their power purchases toward developing Vermont's agricultural bio-energy production sector.

Broad Strategy A3 | Reduce the conversion of quality farmland.

Agriculture is an integral component of the regional identity economy. This relationship has ramifications that extend far beyond just the farming community. The consumption of land influences taxes, transportation, environmental quality, community character, housing costs, and essential services. Within the Finger Lakes Region, the conversion of high-quality agricultural soil for development is largely incremental, yet it is as close to a permanent change to the economy, environment, and society as it gets. It is part and parcel of at least two of the central challenges to the agricultural sector as a whole: the lack of understanding regarding the requirements of both production and conservation; and market pressures that do not necessarily align with the well-being of the community as a whole.

In a time when land values are the primary asset of an aging sector in a sluggish economy, consensus on the best approaches to farmland preservation is hard to come by. However, considering the long-term implications of farmland loss, these barriers must be addressed.

Prioritization
This Broad Strategy is prioritized due in part to the importance of the land resource to the agricultural economy, and to the multiple economic/fiscal and environmental impacts of conversion that outstrips population growth. It also leverages other strategies related to carbon sequestration, and will help to maintain community character within the region.

This strategy is aligned with the following Guiding Principles:

- Preserve, protect and improve natural resources and acknowledge the link between natural systems (prime farmland)
- Promote robust, high quality economic growth

Potential Stakeholders and Resources
This strategy will require efforts on behalf of agricultural sector stakeholders, educational providers (e.g. extension agents), and public sector representatives (e.g. elected officials, assessors, planning commissioners). Funding may be available through agencies such as NYS Department of Agriculture & Markets and the USDA, and through non-governmental organizations such as local land trusts. Funding may also be leveraged if the planning efforts are combined with other programs, or through other organizations such as the American Farmland Trust.

Challenges and Sub-strategies
There are several challenges to advancing this Broad Strategy. These challenges can be addressed by more specific Sub-strategies. For example, the disconnect between local regulatory frameworks and farming infrastructure and practices can be addressed by aligning local land use regulations with the functional and financial needs of farms. Limited incentives and regulatory tools for keeping land in production can be addressed by supporting the creation and implementation of municipal farmland protection plans and improving regulatory context for purchase, lease, and/or transfer of development rights. The limited knowledge of options for property transfer warrants the expansion or creation of opportunities to engage existing and new farmers in succession planning efforts.

Sub-strategy 3.1 | *Support the creation and implementation of municipal farmland protection plans.*

This Sub-strategy is aligned with the FLREDC strategies:

- Invest in Community, Industrial Development & Infrastructure
  - Reinforce the identity, sense of place, and character of the area through downtown redevelopment, adaptive reuse of existing buildings and infrastructure, and historic preservation.
  - Foster the development of the region's industrial complexes and business parks for commercial or industrial use.
- Agriculture and Food Processing
  - Increase the value, diversity of agricultural products, and exports.
- Tourism and the Arts
  - Invest in the development, promotion, and preservation of cultural, artistic, and historic assets.

In 1992, the Agricultural Protection Act was passed to encourage development of agricultural and farmland protection programs at the State and local

levels. The legislation is intended to support local efforts to protect agricultural land and ensure the continued economic viability of the State's agricultural industry. Article XIV, Section 4 of the New York State Constitution provides that the policy of the State shall be to encourage the development and improvement of its agricultural lands for the production of food and other agricultural products. Farmland Protection Programs are the framework for protecting agricultural land and supporting the continued viability of the agricultural industry. These programs may identify a number of different tools to overcome local development pressure including agricultural districts, conservation easements and the purchase of development rights (PDR).

Agricultural districts are the cornerstone of farmland protection in New York. The Agricultural Districts Law (Agriculture and Markets Law-AML-Article 25-AA) helps maintain a supportive operating environment for farm businesses in State-certified districts through several "right to farm" provisions. When this tool is insufficient to overcome local development pressure and other issues affecting farmland, other tools in the Farmland Protection Plan including PDR can be used.

Acknowledging the importance of agriculture to the region, Genesee, Livingston, Monroe, Ontario, Seneca, Wayne, Wyoming, and Yates counties have adopted Agriculture and Farmland Protection Plans, and all nine counties have implemented Agricultural District programs. To further support the farming community, five towns within the region (Chili, Wheatland, Farmington, Geneseo, and Mount Morris) have received state grants within the last year to create or update their respective farmland protection plans. Recent budget increases within the Environmental Protection Fund have allowed the Department of Agriculture and Markets to begin clearing a backlog of farmland protection plans and to dedicate new grant funds, and the Finger Lakes Region is well-positioned to take advantage of available funding. Integrating the farmland protection plans with incentives and protection measures associated with Agriculture Districts will further strengthen the regions efforts to keep quality farmland in active production.

Sub-strategy 3.2 | *Improve regulatory context for purchase, lease and/or transfer of development rights.*

The "Greenprint for Pittsford's Future" has been hailed as a national model for community conservation. This plan, adopted in 1996, will preserve 2,000 acres (67%) of the undeveloped lands remaining in Pittsford including 1,200 acres of prime and unique farmland. The action plan included:

- Purchase of Development Rights (PDR) on 1,200 acres
- incentive zoning (transfer of development rights) on about 200 plus acres
- mandatory clustering protecting about 600 plus acres

Pittsford's PDR program is the community's investment in itself. The PDR program protects approximately 1,200 acres on seven farms at an average cost to a homeowner of about $50 per year to cover municipal bonds up to $9.9 million to purchase the development rights. The property owners are committing their land to this future and are contributing to the community in a substantial way. Transfer of Development Rights (TDR) programs are generally volunteer, incentive-based, and market-driven approach to preserve land and steer development growth away from rural and resource lands into more urban or growth areas. TDR allow rural landowners to receive financial compensation without having to sell or fully develop their land, and developers are financially motivated to purchase development rights from the landowner as they are able to put additional dwelling units in their projects.

Encouraging an increased use of TDR and PDR programs will support the region's interest in protecting its farmland while supporting sustainable economic growth. Such programs can be implemented on a regional or local level and would

involve local municipalities to amend their local land use laws allowing/adding such programs.

Sub-strategy 3.3 | *Increase use of underutilized grasslands for livestock production.*

Management-intensive grazing has several benefits for farmers, landowners, consumers, and the public at large. Throughout the region, idled farmland and other grasslands are a resource that would produce both jobs and profit for interested livestock producers if better utilized. Improved utilization faces a number of obstacles throughout the region, including but not limited to decreased support for technical assistance, lack of awareness, and graziers' access to capital.

Implementation of this strategy is achieved through programs such as Graze-NY, which provided valuable guidance and assistance to livestock producers in the region until its funding was eliminated. Such programs could help to address known barriers if properly supported. Although some substantive portions of the program are still available through other initiatives, the Graze-NY program was unique in its holistic approach to grazing and grasslands management.

Sub-strategy 3.4 | *Expand or create opportunities to engage existing and new farmers in succession planning efforts.*

This Sub-strategy is aligned with the following FLREDC Regional Strategies and Sector Strategies:

- Align Workforce Development Efforts with Sector Needs
  - Expand opportunities for the region's employees and spur the creation of high-skill, high-wage jobs; strengthen and develop education and training programs needed to provide employees with the skill sets for key growth industries; address regional workforce shortages in healthcare, agriculture, information technology, manufacturing, and other key fields.
- Business Services
  - Foster closer cooperation among the region's companies and institutions of higher education to accelerate technology transfer and align workforce training programs with the skill sets required by the sector.
- Agriculture and Food Processing
  - Increase the value, diversity of agricultural products, and exports.

Succession planning, or lack thereof, is one of the most significant challenges to keeping agricultural land in production and ensuring adequate land access for new farmers entering the marketplace. This strategy is implemented by programs such as NY FarmLink, which offers "matching" services between prospective buyers and willing sellers, and similar services related to business partnerships, land leasing, and operation management opportunities. While NY FarmLink is open to any interested parties within the state, other region-specific programs have also been established, such as the Catskills Farmlink and Westchester Land Trust Farmland Match program.

