

# CAPITAL

| Region |

Sustainability  
Plan





**CENTER FOR ECONOMIC GROWTH**  
anything's possible™

December 10, 2012

Dear Capital Region Cleaner, Greener Communities Planning Team:

On behalf of the Center for Economic Growth (CEG), I would like to commend everyone who has been involved in the Capital Region's Cleaner, Greener Communities Program.

When I was approached to become involved in the program, I gladly accepted for one fundamental reason: Sustainability is good for business. At CEG, we believe that a company -- and a community -- should plan for the future, be careful with its resources, and operate with a unified vision to maximize its full potential.

The Cleaner, Greener Communities Program in the Capital Region encompasses Albany, Columbia, Greene, Rensselaer, Saratoga, Schenectady, Warren and Washington counties, a vast area with diverse assets and challenges.

From my perspective, the program provided an opportunity for the Capital Region to evaluate where we are, where we're headed; and where we want to be. Citizens were encouraged to attend public forums and to participate online by posting ideas on virtual sticky notes and through online forums. The process has been open, transparent and participatory.

As a result, the sustainability plan sets forth regional goals and metrics to reduce greenhouse gas and improve the energy supply, transportation, water management, waste management, land use, open space, agriculture, housing and economic development in the region.

Since the plan is the first step, CEG also looks forward to supporting regional businesses and communities in a subsequent implementation phase. Continued support throughout the region, therefore, will help to ensure the plan's success.

Again, congratulations on a job well done.

Sincerely,

F. Michael Tucker  
President & CEO  
Center for Economic Growth

**Acronyms**

<b>ADA</b>	Americans with Disabilities Act	<b>LID</b>	Low Impact Development
<b>ARRA</b>	American Recovery and Reinvestment Act	<b>LSWMP</b>	Local Solid Waste Management Plan
<b>BMP</b>	Best Management Practices	<b>MGD</b>	Million Gallons per Day
<b>BRT</b>	Bus Rapid Transit	<b>MS4</b>	Municipal Stormwater Permit
<b>C&amp;D</b>	Construction & Demolition Debris	<b>MSW</b>	Municipal Solid Waste
<b>CGC</b>	Cleaner Greener Communities	<b>MW</b>	Megawatt
<b>CHP</b>	Combined Heat and Power	<b>NAAQS</b>	National Ambient Air Quality Standards
<b>CO<sub>2</sub>e</b>	Carbon Dioxide Equivalent	<b>NOAA</b>	National Oceanic and Atmospheric Administration
<b>CNG</b>	Compressed Natural Gas	<b>NRCS</b>	Natural Resources Conservation Service
<b>CNU</b>	Congress for New Urbanism	<b>NYSERDA</b>	New York State Energy Research and Development Authority
<b>CDTC</b>	Capital District Transportation Committee	<b>NYSDEC</b>	New York State Department of Environmental Conservation
<b>CDRPC</b>	Capital District Regional Planning Commission	<b>NYSDOT</b>	New York State Department of Transportation
<b>CEG</b>	Center for Economic Growth	<b>NYSEG</b>	NYS Electric and Gas
<b>COE</b>	Corps of Engineers	<b>OPRHP</b>	Office of Parks Recreation and Historic Preservation
<b>DASNY</b>	Dormitory Authority State of New York	<b>PPA</b>	Power Purchase Agreement
<b>DOE</b>	US Department of Energy	<b>PPM</b>	Parts Per Million
<b>EV</b>	Electric Vehicle	<b>PV</b>	Photovoltaic
<b>FEMA</b>	Federal Emergency Management Agency	<b>TBD</b>	To Be Determined
<b>FHA</b>	Federal Highway Administration	<b>TOD</b>	Transit-Oriented Development
<b>FTA</b>	Federal Transit Administration	<b>USDA</b>	U.S. Department of Agriculture
<b>GIS</b>	Geographic Information System	<b>USDOT</b>	U.S. Department of Transportation
<b>GHG</b>	Greenhouse Gas	<b>USEPA</b>	U.S. Environmental Protection Agency
<b>HOV</b>	High-Occupancy Vehicle	<b>USFS</b>	United States Forest Service
<b>HVAC</b>	Heating, Ventilation, and Air Conditioning	<b>USGBC</b>	United States Green Building Council
<b>IGCC</b>	International Green Construction Code	<b>USGS</b>	United State Geological Survey
<b>KW</b>	Kilowatt	<b>WTE</b>	Waste to Energy
<b>LED</b>	Light Emitting Diode	<b>WWTP</b>	Wastewater Treatment Plant
<b>LEED</b>	Leadership in Energy and Environmental Design		



# Acknowledgements

We would like to thank the following people for their work on the capital region sustainability plan

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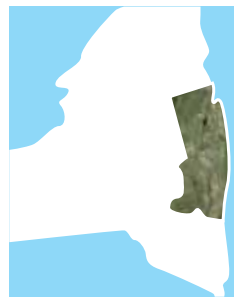
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Section 1.0  
**Introduction**





## SECTION 1.0: **Introduction**

### *About the Cleaner, Greener Communities Program*

*In 2011, Governor Andrew Cuomo announced the creation of the Cleaner, Greener Communities Program focused on building more sustainable communities through empowering and resourcing regional planning along with the implementation of sustainable practices.*

The Program will guide and support integrated, sustainable solutions to improve quality of life through two phases.

Key goals of the Program are:

- Establish sustainability & land use policies
- Guide infrastructure investment
- Promote sustainable growth
- Reduce GHG Emissions 80% below 1990 levels by 2050

Funding for Cleaner, Greener Communities comes from the Regional Greenhouse Gas Initiative (RGGI) and is administered by the New York State Energy Research and Development Authority (NYSERDA). NYSERDA, a public benefit corporation, offers objective information and analysis, innovative programs, technical expertise and funding to help New Yorkers increase energy efficiency, save money, use renewable energy, and reduce their reliance on fossil fuels.

Through this Program, NYSERDA will provide \$100 million in funding to help New York's 10 Regions establish sustainability plans and adopt smart development practices. NYSERDA will



administer the funding to Regions through a two-phase competitive grant process:

**Phase I** provided nearly \$10 million in funding to Regional planning teams to create comprehensive sustainability plans or to expand the scope of existing sustainability plans. Up to \$1 million per Region was awarded. Grants were awarded to a municipality (county, city, town, village within New York State), acting on behalf of a consortium of other municipalities located in one of the 10 Regions defined by the Regional Economic Development Council (REDC).

**Phase II** will provide up to \$90 million toward Regional projects that support the Regional sustainability goals identified during the planning process, provide the greatest opportunity to reduce greenhouse gas emissions, save energy and deploy renewable energy, and improve the economic and environmental health of our communities. Phase II is expected to launch in 2013.

### The Capital Region

The Sustainability Plan defines the Capital Region as the eight counties of Albany, Columbia, Greene, Rensselaer, Saratoga, Schenectady, Warren, and Washington.

#### Current State of the Capital Region

The Capital Region of New York includes 159 municipalities, including 10 cities and 43 villages and is home to approximately 1.1 million people. It is a geographically and culturally diverse Region that has tremendous assets, many of which demonstrate the Region is already on a path toward sustainability.

In recent years, the Region has welcomed economic growth in the area of technology. The College of Nanoscale Science and Engineering, located at the University at Albany, currently houses several initiatives designed to advance nanotechnology research and application in the energy and environmental industries.

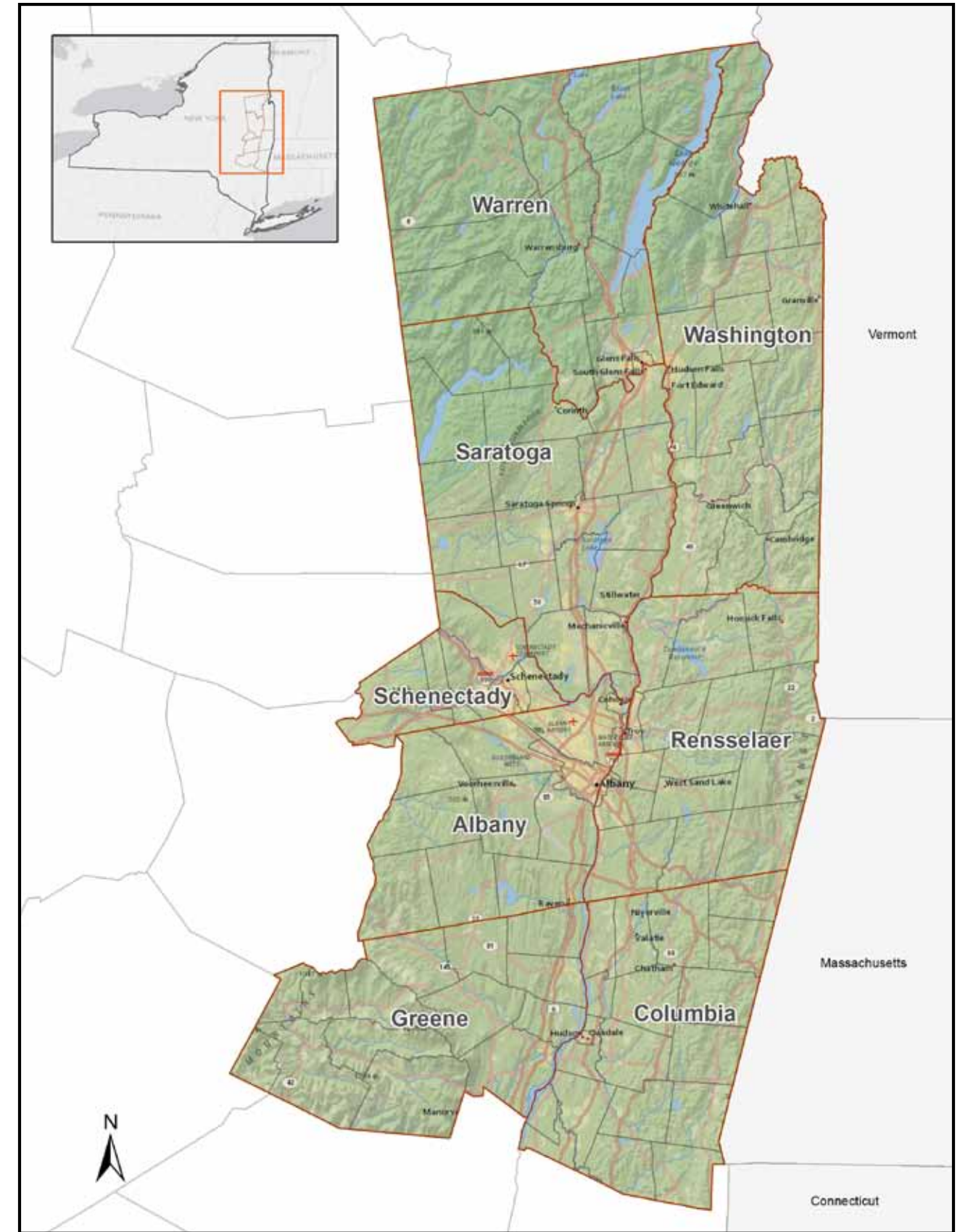
General Electric has located its Renewable Energy Headquarters and Advanced Sodium Battery Plant at the Main Plant in Schenectady bringing cutting edge renewable energy technology to the Region. The establishment of the Global Foundries microchip fabrication plant and the relocation of SEMATECH and the International Sematech Manufacturing Initiative (ISMI) to the Capital Region are likely to attract many semiconductor companies and create additional jobs in the Region.

The Capital Region offers excellent access to all major markets in the Northeast. It is approximately a three hour drive to New York City, Montreal, and Boston. Its location also means products manufactured in the Capital Region are within one day's delivery time of 52% of the combined U.S. and Canadian populations.

The Capital Region is home to 20 institutions of higher education, including several professional and graduate-level programs. These institutions educate an average of 67,000 students annually.

The Capital Region is well served by its multi-modal transportation system. Situated at the crossroads of three major interstate corridors, I-90, I-88 and I-87, the Region is well connected in all directions. The Hudson River, Erie and Champlain Canals, the Port of Albany, and several smaller port facilities offer extensive water access. The Region boasts a modern international airport and is served amply by both passenger and freight rail. The Capital Region has an abundance of cultural attractions including Proctors, the Palace Theater, the Saratoga Performing Arts Center, the New York State Museum, and numerous historic and heritage areas. In addition to arts and cultural institutions, the Capital Region is home to world-renowned tourist attractions including Saratoga Springs, Lake George, the Erie Canal and Erie Canalway Trail. These assets contribute to a strong tourist economy and increase the quality of life of existing residents.

Figure 1.1 The Capital Region







With its innovative glycol collection system and its fleet of alternative fuel vehicles, Albany International Airport is an active making the Capital Region more sustainable.

In addition to these assets, there are many examples that demonstrate the Region's progress in becoming more sustainable, including:

The Region has seen a steady growth in the number and size of farmers markets. Each weekend more than two dozen farmers markets can be found throughout the Region, which help promote buying local and access to fresher, healthier local produce.

The Region's community colleges and the Capital District BOCES (Board of Cooperative Education Services) have all incorporated sustainability into their curricula.

Private investment in the Region's cities has been steadily increasing. The City of Saratoga Springs boasts a thriving mixed use downtown. The Schenectady downtown has seen a significant commercial turn

around. The downtowns in Albany and Troy are beginning to see a stronger residential market, reversing a decades long trend.

CDTC has funded a total of 73 projects, supported by \$4.7 Million in federal, state and local funds, under its Linkage Program.

Waste reduction and recycling program implementation and the development of a private single-stream recycling facility in South Albany has resulted in a significant reduction in landfill waste.

CDTC is continuing to develop a Bus Rapid Transit system through the Central Avenue and Western Avenues corridors in Albany

The Region is home to almost 240 LEED certified buildings, more than 30 of which are single family homes.

The Region is home to 24 state parks and

Figure 1.2 Poverty Concentration

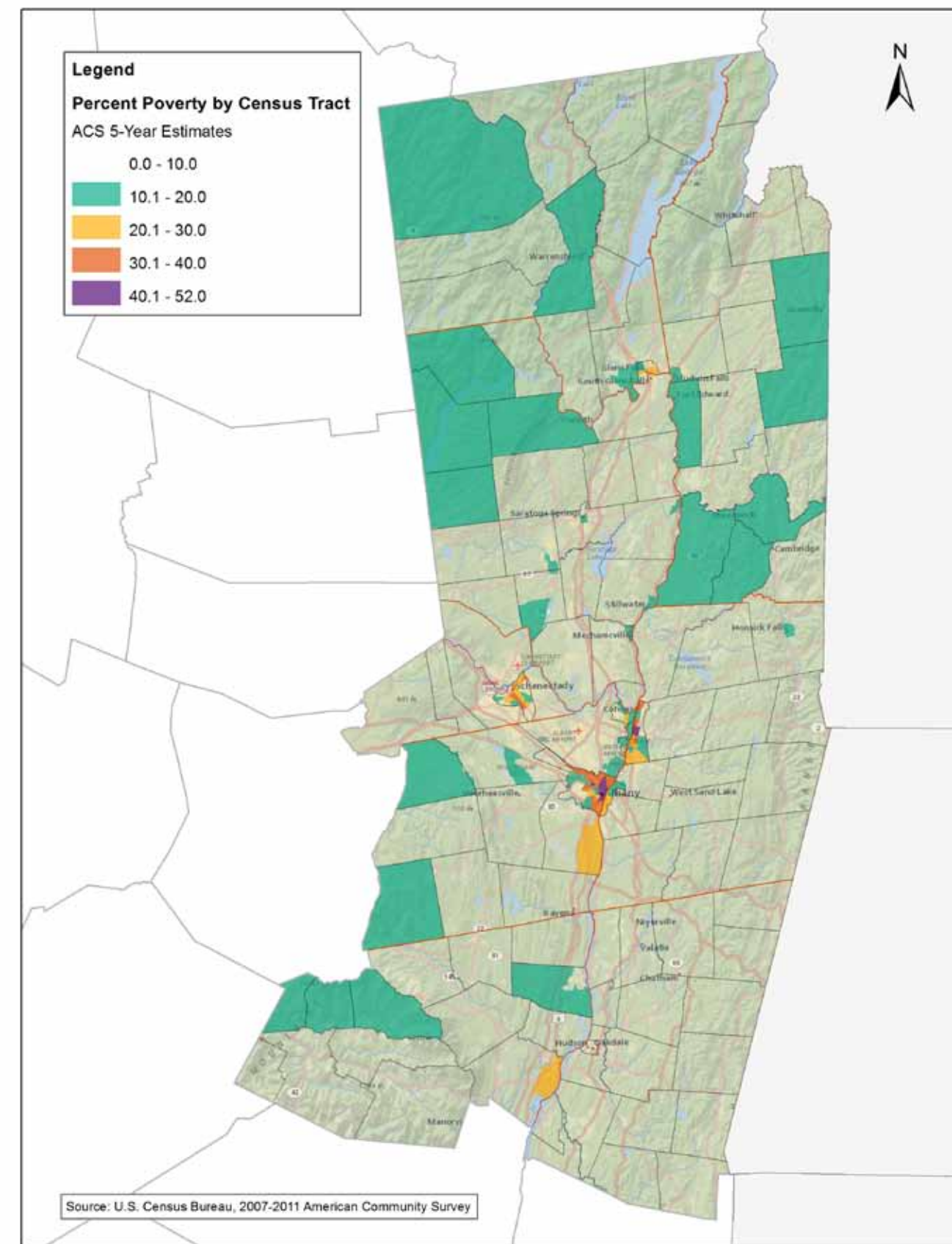
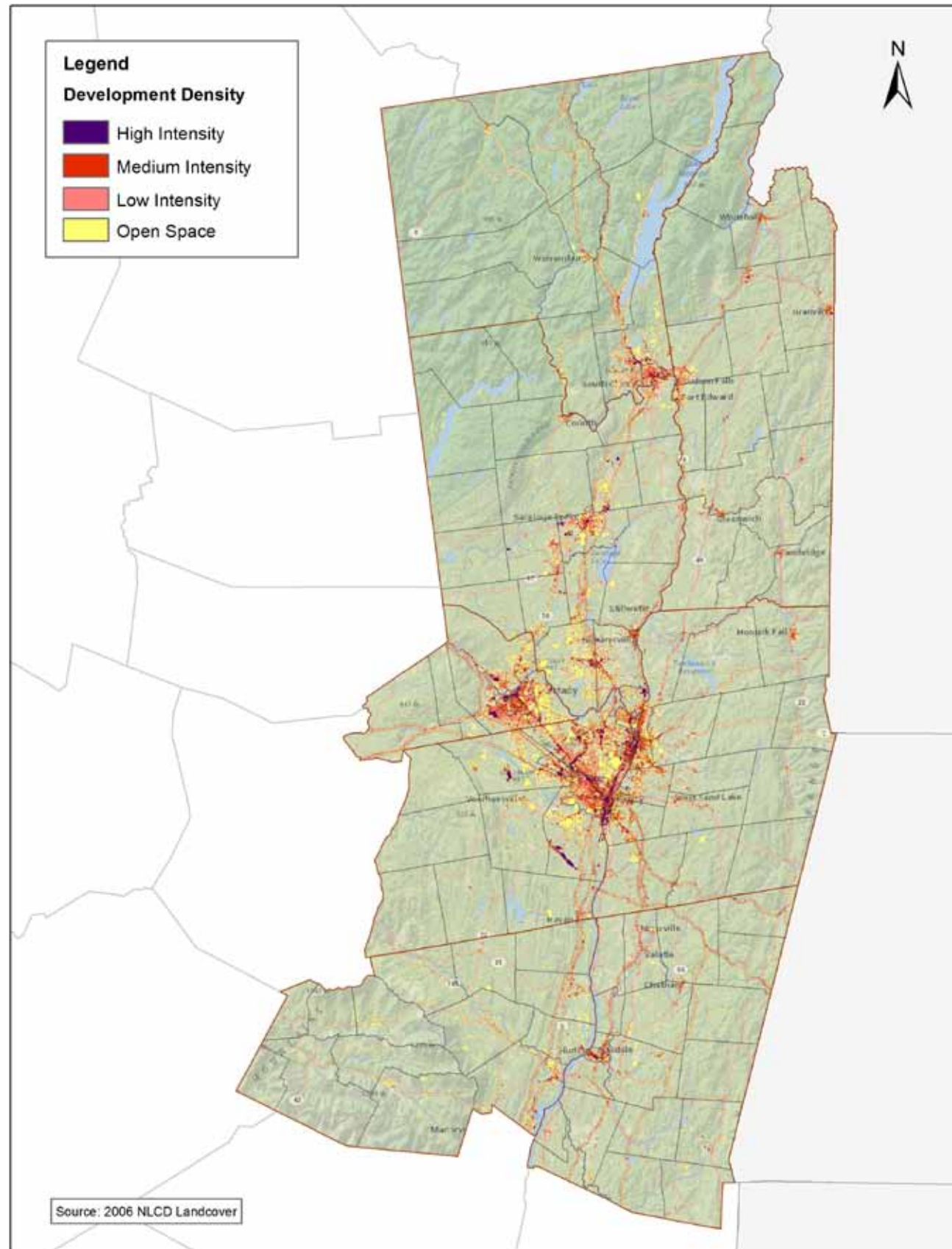


Figure 1.3 Development Density



historic sites with a combined annual attendance of over 4 million

Sixteen communities in the Region have taken the Climate Smart Communities Pledge.

The Community Loan Fund of the Capital Region, along with a number of other county economic development agencies, has increased its small business lending, training and financial literacy programs targeted at low-income, minority and women business owners.

These are but a few examples of the many sustainability related initiatives within the Region. However, challenges remain and will continue within the Region unless systemic problems are addressed within a framework of Regional sustainability. First and foremost of these challenges is the growth the Capital Region has seen in recent decades, which is continuing, despite the recent economic slowdown. From 2000 to 2010 the Capital Region was the second fastest growing Region in the state, with a growth rate of 4.8%.

The Region has also experienced significant urban sprawl since the 1950's, seen in the Region's steady population growth in suburban and exurban areas. In contrast, almost all of the Region's cities and villages (with the City of Saratoga Springs being the most prominent exception) have experienced diminishing property values, loss of essential businesses, vacant buildings and abandoned properties.

As cities and villages have declined, pockets of poverty have increased, reducing opportunities for low-income populations and people of color. At the same time, sprawl has required extension of roads and infrastructure, new and expanded schools, and increased municipal workforce, all of which increase municipal operating costs. The Sustainability Plan must provide a means to reinvest in the urban cores as well as the rural communities and increase the availability of services and economic

opportunities to the underserved populations.

Furthermore, the presence of the large base of public sector jobs provides a stable economy but the heavy dependence upon these positions places the Capital Region in a disproportionately vulnerable position when reductions to the state workforce occur. A sustainable Capital Region will have a greater diversity of employment opportunities including those in the expanding green jobs sector. To offer a more diverse set of employment opportunities, the Capital Region must also begin to sufficiently train its workforce to meet the needs of the existing and emerging industries. The current public transportation system in the Capital Region is well established in the urban centers but fails to create Regional accessibility making it difficult to attract workers outside of cities, as well as providing limited access to suburban jobs for low-income urban residents. Investing in the public transportation system will allow for increased employment levels and equity, as well as decreased dependency on automobiles as more residents will be able to take advantage of a Regional public transportation system.

The Capital Region has and will continue to be challenged on a variety of fronts. These challenges are exemplified by a few Regional statistics:

The NYS Environmental Facility Corporation estimates the Region requires \$2.5 billion in water and sewer improvements

The Region lost 45,000 acres of farmland between 2002-2007

Slightly more than 16 of the municipalities in the Region are near the top in New York for per capita debt



## What the Plan Does

A Regional sustainability plan will provide a framework for programs and projects that will reduce air, water and land pollution and improve our quality of life through smart growth and sustainable development. In addition, the Sustainability Plan will also guide work to improve energy efficiency, promote renewable energy, reduce greenhouse gas emissions, and create green job opportunities throughout the Capital Region. This is an important endeavor that will provide a framework for future growth, increase economic competitiveness, improve livability, and enhance the Region's resilience to climate change.

Specifically:

The Sustainability Plan provides policy guidelines for encouraging reinvestment in the urban cores as well as suburban and rural communities.

The Plan discusses methods to increase the availability of services and economic opportunities to underserved populations.

The Plan makes recommendations for creating greater diversity of employment opportunities including those in the expanding green jobs sector. The Plan will also discuss how to begin to sufficiently train its workforce to meet the needs of the existing and emerging industries.

The Plan will address changes to the public transportation system that will allow for increased employment levels and equity as well as decreased dependency on automobiles, as more residents will be able to take advantage of a Regional public transportation system.

The Plan identifies ways for the Region to maintain its position as a leader in the technology sector, including methods to attract and support established and emerging R&D facilities.

This Plan also provides a framework for providing job opportunities, training, and a high quality of life for recent graduates to encourage them to remain in the Capital Region.

The Sustainability Plan is a Regional economic priority because it will focus on how the Region can thrive in a new economy that creates sustainable jobs for the Region and enhances the Capital Region as a national hub of sustainability in order to continue to attract new, innovative businesses.

Additionally, as governments address rising energy costs and seek ways to become more self-reliant for power, dollars remain in New York. As the home of the State Capital and in concert with the Governor's mission to implement a new New York Agenda, this Region is well positioned to link its economic opportunities with the creation of sustainable communities where people want to live, work, and play.

## Capital Region Sustainability Planning Consortium

In response to the Governor's 2011 announcement of the Cleaner Greener Communities program, the City of Albany contacted every county and municipality in the eight-county Capital Region to discuss a response to the opportunity. On October 3, 2011, approximately 25 county and municipal representatives from around the Capital Region came together to discuss the opportunity and unanimously voted for the City of Albany to lead the grant proposal development process on behalf of the Region. As part of the proposal, a governance structure was established for the program, which included a Regional Consortium to guide the overall process. In an effort to garner Region-wide support, all 159 municipalities and eight counties were contacted about joining the Consortium twice prior to submission of the grant application.

## Capital District Sustainability Planning Consortium

Capital District Regional Planning Commission	City of Albany Albany County	Town of Glenville Rensselaer County
Capital Region Transportation Committee	Town of Colonie City of Cohoes	City of Troy City of Rensselaer
Warren County Economic Development Council	Village of Green Island Town of Guilderland	Saratoga County City of Saratoga Springs
Capital District Transportation Authority	Town of Bethlehem City of Watervliet	Town of Clifton Park Warren County
Adirondack/Glens Falls Transportation Council	Schenectady County City of Schenectady Town of Niskayuna	Village of Lake George Washington County

By the time the grant was submitted the Consortium consisted of 26 members.

Once the Consortium was successful in securing a grant through the Cleaner Greener Communities Program in early 2012, it undertook an effort to secure a planning team to provide the technical expertise in sustainability planning to work with the Region, engage the public, and guide the planning process. By spring of 2012, the Consortium had selected a Planning Team and they were tasked with organizing the planning process and implementing the vision of the Consortium.

Working with the City of Albany acting as a Lead Municipality for the Consortium, the Planning Team developed and refined the overall process for the sustainability plan as well as the governance structure for the Capital Region Sustainability Plan.

### Executive Committee

The Sustainability Plan is overseen by an Executive Committee, which consists of one representative from each county within the

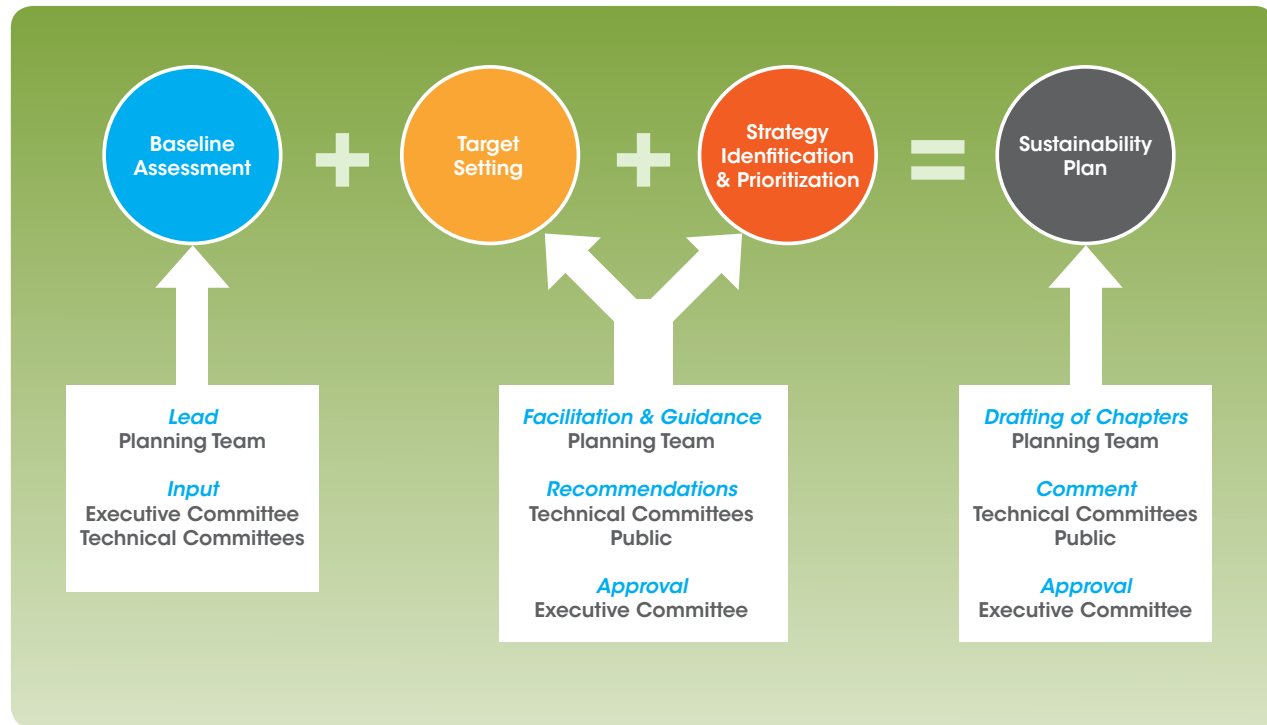
Capital Region, the chair of each of the eight Technical Committees, and the City of Albany as the lead municipality.

The primary responsibilities of the Executive Committee are:

- Oversee planning process
- Encourage municipal involvement
- Promote public engagement opportunities
- Provide final approval of sustainability strategies

The Executive Committee Meetings were convened and moderated by the Planning Team in May and October of 2012. The May meeting established the structure for the planning process, discussed goals of the Cleaner Greener Communities program, finalized the schedule, and reviewed the structure and responsibilities of the Technical Committees. At the October 2012 meeting, the Executive Committee reviewed public input gathered to date and the work of the Technical Committees and finalized the list of recommended priority sustainability initiatives.





### Technical Committees

The majority of the work on the Sustainability Plan was completed by the eight Technical Committees, which were established around the following focus areas:

- Climate Adaptation
- Economic Development
- Energy
- Food Systems
- Land Use & Livable Communities
- Solid Waste
- Transportation
- Water

Each Technical Committee had between 15 and 25 members with a broad geographic representation. Technical Committee membership represented a mix of municipal, county, and state agencies, public and private higher education institutions, private industry and not-for-profit agencies. Members were solicited based on their experience and leadership in the Region related to the specific focus area.

Primary responsibilities of the Technical Committees included:

- Review Regional baseline assessment
- Develop goals
- Identify and prioritize sustainability initiatives
- Confirm implementation strategies for priority initiatives

A member of the Planning team served as the technical support lead for each Technical Committee. The Planning Team member's role was to schedule and facilitate meetings, document the work of the committee, and prepare the narrative that will form the basis of the Regional Sustainability Plan. Technical Committees met three to four times between June and October of 2012, with their work outlined in the planning process described below.

### Planning Process

The Capital Region Sustainability Plan was developed through a comprehensive process that consisted of assessing the current conditions of the Region, setting goals, identifying and prioritizing strategies, developing implementation plans for these strategies, and identifying priority sustainability indicators and targets in each of the eight focus areas.

#### Baseline Assessment

A baseline assessment was conducted for each of the eight focus areas that comprise the Capital Region Sustainability Plan. The baseline assessment provides an overview of the existing conditions and issues associated with each focus area and identifies where there may be gaps in achieving sustainability.

The assessment provides a snapshot of the existing scenario in the Region and includes economic, demographic, infrastructure, energy, and other data from the U.S. Census; Regional, state, and federal agencies; academic institutions; and Regional, state and national organizations. The baseline assessment information was presented at the

first round of technical committee meetings. This information provided the foundation for identifying sustainability goals and initiatives.

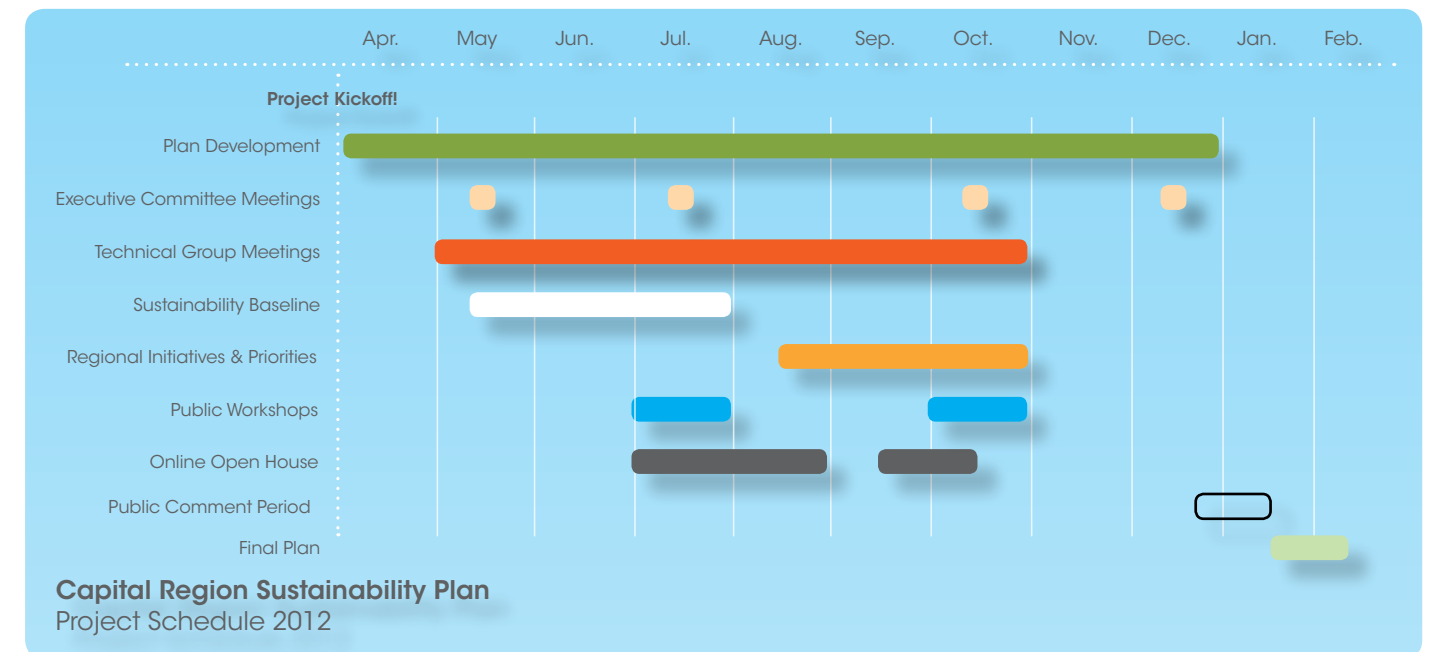
#### Goal Setting

Each technical committee discussed and established overarching goals related to how sustainability could be achieved in their respective focus area. These goals became the foundation for discussions with the technical committees and the public related to the identification of Regional initiatives.

#### Identification and Prioritization of Regional Initiatives

Using the baseline assessment as a foundation and the goals as guidance, each technical committee considered current and projected gaps in the focus area and identified a variety of actions that could be implemented to address these gaps. Ideas generated from the technical committees and the public were organized into up to ten strategic initiatives for each focus area. These strategic initiatives were then evaluated based on criteria identified by the Executive Committee.

The evaluation criteria included replicability, greenhouse gas reduction potential, ease of



implementation, timeline for implementation, and cost. Additional information on the evaluation criteria and the screening process can be found in Appendix 1 & 2. The results of the evaluation were provided to the technical committees for consideration for the prioritization process.

The public and each technical committee ranked the initiatives for all eight focus areas. The results of these rankings were then provided to the Executive Committee, who made the final decision on the top three priority initiatives for each focus area. The results of the prioritization exercises are provided in Appendix 3.

#### Implementation Strategy

The three priority initiatives for each focus area were further discussed to consider what implementation could look like in the Capital Region. Each implementation strategy identifies a responsible party, partners, potential cost, funding sources, a timeline, and the greenhouse gas reduction potential. The governance structure, where applicable, lays out the process a local government should take to implement applicable initiatives, level of implementation, and related initiatives throughout the Regional Sustainability Plan that have potential synergies or cross-purposes with this initiative.

#### Indicators & Target Establishment

The overall planning process also resulted in the development of sustainability indicators and targets that will help the Region measure the progress towards achieving the goals and initiatives of the Sustainability Plan. The indicators are relevant to the individual focus areas and provide a method for tracking meaningful outcomes that resonate with stakeholders and decision makers. Indicators were categorized as either Priority 1 or Priority 2 to identify which might be most effective given limited resources available to measure and track implementation. A total of ten

Priority 1 indicators were identified. Priority Indicators are found in Section 12, with Priority 2 indicators provided in Appendix 4.

The sustainability targets include a long-term goal for achieving a specific objective, such as “Reduce per capita energy consumption 20% by the year 2020”. These targets are connected to the baseline assessment which provides the data which the Region can use to measure the progress towards achieving the long-term goals established for each focus area. Sustainability targets can be found in Section 12 of this plan.

Each focus area chapter in this plan has four sections designed to present the results of the planning process:

Baseline Assessment

Sustainability Goals

Regional Initiatives

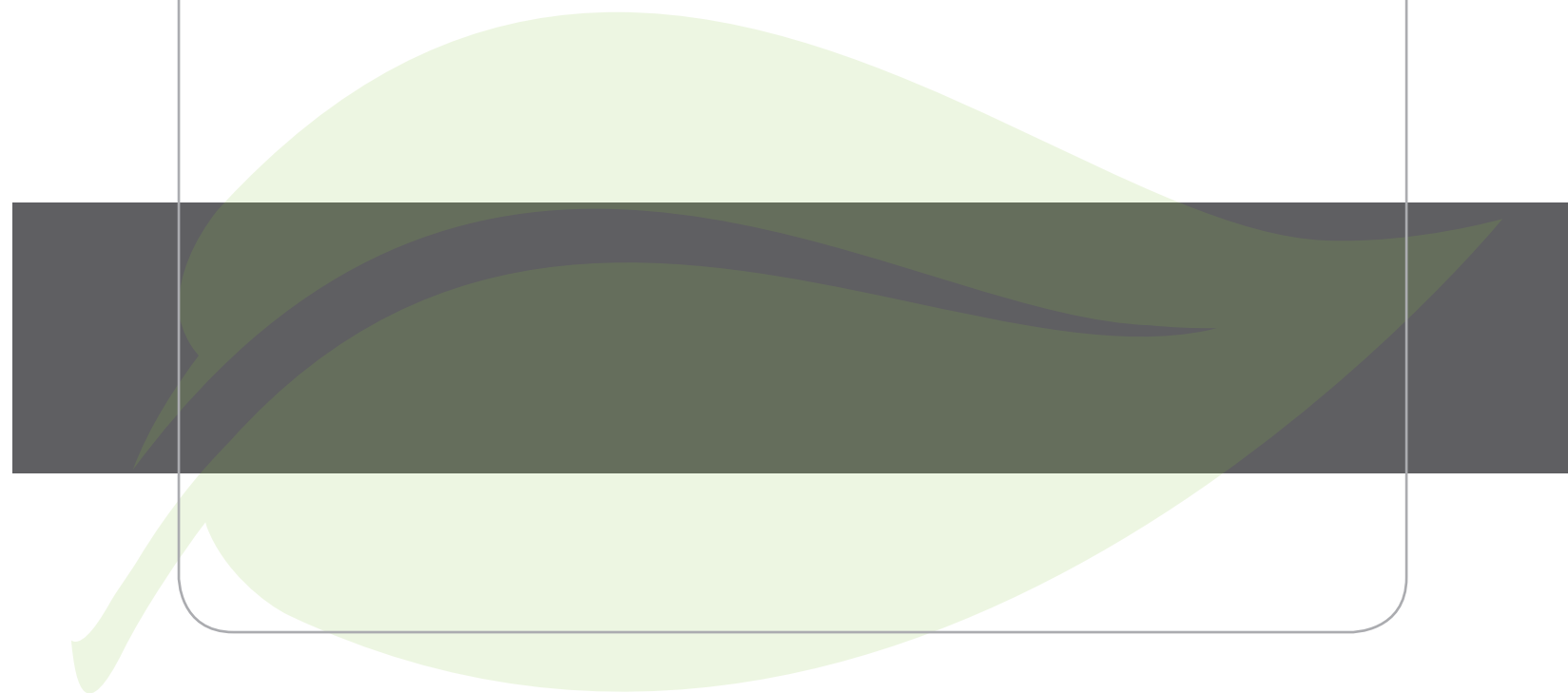
Implementation Strategy and Governance

Structure



Section 2.0









# Summary of Priority Initiatives













## SECTION 2.0: Summary of Priority Initiatives

The following have been identified a Priority Initiatives for the Capital Region. Based on the public input and work of the Executive and Technical Committees, these initiatives have been identified as the most important toward making the Region more sustainable. The matrix illustrates the integration of the eight focus areas that form the basis of the Plan.

-  Climate Adaptation
-  Economic Development
-  Energy
-  Food Systems
-  Land Use and Livability
-  Solid waste
-  Transportation
-  Water

Initiative	Implementer	Partners	Preliminary Cost*								
<b>Overarching Initiatives</b>											
Regional Sustainability Coordinator	Center for Economic Growth	Local Governments State Agencies Regional Green Alliance	\$\$	✓	✓	✓	✓	✓	✓	✓	✓
Regional Green Alliance	Center for Economic Growth	Local Governments Community Loan Fund  Capital District Regional Planning Commission  Lake George-Lake Champlain Regional Planning Board  Capital District Economic Development Council  Capital District Transportation Committee	\$\$	✓	✓	✓	✓	✓	✓	✓	✓
Regional Sustainability Website	Center for Economic Growth	Local Governments Regional and State Agencies	\$	✓	✓	✓	✓	✓	✓	✓	✓
<b>Climate Adaptation</b>											
Promote Green Infrastructure	Local Governments	Albany County Stormwater Coalition		✓				✓			✓
Complete local climate vulnerability assessments and adaptation planning	Local governments	Climate Smart Communities Regional Coordinators		✓	✓			✓			✓
Develop a Guidance Document on how to integrate climate change impacts into existing plans and processes	State, local governments or non-profit	ECOS: The Environmental Clearinghouse  Climate Smart Communities Regional Coordinators		✓	✓	✓		✓			✓



Initiative	Implementer	Partners	Preliminary Cost*							
<b>Economic Development</b>										
Strengthen Regional Small Business Support Programs	Capital Region Economic Development Council	Center for Economic Growth	\$\$	✓	✓		✓			
		Empire State Development	\$\$							
		County IDA's Chamber of Commerce Economic Development Corporation Community Loan Fund of the Capital Region	\$\$							
Support Expansion of Land Banking through existing and new mechanisms	County-Municipal Partnerships	Empire State Development Local Governments County IDA's		✓	✓			✓		
Expand green jobs training	Center for Economic Growth	Adirondack Community College Schenectady Community College Hudson Valley Community College Columbia Green Community College Capital District BOCES		✓	✓	✓				
<b>Energy</b>										
Establish Energy Efficiency and Renewable Energy Financing Districts (or PACE program)	County level or multiple municipalities/ counties	Municipalities – town, village, and county	\$\$\$	✓	✓	✓				✓
		NYSERDA and/or DEC 3rd Party Financing Entity NYS Homes and Community Renewal Local Housing Authorities								
Establish a revolving energy efficiency improvement fund for local businesses	Capital District Regional Planning Commission (CDRPC) or non-profit partnership between financial entity and municipality(ies)	CDRPC Municipalities Banks Chambers of Commerce Center for Economic Growth (CEG) Community Loan Fund of the Capital Region	\$\$	✓	✓	✓		✓		
Adopt a local energy-efficient building code	Local government (whichever level enforces building code)	NYS Builders Association Local developers Building Performance Contractors Association	\$	✓		✓		✓		



Initiative	Implementer	Partners	Preliminary Cost*							
<b>Food Systems</b>										
Create a food hub for regional food processing, storage, and distribution	Capital District Community Gardens and Regional Food and Agricultural Coalition	Capital District Cooperative, Inc. Capital District Community Gardens USDA Distributors Food Service Corps Institutions/Hospitals Skidmore College SUNY Albany Cornell Cooperative Extension Farmers Economic Development stakeholders County IDAs	\$\$\$	✓		✓	✓		✓	
		Local governments or elected officials Emergency Food provider; USDA Statewide food policy council Farm Bureau American Farmland Trust NOFA Cornell Cooperative Extension (Farm and Nutrition) Local food and public health leaders Urban representatives (such as the Affordable Housing Partnership)	\$	✓		✓	✓		✓	
Re-establish a Regional Food and Agricultural Coalition for the Capital Region	Capital District Community Gardens	Local governments or elected officials Emergency Food provider; USDA Statewide food policy council Farm Bureau American Farmland Trust NOFA Cornell Cooperative Extension (Farm and Nutrition) Local food and public health leaders Urban representatives (such as the Affordable Housing Partnership)	\$	✓		✓	✓		✓	
Establish an initiative to create/increase "local food" transactions, especially between large grocery stores and farms	Capital Region Economic Development Council	Grocery store chain owners and managers Farmers Cornell Cooperative Extension Regional Food and Agricultural Coalition Restaurant owners Local government officials and planning staff	\$\$	✓		✓			✓	





Initiative	Implementer	Partners	Preliminary Cost*								
<b>Land Use and Livability</b>											
<b>Modify Local Codes And Regulations To Allow For Sustainable, Compact Development</b>	Any municipality	MPOs and regional planning agencies (CDTC, A/GFTC, CDRPC) County Planning departments, Department of Health Community gardens and citizen groups Could involve multiple communities working together Developers and large property owners	\$\$-\$\$\$	✓	✓	✓	✓	✓	✓	✓	✓
<b>Repair And Modernize Existing Infrastructure</b>	Local governments Regional coalitions Sewer districts	Local governments Regional coalitions Sewer districts	\$\$\$	✓	✓	✓	✓				✓
<b>Develop a Greenway Connectivity Plan</b>	Local/County government, Coalition	MPOs NYSDOT NY Parks and Trails Local advocacy groups	\$\$\$	✓			✓			✓	
<b>Solid Waste</b>											
<b>Improve and increase composting options</b>	Municipalities or Local Solid Waste Planning Units	Institutions, Non-profits, and Private companies	\$\$		✓				✓	✓	
<b>Adopt C&amp;D waste reduction and recycling policies</b>	Municipalities	Private developers and facility operators to develop additional C&D recycling facilities as needed	\$\$\$						✓	✓	
<b>Site and develop anaerobic digestion facilities in the Region</b>	Municipalities or other Local Government Entities	Private facility owners or operators	\$\$\$		✓				✓		



Initiative	Implementer	Partners	Preliminary Cost*								
<b>Transportation</b>											
<b>Implement a bicycle and pedestrian infrastructure improvement program</b>	Municipalities (especially across municipal boundaries) Counties State agencies, and other agencies such as CDTC and CDTA.	Community groups Businesses Developers, etc.	\$\$-\$	✓	✓	✓	✓			✓	
<b>Improve transit service through technology improvements</b>	Transit Agencies throughout the Region	Municipalities and NYSDOT	\$\$\$		✓	✓	✓			✓	
<b>Optimize transportation system through alternative street design and advanced signal technology</b>	Municipalities, DOT, transit agencies, counties	Development community Community organizations Non-profits	\$\$			✓	✓			✓	
<b>Water</b>											
<b>Asset Management for Water &amp; Sewer Systems</b>	System owner	State Health Dept. County Health Dept. Professional Organizations Watershed coalitions CSO interests Dept of State (DOS)	\$\$	✓					✓		✓
<b>Small Grant Program for Innovative Water Quality Projects</b>	Water quality committees or soil & water conservation districts	NYSDEC NYSDOS Regional planning commission Water and sewer districts Darrin Freshwater	\$	✓					✓		✓
<b>Watershed Assessment Study for Stormwater Management</b>	Counties, coalitions, colleges and universities	Stormwater coalitions Soil and water conservation districts	\$\$	✓					✓		✓



Section 3.0

# Stakeholder Engagement





## SECTION 3.0: **Stakeholder Engagement**

*The public engagement process to develop the Cleaner, Greener Sustainability Plan for the Capital Region was launched in April 2012. A variety of mediums were used to ensure that diverse stakeholders from throughout the region had the opportunity to provide feedback on the creation of this Plan.*

The City of Albany, who signed the contract with NYSERDA, represents the lead municipality on the project and is in charge of managing consultants and ensuring the process remained on track. The Planning Team, was in charge of facilitating and resourcing the process and delivering the sustainability plan. The purpose of this chapter is to explain how various stakeholders from around the region were engaged in this fast-tracked planning process to develop a Plan that reflects a shared vision for a more sustainable region.

