III. PROJECT BENEFIT METRICS REPORT

Project Benefits Metrics Report

Section 1: Benefits Overview

The benefit metrics report is for the Comprehensive Plan for the City of Geneva in Ontario County, New York. The following values drive this plan:

- That we are stewards of our special natural setting.
- That our "uniquely urban" character and sense of community are at the core of who we are.
- That our multi-cultural heritage is a point of pride.
- That our arts, architectural and recreational assets are important to us.
- That it is important to keep our economy strong.

The adoption of the Comprehensive Plan will signal the commitment of the City to pursue initiatives that build a sustainable land use pattern, a strong housing market and healthy lifestyles for residents. Initiatives also encourage the municipality and property owners to reduce energy and solid waste consumption through providing options for alternative energy usage; solid waste diversion; and alternative transportation amenities. The plan is oriented toward the goals of the Cleaner, Greener Communities program in that it will encourage initiatives to reduce greenhouse gas emissions. It also strives to trigger market forces by rebuilding the middle market from both current and potential residents while promoting social equity. These are the primary themes that emerged through the City's comprehensive planning process.

Section 2: Expected Annual Benefits by Close of CGC Project Period

N/A

Section 3: Potential for Future and/or Long Term Transformational Benefits

Section 3: Future and Long Term Transformation Benefits				
Type	**Metric**	**by 5 years**	**by 15 Years**	**by 30 Years**
RPM	GHG Emissions Savings /year	6,577 MTCDE / year	19,263 MTCDE / year	38,587 MTCDE / year
RPM	Total Conventional Energy Savings	218,759 MMBTU	2,042,656 MMBTU	7,995,200 MMBTU
RPM	Natural Gas Savings	673,444 therms / year	2,023,258 therms / year	4,049,198 therms / year
RPM	Grid Electricity Savings	3,346,646 KWh / year	10,330,171 KWh / year	20,678,876 KWh / year
RPM	Gasoline Savings	71,520 gallons / year	158,941 gallons / year	321,562 gallons / year
SCM	Vehicle-Miles-Travelled reduced	1,530,536 miles / year	3,401,345 miles / year	6,881,430 miles / year
SCM	Solid Waste Diverted	23,818 tons / year	41,642 tons / year	68,378 tons / year

RPM	Conventional Energy Cost Savings	$ 3,444,571	$ 28,322,040	$ 110,739,960
RPM	Permanent Jobs Created	136	273	636
RPM	NYSERDA CGC Investment (funding requested)	$50,000	NA	NA
RPM	Investment by Others	$40,000	TBA	TBA

Methods and Assumptions

Metric 1. GHG Emission Savings: This report includes GHG emission savings from saved electricity, natural gas, and gasoline (Metrics 3,4, and 5). We use the total annual savings in MWh, Therms, and Gallons as a basis for emission savings. The EPA Greenhouse Gas Equivalencies Calculator allows for easy calculation of tons of CO_2 equivalents.

Data Source:

- EPA Greenhouse Gas Equivalencies Calculator: http://www.epa.gov/cleanenergy/energy-resources/calculator.html

Metric 2. Total Conventional Energy Savings: This report includes energy savings from residential and non-residential properties and from vehicles. We base the residential estimate on average energy consumption estimates for single-family and multi-family homes by the US Energy Information Administration. A multi-family home uses 34.7 million Btu less in total energy than a single-family home. The final Comprehensive Plan encourages higher-density mixed-use infill development with mixed-income housing, particularly in Downtown Geneva. Implementing these policies leads to an estimated change of 0.5% total residential units from single-family to multi-family. This number includes actual conversions (apartment buildings replacing single-family homes) and newly constructed units based on population projections and stable household sizes.

The non-residential energy savings include savings in electricity and natural gas consumption (Metrics 3 and 4). Converting MWh and Therms into Btu allows for comparison with residential values. For vehicles, we use gasoline savings as a measure for energy savings. Converting gallons of gasoline into Btu allows us for comparison with residential and non-residential property numbers.

Metric 3. Natural Gas Savings: NYSEG provides 2013 natural gas use numbers for the City of Geneva that serve as the baseline for calculations. This report includes natural gas savings from residential and non-residential properties. For savings from residential properties, the Comprehensive Plan and other documents such as the City's Site-Based Marketing Concept encourage mixed-income infill development, which would lead to higher densities and an increasing share of multi-family properties. Multi-family units use 27% less electricity on average than single-family units. Again, this PBMR assumes that every year, 0.5% total residential units will change from single-family to multi-family. This number

includes actual conversions (apartment buildings replacing single-family homes) and newly constructed units based on population projections.

