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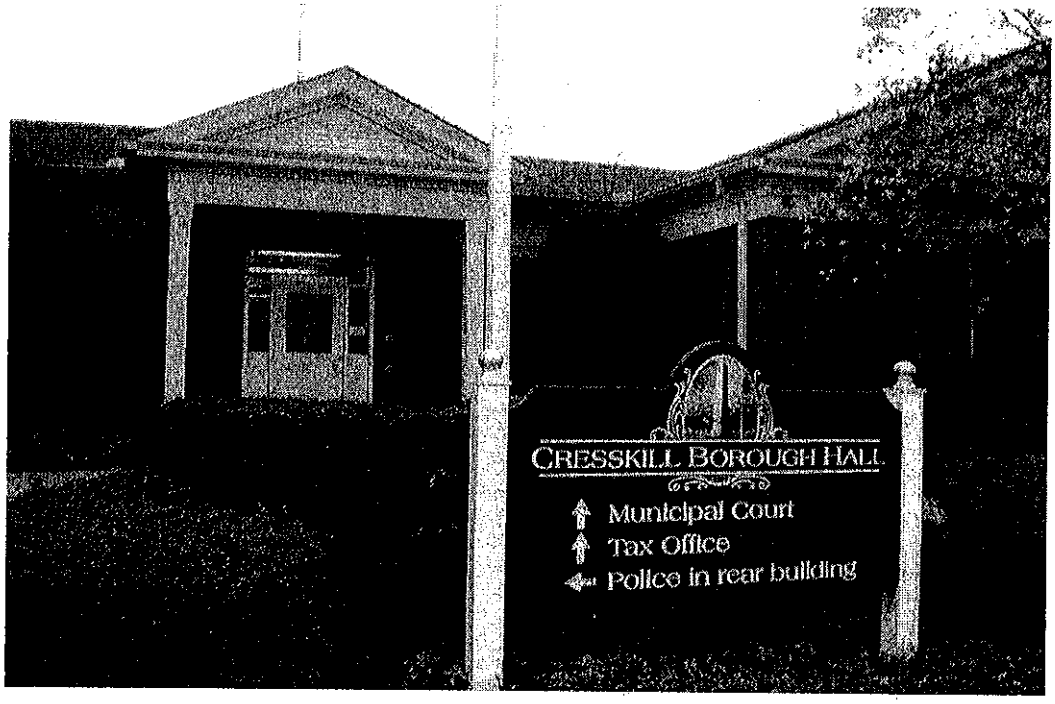
July 24, 2009

Local Government Energy Program
Energy audit report

For

Cresskill Borough Hall
Borough of Cresskill
Bergen County, NJ 07626

Project Number: LGEA06



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INTRODUCTION

On April 20th, 2009, Steven Winter Associates, Inc. (SWA) performed an energy audit and assessment of the Cresskill Borough Hall located in Bergen County, NJ. Current conditions and energy-related information were collected in order to analyze and facilitate the implementation of energy conservation measures for the building.

The Cresskill Borough Hall was built in 1980 and currently houses the Mayor's office, Borough administration offices as well as the Cresskill Police Department. The Cresskill Borough Hall building is one story and consists of a total floor area of 11,523 square feet. Typical occupancy is approximately 35 employees on any given day.

Energy data and building information collected in the field were analyzed to determine the baseline energy performance of each building. Using spreadsheet-based calculation methods, SWA estimated the energy and cost savings associated with the installation of each of the recommended energy conservation measures. The findings for the building is summarized in this report.

The goal of this energy audit is to provide sufficient information to make decisions regarding the implementation of the most appropriate and most cost effective energy conservation measures for the building.

EXECUTIVE SUMMARY

This document contains the energy audit report for the Cresskill Borough Hall located at 67 Union Ave., Cresskill, NJ 07626. Borough Hall is a one story building. Based on the field visit performed by Steven Winter Associates (SWA) staff on April 20th, 2009 and the results of a comprehensive energy analysis, this report describes the site's current conditions and recommendations for improvements. Suggestions for measures related to energy conservation and improved comfort are provided in the scope of work. Energy and resource savings are estimated for each measure that results in a reduction of heating, cooling, and electric usage.

In the most recent full year of data collected (March 18th, 2008 through March 18th, 2009), the Borough Hall building consumed approximately 189,360 kWh or $30,722 worth of electricity and 2,634 therms or $3,632 worth of natural gas. The average aggregated cost of electricity was calculated to be $0.16/kWh and the average aggregated cost of natural gas was calculated to be $1.58/therm. With electricity and gas combined, the building consumed 910 MMBtus of energy at a total cost of $34,354.

SWA benchmarked Cresskill Borough Hall using the U.S. Environmental Protection Agency's (EPA) *Energy Star Portfolio Manager* Energy benchmarking system. The Portfolio Manager generated a benchmark score of 35 for the building, when compared to a national average. The benchmark rating is based on the facility's source energy use, level of business activity, and geographical location. The Portfolio Manager is also capable of generating a site energy use intensity number using 2008 as a baseline year.