Counties and regional organizations should consider the development and implementation of a program specific to the needs and resources within

the Finger Lakes to help facilitate the transition of farmland between operations and keep it in production.

Broad Strategy A4 | Support farm-scale diversity of product types, both in-season and across seasons, and support the establishment and growth of a diversity of operations with regard to size, market, and operation type.

As discussed elsewhere, diversity is a defining characteristic of Finger Lakes agriculture. From rural farms to urban agriculture, sole proprietorships to corporate operations, and a wide variety of foods to the increasing production of fibers, the Finger Lakes Region exhibits a diversity of operational sizes, types, and products that serves to strengthen both the sector and the region as a whole. The support of agricultural diversity is aligned with several Regional Guiding Principles, including but not limited to: the improvement of resiliency and links between infrastructural systems; improvement of public health; strengthening of regional partnerships; and the promotion of high-quality economic growth.

Because agricultural production is by its very nature a diverse enterprise, the strategies required to maintain and increase the diversity of the sector must approach various levels and types of production. In addition, these strategies must not only address production as it currently occurs, but also the potential changes in consumption and regulation that could initiate new markets for Finger Lakes producers in the future.

This Broad Strategy is aligned with the following FLREDC Regional Strategies and Sector Strategies:

- Optimize business creation, retention, and expansion
  - Address local and state barriers to growth and competitiveness, including exploring ways to reduce the cost of doing business by strengthening regional planning efforts, developing cooperative agreements, and streamlining services.
  - Strengthen and expand (both in terms of capacity and geographic reach) the region's network and acceleration facilities as well as business support and networking services.
  - Expand access to seed, early-stage, venture, and public/private capital.
  - Increase the number of entrepreneurs through education/training programs and recruitment, particularly those with domain experience in key sectors.
- Business Services
  - Foster closer cooperation among the region's companies and institutions of higher education to accelerate technology transfer and align workforce training programs with the skill sets required by the sector.
- Agriculture and Food Processing
  - Increase the value, diversity of agricultural products, and exports.
  - Support the creation and expansion of food processing companies in the region through incentives and academic-private partnerships to gain manufacturing efficiencies and access to new markets.

Prioritization

The Broad Strategy is prioritized here because sector and operational diversity helps to increase resilience at multiple scales, it increases economic opportunities within the region, and increases access to regional agricultural products both within and outside of the region. This strategy is aligned with the following Guiding Principles:

- Improve accessibility, connectivity and mobility
- Preserve, protect and improve natural resources and acknowledge the link between natural systems
- Promote robust, high quality economic growth

Potential Stakeholders and Resources
This strategy will require efforts on behalf of agricultural sector stakeholders, agricultural researchers/educational providers (e.g. extension agents), and public sector representatives (e.g. elected officials, agency personnel). Funding may be available through agencies such as NYS Department of Agriculture & Markets and the USDA, the Finger Lakes Small Business Expansion Fund, NY Farm Viability Institute, and through private foundations and/or non-governmental organizations.

Challenges and Sub-strategies
There are several challenges to advancing this Broad Strategy. These challenges can be addressed by more specific Sub-strategies. For example, the difficulty in managing farm-scale diversity as compared to mono-crop operation types can be addressed by developing models to assist in management of farm-scale diversity for small and medium-sized operations. The disconnection between market pressures relative to production and environmental quality can be addressed by researching the regional potential for environmental markets (e.g. carbon sequestration, water quality) and supporting the development of environmental markets and incentives that are aligned with both the financial and functional needs of farms.

Sub-strategy 4.1 | *Develop models to assist in the management of farm-scale diversity for small and medium sized operations.*

Small to medium scale farms with the right diversity mix can be more resilient to market fluctuations. This strategy is already supported within the region, by the Food Venture Center at the New York State Agriculture Experiment Station in Geneva, which promotes farm based food production as a way to add diversity to a farm's product line. Additional examples of resources from outside of the region include the USDA's Alternative Farming Systems Information Center, as well as Alternative Enterprise Budgets developed by the Leopold Center for Sustainable Agriculture. Resources such as these could be tailored to the environmental and market context of the Finger Lakes, relative to the conditions that determine the region's market opportunities (e.g. hardiness, equipment management, access to consumers).

Sub-strategy 4.2 | *Strengthen opportunities for producing, marketing and exporting specialty agricultural products.*

Regional examples of implementation of this Sub-strategy include the development of the New York Craft Malt facility in Batavia, which will malt locally grown food-grade barley to serve the growing craft beer market. This strategy would also encompass the Finger Lakes Small Business Expansion Fund, which has provided financial services for small agriculture-related business such as the Once Again Nut Butter peanut butter production facility in Nunda. County-wide examples of specialty product marketing include the Ontario County Agricultural Enhancement Board's Agriculture Adventure Trail website, which serves as a marketing resource for local specialty products such as maple products, herbs, jellies, honey, garlic, grapes, apples, and more.

Implementation of this Sub-strategy could involve collaboration between private businesses and county/local agencies and not-for-profit enterprises. One approach is the development of an Agriculture & Forestry page on the sustainable-fingerlakes.org website which could highlight the value and

availability of the region's specialty agricultural products.

Sub-strategy 4.3 | *Support research and development initiatives regarding environmental markets and other incentives related to carbon sequestration and water quality improvement.*

A number of incentives in the agricultural sector were designed to address a variety of needs, including but not limited to price stability, mitigation of wetland losses, and soil loss reduction. However, the creation of market-based incentives regarding carbon sequestration and water quality improvement has not been embraced within New York State to the extent that it has elsewhere. Implementation of this Sub-strategy at the state level could follow existing examples such as the Saulk River Ecosystem Services Project in Minnesota or the Chicago Climate Exchange. Both examples represent a new frontier in incentivizing best management practices for both water quality and carbon sequestration. Such markets will require the support of front-end research, which would open a number of opportunities for regional institutions.

Counties and regional organizations should research the potential to develop and implement market-based incentives.

Broad Strategy A5 | Educate the non-farming community about the economic, environmental, and social impacts that the agricultural sector has on the region.

Education and outreach is one of the most essential components of sustainability in general, and of agricultural sustainability in particular. The long-term trends operating in the industrialized and post-industrial economy may have improved the technical knowledge of the public, but this has often come at the expense of knowledge regarding natural systems and how society interacts with them. This is apparent in the public discourse regarding agriculture, or the lack thereof. As the saying goes, "if you eat, you're involved in agriculture"; yet one of the primary challenges to agricultural sustainability is the lack of public understanding of the functional and financial requirements of farming. If the agricultural sector of the Finger Lakes is to thrive, every resident of the region—from farmers, to elected officials, institutional leaders, business owners, and consumers of every kind—must understand the many ways in which agriculture is both shaping and shaped by the region as a whole.

This Broad Strategy is aligned with the following FLREDC Regional Strategies and Sector Strategies:

- Optimize business creation, retention, and expansion
  - Address local and state barriers to growth and competitiveness, including exploring ways to reduce the cost of doing business by strengthening regional planning efforts, developing cooperative agreements, and streamlining services.
- Business Services
  - Foster closer cooperation among the region's companies and institutions of higher education to accelerate technology transfer and align workforce training programs with the skill sets required by the sector.

- Agriculture and Food Processing
  - Increase the value, diversity of agricultural products, and exports.
  - Support the creation and expansion of food processing companies in the region through incentives and academic-private partnerships to gain manufacturing efficiencies and access to new markets.

