Onondaga County
Climate Action Plan
April 2012

Prepared by

Assisted by

Table of Contents

Message from County Executive Joanne M. Mahoney

Message from County Executive Joanne M. Mahoney

An important focus of my administration has been to study, develop and implement green house gas reduction measures. We created the position Director of Energy and Sustainability and our team helped champion efforts to secure a $2.5 million dollar energy efficiency grant from the federal stimulus program. We also formed the county's Environmental Sustainability Advisory Committee, comprising representatives from all county departments and headed by the Director of our Office of the Environment, David Coburn. One of the charges of the committee was to develop and advance the following comprehensive Climate Action Plan for Onondaga County.

The Climate Action Plan includes a baseline inventory of the County's carbon emissions, a listing of those emissions by source and recommendations for improving our greenhouse gas inventory. Two of the most important and challenging aspects of the Climate Action Plan are financing and implementing its recommendations, but we are not going to miss out on these opportunities—we are determined to act on our words.

We are excited to move forward with the following actions to be more sustainable and reduce our carbon footprint. And while we have already begun to execute these changes in the workplace, throughout the community and at home, there is and will always be more to do.

Sincerely,

Joanne M. Mahoney

Onondaga County Executive

Executive Summary

Executive Summary

Introduction

Scientific evidence continues to support the view that climate change is an urgent threat to the environmental and economic health of our planet, our country and our community. In October of 2008, County Executive Joanie Mahoney established a County Environmental Sustainability Advisory Committee to identify and implement ways to incorporate principles of sustainability into the County's culture, policies and programs. In May of 2009, the County Legislature, at the request of the County Executive, adopted by resolution the State of New York's Climate Smart Community Pledge "…to demonstrate leadership in slowing the harmful effects of climate change."

Soon after passage of the Climate Smart Community Pledge, the County Executive directed the County's Environmental Sustainability Advisory Committee to begin developing a "Climate Action Plan," with the reduction of greenhouse gas emissions associated with County operations being its primary focus. This Climate Action Plan summarizes the County's current "carbon footprint" (the amount of carbon dioxide, which is a common measure of greenhouse gas emission released into the environment) associated with County operations, identifies greenhouse gas emissions reduction measures the County is already implementing, identifies additional greenhouse gas mitigation measures the County can take to reduce its carbon footprint, sets overarching goals for greenhouse gas emission reductions and outlines a strategy for Climate Action Plan implementation.

The County feels that a realistic greenhouse gas emission reduction plan must include a reasonable return on investment, must take a long-term view in order to allow for incremental change, requires full commitment and support from management, openness to all options and the flexibility to accommodate changing understandings, technology and circumstances. With regard to this latter point, there is no finish line in this endeavor. This planning process is more accurately viewed as "on-going," and the County's Climate Action Plan should be viewed as an evolving document, intended to guide future policies and programs.

Greenhouse Gas Inventory

Onondaga County performed a baseline inventory of greenhouse gas emissions resulting from its calendar year 2008 operations (except due to availability of data by department, the inventory utilized gasoline and diesel consumption records for 2010). It is important to identify the sources of greenhouse gas emissions associated with County operations and their relative contribution to total County emissions so that attention can be focused on the most significant sources.

The total annual greenhouse gas emissions associated with County operations are approximately 72,000 metric tons per year. Greenhouse gas emissions associated with the use of electricity and natural gas in County-owned and operated facilities (including processes like pumping water and wastewater) account for just under 62,000 metric tons of carbon dioxide equivalents (CO_2e), or about 86% of the County greenhouse gas emissions.

County fleet operations accounted for a little over 8,357 metric tons of carbon dioxide equivalents, or about 11% of the County's greenhouse gas emissions. As the second highest source of greenhouse gas emissions associated with County operations, fleet emissions represent another important area of focus.

Greenhouse Gas Reduction Targets

Onondaga County has set its emission reduction target at 25% over 25 years, or an average reduction of approximately 1% per year. This emission reduction goal should be critically evaluated at five year intervals to determine if the County needs to adjust its approach in order to meet the target, or if the target can be made even more aggressive due to new technology or changing circumstances.

The County has sought to establish a target that is both aggressive and achievable. The County's current carbon footprint is approximately 72,000 metric tons per year. A goal of 25% reduction in greenhouse gas emissions by the year 2036 amounts to a total reduction of 18,000 metric tons, or an average of 720 metric tons per year.

Major Current Efforts to Reduce Greenhouse Gas Emissions

Approximately 59% of the County's greenhouse gas emissions are associated with electricity usage, and 27% are associated with natural gas use in County facilities.

The American Recovery and Reinvestment Act of 2009 appropriated funding for the United States Department of Energy (DOE) to award grants to units of local government under the Energy Efficiency and Conservation Block Grant (EECBG) Program. Onondaga County was awarded approximately $2,500,000 under the EECBG grant program.

The County's EECBG strategy, approved by the DOE, allocates approximately $1,800,000 to reduce energy consumption or produce renewable energy at County Facilities Operations as follows:

Description	Budget
Benchmarking and energy audits	$105,000
Energy efficiency projects at county facilities	$1,385,000
Retro-commissioning*	$250,000
Renewable energy demonstration projects	$63,000
Total	**$1,803,000**

** Retro-commissioning is a process that seeks to improve energy performance by "tuning-up" existing building equipment and systems so they perform as designed and as efficiently as possible.*

With regard to Green Building concepts, in May of 2011, the Onondaga County Legislature approved the requirement for "Life-Cycle Assessment" for all large-scale County infrastructure and capital projects. In 2008, the Onondaga County Industrial Development Agency (OCIDA) approved a program for a graduated scale of payments in lieu of taxes (PILOT) for buildings achieving various levels of LEED certification for private development. The County has also been evaluating the energy and water retention performance of green or vegetative roofing systems relative to other conventional, energy-efficient roofing systems. A major roof replacement project on multiple buildings at the Jamesville Correctional Facility offered the opportunity for a side-by-side test to evaluate different roofing systems.

To reduce its emission of greenhouse gases, the Metropolitan Wastewater Treatment Plant (Metro) uses about 93% of the biogas it produces to fuel on-site boilers to heat buildings and digesters, as well as to fuel a gas driven electric generator that partially powers the plant. The remaining biogas is burned or "flared" since the resulting CO_2 has less climate warming potential than the originating bio-gas.

Onondaga County currently procures between 80 and 100 million dollars in goods and services each year. The County Executive has issued an Administrative Directive that calls for the Division of Purchase to consider the following on every contract and transaction: Recycled content, reusability, fuel usage, toxins produced and energy efficiency of each purchase.

The County has implemented a mowing reduction program that has resulted in the discontinuation of mowing of almost 60 acres of County-owned land, and over 92 acres where mowing has been either eliminated or reduced. This initiative has yielded an estimated reduction in usage of over 1,000 gallons/year of petroleum based fuels and the elimination of 10 metric tons of carbon dioxide/year.

Initiated in 2009 by County Executive Joanie Mahoney, "Save the Rain" is Onondaga County's program to improve the environment and improve Onondaga Lake by reducing the amount of storm-water runoff that flows directly into the sanitary

sewer system. During rain and snow events, stormwater runoff flows directly into sanitary sewer systems, resulting in "overflows" that can send polluted stormwater and sewage into Onondaga Lake through its tributaries. By reducing the amount of storm water going into the sewers through "green" technologies, the County can reduce the need for, and cost of "gray" facilities (traditional wastewater collection and treatment facilities), while still minimizing the number of "overflows."

At the direction of County Executive Mahoney, the Syracuse-Onondaga County Planning Agency (SOCPA) is currently working to create a new Sustainable Development Plan for Onondaga County, which will focus on working together as a region to promote sustainability, and to make the decisions necessary to reduce greenhouse gas emissions and enhance quality of life within Onondaga County. The Plan will include models that will help illustrate the costs and impacts involved in different future growth scenarios, including energy usage measures and vehicle miles traveled. Ultimately, the goal of this County land use planning effort is to promote regional sustainability, which will reduce the amount of greenhouse gases associated with the extension and maintenance of infrastructure and reduce vehicle travel associated with County operations.

Key Recommendations

Among the 36 recommendations presented in Chapter 5, some of the most important are:

Energy

The County should:

- Adopt a hierarchy of policies and practices to reduce energy consumption and reduce associated greenhouse gas emissions. The hierarchy should generally be as follows:

  1) Conserve - Eliminate the wasteful use of energy when it is not needed.
  2) Improve efficiency - Make sure the energy that is used is being used in an efficient manner to accomplish as much productivity per unit of energy used.
  3) Use energy not produced by fossil fuels - Such energy could be from renewable sources or could be expanded to include energy produced by existing large hydro or nuclear stations.

- Reduce the amount of unoccupied County office and operational space and either sell, lease or put excess space into "shut-down" mode.
- Establish County goals and standards for the energy efficiency of its facilities and publicly disclose building performance.
- Identify priority facilities (worst energy performance) using Portfolio Manager Benchmarking tool.
- Verify energy and greenhouse gas reductions actually realized by implemented energy conservation measures via Portfolio Manager Tool.
- Consider increasing the use of energy that does not rely on fossil fuels for production.

Green Buildings

The County should:

- Adopt an aggressive approach leading to the establishment of Green Building Standards employing the United States Green Building Council (USGBC) Leadership in Environmental and Energy Design (LEED) rating system for New Construction (NC), Commercial Interiors (CI) and Existing Buildings: Operations and Maintenance (EB:O&M) for all buildings owned and, where possible, occupied by Onondaga County.
- All County projects should be reviewed by a Department of Facilities Management LEED Accredited Professional (AP's) to determine the category of LEED certification which appropriately applies to the defined scope of work.
- All New Construction (NC), Interior Construction (CI) and Core and Shell (C&S) projects to be designed by contracted design professionals achieve LEED Silver as a baseline certification.

- All renovation work performed on existing buildings under the supervision of Facilities LEED APs, for the defined project scope, should meet LEED Silver criteria as a baseline, to be verified (not certified) using the most appropriate USGBC criteria and checklists, including Re-Green.

Fleet

The County should:

- Purchase and use the smallest and/or most fuel efficient vehicle makes and models available that meet the intended uses and operational needs of the department for which the vehicles are intended. Include a minimum efficiency standard in miles per gallon by type of vehicle and include such a standard in any new vehicle procurement specifications.
- As appropriate (based on fuel prices, fuel efficiency, infrastructure considerations and greenhouse emission reductions) begin converting the County fleet to alternative fuel vehicles.
- The County should develop and departments maintain an inventory and perform routine analyses of their fleet vehicles and, based on this inventory, departments should identify older vehicles that are used infrequently, as well as those that are disproportionately inefficient and schedule their elimination or replacement.
- Implement a no idling policy prohibiting County employees from idling County-owned or operated vehicles.

Purchasing

The Purchasing Department should:

- Integrate life cycle cost analysis, including direct and indirect costs, in the procurement of products requested by County departments.
- Use the buying power of the County and participating municipalities to encourage changes in the products (and associated packaging) and services the County receives, and the cradle to cradle process used to make them.
- Fully implement the elements of the existing County Administrative Directive concerning the purchase of use of environmentally preferable products.

Outreach

The County should create a targeted and consistent messaging campaign, with and for County employees, integrating the concepts embodied in the County's "Path for a Sustainable Future" initiative—which includes greenhouse gas emission reduction initiatives—into all facets of County government.

Financing

Establish a funding mechanism to implement those greenhouse gas reduction projects that provide the best economic payback or largest greenhouse gas reduction per dollar invested. Consider allocating a percentage of the County's overall capital budget for energy efficiency, green building, fleet and other greenhouse gas reduction projects. For those projects for which there are significant savings, financing might also be achieved by using the expected savings to either issue bonds or to enter into a performance contract with a third party.

Chapter 1—Introduction

Chapter 1—Introduction

Scientific evidence continues to support the view that climate change is an urgent threat to the environmental and economic health of our planet, our country and our community. Many communities, in this country and abroad, already have strong local policies and programs in place to combat climate change, but more action is needed at the local, state, and federal levels to meet the challenge.

In October of 2008, County Executive Joanie Mahoney established a County Environmental Sustainability Advisory Committee to identify and implement ways to incorporate the principles of sustainability into the County's culture, policies and programs. In May of 2009, the County Legislature, at the request of the County Executive, adopted by resolution the State of New York's Climate Smart Community Pledge "…to demonstrate leadership in slowing the harmful effects of climate change."

In taking the Climate Smart Community Pledge, the County of Onondaga declared that:

1. Climate change poses a real and increasing threat to our local and global environments, which is primarily due to the burning of fossil fuels; that
2. The effects of climate change can endanger our infrastructure, economy and livelihoods, harm our ecological communities, impact our drinking water supplies and recreational opportunities and pose health threats to our citizens; that
3. Our response to climate change provides us with an opportunity to save money and to build a livable, energy independent and secure community, a vibrant economy, maintain healthy and safe schools and resilient infrastructures; and
4. The County believes that the scale of greenhouse gas emissions reductions needed for climate stabilization will require sustained and substantial efforts.

In light of these understandings, soon after passage of the Climate Smart Community Pledge the County Executive directed the County's Environmental Sustainability Advisory Committee to begin developing a "Climate Action Plan," with the reduction of greenhouse gas emissions associated with County operations being its primary focus.

This Climate Action Plan summarizes the County's current "carbon footprint" (the amount of carbon dioxide, which is a common measure of greenhouse gas emission released into the environment) associated with County operations, identifies greenhouse gas emissions reduction measures the County is already implementing, identifies additional greenhouse gas mitigation measures the County can take to minimize its carbon footprint, sets overarching goals for greenhouse gas emission reduction and outlines a strategy for Climate Action Plan implementation.

The County feels that a realistic greenhouse gas emission reduction plan must include a reasonable return on investment, must take a long-term view in order to allow for incremental change, requires full commitment and support from management, openness to all options and the flexibility to accommodate changing understandings, technology and circumstances. With regard to this latter point, there is no finish line in this endeavor. This planning process is more accurately viewed as on-going, and the County's Climate Action Plan should be viewed as an evolving document, intended to guide future policies and programs.

Chapter 2—Greenhouse Gas Inventory

Chapter 2—Greenhouse Gas Inventory

A carbon footprint is the measurement of total greenhouse gas emissions contributed by a person, household, business, institution or community over the course of a year. It takes into account greenhouse gas emissions from the combustion of natural gas and electricity usage by a particular department or building, from mobile combustion of fuels (from gasoline and diesel used by both on-road vehicles and off-road equipment) and from process emissions associated with manufacturing or, in the County's case, from processing sludge and nitrous oxide emissions associated with municipal wastewater.

Measuring your carbon footprint, or conducting an inventory of your greenhouse gas emissions, can give a clearer understanding of just how much greenhouse gas is being generated, help identify primary sources of greenhouse gases and help compare emissions with similar generators of greenhouse gases. Since carbon dioxide is typically used as a method of measuring the contribution of greenhouse gases into the atmosphere (there are several other greenhouse gases besides carbon dioxide), greenhouse gas emissions are often expressed as carbon dioxide equivalents (CO_2e) over some period of time, a year, for example.

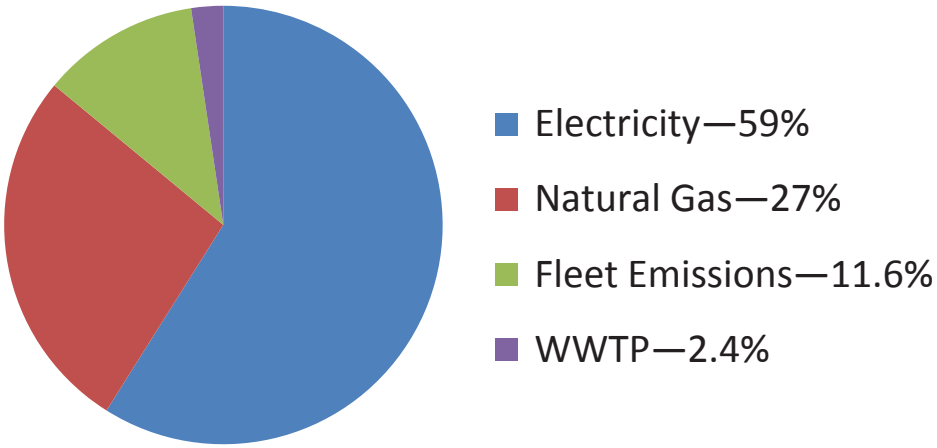
Onondaga County performed an inventory of greenhouse gas emissions from its operations based primarily on data for the calendar year 2008. This was accomplished in part with the assistance of both graduate and undergraduate students at the State University of New York – Environmental Science & Forestry and C&S Engineers. The inventory utilized electricity and natural gas used by County buildings and facilities, wastewater discharges and methane emissions from County wastewater treatment facilities, and electrical usage from the lighting of various County areas. Since gasoline and diesel data by department were not readily available for 2008, this inventory utilized gasoline and diesel records for 2010. It should be noted that the County's carbon footprint calculations exclude what are referred to as "Scope 3 Emissions," or those that are beyond the County's direct control, such as carbon emissions associated with the production of products purchased by the County, the delivery of goods to the County, or post-consumer emissions from product disposal (from landfills or waste incinerators).

The County manages over 200 facilities consisting of libraries, stadiums, civic centers, county offices, police stations, correctional facilities, a justice center, a forensic science center, a public safety center, a convention center, municipal parking garages, recreation centers, potable water treatment facilities, six wastewater treatment plants, 2,300 miles of pipeline and associated pumping facilities. Further, Onondaga County owns and operates approximately 1,400 on and off-road vehicles, some of which are used to help maintain approximately 800 miles of County highway.

It is important to identify the sources of greenhouse gas associated with County operations and their relative contribution to total County emissions so that attention can be focused on the most significant sources. The total annual greenhouse gas emissions associated with County operations are approximately 72,000 metric tons per year. Just for perspective, it was reported that operations associated with New York City government resulted in a total release of approximately 3.8 million metric tons of CO_2e. City and County operations in Portland, Oregon (county population 735,000) in 2008 were estimated to be 170,000 metric tons of CO_2e (Note: It is not known how these numbers were calculated or what emission sources were used in these calculations, so the numbers might not necessarily be comparable to those generated in Onondaga County's inventory).

Figure 1 provides a breakdown of County greenhouse gas emissions between electricity usage, natural gas usage, fleet (based on fuel consumption) and greenhouse gas emissions from wastewater treatment process operations.

Figure 1—Comparison of Emission Sources



Greenhouse gas emissions associated with the use of electricity and natural gas in County-owned and operated facilities account for about 61,800 metric tons of carbon dioxide equivalents, or 86% of the County greenhouse gas emissions. It should be noted that departments, such as the Metropolitan Water Board (MWB) and Water Environment Protection, also use electricity for pumping and processing purposes. By itself, electricity usage by the County is responsible for approximately 42,300 metric tons of carbon dioxide equivalents (CO_2e) or 59% of the County's carbon footprint, while natural gas combustion accounts for 19,400 CO_2e or about 27% of the County's carbon footprint. Consequently, a primary focus of the County's efforts to reduce greenhouse gas emissions should be aimed at reducing energy use in its buildings and electricity use for facilities associated with water distribution and wastewater transmission and processing.

