



New York Climate Smart Communities

Suffolk County Climate Action Plan

March 2015



**Climate Smart
Communities**

ACKNOWLEDGEMENT

The Suffolk County Climate Smart Community Standing Committee held eight meetings and prepared a draft of this Climate Action Plan. Once finalized, it was submitted to the Suffolk County Legislature's Public Works, Transportation, and Energy Committee, chaired by Legislator Al Krupski. Standing Committee Members include the following:

- 1) The Chairperson of the County Legislature's Committee on Economic Development and Energy, or his or her designee, who shall serve as chair of the committee;
 - a. Neal Lewis, Executive Director, Sustainability Institute at Molloy College
- 2) The Presiding Officer of the County Legislature, or his or her designee;
 - a. Charles Gardner, Director of Government Affairs, Long Island Chapter, National Electrical Contractors Association
- 3) The Minority Leader of the County Legislature, or his or her designee;
 - a. Michael Kaufman, Suffolk County Planning Commission
- 4) The Chairperson of the County Legislature's Environment, Planning and Agriculture Committee, or his or her designee;
 - a. Suffolk County Legislator Kara Hahn
- 5) The Commissioner of the County Department of Public Works, or his or her designee;
 - a. Lori Baldassare, Director of Program Evaluation Suffolk DPW
- 6) The Director of the Division of Planning in the Department of Economic Development and Planning, or his or her designee;
 - a. Dorian Dale, Director of Sustainability & Chief Recovery Officer
- 7) The Director of the Office of Legislative Budget Review, or his or her designee;
 - a. Joseph Schroeder C.E.M, Energy Specialist, Budget Review Office
- 8) A community member, to be selected by the County Legislature; and
 - a. Kevin McDonald, Public Lands Program Director, The Nature Conservancy
- 9) A community member, to be selected by the County Executive;
 - a. No member selected

Legislator Wayne Horsley was the Chair of the Legislature's Committee on Economic Development and Energy when the resolution was passed and the Climate Smart Community Standing Committee (the Committee) began its work. He attended all the meetings and played an integral part in the development of the Climate Action Plan (CAP). The assistance of Legislator Horsley's staff was invaluable, particularly legislative aides John Paul DiMartino, who helped draft the Resolution, and Claire Mangelli, who helped to organize communications and meetings for the Committee. Legislator Krupski's legislative aide, Gwynn Schroeder helped to organize the work of the Committee when the Legislator took over as Chair of the Legislature's Public Works, Transportation, and Energy Committee.

In addition to the members of the committee, several other people played key roles in the drafting of this plan. Javed Ashraf P.E., C.E.M, Principal Mechanical Engineer, Suffolk County Department of Public Works, made a vital contribution to the process, supplying necessary data and his considerable experience. Lisa Broughton, Bio/High Technology Development Specialist, and Energy Director of the Suffolk County Department of Economic Development and Planning attended all meetings of the Committee and provided invaluable assistance in the development of the CAP. Dave Calone, Chair of the Suffolk County Planning Commission also contributed significantly to the process, as did the representatives of Suffolk County Community College, Nina Leonhardt, Associate Dean for Continuing

Education, and Nicholas Palumbo, Executive Director of Sustainability Program. The Committee would like to thank them all for their efforts and contributions to the CAP.

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TABLE OF CONTENTS

EXECUTIVE SUMMARY	1
1 INTRODUCTION	2
1.1 Climate Action Plan Summary	2
1.2 Lay of the Land	2
1.2.1 Lessons Learned	3
1.2.2 Existing Plans, Studies, and Reports	4
1.2.3 Pledges/Memberships/Associations	4
1.2.4 Greenhouse Gas Inventory	4
1.2.5 Greenhouse Gas Emissions Reductions Targets	6
1.2.6 Climate Smart Community Certification	7
2 MUNICIPAL FACILITIES AND OPERATIONS.....	8
2.1 Buildings.....	8
2.1.1 Accomplishments.....	8
2.1.2 Projects and Policies under Consideration, Development, or Implementation	10
2.1.3 Potential Future Actions and Initiatives	11
2.2 Renewables.....	13
2.2.1 Accomplishments.....	13
2.2.2 Projects and Policies under Consideration, Development, or Implementation	14
2.2.3 Potential Future Actions and Initiatives	14
2.3 Exterior Lighting	15
2.3.1 Accomplishments.....	15
2.3.2 Projects and Policies under Consideration, Development, or Implementation	16
2.3.3 Potential Future Actions and Initiatives	16
2.4 Fleet.....	17
2.4.1 Accomplishments.....	17
2.4.2 Projects and Policies under Consideration, Development, or Implementation	17
2.4.3 Potential Future Actions and Initiatives	17
2.5 Solid Waste and Wastewater	19
2.5.1 Accomplishments.....	19
2.5.2 Projects and Policies under Consideration, Development, or Implementation	20
2.5.3 Potential Future Actions and Initiatives	21
2.6 Operations	22

2.6.1	Programs and Policies in Effect.....	22
2.6.2	Potential Future Actions and Initiatives	23
3	SUFFOLK COUNTY COMMUNITY COLLEGE FACILITIES AND OPERATIONS	24
3.1	Buildings.....	24
3.1.1	Accomplishments.....	24
3.1.2	Projects and Policies under Consideration, Development, or Implementation	25
3.1.3	Potential Future Actions and Initiatives	25
3.2	Renewables.....	26
3.2.1	Accomplishments.....	26
3.2.2	Projects and Policies under Consideration, Development, or Implementation	26
3.2.3	Potential Future Actions and Initiatives	26
3.3	Exterior Lighting	27
3.3.1	Accomplishments.....	27
3.3.2	Projects and Policies under Consideration, Development, or Implementation	27
3.3.3	Potential Future Actions and Initiatives	27
3.4	Fleet.....	28
3.4.1	Accomplishments.....	28
3.4.2	Potential Future Actions and Initiatives	28
3.5	Solid Waste and Wastewater.....	29
3.5.1	Accomplishments.....	29
3.5.2	Projects and Policies under Consideration, Development, or Implementation	29
3.5.3	Potential Future Actions and Initiatives	29
3.6	Education and Training Programs.....	30
3.6.1	Accomplishments.....	30
3.6.2	Projects and Policies under Consideration, Development, or Implementation	30
3.6.3	Potential Future Actions and Initiatives	31
4	COMMUNITY-WIDE POLICIES AND INITIATIVES.....	32
4.1	Residential Buildings.....	32
4.1.1	Laws, Codes and Regulations in Effect	32
4.1.2	Current Programs and Policies	32
4.1.3	Programs and Policies under Consideration for Potential Future Action	33
4.2	Commercial and Industrial Buildings.....	34
4.2.1	Laws, Codes and Regulations in Effect	34

4.2.2	Programs and Policies under Consideration for Potential Future Action	34
4.3	Community-Wide Policies and Initiatives to Promote Renewable Energy.....	35
4.3.1	Laws, Codes and Regulations in Effect	35
4.3.2	Current Programs and Policies	36
4.3.3	Programs and Policies under Consideration for Potential Future Action	36
4.4	Transportation	37
4.4.1	Laws, Codes and Regulations in Effect	37
4.4.2	Current Programs and Policies	37
4.4.3	Programs and Policies under Consideration for Potential Future Action	38
4.5	Educational Initiatives	39
4.5.1	Current Programs and Policies	39
4.5.2	Programs and Policies under Consideration for Potential Future Action	39
4.6	Land Management	41
4.6.1	Laws, Codes and Regulations in Effect	41
4.6.2	Current Projects and Policies.....	41
4.6.3	Programs and Policies under Consideration for Potential Future Action	41
5	CLIMATE CHANGE, PLANNING AND ADAPTATION	43
5.1	Climate Change in New York.....	43
5.1.1	Observed Effects of Climate Change.....	43
5.1.2	Projected Climate Changes.....	43
5.1.3	Projected Effects of Climate Change.....	43
5.1.4	TDR Plan and Comprehensive Plan	44
5.1.5	Multi-Jurisdictional All Hazards Mitigation Plan.....	44
5.1.6	Hazard Mitigation Grant Program	46
5.2	Community Self-Assessment and Planning.....	48
5.3	Adaptation Strategies	49
5.3.1	Community Planning and Capacity Building.....	49
5.3.3	Health and Social Services.....	51
5.3.4	Housing.....	51
5.3.5	Infrastructure.....	52
5.3.6	Natural and Cultural Resources	53
	APPENDICES	54

EXECUTIVE SUMMARY

This CAP is organized into four sections: *Municipal Facilities and Operations*; *Suffolk County Community College Facilities and Operations*; *Community-wide Policies and Initiatives*; and *Climate Change Adaptation and Resiliency*. Sections One and Two provide information on facilities and operations over which the county has direct control and describe *Past Actions and Achievements*; *Projects and Policies Currently Under Consideration, Development or Implementation*; and *Potential Future Actions and Initiatives*. Section Three looks at a number of items that the County can affect by policy and describes *Laws, Codes, and Regulations in Effect*; *Current Programs and Policies*; and *Programs and Policies under Consideration or Planning for Potential Future Action*. Section Four, *Climate Change Planning and Adaptation*, provides an overview of the County's plans to adapt to the effects of climate change including rising seas, more intense rainfall, higher temperatures, and more frequent droughts.

Suffolk County has for years acted to mitigate climate change. The County is one of the original participants in the *Long Island Clean Energy Leadership Task Force*. In 2005, Suffolk became the first municipality on Long Island to adopt a *Clean Energy Action Plan*. The plan documented the County's planned efforts to reduce energy consumption and greenhouse gas (GHG) emissions from county operations and facilities. It did not address community-wide GHG emissions. The County's ongoing commitment to reducing its energy use and carbon footprint has resulted in an estimated \$5 million of annual savings. The County's success is due in part to a commitment by County departments to accept new technology and new approaches to operations. This 'cultural change' has allowed the County to simultaneously reduce impacts on the environment, improve productivity and the work environment, and save taxpayer money.

Suffolk County has taken a leadership role in developing codes for renewables, the effort to develop a unified solar permitting code, led by the Suffolk County Planning commission, resulted in a code that removes obstacles to solar installations which has been adopted by towns and villages in both Suffolk and Nassau counties, and has become a model for the rest of the state. The unified solar code and the intergovernmental cooperation that led to it garnered press recognition nationally.

Suffolk County has adopted a 20-percent GHG emissions reduction target by 2020 from a 2005 baseline for government operations. It has similarly set a 20 percent GHG emissions reduction target by 2020 from a 2005 baseline for community-wide emissions. The County plans to continue upgrading the energy performance of its buildings and modifying its operations to meet this goal. Suffolk County plans to establish real-time building energy management systems with a central web-based dashboard to track performance in each of its major buildings. Suffolk County Community College has developed plans for a new *Renewable Energy and STEM Center* that will increase its instructional capacity in renewable energy and provide a high school pipeline program in science, technology, engineering, and math with a focus on energy.

Suffolk County is preparing a new Comprehensive Plan that will have a section devoted to climate change and the adaptation measures necessary to make it more resilient. It is simultaneously preparing a Multi-Jurisdictional All Hazards Mitigation Plan that sets out strategies to achieve its resiliency goals.

1 INTRODUCTION

1.1 Climate Action Plan Summary

This Climate Action Plan (CAP) is the result of a two-year process. It was prepared in accordance with the commitment made by the Suffolk County Legislature when it adopted the Climate Smart Communities pledge on November 20, 2012 through Resolution No. 960-2012, “Adopting Climate Smart Community Goals in the County of Suffolk.” In that resolution, the Legislature found:

Climate change poses a real and increasing threat to the environments of Suffolk County, New York State, and the world, and is primarily caused by the burning of fossil fuels; and climate change has a major impact in all communities: endangering infrastructure, economies and livelihoods; harming local agriculture and ecology, including native fish and wildlife populations; encouraging the spread of invasive species and exotic diseases; reducing drinking water supplies and recreational opportunities; and posing health threats to our citizens.

By adopting that resolution, Suffolk County began its participation in the New York State Climate Smart Communities program and established the Suffolk County Climate Smart Community Standing Committee (the Committee). The draft CAP was developed by the Committee, which represents various government departments and community representatives. The draft CAP, with Appendices, was approved by the Committee on Monday, October 27, 2014, and by email vote the committee approved minor revisions to the text on Monday, March 2, 2015.

1.2 Lay of the Land

Suffolk County has been aggressively pursuing a number of energy and sustainability initiatives for over a decade. The County’s commitment to smart and efficient energy use through facility improvements has resulted in direct energy savings compounded by significant reductions in maintenance costs. At the time of this writing, direct energy use reduction at targeted facilities, documented by measurement and verification of system performance and year-over-year actual energy use data, has resulted in approximately \$5 million of recurring annual savings in expenditures for energy which equates to a 25 percent reduction in electricity use and over 30 percent reduction in natural gas consumption in the last seven years. These targeted efficiency upgrades have also resulted in significant reductions in annual maintenance costs, exceeding approximately \$250,000 annually (on average) and projected to achieve more than \$400,000 annually for the current (2014) list of pending projects (Appendix A). It is also important to note that the County has implemented energy efficiency upgrades with project “bundles” that have an average return on investment exceeding 25 percent and those projects deliver actual savings net of debt service in the first year after project completion. These economic benefits are in addition to the external environmental benefits such as reduction of greenhouse gas emissions. As New York’s fourth-most populous county and second largest in terms of area, this plan aims to set a precedent for other counties by highlighting the many ways that counties can lower greenhouse gas emissions and combat climate change.

1.2.1 Lessons Learned

One of the driving forces behind the County's achievements in energy efficiency is its commitment to creating a culture of smart energy use. There are few technologies applied to building construction and building systems that have not been commercially available for at least twenty years. In fact, most design features and systems relating to energy have been available for more than a generation. While some innovations come at greater first cost than "standard" features, often the equipment requires less available expertise for operation and maintenance. Life-cycle cost analysis frequently reveals significant recurring annual savings related to both energy use and maintenance. The lack of widespread adoption of these innovations is often due more to a culture of risk aversion and comfort with existing systems than technological or economic obstacles.

So why is it that across the Nation in both the public and private sectors, many design and technology alternatives remain unapplied or even avoided? The answer we discovered in Suffolk County requires an appreciation of "intangible" influences on decision-making, and in this case, the single greatest hurdle to applying available technology to new and existing buildings is "culture." Culture in this context refers to a willingness and ability to accept change. Objections to change exist in many forms, and may include aversion to risk with respect to unfamiliar technologies, and comfort levels with existing equipment.

When first proposed, it was difficult to secure funding to support capital projects for such things as condensing gas boilers, updating building controls, and linking building management systems to the internet for remote monitoring. Documenting operating savings and avoided costs in "first step" projects was critical to securing the support of elected officials for ongoing funding for such projects. Building upgrades have in part been designed to assist buildings operations and maintenance personnel to manage energy systems more efficiently and reduce demands on staff. The buildings' operations and maintenance staff have become important partners in the ongoing energy efficiency upgrades precisely because project implementation has had the intended effect of mitigating maintenance problems in a time of decreasing staff numbers. In addition to typical operational regimens, both the design and operations staffs have a growing comfort level with the new technologies resulting from active involvement in equipment installation, and are now driving investment in many new projects.

Suffolk County's leadership has made energy efficiency and clean energy a priority, as evidenced by the appointment of a Sustainability Director, and continued funding of the energy efficiency through Capital Program 1664. This support at the highest level has enabled the County to make significant strides toward changing the culture of County government. Support has also resulted in the formation of an Energy Initiatives Suffolk Working Group whose mission is to reduce Suffolk County's energy use, carbon footprint and facilities' life cycle costs.

Culture change at the County is an ongoing process that has experienced good support. As the County continues with its cultural shift, we hope to serve as an example, so that other municipalities can benefit from our experience and achieve results at an accelerated rate.

1.2.2 Existing Plans, Studies, and Reports

- A Clean Energy Action Plan was adopted in 2005.
- A written Energy Policy was adopted in 2002 is in the process of being revised.
- The Long Island Carbon Footprint Project generated community-wide greenhouse gas emissions data for Suffolk County for 2005 (comparative baseline) and 2010.
- *Comprehensive Plan 2035* is in draft form.
- A Hazard Mitigation Plan was completed in April 2014.
- A Transfer of Development Rights (TDR) Study was completed in May 2014.
- A *Sustainable Communities Regional Planning* grant program is ongoing.
- The *Sewer Infrastructure* program is ongoing.

1.2.3 Pledges/Memberships/Associations

Suffolk County is a member of the following organizations and programs:

- Climate Smart Communities
- Greater Long Island Clean Cities Coalition
- Cool Cities
- Long Island Clean Energy Leadership Task Force
- United States Green Building Council
- The New York-Connecticut Sustainable Communities Consortium
- Long Island Association Energy & Environment Committee
- Long Island Regional Planning Council
- New York Metropolitan Transportation Council

1.2.4 Greenhouse Gas Inventory

The Rauch Foundation funded an effort by the New York Institute of Technology (NYIT) to draft a comprehensive regional greenhouse gas (GHG) emissions inventory for Long Island's (LI) Nassau and Suffolk counties. NYIT released the results of the inventory as a report and [interactive website](#) in 2013. The *Long Island Carbon Footprint Project* provides an inventory and analysis for 2010 and comparisons to 2005 emissions. The website also hosts an interactive map that provides emissions data by sector, source, region, and municipality. The LI GHG inventory includes the following sources:

- Fuel use (oil and natural gas) and electricity
- Transportation
- Industrial processes
- Agriculture
- Waste (wastewater and solid waste)
- Land use, land-use change, and forestry

The inventory utilizes data from the following sectors:

- Residential - building energy consumption
- Commercial and Industrial - building energy consumption
- Municipal - building energy consumption (included in commercial sector)
- Land Transportation - vehicle and fuel types, vehicle miles traveled (VMT)
- Marine Transportation - recreational only

- Solid Waste - generation rates and disposal types
- Waste Hauling - types and destinations
- Wastewater Treatment –wastewater treatment plants, and on-site wastewater systems
- Land Use - agriculture, forested areas, open space
- Streetlights - type

Most data collected in the inventory are parsed by taxing jurisdiction (town, county, and city) and in some cases by zip code. Other data were from the following sources:

- LIPA electric data by municipality (including villages and some unincorporated areas)
- National Grid gas data by zip code
- Fuel Oil – from the Oil Institute of Long Island
- Transportation data – by community, but includes vehicles traveling through

The inventory methodology utilized by NYIT was based in large part on the protocols developed by the New York State (NYS) GHG Protocol Working Group that was administered by the New York State Energy Research and Development Authority (NYSERDA). The emissions inventory developed by NYIT was provided by Long Island's Climate Smart Communities Coordinators to Suffolk County and other participating CSCs using the template developed by the NYS GHG Protocol Working Group. The NYIT spreadsheets contain the raw data, calculations, emissions factors, and methodology involved with the development of the Long Island GHG inventory. Participating CSCs will be able to use the inventory spreadsheets developed by NYIT for each sector for future emissions tracking. The NYIT GHG inventory project found a significant reduction in emissions on Long Island from 2005-2010 (see table on following page). As a region, Long Island reduced its overall emissions by 9.75 percent from 2005 to 2010. Quantitative metrics, like emissions reductions and cost savings, are often missing from community-level environmental initiatives.

The decline in fuel oil related emissions reflects a shift to natural gas as prices declined. Electricity related emissions declined slightly even though population increased, suggesting an increase in efficiency. A substantial decline in gasoline related emissions reflects both a switch to more efficient vehicles and the economic decline in the same period.

<i>Suffolk County GHG Emissions: 2005 - 2010 (Million MT CO₂e)</i>		
Source	2005	2010
Electricity	6.70	6.65
Natural Gas	1.83	1.94
Fuel Oil	3.43	2.81
Gasoline	6.18	4.75
Diesel	0.91	0.97
Total	19.05	17.12

Long Island Carbon Footprint Project, NYIT

1.2.5 Greenhouse Gas Emissions Reductions Targets

This Climate Action Plan seeks to establish policies and identify strategies that will reduce greenhouse gas (GHG) emissions to levels consistent with mitigating the worst effects of climate change. Scientific consensus suggests that an 80 percent reduction in GHG emissions under 1990 levels by 2050 is necessary to achieve that result, and New York State policy has set that as long-term target for Statewide GHG emissions.

Government Operations Goals

Suffolk County government has direct control over a significant number of buildings and other facilities and a large fleet of vehicles. Investment in and management of these assets can make significant changes in energy use and GHG emissions. A target of 20 percent reduction in emissions by 2020 from 2005 baseline government operations represents a meaningful but achievable goal for Suffolk County. This target is substantially consistent with New York State Executive Order 88, which calls for a 20 percent reduction in energy use intensity in State owned and operated buildings by 2020. The County has already realized measured reductions of 30 percent-60 percent in major facilities where energy efficiency improvements have been carried out.

Community-wide Goals

Suffolk County government has less direct control of the individual decisions that influence community emissions, as the County has no zoning authority. The Suffolk County Planning Commission has limited review authority over municipal land use decisions. Without this control, its ability to generate emissions reductions related to development and transportation are limited. However, the County has utilized its ability provide regional leadership and adopt policies that encourage improved efficiency and adoption of renewables. These programs and policies are highlighted in Section 3 of this Plan.

There is reason to be somewhat optimistic concerning community-wide reductions in GHG emissions. The Long Island Carbon Footprint Project found that overall emissions in Suffolk County dropped from 19.05 million metric tons CO₂e in 2005 to 17.12 million metric tons CO₂e in 2010, a reduction of about 10 percent. Analysis by the Sustainability Institute at Molloy College indicates that already planned changes to the LIPA electric generation fleet on Long Island, along with projected reductions from energy efficiency programs and investments in renewable energy, would reduce the carbon emitted by electric generation by an amount approximately equal to 10 percent of Long Island's overall GHG emissions in 2010.

Vehicle related emissions make up about 31 percent of Long Island's total GHG emissions. Emissions from on-road vehicles dropped from 12,960,118 MT CO₂e in 2005 to 10,854,420 in 2010, a drop of 16.25 percent, even though vehicle miles traveled increased slightly during that period. This is believed to be due primarily to consumers choosing more fuel-efficient vehicles. It is anticipated that increases in federal fuel efficiency standards for new vehicles (new CAFE standard of 54.5 mpg by 2025) will have a significant effect on reducing GHG emissions in Suffolk County, as these more efficient vehicles displace the existing fleet. Continued population growth could reduce the positive impact of the new fuel standards. The County has recognized that more people means more emissions and congestion and has introduced 'Connect Long Island' a new mass transit initiative described in subsequent pages of this document.

With this in mind, this Climate Action Plan sets a target of 20 percent reduction in community-wide emissions below the 2005 baseline by 2020.

1.2.6 Climate Smart Community Certification

Suffolk County intends to participate in the Climate Smart Communities (CSC) certification process, to document the efforts being made by the County. The County has already made significant progress toward achieving the 13 priority actions that are identified in the CSC Certification Manual. Priority actions completed by Suffolk County include the following:

1. *Pass a resolution adopting the CSC Pledge:* Suffolk County adopted the CSC pledge by resolution in 2012.
2. *Create a community Climate Smart Community task force focused on climate mitigation and adaptation:* The resolution adopting the Pledge also created a Climate Smart Community Standing Committee comprised of County officials and community members.
3. *Develop a community GHG emissions inventory:* The Long Island Carbon Footprint Project has provided community-wide data at the county level.
4. *Establish a government operations emissions reduction target:* The target has been adopted as part of this plan.
5. *Establish a community emissions reduction target:* The target has been adopted as part of this plan.
6. *Develop a government operations climate action plan:* This plan includes the government operations climate action plan for Suffolk County.
7. *Develop a community climate action plan:* This plan includes the community climate action plan for Suffolk County.
8. *Conduct energy audits of local government buildings:* Suffolk County has completed audits and begun upgrades on most of its highest energy use facilities. Audits of other facilities are ongoing.

2 MUNICIPAL FACILITIES AND OPERATIONS

2.1 Buildings

Reducing energy consumption through energy efficiency improvements and conservation measures in existing buildings is one of the most cost effective ways to reduce greenhouse gas emissions. At the same time, this work will increase economic activity by creating local jobs and reducing municipal energy costs for taxpayers. Suffolk County has been an early adopter of many of these energy efficient technologies, which has resulted in significant returns in terms of energy and cost savings.

2.1.1 Accomplishments

Energy conservation initiatives at various County facilities are reducing energy consumption in County facilities by incorporating energy saving features into new designs, major renovations, and other related upgrades. The program is implemented independent of other resources, but leverages financial and equipment incentives offered by LIPA, National Grid, NYSEDA, NYPA, and others. The County established a priority system to ensure maximum return on investment.