Prioritization
This Broad Strategy is prioritized because education and outreach serve as the foundation for sustainability initiatives; without additional knowledge about the relationship between agriculture and other aspects of society, the economy, and the environment, improved stewardship of the region's agricultural resources is less likely. Education and outreach will improve the public discourse related to agriculture such that residents, consumers, and decision-makers are better able to identify those connections, and have a clearer understanding of their relationships to the sector such that each can make more informed decisions with increased awareness of their impacts.

This Broad Strategy is aligned with the following Guiding Principles:

- Build sustainability capacity and understanding through outreach and education
- Bring the Finger Lakes Region together through a shared identity and common goals

Potential Stakeholders and Resources
This strategy will require efforts on behalf of agricultural sector stakeholders, educational providers (e.g. Cornell Cooperative Extension agents), and representatives of other sectors that are connected with the agricultural economy (e.g. finance, insurance, etc.). Funding may be available through agencies such as NYS Department of Agriculture & Markets and the USDA. Depending on the nature of the outreach initiative, funding may be available through other programs such as the New York State Arts Council, or other private and/or non-governmental organizations.

Challenges and Sub-strategies
There are several challenges to advancing this Broad Strategy. These challenges can be addressed by more specific Sub-strategies. For example, the lack of public awareness related to the size, requirements, and impact of the agricultural sector warrants support for efforts to document the economic impact of agriculture and forestry throughout the region. The limited resources available to facilitate the entrance of new farmers into the marketplace presents an opportunity to align a network for direct and specific educational opportunities, where new farmers have access to experienced producers, lenders, employers, etc. The limited resources available to promote the growth of small farms can be addressed by expanding access to service programs specifically oriented toward small farms.

Sub-strategy 5.1 | *Support efforts to document the economic impact of agriculture and forestry throughout the region.*

An example of implementing this Sub-strategy is the Livingston County Annual Decision Makers' Tour of Agriculture hosted by the Genesee Valley Conservancy. On the 2011 tour, approximately 45 town and county officials, primarily planning and zoning board members, toured several agricultural operations. The theme that year was "Strength and Diversity" and included operations as diverse as wine, evergreen and deciduous tree growers and grain and dairy farms. The intent of the tour is to highlight the economic value of agriculture and the importance of its preservation and protection.

This strategy should be implemented at the regional, county, and local levels and could involve collaboration between public and private enterprises. As noted previously, the development of an Agriculture & Forestry page on the sustainable-fingerlakes.org website would provide information on the economic benefits of agriculture to the region.

Sub-strategy 5.2 | *Expand access to service programs specifically oriented toward small farms.*

For many small farmers, and especially for new farmers, service programs can turn visions and ideas into action and growth. However, many obstacles still remain between prospective farmers and those resources, whether with regard to program requirements or lack of knowledge of the programs. Others are endemic to the nature of small and beginning farmers, such as the mismatch in timing between upfront investments and revenue generation.

Local programs such as the Finger Lakes Economic Development Center's Agricultural Loan Fund in Yates County, and regional examples such as The Carrot Project, which occurs in Lee, Massachusetts, and Farm Credit East's Farm Start program, a financial services cooperative for the Northeast agricultural industry are two initiatives that are targeted specifically toward new and small farms. Increased access to these and similar programs, whether through increased funding or exposure or geographic applicability, could increase the viability of small farms within the region.

Implementation of this strategy can occur at the region, county or town level. There is a need to continue to support programs like the New York Farm Viability Institute (NYFVI) grant program which helped fund pilot programs where dairy farmers get one-on-one attention with a group of industry consultants in all different areas to help efficiently and cooperatively offer solutions tailored to individual issues.

Sub-strategy 5.3 | *Create or expand opportunities to build a regional food identity focused on the Finger Lakes Region.*

In addition to the FLREDC strategies identified for the Broad Strategy A5, this Sub-strategy is aligned with the following FLREDC Sector Strategies:

- Tourism and the Arts
  - Invest in the development, promotion, and preservation of cultural, artistic, and historic assets.
  - Develop, network, and promote the region's growing wine, culinary, agricultural, and for micro-chip enterprises.

This Sub-strategy is exemplified by the numerous agricultural events that celebrate and educate on the importance of agriculture to the regional economy. Implementation of this strategy may be done at the regional, municipal, or community organization level. There is an opportunity for the local chamber of commerce to promote a Finger Lakes regional food identity. Some of the region's events include the annual Orleans County Farmer to Neighbor Dinner, the Wayne County Agri-Palooza and county fairs.

Broad Strategy F1 | Support efforts to increase equitable forest recreation opportunities and urban forestry/green infrastructure initiatives.

Closely related to the valuation of forest ecological services and the expansion of educational and outreach efforts is the need to address equitable access to forest recreation and new opportunities to expand the region's green infrastructure. Among the many other benefits they offer, forested lands provide opportunities for outdoor recreation, one of the hallmarks of the regional tourism sector.

In addition, many communities throughout the Finger Lakes have embraced green infrastructure techniques on both public land and in private developments. Supporting these existing opportunities and finding both traditional and

creative avenues for funding expansion of green infrastructure and forest recreation areas, especially in low-income areas, will align with the regional Guiding Principles to preserve, protect and improve natural resources and acknowledge the link between natural systems; improve accessibility, connectivity and mobility; and to build sustainability capacity and understanding through outreach and education; to improve public health; and to maintain, protect and improve the functionality and climate change/disaster resiliency of existing infrastructure systems and acknowledge the links between systems.

This Broad Strategy is aligned with the FLREDC Sector Strategy – "Tourism and the Arts - Strengthen and support the development of the Finger Lake's diverse water resources and recreational tourism opportunities, allowing greater access and promoting year-round use."

Prioritization
This Broad Strategy is prioritized due to the potential for green infrastructure to reduce water pollution and long-term stormwater management costs, and for the potential positive impacts related to increased canopy cover within urban areas. This strategy is aligned with the following Guiding Principles:

- Improve accessibility (to forest recreation opportunities), connectivity and mobility
- Preserve, protect and improve natural resources and acknowledge the link between natural systems

Potential Stakeholders and Resources
This strategy will require efforts on behalf of municipal governments, particularly municipal foresters and forestry professionals, as well as resident advocates. Funding may be available through agencies such as the NYS DEC, US Forest Service, and the US EPA. Several non-governmental organizations and foundations also provide forestry-related funding opportunities, such as the Conservation Alliance, the Arbor Day Foundation, and the National Association of Regional Councils' Green Infrastructure Initiative.

Challenges and Sub-strategies
There are several challenges to advancing this Broad Strategy. These challenges can be addressed by more specific Sub-strategies. For example, the inconsistent public awareness regarding benefits, costs, and scope of municipal forestry programs can be addressed by encouraging networking opportunities for community tree boards. The lack of quality data regarding community tree/forest resources can be addressed by encouraging the use and sharing of a standardized community tree inventory database.

Sub-strategy 1.1 | *Promote community adoption of the four standards to become a Tree City USA*

This Sub-strategy is aligned with the following FLREDC Regional Strategies to "Invest in Community, Industrial Development & Infrastructure" including "reinforce the identity,

sense of place, and character of the area through downtown redevelopment, adaptive reuse of existing buildings and infrastructure, and historic preservation."

Tree City USA is a program sponsored by the National Arbor Day Foundation in cooperation with the USDA Forest Service and the state forestry agencies. It provides direction, technical assistance, public attention, and national recognition for urban and community forestry programs. There are four standards which must be met to qualify as a Tree City USA Community; a community must have a 1) tree board or department, 2) tree care ordinance, 3) community forestry program with an annual budget of at least $2 per capita, and 4) an Arbor Day observance and proclamation. The communities in the region recognized as Tree Cities USA are:

- Bergen
- Brighton
- Brockport
- Canandaigua
- Fairport
- Geneva
- Greece
- Medina
- Naples
- Rochester

Although these communities in the Finger Lakes Region were recognized as Tree Cities in 2012, it is recommended that all towns, villages, and cities in the region strive to meet the four qualifying standards and apply to become a Tree City USA.