County fleet operations accounted for 8,357 CO_2e, or about 11% of the County's greenhouse gas emissions. Greenhouse gas emissions associated with the use of gasoline accounts for approximately 4,869 CO_2e or 58% of fleet emissions, with emissions from diesel engines accounting for the remainder. As the second highest source of greenhouse gas emissions associated with County operations, fleet emissions represent another important area of focus.

The balance of the County's primary sources of greenhouse gases are associated with process

Figure 2—Greenhouse Gas Emissions for Energy Use (in metric tons per year)

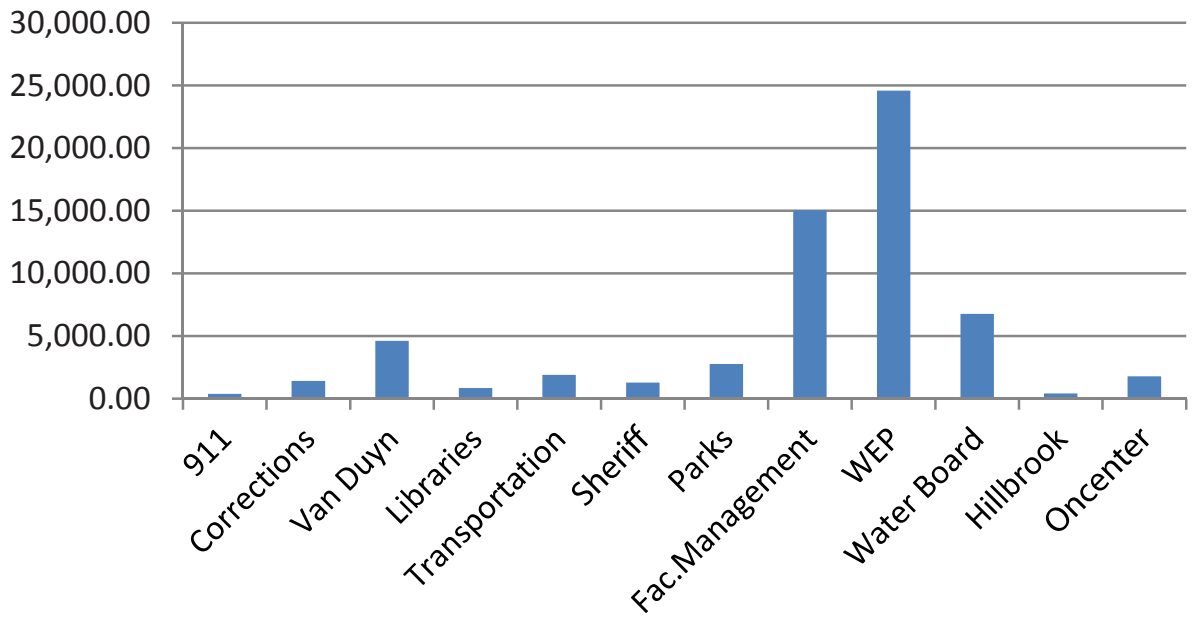
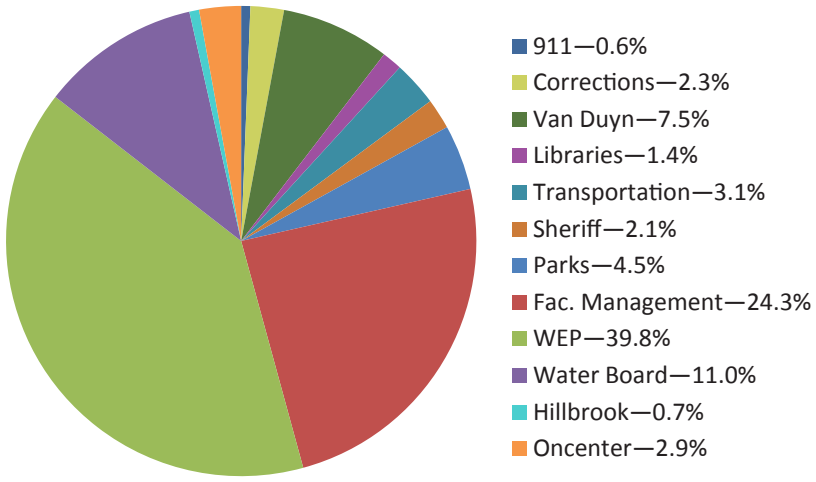


Figure 3—Percent Greenhouse Gas Emissions Associated with Energy Use



emissions (the incomplete combustion of methane and the nitrous oxide in the County's wastewater effluent), which comprises approximately 1,695 CO_2e, or about 2% of all County greenhouse gas emissions.

Figure 2 and Figure 3 provide a breakdown of greenhouse gas emissions associated with electricity and natural gas use in County facilities by department. A detailed spreadsheet of emission calculations associated with electricity and natural gas use in County facilities is presented in Appendix A.

From these tables it can be seen that the four largest generators of greenhouse gas emissions associated with electricity and natural gas use in County facilities are Water Environment Protection (WEP), Facilities Management, the Metropolitan Water Board and Van Duyn Home and Hospital. The facilities operated by these four departments combined contribute approximately 51,000 CO_2e , or about 82% of the greenhouse gas emissions associated with electricity and natural gas use by the County. This amounts to almost 70% of the County's total carbon footprint. Particular attention should be focused on facilities associated with these departments in the County's efforts to reduce greenhouse gas emissions.

Figure 4 and Figure 5 provide a breakdown by department of greenhouse gas emissions associated with vehicles and equipment operating on diesel and gasoline. A detailed spreadsheet of the emission calculations is presented in Appendix A.

As illustrated in Figure 4 and Figure 5, the departments with the greatest greenhouse gas emissions

Figure 4—Fleet Greenhouse Gas Emissions (in metric tons per year)

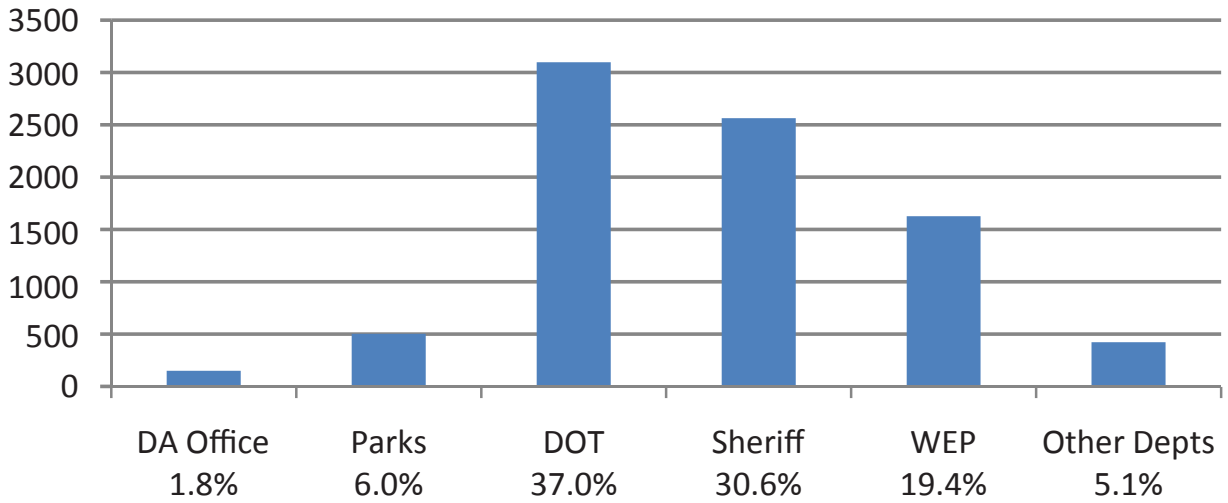
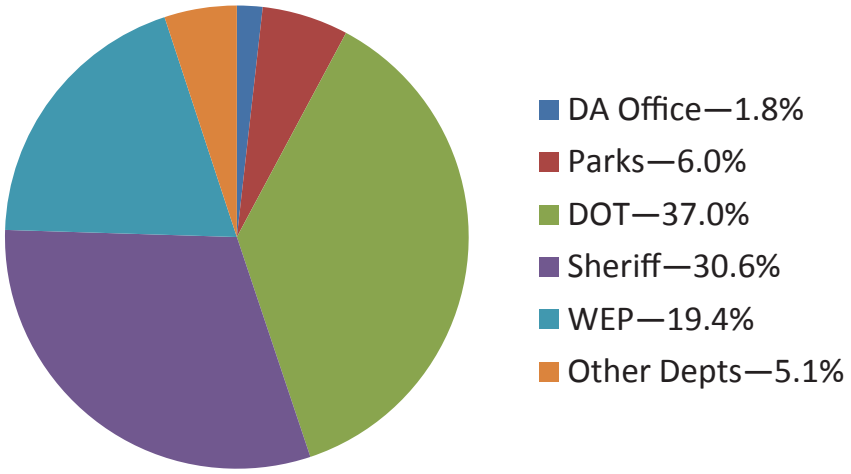


Figure 5—Fleet Greenhouse Gas Emissions (by percent)

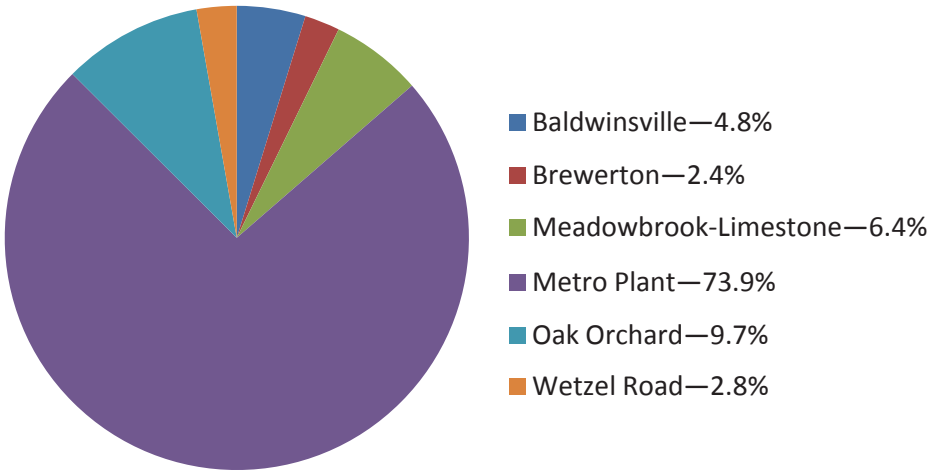


associated with gasoline and diesel fuel are the Department of Transportation, the Sheriff Department and the Department of Water Environment Protection (WEP). These three departments use just under 445,042 gallons of the 550,578 gallons of gasoline used annually by the County fleet, and over 328,000 gallons of the 342,719 gallons of diesel used annually by the County fleet. Use of both types of fuel by these three departments combined amount to over 87% of the annual greenhouse gas emissions associated with County fleet operations, and about 8% of the County's total greenhouse gas emission. Approximately 37% of the annual greenhouse gas emissions associated with County fleet operations is generated by DOT fleet operations, and another 30% is attributable to the Sheriff's Department's fleet. Combined, the DOT and Sheriff's Departments fleet operations generate over 67% of the carbon footprint associated with fleet operations. As the biggest users of gas and diesel, and the generators of the greatest amounts of greenhouse gas emissions, these fleet operations should be a primary focus of County efforts to reduce fuel consumption and associated greenhouse gas emissions.

In addition to the emissions associated with the consumption of electricity, natural gas, gasoline and diesel fuel, a final category of emissions associated with County operations includes process emissions associated with the operation of the wastewater treatment plants by the Department of Water Environment Protection. The County operates six wastewater treatment plants and 150 pumping stations, as well as a wastewater labora-

County fleet

Figure 6—Greenhouse Gas Emissions, WEP Process Emissions



tory. Process emissions associated with the incomplete combustion of methane and the nitrous oxide emissions from the treatment plant processes and effluent generates approximately 1,700 CO_2e. The Metropolitan Sewage Treatment Plant alone contributes approximately 74% percent of these process emissions. Figure 6 represents a breakdown of process emissions from County wastewater treatment plants.

Metropolitan Syracuse Wastewater Treatment Plant

Chapter 3—Greenhouse Gas Reduction Target(s)

Chapter 3—Greenhouse Gas Emission Reduction Target

It is important to establish a greenhouse gas emission reduction goal or target in order to create a framework that can guide the planning and implementation of emission reduction measures now and in the future. Onondaga County has set its emission reduction target at 25% over 25 years, or an average reduction of approximately 1% per year. This emission reduction goal should be critically evaluated at five year intervals to determine if the County needs to adjust its approach in order to meet the target, or if the target can be made even more aggressive due to new technology or changing circumstances.

The County has sought to establish a target that is both aggressive and achievable. The County's current carbon footprint is approximately 72,000 metric tons per year. A goal of 25% reduction in greenhouse gas emissions by the year 2036 amounts to a total reduction of 18,000 metric tons, or an average of 720 metric tons per year.

For perspective, to make a 1% reduction in greenhouse gas emissions solely by reducing the amount of energy used by County operations (not relying on fleet or process reductions), the County would need to reduce electricity consumption by 1.6 million kWh (an amount approximately equal to the amount of electricity currently used by the Department of Corrections/Jamesville Penitentiary each year) and natural gas consumption by 43,200 therms (the OnCenter currently uses approximately 50,000 therms per year). To offer another reference for purposes of comparison, the energy reductions that resulted from the County's previous Carrier Energy Performance Contract amounted to an annual reduction in electricity use by about 13.4 million kWh and natural gas use by about 898,000 therms, which resulted in a reduction in just over 9,000 metric tons of CO_2e. This was achieved with an investment of about $16 million, and is calculated to result in an annual cost savings of approximately $1.9 million.

It is important to keep in mind that there are a number of factors beyond the County's control that will impact realization of its target reduction of 25% over 25 years, or an average reduction of approximately 1% per year. One must accept that there is considerable variability in meteorological conditions from year to year, with occasional extremes in either or both temperature and/or precipitation. Hotter summers and/or colder winters will result in higher energy use, and wetter years (that will require more pumping of wastewater for treatment, for example) will also result in higher energy use.

Further, it is expected that the County will be required to construct and operate new/additional facilities during the course of the next 25 years. For example, in order to improve water quality conditions in Onondaga Lake, it might be necessary for the County to construct additional wastewater treatment facilities, some of which are known to be very high energy users. In these circumstances the County will recalculate a revised baseline from which emission reductions will be determined.

It should also be recognized that new technology, aimed at improving energy and fuel efficiency, is emerging at a relatively rapid rate in response to concerns over climate change and energy prices. It is hoped and expected that such discoveries will enable the County to realize its emission reduction goals, and perhaps allow it to evaluate the feasibility of establishing new, more aggressive goals over time.

Chapter 4—Current Efforts to Reduce Greenhouse Gas Emissions

Chapter 4—Current Efforts to Reduce Greenhouse Gas Emissions

This section describes projects, programs and policies aimed at reducing County greenhouse gas emissions that have already been adopted or initiated by the County.

Energy

Approximately 59% of the County's greenhouse gas emissions are associated with electricity usage and 27% are associated with natural gas use in County facilities. Onondaga County has a history of being proactive in the reduction of its overall energy use. In 2003, the County engaged with an energy services company (ESCO) to audit and implement energy-related capital improvements at 25 of the County's largest energy consuming facilities. These energy audits identified numerous energy efficiency and conservation measures (ECMs) including: lighting controls and replacements, motor replacements, variable speed drive installations and HVAC controls upgrades. Approximately 50% of the ECMs identified by the 2003 program have been implemented resulting in an annual energy reduction of 13,363,000 kWh and 899,000 therms, which equates to a reduction of approximately 9,170 metric tons of greenhouse gas equivalent (CO_2e). This energy reduction also results in annual savings of approximately $1.8 million per year. For more information on the energy conservation measures implemented under the County's previous energy performance contract, visit the County's web site at: www.ongov.net/facilities/energy.html#four.

Energy Efficiency and Conservation Block Grant (EECBG)

The American Recovery and Reinvestment Act of 2009 appropriated funding for the United States Department of Energy (DOE) to award grants to units of local government under the Energy Efficiency and Conservation Block Grant (EECBG) Program. Onondaga County has been allocated approximately $2,500,000 under the EECBG Program.

The County's EECBG Strategy, approved by the DOE, allocates approximately $1,800,000 to reduce energy consumption or produce renewable energy at County Facilities Operations as shown on table 4.1.

Table 4.1—EECBG Strategy Allocations

Description	Budget
Benchmarking and energy audits	$105,000
Energy efficiency projects at county facilities	$1,385,000
Retro-commissioning*	$250,000
Renewable energy demonstration projects	$63,000
Total	**$1,803,000**

** Retro-commissioning is a process that seeks to improve energy performance by "tuning-up" existing building equipment and systems so they perform as designed and as efficiently as possible.*

The EECGB Program funding received by the County will also be enhanced by matching NY State Energy, Research and Development Authority (NYSERDA) and/or power utility incentives.

The EECBG funded benchmarking and initial energy assessments have been completed. The purpose of the benchmarking and initial energy assessments was to identify the County's least energy efficient facilities in order to target comprehensive energy audits. The follow-up comprehensive energy audits that will develop detailed project costs estimates and estimates of energy and greenhouse gas reductions are in process, and are expected to be completed by the fall of 2011. Using the results of the comprehensive energy audits, retro-commissioning inspections and the list of remaining, unimplemented ECMs from the 2003 energy performance contract, the County will select the best energy efficiency projects at County facilities to be funded by the EECBG. These energy efficiency projects will be completed by mid-2012.

County lighting project

The buildings to be retro-commissioned have been selected and applications for NYSERDA co-funding are in progress. Field inspections and equipment inventories have been completed. Retro-commissioning is to be completed by mid-2012.

A 16 kW solar photovoltaic system has been installed at the County's Beaver Lake Nature Center and began operation in May 2011. The County is also considering a 10 kW wind turbine to be installed at its Metropolitan Raw Water Pump Station pending resolution of zoning and permitting issues.

Beaver Lake Nature Center

NYSERDA Energy Efficiency, Renewable Energy, and Alternative-Fuel Projects (RFP 1613)

On July 30, 2009 New York State Energy Research and Development Authority (NYSERDA) announced its Competitive Solicitation to Fund Energy Efficiency, Renewable Energy, and Alternative-Fuel Vehicle Projects (RFP 1613) using American Recovery and Reinvestment Act (ARRA) funds allocated to New York State's Energy Office. Onondaga County proposed two projects, both of which were awarded NYSERDA funding. The projects include:

1) District Heating and Cooling Plant Heat Recovery for Justice Center Domestic Hot Water Project

   The Justice Center Heat Recovery Project will use the heat by-product of two natural gas-fired electric generators located in the County's District Heating and Cooling Plant to produce hot water for use in the adjacent Justice Center. The expected energy savings is over 3,500 million British Thermal Units (MMBTU) in annual natural gas consumption, reducing Greenhouse gas emissions by approximately 185 tons per year. This project is currently underway and expected to be complete by August 2011. NYSERDA is funding 70% of the $220,000 project, which is expected to deliver $44,000 of annual energy savings.