The County has achieved measured reductions in energy use of 30 percent-60 percent in targeted buildings. Suffolk County is the number one government participant in LIPA efficiency programs. The County has received \$3 million in rebates from LIPA. Suffolk has undertaken energy efficiency retrofits of the following facilities:

- H. Lee Dennison Building
 - Installation of energy-efficient condensing boilers
 - Various lighting upgrades
 - Installation of occupancy sensors
 - Project cost: \$500,000
 - LIPA rebate: \$43,264
 - National Grid rebate: \$100,062
 - Annual electric savings: 1,053,000 kWh
 - Annual gas savings: 53,190 therms
- Farmingville Health Center
 - Major HVAC upgrades
 - Installation of low-emissivity windows
 - Various lighting upgrades
 - Installation of occupancy sensors
 - Project cost: \$700,000
 - LIPA rebate: \$4,953.10
 - Annual electric savings: 281,920 kWh
 - Annual gas savings: 718 therms
 - Board of Elections Building
 - Installation of energy-efficient condensing boilers
 - Various lighting upgrades
 - Installation of occupancy sensors
 - Beginning in 2014, the County has planned several phases of major retrofits to achieve near net-zero energy consumption



- Cohalan Court Complex
 - Major HVAC upgrades
 - Various lighting upgrades
 - Installation of occupancy sensors
 - Project cost: \$1,000,000
 - LIPA rebate: \$186,000
 - National Grid rebate: \$100,000
 - Annual electric savings: 824,000-KWh
 - Annual gas savings: 46,156-therms
- Sydney B. Weinberg Forensic Sciences Building
 - 65 kW micro-turbine
 - Major HVAC upgrades
 - Various lighting upgrades
 - Insulation improvements
 - Installation of occupancy sensors
 - Project cost: \$5,600,000
 - LIPA rebate: \$500,000
 - Annual electric savings: 2,423,100 kWh
 - Annual boiler gas savings: 74,510 therms
- Riverhead County Complex
 - Decentralization of high temperature hot water boilers at the power plant
 - Installation of energy-efficient condensing boilers at the Evans K. Griffin County Center building
 - New boilers and heat exchangers for the Arthur M. Cromarty Criminal Courts building and the Riverhead Detention Facility.
 - Chiller plant optimization
 - Total estimated project cost: \$3,000,000
 - Realized annual savings (as of March 2012): \$170,000
 - Expected total annual savings: \$820,000
 - Project payback period: 3.7 years
- Griffing Avenue Courts Building
 - 24 kW solar array - including an LCD display to show energy production and savings
 - Electric vehicle charging station
 - Various lighting upgrades
 - Next phase of improvements will include chiller optimization
 - Project cost: \$235,200
 - LIPA rebate: \$51,480
 - Annual electric savings: 30,660 kWh
 - Annual savings: \$4,600
- Bergen Point Waste Water Treatment Plant
 - 24 kW solar array
 - Major HVAC upgrades
 - Various lighting upgrades
 - Project cost: \$5,138,000
 - LIPA rebate: \$74,200
 - National Grid rebate: \$143,000
 - Annual electric savings: 1,579,837 kWh
 - Annual gas savings: 225,560-therms



- Suffolk County Police Department: Fourth Precinct Building
 - New construction – built according to LEED Silver standards
 - 43 kW solar array
- Scully Estates
 - Renovated according to LEED EB 2.2 standards
 - Major HVAC upgrades
 - Project cost: \$2,000,000
 - KeySpan grant: \$25,000
- W.H. Rogers Building
 - Major HVAC upgrades
 - Electricity savings of over 30 percent annually
 - Natural gas savings of over 25 percent annually

For more details about energy efficiency projects at Suffolk County Facilities see Appendix C.

2.1.2 Projects and Policies under Consideration, Development, or Implementation

The County has been actively pursuing a number of measures to retrofit its buildings to make them more energy efficient. Continuing measures include, but are not limited to, extensive lighting retrofits, chiller plant optimization, building management systems, and real-time remote monitoring. Suffolk County Department of Public Works has installed remote monitoring systems in 16 facilities. The total estimated cost is \$ 3,261,000 for total annual savings of \$ 1,149,000. The project payback period is 2.8 years.

Beginning in 2014, the Board of Elections building will undergo several phases of major retrofits to achieve near net-zero energy consumption level, that is, on-site generation of all energy needs such as heating, air conditioning, lighting and other electricity demand. The County plans to use this project as a showcase and replicate it on other County buildings. The Suffolk County Climate Smart Communities Standing Committee would like to highlight the next phase of improvements as a CSC demonstration project. Improvements will include the following:

- Replace all single pane windows with energy efficient argon-filled double-pane windows.
- Replace existing constant-volume air handlers with variable-volume air handlers; the latter approach reduces energy consumed by fans and provides more efficient dehumidification.
- Investigate the feasibility of replacing existing inefficient air-cooled chiller with a ground-coupled geothermal system.
- Install a building management system with remote access to control and monitor climate conditions in the building.
- Replace the existing roof with an insulated standing seam metal roof and 100-kW solar panels as part of the phased approach.

Other projects underway include the following:

- Currently upgrading interior and exterior lighting with LED; phasing out high-pressure sodium, T-12, and metal halide fixtures.
- Established policy by executive order to evaluate cool roof and/or green roof options for all new construction and renovation of flat roofs.



- Established policy requiring compliance with LEED principles, although not certification, for construction of County buildings and renovations over \$1 million and for projects “built to suit” for long-term leases.
- Established policy for all capital projects for new facilities to incorporate energy conservation into their design.
- Continuing to pursue energy modeling with support from the SUNY at Stony Brook University Advanced Energy and Research Technology Center.
- Continuing partnership with BOCES to improve energy efficiency of school districts.
- Continuing to make municipal facilities available for third parties to install and test new or emergent technologies and systems, including the following:
 - Ice storage
 - Fuel cell systems
 - Micro-turbines

2.1.3 Potential Future Actions and Initiatives

Suffolk County has discussed a number of forward-thinking actions to finance, manage, and upgrade its buildings. The County plans to continue with retrofits of municipal facilities including the installation of white and green roofs, improved insulation, and window replacements.

The County recognizes the importance of a real time energy management and building dashboard Information system. That project is therefore considered as CSC demonstration project and is described on the following page. The project would implement a web-based interface and dashboard of building automation Systems to monitor and control the entire County-owned building inventory. This would be electronically linked to building drawings, equipment operation guides, and maintenance records.

Suffolk County is considering the establishment of a self-sustaining Climate Smart fund for use by municipal departments, potentially in the form of a reinvestment fund to apply operating expenditure reductions to capital improvements.

It would like to implement energy-saving office practices including the following: automatic shutdown of computers after a designated time and would like to install occupancy sensors to drive heating and cooling systems.

The County identified additional energy-efficient projects for its 2014 budget including the following:

- Optimize or replace the chillers in several buildings.
- Install building management systems in ten buildings.
- Install combined heat and power (co-generation) systems in two of its largest buildings.
- Install efficiency upgrades including cool roofs, lighting upgrades, and windows in various facilities.



CLIMATE SMART COMMUNITIES DEMONSTRATION PROJECT

Real-Time Energy Management and Building Dashboard Information Project

Suffolk County has implemented an aggressive energy efficiency building retrofit program that includes a strong commitment to measurement and verification of energy use reductions. The related reductions in expenditures for energy represent recurring annual savings in the form of avoided operating costs, the benefits of which flow to Suffolk County taxpayers and less tangibly, to energy consumers throughout the Long Island region. Energy use reductions have been documented in year-over-year consumption comparisons based on utility billing data and limited use of real-time pulse monitoring of utility meters. At the time of this writing, real-time monitoring is being expanded to capture approximately 70 percent of electricity and natural gas consumed by County facilities.

Documentation of the energy efficiency program's success has been presented in the form of case studies; presentations to the Legislature and other municipal groups, private industry groups; and publicly available reports to elected officials. Ongoing assessment of program integrity has been critical to building support for continuation and expansion of these efforts.

Suffolk County has forged inter-municipal energy commodity and energy efficiency partnerships to foster a regional approach to energy issues with local towns, villages, school districts, libraries, and fire districts. In addition, the County has helped to found an ongoing public/private collaborative with seven local school districts, colleges, and universities that are jointly developing academic programs in energy. Academic programs in energy are intended to promote awareness of energy issues throughout the local population, promote a working understanding of energy issues throughout the workforce, and to encourage technical and non-technical career paths in the energy industry.

Going forward, the County would like to expand its commitment to need-based and data-driven decision making by developing a web-based building dashboard management tool. Making energy management information available to building managers in real-time will allow better decision-making and more efficient use of limited resources. Once the tool is developed, it can serve as a model and be offered as a service to other municipal partners.



2.2 Renewables

Renewable energy technologies are clean sources of energy that have a lower environmental impact than conventional energy technologies. Most renewable energy investments are spent on materials and workmanship to build and maintain facilities, rather than on energy imports. This helps to create local jobs, lower greenhouse gas emissions, and reduce reliance on foreign sources of energy. As an example, the solar photovoltaic (PV) industry creates 22.4 jobs per megawatt while natural gas in comparison creates 1.1 jobs per megawatt¹.



2.2.1 Accomplishments

Starting in 2007, Suffolk County began participating in EPA's Green Power Purchase program, with purchased green power representing 15 percent of the County's total electric consumption. In 2010, the County went out to bid in an effort to increase its green power purchase. Total electric consumption for 2010 was estimated at 130,000,000 kWh (\$20,280,000) at an average cost of \$0.156 per kWh. The County was able to make a Green Power Purchase of 117,000,000 kWh/year at a cost of \$98,000 per year. This was a one-year contract starting January 2011.

At the same time, the solar carport project, which was part of the LIPA 50 MW solar project, was beginning to be energized. As host to 12.83 MW of solar photovoltaics (PV), Suffolk County realized that it was no longer necessary to purchase green attributes from solar developments elsewhere, so the contract was not renewed for 2012. However, before ending the program, Suffolk County was designated by the EPA as the sixth "greenest" municipality in the United States for its commitment to the green power purchase program.

The County's commitment to solar energy is further evidenced by an executive order directing that new County buildings over 10,000 square feet include solar PV sufficient to provide 5 percent of anticipated peak electric load. The County has also installed solar PV panels at a number of its facilities including the following:

- Police Headquarters, Yaphank.
 - 50-kW PV system
 - NYSDERA grant: \$260,000 (50/50 match)
 - Annual savings: \$10,841
 - Cost to County = \$260,000
- Suffolk County Police Department, Fourth Precinct Building, Smithtown (LEED Silver)
 - 43-kW PV system
 - LIPA incentive: \$600,000
 - Annual savings: \$8,250
 - Cost to County = \$0
- Riverhead County Complex
 - 24-kW two-sided PV system
 - Cost to County: \$235,200

¹ EPA Clean Energy Strategies for Local Governments On-site Renewable Energy Generation (2008). Figure 7.2.1. Job Creation From Renewable Energy Projects per MW Capacity.
<www.epa.gov/statelocalclimate/documents/pdf/on-site_generation.pdf>



- Annual savings: \$4,600
- Griffing Avenue Courts Facility
- Bergen Point Waste Water Treatment Plant
 - 24-kW PV system
 - Cost to County: \$124,582 (after LIPA rebate of \$65,680)
 - Annual savings: \$4,216
- Citi Park Stadium, Islip Board of Elections
 - 5-kW PV system
 - Cost to County: \$0
- Suffolk County Parks – GAT/R Site (Montauk)
 - 5-kW PV system
 - Installed solar thermal domestic hot water system
 - Cost to County: \$17,320 (after LIPA rebate of \$22,680)
 - Annual savings: \$1,100
- Installed solar PV carports at several Suffolk County parking lots:
 - Current system: 12.83 MW
 - Four municipal campus lots
 - Two LIRR parking lots
- Solar lighting at DPW building in Yaphank

In addition, the County has two biodiesel pilot programs in progress, one at the Bergen Point /Indian Island facilities and the other as part of Suffolk County dredging projects.

2.2.2 Projects and Policies under Consideration, Development, or Implementation

Construction will begin in 2014 on a 100-kW solar PV system being designed as part of an upgrade to the Board of Elections facility that will include new roof and lighting. This system will use 100-kW of solar panels connected to the LIPA grid via a central inverter. The cost of the PV system is estimated at \$350,000. Savings are projected to be \$19,000/year.

2.2.3 Potential Future Actions and Initiatives

The County is exploring a number of initiatives that will expand its commitment to renewable energy. It plans to explore the feasibility of installing additional solar, wind, and geothermal systems at its municipal facilities. It will seek public-private partnerships to provide sites for new renewable technology projects. SunEdison is proposing to install two ground mounted photovoltaic systems, totaling 6.8 MW at Francis S. Gabreski Airport in Westhampton. The solar system will produce enough electricity to offset the CO₂ emissions from the electricity use of over 5,400 average homes. Suffolk County will incur no capital costs and will receive financial compensation in the form of annual lease payments from SunEdison. In return, SunEdison will sell all the electric power to PSEG-LI under its Clean Solar Initiative Feed-In-Tariff-II.

The County will explore educational partnerships and training programs, such as the proposed Renewable Energy Training Center for Suffolk County Community College. It will seek renewable incentives from PSEG-Long Island for Suffolk County facilities. Suffolk County will issue a request for proposals to install wind turbines on County-owned properties.



2.3 Exterior Lighting

Improving the efficiency of exterior lighting is one of the simplest, yet most effective changes to be made at the municipal level. While the County has explored several different exterior lighting technologies, LED lighting has provided the best return on investment to date. The typical LED street light uses 50 percent less energy per lumen than high-pressure sodium lighting, has an average lifespan 10 years longer than conventional lighting, and lower maintenance costs.

2.3.1 Accomplishments

Suffolk County made a commitment to upgrade the exterior lighting at many of its facilities. The installations included replacement of sodium and mercury vapor lamps with LED lamps and innovative solar lighting with battery storage. Exterior lighting improvements have included the following:

- Department of Public Works, Yaphank
 - Installed solar PV-powered LED parking lot lighting with battery storage.
 - Fixture type: pole mounted LED fixtures with solar panel and battery
 - Annual cost savings: \$1,358
 - Annual energy savings: 10,862 kWh
 - ARRA funds: \$104,400
 - Cost to County: \$67,600
 - Installed solar-wind pole lighting
 - Fixture type: Induction
 - Annual cost savings: N/A (new installation)
 - Annual energy savings: N/A (new installation)
 - County funds: \$15,000
- North County Complex, Hauppauge
 - Replaced parking lot and street lighting
 - Fixture type: Induction
 - Annual cost savings: \$14,719
 - Annual energy savings: 47,169 kWh
 - ARRA funds: \$185,000
 - Cost to County: \$13,960
- Shinnecock Canal
 - Replaced existing mercury vapor pole lighting with LED
 - Fixture type: LED
 - Annual cost savings: \$1,844
 - Annual energy savings: 14,751 kWh
 - Cost to County: \$26,200
- Police Headquarters
 - Replaced high pressure sodium fixtures with LED fixtures
 - Fixture type: LED
 - Annual cost savings: \$8,500
 - Annual energy savings: 22,265 kWh
 - Cost to County: \$46,380
- Sixth District Court, Patchogue
 - Replaced high pressure sodium fixtures with LED fixtures



- Fixture type: LED
- Annual cost savings: \$4,247
- Annual energy savings: 8,048 kWh
- Cost to County: \$28,600

2.3.2 Projects and Policies under Consideration, Development, or Implementation

The County has a number of initiatives in development that will further improve the efficiency of its outdoor lighting equipment. They include the following:

- Suffolk County has passed legislation requiring compliance with dark sky guidelines for exterior lighting on and near County properties.
- Continue with conversions of metal halide and high-pressure sodium lighting fixtures to more efficient LED lights. Depending on the type of exterior lighting, it may be possible to replace the bulb rather than the whole fixture.
- Where feasible, continue to install solar PV LED lighting with battery backup for critical facilities.
- Passed Resolution No. 732-2013 to reduce light pollution from County-owned facilities through the regulation of correlated color temperature of exterior lighting.

2.3.3 Potential Future Actions and Initiatives

The County plans to continue its exterior lighting upgrades. It is considering performing an audit of all of the exterior lighting it owns and operates, including street lights, traffic lights, parking lot lights, and other exterior lights (*e.g.*, parks).

Where feasible, Suffolk County will continue to retrofit exterior lighting by using renewable sources of power to reduce costs and increase system resiliency.

The County plans to work with the Climate Smart Communities Coordinator to develop and host a workshop to identify best practices and the latest technologies for energy efficient exterior lighting for municipalities.



2.4 Fleet

As the second-largest county (by area) in New York State, Suffolk County employees rely heavily on the County fleet. There are numerous benefits to developing a more fuel efficient fleet. By purchasing and driving vehicles that have a higher MPG rating, the County can decrease greenhouse gas emissions while cutting fuel costs. The initial additional cost associated with more fuel efficient vehicles can typically be recouped in a relatively short time.

2.4.1 Accomplishments

Suffolk County has actively sought to increase the fuel efficiency of its vehicle fleet. The County has upgraded its fleet by introducing hybrid electric light-duty vehicles (HEV) and compressed natural gas (CNG) heavy & light duty vehicles. It has 110 hybrid vehicles in its fleet of approximately 2,000 non-emergency vehicles. The County installed Level 1/Level 2 electric vehicle charging station at its Griffing Avenue Courts building to service its electric and plug-in electric vehicles.

The Suffolk County Department of Public Works installed two publicly accessible, fast-fill CNG fueling stations. Both stations have separate billing systems for County fleet vehicles and the public. Details of the two stations are as follows:

- Commack
 - Cost: \$1,577,037
 - Project timeline: 7 months
 - Funding: 50 percent ARRA funds
- Westhampton Beach
 - Cost: \$2,196,547
 - Project timeline: 6 months
 - Funding: 50 percent ARRA funds

2.4.2 Projects and Policies under Consideration, Development, or Implementation

Suffolk County DPW is planning to construct an additional CNG fueling station in Yaphank. The County is monitoring vehicle use patterns with fleet management software, resulting in reduced fuel use and decreased maintenance costs.

2.4.3 Potential Future Actions and Initiatives

Suffolk County is considering municipal capital leasing in place of purchases to eliminate the upfront cost associated with vehicle purchases. Capital lessees typically own the vehicle at the end of the lease. The County will also determine the best locations for additional electric vehicle charging and alternative fuel vehicle filling stations. Potential locations could include municipal facilities, transit stations, schools, and office complexes. The County plans to contract with vendors through inter-municipal coordination and the Long Island Purchasing Council to install charging/fueling stations.

Suffolk County is supportive of the Long Island Green Homes Consortium's initiative to create an east-west EV charging station corridor on Long Island, and is hopeful that this important, regional project will



be selected for NYS funding through the Cleaner, Greener Grant. Suffolk County will participate in the planning activities and drafting of model codes through the Suffolk County Planning Commission and the Department of Economic Development and Planning. Creating such a corridor will have significant benefits to Suffolk County residents, including; strengthening the competitive position of commercial and industrial areas on Long Island; improving property values; and reducing greenhouse gas emissions.

Suffolk County is committed to working with the other municipalities and organizations in creating this east-west corridor. Specifically, the County will assist wherever possible in completing a feasibility siting study and drafting design specifications. The County will also be open to the construction of EV charging stations at County facilities in future funding rounds, if a siting study has specific recommendations for stations on County property.



Fleet



2.5 Solid Waste and Wastewater

Wastewater management is highly complex in Suffolk County, with a system that includes several large municipal treatment plants, approximately 160 privately owned wastewater treatment facilities, and many thousands of individual septic systems (approximately 75 percent of the County is unsewered). Sewage treatment is a significant part of the County's government operations energy use and GHG emissions. Expanding sewage treatment can also reduce nitrogen loading. This helps to maintain healthy wetlands that are important to protecting against increased storm surges and flooding due to climate change. The County is currently performing several planning and feasibility studies to improve and streamline wastewater treatment throughout the County.

Efficient management of solid waste is also vital to the health of Suffolk County, as every step in the life cycle of municipal solid waste (MSW) management contributes to greenhouse gas emissions— from the production of the products that eventually become municipal solid waste to its collection and eventual decomposition.

According to the New York Institute of Technology, the Long Island Carbon Footprint 2013, assigned per person Carbon Footprint for Waste Water Treatment is 0.1129 MT CO₂. Nitrogen is the major element discharged in wastewater. The US Environmental Protection Agency notes that septic systems account for about 0.5 percent of the total per capita CO₂e emission rate in the United States (*i.e.*, 23 tons CO₂e/capita-year;). Septic tanks also emit methane, a more dangerous greenhouse gas. According to a 2010 report published by the Water Environment Research Foundation, *"a majority of the methane emissions associated with wastewater originate from conventional septic tank systems, due to the large number of individual septic systems now in use."*

According to the Long Island Regional Economic Development Council (REDC) plan, the lack of regional sewer infrastructure is a key roadblock to successful economic growth (Critical Issue #2, pages 34 & 47). The 2013 Cleaner Greener Communities Long Island Sustainability Plan, under the goal of Increasing Water Pollution Control (page 107), cites Strategy 3.1 *"Conduct a feasibility study to convert septic systems in priority areas to cluster treatment facilities with better treatment capabilities"* and Strategy 3.2 *"Incentivize the replacement or retrofit of failing septic systems."* The REDC plan reflects general agreement across Long Island that expanded sewer infrastructure and water quality protection is needed in Suffolk County for economic development expansion and drinking water and surface water protection. The County is examining options for wastewater treatment that will improve water quality by reducing nitrogen loading and reduce energy consumption at its existing facilities. Reducing nitrogen loads to surface waters will also help sustain Suffolk County's wetlands that are important in protecting against the increased storm surges and flooding anticipated from climate change.

2.5.1 Accomplishments

Wastewater treatment plants consume large amounts of power. The County made a number of efficient and renewable energy upgrades to its Bergen Point Wastewater Treatment Plant. The work included the installation of a 24-kW solar array, major HVAC upgrades, and various lighting improvements. Project costs and savings were as follows:



- Project cost: \$5,138,000
- LIPA rebate: \$74,200
- National Grid rebate: \$143,000
- Annual electric savings: 1,579,837 kWh
- Annual gas savings: 225,560 therms

In 2011, Suffolk County passed a resolution establishing a Sewer Infrastructure Committee to devise programming for the expansion of wastewater collection and treatment and to institute distributed (community) wastewater treatment to address the problem of onsite systems (*i.e.*, cesspools/septics). In 2013, the County allocated \$20 million to community sewer districts to expand and enhance sewer service.

2.5.2 Projects and Policies under Consideration, Development, or Implementation

The vast majority of residents and businesses in Suffolk County are served by traditional septic systems and cesspools. Despite the critical importance of wastewater treatment facilities to the County's environment and economic future, no central database existed that would provide a comprehensive and accurate picture of the County's wastewater treatment and service area infrastructure. In a move designed to provide critical baseline information for economic development and environmental land use planning, Suffolk County developed a GIS database for wastewater infrastructure. A Blue Ribbon Panel (Resolution 40-2012) was formed drawing experts from the departments of Economic Development and Planning, Health Services, and Public Works, as well as town, village and federal government representatives charged with examining the consolidation of multiple sewer districts into one. The Suffolk County Department of Economic Development and Planning, in conjunction with the departments of Public Works and Health Services, developed a verified, current database that can be used to define and inform a region-wide perspective on the status of wastewater treatment infrastructure. It included publicly and privately owned treatment plants and the areas and population served by this infrastructure in Suffolk County. The County was awarded a National Association of Counties 2013 Achievement Award for Wastewater Infrastructure Mapping.

Suffolk County has initiated an effort to develop a fuel product from the municipal waste stream that would be equivalent to #2 fuel oil (or of a higher quality). Fats, oils, and grease (FOG) – wastewater to energy operation was developed in close cooperation with the Department of Public Works (Sanitation), Brookhaven National Laboratory (BNL), and a private sector partner, Changing World Technologies (CWT) to evaluate the technical and economic potential of converting the County's wastewater stream to liquid fuel. This collaboration has received limited funding through the capital budget under CP 8186 - Fats/Oils and Grease to Fuel Demonstration Project.

CWT (now RDX Technologies Corporation) has converted other raw organic products into a commercially available synthetic liquid fuel that BNL has evaluated and determined to be suitable for use in boilers. The intended environmental benefits of the process include capture and reuse of the heat content of the County's wastewater stream, reduction in the volume of sludge produced and sludge carting fees, and production of a clean-burning alternative to traditional fuel oil. If the volume of wastewater to be treated can be reduced by the harvesting of latent energy now discarded, it may be



possible to process waste from a greater number of source facilities with smaller pipelines and lower plant capacity. The result could be more cost effective expansion of sewer districts across the County.

Suffolk County currently spends approximately \$6 million annually to haul sewage sludge out of Suffolk County and is currently soliciting proposals for alternatives. Converting a portion of the sludge to fuel could reduce nominal carting fees resulting in recurring annual savings in the form of avoided costs. If an adequate market for the liquid fuel can be cultivated, the County could realize a potential revenue stream for which there is no shortage of feedstock. Depending on successful implementation of the technology, and other factors, it may be possible to eliminate sludge hauling entirely.