In order to compare commercial buildings equitably, the *Portfolio Manager* ratings convey the consumption of each type of energy in a single common unit. The EPA uses source energy to represent the total amount of raw fuel required to operate the building. The site energy use intensity for the Cresskill Borough Hall building is 81 kBtu/sq.ft/year. After energy efficiency improvements are made, future utility bills can be added to the Portfolio Manager and the site energy use intensity for a different time period can be compared to the year 2008 baseline to track the changes in energy consumption associated with the energy improvements.

SWA recommends a total of 2 Energy Conservation Measures (ECMs) for Cresskill Borough Hall. The total investment cost for these ECMs is **$77,720**. SWA estimates a first year savings of **$4,536** with a simple payback of **17.1 years**. SWA also estimates that Cresskill Borough Hall will be able to reduce their carbon footprint by **49,583 lbs of CO2 annually.**

There are various incentives that Cresskill Borough Hall could apply for that could also help lower the cost of installing the ECMs. SWA recommends that the Borough of Cresskill applies for the NJ SmartStart program through the New Jersey Office of Clean Energy. This incentive can help provide technical assistance for the building in the implementation phase of any energy conservation project.

When pursuing incentives through the SmartStart program, SWA encourages building managers to contact the program provider to obtain more detailed information on the program guidelines and request pre-approval for all planned upgrades. At the time of this report, gas furnaces would be eligible for an incentive of up to $400 per unit. Incentives for lighting vary but replacing T12 lighting with T8 lighting would be eligible for an incentive up to $30 per fixture and LED exit signs would be eligible for up to $20 per fixture.

For further information on both custom and prescriptive incentives, please visit:

http://www.njcleanenergy.com/commercial-industrial/programs/nj-smartstart-buildings/tools-and-resources/equipment-incentives/equi

The New Jersey Clean Energy website also provides information on an upcoming Direct-Install program that would be applicable to this project. The Direct-Install program is aimed at commercial buildings with an average

annual demand of less than 200kW. This program is designed to offset up to 80% of the cost of replacing equipment nearing the end of its useful lifecycle with high efficiency alternatives. This program could help offset the cost of replacing the entire heating system. This program has not officially been released but can be follow online at:

http://www.njcleanenergy.com/commercial-industrial/programs/programs

The following table summarizes the proposed Energy Conservation Measures (ECM) and their economical relevance.

SCOPE OF WORK – SUMMARY TABLE

ECM Table without Incentives

		Installed Cost		1st year energy savings									Lifetime		
ECM#	ECM description	Estimated $	Source	Electric Savings (kWh)	Unit	Natural Gas Savings (therms)	Unit	Demand	Unit	$ Savings/year	SPP	LoM	Cost Savings	ROI	Annual Carbon Reduction (lbs of CO2)
1	Replace five (5) hot air furnaces	$ 42,500	RSMeans	-	kWh	176	therms	-	kW	$ 278	152.8	25	$ 6,952	-3.3%	1,940
2	Upgrade existing lighting	$ 35,220	RSMeans	26,609	kWh	-	therms	3.0	kW	$ 4,257	8.3	20	$ 85,149	7.1%	47,643
Total	**Total Scope of Work**	**$ 77,720**	-	**26,609**	-	176		3.0	-	**$ 4,536**	**17.1**		**$ 92,101**		**49,583**

Definitions:

SPP: Simple Payback (years)
LoM: Life of Measure (years)
ROI: Return on Investment (%)

Assumptions:

Discount rate:	3.2%	per DOE FEMP guidelines	Average Electric Rate =	0.16	$/kWh	Carbon Dioxide per unit Electricity =	1.7905	lbs of CO2/kWh
Energy price escalation rate:	0%	per DOE FEMP guidelines	Average Natural Gas Rate =	1.58	$/therm	Carbon Dioxide per unit Nat.l Gas =	11.023	lbs of CO2/therm