2) Van Duyn Energy Management System Upgrade

   The Van Duyn Energy Management System Upgrade will allow active control of air handling units and implementation of demand control ventilation strategies. The estimated heating energy savings is over 5,687 MMBTU (over 300 metric tons of GREENHOUSE Gas emissions) in natural gas consumption, and approximately 45 MMBTU (about 2.4 metric tons of green-

house Gas emissions) in cooling energy savings. This project is currently underway, and is expected to be completed by August 2011. NYSERDA is funding 80% of the $337,000 project which is expected to deliver $48,000 of annual energy savings.

National Grid Small Business Energy Efficiency Lighting Projects

New York State has created an Energy Efficiency Portfolio Standard (EEPS) program to develop and encourage cost-effective energy efficiency. Under this program the New York Public Service Commission approved the establishment of a utility-administered electric energy efficiency program to be administered under the Niagara Mohawk (National Grid) Small Business Program. National Grid's Small Business Program will pay for an energy audit, and for up to 70% of the costs of energy efficient equipment and its installation. The program is directed at accounts with an average electricity demand of less than 100 kW, which includes some of the accounts associated with County facilities. Consequently, under this funding opportunity the County has had energy efficient lighting installed the facilities shown on Table 4.2.

The expected energy savings from this initiative is over 780,000 kWh per year, with a corresponding greenhouse gas reduction of about 240 metric tons per year of CO_2e. The expected annual energy cost savings will total nearly $100,000 per year. All of these projects have a projected pay-back period of less than 36 months.

Table 4.2—Energy Efficient Lighting Installations

Dept.	Description	Estimated Annual Energy Savings (kWh)	Annual Million BTU	GHG Reduction (MtCO2e)
Facilities Mgt.	Everson Garage	56,488	192.8	17.5
OC Public Library	Mundy Branch	114,444	390.6	35.5
OC Public Library	Hazard Branch	45,008	153.6	14.0
OC Public Library	Soule Branch	32,328	110.3	10.0
OC Public Library	Betts Branch	34,729	118.5	10.8
OC Public Library	Beauchamp Branch	34,092	116.4	10.6
OC Public Library	White Branch	25,381	86.6	7.9
OC Public Library	Petit Branch	23,538	80.3	7.3
OC Public Library	Paine Branch	22,210	75.8	6.9
OnCenter	OnCenter Parking Garage	173,705	592.9	53.9
Parks	Beaver Lake Nature Center	29,166	99.5	9.0
Parks	Parks Main Office - Park St.	19,810	67.6	6.1
Sheriff	Cessna Drive	58,290	198.9	18.1
Facilities Mgt.	Sheriff Office	113,312	386.7	35.2
Total		782,501	2,670.7	242.8

Green Building

The County Executive recognizes that building construction, renovation and operating practices are primary contributors to Onondaga County's greenhouse gas emissions. According to the U.S. Environmental Protection Agency (EPA), buildings account for 68% of the Country's electrical consumption and 39% of the Country's total energy consumption. In addition to energy, savings, high-performance, green buildings are healthy, productive places to work; are less costly to operate and maintain; and have a reduced environmental footprint. Green Building considerations touch on all areas of environmental sustainability and can employ methods that will provide the following benefits:

- Employee Productivity, Health and Safety
- Reduction in Workplace Liabilities
- Economic Development
- Site Enhancement
- Energy Optimization
- Water Conservation
- Wastewater and Storm Water Reduction
- Solid Waste Reduction
- Environmentally Responsible Material Selection
- Indoor Environmental Quality

For these reasons, locally-based, regional, national and global businesses such as Welch Allyn, O'Brien & Gere and King & King Architects as well as world-class non-profits such as St. Joseph's Hospital and Syracuse University, have chosen to be proactive in their green building investments. These investments are guided by sound business results as well as a reduction in environmental impact and social responsibility.

Credible, independent studies have verified the financial benefit of green, high-performance buildings. It's just good business, especially when highly quantifiable workforce benefits are factored. One recent study concluded that green design produces more than 10 times the added capital cost of building green. Performance of new green buildings results in a minimum of 30% reduction in operating costs. In addition, the cost of building green continues to decline as the construction industry gains experience, and green materials and resources become more readily available. In many instances, Leadership in Energy and Environmental Design (LEED) certified or Silver projects can be completed at no additional cost over traditional construction. As a result, municipalities throughout the Country are establishing goals, policies, standards and a commitment to green and high performance building programs for both municipal and private building development and construction. A significant majority of these policies require LEED Silver as the minimum standard.

Onondaga County, through the Department of Facilities Management (Facilities), is currently responsible for 1,000,000 square feet of building area in the Downtown Complex and over 100 buildings leased and operated, or self-maintained by County Departments such as Libraries, Health, Transportation, Parks and Recreation, Metropolitan Water Board and Water Environment Protection. While many individuals throughout these County departments support green building practices on an informal, ad hoc basis, there has not been a comprehensive means of identifying best practices, creating policy and communicating and institutionalizing such practices throughout all County properties.

Several green building-related initiatives are in progress:

- The Energy Efficiency and Conservation Block Grant (EECBG), discussed previously in more detail in the Energy Section, is employing the performance contract structure to assess, audit, evaluate and implement various energy-saving projects throughout County facilities.
- Facilities architects are regularly considering the use of green building methods and materials for self-performed ("in-house") projects and in association with outside consultants.

- In May of 2011, the Onondaga County Legislature approved the requirement for Life-Cycle Assessment for all large-scale County infrastructure and capital projects.
- In 2008, the Onondaga County Industrial Development Agency (OCIDA) approved a program for a graduated scale of payments in lieu of taxes (PILOT) for buildings achieving various levels of LEED certification for private development.
- The County has been evaluating the energy and water retention performance of green or vegetative roofing systems relative to other conventional, energy-efficient roofing systems. A major roof replacement project on multiple buildings at the Jamesville Correctional Facility offered the opportunity for a side-by-side test to evaluate different roofing systems.
- As part of the County's "Save the Rain Program" (see Section on storm water) the County is replacing the OnCenter complex roof with a vegetative roof. This initiative will help to save energy, reduce cooling costs at the facility and contribute to the capture of 1 million gallons of rainfall annually. The 60,000 square foot roof top will be one of the largest green roofs in the North East.

Jamesville Penitentiary

At the State level, New York State Green Building Construction Act, through the Office of General Services, mandates LEED registration of all projects with a goal of LEED Silver for all State-owned new construction and major renovations.

The goal of the County's Green Building initiative is to identify steps the County can take to further reduce the impact of the County's built environments on its carbon footprint while reaping all of the other benefits of green building, and institutionalize best practices through the on-going evaluation of life cycle performance and cost-benefit.

Fleet Management

Onondaga County owns and operates approximately 1,400 on and off-road vehicles. As described in Section 2, the carbon dioxide equivalent emissions associated with Onondaga County vehicles in 2010 was 8,357 metric tons, which is approximately 11% of the County's total greenhouse gas emissions. The majority of fleet greenhouse gas emissions are associated with the Department of Transportation (37% of County fleet emissions), Sherriff's department (30% of County fleet emissions), and Water Environmental Protection (19% of County fleet emissions).

The County's Environmental Sustainability Advisory Committee formed a subcommittee comprised of representatives of the Department of Management and Budget, Transportation, Water Environment Protection, Parks, and other County departments as needed to develop an approach to "greening the County's fleet." As part of that effort, the subcommittee has developed an approach to "standardize" the County's fleet for purposes of both emission reductions and cost savings. To this end, the sub-committee has developed a system to evaluate the costs and environmental impacts of various vehicles. The goal of this effort has been to standardize the vehicle selection process to certain types of vehicles considering, among other things, fuel efficiency and environmental impact. Besides having the County purchase fuel efficient vehicles, when the intended use meets the vehicle's specifications, standardization will also reduce the costs of maintenance and repair.

Further, the implementation of anti-idling policies in some County departments has also reduced fuel usage and associated emissions. In general, estimates are that idling a vehicle for one hour uses

1 gallon of gasoline. Several Onondaga County departments, such as the Department of Transportation (DOT) and Water Environment Protection (WEP), have implemented anti-idling guidance.

It is also worth noting that the County Department of Parks and Recreation has been using Global Electric Motorcars, or GEM cars, for staff transportation where possible. Further, the County's Division of Purchase has recently completed the search for a new fuel monitoring system which will allow departments to better track their fuel usage.

Purchasing

Onondaga County currently procures between 80 and 100 million dollars in goods and services each year. The role of the Division of Purchase has traditionally been to certify that the law was followed in making a purchase, and that the product is the most efficient use of tax payer dollars that allows each department to perform their primary function. The department's focus has historically been on the lowest cost product or service, without concern for how the product is packaged, from where it is shipped, how it is manufactured, how long its useful life is or how much of it can be reused at the end of that natural life.

Although the greenhouse gas inventory in Section 2 did not address "Scope 3 emissions" (Scope 3 emissions include those indirect emissions that result from an organization's activities, but arise from sources that are owned or controlled by others) there is a new and growing awareness of the relationship between the County's procurement practices and greenhouse gas emissions associated with County operations. There are several measurable benefits associated with environmentally preferable products that support an Environmentally Preferable Purchasing program:

- Lower purchase price for things such as remanufactured products
- Reduced operational costs due to energy efficiency
- Reduced disposal costs via the purchasing of more durable products
- Reduced hazardous waste management costs by utilizing less toxic products
- Reduced worker health and safety costs

The Purchasing Department also recognizes that it is no longer enough to think about County purchases only in terms of the short-term costs. It must look at the "life cycle" of products the County is buying, and must champion the understanding that, in the long run, it is appropriate to invest "up-front" for better products or services. It is through such a shift in focus—to life cycle cost analysis, and to the additional criteria noted above (packaging, shipping distance, reuse and recycling) that the Purchasing Department can have a central role in reduction of greenhouse gas emissions from County operations.

The County Executive and the Division of Purchase have already taken an important step toward reducing greenhouse gases by putting into place a green and sustainable purchasing preference Administrative Directive. This directive calls for the Division of Purchase to consider the following on every contract and transaction: Recycled content, reusability, fuel usage, toxins produced and energy efficiency of each purchase.

Onondaga County has begun purchasing basic supplies with a higher recycled content, including industrial paper supplies. Another of the Purchasing Department's recycling and reuse successes thus far has come at the end of useful life of purchased items. The Division of Purchase currently runs a highly successful surplus management program which "re-purposes" more than 90% of all fixed assets, either by redistributing the materials to other County departments, by giving the materials away to not-for-profit organizations or by auctioning the materials for reuse.

Wastewater Treatment

Wastewater treatment comprises a large part of the County's energy consumption, and approximately one third of the County's greenhouse gas emissions, primarily due to electrical usage associated with pumping and process emissions of methane

and nitrous oxide. Onondaga County's Department of Water Environment Protection (WEP) is responsible for the operation and maintenance of six wastewater treatment plants, 150 pump stations, three regional treatment facilities, five floatables control facilities, four drainage districts and various regulatory programs associated with those facilities. Due to the significant amount of pumping associated with the conveyance of wastewater, the heating requirements for department facilities and sludge processing, and other energy requirements for mixing and aeration in the treatment processes, wastewater treatment facilities are recognized as high-energy users, resulting in the large volumes of associated greenhouse gas emissions.

Of the six wastewater treatment plants operated by Onondaga County, the Syracuse Metropolitan Wastewater Treatment Plant (Metro) is the largest facility, and serves as the centralized processing facility for the sludge produced from the Brewerton, Meadowbrook-Limestone, Oak Orchard and Wetzel Road treatment plants. A direct by-product of the sludge digestion process is the production of "biogas" - largely consisting of methane (65%). Although methane is a principal greenhouse gas, it can also be viewed as a resource because it can be used for its Btu or energy content. During 2008, Metro generated approximately 175 million cubic feet per year of biogas (this amount can vary considerably from year to year), and combusted about 93% in on-site boilers to heat buildings as well as the digesters, with the remaining gases burned by flares to minimize greenhouse gas emissions. During 2012, the Metro wastewater treatment plant will utilize a 380 kW generator (co-gen) that is designed to run on methane (biogas). It is anticipated that the Wetzel Road treatment plant, with its recently upgraded anaerobic digesters, will generate approximately 11 million cubic feet of biogas per year, all of which will be utilized in a boiler or "flared" so that almost all of the gases produced by the plant will be combusted.

The Department of Water Environment Protection has routinely sought ways to reduce its energy usage. Recently the Department:

- Installed variable-frequency drives to control the frequency of power supplied to its motors.
- Performed laser shaft alignments (misaligned shafts convert energy to vibration that is no longer doing useful work and wastes energy).
- Installed occupancy sensors for lighting in priority areas.
- Installed twelve new, more efficient sand recirculation pumps in the phosphorus treatment plant.

Stormwater Treatment/Save the Rain

Onondaga County's "Save the Rain" program, initiated by County Executive Joanie Mahoney, is an initiative designed to improve the environment and improve Onondaga Lake by reducing the amount of stormwater runoff that flows directly into the sanitary sewer system. The County's De-

Save the Rain outreach efforts

partment of Water Environment Protection (WEP) is leading efforts to save the rain by developing green infrastructure and environmentally friendly solutions to capture stormwater where it lands.

By reducing the amount of storm water going into the sewers through "green" technologies, the County can reduce the need for and cost of "gray" facilities (traditional wastewater collection and treatment facilities), while still minimizing the number of combined sewer overflows (CSOs). These "green infrastructure" projects will have a number of greenhouse gas reduction benefits. For one thing it will reduce heat island effects, reducing the power needed to cool indoor air in the City. The vegetative green infrastructure measures, like rain gardens, bio-swales and tree plantings (8,500 trees), will have the indirect benefit of sequestering or storing carbon. But probably more importantly, using green infrastructure to address stormwater will use much less energy than traditional, gray wastewater and stormwater treatment measures that rely on extensive pumping.

Table 4.3 provides a listing of energy reductions realized by implementing a green-approach for CSO abatement.

In summary, the benefits of using green infrastructure instead of traditional, gray infrastructure are:

- Reduction in stormwater runoff volumes
- Reduction in potential water pollution and erosion
- Saves cost on construction when compared to traditional "gray infrastructure
- Reduction in energy demands and costs
- Improves air quality and human health
- Benefits communities and increases land value

Landscape Management

Onondaga County also minimizes its impact on climate change, and at the same time reduces its long-term costs by making changes to the way in which it manages landscapes under its control; at parks, around buildings and parking lots, and by better managing its urban and rural forest resources. Grounds-keeping and park management practices have an impact on climate change, primarily from greenhouse gas emissions associated with grounds-keeping equipment. In addition, the vegetation and trees within forested lands under the County's management serve an important function in the capture and sequestration of greenhouse gases that contribute to climate change.

Alternatives to Mowing

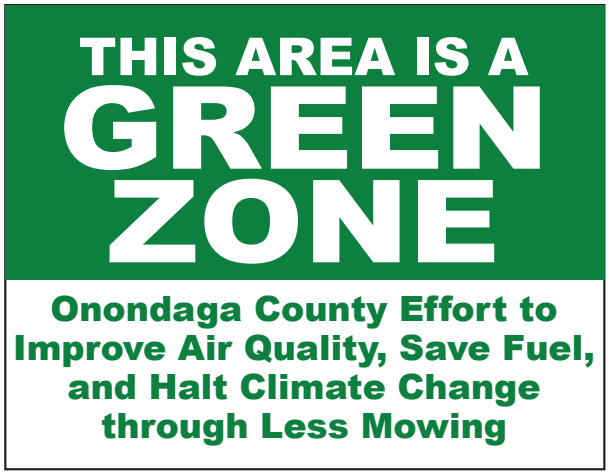
The County has already implemented a program whereby County departments identified areas un-

Table 4.3—Save the Rain–CSO Program Energy Savings

Original Traditional/ Gray Project	Operational Frequency	Save The Rain Project	Estimated Reduction in Energy Use
Upper Harbor Brook Regional Treatment Facility—Four 500-hp pumps	20-40 events annually	Harbor Brook Wetland with Storm King/new Intercepting Sewer—no pumps	100%
Lower Harbor Brook Regional Treatment Facility—Four 1,000-hp pumps	20-40 events annually	Lower Harbor Brook Storage—Two 110 horse power pumps	80%*
Clinton Storage Regional Treatment Facility—Five 1,000-hp pumps	20-65 events annually	Clinton Storage Tunnels—Three 250 horse power pumps	75%**

** New green storage facility has smaller HVAC, odor control and heated structures*

*** New green storage facility has smaller HVAC, odor control and heated structures. First 6 million gallons uses gravity flow to drain tunnels. New 250 horse power effluent pumps will operate between only 4-10 times annually.*



der their jurisdiction where mowing could either be reduced or eliminated altogether. This mowing reduction program has resulted in the discontinuation of mowing of almost 60 acres of County-owned land, and over 92 acres where mowing has been either eliminated or reduced. This initiative has yielded an estimated reduction in fuel usage of over 1,000 gallons/year and over 10 metric tons of carbon dioxide per year. An important aspect of the success of this program is making sure that the citizens of the County understand the purpose of the reduced mowing initiative. To that end, the County has developed informational signs to be placed at selected reduced mowing zones to present that message to the public. As other sustainable landscape management practices area employed, such as alternative ground covers, similar signage could be utilized in those areas as well.

While it has been be feasible to reduce or eliminate mowing on some County-maintained green areas, and might be expanded to additional areas, there is an expectation of a certain level of aesthetic or visual character which cannot be provided by unmowed turf grasses in other areas. In these areas, alternative vegetative ground cover plants can be considered. These plants could take a variety of forms, from low-growing broadleaf herbaceous plants, to small creeping shrubs, to mixes of wildflowers and native grasses. There are a number of considerations which should be accounted for in selecting the appropriate species and planting scheme, namely:

- Hardiness
- Salt tolerance (particularly for roadside areas)
- Height (especially where sight lines and visual access are important)
- Deer resistance
- Native/naturalized/invasive tendency
- Maintenance requirements
- Aesthetics

A list of potential alternative groundcover plants have been included in Appendix A. Consideration of the cost of installing these alternative ground covers, and their relative benefits in terms of greenhouse gas emissions reduction should also be taken into account.

Carbon Sequestration—Tree Canopy and Forest Management

Carbon sequestration involves the removal and storage of carbon from the atmosphere in carbon "sinks" (such as oceans, forests or soils) through physical or biological processes, such as photosynthesis. Humans have tried to increase carbon sequestration by growing new forests.

While tree planting does not translate into a direct reduction of greenhouse gas emissions, trees are an important "carbon sink," and serve a variety of other important ecosystem functions. While newly planted trees with little mass store relatively small amounts of carbon, the carbon storage of benefits of mature trees is great, so from a macroscopic view tree canopy is an important element of the carbon footprint of a community. For perspective, C&S Companies used a tool called i-Tree Vue to calculate carbon sequestration in a couple of County parks, Highland Forest and Beaver Lake. It was estimated that tree canopy at Highland Forest Park includes about 2,670 acres, and provides storage for a CO_2e of 11,915 metric tons per year. At Beaver Lake Park it was estimated that tree canopy includes about 354 acres, and provides storage for a CO_2e of 1579 metric tons per year.

In 2010, the County Parks Department issued a Request for Proposals to hire a forestry manage-

Highland Forest

ment consultant to prepare initial and long term forestry management plans for each of the County Parks and other County property as the County may designate. The purpose of this initiative is to preserve the health of the forested land owned by Onondaga County through a sustainable management program which includes thinning, replanting, cutting, disease control, pest control and other strategies.