Sub-strategy 1.2 | *Encourage the use and sharing of a standardized community tree inventory database.*

Many communities in the region have ample urban forestry resources, while others are lacking. One of the major hurdles to understanding the value of these assets is the lack of available data at the local level. The USDA Forest Service has created a free professional software suite, i-Tree, to help communities collect, manage, and analyze data about their street trees and urban forests and the benefits they provide.

More than 7,000 communities around the country have used the tools to count and assess their trees and the environmental benefits they provide. For example, a 2011 assessment in Winchester, Virginia, concluded that the City's 233,639 trees provided an annual savings of $460,000 in building energy costs and an annual gross carbon sequestration of 1,620 tons. These analyses could be easily replicated to varying degrees with the software, possibly with the field data collection work partially completed by students at one of the Finger Lakes Region's many institutions of higher education.

Increasing the number of communities with tree inventories will not only benefit each community but also provide a greater understanding the regional environmental benefits provided by their urban forestry resources. Collaboration between communities with tree inventories and those without could lead to more Tree City communities and hopefully shared tree inventory databases.

Broad Strategy F2 | Support watershed, riparian, shoreline, and habitat protection and restoration efforts to increase resiliency and diversity of the native species ecosystems, delicate watersheds, and critical habitats.

Many of the sensitive forest areas in the region provide habitat for a diverse ecosystem of native species. These areas, such as the forest edge zones near streams and on lake shorelines, are often subject to destruction and clearing due to agriculture, development, or other causes. The fragility of these crucial areas is often either not understood or viewed as a small price to pay in exchange for increased recreational access, additional cropland, or waterfront property.

The strengthening of existing protections and development of new solutions will reduce the risk of damage by invasive species, protect water and soil resources, and increase the opportunities for population expansion for important local species such as breeding birds.

This Broad Strategy is aligned with the FLREDC Regional Strategy to "Invest in Community, Industrial Development & Infrastructure" in particular its strategy to "seek to invest in water resource-related projects that enhance water access, retain water quality and increase water safety."

Prioritization
This Broad Strategy is prioritized because it will preserve fragile and vulnerable ecosystems throughout the region, all of which will assist in carbon sequestration and pollution mitigation in some form or another. In doing so, actions associated with this Broad Strategy will increase the resilience of environmental and economic systems within the region. This strategy is aligned with the Guiding Principle to "preserve, protect and improve natural resources and acknowledge the link between natural systems."

Potential Stakeholders and Resources
This strategy will require efforts on behalf of a wide range of stakeholders from across the region, including but not limited to government agencies at all levels, environmental advocacy groups, and landowners. Depending on the location and scope of restoration initiatives, funding may be available through agencies such as the NYS DEC, NYS Department of Agriculture & Markets, the US EPA, US Forest Service, or others. Numerous non-governmental organizations and foundations also provide restoration-related funding opportunities, including but not limited to the Trust for Public Land and the Kodak American Greenways Program.

Challenges and Sub-strategies
There are several challenges to advancing this Broad Strategy. These challenges can be addressed by more specific Sub-strategies. For example, the limited geographic scope of existing environmental management plans and/or rehabilitation efforts can be mitigated by encouraging stronger landscape connectivity and forest management rehabilitation practices that can support adaptation and increase resilience of individual species and natural systems at the landscape level (i.e. 2,500 acre units).

Additionally, in partnership with Finger Lakes Partnership for Regional Invasive Species Management, there should be continued support for programs at all levels of government to combat invasive pests and diseases such as the Emerald Ash Borer. The limited exposure and adoption of existing initiatives/plans should be the impetus for providing near-term funding for NYSDEC Forest Resource Assessment and Wildlife Action Plans to practice adaptive management for climate adaptation and target early responses to major stressors on forest related to climate change.

Sub-strategy 2.1 | *Encourage stronger landscape connectivity and forest management rehabilitation practices that can support adaptation and increase resilience of individual species and nature systems at the landscape level (2500 acre units).*

An example of this Sub-strategy was the effort by the City of Rochester to protect the drinking water supply in Hemlock and Canadice Lakes. In order to protect water quality, the City acquired much of the watershed property around the lakes. Over the decades, the land was planted and/or naturally reverted to forest, with few remaining traces of its former uses except for stone walls. Today the NYSDEC manages the Hemlock-Canadice State Forest which covers approximately 6,684 acres in the towns of Livonia, Conesus, and Springwater in Livingston County and the towns of Richmond and Canadice in Ontario County.

Forest ecosystem dynamics should be integrated with adaptive management whereby institutions such as the New York State Forest Owners Association, the American Tree Farm System, Audubon-NY, watershed organizations, cooperating foresters, and loggers co-manage forest resources with the NYSDEC and Empire State Forest Products Association. Adaptive forest management in the Finger Lakes Region will rely on collaboration among diverse stakeholders operating at differing levels of management through institutional networks which can create and transfer knowledge, develop social capital, and institute the legal, political, and financial support that result in regenerated forest stands that provide multiple benefits to their neighboring communities.

Sub-strategy 2.2 | *In partnership with Finger Lakes Partnership for Regional Invasive Species Management (FL-PRISM), continue to support programs at all levels of government to combat invasive pests and diseases like the Emerald Ash Borer*

Counties and local communities across the region have proactively addressed the issue of invasive species. Invasive species are non-native species that can cause harm to the environment or to human health. Because they are not native, invasive species have few or no natural predators within the region. Partnerships for Regional Invasive Species Management (PRISMs) have been organized for eight regions across the state to develop early detection and rapid response programs to prevent the spread of invasive species.

There is a need to continue local and regional efforts to curb invasive species. These efforts have been focused on education and outreach efforts such as information related to the Emerald Ash Borer and the “Purple Traps” on the website of the Cornell University Cooperative Extension of Ontario County. Local governments can be critical partners in these efforts, by training appropriate staff and officials (e.g. highway workers, public works employees, local environmental management councils) in the identification of invasive species and effective responses to deal with them.

Sub-strategy 2.3 | *Provide near-term funding for NYSDEC Forest Resource Assessment and Wildlife Action Plans*

To date, New York State has already completed a large amount of work towards enhancing the sustainability of forests and other fragile ecosystems. In particular, two studies were completed within the last decade assessing the existing conditions of and providing

recommendations to improve many aspects of both forestland and wildlife: The NYSDEC Forest Resources Assessment and Strategy, and the New York State Comprehensive Wildlife Conservation Strategy (also known as the State Wildlife Action Plan). These reports offer information on opportunities and threats currently existing, along with recommendations for crafting a sustainable future in their respective subject areas.

Support and funding for local implementation of these efforts (through the adoption of policies, financial support of projects, education and/or further research) at the local municipal level will improve both the quality and sustainability of forest resources in the Finger Lakes Region. The priority issues and recommendations identified within these resources can be facilitated through inclusion in local comprehensive plans, the creation of local Generic Environmental Impact Statements (GEIS) for timber harvests or other forestry-related actions, and/or reviews of local zoning laws relative to land clearing and open space.

Sub-strategy 2.4 | *Encourage landowners to participate in NY CREP and similar programs to receive compensation for protecting/restoring natural features*

The Conservation Reserve Enhancement Program (CREP) is a program that provides direct financial incentives to landowners who agree to take land in sensitive areas, such as buffers along streams, out of production and plant trees, shrubs and grasses. Landowners with eligible cropland can qualify for planting material cost-sharing, and annual rent payments for the land. This program, administered by a partnership including local Soil and Water Conservation Districts, USDA Farm Service Agency, and the NYS Department of Agriculture and Markets, represents a direct action taken to protect water quality through reducing runoff from sensitive buffer areas.

Regional farmers and landowners should be encouraged to participate in the CREP, and the program should be continually supported.

Broad Strategy F3 | Educate the general public, landowners/industry professionals, and decision-makers regarding the relationships between watershed land uses, forest management, water quality protection and rural economic viability, and forest sustainability issues.