At the beginning of the project, PlaceMatters prepared a Stakeholder Engagement Strategy to guide public outreach and engagement (included in the Appendix 9). The Strategy (see Figure 3.1) included a variety of public input opportunities: a website; an online survey; a Facebook page and Twitter account; and two rounds of public workshops hosted throughout the region in July and October.

To support the public engagement process, PlaceMatters partnered with Crowdbrite to improve civic engagement and team collaboration. The Crowdbrite approach involves both online and in person engagement connected with a complete and integrated technology platform. Crowdbrite uses a combination of high tech and “high touch” approaches where users can post virtual sticky notes, images, video clips and comments along with



# Stakeholder Engagement Strategy

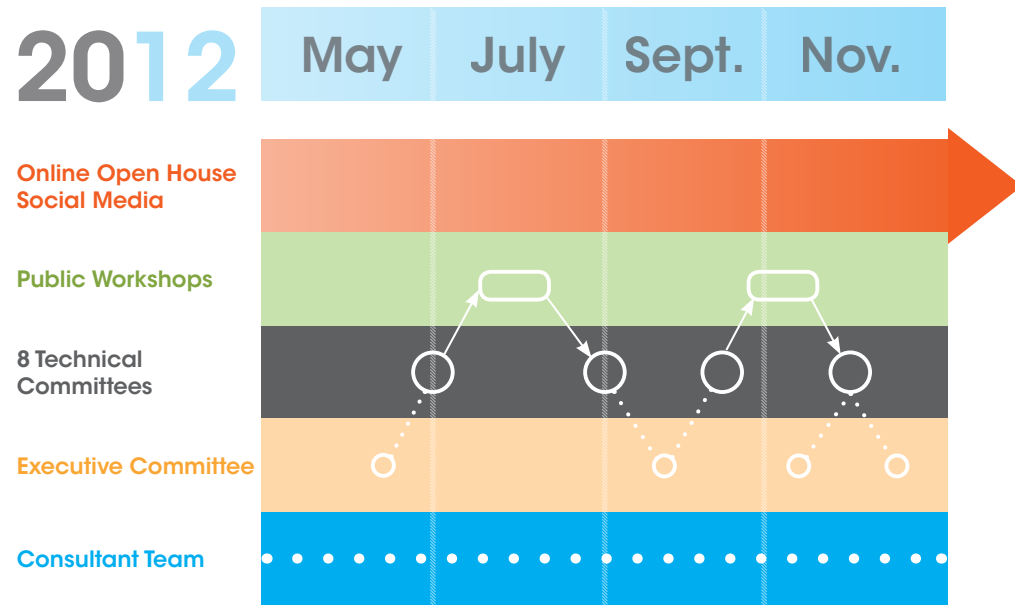


Figure 3.1 Structure and timing of stakeholder engagement

Residents, business owners, government agencies, farmers and creative problem solvers were brought together to work in teams to start building a shared understanding of potential solutions through the use of a variety of different visual mapping techniques to help group solve complex challenges.

Each phase of the process built on the work completed in the previous phase, focusing on the priorities and further refining them through both the Executive Committee, Technical Committees and public process. Public input therefore informed the work of the Technical and Executive Committees, and their work then formed the basis of additional rounds of public input.

votes for top ideas utilizing an interactive “canvas” and witness other people adding their comments in real time.

Use of Crowdbrite canvases provided an important vehicle to share information and build capacity both at the meetings and online. By visually organizing information the team members and the public were able to see the relationships between ideas, their benefits and potential impacts on moving the region to a more sustainable future.

## Executive and Technical Committees

The Plan was developed under the leadership of an Executive Committee, which was supported by the Consultant Team. The Executive Committee consisted of one representative from each county, the chair of each Technical Committee and the primary staff liaison from the City of Albany as the lead municipality. Their primary role was to oversee



the process, provide a framework for initiative identification, and make final decisions on what is included in the Sustainability Plan.

The planning process revolved around eight Focus Areas:

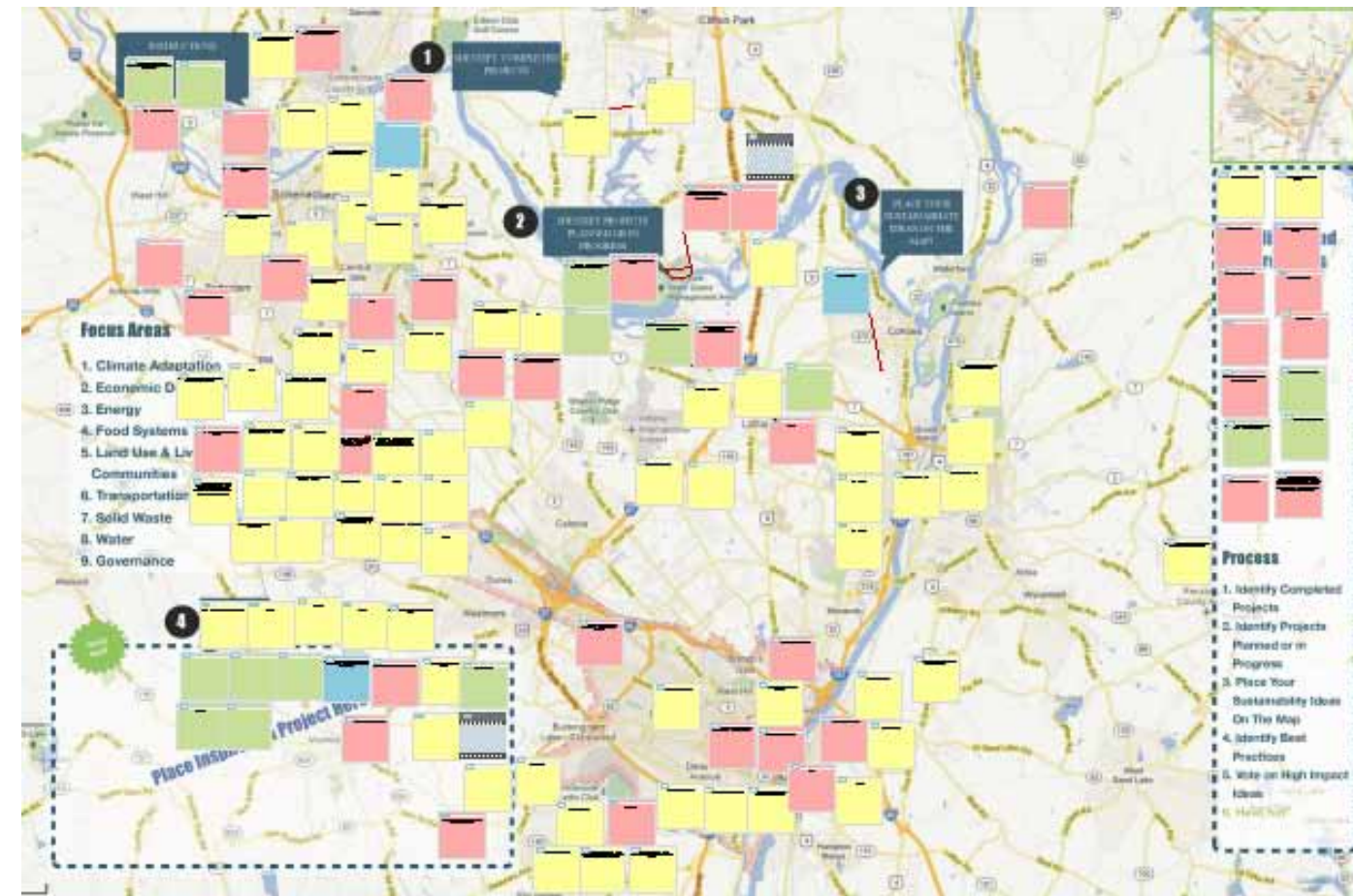
- Climate Adaptation
- Economic Development
- Energy
- Food Systems
- Land Use and Livability
- Transportation
- Solid Waste
- Water

With the exception of Food Systems, these Focus Areas were the standard categories recommended by the State’s Cleaner, Greener Communities Program. The Food Systems

Focus Area was added by the Executive Committee in response to a strong interest in initiatives supporting agriculture and local food markets in the region. In May 2012, eight Technical Committees, each dedicated to one Focus Area, were formed.

The Committees included elected and appointed officials, local government staff, representatives from non-profit organizations, and private sector stakeholders from around the region. The Technical Committees were supported by a consultant lead from either CHA or VHB. Their role was to develop a baseline assessment that outlined the existing state of each Focus Area, set sustainability goals that considered the needs of the region, and to identify and prioritize initiatives that addressed those goals. The Technical Committees met a minimum of three times

Figure 3.2 Ideas collected during first exercise using maps and Crowdbrite’s cloud-based canvases



and corresponded over email and collaborative online tools to conduct their work.

## Engagement Opportunities

### Committee Coordination

An initial meeting was held with the Executive Committee on May 10, 2012. This meeting focused on introducing the project and engaging the Committee members in small group discussions about regional strengths, regional challenges and their vision for the future. The Consultant Team used PlaceMatters' Brainstorm Anywhere tool and Turning Points' keypad polling to gather and prioritize ideas (see the report in Appendix 10). The Team also asked the Executive Committee to help identify stakeholders who should be involved in the process. In addition, the Committee identified regional strengths and challenges and the core issues or themes that should be part of a regional vision.

The Technical Committees were formed in June 2012. The first series of meetings included a review of baseline data, identification gaps, and a goal-setting exercise specific to each Focus Area. The Technical Committees met again for a second round of meetings in July to confirm the goals, discuss examples of potential initiatives that could accomplish those goals, and determine whether and how those examples were applicable to the Capital Region.

The Consultant Team facilitated a discussion about potential initiatives that would meet the goals of the individual Focus Areas. The final round of Technical Committee meetings was held in September to review the feedback collected at the first round of workshops and online (see next page). The list of final initiatives was prioritized using keypad polling. Each Technical Committee prioritized initiatives from their own Focus Area, as well as those of the other seven Focus Areas.

### First Round of Public Workshops and Online Open House – July 2012

Members of the Consultant Team, the Executive Committee and the Technical Committees collected emails for public outreach. PlaceMatters sent out a mass email, introducing the project and giving recipients the opportunity to “opt-in” to receive updates and receive invitations to participate in future activities. Recipients were also encouraged to spread the word and invite others they felt would be interested in the program. In July 2012, a series of three public workshops took place around the region to gather citizen input and ideas on improving sustainability practices.

During the workshops, participants were asked to partake in three interactive exercises guided by volunteer table facilitators. The first involved brainstorming and mapping examples of existing sustainability projects and best practices currently in use within the region onto paper maps and then onto an online mapping and collaboration tool called Crowdbrite (see Figure 3.2). Best practice examples were highlighted by many and were used by the Technical Committees as they developed policy language for the eight focus areas. The language used by the participants in the workshops was collected in their own words and visually analyzed using an online platform for word priority associations.

Crosscutting ideas that would impact more than one focus area were identified separately and discussed in the reports. Prioritization was completed in teams voting with dots and supported by individual keypad polling. As ideas were developed and entered on maps a visual clustering analysis was completed for the identification and refinement of current and proposed sustainability projects.



Working in teams, participants at the workshops therefore provided important feedback on proposed goals, including suggestions to improve them and also crafting 75 new potential goals. Over 300 strategies were also developed across the eight focus areas to move the region to a more prosperous and sustainable future. A large focus of the workshops was to receive input on how to improve the policies and identify any that might be missing. In total, more than 266 improvements and new strategies were identified at the meetings. All information (ideas, comments, photos, etc.) entered into Crowdbrite was then sorted by top votes and presented by to the technical teams and the public. See Table 3.1 for a summary of the workshops, the exercises and the six top strategies that emerged.



Figure 3.3 Participants at the Rensselaer County Meeting

### Round 1 Workshop Details

Approximately 150 residents participated in the first round of workshops. The objectives for these workshops were to:

1. Present the visions for the region suggested by the Executive Committee
2. Review the goals for each Focus Area and prioritize the goals based on feedback from small group discussions; and
3. Brainstorm and prioritize initiatives for achieving goals

The workshops were held 7 to 9PM at the following locations:

- July 23: Coxsackie High School (Greene County);
- July 24: Doane Stuart School (Rensselaer County);
- July 25: Queensbury High School (Warren County).

Keypad polling devices were used to gather demographics and help prioritize initiatives across all eight Focus Areas (see results in Appendix 11).

### Round 1 Workshop Format

The First Round of Workshops included three exercises:

Exercise 1 - Attendees brainstormed and mapped examples of existing sustainability projects and best practices in the region onto paper maps. These were then mapped on Crowdbrite's interactive platform with the help of a facilitator and note-taker. Residents unable to attend a workshop could participate online utilizing the Crowdbrite canvas anytime during the open house period. Appendix 12 shows the results of this mapping exercise.

Exercise 2 - Small group discussions were organized around each focus area. Attendees chose a focus area they were interested in and then reviewed the goals from each Technical Committee, discussed any potential changes to the goals. The groups then brainstormed and prioritized initiatives for the goals in each Focus Area.

Exercise 3 - The third exercise was a repetition of the second with attendees choosing a second Focus Area to discuss.

### Round 1 Workshop Results

The top initiatives from the first round of workshops include:

1. Build capacity for agencies, governments, institutions, and individuals to adapt to a changing climate.
2. Promote HOV, ride shares and public transit.
3. Transit-oriented design, affordable public transit and improved bike and trail networks.
4. Promote Buy Local Food and Buy Local Forest Products to support agricultural and forested land use.
5. Give funds to local co-ops that involve the community and local food. Coordinate purchase of local food for multiple school districts and create distribution systems from farms to inner cities
6. Reduce sprawl, create vibrant centers to reduce development pressure on rural areas.

See Appendix 13 for a full summary of the first round of workshops.

Table 3.1 First round of workshops summary



### Second Round of Public Workshops and Online Open House – October 2012

Email announcements were sent in three batches to residents and stakeholders on the listserv to spread the word about the time, location and purpose of the second round of workshops. Behan Communications developed press releases for local newspapers and media outlets and information was posted on the Sustainable Capital Region website, Facebook page and via Tweeter. Policy initiatives were put online as well for the public and technical teams to deliberate and vote on which should be moved forward toward implementation.

All of this information was available online using the Crowdbrite platform and it was also duplicated in paper format during the public meeting process. This inclusive and transparent process was the first crowd sourced sustainability plan as part of the Cleaner, Greener Communities Program. People were invited to review the topics and initiatives and provide feedback online by posting comments on the Crowdbrite canvases covering each of focus areas and/or by attending one of three workshops.

Upon arrival participants were given a sheet of green sticky dots and invited to view the Crowdbrite 3x4 foot poster boards stationed around the room, one for each focus area with the proposed initiatives underneath. Next to each initiative was a space for participants to place dots indicating their level of support for the initiative (no support, some support, high support) as well as write comments. Images of the Crowdbrite canvases for the second round of public input can be found in Appendix 15.

During the second round of workshops, there was a group of participants concerned about the role of government linked to this Program, specific initiatives within, and, in some cases, Federal and State programs overall. During the third meeting, a group of participants made a request to the facilitators to shorten the time dedicated to small group exercises so

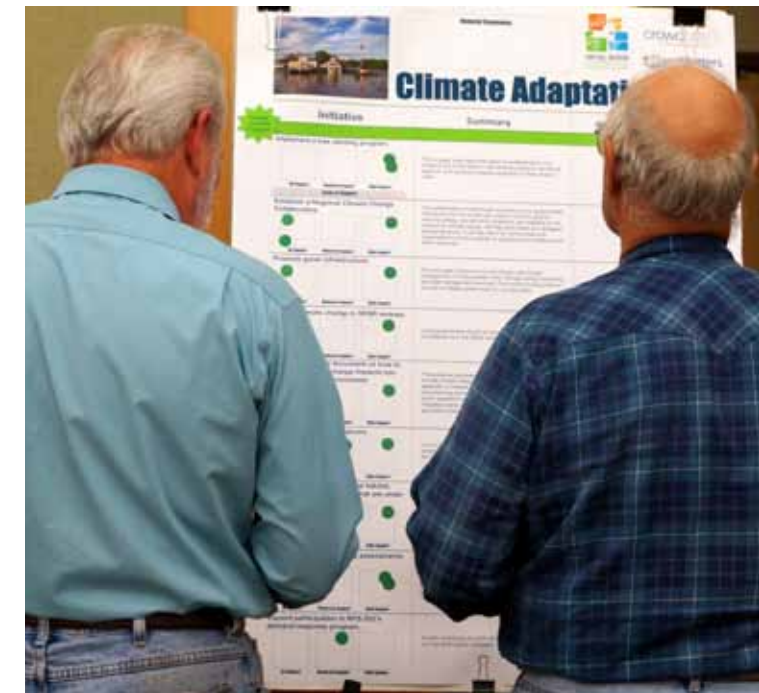


Figure 3.4 Prioritization with sticky dots

that there was more time to ask questions and vet concerns with the full group intact. Using the keypad polling devices the facilitators asked the group to approve the motion and with a super majority of votes in favor, an additional 45 minutes was allocated to Q&A.

The outcome of these workshops was three top initiatives for each Focus Area. Attendees also discussed potential implementation strategies for the top initiatives and the resources necessary to achieve these initiatives. See Table 3.2 for a summary of the workshop structure, exercises, and results.

*During the public workshops, many of the questions and comments focused on government spending including a few questions about whether this program was linked to the United Nations' Agenda 21. However, there is no funding or programmatic link between the Cleaner, Greener Communities Program and Agenda 21.*





Table 3.2 Second round of workshops summary

Round 2 Workshop Details	Round 2 Workshop Format	Round 2 Workshop Results
<p>Approximately 110 residents of the region came to the second round of workshops. The public was invited to provide feedback on the initiatives by posting comments on the online Crowdbrite canvases and/or by attending one of three workshops.</p> <p>Workshops were held 7 to 9 p.m. as follows:</p> <ul style="list-style-type: none"> <li>• October 1: Union College (Schenectady County);</li> <li>• October 2: Fort Ann School (Washington County);</li> <li>• October 3: Columbia-Greene Community College (Columbia County).</li> </ul> <p>Using PlaceMatters' Brainstorm Anywhere tool, the participants' ideas were entered into laptops. Each table had a projector or screen making it possible for participants to view the notes in real time. Keypads were used to gather demographics and ask evaluation questions (see results in Appendix 14).</p>	<p>Participants were instructed to work in small groups where they were asked to partake in two topic discussions guided by volunteer table facilitators as follows:</p> <ol style="list-style-type: none"> <li>1. Participants were asked to share their thoughts about the initiatives;</li> <li>2. The small groups were asked to choose their top two initiatives based on a set of criteria, including: which should take priority in terms of timing, funding, etc.;</li> <li>3. Attendees were asked to answer two questions on each initiative: <ul style="list-style-type: none"> <li>• What is required to successfully implement this strategy (e.g. create partnerships, apply for grant funding, etc.)?</li> <li>• Who are the potential partners that can help implement this strategy?</li> </ul> </li> </ol>	<p>Three priority initiatives were chosen for each of the eight Focus Areas (see following page).</p> <p>The participants also identified some key partners and implementation strategies that will be helpful in ensuring that the initiatives are successfully implemented at the local and regional level.</p> <p>Partnerships with local farmers and coordination with regional planning are two examples of key partnerships identified during the discussions.</p> <p>Participants were encouraged to continue providing feedback on the initiatives, for the week following the workshops, using the online Crowdbrite canvas.</p>

**Online Survey**

To broaden the level of outreach, PlaceMatters created an online survey that mirrored the open house portion of the workshop with poster boards allowing the public to express their level of support and provide comments on the sustainability initiatives.

Using a service offered by Care2, which does email blasts to targeted geographical areas, PlaceMatters was able to send out two large volume emails to residents in the eight counties represented in the Capital District. Each email was sent to over 12,000 recipients in the region with links to a Survey Gizmo survey and links to project websites. This broad-brush outreach effort made it possible to increase awareness and more than double the number of participants contributing comments to the

development of the Plan. Each email campaign had a greater than 10% "open" rate with more than 5% (155) of participants reading the email completing the survey as well as more than 5% (158) clicking website links provided in the emails (the New York, Cleaner, Greener Communities Program and the Facebook and Twitter pages - (see Care2 report in Appendix 19). Full survey results are included in the reports by focus area under Appendices 16.



**Outcomes from public input and choices of the Executive and Technical Committees**

The comments and votes collected during the workshops and via the survey were summarized by the consultant team. The Initiatives that were selected as top priority via the workshops, the canvases and the survey were compared to those selected as top initiatives by the Technical and Executive Committees; a majority of the top initiatives matched for each focus area. For the other ones, the Executive and Technical Committees reviewed the reports under each focus area, taking into consideration initiatives receiving the highest level of support and comments suggesting additions or tweaks to the initiative working and, in some cases, combining initiatives when appropriate. Details about this process can be found here below for each focus area with full reports found in Appendices 10-1 through 10-8:

**| Climate Adaptation |**

At each stage of the process, the initiative promoting green infrastructure received high support. In addition, the public highly favored the tree planting program and the protection and enhancement of critical habitat, floodplains, and wetlands that are under threat from climate change. As per the public's input, the initiative promoting green infrastructures has been broadened to encompass additional tree planting and the protection and enhancement of critical habitat.

The other two initiatives that were selected by the Technical and Executive Committees were also directed towards natural habitats, as the first one promotes local vulnerability assessments and adaptation planning while the second one proposes the development of a guidance document on how to integrate climate change impacts into existing plans and processes.

**| Economic Development |**

Throughout the process, the public favored the following two initiatives: implement a

"Buy Local" campaign and establish a financial literacy program. Those two initiatives have been combined with others (including the small business incubator program) under the umbrella of a new larger initiative to create a Regional Small Business Support Program.

The public also voted to expand NYSERDA's green jobs training to include green infrastructure design, installation and maintenance. This initiative has been selected as well by the Executive Committee but extended outside NYSERDA to develop green job training at the regional level.

Finally, the initiative that was mentioning the establishment of a regional land bank has been reworded and tweaked towards the establishment of multiple regional land banks to allow for faster brownfield and vacant land acquisition processes.

**| Energy |**

Throughout the process, the initiative for the establishment of a revolving energy efficiency improvement fund for local businesses received high public support and was selected as well by the Technical and Executive Committees.

The other two initiatives that received high public support were the implementation of a Smart Grid Pilot program and the incentivization of Combined Heat and Power District Energy Systems. Those two initiatives have however not been selected by the Technical and Executive Committees in those words. Instead, they have chosen to promote the establishment of Energy Efficiency and Renewable Energy Financing Districts (or PACE program) and the establishment of a revolving energy efficiency improvement fund for local businesses.

**| Food Systems |**

Throughout the process, the initiative to create/increase "local food" transactions, especially between large grocery stores and





farms received high public support and was selected as well by the Technical and Executive Committees.

The public also voted for the initiatives to build capacity for new and existing farmers by establishing a Farmers Support and Enhancement Program, to create a Regional Farmland Protection Plan and to establish a regional gleaning and food recovery program. Those three initiatives were not selected by the Technical and Executive Committees as their top ones, but may be included in their other two top initiatives which are the creation of a food hub for regional food processing, storage, and distribution and the re-establishment of a Regional Food and Agricultural Coalition for the Capital Region.

**| Land Use and Livable Communities |**

Throughout the process, the initiative to repair and modernize existing infrastructure received high public support and was selected as well by the Technical and Executive Committees.

The public also voted to prioritize brownfield redevelopment. The Land Use Technical Committee has not selected this initiative as such, but brownfields were taken into consideration by the Economic Technical Committee through their multiple regional land banks creation initiative.

In addition, the public favored the development of a regional greenway connectivity plan along with improvements in public access to waterfront areas, which has been combined into a single initiative by the Technical and Executive Committees.

Finally, during the workshops the public voted in favor of modifying local codes and regulations to allow for sustainable, compact development, which has been supported by the Executive and Technical Committees as well.

**| Solid Waste |**

Throughout the process, the two initiatives to improve and increase composting options and site and develop anaerobic digestion facilities in the region received high public support and were selected as well by the Technical and Executive Committees.

The development of a Resource Recovery Park, while it received a high level of support in comments from the public, the Technical and Executive Committees instead decided to include the adoption of a construction and demolition waste reduction ordinance in the top three given it was felt this initiative would have a higher return on investment.

**Stakeholders**

Throughout, the goal has been to provide as many opportunities as possible for stakeholders to provide feedback at every step of the planning process. Stakeholders included:

- Elected officials
- Local Government staff
- Businesses
- State agencies
- General public
- Educational institutions (K-12 and higher education)
- Regional agencies
- Non-governmental organizations
- Non-profit and community-based organizations
- Organized labor
- Sector-based groups and associations
- Social advocacy groups

**| Transportation |**

Throughout the process, the two initiatives to implement a bicycle and pedestrian infrastructure improvement program and to optimize the transportation system through alternative street design and advanced signal technology received high public support and were selected as well by the Technical and Executive Committees.

**Media Coverage**

Various media and messaging vehicles were utilized to reach these target audiences, including:

- Press releases to local print, radio, and TV media
- Public service announcements (PSAs) on cable TV public access channels
- Notices in newspapers
- Social media and project website
- Personal engagement through Chambers of Commerce, county planning departments, and economic development agencies
- Media interviews

In addition to press releases and media advisories (see Appendix 18), a concerted effort

was made to secure PSAs as a free and effective means to reach the region's diverse populations and to encourage public participation. PSAs were secured across media, including: Fox 23; WNYT television and web promotion; Clear Channel, Albany Broadcasting, WGNA and the Regional Radio Group radio mentions; and The Eagle newspaper in Washington County.

Behan Communications also secured interviews for Michael Tucker and other members of the planning committee, which led to coverage in the Times Union, Troy Record, Register-Star, Leader Herald, and on 90.3 WAMC, among others. Appendix 18 includes articles and other media coverage.

The public also voted in favor of the creation of an interconnected regional transit system, which has not been selected by the Technical and Executive Committees. It was felt that this initiative would be too expensive to implement and that it made sense to instead focus on improvements. Along these lines, the Technical and Executive Committees decided to promote the improvement of the transit service through technology improvements.

**| Water |**

Throughout the process, the two initiatives to develop an Asset Management Plan for water and sewer systems and to conduct a watershed assessment for stormwater management received high public support and were selected as well by the Technical and Executive Committees.

The public also voted in favor of the development of a purchasing consortium for municipal water projects. Instead, the Technical and Executive Committees decided to promote the creation of a small grant program for

innovative water quality projects, which could also cover a purchasing consortium.

**Public Comments on the Plan**

The comments collected during the workshops and via the survey were summarized by the Consultant Team. The initiatives that were selected as top priority via the workshops and survey were compared to those selected as top initiatives by the Technical Committees. A majority of the top initiatives matched across the public input and Technical Committees.

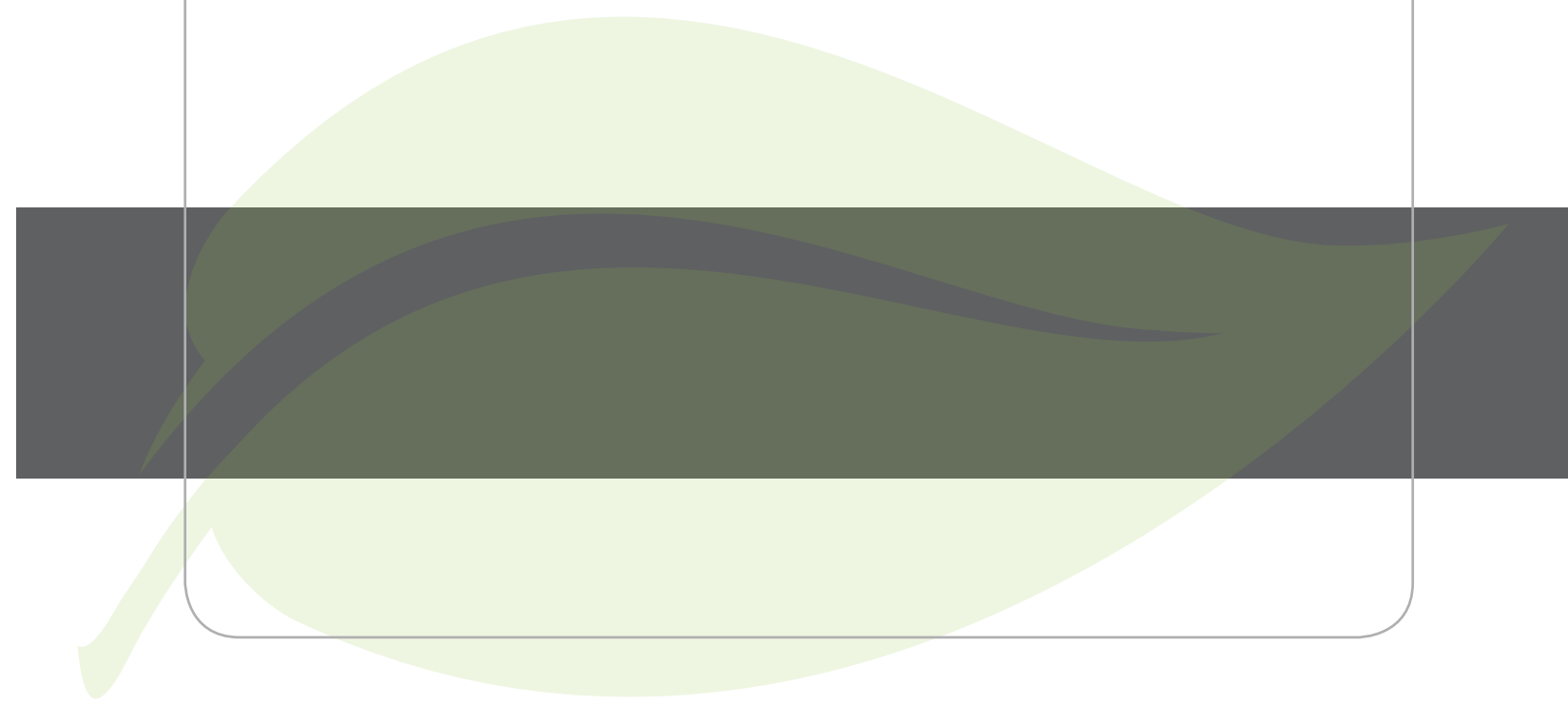
The Executive Committee and Technical Committees reviewed the reports under each Focus Area, taking into consideration initiatives receiving the highest level of support and comments suggesting additions or tweaks to the initiative working and, in some cases, combining initiatives when appropriate. The Executive Committee made a final decision based on these results.





Section 4.0

# Climate Adaptation





## SECTION 4.0: **Climate Adaptation**

*New York State has identified climate change– both mitigation and adaptation– as a priority area. Over the last several years, the State has led the way on identifying, and taking action, to reduce the impacts of a changing climate through the development of the Integrated Assessment for Effective Climate Change Adaptation Strategies in New York State (ClimAID) and the State Climate Action Plan.*

The Capital Region also identified climate change as a priority and through the Cleaner Greener Communities program has created a Regional greenhouse gas emissions inventory, a Climate Change Adaptation Technical Committee and completed a high level vulnerability assessment for the Region.

This chapter on climate adaptation provides an overview of the primary climate change impacts the Capital Region will experience, how various sectors will be affected by these impacts, and a summary of the results of the Climate Adaptation Technical Committee's efforts to identify a goal and strategies that, once implemented, can increase the resiliency of the Region. Unless otherwise specified, all climate data in this chapter are from the ClimAID report (NYSERDA, 2011).

This chapter discusses three primary climate impacts, or changes in climate directly related to the warming of the earth's atmosphere, on the Capital Region: changes in precipitation, changes in temperature, and sea level rise. Primary climate impacts can cause secondary climate impacts (or climate hazards), such as flooding, drought, and hurricanes. Primary and secondary climate impacts cause climate effects – or the results of primary and secondary climate impacts

### **Best Practices**

Crop Adaptation - Bowman's Orchard in Rexford (Saratoga County) grows both Fuji and Granny smith and Borden's grows granny smiths in Schaghticoke. Fuji and Granny Smith both do best in warmer climates and are not traditionally grown in the northeast.





on the social, natural, and built systems in a community. For example, poor air quality from high heat days and property damage resulting from a severe storm are both examples of how climate impacts affect the Region.

The complete climate adaptation vulnerability assessment is provided in appendix \_\_\_; providing an overview of the Capital Region's past and projected future climate. It also outlines the climate hazards that currently impact the Region and how they will affect the specific focus areas of the Capital Region Sustainability Plan.

### Regional Baseline

#### Climate Overview

The difference between climate and weather is often confused. Weather is the state of the atmosphere over a short period of time. Climate refers to the long term trends in weather (NASA, 2005).

The general climate of the Capital Region is "humid continental." The average annual temperature is 48°F and the Region experiences on average 39 inches of precipitation each year (NOAA). Climate conditions vary across the Region: the southern areas' climate is moderated in the winter by its relative proximity to the Atlantic Ocean, whereas generally, the north and western counties experience colder winters, with more precipitation falling as snow, and slightly warmer summers, with more days above 90°F. For example, Cairo in Green County receives,

*"Weather is what conditions of the atmosphere are over a short period of time, and climate is how the atmosphere "behaves" over relatively long periods of time. When we talk about climate change, we talk about changes in long-term averages of daily weather." (NASA, 2005)*

on average, only 48.8 inches of snow per year, while Glens Falls in Warren County receives 67.4 inches per year (NOAA). Table 4.1 provides a complete comparison.

#### Climate Hazards

Climate hazards that impact the Region include:

- Extreme heat
- Flood
- Hailstorm/Ice storms
- Hurricanes and other tropical storms (including nor'easters)
- Tornados
- Wildfires
- Winter Weather

As shown in Figure 4.1, flooding and tornadoes are the most costly hazards in the Capital Region (SHELDUS, 2011). Figure 4.2 shows the current FEMA floodplains in the Region and Figure 4.3 shows the storm surge inundation areas from a tropical storm. The Troy Dam prevents storm surge impacts from the most northern portion of the Region, so Figure 4.3 is focused on the southern end only. The recent impacts of Tropical Storm

Table 4.1 Capital Region Climate Change Summary

	Annual average temp. (°F)	Annual average precipitation (in)	Snowfall (in)	Cooling degree days	Heating degree days	# of days with precipitation ≥1 inch	# of days with max. temp. ≥ 90°F	# of days with max. temp. ≤ 32°F
Glens Falls	45.6	39.01	67.4	426	7402	7.9	6.2	51.7
Albany	48.3	39.31	61.7	612	6598	7.5	9.1	43.5
Cairo	47.8	40.97	48.8	516	6294	10.4	11.2	35.6

Averages calculated from 1981 – 2011 Source: (NOAA)

Figure 4.1 Capital Region Property Damage by Natural Hazards Type (2011)