2.5.3 Potential Future Actions and Initiatives

2.5.3.1 Wastewater

The County is actively engaged in a major initiative to improve the quality of its groundwater and surface waters. As part of that initiative, the County intends to undertake the following:

- Explore the feasibility of a single County-wide water/wastewater district that includes all properties, sewer and unsewered.
- Implement a pilot program using the portion of the County's Sewer Assessment Stabilization Reserve Fund and the New York State funding allocated in 2014 dedicated to addressing the County's large and growing problem of aging and failing cesspool and septic tanks.
- Consider a Water Protection Fee that would be paid by all property owners who draw water from our sole-source aquifer to augment sewer fees. Fee to be based on water use, assessed value, on-site system, or sewer connection.
- Consider an additional ¼-percent sales tax for aquifer protection.
- Utilize the Water Protection Fee to upgrade onsite systems (OWTS) and wastewater treatment plants (WWTPs), construct new regional and community WWTPs, service all OWTS and WWTPs.
- Consider the creation of a regional responsible management entity to upgrade, manage, and finance the upgrade of OWTS.
- Implement gray water or effluent reuse systems for appropriate County facilities, such as golf courses and parks.
- Identify pilot projects to study gray water reuse, and direct Department of Health to study and establish standards for gray water reuse, to reduce energy use due to load on sewage treatment facilities and pumping of fresh water.

2.5.3.2 Solid Waste

The County plans to examine the following measures to reduce the quantity of solid waste it generates and increase its participation in recycling programs:

- Implement paperless office preferences in County offices.
- Ban the use of disposable Styrofoam products throughout by the County.
- Work with municipalities to include County facilities in recycling programs, as is being done with the Brookhaven program.



2.6 Operations

Environmentally preferable products, services and operations have a reduced effect on human health and the environment when compared with competing products or operations. Often, small changes to purchasing and operating protocols contribute significantly to meeting the County's environmental goals, improving worker safety and health, and reducing health and disposal costs. These small shifts in the selection of products and office operational practices can have a major impact on energy use and expenses.

2.6.1 Programs and Policies in Effect

Working with Nassau County, Suffolk County established the Long Island Purchasing Council (LIPC). Suffolk County examined its purchasing policies and established several new guidelines. It adopted a purchasing policy banning inefficient light bulbs in County facilities. It adopted another purchasing policy requiring Energy-Star certified products in County facilities. It also adopted a policy requiring green/biodegradable cleaning products for use in County facilities.

Suffolk County added staff to provide full-time monitoring and management of its building management systems and real-time monitoring systems.

The County established the *Energy Commodity and Energy Efficiency Collaborative*. Because of close cooperation between Budget Review, the Department of Public Works, and the County Attorney's Office, Suffolk County has awarded several natural gas commodity purchase contracts through the request for bids (RFB) process since 2010, the most recent beginning in January 2013. The contracts are open to all municipal subdivisions within the County and currently include forty-three school districts, five towns, three fire districts, and one library. While savings attributable to the purchase of energy commodity can result in marginal energy bill reductions, the most significant savings are achieved through energy efficiency upgrades. Energy efficiency is the most effective way to "eliminate" a significant portion of energy bills, especially when the cost of energy commodity may spike.

The goal of the *Energy Commodity and Energy Efficiency Collaborative* is to assist all municipal subdivisions within the County to reduce energy use. This effort includes periodic training of personnel through voluntary contributions by equipment providers, local union trade schools, and other interested partners in academia. In close cooperation with Eastern and Western Suffolk BOCES, the training offered to operations and maintenance personnel (including the County's own employees) will be adapted for classroom instruction for vocationally oriented students.

Budget Review and DPW are working closely with BOCES organizations to create an internal (BOCES) position that would serve as an energy resource for the benefit of all Suffolk County school districts. That resource would be effective in identifying baseline conditions of all school facilities, scoping energy projects, evaluating energy project proposals, and coordinating energy project upgrades. Western Suffolk BOCES has retained two paid student interns to perform a baseline assessment of its facilities, and they have been working on that project since January 2014. In addition, adaptation of training sessions for the junior high and high school classroom will contribute to the sustainable use of energy by the next generation of consumers, and provide feedstock for local academic programs in energy.



2.6.2 Potential Future Actions and Initiatives

Suffolk County's CSC Task Force identified the following actions and initiatives that could reduce energy consumption and GHG emissions from its operations:

- Expand “green” purchasing policy to implement internally and through LIPC. “Green” purchasing includes buying recycled products, bulk or multi-pack items, used equipment and accessories and trades with other agencies, governments, and organizations.
- Implement energy-saving office practices, including: automatic shutdown of computers after a designated time, installation of light sensors, and occupancy sensors to control heating and cooling.
- Implement an asset management system to track material, equipment, and labor expenditures to identify savings opportunities.
- Develop and bring to the Legislature for adoption a comprehensive policy for employee energy conservation practices and training.
- Investigate the development of a policy to institute a performance-based ‘shared-savings’ incentive program to encourage innovation and energy savings by departments and employees.
- Career development of municipal employees is a critical component to long term, sustainable gains in energy efficiency. The State should create new civil service titles and job descriptions for positions necessary to meet the needs created by new technologies and economic realities.
- Establish best practices for maintenance of mechanical systems in municipal owned and operated building including the following:
 - Energy audits and retro-commissioning of all buildings, to be repeated on a 10 year schedule.
 - Annual re-commissioning of all major central building systems.
 - Annual tune-up, cleaning, and combustion safety test of all combustion systems, to ensure efficient and safe operation.
 - Tests for carbon monoxide leaks after repairs and maintenance of combustion systems.
 - Evaluations of the feasibility of installing of carbon monoxide detectors with digital readouts in all buildings with a combustion source, on all floors with a combustion source, and one floor above. This will allow workers to check on the safety of indoor air quality. It will also allow maintenance personnel to correct flaws in the combustion and ventilation systems before they are injurious to the health of workers. The County is reviewing the “*Steve Nelson Safety Act*” which would require carbon monoxide detectors with digital readouts in all regularly occupied County buildings.



3 SUFFOLK COUNTY COMMUNITY COLLEGE FACILITIES AND OPERATIONS

With approximately 27,000 students enrolled at three campuses in Selden, Brentwood, and Riverhead, Suffolk County Community College (SCCC) is the largest community college in the State University of New York (SUNY) system. The college offers Associate in Arts (A.A.), Associate in Science (A.S.), and Associate in Applied Science (A.A.S.) degrees and professional certificates in 100 programs of study. Suffolk County Community College is a two-year unit of the SUNY. The College's budget must be approved by the Suffolk County Legislature. For the 2013-2014 year, it included \$195 million in expenses. The Suffolk County Legislature approved a County contribution to those expenditures of \$39 million for that academic year. Suffolk County also designates a portion of its capital budget for College projects.

3.1 Buildings

Suffolk County Community College has three campuses: 1) the Ammerman Campus (720,355 sq. ft., 156 acres), 2) the Eastern Campus (189,143 sq. ft., 192 acres), and 3) the Grant Campus (584,371 sq. ft., 207 acres). In total, the College has 1,493,869 sq. ft. (555 acres). The College's Montaukett Learning Resource Center (Eastern) achieved LEED Gold Standard Design and its Workforce Development Tech Center (Grant Campus) achieved LEED Certified status.

3.1.1 Accomplishments

The College has completed numerous projects to increase campus energy efficiency. The NYPA Envest Energy Conservation Project included the following two phases and generated the savings as indicated:

- Phase 1 (2003 – 2011)
 - Installed web based building automation system (BMS) for all major buildings on all campuses
 - Installed variable speed drives
 - Replaced motors with premium efficiency motors
 - Converted constant volume air distribution systems to variable volume systems
 - Replaced chillers
 - Installed occupancy control of lighting
 - Savings (estimated)
 - Electric consumption – 3,575,758 KWH
 - Electric demand – 3,509 KW
 - Natural gas – 59,861 therms
- Phase 2 (2010 – 2011)
 - Replaced boilers
 - Replaced chillers
 - Replaced HID lighting (indoor)
 - Replaced burners and controls in central energy plant
 - Installed vending machine controls
 - Installed demand controlled ventilation
 - Savings (estimated)



- Electric consumption – 1,163,471 KWH
- Electric demand – 232 KW
- Natural gas – 105,960 therms
- Fuel oil – 8,966 gallons

The College completed a grant-funded condensing boiler project in 2011. It involved the installation of condensing boilers in five buildings. The project generated estimated energy savings of (natural gas) of 53,920 therms. The following buildings were renovated with extensive improvements to the building envelope and HVAC systems that included high efficiency variable refrigeration flow systems:

- Southampton Building (2012)
- Riverhead Building two upper floors (2013)
- Riverhead Building two lower floors (scheduled for 2014)

3.1.2 Projects and Policies under Consideration, Development, or Implementation

The following buildings will be upgraded in the years indicated:

- Science Building (Ammerman) (2014)
- Library (grant) (2014 – 2015)
- Health and Wellness Building (Eastern) (2015 – 2016)

3.1.3 Potential Future Actions and Initiatives

The College has applied for a grant to construct a Renewable Energy and STEM Center that will act as a showcase for the merits of renewable energy, provide a facility where the installation, repair and maintenance of renewable energy systems can be taught and create an opportunity to combine research from Stony Brook University with SCCC's expertise in training. A description is found in subsequent pages and is considered a Climate Smart Communities demonstration project.



3.2 Renewables

The College has actively supported use of renewable energy technology at its facility as part of its mission. It has installed solar voltaic panels and plans to add additional capacity. It is considering use of wind and geothermal technology.

3.2.1 Accomplishments

- Grant funded 702 KW system installed on Smithtown Science Building (2005)
- Capital project funded 7.2-KW system installed on Workforce Development and Technology Center (2002)

3.2.2 Projects and Policies under Consideration, Development, or Implementation

- Exploring rooftop and ground mounted solar PV installations at all campuses

3.2.3 Potential Future Actions and Initiatives

- Evaluating small wind generation possibilities and will consider geothermal and other renewable energy strategies in future capital projects, particularly Renewable Energy and STEM Center



3.3 Exterior Lighting

The College recognizes the need to comply with Dark Skies legislation. It is piloting LED lamps for its exterior lighting and plans for a full conversion should the tests prove cost effective.

3.3.1 Accomplishments

- All Eastern Campus light fixtures retrofit to full-cutoff, dark-skies compliant (2008)

3.3.2 Projects and Policies under Consideration, Development, or Implementation

- Pilot LED conversion project underway at Eastern Campus.

3.3.3 Potential Future Actions and Initiatives

- Evaluating LED replacements for exterior lighting



3.4 Fleet

Suffolk County Community College is committed to the use of alternative fuel vehicles. It currently uses all electric vehicles for campus maintenance. The College is reviewing several alternative fuel vehicle initiatives.

3.4.1 Accomplishments

- Electric service vehicles (approximately 15)

3.4.2 Projects and Policies under Consideration, Development, or Implementation

- Sustainable student transportation initiative
 - Discussion of Suffolk County transit partnership
 - Evaluating intra-campus shuttle at Ammerman
 - Discussions regarding Zipcar university program

3.4.3 Potential Future Actions and Initiatives

- Considering new procurement policies promoting alternative fuel and hybrid vehicles



Fleet



3.5 Solid Waste and Wastewater

Reduction of the school's water consumption preserves a valuable resource and reduces wastewater generation. Demonstrating green infrastructure is important to the school's mission as well as to its environmental impact. Reducing the College's solid waste generation will benefit its bottom line and make a valuable statement to its student body.

3.5.1 Accomplishments

- Grant-funded water conservation project (2010)
 - Installation of water conserving plumbing fixtures
 - Savings (estimated)
 - 750,000 gallons per year

3.5.2 Projects and Policies under Consideration, Development, or Implementation

- Grant-funded stormwater infrastructure project (2014)
 - Three storm-water infrastructure projects that capture storm-water and filter it through rain gardens

3.5.3 Potential Future Actions and Initiatives

- Solid waste stream audit



3.6 Education and Training Programs

Suffolk County Community College has as its mission the education of its 27,000 students. It offers extensive programming in the sciences and applied sciences. The College also has a Workforce Development program that focuses on technical training in the fields of renewable energy and energy efficiency. The Suffolk County Legislature approved funding in May 2014 for the design and planning of a Renewable Energy and Science, Technology, Engineering and Math (STEM) Center on the College's Michael J. Grant Brentwood Campus. This project is referenced elsewhere in this document as a Climate Smart Communities demonstration project.

3.6.1 Accomplishments

- Developed renewable energy/energy efficiency curriculum using seed funding (\$30,000) from Suffolk County (credit and non-credit)
- Proposed, designed and implemented Emerging and Transitional Worker Training
 - Grant-funded by NYSDOL, 2010-2011
 - Goal: Non-credit technical career training pathways to employment for unemployed/low income population
 - Energy efficiency, solar installer and LEED Green Associate training
 - GED preparation for those without high school equivalency
 - National Work Readiness credential for those without work experience
 - 150 people served
- Proposed, designed and implemented Pathways to Opportunities Within Energy & Renewables (POWER)
 - Funded by USDOL grant, 2010-2014
 - Goal: Increase “green capacity” by training unemployed and incumbent workers in energy efficiency, solar installer and LEED, using a pathways approach
 - Energy efficiency (BPI certification), solar installer (NABCEP entry level certification), LEED Green Associate training
 - GED preparation for those without high school equivalency
 - As of December 31, 2013, 377 participants served

3.6.2 Projects and Policies under Consideration, Development, or Implementation

- Planning geothermal exchange loop for Workforce Development Training Center with partial installation by students
- Proposed, designed and implemented Leading Innovation through Green High-Tech Engineering and Sustainability (LIGHTES)
 - Funded by NSF-ATE (Advanced Technical Education) grant, 2012-2015
 - Goal: Increase “green capacity” by offering engineering degree programs that include green energy courses, increasing alternative energy awareness, and providing green energy high school pipeline program experiences.
 - Enhanced Engineering Science and Electrical Technology degree courses and programs
 - Designed and offered new course in alternative energy
 - Infused concepts into pre-calculus courses on all three campuses



- Infused concepts into meteorology course
 - Pipeline activities
- Infused concepts into SCCC's Science & Technology program (STEP) physics, math, meteorology, physical geology and energy courses for students in grades 7-12
- Held summer teacher workshop, July 2013 and July 2014
- Proposed and designed Science Education for New Civic Engagements and Responsibilities (SENCER) implementation project sub-award
 - Funded by an NSF-SENCER grant, 2014
 - Goal: to re-design courses across the curriculum that will incorporate inquiry, hands-on, and community-based activities that address strategies to mitigate the deleterious effects of human activities on climate and the environment.
 - Students are currently studying nitrogen loading in water
- Offering continuing education energy awareness courses to Suffolk County residents

3.6.3 Potential Future Actions and Initiatives

- Proposed renewable energy and STEM center for Michael J. Grant campus
- Applied for larger NSF-ATE grant as a follow-up to LIGHTES



4 COMMUNITY-WIDE POLICIES AND INITIATIVES

4.1 Residential Buildings

With more than 569,000 housing units, the impact of residential energy use and waste generation in Suffolk County is substantial. According to the US Energy Information Administration's most recent Residential Energy Consumption Survey, US homes built in 2000 and later consume only 2 percent more energy on average than homes built prior to 2000, despite being on average 30 percent larger. The same agency also found a decline in the proportion of energy consumption used for heating and cooling (48 percent in 2009 vs. 58 percent in 1993). The study attributed the decline to increased adoption of more efficient equipment, better insulation, more efficient windows, and population shifts to warmer climates. Some of the decline is also due to increased energy consumption for appliances and electronics. Although larger appliances such as refrigerators and clothes washers are more efficient, the increasing number of energy-consuming devices has offset these efficiency gains.

Where people live also influences their energy consumption and greenhouse gas emissions. Single-family residences located outside the urban core, the downtown, or hamlet center require occupants to drive for all necessities and amenities. In fact, a recent study by [UC Berkeley researchers](#) found that densely populated areas contribute less greenhouse gas emissions per person than their suburban neighbors do. Suffolk County created an incentive program to direct new development to hamlet centers, downtowns, and transit hubs. The County is also considering other measures to discourage sprawl and reward energy efficiency.

4.1.1 Laws, Codes and Regulations in Effect

The Suffolk County Planning Commission has developed guidelines for approval by which all new residential, commercial, and industrial buildings should be designed and constructed to reduce energy consumption and improve environmental quality.

4.1.2 Current Programs and Policies

Suffolk County is currently carrying out its first Carbon Monoxide Safety Awareness Campaign declaring January 2014 to be Carbon Monoxide Awareness Month. This awareness campaign seeks to inform homeowners of the hazards that carbon monoxide presents and to encourage homeowners to have home energy audits completed, which include combustion safety tests. This awareness campaign will promote public safety, while also encouraging homeowners to take steps toward making their homes more energy efficient.

The County has developed flood and emergency preparation materials for distribution to homeowners. Information includes emergency preparedness procedures, directory of local resources and services, as well as information about flood insurance, home retrofits and resilient building material requirements for properties within flood hazard areas.



“Jumpstart Suffolk” is part of the County’s comprehensive economic development strategy to encourage mixed-use development projects that support place-making, encourage job creation, enhance public transportation, are environmentally sustainable, and provide ‘places of interest.’ The County budgeted \$5 million for 2015 projects.

4.1.3 Programs and Policies under Consideration for Potential Future Action

Incentivize mixed use/mixed income development in hamlet centers, downtowns, and transit hubs by reducing sewer connection fees. Discourage development in less desirable areas (valuable open space/undeveloped land, etc.) by increasing connection fees and making program revenue neutral.

Evaluate feasibility of modifying the mortgage recording tax to incentivize energy efficiency beyond the current code requirements. Set lower tax for more efficient buildings and higher tax for less-efficient buildings to make program revenue neutral.



4.2 Commercial and Industrial Buildings

Based upon the successes of the energy efficient improvements and operational changes at many of the County's larger facilities, Suffolk County's many commercial and industrial buildings could achieve similar results. Reducing energy and operating costs for local businesses helps both the environment and the local economy.

4.2.1 Laws, Codes and Regulations in Effect

The Suffolk County Planning Commission has developed guidelines for approval to which all new residential, commercial, and industrial buildings should be designed and constructed to reduce energy consumption and improve environmental quality.

4.2.2 Programs and Policies under Consideration for Potential Future Action

Suffolk County applied for municipal membership to work with the New York State Energy Improvement Corporation's Energize NY (PACE) Benefit Financing Program. The Program offers financing for energy upgrades on real property using PACE (Property Assessed Clean Energy) financing. The Energize NY Program provides marketing and outreach assistance for energy upgrade programs at the local level. The County would offer this PACE funding mechanism to commercial property owners to allow them to finance energy-efficient improvements, reducing both emissions and daily operating costs. The County is also considering the following other initiatives.

- Explore the feasibility of requiring or incentivizing white/green roofs and other elements of passive solar design, energy efficiency, and greenhouse gas sequestration for commercial and industrial properties.
- Explore the feasibility of requiring or incentivizing electric vehicle charging stations at centers of employment.
- Coordinate inter-municipal cooperation to develop a unified, expedited permitting process for private installation of alternative fuel and electric vehicle charging infrastructure at commercial/industrial properties.
- Coordinate inter-municipal cooperation to develop a unified, expedited permitting for site plans that incorporate sustainable features and/or practices.
- Explore the feasibility of a local green business incubator.
- Require energy efficiency and cost evaluations at property transfers, to be paid by seller. Tie property mortgage recording tax to efficiency - with larger homes requiring greater efficiency in a revenue neutral program.
- Collaborate with local utilities to review, revise, and promote energy-efficiency incentives for large commercial properties.
- Offer refunds of LEED certification fees for eligible projects (Town of Babylon, 2006).
- Work with the Suffolk County Planning Commission to develop model codes to expedite permitting for private installation of alternative fuel and electric vehicle charging infrastructure in local municipalities.



4.3 Community-Wide Policies and Initiatives to Promote Renewable Energy

As Suffolk County has little land use and zoning authority, its potential impact on community-wide renewable energy use is limited. It is, however, able to formulate model codes, policies, and guidelines for adoption by the towns and villages.

4.3.1 Laws, Codes and Regulations in Effect

The Suffolk County Planning Commission brought together representatives from the towns of East Hampton, Southampton, Riverhead, Brookhaven, and Southold to create a wind code template to encourage small-scale wind as an accessory structure/use while developing consistent regulations and implementing best practices across the East End. The purpose was to avoid wind installations having to be approved by the town boards, and instead make them eligible for a permit from each town's building department if they meet certain criteria for setbacks, noise standards, safety measures, etc. The code has different requirements for residential, commercial, and industrial zones. The Town of Brookhaven adopted the code in 2013, and several of the other towns plan to consider adoption in 2014.

Suffolk County Planning Commission worked with local towns to develop a unified solar permitting code. In the face of the US DOE identifying varying permit processes across municipalities as one of the top reasons holding back widespread adoption of solar across the United States and with local Long Island solar contractors complaining about being stymied by various rules from jurisdiction to jurisdiction, the Suffolk County Planning Commission initiated an effort that brought Suffolk's towns and villages together to develop a streamlined and standardized permit process for residential solar installations. With the help of LIPA and the Nassau County Planning Commission, in 2012 the Long Island Solar Permitting Initiative (LIUSPI) was adopted not only in all ten of Suffolk's towns (and many villages), but also in several Nassau County villages as well. This is believed to be the first time that Suffolk's 10 towns worked together to create code and then have that code adopted by all of the townships.

The new permitting process reduced paperwork and other requirements that in the past had added time and expense. At the same time, the new requirements provided better information for municipalities and first responders. In particular, the new procedure required a minimal fee for solar panel permit applications; created a new targeted 'fast track' permit application that allows professional certification of plans while not requiring a property survey; required municipal permit determinations in 14 days; created a central registry of solar installation; and required warning labels on the utility meter and an AC disconnect switch.

In 2013, NYSERDA and Governor Cuomo used the LIUSPI effort as a basis for a standardized solar permitting program throughout NY State. In 2012, Suffolk County was awarded a National Association of Counties (NACO) Achievement Award for the County Planning Commission's efforts to create the LIUSP. In addition, following prominent coverage in the national solar industry press, Planning Commission Chair David Calone was asked to brief to counties in suburban Chicago about how Long Island was able to streamline the permitting process at an event held at the Illinois Institute of Technology in July 2012.



Suffolk County Planning Commission established renewable guidelines for new developments: When possible new buildings should utilize solar, wind and/or geothermal. When laying out new developments consideration should be given to orienting buildings to best utilize solar energy.

4.3.2 Current Programs and Policies

- Solar PV installations are exempted from County sales tax
- The Suffolk County model geothermal code was adopted by the Suffolk County Planning Commission in early October and will be rolled out to the municipalities along with a PSEG municipal incentive for adoption in November.

4.3.3 Programs and Policies under Consideration for Potential Future Action

- Continue to pursue incentives, such as sales tax exemptions, for solar PV and other forms of renewable energy (PSEG).
- Explore the feasibility of additional incentives (*e.g.*, Town of Islip code allows for increased density for developments with renewable installations).



4.4 Transportation

With a land area greater than 900 square miles, an efficient transportation system is vital to Suffolk County. Traditionally, the County has been an auto-dominated landscape, with land use patterns and transportation options centered on the use of private automobiles. However, in recent years, the County has taken several steps toward expanding public transportation options and encouraging the use of cleaner, more efficient technologies. In Suffolk County, three of four people drive to work alone, while only one of 10 takes public transit. The average Suffolk resident drives 40 miles per day. Total regional on-road emissions were a staggering 10,832,238 MTCO₂e in 2010, with 84 percent stemming from gasoline used in passenger vehicles.

4.4.1 Laws, Codes and Regulations in Effect

The County has been encouraging the use of alternative fuel vehicles. It installed a publicly accessible electric vehicle (EV) charging station at Griffing Avenue Building. It also established preferential parking for vehicles with NYS Clean Pass at County facilities.

4.4.2 Current Programs and Policies

The County initiated the planning phase of *Connect Long Island* which will comprise a comprehensive regional transportation and development plan. The plan will lay the foundation for an innovation economy and sustainable growth by promoting transit oriented developments (TOD) and a 21st-century transportation infrastructure that connects these development hubs to our major research and educational institutions and innovation zones for emerging high-tech companies.

In March 2013, as the foundation of the *Connect Long Island* initiative, the County issued RFPs to work with the staff of the Department of Economic Development and Planning to complete phase two of the Suffolk County Comprehensive Master Plan 2035 and Bus Rapid Transit (BRT) feasibility study (NYMTC providing \$600,000 for projects).