Forests, water, soil, and the quality of life for residents of the more rural areas of the region are all interconnected. One of the challenges surrounding forestry sustainability issues is that often the depth of the connection between the health of forested areas and many other issues is missing from the consciousness of everyday citizens, landowners, and regional producers and consumers. What can seem on the surface or from the side of a highway to just be a clump of trees, or a pile of timber recently cleared for development is

intricately connected to the health of a nearby river, and the quality of soil on the farm next door, among many other things. Outreach, training, and direct support for forest landowners and forestry sector professionals can help promote responsible actions and decisions by policy makers.

Prioritization
As with the agricultural outreach and education strategy described previously, this Broad Strategy is prioritized because it serves as the foundation for many efforts aimed at increasing the public's knowledge related to regional forest resources. It is aimed at reducing the occurrence and impact of unsustainable forest management practices, while cultivating a productive and sustainable forestry ethic within the region. This strategy is aligned with the following Guiding Principles:

- Preserve, protect and improve natural resources and acknowledge the link between natural systems
- Build sustainability capacity and understanding through outreach and education

Potential Stakeholders and Resources
This strategy will require efforts on behalf of government agencies at all levels, environmental advocacy groups, landowners, and educational providers (e.g. extension agents). Funding may be available through agencies such as the NYS DEC, NYS Department of Agriculture & Markets, the US EPA, US Forest Service, or others. Funding could also be leveraged through partnerships with local/regional organizations such as land trusts, watershed alliances, and/or lake associations.

Challenges and Sub-strategies
There are several challenges to advancing this Broad Strategy. These challenges can be addressed by more specific Sub-strategies. For example, the lack of awareness regarding the range of benefits associated with forest ecosystem stewardship on behalf of both landowners and public sector decision-makers could be addressed by increasing consideration of environmental issues at all levels of economic decision-making. Additionally, the use of silvicultural BMPs through direct financial incentives to landowners should be increased.

The local reliance on property-based tax system incentivizes forest parcelization and unsustainable extractive practices (e.g. high-grading). To address this, subsidies for development patterns and production methods that are environmentally harmful/socially inequitable should be phased out in favor of supporting systems and policies that internalize environmental and social costs and reward responsible growth.

Sub-strategy 3.1 | *Continue to support and encourage participation by County Soil and Water Conservation Districts (SWCD) in the NYSDEC/Natural Resources Conservation Service (NRCS) Environmental Quality Incentives Program (EQIP) Forestry Initiative.*

The EQIP (Environmental Quality Incentives Program) Forestry Initiative is an opportunity for private forestland owners in NY to implement conservation and management practices that will improve health and productivity of their forests, prevent soil erosion and improve habitat for at-risk wildlife species. The EQIP Forestry Initiative is a subset of the EQIP.

EQIP is a voluntary program that provides financial and technical assistance to eligible private forestland owners who are willing to address priority environmental issues by implementing conservation practices. To encourage participation, local municipalities could engage in an education and outreach campaign to ensure program information is provided to eligible landowners.

Sub-strategy 3.2 | *Support the efforts of and partner with advocacy organizations that provide outreach and education on forest and land management issues (e.g. The Nature Conservancy Central & Western NY, Rochester Regional Group of the Sierra Club).*

There is value in leveraging the efforts of other organizations working to protect the region's forest and promote land management and conservation. An example of this Sub-strategy is the work of the Nature Conservancy to acquire strategic lands and conservation easements within the Hemlock and Canadice lakes watershed through both purchase and donation. The Conservancy also works closely with the City of Rochester on management and conservation options for their 7,100 acres within the watershed. The Nature Conservancy has also teamed up with the City of Rochester, Finger Lakes Land Trust, and Audubon Society to build awareness about the importance of conservation in the Hemlock and Canadice Lake watershed.

Sub-strategy 3.3 | *Support retention and recruitment of sustainable timber harvesters.*

This Sub-strategy is aligned with the FLREDC Regional Strategy to:

- Optimize business creation, retention, and expansion
  - Address local and state barriers to growth and competitiveness, including exploring ways to reduce the cost of doing business by strengthening regional planning efforts, developing cooperative agreements, and streamlining services.
- Strengthen Academic and Industry Partnerships
  - Develop programs and shared resources that allow closer collaboration between academic and industry scientists.
- Business Services
  - Foster closer cooperation among the region's companies and institutions of higher education to accelerate technology transfer and align workforce training programs with the skill sets required by the sector.

In order to maximize the sustainability of the regional forest sector, it is critical that industry professionals be trained in responsible management and harvesting techniques that balance both the economic and environmental costs and benefits of silviculture. Programs such as New York Logger Training (NYLT) offer workshops to provide professionals with these skills, eventually leading to an industry standard NYLT Certification. Efforts to encourage harvesters to participate in these training opportunities, such as financial support and certification requirements should be supported at the regional level. For example, the NYSDEC requires NYLT certification in order to perform work on state-owned forest lands. Expanding efforts like this will increase the harvesters' economic opportunities, spread the use of silvicultural best management practices, and contribute to the overall economic viability of the forestry sector in the region.

Broad Strategy F4 | Encourage the valuation of ecological services provided by regional forest resources.

The forested areas of the Finger Lakes region provide many benefits to the people who live there. From sequestering carbon and providing wildlife habitat to mitigating stormwater runoff, the forest ecosystem offers a wide variety of services. Many of these services, however, exist as externalities in the regional economy. In other words, their benefits are not fully taken into account because in most cases they are not associated with a market value.

This Broad Strategy is aligned with the following FLREDC strategies:

- Strengthen Academic and Industry Partnerships
  - Develop programs and shared resources that allow closer collaboration between academic and industry scientists.
- Invest in Community, Industrial Development & Infrastructure
  - Reinforce the identity, sense of place, and character of the area through downtown

redevelopment, adaptive reuse of existing buildings and infrastructure, and historic preservation.
    - Foster the development of the region's industrial complexes and business parks for commercial or industrial use.
- Tourism and the Arts
    - Strengthen and support the development of the Finger Lake's diverse water resources and recreational tourism opportunities, allowing greater access and promoting year-round use.

Prioritization
This Broad Strategy is prioritized because it represents a nexus of economic opportunity and environmental awareness. It has the potential to lead to financial incentives or other economic rewards for forest landowners' adoption of silvicultural BMPs. This strategy is aligned with the following Guiding Principles:

- Preserve, protect and improve natural resources and acknowledge the link between natural systems
- Promote an equitable distribution of cost and benefit
- Build partnerships between local governments, the private sector, regional institutions and the public

Potential Stakeholders and Resources
This strategy will require efforts on behalf of government agencies particularly at the state level, environmental advocacy groups, landowners, and institutional partners in the field of environmental research. Funding may be available through agencies such as the NYS DEC, NYSERDA, the US EPA, US Forest Service, or others.

Challenges and Sub-strategies
There are several challenges to advancing this Broad Strategy. These challenges can be addressed by more specific Sub-strategies. For example, there is a lack of opportunities to capture the value of forest-related ecosystem services, as compared to the range of opportunities to capture market value of timber harvest. To address this, forestry carbon offset programs (with minimal transaction and compliance costs) should be encouraged, with eligible activities including avoided clearing, sustainable forest management, and reforestation. The inconsistency of carbon capture models can be addressed by expanding and refining standardized methods of quantifying carbon flow in and out of forest resource carbon pools (living biomass, dead wood, soils, and harvested products) to allow for expanded, meaningful participation in carbon offset markets.

Sub-strategy 4.1 | *Expand and refine standardized methods of quantifying carbon flow in and out of forest resource carbon pools to allow for expanded, meaningful participation in carbon offset markets; Encourage forestry carbon offset programs with eligible activities including avoiding clearing, sustainable forest management, and reforestation.*

There is an opportunity for the region's research and development institutions to work on expanding and refining standardized methods of quantifying carbon flow. This work is aligned with existing efforts at Rochester Institute of Technology's Golisano Institute for Sustainability of the NYS Pollution Prevention Institute (NYS P2I).