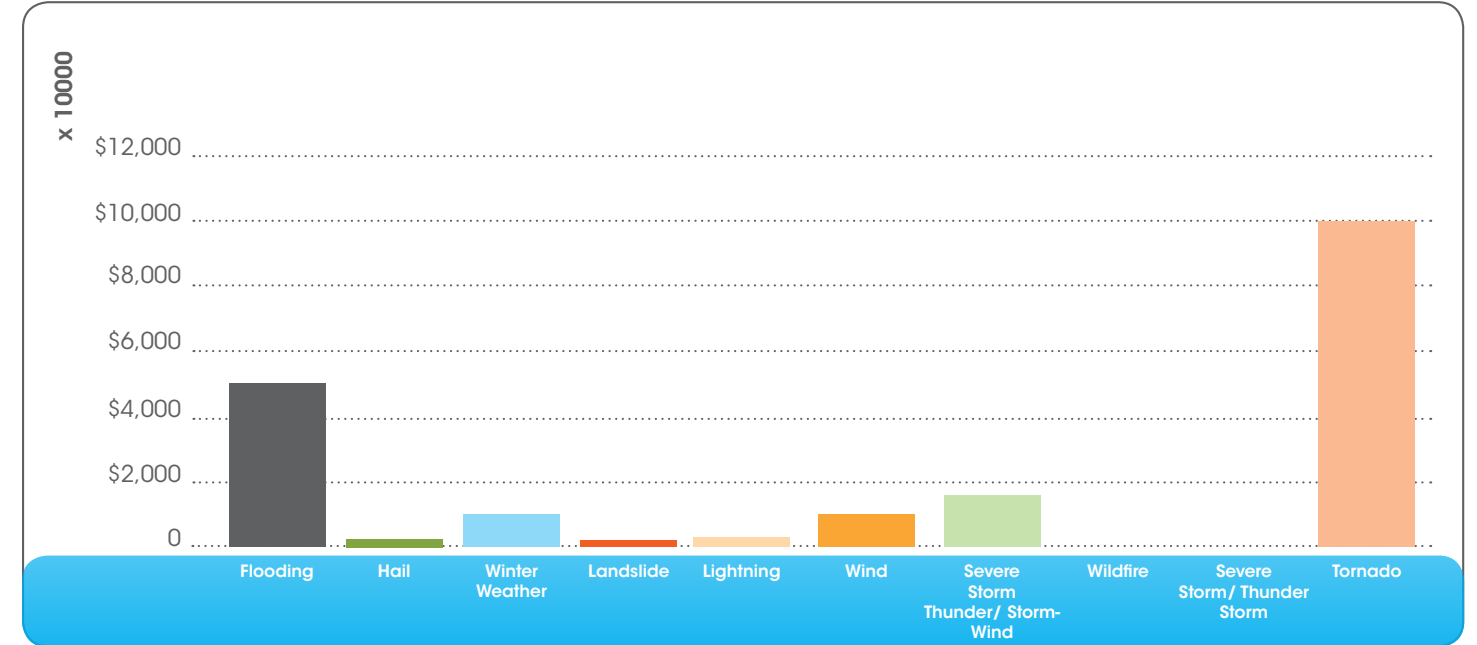


Figure 4.4

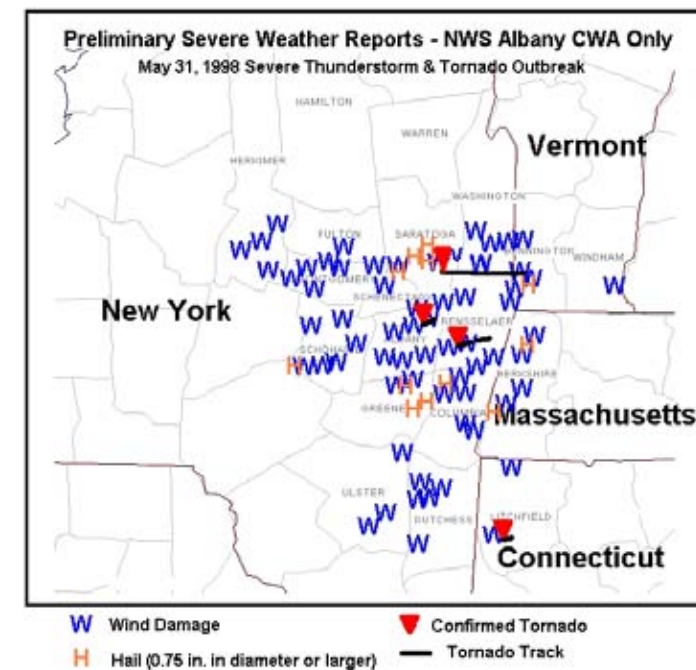


Figure 4.5 Damage in the Capital District from May 31, 1998





Figure 4.2 Current Regional FEMA Floodplains

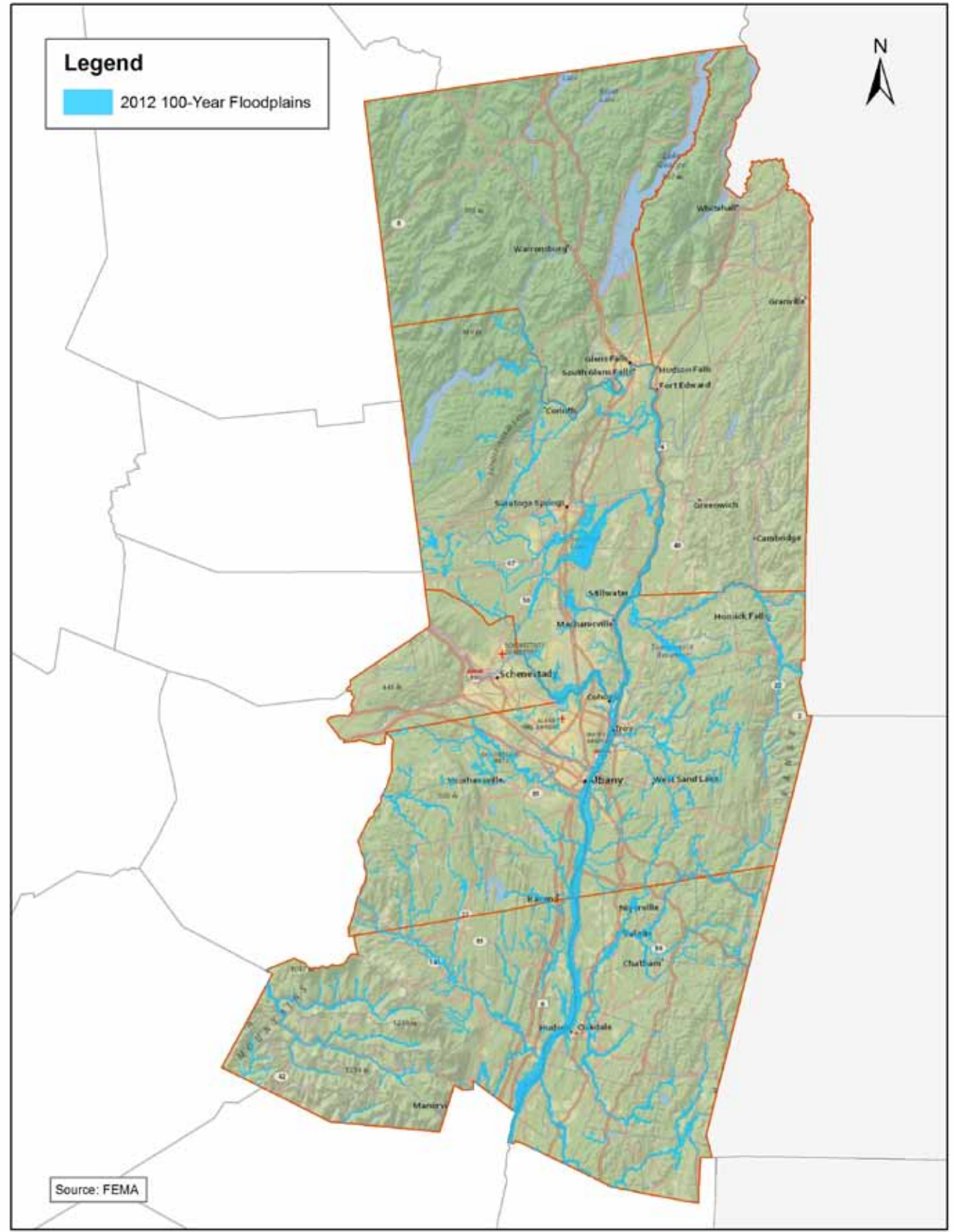


Figure 4.3 Storm Surge Inundation from a Tropical Storm

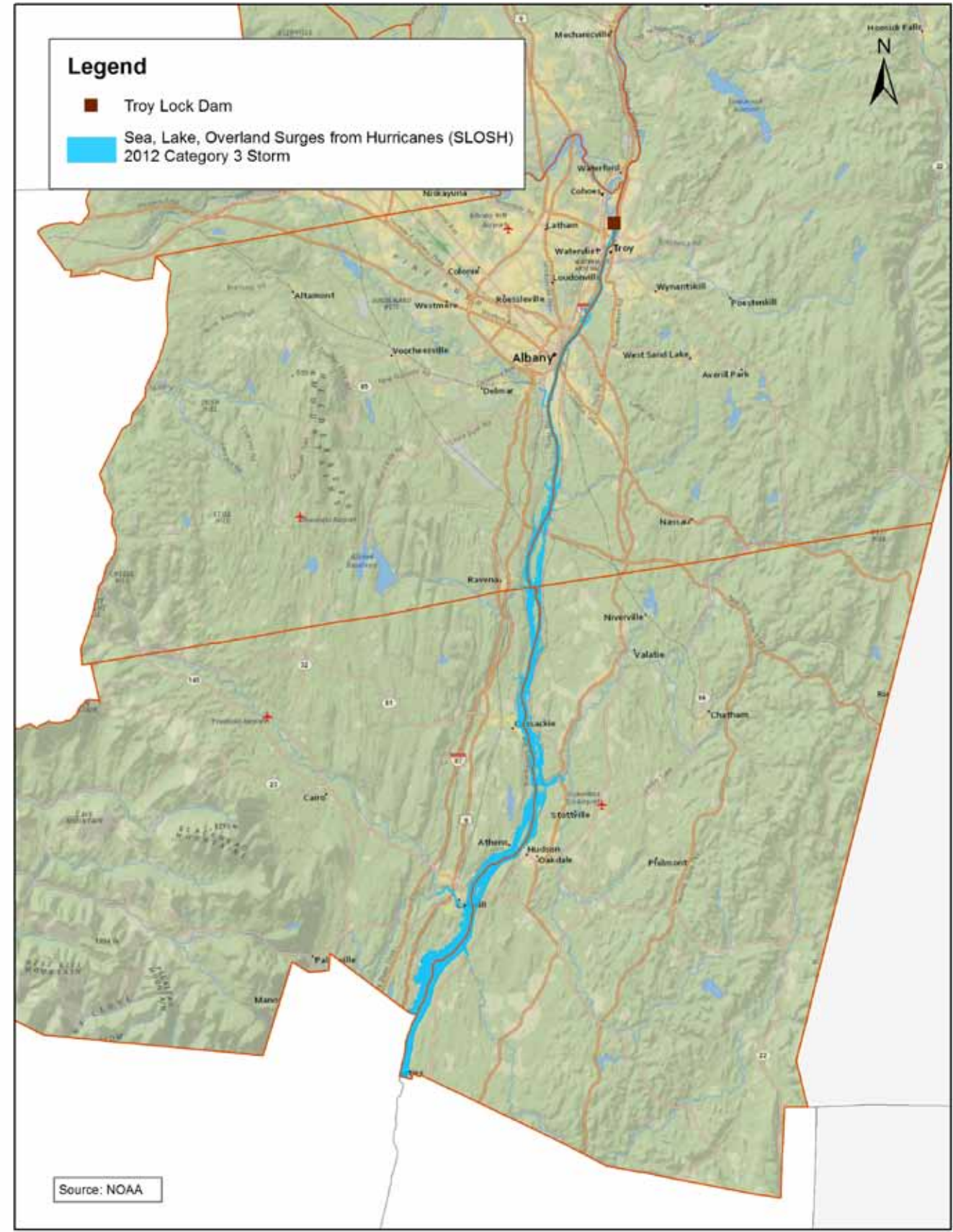




Figure 4.6 Floodplain Potential in 2080

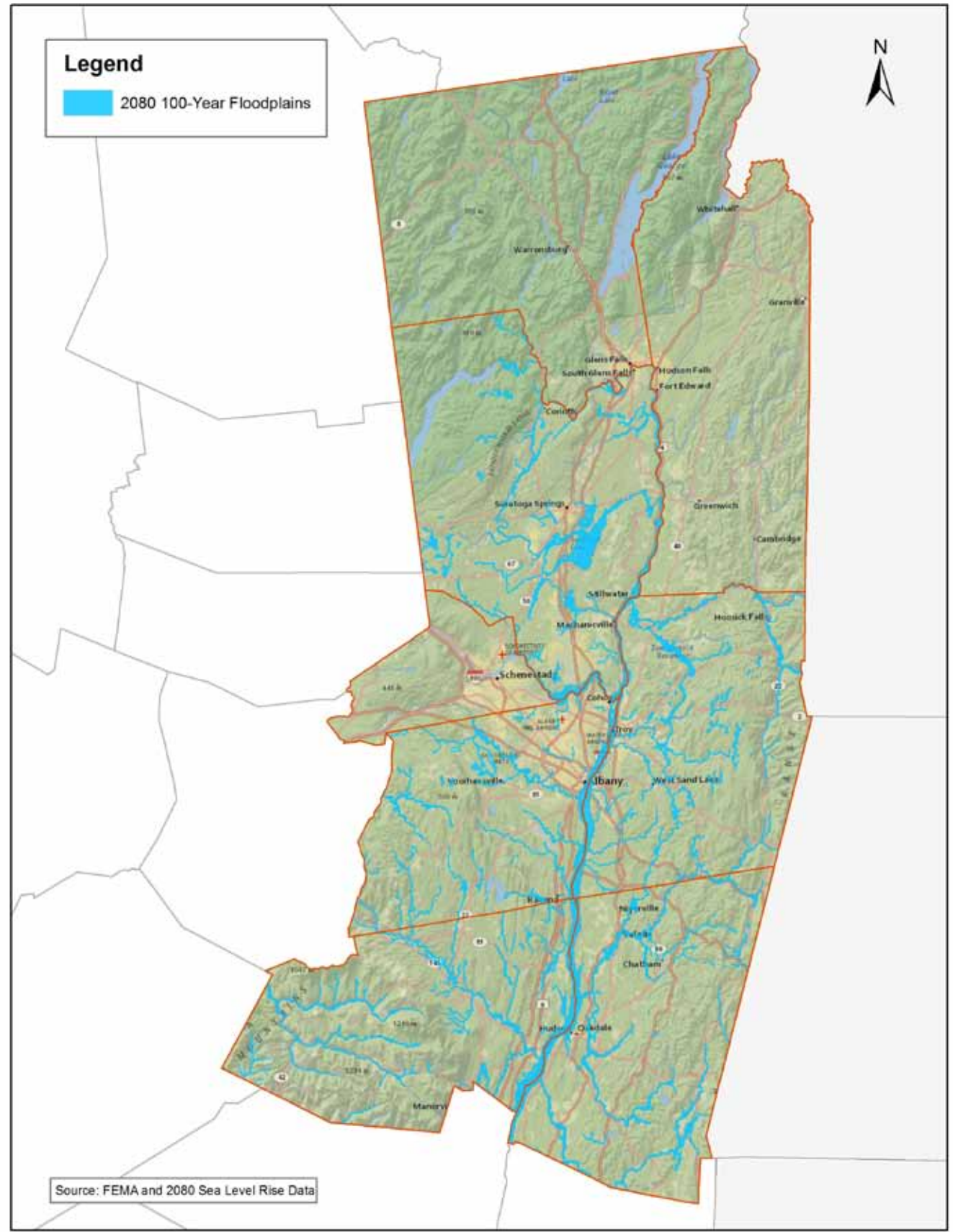
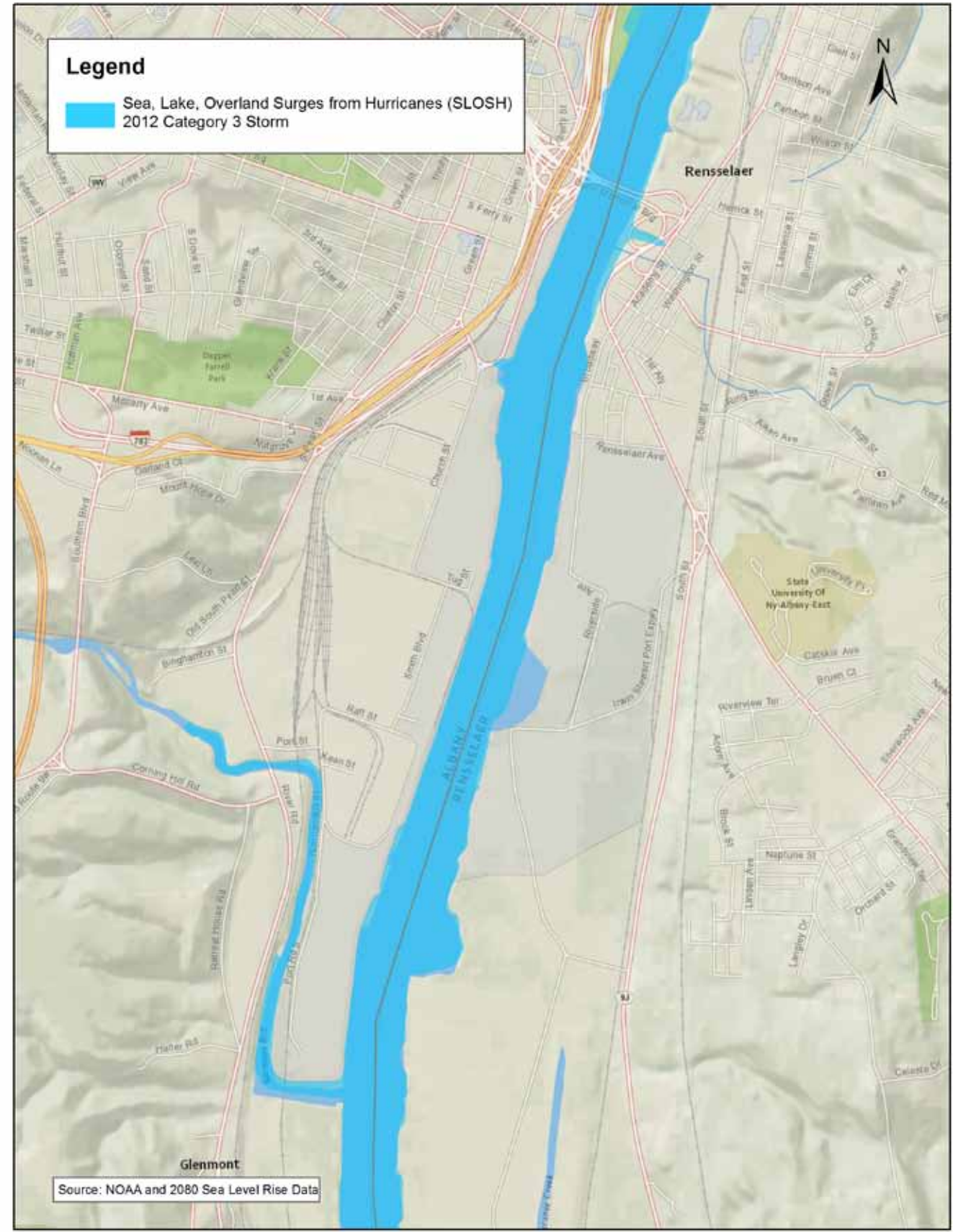


Figure 4.7 Storm Surge Inundation Potential in 2080





Irene are a great reminder and example of the damage that can result from flooding.

A tornado outbreak on May 31, 1998 spawned three tornadoes in the Region (see Figures 4.4 and 4.5). The most severe was an F3 that tore through Rensselaer and Saratoga counties, causing over \$97 million worth of damages (2011 USD) (SHELDUS, 2011).

#### Observed Climate Trends

Historical weather patterns already indicate warming trends for New York State. The New York State Department of Environmental Conservation's Hudson River Estuary Program documents the following climate trends for the state (NYS Department of Environmental Conservation, 2012):

- Increasing average temperature: nearly 2°F in 30 years.
- Warmer winter average temperatures: 5°F in 30 years.
- Earlier bloom dates of many plant species: 4-8 days earlier on average than they were in the early 1970s.
- Increasing average rainfall and intensity of heavy downpours
- Decreasing days with snow cover.
- Rising sea level: in New York Harbor

Table 4.2 Observed Climate Trends: Temperature Change per Decade

	Annual	Spring	Summer	Fall	Winter
1901-2000	0.18**	0.25**	0.13*	0.06	0.29**
1970-2008	0.64**	0.23	0.69**	0.47	1.23**

Temperatures in °F per decade  
 \*Significant at the 95% level  
 \*\*Significant at the 99% level (NYSERDA, 2011)

Table 4.3 Observed Climate Trends: Precipitation Change per Decade (inches)

	Annual	Spring	Summer	Fall	Winter
1901-2000	1.13**	0.33	0.34	0.36**	0.10
1970-2008	1.33	0.16	0.50	0.62	-0.15

\*Significant at the 95% level  
 \*\*Significant at the 99% level (NYSERDA, 2011)

sea level is 15 inches higher today than it was in 1850.

ClimAID documented specific observed climate trends for the Region based on the weather station at Albany (see Tables 4.2 through 4.4) The statistically significant trends include an increase in temperatures between 1901 and 2011 as well as between 1970 and 2008, and an increase in precipitation between 1901 and 2000. However, it should be noted that there was no statistically significant increase in precipitation between 1970 and 2008. The number of days per year at or below 32°F has decreased by approximately seven days per decade. Non-statistically significant trends represent normal climate variation that occurs over time that is not likely related to global climate change.

#### Projected Changes in Climate

According to the global climate model (GCM), an increase in annual average temperature is extremely likely this century. If greenhouse gas (GHG) emissions continue on the current trajectory, temperatures could increase by as much as 8°F by the end of the century (see Table 4.5). In the Capital Region, the number of days per year with maximum temperatures exceeding 90°F could increase from 10 to 75

### Best Practices

Green Roof Subsidy - "The City of Portland offers an incentive to property owners and developers to add more ecoroofs. The incentive program is part of Portland's Grey to Green initiative to increase sustainable stormwater management practices, control non-native, invasive plants, and protect sensitive natural areas. The incentive funds up to \$5 per square foot of an ecoroof project. Installation costs for ecoroofs in Portland range from \$5 to \$20 per square foot.

days based on the high emission scenario. The number of days per year with minimum temperature at or below 32°F could decrease from 134 to 131. (NYSERDA, 2011). The models also project an overall increase in annual precipitation; however most of this increase will occur in the winter, with possible decreases in precipitation in the summer and early fall. (NYSERDA, 2011). Intense precipitation events are also likely to increase, with potentially 14 days a year that exceed 1 inch of rainfall as shown in Table 4.6.

Sea level rise is extremely likely this century. For the tidal Hudson River, which extends up to the dam at Troy, the downscaled projections of the model show sea level rise between 8 and 18 inches by the 2080s, and under the a rapid ice melt scenarios the projections are 37 to 50 inches. Flooding along the Hudson River south of the dam at Troy will increase from storms as sea level rises. Figures 4.6 and 4.7 show the floodplain and the storm surge inundation potential in 2080. Other changes in extreme events are difficult to project due to their inherit variability. However, some qualitative data exists to support the following projections (NYSERDA, 2011):

- More frequent nor'easters
- More frequent intense hurricanes as sea surface temperatures increase
- Increase in frequency and intensity of downpours (intense precipitation occurring over a period of minutes or hours)



### Best Practice

Regional Climate Collaboration- The Tompkins County Climate Protection Initiative (TCCPI) "is a multi-sector collaboration seeking to leverage the climate action commitments made by Cornell University, Ithaca College, Tompkins Cortland Community College, Tompkins County, the City of Ithaca, and the Town of Ithaca to mobilize a countywide energy efficiency effort and accelerate the transition to a clean energy economy." By leveraging resources, the Region has pushed forward hundreds of initiatives relating to clean energy, sustainability and climate change. (TCCPI)

### Goals

Based on the historical climate trends and the climate projections that have been identified for the Capital Region, the Climate Adaptation Technical Committee confirmed one overarching goal:

*Enhance the Region's resiliency in the face of climate change in order to maintain basic services and minimize the impacts of climate change on the most vulnerable populations and ecosystems.*

The Committee identified nine specific strategies that the Capital Region could implement to achieve this goal. Table 4.7 lists the goal and initiatives for Climate Adaptation.

### Regional Initiatives

The Climate Adaptation initiatives were developed with input from the Technical Committee to meet the goal mentioned previously. Three of these initiatives were prioritized as the immediate focus for implementation within the Region.

**Promote Green Infrastructure.** According to the U.S. EPA, green infrastructure can be a cost-effective and resilient approach to address our water infrastructure needs while





Table 4.4 Annual Average Climate Projections

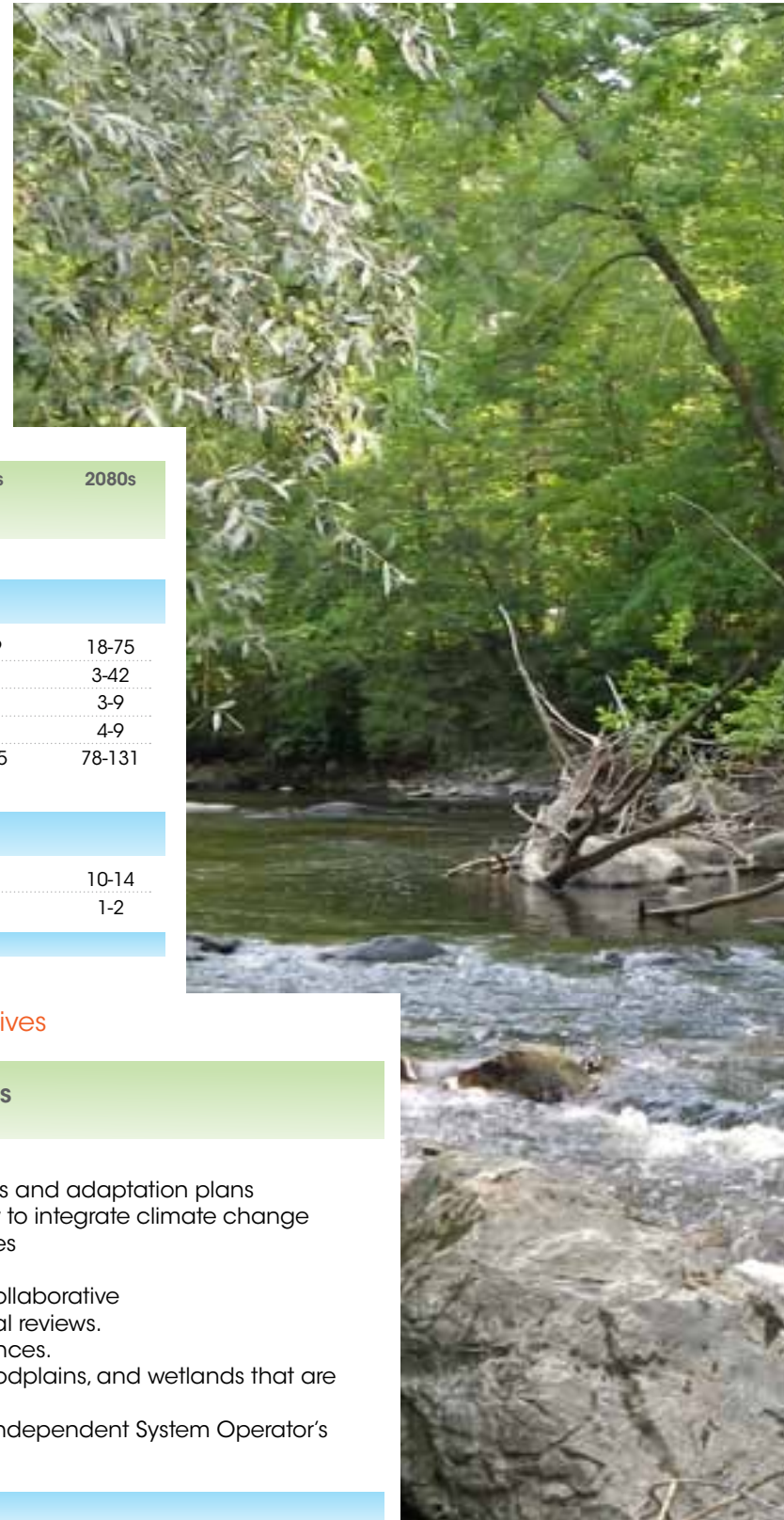
	Baseline 1981-2011*	2020s	2050s	2080s
Air temperature	48°F	+ 1.5 to 3.0°F	+3.0 to 5.5°F	+4.0 to 8.0°F
Precipitation	39 in	0 to +5%	0 to +5%	+5 to 10%
Sea level rise		Inches	Inches	Inches
GCM-based	n/a	+1 to +4	+5 to +9	+8 to +18
Rapid ice-melt scenario	n/a	-4 to +9	-17 to +26	-37 to +50

Table 4.5 Extreme Weather Climate Projections

	Baseline (Saratoga Springs) 1971-2000	2020s	2050s	2080s
Full range of changes in extreme events: minimum and maximum (NYSERDA, 2011)				
<b>Heat Waves &amp; Cold Events</b>	Number of days per year with max. temperature exceeding			
	90°F	10	11-28	17-49
	95°F	1	1-7	3-21
	# of heat waves/year	2	2-4	2-7
	Average duration	4	4-5	4-6
<b>Intense Precipitation</b>	Number of days per year with rainfall exceeding:			
	1 inch	10	8-12	9-12
	2 inches	1	1-2	1-2
	# of days per year with min. temp. ≤32°F			
		134	121-147	92-135

Table 4.6 Climate Adaptation Goal and Initiatives

Goals	Initiatives
Enhance the Region's resiliency in the face of climate change in order to maintain basic services and minimize the impacts of climate change on the most vulnerable populations and ecosystems.	<ul style="list-style-type: none"> <li>Promote Green Infrastructure</li> <li>Complete local vulnerability assessments and adaptation plans</li> <li>Develop a Guidance Document on how to integrate climate change impacts into existing plans and processes</li> <li>Implement a tree planting program</li> <li>Establish a Regional Climate Change Collaborative</li> <li>Include climate change in environmental reviews.</li> <li>Enforce and enhance floodplain ordinances.</li> <li>Protect and enhance critical habitat, floodplains, and wetlands that are under threat from climate change.</li> <li>Expand participation in New York State Independent System Operator's demand response program.</li> </ul>



improving air quality, creating or connecting habitat, and reducing the effects of heat island. Green infrastructure can include anything from green alleys and green roofs to urban tree canopy and rain gardens. (EPA, ND) Local governments can update their zoning to provide incentives and/or requirements for

green infrastructure in new construction and major retrofits. There are many zoning tools available such as landscape ordinances, on-site stormwater management requirements, ecological surface requirements, and open space/permeable surface requirements. It is important that different types of cities,

towns, and villages leverage the tools that will be most effective in their community. In order to pay for and maintain green infrastructure practices, a management structure with a dedicated funding stream needs to be established. The recommended structure to support the utilization of both grey and green infrastructure is a stormwater utility district (SUD). Currently there are no SUDs in New York State. It is highly recommended that New York create well-crafted enabling legislation that addresses current roadblocks to implementing green infrastructure practices across municipal boundaries at all scales of development.

**Complete Local Vulnerability Assessments and Adaptation Plans.** The Intergovernmental Panel on Climate Change (IPCC) defines vulnerability as “the degree to which a system is susceptible to, or unable to cope with, adverse effects of climate change, including climate variability and extremes. Vulnerability is a function of the character, magnitude, and rate of climate variation to which a system is exposed, its sensitivity, and its adaptive capacity” (IPCC, 2007) The goal of a vulnerability assessment is to examine the impacts of climate change and assess how they will affect the Region's systems and sectors. As part of the Cleaner Greener Communities Regional Sustainability Plan, a high level climate vulnerability assessment was conducted for all eight counties of the Capital Region. The local governments within the Region should leverage this effort to develop a more specific assessment for their own community. These local vulnerability assessments should include mapping of vulnerable infrastructure and identification of vulnerable populations. The assessments could provide communities guidance on how to avoid planning projects that would be vulnerable to climate change. The second phase of this strategy would be to build off of these vulnerability assessments and create adaptation plans to reduce vulnerabilities. Sector-specific elements, such as transportation and

agriculture, should be included in this strategy.

**Develop a Guidance Document on How to Integrate Climate Change Impacts into Existing Plans and Processes.** Local governments already have plans and processes. Rather than waiting for the next round of planning updates, the guidance document will help local governments integrate elements of climate change impacts into existing plans and processes without having to allocate significant resources to create a separate, new plan. Relevant plans could include master/comprehensive plans, waterfront plans, emergency management/hazard mitigation plans, public health plans, transportation plans, agriculture preservation plans, neighborhood plans, etc. The Climate Smart Communities Regional

**Best Practices**

Tree Planning Coupon Incentive - Baltimore County's Growing Home Campaign has provided \$10 coupons to homeowners toward the purchase of most trees at local nurseries. Each coupon represents \$5 of public funds and \$5 of retail funds. The county began the program as an innovative way to increase tree canopy cover as part of its larger “Green Renaissance” forest conservation and sustainability plan. In the first two months of the program, 1,700 trees were planted.”





Coordinator Program could be a perfect partner to accomplish this strategy quickly.

The Climate Adaptation Technical Committee identified other initiatives that were not ranked among its top three. These other initiatives are listed below:

- Implement a tree planting program
- Establish a Regional Climate Change Collaborative
- Include climate change in SEQR reviews.
- Enforce and enhance floodplain ordinances.
- Protect and enhance critical habitat, floodplains, and wetlands that are under threat from climate change.
- Expand participation in NYS ISO's demand response program.

An implementation strategy which outlines the resources, costs and timeline associated with achieving the priority initiatives, is provided in Table 4.8.



Table 4.7 Climate Adaptation Implementation Strategy

Initiative	Regional Priority	Implementer	Partners	Preliminary Cost	Greenhouse Gas Reduction Potential**	Potential Funding Sources	Timeline
Promote Green Infrastructure	1	Local Governments	Stormwater Coalition of Albany County	\$\$\$	Medium	NY State Environmental Facilities Corporation US EPA Stormwater Utility District	Mid-Term (1-5 years)
Complete local climate vulnerability assessments and adaptation planning	2	Local governments	Climate Smart Communities Regional Coordinators	\$\$-\$	Low	FEMA- through integration with Hazard Mitigation Plans Climate Smart Communities	Short Term (<1 year)
Develop a Guidance Document on how to integrate climate change impacts into existing plans and processes	3	State, local governments or non-profit	ECOS: The Environmental Clearinghouse Climate Smart Communities Regional Coordinators	\$	Low	Climate Smart Communities	Short-term (<1 year)

\*Overall Cost: \$ - < \$100,000, \$\$ - \$100,000 to \$500,000, \$\$\$ - > \$500,000  
 \*\*Greenhouse Gas Reduction Potential: High - Strategy will result in a direct, quantifiable reduction in GHG emissions; Medium - Some GHG emissions reduction may occur but it cannot be quantified; Low - GHG reduction is very indirect, unlikely to occur, or unknown

Table 4.8 Climate Adaptation Governance Structure

Name of Initiative	Process to Implement (update zoning ordinance, adopt a policy or plan, resolution to approve funding, etc.)	Related Policies – positive link-ages and alignments	Related Policies – barriers and cross-purposes	Local Government Level of Implementation
Promote Green Infrastructure	Local Jurisdictions Update and Adopt Zoning Codes  Region Develops and Provides Technical Assistance to Communities	Within Adaptation, code changes can be coordinated and vulnerability assessments used to inform code updates.  This initiative should be coordinated with other code-related initiatives such as Economic Development - Establish Model Zoning Code and Water - Revise Municipal Code to Incorporate Water/Stormwater Management Best Practices. There are also synergies with several water-related initiatives including: Water - Develop a Predictive Model for Stormwater Management; Water - Conduct a Watershed Assessment for Stormwater Management; Water - Develop an Asset Management Plan for Municipal Water and Sewer Systems; and Water - Develop a Purchasing Consortium for Municipal Water Projects. Finally, Energy - Establish Green Districts and Land Use - Repair and Modernize Existing Infrastructure offer opportunities for coordination.	Potential to be at cross-purposes with Land Use - Transit-oriented Development initiative if code changes are not well coordinated to integrate both density and green infrastructure objectives. Similarly, potential to be at cross purposes with Land Use - Modify Local Codes and Land Use Regulations to Allow for Sustainable, Compact Development if density requirements do not allow for sufficient green infrastructure.	Implementation at county, city, and town level, as well as in all other local jurisdictions (such as villages) with zoning authority.
Conduct Local Vulnerability Assessments and Adaptation Planning	Develop Assessments and Create Adaptation Plans. Plans could be stand-alone or integrated with other plans such as master/comprehensive plans.	Within Adaptation, vulnerability assessments should be used to inform code changes as well as land acquisition.  Vulnerability Assessments could be helpful to inform Water - Asset Management Plans for Municipal Water and Sewer Systems as well as the establishment of a grant program for water projects in smaller communities. The Water - Develop a Predictive Model for Stormwater Management initiative could help inform the vulnerability assessments.	None identified.	Implementation at county and city level; smaller jurisdictions could conduct joint planning with each other or larger jurisdictions to leverage resources.

The governance overview in Table 4.9 provides guidance to jurisdictions in the Region on specific actions they can take to implement the Plan's various initiatives. It also evaluates each initiative against all other initiatives in the Plan to identify where there are opportunities for synergies in implementation, as well as where initiatives have the potential to work at cross purposes so that these potential inconsistencies can be proactively addressed.





Section 5.0

# Economic Development





## SECTION 5.0: **Economic Development**

*The Capital Region's economy has held strong over the past several years, thanks in part to the strong presence of state government and related industries, population growth, and investments in technology and infrastructure. However, disparities are increasing in the Region that new economic development strategies can help address.*

### **Regional Baseline**

#### **Common Economic Indicators**

In 2010, the eight-county Capital Region had a total population of 1,074,639 (Census 2010) – this marks a 4.3% increase in population from the Census 2000 count of 1,029,927. Over this time period, the Capital Region gained population at a faster rate than Upstate New York (1.5%) and New York State overall (2.1%), but at a slower rate than the United States as a whole (9.7%).

The median income for the Capital Region's 430,474 households was \$55,683 (ACS, 2010). Per capita income was \$29,175. These income measures were highest in Saratoga, Albany, and Columbia County, and were lowest in Greene and Washington County. Median household income for the Region was comparable to the statewide value and higher than the national value. Per capita income in the Capital Region was less than the statewide value and higher than the national per capita income.

In the Capital Region, 10.6% of all individuals were living below the poverty line in 2010 – this is slightly lower than the 2010 poverty rates for New York State (14.2%) and the United States as a whole (13.8%). Figure 5.1 illustrates poverty

### **Best Practices**

Create Green Alliance – In the Sacramento, CA, green building, energy and other sustainable enterprises band together to form an alliance organization that promotes awareness of services, marketing, business directories, networking and team-building capacity.





Table 5.1 Population Growth

Geography	% Change in Population, 2000-2010
Capital Region	+4.3%
Upstate New York	+1.5%
New York State	+2.1%
United States	+9.7%

Table 5.2 Regional Income

Geography	Median Household Income	Per Capita Income
Capital Region	\$55,683	\$29,175
New York State	\$55,603	\$30,948
United States	\$51,904	\$27,334

Table 5.3 Poverty Levels

Geography	% Individual Poverty	% Household Poverty	% Family Household Poverty
Capital Region	10.6%	10.2%	6.7%
New York State	14.2%	13.6%	10.7%
United States	13.8%	13.0%	10.1%

concentration throughout the Region.

At the household level, 10.2% of all Capital Region households had earnings below the poverty threshold. This rate compares favorably to the 13.6% household poverty rate for New York State and the 13.0% rate for the United States. The Capital Region's poverty rate was 6.7% for family households.

*Sustainable economic development is examining and correcting conditions as needed to advance economic prosperity, social equity and cultural diversity without compromising environmental quality, availability of natural resources, and biodiversity for future generations.*

### Green Industry

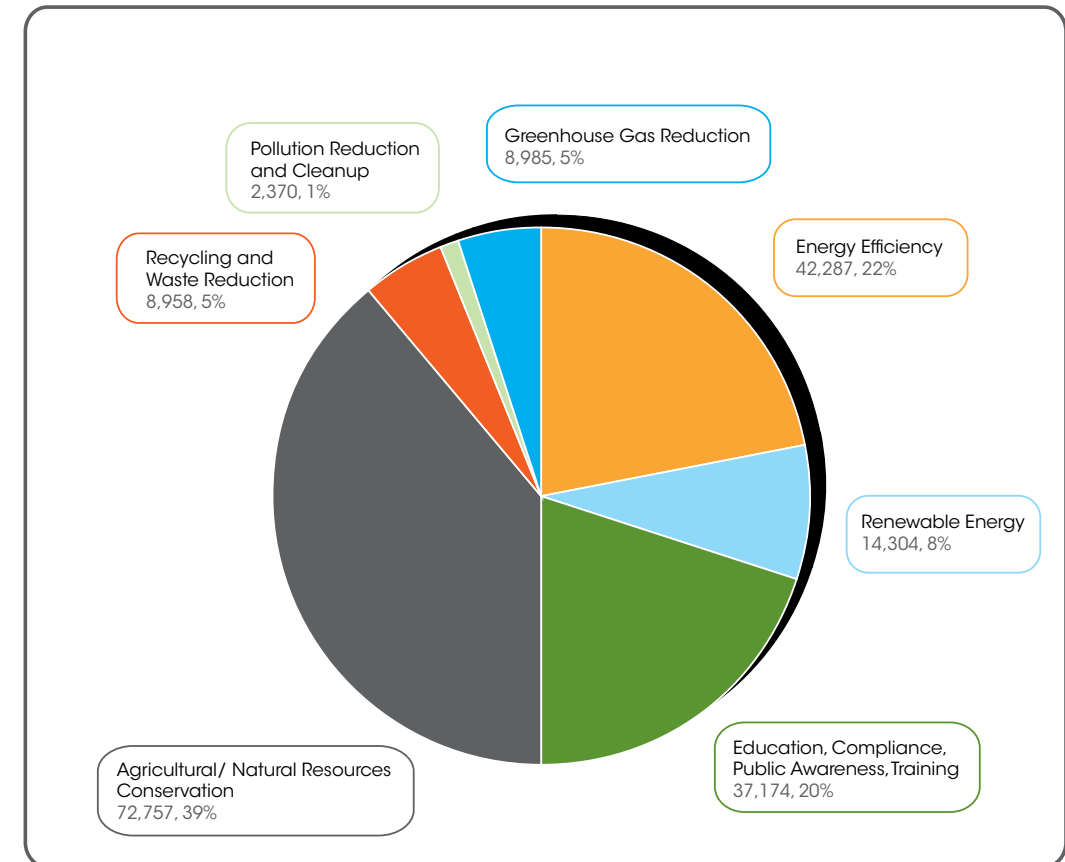
The U.S. Bureau of Labor Statistics (BLS, 2012) has instituted a Green Goods and Services (GGS) Survey program to identify and count the number of "green jobs" and their contributions to the U.S. economy. The GGS program defines green jobs as "jobs in businesses that produce goods and provide services that benefit the environment or conserve natural resources."

Based on the North American Industrial Classification System (NAICS) codes, the BLS lists all industries that are involved in the provision of green goods and services.

Green industries are assigned to one of the following seven categories:

- Renewable energy
- Energy efficiency
- Greenhouse gas reduction

Figure 5.1 Green Industry Employment: Capital Region



- Pollution reduction and cleanup
- Recycling and waste reduction
- Agricultural and natural resources conservation
- Education, compliance, public awareness, and training

Employment information from the U.S. Census Bureau's 2010 County Business Patterns (CBP) data set was used to estimate the number of Capital Region employees working in each green industry category, as shown in Figure 5.2. In 2010, green industry employment represented 186,835 of the Capital Region's 384,629 total employees, or 48.6% of the total. It should be noted that while these industries serve "green" functions, not all employees within these industries are devoted to sustainable practices (NAICS, 2010).

To better understand how the Capital Region ranks in green services and employment,

we can compare the level of green industry employment to a national standard. Location Quotients (LQs) allow us to compare the level of green employment in the Capital Region against a national standard. Location quotients of greater than 1 mean that a particular industry or set of industries is concentrated within a Region, compared to the nation as a whole. Conversely, LQs of less than 1 mean that a given industry or set of industries is less prevalent within a Region than in the nation as a whole.

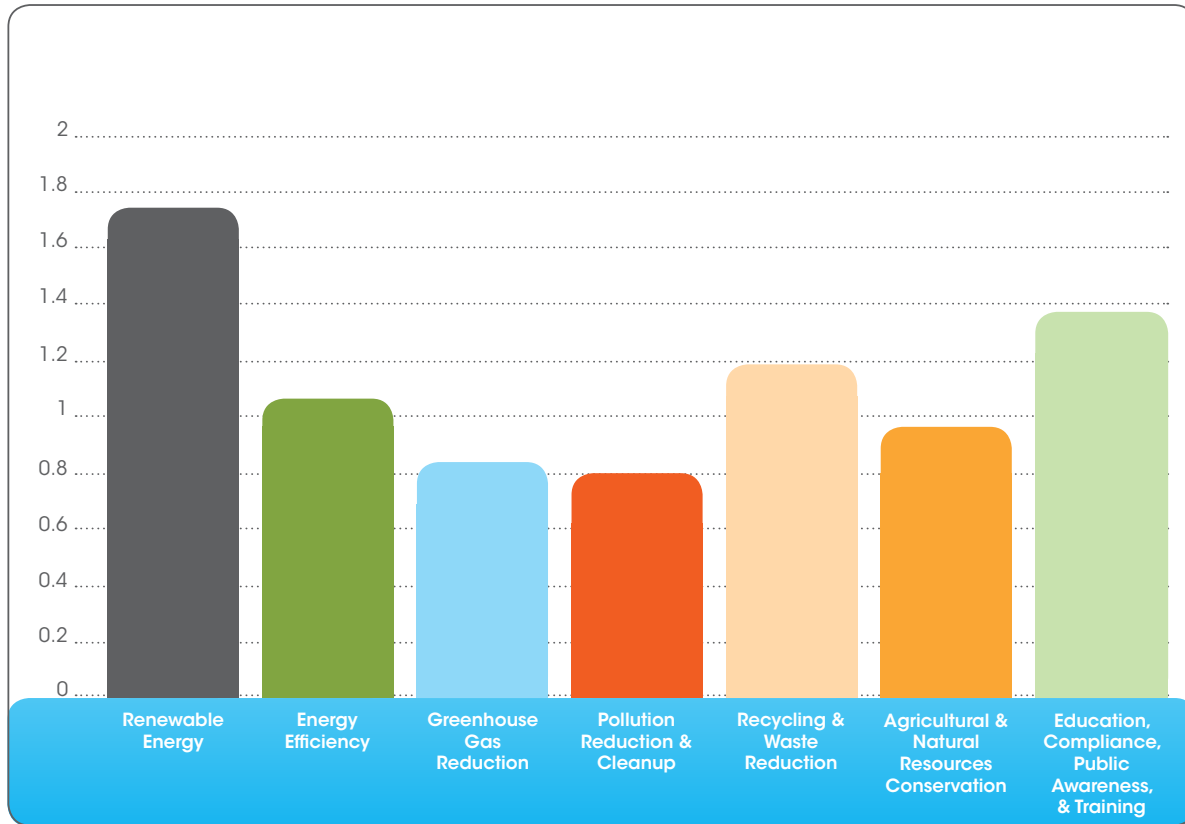
Location quotients were calculated for each of the BLS green industry categories. Results of these calculations are shown in Figure 5.3 and are as follows:

- Renewable energy, 1.70
- Energy efficiency, 1.04
- Greenhouse gas reduction, 0.86
- Pollution reduction





Figure 5.2 Location Quotients: Green Industry Categories in the Capital Region



and cleanup, 0.80  
 Recycling and waste reduction, 1.19  
 Agricultural and natural resources conservation, 0.97  
 Education, compliance, public awareness, and training, 1.38

Of the seven BLS green industry categories, Renewable Energy is strongest in the Capital Region, with employment at a level 1.7 times that of the nation as a whole. Employment in Education, Compliance, Public Awareness, and Training also well exceeds national levels, and Recycling and Waste Reduction employment is higher in the Capital Region than in the nation overall. Energy Efficiency and Agricultural and Natural Resource Conservation are on par with national levels. Greenhouse Gas Reduction and Pollution Reduction and Cleanup are relatively weak in the Capital Region compared to a national standard.

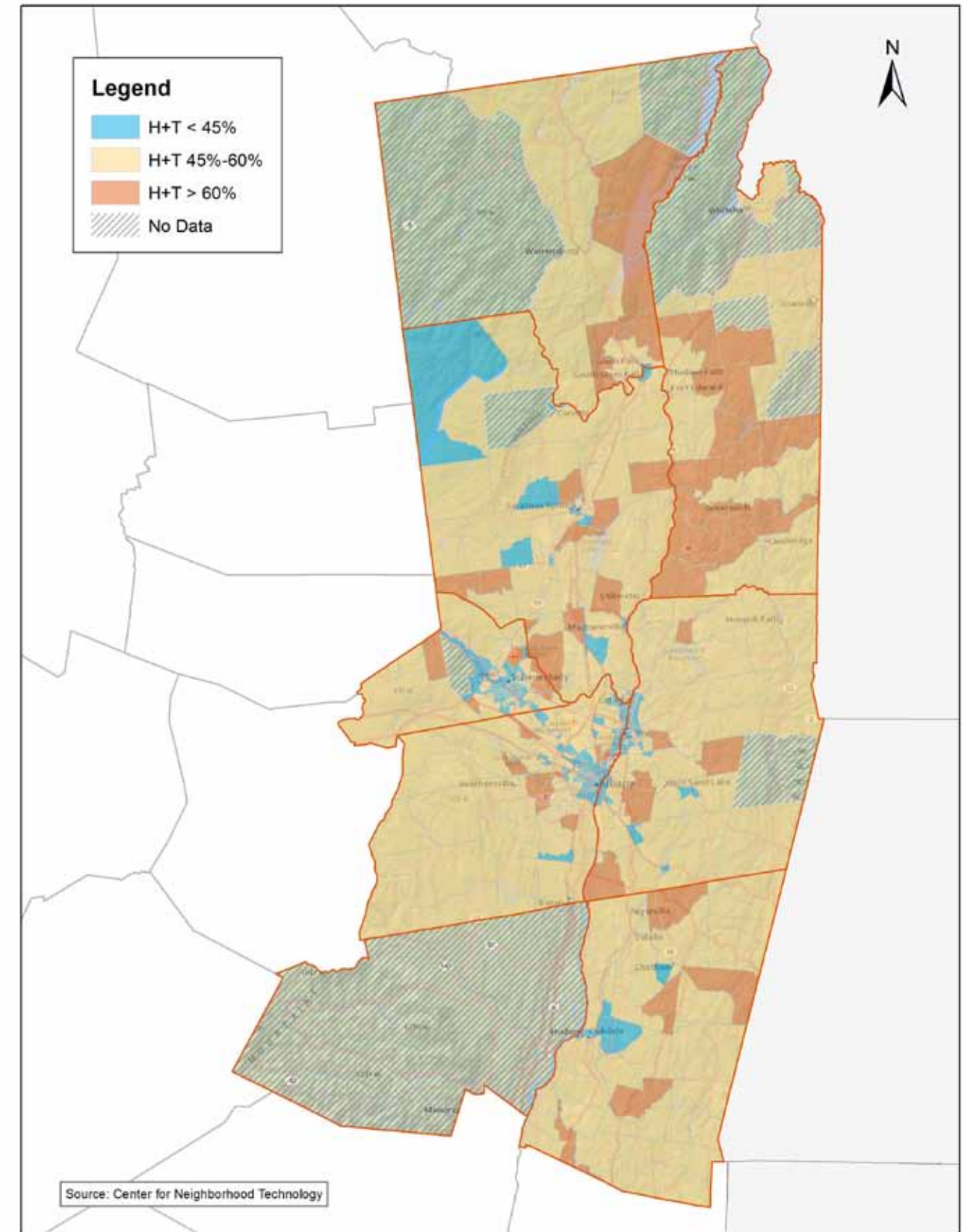
**Housing and Transportation (H&T) Index**

Housing and transportation represent the two largest expenses for most households. The benchmark for combined housing and transportation (H & T) affordability stands at 45% of median household income. Combined H&T expenses of more than 45% are considered higher than what is affordable for most households (CNT, 2012).

Figure 5.3 shows, at the Census block group level, the combined costs of H&T as a percentage of area median income throughout the Capital Region. Most block groups (62%) in the Region have housing and transportation costs greater than median area income. Affordable (H&T less than 45%) block groups in the Region are concentrated in the urban areas of Albany, Schenectady, and Saratoga – this is likely because residents of these areas live closer to workplaces and other amenities, which reduces their transportation costs.

Table 5.4 provides the percentage

Figure 5.3 Combined Housing and Transportation Costs



Source: Center for Neighborhood Technology





Table 5.4 Housing and Transportation Index by County

Geography	Percentage of Households with H&T > 45% of Median Household Income
Albany County	54.5%
Columbia County	83.5%
Greene County	Not Available
Rensselaer County	63.7%
Saratoga County	83.5%
Schenectady County	53.5%
Warren County	98.1%
Washington County	100%
Capital Region	66.5%



of Capital Region households with combined H&T expenses greater than 45% of median household income.

**Goals**

The Economic Development Technical Committee developed the goals and initiatives outlined in Table 5.5. Much of the Technical Committee’s work focused on improving the micro-economic environment of the Region, meaning that economic development is focused at the local scale. This is in contrast to many economic development programs and policies that focus on attracting the large scale businesses and companies, which, while employing many, often requires significant public incentives along with major investment in new infrastructure to compete against other parts of the state or country.

**Best Practices**

“Buy Local” Marketing - The most successful “buy local” campaigns promote awareness of the importance of supporting local businesses, and also help to market locally owned and operated establishments. Innovative practices include the publication of independent business directories and even the creation of Regional currencies accepted by locally owned businesses.

Significant discussion revolved around helping the small business community by assisting with financial literacy, improving access to low cost financing and venture capital along with a variety of approaches to provide support for equitable economic growth and development. This effort would link to an integrated Regional “buy local campaign” that promotes our agricultural economy, while focusing investment in our villages and cities.