The County has also embarked on a plan to plant 8,500 trees as part of its "Save the Rain" initiative (See Stormwater Treatment section). Many of the green infrastructure projects associated with the Save the Rain effort involved vegetative stormwater control measures. Recent requirements associated with "Phase II Stormwater Regulations" now require local municipalities to integrate "green infrastructure" measures into development site designs. Just as the Save the Rain initiative will integrate vegetative stormwater control measures, so too will the new site design requirements associated with municipal stormwater compliance permits. While these measures will not result in a significant increase in carbon sequestration in the region, there will be some benefit.

Sustainable Development Planning

The relationship between climate change and land use is significant, as land development patterns can either reduce or increase the demand for energy. An analysis of current patterns of development in Onondaga County show that decisions related to land use have led to increases in the County's greenhouse gas emissions. For example:

- Onondaga County has experienced growth in both the number of housing units and housing unit size. Almost 8,000 new residential parcels have been created in Onondaga County since 2000, while average house size increased approximately 40% between 1982 and 2000. Households are responsible for a significant amount of energy related greenhouse gas emissions, and larger detached households use more energy than smaller or attached households.
- The County is also experiencing water and sewer infrastructure expansion, which promotes new development in previously undeveloped rural areas and expansion of the County's urban area. New development on previously undeveloped land also decreases open space and farmland, which play in important role in carbon sequestration as described earlier.
- New development in undeveloped areas located farther from the urban core leads to an increase in vehicle miles traveled (VMT). VMT in Onondaga County has increased 43% since 1990, which increases the region's greenhouse gas emissions (approximately a third of total national greenhouse gas emissions are transportation-related).
- During the same period that the County's housing units, housing unit size, water and sewer infrastructure, VMT and greenhouse gas emissions have been increasing, the County's population has been stagnant, with a substantial decline in the City of Syracuse.

Several studies have shown that compact, well-planned development patterns can lead to more energy efficient communities and provide economic, social and environmental benefits at scales rang-

ing from individual buildings to the entire region. The current trend of sprawl without population growth illustrates both the fiscal inefficiencies and the environmental impacts of enlarging our urbanized area.

It is important to note that the County's authority, as it relates to land use decisions, is limited by New York State General Municipal Law, which empowers local municipalities through "home rule," and gives them the authority to make final decisions regarding land use and zoning decisions. The County is able to exercise some influence over regional development patterns by making decisions regarding extension of County road and sewer infrastructure. "Sprawl" requires more miles of roads and sewer lines, and leads to greater construction and maintenance costs (e.g., monitoring, plowing, repairing, pumping and replacing) and higher greenhouse gas emissions.

Historically Onondaga County has made efforts to encourage more sustainable land use decision-making. The County's 2010 Development Guide was adopted by the County Legislature in 1998. It has served as the County's Comprehensive Plan, and consists of two documents: the Onondaga County 2010 Development Guide, which provides general goals and policies, and a Framework for Growth in Onondaga County, which examines County-wide conditions and trends. These documents were intended to encourage sustainability, and reflect the relationship between land use, public infrastructure and associated costs.

At the direction of County Executive Mahoney, the Syracuse-Onondaga County Planning Agency (SOCPA) is currently working to create a new Sustainable Development Plan for Onondaga County, which will focus on working together as a region to promote sustainability, and to make the decisions necessary to reduce greenhouse gas emissions and enhance quality of life within Onondaga County. Relevant County departments are participating with SOCPA on plan and policy development. The new plan will detail current development patterns and resulting challenges to economic, social and environmental sustainability. The Plan will include

SOCPA Sustainable Development Plan

models that will help illustrate the costs and impacts involved in different future growth scenarios, including energy usage measures and vehicle miles traveled, and ask County residents to choose how our community wants to grow to create a vision for the future.

In addition, the Sustainable Development Plan will identify the actions required by citizens and at all levels of government to achieve our community's vision, including specific policy directives. Policy directives for County government will include an increased consideration of planning in review of capital projects and County expenditures on road and sewer infrastructure.

Ultimately, the goal of Onondaga County's land use planning effort is to promote regional sustainability, which will reduce the amount of greenhouse gases associated with extension of infrastructure and reduce vehicle travel and operation and maintenance costs associated with County infrastructure.

To meet this goal, the County will complete a new land use plan for Onondaga County that will:

- Develop specific policy directives for County agencies to limit future infrastructure expansion and County investment without considerations of regional sustainability goals and impacts, including greenhouse gas emissions
- Create incentives for sustainable development
- Educate citizens and local decision-makers, create partnerships to promote smart growth and influence local and state policy

Achieving success in land use planning ultimately requires a shift in societal behavior and settlement patterns. As such, an important part of the Coun-

ty's planning effort involves continuing citizen-focused approaches. To this end, SOCPA will participate in continued outreach effort to engage local municipalities and the public, including municipal, and stakeholder and public meetings, and creation of an engaging website with research, tools, best practices and policy recommendations for local governments and citizens.

Solid Waste Minimization

Onondaga County recognizes that the consumption of goods and the subsequent generation and disposal of solid waste contributes to greenhouse gas emissions. If a product is thrown away (not reused or recycled), it ends up in the community's waste-to-energy facility or is landfilled.

As stated in the Onondaga Citizen's League's recent report, "What does it mean to be green?" the benefits of recycling are clear: It saves energy and natural resources, and limits the production of greenhouse gases. The report states that, "Every ton of paper that is recycled saves 463 gallons of oil, 7,000 gallons of water and 17 trees." Among the most sustainable ways to manage solid waste is to minimize the production of it by reducing the amount generated, making constructive reuse of it or by recycling it.

The County currently recycles paper, plastic, glass and metals consistent with the requirements of Local Law #12 passed in 1989, which mandates county-wide source separation of specific materials from the waste stream for recycling.

In addition to the recyclable items typically separated by households and businesses within the county, the County's downtown campus and some of its off-campus sites currently also separate for recycling certain metals associated with building maintenance activities, special projects and construction waste (e.g., copper wire, brass, aluminum). Further, some wood waste, such as pallets, is separated and sent to the Onondaga County Resource Recovery Agency (OCRRA) transfer station at Ley Creek for processing of recyclable components. The Rosamond Gifford Zoo also sends manure to a compost site, and the County's "e-waste" (computers, radios, etc.) is reused rather than handled as a waste. Electronic devices which are beyond their useful life to the County are made available to not-for-profit organizations for reuse or auctioned off for reuse or parts recovery.

In 2010, the County's Environmental Sustainability Advisory Committee created a subcommittee on Waste Minimization. Members of the Waste Minimization Subcommittee include representatives from the County's Office of Environment, Department of Facilities Management, Department of Information Technology, and the Syracuse-Onondaga County Planning Agency. While the Waste Minimization Subcommittee is charged with identifying waste reduction strategies for the County, such efforts necessarily overlap or intersect with the efforts of other greenhouse gas reduction initiatives. For example, the County's "Environmental Purchasing" initiative strives to promote the purchase and use of environmentally preferable products which, as noted above, is aimed not

Recycling in County office buildings

only at procuring products used by the County with recycled content, but also their reusability or recyclability. This will in turn reduce the quantity of material that will require disposal by the County as waste.

The extent to which the County is successful in reducing, reusing or recycling waste is an important facet of operating in a more sustainable manner. The goal of the County's waste minimization initiative has been to identify steps to further reduce waste generation from its operations and the impact of solid waste on the County's carbon footprint.

Outreach/Marketing

The County launched its new sustainability campaign illustrating its "Path for a Sustainable Future" in the summer of 2011. The County's Climate Action Plan is a component of the County's Path for a Sustainable Future efforts. To date the campaign has included posters in the building elevators, a banner in the public space leading to the cafeteria and a newly revamped website: http://www.ongov.net/sustainability/. On the website one can see what sort of projects the County is involved in by viewing each of the tabs: water, energy, recycle, transit, land and building. An internal e-mail campaign continues to keep employees informed of what the County is doing, as well as what individual employees are doing to be more sustainable and to reduce the County's carbon footprint. Through this outreach and marketing campaign, the County hopes to promote conversation amongst peers so that everyone can learn from each other how to make the County's operations more sustainable.

Outreach efforts

Chapter 5—Recommendations for Additional Efforts to Reduce Greenhouse Gas Emissions

Chapter 5—Recommendations for Additional Efforts to Reduce Greenhouse Gas Emissions

The following recommendations are intended to identify additional greenhouse gas reduction measures the County can take to minimize its carbon footprint. They involve recommended emission reduction measures for energy use, fleet initiatives, greening County buildings, wastewater treatment, green infrastructure for stormwater control, environmentally friendly purchasing policies, managing County-owned landscapes, sustainable land use planning and solid waste minimization.

Each recommendation is identified by its area of focus ("Aspect"). Each recommendation or action is briefly described, anticipated benefits are identified, estimated costs are discussed, followed by implementation considerations.

It should be noted that even though the County did not include "Scope 3 Emissions" in the calculation of its carbon footprint, the following does include recommendations to address such areas as product stewardship and waste reduction, as the County feels such measures are in keeping with its goal of integrating the concepts of sustainability into the County culture.

Aspect—Energy

Recommendation: The County should adopt a hierarchy of policies and practices to reduce energy consumption and reduce associated greenhouse gas emissions.

Description: The hierarchy should generally be as follows:

1) Conserve—Eliminate the wasteful use of energy when it is not needed.
2) Improve efficiency—Make sure the energy that is used is being used in an efficient manner to accomplish as much productivity per unit of energy used.
3) Use energy not produced by fossil fuels—Such energy could be from renewable sources or could be expanded to include energy produced by existing large hydro or nuclear stations.

No matter what the energy source, the conservation and efficiency actions are lower in cost and, in the end, minimize the amount of renewable energy needed for operations.

Benefits: Implementation of a hierarchy of measures to guide the County's approach to energy use and reductions in greenhouse gas emissions will provide overall guidance and direction as the County further develops and implements energy use policy and programs.

Estimated Cost: Adoption of the hierarchy in and of itself will not result in any costs. Implementation of efficiency measures and alternative fuel sources will likely involve capital investment that should undergo life-cycle cost analysis to demonstrate long-term cost savings.

Implementation Considerations: The messaging campaign aimed at the County workforce should include the County's hierarchy to help ensure a clear understanding of, and to guide daily decision-making as it relates to the County's energy consumption goals and objectives.

Aspect—Energy

Recommendation: Reduce the amount of unoccupied County office and operational space and either sell, lease or put excess space into "shut-down" mode.

Description: Standards for office, maintenance and other operational functions should be set to first minimize occupied square footage needed for operations, then consolidate as much of the County operations into as few facilities as possible. Unoccupied space can be either: sold, leased or placed in "shut-down" mode to minimize energy usage. Industry standards for square footage per worker type should be used in the process.

Benefits: The recommended conservation efforts are low cost and require relatively little time to implement. Reduction of County operational square footage results in multiple cost, energy and greenhouse gas emission benefits. Reduced square footage minimizes overall facilities management costs and allows any efficiency measures to be focused on fewer facilities or fewer square feet of operational space. It may also provide revenue opportunities to lease or rent space that cannot be sold.

Cost Estimates: Costs associated with consolidating operations space will involve mostly employee time, but could involve some internal building or site redesign and construction to accommodate relocated operations. It is expected that the cost savings associated with the reduction in operating space will off-set relocation and renovation costs over time.

Implementation Considerations: The overall reduction of County operational facilities will require some tools and study to evaluate how to optimize densification of County operations into new areas.

Aspect—Energy

Recommendation: Establish County policies and procedures that conserve energy.

Description: Establish and implement County facility and equipment operational standards consistent with industry, Department Of Energy (DOE) and U.S. EPA recommendations for items such as thermostat setting levels, room lighting, task lighting and computer usage/shut-down to reduce energy use.

Benefits: Energy conservation is an inexpensive and effective way to reduce energy consumption and greenhouse gas emissions.

Estimated Costs: Adoption of energy conservation policies and procedures in and of itself will not result in any costs other than time and effort.

Implementation Considerations: Many energy conservation actions require only the issuance of a policy or procedure to implement. The messaging campaign aimed at the County workforce should include the County's hierarchy to help ensure a clear understanding of, and to guide daily decision-making as it relates to the County's energy conservation goals and objectives.

Aspect—Energy

Recommendation: Develop and maintain baseline and benchmark energy use and greenhouse gas emissions for designated County Facilities.

Description: Through its EECBG energy performance and retro-commissioning projects, Onondaga County began establishing baseline and benchmark energy consumption and greenhouse gas emissions for approximately 50 of the County's largest energy using facilities. This benchmarking uses EPA/DOE Portfolio Manager web based software which will allow the County to continually monitor and compare the energy usage intensity and greenhouse gas emissions of its buildings to similar facilities across the country.

Benefits: The energy intensities and ratings produced by EPA/DOE Portfolio Manager will be used for four primary purposes:

1) Identify the County's least efficient facilities allowing the County to focus its resources on facilities with the greatest efficiency improvement potential.
2) Verify the energy savings resulting from any energy efficiency projects such as ECMs and retro-commissioning activities.
3) The intensities will be maintained and continue to be used to identify adverse trends in energy consumption patterns in order to identify future energy conservation measures (ECMs) and to work toward Energy Star certification of its facilities.
4) As the energy efficiency of buildings improves nationwide, the benchmark standards will continue to rise, thus the County can evaluate whether its energy efficiency and greenhouse gas reduction efforts are keeping pace with nationwide trends.

Use of the benchmarking process ensures that County efforts will be consistent with other facilities across the country.

Estimated Costs: The Portfolio Manager is a free software product developed and maintained by the US Environmental Protection Agency and Department of Energy. County consumption data is input and maintained by County employees. Building attributes must be certified by a Professional Engineer (PE) in order to obtain an Energy Star Certificate. If the County chooses to include more than the initial 50 buildings, some cost may be incurred for PE certification of the input.

Implementation Considerations: The County should decide how many of its facilities, beyond the current 50, should be included and maintained in the Portfolio Manager software. The County will need to decide on the appropriate target performance goals. It will be important to maintain the accuracy of the information in the Portfolio Manager database, including building usage, occupancy levels, etc.

Aspect—Energy

Recommendation: Establish County goals and standards for the energy efficiency of its facilities and publicly disclose building performance.

Description: Set visible energy efficiency targets and manage facilities to meet those targets. Buildings that perform at the 75th percentile or better receive an Energy Star rating and certificate.

Benefits: Setting targets provides the basis for the necessary management and decision making process. Setting targets will allow the development of planned actions to meet the targets and allow prioritization of energy efficiency and greenhouse gas reduction projects aimed to meet those targets. Expanding communication of goals, standards and building performance to the public may elicit some participation by other local commercial and government entities.

Estimated Costs: Establishing goals and standards in and of themselves have no cost. However, the setting of standards can require capital investment to achieve those standards. Until it is clear where County facilities are performing relative to ultimate standards, it is not possible to develop meaningful cost estimates.

Implementation Considerations: Goals and standards should be set at levels that are reasonable and consistent with the resources that will be available to implement the projects and actions necessary to meet those goals. Such decisions should be based on life-cycle cost analysis.

Aspect—Energy

Recommendation: Identify priority facilities (worst energy performance) using the Portfolio Manager Benchmarking tool.

Description: The EPA/DOE Portfolio Manager will produce reports that identify the Site and Source Energy Intensity per appropriate unit. For typical office buildings, this will be in BTU/ft.2 For water treatment and waste water plants, this will be in the form of BTU/gallons/day. For most common facility types, the Portfolio Manager will also provide a benchmark rating comparing building performance to similar facilities nationwide in the form of a percentile ranking. The percentile ranking can then be compared to the established goal or standard to determine which facilities are ranked furthest from the standard. Also, greenhouse gas emissions produced from facility energy use will be provided. [Note: this will not address greenhouse gas emissions from Waste Water Treatment processes.] Some types of County facilities are not included in the Portfolio Manager tool. For those facilities, the energy use per square foot or "Energy Intensity" can be used as a tool to identify inefficient buildings.

Benefits: Using benchmark ratings allows the County to target the worst performing facilities on a priority basis. Also, using benchmark ratings will allow the County to bring its facilities' performance to "peer group" norms and avoid overspending on excessive energy efficiency projects or actions.

Estimated Costs: There is essentially no cost in identifying and prioritizing the facilities with the lowest performance. This information will be available from the Portfolio Manager, which is no-cost software made available by the DOE and EPA. Costs will be incurred as energy efficiency projects are implemented.

Implementation Considerations: It will be important to maintain the accuracy of the information in the Portfolio Manager database, including building usage, occupancy levels, etc. Utility consumption data must also be maintained. This activity will be accomplished with in-house County personnel.

Aspect—Energy

Recommendation: Develop and maintain a "master" list of energy conservation projects or measures (e.g., Retro- Commissioning, employee culture change, procedures) that will be necessary to bring priority, low performing facilities up to County goals and standards.

Description – As poor performing facilities are identified, the County should develop a "master" list of actions needed to reduce energy consumption and greenhouse gas emissions. The starting point for the list should include; (i) projects identified by the Carrier Energy Performance Contract but not yet implemented, (ii) projects identified by the EECBG Initial Energy Assessment and Comprehensive Energy Audits and Retro-Commissioning but not yet implemented, and planned capital projects that have an energy efficiency component. The list should also include other energy reduction measures such as retro-commissioning, maintenance, employee culture change, etc. Most items can be identified by County employees and facilities managers and maintenance staff. Additional energy audits may be necessary to address additional facilities or to update prior studies. Projects and actions must include an estimated cost to implement and estimate energy and emissions reductions.

Benefits: Developing and maintaining a master list of energy efficiency projects will allow Commissioners and the Administration to determine the best projects or actions to implement with available funding from a County-wide operations perspective, rather than department-by-department. This will maximize the benefit of County funds spent on energy efficiency and greenhouse gas reduction efforts.

Estimated Costs: Projects for approximately the 50 largest energy using County Facilities have been identified through the Carrier and EECBG Energy Performance Projects. Additionally, 9 of the County's high energy consuming facilities are included in its EECBG Retro-commissioning project, which will identify addition efficiency or conservation measures. Many additional measures can be developed by department maintenance and operations personnel, or can include capital projects that have an energy savings component. In some cases, an energy audit or study may be necessary to develop a good estimate of project implementation costs and energy and greenhouse gas reductions. Such studies can usually obtain 50% co-funding under the current NYSERDA FlexTech Program.

Implementation Considerations: In addition to development of a master list of energy projects, it will be necessary to develop the funding mechanism and prioritization process also noted in these recommendations that cut across department lines and selects projects and actions based on maximizing County operations benefit rather than individual departments.

Aspect—Energy

Recommendation: Verify energy and greenhouse gas reductions actually realized by implemented energy conservation measures via Portfolio Manager Tool.

Description: Following implementation of approved energy conservation measures, energy savings and greenhouse gas reductions should be monitored via the Portfolio Manager Tool. Verification of actual costs and energy and greenhouse gas reductions provides a feedback mechanism on the effectiveness of the project as well as the

evaluation process. Additionally, U.S. Department of Energy, NYSERDA and utility funding mechanisms require a measurement and verification process. Portfolio Manager provides a well-documented and well maintained software package that accounts for weather and other variables in its calculation process.