1. HISTORIC ENERGY CONSUMPTION

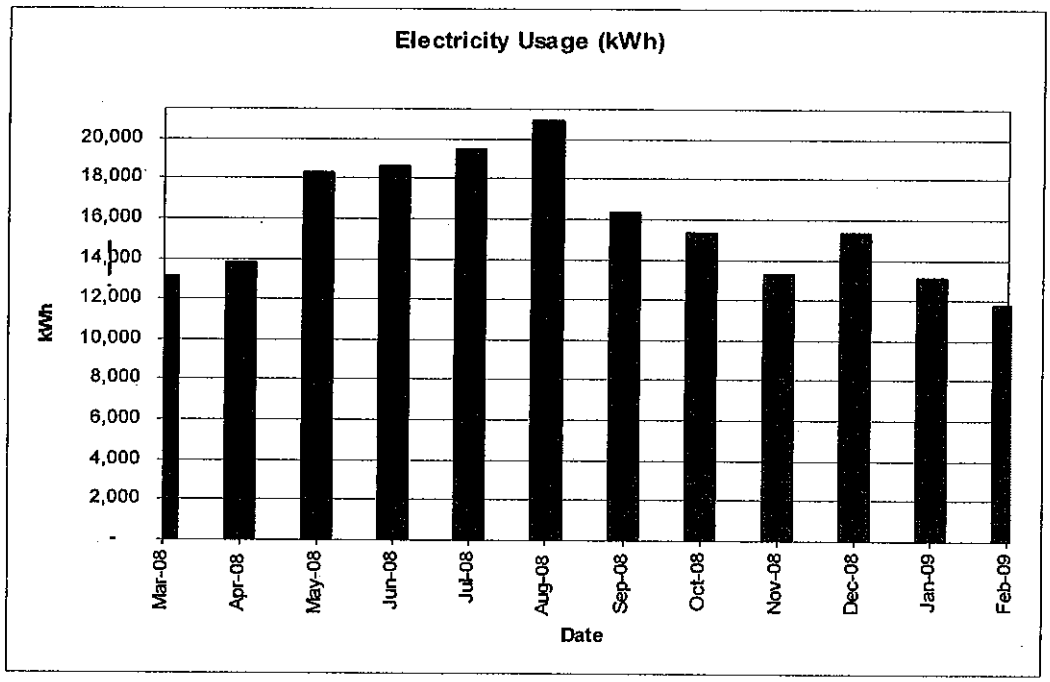
1.1. Energy usage and cost analysis

SWA received and analyzed utility bills from March 2007 through March 2009 that were received from the Borough of Cresskill.

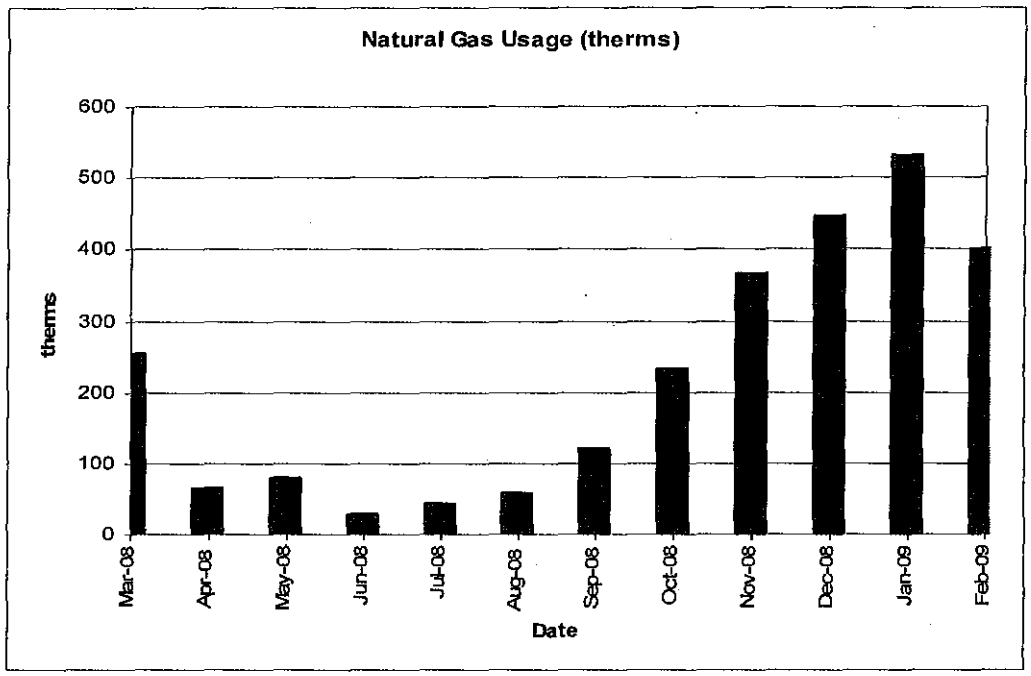
Electricity – The Cresskill Municipal Building has one electric meter for incoming electricity supply. The building purchases electricity from Orange & Rockland at **an average aggregated rate of $0.16/kWh** based on March 2008 through March 2009 electric bills. The building purchased **approximately 189,360 kWh or $30,722 worth of electricity from March 2008 through March 2009.** Based on the same time period, the building also has **an average monthly demand of 40.0 kW and monthly peak demand of 48.0 kW.**

Natural Gas – The Cresskill Municipal Building has one gas meter for incoming natural gas from PSE&G. Between March 2008 and March 2009, the building purchased **approximately 2,634 therms or $3,632 worth of natural gas.** To account for the additional costs associated with transportation and delivery fees, an average total gas rate of $1.58 per therm was assumed in this report.