**Regional Initiatives**

The Economic Development initiatives were developed to meet the overall goals. The first Regional initiative will leverage the multiple programs throughout the Region to help with small business support through intermunicipal and interagency partnerships to reduce redundancies and better share resources.

The second initiative focuses on encouraging investment in the Region’s cities and villages by fostering additional land banks to get undeveloped and vacant properties and buildings back on the tax roll. The third Regional priority initiative focuses on fostering our burgeoning green economy by developing a integrating, Region wide approach for green jobs training.

The Technical Committee believes the priority

Table 5.5 Economic Development Goals and Initiatives

Goals	Initiatives
Economic development should focus on the Region’s 52 cities and villages—through such strategies as transit-oriented, mixed-use development and land recycling—to increase community revitalization, reduce poverty, improve the efficiency of public works investments, and safeguard our rural and agricultural resources.	Strengthen Regional small business support programs Expand and establish multiple Regional land banks through existing and new mechanisms Establish Model Green Code for adoption by communities
Expand economic opportunities to support a socially and economically diverse population by focusing on small business growth, neighborhood revitalization, expanding our agricultural economy and reducing urban and rural poverty.	Expand green jobs training offered by NYSERDA, Community Colleges and Capital District BOCES Regional Small Business Support Program Expanding Community Loan Fund of the Capital Region
Align state, Regional and local policies and funding to remove barriers to collaboration and shared services, increase the opportunities to leverage funding, and improve accountability and effectiveness of all levels of government.	Establish Model Green Code for adoption by communities Regional Green Education Program to help the Region understand the benefits of sustainability
Grow the Region’s agricultural economy by assisting local farms and complementary businesses in promoting their products at the local, state and national level and by expanding and strengthening the agricultural infrastructure. The importance of agriculture and its positive social, environmental and economic benefits must be highlighted and celebrated as part of the Region’s heritage, community, environment and business climate.	Establish Regional Food and Agricultural Coalition
Capitalize on knowledge and innovation offered by the Region’s 16 universities and the technology offered by the private sector to advance our green economy to the forefront nationally by becoming more energy efficient, increasing production and use of renewable energy sources, creating green buildings, increasing recycling, creating Complete Streets, and reducing greenhouse gas emissions.	Expand green jobs training Regional Green Education Program

initiatives will help address the Region’s disparity issues and poverty levels by supporting inner city small businesses, especially among low income and minority business owners. Further enhancing our green jobs training program, creates “blue collar” job opportunities for everything from the building trades to agriculture and administrative work.

**Strengthen Regional Small Business Support Programs.** Develop a comprehensive plan to review small business support programs to help improve efficiency, share resources and reduce redundancies throughout the Regions

multiple programs. The Regional Small Business Support Program should: include an incubator program designed to assist inner city, low income and minority populations access low cost financing and venture capital for start-up and emerging businesses; expand support for start-up and expanding locally-owned small businesses, micro enterprises, worker-owned and social enterprises; provide Regional access to high quality training and technical support, including financial literacy; access to small business incubators and related support; provide access to affordable capital; identify advocacy liaisons





to reduce barriers and navigate permitting, licensing, certification processes; support buy local campaigns that support locally-owned businesses and facilitate local re-circulation of capital; and identify and nurture small businesses and small business clusters that can generate significant economic activity.

**Support Expansion of Regional Land Banks by existing and new mechanisms.** Promote the development of multiple land banks to allow quick and efficient acquisition and disposition of brownfield, vacant, abandoned and tax delinquent properties.

**Expand green jobs training.** The green job training programs that NYSERDA, BOCES and the Region's community colleges offer (e.g., training on how to install solar, etc.) should coordinate efforts and be expanded to include green infrastructure design and maintenance in green jobs training. Other suggested initiatives recommended by the Economic Development Technical Committee include:

**Establish Model Green Code.** Develop model green code for appropriate locations, and to promote sustainability through provisions related to energy conservation, protection and expansion of agriculture, green infrastructure, urban agriculture, transit-oriented development, etc.

**Regional Food and Agricultural Consortium.** This is considered a Regional priority by the Food Systems Technical Committee. The initiative would include developing a Regional agriculture consortium that brings together agriculture, higher education, technology, transportation and economic development organizations and institutions to promote the Regions agriculture. The Consortium would provide public education/awareness/marketing ("buy local" campaigns), and directory services, pool ideas/knowledge/resources among farmers, connecting local farmers with local restaurants and institutions,

provide market venues, and work in advocacy. **Regional Green Education Program.** Green education organizations typically provide services including public awareness through media campaigns, school programs, curriculum and lesson plans, professional development, and even certification programs. An implementation strategy which outlines the resources, costs and timeline associated with achieving the priority initiatives, is provided in Table 5.6.

**Best Practices**

Land bank programs allow municipal or regional bodies to acquire vacant, abandoned, and tax delinquent properties. These properties are rehabilitated or redeveloped, and then sold to members of community as improved real estate. The City of Schenectady, Schenectady County, and the City of Amsterdam were awarded funding in Round 1 of the New York State Land Bank Program to institute a land bank.



Table 5.6 Economic Development Implementation Strategy

Initiative	Regional Priority	Implementer	Partners	Preliminary Cost*	Greenhouse Gas Reduction Potential**	Potential Funding Sources	Timeline
Regional Small Business Support Program	1	Capital Region Economic Development Council	Center for Economic Growth Empire State Development County IDA's Chamber of Commerce Economic Development Corporation Community Loan Fund of the Capital Region National Grid	\$\$	Low	NYS Consolidated Funding Application Chambers of Commerce County IDA Empire State Development	Mid-Term (1-5 years)
Multiple Regional Land Banks	2	County-Municipal Partnerships	Empire State Development Local Governments County IDA's National Grid NYS Build Now	\$\$	Medium	Empire State Development/ New York State Land Bank Program NYS Consolidated Funding Application	Mid-Term (1-5 years)
Expand green jobs training	3	Center for Economic Growth	Adirondack Community College Schenectady Community College Hudson Valley Community College Columbia Green Community College Capital District BOCES Northeast Parent & Child Society Trade Unions	\$\$	Medium	NYSERDA Community Colleges NYS Consolidated Funding Application	Mid-Term (1-5 years)

\*Overall Cost: \$<\$100,000; \$\$-100,000 to \$500,000; \$\$\$> \$500,000.

\*\*Greenhouse Gas Reduction Potential: High – Strategy will result in a direct, quantifiable reduction in GHG emissions; Medium – Some GHG emissions reduction may occur but it cannot be quantified; Low – GHG reduction is very indirect, unlikely to occur, or unknown

In addition to the implementation strategy above, it is recognized that these initiatives will require action by the local government to implement. To that end, the governance structure is intended to outline a process for local governments to implement the priority initiatives and the policies and programs where there are alignments or hindrances to implementation. Table 5.7 identifies the applicable governance structure for these initiatives.





Table 5.7 Economic Development Governance Structure

Name of Initiative	Process to Implement (update zoning ordinance, adopt a policy or plan, resolution to approve funding, etc.)	Related Policies – positive linkages and alignments	Related Policies – barriers and cross-purposes	Local Government Level of Implementation
Regional Small Business Support Program	Develop Regional Strategic Plan	Existing small business support programs throughout the Region		Require involvement from all state municipal and county agencies supporting small businesses
Multiple Regional Land Banks	Must be approved through NYS Land Banks Program Administered by Empire State Development	<p>Within Economic Development, land acquisition through land banks could complement the model zoning code, particularly where the code addresses redevelopment.</p> <p>Potential to link land bank activity to Adaptation - Conduct Local Vulnerability Assessments and Adaptation Planning as well as the land bank component of Adaptation - Protect and Enhance Critical Habitat, Floodplains, and Wetlands that are Under Threat from Climate Change. Acquisition activity could also be linked to encouraging green districts under Energy - Establish Green Districts. Also potential links to Land Use - Develop and Implement Sustainability Guidelines for Historic Buildings and Districts; Land Use - Design and Install Public Plazas; Land Use - Prioritize Brownfield Development; and Land Use - Modify Local Codes and Land Use Regulations to Allow for Sustainable, Compact Development.</p>	Requires inter-municipal, interagency cooperation. In general, land acquisition-related initiatives and code changes should be coordinated so they are working toward common outcomes and not attempting to duplicate efforts (e.g., targeting land acquisition where zoning keeps land in desired uses).	Should be implemented at the Regional level.
Expand green jobs training	N/A			



Section 6.0  
**Energy**







## SECTION 6.0: **Energy**

*The responsible use of our energy resources to meet the needs of the present without compromising the ability of future generations to meet their needs is an essential component of this plan.*

Energy production and consumption are the Region's largest sources of greenhouse gas emissions. However, Capital Region residents, businesses, and government leaders possess the will and innovation to live more efficiently and shift to cleaner technologies, both as an environmental objective and also as a way to reduce energy costs and spur economic development. Technologies that promote sustainable energy systems include renewable energy sources, such as hydroelectricity, solar energy, wind energy, geothermal energy, and also technologies designed to improve energy efficiency. The Capital Region's energy needs can be satisfied through both conserving energy and incorporating more renewable energy systems onto the grid.

The preferred path for the Region will be to develop a local energy future that focuses on reduced demand through conservation and efficiency while increasing the supply of clean energy. This plan focuses on initiatives that the Region can implement to promote energy efficiency and conservation, increase the development of renewable resources, support the development of innovative green practices, and increase public awareness of the Region's energy resources.

### **Best Practices**

Tax Breaks for Energy Efficiency– Montgomery County, Maryland offers property tax credits up to \$250 are available for the installation of eligible energy-conservation devices.





## Regional Baseline

In order to identify and prioritize areas for improvement in the energy sector, it was necessary to assess the current energy profile of the Region, including generation and consumption, and the resulting greenhouse gas emissions of the Region. The Energy Technical Committee referenced various publicly available data sources as part of this process. This included data from the following:

- U.S. Energy Information Administration (EIA), State Energy Data System
- U.S. Census Bureau (Census), State & County Population Estimates
- New York State Climate Action Plan (2010)
- New York State Energy Plan (2009)
- New York State Department of Taxation and Finance, Office of Real Property Tax Services
- New York State Regional Greenhouse Gas Emissions Summary
- Climate Smart Communities Regional Greenhouse Gas Inventory (Draft)

Energy consumption from the following sectors was evaluated:

- Residential
- Commercial
- Industrial
- Transportation

## Energy Usage

Energy usage data for New York State and Capital Region was provided by EIA and the Regional Greenhouse gas inventory, respectively. Usage is summarized in Million British Thermal Units (MMBtu) in Figure 6.1 and Table 6.1. The totals highlighted in Table 6.1 are estimates based on 2008 EIA data for New York and are prorated based on 2011 population for the Region. It was also assumed that the Capital Region has similar energy consumption by sector as the State of New York as a whole.

The commercial sector consumes more energy than other sectors, but the residential and transportation sectors are a very close second and third, respectively.

Energy use per capita is provided in Table 6.2. ([www.eia.gov/state/seds/seds-data-complete.cfm](http://www.eia.gov/state/seds/seds-data-complete.cfm)). The Capital Region is slightly above the statewide average but significantly below US average. For comparison, NYS's energy use per capita is the second lowest of all states in the nation. The capital Region is slightly above the New York State average.

## Greenhouse Gas Emissions

Greenhouse gas emissions from energy—both stationary and mobile sources—represent 88 percent of all emissions for the Capital Region. Greenhouse gas per capita is provided in table 6.3. The energy sector emissions sources include energy consumption in the stationary built environment in the residential, commercial, and industrial sectors regardless of where the energy was generated, as well as emissions from energy generated within the Region. The stationary energy portion represents approximately half of all Regional emissions. Of that, as indicated in Table 6.4, residential energy consumption is the largest source of GHG emissions. Within the residential and commercial sectors, emissions from consumption of natural gas were the largest portion, followed closely by emissions from electricity consumption. Also included in Table 6.4 is the summary of transportation emissions due to fuel use in on-road, off-road, rail, and marine vehicles. While transportation emissions are reported as a separate sector in the Regional Greenhouse Gas Inventory, transportation represents a mobile source of emissions from energy use, and is thus provided here for reference.

Transportation emissions represent 36% of the Region's total emissions. A detailed breakdown of energy emissions and consumption, by sector and fuel source,

Figure 6.1 Capital Region Energy Percent by Sector

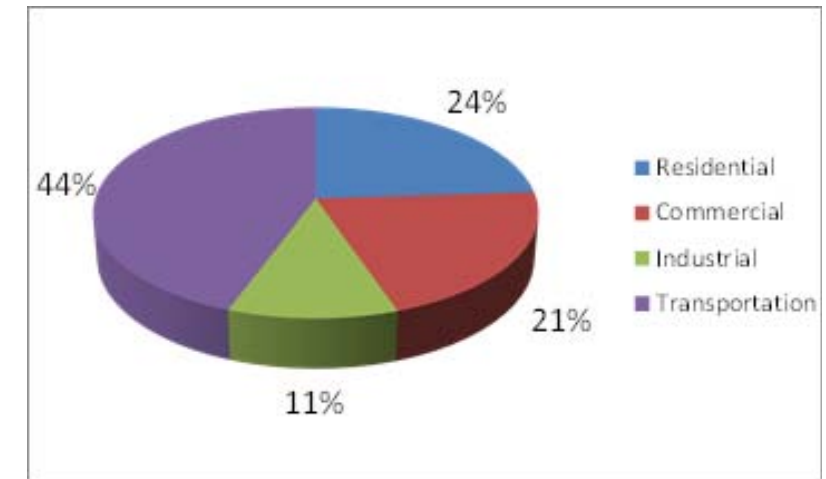


Table 6.1 Capital Region Energy Usage by Sector

Sector	New York Total (MMBtu)	Capital Region Total (MMBtu)
Residential	1,165,877,544	56,203,144
Commercial	1,274,997,238	48,591,773
Industrial	434,151,103	25,464,195
Transportation	1,113,122,682	103,913,669
Total	3,988,144,670	234,172,780

Table 6.2 Capital Region Energy Use per Capita

County Name	Energy Use per Capita (MMBtu/person)
Capital Region	216.9
New York (2010)	192.2
United States (2010)	315.9

Table 6.3 Average per Capita Greenhouse Gas Emissions

Region	Metric tons CO2e per capita
US Average	19.0
New York State (with NYC)	9.8
New York City	5.9
NYS (no NYC)	12.7
Capital Region	16.3



can be found in Appendix 8—the Tier II Regional Greenhouse Gas Inventory.

### Generation

Regional 2011 electricity generation by source was obtained via a review of the New York Independent Service Operators 2012 Gold Book report and is presented in Table 6.5 for each county.

### Renewable Energy

Technologies such as solar photovoltaic (PV), solar thermal hot water, wind energy, and geothermal heating and cooling can be sustainable alternatives to reduce dependence on fossil fuels. Renewable energy contributes to the public benefit by enhancing the reliability of the grid, increasing in-state electricity generation, increasing the diversity of the Region's energy resources, keeping local dollars within the state, and making the electric supply market more competitive by promoting consumer choice. Solar PV technology makes use of the abundant energy from the sun, and its use has little impact on our environment. PV can be used in a wide range of products, from small consumer items to large commercial solar electric systems. Solar PV is the most prominent (non-hydro) renewable technology based on in-Region generation capacity. Table 6.7 summarizes the installed Solar PV Capacity by County.

Table 6.4 Capital Region Energy Sector GHG Emissions by Source and County, 2010 (Metric Tons CO<sub>2</sub>e)

	Region	Albany	Columbia	Greene	Rensselaer	Saratoga	Schenectady	Warren	Washington
Residential Energy Consumption	3,015,446	882,719	181,437	140,327	438,817	646,897	453,778	152,773	118,698
Commercial Energy Consumption	2,902,316	1,338,288	108,159	96,635	295,356	479,506	359,341	75,117	149,914
Industrial Energy Consumption	1,788,853	779,985	34,599	170,045	50,078	252,497	165,519	282,584	53,546
Energy Generation/ Supply	1,348,995	586,188	15,124	327,265	129,048	157,056	99,350	33,404	17,093
Transportation	6,288,768	1,874,252	396,517	402,927	780,688	1,439,606	575,254	504,771	314,754
Total:	15,344,378	5,461,432	735,836	1,137,199	1,693,987	2,975,562	1,653,242	1,048,649	654,005

### Best Practices

**Green Leases**— Green leases (also known as aligned leases, high performance leases, or energy efficient leases) align the financial and energy incentives of building owners and tenants so they can work together to save money, conserve resources, and ensure the efficient operation of buildings.

**SmartGrid Demonstration Project**— A utility provider in Ohio replaced traditional electric meters with new, digital Smart Meters in 2010. This upgrade of about 110,000 traditional residential and business electric meters in northeast central Ohio is the first step of the gridSMART project.

### Goals

As the Capital Region's population grows, energy usage will be affected by increases in housing, commercial floor space, transportation, and goods and services. These changes will affect not only the level of energy use but also the mix of fuels consumed. Changes in the structure of the economy and in the efficiency of the equipment used throughout the economy will also have an impact on energy use per capita. Efficiency

gains in household appliances, construction and vehicles are expected to have a direct, downward impact on energy use per capita, as do efficiency gains in the electric power sector, as older, inefficient coal and other fossil fuel based electricity generating plants are retired. In addition, the renewable share of total energy generation is expected to increase as technology advances, and as the availability of tax credits for renewable electricity generation offsets installation costs. A number of the Region's local governments have taken steps to reduce their contribution to climate change. For example, the City of Albany has developed a Comprehensive Plan, Albany 2030, which is a master guidance document outlining a framework for future community efforts, sustainability initiatives, investments, policy decisions and management within the City. Albany

2030 is a "to do" list that will be used to leverage positive and effective improvements, while complementing current and ongoing City initiatives and (re)development.



As shown in Figure 6.2, 109 local governments have also joined New York's Climate Smart Communities (CSC) program, a state-local partnership dedicated to reducing greenhouse gas emissions, saving taxpayer dollars and advancing community goals for health and safety, economic vitality, energy independence and quality of life. Additionally, the Capital Region is part of a CSC pilot program providing direct technical assistance to the 16 communities in the Region who

Table 6.6 Upstate NY Electric Grid Generation Mix by Type (2009)

Resource Type	Percent of Generation Mix
Coal	14.49%
Oil	0.90%
Natural Gas	18.93%
Nuclear	30.59%
Hydro	30.79%
Biomass	1.60%
Solar	0.00%
Wind	2.35%
Geothermal	0.00%
Other Fossil	0.35%

Figure 6.2 Climate Smart Communities

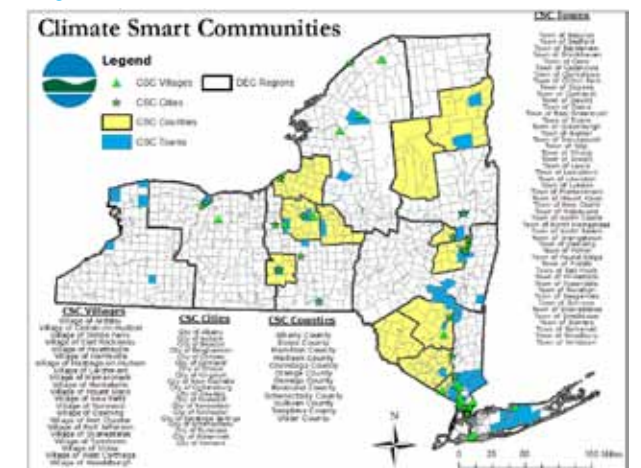


Table 6.5 Regional Electric Generation by Type and County (2011 Gigawatt Hours)

	Albany	Columbia	Greene	Rensselaer	Saratoga	Schenectady	Warren	Washington
Hydro	312	2	0	104	1,442	0	250	342
Fossil Fuel	6,243	0	7,254	3,932	900	0	0	1
Nuclear	0	0	0	0	0	0	0	0
Other Fuel <sup>2</sup>	50	0	0	0	0	0	0	81





have adopted the pledge. Any town, city, village or county can join Climate Smart Communities, without cost, by adopting the CSC Pledge and informing NYSDEC that their community has adopted the pledge. Benefits include access to information, technical assistance and funding assistance.

In 2009, New York State set a goal to reduce GHG emissions from all sources within the state to a level 80% below the 1990 level by 2050. In support of that objective, the Energy Technical Committee set a target to reduce the baseline per capita energy consumption 10% by 2020. To achieve this objective, the Energy Technical Committee suggested the goals and initiatives outlined in Table 6.8.

NYSERDA and the utilities in the Region, including National Grid, NYSEG, Central Hudson, and Green Island Power Authority, each have various energy efficiency incentive programs already in place to support the Capital Region's goals. These incentives come in the form of rate discounts, capital project funding assistance, and energy audits, and are an important part of any planned energy efficiency project.

### Regional Initiatives

The Energy Technical Committee identified a number of initiatives that could help the Region achieve the seven goals outlined above. The details of initiatives were discussed by the

Committee and were evaluated for their overall benefits to the Region, costs, and feasibility. The initiatives were ranked by the public and the Committee and the top three priority initiatives identified via the process outlined in Chapter 2 are described below.

**Establish Energy Efficiency and Renewable Energy Financing Districts (or PACE program).** The most common challenge for residential and commercial property owners in upgrading their home or building to be more energy-efficient is the upfront cost of the upgrades. While efficiency upgrades are typically viewed as a worthy investment with a real payback, environmental benefits, and improved building performance, the reality is that many property owners—particularly residential and small business owners—do not have the upfront capital to make the investment. Energy efficiency and renewable energy financing districts, more commonly known as Property Assessed Clean Energy or PACE programs, allow property owners to borrow money to pay for energy improvements. The municipality will provide financing for the project, typically by selling bonds secured solely by payments made from participating property owners. The amount borrowed is typically repaid via a special assessment on the property over a period of up to 20 years. These programs can be established for the commercial or residential sectors, or both. Such a program could supplement the efficiency programs currently offered through NYSERDA or local utilities to create more significant

improvements in efficiency across two of the largest energy consuming sectors—the commercial and residential built environment. NY State has passed PACE-enabling legislation, but the funding to support it can only come from federal dollars under current law. Given that DOE's Energy Efficiency and Conservation Block Grant program has effectively come to an end, alternate federal sources would need to be identified or state legislation would need to be amended to allow for state/local/private investments in such programs. Also it is important to note that residential PACE programs have been halted due to federal litigation regarding the priority of the lien on the mortgage. Most communities that are implementing PACE programs at this point are focused solely on the commercial sector. Alternative solutions for funding such programs have also been implemented, such as in Babylon, NY. The Energy Technical Committee recommends this program be

implemented at the county level or by a group of municipalities in order to pool resources and reduce overhead costs.

**Establish a revolving energy efficiency improvement fund for local businesses.** The purpose of a revolving energy fund is to provide small businesses with low-interest loans to cover the initial costs of energy efficiency and renewable energy projects for their buildings and operations. Loans are provided at a low interest rate and are repaid by the business owner with savings achieved from projects. The loan could be for total or partial project costs and typically the fund would set a limit on the loan amount available. The repayment plus the interest costs collected keep the fund replenished so that loans can continue to be offered in the future. Revolving energy funds are a popular mechanism for financing energy improvements because after the initial capital is invested, the fund is

Table 6.7 Installed Solar PV Capacity by County

	Albany	Columbia	Greene	Rensselaer	Saratoga	Schenectady	Warren	Washington
Installed Solar PV Capacity (kW)	3736	2500	607	2854	3412	2604	676	592

Source: Installed Solar PV Capacity provided by NYSERDA PowerClerk. Current as of 10/25/2012. <http://nyserda.powerclerkreports.com>

<sup>4</sup>Installed Capacity includes only grid connected systems installed under NYSERDA PONs  
<sup>5</sup>[www.albany2030.org](http://www.albany2030.org)

Table 6.8 Energy Goals and Initiatives

Goals	Initiatives
Improve efficiency of buildings and operations in the residential, commercial, industrial, municipal and institutional sectors.	<ul style="list-style-type: none"> <li>Establish a revolving energy efficiency improvement fund for local businesses</li> <li>Create a standard environmentally preferable purchasing (EPP) policy</li> <li>Adopt a local energy-efficient building code</li> <li>Establish Energy Efficiency and Renewable Energy Financing Districts (or PACE program)</li> </ul>
Increase public awareness and understanding of energy efficiency, conservation, and renewable sources.	Part of all initiatives
Improve the Region's Energy Security and Resiliency.	<ul style="list-style-type: none"> <li>Implement a Smart Grid program</li> <li>Incentivize Combined Heat and Power District Energy Systems</li> </ul>
Support economic development of the Region through sustainable energy initiatives.	Establish Green Districts
Increase the percentage of the Region's energy that comes from renewable sources.	<ul style="list-style-type: none"> <li>Engage in Power Purchase Agreements</li> <li>Lower or eliminate permitting fees for energy conservation or renewables</li> </ul>
Reduce energy consumption and intensity throughout the Region as part of a larger GHG reduction plan.	Establish a local carbon tax

<sup>6</sup>[www.dec.ny.gov/energy/50845.html](http://www.dec.ny.gov/energy/50845.html)

<sup>7</sup>A summary of these incentive programs can be found at <http://dsireusa.org/incentives/index.cfm?re=0&ee=0&spv=0&st=0&srp=1&state=NY>





self-sustaining. Central New York Regional Planning and Development Board established an Energy Efficiency Revolving Loan Fund to support energy efficiency improvements as well as economic development goals within the Region. CNYRPDB's fund could serve as a model for the Capital Region if implemented at the Regional scale.

**Adopt a local energy-efficient building code.** Currently, new construction in New York State operates under the Energy Conservation Construction Code of New York State -2010 (ECCCNYS). Local governments can adopt their own energy conservation requirements, as long as they are no less restrictive than the current ECCCNYS. Local additions or changes to the code could include stricter energy efficiency requirements and/or green building standards. A stricter energy code results in higher performance buildings, lower energy costs, and higher property values. It also creates job training and job creation opportunities for home energy raters, high efficiency equipment suppliers and installers, and other related professionals.

The Energy Technical Committee recommends developing a stricter, standard energy efficient building code that could be adopted at the local level. This has been a successful model for implementation in Massachusetts, as shown in Figure 6.3, where local governments adopted a "Stretch Energy Code" as part of the requirements for becoming a Green Community. The Stretch Code specifically lays out requirements to improve on the current state energy code by at least 20%. Collaboration and education among local governments, building inspectors, home builder associations, and other developers will be an essential component of implementing this initiative.

The Energy Technical Committee identified other initiatives that were

not ranked among its top three. These other initiatives are listed below:

- Establish Green Districts
- Create a standard environmentally preferable purchasing (EPP) policy
- Engage in Power Purchase Agreements
- Implement a Smart Grid pilot program
- Incentivize Combined Heat and Power District Energy Systems
- Establish a local carbon tax
- Lower or eliminate permitting fees for energy conservation or renewables

An implementation strategy which outlines the resources, costs and timeline associated with achieving the priority initiatives, is provided in Table 6.9.

Figure 6.3 Stretch Energy Code Status

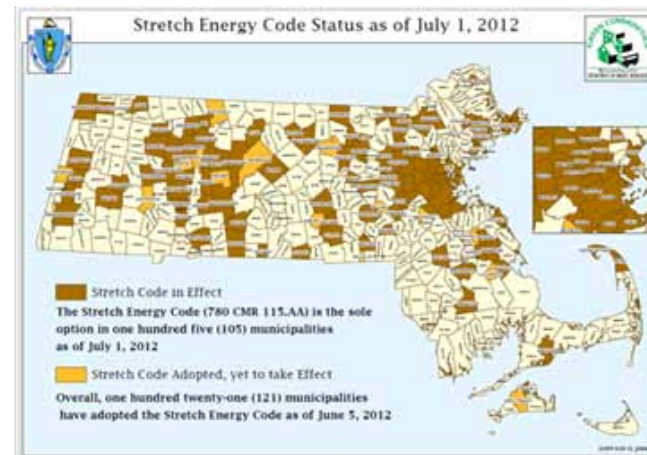


Table 6.9 Energy Implementation Strategy

Initiative	Regional Priority	Implementer	Partners	Preliminary Cost	Greenhouse Gas Reduction Potential**	Potential Funding Sources	Timeline
Establish Energy Efficiency and Renewable Energy Financing Districts (or PACE program)	1	County level or multiple municipalities/ counties	Municipalities – town, village, and county NYSERDA and/or DEC 3rd Party Financing Entity NYS Homes and Community Renewal Local Housing Authorities	\$\$\$	Medium	NY Environmental Protection Fund Local Solid Waste Funds US Dept. of Energy (as available) NYSERDA	Mid-Term (1-5 years)
Establish a revolving energy efficiency improvement fund for local businesses	2	Capital District Regional Planning Commission (CDRPC), Community Loan Fund of the Capital District, or non-profit partnership between financial entity and municipality(ies)	CDRPC Municipalities Banks Chambers of Commerce Center for Economic Growth (CEG) Community Loan Fund	\$\$	Low	Community Loan Fund Empire State Development funds NYSERDA	Short Term (<1 year)
Adopt a local energy-efficient building code	3	Local government (whichever level enforces building code)	NYS Builders Association Local developers Building Performance Contractors Association	\$	Medium	Municipal budget to cover administrative costs of code revisions, education, and implementation	Mid-Term (1-5 years)

\*Overall Cost: \$ - < \$100,000, \$\$ - \$100,000 to \$500,000, \$\$\$ - > \$500,000  
 \*\*Greenhouse Gas Reduction Potential: High – Strategy will result in a direct, quantifiable reduction in GHG emissions; Medium – Some GHG emissions reduction may occur but it cannot be quantified; Low – GHG reduction is very indirect, unlikely to occur, or unknown

*Long Island Green Homes, a program of the Town of Babylon, NY is a residential retrofit financing program in which the Town pays a contractor directly for the home energy improvements and the owner pays the Town back through a monthly payment that would be covered by their energy savings. Residents pay a 3% interest rate and if the homeowner moves, payments are passed on to the next owner. The Town implemented this program by defining energy waste as a form of waste and therefore provide a "benefit assessment" wherein the Town pays for energy improvements through its solid waste fund because the improvements serve as a public benefit. More information is available at <http://ligreenhomes.com/>.*

**Emissions Reduction Potential from PACE:**  
*If a residential PACE program were implemented in half of the Region and realized just a two percent uptake among homeowners, it would have the potential to reduce Regional GHG emissions by approximately 9,000 MTCDE, a potential that would be greater if implemented broadly and with high levels of participation.*

**Emissions Reduction Potential from Local Energy-Efficient Building Code:**  
*A Climate Policy Initiative report estimates that the impact of energy efficient building codes is a 1.8% reduction in GHG emissions from the residential building sector. Applying this rate to both the residential and commercial sector, if energy efficient building codes were implemented across the Region, the potential reduction would be 106,520 Metric Tons of Carbon Dioxide Equivalent.*

<sup>9</sup><http://www.cnyrpdb.org/docs/economic/EnergyLoanBrochure2012.rev1.pdf>





Table 6.10 Energy Governance Structure

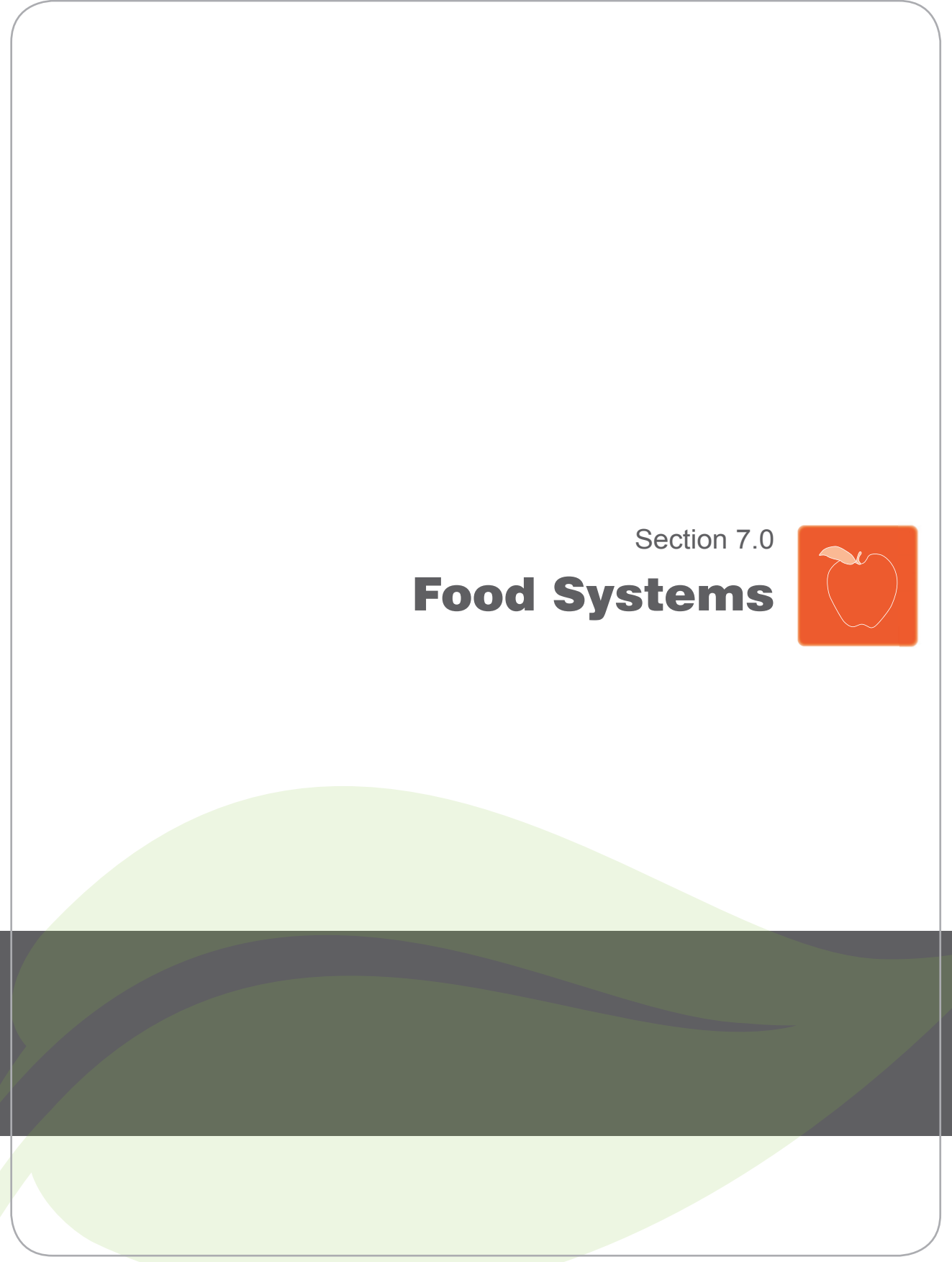
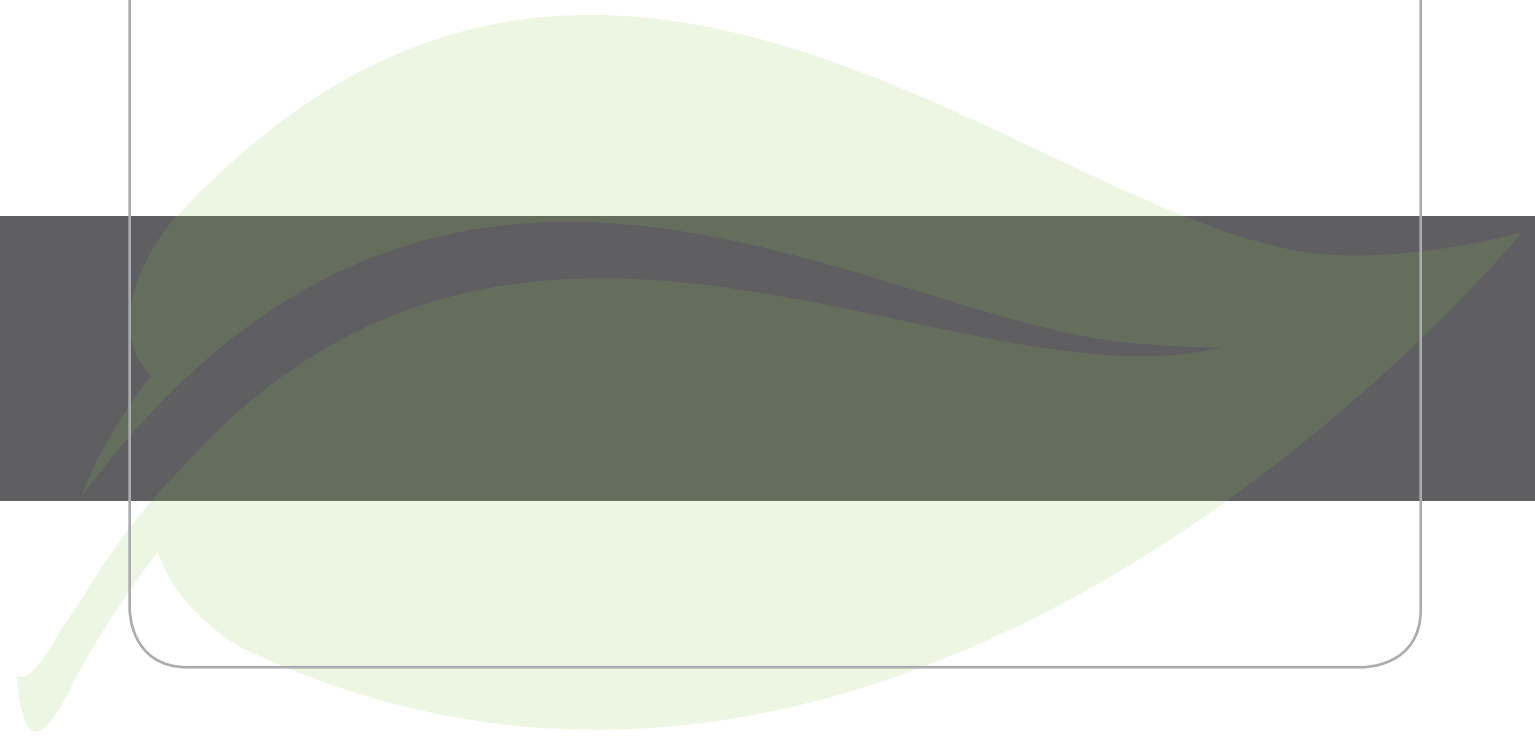
Name of Initiative	Process to Implement (update zoning ordinance, adopt a policy or plan, resolution to approve funding, etc.)	Related Policies – positive link-ages and alignments	Related Policies – barriers and cross-purposes	Local Government Level of Implementation
Establish Energy Efficiency and Renewable Energy Financing Districts (or PACE program)	Establish District	<p>Within the Energy focus area, generally complementary with efforts to promote energy efficiency and conservation.</p> <p>Could help support other initiatives focused on economic development such as Economic Development - Create Green Alliance Between Government and Business. Can also help support energy efficient housing options for Land Use- Promote Sustainable and Affordable Housing.</p>	May need to distinguish appropriate use of this financing vs. revolving loan fund. PACE has also faced legal issues.	Implementation at the County level, linked to collection of property taxes.
Local Business Energy Efficiency Improvement Fund	Establish Fund	<p>Within the Energy Focus Area, there are several initiatives that will be supportive of businesses including those targeting expedited permitting for energy conservation or renewables and financing districts. Fund could be used to support targeted business sectors in the Region, such as Food Systems-agriculture. Carbon tax revenues could be used to seed the fund.</p> <p>Complementary with Economic Development- Create Green Business Alliance Between Government and Business. Funds also could be used to support Waste-Site and Develop Anaerobic Digestion Facilities in the Region.</p>	Carbon tax could be perceived by some as disincentive for businesses.	Implementation at the Regional level; also potential local implementation at the larger city or county level.
Adopt a Local Energy-Efficient Building Code	Update Building Codes	<p>Within the Energy Focus Area, this initiative should be coordinated with proposed revisions to the permitting process, establishing green districts and encouraging district energy systems, all of which can also be addressed in code.</p> <p>This initiative should be coordinated with other code-related initiatives such as Adaptation - Create Floodplain Ordinances; Economic Development - Establish Model Zoning Code; and Land Use- Modify Local Codes and Land Use Regulations to Allow for Sustainable, Compact Development.</p>	Some jurisdictions have encountered challenges integrating energy efficiency and historic preservation objectives in Land Use- Develop and Implement Sustainability Guidelines for Historic Buildings and Districts.	Driven by state code requirements but implementation by all jurisdictions at the local level for any comparable or above-standard code development; may in some cases be at county level where building code is enforced.

In addition to the implementation strategy above, it is recognized that these initiatives will require action by the local government to implement. To that end, the governance structure is intended to outline a process for local governments to implement the priority initiatives and the policies and programs where there are alignments or hindrances to implementation. Table 6.8 identifies the applicable governance structure for these initiatives.



Section 7.0

# Food Systems





## SECTION 7.0: **Food Systems**

*A food system encompasses the chain of activities that connect all aspects of the food life cycle from the farms that produce our food, the farmers who work to produce it, and the people who consume it*

In 2010, the Academy of Nutrition and Dietetics (formerly American Dietetic Association), American Nurses Association, American Planning Association, and American Public Health Association initiated a collaborative process to develop a set of shared food system principles to support sustainable food systems that promote health – the current and future health of individuals, communities, and the natural environment (APA, 2012).

The focus of this chapter of the Sustainability Plan is to create and sustain a regional food system for the 21st Century – one that supports local farmers and creates economic development opportunities for both new and experienced farmers. In order to accomplish this, the initiatives in this chapter focus on protecting farmland to support local food production as well as investing in the creation of additional processing and distribution facilities to sustain the region's food production competitiveness. In addition to initiatives that sustain food production, processing and distribution, this chapter also recommends projects and programs that enhance access to healthy food for all the region's citizens by expanding community gardens, providing local fresh produce at local neighborhood stores, and distributing donated food to those with immediate need.

### **Best Practices**

Farmfinder Website - New England Farmland Finder website at ([newenglandfarmlandfinder.org](http://newenglandfarmlandfinder.org)) helps farmers and landowners find each other. It contains information and resource links to inform and support farm seekers and landowners. The site was launched by a collaboration of New England organizations focusing on farmland access issues. The new service complements local and statewide efforts to match new farmers with available land.







### Best Practices

Urban Agriculture – City of Portland, OR allows agriculture that “includes activities that raise, produce or keep plants or animals” under its agriculture use category. Feedlots, food processing, livestock auction, and retail plant nurseries are mentioned under different use categories. This agriculture use category is permitted by right in all industrial districts and low-density residential districts, and conditional in medium density districts and some retail commercial districts. In Madison, Wisconsin the zoning ordinance allows the “keeping of up to four (4) chickens on a [residential] lot” provided the owner obtains a license (\$10.00/ year) and follows the enclosure and setback rules stipulated in the ordinance.

### Regional Baseline

The Capital Region’s agricultural sector is strong and diverse, including businesses that provide goods and services to farmers, such as feed and fertilizer; farms that produce a variety of crops, dairy, livestock and other farm products; food processors; and trucking companies involved in processing, distributing, and marketing food and food products. The Region’s agricultural economy supports approximately 3,300 businesses that generate over \$9.9 billion in revenue (CREDC, 2011).

### Small Farms within the Capital Region

Within the Capital Region, there are many small-scale farming operations with farmers producing to provide secondary income or farming for lifestyle reasons. Over half of the farms in the Capital District have sales of less than \$10,000 annually (USDA, 2007).

According to the Capital Region Economic Development Council, in 2011 there were 34,400 employees working in the agricultural sector, with the average business generating \$3.5 million in sales and employing 11 individuals (CREDC, 2011). In addition to farming, the agricultural sector includes businesses that process, transport, warehouse, distribute, and harvest agricultural products. The region’s farms support numerous ancillary businesses such as feed and fertilizer suppliers, equipment sales and repairs, fuel, and veterinary services (NY Data Book, 2008). According to the 2011 Capital Region Economic Development Council Strategic Plan, the agricultural industry has provided “a solid platform for economic growth and job creation over the last five years, posting a 20 percent growth in firm numbers and nearly 1 percent growth in employment base over a period when the balance of the economy contracted (CREDC, 2011).”

New York State is recognized as a national leader in agricultural productivity. Within the Capital Region, farmers sold \$19 million worth of fruit, tree nuts and berries in 2007 (USDA, 2007). The Capital Region is also a top producer of animals, animal products, and animal feed. For example, Washington County has the third-highest farm acreage for corn for animal feed (silage) in New York State and Columbia County is first in the State in the sale of sheep, goats, and their products (OSC, 2010). Other crops and hay make up five percent of the total crop production market value of the entire Capital Region, and is particularly dominant in Saratoga County where hay and other grass silage products are worth approximately \$4 million (USDA, 2007) (Ranking, 2007). Milk and other dairy products sold in the Capital Region brought in \$173 million to the region in 2007 (Ranking, 2007). Within the region, Washington, Columbia, Saratoga and Rensselaer Counties all have significant dairy production.

*Farmers Markets can provide access to fresh, healthy produce to areas that are typically underserved by full service grocery stores. A satellite farmers market, based on the successful Schenectady Greenmarket, is being located within a Schenectady “food desert” in the Bellevue neighborhood. Funding for the satellite market is from a \$7,000 grant through the New York State’s Fresh Connect Program.*

While the Capital Region’s agricultural economy continues to be strong, farmland in the region is vulnerable to sprawl-type development. An analysis of farmland and development patterns by the Columbia Land Conservancy in Columbia County found that the amount of land in agricultural use was declining. In fact, the entire Capital Region had a net loss of about 45,000 acres of farmland and 16 farms just in the five year period between of 2002 and 2007, which was the year of the last USDA survey.

One of the primary tools that New York State uses for farmland protection is its Agricultural Districts Program, which promotes the continued use of farmland for agricultural production through a number of farmer benefits. The program’s benefits include preferential real property tax treatment (agricultural assessment and special benefit assessment), protections against overly restrictive local laws, government funded acquisition or construction projects, and private nuisance suits involving agricultural practices (NYS Department of Agriculture and Markets, 2012).