In 2014, Suffolk County was awarded \$1.5 million from the LI Regional Economic Development Council and NYSEDA to implement the next phase of *Connect Long Island*. The proposed demonstration project will help meet one of the goals of the Cleaner, Greener Communities program by removing vehicles from the road each day reducing greenhouse gas (GHG) emissions by reducing vehicle miles traveled. Investments in this type of transportation infrastructure moves Suffolk County toward a more environmentally sustainable future. *Connect Long Island* supports smart growth and sustainable development by focusing new development around transit.

Suffolk Transit bus service has been expanded since 2013. Sunday service has been made available on critical routes on the East End.

Suffolk County is also expanding its bicycle network. The County has a policy that requires it to include bicycle lanes on new County road construction.



4.4.3 Programs and Policies under Consideration for Potential Future Action

Suffolk County has several other programs under consideration to expand available transportation alternatives to single occupancy vehicles including the following:

- Develop community-wide bicycle network, including a bike rental network, the provision of public parking (racks, lockers) and site plan requirements for bicycle racks/access.
- Provide incentives for carpooling/vanpooling: free park & ride lots, preferred parking at transit hubs, etc.
- Develop a car-sharing network: particularly useful for those with second homes, promotes use of public/more efficient forms of transportation, such as local shuttles, trains and buses.
- Site and construct an intermodal transit hub, attempt to coordinate schedules across modes.
- Expand network of sidewalks to encourage pedestrian activity throughout County communities.
- Utilize transportation assets for multiple functions such as road energy systems that use heat captured by asphalt to store and pipe heated water to nearby buildings.



Transportation



4.5 Educational Initiatives

4.5.1 Current Programs and Policies

Budget Review is currently working with representatives of the SUNY Chancellor's Office, seven local colleges and universities, and local school districts in a public/private collaborative effort to develop academic programs in energy. The K through 12 components of the effort will also include adult education opportunities intended to provide a general public education. High school coursework is intended to provide feedstock to undergraduate college programs. Technical and non-technical students of any participating college will be able to accrue credits from any other participating institution for the completion of degree requirements. The Suffolk County Legislature has supported this initiative for several years through the Suffolk County Community College budget process and with at least two letters of support signed by all legislators. That support has contributed to the growth of the collaborative and the recent award of a National Science Foundation grant. This effort is intended to support the development of high-technology energy industry functions here on Long Island, to retain local talent, attract students from other regions, and generally educate the local population on how personal activities influence the high cost of energy in our region.

Suffolk County Community College also offers non-credit, professional development courses to prepare for tests for BPI Building Analyst, Building Envelop and NABCEP Solar PV installation certifications, and continuing education energy awareness courses (*Be a Smart Energy Consumer* and *Solar Energy for Home and Business*) each semester in addition to an *Introductory ARCGIS* course and a *LEED Green Associate* course.

4.5.2 Programs and Policies under Consideration for Potential Future Action

Suffolk County Community College has proposed a continuing education course entitled *Does Climate Change Affect Us Locally?* The College is also considering offering a workshop series for various constituencies such as the public, teachers, and the trades in

- Current and emerging efficient lighting systems,
- Geothermal systems,
- Fuel cell systems and
- Electric vehicles.

The College has proposed a major new initiative – a Renewable Energy and STEM (science, technology, engineering, and mathematics) Center at its Grant Campus – see Climate Smart Communities demonstration project description on following page.



CLIMATE SMART COMMUNITIES DEMONSTRATION PROJECT

Renewable Energy & STEM Center

This building will act as a showcase for the merits of renewable energy, provide a facility where the installation, repair and maintenance of renewable energy systems can be taught and create an opportunity to combine research from Stony Brook University with SCCC's expertise in training. The building will house laboratories and classrooms where solar photovoltaics, wind power, geothermal and other renewable energy and energy conservation technologies can be taught. The first floor of this two-story building will be used for renewable energy training and for other STEM- (science, technology, engineering, and mathematics) related courses. The second floor will serve as an incubator for firms licensing technology from Stony Brook University. The building will be designed as a "Net Zero Energy Building." The energy required to illuminate, heat, cool and ventilate the building will be equal to or less than the energy produced from solar and wind sources.



4.6 Land Management

Suffolk County has acquired a large inventory of public land for diverse uses including local governance, highway maintenance, vehicle and equipment storage, rights-of-way, drainage, wastewater treatment, passive and active recreation, and conservation purposes. Suffolk County has invested more than \$1 billion in open space and farmland acquisition since 1959, representing the largest municipal investment of any County in the United States (Trust for Public Land). There are 162,510 acres of preserved land in Suffolk County. The County is continuing its investment in open space and has plans for new programs. Suffolk County is also actively encouraging land preservation through its efforts to incentivize infill development and transit oriented development.

4.6.1 Laws, Codes and Regulations in Effect

In 2012, Legislative Resolution No. 298-2012 directed the Department of Economic Development and Planning to review, update, and consolidate the County's open space master lists. There are 86 proposed open space assemblages identified as priority acquisitions, representing 1,040 parcels, 4,649 acres.

In 2013, Suffolk County updated Chapter 8, the Policy governing the County's purchase of farmland development rights. "Beginning on January 1, 2014, no owner shall leave agricultural land uncultivated and not engage in agricultural production or a commercial horse boarding operation and/or a commercial equine operation, for more than two consecutive years." It is anticipated that if agricultural land is uncultivated, the County will coordinate with local groups to facilitate leases to new farmers. Other changes included allowing processing facilities on preserved farmland to produce value added commodities (jams, salsa, pickles, etc.), reducing energy consumed in transporting food miles from out of the region.

4.6.2 Current Projects and Policies

A significant portion of the undeveloped or open areas within Suffolk County's public land inventory are actively managed and maintained, for example, via the mowing of lawns, trimming of trees and shrubs and removal of debris. The maintenance of these areas is accomplished through fossil-fuel-powered equipment (*e.g.*, lawn mowers and tractors). Land management may also comprise pesticide, herbicide, and fertilizer application where necessary.

4.6.3 Programs and Policies under Consideration for Potential Future Action

The County would like to compile an inventory of parcels it owns that require significant land management and maintenance. The land inventory will support the development of "*carbon footprint*" estimates and land management plans for County-owned land.



The County is reviewing its ability to encourage transit oriented development through Planning Commission jurisdiction, sewer connection approvals through the sewer agency, grants, Health Department approvals, jurisdiction over hydrogeologic zone limitations, and other areas of authority.

It also wishes to develop and implement a resource conservation (e.g., fossil fuels and water) and land management plan for such parcels including, where possible and practical, the following elements:

- Replant turf grasses in lawns and along rights-of-way, drainage swales and other easements with native grasses, wildflowers and herbaceous species that require minimal watering, maintenance and mowing. Native grasses, selected for both drought-resistance and height-restriction (e.g., grow no taller than 18 inches), can replace non-native turf grasses which typically require more intensive maintenance (e.g., cutting, watering and fertilizer and pesticide applications).
- Re-purpose County-owned parcels or portions thereof, where appropriate, for use as community gardens and orchards thus permitting residents to raise vegetables and fruit locally. (Locally grown produce reduces the demand for food imports from other regions and the fossil fuels required for their transport.)



5 CLIMATE CHANGE, PLANNING AND ADAPTATION

5.1 Climate Change in New York

The following summary of climate change effects is taken from the *Climate Smart Resiliency Planning Evaluation Tool for New York State Communities*, developed by the New York State Climate Smart Communities program.

5.1.1 Observed Effects of Climate Change

The New York State Energy Research and Development Authority (NYSERDA) released a report in 2011 that evaluated scientific work to date and discussed the projected effects of climate change in New York over the next 100 years. The report, *ClimAID: the Integrated Assessment for Effective Climate Change Adaptation Strategies in New York State* was the work of more than 50 scientists. The report examines the effect of climate change on a number of sectors in seven geographic areas of the State. Those sectors include water resources, coastal zone, ecosystems, agriculture, energy, transportation, telecommunications, and public health. *ClimAID* noted the following critically important observations:

- Annual average temperatures have risen about 2.4 °F since 1970, with winter warming exceeding 4.4 °F.
- Sea level along New York's coastline has risen about a foot since 1900.
- Intense precipitation and heavy downpours have increased in recent decades.

5.1.2 Projected Climate Changes

The *ClimAID* report made the following predictions for the next 100 years in New York State:

- Annual average temperatures in New York State will rise by 4 to 9 °F by about 2080.
- Average precipitation will increase five to 15 percent by about 2080, with most of the increase in winter.
- Intense downpours will become more frequent.
- Short-term droughts will become more frequent.
- The number and duration of extreme heat events will increase.
- Along the seacoast and tidal portion of the Hudson River (to the Federal Dam at Troy), sea level could rise more than four feet by 2090.

5.1.3 Projected Effects of Climate Change

The report utilized the predicted climate changes to describe the potential effects on the State's natural resources, built environment, and public health. The *ClimAID* report listed the following potential effects of climate change on natural resources, the coastal zone, infrastructure, and public health (edited to include only those with a potential impact on Suffolk County):

- Natural resources (ecosystems, agriculture and water resources)
 - Increased flooding affecting ecosystems, communities, and infrastructure.
 - Lowered groundwater.



- *Negative effects on native aquatic species due to increased water temperatures.*
- *Widespread shifts in species composition in the state's forests and expansion of some invasive species into New York.*
- *Lost agricultural productivity from temperature stresses, summer drought, and invasive species.*
- **Coastal zone**
 - *Sea level rise, leading to permanent inundation of low-lying areas, increased beach erosion, reduction of coastal wetland area and species, and flood events that are more frequent and more destructive.*
- **Infrastructure (energy, transportation, telecommunications)**
 - *Disruption of water, transportation, communication, and energy systems due to extreme weather.*
- **Public health**
 - *Expansion of vector-borne diseases affecting humans, livestock, and wildlife.*
 - *Heat waves leading to increased illness and deaths from heat stress.*
 - *Increased levels of air pollution, causing asthma and other respiratory illness.*

5.1.4 TDR Plan and Comprehensive Plan

The County completed a transfer of development rights (TDR) study in May 2013. The study will be important when considering buyout and acquisition programs for properties in low-lying portions of the County.

Suffolk County is preparing an update of its comprehensive plan as well as its hazard mitigation plan. The County's *Comprehensive Plan 2035* will be completed in two phases. Phase I is an inventory with detailed information about the County. In Phase II, the information will be analyzed and policy recommendations made. Phase I includes information on the economy, population, and quality of life as well as a review of local and regional plans in the appendix. Phase II of the Comprehensive Plan effort – entitled "Framework for the Future" – will be public released and finalized by early 2015.

5.1.5 Multi-Jurisdictional All Hazards Mitigation Plan

In early 2014, the County sent a draft multi-jurisdictional all hazards mitigation plan to FEMA for its review. The plan includes discussion of the following 13 types of hazards:

- | | |
|-----------------------------|--------------------------------|
| ● Coastal erosion | ● Infestation |
| ● Drought | ● Nor'easter |
| ● Earthquake | ● Severe storm |
| ● Expansive soils | ● Shallow groundwater flooding |
| ● Flood | ● Wildfire |
| ● Groundwater contamination | ● Severe winter storm |
| ● Hurricane | |



The plan has an extensive mitigation section that lists the County's past mitigation accomplishments as well as its goals and objectives for the future. Following are some of the key accomplishments included in the plan.

- All 10 towns, their municipalities, two tribal nations, and key county and regional stakeholders participated in the plan.
- All municipalities participating in this plan participate in the National Flood Insurance Program.
- Suffolk County invested in 22 backup generators.
- The County participates on the *New York Coastal Storm Planning Team*.
- The County established public education programming and an [emergency preparedness website](#). The Fire Rescue & Emergency Services department gives regular hurricane preparedness presentations.
- Many Suffolk County municipalities adopted land-use and zoning standards to manage development without increasing hazard risk and vulnerability.
- Municipalities funded mitigation including the formation of coastal erosion districts, the construction of 'engineered beaches,' and establishment of property transfer fees to acquire high-risk properties for preservation as open-space.

The County established the following goals for its hazard mitigation plan:

- Save lives and reduce injury
- Avoid, minimize or reduce damage to property including but not limited to critical facilities, infrastructure and those properties known to receive or experience repetitive damages
- Reduce exposure to risk, while protecting or restoring natural processes to the maximum extent possible
- Consider the wise uses of land in known or identified hazard areas
- Encourage the development and implementation of long-term, cost-effective and environmentally sound mitigation projects
- Promote hazard mitigation awareness and education throughout the county
- Improve community emergency management capability (i.e., prepare, respond, recover, mitigate)
- Maintain economic viability after a hazard event.

The Hazard Mitigation Plan established the following objectives:

- Enhance the public's understanding of natural hazards, the risk they pose and ways to mitigate those impacts
- Retrofit, acquire, or relocate structures in high hazard areas, including but not limited to those known to be or subject to repetitive damages
- Continually improve understanding of the location and potential impacts of natural hazards, the vulnerability of building types, and community development patterns and the measures needed to protect life safety at the local government level
- Strengthen codes so that new construction can withstand the impacts of natural hazards and lessen the impact of that development on the environment's ability to absorb the impact of natural hazards
- Seek projects that minimize or mitigate their impact on the environment including but not limited to the following: beach nourishment, stream channel restoration, and wetlands creation/preservation



- Consider providing incentives to promote wise land uses in known or identified high risk areas
- Establish a partnership among all levels of government and the business community to improve and implement methods to protect property
- Develop and implement wildfire mitigation and watershed protection strategies that reduce losses to wildlife habitat and protect water while also reducing damage to development
- Lower the cost of flood insurance premiums through CRS program
- Protect against invasive species (noxious weeds) and exclude and eradicate invasive insects, disease, and weeds
- Implement water conservation measures, use reclaimed water, and increase groundwater usage, create surface water storage where appropriate
- Develop or improve early warning emergency response systems and evacuation procedures
- Work to lower emergency service response times, including improvement to transportation facilities
- Seek to integrate/coordinate all phases of Emergency Management within the planning area
- Seek mitigation projects that provide the highest degree of natural hazards protection at the least cost by considering projects that will mitigate the impacts of multiple hazards and/or leverage multiple funding sources
- Increase resilience of critical facilities and infrastructure
- Implement best stormwater management practices and seek to implement identified stormwater management activities and projects, including securing needed funding (new objective for the 2014 update).

The Suffolk County Hazard Mitigation Plan includes 47 sections describing the assets, hazards, and mitigation strategies in place for each of the covered villages and towns, the two Indian nations, and the Suffolk County Water Authority. Section 9.1 of the Plan covers Suffolk County itself, including its hazard risks and vulnerabilities, capacity and capabilities and a lengthy table of mitigation initiatives. These initiatives are reproduced in Appendix B.

5.1.6 Hazard Mitigation Grant Program

The Hazard Mitigation Grant Program (HMGP) provides grants to states and local governments to implement long-term hazard mitigation measures after a major disaster declaration. The purpose of the HMGP is to reduce the loss of life and property due to natural disasters and to enable mitigation measures to be implemented during the immediate recovery from a disaster. The HMGP is authorized under Section 404 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act.²

Suffolk County will have completed its updated Hazard Mitigation Plan in 2014. In addition to outlining emergency preparedness needs and procedures, the Hazard Mitigation Plan makes the County eligible to receive hazard mitigation construction and education grants. As disasters occur, the Federal Emergency Management Agency (FEMA) also makes an additional percentage of the total damage amounts incurred available to local governments having an approved Hazard Mitigation Plan (HMP) for implementing rebuilding projects.

² <http://www.fema.gov/hazard-mitigation-grant-program>



5.1.6.1 *New York Rising Community Reconstruction Program*

Through the New York Rising Community Reconstruction program (NYRCR), New York State is assisting communities to rebuild better and safer through community-driven plans that consider current damage, future threats to community assets, and the community's economic future. In keeping with the National Disaster Recovery Framework, NYRCR Plans consider the needs, risks, and opportunities related to assets in the following recovery support functions: Community Planning and Capacity Building, Economic Development, Health and Social Services, Housing, Infrastructure, and Natural and Cultural Resources. To better align Suffolk County's climate strategies with future funding opportunities, the Suffolk County Climate Action Plan addresses adaptation and mitigation within a similar structure and framework.³

There are eight New York Rising Community Reconstruction Planning Areas within Suffolk County. The planning areas comprise the following eight communities: Village of Amityville/Copiague, Village of Lindenhurst, Village of Babylon/West Babylon, West Islip, Oakdale/West Sayville, Mastic Beach and Smith Point of Shirley, West Gilgo to Captree, and Fire Island. The final plans for these NYRCR communities are available on the Office of Storm Recovery's website: <http://stormrecovery.ny.gov>. Implementation of those plans will begin in the later part of 2014.



³ <http://stormrecovery.ny.gov/community-reconstruction-program>

5.2 Community Self-Assessment and Planning

Performing a risk and vulnerability assessment is a critical first step in developing comprehensive adaptation strategies for addressing the effects of climate change and sea level rise. In general, a comprehensive assessment will include the following items:

- An assessment of risks to assets. Assets are places or things where economic, environmental and social functions of the County take place, or are critical infrastructure required to support those functions. The County may need to look at assets that were not damaged in prior events but are located in the 100-year floodplain and are thus susceptible to future storms. The *Climate Smart Resiliency Planning Evaluation Tool for New York State Communities* can assist in this process.
 - Identify coastal high-hazard area.
 - Perform vulnerability assessment of County-owned or controlled: ecosystems, critical species, contaminated sites, wastewater infrastructure, stormwater infrastructure, potable water resources, energy facilities, transportation systems, building stock (commercial and residential), emergency facilities, parks/recreation/public access areas, vulnerable populations (should be updated on a regular schedule and/or as new data becomes available).
 - Identify vulnerable areas as coastal high-hazard areas or adaptation action areas - potential criteria: areas below, or at mean higher high water, areas with a hydrological connection to coastal waters, areas designated as emergency evacuation routes. (Broward County, Florida, 2013)
 - Identify County-owned or controlled critical assets and facilities (infrastructure, housing units, individuals, vehicles, and structures) within the coastal high-hazard area.
- An analysis of costs and benefits. The County should assure that their adaptation and mitigation strategies include an assessment of the costs and benefits associated with the projects and actions being proposed.
- Strategies that address vulnerable populations. Communities should explicitly note strategies benefiting vulnerable populations.
- Detailed implementation tasks. The County may need to expand its plans for implementation and assign responsibility for specific actions to specific individuals or organizations, and establish timelines for each action, as appropriate.
- Development of a post-disaster redevelopment plan. Consider locational restrictions for new or major (greater than 50 percent) County reconstruction projects.



5.3 Adaptation Strategies

The terms ‘adaptation’ and ‘resilience’ are related but often used interchangeably. A recent article defines ‘resilience’ this way: *Community resilience is the capability to anticipate risk, limit impact, and bounce back rapidly through survival, adaptability, evolution, and growth in the face of turbulent change*⁴. Adaptation is the set of strategies that communities use to become more resilient. Adaptation strategies to increase the resilience of housing, infrastructure, natural and cultural resources, and health and social service facilities typically fall into the three categories - protection, accommodation, and retreat.

Protection strategies include natural (green or soft) solutions and constructed (gray or hard) solutions. Generally, natural protection strategies, including maintenance of local and regional ecosystems, habitat restoration, coastal buffers, wetland mitigation, urban reforestation, and expanded green infrastructure, are preferred to ‘hard’ structures. These ‘green’ solutions offer ecological benefits in addition to their value for adaptation. Certain community assets are location-dependent and therefore ‘hard’ protection systems may be the only feasible option.

Accommodation strategies do not prevent flooding or inundation, but allow structures to survive (*i.e.*, it makes them more resilient). Examples include elevation of structures and stormwater system improvements.

Retreat strategies do not prevent flooding or inundation but offer options for the loss of use or property value. Examples include buyouts, acquisitions, transfer of development rights, purchase of development rights, rolling easements, and conservation easements.

Still other strategies involve new programs, policies, plans, actions, and data collection. These adaptation strategies are categorized in the NYRCR program as Community Planning and Capacity Building.

Following are the strategies included in Suffolk County’s Multi-Jurisdictional All Hazards Mitigation Plan as well as other strategies under consideration. The strategies from the Mitigation Plan and the others are arranged into the Recovery Support Function categories of the NYRCR program as follows.

5.3.1 Community Planning and Capacity Building

The following strategies were included in the 2014 *Multi-Jurisdictional All Hazards Mitigation Plan*:

- Build local floodplain management and disaster recovery capabilities.
- Establish jurisdictional knowledge of the adaptation needs of property owners.
- Develop a countywide debris management plan.
- Create a multi-jurisdictional seismic safety committee.
- Align adaptation plans through all levels of authority.
- Provide adaptation education for natural disasters.
- Districts vulnerability analyses.
- Continue to support the actions of the *Wild Fire Task Force*.

⁴ *Definitions of Community Resilience: An Analysis*, 2013. Community & Regionals Resilience Institute. 14pp.



- Enhance the operation of the *Suffolk County Emergency Operations Center* through improvements in facilities, hardware, technology, and information as it becomes available.
- Enhance the functionality of *Points of Distribution*.
- Continue to expand and enhance the *Emergency Preparedness Registry* (formerly known as the *Joint Emergency Evacuation Program - JEEP*) program through improvements to technology and information as they become available.
- Resolve discrepancies between the Real Property Tax Department and the Treasurer's Office databases regarding the number of tax parcels needed to support or enhance the countywide risk assessment.
- Implement the *Suffolk County Information Technology Disaster Recovery Plan*.
- Establish a backup fire rescue communications facility.
- Improve the *Suffolk County Emergency Operations Center*.
- Enhance emergency preparedness awareness by active participation in training exercises at the County and local levels.
- Where appropriate, support retrofitting, acquisition and/or relocation of structures located in flood-prone areas to protect structures from future damage, especially those known to be identified as 'repetitive loss' properties.
- Ensure that all appropriate county employees are trained and qualified according to FEMA's *National Incident Management System*.
- Develop and/or enhance the current stormwater management system to comply with federal and state regulations such that there will be a net reduction in the flood risk caused by stormwater impacts.
- Enhance the building inventory for all of Suffolk County using latest technology and GIS applications for use within HAZUS- MH for future risk assessment to be performed by Suffolk County towns and villages.
- Enhance the Suffolk County *Comprehensive Emergency Management Plan* to address hazards from earthquakes. Implementation of this initiative will be supported by the development of the countywide *Seismic Task Force*.
- Inquire about future development in all participating jurisdictions annually, at the annual plan review meeting, and map these locations within GIS/HAZUS to determine if they are/are not located within identified hazard areas. Update the plan with these findings.
- Integrate sea-level rise planning into other plans and documents. To be effective, local comprehensive plans, hazard mitigation plans, emergency management plans, and post-disaster recovery plans should all address the potential impacts of sea-level rise.
- Develop emergency preparedness public awareness campaign with Office of Emergency Management.
- Encourage participation of Suffolk municipalities in the National Flood Insurance Program Community Rating System.
- Develop policies and plans for periods of declared drought.
- Promote 'No Adverse Impact' concepts from the National Association of Floodplain Managers.
- Track repetitive loss properties and develop potential strategies for transitioning properties to non-residential/public use.



5.3.3 Health and Social Services

Suffolk County's Department of Social Services provides an extensive array of programs through its four main offices and satellite facilities. The Department provides numerous services that are critically important during emergencies related to climate change (floods, droughts, heat waves, etc.). They include temporary food, financial, and housing assistance, emergency energy and utility assistance, as well as assistance for seniors and children, and health care through Medicaid.

The County's Department of Fire, Rescue, and Emergency Services is another key agency of County government that provides services before during and after climate change related emergencies. The Department's [Office of Emergency Management \(OEM\)](#) coordinates the County's response to natural and man-made disasters. OEM personnel are responsible for development of the Comprehensive All-Hazards Emergency Management Plan, the operation of the county's Emergency Operation Center (EOC) and work with local, state, and federal officials in all aspects of shelter management, planning, resource management, and emergency response and recovery activities.

The Department of Fire, Rescue, and Emergency Services also has a "Smart 911" system that allows County residents to provide information that would be useful to emergency service providers. In addition, residents can sign up to receive emergency notifications from the Suffolk County Code Red System.

For those with special needs, the County has an Emergency Preparedness Registry. It allows residents to provide information that emergency responders will need to help locate and evacuate people with special needs or high risks during an emergency, especially when a family, caregiver, or others are unable to help them. Suffolk County is also considering the following strategies in the development of its adaptation plan:

- Establishment of partnerships with local hotels and other "safe" structures or consider storm-proofing County facilities to increase shelter space.
- Establishment of partnerships with local non-profits and/or elderly care specialists to assist individuals during emergencies.
- In preparing for a storm or emergency event, restrict access to highly vulnerable and/or dangerous areas to decrease evacuation times and reduce unnecessary risks.