Benefits: Verifying the benefits of energy conservation measures will help ensure reduced County energy costs and greenhouse gas emissions.

Estimated Costs: Portfolio Manager is a no-cost software tool. Use of the tool will require input and updating by County employees.

Implementation Considerations: Staff will have to become versed in use of the Portfolio Manager Tool.

Aspect—Energy

Recommendation: Consider increasing the use of energy that does not rely on fossil fuels for production.

Description: The County Executive's Opportunity Agenda Action Plan includes a goal of using 15% renewable energy in all County Facilities by 2015. This can be accomplished by implementing additional renewable energy projects, or by the purchase of renewable energy or renewable energy certificates. At present day energy prices, both solar PV and wind power projects have a very long payback (20-30 years), even with available NYSERDA incentives. The County has installed a demonstration 16 kW solar PV panel at its Beaver Lake Nature Center and is considering a demonstration 10 kW wind turbine at its Metropolitan Water Board Raw Water pump station. The County should monitor the actual energy production and savings for comparison with initial estimates and projections. Advancements in technology and the benefits of mass production continue to bring down the cost of renewable power. The County should continue to monitor these developments and costs which could impact future investment in renewable power. Further, the County should seek to make available existing facilities and land for project development, thus assisting in the development of renewable technology and manufacturing. Typically, host facilities will be receive the electricity produced at the facility at a price dependent upon contract terms. Excess energy could be sold to the grid. Finally, New York State operates a program whereby electric utility customers can contract for the purchase of renewable energy certificates (or attributes) from renewable energy producers that equates to the actual purchase of renewable energy. Such an approach will increase the cost of energy by 10%-20%. One approach could be to combine the purchase of renewable energy attributes with energy conservation and efficiency efforts. As energy usage and cost savings are achieved through conservation and efficiency, some or all of the cost savings could be used to purchase renewable energy attributes, thus keeping overall electricity costs level while increasing the County's use of renewable energy. It should be noted that the New York State energy production mix is one of the cleanest in the United States as the result of the large contribution of NYPA hydroelectric projects and nuclear generation.

Benefits: Using actual data from demonstration projects will make future project estimates more accurate as well as providing an indication of operational and maintenance issues. Waiting for improvements in technology and lower costs from mass production will allow for increased renewable energy production at lower costs and likely more reliable and lower maintenance equipment. Acting as a host facility for installation of private renewable power projects avoids the large upfront investment for such projects. By purchasing renewable energy the County would reduce its greenhouse gas emissions. No large upfront capital investment is required.

Estimated Costs: There are no costs for monitoring renewable energy projects and industry developments other than staff time. The costs of opportunities to host renewable energy projects built and operated by others will be unknown until contract terms are established. These attributes currently add between $0.015-$0.02/kWh to prevailing elec-

tricity prices. Current wholesale electricity prices currently vary from about $0.04-$0.06/kWh, thus purchasing renewable attributes will add between 25%-50% to the wholesale electricity price. Delivered retail electricity prices, including utility distribution charges, vary between about $0.11-$0.15/kWh, thus the impact on the total utility costs is about 10%-20%.

Implementation Considerations: This approach may delay the County's adoption of renewable technologies and greenhouse gas reductions. County would need to identify the amount of renewable energy purchased and select a supplier.

Aspect—Green Building

Recommendation: Green Building practices should be the baseline filter under which all County design and construction work is performed and under which any value engineering considerations should be made. The County should adopt an aggressive approach leading to the establishment of Green Building Standards employing the United States Green Building Council (USGBC) Leadership in Environmental and Energy Design (LEED) rating system for New Construction (NC), Commercial Interiors (CI) and Existing Buildings: Operations and Maintenance (EB:O&M) for all buildings owned and, where possible, occupied by Onondaga County. LEED is a system for sound design and construction accountability, employing established trade-specific standards (i.e. ASHRAE), but allowing and encouraging innovation.

Description: The Green Building Certification Institute (GBCI) administers LEED certification on projects under the LEED Rating System. LEED points are awarded on a 100-point scale, and credits are weighted to reflect their potential environmental impacts. A project must satisfy all prerequisites and earn a minimum number of points to be "certified." The level of certification (Certified, Silver, Gold, or Platinum) is based on the number of points achieved for a project. It is recommended that the County establish as its goals:

- All County projects should be reviewed by a Department of Facilities Management LEED Accredited Professional (AP's) to determine the category of LEED certification which appropriately applies to the defined scope of work.
- All New Construction (NC), Interior Construction (CI) and Core and Shell (C&S) projects to be designed by contracted design professionals achieve LEED Silver as a baseline certification.
- Renovation work performed on existing buildings under the supervision of Facilities LEED AP's, for the defined project scope, should meet LEED Silver criteria as a baseline, to be verified (not certified) using the most appropriate USGBC criteria and checklists, including Re-Green. Exceptions should be documented in writing and approved through the Green Building Standards Committee. With regard to renovation work, the County should also:
  - o Approach renovations from a comprehensive perspective rather than piecemeal to optimize the benefits of green building investment, choosing fewer comprehensive projects over a higher number of independent improvements.
  - o Create an ongoing work plan for prioritization of such projects
- Develop a strategy with guidelines to meet a goal of LEED Silver Operations and Maintenance (EB:O&M), initially using the Downtown Complex as a pilot site to develop a model approach that should then be applied to all County buildings as soon as possible and to the greatest extent possible, including, but not limited to:
  - o Implementation of Green Cleaning practices
  - o Selection and standardization of green building materials and methods
  - o Establishing a program for retro-commissioning, prioritizing the highest energy consuming and occupancy facilities
  - o Creating a policy for space utilization that serves green building goals such as day-lighting and reduction of fixed partition construction, optimizes space and productivity, and

considers proper HVAC system design and distribution for comfort and indoor air quality

In order to meet these goals, it will be necessary to also implement the following measures:

- Facilities Design and Construction group personnel should pursue and achieve LEED AP status, specific to their area of expertise, for the purpose of managing internal LEED compliance and review of projects undertaken "in-house." County Code Enforcement Officers should pursue and achieve LEED Green Associate status as a means to provide basic knowledge of green building principles and practices. These professionals will interact extensively with the Department of Purchase and other departments involved in new construction, renovations and up-grades to existing buildings.
- Continue the efforts of the Green Building Standards Committee (GBSC) and expand participation to include representatives of all impacted departments for the purpose of education and program implementation. The Committee should be charged to:
  - o "Encourage innovation, to remove obstacles to green building, and to facilitate" (City of Los Angeles) the County's green building objectives.
  - o Establish pilot policies and specifications for implementation throughout County facilities. This should include the establishment of a mechanism for evaluating pilot policies and specifications and identifying challenges and successes. Initial pilot specifications could include HVAC performance, shell and roofing systems and flooring products.
  - o Educate management and maintenance personnel on new procedures through workshop programs for each audience, and through regular communication including on-line opportunities for feedback.
  - o Provide vendor and professional workshops to familiarize County Employees with new practices and policies.
- Provide the tools for proper implementation through investment in facility management, asset management and architectural software.

Benefits: Adopting and implementing the green building initiatives outlined above will serve to:

- Reduce greenhouse gas emissions
- Conserve water
- Reduce the impacts of stormwater
- Moderate the localized impacts of temperature
- Reduce energy and water consumption
- Increase property values
- Decrease strain on energy infrastructure
- Improve employee health and productivity
- Save money (over the long term)

Estimated Costs: First costs of LEED Silver buildings are 0-5% greater than traditional construction, but the improved building performance over the life cycle of the project typically creates net savings for the investment. In particular, the comprehensive deployment of LEED balances investment in certain building systems with savings in others. The costs and payback of various green building considerations work in concert for overall savings and benefits. In addition, green buildings can produce 30% or more in operating cost savings.

Implementation Considerations: To realize the full potential of the Green Building program recommended above, it will be necessary to:

- Encourage appropriate Facilities, Law, Purchasing and other building and maintenance related personnel to pursue the Green Associate credential, including all GBSC members.
- Celebrate successes through the County's Sustainability website and other internal and external communications.
- Engage external support for initiatives through participation of local USGBC members, design professionals and institutional practitioners to benefit from their experience in assessing and implementing LEED criteria, leading charettes and sharing experiences and best practices.

- Optimize third-party funding through thorough and strategic pursuit of grant funding, including regular review of grant websites and designated grant writing responsibilities.

Further, it must also be recognized that County greenhouse gas emission reduction initiatives involving energy (efficiency and conservation and alternative fuels), purchasing (Administrative Directive for the Purchase and Use of Environmentally Preferable Products), stormwater (Save the Rain) and landscape management overlap with, and must be recognized as essential elements of the Green Building goals outlined above, including the establishment of a designated sustainability implementation fund.

Aspect—Fleet

Recommendation: Purchase and use the smallest and/or most fuel efficient vehicle makes and models available that meet the intended uses and operational needs of the department for which the vehicles are intended. The County should also explore the benefits of establishing minimum efficiency standards in miles per gallon for various vehicle sizes.

Description: County departments should match duty requirements of staff to the smallest possible vehicle for the task. This policy can be implemented immediately as the County's older vehicles are retired. The County's Environmental Sustainability Advisory Committee formed a subcommittee comprised of representatives of the Department of Management and Budget, Transportation, Water Environment Protection, Parks, and other County departments as needed to develop an approach to "greening the County's fleet." As part of that effort, the subcommittee has developed an approach to "standardize" the County's fleet for purposes of both emission reductions and cost savings. To this end, the sub-committee has developed a system to evaluate the costs and environmental impacts of various vehicles. The goal of this effort has been to standardize the vehicle selection process to certain types of vehicles considering, among other things, fuel efficiency and environmental impact. Besides having the County purchase fuel efficient vehicles, when the intended use meets the vehicle's specifications, standardization will also reduce the costs of maintenance and repair.

Benefits: Purchasing right sized and more fuel efficient vehicles will serve to increase the gas mileage and reduce associated greenhouse gas emissions. Calculations indicate a 35 mpg vehicle would save 2 metric tons per year compared to a 23 mpg sedan, while a 16 mpg truck would save approximately 8 tons of greenhouse gas equivalent per year compared to a 8 mpg vehicle (assuming 15,000 miles per year).

Estimated Costs: It is expected that purchasing more fuel efficient vehicles will lower operating costs because of reduced fuel consumption and smaller sized vehicles.

Implementation Considerations: It will be necessary for departments to purchase and use the right sized vehicle for the task at hand. County personnel may resist smaller vehicles than have traditionally been used. However, as long as the vehicle can achieve the desired task, using less expensive and more fuel efficient vehicles will save the County money.

Aspect—Fleet

Recommendation: As appropriate (based on fuel prices, fuel efficiency, infrastructure considerations and greenhouse gas emission reductions) begin converting the County fleet to alternative fuel vehicles. Vehicle procurement specifications should be written with enough flexibility to allow for the purchase or lease of alternatively fueled vehicles or electric drive train vehicles.

Description: Alternative fuel vehicles provide an opportunity for Onondaga County to reduce its combustion of petroleum based fuels. These can include hybrid electric, plug-in electric, compressed natural gas, liquefied natural gas, propane, hydrogen, flex-fuel or biofuels. There are a limited number of manufactured alternative fuel vehicles available, such as the Chevy Volt, Nissan Leaf (operating on electricity) and the Honda NX Natural

Gas Civic. However, vehicles, including trucks, vans, and other types, can be up-fitted by replacing the injectors and fuel system to natural gas capability. Although both compressed natural gas and electricity are readily available, the infrastructure needed to power vehicles is not yet widely available in the Onondaga County area at this time.

Natural gas fueling stations or electric charging stations are not readily available in Onondaga County at this time. In order for Onondaga County to become committed to purchasing large numbers of alternative fuel vehicles, infrastructure would need to be developed to support them. The useful life for a new CNG refueling station is approximately 20 years, while the life span of electric charging stations may vary depending upon location. Alternative fuel vehicles will typically have less maintenance than conventional fuels, but would require initial training of the County's maintenance staff.

Benefits: Alternative fuel vehicles should be considered when life-cycle costs analyses demonstrate overall cost savings. All of the alternative fuel types noted above will result in reduced greenhouse gas emissions. The transition of some County fleet vehicles to electric would totally eliminate tailpipe emissions for both criteria pollutants and greenhouse gases. However, the operating range of electric vehicles is far less than gasoline. The conversion to compressed natural gas vehicles will reduce greenhouse gases emissions by approximately 20-30%, and is expected to reduce fuel cost by approximately 30%.

Estimated Costs: Presently alternative fuel vehicles typically cost more to purchase or retrofit. It is expected that there will continue to be grant funding opportunities to reduce or eliminate the incremental cost differential. Installing fueling infrastructure will also add to the cost of converting to alternative fuel vehicles. These costs will vary depending upon circumstances. The cost of a new electric charging stations and compressed natural gas fueling station varies depending upon design, capacity, and location. The capital cost of one electric charging station typically ranges from $6,500 to $15,000 depending on infrastructure requirements. The cost for installing "time fill" CNG fueling facilities (small compressors that require several hours to fill a vehicle) is approximately $15,000, while rapid fill CNG fueling facilities, depending on circumstances, can cost from approximately $750,000 to one million dollars. It is expected that grant funding can help offset the cost for fueling infrastructure, as well. Over time, as alternative fuel vehicles become more popular, the incremental cost for the vehicles themselves are expected to decrease.

Implementation Considerations: Alternative fuel vehicle fueling or charging stations are not widely available in Onondaga County at this time. If the County becomes committed to purchasing a particular type of alternative fuel vehicle on a large scale, infrastructure would need to be developed to support these vehicles. Alternative fuel vehicles are expected to have less maintenance than conventional fuels.

Aspect—Fleet

Recommendation: Implement a no idling policy prohibiting County employees from idling any County-owned or operated vehicles.

Description: The implementation of anti-idling policies for Onondaga County operations will reduce fuel usage and associated emissions. This requirement should apply to all vehicles operated on diesel and non-diesel fuel. This requirement should prohibit vehicles from idling when the vehicle is not in motion except for traffic conditions, safety, maintaining a specific temperature for passenger comfort, the purpose of maintenance (including idling times recommended by manufacturers), or emergency services (fire, police, etc.).

Several Onondaga County departments, such as the Department of Transportation (DOT) and Water Environment Protection (WEP), have already implemented anti-idling guidance. It is proposed to develop a policy to eliminate the idling of all County vehicles (noting the exceptions outlined above).

It is also suggested that departments consider obtaining and installing GPS units in all County vehicles that will afford, in addition to safety and vehicle use monitoring benefits, will allow for the monitoring and enforcement of a no idling policy.

Benefits: The benefits of an anti-idling policy will be the reduction in fuel costs as well as greenhouse gas emissions. In general, estimates are that idling a vehicle for one hour uses 1 gallon of gasoline. If the implementation of this program reduces idling by thirty minutes per day, then Onondaga County will save approximately 120 gallons and over a metric ton of greenhouse gas equivalents per year per vehicle operating on diesel fuel.

Estimated Costs: An anti-idling policy will have minimal costs, primarily associated with training. If the County choses to install GPS and/or anti-idling equipment in vehicles, costs can vary, with some being fairly expensive. However, there will be operating savings due to lower fuel usage.

Implementation Considerations: Education will be a key component in an anti-idling policy. It is anticipated that an anti-idling policy may not be initially well received by County employees utilizing the fleet. However, as the County promotes its initiatives to reduce its carbon footprint, people are expected to be more receptive to an anti-idling policy.

Aspect—Fleet

Recommendation: The County should continue to ensure proper vehicle maintenance and regular employee training to maximize fuel savings.

Description: Proper maintenance, including replacing vehicle fluids and filters on a regular basis, maintaining proper tire inflation and checking emission controls increases gas mileage and extends the life of the vehicle. Vehicles should be regularly scheduled for maintenance in accordance with manufacturer guidance.

In addition, training of drivers on standard operating procedures can also save fuel and reduce greenhouse gas emissions. Regular drivers of County vehicles could be trained on fuel efficient driving habits including, but not limited to, slow acceleration, optimum speed and the effects of idling and braking.

Benefits: The benefits of proper training and vehicle maintenance is the reduction in fuel consumption/costs, as well as greenhouse gas emissions.

Estimated Costs: The cost of proper training and vehicle maintenance should be minimal. Onondaga County currently has a trained maintenance staff to perform the necessary services. Education will involve the labor hours for the training.

Implementation Considerations: Education will be a key in ensuring that County employees utilize good driving habits. The reduction in greenhouse gas emissions and costs will be dependent on employee commitment.

Aspect—Fleet

Recommendation: In order to make informed decisions about vehicle selection and use, the County should develop and departments should maintain an inventory and perform routine analyses of their fleet vehicles to include:

- Number of vehicles classified by the model year, make, engine size, drivetrain type (2 or 4-wheel) and rated vehicle weight and classification (light, medium or heavy duty)
- Miles per gallon per vehicle
- Type of fuel used
- Average cost per gallon of fuel
- Average fuel cost per mile
- Annual miles driver per vehicle
- Total annual fuel consumption per vehicle
- Vehicle function

Description: Based on this inventory, departments should identify older vehicles that are used infrequently, as well as those that are disproportionately inefficient, and schedule their elimination or replacement.

Benefits: Maintaining good records on vehicle use and performance will allow the County to operate a more efficient and cost effective fleet, and will result in reduced greenhouse gas emissions.

Estimated Costs: Other than the time to generate, maintain and evaluate inventory data, this recommendation will involve no added costs.

Implementation Considerations: This recommendation will require departments and employees to remain diligent in maintaining records.

Aspect—Purchasing

Recommendation: Integrate life cycle cost analysis, including direct and indirect costs, in the procurement of products requested by County Departments.

Description: Municipalities are not viewing green purchasing as simply a one-time cost savings; but rather are taking a much longer view by calculating the direct and indirect costs for the full life cycle of products. This life cycle view considers how products are created, used and disposed of.

A Life-Cycle Analysis requires looking beyond initial costs. By considering the costs of operations and maintenance, worker exposure, worker productivity, and waste disposal in the final price estimates, a municipality can paint a more accurate picture of the procurement impact and true costs of a given good or service. Such costs are often not considered, but when examined can reveal previously unrecognized savings.

In May of 20011 the County Legislature passed a resolution requesting County departments to conduct life cycle assessments when preparing projected budgets in conjunction with funding requests for large-scale infrastructure and capital projects. Recognition of the importance of life cycle cost analysis by the County Legislature represents an important step in the County's efforts to become more sustainable.

This recommendation extends the County Legislature's call for life cycle cost analysis to all aspects the County's procurement operation.

Benefits: A life cycle cost analysis provides a means to overcome pricing discrepancies between traditional and environmentally preferable products by encouraging the integration of environmental factors into procurement policies by looking beyond initial costs. By considering the costs of operations and maintenance, worker exposure, worker productivity, and waste disposal in the final price estimates, a municipality can obtain a more accurate picture of the procurement impact and true costs of a given product or project.

Estimated Costs: The application of life cycle cost analysis by the County purchasing department by itself does not result in any cost to the County. If the County were to procure technical assistance to carry out this recommendation, it is anticipated that the cost would be negligible, and the avoided costs realized from basing purchases on life cycle cost analysis would result in a short payback period. The overall impact of life cycle cost analysis is expected to reduce costs to the County over the long term.

