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March 8, 2011

Local Government Energy Program
Energy Audit Report

City of Summit

City Hall
512 Springfield Avenue
Summit, 07901

Project Number: LGEA74

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EXECUTIVE SUMMARY

The Summit City Hall is a two-story building with a basement comprising a total conditioned floor area of 58,000 square feet. The original structure was built in 1995 without any major renovations since. The following chart provides an overview of current energy usage in the building based on the analysis period of August 2009 through July 2010:

Table 1: State of Building-Energy Usage

	Electric Usage, kWh/yr	Gas Usage, therms/yr	Other fuel usage	Current Annual Cost of Energy, $	Site Energy Use Intensity, kBtu/sq ft yr	Joint Energy Consumption, MMBtu/yr
Current	1,473,930	30,514	N/A	$266,893	141.0	8,081
Proposed	1,368,734	29,525	N/A	$241,413	133.1	7,623
Savings	105,196	989	N/A	$25,480*	7.9	458
% Savings	7%	3%	N/A	10%	6%	6%
Proposed Renewables	35,400	Includes SRECs		$26,723	2.1	121
*Includes operation and maintenance savings						

There may be energy procurement opportunities for the Summit City Hall to reduce annual electricity costs, which are $17,216 higher, when compared to the average estimated NJ commercial electric rates.

SWA has also entered energy information about the City Hall in the U.S. Environmental Protection Agency's (EPA) ENERGY STAR® Portfolio Manager Energy benchmarking system. The resulting Site Energy Use Intensity is 141.0 kBtu/sq ft yr, which is higher than the average comparable building by 62%.

Based on the current state of the building and its energy use, SWA recommends implementing various energy conservation measures from the savings detailed in Table 1. The measures are categorized by payback period in Table 2 below:

Table 2: Energy Conservation Measure Recommendations

ECMs	First Year Savings ($)	Simple Payback Period (years)	Initial Investment, $	CO2 Savings, lbs/yr
0-5 Year	$17,366	0.9	$15,047	155,127
5-10 Year	$8,114	8.8	$71,693	44,127
Total	$25,480	3.4	$86,740	199,253
Renewables	$26,723	7.0	$187,500	63,384

SWA estimates that implementing the recommended ECMs is equivalent to removing approximately 17 cars from the roads each year or the equivalent of planting 485 trees to offset the annual CO2 emissions generated.

Further Recommendations: Other recommendations to increase building efficiency pertaining to capital improvements and operations and maintenance are (with additional information in the Proposed Further Recommendations section):

Capital Improvements

- Install NEMA premium motors when replacements are required
- Enhance the generator capacity due to unreliable electric supply in the area with the next major renovation

Operations and Maintenance

- Maintain roofs - SWA recommends regular maintenance to verify water is draining correctly

- Maintain downspouts and cap flashing
- Provide weather-stripping/air-sealing
- Repair/seal wall cracks and penetrations
- Change filters on air handling units monthly
- Tighten belts on exhaust fans and blowers every three to six months
- Inspect air handling units' coils for dirt buildup three to six months

The recommended ECMs and the list above are cost-effective energy efficiency measures and building upgrades that will reduce operating expenses for the City of Summit. Based on the requirements of the LGEA program, the City of Summit must commit to implementing some of these measures, and must submit paperwork to the Local Government Energy Audit program within one year of this report's approval to demonstrate that they have spent, net of other NJCEP incentives, at least 25% of the cost of the audit (per building). The minimum amount to be spent, net of other NJCEP incentives, is $2,935 (or 25% of $11,741).

Financial Incentives and Other Program Opportunities

The table below summarizes the recommended next steps that the City of Summit can take to achieve greater energy efficiency and reduce operating expenses.

Table 3: Next Steps for the City Hall

Recommended ECMs	Incentive Program (Please refer to Appendix F for details)
Upgrade (64) Incandescent Lamps with CFLs	Direct Install
Install (2) beverage and (2) Snacks vending machine energy misers	Direct Install
Upgrade (2) Metal Halide Fixtures with T5 fixtures	Smart Start, Direct Install
Install (5) Demand Controlled Ventilation Systems	Direct Install
Replace (3) Hot Water Pump Motors 5HP, 81.5% eff with NEMA 89.5% eff Motors	Smart Start, Direct Install
Install (30) Occupancy Sensors	Smart Start, Direct Install
Install (4) New Pulse Start Metal Halide Fixtures	Smart Start, Direct Install
Install a 30kW Solar Photovoltaic Rooftop System	SRECs
Replace (29) Incandescent/Fluorescent Exit Signs with LED type	Smart Start, Direct Install
Install (348) new T8 Fixtures	Smart Start, Direct Install

There are various incentive programs that the City of Summit could apply for that could help lower the cost of installing the ECMs. For the City Hall, and contingent upon available funding, SWA recommends the following incentive programs:

- **Direct Install 2010 Program**: Commercial buildings with peak electric demand below 100kW can receive up to 60% of installed cost of energy saving upgrades. The 100kW threshold does not apply for LGEA projects that are also receiving EECBG funding. Program incentives are capped at $50,000 per building and $250,000 per customer per year.
- **Smart Start**: Most of energy savings equipment and design measures have moderate incentives under this program.
- **Renewable Energy Incentive Program**: Receive up to $0.75/Watt toward installation cost for PV panels upon available funding. For each 1,000 kWh generated by PV renewable energy, receive a credit between $475 and $600.
- **Utility Sponsored Programs**: See available programs with JCP&L https://www.firstenergycorp.com/JCP_L/index.html and PSE&G http://www.pseg.com/environment2008/wyd/community/community.jsp

- **Energy Efficiency and Conservation Block Grant Rebate Program**: Provides up to $20,000 per local government toward energy saving measures; http://njcleanenergy.com/EECBG

Please refer to Appendix F for further details.

INTRODUCTION

Launched in 2008, the Local Government Energy Audit (LGEA) Program provides subsidized energy audits for municipal and local government-owned facilities, including offices, courtrooms, Summit halls, police and City Halls, sanitation buildings, transportation structures, schools and community centers. The Program will subsidize up to 100% of the cost of the audit. The Board of Public Utilities (BPUs) Office of Clean Energy has assigned TRC Energy Services to administer the Program.

Steven Winter Associates, Inc. (SWA) is a 38-year-old architectural/engineering research and consulting firm, with specialized expertise in green technologies and procedures that improve the safety, performance, and cost effectiveness of buildings. SWA has a long-standing commitment to creating energy-efficient, cost-saving and resource-conserving buildings. As consultants on the built environment, SWA works closely with architects, developers, builders, and local, state, and federal agencies to develop and apply sustainable, 'whole building' strategies in a wide variety of building types: commercial, residential, educational and institutional.

SWA performed an energy audit and assessment for the City Hall at 512 Springfield Avenue, Summit, 07901. The process of the audit included facility visits on July 29 and August 5, 2010, benchmarking and energy bills analysis, assessment of existing conditions, energy modeling, energy conservation measures and other recommendations for improvements. The scope of work includes providing a summary of current building conditions, current operating costs, potential savings, and investment costs to achieve these savings. The facility description includes energy usage, occupancy profiles and current building systems along with a detailed inventory of building energy systems, recommendations for improvement and recommendations for energy purchasing and procurement strategies.

The goal of this Local Government Energy Audit is to provide sufficient information to the City of Summit to make decisions regarding the implementation of the most appropriate and most cost-effective energy conservation measures for the City Hall.

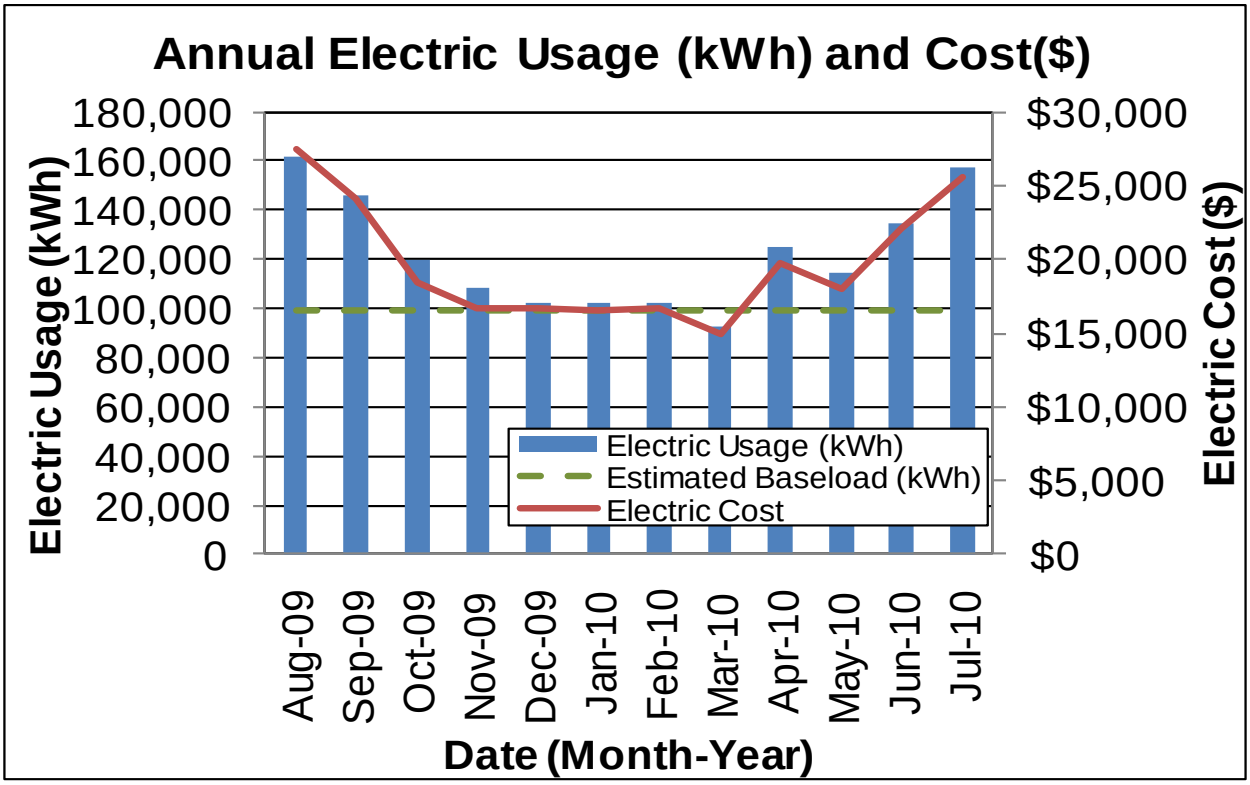
HISTORICAL ENERGY CONSUMPTION

Energy usage, load profile and cost analysis

SWA reviewed utility bills from August 2008 through July 2010 that were received from the utility companies supplying the City Hall with electric and natural gas. A 12 month period of analysis from August 2009 through July 2010 was used for all calculations and for purposes of benchmarking the building.

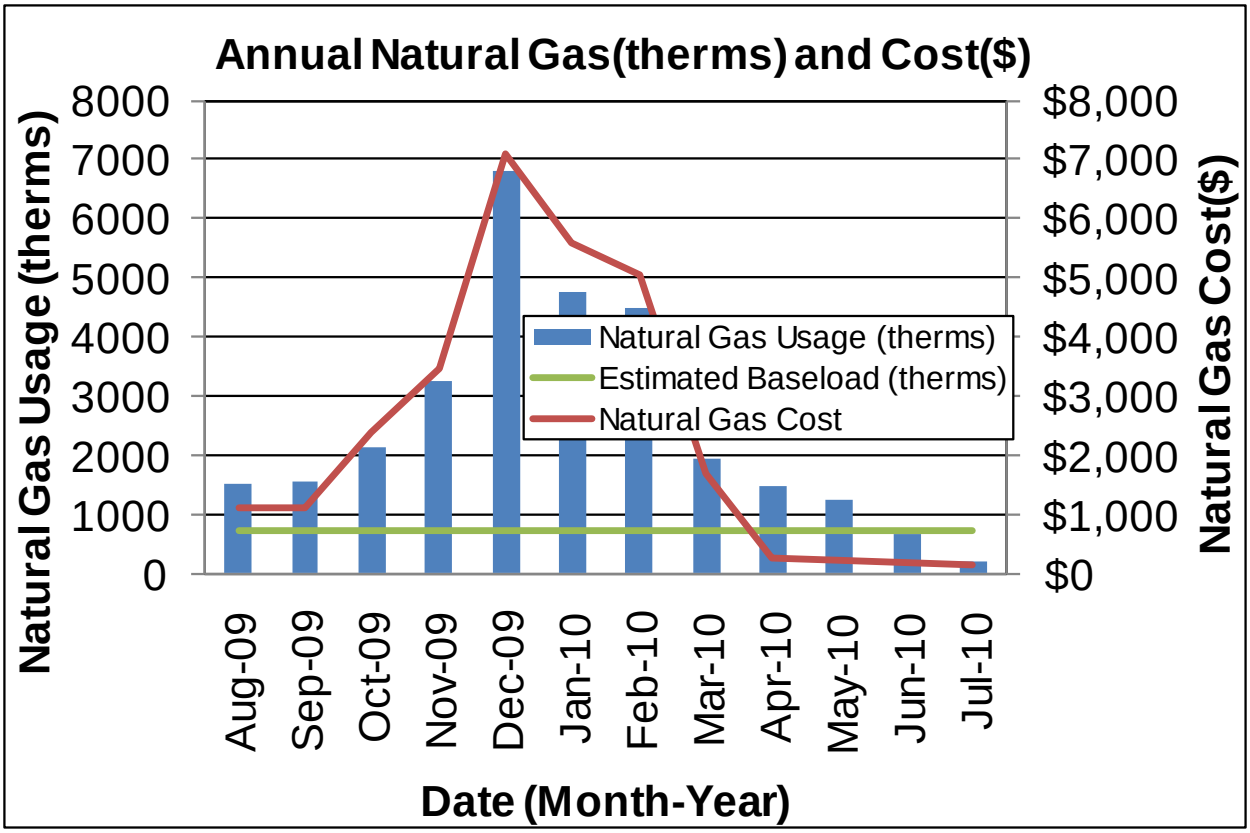
Electricity - The City Hall is currently served by one electric meter. The City Hall currently buys electricity from JCP&L at **an average aggregated rate of $0.162/kWh**. The City Hall purchased **approximately 1,473,930 kWh, or $238,306 worth of electricity,** in the previous year. The average monthly demand was 261.0 kW and the annual peak demand was 286.1 kW.

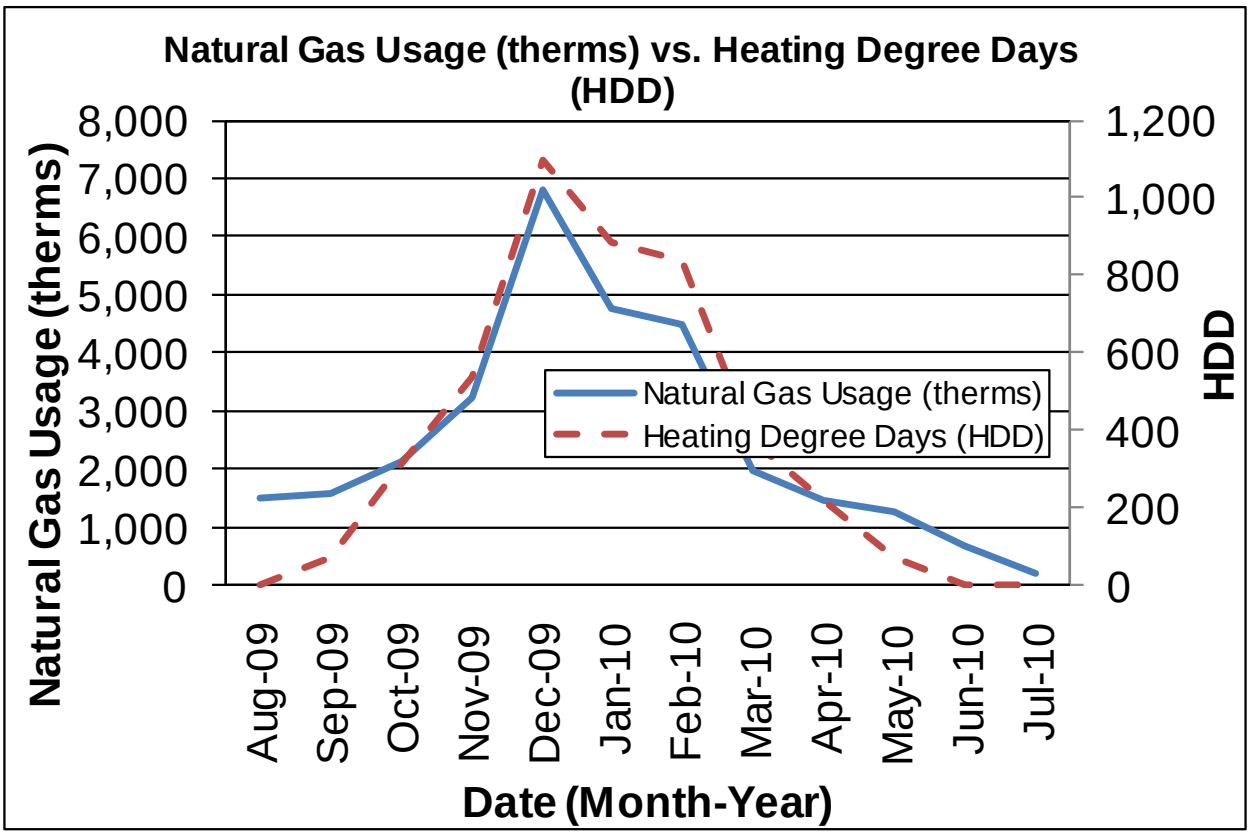
The chart below shows the monthly electric usage and costs. The dashed green line represents the approximate base-load or minimum electric usage required to operate the City Hall. The HVAC fans are operating throughout the year and are part of the building's miscellaneous electricity users.



Natural gas - The City Hall is currently served by one meter for natural gas. The City Hall currently buys natural gas from PSE&G at **an average aggregated rate of $0.937/therm**. The City Hall purchased **approximately 30,514 therms, or $28,588 worth of natural gas,** in the previous year.

The following chart shows the monthly natural gas usage and costs. The green line represents the approximate base-load or minimum natural gas usage required to operate the City Hall.

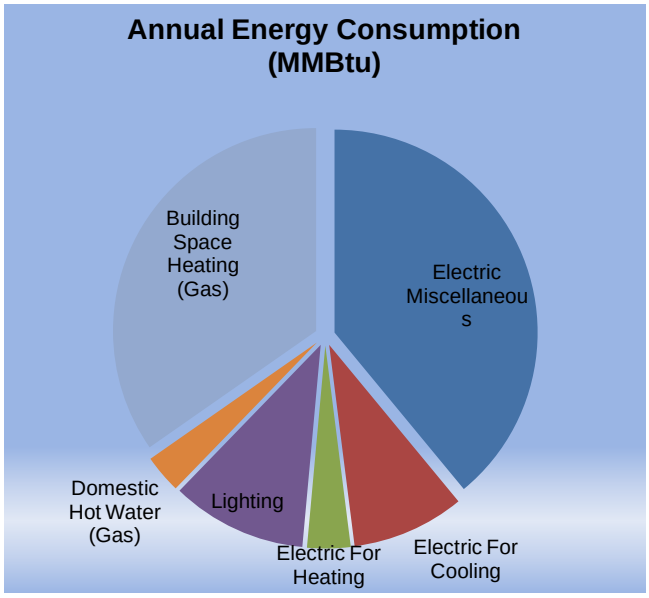

Annual Natural Gas(therms) and Cost($)
Natural Gas Usage (therms)
8000
7000
6000
5000
4000
3000
2000
1000
0
$8,000
$7,000
$6,000
$5,000
$4,000
$3,000
$2,000
$1,000
$0
Natural Gas Cost($)
Natural Gas Usage (therms)
Estimated Baseload (therms)
Natural Gas Cost
Aug-09
Sep-09
Oct-09
Nov-09
Dec-09
Jan-10
Feb-10
Mar-10
Apr-10
May-10
Jun-10
Jul-10
Date (Month-Year)

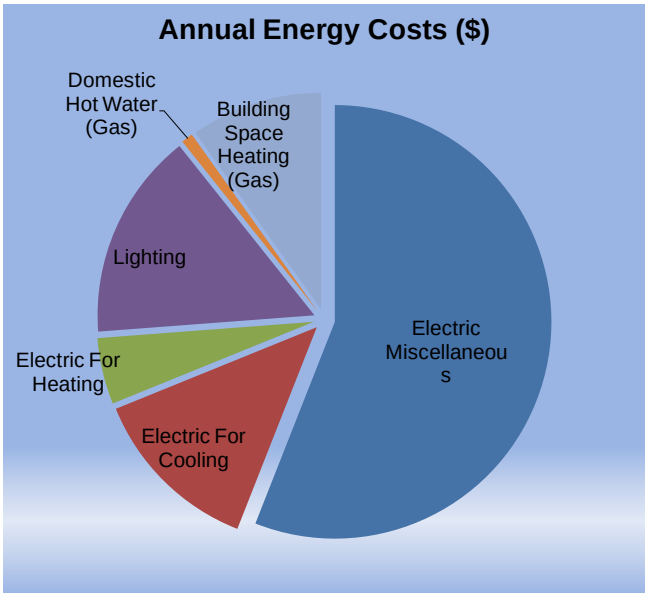

Natural Gas Usage (therms) vs. Heating Degree Days (HDD)
Natural Gas Usage (therms)
8,000
7,000
6,000
5,000
4,000
3,000
2,000
1,000
0
1,200
1,000
800
600
400
200
0
HDD
Natural Gas Usage (therms)
Heating Degree Days (HDD)
Aug-09
Sep-09
Oct-09
Nov-09
Dec-09
Jan-10
Feb-10
Mar-10
Apr-10
May-10
Jun-10
Jul-10
Date (Month-Year)

The previous chart shows the monthly natural gas usage along with the heating degree days or HDD. Heating degree days is the difference of the average daily temperature and a base temperature, on a particular day. The heating degree days are zero for the days when the average temperature exceeds the base temperature. SWA's analysis used a base temperature of 65 degrees Fahrenheit.

The following graphs, pie charts, and table show energy use for the City Hall based on utility bills for the 12 month period. Note: electrical cost at $47MMBtu of energy is over 5 times as expensive as natural gas at $9/MMBtu.