5.3.4 Housing

Suffolk County's Department of Social Services provides temporary housing assistance during and after emergencies. The Department of Fire, Rescue and Emergency Services has [Shelter and Storm Surge Mapping Tool](#) that locates shelters with driving directions, shows potential flood areas, and has links to emergency related information. The County also supports the efforts of non-governmental housing agencies. The County is exploring greater use of transfer of development rights (TDRs) to reduce risks to vulnerable properties by transferring development from undeveloped or high risk land to compact, walkable developed communities (*Suffolk County Transfer of Development Rights Study, 2012*).



5.3.5 Infrastructure

The County developed a long list of infrastructure projects in its *Multi-Jurisdictional All Hazards Mitigation Plan*. The list, reproduced below, includes transit, road, wastewater, communications, emergency power, stormwater, and other infrastructure projects. The following projects will provide some measure of adaptation that will help the County increase the resilience of its infrastructure:

- Institute a bus rapid transit demonstration project that could also be used in emergencies.
- Develop a pilot program to upgrade wastewater infrastructure in flood prone coastal areas.
- Restore bulkheading throughout Suffolk County.
- Reconstruct the jetties and bulkheads of the Shinnecock Canal.
- Provide safety and drainage improvements to the center medians on CR46, William Floyd Parkway from Coraci Boulevard to Smith Point.
- Weatherproof the Police Department headquarters building to withstand hurricanes.
- Improve CR38, North Sea Road, from CR39, North Road to the vicinity of Noyack Road.
- Improve CR79, Sag Harbor/Bridgehampton Turnpike, from Brick Kiln Road to NYS Rt. 27, Montauk Highway.
- Improve County Road 39, North Road/Flying Point Road.
- Reduce infiltration and inflow in Sewer District No.3 (Southwest).
- Install a sewage pump station and force main in Sewer District No. 1 (Port Jefferson).
- Provide outfall rehabilitation in Sewer District No. 6.
- Provide emergency electric generators for all sewer districts.
- Provide improvements to pumping stations 9 and 10 in Sewer District No. 3 (Southwest).
- Provide improvements to the electrical substation in Sewer District No. 3 (Southwest).
- Provide improvements to the perimeter wall in Sewer District No. 3 (Southwest).
- Install an ocean outfall for Sewer District No.3 (Southwest).
- Install a co- generation system in Sewer District No. 3 (Southwest).
- Improve radio tower infrastructure.
- Provide fuel supply protection for the Marine Bureau.
- Repair damage to the Marine Bureau shop and protect from future storm damage.
- Install a permanent generator at the 911 backup center.
- Install a permanent generator at the aviation east hanger.
- Install a permanent generator at the police academy emergency work shelter.
- Install a permanent generator at the special patrol bureau.
- Install a permanent generator at the marine bureau.
- Provide drainage deflection maintenance to protect public and private properties in eastern Suffolk County.
- Provide emergency generators to Suffolk County Department of Social Services countywide.
- Enhance stormwater conveyance capability in areas contributing to shallow groundwater in the Nissequogue River and Lake Ronkonkoma areas.
- Provide backup power sources at specified critical facilities.
- Retrofit critical facilities that are vulnerable to natural hazards including the following:
 - Enhance the flood protection at the Suffolk County maximum security facility jail (former SC-27).
 - Enhance flood and shoreline protection at the Bergen Point Sewage Treatment Plant (former SC-28).



- Continue to develop, enhance, and implement plans to protect the 6 ½ mile Bergen Point Sewage Treatment Plant ocean outfall pipe from damage during coastal or other hazard events (former SC-31).

5.3.6 Natural and Cultural Resources

Protection and strengthening of the County's natural and cultural resources will help prepare for climate change. It will also be important to the County's economy, as many of these resources serve the recreational needs of the County's tourist industry. Strategies from the *Multi-Jurisdictional All Hazards Mitigation Plan* include measures to reduce erosion, protect and restore wetlands, creeks, and beaches, and protect and restore historic structures. Reducing floodplain development is a priority of the County's using acquisitions and transfers of development rights. Maintenance of ocean inlets and sand flow is also on the list of projects. Projects include the following:

- Acquire properties within coastal flood hazard areas.
- Restore the stream corridor and floodplain in Mud Creek County Park.
- Restore the tidal wetland at Smith Point County Park to improve protection against flooding and storm damage.
- Restore the northeast branch of the Nissequogue River from the vicinity of Clearbrook Drive to Miller's Pond.
- Develop "engineered beach" at Meschutt Beach County Park.
- Provide infrastructure protection and erosion control at Orient Point County Park.
- Provide infrastructure protection and erosion control measures for the bluff at Indian Island County Park.
- Provide erosion control measure to protect hole #5 at Indian Island Golf Course.
- Reinforce the structural integrity of Cedar Point Lighthouse to protect against storm damage.
- Raise historic structures (Oyster House and Penny Boat building) at the Long Island Maritime Museum: to protect against storm surges.
- Provide erosion control measures at the Timber Point Golf Course to protect Great South Bay from erosion from the Blue Course holes 5 and 6 and Gibraltar. Install riprap along the slope of Gibraltar and a vegetated berm along the fairways of holes 5 and 6.
- Enhance existing beach nourishment plans and develop engineered beaches where appropriate.
- Stabilize and restore the Coindre Hall Boat House complex.
- Curtail floodplain development by transferring flood-prone properties in the Narrows Bay area obtained by Suffolk County through tax lien procedures to the Parks, Recreation, and Conservation Department for open space purposes as per the *Narrow Bay Floodplain and Mitigation Plan* of 1997.
- Maintain ocean inlets at current locations and configurations. Close new inlets if they develop.
- Stabilize ocean inlet channels with regularly-scheduled sand by-passing operation to preserve navigation and maintain the long-shore transport of sand across the inlets.
- Evaluate various restoration techniques in marshes and wetlands. Healthy wetlands will adapt and grow with sea level rise, providing a natural buffer for low-lying coastal areas.
- Preserve land for public uses for in high-risk areas to reduce vulnerability of residents and properties.



APPENDICES

Appendix A. Pending Suffolk County Projects

Appendix B. Suffolk County Mitigation Initiatives

Appendix C. Suffolk County Facilities Case Studies



Appendices



Appendix A

Pending Suffolk County Projects



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Appendices
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2013 - 2016 Tier 1 Energy Efficiency Projects																					
Project Start Date	Projected Completion Date	Schedule Year	Project #	Count	Projects ~ Phase I-b	Fund	2013 (Mod) Installed Costs (\$)	2014 Installed Costs (\$)	2015 Installed Costs (\$)	2016 Installed Costs (\$)	Annual Energy Savings (\$)	Annual Maintenance Savings (\$)	Cumulative Annual Savings (\$)	2013 (Mod) Total Annual Savings (\$)	2014 Total Annual Savings (\$)	2015 Total Annual Savings (\$)	2016 Total Annual Savings (\$)	Combined Simple Payback (years)	Savings to Investment Ratio (SIR) without rebate	Return on Investment (ROI)	
					Solar Electric (PV) Systems: Alternative Market Development Project - side-by-side evaluation																
					Board of Elections (Direct Coupled and LIPA profiles)																
Jan-13	Feb-13	2013	1	1	Replace Lighting Warehouses 1,2,and 3	1664	n/a	n/a	n/a	n/a	\$ 47,238	\$2,782	\$ 50,020	\$ 50,020	n/a	n/a	n/a	4.04	2.11	24.76 percent	
Jul-13	Aug-13	2013	2	1	Replace Existing Roof new Standing Seam Aluminum with R-10 insulation	1459	\$ 1,100,000	n/a	n/a	n/a	\$ 28,541	\$2,500	\$ 31,041	\$ 31,041	n/a	n/a	n/a	35.44	0.49	2.82 percent	
Jul-13	Aug-13	2013	3	1	Install 30-kW Solar PV DC-to-DC connection to new lighting circuits	1664	\$ 120,000	n/a	n/a	n/a	\$ 14,400	\$ -	\$ 14,400	\$ 14,400	n/a	n/a	n/a	8.33	1.79	12.00 percent	
Sep-13	Oct-13	2013	4	1	Install 30-kW Solar PV Central Inverter & LIPA Interconnection	1664	\$ 120,000	n/a	n/a	n/a	\$ 14,400	\$ (800)	\$ 13,600	\$ 13,600	n/a	n/a	n/a	8.82	1.69	11.33 percent	
					subtotal Solar PV		1664/1459	\$ 1,340,000	\$ -	\$ -	\$ -	\$ 104,579	\$ 4,482	\$ 109,061	\$ 109,061	\$ -	\$ -	\$ -	12.29	1.15	8.14 percent
					Chiller Optimization/Replacement: Central Plant Efficiency Improvements																
Dec-13	Mar-14	2013	5	1	HL Dennison Absorption - Replacement	1664	\$ 1,395,730	n/a	n/a	n/a	\$ 100,000	\$ 10,000	\$ 110,000	n/a	\$ 110,000	n/a	n/a	12.69	1.37	7.88 percent	
Dec-13	Mar-14	2013	6	1	W.H. Rogers Absorption - Replacement	1664	\$ 431,768	n/a	n/a	n/a	\$ 10,588	\$ 32,500	\$ 43,088	n/a	\$ 43,088	n/a	n/a	10.02	1.74	9.98 percent	
Jan-14	Mar-14	2013	7	1	Police HQ Upgrade existing chiller plant with air-cooled chiller	1664	\$ 850,000	n/a	n/a	n/a	\$ 53,920.00	\$ 150,000	\$ 203,920	n/a	\$ 203,920	n/a	n/a	4.17	3.57	24 percent	
Jan-14	Mar-14	2014	8	1	Griffing Ave Courts - Optimization	1664	n/a	\$ 375,000	n/a	n/a	\$ 76,000	\$ 800	\$ 76,800	n/a	\$ 76,800	n/a	n/a	4.88	3.05	20.48 percent	



2013 - 2016 Tier 1 Energy Efficiency Projects																				
Project Start Date	Project Completion Date	Schedule Year	Project #	Count	Projects ~ Phase I-b	Fund	2013 (Mod) Installed Costs (\$)	2014 Installed Costs (\$)	2015 Installed Costs (\$)	2016 Installed Costs (\$)	Annual Energy Savings (\$)	Annual Maintenance Savings (\$)	Cumulative Annual Savings (\$)	2013 (Mod) Total Annual Savings (\$)	2014 Total Annual Savings (\$)	2015 Total Annual Savings (\$)	2016 Total Annual Savings (\$)	Combined Simple Payback (years)	Savings to Investment Ratio (SIR) without rebate	Return on Investment (ROI)
Jan-15	Mar-15	2015	9	1	Riverhead Center Power Plant - Optimization	1664	n/a	n/a	\$ 586,600	n/a	\$ 211,000	\$ 1,000.00	\$ 212,000	n/a	n/a	\$ 212,000	n/a	2.77	5.38	36.14 percent
		2015	10	1	Riverhead Center Power Plant Satellite Chiller Study	1664	n/a	n/a	\$ 100,000	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Sep-15	Mar-16	2016			Satellite Chillers @ Riverhead Complex	1664	n/a	n/a	n/a	\$ 2,321,592	\$ 119,227	\$ 240,000	\$ 359,227	n/a	n/a	n/a	359,227	6.46	2.30	15.47 percent
					subtotal Chiller Optimization	1664	\$ 2,677,497	\$ 375,000	\$ 686,600	\$ -	\$ 451,508	\$ 194,300	\$ 645,808	\$ -	\$ 433,808	\$ 212,000	\$ -	5.79	2.75	17.27 percent
					Install Building Management Systems (BMS):	Energy Systems Integration and Efficiency Improvements														
Jul-13	Dec-13	2013	11	1	Police Pcts (3rd, 5th, 6th, 7th) Installation of BMS and Remote Access (assumes 4 buildings)	1664	\$ 200,000	n/a	n/a	n/a	\$ 76,353	\$ -	\$ 76,353	n/a	\$ 76,353	n/a	n/a	2.62	5.68	38.18 percent
Sep-13	Dec-13	2013	12	1	Various County Facilities Real-Time Monitoring of energy meters and BMS (assumes 6 buildings/yr)	1664	\$ 300,000	\$ 350,000	\$ 250,000	\$ 250,000	\$ 135,000	\$ -	\$ 135,000	n/a	\$ 50,000	\$ 50,000	\$ 35,000	6.00	1.42	16.67 percent
					subtotal BMS	1664	\$ 500,000	\$ 350,000	\$ 250,000	\$ 250,000	\$ 211,353	\$ -	\$ 211,353	\$ -	\$ 126,353	\$ 50,000	\$ 35,000	6.39	1.87	15.66 percent
					Combined Heat & Power (aka Cogeneration):	Central Plant Augmentation														
Jan-15	Apr-15	2014	13	1	Dennison Building - 65 kW base-loaded with 40-ton exhaust fired absorber	1664.111	n/a	\$ 540,000	n/a	n/a	\$ 70,000	\$ (10,800)	\$ 59,200	n/a	n/a	\$ 59,200	n/a	9.12	1.31	10.96 percent
Jan-16	Apr-16	2015	14	1	Cohalan Court Complex - 65 kW	1664.111	n/a	n/a	\$ 640,000	n/a	\$ 75,000		\$ 64,200	n/a	n/a	n/a	\$ 64,200	9.97	1.20	10.03 percent



2013 - 2016 Tier 1 Energy Efficiency Projects																				
Proje cted Start Date	Projec ted Compl etion Date	Sche dule Year	Proj ect #	Count	Projects ~ Phase I- b	Fund	2013 (Mod) Installed Costs (\$)	2014 Installed Costs (\$)	2015 Installed Costs (\$)	2016 Installed Costs (\$)	Annual Energy Savings (\$)	Annual Mainten ance Savings (\$)	Cumulat ive Annual Savings (\$)	2013 (Mod) Total Annual Savings (\$)	2014 Total Annual Savings (\$)	2015 Total Annual Savings (\$)	2016 Total Annual Savings (\$)	Comb ined Simpl e Payba ck (years)	Saving s to Invest ment Ratio (SIR) witho ut rebate	Return on Investment (ROI)
					base-loaded															
					subtotal CoGen	1664	\$ -	\$ 540,000	\$ 640,000	\$ -	\$ 145,000	\$ (21,600)	\$ 123,400	\$ -	\$ -	\$ 59,200	\$ 64,200	9.56	1.25	10.46 percent
					Various Efficiency Upgrades:	Reduced Energy Use Profile of Facility														
Jul-13	Nov-13	2013	15	1	Countywide Facilities T-12 Fluorescent Lighting Replacement	1664	\$ 500,000	n/a	n/a	n/a	\$ 206,155	\$ 30,000	\$ 236,155	n/a	\$ 236,155	n/a	n/a	2.12	4.03	47 percent
Jul-13	Jul-13	2013	16	1	W.H. Rogers Bldg. Window Film to Reduce Summer Cooling Load	1664	\$ 37,500	n/a	n/a	n/a	\$ 3,793	\$ -	\$ 3,793	\$ 3,793	n/a	n/a	n/a	9.89	1.21	10 percent
Jul-13	Aug-13	2013	17	1	W.H. Rogers Bldg. White Roof to Reduce Summer Cooling Load	1664	\$ 130,455	n/a	n/a	n/a	\$ 3,947	\$ 5,000	\$ 8,947	\$ 8,947	n/a	n/a	n/a	14.58	0.82	6.86 percent
May-13	Jun-13	2013	18	1	1st Pct Boiler Replacement	1664	\$ 150,000	n/a	n/a	n/a	\$ 39,447	\$ 2,500	\$ 41,947	\$ 41,947	n/a	n/a	n/a	3.58	4.87	28 percent
Jul-13	Dec-13	2013	19	1	Various County Facilities ~ 6 Yr Plan Lighting Upgrades & other improvements Interior and Exterior (parking lot / other)	1664	\$ 200,000	\$ 450,000	\$ 450,000	\$ 450,000	\$ 251,256	\$ 926,677	\$ 1,177,933	\$ 131,017	\$ 392,644	\$ 392,644	\$ 392,644	1.18	8.41	84 percent
Apr-14	Jun-14	2014	20	1	395 Oser Avenue Lighting upgrades with occupancy controls	1664.111	n/a	\$ 96,000	n/a	n/a	\$ 44,161	\$ 2,500	\$ 46,661	n/a	\$ 46,661	n/a	n/a	2.06	4.15	49 percent
Feb-14	May-14	2014	21	1	Riverhead Criminal Courts Building Install Window Films to reduce glare and heat loss/gain	1664.111	n/a	\$ 300,000	n/a	n/a	\$ 53,920	\$ -	\$ 53,920	n/a	\$ 53,920	n/a	n/a	5.56	1.53	18 percent



2013 - 2016 Tier 1 Energy Efficiency Projects																					
Project Start Date	Project Completion Date	Schedule Year	Project #	Count	Projects ~ Phase I-b	Fund	2013 (Mod) Installed Costs (\$)	2014 Installed Costs (\$)	2015 Installed Costs (\$)	2016 Installed Costs (\$)	Annual Energy Savings (\$)	Annual Maintenance Savings (\$)	Cumulative Annual Savings (\$)	2013 (Mod) Total Annual Savings (\$)	2014 Total Annual Savings (\$)	2015 Total Annual Savings (\$)	2016 Total Annual Savings (\$)	Combined Simple Payback (years)	Savings to Investment Ratio (SIR) without rebate	Return on Investment (ROI)	
Apr-14	Aug-14	2014	22	1	Various County Facilities Repair window gaskets and Install window films to reduce glare and heat loss/gain (assumes RFP for 20 buildings)	1664	n/a	\$ 900,000	n/a	n/a	\$ 68,000	\$ -	\$ 68,000	n/a	\$ 68,000	n/a	n/a	13.24	0.64	8 percent	
					subtotal Various Upgrades	1664	\$ 1,017,955	\$ 1,746,000	\$ 450,000	\$ 450,000	\$ 670,679	\$ 966,677	\$ 1,637,356	\$ 185,704	\$ 797,381	\$ 392,644	\$ 392,644	2.07	5.25	48.26 percent	
											\$ 1,583,118	\$ 1,143,859	\$ 2,726,977								
					2013 Tier 1 Total	1664	\$ 5,785,452	-	-	-	191,054	244,982	436,036	\$ 294,764	-	-	-	19.63	0.69	5.1 percent	2013
					2014 Tier 1 Total	1664	-	\$ 3,011,000	-	-	779,172	469,550	1,248,722	-	\$ 1,357,541	-	-	2.22	5.56	45.1 percent	2014
					2015 Tier 1 Total	1664	-	-	\$ 2,026,600	-	371,876	245,238	617,113	-	-	\$ 713,844	-	2.84	4.04	35.2 percent	2015
					2016 Tier 1 Total	1665	-	-	-	\$ 700,000	151,693	256,089	407,783	-	-	-	\$ 491,844	1.42	7.16	70.3 percent	2016

2013+2014	\$ 8,796,452		\$ 970,225	\$ 714,532	\$ 1,684,757	2013+2014	\$ 1,652,306		5.32	2.49	18.8 percent	2013+2014
2014-		\$	\$	\$	\$			\$			39.6 percent	2014-



2013 - 2016 Tier 1 Energy Efficiency Projects																						
Proj ected Start Date	Projec ted Compl etion Date	Sche dule Year	Proj ect #	Count	Projects ~ Phase I- b	Fund	2013 (Mod) Installed Costs (\$)	2014 Installed Costs (\$)	2015 Installed Costs (\$)	2016 Installed Costs (\$)	Annual Energy Savings (\$)	Annual Mainten ance Savings (\$)	Cumulat ive Annual Savings (\$)	2013 (Mod) Total Annual Savings (\$)	2014 Total Annual Savings (\$)	2015 Total Annual Savings (\$)	2016 Total Annual Savings (\$)	Comb ined Simpl e Payba ck (years)	Saving s to Invest ment Ratio (SIR) witho ut rebate	Return on Investment (ROI)		
							2016				5,737,600	1,302,741	970,877	2,273,618				2,563,230	2.52	4.50		2016
							2013-2016				\$ 11,523,052	\$ 1,493,795	\$ 1,215,859	\$ 2,709,653				\$ 2,857,994	4.03	3.24	24.80 percent	2013-2016

Source: Department of Public Works & Office of Budget Review

		2013	2014	2015	2016	2013+2014	2013-2016	2014-2016
	1st year debt service (for each project year)	\$ 385,526	\$ 200,645	\$ 135,047	\$ 46,646	\$ 586,171	\$ 767,864	\$ 382,337
	1st year net savings (less debt service)	\$ 50,510	\$ 1,048,077	\$ 482,066	\$ 361,137	\$ 1,098,586	\$ 2,090,130	\$ 1,891,281
2013	The BRO Proposed funding for this project includes \$5,785,452 in serial bond financing for this project in 2013. If the entire \$5,785,452 were borrowed at once, the estimated fiscal impact to the operating budget for debt service payments is \$385,526 in the first year and \$7,767,545 over the life of an 18-year bond.							
2014	The BRO Proposed funding for this project includes \$3,011,000 in serial bond financing for this project in 2014. If the entire \$3,011,000 were borrowed at once, the estimated fiscal impact to the operating budget for debt service payments is \$200,645 in the first year and \$4,042,567 over the life of an 18-year bond.							
2015	The BRO Proposed funding for this project includes \$2,026,600 in serial bond financing for this project in 2015. If the entire \$2,026,600 were borrowed at once, the estimated fiscal impact to the operating budget for debt service payments is \$135,047 in the first year and \$2,720,912 over the life of an 18-year bond.							
2016	The BRO Proposed funding for this project includes \$700,000 in serial bond financing for this project in 2016. If the entire \$700,000 were borrowed at once, the estimated fiscal impact to the operating budget for debt service payments is \$46,646 in the first year and \$939,820 over the life of an 18-year bond.							
2014-2016	The BRO Proposed funding for this project includes \$5,737,600 in serial bond financing for this project (2014-2016 and SY). If the entire \$5,737,600 were borrowed at once, the estimated fiscal impact to the operating budget for debt service payments is \$382,337 in the first year and \$7,703,299 over the life of an 18-year bond.							
2013-2016	The BRO Proposed funding for this project includes \$11,273,052 in serial bond financing for this project (2013-2016 and SY). If the entire \$11,523,052 were borrowed at once, the estimated fiscal impact to the operating budget for debt service payments is \$767,864 in the first year and \$15,470,844 over the life of an 18-year bond.							
2013+2014	The BRO Proposed funding for this project includes \$8,796,452 in serial bond financing for this project in 2013+2014. If the entire \$8,796,452 were borrowed at once, the estimated fiscal impact to the operating budget for debt service payments is \$586,171 in the first year and \$11,810,112 over the life of an 18-year bond.							



Appendix B

Suffolk County Mitigation Initiatives



9.1.6 Mitigation Strategy and Prioritization

This section discusses past mitigations actions and status, describes proposed hazard mitigation initiatives, and prioritization.

Past Mitigation Initiative Status

The following table indicates progress on the County's mitigation strategy identified in the 2008 Plan. Actions that are carried forward as part of this plan update are included in the following subsection in its own table with prioritization. Previous actions that are now on-going programs and capabilities are indicated as such in the following table and may also be found under 'Capability Assessment' presented previously in this annex.