The following chart shows electricity usage for the Borough Hall Building based on utility bills for the 2008- 2009 billing period.



The following chart shows the natural gas usage for the Borough Hall Building based on utility bills for the year March 2008 to March 2009.



In the above chart, the natural gas usage follows a heating trend as expected. During the summer it is clear that the natural gas usage is very minimal which reflects that heat is not being used and the DHW load is minimal.

1.2. Utility rate

Cresskill Borough Hall currently buys electricity from Orange & Rockland and gas from PSE&G at the BGSS general service rate. The BGSS general service rate is a typical rate where customers pay for natural gas based on usage and electricity based on usage with the addition of an electrical charge demand. Cresskill Borough Hall uses Orange & Rockland account #24725-63001, at the service address of 0 Union Ave, Cresskill, NJ and PSEG account #41 449 190 13, at the service address of 67 Union Ave, Cresskill, NJ. Electricity for the building was billed at an average rate of **$0.16/kWh.** Natural Gas for the building was billed at an average rate of **$1.58/therm.**

1.3. Energy benchmarking

The Cresskill Borough Hall Building information and utility data were entered into the U.S. Environmental Protection Agency's (EPA) *Energy Star Portfolio Manager* Energy benchmarking system. A performance score could not be generated for the building since it is a mixed use building containing both the Borough Hall and the Police Department. SWA recommends that the Cresskill Borough maintain the Portfolio Manager account at the link below. As the account is maintained, SWA can share the Cresskill Borough Hall building and allow future data to be added and tracked using the benchmarking tool.

http://www.energystar.gov/index.cfm?c=evaluate_performance.bus_portfoliomanager

STATEMENT OF ENERGY PERFORMANCE
Borough of Cresskill

Building ID: 1755590
For 12-month Period Ending: February 28, 2009[1]
Date SEP becomes ineligible: N/A

Date SEP Generated: July 23, 2009

Facility	Facility Owner	Primary Contact for this Facility
Borough of Cresskill 67 Union Ave Cresskill, NJ 07626	N/A	N/A

Year Built: 1980
Gross Floor Area (ft²): 11,523

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

Site Energy Use Summary[3]	
Natural Gas (kBtu)[4]	280,738
Electricity (kBtu)	648,661
Total Energy (kBtu)	929,399
Energy Intensity[5]	
Site (kBtu/ft²/yr)	81
Source (kBtu/ft²/yr)	214
Emissions (based on site energy use)	
Greenhouse Gas Emissions ($MtCO_2e$/year)	77
Electric Distribution Utility	
Rockland Electric Co	
National Average Comparison	
National Average Site EUI	104
National Average Source EUI	213
% Difference from National Average Source EUI	0%
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

2. FACILITY AND SYSTEMS DESCRIPTION

2.1. Building Characteristics

Cresskill Borough Hall was built approximately 29 years ago. The building is one story with a total floor area of 11,523 square feet.

2.2. Building occupancy profiles

During the site visit, there were approximately 20 employees observed in the building at once. The Borough Hall building is operated during the normal business hours of 8:30am to 4:30pm, with Borough Hall board meetings as well as other public assemblies running after 4:30pm. For the purpose of the audit, the building was assumed to operate from 7:30am to 7:30pm on weekdays. The Police Station is one exception of building operation hours, since it is operated 24 hours per day.

2.3. Building envelope

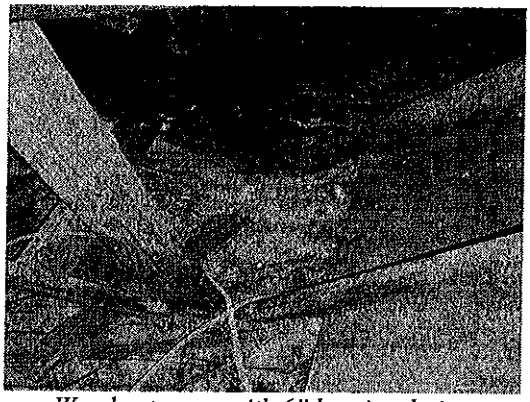
2.3.1. Exterior walls

The exterior walls of the Borough Hall building consist of a 4" face brick with 2"x4" wood framing spaced 16" on center on the interior side. There is 6" of R-11 fiberglass batt insulation situated in between each of the wooden studs. There are portions of the exterior walls where the gabled trusses form the roofline, these areas are sided with ¾" duroply siding. While insulation could be added to the exterior walls of the main building, it would not be aesthetic and it would have a significant impact on building operations. SWA has determined that it is not cost effective to do so at this time. If any portion of the building is renovated or improved as part of a capital improvement plan, SWA recommends increased insulation is added to any walls during construction.

Face brick on lower portion; siding on trussed section

2.3.2. Roof

The pitched roof of the building is formed from wooden trusses and the surface is formed from dark gray asphalt shingles. The roof surface appeared to be in fair-good condition and it would not be cost effective to upgrade at this point in time. The roof utilizes vented soffit to vent the attic space.