Annual Energy Consumption / Costs					
	MMBtu	% MMBtu	$	% $	$/MMBtu
Electric Miscellaneous	3,153	39%	$149,381	56%	47
Electric For Cooling	726	9%	$34,390	13%	47
Electric For Heating	279	3%	$13,202	5%	47
Lighting	872	11%	$41,333	15%	47
Domestic Hot Water (Gas)	247	3%	$2,311	1%	9
Building Space Heating	2,805	35%	$26,276	10%	9
Totals	8,081	100%	$266,893	100%	
Total Electric Usage	5,029	62%	$238,306	89%	47
Total Gas Usage	3,051	38%	$28,588	11%	9
Totals	8,081	100%	$266,893	100%	

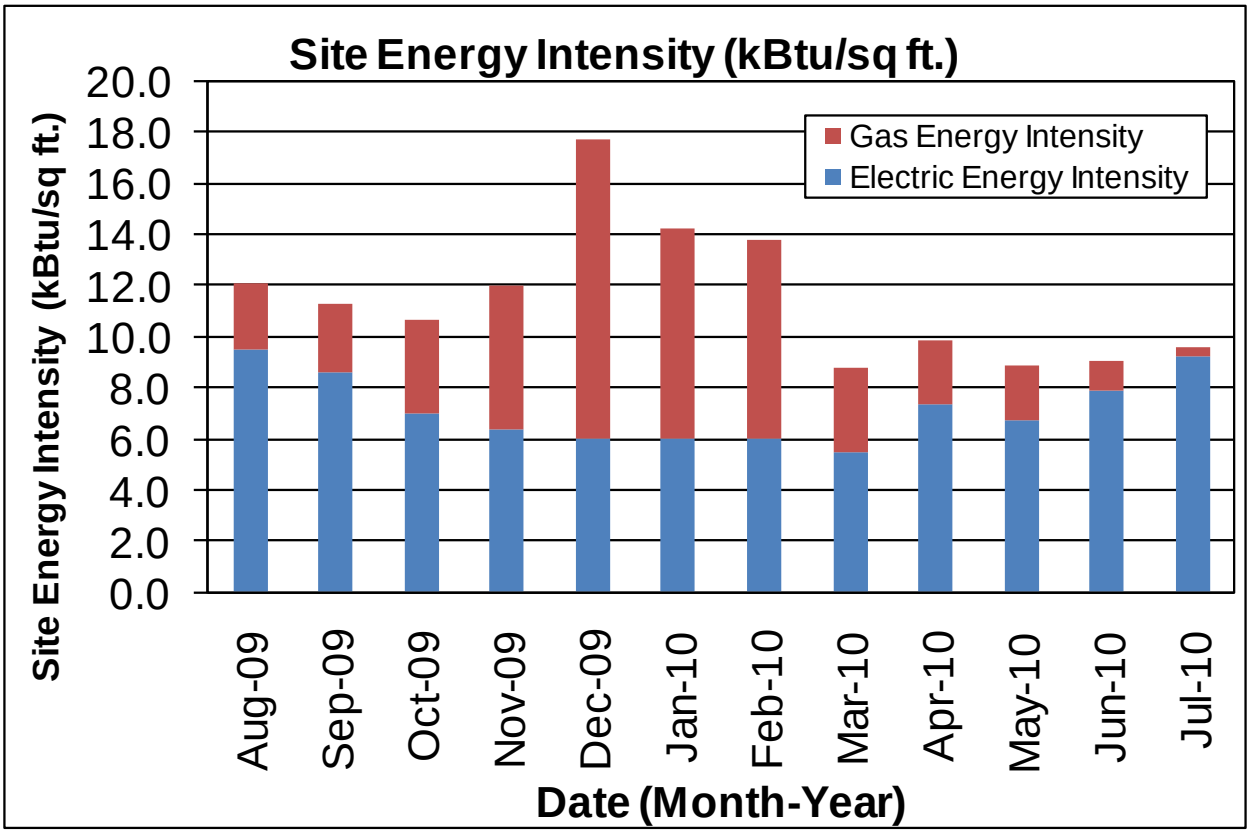




Energy benchmarking

SWA has entered energy information about the City Hall in the U.S. Environmental Protection Agency's (EPA) ENERGY STAR® Portfolio Manager Energy benchmarking system. This mixed use facility is categorized as a non-eligible ("Other") space type. Because it is an "Other" space type, there is no rating available. Consequently, the City Hall is not eligible to receive a national energy performance rating at this time. The Site Energy Use Intensity is 141.0kBtu/sq ft yr compared to the national average of a commercial building consuming 104.0kBtu/sq ft yr. See ECM section for guidance on how to improve the building's rating.

Due to the nature of its calculation based upon a survey of existing buildings of varying usage, the national average for "Other" space types is very subjective, and is not an absolute bellwether for gauging performance. Additionally, should the City of Summit desire to reach this average there are other large scale and financially less advantageous improvements that can be made, such as envelope window, door and insulation upgrades that would help the building reach this goal.



Per the LGEA program requirements, SWA has assisted the City of Summit to create an ENERGY STAR® Portfolio Manager account and share the City Hall facilities information to allow future data to be added and tracked using the benchmarking tool. SWA has shared this Portfolio Manager Account information with the City of Summit (user name of "cityofsummit" with a password of "cityofsummit") and TRC Energy Services (user name of "TRC-LGEA").

Tariff analysis

As part of the utility bill analysis, SWA evaluated the current utility rates and tariffs. Tariffs are typically assigned to buildings based on size and building type.

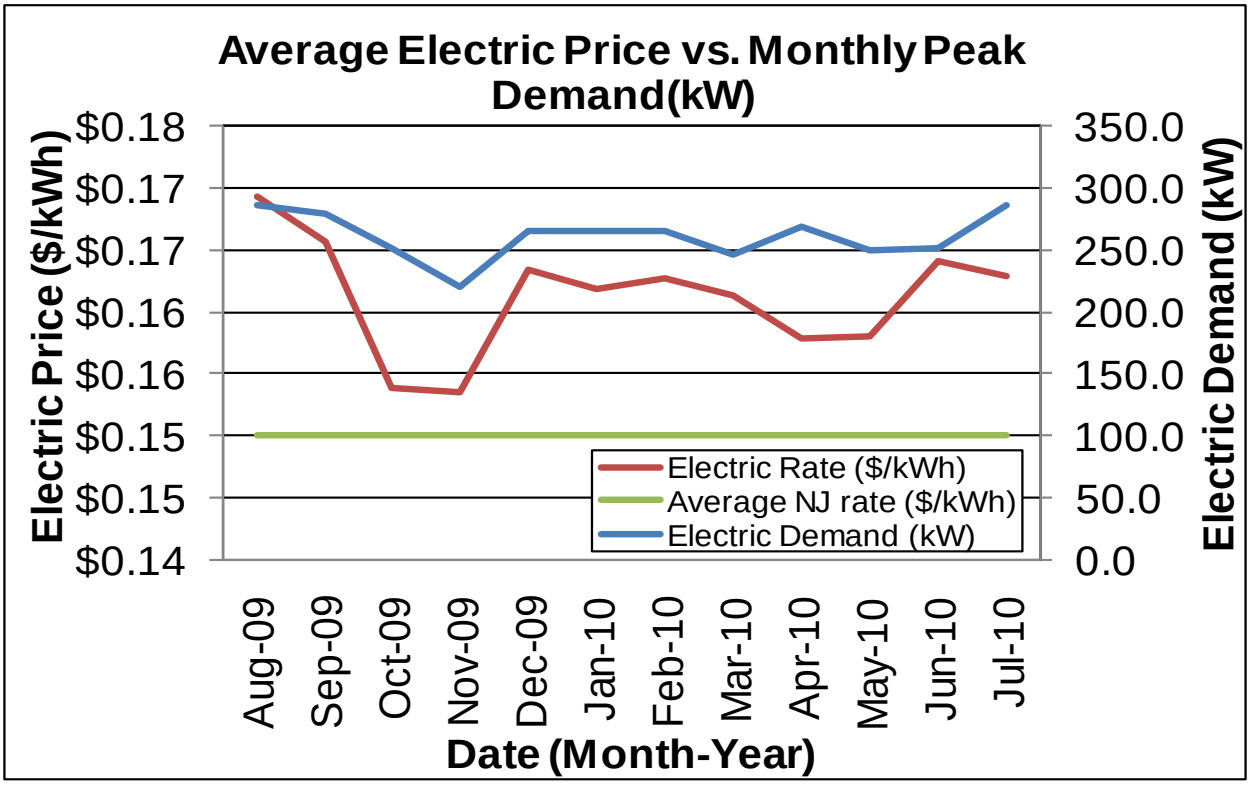
Tariff analysis is performed to determine if the rate that a building is contracted to pay with each utility provider is the best rate possible resulting in the lowest costs for electric and gas provision. Typically, the natural gas prices increase during the heating months when natural gas is used for heating. Some high gas price per therm fluctuations in the summer may be due to high energy costs that recently occurred and low use caps for the non-heating months. Typically, electricity prices also increase during the cooling months when electricity is used by the HVAC for cooling.

The supplier charges a market-rate price based on use, and the billing does not break down demand costs for all periods because usage and demand are included in the rate. Currently, the building is paying a general service rate for natural gas. Demand charges are not broken out in the bill. Thus the building pays for fixed costs such as meter reading charges during the summer months. The building is direct metered and currently purchases electricity at a general service rate for usage with an additional charge for electrical demand factored into each monthly bill. The general service rate for electric charges is market-rate based on usage and demand. Demand prices are reflected in the utility bills and can be verified by observing the price fluctuations throughout the year.

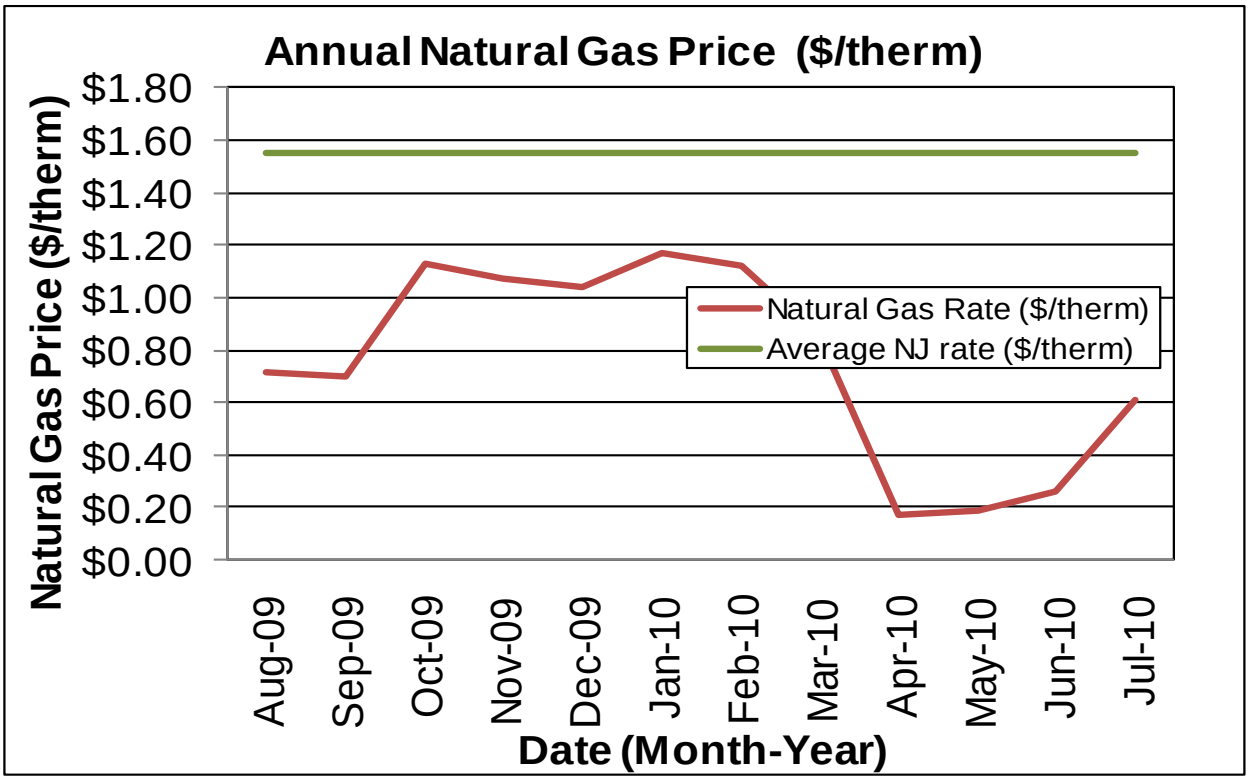
Energy Procurement strategies

Billing analysis is conducted using an average aggregated rate that is estimated based on the total cost divided by the total energy usage per utility per 12 month period. Average aggregated rates do not separate demand charges from usage, and instead provide a metric of inclusive cost per unit of energy. Average aggregated rates are used in order to equitably compare building utility rates to average utility rates throughout the state of New Jersey.

The average estimated NJ commercial utility rates for electric are $0.150/kWh, while City Hall pays a rate of $0.162/kWh. The City Hall annual electric utility costs are $17,216 higher, when compared to the average estimated NJ commercial utility rates. Electric bill analysis shows fluctuations up to 9% over the most recent 12 month period.



The average estimated NJ commercial utility rates for gas are $1.550/therm, while City Hall pays a very competitive rate of $0.937/therm. Natural gas bill analysis shows fluctuations up to 85% over the most recent 12 month period.



Utility rate fluctuations may have been caused by adjustments between estimated and actual meter readings; others may be due to unusual high and recent escalating energy costs.

SWA recommends that the City Hall further explore opportunities of purchasing both natural gas and electricity from third-party suppliers in order to reduce rate fluctuation and ultimately reduce the annual cost of energy for the City Hall. Appendix C contains a complete list of third-party energy suppliers for the City of Summit service area.

EXISTING FACILITY AND SYSTEMS DESCRIPTION

This section gives an overview of the current state of the facility and systems. Please refer to the Proposed Further Recommendations section for recommendations for improvement.

Based on visits from SWA on Thursday, August 05, 2010, the following data was collected and analyzed.

Building Characteristics

The two-story with a basement, 58,000 square foot Summit City Hall building was originally built in 1995 without any major renovations since. The building houses on Level 1: the Health Services, the Housing Authority, the Municipal Court, the Community Services and the Police Department; Level 2: the Administrative Services and the Financial Services. Other spaces include various municipal offices, storage spaces, meeting rooms, bathrooms, mechanical rooms and public exhibits. The basement houses Police parking, locker rooms, a lunch room and mechanical rooms. There are three attic mechanical rooms housing Air Handling Units (AHs).

West Façade

South Façade

East Façade

North Façade

Building Occupancy Profiles

There are approximately 62 occupants in the building at any one-time. Municipal Administration employees work weekdays 8:00am to 4:30pm. The Police Department spaces are occupied 24 hours - 7 days/week. The Police Department has 50 officers and is located on the 1st floor/level and basement. The Police Department occupancy is approximately 15 to 20 employees during daytime; four 12 hour shifts with approximately 5 to 10 employees in and out on night shift and weekends. The Police Dispatch is located in the building. Courtroom Office hours are 8:00am-4:30pm. The Court is in session every Wed 9:00am-4:00pm with approximately 100 visitors in

attendance. There are four meeting rooms (inclusive of the Court room) used regularly for various evening meetings such as: City Council, Planning Board, Zoning Board, etc…

Building Envelope

Due to unfavorable weather conditions (min. 18 deg. F delta-T in/outside and no/low wind), no exterior envelope infrared (IR) images were taken during the field audit.

Exterior Walls

The exterior wall envelope is mostly constructed of brick veneer and some precast concrete accents, over a steel frame with 3-1/2 inches of fiberglass batt cavity insulation. The interior is mostly painted gypsum wallboard.

Note: Wall insulation levels could not be verified in the field and are based on available construction plans.

Exterior and interior wall surfaces were inspected during the field audit. They were found to be in overall good condition with only a few signs of uncontrolled moisture, air-leakage or other energy-compromising issues detected on all facades.

The following specific exterior wall problem spots and areas were identified:

Uncontrolled roof water run-off due to defective/clogged gutters and downspouts

Overgrown ground vegetation touching/blocking exterior wall surfaces

Overgrown ground vegetation touching/blocking exterior wall surfaces

Un-caulked/un-sealed exterior wall penetrations

Un-caulked/un-sealed exterior wall penetrations

Efflorescence on brick and masonry walls indicate moisture presence within the wall cavity.

Roof

The building's roof is predominantly cross-hipped over a steel structure, with a standing-seam metal finish. It is original/has never been replaced, consisting of R-30 fiberglass batt attic/ceiling insulation. The section above the sally port and holding cells is covered by a flat and parapet type over steel decking with a dark colored EPDM single membrane finish. This roof is original and has never been replaced.

Note: Roof insulation levels could not be verified in the field or on construction plans, and are based upon similar wall types and time of construction.

Roofs, related flashing, gutters and downspouts were inspected during the field audit. They were reported to be in overall good condition, with only a few signs of uncontrolled moisture, air-leakage or other energy-compromising issues on any roof areas.

The following specific roof problem spots were identified:

Ground vegetation touching/overhanging roof surfaces

Ground vegetation touching/overhanging roof surfaces

Uncontrolled vegetation growth on roof

Signs of standing water/pooling

Base

The building's base is composed of a below-grade basement with a slab floor with a perimeter footing with poured concrete foundation walls and two inches of rigid insulation.

Slab/perimeter insulation levels could not be verified in the field and are based on available construction plans.

The building's base and its perimeter were inspected for signs of uncontrolled moisture or water presence and other energy-compromising issues. Overall the base was reported to be

in good condition with only a few signs of uncontrolled moisture, air-leakage and/or other energy-compromising issues visible form the exterior only.

The following specific base problem spots were identified:

Uncontrolled roof water run-off due to missing/ineffective downspout deflector

Uncontrolled roof water run-off due to missing/ineffective downspout deflector

Uncontrolled water run-off due to poor downspout seal

Windows

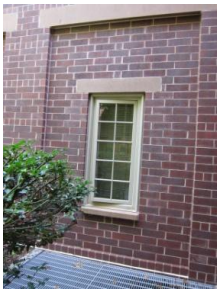
The building contains several different types of windows:

- The majority of the windows are casement type windows with an insulated aluminum frame, tinted low-E/gas-filled, double glazing and interior mini blinds. The windows are located on the first and second floors and are original/have never been replaced.

- Other windows were similar but fixed.

Windows, shading devices, sills, related flashing and caulking were inspected as far as accessibility allowed for signs of moisture, air-leakage and other energy compromising issues. Overall, the windows were found to be in good condition with only a few signs of uncontrolled moisture, air-leakage and/ or other energy-compromising issues.

The following specific window problem spots were identified:



Open window in air-conditioned space

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Exterior doors

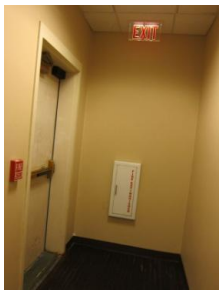
The building contains three different types of exterior doors:

- Five glass with aluminum frame type exterior doors. They are located on the main floor and are original/have never been replaced.

- One aluminum type exterior doors. They are located on the main floor and are original/have never been replaced.

All exterior doors, thresholds, related flashing, caulking and weather-stripping were inspected for signs of moisture, air-leakage and other energy-compromising issues. Overall, the doors were found to be in good condition with only one sign of air-leakage and/ or other energy-compromising issues.

The following specific door problem spots were identified:



Missing/worn weather-stripping

Missing/worn weather-stripping close-up of picture on left

Building air-tightness

Overall the field auditors found the building to be reasonably air-tight, considering the building's use and occupancy, as described in more detail earlier in this chapter.

The air tightness of buildings helps maximize all other implemented energy measures and investments, and minimizes potentially costly long-term maintenance, repair and replacement expenses.

Mechanical Systems

Heating Ventilation Air Conditioning

City Hall is heated via five air handlers (AH-1 through 5), ceiling hung hydronic heaters, one basement heating and ventilating unit (HV-1), (fan and non-fan powered) variable air volume boxes, associated distributive ducts, dampers and diffusers with hot water provided by two gas fired cast iron sectional boilers located in the basement boiler room.

City Hall is cooled by the same five air handlers, three fan coil cooling units (FCU-1 through 3), associated distributive ducts, dampers and diffusers with chilled water provided by a 210 ton refrigeration chiller located in the basement boiler room and its cooling tower located near the building.

A comprehensive Equipment List can be found in Appendix A.

Equipment

Two Weil-McLain, B-1 & 2, 1,703MBtu/hr cast iron sectional boilers, installed in 1995, provide hot water to five air handlers (AH-1 through 5), ceiling hung hydronic heaters (UH-1 through 20), one basement heating and ventilating unit (HV-1) and fan variable air volume boxes. Each boiler has a forced draft surface stabilized gas fired burner. The boilers' efficiency is estimated to be 80%. They are in satisfactory condition and have 40% remaining estimated service lives. Three heating hot water Taco pumps, P-5, 6 & 7, 120 gpm, 60 ft of head circulate the hot water to terminal coils and back to the boilers. The pumps' 5 HP motors are 81.5% efficient. P-5, 6 & 7 are in satisfactory condition and have 25% remaining estimated service lives.

City Hall heating hot water circulators

Heating terminal units such as the fan powered variable volume boxes (FP-1 through 6), ceiling hung (UH-1 through 20) and cabinet (CH-1) hydronic heaters and HV-1 basement heating and ventilating unit heat various mechanical, storage and specialized rooms via hot water heating coils. They are in satisfactory condition and have 25% remaining estimated service lives.

Ceiling hung hydronic heaters (typical)

The City Hall building is mainly cooled/heated by five air handlers (AH-1 through 5). They are in satisfactory condition and have 25% remaining estimated service lives. Their blowers are operated via variable frequency drives (VFDs) for efficient energy usage. The Building Management System controls/sends signals to the blower VFDs.

AH-1 serves the 1st floor eastside offices. It has a 20 HP McQuay supply blower.

AH-2 serves the 1st floor Police Department. It has a 15 HP McQuay supply blower.

AH-3 serves the 2nd floor south-side offices. It has a 15 HP McQuay supply blower.

AH-4 serves the 1st floor and 2nd floor west-side offices. It has a 20 HP McQuay supply blower.

AH-5 serves the basement locker room. It has a 10 HP McQuay supply blower.