Using methods for quantifying carbon flow, markets can be instituted (such as development mitigation credit trading). Carbon markets/offset programs can be used to protect existing forestland and encourage reforestation is to systematically internalize these important and quantifiable ecological services in a way that rewards landowners for forest stewardship.

It is recommended that local municipalities collaborate with local agencies to establish and manage programs that encourage best management practices in forest stewardship.

Sub-strategy 4.2 | *Encourage landowner participation in the NYS Real Property Tax Law 480-a Program, and advocate for changes to forestry tax laws to encourage stewardship*

Section 480-a of the New York State Real Property Tax Law (RPTL) is the statute that governs the taxation of forest land. This statute allows for the reduction of 80% of the assessed value of forest lands in exchange for the adoption of certain forestry management procedures. For a number of reasons, enrollment in this exemption program is very low among eligible owners, especially in comparison to other states with such programs. Efforts can be made to educate both landowners and assessors within the region about the benefits and structure of the program in such a way as to enroll more eligible recipients and thus preserve additional forest resources.

Agriculture

Subject Area Goal

Increase the viability, accessibility, and ecological contribution of farms, while decreasing waste and dependence on external inputs.

Opportunities

- Stronger connections with urban markets
- Mostly family-owned farms—better suited to sustainable models
- Environmental protection through farmland design and practice
- Rise of local farmers markets
- Slow food / locavore / organic movements
- Strategic land use policies and programs

Challenges

- Rising costs
- Rapidly-evolving technologies
- Development pressure (slow-paced sprawl)
- Aging farm owners
- Succession planning
- Public perception and nuisances

Variables

- Availability of capital
- Quality workforce
- Consumption patterns and consumer tastes
- National / global markets
- Erratic weather

There is significant alignment between the strategies identified for Materials and Waste Management, Water Management, and Agriculture & Forestry. Refer to other subject areas for additional strategies that may benefit Agriculture.

Indicators and Targets

Indicators	Broad Strategies Measured	Baseline Value (2010)	Short-Term Target* (2020)	Mid-Term Target* (2035)	Long-Term Target* (2050)
Acres of agricultural land in non-agricultural use	A1, A3, A5	155,968 acres	maintain baseline	maintain baseline	maintain baseline
Direct farm sales per capita (as a percent of at home food expenditures)	A1, A5	0.49%	+ 1.5% (2%)	+ 4.5% (5%)	+ 9.5% (10%)
Use of external inputs	A5	10.7%	- 0.6% (10.1%)	- 1.8% (8.9%)	- 2.9% (7.8%)
Diversity of production (Shannon's Diversity Index)	A2, A4, A5	6.97	7.00	7.00	7.00

*All % reductions or increases are related to the 2010 baseline values, not the previous target.

Agriculture

Subject Area Goal

Increase the viability, accessibility, and ecological contribution of farms, while decreasing waste and dependence on external inputs.

Priority Broad Strategies

Connection with criteria: ● Strong ◐ Moderate ○ Marginal

	Evaluation Criteria					
	Benefits Multiple Subject Areas	Benefits Multiple Capitals	Benefits Multiple Communities	Implementation Feasibility	Consistent with Planning Efforts	Financial Feasibility
Broad Strategy A1—Support the continued development of an efficient and productive regional food system.	●	●	●	●	●	●

Representative Sub-Strategies / Project Ideas

1.1 Support the expansion of regional processing and distribution facilities, and/or other facilities that add value to regional food products.
1.2 Increase food security for individuals and households at risk of hunger.
1.3 Increase regional farms' sales to regional institutional buyers.
1.4 Increase regional farms' direct sales to consumers through such means as multi-farm community supported agriculture programs and increased access to local food retailers.

Representative Projects

- Headwaters Food Hub—processing and logistics facility to support the regional food system by managing supply chain logistics, aggregation, distribution, and sales of local, sustainable, source-identified foods from a network of partner farms, including their own, and from local food producers.
- Finger Lakes Food Processing Cluster Initiative—leveraging the Jobs and Innovation Accelerator Grant from US Economic Development Agency and SBA and NYS to support this coordinated initiative that provides assistance, training, and collaborative partnerships. Project is underway.
- Regional Multi-Farm CSA Development—development and promotion of CSA-consumer website.

Broad Strategy A2—Increase adoption of distributed bio-energy production technologies to increase production of renewable energy from farm and forest products and product waste.	●	●	●	●	●	●

Representative Sub-Strategies / Project Ideas

2.1 Advance the availability and affordability of scalable plug-and-play bio-energy production systems, and provide standards for selling excess power into the grid.
2.2 Assist farm operators in analyzing energy demand, as well as opportunities for efficiency and potential energy production.
2.3 Establish local policy frameworks and incentives for community-scale bio-energy production and distribution.
2.4 Develop purchase agreements for the sale of bio-energy produced by the agricultural and forestry sectors to the power grid.

Representative Projects

- Farm Energy Sustainability Plans—energy analysts and farm service providers review loads, timing, motor efficiencies, lighting and fuel use to find demand efficiencies. Plans may also review potential for on-site renewable energy production, including biogas, wind, solar, and biofuels.
- Seneca AgBio Green Energy Park—Agricultural and Renewable Energy Program with projects including grape waste processing, grapeseed oil production, and biodiesel production. Project currently delayed.

Broad Strategy A3—Reduce the conversion of quality farmland.	●	●	●	●	●	●

Representative Sub-Strategies / Project Ideas

3.1 Support the creation and implementation of municipal farmland protection plans.
3.2 Improve regulatory context for purchase, lease and/or transfer of development rights.
3.3 Increase use of underutilized grasslands for livestock production.
3.4 Expand or create opportunities to engage existing and new farmers in succession planning efforts.

Representative Projects

Broad Strategy A4—Support farm-scale diversity of product types, both in-season and across seasons, and support the establishment and growth of a diversity of operations with regard to size, market, and operation type.	●	◐	●	●	●	◐

Representative Sub-Strategies / Project Ideas

4.1 Develop models to assist in the management of farm-scale diversity for small and medium sized operations.
4.2 Strengthen opportunities for producing, marketing and exporting specialty agricultural products.
4.3 Support research and development initiatives regarding environmental markets and other incentives related to carbon sequestration and water quality improvement.

Representative Projects

- Finger Lakes Small Business Expansion Fund—Creation of a $1.15 million investment pool targeting seven companies in identified key industries (including the Once Again Nut Butter processing facility) geographically distributed throughout region.

Broad Strategy A5—Educate the non-farming community about the economic, environmental, and social impacts that the agricultural sector has on the region.	◐	◐	●	●	●	●

Representative Sub-Strategies / Project Ideas

5.1 Support efforts to document the economic impact of agriculture and forestry throughout the region.
5.2 Expand access to service programs specifically oriented toward small farms.
5.3 Create or expand opportunities to build a regional food identity focused on the Finger Lakes Region.

Representative Projects

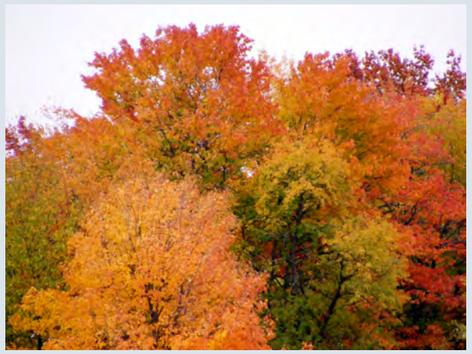
- Conference Sessions—continue efforts to educate economic development stakeholders on agricultural issues through sessions at the Local Government Workshop.
- Agricultural Events—support regional agricultural initiatives such as the Wyoming County Dairy Institute, Agri-Palooza, and Celebrate-Ag. (G/FLRPC CEDS)
- Dairy Profit Teams—NYFVI grant helped fund pilot program where dairy farmers get one-on-one attention with a group of industry consultants in all different areas to help efficiently and cooperatively offer solutions tailored to individual issues.
- Livingston County Annual Decision-Makers' Tour of Agriculture—Increasing exposure between planning/zoning commissioners and farm operators.