Implementation Considerations: Purchasing Department employees should be trained and equipped with the information and tools needed in order to ensure life cycle cost analysis is properly and thoroughly applied and implemented. Implementation of life cycle cost analysis might result in somewhat higher initial capital costs for goods and projects, but will result in lower costs over the life of the products and projects.

Aspect—Purchasing

Recommendation: Use the buying power of the County and participating municipalities to encourage changes in the products (and associated packaging) and services the County receives, and the cradle to cradle process used to make them.

Description: U.S. cites large and small can exercise their significant buying power to have both a direct impact on the market because of the volume of products and services they procure and an indirect impact by spurring similar action across the private sector. Making use of this influence,

it is expected that the County can begin to effect greater and more rapid changes consistent with the County's Environmentally Preferable Products Administrative Directive.

Benefits: It is expected that leveraging the purchasing power of the County and participating municipalities, the County will obtain greater influence with respect to project packaging, the recycled content of products, the reusability of products, product life (which affects waste generation), product efficiency (e.g., energy efficiency), where products are produced, how products are delivered and how products can be managed at the end of their useful life (with respect to product stewardship).

Estimated Costs: It is expected that making use of this influence will drive costs for environmentally preferable products down to a level that is more competitive with traditional products procured by the County.

Implementation Considerations: The more municipalities that participate with the County in this effort, the more effective the County can be in influencing product types and costs.

Aspect—Purchasing

Recommendation: Fully implement the elements of the existing County Administrative Directive concerning the purchase of use of environmentally preferable products.

Description: In 2009, the County Executive signed an Administrative Directive calling for the purchase and use of products that are environmentally safe, and for services that have a lessor or reduced effect on human health or the environment when compared to competing products or services that serve the same purpose (Environmentally Preferable Purchasing). Specifically, environmentally preferable purchasing means procuring goods and services that don't sacrifice performance or price while simultaneously reducing the environmental impact associated with their manufacturing, use, and/or disposal. It involves such considerations as:

- Is it reusable or more durable than its traditional counterpart?
- Is it made from recycled materials?
- Does it conserve energy or water?
- Is this product less hazardous than its traditional counterpart?
- What happens to the product at the end of its life? Is it recyclable? Will the manufacturer take the

product back? Does it require special disposal?

- Is it made from plant-based raw materials?
- Is it produced locally?

The Purchasing Department has been able to apply the County's environmentally preferable purchasing directive in a number of key areas (e.g., lighting and cleaning products). It is timely for the Purchasing Department to apply the Administrative Directive more broadly. With the anticipated application of life cycle cost analysis, it is expected that more environmentally preferable products will be found to be cost-effective replacements for traditional products with great environmental and/or human health impacts.

Benefits: Full implementation of this Administrative Directive will reduce the impact of products the County purchases on the environment, human health and waste generation.

Estimated Costs: Some products that meet the intent of the County's Administrative Directive concerning the purchase of use of environmentally preferable products are more expensive than traditional products. It is hoped that by exercising its growing buying power, these incremental costs can be reduced to justify the preferred product.

Implementation Considerations: The County will have to educate other local municipalities on the benefits of expanding the collective purchasing power of government in reducing product pricing. Buyers may require some training in order to identify products for which environmentally preferable alternatives exist.

Aspect—Purchasing

Recommendation: The Purchasing Department must fully support efforts associated with County's existing and proposed energy efficiency/conservation efforts, proposed green building polices, proposed waste minimization and proposed green fleet policies in making County purchases.

Description: The County's purchasing policies and practices will be instrumental in implementing several recommendations in the County's Climate Action Plan. For example, the purchase and use of Energy Star equipment will be essential in meeting the County's energy conservation and efficiency objectives. LEED certification of County facilities (see recommendations on Green Buildings) requires the use of lighting products that are not only more energy efficient, but that have longer life, thereby reducing disposal frequency and volumes (waste minimization). To help meet the County's emerging green fleet objectives, purchasing policies will need to have enough flexibility to allow for the purchase or lease of alternatively fueled vehicles or electric drive train vehicles.

Benefits: The enthusiastic support of the Purchasing Department represents a fundamental and essential element with regard to the County's entire greenhouse gas emission reduction initiatives. With the Department's support and assistance, the County will be able to maximize its efforts to reduce greenhouse gas emissions and become more sustainable.

Estimated Costs: It might be beneficial to afford some level of outside training to County buyers in order to maximize program success.

Implementation Considerations: It will be essential to ensure that County buyers are aware of the County's greenhouse gas reduction objectives and how the purchase of goods and services relates to those objectives.

Aspect—Wastewater

Recommendation: Fully utilize cogeneration facilities to beneficially utilize methane produced from the sludge digestion process.

Description: A direct byproduct of the digestion process of a wastewater treatment plant is the production of biogas—largely consisting of methane (65.7%). Although methane is a principal greenhouse gas, it is viewed as a resource and is used for its Btu content. Specifically, WEP uses the biogas for operating several on-site boilers at Metro, which in turn supply heat to campus buildings as well as heating via heat exchanger for the sludge being processed in the digesters.

In the future, Water Environment Protection plans to fully utilize a 380 kW generator (co-gen) that is designed to run on methane (biogas generated as part of the wastewater treatment process) at Metro. Based on design documentation, the unit will be able to utilize up to 76 million cubic feet per year of the methane generated. This equates to a 43% utilization of the biogas generated by Metro in 2008. The balance of the biogas generated will continue to be used in the on-site boilers.

Until late 2011, the Wetzel Road wastewater treatment plant's sludge will be transported to Metro for further treatment/digestion. The facility recently had anaerobic digesters upgraded on-site and will utilize the methane in a boiler dedicated to heating the digesters via a heat exchanger, with the excess biogas being flared to combust the excess methane generated by the process. In the future, after allowing two years of data for actual biogas production, the Department of Water Environment Protection will evaluate the feasibility of utilizing a cogeneration facility at the Wetzel Road wastewater treatment facility.

Benefits: The cogeneration facility at Metro will beneficially use the biogas to generate steam and electricity. This will reduce natural gas and electrical purchases from National Grid, providing an estimated annual utility cost savings of $124,281.

In the short term, the use of anaerobic digestion at Wetzel Road wastewater treatment plant will reduce fuel use and associated greenhouse gas emissions from the transport of sludge to the Metro facility. The reduction in sludge disposal at Metro will eliminate approximately 42 metric tons per year of carbon dioxide that would have been generated through hauling the sludge, and by reducing the volume of volatile solids at Metro.

Estimated Costs: The County's capital cost for the 380 kW co-generation unit at Metro was $610,000. Once WEP has two years of actual operating and biogas production data for the Wetzel Road facility, the Department of Water Environment Protection will evaluate the feasibility of installing a co-generation unit at the Wetzel Road treatment plant.

Implementation Considerations: Water Environment Protection plans to have the cogeneration facility at Metro and the anaerobic digesters and associated flare at Wetzel Road in operation by 2012. Evaluation of the project in terms of actual cost savings and greenhouse gas reductions will be formalized at that point.

Aspect—Wastewater

Recommendation: Evaluate technologies to improve the efficiency of anaerobic digestion.

Description: Anaerobic digestion is a sludge treatment process that generates methane through the reduction/destruction of volatile solids, with the associated biogas being utilized in boilers, in a cogeneration process or flared for more complete combustion. The Department of Water Environment Protection is currently exploring a number of technologies to improve the efficiency of the Metro anaerobic digesters—via greater solids reduction and increased dewatering capacity—with the goal of ultimately reducing trucking of the treated biosolids for final disposal or reuse. It is anticipated that the Department of Water Environment Protection will be pursuing and evaluating improved sludge processing methods, with a goal of achieving greater energy benefits. Specifically, improved anaerobic digestion will increase biogas production and allow increased volume for cogeneration.

In addition to improved anaerobic digestion, the Department will evaluate options for increasing the thickening of solids hauled from the outlying treatment plants at Brewerton, Meadowbrook-Limestone, and Oak Orchard. Increased thickening, or an increase in the percent of the sludge's solids, reduces the volume of sludges necessary to be hauled to Metro for additional treatment. Any reduction sludge hauling reduces the greenhouse gases generated from transportation.

Benefits: A reduction in dewatered sludge volume will reduce both disposal costs and greenhouse gas emissions. The elimination of every trip associated with hauling treated bio-solids from Metro for final disposal, the Department would save $1,875 and eliminate 0.09 MT of CO_{2e}. On average, the elimination of a load of thickened sludge from the outlying wastewater treatment plants to Metro, would save $104 and eliminate 0.028 MT of CO_{2e}.

Estimated Costs: The Department estimates that a study to evaluate these recommendations will cost approximately $75,000, and could be completed in late 2013, following the completion of the current Metro anaerobic digesters cleaning and repair contract. If the study documents that cost effective and sustainable improvements can be incorporated into the digestion and thickening processes, the County should consider implementing the recommended modifications.

Implementation Considerations: Evaluation of the study recommendations in terms of cost savings and greenhouse gas reductions will be determined in future efforts.

Aspect—Wastewater

Recommendation: Study and implement energy use reduction technologies at WEP facilities.

Description: Water Environment Protection has identified a number of energy efficiency and conservation measures to evaluate and implement, where feasible. These include, but are not limited to:

1. Installation of occupancy sensors for lighting that reduces energy consumption.

2. Variable Frequency Drives (VFD) and premium efficiency motor installations that reduces energy consumption.
3. Installation of additional insulation when roofs are replaced to reduce heating and cooling costs.
4. Improvements to the building envelopes as capital improvement projects are initiated at specific facilities identified in the Capital Improvement Project (CIP) plan. Building envelope improvements include energy efficient windows and doors and additional insulation as necessary.
5. Performing boiler maintenance and annual tune ups that allow for peak efficiency operations, reducing fuel consumption and ensuring minimized emissions.
6. Performing maintenance on HVAC equipment and controls, and programming upgrades that result in more efficient operations and reduced energy consumption.
7. Implement laser shaft alignment that results in extended equipment life and a reduction in the amount of labor required for repairs, as well as reducing operating costs associated with wasted energy.
8. Evaluate the replacement of existing positive displacement and rotary lobe blower technology with the more energy efficient turbo blowers or hybrid compressor technology. Currently this technology carries a larger capital cost. However, it is hoped that the new technology will become less expensive as it becomes more popular.

Benefits: The implementation these and other energy efficient projects will reduce greenhouse gas emissions and reduce operating costs.

Estimated Costs: The cost of implementing these measures has not yet been determined. A cost-benefit analysis will be performed prior to project implementation.

Implementation Considerations: The implementation of energy efficient measures is a function on available capital to invest in long term energy and greenhouse gas reductions. The County will continually research available funding opportunities from both federal and state sources.

Aspect—Stormwater/Green Infrastructure

Recommendation: Fully implement the County's Save the Rain Program.

Description: The "Save the Rain" program, launched by County Executive Joanie Mahoney, is a comprehensive plan to assist in the cleanup and restoration Onondaga Lake. The program includes construction of traditional gray infrastructure projects and the development of an innovative green infrastructure plan to reduce the effects storm water pollution to the Lake and its tributaries.

The program aims to reduce storm water inflow to the combined sewer system and raise the public's awareness to improve the environment. Green infrastructure projects may include, but not limited to the following measures:

- Rain barrels
- Rain gardens
- Porous pavement
- Green roofs
- Cisterns
- Bio-swales

Benefits: By reducing the amount of storm water going into the sewers through these "green" technologies, the County hopes to reduce the need for and cost of previously planned and anticipated traditional "gray" facilities, while still minimizing the number of Combined Sewer Overflows (CSOs). The Midland Avenue Regional Treatment Facility (RTF) in 2010 resulted in $175,000 in energy (electricity and natural gas) costs. Green infrastructure projects will, in addition to avoiding the construction costs and annual energy use associated with what would have been two additional RTFs, have several greenhouse gas reduction benefits by reducing heat island effects, improve air quality, provide urban habitat and improve aesthetics.

Table 5.1—Save the Rain–CSO Program Energy Savings

Original Traditional/ Gray Project	Operational Frequency	Save The Rain Project	Estimated Reduction in Energy Use
Upper Harbor Brook Regional Treatment Facility—Four 500-hp pumps	20-40 events annually	Harbor Brook Wetland with Storm King/new Intercepting Sewer—no pumps	100%
Lower Harbor Brook Regional Treatment Facility—Four 1,000-hp pumps	20-40 events annually	Lower Harbor Brook Storage—Two 110 horse power pumps	80%*
Clinton Storage Regional Treatment Facility—Five 1,000-hp pumps	20-65 events annually	Clinton Storage Tunnels—Three 250 horse power pumps	75%**

** New green storage facility has smaller HVAC, odor control and heated structures*

*** New green storage facility has smaller HVAC, odor control and heated structures. First 6 million gallons uses gravity flow to drain tunnels. New 250 horse power effluent pumps will operate between only 4-10 times annually.*

Table 5.1 reflects the benefits of reductions in energy use by eliminating the need for additional RTFs. The new design of the upper and lower Harbor Brook RTFs will save 222 metric tons per year of CO_2.

Estimated Costs: At this time, the cost of implementation of the Save the Rain program has not been estimated at $80,000,000.

Implementation Considerations: The implementation of the Save the Rain program will be conducted over the next few years. It is expected that the effort will lead to further community participation and reductions.

Aspect—Sustainable Landscape Management: Tree Canopy

Recommendation: Preserve and expand existing tree canopy in County park land.

Description: Onondaga County currently manages approximately 6,500 acres of park land; some currently dedicated to forest lands and some to recreational activities. The trees in these areas sequester and store carbon from the atmosphere. In 2010, the County Parks Department issued a request for proposals to hire a forestry management consultant to prepare initial and long term forestry management plans for each of the County Parks and other county property as the County may designate. The purpose of this initiative is to preserve the health of the forested land owned by Onondaga County through a sustainable management program which includes thinning, replanting, cutting, disease control, pest control and other strategies.

Benefits: The benefit of tree preservation is that trees will continue to store carbon, and sequester increasing quantities of carbon as they grow. In addition, tree preservation offers a variety of ecosystem services, including providing wildlife habitat, cooling the air, capturing storm water and reducing erosion.

Estimated Costs: Maintaining the existing tree canopy should have no cost. If trees are harvested, a portion of the county's income from timber sales should be dedicated to a tree replacement program.

Implementation Considerations: Ash tree populations are in serious danger of being eliminated by the emerald ash borer (EAB), which has been discovered in 10 counties in New York to date. The Department of Environmental Conservation estimates that ash trees comprise 13% of the forest population (by basal area) in Onondaga County. For this reason, the County is considering the pos-

sibility of harvesting ash trees from various park lands before the wood is damaged by the EAB. Harvested timber would be a source of income. In order to mitigate the effects of removing existing trees, a replanting policy should be implemented. New plantings provide far less ecosystem benefits than established trees. Therefore, new plantings should outnumber the quantity of trees which are removed. The replacement ratio should be coordinated with the County's Sustainable Forest Management plan to compensate for trees harvested and other losses of tree canopy.

Aspect— Sustainable Landscape Management: Alternative Groundcovers

Recommendation: In appropriate areas, install alternative groundcovers that require less energy use and maintenance in lieu of traditional lawn when restoring disturbed areas.

Description: While it may be feasible to reduce or eliminate mowing on some County maintained green areas, in other areas there may be an expectation of a certain level of aesthetic or visual character which cannot be provided by un-mowed turf grasses. In these areas, alternative vegetative ground cover plants should be considered. These plants could take a variety of forms, from low-growing broadleaf herbaceous plants, to small creeping shrubs, to mixes of wildflowers and native grasses.

Benefits: Depending on the type of groundcover selected, it may be possible to reduce or even eliminate mowing in these areas. A typical one acre area which may require 30 weekly mowings if maintained with traditional turf cover, would require the use of approximately 21 gallons of fuel, resulting in a reduction of .21 metric tons of equivalent CO_2 emissions (assuming diesel powered mowing equipment). These emissions could be reduced dramatically by utilizing alternative groundcovers.

Estimated Costs: The cost of implementing an alternative groundcover program depends upon the type of groundcover selected. For a typical area of approximately one acre, provided an estimate that a low-growing native grass cover planting would cost approximately $11,000, a perennial planting would cost $187,000 and a shrub planting would cost approximately $300,000.

Implementation Considerations: Given the limited resources of the County departments, planting of alternative groundcovers will be most practical in situations where ground disturbance is already taking place. The native low-growing seed mix option will be most feasible for larger areas. Due to the high initial cost of the perennial and shrub planting options, these should be reserved for areas where aesthetics are most important and visibility to the public is high. The County should utilize informational signs to be placed at selected alternative groundcover areas to explain the purpose and need for these areas to the public.

Aspect—Sustainable Landscape Management: Mowing Reduction & Efficiency

Recommendation: Expand the existing mowing reduction program where appropriate. In addition, the County should seek to maximize mowing efficiency in areas that area regularly mowed.

Description: Grounds-keeping and park management practices have an impact on climate change, primarily from the greenhouse gas emissions from grounds-keeping equipment. To this end, the County has already initiated a program whereby County departments identified areas under their jurisdiction where mowing could either be reduced or eliminated altogether. Departments should continue to identify additional areas where mowing activities can be eliminated or reduced. Further, the amount of time spent on necessary mowing directly impacts the emissions of greenhouse gases by mowing equipment. Therefore, maximizing mowing efficiency is another area where greenhouse gas emissions can be reduced. This may involve laying out more efficient mowing zones, patterns and turning movements and education of operators.

While it has been feasible to reduce or eliminate mowing on some County maintained green areas, and might be expanded to additional areas, there is an expectation of a certain level of aesthetic or visual character which cannot be provided by unmowed turf grasses in other areas. In these areas, alternative vegetative ground cover plants can be considered. These plants could take a variety of forms, from low-growing broadleaf herbaceous plants, to small creeping shrubs, to mixes of wildflowers and native grasses. There are a number of considerations which should be accounted for in selecting the appropriate species and planting scheme, namely:

- Hardiness
- Salt tolerance (particularly for roadside areas)
- Height (especially where sight lines and visual access are important)
- Deer resistance
- Native/naturalized/invasive tendency
- Cultural requirements (Lingo)
- Maintenance requirements
- Aesthetic

A list of potential alternative ground cover plants have been included in Appendix A. Consideration of the cost of installing these alternative ground covers, and their relative benefits in terms of greenhouse gas emissions reduction should also be taken into account.

Benefits: The County's mowing reduction program has yielded over 92 acres where mowing has been either eliminated or reduced. This will yield an estimated annual reduction in fuel usage of over 1,000 gallons, with a subsequent decrease in greenhouse gas emissions. Expansion of this program and improvements in efficiency could further reduce emissions associated with mowing.

Estimated Costs: The only costs of the mowing reduction program are the time required by County staff to identify candidate areas for reduction and instructing operators on the limits of these areas. Similarly, the costs in mowing efficiency improvements are the time required to analyze optimal mowing patterns and instructing operators on the proper mowing technique. The reduced fuel use will yield a costs savings.

Implementation Considerations: An important aspect of the success of this program is making sure that the citizens of the County understand the purpose of the mowing reduction program. The County should utilize informational signs to be placed at selected mowing reduction zones to present that message to the public.