A 210 ton refrigeration Dunham-Bush chiller (with two compressors), located in the basement boiler room, and its associated BAC cooling tower provide chilled water to the five air handlers (AH-1 through 5) and three fan coil cooling units (FCU-1 through 3). The chilled water Taco circulating pumps, P-1 & 2 (20 HP each, 88.5% motor efficiency), are also located in the basement, next to the chiller as well as the cooling tower Taco circulating pumps, P-3 & 4(20 HP each, 88.5% & 92.4% motor efficiency). The chiller, cooling terminals and pumps are operating satisfactorily and have 25% (40% for the chiller) remaining estimated service lives.

The one cell BAC cooling tower has a 5 HP low speed and a 15 HP high speed motors to operate its fan (30 sec between motor switch-over) and cool 610 gpm of water.

Two cooling tower circulating pumps (top left)

210 Ton chiller (center)

Two chiller pumps (right)

Cooling Tower (bottom left)

A 4 ton, 10 SEER, Carrier mini split AC unit provides cooling to the Dispatch and Shift Commander, 1st floor. It is in satisfactory condition and has a 25% remaining estimated service life.

A 2 ton, 17 SEER, Sanyo mini split AC unit provides cooling to the IT Server/ Communication room. It is in satisfactory condition and has a 95% remaining estimated service life.

Each of the five air handlers (AH-1 through 5) contains a chilled water coil system for cooling and a hot water coil for heating.

The City Hall is provided ventilation by outside air intake louvers on the air handlers. The outside air louvers are motorized to allow economizer efficient operation when the outside air conditions are favorable. Bathroom exhaust fans also help ventilate the building. Each AH has an associated return fan (RF) operated via variable frequency drive (VFD) for efficient energy usage.

Supply and Exhaust fans outside the air handlers are generally driven by fractional horsepower motors (with a few exceptions). There are: seven Toilet Exhaust Fans: TE-1A, 1B, 2A, 2B, 2C, 4A and 5A; three 2nd floor Pantry Exhaust Fans: PE-1A, 4A and 5A; nine Mechanical and Storage room Exhaust Fans: EF-1 through 9; six 1st and 2nd floors Conference Room Exhaust Fans: TF-2A, 2B, 2C, 3A, 3B and 3C; three Supply Fans: SF-1, 2 and 3; and three 1st floor Dark Room and Basement Garage Dark Room Fans: DE-2A and GEF-1 & 2. All building supply, return and exhaust fans are in satisfactory condition and have 25% remaining estimated service lives.

Distribution Systems

A typical air handler unit arrangement draws in fresh air and brings it into a mixing box, where it is combined with return air from the building. A small portion of the return air is purged and vented outside prior to entering the mixing box. The mixed air inside the air handler is sent through a filter before passing through the hot water coil. The air handler fan then pulls the air through the chilled water coil before the conditioned air is distributed into the building spaces via VAV boxes and diffusers. The cooling system is only active in the cooling season and heating coils in the air handlers and VAVs trim the air temperature via reheat. In between seasons only the blowers will be active to provide fresh air to the building.

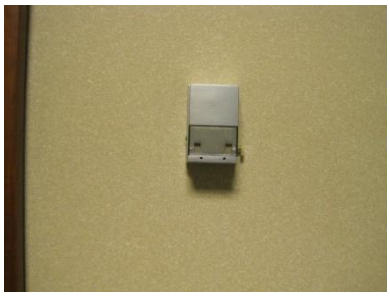
The City Hall air handlers distribute conditioned air to associated spaces via a ductwork system, VAVs and diffusers. The ducts are insulated on the inside for heat and noise abatement. The air handlers are controlled via a Siemens Building Management System (BMS). Zone thermostats can be locally set only by Maintenance.

Heating hot water and chilled water are distributed throughout the building to coils and terminal units and return back to the boiler or chiller respectively.

Controls

The Siemens BMS system controls each air handler and VAV box based on its associated room thermostat and setting, filter, pump and fan differential pressure, duct temperature sensors and adjusts for outdoor temperature reset. Based on this information, hot and chilled water pumps and valves, supply and return fans and dampers, boiler burners are electronically activated, controlled and adjusted via transducers and pneumatic signals. The control valves and thermostats are pneumatically operated. Most critical HVAC fans are VFD controlled. The BMS and thermostats are set for night setbacks.





Typical: Input/output electronic to pneumatic signal panels; Fan VFDs; Area thermostat

Domestic Hot Water

The domestic hot water (DHW) for the City Hall is provided by a gas fired Rheem, 21V100-1 domestic hot water heater with 100 gal storage and 75,000 Btu/hr capacity. It has an Energy Factor of 0.48. This DHW heater appears in satisfactory condition and has a 25% remaining estimated service life. It replaced a barely used 300 gal PVI domestic hot water heater which was deemed too big and is now stored disconnected in the basement Boiler room.


Rheem 100 gal storage replaces PVI 300 gal storage DHW

Electrical systems

Lighting

See attached lighting schedule in Appendix B for a complete inventory of lighting throughout the building including estimated power consumption and proposed lighting recommendations.

As of **July 1, 2010** magnetic ballasts most commonly used for the operation of T12 lamps will no longer be produced for commercial and industrial applications. Also, many T12 lamps will be phased out of production starting July 2012.

Interior Lighting - The City Hall currently contains T12 fixtures and ceiling mounted CFLs. Based on measurements of lighting levels for each space, there are no vastly over-illuminated areas.

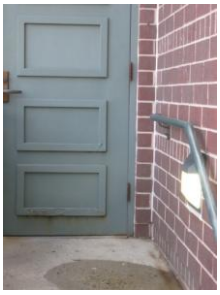
Compact Fluorescent sconce fixture and typical T12 fixture

Exit Lights - Exit signs were found to be Fluorescent and Incandescent types.

Typical fluorescent and incandescent Exit Signs seen throughout the building

Exterior Lighting - The exterior lighting surveyed during the building audit was found to be a mix of Metal Halide lamps and CFL fixtures. Exterior lights are controlled by timers. SWA recommends that four lights leading at Police basement stairs which are on 24hours/7days be put on photocell or motion detector activation.

Pole mounted Metal Halide parking lot and recessed exterior fixtures

Landscape bollard lighting with CFLs 24/7 light to Police station

Appliances and process

SWA has conducted a general survey of larger, installed equipment. Appliances and other miscellaneous equipment account for a significant portion of electrical usage within the building. Typically, appliances are referred to as “plug-load” equipment, since they are not inherent to the building’s systems, but rather plug into an electrical outlet. Equipment such as process motors, computers, computer servers, radio and dispatch equipment, refrigerators, vending machines, printers, etc… all create an electrical load on the building that is hard to separate out from the rest of the building’s energy usage based on utility analysis.

Elevators

The City Hall is a two-story building with basement and two (three level) building Dover (ThyssenKrupp) elevators. PE-1 has a 2,500 lbs capacity and CE-1 has a 3,500 lbs capacity. The hydraulic systems are similar: Rota-Flow Power Unit Model EP-95-30, Dover Elevator Model 590AH3, 30 HP motor, 462 psi working pressure. The elevators appear in satisfactory condition and no action is required at this time besides routine maintenance.

Lift Stations

The building has one storm-water and two sewage lift stations in the basement. Each station has a primary and a back-up pump and a 500 gal accumulation tank. Storm-water and sewage is pumped out based on tank level. The equipment appears in satisfactory condition and has a 25% remaining estimated service life.

Lift station (typical)

Instrument Air

Instrument air is provided by a Quincy Climate Control system with two 5 HP, 81.5% efficient compressor motors, in conjunction with two Hakison refrigerated dryers used for HVAC controls. The equipment appears in satisfactory condition and has a 25% remaining estimated service life.

Instrument air compressor; Instrument air refrigerated dryer

Other electrical systems

There are not currently any significant energy-impacting electrical systems installed at City Hall, except for a Caterpillar 205kW/256kVA diesel emergency generator (and a 275 gal diesel tank in a containment enclosure next to it). The generator appears in satisfactory condition and has a 25% remaining estimated service life. Also, the incoming power main transformer is owned/maintained by JCP&L and it appears in satisfactory condition. It supplies 277VAC to the building's eleven Siemens step-down/up transformers ranging in size from 15 to 45 kVA. The transformers are in satisfactory condition.



Siemens step-down/up transformer (typical); Main incoming transformer; Caterpillar emergency generator

RENEWABLE AND DISTRIBUTED ENERGY MEASURES

Renewable energy is defined as any power source generated from sources which are naturally replenished, such as sunlight, wind and geothermal. Technology for renewable energy is improving, and the cost of installation is decreasing, due to both demand and the availability of state and federal government-sponsored funding. Renewable energy reduces the need for using either electricity or fossil fuel, therefore lowering costs by reducing the amount of energy purchased from the utility company. Technology such as photovoltaic panels or wind turbines, use natural resources to generate electricity on the site. Geothermal systems offset the thermal loads in a building by using water stored in the ground as either a heat sink or heat source. Solar thermal collectors heat a specified volume of water, reducing the amount of energy required to heat water using building equipment. Cogeneration or CHP allows you to generate electricity locally, while also taking advantage of heat wasted during the generation process.

Existing systems

Currently, there isn't any renewable system installed at the Summit City Hall.

Evaluated Systems

Solar Photovoltaic

Photovoltaic panels convert light energy received from the sun into a usable form of electricity. Panels can be connected into arrays and mounted directly onto building roofs, as well as installed onto built canopies over areas such as parking lots, building roofs or other open areas. Electricity generated from photovoltaic panels is generally sold back to the utility company through a net meter. Net-metering allows the utility to record the amount of electricity generated in order to pay credits to the consumer that can offset usage and demand costs on the electric bill. In addition to generation credits, there are incentives available called Solar Renewable Energy Credits (SRECs) that are subsidized by the state government. Specifically, the New Jersey State government pays a market-rate SREC to facilities that generate electricity in an effort to meet state-wide renewable energy requirements.

Based on utility analysis and a study of roof conditions, the City Hall is a good candidate for a 30 kW Solar Panel installation. See ECM#8 for details.

Solar Thermal Collectors

Solar thermal collectors are not cost-effective for this building and would not be recommended due to the insufficient and intermittent use of domestic hot water throughout the building to justify the expenditure.

Wind

The City Hall is not a good candidate for a wind power generation due to unfavorable wind conditions in this area of New Jersey.

Geothermal

The City Hall is not a good candidate for a geothermal installation since it would require replacement of the entire existing HVAC system, of which major components still have 25% to 95% remaining useful lives.

Combined Heat and Power

The City Hall is not a good candidate for a CHP installation and would not be cost-effective due to the size and operations of the building. Typically, CHP is best suited for buildings with a high electrical base-load to accommodate the electricity generated, as well as a means for using waste heat generated. Typical applications include buildings with an absorption chiller, where waste heat would be used efficiently.

PROPOSED ENERGY CONSERVATION MEASURES

Energy Conservation Measures (ECMs) are recommendations determined for the building based on improvements over current building conditions. ECMs have been determined for the building based on installed cost, as well as energy and cost-savings opportunities.

Recommendations: Energy Conservation Measures

ECM#	Description of Recommended 0-5 Year Payback ECMs
1	Upgrade (64) Incandescent Lamps with CFLs
2	Install (2) Beverage and (2) Snacks Vending Machine Energy Misers
3	Upgrade (2) Metal Halide Fixtures with T5 fixtures
4	Install (5) Demand Controlled Ventilation Systems
5	Replace (3) Hot Water Pump Motors 5HP, 81.5% eff with NEMA 89.5% eff Motors
ECM#	**Description of Recommended 5-10 Year Payback ECMs**
6	Install (30) Occupancy Sensors
7	Install (4) New Pulse Start Metal Halide Fixtures
8	Install a 30 kW Solar Photovoltaic Rooftop System
9	Replace (29) Incandescent/Fluorescent Exit Signs with LED Type
10	Install (348) New T8 Fixtures

In order to clearly present the overall energy opportunities for the building and ease the decision of which ECM to implement, SWA calculated each ECM independently and did not incorporate slight/potential overlaps between some of the listed ECMs (i.e. lighting change influence on heating/cooling.

ECM#1: Upgrade (64) Incandescent Lamps with CFLs

During the field audit, SWA completed a building lighting inventory (see Appendix B). The existing lighting also contains inefficient incandescent lamps. SWA recommends that each incandescent lamp is replaced with a more efficient, Compact Fluorescent Lamp (CFL). CFLs are capable of providing equivalent or better light output while using less power when compared to incandescent, halogen and Metal Halide fixtures. CFL bulbs produce the same lumen output with less wattage than incandescent bulbs and last up to five times longer. The labor for the recommended installations is evaluated using prevailing electrical contractor wages. The building owner may decide to perform this work with in-house resources from the Maintenance Department on a scheduled, longer timeline than otherwise performed by a contractor.

Installation cost:

Estimated installed cost: $858 (includes $644 of labor)
Source of cost estimate: RS Means, Published and established costs, NJ Clean Energy Program

Economics:

est. installed cost, $	est. incentives, $	net est. ECM cost with incentives, $	kWh, 1st yr savings	kW, demand reduction/mo	therms, 1st yr savings	kBtu/sq ft, 1st yr savings	est. operating cost, 1st yr savings, $	total 1st yr savings, $	life of measure, yrs	est. lifetime cost savings, $	simple payback, yrs	lifetime return on investment, %	annual return on investment, %	internal rate of return, %	net present value, $	CO_2 reduced, lbs/yr
858	none at this time	858	11,252	2.3	0	0.7	3,142	4,965	5	24,825	0.2	2,793	559	579	21,077	20,147

Assumptions: SWA calculated the savings for this measure using measurements taken during the field audit and using the billing analysis. SWA also assumed an aggregated 69 hrs/yr to replace aging burnt out lamps vs. newly installed.

Rebates/financial incentives:

- There is no incentive available for this measure at this time.

Please see Appendix F for more information on Incentive Programs.

ECM#2: Install (2) Beverage and (2) Snacks Vending Machine Energy Misers

Energy vending miser devices are now available for conserving energy used by beverage vending machines and coolers. There isn't a need to purchase new machines to reduce operating costs and greenhouse gas emissions. When equipped with the vending miser devices, refrigerated beverage vending machines use less energy and are comparable in daily energy performance to new ENERGY STAR® qualified machines. Vending miser devices incorporate innovative energy-saving technology into small plug-and-play devices that installs in minutes, either on the wall or on the vending machine. Vending miser devices use a Passive Infrared Sensor (PIR) to: Power down the machine when the surrounding area is vacant; Monitor the room's temperature; Automatically repower the cooling system at one- to three-hour intervals, independent of sales; Ensure the product stays cold.

Snack vending miser devices can be used on snack vending machines to achieve maximum energy savings that result in reduced operating costs and decreased greenhouse gas emissions with existing machines. Snack vending miser devices also use a Passive Infrared Sensor (PIR) to determine if there is anyone within 25 feet of the machine. It waits for 15 minutes of vacancy, then powers down the machine. If a customer approaches the machine while powered down, the snacks vending miser will sense the presence and immediately power up.

There are a beverage and a snack vending machine in the basement Police Station break room, and another similar set in the 2nd floor Municipal section break room.

Installation cost:

Estimated installed cost: $508 (Includes $229 of labor)
Source of cost estimate: Manufacturers information

Economics:

est. installed cost, $	est. incentives, $	net est. ECM cost with incentives, $	kWh, 1st yr savings	kW, demand reduction/mo	therms, 1st yr savings	kBtu/sq ft, 1st yr savings	est. operating cost, 1st yr savings, $	total 1st yr savings, $	life of measure, yrs	est. lifetime cost savings, $	simple payback, yrs	lifetime return on investment, %	annual return on investment, %	internal rate of return, %	net present value, $	CO_2 reduced, lbs/yr
508	none at this time	508	5,417	0.1	0	0.3	0	876	12	10,510	0.6	1,969	164	172	7,855	9,699

Assumptions: SWA calculated the savings for this measure using measurements taken during the field audit and using the billing analysis. SWA assumes energy savings based on modeling calculator found at www.usatech.com or http://www.usatech.com/energy_management/energy_calculator.php

Rebates/financial incentives:

- There is no incentive available for this measure at this time.

Please see Appendix F for more information on Incentive Programs.

ECM#3: Upgrade (2) Metal Halide Fixtures with T5 Fixtures

During the field audit, SWA completed a building interior as well as exterior lighting inventory (see Appendix B). The existing City Hall lighting consists of 2 standard probe start Metal Halide (MH) lamps. SWA recommends replacing the interior higher wattage MH fixtures with T5 lamps and electronic ballasts which offer the advantages of standard probe start MH lamps, but minimize the disadvantages. They produce higher light output both initially and over time, operate more efficiently, produce whiter light, and turn on and re-strike faster. Due to these characteristics, energy savings can be realized via one-to-one substitution of lower-wattage systems, or by taking advantage of higher light output and reducing the number of fixtures required in the space. The labor for the recommended installations is evaluated using prevailing electrical contractor wages. The building owner may decide to perform this work with in-house resources from the Maintenance Department on a scheduled, longer timeline than otherwise performed by a contractor. (Add any ECM specifics)

Installation cost:

Estimated installed cost: $388 (Includes $213 of labor)
Source of cost estimate: Manufacturers information

Economics:

est. installed cost, $	est. incentives, $	net est. ECM cost with incentives, $	kWh, 1st yr savings	kW, demand reduction/mo	therms, 1st yr savings	kBtu/sq ft, 1st yr savings	est. operating cost, 1st yr savings, $	total 1st yr savings, $	life of measure, yrs	est. lifetime cost savings, $	simple payback, yrs	lifetime return on investment, %	annual return on investment, %	internal rate of return, %	net present value, $	CO_2 reduced, lbs/yr
420	32	388	1,332	0.3	0	0.1	270	486	15	7,290	0.8	1,779	119	125	5,165	2,385

Assumptions: SWA calculated the savings for this measure using measurements taken during the field audit and using the billing analysis.

Rebates/financial incentives:

- NJ Clean Energy - Retrofit with T5 fixtures with electronic ballasts ($16 per fixture) - Maximum incentive amount is $32.

Please see Appendix F for more information on Incentive Programs.

ECM#4: Install (5) Demand-Controlled Ventilation Systems

On the day of the site visit, SWA observed that there were not any air flow controls based on occupancy. SWA recommends that carbon dioxide sensors be installed (in return air ducts) in the larger spaces to sense occupancy and improve Indoor Air Quality (IAQ). Signals from these sensors need to be taken back to the HVAC air flow controls for programming to regulate the amount of cooling and heating for these spaces and vary air flows according to occupancy. Thus, many a time when these spaces are sparsely occupied, savings will be realized in the heating and cooling of these spaces, by bringing into the spaces the right amount of fresh air (rather than too much unconditioned air).

Demand controlled ventilation (DCV) is the process of automatically modulating the rate of outdoor air supply (i.e., rate of ventilation) as the "demand" or need for ventilation varies. The objective is to keep ventilation rates at or above design specifications and code requirements and also to save energy by avoiding excessive ventilation rates, as energy is normally required to heat, cool, and dehumidify the ventilation air supplied to buildings. The need for ventilation is increased when the rate of air pollutant generation from indoor sources is high. People and their activities are among the important indoor pollutant sources and in many indoor spaces occupant density is highly variable. Thus, DCV is most often implemented in spaces with sometimes high and temporally variable occupant density, for example meeting rooms and theatres. In the usual application of DCV, ventilation rates are automatically modulated based on measured indoor concentrations of carbon dioxide (CO2), as CO2 is emitted by people as a metabolic by product and more easily measured than other air pollutants resulting from occupancy. When the indoor occupant density is increased, the indoor concentration of CO2 increases, unless the ventilation rate also increases. Carbon dioxide is not generally considered a directly harmful air pollutant at the concentrations found indoors - rather the concentration of CO2 is considered a proxy for the concentration of a variety of other odorous or potentially harmful pollutants emitted by people or their activities. A typical DCV system is designed to modulate ventilation rates over time so that indoor carbon dioxide concentrations do not exceed a set point, or target, value. The set point CO2 concentration is typically between 800 and 1,000 parts per million with outside CO2 levels typically at low concentrations of around 400 to 450 ppm. SWA considered DCV opportunities for the four building package units.

Building codes require that a minimum amount of fresh air be provided to ensure adequate air quality. To comply, ventilation systems often operate at a fixed rate based on an assumed occupancy (e.g., 15 cfm per person multiplied by the maximum design occupancy). The result is there often is much more fresh air coming into buildings than is necessary. That air must be conditioned, resulting in higher energy consumption and costs than is necessary with appropriate ventilation. ANSI/ASHRAE Standard 62.1-2007, Ventilation for Acceptable Indoor Air Quality, sets minimum ventilation rates and other requirements for commercial and institutional buildings, besides state and local building codes.

Some of the spaces to be considered for DCV are the Court room and nearby meeting rooms, the Police Department and other gathering spaces throughout the building that fluctuate in occupancy.

Installation cost:

Estimated installed cost: $12,000 (includes $3,600 of labor)
Source of cost estimate: RS Means; Published and established costs; Similar projects

Economics:

est. installed cost, $	est. incentives, $	net est. ECM cost with incentives, $	kWh, 1st yr savings	kW, demand reduction/mo	therms, 1st yr savings	kBtu/sq ft, 1st yr savings	est. operating cost, 1st yr savings, $	total 1st yr savings, $	life of measure, yrs	est. lifetime cost savings, $	simple payback, yrs	lifetime return on investment, %	annual return on investment, %	internal rate of return, %	net present value, $	CO_2 reduced, lbs/yr
12,000	none at this time	12,000	60,914	0.9	989	5.3	0	10,775	12	129,300	1.1	978	81	90	91,071	119,967

Assumptions: SWA assumed thermal savings based on heating and cooling loads calculated using the billing analysis. In order to estimate savings for this measure, SWA calculated energy reductions equivalent to the ratio of the energy saved to the total heating and cooling used by the size of the space(s), occupancy and utilization according to known schedules (in view that some of the spaces are rarely used at the full designed capacity) and compared it to 5% heating/cooling reduction and used the more conservative estimate.

Rebates/financial incentives:

- There is no incentive available for this measure at this time.

Please see Appendix F for more information on Incentive Programs.