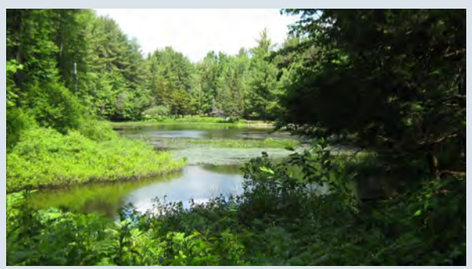
Finger Lakes Regional Sustainability Plan

Forestry

Subject Area Goal

Increase the viability, accessibility, and ecological contribution of forests, while decreasing waste and dependence on external inputs.





Opportunities

- Preservation of region's historic character
- Environmental protection through forest land design and practice
- Alternative energy sources
- Strategic land use policies & programs

Challenges

- Rising costs
- Limitations of government structures to adequately protect forests
- Development pressure
- Lack of public understanding of value

Variables

- Availability of capital
- National / global markets
- Erratic weather

There is significant alignment between the strategies identified for Materials and Waste Management, Water Management, and Agriculture & Forestry. Refer to other subject areas for additional strategies that may benefit Forestry.

Indicators and Targets

Indicators	Broad Strategies Measured	Baseline Value (2010)	Short-Term Target* (2020)	Mid-Term Target* (2035)	Long-Term Target* (2050)
Ratio of percent of forests by tree size class • Small • Medium • Large	F3	• 16% • 21% • 63%	maintain baseline	maintain baseline	maintain baseline
Amount of biomass in live trees	F1, F2, F4	60,937,524 short tons	+ 5%	+ 10%	+ 15%
Number of forest interior indicator bird species (survey blocks containing at least three indicator species)	F2	21 survey blocks	49 survey blocks	144 survey blocks	240 survey blocks
Invasive Species Index (custom index tracking three species: European woodwasp, hemlock woolly adelgid, and emerald ash borer)	F2, F3	8.5	maintain baseline	6.5	4
Wildfire occurrences	F3	3,885 wildfires	-5%	-10%	-15%

*All % reductions or increases are related to the 2010 baseline values, not the previous target.

Forestry

Subject Area Goal

Increase the viability, accessibility, and ecological contribution of forests, while decreasing waste and dependence on external inputs.

Priority Broad Strategies

Connection with criteria: ● Strong ◐ Moderate ○ Marginal

	Evaluation Criteria					
	Benefits Multiple Subject Areas	Benefits Multiple Capitals	Benefits Multiple Communities	Implementation Feasibility	Consistent with Planning Efforts	Financial Feasibility
Broad Strategy F1—Support efforts to increase equitable forest recreation opportunities and urban forestry/green infrastructure initiatives.	●	●	●	●	●	◐

Representative Sub-Strategies / Project Ideas

1.1 Promote community adoption of the four standards to become a Tree City USA.

1.2 Encourage the use and sharing of a standardized community tree inventory database.

Representative Projects

- Wayne County Comprehensive Shoreline Management Project—Elevation site assessment and task analysis of built environment and development of cost estimates for repairing and relocating facilities. Will serve as the basis to modify comprehensive plans.

Broad Strategy F2—Support watershed, riparian, shoreline, and habitat protection and restoration efforts to increase resiliency and diversity of the native species ecosystems, delicate watersheds, and critical habitats.	◐	◐	●	●	●	●

Representative Sub-Strategies / Project Ideas

2.1 Encourage stronger landscape connectivity and forest management rehabilitation practices that can support adaptation and increase resilience of individual species and nature systems at the landscape level (2,500-acre units).

2.2 In partnership with Finger Lakes Partnership for Regional Invasive Species Management (FL-PRISM), continue to support programs at all levels of government to combat invasive pests and diseases like the emerald ash borer.

2.3 Provide near-term funding for NYSDEC Forest Resource Assessment and wildlife action plans.

2.4 Encourage landowners to participate in NY CREP and similar programs to receive compensation for protecting/restoring natural features.

Representative Projects

Broad Strategy F3—Educate the general public, landowners/industry professionals, and decision-makers regarding the relationships between watershed land uses, forest management, water quality protection and rural economic viability, and forest sustainability issues.	●	◐	●	●	◐	◐

Representative Sub-Strategies / Project Ideas

3.1 Continue to support and encourage participation by County Soil and Water Conservation Districts (SWCD) in the NYSDEC/Natural Resources Conservation Service (NRCS) Environmental Quality Incentives Program (EQIP) Forestry Initiative.

3.2 Support the efforts of and partner with advocacy organizations that provide outreach and education on forest and land management issues (e.g., The Nature Conservancy Central & Western NY, Rochester Regional Group of the Sierra Club).

3.3 Support retention and recruitment of sustainable timber harvesters.

Representative Projects

Broad Strategy F4—Encourage the valuation of ecological services provided by regional forest resources.	●	◐	●	◐	◐	◐

Representative Sub-Strategies / Project Ideas

4.1 Expand and refine standardized methods of quantifying carbon flow in and out of forest resource carbon pools to allow for expanded, meaningful participation in carbon offset markets; Encourage forestry carbon offset programs with eligible activities including avoiding clearing, sustainable forest management, and reforestation.

4.2 Encourage landowner participation in the NYS Real Property Tax Law 480-a Program, and advocate for changes to forestry tax laws to encourage stewardship.

Representative Projects

- New York Green's "Green Genesee Road Map" pilot project—a blueprint for sustainable land use and development practices that should be replicated for other counties throughout the region.

3.13 Alignment with FLREDC Strategic Plan

The Finger Lakes Regional Sustainability Plan, aligned with the Finger Lakes Regional Economic Development Council (FLREDC) Strategic Plan – *Accelerating Our Transformation*, will improve the economic and environmental health of the region and thereby improve the quality of life in the Finger Lakes. The Plan objectives include:

- Build upon existing and planned sustainability efforts in the Finger Lakes Region by establishing a framework for infrastructure investment decision making
- Outline specific and tangible actions to support the state's goal to reduce greenhouse gas (GHG) emissions by 80 percent from 1990 levels by the year 2050
- Inform municipal policies and plans
- Identify recommendations for adapting to the effects of climate change in a manner that promotes robust, high quality economic growth

Table 3-2 shows the alignment of the Finger Lakes Regional Sustainability Plan Broad Strategies with the Regional and Sector strategies outlined in the FLREDC Strategic Plan Update – *Accelerating Our Transformation: Year 2*. The table also includes a qualitative assessment of the broad strategy's potential to reduce GHG emissions and create jobs.

The estimated reduction in GHG emissions is based on the 2010 GHG Inventory (Section 3.11) and the combined effectiveness of all Sub-strategies. Broad strategies like *WM1 | Inventory, monitor and educate to create a better understanding of the region's water resources*, which focuses on monitoring and education may not have a significant effect on GHG emissions. While a broad strategy like *E2 | Promote energy conservation and efficiency by developing educational programs, increasing participation in available state and federal incentive programs, and by adopting local and regional policies*, will have a significant reduction on GHG emissions since the energy consumption of businesses and residents generates 17% and 24% of the region's total emissions.