Table 9.1-6. Past Mitigation Initiative Status

Description	Status	Review Comments
SC-1: Creation of a Suffolk County Multi-Jurisdictional Comprehensive Debris Management Plan.	In Progress, Ongoing	An amended version of this initiative has been carried forward in the County's updated mitigation strategy. Following Hurricane Sandy the SC DPW began the assembly of a Countywide Debris Management Plan based on the successes and organizational structure utilized during Sandy, as well as the Debris Management Plan Template and Toolbox created by the Regional Catastrophic Planning Team.
SC-2: Stormwater Management – Nissequogue River and Lake Ronkonkoma areas – enhance stormwater conveyance capability in areas contributing to shallow groundwater.	Continuous/Ongoing	The SC DPW has supported both County and local efforts to improve stormwater conveyance within the area. This initiative has been carried forward in the County's updated mitigation strategy.
SC-3: Cooperate with federal, state and local agencies to study, identify, and remediate the causes of shallow groundwater and flooding issue.	Continuous/Ongoing (SCDPW)	This initiative is being removed from the County's updated mitigation strategy as it refers to activities that are an ongoing and normal part of County operations. Specific related have been identified within the County's updated mitigation strategy.
SC-4: Implement proactive stream/drainage system maintenance.	Continuous/Ongoing (SCDPW, SC Parks)	This initiative is being removed from the County's updated mitigation strategy as it refers to activities that are an ongoing and normal part of County operations.
SC-5: Provide backup power sources at vital critical facilities where necessary	In Progress	Power Assessment surveys of critical facilities throughout the County were repeatedly taken over the past several years in conjunction with the US ACE to identify and prioritize needs. Budget constraints and financial priorities within the County have delayed the procurement of backup power sources for these facilities. However, the electrical need profiles and prioritization of facilities has been completed.
SC-6: Continue to support actions of the Wild Fire Task Force	Continuous/Ongoing	Suffolk County coordinated with NYS to conduct Firewise training in the county. Firewise includes public education and outreach designed for home owners at risk in the wildland-urban interface. Suffolk County coordinated and financed the installation of 6 fire wells in the pine barrens where city water does not exist. NY Wildfire and Incident Management Academy increased their course availability by holding the academy in both the spring and fall (used to be just in the fall). Additionally, offered several courses free of charge to Suffolk County firefighters.
SC-7: Develop or enhance plans to include comprehensive evaluation of coastal storms and the reduction of their impacts at local level. Seek to coordinate all levels of planning in this area.	Continuous/Ongoing	This initiative is being removed from the County's updated mitigation strategy as it refers to activities that are an ongoing and normal part of County operations. Specific related have been identified within the County's updated mitigation strategy. The efforts of the Regional Catastrophic Planning Team and the program are winding down over the next 2 years. Many plans have been completed and are presently being distributed. The RCPT hired a regional field liaison to visit



Description	Status	Review Comments
		each jurisdiction and advocate and educate for the use of the plans.
SC-8: Continue to develop, enhance and implement existing emergency response plans to utilize new and developing technology/information as it becomes available.	Continuous/Ongoing	<p>This initiative is being removed from the County's updated mitigation strategy as it refers to activities that are an ongoing and normal part of County operations. Specific related have been identified within the County's updated mitigation strategy.</p> <p>Bus Evacuation Plan has been updated to include home pick-ups, a call center, and designated phone number. Other private bus companies have been brought into the plan as well. Fire Island Evacuation and Re-Occupation plans have been completed. Equipment Typing is a work-in-progress, as is the Resource database both of which will continue to be refined as new information and data become available.</p>
SC-9: Expand the public education on ways to protect their property before and during hazard events and where they can acquire the appropriate property protection measures	Continuous/Ongoing	<p>An amended version of this initiative has been carried forward in the County's updated mitigation strategy, specifically under the Sandy HMGP Project #931, "Mitigation Education for Natural Disasters" (MEND).</p> <p>SC FRES routinely gives educational presentations to requesting organizations and regular scheduled meetings are held with the Emergency Managers in each of the ten Towns in SC. Additional meetings are held with Native American Nations and a variety of Safety organizations and forums across the County. SC Ready program flyers produced for information. SC received an HMPG 1692 Grant for Public Education and has established a website www.suffolkcountyny.gov/mend that presents a vast amount of information to the public. In addition, an approved LOI and subsequent HMGP application #1249 under DR 4085 is being submitted on 10/30/13 for expansion of the SC Education Program over a three year period that will address Hazards of Concern to all SC residents.</p>
SC-10: Continue/enhance the development of engineered beaches where appropriate	In Progress / Ongoing	<p>An amended version of this initiative has been carried forward in the County's updated mitigation strategy, specifically to include the following mitigation initiative.</p> <p>The Disaster Relief Appropriations Act of 2013 established a pool of \$700 million for the Fire Island to Montauk Point (FIMP) project to upgrade natural and manmade storm protections along the 83 mile stretch of Long Island's south shore. The US ACE will be working with NYS and SC to establish multiple barriers of protection including: dune enhancement; surge dampening; elevation of homes and transportation infrastructure; and modifications to facilitate movement of sand along the shoreline and inlets. This multi-year US ACE project which will become a national model for managing shorelines and protecting coastal communities is expected to begin during the winter of 2013/2014 and will address floodplain management and maintenance activities moving forward.</p>
SC-11: Develop or enhance existing beach nourishment plans	In Progress / Ongoing	This initiative has been carried forward within the amended prior initiative.
SC-12: Enhance operation of the Suffolk County Emergency Operations Center (EOC) through improvements in facilities/hardware/technology and information as it becomes available.	In Progress	<p>This initiative has been carried forward in the updated County mitigation strategy.</p> <p>Improvements to the SC EOC are continually being made. Recent improvements include improved space utilization, new laptop computer stations, new seating and furniture, new HVAC units, new large screen interactive TV/computers, improvements to software including the E-Team system for managing emergency and large scale events, procurement of CodeRed a reverse 911 calling system for emergency notifications, expansion of GIS capabilities, expansion of wifi capabilities, etc. SC is also moving forward with the establishment of a back-up EOC with the selection of a location and work beginning on initial</p>



Description	Status	Review Comments
		communication/data connections.
SC-13: Enhance functionality of Points of Distribution (PODs)	In Progress	<p>This initiative has been carried forward in the updated County mitigation strategy.</p> <p>POD plans have been finalized. POD training and exercises in conjunction with SC Health Dept. and other organizations and agencies occur annually, including the use of POD's to distribute flu vaccinations to county employees. Improvements will continue to be made to more effectively make use of the POD concept.</p>
SC-14: Expand and enhance Joint Emergency Evacuation Program (JEEP) program through improvements to technology and information as it becomes available.	In Progress	<p>A modified version of this initiative has been carried forward in the updated County mitigation strategy, specifically to identify the changes noted below.</p> <p>The JEEP program has undergone improvements and is now known as the SC Emergency Preparedness Registry. SC FRES worked in conjunction with SC EMS, Office for People with Disabilities and IT, to put into service an on-line enrollment feature along with improvements to the database and applicant review and approval processes. Enrollment in the program has increased to over 750 individuals throughout the County who have special needs. The improvements made have been accomplished with existing staff and within the constraints of the SC Budget. The Program goals continue to be increasing enrollment and making technology and informational improvements as they become available through grant funding, cooperative efforts and available resources.</p>
SC-15: Resolve discrepancy between the Real Property Tax Dept. and the Treasurer's Office databases regarding number of tax parcels to support or enhance County-wide risk assessment	In Progress	<p>This initiative has been carried forward in the updated County mitigation strategy.</p> <p>Efforts continue to align the two databases. Additional work is required and addressed as resources are available.</p>
SC-16: Cap Budget # 1729 - Implement the Suffolk County Information Technology Disaster Recovery Plan	In Progress	<p>This initiative has been carried forward in the updated County mitigation strategy.</p> <p>This effort is on-going. There has been progress with the building of a Disaster Recovery Data Center in the Riverhead County Building. Equipment has been upgraded and future usage is being reviewed</p>
SC-17: Cap Budget # 3230 - Establishment of a Backup Fire Rescue Communications Facility	In Progress, 95% Completed	<p>This initiative has been carried forward in the updated County mitigation strategy.</p> <p>The establishment of a "Hot" back up Fire Rescue Communications Facility began in Nov 2010 and is fully operational at present (10/13). Final items are being addressed and the project is expected to be 100% completed by March 2014. The Project is funded from the SC Capital Budget.</p>
SC-18: Cap Budget # 3418 - Improvements to the Suffolk County Emergency Operations Center (EOC)	No Progress	<p>This initiative has been carried forward in the updated County mitigation strategy.</p> <p>Due to financial limitations within the County this Budget Item in the SC Capital Budget has been reviewed for prioritization and rescheduled for subsequent years. It is expected to move forward when funding is available. A Letter of Intent (LOI) for SC EOC Improvements was submitted under the Sandy DR 4085 HMGP but no approvals were received to establish grant funding for this effort.</p>
SC-19: Enhance emergency preparedness awareness by active participation in training exercises at both the county and local levels	In Progress	<p>This initiative has been carried forward in the updated County mitigation strategy.</p> <p>SC OEM regularly participates in training exercises, tabletops and workshops both within and outside of the County with federal, state, local municipalities, Tribal</p>



Description	Status	Review Comments
		Nations, PNPs, Utilities, Agencies and other organizations. On average FRES staff participates in over 20 training sessions each year. FRES regularly conducts training in our Emergency Management software system E-Team for all county departments, municipalities, agencies, and organizations as needed. In the last several years, over 400 people have been trained in the use of E-Team.
SC-20: Curtail floodplain development by transferring flood-prone properties in the Narrows Bay area obtained by Suffolk County through tax lien procedures to the SC Parks, Recreation and Conservation Dept. for open space purposes as per Narrow Bay Floodplain and Mitigation Plan 1997	In Progress (Planning and RE)	This initiative has been carried forward in the updated County mitigation strategy. Planning and RE
SC-21: Where appropriate, support retrofitting of structures located in flood-prone areas to protect structures from future damage, especially those known to be identified as ‘repetitive loss’.	In Progress (SC DPW)	An amended version of this initiative has been carried forward in the updated County mitigation strategy, incorporating the following similar mitigation initiative.
SC-22: Where appropriate, support acquisition and relocation of structures from flood-prone areas, especially those known to be identified as “repetitive loss”	In Progress (Planning and RE)	This initiative is being carried forward as an amendment to the above.
SC-23: Maintain ocean inlets at current locations and configurations. Close new inlets if they develop.	In Progress	This initiative has been carried forward in the updated County mitigation strategy. The Disaster Relief Appropriations Act of 2013 established a pool of \$700 million for the Fire Island to Montauk Point (FIMP) project to upgrade natural and manmade storm protections along the 83 mile stretch of Long Island’s south shore. The US ACE will be working with NYS and SC to establish multiple barriers of protection including: dune enhancement; surge dampening; elevation of homes and transportation infrastructure; and modifications to facilitate movement of sand along the shoreline and inlets. This multi-year US ACE project which will become a national model for managing shorelines and protecting coastal communities is expected to begin during the winter of 2013/2014 and will address floodplain management and maintenance activities moving forward.
SC-24: Through a regularly scheduled sand by-passing operation, stabilize ocean inlet channels for navigation and maintain the longshore transport of sand across the inlets.	In Progress	This initiative has been carried forward in the updated County mitigation strategy. The Disaster Relief Appropriations Act of 2013 established a pool of \$700 million for the Fire Island to Montauk Point (FIMP) project to upgrade natural and manmade storm protections along the 83 mile stretch of Long Island’s south shore. The US ACE will be working with NYS and SC to establish multiple barriers of protection including: dune enhancement; surge dampening; elevation of homes and transportation infrastructure; and modifications to facilitate movement of sand along the shoreline and inlets. This multi-year US ACE project which will become a national model for managing shorelines and protecting coastal communities is expected to begin during the winter of 2013/2014 and will address floodplain management and maintenance activities moving forward.
SC-25: Participation in an multi-jurisdictional update of SC All Hazards Comprehensive Emergency Management Plan	In Progress (95% complete); Continuous	This initiative is being removed from the County’s updated mitigation strategy as it refers to activities that have been established by the County within Section of this plan update.
SC-26: Ensure that all appropriate county employees are NIMS trained and qualified	In Progress	This initiative has been carried forward in the updated County mitigation strategy. SC FRES conducts NIMS and ICS training courses throughout the year for all County employees, municipalities, Agency and organizational emergency management personnel. Course announcements are distributed County-wide to ensure maximum visibility. Since 2006 approximately 4,700 personnel have been trained during 90 different training sessions in various levels



Description	Status	Review Comments
		of NIMS and ICS
SC-27: Enhance the flood protection at the Suffolk County Maximum Security Facility Jail	In Progress (SCDPW)	An amended version of this initiative has been carried forward; see SC-32 below.
SC-28: Enhance the flood and shoreline protection at the Bergen Point Sewage Treatment Plant	In Progress (SCDPW)	An amended version of this initiative has been carried forward; see SC-32 below.
SC-29: Develop and/or enhance the current stormwater management system to be in compliance with federal and state regulations such that there will be a net reduction in the flood risk caused by stormwater impacts	In Progress	2009 Update – DPW Drainage improvements. DPW and Planning
SC-30: Enhance the building inventory for all of Suffolk County using latest technology and GIS applications for use within HAZUS-MH for future risk assessment to be performed by Suffolk County, Towns and Villages	In Progress	Continuing improvements being made to building inventory through technology and GIS application capabilities.
SC-31: Continue to develop, enhance and implement plans to protect the 6 ½ mile Bergen Point Sewage Treatment Plant Ocean Outfall Pipe from damage during coastal or other hazard events	In Progress (SCDPW)	An amended version of this initiative has been carried forward; see SC-32 below.
SC-32: Retrofit critical facilities and infrastructure vulnerable to natural hazards.	In Progress	An amended version of this initiative has been carried forward in the updated County mitigation strategy, specifically identifying specific facilities and projects, including those identified in SC-27 and SC-28. 2009 Update – DPW prior HMGP grant application for SCPD headquarters
SC-33: Continue to support the implementation, monitoring, maintenance and updating of this Plan, as defined in Section 7.0	Ongoing / Continuous	This initiative is being removed from the updated strategy as it identifies a continuous and ongoing program. This plan update represents this ongoing effort.
SC-34: Enhance the SC Comprehensive Emergency Management Plan (CEMP) to address hazards from earthquakes	In Progress	This initiative has been carried forward in the updated County mitigation strategy. This effort is still planned however six Federal disaster declarations affecting Suffolk County since 2008, budget constraints, financial priorities and grant funding opportunities within the County have delayed the kickoff of this effort.
SC-35: Inquire about future development in all participating jurisdictions annually, at the annual plan review meeting, and map these locations within GIS/HAZUS to determine if they are/are not located within identified hazard areas. Update the plan with these findings.	In Progress	This initiative has been carried forward in the updated County mitigation strategy. Improvements in the County's GIS capabilities will facilitate this initiative in the future. It is a key discussion point in the Plan update and will be an Agenda item at each annual plan review meeting moving forward.
SC-36 (added during 2009 update): Expand Stakeholder involvement and participation with SC HMP	In Progress / Ongoing	This initiative is being removed from the updated strategy as it identifies a continuous and ongoing program. This plan update represents this ongoing effort, which has now included all municipalities, the two Tribal Nations. Further, a comprehensive group of stakeholders have participated and provided input to this plan update process, as documented in Section 3. The updated mitigation strategy includes programs and initiatives that will further stakeholder involvement and participation in hazard mitigation throughout the county. Presentations made by SC OEM staff to the public and organizations throughout the County have increased the awareness of Hazard Mitigation. The SC HMP website at www.suffolkcountyny.gov/respond has recorded over 19,000 visits since coming on line attesting to its visibility and stakeholder involvement. The current update of the SC HMP has an aggressive program for stakeholder involvement including the use of social media, on-line questionnaires and public meetings.

Appendix C

Suffolk County Facilities Case Studies

Westhampton CNG Filling Station

COST ANALYSIS

Total Cost

\$2,196,547.84

ARRA Funding

50%

Project Construction Timeline

6 mo.

Fast-Fill Capacity

408 scf per minute

(135 scf = 1 diesel gallon equivalent)

Storage Capacity

69,000 scf. @ 4500 psi



Workers Casting a Concrete Curb



Aerial View of Site at South
Perimeter Rd.

Compressed natural gas (CNG) has become an affordable alternative to fossil fuel. Suffolk County Department of Public Works (DPW) installed CNG filling stations at its Westhampton and Commack Highways facilities. The County fleet has expanded its fleet to include more CNG vehicles which reduce operation costs emissions. An American Recovery and Reinvestment Act (ARRA) Federal Grant provided 50% reimbursement of the construction cost to Suffolk County.

The CNG filling station was constructed just outside the Westhampton facility. The equipment is installed on these grounds which are locked at night, however the site is available for public fuelling during all hours. The site was chosen to serve commercial and public drivers on the East end of Long Island.

The manpower to carry out the project, its design and construction, was contracted to outside agencies through a request for proposal (RFP). The consultant was selected in May of 2010 and planning began.

Two options were presented: a time-fill, and a fast-fill station. The fast-fill station was selected based on expected volume. This type of station requires larger equipment to compress and store the natural gas. Two 125 hp compressors and two, three-tank storage arrays were provided to meet specified 408 scfm flow and 69,000 scf storage requirements.



Compressors, Dryers, and
Storage Equipment

Two dispensers were provided with room for trucks to maneuver in and out of the station. Separate billing systems for the County fleet and the public were required. The billing system is capable of reading any major credit card. Proper safety is a paramount issue and proper signage, emergency shut-down switches, extinguishers, and an auto-dial emergency line were provided.

SUFFOLK COUNTY DEPARTMENT OF PUBLIC WORKS

335 Yaphank Ave.

Yaphank NY, 11980

The Westhampton project took less than 1 year to plan and build. Planning ran from February to September 2011 and construction ran from August to December 2011. Construction of the Commack filling station was underway during this time.

Construction activities such as surveying, cutting, trenching, paving, concrete casting, and equipment mounting were handled by our general contractor. The electrical contractor provided electrical service and power and control wiring to the equipment and site lighting. Gas piping and instrumentation were provided by the plumbing contractor.

The CNG dispensing islands' location outside of the Westhampton facility prevents any interruption of County operations and allows the station to remain open to the public 24-7.



CNG Dispensing Island Close-up



Workers Installing Dispensing Islands



Two Fast-Fill CNG Dispensing Islands

A 2-year contract for the operation, maintenance, and data management (OM&DM) of the CNG station was awarded in March 2012. The duties include billing, payment of utilities, replacement of parts, repair of equipment, and 24-hour emergency response. The contract for operation of the station sets a price for 2 years on the natural gas provided to County vehicles and commercial and public vehicles.

	County-owned/ operated vehicles	Non County-owned/ operated vehicles
Cost per diesel gallon equivalent (\$ per DGE)	\$ 1.792	\$ 2.80
Cost per gasoline gallon equivalent (\$ per GGE)	\$ 1.60	\$ 2.50

The CNG stations increase the number of alternative fuel infrastructure locations in Western and Eastern Suffolk County. CNG fuel saves money for County, commercial fleets, and energy conscious consumers.

COST ANALYSIS

Total Estimated Cost

\$3,000,000

Remaining Project Timeline

10 months

Realized Annual Savings So Far

\$170,000

Expected Total Annual Savings

\$820,000

Project Payback Period

3.7 years

Three AERCO Benchmark 1.5
Condensing Boilers Installed at the
County Center



Evans K. Griffing County Center

Riverhead County Center – Decentralization of HTHW at the Power Plant

Suffolk County Department of Public Works (DPW) is in the process of shutting down the high temperature hot water (HTHW) boilers at its power plant in Riverhead. The move is expected to achieve energy savings, reduce greenhouse gas emissions, and save on operating costs.

The job is being done in-house with DPW staff coordinating the design and construction work. The cost of operating a HTHW boiler plant is prohibitively expensive and when some tubes broke on one of the boiler, and DPW staff were faced with the question of bandaging the problem or undergoing a major replacement. They considered repairing the boiler, revamping the system to steam, or decentralizing the plant. Maintenance costs associated with the centralized plant were too high. Heat losses from the piping tunnels to each building were unattractive to its efficiency goals. Decentralizing the plant proved to be the best option

Decentralization has begun as boilers have been installed at Evans K. Griffing County Center. Fuel consumption at the Power Plant is already significantly decreasing. We are down approximately 40,000 therms in the peak heating months and have picked up an additional load of only 20,000 therms.

Annual savings are on the order of \$170,000 and when the other two facilities are brought online the saving will increase to \$820,000.



Riverhead County Complex: Jail, Criminal Court, County Center, and Power Plant (left to right, bottom)

SUFFOLK COUNTY DEPARTMENT OF PUBLIC WORKS

335 Yaphank Ave.

Yaphank NY, 11980

We plan to install five AERCO Benchmark 3.0 condensing boilers at the Criminal Courts and the Jail.



Clothes Dryers at the Jail



Detention Facility at Riverhead

Our plan is to provide gas-fired laundry equipment first to allow for removal of the steam generators above the laundry room. HTHW heat exchangers and domestic hot water tanks will be removed. Condensing boilers and plate-to-frame heat exchangers will be installed in the mechanical space as a new boiler room to provide heat and hot water to the entire South portion of the Jail, apart from the five-story maximum security sections.

Maximum security is provided for by High efficiency steam boiler will be installed by the kitchen so that steam appliances may remain. Plate-to-frame heat exchangers are compact and recover domestic hot water temperature quickly. They will take the place of cumbersome storage tanks, freeing up space and reducing maintenance costs.

Renovations at the Criminal Courts building will include condensing boilers and plate-to-frame heat exchangers similar to plans for the Jail. The Criminal Courts building is



Arthur M. Cromarty Criminal Courts

mostly office space and the domestic hot water load will be easily met by the plate-to-frame exchanger.

Once all the heating and domestic hot water loads have been met at the separate buildings, a set of boilers and a small instantaneous water heater will provide for the Power Plant



Power Plant at Riverhead

Suffolk County – Remote Monitoring of Facilities

COST ANALYSIS

Total Estimated Cost

\$ 3,261,000

First Installation

November 2008

Total Annual Savings

\$ 1,149,000

Project Payback Period

2.8 years

Suffolk County DPW has installed remote monitoring in sixteen facilities. Remote monitoring allows building operators to control the building from any location with internet access. It also allows engineers and other professionals to get involved in the more efficient operation of the building. In large facilities such as Medical Examiner, H. Lee Dennison, and Cohalan Court Complex savings are in the 5-10% range. With smaller buildings savings are sometimes greater in the 5-20% range.

Remote monitoring allows for control of all buildings systems connected to a controller. Figure 1 shows an air handler at Cohalan Court Complex. From this screen the discharge air set-point can be changed to reduce the cooling or heating required or the economizer can be monitored to determine if the optimum amount of outside air is being brought to the building. Figure 2 shows the screen that controls the scheduling of equipment. Lights and the air handlers can be shut off automatically on nights and weekends to save energy when the systems are not needed but would normally be left operating.

The first installation was performed at Medical Examiners with an Energy Services Company (ESCO) contract. The biggest savings from the project were the result of remote monitoring, chiller replacement, VAV fume hoods, and high efficiency lighting. Among all these improvements remote monitoring accounted for \$ 124,600 saved in the first year. Current savings at this site are outlined in Figure 3.

Another project was completed in March 2010 at H. Lee Dennison Executive. Remote monitoring was installed with VFD's on air handler motors. Other projects were already being implemented there such as high efficiency boilers and occupancy sensors. A time schedule was set for exhaust fans, lights, and air handlers to be on 10 hours a day, six days a week and off all day Sunday. The resulting savings on gas and electric from the installation was \$ 187,000. Of that savings the savings from remote monitoring comprised \$ 45,100. Table 1 shows the percent saved on utility bills where remote monitoring was installed. Savings from other energy projects were separated out from the total savings to show their separate contributions.

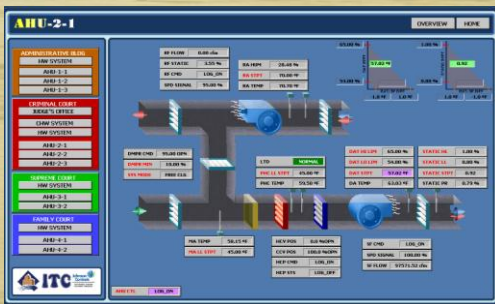


Fig. 1 Control screen for an air handler unit at Cohalan Court Complex. Allows control of several points including damper position, heating valve opening, and discharge air setpoint.

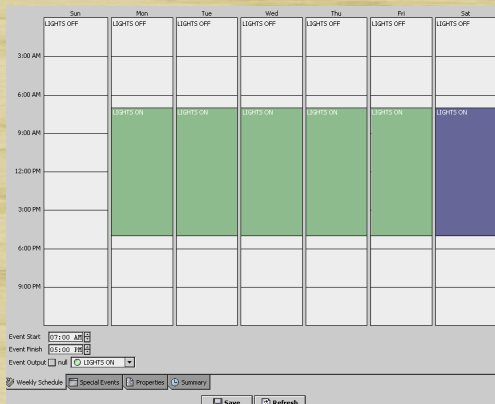


Fig. 2 Control schedule for lighting. Lights are on 10 hours a day six days a week except Sunday.