For savings in non-residential properties, the City encourages increased energy efficiency through recommendations in a 2010 energy audit and the Plan's promotion of a Building Renovation Task Force. This PBMR assumes that future non-residential development will reach energy efficiency standards comparable to LEED standards; research demonstrates that LEED buildings are 24% more efficient when compared to conventional buildings. Typically, government agencies and insurance companies estimate a useful life for new constructed buildings to be 50 years. Accordingly, this report assumes that every year new construction will replace 2% of the non-residential stock and that this new construction fulfills the stricter efficiency standards.

Data Sources:

- Cornell PAD Population Projections: http://pad.human.cornell.edu/counties/projections.cfm
- US Census 2009 – 2013 ACS 5-year estimates: http://www.census.gov/acs/www/data_documentation/2013_release/
- New Buildings Institute (2008): Green Building Performance Evaluation. http://newbuildings.org/sites/default/files/MeasuredResultsFromLEED-NC_TurnerACEEE2008.pdf
- US EIA Residential Energy Consumption Survey: http://www.eia.gov/consumption/residential/about.cfm
- NYSEG Account information City of Geneva

Metric 4. Grid Electricity Savings: NYSEG provides 2013 electricity use numbers for the City of Geneva that serve as the baseline for calculations. This report includes electricity savings from residential and non-residential properties. The Comprehensive Plan encourages infill development, which would lead to higher densities and an increasing share of quality multi-family, mixed-income housing units. Multi-family units use 27% less electricity on average than single-family units. We assume that every year, 0.5% total residential units will change from single-family to multi-family. This number includes actual conversions (apartment buildings replacing single-family homes) and newly constructed units based on population projections.

For savings in non-residential properties, the City encourages energy efficiencies through recommendations in the 2010 energy audit and the Plan's promotion of a Building Renovation Task Force. This PBMR assumes that future non-residential development will reach energy efficiency standards comparable to LEED standards; 24% lower than conventional buildings. Typically, government agencies and insurance companies estimate a useful life for new constructed buildings to be 50 years. Accordingly, this report assumes that every year new construction will replace 2% of the non-residential stock and that this new construction fulfills the stricter efficiency standards.

Data Sources:

- Cornell PAD Population Projections: http://pad.human.cornell.edu/counties/projections.cfm
- US Census 2009 – 2013 ACS 5-year estimates: http://www.census.gov/acs/www/data_documentation/2013_release/
- New Buildings Institute (2008): Green Building Performance Evaluation. http://newbuildings.org/sites/default/files/MeasuredResultsFromLEED-NC_TurnerACEEE2008.pdf
- US EIA Residential Energy Consumption Survey: http://www.eia.gov/consumption/residential/about.cfm
- NYSEG Account information City of Geneva

Metric 5. Gasoline Savings:

The Federal Highway Administration estimates the average fuel economy of light duty vehicles at 21.4 mpg. To allow for easier computation, the PBMR maintains this estimate for the 30-year time horizon. Using this value and applying it to the total amount of vehicle-miles-travelled reduced (Metric 6), we can calculate the gasoline savings in gallons.

Data Sources:

- Cornell PAD Population Projections: http://pad.human.cornell.edu/counties/projections.cfm
- FHWA Fuel Economy Statistics: http://www.fhwa.dot.gov/policyinformation/statistics/2011/vm1.cfm

Metric 6. Vehicle-Miles-Travelled Reduced: The Finger Lakes Regional Sustainability Plan provides a current vehicle-miles-travelled (VMT) estimate that serves as a baseline number. The implementation of the City of Geneva Comprehensive Plan would lead to more compact and mixed-use development patterns, as well as a focus on development of existing corridors. Case studies show that a focus on infill development reduces VMT by around 4%. Since the Comprehensive Plan affects the built form gradually over time, we assume Geneva can reach this 4% reduction for the 30-year horizon, 2% for the 15-year horizon, and 1% for the 5-year horizon.

In addition, Geneva aims to install bicycle infrastructure and encourage biking as a transportation alternative to driving. Currently, only two cities in Upstate New York are bike-friendly communities as designated by the League of American Cyclists: Buffalo and Rochester. The PBMR assumes that Geneva can increase their bike-commuting share to the average of Buffalo and Rochester's current share within the 15-year horizon and improve the share at the same linear rate for the 30-year horizon. This would raise the modal share of biking from currently 0.55% to 1.75% in 30 years. The total decrease in VMT is the sum of the increase in biking and the impact of denser infill development.