ECM#5: Replace (3) Hot Water Pump Motors 5HP, 81.5% eff with NEMA 89.5 % eff Motors

During the field audit, SWA completed the building equipment inventory and observed standard efficiency motors. Efficiency varies by motor size, with larger motors tending toward higher efficiency. The highest-efficiency motors available commercially today have efficiencies of 93-94%, and higher for the largest motors. Focusing on the entire motor system, not just the motor, offers even greater potential for energy savings. An important tool for increasing motor system efficiency is the adjustable speed drive (ASD), a device that precisely controls motor speed which is evaluated on a case by case basis. Premium-efficiency motors cost 15-25% more than standard motors, or $8-$40 more per horsepower, they pay for themselves quickly in saved operating costs. The exact length of the payback period depends on several factors, including annual hours of use, energy rates, costs of installation and downtime, and the availability of utility rebates. The labor for the recommended installations is evaluated using prevailing electrical contractor wages. The building owner may decide to perform this work with in-house resources from the Maintenance Department on a scheduled, longer timeline than otherwise performed by a contractor.

The Boiler Room houses three 5 HP floor-mounted (P-5 through 7, one is a spare) circulator pumps serving the building as part of the hot water heating system to serve the hot water coils and other hot water terminal units in all parts of the building. The pumps operate in a lead-lag fashion. All pump motors are standard efficiency (or 81.5%). Energy savings will be realized by utilizing NEMA premium efficiency motors for these pumps.

Installation cost:

Estimated installed cost: $1,293 (includes $323 labor)
Source of cost estimate: Similar projects and DOE Motor Master International selection

Economics (with incentives):

est. installed cost, $	est. incentives, $	net est. ECM cost with incentives, $	kWh, 1st yr savings	kW, demand reduction/mo	therms, 1st yr savings	kBtu/sq ft, 1st yr savings	est. operating cost, 1st yr savings, $	total 1st yr savings, $	life of measure, yrs	est. lifetime energy cost savings, $	simple payback, yrs	lifetime return on investment, %	annual return on investment, %	internal rate of return, %	net present value, $	CO_2 reduced, lbs/yr
1,455	162	1,293	1,636	0.0	0	0.1	0	265	20	5,290	4.9	309	15	20	2,491	2,929

Assumptions: SWA calculated the savings for this measure using nameplate data taken and using the billing analysis. The DOE Motor Master International selection and calculator was used with the assumption that two of the three heating water pumps operates for the heating season. According to weather bin data for McGuire AFB, Trenton, NJ, the pumps considered should operate for approximately 2,000 hours per year.

Rebates/financial incentives:

- NJ Clean Energy - Premium motors ($45-$700 per motor) - Maximum incentive amount: $162.

Please see Appendix F for more information on Incentive Programs.

ECM#6: Install (30) Occupancy Sensors

During the field audit, SWA completed a building lighting inventory (see Appendix B). SWA observed that the existing lighting has minimal to no control via occupancy sensors. SWA identified a number of areas that could benefit from the installation of occupancy sensors. SWA recommends installing occupancy sensors in areas that are occupied only part of the day and the payback on savings is justified. Typically, occupancy sensors have an adjustable time delay that shuts down the lights automatically if no motion is detected within a set time period. Advance micro-phonic lighting sensors include sound detection as a means to control lighting operation. The labor for the recommended installations is evaluated using prevailing electrical contractor wages. The building owner may decide to perform this work with in-house resources from the Maintenance Department on a scheduled, longer timeline than otherwise performed by a contractor.

Installation cost:

Estimated installed cost: $6,000 (includes $3,600 of labor)
Source of cost estimate: Manufacturer and Store established costs, NJ Clean Energy Program, Similar Projects

Economics (with incentives):

est. installed cost, $	est. incentives, $	net est. ECM cost with incentives, $	kWh, 1st yr savings	kW, demand reduction/mo	therms, 1st yr savings	kBtu/sq ft, 1st yr savings	est. operating cost, 1st yr savings, $	total 1st yr savings, $	life of measure, yrs	est. lifetime energy cost savings, $	simple payback, yrs	lifetime return on investment, %	annual return on investment, %	internal rate of return, %	net present value, $	CO_2 reduced, lbs/yr
6,600	600	6,000	7,226	1.5	0	0.4	0	1,171	15	17,565	5.1	193	13	18	7,538	12,938

Assumptions: SWA calculated the savings for this measure using measurements taken during the field audit and using the billing analysis.

Rebates/financial incentives:

- NJ Clean Energy - Occupancy sensor wall mounted ($20 per control) - Maximum incentive amount: $600.

Please see Appendix F for more information on Incentive Programs.

ECM#7: Install (4) New Pulse Start Metal Halide Fixtures

During the field audit, SWA completed a building interior as well as exterior lighting inventory (see Appendix B). The existing lighting contains standard probe start Metal Halide (MH) lamps. SWA recommends replacing the higher wattage MH fixtures with pulse start MH lamps which offer the advantages of standard probe start MH lamps, but minimize the disadvantages. They produce higher light output both initially and over time, operate more efficiently, produce whiter light, and turn on and re-strike faster. Due to these characteristics, energy savings can be realized via one-to-one substitution of lower-wattage systems, or by taking advantage of higher light output and reducing the number of fixtures required in the space. The labor for the recommended installations is evaluated using prevailing electrical contractor wages. The building owner may decide to perform this work with in-house resources from the Maintenance Department on a scheduled, longer timeline than otherwise performed by a contractor.

Installation cost:

Estimated installed cost: $2,640 (Includes $1,980 of labor)
Source of cost estimate: Manufacturers information

Economics:

est. installed cost, $	est. incentives, $	net est. ECM cost with incentives, $	kWh, 1st yr savings	kW, demand reduction/mo	therms, 1st yr savings	kBtu/sq ft, 1st yr savings	est. operating cost, 1st yr savings, $	total 1st yr savings, $	life of measure, yrs	est. lifetime cost savings, $	simple payback, yrs	lifetime return on investment, %	annual return on investment, %	internal rate of return, %	net present value, $	CO_2 reduced, lbs/yr
2,740	100	2,640	1,542	0.3	0	0.1	211	460	15	6,900	5.7	161	11	15	2,687	2,761

Assumptions: SWA calculated the savings for this measure using measurements taken during the field audit and using the billing analysis. SWA also assumed an aggregated 3 hrs/yr to replace aging burnt out lamps/ballasts vs. newly installed.

Rebates/financial incentives:

- NJ Clean Energy - Pulse Start Metal Halide ($25 per fixture) - Maximum incentive amount is $100.

Please see Appendix F for more information on Incentive Programs.

ECM#8: Install a 30 kW Solar Photovoltaic Rooftop System

Currently, the building does not use any renewable energy systems. Renewable energy systems such as photovoltaic (PV) panels can be mounted on the building roof facing south which can offset a portion of the purchased electricity for the building. Power stations generally have two separate electrical charges: usage and demand. Usage is the amount of electricity in kilowatt-hours that a building uses from month to month. Demand is the amount of electrical power that a building uses at any given instance in a month period. During the summer periods, electric demand at a power station is high, due to the amount of air conditioners, lights, and other equipment being used within the region. Demand charges increase to offset the utility's cost to provide enough electricity at that given time. Photovoltaic systems offset the amount of electricity used by a building and help to reduce the building's electric demand, resulting in a higher cost savings. Installing a PV system will offset electric demand and reduce annual electric consumption, while utilizing available state incentives. PV systems are modular and readily allow for future expansions.

The size of the system was determined considering the available roof surface area, without compromising service space for roof equipment and safety, as well as the facilities' annual base load and mode of operation. A PV system could be installed on a portion of the roof with panels facing south. A commercial multi-crystalline 230 watt panel has 17.5 square feet of surface area (providing 13.1 watts per square foot). A 30 kW system needs approximately 130 panels which would take up 2,280 square feet.

A PV system would reduce the building's electric load and allow more capacity for surrounding buildings as well as serve as an example of energy efficiency for the community. The building is not eligible for a residential 30% federal tax credit. The building owner may want to consider applying for a grant and / or engage a PV generator / leaser who would install the PV system and then sell the power at a reduced rate. Typically, a major utility provides the ability to buy SREC's at $600/MWh or best market offer. However, this option is not available from the local utility. Please see below for more information.

Please note that this analysis did not consider the structural capability of the existing building to support the above recommended system. SWA recommends that the City of Summit contract with a structural engineer to determine if additional building structure is required to support the recommended system and what costs would be associated with incorporating the additional supports prior to system installation. Should additional costs be identified, the City of Summit should include these costs in the financial analysis of the project.

Installation cost:

Estimated installed cost: $187,500 (includes $120,000 of labor)
Source of cost estimate: Similar projects

Economics (with incentives):

est. installed cost, $	est. incentives, $	net est. ECM cost with incentives, $	kWh, 1st yr savings	kW, demand reduction/mo	therms, 1st yr savings	kBtu/sq ft, 1st yr savings	est. operating cost, 1st yr savings, $	total 1st yr savings, $	life of measure, yrs	est. lifetime cost savings, $	simple payback, yrs	lifetime return on investment, %	annual return on investment, %	internal rate of return, %	net present value, $	CO_2 reduced, lbs/yr
210,000	22,500	187,500	35,400	30.0	0	2.1	0	26,723	25	668,087	7.0	256	10	12	152,216	63,384

Cash flow:

Annual Solar PV Cost Savings Breakdown

Rated Capacity (kW)	30.0
Rated Capacity (kWh)	35,400
Annual Capacity Loss	0%

Year	kWh Capacity	Installed Cost	Incentives	Electric Savings ($)
0		$210,000	$22,500	
1	35,400		$21,000	$5,723
2	35,400		$21,000	$5,723
3	35,400		$21,000	$5,723
4	35,400		$21,000	$5,723
5	35,400		$21,000	$5,723
6	35,400		$21,000	$5,723
7	35,400		$21,000	$5,723
8	35,400		$21,000	$5,723
9	35,400		$21,000	$5,723
10	35,400		$21,000	$5,723
11	35,400		$21,000	$5,723
12	35,400		$21,000	$5,723
13	35,400		$21,000	$5,723
14	35,400		$21,000	$5,723
15	35,400		$21,000	$5,723
16	35,400		$0	$5,723
17	35,400		$0	$5,723
18	35,400		$0	$5,723
19	35,400		$0	$5,723
20	35,400		$0	$5,723
21	35,400		$0	$5,723
22	35,400		$0	$5,723
23	35,400		$0	$5,723
24	35,400		$0	$5,723
25	35,400		$0	$5,723
	kWh	Cost	Saving	
Lifetime Total	**885,000**	**($210,000)**	**$337,500**	**$143,087**

Assumptions: SWA estimated the cost and savings of the system based on past PV projects. SWA projected physical dimensions based on a typical Polycrystalline Solar Panel (230 Watts, model #ND-U230C1). PV systems are sized based on Watts and physical dimensions for an array will differ with the efficiency of a given solar panel (W/sq ft).

Rebates/financial incentives:

NJ Clean Energy - Renewable Energy Incentive Program, Incentive based on $0.75 / watt Solar PV application for systems 30 kW or less. Incentive amount for this application is $22,500 for the proposed option. http://www.njcleanenergy.com/renewable-energy/programs/renewable-energy-incentive-program

NJ Clean Energy - Solar Renewable Energy Certificate Program. Each time a solar electric system generates 1,000kWh (1MWh) of electricity, a SREC is issued which can then be sold or traded separately from the power. The buildings must also become net-metered in order to earn SRECs as well as sell power back to the electric grid. A total annual SREC credit of $21,000 has been incorporated in the above costs however it requires proof of performance, application approval and negotiations with the utility.

Options for funding ECM:

This project may benefit from enrolling in NJ SmartStart program with Technical Assistance to offset a portion of the cost of implementation.
http://www.njcleanenergy.com/commercial-industrial/programs/nj-smartstart-buildings/nj-smartstart-buildings

Please see Appendix F for more information on Incentive Programs.

ECM#9: Replace (29) Incandescent/Fluorescent Exit Signs with LED Type

During the field audit, SWA completed a building lighting inventory (see Appendix B). SWA observed that the building contains a number of incandescent Exit signs. SWA recommends replacing these with LED type. Replacing existing Exit signs with LED Exit signs can result in lower kilowatt-hour consumption, as well as lower maintenance costs. Since Exit signs operate 24 hours per day, they can consume large amounts of energy. In addition, older Exit signs require frequent maintenance due to the short life span of the lamps that light them. LED Exit sign last at least 5 years. In addition, LED Exit signs offer better fire code compliance because they are maintenance free in excess of 10 years. LED Exit signs are usually brighter than comparable incandescent or fluorescent signs, and have a greater contrast with their background due to the monochromatic nature of the light that LEDs emit. The building owner may decide to perform this work with in-house resources from the Maintenance Department on a scheduled, longer timeline than otherwise performed by a contractor.

Installation cost:

Estimated installed cost: $3,785 (Includes $848 of labor)
Source of cost estimate: Manufacturers information

Economics:

est. installed cost, $	est. incentives, $	net est. ECM cost with incentives, $	kWh, 1st yr savings	kW, demand reduction/mo	therms, 1st yr savings	kBtu/sq ft, 1st yr savings	est. operating cost, 1st yr savings, $	total 1st yr savings, $	life of measure, yrs	est. lifetime cost savings, $	simple payback, yrs	lifetime return on investment, %	annual return on investment, %	internal rate of return, %	net present value, $	CO_2 reduced, lbs/yr
4,365	580	3,785	2,337	0.5	0	0.1	53	431	15	6,465	8.8	71	5	8	1,247	4,184

Assumptions: SWA calculated the savings for this measure using measurements taken during the field audit and using the billing analysis. SWA also assumed an aggregated 2 hr/yr to replace aging burnt out lamps/ballasts vs. newly installed and included this with the annual savings.

Rebates/financial incentives:

- NJ Clean Energy - LED Exit Signs ($20 per fixture) - Maximum incentive amount is $580.

Please see Appendix F for more information on Incentive Programs.

ECM#10: Install (348) New T8 Fixtures

During the field audit, SWA completed a building lighting inventory (see Appendix B). The existing lighting contains inefficient T12 fluorescent fixtures with magnetic ballasts. SWA recommends replacing each existing fixture with more efficient, T8 fluorescent fixtures with electronic ballasts. T8 fixtures with electronic ballasts provide equivalent or better light output while reducing energy consumption by 30% when compared to T12 fixtures with magnetic ballasts. T8 fixtures also provide better lumens for less wattage when compared to incandescent, halogen and Metal Halide fixtures. The labor for the recommended installations is evaluated using prevailing electrical contractor wages. The building owner may decide to perform this work with in-house resources from the Maintenance Department on a scheduled, longer timeline than otherwise performed by a contractor.

Installation cost:

Estimated installed cost: $59,268 (Includes $41,488 of labor)
Source of cost estimate: Manufacturers information

Economics:

est. installed cost, $	est. incentives, $	net est. ECM cost with incentives, $	kWh, 1st yr savings	kW, demand reduction/mo	therms, 1st yr savings	kBtu/sq ft, 1st yr savings	est. operating cost, 1st yr savings, $	total 1st yr savings, $	life of measure, yrs	est. lifetime cost savings, $	simple payback, yrs	lifetime return on investment, %	annual return on investment, %	internal rate of return, %	net present value, $	CO_2 reduced, lbs/yr
64,488	5,220	59,268	13,540	2.8	0	0.8	3,858	6,052	15	90,780	9.8	53	4	6	11,576	24,243

Assumptions: SWA calculated the savings for this measure using measurements taken during the field audit and using the billing analysis. SWA also assumed an aggregated 85 hrs/yr to replace aging burnt out lamps/ballasts vs. newly installed.

Rebates/financial incentives:

- NJ Clean Energy - Retrofit T12 with T8 fixtures with electronic ballasts ($15 per control) - Maximum incentive amount is $5,220.

Please see Appendix F for more information on Incentive Programs.

PROPOSED FURTHER RECOMMENDATIONS

Capital Improvements

Capital Improvements are recommendations for the building that may not be cost-effective at the current time, but that could yield a significant long-term payback. These recommendations should typically be considered as part of a long-term capital improvement plan. Capital improvements should be considered if additional funds are made available, or if the installed costs can be shared with other improvements, such as major building renovations. SWA recommends the following capital improvements for the City Hall:

- Install premium motors when replacements are required - Select NEMA Premium motors when replacing motors that have reached the end of their useful operating lives.

- Enhance the generator capacity due to unreliable electric supply in the area with the next major renovation. The existing generator can handle 70% of the building load and is exercised on a weekly basis.

Operations and Maintenance

Operations and Maintenance measures consist of low/no cost measures that are within the capability of the current building staff to handle. These measures typically require little investment, and they yield a short payback period. These measures may address equipment settings or staff operations that, when addressed will reduce energy consumption or costs.

- Maintain roofs - SWA recommends regular maintenance to verify water is draining correctly and drains are cleaned.

- Maintain downspouts and cap flashing - Repair/install missing downspouts and cap flashing as needed to prevent water/moisture infiltration and insulation damage. SWA recommends round downspout elbows to minimize clogging.

- Provide weather-stripping/air-sealing - SWA observed that exterior door weather-stripping was beginning to deteriorate in places. Doors and vestibules should be observed annually for deficient weather-stripping and replaced as needed. The perimeter of all window frames should also be regularly inspected, and any missing or deteriorated caulking should be re-caulked to provide an unbroken seal around the window frames. Any other accessible gaps or penetrations in the thermal envelope penetrations should also be sealed with caulk or spray foam.

- Repair/seal wall cracks and penetrations - SWA recommends as part of the maintenance program installing proper flashing and correct masonry efflorescence, and sealing wall cracks and penetrations wherever necessary in order to keep insulation dry and effective.

- Provide water-efficient fixtures and controls - The building’s public bathrooms already have auto flushers on urinals and toilets. This upgrade should be carried on throughout the rest of the building. Adding controlled on/off timers on all lavatory faucets is a cost-effective way to reduce domestic hot water demand and save water. Building staff can also easily install faucet aerators and/or low-flow fixtures to reduce water consumption. There are many retrofit options, which can be installed now or incorporated as equipment is replaced. Routine maintenance practices that identify and quickly address water leaks are a low-cost way to save water and energy.

Retrofitting with more efficient water-consumption fixtures/appliances will reduce energy consumption for water heating, while also decreasing water/sewer bills.

- SWA recommends that the building considers purchasing the most energy-efficient equipment, including ENERGY STAR® labeled appliances, when equipment is installed or replaced. More information can be found in the "Products" section of the ENERGY STAR® website at: http://www.energystar.gov.

- Use smart power electric strips - in conjunction with occupancy sensors to power down computer equipment when left unattended for extended periods of time.

- Create an energy educational program - that teaches how to minimize energy use. The U.S. Department of Energy offers free information for hosting energy efficiency educational programs and plans. For more information please visit: http://www1.eere.energy.gov/education/.

- Change filters on air handling units monthly to ensure efficient operation of the blowers and ensure adequate air delivery to the spaces.

- Tighten belts on exhaust fans and blowers every three to six months - Tightening belts on belt-driven fans/blowers can maximize the overall efficiency of the equipment.

- Inspect air handling units' coils for dirt buildup three to six months. These conditions should be rectified if found because they will cause inefficient operation and possibly damage to the equipment.

- Overgrown ground vegetation should be trimmed/removed to not touch or block exterior wall surfaces from access, ventilation and sunlight.

The recommended ECMs and the list above are cost-effective energy efficiency measures and building upgrades that will reduce operating expenses for the City of Summit. Based on the requirements of the LGEA program, the City of Summit must commit to implementing some of these measures, and must submit paperwork to the Local Government Energy Audit program within one year of this report's approval to demonstrate that they have spent, net of other NJCEP incentives, at least 25% of the cost of the audit (per building). The minimum amount to be spent, net of other NJCEP incentives, is $2,935 (or 25% of $11,741).