Comparison of BMS Savings and Other Energy Savings to Lowered Energy Cost

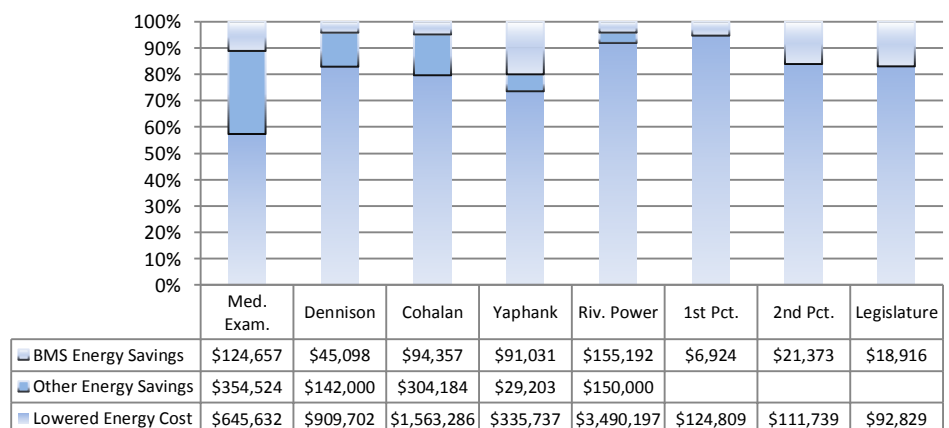
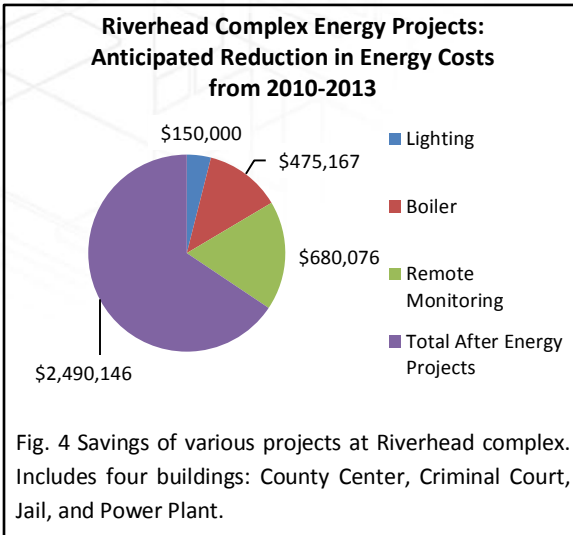


Table 1 – Percent saved on total utility cost (electric and gas/fuel) upon installation of remote monitoring and other energy saving measures. Remote monitoring saved between 5-20%.

Riverhead complex has 790,825 square feet of building space. Installing remote monitoring systems in the Criminal Courts and the Jail is expected to produce savings of 18.5% on energy costs. Figure 4 shows that this location is the center of other large energy projects such as lighting upgrades and high efficiency boilers.



Medical Examiner Energy Projects: Reduction in Energy Costs from 2009 to 2012

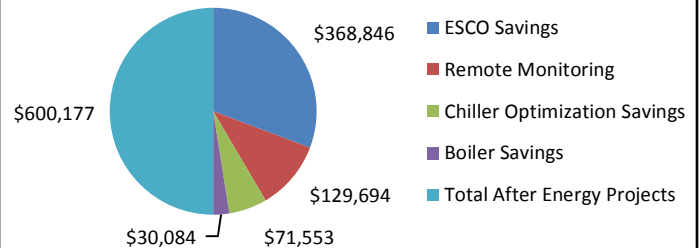
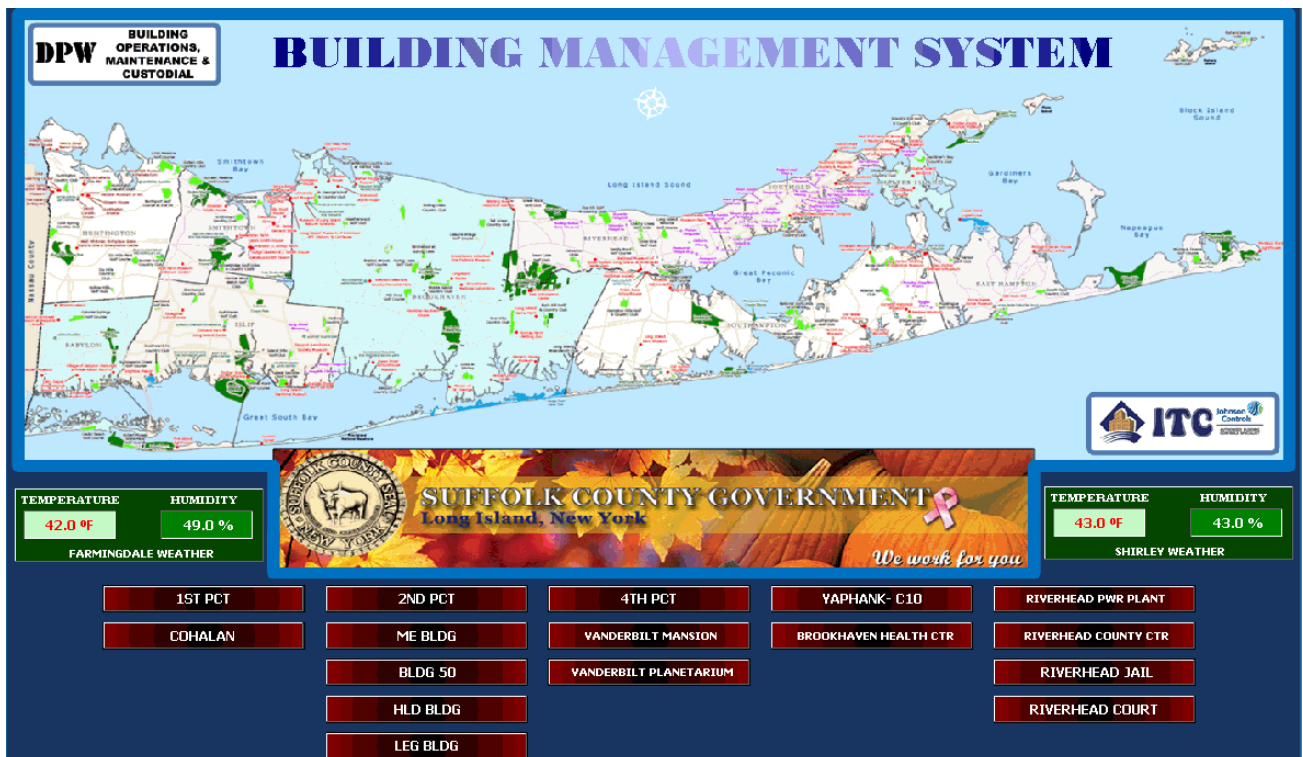


Fig. 3 Savings of various projects at Medical Examiner's building. BMS savings is broken out from ESCO savings which include lighting, chiller upgrade, and VAV fume hoods.

Installing BMS saves between 5-20% on energy costs depending on the size of the building. At the sixteen sites where remote monitoring is installed at Suffolk County \$1,149,000 is being saved on energy costs. Managing the buildings is easier with access to the equipment controllers from any location with internet access and responsibility for building is shared between Operations and Maintenance and Engineering personnel.



COST ANALYSIS

Total Cost

\$5,600,000

LIPA Rebate

\$500,000

Annual Electric Savings

2,423,100 kWh

Annual Boiler Gas Savings

74,510 therms



VFD for Air Handler Unit



ASHRAE 110 Fumehood Testing
www.lfsystems.com

1 - www.co.suffolk.ny.us

Sydney B. Weinberg Forensic Sciences Building

CASE SUMMARY

The Forensic Sciences building is an 85,000 square foot facility located in Hauppauge in the North County Complex off of Veterans Memorial Highway. It houses the Office of the Suffolk County Medical Examiner and is divided into Pathology, Toxicology, and Crime Laboratory sections. It also houses the Public and Environmental Health Laboratory.

The Pathology section investigates about 4,500 deaths per year and performs about 900 autopsies per year. The Toxicology Section performs analysis in post-mortem, human performance, and forensic drug testing. The Crime Laboratory has Serology/DNA, Firearms, Arson, Trace Evidence, and other laboratories to analyze evidence submitted by law enforcement agencies [1].

The heating and cooling demands of this facility are met by typical HVAC equipment including fume hoods and a micro-turbine for electric generation and additional heat. Fume hoods are notorious for sapping energy because of the large rate of air circulation. This is a 24 hour-a-day facility and even marginal energy reductions to the equipment yield significant changes in energy consumption. The building was fitted with energy efficient equipment and operating systems to reduce carbon dioxide emissions and energy consumption.

ENERGY RETROFIT

The County chose to retrofit this facility because it lends itself an energy retrofit. The County determined how to meet the needs of the building and how to do it with the least environmental impact.

A 65 kW micro-turbine, installed since 2006, produces electricity from gas combustion and reduces the demand for electric service. With the help of Ameresco, an energy servicing company, the County monitored and quantified its advances toward greater efficiency.

The air-cooled chiller plant was replaced with two 600-ton water cooled centrifugal chillers with VFDs. T12 lamps and ballasts were replaced with T8 lamps and electronic ballasts. Occupancy sensors were installed in offices, storage rooms, and conference rooms to limit 24-hour demand. Variable frequency drives were installed on all fan motors on the air-handlers. The fume-hoods, 56 in all, were converted to variable flow. All standard efficiency motors were replaced with premium efficiency motors. The existing building management system was updated with a state of the art Johnson Controls MetaSys BMS. Weather-stripping was placed on all exterior doors to reduce infiltration. A separate gas fired water heater was installed to enable shut down of the boilers during the summer months.

SUFFOLK COUNTY DEPARTMENT OF PUBLIC WORKS

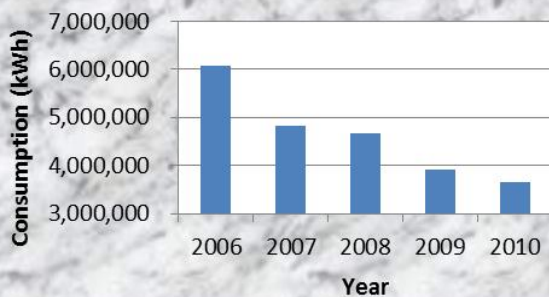
335 Yaphank Ave.

Yaphank NY, 11980

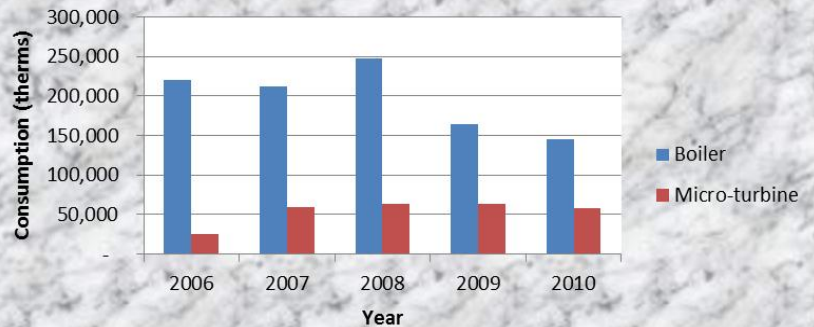


Forensic Sciences Building in Hauppauge

Forensic Sciences Electric Consumption



Forensic Sciences Boiler and Micro-turbine Gas Consumption



Year	Electric Consumption (kWh)	Cost
2010	3,648,300	\$ 606,762.94
2009	3,908,700	\$ 679,302.78
2008	4,680,900	\$ 761,158.96
2007	4,821,300	\$ 775,085.51
2006	6,071,400	\$ 1,085,796.77

Forensic Sciences Annual Electric Consumption

Year	Boiler Consumption (therms)	Micro-turbine Consumption (therms)	Boiler Gas Cost	Micro-turbine Gas Cost
2010	145,789	58,708	\$ 167,012.25	\$ 58,412.65
2009	163,841	63,167	\$ 207,759.94	\$ 60,520.59
2008	247,291	63,225	\$ 348,123.19	\$ 80,814.61
2007	212,109	59,683	\$ 246,165.86	\$ 66,950.74
2006	220,299	24,937	\$ 272,756.68	\$ 25,446.79

Forensic Sciences Annual Gas Consumption

RESULT

In 2010, using the year 2006 as a baseline, the County reduced electric consumption by 40% and gas consumption by 34%. The electric and boiler gas savings are 2,423,100 kWh and 74,510 therms annually and these account for approximately 1,255 tons and 436 tons less CO₂ emissions each year.

Emissions calculations were done using
<www.abraxasenergy.com/emissions>

SUFFOLK COUNTY DEPARTMENT OF PUBLIC WORKS

Chief Engineer, Michael Monaghan, P.E. (631) 852-4225

Project Manager, Javed Ashraf, C.E.M., P.E. (631) 852-4229



Medical Examiners Building

COST ANALYSIS

Project Cost

\$550,000

National Grid Rebate

\$20,761

Annual Electric Savings

2,618,400 kWh

Medical Examiners Building

CASE SUMMARY

The Medical Examiners Building, a three story structure, is located in North County Complex in Hauppauge, New York. This building receives its heating and cooling service from units that are shared with the District Attorney's Building. The combined square footage of the two buildings is 156,101 square feet. These buildings house over 200 employees that investigate about 4500 deaths a year providing a crucial service to the county.

Before the upgrades to the heating and cooling systems were made, the buildings were heated by three HB Smith Cast Iron Section Low Pressure Steam Boilers. This outdated 30 million BTU/hour boiler plant, which was original to the 1986 construction, was vastly too large for the buildings that it was serving. Also these antiquated boilers needed to have their sections frequently replaced causing an additional expense.

ENERGY RETROFIT

The retrofit for the Medical Examiners Building has enabled the building to run on a much more efficient system and to save large amounts of energy on a yearly basis. Due to the purchase of the gas hot water heater and the micro turbine, the building is able to completely shut off the boilers during the summer months saving energy and money. Also, during the most recent heating season only two out of the three boilers were used.

As mentioned before, the older boilers were out of date and becoming increasingly less practical to operate. The new boilers that were installed are 2,008,500 Btu/hour Cleaver brook Clearfire Boilers that run at 86% efficiency, a massive improvement over the old boilers.

To cool the building new chillers were also installed; these chillers added to the reduction of energy costs for the building. To reduce energy consumption even further the county plans to shut down the systems for the part of the day when they are not needed.

UPKEEP

For the new boiler system to run a peak efficiency constant monitoring and upkeep are required. After the initial installation, Craig Rhodes, Brian Darwell and the staff of Buildings Operations and Maintenance have overseen the upkeep of the boiler systems in the Medical Examiners Building. Though the continued effort of Buildings Operation and Maintenance the boilers will repeatedly save the County both energy and money.



Old Boiler



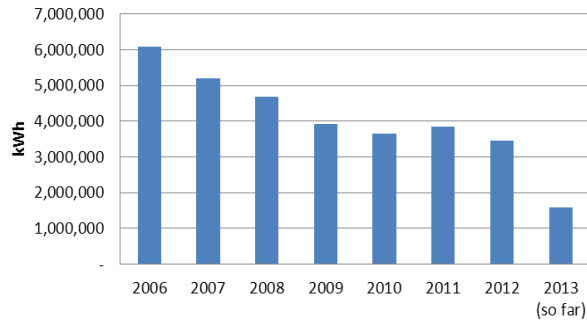
New Boilers

SUFFOLK COUNTY DEPARTMENT OF PUBLIC WORKS

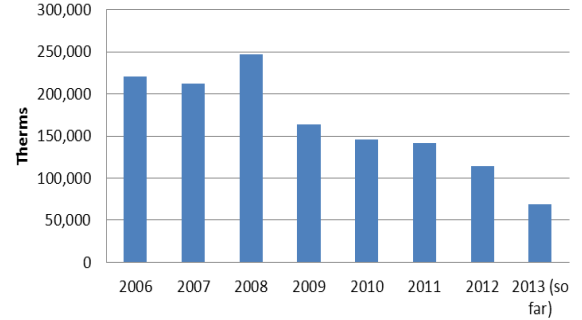
335 Yaphank Ave.

Yaphank NY, 11980

Building Electric Consumption



Boiler Plant Gas Consumption



Year	kWh	Cost
2006	6,071,400	\$1,085,797
2007	5,191,500	\$821,928
2008	4,680,900	\$761,159
2009	3,908,700	\$671,303
2010	3,642,300	\$606,763
2011	3,834,600	\$590,521
2012	3,453,000	\$529,460
2013 (so far)	1,588,200	\$244,953

Annual Electric Consumption Record for Medical Examiners Building

Year	Therms	Cost
2006	220,299	\$272,757
2007	212,109	\$246,166
2008	247,291	\$348,123
2009	163,841	\$207,760
2010	145,789	\$166,796
2011	141,998	\$144,152
2012	114,204	\$95,558
2013	68,511	\$52,831

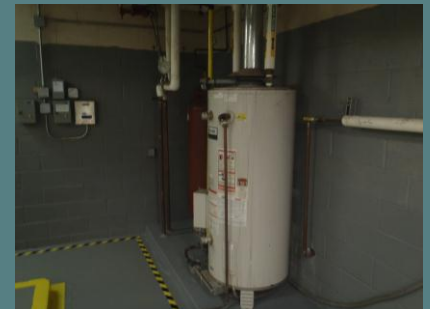
Annual Natural Gas Consumption Record for Medical Examiners Building

The reduction in energy consumption by the installation of the new boilers saves about 1.9 metric tons of CO₂ each year, which is equivalent to the emissions from the consumption of twenty-five tanker trucks worth of gasoline.

Calculations from epa.gov



Old Domestic Hot Water Heaters



New Domestic Hot Water Heater

SUFFOLK COUNTY DEPARTMENT OF PUBLIC WORKS

Chief Engineer, Michael Monaghan, P.E. (631) 852-4225

Project Manager, Javed Ashraf, P.E., C.E.M. (631) 852-4229

COST ANALYSIS

Project Cost

\$235,200

Annual Electric Savings

30,660 kWh

Annual Savings

\$4,600

Emissions savings:

CO₂ 15 ton SO₂ 114 lb NO_x 35 lb



Charge Point Level I&II Electric Vehicle (EV) Charging Station



24 kW South Facing, Two-Sided, Solar Panel Array

Griffing Ave. Courts

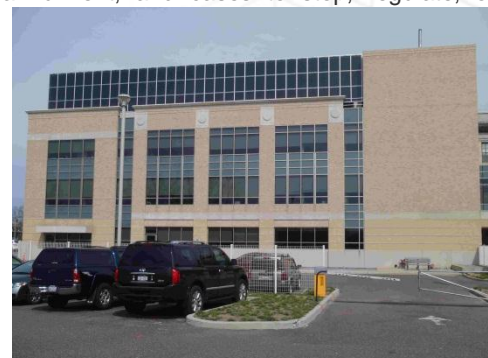
Solar Panel, Electric Car Charging Station, and Lighting Upgrade

The Suffolk County Supreme Court is a 104,500 sq. ft. new construction at Griffing Ave in Riverhead. This is an addition to 106,000 sq. ft. of already existing space for the Supreme Court, Commissioner of Jurors, and the courthouse annex. The Supreme Court deals with felonies, cases for more than \$25,000 in money damages, divorce, separation, and annulment, and cases to stop, regulate, or supervise private or governmental activities. Suffolk County Department of Public Works owns and operates the facility.

To advance Suffolk County's energy efficiency measures we installed 96 two-sided, Sanyo solar panels to produce a total of 19,422 kWh annually. The panels face South and there is a plasma LCD display in the lobby showing visitors the energy produced and emissions averted by the solar panels.

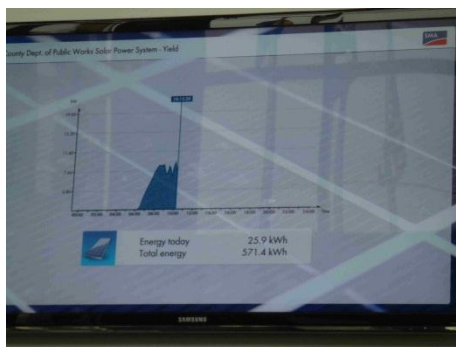
The solar panel project qualifies for a \$51,480 LIPA rebate. The building was provided with 748 Lithonia T8 and T5 super-saver fluorescent fixtures and 128 occupancy sensors qualifying for \$100,000 in rebates.

To further the use of new technology we installed a Charge Point Level 1 (120V) and 2 (208-240V) EV charging station. Drivers charge their cars by starting an account with mychargepoint.net. They then use an RFID-based smart card, contactless credit card or call the number on each station to use the station. Electric vehicles typically have a range of 60-100 miles and take 16 hours on 110V or 8 hours on 240



Solar Panels Blend into Building Facade

V charging stations to fully charge. Electric cars save \$12 and 62.6 lb CO₂ emissions for every 100 mi.



Lobby Display Counts kWh and GHG

Energy projects are always in the works and we plan to do chiller optimization in the building complex. There are two 400 ton chillers operating with 165 hp pumping and cooling tower power. By switching from "primary-secondary" to "primary variable-flow" we will save 319,171 kWh, or \$56,682 in operating costs, and 239 tons of CO₂ emissions. The

project is eligible for a rebate of \$73,034. By leveraging these energy projects and rebates we are able to get the most savings at the least initial cost.

SUFFOLK COUNTY DEPARTMENT OF PUBLIC WORKS

335 Yaphank Ave.

Yaphank NY, 11980

COST ANALYSIS

Project Cost

\$700,000

LIPA Rebate

\$4953.10

Annual Electric Savings

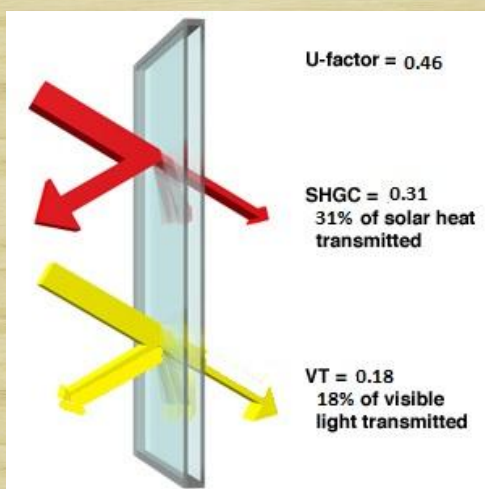
281,920 kWh

Annual Gas Savings

718 therms



Rooftop Unit on Farmingville Health Center



Low-e glass transmits as much light as possible but rejects more heat.
www.efficientwindows.org

Farmingville Health Center

CASE SUMMARY

The Farmingville Health Center is a 17,514 square foot office in Farmingville, NY which serves Environmental Health, Alcoholism and Substance Abuse, Mental Health, a Children's Clinic, and Public Health. There are approximately 57 Suffolk County employees in the facility during regular working hours.

The space conditioning needs were met by hydronic heating and cooling supplemented by rooftop units. The boiler used was a cast-iron sectional boiler and the chiller plant was a reciprocating chiller with air cooled condenser fans outside the building that provided chilled water. The County took measures to reduce energy consumption at the Farmingville site.

ENERGY RETROFIT

The energy efficiency measures taken at Farmingville Health Center include low-emissivity windows, high-efficiency rooftop units, new lighting, and point-of-use water heaters.

The hydronic heating and cooling system was removed and replaced with high efficiency rooftop units. All seven units are ASHRAE 90.1 compliant and 5 units are rated SEER of 12.5, one is rated 14, and one SEER 12. A chlorine free refrigerant, Puron®, is used to comply with the phase-out of harmful refrigerants. They provide heating with natural gas combustion and cooling with electric power. Space conditioning was divided into seven sections providing better tracking of the load.

The windows were replaced with low-emissivity double-pane glass with reflective coating and a thermal break. This provides the best rejection of solar heat gain and a higher thermal resistance. The low emissivity of the glass prevents the window from exchanging energy with outdoors by radiation and the thermal break interrupts the flow of heat through the window frame.

The existing T12 fluorescent lighting in the corridor was replaced with T5 fluorescent fixtures. A typical 160 watt fixture was replaced with a 28 watt fixture. Though only used in a portion of the building, the savings are large.

SUFFOLK COUNTY DEPARTMENT OF PUBLIC WORKS

335 Yaphank Ave.

Yaphank NY, 11980



Year	Electric Consumption (kWh)	Cost
2010	162,880	\$ 31,054
2009	178,720	\$ 34,131
2008	223,360	\$ 41,732
2007	334,880	\$ 59,155
2005	444,800	\$ 68,169

Farmingville Health Center Annual Electric Consumption

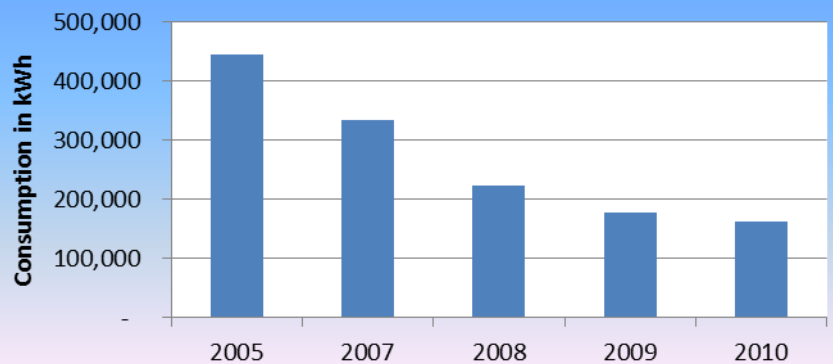
Year	Gas Consumption (therms)	Cost
2010	8,757	\$11,042.95
2009	8,360	\$ 8,360.00
2008	12,317	\$18,562.34
2007	8,752	\$12,752.37
2006	9,866	\$14,484.09
2005	9,475	\$12,301.39

Farmingville Health Center Annual Gas Consumption

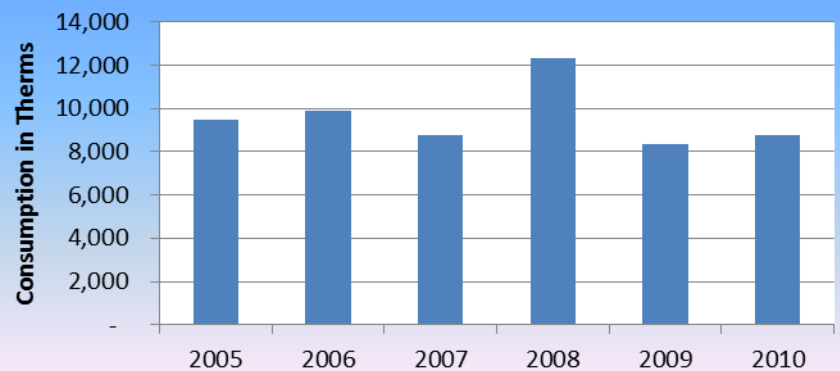
RESULT

The results were compared using the 2005 and 2010 billing records. The facility saves over 60% of electricity, 281,920 kWh, compared to the previous case. The heating load was reduced by 718 therms, approximately 8%. This project is a great success in both the lighting and HVAC aspects. The measures taken here are being replicated at other County facilities.