*The agricultural industry has provided “a solid platform for economic growth and job creation over the last five years posting a 20 percent growth in firm numbers and nearly 1 percent growth in employment base over a period when the balance of the economy contracted.*

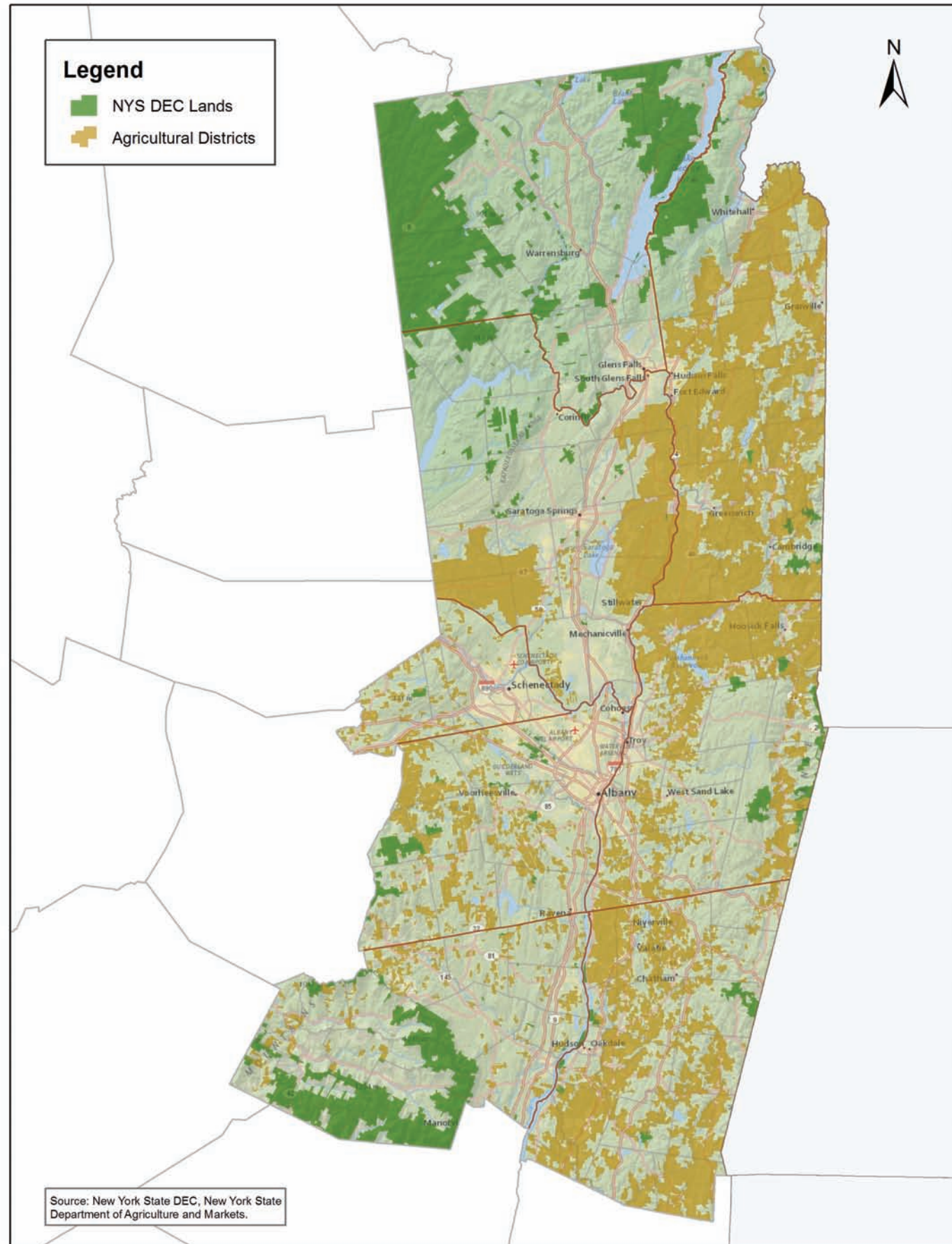
Figure 7.1 (next page) shows the Capital Region’s current designated agricultural districts (except Warren County – spatial data was not available through Cornell). More than one-fifth of the Capital Region’s lands are designated as agricultural districts, with about 18 percent in active farming, including Warren County (CREDC, 2011). However, not all farmers in the region may be aware of the benefits offered by enrolling in the agricultural district, making outreach and support for this program a priority to continue to protect the region’s agricultural lands (Town of Charlton, 2010).

<sup>1</sup>Food Systems also include how excess farm products (or organic waste) are handled. In this plan, organic waste is discussed in the Waste chapter.





Figure 7.1 Agricultural Districts and NYS Department of Environmental Conservation Land within the Capital Region



### Food Processing and Distribution

While the preservation of existing farms and the creation of new farms are important to sustaining viable farmland, there are two other important components of sustainable food systems – processing and distribution. Of the 340 meat, poultry, and egg processing facilities in New York State regulated by the USDA’s Food Safety and Inspection Service (FSIS), approximately 23 are in the Capital Region in Albany, Columbia, Rensselaer, Saratoga and Schenectady Counties (FSIS, 2012).

The current locations of all food processing and distribution facilities were not available for the entire Capital Region, however, a review of the literature indicates there is a need for additional processing operations (washing, grading, freezing and packing fruit and vegetables, slaughter and mills) and wholesale distribution serving local farm products (Williams and Zimmerman, 2010). However, the USDA and New York State inspection and certification processes can be somewhat of a barrier for individual farmers to surpass due to the complexity and requirements that can vary by size, scale, and type of processing facility.

The Capital Region Economic Development Council Strategic Plan encourages the creation of “an urban kitchen incubator in one or more of the Capital Region cities to encourage food entrepreneurs who need access to a licensed commercial kitchen and want to work with locally produced ingredients in their start-up food retailing or catering businesses.” (CREDC, 2011) Providing adequate processing and distribution facilities, located more strategically throughout the region, can improve profit margins for farmers helping to keep the Capital Region competitive within the larger agricultural economy and remove the barrier for new farmers to process and distribute their products.

*In support of regional collaboration on agriculture, the American Farmland Trust recently sponsored a conference in November 2012 in Saratoga Springs called **Harvesting Opportunities in New York: Growing Local Food Economies and Protecting Farmland**, to inspire and educate New Yorkers to support agriculture, strengthen local farm and food economies, and protect farmland. Farmers, public officials, land trusts, local food and public health leaders, and concerned citizens were all invited to attend.*

### Consumption

Another important element of a food system is consumption. Within the Capital Region, there is great demand for regional agricultural products, as seen in the increasing number of farmers markets and community supported agriculture (CSA) programs throughout the region. Today, there are 52 farmers markets throughout the region, with at least a couple occurring in each county (see Table 7.1 for details).

Despite a strong agricultural presence, many Capital Region residents do not have adequate access to affordable, healthy food

*Food deserts are defined as low-income census tracts where a substantial number or share of residents has low access to a supermarket or large grocery store.*

Low-access to a healthy food retail outlet is defined as households that are more than 1 mile from a supermarket or large grocery store in urban areas and as more than 10 miles from a supermarket or large grocery store in rural areas (USDA ERS, 2012).





According to the USDA, ten census tracts in Albany County, nine census tracts in Schenectady County, and two census tracts in Columbia County are classified as food deserts (USDA ERS, 2012). Figure 7.2 provides a map of food deserts in Albany and Schenectady Counties. More than 40,000 people in Albany County, almost 20,000 people in Schenectady County, and 7,500 in Columbia County live in food deserts.

Table 7.1 Number of Farmers Markets in the Capital District Region

County	Farmers Markets	Farmers Markets Participating in WIC/FMNP	Number of Year Round Farmers Markets
Albany	15	15	1
Columbia	7	5	1
Greene	2	2	0
Rensselaer	5	3	1
Saratoga	8	8	3
Schenectady	9	4	1
Warren	4	4	1
Washington	7	7	0
Total	52	48	8

Source: NYS Department of Agriculture and Markets: <http://www.agriculture.ny.gov/>  
 Notes: WIC is a federally-funded health and nutrition program for women, infants, and children.

FMNP is the Senior Farmers Market Nutrition Program awards grants to States to provide low-income seniors with coupons that can be exchanged for eligible foods (fruits, vegetables, honey, and fresh-cut herbs) at farmers' markets, roadside stands, and community supported agriculture programs.

The existence of food deserts has also been linked to public health concerns, including increased obesity rates, in studies of urban areas (Whitacre et al., 2009)(Ploeg et al., 2009)(Mari Gallagher, 2007). As shown in Figure 7.3, adult obesity rates in the region are nearing 30 percent in five counties, and the low-income preschool obesity rate in four counties is over 15 percent (see Figure 7.1). The region's adult obesity rate of 27.2 percent is above New York State's average of 23.9 percent (CDC, 2012). The obesity rates are also above the Healthy People 2010 targets established by the Center for Disease Control (CDC), which establishes adult obesity targets of no more than 10 percent and childhood obesity targets of no more than 5 percent (CDC, 2011). Increasing access to grocery stores with fresh produce can be an effective tool in reducing obesity rates in the region.

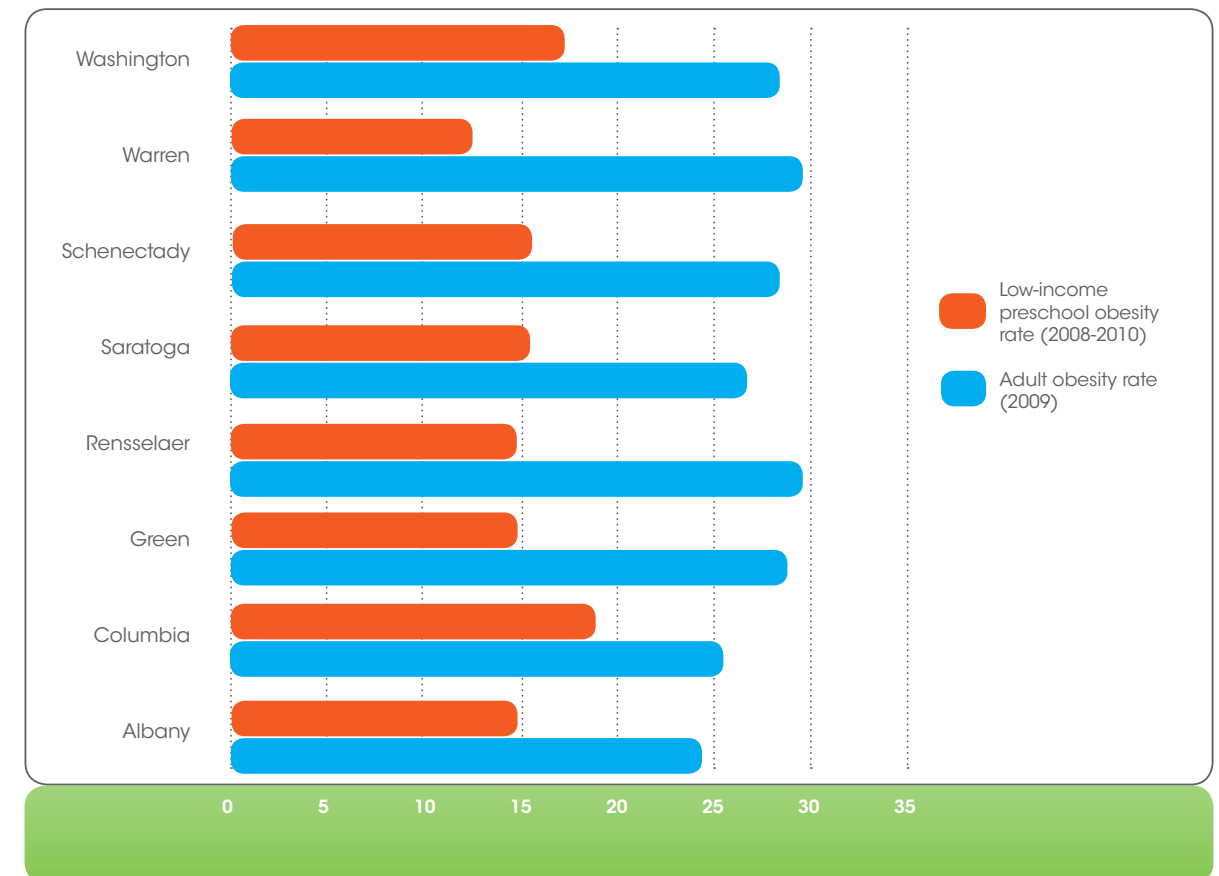
*Capital Region had a net loss of about 45,000 acres of farmland and 16 farms just in the five year period between of 2002 and 2007.*

Figure 7.2 Food Deserts



Source: U.S. Department of Agriculture. Food Desert Location Documentation. Accessed June 2012. <http://www.ers.usda.gov/data/fooddesert/documentation.html>

Figure 7.3. Adult and Low-Income Preschool Obesity Rates





### Greenhouse Gas Emissions

Sectors of the Regional Greenhouse Gas Inventory that are relevant to the Food Systems focus area of this Plan include agriculture, waste, transportation, and energy. A detailed breakdown of emissions by sector, source, and by county can be found in Appendix 8. In other words, food systems are connected to all of the major sources of greenhouse gas emissions within the region. While the direct contribution of food systems within each of these sectors cannot be quantified, GHG emissions are generated from commercial buildings that process and distribute food, from fuels burned in the transport of fuels across the region, from the decomposition of food waste in landfills, and from agriculture processes in the growing of food. Therefore, while no direct reduction potential could be measured for any one initiative identified for Food Systems in this plan, the potential contribution to emissions reduction from strategies such as locally sourcing foods, making food processing facilities more efficient, increasing composting options and other methods of handling food waste, and improving agriculture practices, can all have a significant impact in reducing a portion of the Region's 17.5 million metric tons of CO<sub>2</sub> emissions.

The Regional Food Bank of Northeastern New York collects large food donations from the food industry and distributes it to charitable agencies serving hungry and disadvantaged people in northeastern New York, which includes the Capital Region. In 2011 alone, the Regional Food Bank distributed 10.8 million pounds of food to agencies in the Capital Region.

### Current Initiatives

Despite some of its challenges, the Capital Region is addressing many food systems' issues, such as establishing local policies, farmland preservation and increasing access to local and healthy food, for all residents in the region. Assistance and support is available at many levels in the Region:

**Local governments develop and implement Agricultural and farmland Protection Plans, and adopt Right to Farm Laws;**

**The Soil and Water Conservation Districts and USDA Farm Service Agency and Natural Resource Conservation Service assist farmers with land conservation and farm management programs; and**

**Non-profit organizations have been actively preserving farmland in the region, including the American Farmland Trust(www.farmland.org), Agriculture Stewardship Association (www.agstewardship.org), Scenic Hudson (www.scenichudson.org), Open Space Institute (www.osiny.org), Rensselaer Land Trust (www.renstrust.org), and the Columbia Land Conservancy (clctrust.org) . The Cornell Cooperative Extension has offices throughout the Capital Region that support local farm businesses by offering technical service, workshops, tours, newsletters and one-on-one consultation.**

Also active in the Capital Region's urban centers, the Capital District Community Gardens (CDCG) (www.cdcg.org) is a nationally recognized non-profit organization that fosters self-sufficiency through gardening, improves access to fresh fruits and vegetables in underserved areas, and revitalizes urban neighborhoods by turning vacant lots into productive neighborhood garden spaces. In addition to many other food based initiatives (see sidebar), CDCG operates 48 community gardens in communities in Albany, Rensselaer, Saratoga, and Schenectady Counties.

*One of the primary tools that New York State uses for farmland protection is its Agricultural Districts Program, which promotes the continued use of farmland for agricultural production through a number of farmer benefits.*

**The Capital District Community Gardens runs the following programs:**

The successful Veggie Mobile produce market makes regular stops in urban neighborhoods with poor access to food and distributes affordable, fresh produce.

The Healthy Convenience Store Initiative program supports inner-city convenience stores to provide affordable produce in the urban neighborhoods of Albany, Schenectady and Troy. The program is supported with a grant from the Albany County Health Department.

The Produce Project involves Troy High School students in operating an organic, year-round urban farm business in Troy. By selling their crops to local restaurants and at farmers markets, students learn entrepreneurial skills while earning money that will help sustain the Produce Project.

Within the Squash Hunger program, fruits and vegetables donations are brought to shelters, pantries, and soup kitchens by volunteers.

### Goals

Based on the issues identified in the baseline assessment and discussions with the Food Systems Technical Committee, eight overarching goals were identified for food systems. The Technical Committee identified goals for four categories: 1) Production; 2) Processing; 3) Distribution; and 4) Consumption. Food waste, which is an important component of food systems, is addressed in the Solid Waste chapter of this Plan. Three goals under Production address preservation and enhancement of agricultural land to support the economy and protection of the rural lifestyle desired by many Capital Region residents. The Processing and Distribution categories include three goals that emphasize the creation of processing facilities and increasing access for farmers to regional distribution networks like grocery stores and farmers markets. The final two goals, in the Consumption category, include two goals to promote the consumption of local food and increased access by all sectors of the population. Table 7.2 lists the goals and related initiatives for Food Systems.

Table 7.2 Food System Goals and Initiatives

Goals	Initiatives
Prioritize the protection of agricultural land Increase the volume of local food production commensurate to existing and future demand. Maximize the utilization of land appropriate for agriculture and encourage production using sustainable and best management practices.	<ul style="list-style-type: none"> <li>Create a Regional Farmland Protection Plan</li> <li>Build capacity for new and existing farmers by establishing a Farmers Support and Enhancement Program</li> <li>Create/reestablish a Regional Food and Agricultural Coalition for the Capital Region</li> </ul>
Enhance the capacity and number of processing facilities for meat, produce, and other local agricultural products.	<ul style="list-style-type: none"> <li>Create additional medium to small-sized processing facilities, including kitchen incubators, throughout the region</li> </ul>
Increase distribution of locally produced foods to institutions and food stores, including large chain grocery stores and corner stores.	<ul style="list-style-type: none"> <li>Establish a regional "Farm-to-Market Initiative" that includes Institutions, Urban Areas and Individual Consumers</li> </ul>
Create a variety of warehousing and storage options to accommodate seasonal food options and adverse weather conditions	<ul style="list-style-type: none"> <li>Create a food hub for regional food processing, storage, and distribution</li> </ul>
Augment access to fresh produce for residents across the capital region from urban neighborhoods to rural settings.	<ul style="list-style-type: none"> <li>Establish a regional gleaning and food recovery program</li> <li>Establish an initiative to create/increase "local food" transactions, especially between large grocery stores and farms</li> </ul>
Educate consumers and food buyers about the benefits of eating healthy, preparing, and purchasing local foods	<ul style="list-style-type: none"> <li>Create a Regional Healthy Corner/Convenience Store Network</li> </ul>





### Regional Initiatives

The food systems initiatives were developed to meet the overall food systems goals through each phase of the food system, from production to consumption. As previously mentioned, food waste is addressed in the Solid Waste chapter of this Plan. Nine initiatives were identified for food systems. The public and the Food Systems Technical Committee prioritized these initiatives and identified the top three initiatives for proposed funding through the process described in Chapter 2. **The first initiative**, to create a food hub for regional food processing, storage, and distribution, is focused on providing a centralized facility to store, process, and disseminate agricultural products.

**The second initiative** recommends creating a coalition of food and agricultural stakeholders working together to address regional agricultural issues. **The third initiative** would increase local food transactions between residents, regional food stores, and farmers. The food systems initiatives are listed below in the order that they were ranked by the Food Systems Technical Committee.

**Create a food hub for regional food processing, storage, and distribution.** A food hub is a facility that centralizes the business management structure to facilitate the aggregation, storage, processing, distribution, and/or marketing of locally and regionally produced food products

A food hub may provide the core services of a packing house, and/or aggregate and distribute farm-packed cases. This initiative would be to either create a new food hub or augment the capacity and infrastructure at the current farmers market and food hub in Menands, NY.

The first step in implementing this initiative would be to define the 'food shed.' It will be important to understand the geographic boundaries of the area that the food hub will need to serve to identify the stakeholders and understand capacity needs for the hub. In order to assess the viability and need for a food hub or multiple food hubs, the implementer, in this case the Capital District Community Gardens and yet to be established Regional Food and Agricultural Coalition, should undertake a gap analysis to review needs and feasibility, including infrastructure, location, connection to transportation networks, investment needs, and funding sources.

### Best Practices

Farm to Hospital Program - The University of Virginia Health System serves 45,000 meals per week. In order to obtain the needed volume of produce to serve this number of meals, items must be ordered from a number of farms. To address the issue of procurement and delivery, the hospital works with the Local Food Hub (LFH), a fast-expanding aggregator of produce from 70 farms within 100 miles, which has passed along \$750,000 of local produce to its customers. Also, the Local Food Hub operates farm-stands in the hospital cafeterias, a health-promoting service to hospital staff, patients and visitors.

*Why are regional food hubs important? According to the USDA, "many farmers and ranchers—especially smaller operations—are challenged by the lack of distribution and processing infrastructure of appropriate scale that would give them wider access to retail, institutional, and commercial foodservice markets, where demand for local and regional foods continues to rise. Food hubs offer a combination of production, distribution, and marketing services that allows them to gain entry into new and additional markets that would be difficult or impossible to access on their own." (USDA, Regional Food Hub Resource Guide, 2012)*

**Re-establish a Regional Food and Agricultural Coalition for the Capital Region.** This initiative envisions an organized coalition of stakeholders that would meet regularly to identify needs, gaps, and advocate for and promote the region's agricultural sector. This includes investigating local, regional and state food policies; address hunger abatement and food justice; create a more efficient processing and food distribution network; and enhance access of the region's residents to healthy locally produced food. The Regional Food and Agricultural Coalition would initiate collaboration efforts with agriculture, higher education, technology, transportation and economic development organizations and institutions to promote the Capital Region agricultural products. One of its first orders of business would be to evaluate the feasibility of a food hub or hubs in the region. The Capital Region Economic Development Council Strategic Plan also

*Many non-profit organizations have been actively preserving farmland in the region, including the American Farmland Trust, Agriculture Stewardship Association, Scenic Hudson, Open Space Institute, Rensselaer Land Trust, and the Columbia Land Conservancy.*

charges a Farm and Food Coalition to work with local business schools about next generation concepts to enhance the competitiveness of the local agribusiness.

**Establish an initiative to create/increase "local food" transactions, especially between large grocery stores and farms.** This initiative would encourage the region's grocery stores, restaurants, residents, and institutions to purchase local food from the region's farmers. This will require overcoming significant hurdles because larger businesses are accustomed to buying from the larger suppliers. Part of this initiative may include a branding campaign that restaurants, grocery stores, and retailers could use to market locally grown foods to consumers. This initiative may require additional study to identify the current hurdles for the region's grocery stores in working with local farms and how they may be overcome. A good model for a regional initiative that creates and increases "local food" transactions can be found in Western Massachusetts under Community Involved in Sustaining Agriculture (CISA). This program involves residents, restaurants, grocery stores, and retailers in supporting local agriculture and has seen rapid growth and participation over the past several years:

- **Community membership in CISA grew by 188 households, an increase of 42% from 2009**
- **In 2010, the number of farms, restaurants, retailers and related food businesses participating in CISA's e a Local Hero, Buy Locally Grown® program increased by 10% to over 300 (CISA, 2010)**

The Food Systems Technical Committee identified six other important initiatives to address regional food sustainability, including (in the order they were ranked):

- **Create additional medium to small-sized processing facilities, including kitchen incubators, throughout the region**
- **Build capacity for new and existing farmers by establishing a Farmers Support and Enhancement Program**
- **Create a Regional Farmland Protection Plan**
- **Establish a regional gleaning and food recovery program**
- **Create a Regional Healthy Corner/Convenience Store Network**

*The Food Systems Technical Committee identified the creation of additional medium to small-sized processing facilities as one of the top priorities for the region. Committee members agreed there is a need for more processing facilities at all levels of food production, in particular brewing, meat, and specialty food processing facilities. Potential funding for food processing businesses could be found through the USDA - Rural Economic Development Funds; SARE - Sustainable Agriculture; State Agriculture and Markets development program; County IDAs; and partnerships with local universities and business schools. One idea that could help meet this demand would be to use school and university kitchens which are typically not used during summer months for small-scale processing operations when agricultural production in the region is at its peak.*





Table 7.3 Food Systems Implementation Strategy

Initiative	Regional Priority	Implementer	Partners	Preliminary Costs	Greenhouse Gas Reduction Potential**	Potential Funding Sources	Timeline
Create a food hub for regional food processing, storage, and distribution	1 2 3	Capital District Community Gardens and Regional Food and Agricultural Coalition	Capital District Cooperative, Inc. Capital District Community Gardens USDA Distributors Food Service Corps Institutions/Hospitals Skidmore College SUNY Albany Cornell Cooperative Extension Farmers Farm Bureaus Economic Development stakeholders County IDAs	\$\$\$	Medium	USDA - Rural Economic Development Funds SARE - Sustainable Agriculture State Agriculture and Markets development program County IDAs	Long Term (greater than 5 years)
Re-establish a Regional Food and Agricultural Coalition for the Capital Region		Capital District Community Gardens	Local governments or elected officials Emergency Food provider; USDA Statewide food policy council Farm Bureaus American Farmland Trust NOFA Cornell Cooperative Extension (Farm and Nutrition) Local food and public health leaders Urban representatives (such as the Affordable Housing Partnership) Skidmore College and other higher education institutions	\$	Low	USDA Value Added Producer Grants USDA Community Facilities Grants USDA Community Food Projects Grants Competitive Grant Program (CFP)	Short Term (<1 year)
Establish an initiative to create/increase "local food" transactions, especially between large grocery stores and farms		Capital Region Economic Development Council	Grocery store chain owners and managers Farmers Farm Bureaus Cornell Cooperative Extension Regional Food and Agricultural Coalition Restaurant owners Local government officials and planning staff	\$\$	Medium	USDA Farm to School grant program USDA Food and Nutrition Service Program Discretionary Grants USDA's Rural Development Business Opportunity Grant	Mid-Term (1 - 5 years)

\*Overall Cost: \$ - < \$100,000, \$\$ - \$100,000 to \$500,000, \$\$\$ - > \$500,000

\*\*Greenhouse Gas Reduction Potential: High - Strategy will result in a direct, quantifiable reduction in GHG emissions; Medium - Some GHG emissions reduction may occur but it cannot be quantified; Low - GHG reduction is very indirect, unlikely to occur, or unknown

In addition to the implementation strategy above, it is recognized that these initiatives will require action by the local government to implement. To that end, the governance structure is intended to outline a process for local governments to implement the priority initiatives and the policies and programs where there are alignments or hindrances to implementation. Table 7.4 identifies the applicable governance structure for these initiatives.

Table 7.4 Food Systems Governance Structure

Name of Initiative	Process to Implement (update zoning ordinance, adopt a policy or plan, resolution to approve funding, etc.)	Related Policies - positive linkages and alignments	Related Policies - barriers and cross-purposes	Local Government Level of Implementation
Create a Food Hub for Regional Food Processing, Storage, and Distribution	Establish Physical Home and Infrastructure for Food Hub Zoning and building code updates Transportation infrastructure improvements	The various initiatives in the Energy Focus Area that incentivize energy conservation and renewables could help support the viability of a hub. Such a hub could also be part of the Energy-Establish Green Districts initiative.	None identified	Establish at the regional level
Re-establish a Regional Food and Agricultural Coalition for the Capital Region	Establish Coalition with appointed members from local governments in the region	The Coalition could assist with implementation of the Food Hub and creation of processing facilities. They could also serve as a resource for local governments creating farmland protection plans.	None identified	Establish at the regional level
Establish an initiative to create/increase "local food" transactions, especially between large grocery stores and farms	NA - no Governance structure			



Section 8.0

# Land Use and Livable Communities





## SECTION 8.0: **Land Use and Livable Communities**

*L*ivability is based on several key principles including: providing transportation choices; promoting equitable, affordable housing; enhancing economic competitiveness; supporting existing communities; coordinating policies and leveraging investments; and valuing communities and neighborhoods (PSC, 2012).

Land use policies have a direct relationship to each of these principles, making it an essential component to creating and supporting livable communities.

The focus of this chapter is to create a Region composed of livable communities. In order to accomplish this, the initiatives in this chapter focus on land use solutions that protect and enhance the Region's natural and cultural resources, encourage investment and redevelopment that create connected and walkable communities, and promote diverse, affordable and energy efficient housing.

### *Regional Baseline*

A baseline assessment was performed to identify existing land use and livability conditions in the Capital Region, and to identify needs and opportunities for sustainable land use planning. Data was obtained from a variety of resources including U.S. Census, National Land Cover Dataset, NOAA's Coastal Change Analysis Program (C-CAP) as well as several Regional planning studies. Baseline data includes land use, population growth, aging population, poverty and housing.







### Land Cover and Development Overview

The eight-county Capital Region covers an area of approximately 5,340 square miles. As shown in Figure 8.1 (and as mapped in Figure 1.4), 60 percent of the land cover in the Capital Region is forested, according to C-CAP data. Agriculture and woody wetlands are two other dominant land covers in the Region. NYSDEC alone manages approximately 286,700 acres of land in the Region, and this doesn't include other local and private conservation lands.

Developed land (C-CAP, 2006) accounts for just over five percent of the land in the Region. According to C-CAP, approximately 3.3 square miles of land in the Region was developed between 1996 and 2006. The amount of developed land counted here, however, has been underestimated since this data is based strictly on satellite imagery (which is captured in 30 meter by 30 meter pixels) and therefore often fails to document

Table 8.1 Housing Affordability Index

Area	1990	2000	2006*
Capital Region	3.1	2.4	3.3
Albany County	3.3	2.6	3.5
Columbia County	3.5	2.7	NA
Greene County	3.3	2.5	NA
Rensselaer County	2.9	2.3	2.8
Saratoga County	2.9	2.3	3.5
Schenectady County	3.0	2.2	2.8
Warren County	3.0	2.4	3.4
Washington County	2.4	2.1	NA

\*Data for Albany, Rensselaer, Saratoga, Schenectady and Warren Counties only in 2006.  
 \*\*Affordability Index (Median Value of Owner Occupied Units/Median Household Income).  
 Source: New York State Division of Housing and Community Renewal, 2008

C-CAP uses multiple dates of remotely sensed imagery to produce nationally standardized land cover and land change information for the coastal regions of the U.S. This analysis includes all of the Capital Region. While efforts have been made to ensure that data are accurate and reliable within the limits of current technology, C-CAP data sets are not jurisdictional or intended for use in litigation. These data are intended for use in identifying regional landscape patterns and major functional habitats. C-CAP is a national and regional data set that should be used only as a screening tool for very local or site-specific management decisions. Small features and changes should be verified with a higher resolution data source

Figure 8.1 Land Use in the Capital Region (2006)

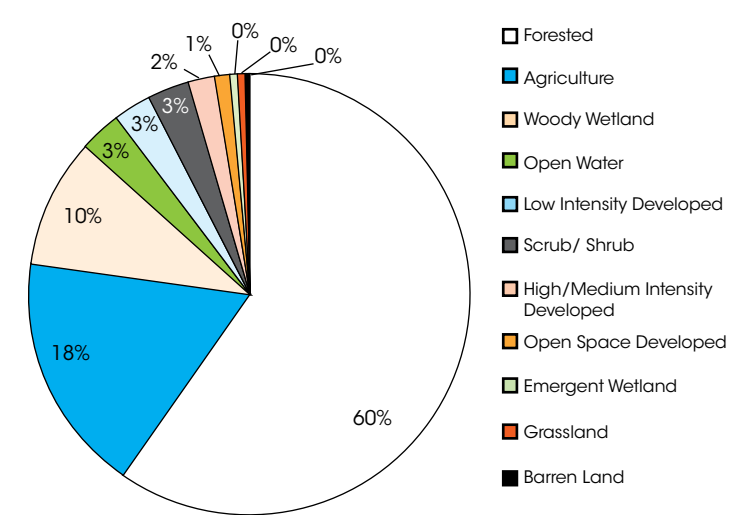


Figure 8.2 Development in the Capital Region

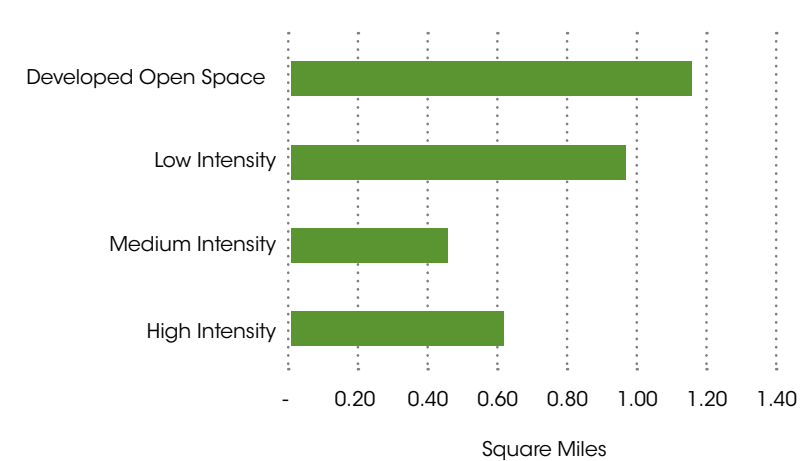
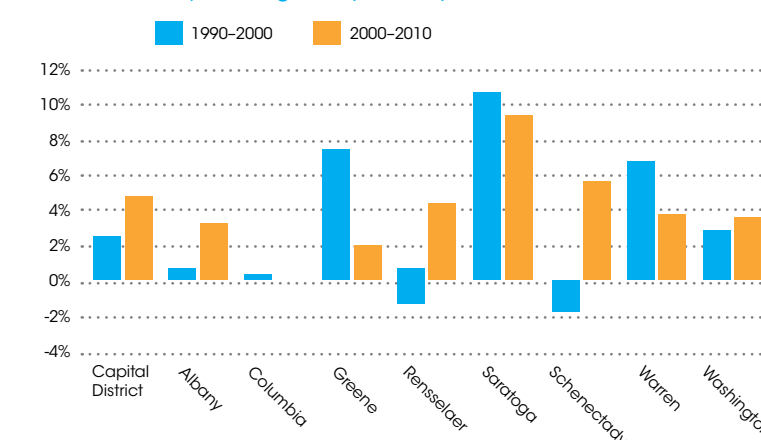


Figure 8.3 Population Change in the Capital Region 1990-2000 compared to 2000-2010 Capital Region by county



### Best Practices

Density Incentives - Arlington County created a green building density bonus program that allows builders to request a larger building than is normally allowed by County Code if the project gains official LEED certification at any of the four levels. The amount of the bonus depends on the award level of the project.

small scale/low density development. In reality, much more land has been developed during this period. Most of the newly developed land was formerly forested land. As shown in Figure 8.2, most of the land developed in the Region during this period, was for developed open space (which could include residential parcels with large amounts of open space and developed recreational uses such as golf courses) and low density residential uses. This may be indicative of an increase in sprawl.

### Land Use

Since land use regulations in New York State are primarily controlled by local laws, individual communities have the ability to provide zoning, subdivision regulations, environmental regulations, and others, which are often guided by a comprehensive planning process that sets priorities for land use regulation. In the case of the Capital Region, some communities have extensive planning processes and regulations, while others have limited regulations or resources, including a lack of zoning regulations.

### Population Growth

The increase in development in the Capital Region is accompanied by an overall increase in population. According to the U.S. Census, the Capital Region's population grew by almost five percent between 2000 and 2010. This is the second highest growth rate in New York State's ten Regions according to A New Vision for the Capital Region's Economy (Regional Economic Development Council, 2011). As

### Community Planning and Conservation in Clifton Park, NY

Through a tool called Transfer of Development Rights (TDR), the Town of Clifton Park in Saratoga County, NY is managing land development to protect commercially viable agricultural land and preserve natural resources.

TDRs send or transfer some or all development rights from one property to another. The "receiving" properties are allowed to develop more intensively than would normally be permitted by the area's zoning. TDR "sending" areas seek to preserve important community land resources (e.g. agriculturally productive soils, groundwater recharge areas, wildlife habitats, etc.).

Flexibility in the TDR program even allows transfer of development rights from one political jurisdiction to another.

The TDR program as stipulated in Chapter 40 of the NYS Laws of 1989 is:

- A voluntary, flexible program.
- A low-cost way to conserve important lands.
- Managing the exchange and holding of the development rights is the unique cost associated with the TDR program.
- Like other land preservation programs, TDRs incur costs associated with the permanent protections of land.

Clifton Park's TDR Program:  
The town recently developed a program that:

- 1) Protects lands in the sensitive western portion of Town (sending properties), and
- 2) Allows bonus density incentives for developments in other locations in the Town (receiving properties).

<http://saratogaplan.org/documents/PDR-TDR-FS.pdf>





shown in Figure 8.3, all counties within the Region experienced growth over this time span. Saratoga County, in particular, had the highest growth in the entire state (9.5 percent).

This growth is a dramatic change from the previous ten-year period. Between 1990 and 2000, the Capital Region grew by just over two percent overall. Some counties in the Region (Rensselaer and Schenectady) even experienced a decline in population during that time period.

#### Aging Population

The growing population in the Capital Region is also aging. Between 2000 and 2010, the average median age for the Region increased by three years (from 38.2 to 41.2). The number of people over the age of 85 also increased in the last decade by 20 percent

(Cornell University Program on Applied Demographics, 2012). Saratoga County has had a particularly large increase of this over age 85 demographic (53 percent).

The aging population in the Region is of particular concern with regard to land use and housing. As this population increases in the Region, the demand for elderly housing will increase. Denser, mixed-use, and walkable communities are generally more senior-friendly than low-density, car-dependent developments. The ability to access basic services (grocery stores, pharmacies, etc.) without having to drive is an important community asset for seniors. Also, it is important to ensure that senior-friendly communities are accessible for all income levels. Many seniors are on fixed incomes and have limited ability to

Table 8.2 Housing and Economic Development Organizations Within The Capital Region

Center for Economic Growth (CEG)	<a href="http://www.ceg.org/">http://www.ceg.org/</a>
Capital District Homeownership Collaborative	<a href="http://www.ahphome.org/collaborative.htm">http://www.ahphome.org/collaborative.htm</a>
CARES, Inc – CARES Housing Program	<a href="http://caresny.org/cares-housing-program.cfm">http://caresny.org/cares-housing-program.cfm</a>
Capital District Regional Planning Commission (CDRPC)	<a href="http://www.cdrpc.org/">http://www.cdrpc.org/</a>
Community Loan Fund of the Capital Region	<a href="http://www.mycommunityloanfund.org">http://www.mycommunityloanfund.org</a>
Various neighborhood and rural preservation companies including housing authorities and providers, community development block grants (CDBGs) and other housing service providers.	

relocate; therefore, their needs must be addressed in their existing communities.

#### Poverty

The poverty rate in the Region is below both the United States and New York State averages. As shown in Figure 8.4, Saratoga County has the lowest poverty rate (Empire State Development, State Data Center, 2009) at approximately six percent, while Albany County has the highest at just over 12 percent.

However, measuring poverty rates at the county level alone omits important information about pockets of poverty that exist both in rural and urban areas. Based on poverty data mapped by CDRPC (which covers four of the Region's eight counties – Albany, Rensselaer, Saratoga, and Schenectady), there are concentrations of poverty in urban areas such as the cities of Albany, Schenectady, Troy, Rensselaer, Watervliet, Mechanicville Saratoga Springs and South Glens Falls. There are also some concentrations of poverty in smaller towns and villages such as Hoosick Falls in Rensselaer County and Ballston Spa in Saratoga County.

#### Housing

The homeownership rate in the Capital Region is above the US average (65.1 percent) in all counties except for Albany County. It is also above the New York State average (55.2 percent) in every county; however, this average is skewed by the low homeownership rate in New York City.

#### Best Practices

Sustainable/Green Building Standards – The Town of Greenburgh, NY Town Code requires every applicant who files an application for site plan review for construction shall make a good faith effort to achieve LEED certification by providing a completed LEED-ND checklist.

The median household income throughout the Region is similar to both the U.S. (\$51,914) and New York State (\$55,603) averages. All counties except for Saratoga fall just below the New York State average, while Greene, Warren and Washington also fall below the US average.

The median value of owner-occupied units has increased in all counties between 1990 and 2010. The values are still well below the New York State average of \$303,900. In 2010, the median value of owner-occupied units surpassed the U.S. average of \$188,400 in all eight counties. Housing value relates to affordability and is dependent on income levels. The housing affordability index (the higher the number, the less affordable housing is), as displayed in Table 8.1, shows that, overall, housing affordability has declined in the Region between 1990 and 2006.

#### Housing Assets and Needs

Information gathered from housing studies conducted for the Capital Region and from the Land Use and Livable Communities Technical Committee was used to assess the housing-related assets and needs within

Table 8.3 GHG Emissions, Capital Region, 2010 (Metric Tons CO<sub>2</sub>e)

	Region	Albany	Columbia	Greene	Rensselaer	Saratoga	Schenectady	Warren	Washington
Residential Energy Consumption*	3,015,446	882,719	181,437	140,327	438,817	646,897	453,778	152,773	118,698
On-road**	5,526,882	1,650,002	342,133	349,166	691,191	1,302,373	506,514	420,380	265,123

Sources:  
 \* 2010 Capital Region Tier 2 Regional Greenhouse Gas Inventory  
 \*\* Calculated using Vehicle Miles Traveled (VMTs). See Table 9.1.





Table 8.4 Land Use and Livable Communities Goals and Initiatives

Goals	Initiatives
Preserve, protect and enhance the Region's natural and cultural resources, sensitive ecosystems and agricultural lands, and effectively provide and manage accessible public space to increase recreational and civic opportunities for all.	<ul style="list-style-type: none"> <li>Develop a Regional greenway connectivity plan</li> <li>Implement land conservation practices into land use planning and zoning</li> <li>Improve public access to waterfront areas</li> </ul>
Encourage investment and redevelopment in existing cities, town centers, villages and hamlets, and encourage compact, connected, walkable communities wherever major development occurs in the Region.	<ul style="list-style-type: none"> <li>Develop and implement sustainability guidelines for historic buildings and districts</li> <li>Prioritize brownfield redevelopment</li> <li>Design and install public plazas</li> <li>Update zoning for transit-oriented development (TOD)</li> <li>Repair and modernize existing infrastructure</li> </ul>
Promote diverse, energy efficient and healthy housing options for all residents of the Region	<ul style="list-style-type: none"> <li>Promote sustainable and affordable housing that meets the needs of the Region's population</li> <li>Modify local codes and regulations to allow for sustainable, compact development</li> </ul>

the Region (NYSHCR, 2010). Assets in the Region include a stable workforce supported by the public sector and a growing high tech sector; a range of housing and economic development agencies and organizations; and a mix of rural and small urban areas with access to open space. Table 8.2 provides a list of several housing and economic development organizations operating within the Region to assess and meet the housing needs in the Region's communities.

A variety of housing needs exist within the Capital Region. According to the New York State Homes and Community Renewal Office of Policy & Research (2011 Catalogue of Need: Capital District Region, 2011), two primary housing needs identified in the Region include: increasing the amount of quality affordable housing, particularly for extremely low-income residents (households earning 30 percent or below the area median income [AMI]) and those impacted by the second home market; and addressing the vacant and blighted properties throughout the Region's cities and rural areas.

A specific need for smaller rental housing (8-12 units) in rural communities for families and seniors was identified by the Land Use and Livable Communities Technical Committee. Also, many very low income residents are being priced out of the rental market and/or living in substandard housing. More affordable

homeownership opportunities are needed to match the economic realities of residents in the Region. It was also noted by the Committee that funding for repairs and accessibility upgrades of senior occupied homes is needed to enable seniors and the elderly to age in place. Additionally, it was expressed that special needs, supportive services, and affordable housing should to be spread throughout the Region, and not concentrated in just a few locations.

#### Greenhouse Gas Emissions

Land use plays a significant role in many activities that are sources of greenhouse gas emissions for the Region. Specifically, land use policies will impact how much land is conserved, land that may serve as point of carbon sequestration for the Region. These policies also impact the movement of goods and people throughout the Region and thus the emissions from the transportation sector. Finally, land use policies shape the Region's building development, particularly building density and proximity to services. Because land use policies impact a variety of areas that are sources of emissions, it is difficult to directly quantify the impact of specific strategies on emissions. However, the goals outlined in this chapter will have an impact on reducing emissions specifically in residential energy consumption and in on-road transportation. Those numbers are highlighted in Table 8.3.

#### Goals

Based on the issues identified in the baseline assessment and in discussions with the Land Use and Livable Communities Technical Committee, three overarching goals were identified for this chapter of the Plan. These goals relate to the use of land, both in rural urban and suburban environments, and the human factors that make a place livable and sustainable.

Ten specific initiatives were identified to achieve these goals. Each initiative directly supports at least one goal. However, some initiatives may also contribute to supporting other goals as well. Table 8.4 lists each land use and livability initiative by the goal it primarily supports.

#### Regional Initiatives

Three Land Use and Livable Communities initiatives were prioritized for implementation within the Region. These initiatives are further described below, and Table 8.5 provides additional details on the implementation strategy for each of these priority initiatives.

#### Modify local codes and regulations to allow for sustainable, compact development.

One of the major drivers of new development, beyond market forces, is what is permitted in any given community as per existing codes and comprehensive planning documents. Investigate updates to local comprehensive plans, and related changes to zoning and/or design guidelines to allow for form-based codes which follow traditional land use patterns. Include provisions for walkable village centers and green infrastructure. Include education of community leaders and residents about form-based codes and encourage their use.

#### Repair and Modernize Existing Infrastructure.

Upgrade infrastructure including water, sewer, sidewalks, parks, telecommunication, utilities and transportation in existing population centers. Promote Complete Streets regulations

and codes to encourage sustainable, green infrastructure. Cities and town centers are important as cultural, civic and economic centers. Ensuring they have the proper infrastructure to maintain such vital functions is critical to any Region. In urban areas, pocket parks within a 1/4 mile of residential areas could provide opens spaces with the added functions of civic space and green infrastructure areas. Having a compelling downtown or village/town center will also make these areas a more attractive place to live and play, not just to work or shop.

**Develop a Regional Greenway Connectivity Plan.** The Capital Region has various trails and greenways throughout the Region including state, county and town/city parks, privately held conservation lands, and multi-use paths. There are numerous plans in place to conserve additional lands and increase trail networks, however there is limited funding to execute these plans. A Regional Greenway Connectivity Plan would help bring these plans together to create a well-connected network of green spaces and trails throughout the eight-county Region. Funding of this Regional plan, as well as the expansion and completion of the existing trail network and planned trails in various communities would help the Region create a robust greenway system that ties together natural resources, recreation and cultural elements. The other initiatives not included in the top three are listed below in order of their ranking:

- Prioritize Brownfield redevelopment
- Implement land conservation practices into land use planning and zoning
- Update zoning for transit-oriented development (TOD)
- Promote sustainable and affordable housing that meets the needs of the Region's population
- Design and install public plazas
- Develop and implement sustainability guidelines for historic buildings and districts
- Improve public access to waterfront areas





### Best Practices

Development Approval Incentives—Sarasota County approved a Green Development Initiative that provides fast-track permitting for residential and commercial green developments. Incentives apply to projects pursuing LEED-ND.