APPENDIX A: EQUIPMENT LIST

Inventory

Building System	Description, % eff	Model # / Serial #	Fuel	Location	Space Served	Date Installed	Estimated Remaining Useful Life %
Heating	(2) Gas fired hot water cast iron boilers,B-1 & 2, 1,703 MBH capacity, 80% eff	Weil-McLain, T688-H model	Natural Gas	Boiler Rm or Mech Rm #4	City Hall	1995	40%
Heating/Cooling	AH-1, heating, reheating and cooling, 13,700 cfm capacity, 20 HP blower motor	McQuay Blower MSL128DH	Electrical (fan)	Penthouse Mech Rm #1	1st flr office east	1995	25%
Heating/Cooling	AH-2, heating, reheating and cooling, 10,500 cfm capacity, 15 HP blower motor	McQuay Blower MSL122DH	Electrical (fan)	Penthouse Mech Rm #2	1st flr Police Dept	1995	25%
Heating/Cooling	AH-3, heating, reheating and cooling, 9,700 cfm capacity, 15 HP blower motor	McQuay Blower MSL122DH	Electrical (fan)	Penthouse Mech Rm #2	2nd flr office south	1995	25%
Heating/Cooling	AH-4, heating, reheating and cooling, 15,400 cfm capacity, 20 HP blower motor	McQuay Blower MSL134DH	Electrical (fan)	Penthouse Mech Rm #3	1st and 2nd flr office west	1995	25%
Heating/Cooling	AH-5, heating, reheating and cooling, 8,300 cfm capacity, 10 HP blower motor	McQuay Blower MSL117DH	Electrical (fan)	Basement Mech Rm #4	Basement Locker Rm	1995	25%
Heating/Cooling	Variable Volume Boxes: V5, 6, 8, 10, 12 and 14	Enviro-Tec SSD II	N/A	City Hall above ceiling	City Hall	1995	25%
Heating	Variable Volume Boxes - Fan Powered: FP1 through 6; 1/6 to ½ HP motors	Enviro-Tec CVFQ-WC-II-6, 8, 10B, 12B, 14B and 14C	Electrical (fan)	City Hall above ceiling	City Hall	1995	25%
Heating	Ceiling hung (UH-1 through 20) and cabinet (CH-1) hydronic heaters, 43,600 Btu/hr, 900 cfm capacity	Mestek Unit Heater HE-60S, Serial # HS9031-93	Electric (Fan)	Mechanical Rooms, Salley Port, Dock, Stairs and Garage	Mechanical Rooms, Salley Port, Dock, Stairs and Garage	1995	25%

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Building System	Description, % eff	Model # / Serial #	Fuel	Location	Space Served	Date Installed	Estimated Remaining Useful Life %
Heating	HV-1, heating, and ventilating unit, 1,500 cfm and 1 HP fan motor	Trane Torrivent T3	Electrical (fan)	Basement Mech Rm #4	Basement Mech Rm #4	1995	25%
Heating	(3) Heating hot water pumps, P-5, 6 & 7, 120 gpm, 60 ft of head	Taco FM2008 7.8 B2E1B2LO, 5 HP motor, 81.5% eff	Electric	Boiler Rm or Mech Rm #4	City Hall	1995	25%
Cooling	(2) cooling tower water pumps, P-3, & 4, 610 gpm, 80 ft of head	Taco FM4010 9.1 B2J1D2LO, 20 HP motors, 88.5 & 92.4% eff	Electric	Boiler Rm or Mech Rm #4	City Hall	1995	25%
Cooling	(2) chilled water pumps, P-1, & 2, 480 gpm, 80 ft of head	Taco with 20 HP motor, 88.5 eff	Electric	Boiler Rm or Mech Rm #4	City Hall	1995	25%
Cooling	Chiller, 210 ton refrigeration capacity, 480 gpm	Dunham-Bush WCX 210C, BD 10 22040, FF18125H144 KAA	Electric	Boiler Rm or Mech Rm #4	City Hall	1995 (with (1) newer compr)	40%
Cooling	One mini split AC unit, 49,500 Btu/hr cooling, 10 SEER	Carrier 50AH048	Electric	South Attic Mech Rm	Dispatch and Shift Com-mander 1st flr	1995	25%
Cooling	AC-1, One mini split AC unit, 24,200 Btu/hr cooling, 17 SEER	Sanyo CL2472, Serial # 0126493 - outdoor; KS2472 - indoor	Electric	Condenser is next to Entrance from Parking	IT Server/ Communic ation Rm	2009	95%
Cooling	Fan Coil Cooling Units: FCU-1 through 3; 1/3 HP motors	Trane C-34 DO 10 and 12	Electric	Basement Switchgear and Mech Rms	Basement Switchgear and Mech Rms	2009	95%
DHW	100 gal, 75,000 Btu/hr capacity, est usage is 312 therms/yr (range is 288-349) with continuous circulator pump	Rheem, Rheemglas Fury, 21V100-1, Serial # RHNG 1201G01428	Natural Gas	Boiler Rm	City Hall	2003	45%

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Building System	Description, % eff	Model # / Serial #	Fuel	Location	Space Served	Date Installed	Estimated Remaining Useful Life %
Ventilation	Return Fans: RF-1 for AH-1, RF-2 for AH-2, RF-3 for AH-3, RF-4 for AH-4 and RF-5 for AH-5	Centrex: SX335B (5 HP) for RF-1, SX275B (3 HP) for RF-2, SX275B (3 HP) for RF-3, SX335B (7.5 HP) for RF-4, SX225B (2 HP) for RF-5	Electric	Mechanical Rooms next to associated air handlers	Same as the associated air handlers	1995	25%
Ventilation	Toilet Exhaust Fans: TE-1A, 1B, 2A, 2B, 2C, 4A and 5A; fractional horsepower except for 5A which has a 1 HP motor	Zephyr cabinet exh. fan Z101 TDA for TE-1 through TE-2C, Zephyr cabinet exh. fan Z14 TDA for TE-4A and Centrex SX145B for TE-5A	Electric	Toilets, Jail and Locker rooms	Toilets, Jail and Locker rooms	1995	25%
Ventilation	Pantry Exhaust Fans: PE-1A, 4A and 5A, fractional horsepower	Zephyr cabinet exh. fan Z12 and Z101 TDA	Electric	2nd floor ceiling	2nd flr pantry 2076, 2012 and 0007,	1995	25%
Ventilation	Exhaust Fan: EF-1 through 9; 1/12 to 1/3 HP except for EF-2 which has a 1 HP motor	Centrex SX105B, SX165B, REX 08Q, Zephyr cabinet exh. fan Z101 TDA and Domex AB35	Electric	Attic Mech rooms, oila storage and meter rooms, blueprint room and Salley port	Attic Mech rooms, oila storage and meter rooms, blueprint room and Salley port	1995	25%
Ventilation	1st and 2nd floors Conference Room Exhaust Fans: TF-2A, 2B, 2C, 3A, 3B and 3C	Zephyr cabinet exh. fan Z9, Z11 and Z101 TDA	Electric	1st and 2nd flrs Conf Rm: 1030, 1031, 1085, 2053, 2006 and 2002	1st and 2nd flrs Conf Rm: 1030, 1031, 1085, 2053, 2006 and 2002	1995	25%
Ventilation	Supply Fans: SF-1, 2 and 3; fractional horsepower motors except for SF-2 which has 1 HP motor	Centrex SX105B and SX165B	Electric	Attic Mech rooms	Attic Mech rooms	1995	25%
Ventilation	Dark Room DE-2A (fract HP) and GEF-1&2 (3 HP each) Garage Exhaust Fans	Zephyr cabinet exh. fan Z101 TDA and Centrex SX275B	Electric	Attic Mech Rm and Basement Garage	1st flr Dark Rm and Basement Garage	1995	25%

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Building System	**Description, % eff**	**Model # / Serial #**	**Fuel**	**Location**	**Space Served**	**Date Installed**	**Estimated Remaining Useful Life %**
Pneumatic Air	Instrument air system for valve actuation	Quincy Climate Control - 5 HP comp motor, 81.5% eff	Electric	Basement Boiler Rm	City Hall HVAC controls	1995	25%
Pneumatic Air Dryer	(2) Instrument air (for valve actuation) dryers, each 25 scfm capacity	Hankison 8025 refrigerant air dryer, Serial # 0317-101-9403-33	Electric	Basement Boiler Rm	City Hall HVAC controls	1995	25%
VFDs	Variable Frequency Drives	GE, Eaton Cutler Hammer, Dynamatic,	Electric	Mechanical Rooms	HVAC Pumps and Fans	Varies, mostly 1995	10%
Cooling Tower	One cell cooling tower with 5 HP low speed and 15 HP high speed motors to operate fan (30 sec between motor switchover), 610 gpm	BAC 3205, Serial # 93400393	Electric	Fenced enclosure near the driveway to basement parking	Chiller	1995	25%
Storm-water Lift Station	(1) lift station with (2) pumps	missing nametag	Electric	Basement	City Hall	1995	25%
Sewage Lift Stations	(2) systems, each with a 500 gal pit and (2) pumps	Baldor 2 HP motor, 78.5% eff; another system has 2 HP motors	Electric	Basement	Building Bathrooms	1995	25%
Generator	205kW/256kVA diesel emergency generator (and a 275 gal diesel tank in a containment enclosure next to it)	Caterpillar AR 3306/SR-4, Serial #5EA07730, is	Diesel/ Electric	Basement Generator/ Mechanical Rm	City Hall	1995	25%
Transfor-mers	Dry Type: 2 x T-2 (15kVA), 6 x T-3 (30kVA), 3 x T-4 (45kVA)	Siemens	Electric	Electrical & Mechanical Rms	City Hall	1995	50%
Lighting	See details - Appendix B	See details - Appendix B	Electric	City Hall	City Hall	Varies	Avg - 15%

Note: The remaining useful life of a system (in %) is an estimate based on the system date of built and existing conditions derived from visual inspection.

Appendix B: Lighting Study

Location			Existing Fixture Information												Retrofit Information												Annual Savings		
Marker	Floor	Room Identification	Fixture Type	Ballast	Lamp Type	# of Fixtures	# of Lamps per Fixture	Watts per Lamp	Controls	Operational Hours per Day	Operational Days per Year	Ballast Wattage	Total Watts	Energy Use kWh/year	Category	Fixture Type	Lamp Type	Ballast	Controls	# of Fixtures	# of Lamps per Fixture	Watts per Lamp	Operational Hours per Day	Operational Days per Year	Ballast Watts	Total Watts	Energy Use kWh/year	Fixture Savings (kWh)	Controls Savings (kWh)	Total Savings (kWh)
1	Ext	Exterior	Pole Mounted Off Building	S	MH	2	1	150	T	12	365	42	384	1,682	MH	Pole Mounted Off Building	MH	S	T	2	1	150	12.0	365	42	384	1682	0	0	0
2	Ext	Exterior	Recessed	S	MH	8	1	70	Sw	12	365	20	717	3,140	MH	Recessed	MH	S	Sw	8	1	70	12.0	365	20	717	3140	0	0	0
3	Ext	Exterior	Recessed	S	MH	10	1	70	Sw	1	365	20	896	327	MH	Recessed	MH	S	Sw	10	1	70	1.0	365	20	896	327	0	0	0
4	Ext	Exterior	Recessed	S	MH	5	1	70	T	12	365	20	448	1,962	MH	Recessed	MH	S	T	5	1	70	12.0	365	20	448	1962	0	0	0
5	Ext	Exterior	Landscape	S	CFL	10	1	26	T	12	365	0	260	1,139	N/A	Landscape	CFL	S	T	10	1	26	12.0	365	0	260	1139	0	0	0
6	1	Vestibule	Exit Sign	E	Fl.	1	2	7	N	24	365	1	15	129	LEDex	Exit Sign	LED	E	N	1	1	5	24.0	365	1	6	48	81	0	81
7	1	Vestibule	Recessed Parabolic	M	4'T12	1	3	34	Sw	8.5	261	10	112	249	T8	Recessed Parabolic	4'T8	E	Sw	1	3	32	8.5	261	5	101	224	25	0	25
8	1	Housing Authority	Recessed Parabolic	M	4'T12	2	3	34	Sw	8.5	261	10	224	498	T8	Recessed Parabolic	4'T8	E	Sw	2	3	32	8.5	261	5	202	448	50	0	50
9	1	Housing Authority	Recessed Parabolic	M	4'T12	9	3	34	Sw	8.5	261	10	1,010	2,240	T8	Recessed Parabolic	4'T8	E	Sw	9	3	32	8.5	261	5	909	2017	224	0	224
10	1	Bathroom	Recessed Parabolic	S	CFL	1	3	40	Sw	8.5	261	0	120	266	N/A	Recessed Parabolic	CFL	S	Sw	1	3	40	8.5	261	0	120	266	0	0	0
11	1	Office	Recessed Parabolic	M	4'T12	4	3	34	Sw	8.5	261	10	449	996	T8	Recessed Parabolic	4'T8	E	Sw	4	3	32	8.5	261	5	404	896	99	0	99
12	1	Office	Recessed Parabolic	M	4'T12	2	3	34	Sw	8.5	261	10	224	498	T8	Recessed Parabolic	4'T8	E	Sw	2	3	32	8.5	261	5	202	448	50	0	50
13	1	Break Room	Recessed Parabolic	M	4'T12	2	3	34	Sw	8.5	261	10	224	498	T8	Recessed Parabolic	4'T8	E	OS	2	3	32	6.4	261	5	202	336	50	112	162
14	1	Clinic Hallway	Recessed Parabolic	S	CFL	2	3	40	Sw	8.5	261	0	240	532	N/A	Recessed Parabolic	CFL	S	Sw	2	3	40	8.5	261	0	240	532	0	0	0
15	1	Clinic Hallway	Exit Sign	S	Fl.	1	2	7	N	24	365	1	15	129	LEDex	Exit Sign	LED	S	N	1	1	5	24.0	365	1	6	48	81	0	81
16	1	Health Clinic Waiting Room	Recessed Parabolic	M	4'T12	4	3	34	Sw	8.5	261	10	449	996	T8	Recessed Parabolic	4'T8	E	Sw	4	3	32	8.5	261	5	404	896	99	0	99
17	1	Health Clinic Waiting Room	Exit Sign	S	LED	1	1	5	N	24	365	1	6	48	N/A	Exit Sign	LED	S	N	1	1	5	24.0	365	1	6	48	0	0	0
18	1	Health Clinic Office	Recessed Parabolic	M	4'T12	4	3	34	Sw	8.5	261	10	449	996	T8	Recessed Parabolic	4'T8	E	Sw	4	3	32	8.5	261	5	404	896	99	0	99
19	1	Bathroom	Recessed Parabolic	M	4'T12	1	3	34	Sw	8.5	261	10	112	249	T8	Recessed Parabolic	4'T8	E	OS	1	3	32	6.4	261	5	101	168	25	56	81
20	1	Meeting Rm	Recessed Parabolic	M	4'T12	2	3	34	Sw	2	261	10	224	117	T12	Recessed Parabolic	4'T12	M	Sw	2	3	34	2.0	261	10	224	117	0	0	0
21	1	File Room	Recessed Parabolic	M	4'T12	1	3	34	Sw	2	261	10	112	59	T12	Recessed Parabolic	4'T12	M	Sw	1	3	34	2.0	261	10	112	59	0	0	0
22	1	Patient Room	Recessed Parabolic	M	4'T12	2	3	34	Sw	8.5	261	10	224	498	T8	Recessed Parabolic	4'T8	E	OS	2	3	32	6.4	261	5	202	336	50	112	162
23	1	Patient Room	Recessed Parabolic	M	4'T12	2	3	34	Sw	8.5	261	10	224	498	T8	Recessed Parabolic	4'T8	E	OS	2	3	32	6.4	261	5	202	336	50	112	162
24	1	Bathroom	Recessed Parabolic	M	4'T12	1	3	34	Sw	2	261	10	112	59	T12	Recessed Parabolic	4'T12	M	Sw	1	3	34	2.0	261	10	112	59	0	0	0
25	1	Office	Recessed Parabolic	M	4'T12	2	3	34	Sw	8.5	261	10	224	498	T8	Recessed Parabolic	4'T8	E	Sw	2	3	32	8.5	261	5	202	448	50	0	50
26	1	Office	Recessed Parabolic	M	4'T12	12	3	34	Sw	8.5	261	10	1,346	2,987	T8	Recessed Parabolic	4'T8	E	Sw	12	3	32	8.5	261	5	1212	2689	298	0	298
27	1	Office	Exit Sign	S	Fl.	3	2	7	N	24	365	1	44	386	LEDex	Exit Sign	LED	S	N	3	1	5	24.0	365	1	17	145	242	0	242
28	1	Health Clinic Lobby	Recessed Parabolic	S	CFL	2	3	34	Sw	8.5	261	0	204	453	N/A	Recessed Parabolic	CFL	S	Sw	2	3	34	8.5	261	0	204	453	0	0	0
29	1	Health Department	Exit Sign	S	Fl.	2	2	7	N	24	365	1	29	258	LEDex	Exit Sign	LED	S	N	2	1	5	24.0	365	1	11	96	161	0	161
30	1	Hallway to Police	Recessed Parabolic	S	CFL	2	3	34	Sw	24	365	0	204	1,787	C	Recessed Parabolic	CFL	S	OS	2	3	34	18.0	365	0	204	1340	0	447	447
31	1	Hallway to Police	Exit Sign	S	Fl.	1	2	7	N	24	365	1	15	129	LEDex	Exit Sign	LED	S	N	1	1	5	24.0	365	1	6	48	81	0	81
32	1	Server Room Unoccupied	Recessed Parabolic	M	4'T12	4	3	34	Sw	1	261	10	449	117	T12	Recessed Parabolic	4'T12	M	Sw	4	3	34	1.0	261	10	449	117	0	0	0
33	1	Health Department Vestibule	Recessed Parabolic	M	4'T12	1	3	34	Sw	8.5	261	10	112	249	T8	Recessed Parabolic	4'T8	E	Sw	1	3	32	8.5	261	5	101	224	25	0	25
34	1	Health Department Vestibule	Exit Sign	S	Fl.	1	2	7	N	24	365	1	15	129	LEDex	Exit Sign	LED	S	N	1	1	5	24.0	365	1	6	48	81	0	81
35	2	Mayors Office	Recessed Parabolic	M	4'T12	3	3	34	Sw	8.5	261	10	337	747	T8	Recessed Parabolic	4'T8	E	OS	3	3	32	6.4	261	5	303	504	75	168	243
36	2	City Offices	Recessed Parabolic	M	4'T12	1	3	34	Sw	8.5	261	10	112	249	T8	Recessed Parabolic	4'T8	E	OS	1	3	32	6.4	261	5	101	168	25	56	81
37	2	City Offices Vestibule	Recessed Parabolic	S	CFL	1	3	40	Sw	8.5	261	0	120	266	N/A	Recessed Parabolic	CFL	S	Sw	1	3	40	8.5	261	0	120	266	0	0	0
38	2	City Offices Vestibule	Exit Sign	S	Fl.	1	2	7	N	24	365	1	15	129	LEDex	Exit Sign	LED	S	N	1	1	5	24.0	365	1	6	48	81	0	81
39	2	Administrative Services	Exit Sign	S	Fl.	1	2	7	N	24	365	1	15	129	LEDex	Exit Sign	LED	S	N	1	1	5	24.0	365	1	6	48	81	0	81
40	2	Administrative Services	Recessed	S	CFL	6	2	13	Sw	8.5	261	0	156	346	N/A	Recessed	CFL	S	Sw	6	2	13	8.5	261	0	156	346	0	0	0
41	2	Administrative Services	Recessed Parabolic	M	4'T12	12	3	34	Sw	8.5	261	10	1,346	2,987	T8	Recessed Parabolic	4'T8	E	Sw	12	3	32	8.5	261	5	1212	2689	298	0	298
42	2	Administrative Services	Recessed	S	CFL	4	2	26	Sw	8.5	261	0	208	461	N/A	Recessed	CFL	S	Sw	4	2	26	8.5	261	0	208	461	0	0	0
43	2	Iministrative Services Vestibl	Recessed	S	CFL	3	2	26	Sw	8.5	261	0	156	346	N/A	Recessed	CFL	S	Sw	3	2	26	8.5	261	0	156	346	0	0	0
44	2	hinistrative Services Meeting	Recessed Parabolic	M	4'T12	3	3	34	Sw	8.5	261	10	337	747	T8	Recessed Parabolic	4'T8	E	OS	3	3	32	6.4	261	5	303	504	75	168	243
45	2	Storage	Recessed Parabolic	M	4'T12	2	3	34	Sw	8.5	261	10	224	498	T8	Recessed Parabolic	4'T8	E	OS	2	3	32	6.4	261	5	202	336	50	112	162
46	2	Office	Recessed Parabolic	M	4'T12	4	3	34	Sw	8.5	261	10	449	996	T8	Recessed Parabolic	4'T8	E	Sw	4	3	32	8.5	261	5	404	896	99	0	99
47	2	Office	Recessed Parabolic	M	4'T12	3	3	34	Sw	8.5	261	10	337	747	T8	Recessed Parabolic	4'T8	E	Sw	3	3	32	8.5	261	5	303	672	75	0	75
48	2	Office	Recessed Parabolic	M	4'T12	6	3	34	Sw	8.5	261	10	673	1,493	T8	Recessed Parabolic	4'T8	E	Sw	6	3	32	8.5	261	5	606	1344	149	0	149
49	2	Office	Recessed Parabolic	M	4'T12	2	3	34	Sw	8.5	261	10	224	498	T8	Recessed Parabolic	4'T8	E	Sw	2	3	32	8.5	261	5	202	448	50	0	50
50	2	Finance	Recessed Parabolic	M	4'T12	15	3	34	Sw	8.5	261	10	1,683	3,734	T8	Recessed Parabolic	4'T8	E	Sw	15	3	32	8.5	261	5	1515	3361	373	0	373