Annual Electric Consumption



Annual Natural Gas Consumption



COST ANALYSIS

Total Cost

\$190,000

Annual Electric Savings

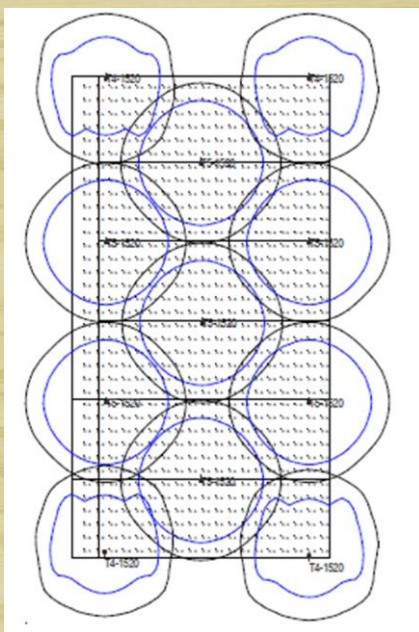
10,862 kWh

Cost Savings

\$1,358



Solar LED Pole Lighting



Photometric Diagram

Solar Parking Lot Lighting Project

CASE SUMMARY

The Department of Public Works constructs, maintains and operates county properties and designs, constructs and maintains county roads, sewerage systems, buildings and other facilities, such as waterways, bridges, docks and marinas. In addition, the department is responsible for the operation of the Suffolk County Transit System as well as the prevention of mosquito-borne disease and the control of nuisance mosquitoes. The building, located in Yaphank, has a 20,000 square foot parking lot in back which has been unlighted, presenting a safety hazard to its occupants.

We sought ways to resolve this issue but found it to be expensive to have the work done in a traditional fashion: by tearing up the parking lot and hard-wiring new poles and lights. We were looking at a half million dollar project until we found Carmanah EverGEN, an LED lighting fixture that could operate on a solar panel and a battery. Carmanah's product also features the ability to dim to 50% when no one is present using motion sensors on the pole. This project is not only using renewable energy, it is also cheaper in first cost, and doesn't cost anything to operate after installation.

When compared with typical 400 W high pressure sodium fixtures these fixtures save 10,862 kWh per year. The life span of the panels and the batteries are 20 years and 12 years respectively. Considering the initial cost savings of \$308,000 dollars we could realize a life-cycle cost savings of \$335,000.

RESULT

The electric savings are 10,862 kWh annually and these account for approximately 10.6 tons less CO₂ emissions each year. Not only does this project save money on first cost and incur no operating costs, but it also contributes to a greener economy and better environment.

SUFFOLK COUNTY DEPARTMENT OF PUBLIC WORKS

335 Yaphank Ave., Yaphank NY, 11980

Chief Engineer, Michael Monaghan, P.E. (631) 852-4225

Project Manager, Javed Ashraf, C.E.M., P.E. (631) 852-4229

COST ANALYSIS

Project Cost

\$500,000

LIPA Rebate

\$43,264

National Grid Rebate

\$100,062

Annual Electric Savings

1,053,000 kWh

Annual Gas Savings

53,190 therms



H. Lee Dennison Building
www.wikipedia.org

H. Lee Dennison Building

CASE SUMMARY

Built in 1969, H. Lee Dennison building is a 12 story, 234,548 square foot facility housing the County Executive, Audit and Control, Environment and Energy, Planning, County Attorney, and EMS. These departments have 540 employees to oversee activities of other County departments and provide services and information to Suffolk County residents.

The space cooling requirements are met by 3 centrifugal chillers rated at 250, 450, and 550 tons. There is a cooling tower for heat rejection. Heating demand is met by two 3 million Btu/h condensing boilers. Domestic hot water demand is met by electric water heaters on each floor. Pumps and fans in the basement supply heating and cooling to the rest of the building and air handlers give the system an extra boost to maintain air supply at the upper levels. The Building management system is Johnson MetaSys connected to the existing pneumatic controls.

ENERGY RETROFIT

The energy efficiency measures at H. Lee Dennison Building include the HVAC system and lighting. A Cleaver Brooks boiler in use at the site produced steam for the building. Because of age and cycling of load on and off, the boiler efficiency is estimated at 70%. The system was replaced with AERCO condensing boilers which achieve efficiencies of about 92% especially at low loads, achieving higher efficiencies at part-load. The boiler also operates at lower temperatures.

The lighting project included retrofit from T12 to T8 fluorescent lighting and installing occupancy sensors. To decrease lighting usage, 284 occupancy sensors were installed in the 12 floors of H. Lee Dennison building.

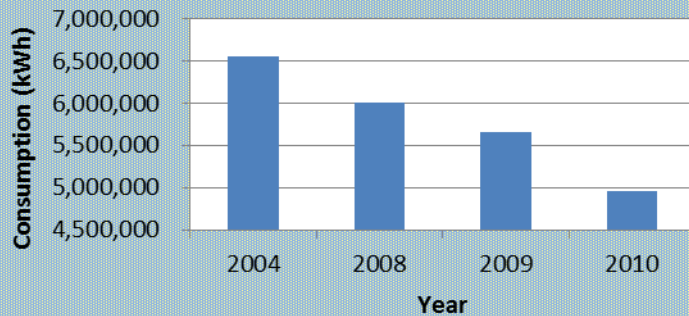
The County installed variable frequency drives on all fan motors on the air-handlers. By shutting off the fans for 10 hours a day, the County aimed to greatly reduce CO₂ emissions each year. With the help of an upgraded existing Building Management System with state of the art Johnson Controls MetaSys BMS, energy usage profiles were reduced through proper operation schedules.

SUFFOLK COUNTY DEPARTMENT OF PUBLIC WORKS

335 Yaphank Ave.

Yaphank NY, 11980

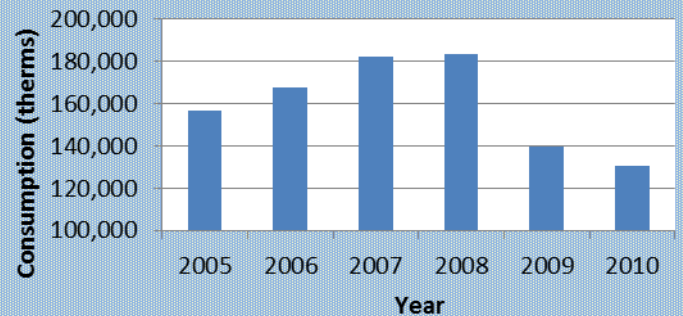
Annual Electric Consumption



Year	Electric Consumption (kWh)	Cost
2004	6,555,600	\$ 819,367
2008	6,010,200	\$ 977,245
2009	5,659,200	\$ 962,360
2010	4,957,200	\$ 826,700

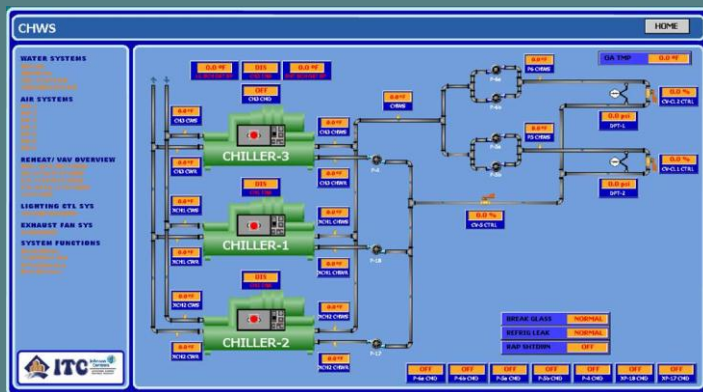
Annual Electric Consumption Record for
H. Lee Dennison Building

Annual Gas Consumption



Year	Consumption (therms)	Cost
2005	156,457	\$ 161,272.95
2006	167,892	\$ 201,727.01
2007	182,397	\$ 205,623.70
2008	183,433	\$ 258,995.87
2009	139,633	\$ 158,845.41
2010	130,243	\$ 142,676.89

Annual Natural Gas Consumption Record for
H. Lee Dennison Building



Building Management System Operating 3 Chillers

RESULTS

The energy savings reduced 856 tons of CO₂ emissions. Emission reductions are calculated against a 2008 baseline. The electric consumption for 2010 was reduced by 1,053,000 kWh reflecting 546 tons of CO₂ emissions reduced. Gas consumption for 2010 was reduced by approximately 53,190 therms reflecting 310 tons of emissions reduced.

Emissions calculations were done using
<www.abraxasenergy.com/emissions>

SUFFOLK COUNTY DEPARTMENT OF PUBLIC WORKS

Chief Engineer, Michael Monaghan, P.E. (631) 852-4225

Project Manager, Javed Ashraf, C.E.M., P.E. (631) 852-4229

COST ANALYSIS

Total Cost

\$1,577,037.86

ARRA Funding

50%

Project Timeline

7 mo.

Fast-Fill Capacity

300 scf per minute

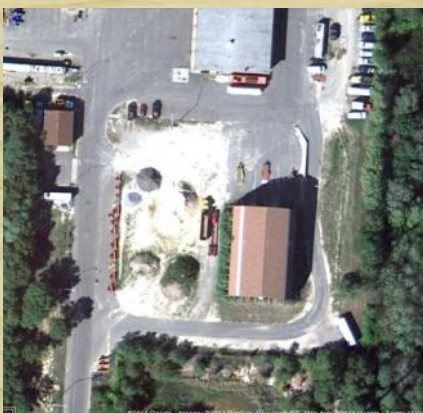
(135 scf = 1 diesel gallon equivalent)

Storage Capacity

36,000 scf. @ 4500 psi



Asphalt Cutting and Removal



Aerial View of Site at Crooked Hill Rd.

Commack CNG Filling Station

Suffolk County Department of Public Works (DPW) installed compressed natural gas (CNG) fuelling stations which are open to the public. The County fleet has expanded to include more CNG vehicles which reduce the operation costs and reduce emissions.

Funding for the design and construction of CNG fuelling stations came from an American Recovery and Reinvestment Act (ARRA) Federal Grant to Suffolk County DPW.

The site chosen for construction of the site is the Highways department Commack facility. The existing structures on the site include a garage, a salt shed, a cell tower, and equipment stored on these grounds which are locked at night. The site is available for public fuelling during the hours of 7:00 am to 3:00 pm. The site was chosen because it is centrally located and available to the County's fleet and to the public.

The Suffolk County DPW did not have the manpower to carry out the project, and it was sufficiently technical to require a request for proposal (RFP). An RFP was issued to several consultants. Paul W. Grosser Consulting Inc. was chosen to design the CNG station and direct the construction of the project.

A fast-fill type station was designed which requires more compressor power and storage than a slow-fill station. The equipment used was ANGI Energy Systems. Four 50 hp compressors and a three-tank storage array were specified. The site was properly graded and paved to provide room for trucks to maneuver in and out of the station. Two pumps were provided with a billing system for the County fleet and any major credit card. Proper safety was a paramount issue and the consultant included all safety precautions. Signs display the site address, emergency telephone, and emergency shut-down switches within the equipment fence and at a safe distance from the equipment and dispensers. A phone line provides auto-dial to Suffolk County in case of any emergencies.

SUFFOLK COUNTY DEPARTMENT OF PUBLIC WORKS

335 Yaphank Ave.

Yaphank NY, 11980



Snow Plows on County Property



Installation of Compressors, Dryers, and Storage



Vehicle Guard Rail at Entrance



Two Dispensing Islands

RESULT

The project took 7 months to plan and build. Planning ran from February to March 2011. Stages of planning were review, comments on drawings, revisions for further review, and getting specs from National Grid and ANGI Energy Systems. Drawings and specs were reviewed by County personnel, the fire marshal, and outside agencies. Construction ran from April to August 2011 with phases such as surveying, cutting, trenching, paving, concrete casting, equipment mounting, running conduit, welding, inspections, and commissioning.

An RFP will be sent out in November for a 2-year contract for the operation, maintenance, and data management (OM&DM) of the CNG station. The duties will include billing of County and public vehicles, payment of utilities, replacement of parts, repair of equipment, and 24-hour emergency response.

The project included design, construction, and OM&DM contract for a fast-fill CNG filling Station. P.W. Grosser was the consultant for the project and ANGI Energy Systems provided the equipment. The design and construction went from February to August 2011 and a 2 year contract will be sent for proposals and award in November. The lessons from this project are that close communication with the consultant was a requirement during the planning stage and construction. In order to phase the construction properly we had to anticipate the utility lead time to build new service, lead time on parts and copies of their proprietary specs, and room for extra conduit in trenches.

COST ANALYSIS

Total Cost

\$1,000,000

LIPA Rebate

\$186,000

National Grid Rebate

\$100,000

Annual Electric Savings

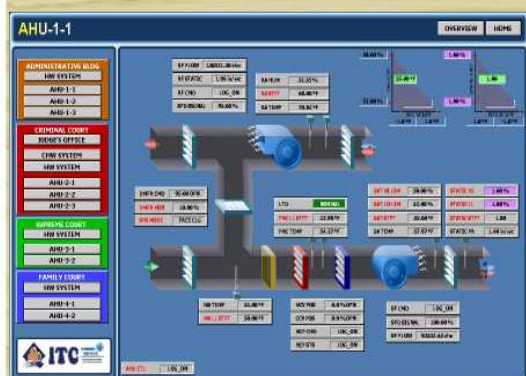
824,000-KWh

Annual Gas Savings

46,156-therms



Variable Frequency Drive VFD



Johnson Controls MetaSys BMS.

Cohalan Court Complex

CASE SUMMARY

Cohalan Court Complex located in Central Islip was built in 1992. The complex is 500,000 ft² and comprises the Supreme Court, Family Court, District Court and the Office building. The space lighting requirements are met by 28-watt super saver T8 lamps with electronic ballast that replaced the 34-watt and 40-watt T12 fluorescent lamps with magnetic ballasts. Before the installation of occupancy sensors, the lighting fixtures in the individual offices, arbitration rooms, conference rooms and interior spaces used to stay on all the time. This problem was effectively solved with the installation of wall and ceiling mounted occupancy sensors.

The complex is served by ten air-handlers that provide conditioned air to meet the space heating and cooling requirements. The air handlers serve the Office building, District Court, Supreme Court and the Family Court. VFDs were installed to drive the fans of the air handling units, reducing or increasing their speed in order to produce the appropriate quantity of air conditioning needed. By installing the VFDs the air handlers do not operate 24-hours a day as they did prior to the installation.

ENERGY RETROFIT

In order to improve the efficiency and reliability of the air handlers and reduce the operating cost, Variable Frequency Drives (VFD) were installed to control the supply and return fans on the air handling units. The VFD reduces or increases fan speed to follow building load, resulting in substantial savings in the utility bill.

Premium efficiency motors replaced the existing standard efficiency motors. The inefficient boiler was replaced with three condensing boilers and high efficiency plate to frame heat exchangers for domestic hot water. The former Siemens Building Management System (BMS) was upgraded with state of the art Johnson Controls MetaSys BMS that allows for the implementation of fully detailed schedules and offsite monitoring.

RESULT

Using the utility bill records from 2008 as the base year and comparing them with the latest 2010 records it shows that the total savings were \$392,289 or 22% in 2010. Cohalan Court Complex reduced its electric consumption by 824,000-KWh, about 7%, and 46,156-therms, approximately 16.5%. The savings in gas and electricity represent a reduction in CO₂ emissions of 697 tons, about 9%. This project showed substantial reductions in electricity, gas, and the cost associated with them.

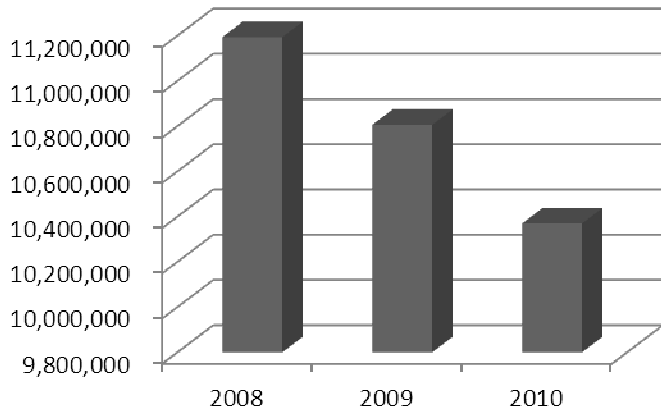
SUFFOLK COUNTY DEPARTMENT OF PUBLIC WORKS

335 Yaphank Ave.

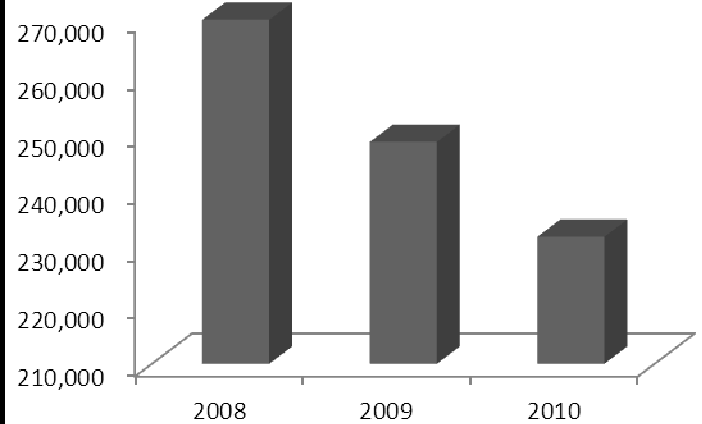
Yaphank NY, 11980



Annual Electric Consumption (KWh)



Annual Gas Consumption (Therms)



Annual Electric Consumption

Year	KWh	Cost
2008	11,194,000	\$1,768,900
2009	10,806,000	\$1,764,943
2010	10,370,000	\$1,629,028

Gas Annual Consumption

Year	Therms	Cost
2008	278,309	\$ 392,429
2009	248,691	\$ 282,397
2010	232,153	\$140,012

Savings in 2010

Savings	Amount	Percentage
Electric	824,000 KWh	7%
Gas	46,156 Therms	17%
Cost	\$392,289	22%
CO ₂	697 Tons	9%

*All the calculations use 2008 as the base year
Emissions calculations were done using
<www.abraxasenergy.com/emissions>

Total Cost

\$5,138,000

LIPA Rebate

\$74,200

National Grid Rebate

\$143,000

Annual Electric Savings

1,579,837 kWh

Annual Gas Savings

225,560-therms



Centrifugal Chiller



24-KW PV System Array



Condensing Boilers

Bergen Point Waste Water Treatment Plant

CASE SUMMARY

Suffolk County Sewer District no. 3 is located at Bergen Point in the Town of Babylon, on the South Shore of Long Island. It serves a 57-square-mile area and it treats 30.5 million gallon of wastewater per day (MGD). The plant was constructed in the 1970s and includes a pump and screen building, primary settling tanks, aeration tanks, a sludge processing building, belt filter press and two multiple hearth incinerators.

Auxiliary facilities consist of an administration and maintenance building, two emergency generators, two steam generating boilers, and a fuel storage facility totaling 291,302 square feet of building space. The plant also has a number of odor control systems and energy efficiency solutions.

ENERGY RETROFIT

The energy efficiency modifications at Bergen Point include the HVAC system and lighting. All the existing 34-watt and 40-watt T12 lamps were replaced with 28-watt super saver T8 lamps; all magnetic ballasts were replaced with high efficiency electronic ballast to further increase lamp efficiency as well as to reduce operational cost and maintenance.

A 325-ton single stage indirect steam absorber was replaced with a 250-ton electric water cooled centrifugal chiller with Variable Frequency Drives (VFD) in order to achieve a greater efficiency.

A 24-KW Photovoltaic (PV) system was put in place to reduce the electric consumption from the grid, especially during peak hours. Premium efficiency motors replaced the existing standard efficiency motors that drive the pumps. The inefficient 30 million Btu high pressure steam boiler was replaced with five 3.0 million Btu condensing boilers that are 98% efficient. The 100-KW electric water heater was replaced with high efficiency condensing water heater for domestic hot water. The old Building Management System (BMS) was upgraded with state of the art Johnson Controls MetaSys BMS that allows for the implementation of fully detailed schedules and offsite monitoring.

RESULT

Using the utility bill records from 2008 as the base year and comparing it with the latest 2010 records it shows that the total savings were \$697,573, or 15%, in 2010. Bergen Point reduced its gas consumption by 225,560 Therms, approximately 35%. An estimated 1,579,837 KWh was saved in electricity, about 6.5%. This project showed substantial reductions in gas and electricity, and the cost associated with them; due to these savings in gas and electricity, Bergen Point was able to reduce its CO₂ emissions by 2,138 tons, or 13%.

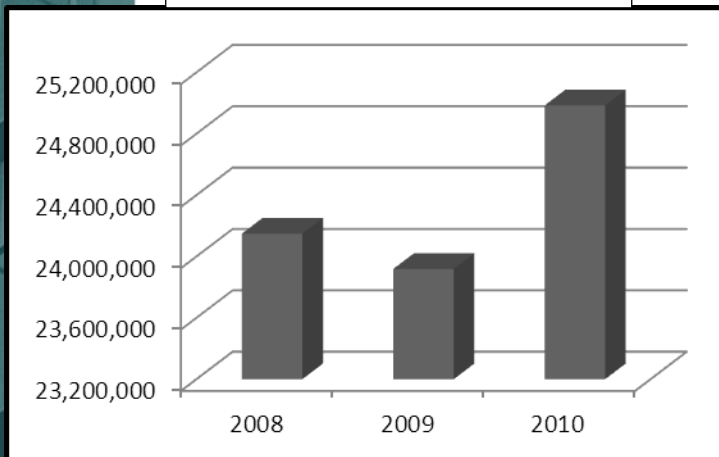
SUFFOLK COUNTY DEPARTMENT OF PUBLIC WORKS

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Yaphank NY, 11980

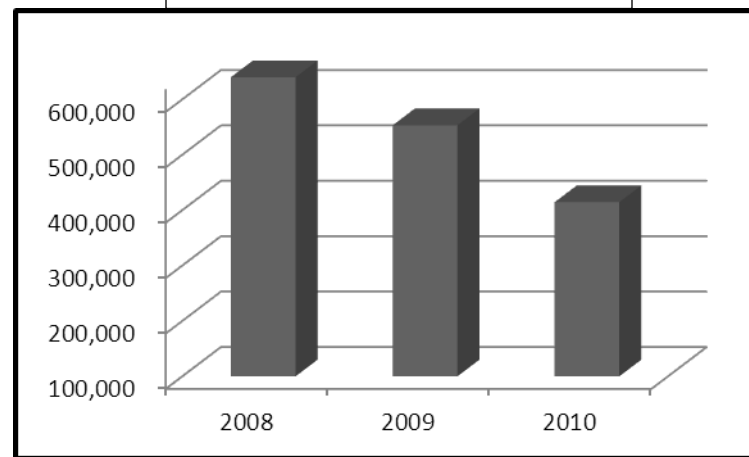


Annual Electric Consumption (KWh)



Year	KWh	Cost
2008	24,148,800	\$3,715,254
2009	23,918,400	\$3,688,616
2010	24,984,000	\$3,743,262

Annual Gas Consumption (Therms)



Year	Therms	Cost
2008	639,940	\$905,000
2009	553,293	\$689,735
2010	414,380	\$475,999

Savings in 2010		
Savings	Amount	Percentage
Electric	1,579,837 KWh	6.5%
Gas	225,560 Therms	35%
Cost	\$697,573	15%
CO ₂	2,138 Tons	13%

*All the calculations use 2008 as the base year
Emissions calculations were done using
<www.abraxasenergy.com/emissions>