Data Sources:

- Cornell PAD Population Projections: http://pad.human.cornell.edu/counties/projections.cfm
- US Census 2009 – 2013 ACS 5-year estimates: http://www.census.gov/acs/www/data_documentation/2013_release/
- EPA (2007): Measuring the Air Quality and Transportation Impacts of Infill Development. http://epa.gov/smartgrowth/pdf/transp_impacts_infill.pdf

Metric 7: Solid Waste Diverted:

The Ontario County Solid Waste Management Plan shows that Geneva currently diverts 11.5% of their solid waste from landfills, about 15,000 tons annually. The City assumes additional potential of about 9,000 tons within the next three years. The PBMR assumes that Geneva could accomplish this goal within the 5-year horizon and maintain this pace at a linear growth rate of 9,000 per 5-year interval.

Data Sources:

- Ontario County Solid Waste Management Plan: http://www.co.ontario.ny.us/DocumentCenter/Home/View/837
- City of Geneva Engineering

Metric 8. Conventional Energy Cost Savings:

This report estimates conventional energy savings for electricity, for natural gas, and for gasoline (Metrics 3, 4, and 5). NYSERDA provides energy prices for the Upstate region. The PBMR uses the past 12 months of data available and created an average price to eliminate seasonal influences. For electricity and natural gas the report used the monthly data for February 2014 – January 2015. For gasoline, the analysis utilizes monthly data for April 2014 – March 2015. Residential, commercial, and industrial customers pay different rates for natural gas and electricity. For these two measures, the analysis created a weighted average price using the current usage of residential, commercial, and industrial customers in Geneva. The energy savings estimated in Metrics 3, 4 and 5 multiplied by this average unit price provides the conventional energy cost savings.

The total conventional energy cost savings are the accumulated savings up to the time horizon. The 30-year number describes all savings occurring in the 30 years to that date. All values are in 2014-dollar values; this report does not use different dollar time values.

Data sources:

- NYSERDA energy prices: http://www.nyserda.ny.gov/Cleantech-and-Innovation/Energy-Prices/

Metric 9. Permanent Jobs Created:

Although it is difficult to foresee the extent to which the business community will respond to the goals and actions of the Comprehensive Plan. it is possible to estimate the number of full-time jobs that could be created based on infill office development and buildout of the industrial parks. Based on the potential manufacturing space in the Tech Farm and Industrial Park of up to 350,000 square feet, assuming that the buildout would create 1 job per 550 square feet of manufacturing area, the project could result in up to 636 new jobs. This is a conservative estimates from Nelson, Arthur C. 2004 planner's estimating guide.

Metric 10. NYSERDA CGC Investment:

This metric describes the grant money awarded to the City of Geneva.

Metric 11. Investment by Others:

This metric currently describes the additional matching investment by the City of Geneva ($20,000), the Geneva Local Development Corporation ($10,000), and the Geneva Industrial Development Agency ($10,000). Once the City adopts the Comprehensive Plan, we expect additional investment in the form of future grants and private sector activity.

Section 4: Projected Impact on Regional and Local Sustainability Indicators

Section 4: Potential to Impact Regional and Local Sustainability Indicators				
	Indicator	**In RSP?**	**Baseline (if known)**	**Brief one-line description of impact**
Energy	Regional energy consumption per capita	Yes	186 MMBtu (2010) regional	Decrease by 37 MMBTU
	Total installed renewable energy	Yes	3,495,768 MMBtu (2010 regionally)	Increase through education initiatives and municipal investments
Transportation	Total percentage of people commuting via walking, biking, transit and carpooling	Yes	15% (2010 regionally)	Increase to 20%
	Vehicles miles traveled per capita	Yes	9,472 (2010 regionally)	Decrease by 5%
Land Use and Livable Communities	Rate of poverty in population centers	Yes	22% (2010 regionally)	Decrease by increasing access to jobs through transportation and land use policies
	Proportion of residents living in existing population centers	Yes	36% (2010 regionally)	Maintain by making Geneva a desirable place to live in
Materials and Waste	Solid waste diverted (not landfilled	Yes	Data not available	Increase current levels fourfold

Management	or exported) (per capita)			
Economic Development	Housing + Transportation Affordability Index	Yes	52% (2010 regionally)	Decrease by reducing transportation cost.