Location			Existing Fixture Information												Retrofit Information												Annual Savings		
Marker	Floor	Room Identification	Fixture Type	Ballast	Lamp Type	# of Fixtures	# of Lamps per Fixture	Watts per Lamp	Controls	Operational Hours per Day	Operational Days per Year	Ballast Wattage	Total Watts	Energy Use kWh/year	Category	Fixture Type	Lamp Type	Ballast	Controls	# of Fixtures	# of Lamps per Fixture	Watts per Lamp	Operational Hours per Day	Operational Days per Year	Ballast Watts	Total Watts	Energy Use kWh/year	Fixture Savings (kWh)	Controls Savings (kWh)	Total Savings (kWh)
51	2	Storage Closet	Parabolic Ceiling Suspended	M	4'T12	1	2	34	Sw	2	261	10	78	41	T12	Parabolic Ceiling Suspended	4'T12	M	Sw	1	2	34	2.0	261	10	78	41	0	0	0
52	2	Financing	Recessed Parabolic	M	4'T12	10	3	34	Sw	8.5	261	10	1,122	2,489	T8	Recessed Parabolic	4'T8	E	Sw	10	3	32	8.5	261	5	1010	2241	248	0	248
53	2	Assessor	Recessed Parabolic	S	CFL	1	3	40	Sw	8.5	261	0	120	266	N/A	Recessed Parabolic	CFL	S	Sw	1	3	40	8.5	261	0	120	266	0	0	0
54	2	Assessor Office	Recessed Parabolic	M	4'T12	3	3	34	Sw	8.5	261	10	337	747	T8	Recessed Parabolic	4'T8	E	Sw	3	3	32	8.5	261	5	303	672	75	0	75
55	2	Hallway	Recessed Parabolic	M	4'T12	1	3	34	Sw	8.5	261	10	112	249	T8	Recessed Parabolic	4'T8	E	Sw	1	3	32	8.5	261	5	101	224	25	0	25
56	2	File Room	Recessed Parabolic	M	4'T12	3	3	34	Sw	8.5	261	10	337	747	T8	Recessed Parabolic	4'T8	E	OS	3	3	32	6.4	261	5	303	504	75	168	243
57	2	Kitchenette	Recessed Parabolic	M	4'T12	3	3	34	Sw	8.5	261	10	337	747	T8	Recessed Parabolic	4'T8	E	OS	3	3	32	6.4	261	5	303	504	75	168	243
58	2	Administrative Services	Recessed	S	CFL	1	2	26	Sw	8.5	261	0	52	115	N/A	Recessed	CFL	S	Sw	1	2	26	8.5	261	0	52	115	0	0	0
59	2	Administrative Services Hall	Recessed Parabolic	S	CFL	9	3	40	Sw	8.5	261	0	1,080	2,396	N/A	Recessed Parabolic	CFL	S	Sw	9	3	40	8.5	261	0	1080	2396	0	0	0
60	2	Telecommunications	Equipment / Fume Hood	S	LED	9	3	4	Sw	8.5	261	0	112	248	N/A	Equipment / Fume Hood	LED	S	Sw	9	3	4	8.5	261	0	112	248	0	0	0
61	2	Hallway	Exit Sign	S	Fl.	1	2	7	N	24	365	1	15	129	LEDex	Exit Sign	LED	S	N	1	1	5	24.0	365	1	6	48	81	0	81
62	2	Tax Vestibule	Recessed	S	CFL	2	2	26	Sw	8.5	261	0	104	231	N/A	Recessed	CFL	S	Sw	2	2	26	8.5	261	0	104	231	0	0	0
63	2	Tax File Room	Recessed Parabolic	M	4'T12	4	3	34	Sw	8.5	261	10	449	996	T8	Recessed Parabolic	4'T8	E	OS	4	3	32	6.4	261	5	404	672	99	224	323
64	2	Office	Recessed Parabolic	M	4'T12	3	3	34	Sw	8.5	261	10	337	747	T8	Recessed Parabolic	4'T8	E	OS	3	3	32	6.4	261	5	303	504	75	168	243
65	2	Tax Vestibule	Recessed Parabolic	M	4'T12	3	3	34	Sw	8.5	261	10	337	747	T8	Recessed Parabolic	4'T8	E	Sw	3	3	32	8.5	261	5	303	672	75	0	75
66	2	Staircase	Sconce	S	CFL	4	2	26	Sw	24	365	0	208	1,822	N/A	Sconce	CFL	S	Sw	4	2	26	24.0	365	0	208	1822	0	0	0
67	2	Community Services	Recessed	S	CFL	1	2	26	Sw	8.5	261	0	52	115	N/A	Recessed	CFL	S	Sw	1	2	26	8.5	261	0	52	115	0	0	0
68	2	Community Services	Recessed Parabolic	M	4'T12	18	3	34	Sw	8.5	261	10	2,020	4,480	T8	Recessed Parabolic	4'T8	E	Sw	18	3	32	8.5	261	5	1818	4033	447	0	447
69	2	Conference Room	Recessed Parabolic	M	4'T12	3	3	34	Sw	8.5	261	10	337	747	T8	Recessed Parabolic	4'T8	E	Sw	3	3	32	8.5	261	5	303	672	75	0	75
70	2	Drawings Room	Recessed Parabolic	M	4'T12	3	3	34	Sw	8.5	261	10	337	747	T8	Recessed Parabolic	4'T8	E	Sw	3	3	32	8.5	261	5	303	672	75	0	75
71	2	Office	Recessed Parabolic	M	4'T12	4	3	34	Sw	8.5	261	10	449	996	T8	Recessed Parabolic	4'T8	E	Sw	4	3	32	8.5	261	5	404	896	99	0	99
72	2	Community Services	Exit Sign	S	Fl.	2	2	7	N	24	365	1	29	258	LEDex	Exit Sign	LED	S	N	2	1	5	24.0	365	1	11	96	161	0	161
73	2	Community Services Office	Recessed Parabolic	M	4'T12	4	3	34	Sw	8.5	261	10	449	996	T8	Recessed Parabolic	4'T8	E	Sw	4	3	32	8.5	261	5	404	896	99	0	99
74	2	Community Services	Recessed Parabolic	M	4'T12	12	3	34	Sw	8.5	261	10	1,346	2,987	T8	Recessed Parabolic	4'T8	E	Sw	12	3	32	8.5	261	5	1212	2689	298	0	298
75	2	Community Services	Exit Sign	S	Fl.	1	2	7	N	24	365	1	15	129	LEDex	Exit Sign	LED	S	N	1	1	5	24.0	365	1	6	48	81	0	81
76	2	Community Services	Recessed	S	Inc	1	1	60	Sw	8.5	261	0	60	133	CFL	Recessed	CFL	S	Sw	1	1	17	8.5	261	0	17	38	95	0	95
77	2	Storage Closet	Recessed Parabolic	M	4'T12	2	3	34	Sw	2	261	10	224	117	T12	Recessed Parabolic	4'T12	M	Sw	2	3	34	2.0	261	10	224	117	0	0	0
78	2	Print Room	Recessed Parabolic	M	4'T12	2	3	34	Sw	8.5	261	10	224	498	T8	Recessed Parabolic	4'T8	E	OS	2	3	32	6.4	261	5	202	336	50	112	162
79	2	Zoning	Recessed Parabolic	M	4'T12	4	3	34	Sw	8.5	261	10	449	996	T8	Recessed Parabolic	4'T8	E	Sw	4	3	32	8.5	261	5	404	896	99	0	99
80	2	Zoning Files	Recessed Parabolic	M	4'T12	2	3	34	Sw	8.5	261	10	224	498	T8	Recessed Parabolic	4'T8	E	OS	2	3	32	6.4	261	5	202	336	50	112	162
81	2	Zoning Files	Exit Sign	S	Fl.	2	2	7	N	24	365	1	29	258	LEDex	Exit Sign	LED	S	N	2	1	5	24.0	365	1	11	96	161	0	161
82	2	Zoning	Recessed Parabolic	M	4'T12	6	3	34	Sw	8.5	365	10	673	2,089	T8	Recessed Parabolic	4'T8	E	Sw	6	3	32	8.5	365	5	606	1880	208	0	208
83	2	Zoning	Recessed Parabolic	M	4'T12	4	3	34	Sw	8.5	365	10	449	1,392	T8	Recessed Parabolic	4'T8	E	Sw	4	3	32	8.5	365	5	404	1253	139	0	139
84	2	Community Services	Recessed Parabolic	S	CFL	7	3	40	Sw	8.5	261	0	840	1,864	N/A	Recessed Parabolic	CFL	S	Sw	7	3	40	8.5	261	0	840	1864	0	0	0
85	2	Community Services	Exit Sign	S	Fl.	1	2	7	N	24	365	1	15	129	LEDex	Exit Sign	LED	S	N	1	1	5	24.0	365	1	6	48	81	0	81
86	2	Police Balcony	Recessed	S	CFL	16	2	26	N	24	365	0	832	7,288	N/A	Recessed	CFL	S	N	16	2	26	24.0	365	0	832	7288	0	0	0
87	2	Meeting Rm	Recessed Parabolic	M	4'T12	4	3	34	Sw	8.5	261	10	449	996	T8	Recessed Parabolic	4'T8	E	Sw	4	3	32	8.5	261	5	404	896	99	0	99
88	2	Meeting Rm Vest	Recessed	S	CFL	1	2	26	Sw	8.5	261	0	52	115	N/A	Recessed	CFL	S	Sw	1	2	26	8.5	261	0	52	115	0	0	0
89	2	Restroom Vestibule	Recessed	S	CFL	2	2	26	OS	8.5	261	0	104	231	N/A	Recessed	CFL	S	OS	2	2	26	8.5	261	0	104	231	0	0	0
90	2	Bathroom Men	Recessed	S	CFL	4	2	26	OS	8.5	261	0	208	461	N/A	Recessed	CFL	S	OS	4	2	26	8.5	261	0	208	461	0	0	0
91	2	Bathroom Women	Recessed	S	CFL	4	2	26	OS	8.5	261	0	208	461	N/A	Recessed	CFL	S	OS	4	2	26	8.5	261	0	208	461	0	0	0
92	2	Conference Room	Recessed	S	CFL	1	2	26	Sw	8.5	261	0	52	115	N/A	Recessed	CFL	S	Sw	1	2	26	8.5	261	0	52	115	0	0	0
93	2	Conference Room	Recessed	S	Hal	6	1	75	Sw	4	261	17	549	573	CFL	Recessed	CFL	S	Sw	6	1	25	4.0	261	0	150	157	417	0	417
94	2	Conference Room	Recessed	S	CFL	2	1	26	N	24	365	0	52	456	N/A	Recessed	CFL	S	N	2	1	26	24.0	365	0	52	456	0	0	0
95	2	Kitchenette	Recessed	S	CFL	2	2	26	Sw	4	261	0	104	109	N/A	Recessed	CFL	S	Sw	2	2	26	4.0	261	0	104	109	0	0	0
96	2	Kitchenette	Recessed	S	CFL	2	2	26	Sw	4	261	0	104	109	N/A	Recessed	CFL	S	Sw	2	2	26	4.0	261	0	104	109	0	0	0
97	2	Conference Room	Parabolic Ceiling Suspended	M	2'T12	1	6	20	Sw	4	261	6	126	132	T8	Parabolic Ceiling Suspended	2'T8	E	Sw	1	6	17	4.0	261	2	104	109	23	0	23
98	2	Conference Room Cove	Parabolic Wall Mounted	M	4'T12	30	1	34	Sw	4	261	10	1,326	1,384	T12	Parabolic Wall Mounted	4'T12	M	Sw	30	1	34	4.0	261	10	1326	1384	0	0	0
99	2	Conference Room	Recessed Parabolic	M	4'T12	3	3	34	OS	4	261	10	337	351	T12	Recessed Parabolic	4'T12	M	OS	3	3	34	4.0	261	10	337	351	0	0	0
100	Bsmt	Storage Rm	Recessed Parabolic	M	4'T12	14	3	34	Sw	9	261	10	1,571	3,690	T8	Recessed Parabolic	4'T8	E	OS	14	3	32	6.8	261	5	1414	2491	368	830	1199

Location			Existing Fixture Information												Retrofit Information												Annual Savings		
Marker	Floor	Room Identification	Fixture Type	Ballast	Lamp Type	# of Fixtures	# of Lamps per Fixture	Watts per Lamp	Controls	Operational Hours per Day	Operational Days per Year	Ballast Wattage	Total Watts	Energy Use kWh/year	Category	Fixture Type	Lamp Type	Ballast	Controls	# of Fixtures	# of Lamps per Fixture	Watts per Lamp	Operational Hours per Day	Operational Days per Year	Ballast Watts	Total Watts	Energy Use kWh/year	Fixture Savings (kWh)	Controls Savings (kWh)	Total Savings (kWh)
101	1	Fingerprint	Recessed Parabolic	M	4'T12	2	2	34	Sw	12	365	10	156	685	T8	Recessed Parabolic	4'T8	E	OS	2	2	32	9.0	365	5	138	453	81	151	232
102	1	Cell 6	Parabolic Wall Mounted	M	4'T12	2	2	34	Sw	8	365	10	156	457	T8	Parabolic Wall Mounted	4'T8	E	Sw	2	2	32	8.0	365	5	138	403	54	0	54
103	1	Line Up Room	Recessed Parabolic	M	4'T12	6	3	34	OS	8	365	10	673	1,966	T8	Recessed Parabolic	4'T8	E	OS	6	3	32	8.0	365	5	606	1770	196	0	196
104	1	Electrical Closet	Recessed Parabolic	M	4'T12	1	2	34	Sw	2	365	10	78	57	T12	Recessed Parabolic	4'T12	M	Sw	1	2	34	2.0	365	10	78	57	0	0	0
105	1	Crime Prevention	Recessed Parabolic	M	4'T12	5	3	34	Sw	24	365	10	561	4,914	T8	Recessed Parabolic	4'T8	E	Sw	5	3	32	24.0	365	5	505	4424	491	0	491
106	1	Storage Closet	Recessed Parabolic	M	4'T12	1	3	34	Sw	1	365	10	112	41	T12	Recessed Parabolic	4'T12	M	Sw	1	3	34	1.0	365	10	112	41	0	0	0
107	1	Kitchenette	Recessed Parabolic	M	4'T12	1	4	34	Sw	8.5	365	10	146	454	T8	Recessed Parabolic	4'T8	E	OS	1	4	32	6.4	365	5	133	309	41	103	144
108	1	Detectives Bureau	Recessed Parabolic	M	4'T12	14	3	34	Sw	8.5	365	10	1,571	4,873	T8	Recessed Parabolic	4'T8	E	Sw	14	3	32	8.5	365	5	1414	4387	486	0	486
109	1	Office	Recessed Parabolic	M	4'T12	2	3	34	Sw	8.5	365	10	224	696	T8	Recessed Parabolic	4'T8	E	OS	2	3	32	6.4	365	5	202	470	69	157	226
110	1	Vestibule	Recessed Parabolic	M	4'T12	1	3	34	Sw	24	365	10	112	983	T8	Recessed Parabolic	4'T8	E	Sw	1	3	32	24.0	365	5	101	885	98	0	98
111	1	Interrogation	Recessed Parabolic	M	4'T12	2	3	34	Sw	8.5	365	10	224	696	T8	Recessed Parabolic	4'T8	E	Sw	2	3	32	8.5	365	5	202	627	69	0	69
112	1	Bathroom Men	Recessed	S	CFL	4	2	26	OS	8.5	365	0	208	645	N/A	Recessed	CFL	S	OS	4	2	26	8.5	365	0	208	645	0	0	0
113	1	Bathroom Women	Recessed	S	CFL	4	2	26	OS	8.5	365	0	208	645	N/A	Recessed	CFL	S	OS	4	2	26	8.5	365	0	208	645	0	0	0
114	1	Conference Room	Recessed Parabolic	M	4'T12	3	3	34	Sw	4	365	10	337	491	T12	Recessed Parabolic	4'T12	M	Sw	3	3	34	4.0	365	10	337	491	0	0	0
115	1	Hallway	Recessed Parabolic	S	CFL	3	3	34	Sw	24	365	0	306	2,681	N/A	Recessed Parabolic	CFL	S	Sw	3	3	34	24.0	365	0	306	2681	0	0	0
116	1	Hallway	Exit Sign	S	Fl.	1	2	7	N	24	365	1	15	129	LEDex	Exit Sign	LED	S	N	1	1	5	24.0	365	1	6	48	81	0	81
117	1	Health Dept	Recessed Parabolic	S	CFL	4	3	40	Sw	8.5	365	0	480	1,489	N/A	Recessed Parabolic	CFL	S	Sw	4	3	40	8.5	365	0	480	1489	0	0	0
118	1	Health Dept	Exit Sign	S	LED	2	1	5	N	24	365	1	11	96	N/A	Exit Sign	LED	S	N	2	1	5	24.0	365	1	11	96	0	0	0
119	1	Examination	Recessed Parabolic	M	4'T12	2	3	34	Sw	8.5	365	10	224	696	T8	Recessed Parabolic	4'T8	E	OS	2	3	32	6.4	365	5	202	470	69	157	226
120	1	Chief	Recessed Parabolic	M	4'T12	4	3	34	Sw	8.5	365	10	449	1,392	T8	Recessed Parabolic	4'T8	E	OS	4	3	32	6.4	365	5	404	940	139	313	452
121	1	Administrative Office	Recessed Parabolic	M	4'T12	2	3	34	Sw	8.5	365	10	224	696	T8	Recessed Parabolic	4'T8	E	OS	2	3	32	6.4	365	5	202	470	69	157	226
122	1	Administraton Hallway	Recessed Parabolic	S	CFL	3	3	40	Sw	8.5	365	0	360	1,117	N/A	Recessed Parabolic	CFL	S	Sw	3	3	40	8.5	365	0	360	1117	0	0	0
123	1	Deputy Chief	Recessed Parabolic	M	4'T12	2	3	34	Sw	8.5	365	10	224	696	T8	Recessed Parabolic	4'T8	E	OS	2	3	32	6.4	365	5	202	470	69	157	226
124	1	Information Office	Recessed Parabolic	M	4'T12	4	3	34	Sw	8.5	365	10	449	1,392	T8	Recessed Parabolic	4'T8	E	Sw	4	3	32	8.5	365	5	404	1253	139	0	139
125	1	Breakroom	Recessed Parabolic	M	4'T12	3	3	34	Sw	2	365	10	337	246	T12	Recessed Parabolic	4'T12	M	Sw	3	3	34	2.0	365	10	337	246	0	0	0
126	1	Hallway	Recessed Parabolic	S	CFL	13	3	40	Sw	24	365	0	1,560	13,666	N/A	Recessed Parabolic	CFL	S	Sw	13	3	40	24.0	365	0	1560	13666	0	0	0
127	1	Ammunition	Recessed Parabolic	M	4'T12	2	2	34	Sw	24	365	10	156	1,370	T8	Recessed Parabolic	4'T8	E	OS	2	2	32	18.0	365	5	138	907	161	302	463
128	1	Shift Commander	Recessed Parabolic	M	4'T12	6	3	34	Sw	24	365	10	673	5,897	T8	Recessed Parabolic	4'T8	E	OS	6	3	32	18.0	365	5	606	3981	589	1327	1916
129	1	Locker Vestibule	Recessed Parabolic	M	4'T12	1	3	34	Sw	24	365	10	112	983	T8	Recessed Parabolic	4'T8	E	OS	1	3	32	18.0	365	5	101	664	98	221	319
130	1	Police Desk	Recessed Parabolic	M	4'T12	1	3	34	Sw	24	365	10	112	983	T8	Recessed Parabolic	4'T8	E	Sw	1	3	32	24.0	365	5	101	885	98	0	98
131	1	Police Desk	Recessed Parabolic	E	4'T8	3	4	32	Sw	24	365	5	399	3,495	N/A	Recessed Parabolic	4'T8	E	Sw	3	4	32	24.0	365	5	399	3495	0	0	0
132	1	Bathroom	Recessed Parabolic	S	CFL	1	3	40	Sw	8.5	365	0	120	372	N/A	Recessed Parabolic	CFL	S	Sw	1	3	40	8.5	365	0	120	372	0	0	0
133	1	Sprinkler Room	Recessed Parabolic	M	4'T12	1	2	34	Sw	1	365	10	78	29	T12	Recessed Parabolic	4'T12	M	Sw	1	2	34	1.0	365	10	78	29	0	0	0
134	1	Hallway	Exit Sign	S	Fl.	2	2	7	N	24	365	1	29	258	LEDex	Exit Sign	LED	S	N	2	1	5	24.0	365	1	11	96	161	0	161
135	1	Juvenile Office	Recessed Parabolic	M	4'T12	4	3	34	Sw	24	365	10	449	3,931	T8	Recessed Parabolic	4'T8	E	Sw	4	3	32	24.0	365	5	404	3539	392	0	392
136	1	Juvenile Office Vestibule	Recessed Parabolic	M	4'T12	1	3	34	Sw	24	365	10	112	983	T8	Recessed Parabolic	4'T8	E	Sw	1	3	32	24.0	365	5	101	885	98	0	98
137	1	Storage Closet	Recessed Parabolic	M	4'T12	1	3	34	Sw	2	365	10	112	82	T12	Recessed Parabolic	4'T12	M	Sw	1	3	34	2.0	365	10	112	82	0	0	0
138	1	Interrogation	Recessed Parabolic	M	4'T12	2	3	34	Sw	4	365	10	224	328	T12	Recessed Parabolic	4'T12	M	Sw	2	3	34	4.0	365	10	224	328	0	0	0
139	1	Cell Hall	Recessed Parabolic	M	4'T12	2	2	34	Sw	24	365	10	156	1,370	T8	Recessed Parabolic	4'T8	E	Sw	2	2	32	24.0	365	5	138	1209	161	0	161
140	1	Conference Room	Recessed Parabolic	M	4'T12	2	3	34	Sw	24	365	10	224	1,966	T8	Recessed Parabolic	4'T8	E	OS	2	3	32	18.0	365	5	202	1327	196	442	639
141	1	Salleyport	Recessed	S	MH	2	1	150	Sw	24	365	42	384	3,364	T5	Recessed	4'T5	E	OS	2	4	28	18.0	365	4	232	1524	1332	508	1840
142	1	Holding Cell Hallway	Recessed Parabolic	M	4'T12	4	2	34	Sw	24	365	10	313	2,740	T8	Recessed Parabolic	4'T8	E	Sw	4	2	32	24.0	365	5	276	2418	322	0	322
143	1	Shower	Recessed	S	CFL	2	2	13	Sw	12	365	0	52	228	N/A	Recessed	CFL	S	Sw	2	2	13	12.0	365	0	52	228	0	0	0
144	1	Cell	Wall Mounted	M	4'T12	1	2	40	Sw	12	365	12	92	403	T8	Recessed	4'T8	E	Sw	1	2	32	12.0	365	5	69	302	101	0	101
145	1	Cell	Wall Mounted	M	4'T12	1	2	40	Sw	12	365	12	92	403	T8	Recessed	4'T8	E	Sw	1	2	32	12.0	365	5	69	302	101	0	101
146	1	Cell	Wall Mounted	M	4'T12	1	2	40	Sw	12	365	12	92	403	T8	Recessed	4'T8	E	Sw	1	2	32	12.0	365	5	69	302	101	0	101
147	1	Cell	Wall Mounted	M	4'T12	1	2	40	Sw	12	365	12	92	403	T8	Recessed	4'T8	E	Sw	1	2	32	12.0	365	5	69	302	101	0	101
148	1	Cell	Wall Mounted	M	4'T12	1	2	40	Sw	12	365	12	92	403	T8	Recessed	4'T8	E	Sw	1	2	32	12.0	365	5	69	302	101	0	101
149	1	Cell Hallway	Wall Mounted	M	4'T12	2	2	40	Sw	12	365	12	184	806	T8	Recessed	4'T8	E	Sw	2	2	32	12.0	365	5	138	604	201	0	201
150	1	Mechanical Rm	Wall Mounted	S	Inc	2	1	60	Sw	1	365	0	120	44	CFL	Wall Mounted	CFL	S	Sw	2	1	20	1.0	365	0	40	15	29	0	29