Wooden trusses with 6" batt insulation

Asphalt shingles on pitched roof

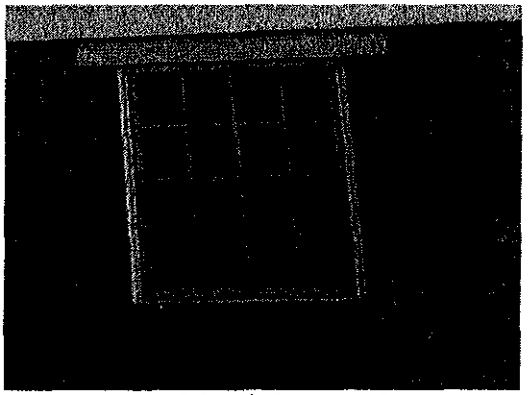
SWA observed 6" worth of R-19 batt insulation located in the attic area of the building. SWA has determined that it is not cost-effect to add insulation at this time. If the ceiling or roof is improved as part of a capital improvement plan, SWA recommends increasing the amount of insulation located in the attic in order and airseal any leaky attic space to keep more conditioned air inside of the actual conditioned spaces and allow the least amount of expensive, conditioned air to escape.

2.3.3. Base

The building's base is 4" concrete slab-on-grade on top of crushed stone. The base is also supported by concrete footings. There were no reported problems with water penetration or moisture.

2.3.4. Windows

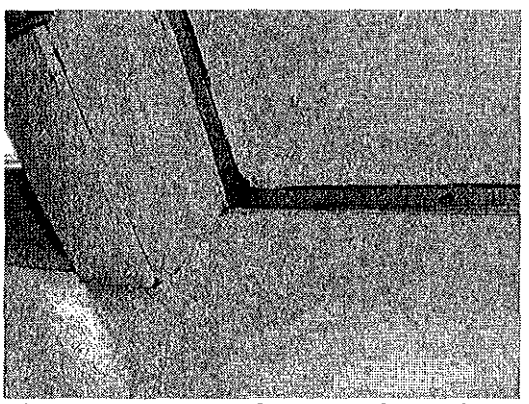
All of the windows in the building are wooden framed double-hung windows. These windows contain double-pane glass except in Police Department secure areas where security glass is used. The windows appeared to be in fair-good conditioned and did not allow for air or moisture penetration around the frame. There are no cost-effective measures for the windows at this point in time.



Typical double-hung window

2.3.5. Exterior doors

The entrance ways for the Cresskill Municipal Building consists of insulated steel doors set in a metal frame. The frames of these doors are poor insulators and allow expensive, conditioned air to leak out of the building. Many of the doors were observed to be having deteriorated weather-stripping so that they did not seal well to the frames. SWA recommends weather-stripping around all of the doors of the building in order to prevent conditioned air from leaking outside of the building. Weather-stripping should be checked at least once a year and replaced as soon as signs of deterioration show.

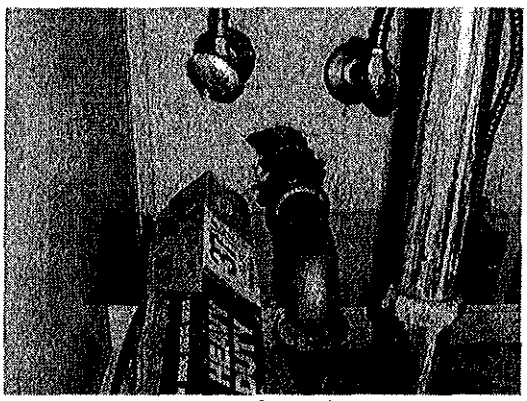


Edges of door in Public Assembly room no longer form tight seal

2.3.6. Building air tightness

The Cresskill Municipal Building was relatively tight with the exception of the exterior doors and some small penetrations inside of the building. Windows and Entranceways such as the front and back vestibule of the main Borough Hall Building should be maintained so that a tight seal is always formed to keep conditioned are from leaking outside of the building. There are also some areas located inside the building that can allow cold air to enter from outside the building and can cause comfort issues. One specific problem area was that there were large holes around piping penetrations located under the sink in the general meeting room behind the public assembly room.

These excessive holes around the penetrations allow cold drafts to enter the room and should be sealed tighter around the penetrations.



Piping penetrations under sink in meeting room

2.4. HVAC systems

2.4.1. Heating

The Cresskill Borough Hall Building contains two separate mechanical rooms with heating equipment. In total there are 5 identical Carrier atmospheric furnaces that meet the needs of the entire building. The first mechanical room is located adjacent to the Public Assembly room in the main area of the building. This mechanical room contains furnace #1 and furnace #2. Furnace #1 is controlled by a programmable thermostat located on the right side wall outside of the mechanical room and serves the Ante Chamber area that includes the main waiting area, public restrooms and meeting room. Furnace #2 is controlled by a non-programmable thermostat on the left side well inside of the Public Assembly room and serves the public assembly room. SWA performed combustion efficiency tests on each of the 5 furnaces located in the building. Each of these units has an input of 125,000 Btu/hr and based on the combustion efficiency tests, SWA assumes that the furnaces have an annual efficiency of <80%.