Indicator 1. Regional Energy Consumption per Capita:

In Section 3, Metric 2, this report provided the total energy savings for a 30-year time horizon. The projected 7,995,200 MMBTU are a cumulative value for 30 years. The value for the 30th year only is 516,547 MMBTU.

Cornell PAD predicts moderate population growth for Ontario County, resulting in a population of 115,709 in 2040. We use this value as the 30-year-horizon population. To predict the 30-year-horizon population for the City of Geneva, we calculate the growth rate for the county and apply that number to the Geneva base population, resulting in 13,998 residents. The total energy savings divided by the 30-year-horizon population is 36.9 MMBTU per capita.

Indicator 2. Total installed renewable energy:

The City of Geneva plans to increase the amount of total installed renewable energy. Through the Comprehensive Plan, the City states its commitment to the environment and renewal energy in particular.

As part of its 2010 energy audit, the City documented baseline information about energy use in local government buildings. The City made improvements to make its buildings more energy efficient at that time and also established a financing mechanism for energy efficiency and renewable energy projects in public buildings.

Indicator 3. Total percentage of people commuting via walking, biking, transit and carpooling:

In Section 3, Metric 6, this report provides an estimate for reduction in vehicle miles traveled (VMT). We predict total VMT savings of 5.2%; 4% through changes in land use patterns and 1.2% through expanding bike infrastructure. An increase in using alternative transportation modes of about 5 percentage points would increase the percentage of people commuting via walking, biking, transit, and carpooling to about 20%.

Indicator 4. Vehicle miles traveled per capita:

In Section 3, Metric 6, this report provides an estimate for total savings in VMT. The 6,881,430 miles divided by a 30-year-horizon population of 13,998 (see Indicator 1) would lead to savings of 492 miles per capita or a decrease by 5%.

Indicator 5. Rate of poverty in population centers:

Research shows that job access is a strong factor of poverty. The Spatial-Mismatch hypothesis argues that in places where job opportunities are close to high-poverty neighborhoods, poor residents can improve their situation easier and poverty rates remain lower. The City's Comprehensive Plan encourages economic development in already developed areas using infill and mixed-use strategies. In addition, the City plans to extend bicycle infrastructure, improving low-cost access to job opportunities. Therefore, this report anticipates a decrease in the overall poverty rate.

Data Source:

- Teitz, M. & Chapple, K. (1998): The Causes of Inner City Poverty: Eight Hypotheses in Search of Reality. In: Cityscape: A Journal of Policy Development and Research. Volume 3, Number 3. http://www.huduser.org/periodicals/cityscpe/vol3num3/article3.pdf

Indicator 6. Proportion of residents living in existing population centers:

In past decades, the Finger Lakes Region experienced growth predominately in its rural and suburban areas. The Comprehensive Plan aspires to position Geneva as an economically successful and desirable community that attracts new residents. If Geneva is an attractive urban alternative, it will help stabilize the region's proportion of residents living in existing population centers.

Indicator 7. Solid waste diverted (not landfilled or exported) (per capita):

Currently, the City of Geneva diverts 11.5% of its solid waste from landfills. In Section 3, Metric 7, this report assumes the City will increase that rate fourfold to a total value of 68,378 tons per year. For a 30-year-horizon population of 13,998 residents, we project a reduction of 4.9 tons of solid waste per capita per year.

Indicator 8. Housing + Transportation Affordability Index:

In Section 3, Metric 6, this report assumes a reduction in vehicle-miles-traveled (VMT) by about 5.2%. The AAA assumes an average cost of 59.2 cents per mile for an average-sized sedan. Using the baseline value of 9,472 VMT per capita, a 5.2% reduction leads to transportation savings of $292 per capita.

The impact of changes in land use patterns is difficult to foresee. On the one hand, encouraging infill development will lead to more residents living in apartment buildings, which typically have a lower utility cost. On the other hand, infill development is about 30% more expensive to build than comparable development in greenfield locations.

Data Sources:

- AAA Cost of Driving study results: http://www.huduser.org/periodicals/cityscpe/vol3num3/article3.pdf
- The Center for Livable Communities. A Local Government Commission Initiative (2001): A Policymaker's Guide to Infill Development. http://lgc.org/wordpress/docs/freepub/community_design/guides/blc_infill_dev_guidebook_2001.pdf
- US EIA Residential Energy Consumption Survey: http://www.eia.gov/consumption/residential/about.cfm