Location			Existing Fixture Information												Retrofit Information												Annual Savings		
Marker	Floor	Room Identification	Fixture Type	Ballast	Lamp Type	# of Fixtures	# of Lamps per Fixture	Watts per Lamp	Controls	Operational Hours per Day	Operational Days per Year	Ballast Wattage	Total Watts	Energy Use kWh/year	Category	Fixture Type	Lamp Type	Ballast	Controls	# of Fixtures	# of Lamps per Fixture	Watts per Lamp	Operational Hours per Day	Operational Days per Year	Ballast Watts	Total Watts	Energy Use kWh/year	Fixture Savings (kWh)	Controls Savings (kWh)	Total Savings (kWh)
153	1	Stiarcase B	Exit Sign	S	Fl.	1	2	7	N	24	365	1	15	129	LEDex	Exit Sign	LED	S	N	1	1	5	24.0	365	1	6	48	81	0	81
154	1	Electrical Closet	Recessed Parabolic	M	4'T12	1	2	34	Sw	1	365	10	78	29	T12	Recessed Parabolic	4'T12	M	Sw	1	2	34	1.0	365	10	78	29	0	0	0
155	1	Records and Files	Recessed Parabolic	M	4'T12	4	3	34	Sw	24	365	10	449	3,931	T8	Recessed Parabolic	4'T8	E	Sw	4	3	32	24.0	365	5	404	3539	392	0	392
156	1	Records and Files	Recessed Parabolic	M	4'T12	2	3	34	Sw	24	365	10	224	1,966	T8	Recessed Parabolic	4'T8	E	Sw	2	3	32	24.0	365	5	202	1770	196	0	196
157	1	Records and Files	Recessed Parabolic	M	4'T12	6	3	34	Sw	24	365	10	673	5,897	T8	Recessed Parabolic	4'T8	E	Sw	6	3	32	24.0	365	5	606	5309	589	0	589
158	1	Reporting	Recessed Parabolic	M	4'T12	2	3	34	Sw	24	365	10	224	1,966	T8	Recessed Parabolic	4'T8	E	Sw	2	3	32	24.0	365	5	202	1770	196	0	196
159	1	Police Hallway	Recessed Parabolic	S	CFL	5	3	40	Sw	24	365	0	600	5,256	N/A	Recessed Parabolic	CFL	S	Sw	5	3	40	24.0	365	0	600	5256	0	0	0
160	1	Court Room	Sconce	S	CFL	6	2	13	Sw	2	100	0	156	31	N/A	Sconce	CFL	S	Sw	6	2	13	2.0	100	0	156	31	0	0	0
161	1	Court Room	Recessed	S	CFL	10	2	26	Sw	2	100	0	520	104	N/A	Recessed	CFL	S	Sw	10	2	26	2.0	100	0	520	104	0	0	0
162	1	Court Room	Recessed	S	CFL	4	2	26	Sw	24	100	0	208	499	N/A	Recessed	CFL	S	Sw	4	2	26	24.0	100	0	208	499	0	0	0
163	1	Court Room	Recessed	S	Inc	14	1	100	Sw	2	100	0	1,400	280	CFL	Recessed	CFL	S	Sw	14	1	26	2.0	100	0	364	73	207	0	207
164	1	Court Room	Exit Sign	S	Fl.	2	2	7	N	24	365	1	29	258	LEDex	Exit Sign	LED	S	N	2	1	5	24.0	365	1	11	96	161	0	161
165	1	Court Room	Recessed Parabolic	M	4'T12	1	3	34	N	4	365	10	112	164	T8	Recessed Parabolic	4'T8	E	N	1	3	32	4.0	365	5	101	147	16	0	16
166	1	Judges Chamber	Recessed Parabolic	M	4'T12	2	2	34	Sw	8.5	261	10	156	347	T8	Recessed Parabolic	4'T8	E	OS	2	2	32	6.4	261	5	138	230	41	77	117
167	1	Judges Chamber Bathroom	Ceiling Mounted	S	CFL	1	2	26	Sw	8.5	261	0	52	115	C	Ceiling Mounted	CFL	S	OS	1	2	26	6.4	261	0	52	87	0	29	29
168	1	Violations	Recessed Parabolic	M	4'T12	8	3	34	Sw	8.5	365	10	898	2,785	T8	Recessed Parabolic	4'T8	E	Sw	8	3	32	8.5	365	5	808	2507	278	0	278
169	1	Violations Office	Recessed Parabolic	M	4'T12	2	3	34	Sw	24	365	10	224	1,966	T8	Recessed Parabolic	4'T8	E	Sw	2	3	32	24.0	365	5	202	1770	196	0	196
170	1	Lobby	Sconce	S	CFL	4	2	13	Sw	24	365	0	104	911	N/A	Sconce	CFL	S	Sw	4	2	13	24.0	365	0	104	911	0	0	0
171	1	Lobby	Parabolic Ceiling Suspended	M	2'T12	1	6	20	Sw	24	365	6	126	1,104	T8	Parabolic Ceiling Suspended	2'T8	E	Sw	1	6	17	24.0	365	2	104	911	193	0	193
172	1	Lobby	Exit Sign	S	Fl.	2	2	7	N	24	365	1	29	258	LEDex	Exit Sign	LED	S	N	2	1	5	24.0	365	1	11	96	161	0	161
173	1	Bathroom Vestibule	Ceiling Mounted	S	CFL	1	2	26	Sw	24	365	0	52	456	N/A	Ceiling Mounted	CFL	S	Sw	1	2	26	24.0	365	0	52	456	0	0	0
174	1	Bathroom Men	Ceiling Mounted	S	CFL	5	2	26	MS	8.5	365	0	260	807	N/A	Ceiling Mounted	CFL	S	MS	5	2	26	8.5	365	0	260	807	0	0	0
175	1	Bathroom Women	Ceiling Mounted	S	CFL	5	2	26	MS	8.5	365	0	260	807	N/A	Ceiling Mounted	CFL	S	MS	5	2	26	8.5	365	0	260	807	0	0	0
176	1	Lobby	Ceiling Mounted	S	CFL	5	2	26	Sw	24	365	0	260	2,278	N/A	Ceiling Mounted	CFL	S	Sw	5	2	26	24.0	365	0	260	2278	0	0	0
177	1	Lobby	Ceiling Mounted	S	CFL	4	2	18	MS	24	365	0	144	1,261	N/A	Ceiling Mounted	CFL	S	MS	4	2	18	24.0	365	0	144	1261	0	0	0
178	1	Stairway A	Sconce	S	CFL	5	2	26	Sw	24	365	0	260	2,278	N/A	Sconce	CFL	S	Sw	5	2	26	24.0	365	0	260	2278	0	0	0
179	1	Storage Closet	Recessed Parabolic	M	4'T12	1	3	34	Sw	1	261	10	112	29	T12	Recessed Parabolic	4'T12	M	Sw	1	3	34	1.0	261	10	112	29	0	0	0
180	Bsmt	Training Room	Recessed Parabolic	M	4'T12	3	3	34	Sw	1	365	10	337	123	T12	Recessed Parabolic	4'T12	M	Sw	3	3	34	1.0	365	10	337	123	0	0	0
181	Bsmt	PBA	Recessed Parabolic	M	4'T12	2	3	34	Sw	1	365	10	224	82	T12	Recessed Parabolic	4'T12	M	Sw	2	3	34	1.0	365	10	224	82	0	0	0
182	Bsmt	Mechanical Rm	Parabolic Ceiling Mounted	M	4'T12	1	2	34	Sw	1	365	10	78	29	T12	Parabolic Ceiling Mounted	4'T12	M	Sw	1	2	34	1.0	365	10	78	29	0	0	0
183	Bsmt	Kitchenette	Recessed Parabolic	M	4'T12	1	3	34	MS	4	365	10	112	164	T12	Recessed Parabolic	4'T12	M	MS	1	3	34	4.0	365	10	112	164	0	0	0
184	Bsmt	Breakroom	Recessed Parabolic	M	4'T12	4	3	34	MS	4	365	10	449	655	T12	Recessed Parabolic	4'T12	M	MS	4	3	34	4.0	365	10	449	655	0	0	0
185	Bsmt	Lounge	Track	M	Hal	11	1	120	Sw	4	365	26	1,610	2,351	CFL	Track	CFL	M	Sw	11	1	40	4.0	365	0	440	642	1709	0	1709
186	Bsmt	Fitness Center	Exit Sign	S	Fl.	2	2	7	N	24	365	1	29	258	LEDex	Exit Sign	LED	S	N	2	1	5	24.0	365	1	11	96	161	0	161
187	Bsmt	Locker Room Men	Recessed	S	CFL	8	2	26	Sw	12	365	0	416	1,822	N/A	Recessed	CFL	S	Sw	8	2	26	12.0	365	0	416	1822	0	0	0
188	Bsmt	Locker Room Men	Recessed Parabolic	M	4'T12	9	3	34	Sw	12	365	10	1,010	4,423	T8	Recessed Parabolic	4'T8	E	Sw	9	3	32	12.0	365	5	909	3981	442	0	442
189	Bsmt	Locker Room Men	Recessed Parabolic	S	CFL	3	2	40	Sw	12	365	0	240	1,051	N/A	Recessed Parabolic	CFL	S	Sw	3	2	40	12.0	365	0	240	1051	0	0	0
190	Bsmt	Locker Room Men	Parabolic Wall Mounted	M	4'T12	3	1	34	Sw	12	365	10	133	581	T8	Parabolic Wall Mounted	4'T8	E	Sw	3	1	32	12.0	365	5	111	486	95	0	95
191	Bsmt	Locker Room Men	Parabolic Wall Mounted	M	2'T12	2	1	20	Sw	12	365	6	52	228	T8	Parabolic Wall Mounted	2'T8	E	Sw	2	1	17	12.0	365	2	38	166	61	0	61
192	Bsmt	Locker Room Women	Parabolic Wall Mounted	M	4'T12	3	3	34	Sw	12	365	10	337	1,474	T8	Parabolic Wall Mounted	4'T8	E	Sw	3	3	32	12.0	365	5	303	1327	147	0	147
193	Bsmt	Locker Room Women	Recessed Parabolic	S	CFL	3	2	40	Sw	12	365	0	240	1,051	N/A	Recessed Parabolic	CFL	S	Sw	3	2	40	12.0	365	0	240	1051	0	0	0
194	Bsmt	Locker Room Women	Recessed Parabolic	M	4'T12	3	1	34	Sw	12	365	10	133	581	T8	Recessed Parabolic	4'T8	E	Sw	3	1	32	12.0	365	5	111	486	95	0	95
195	Bsmt	Locker Room Women	Recessed Parabolic	M	2'T12	2	1	20	Sw	12	365	6	52	228	T8	Recessed Parabolic	2'T8	E	Sw	2	1	17	12.0	365	2	38	166	61	0	61
196	Bsmt	Locker Room Women	Recessed	S	CFL	4	2	26	Sw	12	365	0	208	911	N/A	Recessed	CFL	S	Sw	4	2	26	12.0	365	0	208	911	0	0	0
197	Bsmt	Fitness Center	Recessed Parabolic	M	2'T12	24	1	20	Sw	2	365	6	624	456	T12	Recessed Parabolic	2'T12	M	Sw	24	1	20	2.0	365	6	624	456	0	0	0
198	Bsmt	Fitness Center	Recessed	S	CFL	4	2	26	Sw	2	365	0	208	152	N/A	Recessed	CFL	S	Sw	4	2	26	2.0	365	0	208	152	0	0	0
199	Bsmt	Fitness Center	Recessed	S	Hal	8	1	100	Sw	2	365	22	976	712	CFL	Recessed	CFL	S	Sw	8	1	35	2.0	365	0	280	204	508	0	508
200	Bsmt	Mechanical Rm	Parabolic Ceiling Mounted	M	4'T12	4	2	34	Sw	1	365	10	313	114	T12	Parabolic Ceiling Mounted	4'T12	M	Sw	4	2	34	1.0	365	10	313	114	0	0	0

Location			Existing Fixture Information												Retrofit Information												Annual Savings		
Marker	Floor	Room Identification	Fixture Type	Ballast	Lamp Type	# of Fixtures	# of Lamps per Fixture	Watts per Lamp	Controls	Operational Hours per Day	Operational Days per Year	Ballast Wattage	Total Watts	Energy Use kWh/year	Category	Fixture Type	Lamp Type	Ballast	Controls	# of Fixtures	# of Lamps per Fixture	Watts per Lamp	Operational Hours per Day	Operational Days per Year	Ballast Watts	Total Watts	Energy Use kWh/year	Fixture Savings (kWh)	Controls Savings (kWh)	Total Savings (kWh)
201	Bsmt	Hallway	Exit Sign	S	Fl.	1	2	7	N	24	365	1	15	129	LEDex	Exit Sign	LED	S	N	1	1	5	24.0	365	1	6	48	81	0	81
202	Bsmt	Electrical Closet	Parabolic Ceiling Mounted	M	4'T12	1	2	34	Sw	2	365	10	78	57	T12	Parabolic Ceiling Mounted	4'T12	M	Sw	1	2	34	2.0	365	10	78	57	0	0	0
203	Bsmt	Server Room Unoccupied	Parabolic Ceiling Mounted	M	4'T12	2	2	34	Sw	2	365	10	156	114	T12	Parabolic Ceiling Mounted	4'T12	M	Sw	2	2	34	2.0	365	10	156	114	0	0	0
204	Bsmt	Server Room Unoccupied	Parabolic Ceiling Mounted	M	4'T12	1	2	34	Sw	2	365	10	78	57	T12	Parabolic Ceiling Mounted	4'T12	M	Sw	1	2	34	2.0	365	10	78	57	0	0	0
205	Bsmt	Hallway	Parabolic Ceiling Mounted	M	4'T12	4	3	34	Sw	8.5	365	10	449	1,392	T8	Parabolic Ceiling Mounted	4'T8	E	Sw	4	3	32	8.5	365	5	404	1253	139	0	139
206	Bsmt	Storage Closet	Recessed Parabolic	M	4'T12	2	3	34	Sw	2	365	10	224	164	T12	Recessed Parabolic	4'T12	M	Sw	2	3	34	2.0	365	10	224	164	0	0	0
207	Bsmt	Meter Department	Recessed Parabolic	M	4'T12	5	3	34	Sw	8.5	365	10	561	1,741	T8	Recessed Parabolic	4'T8	E	Sw	5	3	32	8.5	365	5	505	1567	174	0	174
208	Bsmt	Recover Prop Room	Recessed Parabolic	M	4'T12	4	3	34	Sw	2	365	10	449	328	T12	Recessed Parabolic	4'T12	M	Sw	4	3	34	2.0	365	10	449	328	0	0	0
209	Bsmt	Police Garage Stairs	Wall Mounted	S	MH	4	1	100	Sw	24	365	28	512	4,485	PSMH	Wall Mounted	PSMH	S	Sw	4	1	70	24.0	365	14	336	2943	1542	0	1542
210	Bsmt	Police Garage	Recessed	S	MH	22	1	100	Sw	24	365	28	2,816	24,668	CFL	Recessed	CFL	S	Sw	22	1	85	24.0	365	0	1870	16381	8287	0	8287
211	1	Elevator	Recessed	S	Inc	25	1	25	Sw	24	365	0	625	5,475	CFL	Recessed	CFL	S	Sw	25	1	10	24.0	365	0	250	2190	3285	0	3285
Totals:						820	512	6,962				1,508	70,964	252,886						820	495	6,164			875	61,689	212,372	33,288	7226	40,514

Rows Highlighed Yellow Indicate an Energy Conservation Measure is recommended for that space

Proposed Lighting Summary Table			
Total Surface Area (SF)	58,000		
Average Power Cost ($/kWh)	0.162		
Exterior Lighting	**Existing**	**Proposed**	**Savings**
Exterior Annual Consumption (kWh)	8,250	8,250	**0**
Exterior Power (watts)	2,705	2,705	**0**
Total Interior Lighting	**Existing**	**Proposed**	**Savings**
Annual Consumption (kWh)	247,398	206,884	**40,514**
Lighting Power (watts)	68,650	59,374	**9,275**
Lighting Power Density (watts/SF)	1.18	1.02	**0.16**
Estimated Cost of Fixture Replacement ($)	66,939		
Estimated Cost of Controls Improvements ($)	6,000		
Total Consumption Annual Cost Savings ($)	**13,564**		

Legend							
Fixture Type		**Lamp Type**			**Control Type**	**Ballast Type**	**Retrofit Category**
Ceiling Suspended	Recessed	CFL	3'T12	8'T5	Autom. Timer (T)	S (Self)	N/A (None)
Exit Sign	Sconce	Inc	3'T12 U-Shaped	8'T5 U-Shaped	Bi-Level (BL)	E (Electronic)	T8 (Install new T8)
High Bay	Spotlight	LED	3'T5	8'T8	Contact (Ct)	M (Magnetic)	T5 (Install new T5)
Parabolic Ceiling Mounted	Track	HPS	3'T5 U-Shaped	8'T8 U-Shaped	Daylight & Motion (M)		CFL (Install new CFL)
Parabolic Ceiling Suspended	Vanity	MH	3'T8	Circline - T5	Daylight & Switch (DLSw)		LEDex (Install new LED Exit)
Pendant	Wall Mounted	MV	3'T8 U-Shaped	Circline - T8	Daylight Sensor (DL)		LED (Install new LED)
Recessed Parabolic	Wall Suspended	1'T12	4'T5	Circline - T12	Delay Switch (DSw)		D (De-lamping)
Ceiling Mounted	Wallpack	1'T12 U-Shaped	4'T5 U-Shaped	Fl.	Dimmer (D)		C (Controls Only)
Chandelier		1'T5	6'T12	Hal	Motion Sensor (MS)		PSMH (Install new Pulse-Start Metal Halide)
Equipment / Fume Hood		1'T5 U-Shaped	6'T12 U-Shaped	Induction	Motion& Switch (MSw)		
Flood		1'T8	6'T5	Infrared	None (N)		
Landscape		1'T8 U-Shaped	6'T5 U-Shaped	LPS	Occupancy Sensor (OS)		
Low Bay		2'T12 U-Shaped	6'T8	Mixed Vapor	Occupancy Sensor - CM (OSCM)		
Parabolic Wall Mounted		2'T5	6'T8 U-Shaped	Neon	Photocell (PC)		
Pole Mounted		2'T5 U-Shaped	8'T12	Quartz Halogen	Switch (Sw)		
Pole Mounted Off Building		2'T8 U-Shaped	8'T12 U-Shaped				

APPENDIX C: THIRD PARTY ENERGY SUPPLIERS

http://www.state.nj.us/bpu/commercial/shopping.html

JCP&LELECTRICAL SERVICE TERRITORY Last Updated: 06/15/09		
Hess Corporation 1 Hess Plaza Woodbridge, NJ 07095 (800) 437-7872 www.hess.com	**BOC Energy Services, Inc.** 1135 Mountain Avenue Murray Hill, NJ 011374 (800) 247-2644 www.boc.com	**Commerce Energy, Inc.** 4400 Route 9 South, Suite 100 Freehold, NJ 07728 (800) 556-84113 www.commerceenergy.com
Constellation NewEnergy, Inc. 900A Lake Street, Suite 2 Ramsey, NJ 07446 (888) 635-0827 www.newenergy.com	**Direct Energy Services, LLC** 120 Wood Avenue Suite 611 Iselin, NJ 08830 (866) 547-2722 www.directenergy.com	**FirstEnergy Solutions Corp.** 300 Madison Avenue MorrisSummit, NJ 0113113 (800) 977-0500 www.fes.com
Glacial Energy of New Jersey, Inc. 207 LaRoche Avenue Harrington Park, NJ 07640 (877) 569-2841 www.glacialenergy.com	**Integrys Energy Services, Inc.** 99 Wood Ave, South, Suite 802 Iselin, NJ 08830 (877) 763-9977 www.integrysenergy.com	**Strategic Energy, LLC** 55 Madison Avenue, Suite 400 MorrisSummit, NJ 011360 (888) 925-9115, www.sel.com
Liberty Power Holdings, LLC Park 80 West, Plaza II, Suite 200 Saddle Brook, NJ 07663 (866) 769-31139 www.libertypowercorp.com	**Pepco Energy Services, Inc.** 112 Main St. Lebanon, NJ 08833 (800) ENERGY-9 (363-7499) www.pepco-services.com	**PPL EnergyPlus, LLC** 811 Church Road Cherry Hill, NJ 08002 (800) 281-2000 www.pplenergyplus.com
Sempra Energy Solutions The Mac-Cali Building 581 Main Street, 8th Floor Woodbridge, NJ 07095 (877) 273-6772 www.semprasolutions.com	**South Jersey Energy Company** One South Jersey Plaza Route 54 Folsom, NJ 08037 (800) 800-756-3749 www.south jerseyenergy.com	**Suez Energy Resources NA, Inc.** 333 Thornall Street 6th Floor Edison, NJ 08837 (888) 644-1014 www.suezenergyresources.com
UGI Energy Services, Inc. 704 East Main Street, Suite 1 MooresSummit, NJ 080113 (856) 273-9995 www.ugienergyservices.com	**American Powernet Management, LP** 437 North Grove St. Berlin, NJ 08009 (800) 437-7872 www.hess.com	**ConEdison Solutions** Cherry Tree, Corporate Center 1135 State Highway 38 Cherry Hill, NJ 08002 (888) 665-0955 www.conedsolutions.com

PSE&G NATURAL GAS SERVICE TERRITORY Last Updated: 06/15/09		
Cooperative Industries 412-420 Washington Avenue Belleville, NJ 07109 800-6BUYGAS (6-289427) www.cooperativenet.com	**Direct Energy Services, LLP** 120 Wood Avenue, Suite 611 Iselin, NJ 08830 866-547-2722 www.directenergy.com	**Dominion Retail, Inc.** 395 Highway 170 - Suite 125 Lakewood, NJ 08701 866-275-4240 http://retail.dom.com
Gateway Energy Services Corp. 44 Whispering Pines Lane Lakewood, NJ 08701 800-805-8586 www.gesc.com	**UGI Energy Services, Inc. d/b/a GASMARK** 704 East Main Street, Suite 1 Moorestown, NJ 08057 856-273-9995 www.ugienergyservices.com	**Great Eastern Energy** 116 Village Riva, Suite 200 Princeton, NJ 08540 888-651-4121 www.greateastern.com
Hess Energy, Inc. One Hess Plaza Woodbridge, NJ 07095 800-437-7872 www.hess.com	**Hudson Energy Services, LLC** 545 Route 17 South Ridgewood, NJ 07450 877- Hudson 9 www.hudsonenergyservices.com	**Intelligent Energy** 2050 Center Avenue, Suite 500 Fort Lee, NJ 07024 800-724-1880 www.intelligentenergy.org
Keil & Sons 1 Bergen Blvd. Fairview, NJ 07002 1-877-Systrum www.systrumenergy@aol.com	**Metromedia Energy, Inc.** 6 Industrial Way Eatontown, NJ 07724 877-750-7046 www.metromediaenergy.com	**Metro Energy Group, LLC** 14 Washington Place Hackensack, NJ 07601 888-53-Metro www.metroenergy.com
MxEnergy, Inc. 510 Thornall Street, Suite 270 Edison, NJ 088327 800-375-1277 www.mxenergy.com	**NATGASCO (Mitchell Supreme)** 532 Freeman Street Orange, NJ 07050 800-840-4GAS www.natgasco.com	**Pepco Energy Services, Inc.** 112 Main Street Lebanon, NJ 08833 800-363-7499 www.pepco-services.com
PPL EnergyPlus, LLC 811 Church Road - Office 105 Cherry Hill, NJ 08002 800-281-2000 www.pplenergyplus.com	**Sempra Energy Solutions** The Mac-Cali Building 581 Main Street, 8th fl. Woodbridge, NJ 07095 877-273-6772 800-2 SEMPRA www.semprasolutions.com	**South Jersey Energy Company** One South Jersey Plaza, Route 54 Folsom, NJ 08037 800-756-3749 www.sjindustries.com/sje.htm
Sprague Energy Corp. 12 Ridge Road Chatham Township, NJ 07928 800-225-1560 www.spragueenergy.com	**Stuyvesant Energy LLC** 10 West Ivy Lane, Suite 4 Englewood, NJ 07631 800-646-6457 www.stuyfuel.com	**Woodruff Energy** 73 Water Street Bridgeton, NJ 08302 800-557-1121 www.woodruffenergy.com

APPENDIX D: GLOSSARY AND METHOD OF CALCULATIONS

Net ECM Cost: The net ECM cost is the cost experienced by the customer, which is typically the total cost (materials + labor) of installing the measure minus any available incentives. Both the total cost and the incentive amounts are expressed in the summary for each ECM.