Table 8.5 Land Use and Livable Communities Implementation Strategy

Initiative	Regional Priority	Implementer	Partners	Preliminary Cost	Greenhouse Gas Reduction Potential**	Potential Funding Sources	Timeline
Modify Local Codes And Regulations To Allow For Sustain-able, Compact Development	1	Any municipality	MPOs and Regional planning agencies (CDTC, A/GFTC, CDRPC) County Planning departments, Department of Health Community gardens and citizen groups Could involve multiple communities working together Developers and large property owners	\$\$ - \$\$\$	Medium	NYSERDA – competitive grant program, requires some matching from municipality Department of State/EPF CDTC's Linkage program (requires 25% local match) Parks & Trails NY Greenway Grants (Hudson Valley Greenway)	Mid-Term (1 - 5 years) assuming all planning has been done and codes are ready to implement
Repair And Modernize Existing Infrastructure	2	Local governments Regional coalitions Sewer districts	Local governments Public authorities Regional coalitions Sewer districts Water districts Private developers	\$\$\$	Low	NYSEFC (NYS Environmental Facilities Corporation) Clean water/drinking revolving loan fund, NYSDOT	Mid-Term (1 - 5 years) or Long-Term (>5 years), depending on scope
Develop a Greenway Connectivity Plan	3	Local/County government, Coalition	MPOs NYSDOT NY Parks & Trails Local advocacy groups	\$\$\$	Low	Existing state conservation funding	Mid-Term (1 - 5 years)

\*Overall Cost: \$ - < \$100,000, \$\$ - \$100,000 to \$500,000, \$\$\$ - > \$500,000

\*\*Greenhouse Gas Reduction Potential: High – Strategy will result in a direct, quantifiable reduction in GHG emissions; Medium – Some GHG emissions reduction may occur but it cannot be quantified; Low – GHG reduction is very indirect, unlikely to occur, or unknown

In addition to the implementation strategy above, it is recognized that these initiatives will require action by the local government to implement. To that end, the governance structure is intended to outline a process for local governments to implement the priority initiatives and the policies and programs where there are alignments or hindrances to implementation. Table 8.6 identifies the applicable governance structure for these initiatives.

Table 8.6 Land Use and Livable Communities Governance Structure

Name of Initiative	Process to Implement (update zoning ordinance, adopt a policy or plan, resolution to approve funding, etc.)	Related Policies – positive link-ages and alignments	Related Policies – barriers and cross-purposes	Local Government Level of Implementation
Modify Local Codes and Land Use Regulations to Allow for Sustainable, Compact Development	Update and Zoning Codes  Revise and Adopt Comprehensive Plans  Coordinate with the Regional Planning Commission	Coordinate efforts with the multiple code-related initiatives in the Plan including Adaptation - Promote Green Infrastructure and Adaptation - Enforce and Enhance Floodplain Ordinances. Also Economic Development - Establish Model Green Code for Adoption by Communities.	There is the potential to work at cross-purposes if code revision efforts are not coordinated. For example, Adaptation - Promote Green Infrastructure and Adaptation - Enforce and Enhance Floodplain Ordinances.	Implementation by all jurisdictions at the local level.
Repair and Modernize Existing Infrastructure	Revise and Adopt Capital Improvement Plans	Strong linkage with Adaptation - Promote Green Infrastructure. Infrastructure investments should also be informed by Adaptation - Conduct Local Vulnerability Assessments and Adaptation Planning.  Infrastructure issues can also be addressed in Economic Development - Establish Model Green Code for Adoption by Communities as well as Transportation - Develop and Expand Electric Vehicle/Alternative Fuel Infrastructure and Transportation - Optimize Transportation Systems through Alternative Street Design.  Water and sewer-related infrastructure investments should also be coordinated with all of the water-related initiatives.	None identified.	Implementation by all jurisdictions at the local level with cooperation from RPC and other Regional entities.
Develop a Regional Greenway Connectivity Plan	Develop and Adopt Regional Plan	Leverage synergies with Land Use - Implement Land Conservation Practices into Land Use Planning and Zoning; Land Use - Improve Public Access to Waterfront Areas, particularly along river corridors.  Potential linkages with Adaptation - Enforce and Enhance Floodplain Ordinances and Adaptation - Protect and Enhance Critical Habitat, Floodplains, and Wetlands that are Under Threat from Climate Change, particularly for greenways along watercourses. Economic Development - Establish Model Green Code for Adoption by Communities could also be used to channel development away from greenway corridors and provide developer incentives for greenway development.  There are also potential synergies with Food Systems - Create a Regional Farmland Protection Plan where greenways may also include valuable farmland. Adaptation - Enhance Critical Natural Resources, particularly for greenways along watercourses.	Potential for to be at cross purposes with Adaptation - Enforce and Enhance Floodplain Ordinances and other preservation/conservation efforts such as Land Use - Implement Land Conservation Practices into Land Use Planning and Zoning if recreational use in greenways is not planned with these other initiatives in mind.	Establish at the Regional level. Projects implemented locally.



Section 9.0

# Solid Waste





## SECTION 9.0: **Solid Waste**

*Solid waste is broadly defined as materials that have been used for their intended purpose and no longer have value to the owner. Sustainability in solid waste creates systems to reduce waste, recover resources and energy, and minimize waste disposal.*

There are many components of solid waste. Municipal solid waste (MSW) consists of everyday items used in our homes, schools and workplaces, such as product packaging, grass clippings, furniture, clothing, bottles, food scraps, newspapers, appliances, and batteries. Solid waste also includes construction and demolition (C&D) debris, sludges from water and wastewater treatment facilities, and non-hazardous industrial wastes resulting from manufacturing and industrial processes. There are formal definitions of solid waste which are included in both federal and state laws and regulations. In some cases, these definitions include hazardous materials. For purposes of this plan, however, the focus is on the management of non-hazardous solid waste.

Since 1988, New York State has had an established policy with a preferential waste management hierarchy of reduction, reuse, recycling, and energy recovery, with landfill disposal as the method of last resort. Much progress has been made since that time in advancing these preferred waste management methods as well as making landfill disposal more protective of the environment. Yet, 20 years after these policies were established, an estimated 56 percent of the solid waste generated in the state are delivered to landfills, and only 36 percent was recycled (NYSDEC, 2010).

*The Sierra Processing Facility in the City of Albany opened in 2010 to process single stream recyclables, which is a mixture of recyclable paper, glass, metal, and plastic containers collected together. Single stream facilities allow the recycler to only use a single container for material collection, which is more efficient and convenient for the recycler.*





In 2010, NYS DEC established a new state-wide solid waste management plan with a new approach, as follows:

*“...a shift from focusing on ‘end-of-the-pipe’ waste management techniques to looking ‘upstream’ and more comprehensively at how materials that would otherwise become waste can be more sustainably managed through the state’s economy. This shift is central to the state’s ability to adapt to an age of growing pressure to reduce demand for energy, reduce dependence on disposal, minimize emission of greenhouse gases and create green jobs.” (NYSDEC, 2010)*

Following NYSDEC’s lead on this new materials management approach, this Sustainability Plan focuses on finding ways to more effectively manage our materials to reduce waste, recover resources and energy, and minimize disposal.

### Regional Baseline

Existing programs, facilities and infrastructure for solid waste and material management in the Capital Region are a mixture of both publicly-owned and privately-owned. Most waste reduction and recycling programs in the Region are implemented by local or county governments. Alternatively, programs are put into practice by Local Solid Waste Management Planning Units, which have

#### Best Practices

**Product Stewardship** - Also known as extended producer responsibility (EPR), product stewardship calls on manufacturers, retailers, users and disposers to share responsibility for reducing environmental impacts from products. One example, the NYS Electronic Equipment Recycling and Reuse Act requires manufacturers to provide free and convenient recycling of electronic waste to most consumers in the state.

Table 9.1 Local Solid Waste Planning Units

Planning Unit	Geography Served
Capital Region Solid Waste Management Partnership	Parts of Albany and Rensselaer counties
Town of Colonie	Parts of Albany County
Columbia County	All of Columbia County
Eastern Rensselaer County Solid Waste Management Authority (ERCSWMA)	Parts of Rensselaer County
Greene County	All of Greene County
Saratoga County	All of Saratoga County
Schenectady County	All of Schenectady County
Warren / Washington Counties	All of Warren and Washington Counties

been formed to develop and execute Local Solid Waste Management Plans (LSWMP) pursuant to the Solid Waste Management Act of 1988. A listing of the Planning Units in the Capital Region is presented in Table 9.1.

There are three materials recovery facilities (Sierra Processing, Resource Recovery Systems, and Cascades Recovery), all privately owned and operated, located throughout the Region. Typically, these facilities process and upgrade one or more types of mixed recyclable materials (e.g. mixed paper, bottles, cans, and plastic containers) for sale to intermediate markets or to final users of the recycled materials, such as paper mills. In addition to these facilities, there are a number of recyclable handling facilities which primarily function as transfer stations to move recyclable materials to these facilities or facilities outside the Region.

There are also eleven construction and demolition (C&D) processing facilities, all privately-owned and operated, located in the Capital Region. These C&D processing facilities are regulated by NYSDEC and typically remove reusable building or construction materials from the waste stream and process the material into usable components or products (C&D, 2012). Eighteen scrap metal recycling facilities were also identified in the Capital Region,

Table 9.2 Recycling and Composting Facilities in the Capital Region

Facility Name	Facility Type	Location	City	County	State
Albany Compost Facility	Yard Waste	One Connors Blvd	Albany	Albany	NY
Cascades Recovery - MRF	Composting	71 Fuller Road	Colonie	Albany	NY
Bethlehem Compost Facility	Recyclables	1244 Feura Bush Road	Selkirk	Albany	NY
Sierra Processing - MRF	Handling & Recovery	865 S Pearl St	Albany	Albany	NY
Bonded Concrete Company	Yard Waste Composting	Route 155 and Grenada Terrace	Watervliet	Albany	NY
King Road Materials	Recyclables Handling & Recovery	145 Cordell Rd	Colonie	Albany	NY
Callanan Watervliet Asphalt	C&D Processing	100 Crabapple Lane	Watervliet	Albany	NY
WM Biers, Inc./BBC Aggregate Recycling	C&D Processing	100 Port Road	Port of Albany	Albany	NY
Copake Valley farms	C&D Processing	13 Lackawana Road	Copake	Columbia	NY
Seward Valley Farms	C&D Processing	502 Union Street	Hudson	Columbia	NY
Resource Recovery Systems - MRF	C&D Processing	37 Salerno Drive	Ghent	Columbia	NY
County Waste Transfer Corp	C&D Processing	799 Burden Ave	Troy	Rensselaer	NY
County Waste & Recycling Service	Recyclables Handling & Recovery	1927 Route 9	Halfmoon	Saratoga	NY
Hiram Hollow Transfer Station	Recyclables Handling & Recovery	100 Washburn Road	Gansevoort	Saratoga	NY
Magnum Environmental	Recyclables Handling & Recovery	74 Hudson River Road	Waterford	Saratoga	NY
Salvage and Demolition	C&D Processing	69 Button Road	Halfmoon	Saratoga	NY
Mead Enterprises	C&D Processing	603 Main Street	Corinth	Saratoga	NY
Petruzzo Wood Processing Facility	C&D Processing	24 Hetcheltown Road	Clifton Park	Saratoga	NY
Clifton Park Compost	C&D Processing	300 Anthony St	Saratoga Springs	Saratoga	NY
Saratoga Springs Compost	Yard Waste Composting	Vinewood Ave	Schenectady	Schenectady	NY
Schenectady County Composting	Yard Waste Composting	2754 Aqueduct Road	Schenectady	Schenectady	NY
Schenectady WWTP	Food and Yard Waste Composting	544 Burdeck St.	Rotterdam	Schenectady	NY
Rotterdam Compost facility	Biosolids Digestion	34 Padanarum Road	Schenectady	Schenectady	NY
Jackson Demolition Service	Yard Waste Composting	5983 Route 9	Rotterdam	Schenectady	NY
W.M. Larned and Sons	C&D Processing	1342 Bay Road	Bolton Landing	Warren	NY
Aqua Terra Systems	C&D Processing	Route 22	Chestertown	Warren	NY
Peckham Materials Corp	C&D Processing	212 Miller Road	Lake George	Warren	NY
French Mt	C&D Processing	12 Wing Street	Hebron	Washington	NY
Byrd Construction Corp.	C&D Processing	17 Cortland Street	Argyle	Washington	NY
Central Timber	C&D Processing	517 Route 49	Fort Edward	Washington	NY





Table 9.2 Recycling and Composting Facilities in the Capital Region (continued from previous page)

Facility Name	Facility Type	Location	City	County	State
Fort Edward Materials Recycling Facility (Waste Mgmt)	Recyclables Handling & Recovery	12 Wing Street	Fort Edward	Washington	NY
Washington County WWTP	Biosolids Composting	17 Cortland Street	Fort Edward	Washington	NY
CTI Agricycle	Food and Yard Waste Composting		Cambridge	Washington	NY
Jameson Demo & Salvage	C&D Processing	517 Route 49	Greenwich	Washington	NY
Pallets Inc	C&D Processing	99 1/2 East Street	Fort Edward	Washington	NY
Peckham Materials Corp	C&D Processing	438 Vaughn Road	Hudson Falls	Washington	NY

most of which are not regulated by NYSDEC. While these facilities do not provide data to NYSDEC on the quantities of material they recover, they represent an important part of the material management infrastructure that exists in the Region. For example, it was recently mentioned at a CDTC Policy Board meeting that the largest export from the Port of Albany this year was scrap metal.

There are nine composting facilities operating in the Capital Region that have solid waste facility permits from NYSDEC. These include two biosolids (sewage sludge) composting operations, however compost operations at the Schenectady WWTP have recently been replaced by anaerobic digestion. There are also five yard waste composting facilities, and two facilities (CTI Agricycle in Washington County and the Schenectady County Composting Facility) which are permitted

**Best Practices**

Resource Recovery Park - The City of Lee, Missouri has developed Resource Recovery Park which provides for the co-location of reuse, recycling, compost processing, manufacturing, and retail businesses in a central facility. The facility allows waste haulers, businesses and residents to bring all their wastes and recoverable materials to a single place.

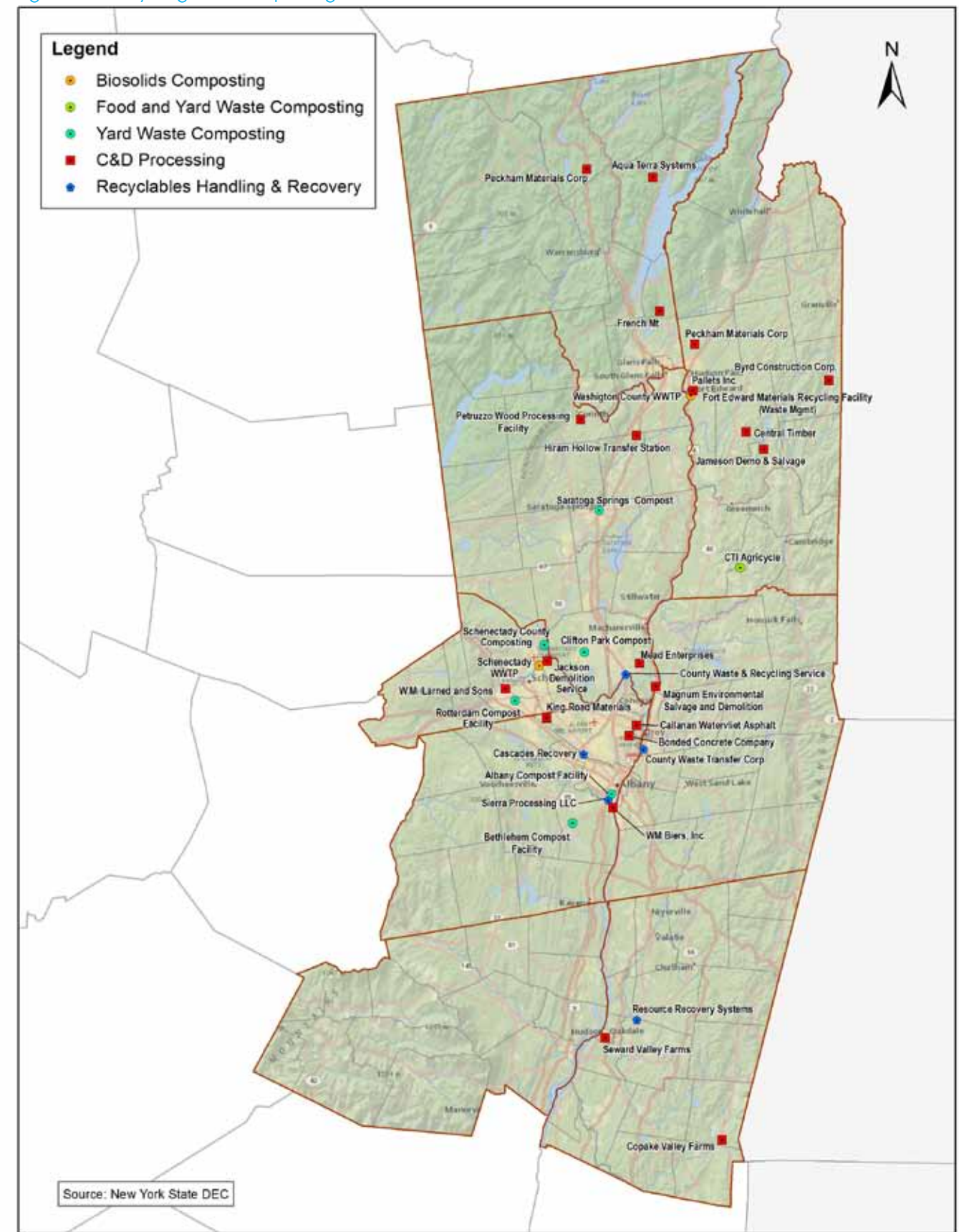
to accept both food and yard waste. Certain very small composting facilities are exempted from NYSDEC permitting requirements if they accept less than 3,000 cubic yards per year of animal manure/bedding or yard waste, alone or in combination. Other small composting facilities do not need permits, but must register with NYSDEC, if they accept more than 3,000, but less than 10,000, cubic yards of yard waste, or more than 1,000 cubic yards of source separated organic waste.

Major recycling and composting facilities in the Region are summarized in Table 9.2, and are shown in Figure 9.1.

While biosolids from the City of Schenectady and Washington County WWTPs are composted, most of the remaining biosolids generated by the WWTPs in the Capital Region are managed by incineration or are disposed at a landfill. The Albany County Sewer District operates two large wastewater treatment plants. The North Plant is located in Menands and is designed to treat an average flow of 35 million gallons a day (MGD). The South Plant is located in the Port of Albany, and is permitted for 29 MGD. Biosolids from each of these facilities are managed by sludge thickening, followed by dewatering with a filter press and combustion in a multiple hearth incinerator.

The incinerator at the North Plant is being upgraded to recover waste heat for electricity generation and is being funded with \$7.9

Figure 9.1 Recycling and Composting Facilities







and energy from food waste generated in the Region. The Radix Ecological Sustainability Center at 153 Grand St. Albany has established a Community Compost Initiative. A weekly compost pick-up service is being provided to subscribers in the City of Albany. Food scraps are brought to the Sustainability Center where they are placed in wire bins and carefully layered with wood chips and leaves. After several months of processing, a nutrient dense soil is created which is used for the Center's food growing demonstrations.

The Albany County Sewer District and the City of Watervliet partnered with Spectrum Bioenergy on a materials including sludge cake, food waste provided. Materials were supplied by the ACSD, Price NYSEDA funded pilot project involving the anaerobic digestion of ½ TPD of various mixes of organic chopper, Bimbo bakeries, Baker commodities, and the City of Watervliet's Residential Organic Waste collection program. Spectrum is presently conducting a follow-up financial feasibility study, which is being funded in part by NYSEDA. This economic feasibility study will assume a 75 TPD AD facility, with feedstock consisting of 40 TPD of sludge cake from ACSD and 35 TPD of organic waste from other commercial sources in the Region and is expected to be completed in 2013.

Much of the solid waste collected in the Capital Region is delivered to transfer stations, with most of the larger transfer stations operated by private companies. At these transfer stations, waste is unloaded from collection vehicles and then reloaded into larger vehicles for shipment to a landfill or waste-to-energy (WTE) facility. There are many smaller transfer stations located throughout the Region. These are often owned by municipalities or counties, and many accept both solid waste and recyclable materials from residents as well as waste haulers.

There is one WTE facility in the Region located in Hudson Falls. This facility is privately owned and operated, and was originally

million in grants from the state and federal governments. It was expected to be completed in 2012. The project will have a long term environmental benefit by reducing GHG emissions and will provide significant economic benefit to the member communities through millions of dollars of energy cost savings (Albany County Sewer District, 2011).

The City of Schenectady's Water Pollution Control Plant has developed a \$7 million project that includes a combined heat and power (CHP) system producing biogas and using an internal combustion engine to create electricity. With the new equipment, the plant will generate an estimated 1,800 megawatt-hours of electricity per year from the biogas – enough to power more than 275 private homes for a year. This will offset the energy costs of the plant and, combined with other improvements, save an estimated \$300,000 in energy costs each year. The CHP system uses anaerobic digestion to produce the biogas. Sewage is treated and the thickened sludge mixed and heated to allow the waste to break down and generate methane. The methane is purified and combusted to generate electricity. NYSEDA provided a \$1 million award toward the cost of the CHP project. The entire process also reduces odors and results in a finished product that can be used for compost (NYSEDA, 2012).

Several new initiatives are also underway in the Region to increase recovery of materials

developed under a long-term service agreement with Warren and Washington Counties. Some solid waste from the Capital Region is also delivered to other WTE facilities located outside of the Region.

Disposal capacity for MSW and other non-hazardous solid wastes are provided at Regional landfills owned by the City of Albany and the Town of Colonie, as well as at several privately-operated landfills located outside of the Region. The City of Albany Landfill has capacity only through approximately 2020. While the Colonie Landfill, which is now privately-operated, has capacity to operate at least until 2025, and may have options for

expansion which will provide additional future capacity. Saratoga County developed a landfill site in the Town of Northumberland, but that landfill has never operated. In October 2012, the County received proposals to consider the opening of that site under private operations, and a decision on that matter is pending.

There are also six non-hazardous industrial waste landfills in the Capital Region designed and operated to accept the specific waste streams generated by their respective facilities. Several small C&D Landfills and Land Clearing Debris Landfills are active in the Region. Major transfer stations and disposal facilities in the Region are summarized in Table 9.3

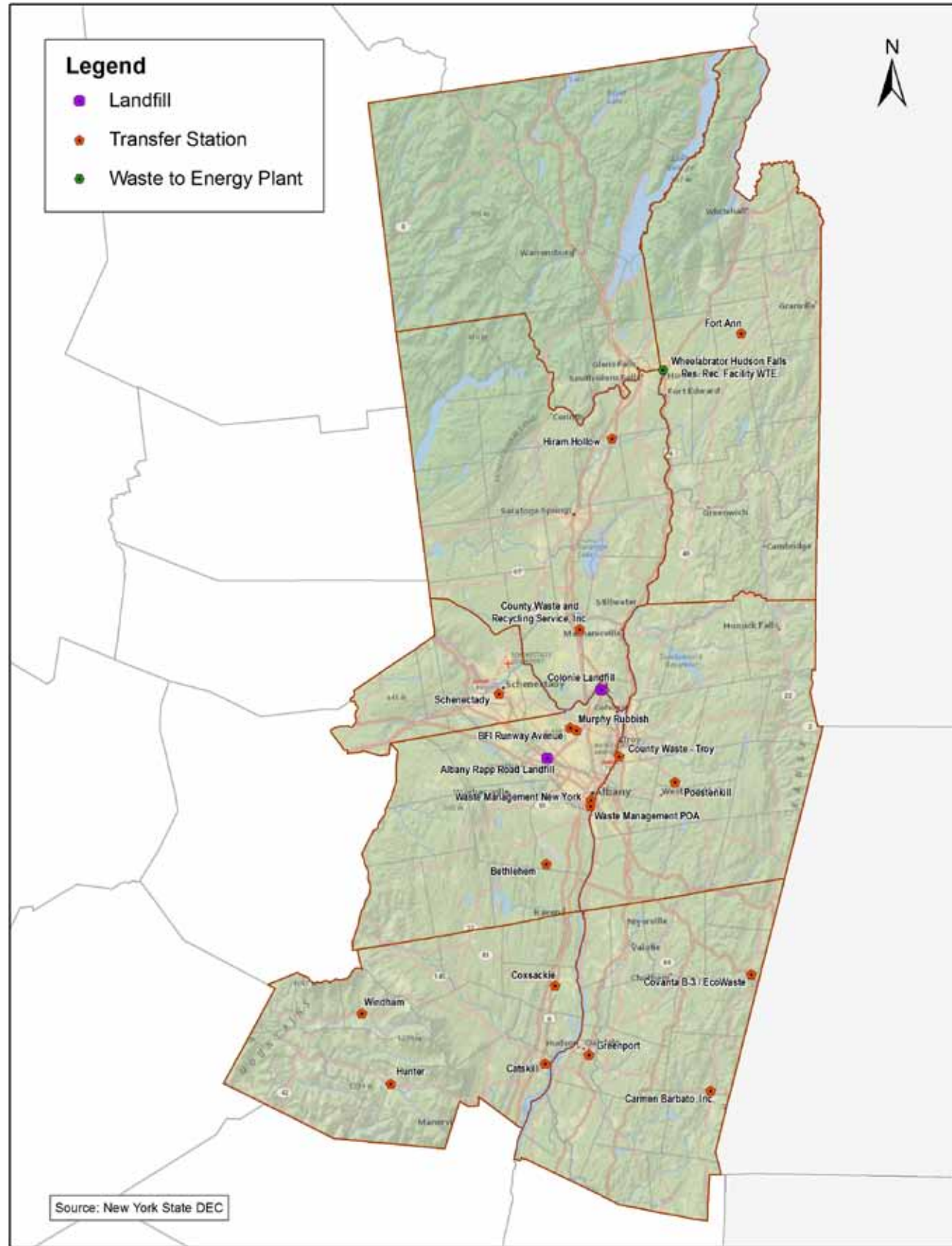
Table 9.3 Major Transfer Stations and Disposal Facilities in the Capital Region

Facility Name	Location	City	State	County
Albany Rapp Road Landfill	525 Rapp Road	Albany	NY	Albany
Colonie Landfill	1319 New Loudon Road	Cohoes	NY	Albany
Bethlehem Transfer Station	136 Rupert Road	Selkirk	NY	Albany
BFI Runway Avenue Waste Transfer Station	Runway Ave.	Latham	NY	Albany
Waste Management New York Transfer Station	21 Gansevoort Street	Albany	NY	Albany
Murphy Rubbish Transfer Station	119 Wade Road	Latham	NY	Albany
Waste Management POA Transfer Station	100 Boat Street	Albany	NY	Albany
Carmen Barbato, Inc. Transfer Station	2778 State Route 23	Hillsdale	NY	Columbia
Covanta B-3 / EcoWaste Transfer Station	25 Flints Crossing Road	Canaan	NY	Columbia
Greenport Transfer Station	51 Newman Road	Hudson	NY	Columbia
Coxsackie Transfer Station	Plank Rd.	Coxsackie	NY	Greene
Windham Transfer Station	Mitchell Hollow Rd. (Rte 21)	Windham	NY	Greene
Hunter Transfer Station	Hylan Rd.	Hunter	NY	Greene
Catskill Transfer Station	State Route 385	Catskill	NY	Greene
Poestenkill Transfer Station	Route 66 and 351	Averill Park	NY	Rensselaer
County Waste - Troy Transfer Station	799 Burden Avenue	Troy	NY	Rensselaer
Hiram Hollow Transfer Station	100 Washburn Rd.	Gansevoort	NY	Saratoga
County Waste and Recycling Service, Inc.	1927 Route 9	Clifton Park	NY	Saratoga
Schenectady Transfer Station	Weaver Street	Schenectady	NY	Schenectady
Fort Ann Transfer Station	Route 149	Fort Ann	NY	Washington
Wheelabrator Hudson Falls Res. Rec. Facility WTE	61 River Street	Hudson Falls	NY	Washington





Figure 9.2 Major Transfer and Disposal Facilities



and their location is shown in Figure 9.2.

### Greenhouse Gas Emissions

Greenhouse gas emissions from the waste sector in the Capital Region included emissions from landfills as well as from MSW incineration. The Regional Greenhouse Gas Inventory, found in Appendix 8 also included wastewater process emissions in this sector. However, those are reported in the Water chapter. GHG emissions from the waste sector totaled 228,849 metric tons CO<sub>2</sub>e in 2010, as indicated in Table 9.4.

### Goals

In an effort to move the Capital Region toward more sustainable systems, the Solid Waste Technical Committee identified three primary goals and nine initiatives,

which are outlined in Table 9.5.

While parts of the Region are among the leaders in statewide recycling achievement, significant quantities of organic materials, including food waste, continue to be disposed of as part of the MSW stream. Diversion of these organic materials represents one of the best opportunities to increase the amount of material recovered for recycling through composting, or the amount of energy recovered, through anaerobic digestion. Existing capacity is lacking and new systems, both large and small, are needed to take advantage of this opportunity. Waste reduction and recycling programs in the Region are well developed, but they could be more successful if more residents, businesses and institutions fully participated. Better public outreach, with more effective enforcement when necessary, will maximize participation and recovery. Designation of additional materials for mandatory recycling

Table 9.4 GHG Emissions from Waste, Capital Region, 2010 (Metric Tons CO<sub>2</sub>e)

	Regional Total	Albany	Columbia	Greene	Rensselaer	Saratoga	Schenectady	Warren	Washington
Solid Waste Management	228,849	65,900	13,224	10,316	33,494	55,761	32,428	11,306	6,421
Landfill Gas	183,703	60,836	13,224	10,316	33,303	32,778	32,428	426	392
MSW incineration	45,146	5,064	-	-	190	22,983	-	10,880	6,029

Table 9.5 Solid Waste Goals and Initiatives

Goals	Initiatives
Develop new systems to recycle and/or recover energy from food waste and other organic materials in the existing solid waste stream	<ul style="list-style-type: none"> <li>□ Improve and increase composting options</li> <li>□ Site and develop anaerobic digestion facilities throughout the Region</li> </ul>
Improve existing reduction and recycling programs by more effectively diverting designated recyclables, by increasing the number of materials that are currently designated for recycling, and by increasing public awareness of the value of waste reduction and recycling.	<ul style="list-style-type: none"> <li>□ Implement single-stream recycling</li> <li>□ Implement volume-based user fees</li> <li>□ Implement a waste inspection program</li> <li>□ Adopt C&amp;D waste reduction and recycling policies</li> <li>□ Establish a revolving loan fund to bridge recycling expenses</li> </ul>
Develop material management strategies, on both the Regional and local level, that encourage local manufacturing that utilizes Regionally recycled materials and that encourages and incentivizes municipalities, businesses, institutions and local non-profits to buy local products, including recycled products.	<ul style="list-style-type: none"> <li>□ Develop a Resource Recovery Park</li> <li>□ Partner with universities to facilitate innovation in waste technologies</li> </ul>



## Best Practices

Volume Based User Fees – The Oneida Herkimer Solid Waste Management Authority has an established Variable fee (Volume based) residential waste collection programs, also referred to as Pay as you Throw (PAYT). The program results in business and residents reducing their waste and increase recycling in an effort to save money.

will also result in reductions in the amount of waste destined for disposal facilities.

Moving from waste management to materials management will result in a more sustainable Region, as our formerly discarded waste becomes the raw materials for local manufacturing and agriculture operations. For example, the product of organic waste composting can be an asset to both agriculture and community gardens and the old growth lumber removed from deconstructed buildings can be a feedstock for a local furniture maker. To do this successfully, we need to better incentivize participants on both ends of these transactions.

## Regional Initiatives

All nine of the solid waste initiatives are included in this Plan, however, given limited resources and time, three of the initiatives were prioritized as the immediate focus for implementation within the Region. The first initiative, to improve and increase composting options, is focused on providing additional Regional capacity to reduce the amount of organic waste that is destined for disposal. The second initiative focuses on creating incentives for increased reduction and recycling of C&D debris by leveraging policy initiatives to promote the development of new facilities. The third initiative will also result in the reduction or organic waste materials destined for disposal, but will also recover energy for

beneficial use. A strategy for implementation of these initiatives is included in Table 9.6.

The three solid waste initiatives are described below in the order in which they were ranked by the Solid Waste Technical Committee.

### Improve and increase composting options.

This initiative envisions a variety of measures including promotion of backyard composting; developing community scale composting facilities; expanding existing leaf and yard waste compost sites to accept additional organic materials, like food waste, and; implementing programs for curbside collection of food waste from residential and commercial sources for composting and anaerobic digestion. This initiative would be led by municipalities or local solid waste planning units with institutions, non-profits, and private companies as potential partners. Facility development may be eligible for funding through MWRR Grants from NYSDEC. Revenue to cover operating expenses can be derived from public works or solid waste program budget, supplemented revenue from user fees and material sales revenue.

**Adopt C&D waste reduction and recycling policies.** Under this initiative, municipalities would enact and implement local laws requiring that applications for building construction, demolition and renovation submit plans for the reduction and recycling of C&D debris. This will then spur the creation of additional C&D recycling capacity by private developers in the Region. Private facility development may be eligible for funding from Empire State Development's Environmental Investment Program. Enforcement of local laws and ordinances will incur expenses that will need to be funded at the local level, and may be eligible for partial reimbursement through MWRR Grants.

### Site and develop anaerobic digestion facilities in the Region.

This initiative will support the development



of anaerobic digestion (AD) facilities that can accept food waste and other biosolids to generate energy. This can include AD facilities at WWTP for biosolids, Co-digestion of WWTP biosolid with other organics, or AD facilities for other mixed organic waste streams. This initiative would be led by municipalities or local government entities with private facility developers and operators as potential partners. Facility development may be eligible for funding from NYSERDA and U.S. Department of Energy. Revenue to cover operating expenses is typically derived from user fees and revenue derived from the sale of energy.

The Solid Waste Technical Committee identified other initiatives that were not ranked among its top three. These other initiatives are listed below in their rank order of preference by the Technical Committee.

- Establish a revolving loan fund to bridge recycling expenses
- Implement single stream recycling
- Develop a Resource Recovery Park

- Implement volume-based user fees
- Partner with universities to facilitate innovation in waste technologies
- Implement a waste inspection program

Table 9.6, below, presents implementation strategies for the three prioritized solid waste Regional strategies. The strategy includes an outline of the resources, costs and timeline associated with achieving these initiatives.





Table 9.6 Solid Waste Implementation Strategy

Initiative	Regional Priority	Implementer	Partners	Preliminary Cost	Greenhouse Gas Reduction Potential**	Potential Funding Sources	Timeline
Improve and increase composting options	1	Municipalities or Local Solid Waste Planning Units	Institutions, Non-profits, and Private companies	\$\$	Medium	MWRR Grants from the NYSDEC User fees	Mid-Term (1 to 5 years)
Adopt C&D waste reduction and recycling policies	2	Municipalities	Private developers and facility operators to develop additional C&D recycling facilities as needed	\$\$\$	Medium	Empire State Development's Environmental Investment Program MWRR Grants from the NYSDEC	Mid-Term (1 to 5 years)
Site and develop anaerobic digestion facilities in the Region	3	Municipalities or other Local Government Entities	Private facility owners or operators	\$\$\$	High	NYSERDA grant U.S. Dept. of Energy User fees Energy revenue	Mid-Term (1 to 5 years)

\*Overall Cost: \$<\$100,000, \$\$-\$100,000 to \$500,000, \$\$\$->\$500,000.

\*\*Greenhouse Gas Reduction Potential: High - Strategy will result in a direct, quantifiable reduction in GHG emissions; Medium - Some GHG emissions reduction may occur but it cannot be quantified; Low - GHG reduction is very indirect, unlikely to occur, or unknown

In addition to the implementation strategy above, it is recognized that these initiatives will require action by the local government to implement. To that end, the governance structure is intended to outline a process for local governments to implement the priority initiatives and the policies and programs where there are alignments or hindrances to implementation. Table 9.7 identifies the applicable governance structure for these initiatives.

Table 9.7 Solid Waste Governance Structure

Initiative	Process to Implement (update zoning ordinance, adopt a policy or plan, resolution to approve funding, etc.)	Related Policies – positive linkages and alignments	Related Policies – barriers and cross-purposes	Local Government Level of Implementation
Improve and Increase Composting Options	Expand Program and Collection Develop Complementary Education Site Facilities	This initiative complements Waste - Site and Develop Anaerobic Digestion Facilities. It may also be possible to coordinate Waste - Implement Single-Stream Recycling along with Waste - Improve and Increase Composting Options as well as Waste - Implement Volume-Based User Fees to offset costs of offering composting pickup.  It may also be possible to leverage Implementation - Create Green Alliance Between Government and Business and Food Systems - Create a Regional Food Hub to link to potential compost processors or end users.	None identified.	Local jurisdictions in partnership with private facility owners and operators.
Adopt Construction and Demolition Waste Reduction Ordinance	Adopt Policies	Efforts could be linked with the updates of building and zoning codes identified in Economic Development - Establish Model Green Code for Adoption by Communities. Also links to Energy - Adopt a Local Energy Efficient Building Code.	None identified.	Implementation by all jurisdictions at the local level.
Site and Develop Anaerobic Digestion Facilities in the Region	Establish Siting Criteria Adopt Supportive Zoning Market and Attract Third-Party Developers	Development of anaerobic digestion facilities could be linked with the Energy - Create Green Districts initiative. It may also be possible to support Food Systems and the Regional agriculture sector with a potential use for agricultural waste. This initiative can also be linked to Energy - Smart Grid Pilot Project as well as Energy - Incentivize Combined Heat and Power District Energy Systems. Funding could be provided by the Carbon Tax.	Zoning code-related initiatives such as: Economic Development - Establish Model Green Code for Adoption by Communities and Land Use - Modify Local Codes and Land Use Regulations to Allow for Sustainable, Compact Development should allow for the siting of such facilities; potential perceived land use conflicts.	Local jurisdictions in partnership with private facility owners and operators.



Section 10.0

# Transportation





## SECTION 10.0: **Transportation**

*The ability to get from one place to the next is an essential component of sustainability, but the degree to which we achieve sustainability is directly impacted by the transportation choices we make on a daily basis*

Modes of transportation heavily influence GHG emission rates, making sustainable transportation a crucial element of any sustainable system. The vehicle miles traveled (VMT) by cars and other motor vehicles generate significant GHGs and must be offset by the provision of sustainable transportation choices for individuals' daily needs. Those choices must include the opportunity to choose walking, bicycling, transit, and fuel efficient vehicles. A multi-modal transportation system results in fewer auto trips, less demand for sprawling land development, and thus lower VMT, leading to a healthier and more sustainable community environment.

Within the Capital Region, there are many active trails, bicycle plans, and transit operators. The City of Albany has produced its own sustainability plan, and other communities are planning bikeways, trails, and considering transit needs. Regional planning and transportation agencies such as CDTC, A/GFTC, and CDRPC are focused on sustainable transportation investments and planning for future development by linking transportation and land use.

This chapter provides an overview of the transportation network and ongoing projects within the Capital Region. Transportation sustainability goals, developed through a public process, are presented along with associated strategies and initiatives to implement those goals. These strategies, were evaluated based on criteria discussed below, and will create a more sustainable transportation system in the Capital Region, where walking, biking, transit and fuel efficiencies are promoted.

### *Best Practices*

Alternative Fuels - Several cities including Boulder, CO, Fayetteville, AR, and San Francisco and Santa Monica, CA have upgraded city fleets to B20 biodiesel fuel. B20 produces 20 percent fewer GHG than regular diesel, and can generally be used in unmodified engines



## Regional Baseline

Extensive planning for all modes of transportation (walking, biking, riding transit, driving, and freight and goods movement) currently exists within the Capital Region. This planning (as well as operation and implementation) is completed by many municipal, county, regional, and state agencies and organizations. In line with the federal government requirement that every metropolitan area with a population of over 50,000 have a designated Metropolitan Planning Organization (MPO) to qualify for any federal transportation funding, the two Capital Region MPOs, CDTC and A/GFTC (which cover 6 of the 8 counties in this region) have assembled multi-modal regional short and long range plans.

The goals and initiatives of these plans, as well as those from regional transit agencies, NYSDOT, and others, provide the baseline from which this sustainability plan is developed. This baseline assessment provides a brief overview of the extensive programs, plans, and existing transportation facilities within the Capital Region. The other two counties in the Capital Region, Greene and Columbia, are not part of a MPO. Other reports and projects from these counties were reviewed to ensure their full inclusion in this baseline assessment.

## Roadways

According to NYSDOT's 2010 Mileage Report for New York State, there are currently about 12,600 centerline miles of roadways in the Capital Region, which is 11 percent of all centerline miles in New York State. Of this mileage, 8,266 miles are local roads, 2,256 miles are county roads, 1,886 miles are state roads, and 150 miles are other roads (which includes non-DOT parkways, Reservation roads, Federal agency roads, institutional roads and toll roads, such as the NYS Thruway). Figure 10.1 illustrates major roadways of the Capital Region roadway network.

VMT is a key indicator and performance measure of sustainable transportation systems and GHG emissions. VMT for each county is shown in Table 10.1. In total, there are 12.5 million VMT per year, or 11,593 miles per person. This per capita number is nearly double the New York State VMT per capita, and about one-third higher than the U.S. average. It should be noted that the New York State per capita VMT is skewed by the high transit ridership of New York City. Likewise, measuring VMT at the county level alone omits important information about the relationship between development patterns and VMT. Congestion on Capital Region roadways, however, is not reported to be a key transportation problem in the region.

Figure 10.1 Capital Region Roadway Network

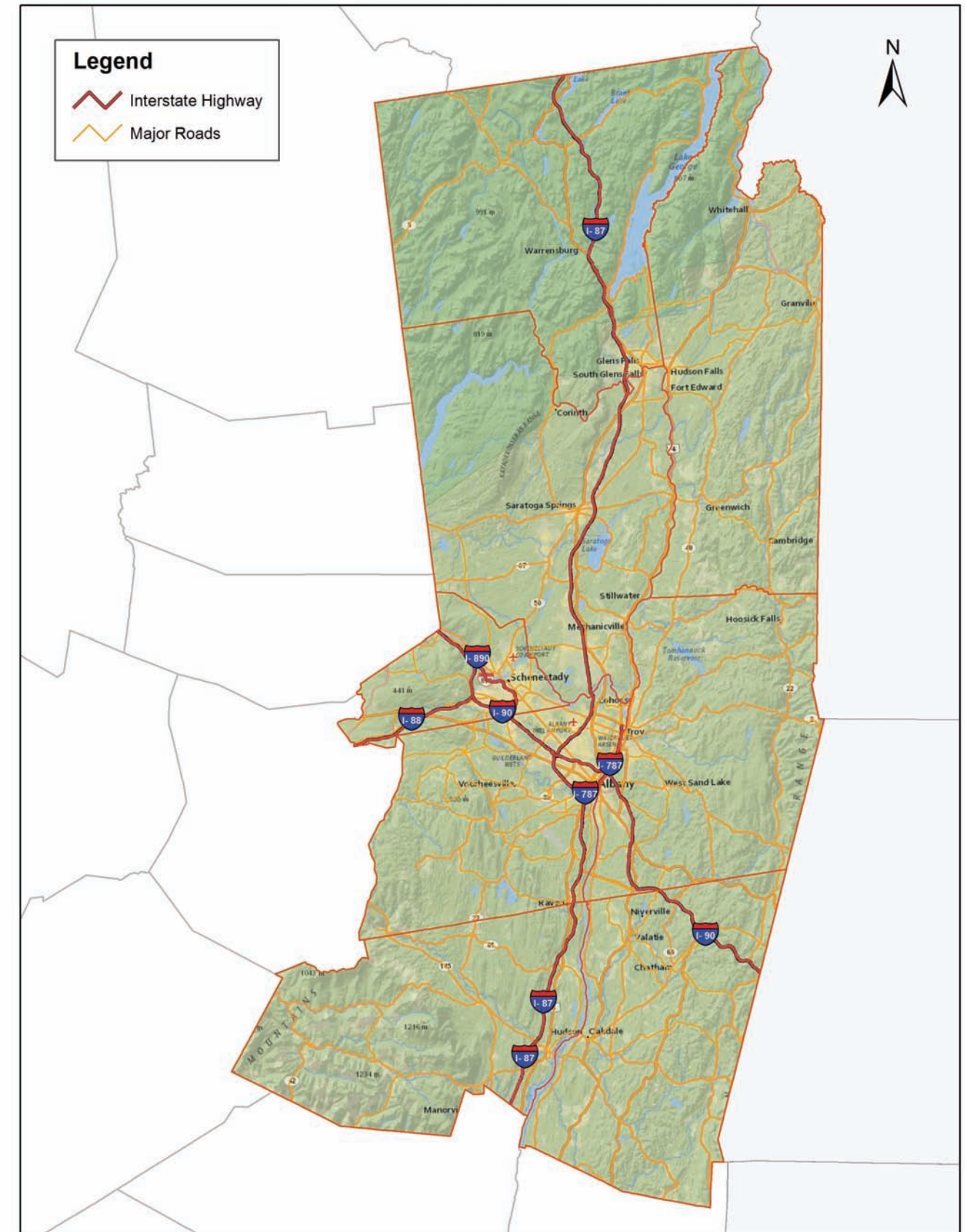




Table 10.1 VMT for the Capital Region

Counties	Annual VMT	2010 Population	VMT per Capita
Albany	3,823,439,548	3304,204	12,569
Rensselaer	1,573,280,999	159,429	9,868
Saratoga	2,968,604,573	219,607	13,518
Schenectady	1,166,027,160	154,727	7,536
Columbia	759,137,123	63,096	12,031
Greene	762,114,755	49,221	15,484
Warren	886,640,874	65,707	13,494
Washington	571,652,844	63,216	9,043
<b>Capital Region Total</b>	<b>12,510,897,877</b>	<b>1,079,207</b>	<b>11,593</b>
New York State	135,250,000,000	19,378,104	6,980
United States	2,966,506,000,000	308,745,538	9,608

Notes:

- VMT estimates for Albany, Rensselaer, Saratoga and Schenectady are for the year 2010 and are based on the CDTC STEP Model.
- VMT estimates for Columbia, Greene, Warren and Washington Counties are for the year 2009 and are based on the Highway Performance Monitoring System.
- New York State 2010 VMT obtained from NYSDOT - [https://www.dot.ny.gov/divisions/policy-and-strategy/darb/dai-unit/ttss/repository/vmt\\_0.pdf](https://www.dot.ny.gov/divisions/policy-and-strategy/darb/dai-unit/ttss/repository/vmt_0.pdf)
- US 2010 VMT obtained from FHWA - <http://www.fhwa.dot.gov/policyinformation/statistics/2010/vm202.cfm>

*The Capital District Regional Bike-Hike Map (CDTC 2006) provides perhaps the most comprehensive look at the non-motorized network, however only a portion of the Capital Region is covered in this plan.*

**New York State Complete Streets Law (S.5411A/A.8366)**

Requires State and local transportation projects undertaken by the State or receiving federal or state funding to consider the convenient access and mobility on the road network by all users of all ages. Design features may include sidewalks, bicycle lanes, crosswalks, pedestrian control signalization, bus pull outs, raised crosswalks, and traffic calming measures.