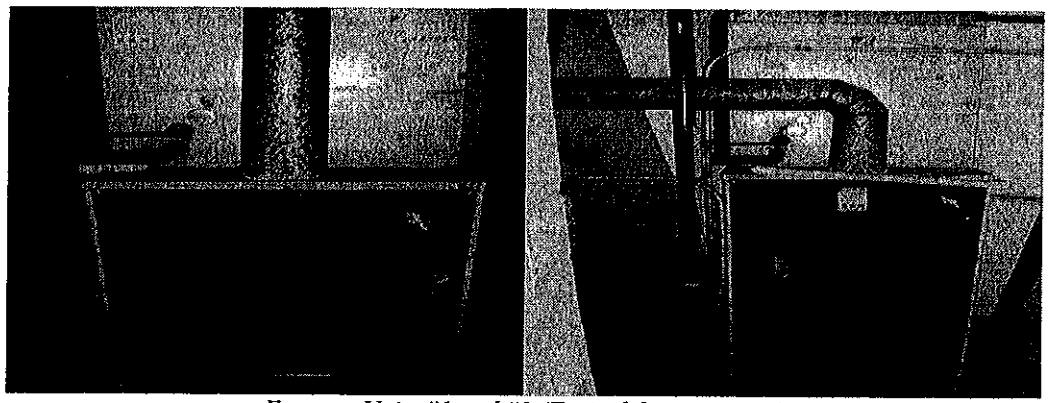
	Combustion Efficiency Tests				
	Unit 1	Unit 2	Unit 3A	Unit 3B	Unit 4*
Stack Temp. (F°)	340	380	382	380	-
Eff. %	77.4	77.3	77.8	79.1	-
CO2	4.9	5.3	4.9	6.4	-
Excess air (%)	124.8	135.0	124.8	73.9	-
CO (ppm)	82	12	70	947	-
WC	0.00	-0.02	0.00	-0.02	-
O2 (%)	12.3	12.2	11.9	8.9	-
CO air free	450	28	161	1783	-
Ambient Air Temp (F°)	60.7	61.4	66.8	65.8	-

** - Unit 4 was not tested because it could not be forced into fire-mode*

Results of combustion efficiency tests

The main mechanical room is located off of a hallway between the Police Department and Borough Hall offices. This mechanical room contains the other 3 Carrier furnaces as well as the Domestic

Hot Water (DHW) heater, the DHW booster pumps, and main sprinkler system. Each of these Carrier furnaces are identical to the two furnaces and have a total input of 125,000 Btu/hr. Unit 3A and Unit 3B serve the office area as well as hallways in the Borough Hall building. Unit 4 serves the Police Department. SWA performed combustion efficiency tests on Unit 3A and Unit 3B and based on test results, assume that the annual efficiency of these furnaces is <80%. The combustion efficiency test for Unit 3B revealed potentially dangerous levels of Carbon Monoxide. There was no Carbon Monoxide detected in the maintenance room, however, very high levels of CO were detected inside of the flue. This indicates that the furnace is not completely burning all of the chemicals inside of the fuel during the combustion process. The excessive levels of CO were detected inside of the flue where they are being pushed outside of the building through ductwork penetrating the roof. This situation is potentially dangerous if the ductwork becomes sealed at some point and allows that CO to enter the conditioned space. Replacing this equipment will help mitigate this problem but CO sensors should be kept up-to-date and tested regularly inside each of the maintenance rooms or anywhere else there is a combustion appliance. A combustion efficiency test could not be performed on Unit 4 since the unit could not be forced into fire-mode by the thermostat. The Police Department thermostat was already reading 85°F, which is also the upper temperature limit of the thermostat.



Furnace Units #1 and #2 (Typical furnace units)

All five of the Carrier furnaces are approaching 30 years old since they are original to the building. Heating equipment such as furnaces, generally have a useful lifetime 25 years. SWA recommends replacing incorporating the replacement of all 5 furnaces into a capital improvement plan. These furnaces should be replaced with furnaces capable of handling the same heating demand but with a much higher efficiency. These atmospheric furnaces should be upgraded to sealed-combustion furnaces. Sealed-combustion furnaces are much more efficient and will therefore reduce gas usage significantly. The furnaces can also be replaced with similar-type atmospheric furnaces that have a higher efficiency. Also, the furnaces should be regulated with a programmable thermostat to make sure that they are operated only when needed. It is important that rooms like the Public Assembly room are also regulated with a programmable thermostat as well. Even though some rooms are only used sparingly, a programmable thermostat can be setup to ensure that rooms are not unnecessarily conditioned overnight, over weekends or over other prolonged periods of time when they are not being used.