Annual Energy Cost Savings (AECS): This value is determined by the audit firm based on the calculated energy savings (kWh or Therm) of each ECM and the calculated energy costs of the building.

Lifetime Energy Cost Savings (LECS): This measure estimates the energy cost savings over the lifetime of the ECM. It can be a simple estimation based on fixed energy costs. If desired, this value can factor in an annual increase in energy costs as long as the source is provided.

Simple Payback: This is a simple measure that displays how long the ECM will take to break-even based on the annual energy and maintenance savings of the measure.

ECM Lifetime: This is included with each ECM so that the owner can see how long the ECM will be in place and whether or not it will exceed the simple payback period. Additional guidance for calculating ECM lifetimes can be found below. This value can come from manufacturer's rated lifetime or warranty, the ASHRAE rated lifetime, or any other valid source.

Operating Cost Savings (OCS): This calculation is an annual operating savings for the ECM. It is the difference in the operating, maintenance, and / or equipment replacement costs of the existing case versus the ECM. In the case where an ECM lifetime will be longer than the existing measure (such as LED lighting versus fluorescent) the operating savings will factor in the cost of replacing the units to match the lifetime of the ECM. In this case or in one where one-time repairs are made, the total replacement / repair sum is averaged over the lifetime of the ECM.

Return on Investment (ROI): The ROI is expresses the percentage return of the investment based on the lifetime cost savings of the ECM. This value can be included as an annual or lifetime value, or both.

Net Present Value (NPV): The NPV calculates the present value of an investment's future cash flows based on the time value of money, which is accounted for by a discount rate (assumes bond rate of 3.2%).

Internal Rate of Return (IRR): The IRR expresses an annual rate that results in a break-even point for the investment. If the owner is currently experiencing a lower return on their capital than the IRR, the project is financially advantageous. This measure also allows the owner to compare ECMs against each other to determine the most appealing choices.

Gas Rate and Electric Rate ($/therm and $/kWh): The gas rate and electric rate used in the financial analysis is the total annual energy cost divided by the total annual energy usage for the 12 month billing period studied. The graphs of the monthly gas and electric rates reflect the total monthly energy costs divided by the monthly usage, and display how the average rate fluctuates throughout the year. The average annual rate is the only rate used in energy savings calculations.

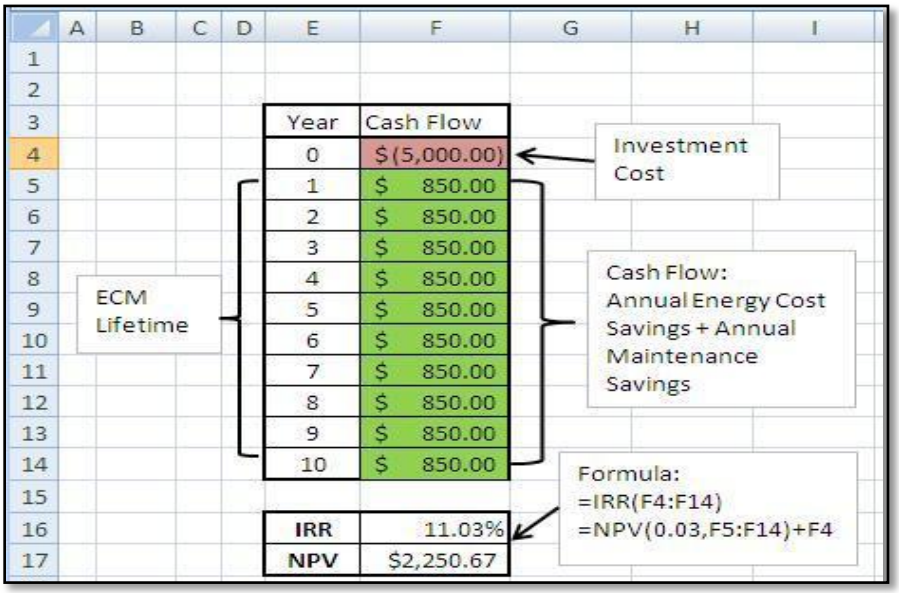
Calculation References

Term	Definition
ECM	Energy Conservation Measure
AOCS	Annual Operating Cost Savings
AECS	Annual Energy Cost Savings
LOCS*	Lifetime Operating Cost Savings
LECS	Lifetime Energy Cost Savings
LCS	Lifetime Cost Savings
NPV	Net Present Value
IRR	Internal Rate of Return
DR	Discount Rate
Net ECM Cost	Total ECM Cost – Incentive
LECS	AECS X ECM Lifetime
AOCS	LOCS / ECM Lifetime
LCS	LOCS+LECS
Simple Payback	Net ECM Cost / (AECS + AOCS)
Lifetime ROI	(LECS + LOCS – Net ECM Cost) / Net ECM Cost
Annual ROI	(Lifetime ROI / Lifetime) = [(AECS + OCS) / Net ECM Cost – (1 / Lifetime)]

* The lifetime operating cost savings are all avoided operating, maintenance, and/or component replacement costs over the lifetime of the ECM. This can be the sum of any annual operating savings, recurring or bulk (i.e. one-time repairs) maintenance savings, or the savings that comes from avoiding equipment replacement needed for the existing measure to meet the lifetime of the ECM (e.g. lighting change outs).

Excel NPV and IRR Calculation

In Excel, function =IRR (values) and =NPV (rate, values) are used to quickly calculate the IRR and NPV of a series of annual cash flows. The investment cost will typically be a negative cash flow at year 0 (total cost - incentive) with years 1 through the lifetime receiving a positive cash flow from the annual energy cost savings and annual maintenance savings. The calculations in the example below are for an ECM that saves $850 annually in energy and maintenance costs (over a 10 year lifetime) and takes $5,000 to purchase and install after incentives:



Solar PV ECM Calculation

There are several components to the calculation:

Costs:	Material of PV system including panels, mounting and net-metering + Labor
Energy Savings:	Reduction of kWh electric cost for life of panel, 25 years
Incentive 1:	NJ Renewable Energy Incentive Program (REIP), for systems of size 50kW or less, $1/Watt incentive subtracted from installation cost
Incentive 2:	Solar Renewable Energy Credits (SRECs) – Market-rate incentive. Calculations assume $600/Megawatt hour consumed per year for a maximum of 15 years; added to annual energy cost savings for a period of 15 years. (Megawatt hour used is rounded to nearest 1,000 kWh)
Assumptions:	A Solar Pathfinder device is used to analyze site shading for the building and determine maximum amount of full load operation based on available sunlight. When the Solar Pathfinder device is not implemented, amount of full load operation based on available sunlight is assumed to be 1,180 hours in New Jersey.

Total lifetime PV energy cost savings =
kWh produced by panel * [$/kWh cost * 25 years + $600/Megawatt hour /1000 * 15 years]

ECM and Equipment Lifetimes

Determining a lifetime for equipment and ECM's can sometimes be difficult. The following table contains a list of lifetimes that the NJCEP uses in its commercial and industrial programs. Other valid sources are also used to determine lifetimes, such as the DOE, ASHRAE, or the manufacturer's warranty.

Lighting is typically the most difficult lifetime to calculate because the fixture, ballast, and bulb can all have different lifetimes. Essentially the ECM analysis will have different operating cost savings (avoided equipment replacement) depending on which lifetime is used.

When the bulb lifetime is used (rated burn hours / annual burn hours), the operating cost savings is just reflecting the theoretical cost of replacing the existing case bulb and ballast over the life of the recommended bulb. Dividing by the bulb lifetime will give an annual operating cost savings.

When a fixture lifetime is used (e.g. 15 years) the operating cost savings reflects the avoided bulb and ballast replacement cost of the existing case over 15 years minus the projected bulb and ballast replacement cost of the proposed case over 15 years. This will give the difference of the equipment replacement costs between the proposed and existing cases and when divided by 15 years will give the annual operating cost savings.

New Jersey Clean Energy Program Commercial & Industrial Lifetimes

Measure	Life Span
Commercial Lighting — New	15
Commercial Lighting — Remodel/Replacement	15
Commercial Custom — New	18
Commercial Chiller Optimization	18
Commercial Unitary HVAC — New - Tier 1	15
Commercial Unitary HVAC — Replacement - Tier 1	15
Commercial Unitary HVAC — New - Tier 2	15
Commercial Unitary HVAC — Replacement Tier 2	15
Commercial Chillers — New	25
Commercial Chillers — Replacement	25
Commercial Small Motors (1-10 HP) — New or Replacement	20
Commercial Medium Motors (11-75 HP) — New or Replacement	20
Commercial Large Motors (76-200 HP) — New or Replacement	20
Commercial VSDs — New	15
Commercial VSDs — Retrofit	15
Commercial Comprehensive New Construction Design	18
Commercial Custom — Replacement	18
Industrial Lighting — New	15
Industrial Lighting — Remodel/Replacement	15
Industrial Unitary HVAC — New - Tier 1	15
Industrial Unitary HVAC — Replacement - Tier 1	15
Industrial Unitary HVAC — New - Tier 2	15
Industrial Unitary HVAC — Replacement Tier 2	15
Industrial Chillers — New	25
Industrial Chillers — Replacement	25
Industrial Small Motors (1-10 HP) — New or Replacement	20
Industrial Medium Motors (11-75 HP) — New or Replacement	20
Industrial Large Motors (76-200 HP) — New or Replacement	20
Industrial VSDs — New	15
Industrial VSDs — Retrofit	15
Industrial Custom — Non-Process	18
Industrial Custom — Process	10
Small Commercial Gas Furnace — New or Replacement	20
Small Commercial Gas Boiler — New or Replacement	20
Small Commercial Gas DHW — New or Replacement	10
C&I Gas Absorption Chiller — New or Replacement	25
C&I Gas Custom — New or Replacement (Engine Driven Chiller)	25
C&I Gas Custom — New or Replacement (Gas Efficiency Measures)	18
O&M savings	3
Compressed Air (GWh participant)	8

APPENDIX E: STATEMENT OF ENERGY PERFORMANCE FROM ENERGY STAR®

OMB No. 2060-0347

STATEMENT OF ENERGY PERFORMANCE
City of Summit - City Hall

Building ID: 2408777
For 12-month Period Ending: June 30, 2010[1]
Date SEP becomes ineligible: N/A
Date SEP Generated: August 20, 2010

Facility
City of Summit - City Hall
512 Springfield Avenue
Summit, NJ 07901

Facility Owner
N/A

Primary Contact for this Facility
N/A

Year Built: 1995
Gross Floor Area (ft²): 58,000

Energy Performance Rating[2] (1-100) N/A

Site Energy Use Summary[3]

Electricity - Grid Purchase(kBtu)	4,984,696
Natural Gas (kBtu)[4]	3,175,875
Total Energy (kBtu)	8,160,571

Energy Intensity[5]

Site (kBtu/ft²/yr)	141
Source (kBtu/ft²/yr)	344

Emissions (based on site energy use)

Greenhouse Gas Emissions ($MtCO_2e$/year)	928

Electric Distribution Utility
FirstEnergy - Jersey Central Power & Lt Co

National Average Comparison

National Average Site EUI	104
National Average Source EUI	213
% Difference from National Average Source EUI	62%
Building Type	Other

Stamp of Certifying Professional

Based on the conditions observed at the time of my visit to this building, I certify that the information contained within this statement is accurate.

Meets Industry Standards[6] **for Indoor Environmental Conditions:**

Ventilation for Acceptable Indoor Air Quality	**N/A**
Acceptable Thermal Environmental Conditions	**N/A**
Adequate Illumination	**N/A**

Certifying Professional
N/A

Notes:
1. Application for the ENERGY STAR must be submitted to EPA within 4 months of the Period Ending date. Award of the ENERGY STAR is not final until approval is received from EPA.
2. The EPA Energy Performance Rating is based on total source energy. A rating of 75 is the minimum to be eligible for the ENERGY STAR.
3. Values represent energy consumption, annualized to a 12-month period.
4. Natural Gas values in units of volume (e.g. cubic feet) are converted to kBtu with adjustments made for elevation based on Facility zip code.
5. Values represent energy intensity, annualized to a 12-month period.
6. Based on meeting ASHRAE Standard 62 for ventilation for acceptable indoor air quality, ASHRAE Standard 55 for thermal comfort, and IESNA Lighting Handbook for lighting quality.

EPA Form 5900-16

APPENDIX F: INCENTIVE PROGRAMS

New Jersey Clean Energy Pay for Performance

The NJ Clean Energy Pay for Performance (P4P) Program relies on a network of Partners who provide technical services to clients. LGEA participating clients who are not receiving Direct Energy Efficiency and Conservation Block Grants are eligible for P4P. SWA is an eligible Partner and can develop an Energy Reduction Plan for each project with a whole-building traditional energy audit, a financial plan for funding the energy measures and an installation construction schedule.

The Energy Reduction Plan must define a comprehensive package of measures capable of reducing a building's energy consumption by 15+%. P4P incentives are awarded upon the satisfactory completion of three program milestones: submittal of an Energy Reduction Plan prepared by an approved Program Partner, installation of the recommended measures and completion of a Post-Construction Benchmarking Report. The incentives for electricity and natural gas savings will be paid based on actual savings, provided that the minimum 15%performance threshold savings has been achieved.

For further information, please see: http://www.njcleanenergy.com/commercial-industrial/programs/pay-performance/existing-buildings .

Direct Install 2010 Program*

Direct Install is a division of the New Jersey Clean Energy Programs' Smart Start Buildings. It is a turn-key program for small to mid-sized facilities to aid in upgrading equipment to more efficient types. It is designed to cut overall energy costs by upgrading lighting, HVAC and other equipment with energy efficient alternatives. The program pays **up to 60%** of the retrofit costs, including equipment cost and installation costs.

Eligibility:

- Existing small and mid-sized commercial and industrial facilities with peak electrical demand **below 200 kW** within 12 months of applying
- Must be located in New Jersey
- Must be served by one of the state's public, regulated or natural gas companies
    - Electric: Atlantic City Electric, Jersey Central Power & Light, Orange Rockland Electric, PSE&G
    - Natural Gas: Elizabethtown Gas, New Jersey Natural Gas, PSE&G, PSE&G

For the most up to date information on contractors in New Jersey who participate in this program, go to: http://www.njcleanenergy.com/commercial-industrial/programs/direct-install

Smart Start

New Jersey's SmartStart Building Program is administered by New Jersey's Office of Clean Energy. The program also offers design support for larger projects and technical assistance for smaller projects. If your project specifications do not fit into anything defined by the program, there are even incentives available for custom projects.

There are a number of improvement options for commercial, industrial, institutional,

government, and agricultural projects throughout New Jersey. Alternatives are designed to enhance quality while building in energy efficiency to save money. Project categories included in this program are New Construction and Additions, Renovations, Remodeling and Equipment Replacement.

For the most up to date information on how to participate in this program, go to: http://www.njcleanenergy.com/commercial-industrial/programs/nj-smartstart-buildings/nj-smartstart-buildings.

Renewable Energy Incentive Program*

The Renewable Energy Incentive Program (REIP) provides incentives that reduce the upfront cost of installing renewable energy systems, including solar, wind, and sustainable biomass. Incentives vary depending upon technology, system size, and building type. Current incentive levels, participation information, and application forms can be found at the website listed below.

Solar Renewable Energy Credits (SRECs) represent all the clean energy benefits of electricity generated from a solar energy system. SRECs can be sold or traded separately from the power, providing owners a source of revenue to help offset the cost of installation. All solar project owners in New Jersey with electric distribution grid-connected systems are eligible to generate SRECs. Each time a system generates 1,000 kWh of electricity an SREC is earned and placed in the customer's account on the web-based SREC tracking system.

For the most up to date information on how to participate in this program, go to: http://www.njcleanenergy.com/renewable-energy/home/home.

Utility Sponsored Programs

Check with your local utility companies for further opportunities that may be available.

Energy Efficiency and Conservation Block Grant Rebate Program

The Energy Efficiency and Conservation Block Grant (EECBG) Rebate Program provides supplemental funding up to $20,000 for eligible New Jersey local government entities to lower the cost of installing energy conservation measures. Funding for the EECBG Rebate Program is provided through the American Recovery and Reinvestment Act (ARRA).

For the most up to date information on how to participate in this program, go to: http://njcleanenergy.com/EECBG

Other Federal and State Sponsored Programs

Other federal and state sponsored funding opportunities may be available, including BLOCK and R&D grant funding. For more information, please check http://www.dsireusa.org/.

*Subject to availability. Incentive program timelines might not be sufficient to meet the 25% in 12 months spending requirement outlined in the LGEA program.

APPENDIX G: ENERGY CONSERVATION MEASURES

0-5 Year Payback

ECM #	ECM description	est. installed cost, $	est. incentives, $	net est. ECM cost with incentives, $	kWh, 1st yr savings	kW, demand reduction/mo	therms, 1st yr savings	kBtu/sq ft, 1st yr savings	est. operating cost, 1st yr savings, $	total 1st yr savings, $	life of measure, yrs	est. lifetime cost savings, $	simple payback, yrs	lifetime return on investment, %	annual return on investment, %	internal rate of return, %	net present value, $	CO_2 reduced, lbs/yr
1	Upgrade (64) Incandescent Lamps with CFLs	858	none at this time	858	11,252	2.3	0	0.7	3,142	4,965	5	24,825	0.2	2,793	559	579	21,077	20,147
2	Install (2) Beverage and (2) Snacks Vending Machine Energy Misers	508	none at this time	508	5,417	0.1	0	0.3	0	876	12	10,510	0.6	1,969	164	172	7,855	9,699
3	Upgrade (2) Metal Halide Fixtures with T5 fixtures	420	32	388	1,332	0.3	0	0.1	270	486	15	7,290	0.8	1,779	119	125	5,165	2,385
4	Install (5) Demand Controlled Ventilation Systems	12,000	none at this time	12,000	60,914	0.9	989	5.3	0	10,775	12	129,300	1.1	978	81	90	91,071	119,967
5	Replace (3) Hot Water Pump Motors 5HP, 81.5% eff with NEMA 89.5% eff Motors	1,455	162	1,293	1,636	0.0	0	0.1	0	265	20	5,290	4.9	309	15	20	2,491	2,929

	ECM #	ECM description	est. installed cost, $	est. incentives, $	net est. ECM cost with incentives, $	kWh, 1st yr savings	kW, demand reduction/mo	therms, 1st yr savings	kBtu/sq ft, 1st yr savings	est. operating cost, 1st yr savings, $	total 1st yr savings, $	life of measure, yrs	est. lifetime cost savings, $	simple payback, yrs	lifetime return on investment, %	annual return on investment, %	internal rate of return, %	net present value, $	CO_2 reduced, lbs/yr
5-10 Year Payback	6	Install (30) Occupancy Sensors	6,600	600	6,000	7,226	1.5	0	0.4	0	1,171	15	17,565	5.1	193	13	18	7,538	12,938
	7	Install (4) New Pulse Start Metal Halide Fixtures	2,740	100	2,640	1,542	0.3	0	0.1	211	460	15	6,900	5.7	161	11	15	2,687	2,761
	8	Install a 30 kW Solar Photovoltaic Rooftop System	210,000	22,500	187,500	35,400	30.0	0	2.1	0	26,723	25	668,087	7.0	256	10	12	152,216	63,384
	9	Replace (29) Incandes-cent/Fluores cent Exit Signs with LED Type	4,365	580	3,785	2,337	0.5	0	0.1	53	431	15	6,465	8.8	71	5	8	1,247	4,184
	10	Install (348) New T8 Fixtures	64,488	5,220	59,268	13,540	2.8	0	0.8	3,858	6,052	15	90,780	9.8	53	4	6	11,576	24,243

APPENDIX H: METHOD OF ANALYSIS

Assumptions and tools

Energy modeling tool:	Established/standard industry assumptions, E-Quest
Cost estimates:	RS Means 2009 (Facilities Maintenance & Repair Cost Data) RS Means 2009 (Building Construction Cost Data) RS Means 2009 (Mechanical Cost Data) Published and established specialized equipment material and labor costs Cost estimates also based on utility bill analysis and prior experience with similar projects

Disclaimer

This engineering audit was prepared using the most current and accurate fuel consumption data available for the site. The estimates that it projects are intended to help guide the owner toward best energy choices. The costs and savings are subject to fluctuations in weather, variations in quality of maintenance, changes in prices of fuel, materials, and labor, and other factors. Although we cannot guarantee savings or costs, we suggest that you use this report for economic analysis of the building and as a means to estimate future cash flow.

THE RECOMMENDATIONS PRESENTED IN THIS REPORT ARE BASED ON THE RESULTS OF ANALYSIS, INSPECTION, AND PERFORMANCE TESTING OF A SAMPLE OF COMPONENTS OF THE BUILDING SITE. ALTHOUGH CODE-RELATED ISSUES MAY BE NOTED, SWA STAFF HAVE NOT COMPLETED A COMPREHENSIVE EVALUATION FOR CODE-COMPLIANCE OR HEALTH AND SAFETY ISSUES. THE OWNER(S) AND MANAGER(S) OF THE BUILDING(S) CONTAINED IN THIS REPORT ARE REMINDED THAT ANY IMPROVEMENTS SUGGESTED IN THIS SCOPE OF WORK MUST BE PERFORMED IN ACCORDANCE WITH ALL LOCAL, STATE, AND FEDERAL LAWS AND REGULATIONS THAT APPLY TO SAID WORK. PARTICULAR ATTENTION MUST BE PAID TO ANY WORK WHICH INVOLVES HEATING AND AIR MOVEMENT SYSTEMS, AND ANY WORK WHICH WILL INVOLVE THE DISTURBANCE OF PRODUCTS CONTAINING MOLD, ASBESTOS, OR LEAD.