The City of Saratoga Springs adopted a complete streets policy using inter-agency cooperation and with the assistance of a group of advocates and stakeholders (Shared Access Saratoga). The policy designated the appointment of an advisory board and the creation of a project checklist to evaluate the integration of complete streets principles in public and private projects within the City.

**Transit**

Transit services within the Capital Region are operated by several different transit providers and agencies. Figure 10.2 illustrates the fixed routes of each of these primary transit operators. Capital District Transit Authority (CDTA) is the largest provider, operating surface transit for Albany, Rensselaer, Saratoga, and Schenectady Counties. Service is provided on nearly 60 local and express routes and paratransit shuttles. According to CDTA's Annual Report 2011-2012, total annual ridership in the fiscal year was 14,910,000 rides with over 62,000 bicycles carried on buses during the year. CDTA has 29 park and ride lots throughout its service area, with 1,655 parking spaces for transit and rideshare use.

Greater Glens Falls Transit (GGFT) provides fixed route bus, paratransit and seasonal trolley services to Washington and Warren Counties, and extending into northern Saratoga County to the Town of Moreau and Village of South Glens Falls. In 2011, total ridership was about 341,000 riders and all GGFT buses include bicycle racks.

Other transit services in the Capital Region include the following:

Coxsackie Transport provides bus and shuttle service within Columbia County, and between Hudson and Albany.

Greene County provides bus service to and from Catskill, NY and surrounding areas, but is limited to peak commuter directions and periods only.

Private coach services are also provided by Adirondack Trails, Yankee Trails, and Brown Coach.

**Roadways**

According to NYSDOT's 2010 Mileage Report for New York State, there are currently about 12,600 centerline miles of roadways in the Capital Region, which is 11 percent of all centerline miles in New York State. Of this mileage, 8,266 miles are local roads, 2,256 miles are county roads, 1,886 miles are state roads, and 150 miles are other roads (which includes non-DOT parkways, Reservation roads, Federal agency roads, institutional roads and toll roads, such as the NYS Thruway). Figure 10.1 illustrates major roadways of the Capital Region roadway network.

VMT is a key indicator and performance measure of sustainable transportation systems and GHG emissions. VMT for each county is shown in Table 10.1. In total, there are 12.5 million VMT per year, or 11,593 miles per person. This per capita number is nearly double the New York State VMT per capita, and about one-third higher than the U.S. average. It should be noted that the New York State per capita VMT is skewed by the high transit ridership of New York City. Likewise, measuring VMT at the county level alone omits important information about the relationship between development patterns and VMT. Congestion on Capital Region roadways, however, is not reported to be a key transportation problem in the region.



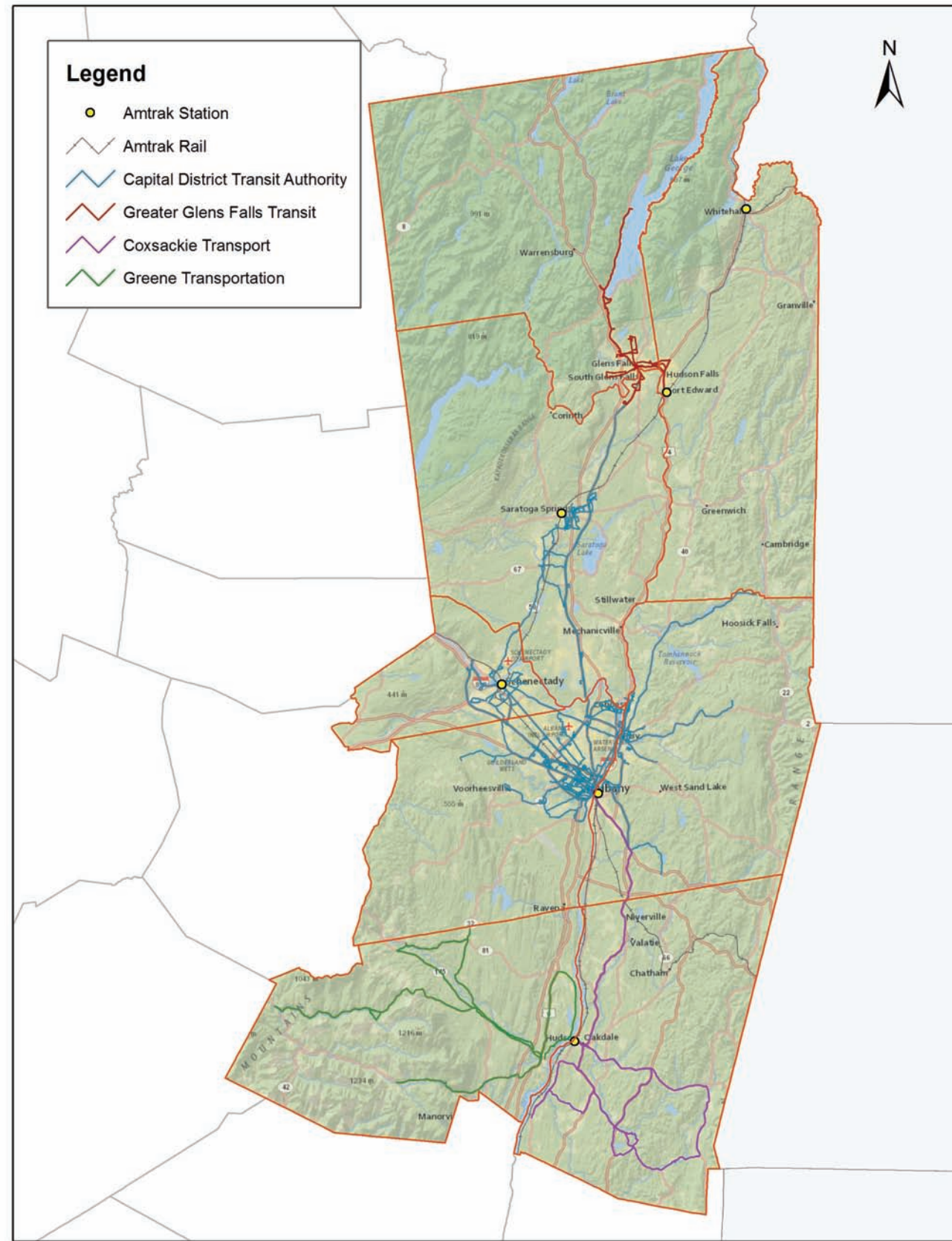
[http://m.poststar.com/news/local/local-transit-system-reports-upswing-in-bus-use-in/article\\_d466ec38-581e-11e1-b53f-001871e3ce6c.html](http://m.poststar.com/news/local/local-transit-system-reports-upswing-in-bus-use-in/article_d466ec38-581e-11e1-b53f-001871e3ce6c.html), Feb 12, 2012







Figure 10.2 Capital Region Transit and Passenger Rail Network



CDTA's first BusPlus bus rapid transit (BRT) route, along Route 5, has successfully increased ridership and reduced travel time along the system's busiest route. BusPlus BRT's efficiency is largely due to limited-stop service and signal prioritization. As shown in Figure 10.3, BusPlus is operated with new hybrid buses which include bicycle racks. Bicycle parking is also provided at most BRT stations. CDTA is planning additional future BRT routes to serve the Capital District. Amtrak also provides rail service in the Capital Region at six stations: Hudson, Albany-Rensselaer, Schenectady, Saratoga Springs, Fort Edward-Glens Falls, and Whitehall. Albany-Rensselaer is the ninth busiest Amtrak service in the nation (55,000 passengers in 2010). Currently, \$35.4 million is being sought by the Governor for construction of capacity improvements at Albany-Rensselaer Station, including a new fourth track. Saratoga Springs station serves over 29,000 passengers per year, primarily traveling to and from New York City. Finally, environmental impact studies are currently underway for the Empire Corridor, a potential high-speed rail service that would travel 463 miles from NYC through Albany/Schenectady to Niagara Falls.

### Land Use - Transportation Relationship

For a community or region to support public transportation with adequate ridership, there typically should be population centers of about 4,000 persons per square mile. This relationship between transit service and population centers is important when it comes to developing a sustainable transportation system. Figure 10.4 illustrates the existing transit service in relationship to population density. The map shows that most population centers are being served, with a few exceptions. Important to note, however, is that just serving a population center is not the entire story – to increase ridership and capture more potential transit demand, transit services must connect customers with the destinations to which they want to travel.

Figure 10.3 CDTA's Busplus North Manning Station (photo courtesy of CDTA)

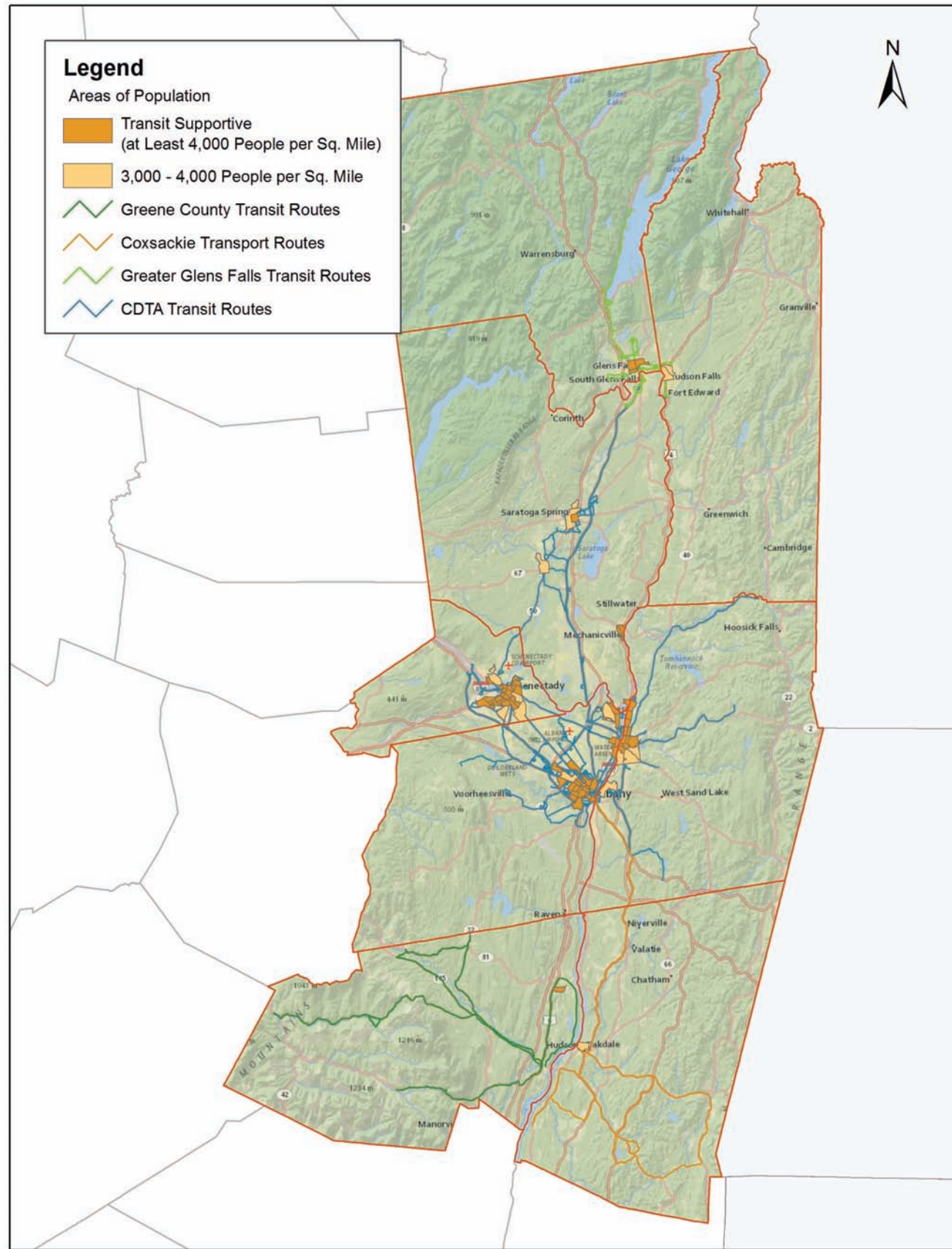


According to CDTA's Annual Report 2011-2012, total annual ridership in the fiscal year was 14,910,000 rides with over 62,000 bicycles carried on buses during the year. CDTA has 29 park and ride lots throughout its service area, with 1,655 parking spaces allowing riders to access the bus services.





Figure 10.4 Transit and Population Density



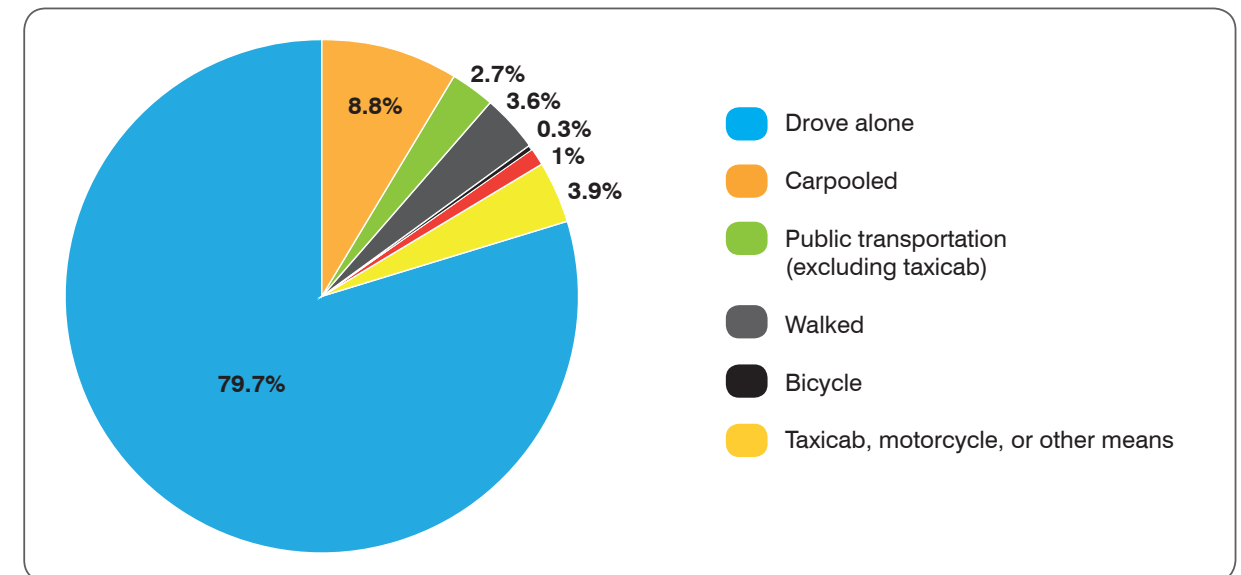
As illustrated in Figure 10.5, almost 80 percent of Capital Region residents commuted to work by driving alone – with only 2.7 percent of Capital Region residents using public transportation.

Comparing those currently using public transportation to the actual number of people living within access of transit, as shown in Table 10.2 indicates that 63 percent, or almost 685,000, of Capital Region residents live within ½ mile of bus services (not including paratransit or on-demand services). They could potentially use a bus rather than a personal vehicle. Of these 685,000 people, 555,000 are within the CDTA bus service area.

### Best Practices

Regional Bicycle and Pedestrian Plan - In CA, the Sacramento Area Council of Governments (SACOG) developed a regional bicycle, pedestrian and trails master plan that incorporates all local and county plans to seek, among other things, to provide inter-jurisdictional bicycle and pedestrian connections, fill gaps in existing and planned interregional bicycle or pedestrian

Figure 10.5 Mode of Commuting to Work



However, although this indicates potential ridership, a key issue is not that there is no access to transit, but rather the transit service provided does not meet the needs of those living nearby. This may be because of inconvenient schedules or routes or the cost- and time effectiveness of taking transit vs. driving.

*To increase ridership and capture ore potential transit demand, transit services must connect customers with the destinations to which they want to travel.*





Table 10.2 Population Within 1/2 Mile of Transit

Coverage Area	Total Population	Population in walking distance to transit *	Percent of Population in walking distance to transit
Warren & Washington Counties	128,923	50,989	40%
Albany, Rensselaer, Saratoga and Schenectady Counties	837,967	554,712	66%
Columbia County	63,096	50,615	80% **
Greene County	49,221	28,303	58%
<b>Total</b>	<b>1,079,207</b>	<b>684,619</b>	<b>63%</b>

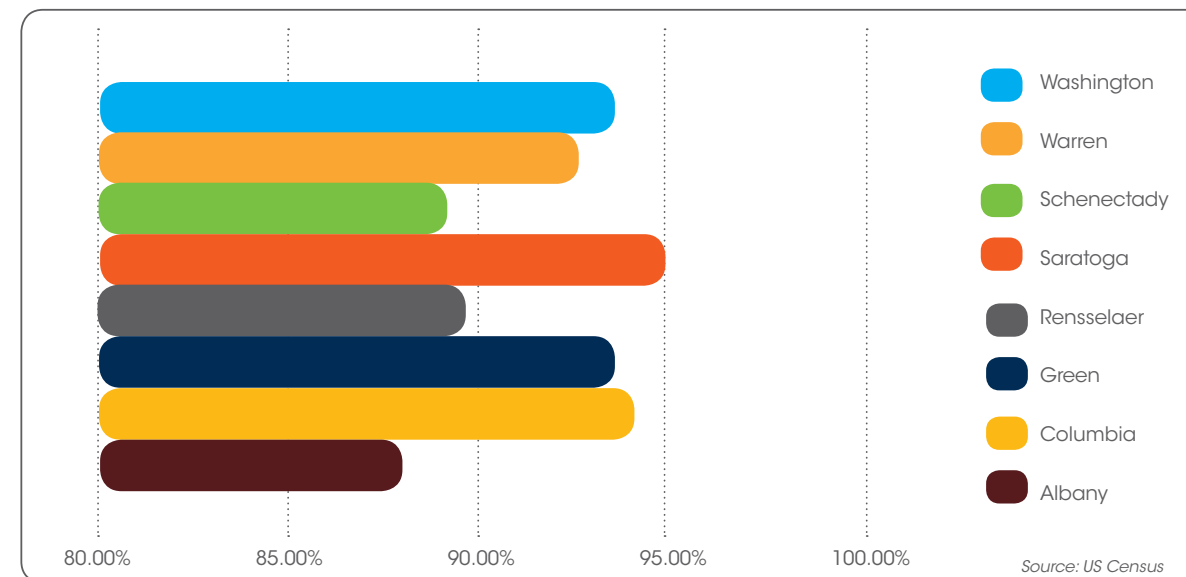
\* Walking distance is defined as 1/2-mile from a bus stop, however, these numbers are based on census block groups. Even if a block groups is only partially within 1/2-mile, the population of the entire block group is entirely included. This may overstate population within a 1/2-mile of transit. Routes in Greene and Columbia Counties do not have bus stops and buses are flagged down by riders at any point on the route. As a result, all population within 1/2-mile of the route (not just bus stops) is included. \*\* Not all Columbia County routes operate every day of the week, so this percent includes all people that are within a 1/2-mile from any route regardless of when it operates.

Another measure of potential dependency on public transportation is whether or not a household has access to a car. Lack of access is typically understood to be an indicator of the need for public transportation. Figure 10.6 illustrates the percent of households in each county that report having access to a vehicle. Within the Capital Region, Saratoga County has the highest car access rate at about 95 percent. Albany County has the lowest rate, at about 87 percent, and Rensselaer and Schenectady Counties are the next lowest rates. These three counties (plus Saratoga County), make up the CDTA service area which, as shown above, also has the greatest number of persons living within walking distance of transit service. Combined, these two measures show that potential transit investment particularly in Albany, Rensselaer and Schenectady counties could serve households that have no other means of transportation.

Although these figures indicate a broad potential for transit riders, a barrier to encouraging public transportation within the Capital Region is a general lack of roadway congestion. Congestion was rarely raised as a public concern. In addition, free and widely available parking does not discourage driving. To encourage additional transit ridership, system expansions and improvements of the transit experience would likely be required as well as increases in parking pricing.



Figure 10.6 Households with Vehicle Availability



### Pedestrians, Bicycles and Trails

Although there is no centralized source of data for bicycle, pedestrian and trail planning, planning for non-motorized transportation and recreation is occurring in many jurisdictions and agencies at a robust level throughout the region. The Capital District Regional Bike-Hike Map (CDTC, 2006) provides a comprehensive look at the non-motorized network. However, only a portion of the Capital Region is covered in this plan. Currently available bicycle, pedestrian and trail maps, programs and plans in the Capital Region include:

- NYSDOT Designated Bicycle Routes (State Bicycle Routes 5 and 9)
- Warren County Bicycle Plan
- Mohawk-Hudson Bike-Hike Trail Map Update
- City of Albany Bike Master Plan
- Tech Valley Trails: Greenways Concept Plan for Capital Region
- Capital District Regional Bike-Hike Map
- A/GFTC Bicycle & Pedestrian Plan and Regional Bicycle Map
- Mohawk-Hudson Bike-Hike Trail Economic Study

- Rensselaer County trail plan
- City of Schenectady Bicycle Plan
- NYS OPR has a data set of trails throughout the state
- NYSDOT database of abandoned rail corridors, and canal corridors
- CDTA and GGFT have bicycle racks on buses, and bicycle racks are found at many CDTA BusPlus stations.
- Parks & Trails New York online Trail Finder at <http://www.ptny.org/trailfinder/>. It includes information on greenways, rail trails, canal trails, bikeways, and riverwalks state wide.
- Altamont Pedestrian and Bicycle Master Plan

A significant number of additional activities and studies are ongoing, including, but not limited to:

- A/GFTC is just finished revising and updating its bicycle & pedestrian map, which is now available to the public.
- A/GFTC's Make the Connection Program is a regional set-aside of construction funds to be used solely for bicycle and pedestrian improvements. CDTA has a similar program





called the Spot Improvement Program. Both programs seek to help plug gaps in the bicycle or pedestrian network.

- City of Albany is undertaking a study to implement a bikeshare program.

- CDTC's New Visions 2035 Plan includes several initiatives, including:

- Bicycle-Pedestrian Priority Map - regional network of over 450 miles and 109 route segments to be made bicycle and pedestrian friendly as a regional system of continuous usable facilities.

- Capital Coexist campaign (launched in 2010) to provide safety and awareness to bicyclists and motorists.

- Safe Routes to School Program (first round awarded funding to six schools in NYSDOT Region 1)

### Vehicular Programs

Both CDTC and A/GFTC host a web-based ridematching site, with linked databases of potential riders. A/GFTC's site is called iPoolNorth, and CDTC's is called iPool2.

The City of Albany has undertaken a feasibility study to examine ways it and other cities can support and promote the use of electric vehicles (EV) through their Electric Vehicle Infrastructure Feasibility Study. This study aims to identify what actions must be taken to make a city "EV Ready" as well as including both policy and charging station location recommendations, information on EV use and demand, existing charging infrastructure, best practices on becoming an EV Ready city, and a checklist for EV readiness that can be used by other municipalities in their efforts to support EVs.

### Airports

Albany International Airport (ALB) is the primary provider of commercial air transportation to the Albany area. There are 25 non-stop destinations served from ALB with 90 daily departures. ALB recently completed a new 230,000 square foot terminal, garage, air traffic control tower, and cargo facility, and recently embarked on a \$232 million capital plan to improve safety and passenger needs. The airport has surface transit connections including local via CDTA and long distance via Adirondack Trails.

In addition to ALB, there are four general aviation airports in the region: Columbia County, Saratoga County, Schenectady County and Floyd Bennett Memorial Airport (Warren County).

### Goods Movement

Goods movement in the Capital Region is provided by roadway, rail, port and air operations, with access to the interstate highway system and the, Class-I freight railroad system, NY State Barge Canal

system. The Capital Region is a key link in the larger upstate region, and efforts must be made to support the sustainable aspects of the goods movement, while still respecting and supporting walkable and livable neighborhoods. Important facts about the freight transportation system today include:

- Port of Albany located on CSX's Northeast Corridor, with rail access to Lake Ontario / Erie Canal, New York/New Jersey, and Boston. The rail provides a connection to Montreal via Canadian Pacific Rail.

- Selkirk Rail Yard, 8 miles south of Albany, is a CSX major classification yard for the Northeast. It provides a gateway to points east

of the Hudson River including New York City, and typically handles 8,000 rail cars per day.

- The Port of Albany is located on the Hudson River, 124 miles north of New York City. In 2008, a record setting year, they imported 227,299 tons and exported 362,050 tons. Recent improvements have allowed the port to increase capacity and become a distribution point for intermodal containers from Pennsylvania, New York and New Jersey.

- In 2010, Albany International Airport ranked 97th in total cargo based upon statistics compiled by Airports Council International-North America. They have a full-service air cargo terminal serving FedEx, UPS and Mobile Air.

### Greenhouse Gas Emissions

The transportation sector is responsible for 36 percent of GHG emissions in the Capital Region. That makes it the second largest contributor of emissions (after non-mobile energy consumption and generation), according to the 2010 Regional Greenhouse Gas Inventory, which can be found in Appendix 8. Within this sector, as indicated in Table 10.3, on-road transportation is the largest portion of emissions. Because VMT data is the foundation for calculating on-road transportation emissions, the emissions data follows a similar trend to the VMT data provided in Table 10.1. Other sources of emissions within the region include those associated with fuel used in off-road vehicles and equipment, as well as in the operation of trains and marine vessels.

Table 10.3 GHG Emissions from Transportation, Capital Region, 2010 (Metric Tons CO<sub>2</sub>e)

	Regional Total	Albany	Columbia	Greene	Rensselaer	Saratoga	Schenectady	Warren	Washington
On-road	5,526,882	1,650,002	342,133	349,166	691,191	1,302,373	506,514	420,380	265,123
Rail	115,385	28,430	8,310	8,197	24,952	13,339	23,088	355	8,714
Marine	120,321	67,375	6,020	4,881	5,106	11,060	1,200	21,135	3,544
Off-road Mobile	526,180	128,445	40,054	40,682	59,439	112,834	44,451	62,901	37,373





## Goals

The Transportation Technical Committee identified the goals and supporting initiatives shown in Table 10.4. Important in the goal development was to maintain consistency with existing long range plans, including among others, the A/GFTC Long Range Transportation Plan for 2030, CTDC's New Visions 2035 Plan Update, and the City of Albany 2030 Comprehensive Plan. This list is not at all comprehensive, but these plans are specifically mentioned because they articulate similar goals for multi-modal transportation, transit-supportive land use, and the efficient movement and fueling of vehicles and freight.



Table 10.4 Transportation Goals and Initiatives

Goals	Initiatives
Provide viable options as alternatives to personal vehicles and single occupancy vehicle commuting.	<ul style="list-style-type: none"> <li>Improve transit service through technology improvements</li> <li>Establish car sharing programs throughout the region</li> <li>Create an interconnected regional transit system</li> </ul>
Create walkable and bikeable communities interconnected by regional transit and trail networks.	<ul style="list-style-type: none"> <li>Implement a bicycle and pedestrian infrastructure improvement program</li> </ul>
Encourage the use of alternative fuels and transportation technologies.	<ul style="list-style-type: none"> <li>Optimize transportation system through alternative street design and advanced signal technology</li> <li>Develop and expand electric vehicle and alternative fuel infrastructure</li> <li>Convert municipal fleets and transit vehicles to electric or other alternative fuels</li> </ul>
Encourage expanded use of efficient and sustainable freight movement, respecting quality of life of communities.	<ul style="list-style-type: none"> <li>Improve freight facility operations, infrastructure, and highway connections</li> <li>Incentivize use of clean and fuel-efficient truck and freight technology</li> </ul>

## Regional Initiatives

All nine of the transportation initiatives are included in this Plan, however, given limited resources and time, three of the initiatives were prioritized as the immediate focus for implementation within the region. These three initiatives are further described as follows:

### Implement a bicycle and pedestrian infrastructure improvement program:

Improve regional non-motorized connectivity by closing the gaps between individual trails, sidewalks or bicycle facilities within the existing network, as well as by creating new facilities. A number of key locations for trails are identified, planned and ready for design approval. This initiative would also provide for expanding bicycle and pedestrian networks both through "spot" improvements and implementing bicycle and pedestrian plans within communities. Such projects should include a focus on improving transit access for pedestrians and bicycles, linking subdivisions to each other and to nearby commercial uses, and/or creating complete streets. Municipalities would partner with non-profits, community organizations and developers to implement this initiative. This initiative is intended for high value, short term implementation projects that can link existing facilities thus encouraging more use of bicycle, pedestrian and transit facilities. Valuable components can be implemented in the short term.

### GHG Reduction Potential from Bicycle and Pedestrian Infrastructure Improvements:

Bicycle and pedestrian infrastructure improvements can reduce VMT by 1-2%. Assuming a 1.5% VMT reduction, the Capital Region could see a reduction of GHG emissions from on-road transportation of 82,743 MTCDE.

### Improve transit service through technology improvements:

This initiative focuses specifically on improvements to transit services throughout the region, with a focus on bus transit. This initiative looks to implement transit technology improvements such as transit signal priority, signal optimization, off-board fare collection, smartcard fare media, automatic vehicle location (AVL)/"NextBus" tracking systems to improve travel time, reliability, and overall user experience and to increase ridership. Additional bus rapid transit routes in the CDTA network can benefit from this initiative, as well as providing opportunities for other regional transit systems to implement technology improvements. Some routes are ready to be implemented with funding availability.

### GHG Reduction Potential from Signal Optimization:

According to the Center for Clean Air Policy, as a rule of thumb, GHG emissions are reduced by two percent from improved traffic signalization. A 2% reduction in transportation emissions across the region would result in a reduction of 110,324 MTCDE.

### Optimize transportation system through alternative street design and advanced signal technology:

The focus of this initiative is on the complete transportation system, including walking, biking, driving and transit. The intention is to use this initiative to create a balanced system between all of these modes through a variety of physical and technological improvements that will improve travel flow, reduce travel times and make communities more attractive for walking, biking, and transit. Improvements





could include connecting the street grid, roundabouts, signal optimization, signal coordination, complete streets design, access management, and energy efficient technology such as LED lighting. The redesign of infrastructure is emphasized and although some projects would be longer term, such as street reconstructions, there are valuable short term projects, such as street restriping to incorporate all modes, which could be implemented quickly and cost efficiently.

The remaining initiatives are listed below:

**Establish car sharing programs throughout the region**

**Convert municipal fleets and transit vehicles to electric or other alternative fuels**

**Create an interconnected regional transit system**

**Develop and expand electric vehicle and alternative fuel infrastructure**

**Improve freight facility operations, infrastructure, and highway connections**

**Incentivize use of clean and fuel-efficient truck and freight technology**

### Best Practices

Car sharing/Fleet Management - In their Sustainability Management Plan, the City of Asheville, NC identified ways to reduce the city government's fuel consumptions by supplementing city vehicle fleet with city-wide Zipcar membership (or Fastfleet by Zipcar program). Also, a survey of employees determined that most staff could do their city duties on a Segway. Police responded that they could do their duties on bicycle. The plan recommended that City establish a formal percent reduction goal to measure implementation success.



Table 10.5 provides additional details on the implementation strategy for the three priority initiatives. The information in each column, including the Preliminary Cost, were discussed by the Transportation Technical Committee. They are general thoughts to provide a basic understanding of the costs that could be associated with each initiative.

Table 10.5 Transportation Implementation Strategy

Initiative	Regional Priority	Implementer	Partners	Preliminary Costs	Greenhouse Gas Reduction Potential **	Potential Funding Sources	Timeline
Implement a bicycle and pedestrian infrastructure improvement program	1	Municipalities (especially across municipal boundaries) Counties State agencies, and other agencies such as CDTC, A/GFTC and CDTA.	Community groups Businesses Developers, etc.	\$ - \$\$	Medium	There are many programs, however they are very competitive and constrained. Also, successful projects typically use a combination of funding sources and rely heavily on the community for support and work to get projects creatively implemented. Some potential sources may include: <ul style="list-style-type: none"> <li>Private foundation support and NGO's</li> <li>CMAQ, if available</li> <li>Recreation trails programs</li> <li>Environmental protection fund</li> <li>MAP21</li> <li>Community Development Block Grants</li> <li>Greenway grants; etc.</li> </ul>	Mid-Term (1-5 years)
Improve transit service through technology improvements	2	Transit Agencies throughout the region	Municipalities and NYS DOT	\$\$\$	Medium	Traditional federal funding sources are a potential source. These are, however, constrained and have not been available for this type of initiative, to date.	Mid-Term (1-5 years)
Optimize transportation system through alternative street design and advanced signal technology	3	Municipalities, DOT, transit agencies, counties	Development community Community organizations Non-profits	\$\$	High	Municipal budgets, federal and state options (though extremely constrained), developers	Mid-Term (1-5 years)

\*Overall Cost: \$ - < \$100,000, \$\$ - \$100,000 to \$500,000, \$\$\$ - > \$500,000

\*\*Greenhouse Gas Reduction Potential: High - Strategy will result in a direct, quantifiable reduction in GHG emissions; Medium - Some GHG emissions reduction may occur but it cannot be quantified; Low - GHG reduction is very indirect, unlikely to occur, or unknown

In addition to the implementation strategy above, it is recognized that these initiatives will require action by the local government to implement. To that end, the governance structure is intended to outline a process for local governments to implement the priority initiatives and the policies and programs where there are alignments or hindrances to implementation. Table 10.6 identifies the applicable governance structure for these initiatives.

Table 10.6 Transportation Governance Structure

Initiative	Process to Implement (update zoning ordinance, adopt a policy or plan, resolution to approve funding, etc.)	Related Policies - positive linkages and alignments	Related Policies - barriers and cross-purposes	Local Government Level of Implementation
Implement a bicycle and pedestrian infrastructure improvement program	n/a			
Improve transit service through technology improvements	n/a			
Optimize transportation system through alternative street design and advanced signal technology	<ul style="list-style-type: none"> <li>Revise and Adopt Transportation Plans</li> <li>Revise and Adopt Supportive Zoning</li> <li>Coordinate with Transit Agencies and Companies</li> </ul>	Street improvements and advanced signal technology should complement <i>Transportation - Improve Freight Facility Operations, Infrastructure, and Highway Connections</i> . It should also generally be complementary with economic development efforts.	Code updates should allow for such transportation technologies and improvements: <i>Economic Development - Establish Model Green Code for Adoption by Communities and Land Use - Modify Local Codes and Land Use Regulations to Allow for Sustainable, Compact Development.</i>	All Local jurisdictions including local municipalities, counties, DOT's and transit agencies.



Section 11.0

**Water**





## SECTION 11.0: **Water**

*Water is essential to life and is therefore an essential consideration for all focus areas. We need water to drink and support our daily activities. We need water to grow and prepare our food. We desire water for recreation of all kinds. Water is part of cultural and religious practices and is integral to our public spaces. With such a heavy dependency on water, we must protect this resource from overuse and degradation.*

The Capital Region and much of the Northeast have an ample supply of water. This is not true for every corner of the Region, but, in general, the populated areas have access to good supplies that are not likely to be diminished significantly by climate change. Central to this supply are the Hudson and Mohawk Rivers and some of the large aquifers that are associated with these rivers.

How we treat our water resources affects the quality of the water that we use. We must, therefore, also focus on our wastewater treatment systems and the runoff we generate from our built environment to ensure proper treatment and control the erosive and sometimes destructive forces of storm events, amplified by impervious area and deforestation.

### *Regional Baseline*

#### *Water Supply*

A simple comparison of average daily water use, projected daily water demand and the list of the approved capacities of NYSDEC permitted facilities indicates that the permitted water supply far

#### *Best Practices*

Water Harvesting Program—The State of California has instituted a water harvesting program for commercial projects. All commercial projects must be designed to capture and retain 50% of its water demand based on the water demands of the designed landscape.

<sup>1</sup> Existing industrial and projected square footage available for Saratoga, Schenectady, Albany, and Rensselaer Counties.







exceeds water demand in the Capital Region both now and for the foreseeable future.

In 2010, the population of the Capital Region was 1,051,233 (CDRPC, 2012) (Cornell, 2012). Of these, based on data provided by NYSDEC (Appendix 20), within the Capital Region there are 80 permitted facilities serving approximately 885,000 people. It is assumed the remaining 166,000+/- people generally rely on private well water for potable water. Additionally, the existing permitted facilities also serve a minimum of 454,545 square feet of non-residential uses (industrial, commercial, and other).

*A few current best practices to reduce water use include:*

- Use water recycling systems for decorative fountains, ponds, lakes and pools
- Reduce outside irrigation by 50% and complete between 7:00pm and 9:00am
- Program the use of low flow showerheads and toilets.
- Install timers and sensors on automated sprinkler systems.
- Install water efficient landscaping

Residential and industrial growth projections for the years 2020 and 2030 were used to calculate future water demand at 100 gallons

**Table 11.1 Residential Water Use Projections**  
(in millions of gallons)

County	2020 per day	2020 per year	2030 per day	2030 per year
Albany	29.0571	10,605.8415	29.4798	10,760.1270
Columbia	6.0777	2,218.3605	5.6460	2,060.7900
Greene	4.9572	1,809.3780	4.9192	1,795.5080
Rensselaer	15.8579	5,788.1335	15.9895	5,836.1675
Saratoga	23.3633	8,527.6045	24.6647	9,002.6155
Schenectady	14.8694	5,427.3310	14.8751	5,429.4115
Warren	6.6189	2,415.8985	6.5391	2,386.7715
Washington	6.3148	2,304.9020	6.1459	2,243.2535
	107.1163	39,097.4495	108.2593	39,514.6445

**Table 11.2 Industrial Water Use Projections**  
(in millions of gallons)

County	2020 per day	2020 per year	2030 per day	2030 per year
Albany	5.1596	1,883.2540	5.2834	1,928.4410
Columbia				
Greene				
Rensselaer	1.14872	419.2828	1.18078	430.9847
Saratoga	1.81988	664.2562	1.9470	710.6550
Schenectady	1.40886	514.2339	1.42468	520.0082
Warren				
Washington				
	9.53706	3,481.02690	9.83586	3,590.0889

per day (gpd) per person for residential users and 20 gpd per square foot for industrial users. As shown in Table 11.1, in 2020, residential water use is projected to grow to 107.1 million gallons per day (mgd) and to over 39,097 million gallons per year (mgy). In 2030, residential water use increases to 108.3 mgd and 39,514 mgy. Table 11.2 shows the anticipated growth in industrial water use in four Capital Region counties. In 2020, industrial water use is projected to grow to 9.5 mgd and 3,481 mgy. In 2030, industrial water use increases to 9.8 mgd and 3,590 mgy. When residential and industrial water uses are combined for the year 2030, water demand is estimated to grow to an average of 118.09 mgd. This compares to an existing capacity of NYSDEC permitted facilities of 254.57 mgd, indicating there is adequate water supply available. However, this data does not take into account several variables. Projections for industrial water use were not readily available for Columbia, Greene, Warren and Washington Counties. In addition, there are users that do not rely on permitted facilities for their water supply. This accounted for approximately 16.61 mgd or 13.8% of all water use in 2010.

The topic of water supply and availability, however, is far more complicated than simple straight line projections. The location of permitted facilities as they relate to population density, land use intensity, water demand intensity, the type and size of water supply (groundwater, surface water reservoir, and river) all play critical roles in the availability of potable water to a specific user or location. Also key to water supply is the availability and condition of permitted water facility infrastructure and distribution system as well as the quantity and quality of groundwater for users relying on private wells.

The Water Supply Resources map (Figure 11.1) provides generalized information and location of groundwater resources throughout the Capital Region. The EPA-designated Schenectady-Niskayuna Sole Source

Aquifer is subject to land use regulations to ensure water quality of the aquifer.

The quality and quantity of the water supply is affected by surrounding land use patterns, sewage overflows, loss of natural buffers and wetlands, increased water temperatures, low stream flows, and non-point pollution including urban and agricultural runoff.

**Wastewater Treatment**

Properly designed and maintained wastewater treatment facilities, whether municipal facilities or individual septic systems, are critical to protecting the water quality of streams, rivers, lakes and groundwater and ensuring adequate supplies of water for drinking, recreation and wildlife.

In the Capital Region there are numerous facilities including wastewater treatment plants and other facilities (municipal, state or commercial) that hold State Pollutant Discharge Elimination System (SPDES) permits to discharge into waterways. These are identified on the Wastewater Treatment Plants and Discharges map shown in Figure 11.2. The quality of this discharge is critical to maintaining the quality and health of receiving water bodies. This, along with the effectiveness of individual septic systems, may have a major impact on both surface and groundwater quality.

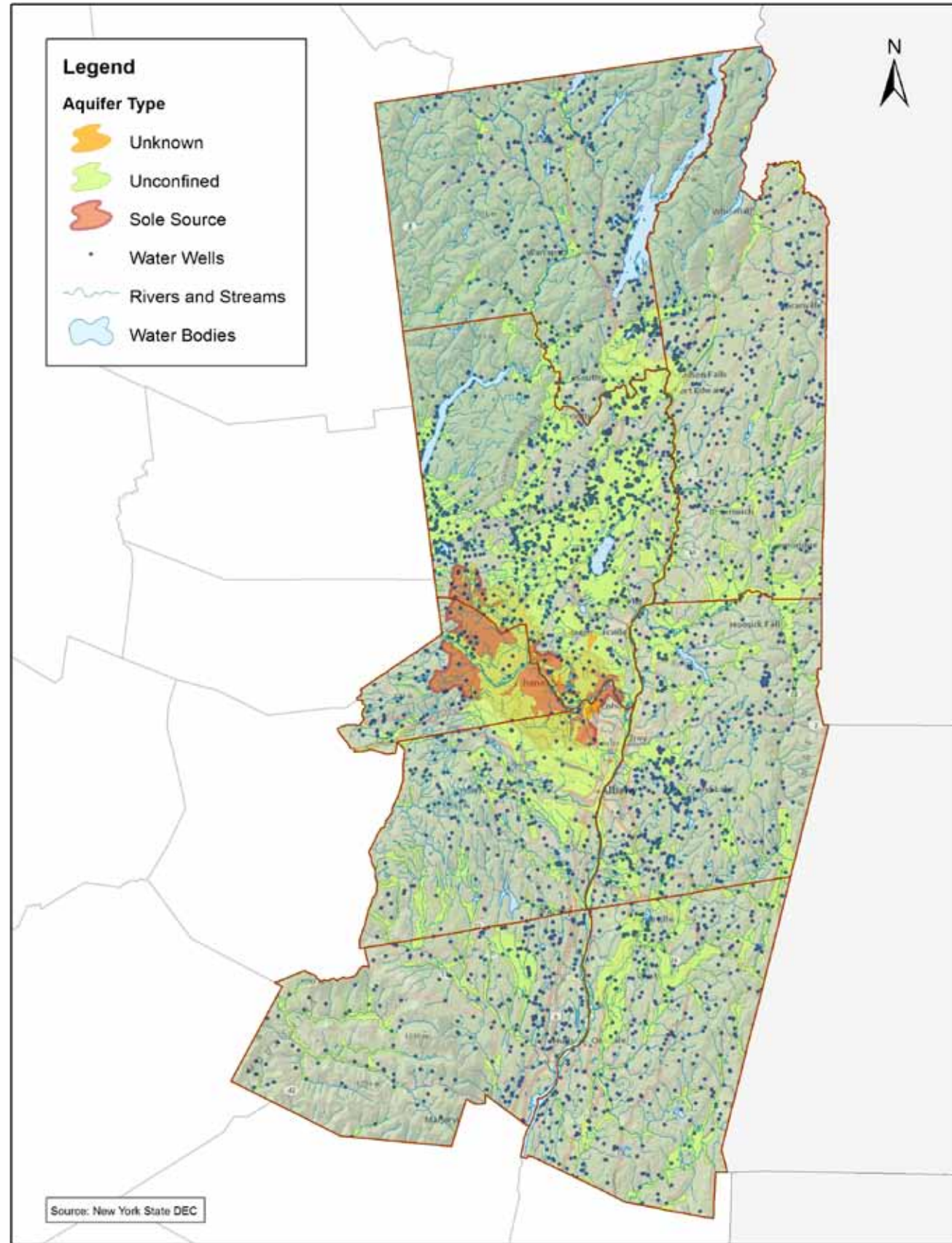
Wastewater treatment concerns vary within the region due to the dynamic development patterns and the combination of older and new development. Within many of the older cities, a major issue is combined sewers and the potential for overflows during certain storm events. In more rural areas, concerns

*Green infrastructure is being used in some locations in the State to treat Combined Sewer Overflow (CSO) discharges. One facility in Syracuse will evaluate the effectiveness of three types of treatment wetlands.*





Figure 11.1 Water Supply Resources



may be focused on runoff from agricultural operations, improperly operating individual septic systems or single point pollution from an industrial or commercial facility.