Aspect—Sustainable Landscape Management: Equipment Emissions

Recommendation: Purchase only equipment which meets the latest US EPA and California Air Resources Board (CARB) emissions standards for both handheld and non-handheld gasoline and diesel equipment. Prioritize older, high-emitting equipment for replacement. Consider equipment which can operate on alternative fuels such as biodiesel.

Description: The vast majority of the County's landscape maintenance equipment consists of lawn mowers, therefore the focus on emissions improvements should be on this type of equipment. As equipment reaches the end of its service life, replacement with new equipment which is designed to meet more stringent EPA emission standards should be a priority.

Benefits: When fully implemented, EPA estimates that the new standards will result in a 35 percent reduction in hydrocarbon and nitrogen oxide emissions from new engines' exhaust. The new standards will also reduce evaporative emissions by 45 percent. By taking advantage of the improved emissions performance of newer equipment, the County could make incremental improvement in its greenhouse gas emissions.

Estimated Costs: As equipment will be replaced as it reaches the end of its service life, there will be no additional cost to achieve this recommendation. If alternative fuel equipment is purchased or existing

equipment is retrofitted, there may be additional costs for fueling infrastructure accommodations.

Implementation Considerations: Requiring new equipment to meet the highest EPA and CARB standards will not present difficulties in implementation, as this information is widely available. Because the equipment lifecycle will determine how fast equipment is replaced with lower-emitting equipment, the improvements in greenhouse gas emissions will be incremental. Acquiring or retrofitting equipment to utilize alternative fuels may allow for additional gains in the near term, beyond those provided by the new, more stringent emissions standards, but also present some challenges in developing fueling infrastructure, supply and cost uncertainties.

Further, for compression ignition engines, biodiesel, which has benefits in terms of emissions, may be a viable alternative. EPA studies estimate that the ozone forming potential hydrocarbon emissions of biodiesel is 50% less than regular diesel, and emissions of several other types of pollutants (sulfur, CO and particulates) is also significantly reduced. Older equipment may require some modifications to run on 100% biodiesel, but blended formulations which can be utilized in unmodified equipment are also available. A major drawback of biodiesel is its poorer performance in cold temperatures; however this is not likely to be a concern during the typical mowing season.

Aspect—Sustainable Landscape Management

Recommendation: Develop and implement a tree replacement policy for all County-owned land at a ratio of two for one.

Description: Trees on County-owned property are often removed due to age, safety concerns, storm damage, construction projects, disease or pest infestations. At the present time the County has no tree replacement policy. In order to preserve and expand the current tree canopy on County-owned land for purposes of carbon sequestration, stormwater control and the other benefits realized by tree canopy, the County should implement a tree replacement policy calling for the planting of two trees to replace every tree that requires removal by the County. Flexibility should be realized in determining what types of trees to plant, both in terms of species and growing method (whips, containerized, bareroot, ball in burlap) and where replacement trees should be planted. Over the next eight years, the County will be planting 8,500 trees as part of the Save the Rain Program. Over the longer-term the County will explore tree replacement funding opportunities with Cornell Cooperative Extension and other sources. The County should also explore the potential for establishing a replacement tree nursery program on County-owned land, and should explore partnerships with Cornell Cooperative Extension and the State College of Environmental Science and Forestry in developing and maintaining such a nursery.

Note: The invasion of Emerald Ash Borer, which could result in the loss/removal of thousands of ash trees on County property over a short period of time for purposes of public safety, presents a unique situation that might have to be addressed outside of this policy recommendation. It should also be noted that tree removal as part of a sustainable forest management plan involves forest thinning for improvement of the overall health of the forest, and should be viewed as exempt from the 2 for 1 replacement policy.

Benefits: Trees sequester and store carbon from the atmosphere, provide benefits for stormwater control, provide air quality benefits, reduce heat island effects and provide habitat. A County policy to expand tree canopy on County-owned property will serve to increase the benefits realized by the current amount of tree canopy.

Estimated Costs: Funding for the 8,500 trees slated to be planted under the Save the Rain program is already in place. The County Department of Community Development, in cooperation with Cornell Cooperative Extension, already funds with federal grant funding the planting several hundred bareroot tree stock in low income areas. Initial compliance with the 2 for 1 policy, beyond the

Table 5.2—Primary Tree Growing Methods

Growing Method, bulk order	Survivorship	Size (average height and caliper)	Cost per tree
Ball in Burlap	90-95%	6-10'h 2"c	$120
Bare Root	90-95%	6-10'h 2"c	$80
Container (5 gallon)	90%	3-6'h 1"c	$120
Reforestation Bare Root (Whips)	30-50%	1.5-3'h	$0.50
Missouri Gravel Bed	90%	6 – 10'h 2"c	$140

trees already being planted under the Save the Rain and Community Development programs, can be achieved very inexpensively by planting seedlings (whips) on park land, though seedlings generally experience a higher mortality than more mature trees. Table 5.2 is a is an estimate that Cornell Cooperative Extension of Onondaga County and the City-County Arborist developed that they feel approximately represents the expected cost (locally), size, and survivorship rates of the five primary tree growing methods.

As supplemental funding sources are identified, or if the County is able to pursue the establishment of a tree nursery on County property, these replacement plantings should include containerized trees, bareroot stock and ball in burlap trees to enhance survivorship.

Implementation Considerations: It will be necessary to establish a tracking system for when and where tree removals occur on County property, and to further develop the details of a tree replacement program. The program will have to address: 1) what replacement trees to use (species and size); 2) where to acquire reliable stock; 3) where replacement trees should be planted; and 4) who will be responsible for planting and maintenance of the new trees until they can survive on their own.

Aspect—Sustainable Landscape Management

Recommendation: Grounds-keepers for County-owned properties should coordinate and be consistent with the County's Save the Rain program's goals and objectives and Phase II Stormwater compliance requirements.

Description: The "Save the Rain" program, launched by County Executive Joanie Mahoney, is a comprehensive plan to assist in the cleanup and restoration Onondaga Lake. The program includes the development of an innovative "green infrastructure plan" to reduce the effects storm water pollution to the Lake and its tributaries (see "Stormwater"). The program aims to reduce storm water inflow to the combined sewer system and raise the public's awareness to improve the environment. Green infrastructure projects may include, but not limited to the following measures:

- Rain barrels
- Rain gardens
- Porous pavement
- Green roofs
- Cisterns
- Bio-swales

The Phase II Stormwater regulations call for the use of green infrastructure in designing new construction projects. Proper implementation of green infrastructure projects, consistent with both the Save the Rain initiative and the Phase II Stormwater requirements will contribute to the incremental reduction in greenhouse gas emissions.

Benefits: Ensure consistency and shared objectives between program areas and incremental greenhouse gas reduction benefits.

Estimated Costs: The costs for implementing these two programs is already integrated into the County budgeting process. The effort to ensure consistency with the Save the Rain and Phase II Stormwater programs will involve staff time and effort.

Implementation Considerations: It will be neces-

sary to ensure communication and coordination between departments involved in grounds-keeping and the individuals at the Department of Water Environment Protection to ensure that this objective is met.

Aspect—Sustainable Development

Recommendation: Onondaga County should complete development of regional land use plan to promote more sustainable land use policy.

Description: The County has adopted the Climate Smart Communities Pledge. One of the ten elements of the pledge is to "promote climate protection through community land use tools" by updating "land use policies, building codes, community plans in ways that reduce sprawl, minimize development in floodplains, and protect forests." In addition, the State's Smart Growth Initiative supports "smart, sensible planning to create livable communities, protect our natural resources and promote economic growth."

Onondaga County has made efforts to encourage more sustainable land use decision-making. The County's 2010 Development Guide was adopted by the County Legislature in 1998. It serves as the County's Comprehensive Plan, and consists of two documents: the Onondaga County 2010 Development Guide, which provides general goals and policies, and a Framework for Growth in Onondaga County, which examines County-wide conditions and trends. These documents are intended to encourage sustainability and reflect the relationship between land use, public infrastructure and public finance. To meet this goal, the County will complete a new land use plan for Onondaga County that will:

- Develop specific policy directives for County agencies to limit future infrastructure expansion and County investment without considerations of regional sustainability goals and impacts
- Create incentives and disincentives for sustainable development
- Educate citizens and local decision makers, create partnerships to promote smart growth and influence local and State policy

Benefits: The new development plan will detail current development patterns and resulting challenges to economic, social and environmental sustainability. It will include a scenario modeling process that will develop two potential future scenarios, one reflecting a continuation of current development patterns and the other incorporating elements of smart growth including denser infill development, mixed use and walkability. The models will illustrate the costs and impacts involved in different future growth scenarios, including energy usage measures and vehicle miles traveled, and ask County residents to choose how our community wants to grow to create a vision for the future.

In addition, the plan will identify the actions required by citizens and at all levels of government to achieve our community's vision, including specific policy directives. Policy directives for County government will likely include an increased consideration of planning in review of capital projects and County expenditures on infrastructure.

Estimated Costs: Onondaga County is using $118,000 in EECBG funds, plus other federal planning funds for a total of $215,000 to create the Sustainable Development Plan.

Implementation Considerations: Achieving success in land use planning ultimately requires a shift in societal behavior and settlement patterns. As such, an important part of the County's planning program involves continuing citizen-focused approaches. The Syracuse-Onondaga County Planning Agency (SOCPA) will participate in a continued outreach effort to engage local municipalities and the public, including municipal, stakeholder and public meetings, and creation of an engaging website with research, tools, best practices and policy recommendations for local governments and citizens.

Aspect—Solid Waste Minimization

Recommendation: Reduce waste and increase recycling at County facilities.

Description: The County has already focused on waste reduction efforts. The focus of the County's efforts going forward will be to:

- Increase employee participation in internal recycling systems already in place.
- Modify employee behavior through outreach and education, and by reducing the number of printers in County facilities.
- Purchase products that can more readily be reused or recycled.
- Require vendors to reduce packaging for products purchased by the County.
- Increase the types of waste that can be diverted from the trash stream.

The following steps should be taken by the County to minimize waste:

- Reduce the amount of recyclable materials that end up in the trash through education by regularly reminding the workforce through an aggressive outreach program which products can be recycled (see Outreach section).
- Ask employees to notify the Department of Facilities Management if they do not have a plastic paper tray for recycling at their work station.
- Remove all trash cans from printer locations and ensure that recycling bins are placed at these locations.
- Ensure the placement of blue recycling bins near all vending areas.
- Enhance the visibility of the three-hole recycling centers in public areas to promote recycling to the general public.
- Reduce the number of printers at employee workstations by replacing them with centralized printing stations.

The success of these efforts will be measured by the quantity and disposal method for the various materials, reduction in purchases of virgin materials, and the annual cost of material purchases and waste disposal. This information will be assessed by the Waste Minimization Committee annually to determine if the program is yielding benefits. The Committee should continue to meet to identify new ways to reduce waste.

Benefits: The goal of the County waste minimization efforts is to reduce the volume of material requiring disposal, which will reduce amount of greenhouse gases generated by County operations.

Estimated Costs: The cost of implementing this recommendation is limited to staff time and effort. It is expected that the reduction of volume from the waste stream will serve to reduce the County's disposal costs.

Implementation Considerations: This effort will have to be integrated into the County Outreach/ Messaging Campaign in order for employees to understand why these efforts are important and how they can contribute to the effort.

Aspect—Waste Minimization

Recommendation: Divert food waste from the County waste stream.

Description: Food waste is the next big target area for waste reduction in the State's Revised Solid Waste Management Plan. A 2005 study by the Onondaga County Resource Recovery Agency (OCRRA) of waste composition in Onondaga County found that about 15% of the total waste stream is comprised of food waste. The County should now implement programs at County facilities serving food to divert portions of the food waste stream (pre-consumer food waste) to the composting program being carried out by OCRRA. This will serve to reduce the amount of food waste that must be incinerated at the waste-to-energy facility on Rock Cut Road (food waste, because of its moisture content, has relatively low Btu content), provide a product with local value and result in potential cost savings, as the tip fees for managing food waste are currently half the cost of tip fees for regular municipal solid waste. Consequently, the County should include in its next bid for contracts to waste haulers specifications for the separate pickup of food waste at appropriate County facilities. As the program matures, consideration to be

given to expanding the diversion program to post-consumer food waste.

Benefits: The benefits of a food waste composting program will be the reduction in waste shipped to the waste to energy facility operated by the Onondaga County Research Recovery Agency (OCRRA) and lower costs for managing food waste.

Estimated Costs: It is expected that a food waste diversion program will result in cost savings because the tip fee for managing such waste is half the cost for managing municipal solid waste.

Implementation Considerations: It will be necessary to obtain from the County Departments and food service providers what issues might exist with respect to waste separation at the source, waste container and storage needs (locations and frequency of pickup), the nature of the food waste generated, the quantity of food waste generated and any contract issues that might arise from such a shift in food waste handling. The County will need to obtain information from waste haulers on the availability of appropriate waste containers (both indoor and outdoor), issues associated with frequency of pickup, transportation issues/costs, and potential savings to the County associated with reduced OCRRA tipping fees. It is likely the answers to these questions will be somewhat site specific.

Aspect—Solid Waste Minimization

Recommendation: Fully implement the elements of the existing County Administrative Director concerning the purchase of use of environmentally preferable products by the County with respect to those areas that will support waste minimization objectives.

Description: In 2009, the County Executive signed an Administrative Directive calling for the purchase and use of products that are environmentally safe, and for services that have a lessor or reduced effect on human health or the environment when compared to competing products or services that serve the same purpose (Environmentally Preferable Purchasing). Specifically, environmentally preferable purchasing means procuring goods and services that don't sacrifice performance or price while simultaneously reducing the environmental impact associated with their manufacturing, use, and/or disposal. As it relates to waste minimization, it involves such considerations as:

- Is it reusable or more durable than its traditional counterpart?
- Is it made from recycled materials?
- What happens to the product at the end of its life? Is it recyclable? Will the manufacturer take the product back? Does it require special disposal?
- Is it made from plant-based raw materials?

The Purchasing Department has been able to apply the County's environmentally preferable purchasing directive in a number of key areas (e.g., lighting products, cleaning products). It is timely for the Purchasing Department to apply the Administrative Directive more broadly, which will reduce the overall volume of waste generated by the County.

Benefits: The extent to which the County can reduce packaging waste, increase the life of products and divert products at the end of their useful life from the waste stream will save the County money and reduce the production of greenhouse gases from current waste disposal methods (incineration and landfilling).

Estimated Costs: While there may be an incremental cost increase for some products, it is expected that implementation of this program will result in lower annual disposal costs and reduced energy costs.

Implementation Considerations: The County will minimize the generation of waste materials through a purchasing program. The goal is to purchase products that can more readily be reused or recycled, and to reduce the amount of packaging at the time of delivery. In order to meet this objective, the County will have to meet with product vendors to discuss if and how to reduce packaging for products.

Aspect—Outreach/Marketing

Recommendation: Create a targeted and consistent messaging campaign, with and for County employees, integrating the concepts embodied in the County's "Path for a Sustainable Future" initiative—which includes greenhouse gas emission reduction initiatives—into all facets of County government.

Description: Create educational and informational publications to be distributed in a variety of ways in order to create greater awareness among County employees about the importance of sustainability and associated greenhouse gas reduction efforts, and to encourage attitudinal and behavioral changes in keeping with those goals and objectives.

The County encompasses a very diverse target market which needs to be broken down into key audiences:

1. All county employees
2. Employees in a position to affect change
3. Building management and maintenance personnel

In order to reach out to these various audiences, a multitude of avenues will be utilized. Through these methods, the County will engage with employees to increase their understanding and acceptance of emerging sustainability and greenhouse gas reduction strategies. This messaging campaign will include:

- internal advertising
- event marketing
- public-space exhibits
- external press releases
- the Communicator (internal newsletter)
- educational brochures, handbooks, pull up banners and posters
- workshops
- demonstration/pilot projects
- media outreach and consulting
- speaking engagements/speaker programs
- on-line presence
- building signage highlighting sustainable features and green technologies
- contests

Benefits: Through this initiative, the Environmental Sustainability Advisory Committee can increase individual employee commitment by providing the knowledge and skills to put sustainable behavior into action.

Estimated Costs: Costs are expected to be limited to time and effort, and some in-house printing.

Implementation Considerations: Those involved in further development of the messaging campaign will have to take into account the diverse nature of the County work force and alternative means of conveying important information in formats available to different elements of that work force.

Aspect—General Administration

Recommendation: Onondaga County should track greenhouse gas emissions on an annual basis and enhance database and record-keeping systems in order to do so.

Description: In order to evaluate the impact of implementing sustainable initiatives that will reduce greenhouse gas emissions, tracking is essential. Onondaga County will perform the following on an annual basis:

- Database tracking natural gas, electricity, gasoline, and diesel usage and associated emissions.
- Monitoring of process methane and nitrous oxide emissions by Water Environment Protection.
- Upload the information onto the Onondaga County Sustainability website.

In order to ease the effort of collecting, analyzing and reporting on the findings, the County should take steps to enhance how the required information is gathered and organized.

Benefits: By tracking greenhouse gas emissions on an annual basis, Onondaga County will be able to determine whether its initiatives are achieving the

expected greenhouse gas benefits. The community will also be able to track the progress of the County's efforts. Finally, Onondaga County can provide an example to other municipalities on the benefits of implementing a Climate Action Plan and tracking the results.

Estimated Costs: The majority of the information requiring tracking is already maintained by the County. Besides the labor to consolidate the information, research the latest methodology, and to calculate greenhouse gas emissions, no additional capital costs is required.

Implementation Considerations: Responsibility and time needs to be provided to County personnel to perform the necessary research and annual emission calculations. Such investments of time and effort can be minimized by revising and improving the way certain data and records are collected and organized.

Aspect—Project Financing

Recommendation: Establish a funding mechanism to implement those greenhouse gas reduction projects that provide the best economic payback or largest greenhouse gas reduction per dollar invested. The County should consider allocating a percentage of the County's overall capital budget for energy efficiency, green building, fleet and other greenhouse gas reduction projects. A master list of projects should be established, giving the highest priority to those projects that provide the greatest return on investment and greatest reduction in greenhouse gas emissions.

Description: While some actions to reduce greenhouse gas emissions may be no or low cost to implement, many will require expenditure of funds for implementation. It is recommended that the County develop a means by which to fund projects and actions targeted primarily at energy, green building and fleet greenhouse gas emissions reduction initiatives. Since most such projects will be focused on reducing energy or fuel consumption, these projects will likely have a savings or return on investment associated with them. One suggested approach is to reach agreement on a percentage of the overall County capital budget that would be targeted toward greenhouse gas reduction. These funds would then be applied to the highest priority projects and activities on a County master list of priority projects. For those projects for which there are significant savings, financing might also be achieved by using the expected energy savings to either issue bonds or to enter into a performance contract with a third party.

Benefits: Annual funding for priority projects ensures that real progress will be made toward minimizing or reducing the County's greenhouse gas emissions.

Estimated Costs: It is expected that funded projects will result in a payback within a certain standard timeframe so that the long-term cost impact results in a net cost savings.

Implementation Considerations: Such a funding framework will have to be fully incorporated into the County's long-term Budgeting and Capital Improvement Planning process.