2.4.2. Cooling

The Cresskill Borough Hall Building is cooled using 3 split-system air-conditioning units. There are two condensing units located outside of the rear entrance near the north side of the Public

Assembly Room; one Luxaire 5-ton unit and one Commercial Comfort 7.5-ton unit. The Luxaire 5-ton unit on the North side of the building was recently replaced and is not the original unit. A third condensing unit is located outside behind the main mechanical room; this unit is a Luxaire 5-ton unit. There are also two window AC units located in the Police Department. One Carrier High Efficiency window unit, whose model number could not be read, is located in the dispatch room window. The second unit is a Friedrich unit with an EER value of 10.8; this unit is located in the window of the Detective's bureau.

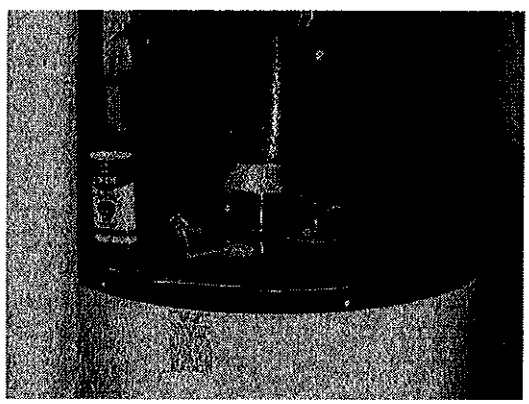
All of the air-conditioning units, with the exception of the Luxaire 5-ton unit that has already been replaced are at or nearing their useful life expectancy. SWA recommends that as part of a capital improvement plan, these units are replaced as they begin to fail. The Carrier window unit located inside of the Dispatch room does not seem to meet the cooling demands of the room. This room is typically kept extremely warm by a large display television as well as other radio dispatch equipment. A larger capacity unit may be considered with a higher efficiency value but this addresses comfort concerns and not necessarily energy savings.

2.4.3. Ventilation

The Borough Hall Building uses a furnace to heat the building and split-system units to cool the building. Both of these systems take in fresh outside air, condition based on thermostat set points and then distribute this air throughout the building. The building is also equipped with operable windows to allow natural ventilation when needed. The attic space of the building is ventilated using vented soffits and also louvered panels in the bell tower. Bathrooms contain exhaust fans that help move odors and stale air out of the building through penetrations in the roof.

2.4.4. Domestic Hot Water

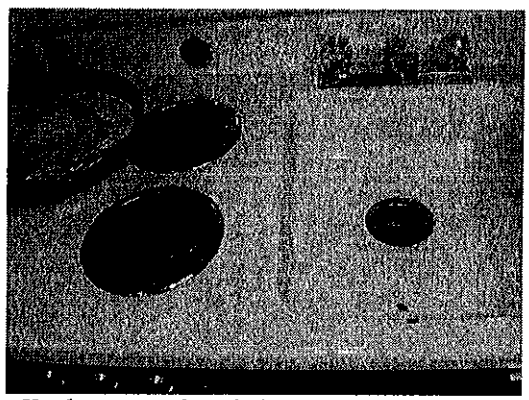
Domestic Hot Water for the building is provided by a RHEEM Guardian hot water system with a Fury gas water heater located in the main mechanical room. The hot water heater is newer and is an atmospheric type heater with an input of 50,000 Btu/hr and 60 gallons of storage. In the main mechanical room, city water comes in at 55°F and is heated by the DHW heater to 125°F. On the day of the audit, the system was using 56 psi of pressure to deliver water to different parts of the building. Water was tested at various faucets throughout the building and was measured to be between 110°-120°F. Water is pumped through the system using a $1/12^{th}$ horsepower, Bell and Gossett Booster Pump.



Atmospheric DHW Heater

It is not cost-effective to replace the existing water heating equipment with higher efficiency equipment. However, higher efficiency water heating equipment will save energy and should be strongly considered upon replacement of the equipment. Energy saving appliances bearing the ENERGY STAR label should be selected to ensure efficiency performance. Incentives may be available to offset any added costs for the installed equipment.

More efficient water-consuming fixtures and appliances save both energy and money through reduced energy consumption for water heating, as well decreased water and sewer bills. The kitchenette faucet located in the meeting room behind the Public Assembly room was measured to be 4.5gpm which can be reduced to 1.5gpm using low-flow aerators. SWA recommends that the aerators in all sinks are retrofitted with low-flow aerators that constrict the volume of water allowed to flow out of the faucets during the time it takes to wash hands, wash dishes, etc. Building staff can also easily install faucet aerators and/or low-flow fixtures to reduce hot water consumption. In addition, routine maintenance practices that identify and quickly address water leaks are a low-cost way to save water and energy.