The Hudson and Mohawk Rivers are the major watersheds in this region, with the Hudson River watershed comprising the majority of the land area. The river essentially bisects the counties in this region flowing north to south. The protection of the rivers and their tributaries is critical to water quality. The Hudson River and its tributaries are already affected by combined sewer overflows (CSO) and sanitary sewer overflows (SSO). CSO's occur during periods of heavy precipitation when a combined stormwater/ sewer system cannot handle all of the additional runoff and discharges untreated sewage into the receiving waterbody. An SSO is designed to discharge sewage prior to reaching the treatment facility during wet weather conditions or emergencies.

The Environmental Features map (Figure 11.3) provides an overview of the important water related resources including reservoirs, NYSDEC wetlands, rivers and streams as well as coastal habitats and NYS agricultural districts that can be impacted by water quality issues related to wastewater discharges.

#### Stormwater Management

Effective stormwater management is necessary to reduce the impacts of erosion and flooding and is also important in improving the region's water quality through facilities designed to both control and treat runoff. Stormwater management can be accomplished through natural systems, green systems and gray systems, either individually or in combination.

The Developed Land and Watershed map (Figure 11.4), delineates land cover with the red areas indicating more densely developed areas. Traditionally, more developed land areas include a higher percentage of impervious area and as a result generally rely on gray infrastructure facilities. These are

*Asset management plans take a comprehensive look at water, sewer, and even stormwater systems to address all aspects of system function to reduce losses and conserve resources (water and energy).*

#### Some local examples of Stormwater Management Best Practices include:

- Doane Stuart School- Green Roof
- Municipal rain gardens – Bethlehem, Cohoes, Colonie, Guilderland
- Columbia County SECD office - rain gardens and porous pavement
- Lake George Village-installation of grass pavers and porous asphalt

#### Best Practices

Green Roofs– A green roof is a roof of a building that is partially or completely covered with vegetation and soil, or a growing medium, planted over a waterproofing membrane. Green roofs are used for stormwater management and energy savings, as well as for aesthetic benefits. Green roofs absorb stormwater and release it back into the atmosphere through evaporation and plant transpiration, while reducing urban temperatures by limiting the amount of heat retaining structures. The vegetation on the roofs also absorb a great deal of the pollutants in the water before it is released into the atmosphere.





Figure 11.2 Water Treatment Plants & Discharges

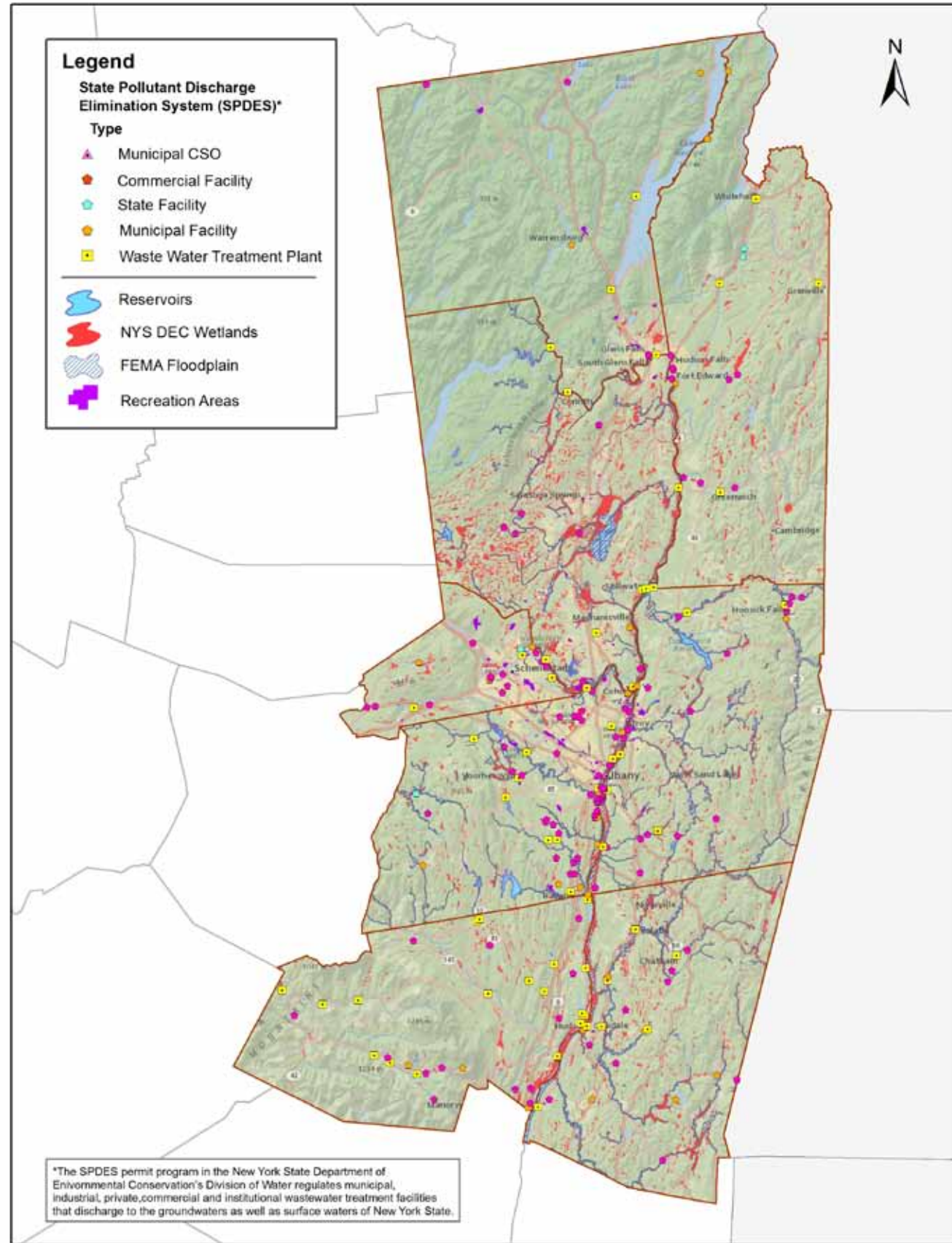


Figure 11.3 Environmental Features

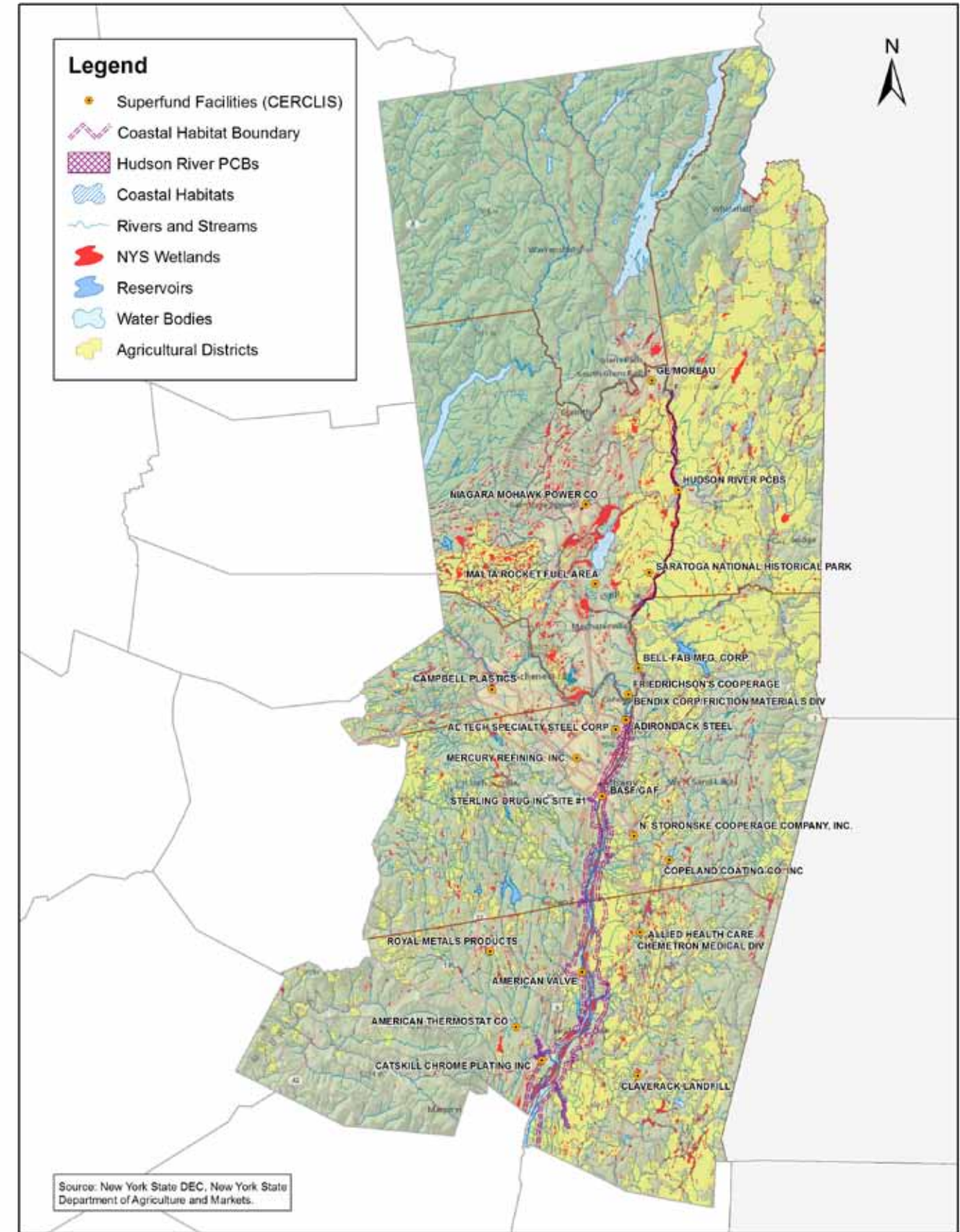
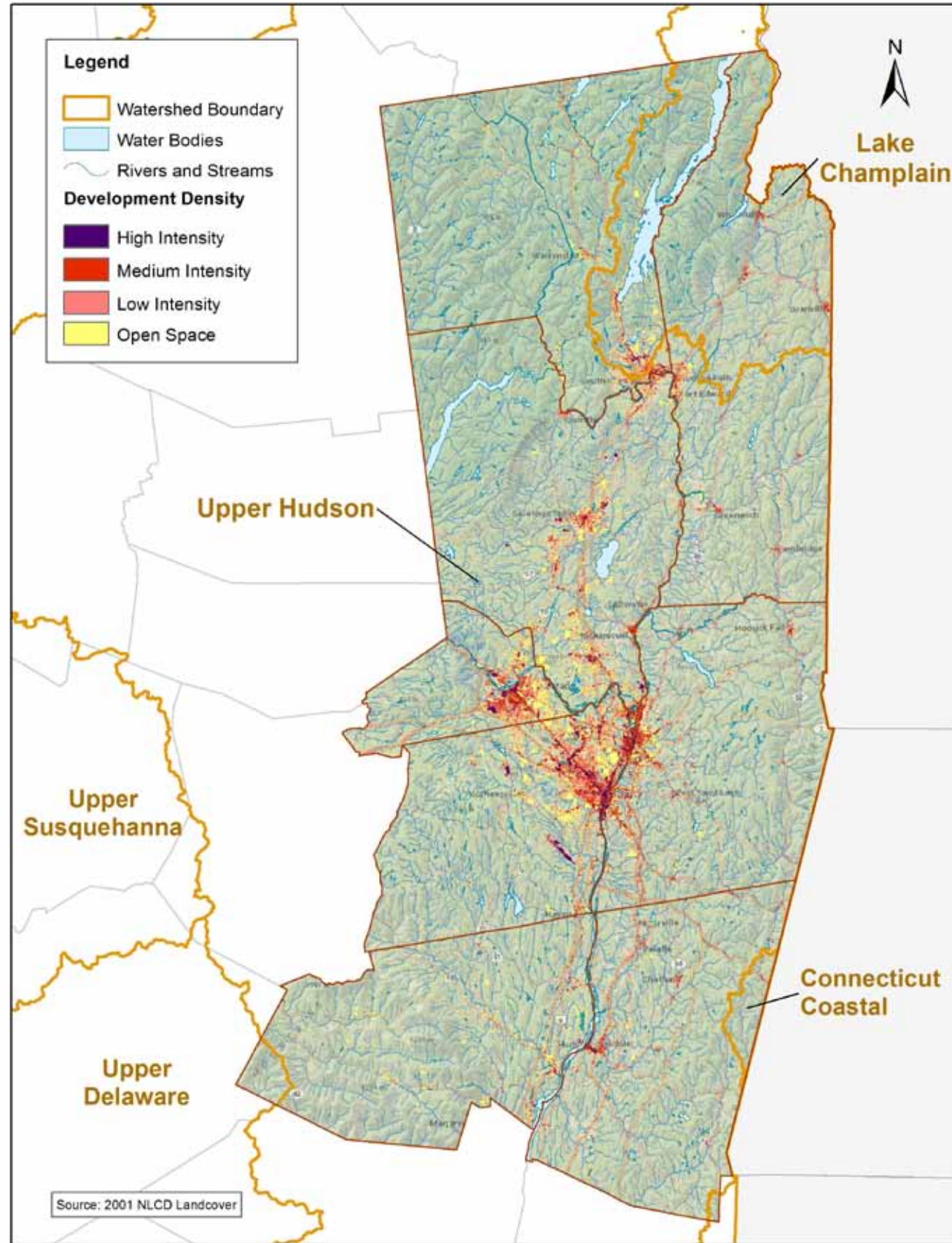




Figure 11.4 Regional Developed Land and Watersheds



the traditional storm sewers and detention basins. Suburban areas have relied on detention ponds for years to control peak runoff from development. State standards for stormwater management for new construction have evolved over time to address stormwater quality in addition to quantity. Stormwater management systems now include treatment wetlands, vegetated swales (bioswales), and other small, strategically placed treatment wetlands often called rain gardens. These types of treatment systems are referred to as green infrastructure since they combine natural functions in a constructed feature such as a basin or swale.

The Save the Rain Program in Onondaga County provides excellent guidance for the use of green infrastructure as a stormwater

management strategy. Completed projects have ranged from large scale (construction of a 60,000 square foot green roof on the Onondaga County Convention Center) to neighborhood level projects (tree plantings at a local community center) (Onondaga County, 2012).

Natural systems provide stormwater management functions with little or no manipulation and can be the most effective and least expensive stormwater management feature to operate. However, to be used as a planned tool for stormwater management, more information is required at a watershed level to identify appropriate areas for land conservation. There has been limited study to date for this purpose in the Capital Region.

Table 11.3 GHG Emissions from Wastewater Treatment, Capital Region, 2010 (Metric Tons CO<sub>2</sub>e)

Wastewater Treatment	Regional Total	Albany	Columbia	Greene	Rensselaer	Saratoga	Schenectady	Warren	Washington
Central WWTPs and Septic Systems	107,943	29,554	6,130	4,782	15,489	21,335	15,032	7,174	8,447

Table 11.4 Water Goals and Initiatives

Goals	Initiatives
Maintain and improve the availability and reliability of the potable water supply and reduce water consumption to ensure adequate supply for all users.	<ul style="list-style-type: none"> <li>Create Asset Management Plan for Water and Sewer Systems</li> <li>Develop a Purchasing Consortium</li> </ul>
Minimize the use of grey infrastructure by maximizing use of both natural systems and when necessary the construction of green infrastructure. Ensure that all downstream areas are appropriately protected from the impacts of stormwater runoff.	<ul style="list-style-type: none"> <li>Develop a Predictive Model for Stormwater Management</li> </ul>
Protect water quality of streams, rivers, lakes, reservoirs, and groundwater to ensure adequate supplies of water for drinking, recreation and wildlife. Reduce energy consumption and maintenance costs associated with sewer systems.	<ul style="list-style-type: none"> <li>Develop an Invasive Species Control Initiative</li> <li>Create a Green Rating System for Commercial &amp; Residential Development</li> <li>Develop Municipal Code Review to Incorporate Water/Stormwater Management Best Practices</li> <li>Conduct a Watershed Assessment for Stormwater Management</li> <li>Create a Small Grant Program for Innovative Water Quality Projects</li> </ul>
Maintain and improve water quality and quantity for recreation and habitat.	





### Greenhouse Gas Emissions

The relevant greenhouse gas emissions for the water focus area, as shown in Table 11.3, include emissions from both the energy sector and from the waste sector—specifically emissions from wastewater treatment. Emissions from wastewater treatment in the Region include process emissions from both septic systems and wastewater treatment plants. The total regional emissions from wastewater treatment in 2010 was 107,943 metric tons CO<sub>2</sub>e. The initiatives identified for this focus area, specifically those that will improve wastewater treatment processes and efficiencies will have an impact on the emissions from this sector, though it is worth noting that this particular emissions source represents less than one percent of total regional emissions. However, improvements in water, wastewater, and stormwater practices in the region, particularly efficiency improvements in the pumping, distribution, and treatment of water, as well as in overall water consumption, could have a significant impact on emissions related to energy consumption in the residential, commercial, and industrial sectors. More details on emissions from energy sources can be found in the Energy chapter.

### Goals

The Water Technical Committee, through the process outlined in Chapter 2, identified three primary goals and eight initiatives as part of this Sustainability Plan. The availability and quality of our water resources should be protected, maintained, and improved by addressing the critical elements described in Table 11.4.

### Regional Initiatives

Sustainability initiatives across the various focus areas are often linked due to the complex interrelationships of natural systems and the effect focus areas such as land use and economic development can have on these systems. Water is therefore an important consideration for all focus areas. All eight of



*Watershed assessment studies will provide better information on the existing conditions of our surface waters and help to provide effective solutions for stormwater management.*

the water initiatives are included in this Plan; however, given limited resources and time, three of the initiatives were prioritized as the immediate focus for implementation within the Region. These three priorities are as follows:

**Create Asset Management Plans for Water and Sewer Systems.** An effective means of assessing and managing water loss, infiltration and inflow, combined sewer overflows, services areas, and energy consumption in a municipal water or sewer system is to conduct an Asset Management Plan that will address all aspects of the system. This initiative will begin with an inventory and assessment of the existing system for a given area or municipality. An energy audit should also be included, focusing on the major components of the system. The next stage of this initiative will involve the creation of a capital improvement plan. This will take into consideration both the extent and location of future growth

and is therefore tied to community land use planning. Conceptual plans will be developed and preliminary cost estimates provided along with an implementation schedule. An education campaign will accompany the implementation strategy to aid in the process of leveraging funding.

**Create a Small Grant Program for Innovative Water Quality Projects.** The intent of this program is to allow the general public to propose innovative projects to improve water quality that could be funded by grant programs administered by Water Quality Coordinating Committees, Soil and Water Conservation Districts or MS4 Consortiums.

**Conduct a Watershed Assessment for Stormwater Management.** A Watershed Assessment for Stormwater Management will inventory and assess the existing drainage network and stormwater systems, both natural and built. The initial step in the process is to identify problem areas within the watershed that should be targeted for improvements followed by the identification of specific projects or mitigation measures selected through an alternatives analysis of various gray infrastructure, green infrastructure, and natural resources options. The predictive model would be a useful tool to assist in the selection process. The last component of this initiative is the opportunity to provide technical assistance to support commercial and residential development.

The other initiatives not included in the top three are listed below:

- Develop an Invasive Species Control Initiative
- Create a Green Rating System for Commercial & Residential Development
- Develop Municipal Code Review to Incorporate Water/Stormwater Management Best Practices
- Develop a Predictive Model for Stormwater Management

### Best Practices

**Whole Farm Planning–** Whole Farm Planning is a holistic approach to farm management used to identify and prioritize environmental issues on a farm without compromising the farm business. Potential risks to the water supply are identified and addressed through careful structural planning to reduce or avoid the transport of agricultural runoff into farm streams and into water supply reservoirs or rivers. By successfully integrating traditional and innovative farm management approaches into a flexible and wide-ranging strategy, this program is unique in its ability to prevent agricultural pollution while also protecting the economic viability of farming.

**Riparian Buffers–** A riparian, or forested, buffer is an area along a shoreline, wetland, or stream where development is restricted or prohibited. The primary function of aquatic buffers is to physically protect and separate a stream, lake, or wetland from future disturbance or encroachment. If properly designed, a buffer can provide stormwater management and can act as a right-of-way during floods, sustaining the integrity of stream ecosystems and habitats.

### Develop a Purchasing Consortium

An implementation strategy which outlines the resources, costs and timeline associated with achieving the priority initiatives, is provided in Table 11.5.





In addition to the implementation strategy above, it is recognized that governance of these initiatives is also a challenge for implementation. Table 11.6 identifies the applicable governance structure. The Governance overview provides guidance to jurisdictions in the region on specific actions they can take to implement the Plan's various initiatives. It also evaluates each initiative against all other initiatives in the Plan to identify where there are opportunities for synergies in implementation, as well as where initiatives have the potential to work at cross purposes so that these potential inconsistencies can be proactively addressed.

Table 11.5 Water Implementation Strategy

Initiative	Regional Priority	Implementer	Partners	Preliminary Cost	Greenhouse Gas Reduction Potential**	Potential Funding Sources	Timeline
Asset Management for Water & Sewer Systems	1	System owner	State Health Dept. County Health Dept. Professional Organizations Watershed coalitions CSO interests Dept of State (DOS)	\$\$	Medium	State Revolving Fund (limited), EPA, DEC	Mid-Term (1-5 years)
Small Grant Program for Innovative Water Quality Projects	2	Water quality committees or soil & water conservation districts	NYSDEC NYSDOS Regional planning commission Water and sewer districts Darrin Freshwater Institute	\$	Low	limited	Short Term (<1 year)
Watershed Assessment Study for Stormwater Management	3	Counties, coalitions, colleges and universities	Stormwater coalitions Soil and water conservation districts	\$\$	Low	EPA, DEC, FEMA, DOS, Canal Corp	Medium – Long term, depends on size of watershed

\*Overall Cost: \$ - < \$100,000, \$\$ - \$100,000 to \$500,000, \$\$\$ - > \$500,000  
 \*\*Greenhouse Gas Reduction Potential: High – Strategy will result in a direct, quantifiable reduction in GHG emissions; Medium – Some GHG emissions reduction may occur but it cannot be quantified; Low – GHG reduction is very indirect, unlikely to occur, or unknown

Table 11.6 Water Governance Structure

Name of Initiative	Process to Implement (update zoning ordinance, adopt a policy or plan, resolution to approve funding, etc.)	Related Policies – positive link-ages and alignments	Related Policies – barriers and cross-purposes	Local Government Level of Implementation
Develop an Asset Management Plan for Municipal Water and Sewer Systems (the two Asset plans were combined)	Complete System Assessment Develop and Adopt Capital Improvement Plans Develop Education Program	Asset plans should be informed by Adaptation - Conduct Local Vulnerability Assessments and Adaptation Planning to prepare for a changing climate's impacts on infrastructure.	None identified.	Local jurisdictions with municipal water systems and Regional Shared Service entities.
Create a Small Grant Program for Innovative Water Quality Projects	Establish Program by Resolution and Fund Program	Any comprehensive effort to identify potential water quality projects or areas for improvement could be coordinated with this effort. This may include the Water - Conduct a Watershed Assessment Study for Stormwater Management, or any mapping that is completed for Adaptation - Protect and Enhance Critical Natural Resources and Food Systems - Develop a Regional Agricultural Protection Plan.	None identified.	Establish at the county or regional level.
Conduct a Watershed Assessment for Stormwater Management	Assess Problem Areas and Identify Projects	Watershed assessments and vulnerability analysis under Adaptation could be coordinated. Identified problem areas can also be used as "prototype" projects to inform code updates in the Adaptation, Economic Development, and Land Use Focus Areas addressing stormwater management.	None identified.	Assessment and project identification at hydrologic unit level; project implementation at local jurisdiction level.



Section 12.0

# Plan Implementation





## SECTION 12.0: **Plan Implementation**

The success of the Cleaner Greener Communities Capital Region Sustainability Plan process is dependent on implementation of the identified initiatives. To that end, three specific initiatives were identified to support the overall implementation and progress of the entire Regional Sustainability Plan:

- 1) Identify a Regional Sustainability Coordinator;
- 2) Create a Regional Green Alliance; and
- 3) Develop a Regional Sustainability Website Portal.

These initiatives will have Region-wide impact since they establish advocacy and coordination of sustainability efforts in the Region, provide tools and resources for educating and building capacity, and track the Region's progress in meeting its sustainability goals. The Center for Economic Growth has been identified as a potential prime implementer of these overarching strategies.

As with all of the initiatives in this plan, an implementation strategy was created to identify the responsible parties, potential partners, costs, funding sources and a timeline for completion. Table 12.1 presents the implementation strategies for the overarching Regional sustainability initiatives. Table 12.2 provides the overarching Regional sustainability initiatives governance structure.

### *Regional Sustainability Coordinator*

The Region must identify and empower a long-term advocate to ensure continued progress on implementing the Regional Sustainability Plan. The Regional Sustainability Coordinator will be responsible for the timely implementation of the priority initiatives throughout the Region and developing support, education, and communication around the Region's sustainability goals. The Coordinator will work closely with the Regional Green

*To ensure implementation of the Plan, it is highly recommended that the Region's counties and municipalities adopt a simple resolution indicating their support for the Plan and intent to incorporate it into their planning and government operations processes (See Appendix 21).*





Alliance and assist with the development and maintenance of the Regional Sustainability Website Portal.

The position will serve as point of contact for local governments, businesses, Regional and state agencies, institutions, foundational donors and other stakeholders to assist with achieving the Region's sustainability goals. The Coordinator will also assist with ongoing collection and dissemination of baseline information, best practices and tracking sustainability indicators and targets. It is recommended that the Climate Smart Communities Regional Coordinator be leveraged and potentially further resourced to support this function.

### Regional Green Alliance

A diverse, multi-stakeholder Regional Green Alliance is needed to implement the initiatives in the Regional Sustainability Plan and

*A great model for the Regional Sustainability Website is Regional Planning agency based in Victoria British, Columbia:*

### Regional Sustainability Monitoring

promote sustainability throughout the Region. At a minimum, the Green Alliance should include representatives from government, business, Regional agencies, non-profit organizations, academic institutions, and agriculture. The Green Alliance would work closely with the Regional Sustainability Coordinator and the Capital Region Economic Development Council to implement the initiatives in the Regional Sustainability Plan, including identifying opportunities to fund and support those initiatives. It is recommended that the existing Executive Committee be considered as a foundation for establishing the Regional Green Alliance.

### Regional Sustainability Website Portal

A website was created for the Regional Sustainability Plan process to engage stakeholders in the Region and track the progress of creating the Plan: <http://sustainablecapitalRegion.org/>. Upon completion of the Plan, the website could be re-designed to track the progress of implementation. The website could be organized by focus area to communicate the sustainability targets, report the implementation status of each initiative, and demonstrate progress towards goals through updated metrics on each sustainability indicator. The website could also include specific opportunities for Regional stakeholders to participate in implementing the initiatives in the Plan. Examples include: sample templates of innovative zoning ordinances or replicable projects that can be implemented throughout the Region.

Table 12.1 Overarching Regional Sustainability Initiatives Implementation Strategy

Initiative	Implementer	Partners	Preliminary Cost	Potential Greenhouse Gas Reduction	Potential Funding Sources	Timeline
Regional Sustainability Coordinator	Center for Economic Growth	Local Governments State Agencies Regional Green Alliance	\$\$	Low	Phase 2 Cleaner Greener Program	Short (less than 1 year)
Regional Green Alliance	Center for Economic Growth	Local Governments Community Loan Fund Capital District Regional Planning Commission; Lake George-Lake Champlain Regional Planning Board; Capital District Economic Development Council; Capital District Transportation Committee	\$\$	Low	Phase 2 Cleaner Greener Program	Short (less than 1 year)
Regional Sustainability Website	Center for Economic Growth	Local Governments Regional and State Agencies	\$	Low	Phase 2 Cleaner Greener Program	Short (less than 1 year)

\*Overall Cost: \$ - < \$100,000, \$\$ - \$100,000 to \$500,000, \$\$\$ - > \$500,000

\*\*Greenhouse Gas Reduction Potential: High - Strategy will result in a direct, quantifiable reduction in GHG emissions; Medium - Some GHG emissions reduction may occur but it cannot be quantified; Low - GHG reduction is very indirect, unlikely to occur, or unknown



Table 12.2 Overarching Regional Sustainability Initiatives Governance Structure

Initiative	Process to Implement (update zoning ordinance, adopt a policy or plan, resolution to approve funding, etc.)	Related Policies—positive linkages and alignments	Related Policies—barriers and cross-purposes	Local Government Level of Implementation
Regional Sustainability Coordinator	n/a	Coordinate with Climate Smart Communities Regional Coordinator Program		
Regional Green Alliance	Municipal resolution required to participate in the Alliance	Coordinate with Capital District Regional Economic Development Council	None Indicated	Establish at the Regional Level
Regional Sustainability Website	n/a			



Section 13.0

# Regional Indicators & Targets





## SECTION 13.0: **Regional Sustainability Indicators and Targets**

*Sustainability indicators allow the Region to track progress towards achieving goals. The targets are the desired state for each indicator from the baseline.*

Sustainability targets are specific and measurable and represent milestones on the Region's path towards achieving its sustainability goals. If possible, sustainability indicators should be tracked on an annual basis.

### **Effective sustainability indicators:**

Are **relevant** to the Region's specific priorities and focus areas such that they are tracking meaningful outcomes that resonate with communities, residents and decision makers;

Are **clear and concise** in the sense that they do not rely on overly complex definitions or calculations that are difficult for stakeholders and decision makers to understand;

Are **well grounded and defensible**;

Are **usable** in making decisions that affect the Region;

Have a **long-range view**, rather than track disconnected short-term outcomes;

Are based on **reliable data** so that they can be consistently and accurately tracked over time; or, if data do not currently exist, a system to reliably collect data can be established;

Can cover multiple community, economic, and/or environmental topics.





Are practical and achievable, but challenging;

Cover multiple focus areas;

Are specific, to improve implementation chances and be easier to measure; and

Have a specific and definite deadline.

### Methodology

Initial guidance on developing sustainability indicators for the region was provided by NYSERDA. NYSERDA's guidance focused on balancing consistency across regions with the need to customize based on unique regional features. Specifically, NYSERDA required the following:

Each of the Plan's Focus Areas included at least one common indicator (common to all regions in the state preparing sustainability plans) from NYSERDA's Common Indicators Document (Appendix 4).

The Plan must include, at a minimum, five indicators (two for land use, two for transportation, and one for energy). These required indicators can also count toward the requirement of having one indicator for each Focus Area category.

Furthermore, the initial list of indicators was also informed by:

The Capital Region Economic Development Council Strategic Plan, with a particular focus on Goals, Strategies, and Expected Outcomes from the Strategic Plan that align with the topics of the Sustainability Plan;

The ICLEI – Local Governments for Sustainability STAR Community Index proposed performance measures by topic area, which were used as a general best practice benchmark for sustainability indicator topic areas and approaches;

The consultant team's general knowledge of sustainability indicators from other sustainability planning efforts nationally.

Initially, over 30 potential indicators were identified. These potential indicators were shared with and vetted by each of the eight Technical Committees. Technical Committee members were asked to comment on a number of key questions regarding the potential indicators including: feasibility of obtaining data, relevance to focus area goals, and whether or not certain indicators were able to track progress at a systems level or across multiple focus areas, as opposed to only at a specific goal level.

As a result of Technical Committee input, potential indicators were sorted into "Priority 1" and "Priority 2" indicators to provide the region guidance on which indicators might be most effective, given resource limitations. Criteria used to identify Priority 1 indicators include:

The indicator can track progress across multiple goals within a focus area, and in some cases goals across multiple focus areas;

Data for the indicator is readily available as part of the plan's baseline, and/or it can be aggregated at the regional level without significant additional effort;

One common indicator from NYSERDA's Common Indicators Document is provided; and/or

The indicator is one of the five core indicators required by NYSERDA.

A total of 12 indicators were identified as potential Priority 1 indicators. Based on planning team review, trends in sustainability targets across the nation and the current state of the indicator in the Region, targets for most of the Priority 1 Indicators were then established and are outlined in Table 13.1.

Table 13.1 Priority 1 Indicators

Proposed Indicator	Common NYSERDA Indicator/ Required Indicator?	Related Focus Areas	Data Sources	Current Baseline	Plan Target	Basis for Target
Annual Regional Energy Consumption Per Capita (Million British Thermal Units (MMBtu))	Common and Required Indicator	Energy (P), Climate Adaptation, Waste, Water, Land Use, Economic Development and GHG Reduction	Capital Region Tier II Greenhouse Gas Inventory. CGC Albany Regional Energy and 2000-2009 Population Estimates.	225 MMBtu/Capita	Reduce per capita energy consumption 20% by 2020	Consistent with targets established by leaders in sustainability, including New York City; Department of Energy Better Buildings Program
Annual Waste Disposal Per Capita	Common Indicator	Waste (P), Economic Development and GHG Reduction	NYSDEC: www.dec.ny.gov; U.S. Census Bureau Figures for Normalizing Per Capita	Total Waste (includes MSW, C&D, NHIW and biosolids): 1.22 tons/capita/year Municipal Solid Waste: 0.72 tons/capita/year.	Reduce per capita disposal of MSW to 0.11 tons/capita/ per year by 2030.	Consistent with NYSDEC's Beyond Waste Plan (2010)
Annual Agriculture - Farm Production (Dollars)	Common Indicator	Food Systems (P), Climate Adaptation, Economic Development and Land Use	U.S Department of Agriculture Statistics Division, Annual Bulletin on Food Production by County: www.nass.usda.gov	\$31.6 million (data not available for Warren County)	Increase by 30% by 2025	Capital Region agricultural industry experienced 20% growth from 2005-2010. Source: CR Economic Development Council. Based on goals and initiatives identified this target seemed achievable
Land Use Patterns, Annual Per Capita Land Consumption (Acres)	Common and Required Indicator	Land Use (P), Climate Adaptation, Water Economic Development, Food Systems and GHG Reduction	Multi-Resolution Land Characteristics Consortium National Land Cover Database. Total amount of land that is developed divided by total regional population. http://www.mrlc.gov/	0.000276 square miles/capita	Reduce by 5% by 2030	Consistent with plans from throughout the US Maryland Land Consumption Texas Land Consumption Kings County Land Consumption
Total Annual Water Permit Notice of Violations (Number)	Common	Water (P) and Climate Adaptation	NYSDEC Permit Violation Data	Approximately 593 violations/yr. over past 5 years.	40% reduction by 2020; 0 permit violations by 2030	Consistent with the goals established by the regional stormwater coalition
Housing + Transportation Index	Common and Required Indicator	Economic Development (P), Land Use and Transportation	Center for Neighborhood Technology: H+T Affordability Index - (http://htaindex.cnt.org/)	Current baseline: Household H & T > 45%: 225,033 (66.5%)	Reduce percent of households with H & T >45% 10% by 2030	Based on the estimated impact of current and proposed initiatives in the region related to increasing urban center density, mixed use developments, and commercial incentives to operate in urban centers
Percent of Passengers Traveling by Mode	Common and Required Indicator	Transportation (P) and GHG Reduction	American Community Survey (Number of employees in the region employed full or part time and number of employees commuting by carpool, transit, walking, and biking). www.census.gov/acs/www	Single Occupancy Vehicle (SOV): 79.7% Carpooled: 8.8% Public Trans: 2.7% Walked: 3.6% Bike: 0.3% Other: 1.0% Work at Home: 3.9%	Reduce SOV miles 25% by 2030	SOV mode share in Eastern US cities range from 28.7% in NYSC to 36% in Philadelphia and 45% in Boston





Table 13.1 Priority 1 Indicators continued

Proposed Indicator	Common NYSERDA Indicator/ Required Indicator?	Related Focus Areas	Data Sources	Current Baseline	Plan Target	Basis for Target
Annual Vehicle Miles Traveled (VMT) Per Capita	Common and Required Indicator	Transportation (P) and GHG Reduction	Summary of VMT by County in the Eight County Capital Region.	11,593 miles/capita	Reduce VMT per capita 20% by 2030	Consistent with other plans from throughout the US
Annual Median House-hold (MHH) Income, Families Below the Poverty Line, Population Below the Poverty Line	Common Indicator	Economic Development (P), Energy, Waste and	2010 United States Census - 2006-2010 American Community Survey, 5-Year Estimates; New York State Department of Labor.	MHH: \$55,683 Families below poverty level: 43,749 (6.71%); Population below poverty level: 114,141 (10.62%)	Increase MHH 3% above rate of inflation by 2020; Reduce total population and number of families below the poverty line 50% by 2020	Consistent with Campaign to Reduce Poverty in America: US Catholic Charities
Economic Value of Property Vulnerable to Flooding	Common and Required Indicator	Climate Adaptation	Village, Town and City Assessors	\$10.8 Billion (does not include Schenectady, Washington, Warren, and Greene Counties; digital floodplain data not available)	Maintain current level through 2030	Preliminary estimate
Number of Climate Smart Communities within Region.	Common and Required Indicator	Governance (P), Climate Adaptation	Climate Smart Communities Program	16	Increase by 25% annually	Based on level of engagement throughout the planning process by local governments
Greenhouse Gas emissions per capita (metric tons of CO2 equivalent per person)	Common and Required Indicator	Energy, Transportation	Tier II Inventory; US Census	16.3 MTCDE (Metric Tons of Carbon Dioxide Equivalent) per capita	12 MTCDE per capita by 2020	Based on current New York State per capita GHG emissions (excluding New York City)

1. Required – required by NYSERDA. Common – suggested by NYSERDA. New – region-specific indicators developed during the planning process
2. (P) – Primary Focus Area the indicator supports



## Glossary

### **Anerobic Digestion**

The process in which volatile organic materials are broken down in the absence of oxygen. This biological process produces a gas, sometimes called biogas, principally composed of methane and carbon dioxide. Waste treatment in this fashion uses the same process which naturally occurs in decomposing organic mud at the bottom of marshes or in landfills.

### **Aquifer**

A body of saturated rock through which water can easily move. Aquifers must be both permeable and porous and include such rock types as sandstone, conglomerate, fractured limestone and unconsolidated sand and gravel. Fractured volcanic rocks such as columnar basalts also make good aquifers.

### **Biosolid**

Solid organic matter recovered from a sewage treatment process and used especially as fertilizer.

### **Brownfield**

Land previously used for industrial purposes or some commercial uses. The land may be contaminated by low concentrations of hazardous waste or pollution, and has the potential to be reused once it is cleaned up.

### **Combined Sewer Overflow(CSO)**

Combined sewer systems are sewers that are designed to collect rainwater runoff, domestic sewage, and industrial wastewater in the same pipe. Most of the time, combined sewer systems transport all of their wastewater to a sewage treatment plant, where it is treated and then discharged to a water body. During periods of heavy rainfall or snowmelt, however, the

wastewater volume in a combined sewer system can exceed the capacity of the sewer system or treatment plant and overflow and discharge excess wastewater directly to nearby streams, rivers, or other water bodies. These overflows, called combined sewer overflows (CSOs), contain not only stormwater but also untreated human and industrial waste, toxic materials, and debris.

### **Complete Streets**

Living streets as implemented in North America, which are designed and operated to enable safe, attractive, and comfortable access and travel for all users, including pedestrians, bicyclists, motorists, transit and school bus riders, delivery and service personnel, freight haulers and emergency responders of all ages and abilities.

### **Compost**

A mixture of various decaying organic substances, as dead leaves or manure, used for fertilizing soil.

### **Compressed Natural Gas (CNG)**

A fossil fuel substitute for gasoline (petrol), Diesel fuel, or propane. Although its combustion does produce greenhouse gases, it is a more environmentally clean alternative and it is much safer than other fuels in the event of a spill (natural gas is lighter than air, and disperses quickly when released). CNG may also be mixed with biogas, produced from landfills or wastewater, which doesn't increase the concentration of carbon in the atmosphere. CNG is made by compressing natural gas, which is mainly composed of methane, to less than 1% of the volume it occupies at standard atmospheric pressure.

### **Estuary**

A body of water formed where freshwater from rivers and streams flows into the ocean, mixing with the seawater.

### **Floodplain Ordinance**

A plan including corrective and preventative measures for reducing flood damage. An ordinance is generally designed to meet National Flood Insurance Program (NFIP) standards for floodplain development, and includes maps with base flood elevations and other flood data, permits required, confirmation that new development does not cause increased flooding elsewhere and standards to control protection of new buildings from the base flooding.

### **Food Desert**

Low-income census tracts where a substantial number of residents has low access to a supermarket or large grocery store. Low-access to a healthy food retail outlet is defined as households that are more than 1 mile from a supermarket or large grocery store in urban areas and as more than 10 miles from a supermarket or large grocery store in rural areas.

### **Food Hub**

A centrally located facility with a business management structure facilitating the aggregation, storage, processing, distribution, and/or marketing of locally/regionally produced food products.

### **Food System**

The whole array of activities, ranging from input distribution through on-farm production to marketing and processing, involved in producing and distributing food to both urban and

rural consumers.

### **Fossil Fuel**

Buried combustible geologic deposits of organic materials, formed from decayed plants and animals that have been converted to crude oil, coal, natural gas, or heavy oils by exposure to heat and pressure in the earth's crust over hundreds of millions of years. The burning of fossil fuels by humans is the largest source of emissions of carbon dioxide, which is one of the greenhouse gases that contributes to global warming.

### **Geothermal Energy (Geothermal heating and cooling)**

Thermal energy generated and stored in the Earth. Geothermal heating and cooling systems use the relatively constant temperature of the earth to heat and cool buildings with 40% to 70% less energy than conventional systems by using electricity to simply move heat from the earth into buildings, allowing much higher efficiencies.

### **Gleaning**

The act of collecting leftover crops from farmers' fields after they have been commercially harvested or on fields where it is not economically profitable to harvest.

### **Greenhouse Gas**

Greenhouse Gas absorbs and emits radiation within the thermal infrared range. The primary greenhouse gases in the Earth's atmosphere are water vapour, carbon dioxide, methane, nitrous oxide, and ozone. Greenhouse gases greatly affect the temperature of the Earth; without them, Earth's

surface would average about 33°C (59°F) colder than the present average of 14 °C (57 °F). However, the burning of fossil fuels has contributed to the increase in carbon dioxide in the atmosphere come from combustion of carbon based fuels, principally wood, coal, oil, and natural gas.

### **Green Jobs**

Jobs in businesses that produce goods and services that benefit the environment or conserve natural resources.

### **Greenway System**

Greenways are defined as corridors of land and/or water that connect and protect the natural, cultural, and recreational resources that define communities, linking these features within the surrounding landscape. Greenways systems help to create sustainable landscapes by connecting ecological and community processes, rather than fragmented by development.

### **Grey Infrastructure**

Conventional piped drainage and water treatment systems (i.e. pipes, tanks, conventional treatment systems including energy-intensive water treatment systems and processes such as membranes and reverse osmosis).

### **Heat Island**

An area, such as a city or industrial site, having consistently higher temperatures than surrounding areas because of a greater retention of heat, as by buildings, concrete, and asphalt.

### **Hydroelectricity**

The production of electrical power through the use of the gravitational force of falling or flowing water; the most widely used form of renewable energy.

### **Livability**

The subset of sustainability impacts

that directly affect people in a community. Livability is based on several key principles including: providing transportation choices; promoting equitable, affordable housing; enhancing economic competitiveness; supporting existing communities; coordinating policies and leveraging investments; and valuing communities and neighborhoods.

### **Mitigation**

The effort to reduce loss of life and property by lessening the impact of disasters. Generally involves existing historic or natural resource such as a stream, wetland, endangered species, archeological site or historic structure.

### **Organic Materials**

Matter that has come from a once-living organism; is capable of decay, or the product of decay; or is composed of organic compounds.

### **Photovoltaic Technology**

A method of generating electrical power by converting solar radiation into direct current electricity using semiconductors (solar panels) that exhibit the photovoltaic effect.

### **Potable Water (drinking water)**

Water safe enough to be consumed by humans or used with low risk of immediate or long term harm  
Power Purchase Agreement- a legal contract between an electricity generator (provider) and a power purchaser (buyer, typically a utility or large power buyer/trader). Commercial PPAs have evolved as a variant enabling businesses, schools, and governments to purchase electricity directly from the

generator rather than from the utility, facilitating the financing of distributed generation assets such as photovoltaic, microturbines, reciprocating engines, and fuel cells.

### **Renewable Energy**

Energy that comes from natural resources such as sunlight, wind, rain, tides, waves and geothermal heat. “Renewable” because they are naturally replenished at a constant rate.

### **Sanitary Sewer Overflow (SSO)**

Unintentional discharges of raw sewage from municipal sanitary sewers caused by blockages, line breaks, sewer defects that allow storm water and groundwater to overload the system, lapses in sewer system operation and maintenance, power failures, inadequate sewer design and vandalism. The untreated sewage from these overflows can contaminate water, causing serious water quality problems.

### **Sole Source Aquifer**

An aquifer that supplies at least 50 percent of the drinking water consumed in the area overlying the aquifer. These areas may have no alternative drinking water source(s) that could physically, legally and economically supply all those who depend on the aquifer for drinking water.

### **Solid Waste**

Any discarded (abandoned or considered waste-like) materials. Solid wastes can be solid, liquid, semi-solid or containerized gaseous material.

### **Sustainability**

Sustainability creates and maintains the conditions under which humans

and nature can exist in productive harmony, to fulfill the social, economic and other requirements of present and future generations. Sustainability is important to ensure that we have and will continue to have, the water, materials, and resources to protect human health and our environment.

### **Tidal Power**

A renewable energy source that converts the energy of tides into electricity. Tidal power is form of hydropower where energy of the water gets extracted from the Earth’s oceanic tides.

### **Urban Sprawl**

The unplanned, uncontrolled spreading of urban development into areas adjoining the edge of a city.

### **Vegetated Swale (bioswale)**

A broad, shallow channel with a dense stand of vegetation covering the side slopes and bottom. Swales can be natural or manmade, and are designed to trap particulate pollutants (suspended solids and trace metals), promote infiltration, and reduce the flow velocity of storm water runoff.

### **Wastewater Treatment**

Chemical, biological, and mechanical procedures applied to contaminated water to remove, reduce, or neutralize contaminants.

### **Zoning Code**

Zoning is the process of planning for land use by a locality to allocate certain kinds of structures in certain areas. Zoning codes include restrictions in different zoning areas, such as height of buildings, use of green space, density (number of structures in a certain area), use of lots, and

types of businesses. Types of zoning include open space, residential, retail, commercial, agricultural, and industrial.



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