Chapter 6—Implementation of the Climate Action Plan

Chapter 6—Implementation of Climate Action Plan—Next Steps

Responsibilities

A key element on the path to success in reducing the County's carbon footprint will be the establishment of responsibility and accountability for implementing approved recommendations, and for clear lines communication between those with program development responsibility and the departments and individuals involved in implementing them.

The Office of Environment/Environmental Director will have overall responsibility for further development and implementation of approved elements of the County's Climate Action Plan. On-going involvement and support for further program development and implementation should continue to come from the Environmental Sustainability Advisory Committee's (ESAC) Policy and Planning Committee. The Environmental Sustainability Advisory Committee should be relied upon to provide on-going advice and input on an as-needed basis. While membership on the ESAC's Policy and Planning Committee can change over time, there should be direct, on-going involvement in Plan implementation by the following key positions:

- The County Environmental Director
- The County Director of Energy & Sustainability
- The County Purchasing Director or their designee
- A member of the Vehicle Use Review Board
- A representative from the Office of Management and Budget
- The County Assistant Communications Director
- The Chairperson of the Green Building Standards Committee (The Green Building Standards Committee, to be expanded per the recommendations noted in Section 5, should have responsibility for further development of green building policies and project oversight with respect to implementation of approved green building recommendations.)

Responsibility for implementation of specific approved elements of the Climate Action Plan will involve many other individuals within the County work force, sometimes in cooperation with outside agencies and organizations. However, the provision of overall program development and implementation will fall to those noted above.

Climate Action Plan Financing

As stated in the Introduction, the County feels that a realistic greenhouse gas emission reduction plan must include a reasonable return on investment, and must take a long-term view in order to allow for incremental change. Regardless of whether the price increases or decreases in the future, the amount of fuel and electricity consumed by the County today represents a significant cost and a significant source of greenhouse gas emissions. Many of the initiatives recommended in Section 5 will result in an annual savings. Some of the greenhouse gas reduction recommendations result in cost savings with no capital investment, while others, all of which are expected to ultimately result in annual savings, will require capital investment.

The County is committed to identifying and pursuing all avenues to assist with financing approved greenhouse gas reduction measures, including those that will require substantial capital investment. The County will continue to seek grant funding from Federal and State sources, such as NYSERDA. It will explore partnerships with others to facilitate cost sharing, and consider local appropriations to invest in projects for which the long term return on investment represents an overall cost savings. The County will also consider establishing a funding mechanism to implement those greenhouse gas reduction projects that provide the best economic payback or largest greenhouse gas reduction per dollar invested. To this end, the County will consider allocating a percentage

of the County's overall capital budget for energy efficiency, green building, fleet and other priority greenhouse gas reduction projects. A master list of projects should be established, giving the highest priority to those projects that provide both the greatest reduction in greenhouse gas emissions as well as greatest return on investment.

Some near-term elements of the Plan are already funded (for example: the Federal Energy Efficiency and Conservation Block Grant funding will be used to pay the cost of a number of soon to be identified energy conservation measures in County facilities; Funding has already been appropriated to implement the County's Save the Rain Program.

As noted above, many greenhouse gas reduction measures that have been recommended do not require investments beyond staff time and effort. It will be critical for the County Environmental Sustainability Advisory Committee to carry out the recommended outreach and marketing initiatives recommended in Section 5 in order to realize the significant emission reduction goals associated with work force behavior modification (powering down electronic equipment when not in use, reducing disposal of recyclables in the trash, avoiding vehicle idling, etc.), and to empower the County work force to make informed decisions on a daily basis.

Timetable

Onondaga County has set its emission reduction target at 25% over 25 years, or an average reduction of approximately 1% per year. This emission reduction goal should be critically evaluated at five year intervals to determine if the County needs to adjust its approach in order to meet the target, or if the target can be made even more aggressive due to new technology or changing circumstances. However, as noted in the Introduction of this Climate Action Plan, there is no finish line in this endeavor. This planning process is more accurately viewed as a journey, and the County's Climate Action Plan should be viewed as an evolving document, intended to guide current and future policies and programs with the ongoing, overarching goal of finding sustainable ways of using less energy and reducing the County's carbon footprint.

This plan recommends specific near term, intermediate and long-term planning efforts, programs and policies, and also recognizes that with evolving technology and new understandings additional unanticipated opportunities will present themselves in the future. In the relative near term the County will complete those programs and projects that are already in the planning stages (e.g., the County Sustainable Development Plan), as well as those for which implementation has already begun (e.g., the Save the Rain program and implementing energy conservation measures associated with the Energy Efficiency and Conservation Block Grant). Still other efforts call for the longer term implementation, like the gradual conversion of the County fleet to more fuel efficient and alternative fuel vehicles as older, less efficient vehicles are replaced, and implementation of green building policies and practices over time as building renovations and new constructions occur. Some projects will require substantial capital investment, and will only be implemented at such time as adequate supplemental funding can be secured to ensure a reasonable return on local investment.

Monitoring/Tracking Progress

Development of this Climate Action Plan began with the accumulation of data and records necessary to calculate the County's current carbon footprint. In order to evaluate the impact of implementing sustainable initiatives that will reduce greenhouse gas emissions, annual tracking is essential. Onondaga County will perform the following on an annual basis:

- Track natural gas, electricity, gasoline, diesel and other fuel usage and associated emissions.
- Monitor process methane and nitrous oxide emissions generated by wastewater treatment operations.
- Calculate changes in the County's carbon footprint.
- Report results.

In some cases it has been recommended that various tools be used in measuring the status of efforts to measure change (e.g., EPA/DOE's Portfolio Manager, which is web based software that will allow the County to continually monitor and compare the energy usage intensity and greenhouse gas emissions of its buildings to similar facilities across the country). It is expected that over time the tools used to calculate greenhouse gas emissions and energy usage will evolve and change. It must be accepted that converting to new tools and methods, which is inevitable, will create challenges when comparing old and new results. In spite of such changes, it should still be possible to track and demonstrate change over time.

Appendices

Appendices

Appendix A

Table 1

Onondaga County Climate Action Plan

Greenhouse Gas Emissions Associated With Energy Use

Department	Electrical Usage (kWhr)	Nat. Gas Usage (Therms)	CO_2 Emissions (Mton/yr)	CH_4 Emissions (Mton/yr)	N_2O Emissions (Mton/yr)	CO_2e Emission (Mton/yr)	%
911	984,431	11,393	382.31	0.02	0	384.25	0.62%
Corrections	1,760,864	158,747	1,418.02	0.1	0.01	1,423.37	2.30%
Van Duyn	6,423,187	471,102	4,599.73	0.31	0.03	4,617.75	7.47%
Libraries	1,711,617	55,112	852.03	0.05	0.01	855.88	1.38%
Transportation	1,682,208	254,493	1,900.34	0.15	0.01	1,906.84	3.08%
Sherriff	3,509,151	25,862	1,284.54	0.05	0.02	1,291.25	2.09%
Parks	5,235,229	197,743	2,760.88	0.16	0.03	2,773.04	4.49%
Fac.Management	20,529,342	1,555,656	14,966.37	1.01	0.12	15,024.69	24.31%
WEP	63,043,361	7,059	24,453.00	1.04	0.32	24,575.00	39.76%
Water Board	18,407,709	135,196	6,735.75	0.28	0.09	6,770.90	10.95%
Hillbrook	816,960	26,998	410.35	0.02	0	412.20	0.67%
On Center	4,590,005	50,478	1,768.54	0.08	0.02	1,777.53	2.88%
Total County Emissions	**128,694,064**	**2,949,839**	**61,531.86**	**3.27**	**0.66**	**61,812.70**	**100.00%**

Table 2

Onondaga County Climate Action Plan
County Fleet Fuel Usage and Greenhouse Gas Emissions

Total Greenhouse Gas from Vehicles

Department	Gasoline (Gallons)	Diesel (Gallons)	CO2 (Mtons)	CH4 (Mtons)	N20 (Mtons)	CO2e (Mtons)	Percent of Total (%)
District Attorney	16,829	0	148.26	0.0042	0.0015	148.82	1.78
Corrections	6,176	630	60.81	0.0016	0.0006	61.03	0.73
Transportation	41,856	267,735	3,086.26	0.0420	0.0269	3,095.47	37.04
E911	1,301	0	11.46	0.0003	0.0001	11.51	0.14
Emergency Management	3,664	0	32.28	0.0009	0.0003	32.40	0.39
Facilities	7,618	0	67.11	0.0019	0.0007	67.37	0.81
Health	2,379	0	20.96	0.0006	0.0002	21.04	0.25
Hillbrook	235	0	2.07	0.0001	0.0000	2.08	0.02
Library	5,355	0	47.18	0.0013	0.0005	47.36	0.57
Mental Health	253	0	2.23	0.0001	0.0000	2.24	0.03
MWB	11,797	220	106.16	0.0030	0.0011	106.56	1.28
ON Center	1,071	0	9.44	0.0003	0.0001	9.47	0.11
Parks	43,441	11,798	502.46	0.0122	0.0050	504.26	6.03
Sheriff	289,194	407	2,551.93	0.0722	0.0263	2,561.59	30.65
Social Services	0	0	0.00	0.0000	0.0000	0.00	0.00
Van Duyn	4,817	1,345	56.09	0.0014	0.0006	56.29	0.67
WEP	113,992	60,584	1,619.20	0.0356	0.0156	1,624.77	19.44
BOE	78	0	0.69	0.0000	0.0000	0.69	0.01
Purchasing	287	0	2.53	0.0001	0.0000	2.54	0.03
Probation	235	0	2.07	0.0001	0.0000	2.08	0.02
Total	**550,578**	**342,719**	**8,329.19**	**0.1778**	**0.0795**	**8,357.56**	**100.00**

Table 3

Onondaga County Climate Action Plan

WEP Wastewater Treatment Plants and Pump Stations

Greenhouse Gas Emissions

Wastewater Treatment Plants	Electricity (kWhr)	Natural Gas (1,000 cu ft)	Diesel (gallons)	CO2 (Mtons)	CH4 (Mtons)	N20 (Mtons)	CO2e (Mtons)	Percentage (%)
Baldwinsville	5,419,000	0	1,725	1,789.28	0.06	0.03	1,799.06	7.68
Brewerton	3,146,000	0	270	1,031.34	0.03	0.02	1,036.95	4.43
Meadow Limestone	5,035,000	0	260	1,648.86	0.05	0.03	1,657.82	7.07
Metro Plant	38,460,000	29,341	0	14,129.76	0.57	0.19	14,202.03	60.61
Oak Orchard	4,395,000	17,226	260	2,352.58	0.13	0.02	2,362.75	10.08
Wastewater Lab	1,447,000	12,826	0	1,152.88	0.08	0.01	1,157.20	4.94
Wetzel Road	2,249,000	8,790	1,000	1,211.34	0.07	0.01	1,216.62	5.19
Total	60,151,000	68,183	3,515	23,316	0.9978	0.3079	23,432.43	100.00

Pump Stations	Electricity (kWhr)	Natural Gas (1,000 cu ft)	Diesel (gallons)	CO2 (Mtons)	CH4 (Mtons)	N20 (Mtons)	CO2e (Mtons)	Percentage (%)
Baldwinsville PS	3,243	89	0	5.76	0.00	0.00	5.78	0.51
Brewerton PS	2,945	0	1,357	14.74	0.00	0.00	14.87	1.30
Meadow Limestone PS	1,050	0	624	6.68	0.00	0.00	6.74	0.59
Metro PS	1,977,508	736	2,943	715.41	0.03	0.01	719.30	62.94
Oak Orchard PS	876,401	1,587	947	380.24	0.02	0.00	382.10	33.43
Wastewater Lab				0.00	0.00	0.00	0.00	0.00
Wetzel Road PS	31,215	0	375	14.02	0.00	0.00	14.11	1.23
Total	2,892,361	2,411	6,246	1,137	0.0472	0.0163	1,142.88	100.00

Process Emissions				CO2	CH4	N20	CO2e	Percentage
	N2O	CH4(cfd)		(Mtons)	(Mtons)	(Mtons)	(Mtons)	(%)
Baldwinsville	0.261	0.0		0.0	0.0000	0.2610	80.91	4.77
Brewerton	0.134	0.0		0.0	0.0000	0.1340	41.54	2.45
Meadow Limestone	0.349	0.0		0.0	0.0000	0.3490	108.19	6.38
Metro Plant	2.569	483191.0		0.0	21.7000	2.5690	1,252.09	73.87
Oak Orchard	0.533	0.0		0.0	0.0000	0.5330	165.23	9.75
Wastewater Lab								0.00
Wetzel Road	0.152	0.0		0.0	0.0000	0.1520	47.12	2.78
Total				0	21.70	4.00	1695.08	100.00

Total Emissions		CO2 (Mtons)	CH4 (Mtons)	N20 (Mtons)	CO2e (Mtons)	Percentage (%)
Baldwinsville—7.2%		1,795.03	0.06	0.29	1,885.74	7.18
Brewerton—4.2%		1,046.08	0.04	0.15	1,093.36	4.16
Meadowbrook Limestone—6.7%		1,655.53	0.06	0.37	1,772.75	6.75
Metro Plant—61.6%		14,845.17	22.29	2.77	16,173.42	61.57
Oak Orchard—11.1%		2,732.82	0.15	0.56	2,910.08	11.08
Wastewater Lab -4.4%		1,152.88	0.08	0.01	1,157.20	4.40
Wetzel Road—4.8%		1,225.36	0.07	0.16	1,277.85	4.86
Total Emissions		24,452.88	22.7449	4.3222	26,270.39	100.00

List of Available Ground Cover

Botanical Name	*Common Name*	*Salt Tolerant*	*Hardiness*	*Height*	*Deer Resistance*	*Snow-pile Tolerant*	*Native Status*
Shrubs							
Arctostaphyllos uva-ursi	Bearberry	yes	3a	12"	A	yes	Eastern North
Comptonia peregrina	Sweetfern	yes	3a	24-48"	unknown	no	Northeastern US
Diervilla sesslifolia	Dwarf Bush	yes	4a	36-60"	unknown	no	Southeastern US
Hypericum kalmianum 'Ames'	Ames Kalm St.	yes	4b	24"	good	no	Northeastern US
Juniperus horizontalis 'Blue Chip', 'Bar Harbor', 'Wiltonii'	Creeping Juniper	yes	3a	12"	A, B	yes	North America
Juniperus sabina 'Broadmoor',	Savin Juniper	yes	3b	12-36"	B	yes	Europe, Asia, Siberia
Paxistima canbyi	Canby Paxistima	unknown	4a	12"	unknown	yes	Virginia, West
Potentilla fruticosa 'Longacre'	Cinquefoil	yes	3a	36"	A	no	Northern
Rhus aromatica 'Gro-Low'	Gro-Low Sumac	yes	3a	24-36"	A	no	Northeastern US
Rosa rugosa 'Alboplena', 'Belle Poitevine', 'Frau Dagmar Hastrup'	Rugosa Rose	yes	3a	36-48"	C	no	Asia
Perennials							
Achillea millefolium	Yarrow	yes	3	24"	B	yes	North America
Adiantum pedatum	Maidenhair Fern	unknown	3	12-24"	good	yes	Northeastern US
Aster divaricatus (Eurybia divaricata)	Woodland Aster	unknown	3	18-24"	B	yes	Northeastern US
Chasmanthium latifolium	Northern Sea Oats	yes	5	36"	A	yes	Northeastern US
Hemerocallis citrina, fulva	Daylily	yes	3	24-30"	C	yes	Asia
Heuchera micrantha, villosa, sanguinea	Coral Bells	yes	2	12-18"	B	yes	North America
Hosta sp.	Plantain Lily	yes	3	12-36"	D	yes	Asia
Tiarella cordifolia	Heartleaf Foamflower	unknown	4	12-18"	B	yes	Northeastern US
Tradescantia ohiensis	Ohio Spiderwort	unknown	5	24-36"	B	yes	Northeastern US
Waldsteinia fragaroides	Barren Strawberry	yes	4	4-6"	unknown	yes	Eastern US
Seed Mixes							
Low-growing Wildflower/Grass Seed Mix	Ernst Conservation Seeds			up to 36"	yes	yes	Ernst Conservation Seeds
Northeastern US Roadside Native Mix	Ernst Conservation Seeds			up to 72"	yes	yes	Ernst Conservation Seeds

ADMINISTRATIVE DIRECTIVE ON ENVIRONMENTALLY PREFERABLE PRODUCTS

Onondaga County Directive	ADMINISTRATIVE DIRECTIVE MANUAL	
	SUBJECT: Purchase and Use of Environmentally Preferable Products Directive	
	SUPERCEDES: November 15, 1998, and Resolution No. 193-2008	PAGE: 701.00
	SIGNED: Joanne M. Mahoney County Executive	DATE: 10/13/09

DIRECTIVE: Onondaga County promotes the study, evaluation, and use of recycled materials and sustainable, environmentally preferable products by its departments, boards, and agencies on a project-by-project and product-by-product basis to encourage a healthier workplace and a healthier environment. The County of Onondaga shall continue its leadership role in promoting sustainability by increasing the purchase and use of environmentally safe products or services that have a lesser or reduced negative effect on human health and the environment when compared to competing products or services that serve the same purpose.

PROCEDURE: The Onondaga County Division of Purchase will incorporate a sustainable product preference in its specifications where practicable and economically feasible and in a manner consistent with state and federal law. In all cases where environmentally preferable products are of equal cost or value and equal or less life-cycle cost, the most sustainable product will be the choice. These products will be identified based on the following criteria:

1. *Recycled Content:* Products containing the greatest percentage of post-consumer recycled materials will be considered the most preferable with a goal of purchasing products made from 100 percent post-consumer material where practicable.

2. *Reusability/Recyclables*: Products that are easily upgradeable, reusable, recyclable, or have components that are reusable or recyclable are preferable. These can include products whose manufacturers have established "take-back" programs.

3. *Reduction in Fuel Usage:* Consideration will be given to the fuel consumption associated with the transportation of goods.

4. *Toxics Reduction*: A preference will be given to products that do not contain toxic materials or use toxics in the manufacturing. This includes but is not limited to styrene, benzene, PVC, and heavy metals such as mercury and dioxin (produced primarily through the manufacture of bleached paper).

5. *Energy Efficient Appliances*: Energy Star or equivalent appliances should be purchased when available.

6. *Green Cleaning*: Janitorial products shall be purchased that are certified by Green Seal or another third-party certification program whenever available.

7. *Wood Products*: Preference will be given to wood products certified by the Forest Stewardship Council where available and economically feasible.

8. *Paper Products*: Paper products will be selected based on the best available combination of recycled content, forest management practices, bleaching practices, and economic feasibility.

9. *Computer Electronics*: Computers and monitors receiving a minimum bronze rating by EPEAT shall be purchased where available with preference for higher ratings where economically feasible.

10. *Lighting*: Preference will be given to LED lighting over fluorescents whenever economically feasible. As a minimum, fluorescent lighting with the lowest possible mercury content shall be used.

Each County Department, Board, Agency, and Commission, when considering the order for new products and services, will:

1. Consider the more sustainable product over a traditional choice to determine the extent to which the agency and its contractors may practicably use the product.

2. Ensure that all contracts issued by the County of Onondaga require the use of recycled and environmentally preferable products whenever practicable and economically feasible.