The potential for job creation is estimated based on the alignment of the strategies with the FLREDC Plan, in particular the FLREDC Regional Strategy to "Optimize business creation, retention, and expansion" or a priority project with significant job creation potential. For example, projects that are primarily education and promotion of existing resources like *T1 | Provide for and promote alternative modes of transportation*, will likely have a marginal impact on job creation. However, strategies like *LU2 | Revitalize existing centers and prioritize the value of place making*, which align with a FLREDC priority project will have a significant impact on job creation. Broad Strategy LU2 aligns with the FLREDC Regional Strategy to "Invest in Community, Industrial Development & Infrastructure" which includes a strategy to "Foster the development of the region's industrial complexes and business parks for commercial or industrial use." The FLREDC identifies efforts to preserve and strengthen the Eastman Business Park as a transformational priority project which has a goal of creating 1,500 jobs over the next five years.

Table 3-2 uses the following symbols:

Table 3-2. Alignment between FLRSP and FLREDC Strategic Plan (see legend on previous page).

Finger Lakes Regional Sustainability Plan	FLREDC Accelerating Our Transformation: Year 2													
	Regional Strategies				Sector Strategies									
	Optimize business creation, retention, and expansion	Strengthen Academic and Industry Partnerships	Align Workforce Development Efforts with Sector Needs	Invest in Community, Industrial Development & Infrastructure	Advanced Healthcare	Life Sciences	Energy Innovation	Optics, Imaging and Photonics	Business Services	Advanced Manufacturing	Agriculture and Food Processing	Tourism and the Arts	Reduce GHG Emissions	Support Job Creation
Story of Place														
SP1| Eddying		◆				◆	◆	◆		◆	◆	◆		
SP2| Democratizing	◆		◆	◆	◆		◆				◆			◐
SP3| Continuously Innovating	◆	◆		◆		◆	◆	◆	◆	◆	◆		●	●
Energy														
E1| Develop, produce, and employ alternative energy	◆	◆					◆				◆		●	◐
E2| Promote energy conservation and efficiency by developing educational programs, increasing participation in available state and federal incentive programs, and adopting local and regional policies.	◆	◆		◆			◆						●	○
E3| Upgrade the existing conventional energy production and distribution in a sustainable way.				◆									○	◐
E4| Develop, produce, and employ renewable energy	◆	◆					◆				◆		●	◐
E5| Develop and implement micro-grid technology integrating local production/distribution with the storage and distribution capacity of a large grid.	◆	◆					◆						●	○
Transportation														
T1| Provide for and promote alternative modes of transportation.	◆			◆									●	○
T2| Promote livability corridors.				◆									●	◐
T3| Leverage transportation system assets to encourage economic development.	◆			◆								◆	●	●
T4| Maintain and improve the functionality, safety and efficiency of the existing transportation infrastructure.				◆									◐	○
T5| Promote the development and adoption of alternative fuels and power sources.	◆	◆		◆			◆						●	●
Land Use & Livability														
LU1| Create healthy, safe and sustainable communities.		◆		◆									●	◐
LU2| Revitalize existing centers and prioritize the value of place making.				◆								◆	●	●
LU3| Support and preserve rural centers and the character of rural areas.				◆							◆	◆	○	◐
LU4| Encourage diversity of our communities to bring about a greater mixture of uses, people, ages and incomes				◆									◐	◐

Table 3-2, continued.

Finger Lakes Regional Sustainability Plan	FLREDC Accelerating Our Transformation: Year 2													
	Regional Strategies				Sector Strategies									
	Optimize business creation, retention, and expansion	Strengthen Academic and Industry Partnerships	Align Workforce Development Efforts with Sector Needs	Invest in Community, Industrial Development & Infrastructure	Advanced Healthcare	Life Sciences	Energy Innovation	Optics, Imaging and Photonics	Business Services	Advanced Manufacturing	Agriculture and Food Processing	Tourism and the Arts	Reduce GHG Emissions	Support Job Creation
Materials and Waste Management														
MM1| Reduce the amount of solid waste generated in the region.	◆									◆	◆		◐	◐
MM2| Increase the percentage of materials reused (upcycled), recycled, and composted within the region.	◆	◆					◆			◆	◆		◐	●
MM3| Address financial barriers through new revenue and business models.													●	○
MM4| Promote comprehensive sustainable materials management education, awareness, and research services.		◆							◆				◐	○
Water Management														
WM1| Inventory, monitor and educate to create a better understanding of the region's water resources.		◆		◆								◆	○	○
WM2| Promote regional standardization of regulations and management.				◆								◆	○	○
WM3| Preserve existing ecosystem services and promote green infrastructure to reduce reliance on grey infrastructure.				◆								◆	◐	○
WM4| Through water conservation, ensure adequate timing and flow of water for sustainable use for people, industry, energy and nature.		◆		◆			◆						●	◐
WM5| Maintain and improve the functionality and efficiency of the water supply and wastewater infrastructure systems.				◆									●	○
Economic Development														
ED1| Embed the framework of this Plan into all planning, execution and measurement activities throughout the region.	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	●	●
ED2| Identify/recruit/support entrepreneurial enterprises consistent with the Story of Place/5 capitals and have broad commercialization potential.	◆	◆				◆	◆	◆					◐	●
ED3| Invest in critical infrastructure to foster economic expansion and advance sustainable initiatives.	◆			◆									◐	◐
ED4| Expand and align training and education initiatives to target strategic sectors and meet the needs of existing and emerging industries.	◆	◆	◆						◆	◆	◆		○	●
ED5| Enrich and market the unique, natural, cultural, agricultural, and destination assets of the region.	◆			◆							◆	◆	◐	●

Table 3-2, continued.

Finger Lakes Regional Sustainability Plan	FLREDC Accelerating Our Transformation: Year 2													
	Regional Strategies				Sector Strategies									
	Optimize business creation, retention, and expansion	Strengthen Academic and Industry Partnerships	Align Workforce Development Efforts with Sector Needs	Invest in Community, Industrial Development & Infrastructure	Advanced Healthcare	Life Sciences	Energy Innovation	Optics, Imaging and Photonics	Business Services	Advanced Manufacturing	Agriculture and Food Processing	Tourism and the Arts	Reduce GHG Emissions	Support Job Creation
Climate Change Adaptation														
CC1| Enhance mutual aid/support among neighboring communities/counties/regions to share/develop/create capabilities, resources, and special assets.													○	○
CC2| Upgrade existing assets and modify municipal/business practices to better withstand extreme conditions.		◆		◆									●	●
CC3| Create self-sufficient "places of refuge" in each community/ neighborhood for critical resources, shelter and aid under normal and extreme conditions.				◆			◆						●	◐
CC4| Create localized networks for critical services to complement existing centralized systems.		◆		◆							◆		●	◐
Governance														
G1| Promote the development of local and regional sustainability initiatives to support the goals of the Plan across all subject areas.			◆	◆					◆		◆	◆	●	●
G2| Encourage regional cooperation and coordination.	◆	◆	◆	◆			◆		◆		◆	◆	●	●
Agriculture & Forestry														
A1| Support the continued development of an efficient and productive regional food system.	◆			◆							◆		◐	●
A2| Increase adoption of distributed bio-energy production technologies to increase production from farm/forest products/waste.	◆	◆	◆				◆		◆		◆		●	◐
A3| Reduce the conversion of quality farmland.			◆	◆					◆		◆	◆	●	●
A4| Support farm-scale diversity of product types and support the establishment/growth of a diversity of operations.	◆								◆		◆		◐	◐
A5| Educate the non-farming community about the economic, environmental, and social impact that the agricultural sector has on the region.	◆										◆	◆	○	○
F1| Support efforts to increase equitable forest recreation opportunities and urban forestry/green infrastructure initiatives.												◆	◐	◐
F2| Support watershed, riparian, shoreline, and habitat protection and restoration efforts to increase resiliency/diversity of the native species ecosystem				◆									◐	○
F3| Educate on the relationships between watershed land uses, forest management, water quality protection and rural economic viability/forest-related sustainability	◆	◆							◆				○	○
F4| Encourage the valuation of ecological services provided by regional forest resources.		◆		◆								◆	◐	○