Kitchenette sink with flow measuring 4.5 gpm

2.5. Electrical systems

2.5.1. Lighting

Interior Lighting – Most of the lighting within the Borough Hall Building consisted of older, inefficient T12 lighting with magnetic ballasts. This lighting is outdated and needs to be replaced. There are approximately 184 fixtures throughout the building that contain T12 fluorescent bulbs with magnetic ballasts that should be replaced with T8 fluorescent bulbs with electronic ballasts. There were only 4 incandescent lights found in the building; three in the Mayor's office and one in the holding cell. Incandescent lights should be replaced with CFL bulbs. CFL bulbs save money since they require less power to operate and they also have a better light quality. The majority of the building has already been fitted with LED exit signs but there are still 2 exit signs that still use fluorescent bulbs. LED exit signs are always cost-effective since they use such little power and operate 24 hours a day, 365 days a year. See attached existing and proposed lighting schedule in Appendix A.

SWA recommends replacing lights with more efficient replacements as per lighting. Areas such as the front vestibule entrance contain lights that are on a keyed switch. These lights were effectively not providing light to any area on the day of the site visit because the glass vestibule allowed sufficient daylight on. These lights can be turned off on days when sunlight is sufficient.

Exit Signs – Most of the exit signs in the Borough Hall building have already been fitted with LED exit signs. There were two exit signs located in the hallway of the Police Department that still contained fluorescent light bulbs. These lights were observed to contain 20W bulbs in comparison to an LED exit sign that only uses 5W. Switching these fixtures to LED will be cost-effective since the lights operate 24/7 for safety.

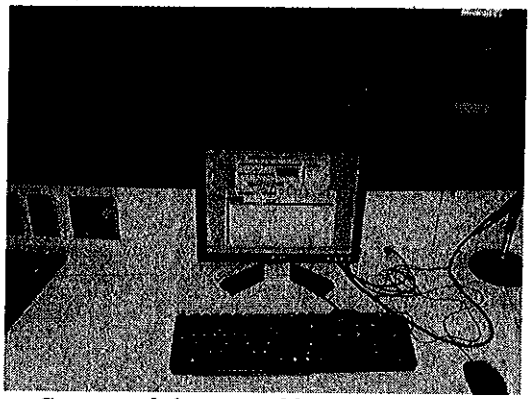
Exterior Lighting – The lighting for the exterior of the building was observed on the day of the audit and would not be cost-effective to upgrade at this time. Exterior lighting is controlled by two timers located in the smaller boiler room near the Public Assembly room. SWA observed that these timers may not be adjusted and maintained on a regular basis. The exterior lights near the Police Department are kept on 24/7 for safety but the other exterior lighting should be shut off at night. There was a smaller timer and a larger timer installed. The smaller timer is set to turn the lights on at 7:15pm and turn them back off at 7am. The larger timer turns lights on from 9pm Friday to 7am on Weekdays and then from 9pm-7am Monday. This larger timer was actually missing pins so that lights stay off from Monday 7am through Tuesday 9pm. Typically, the installer of the timer sets these pins according to factory settings and no one ever maintains them. SWA recommends that these timers are updated at least twice a year to make sure that they stay accurate. It can also be beneficial to adjust these timers according to Daylight Savings Time in order to ensure that exterior lights only come on when necessary.

2.5.2. Appliances and process

Appliances, such as refrigerators, that are over 10 years of age should be replaced with newer efficient models with the Energy Star label. For example, Energy Star refrigerators use as little as 315kwh/hr. When compared to the average electrical consumption of older equipment, Energy Star equipment results in a large savings. Look for the Energy Star label when replacing appliances and equipment, including: window air conditioners, refrigerators, printers, computers, copy machines, etc. More information can be found in the "Products" section of the Energy Star website at: http://www.energystar.gov

The Cresskill Police Department contains typical equipment that is found in a police department. Appliances such as televisions, air-conditioners, computers, radio dispatch equipment, etc. should all be purchased with energy consumption in mind. Replacing purchased equipment for energy efficiency is most likely not cost-effective but if Energy Star and other energy efficient options are always considered; energy consumption can be maintained throughout the entire use of the building.

The Public Assembly room is used sparingly, mostly in the evenings, according to building staff. Building staff should ensure that everything, including the thermostat and any appliances are always shut off when this room is not in use. On the day of the audit, SWA observed that the computer centered at the podium was left on when the room had not been used for at least a day. Computers and other appliances should be shut down, or at least their screens should be when not in use for extended periods of time.



Computer left on in Public Assembly room

2.5.3. Elevators

The Cresskill Borough Hall Building is a one story building and therefore contains no elevators.

2.5.4. Other electrical systems

The Cresskill Borough Hall Building contains a Kohler back-up generator. Generators are useful sources of electrical supply in case of electrical failure. SWA has no recommendations for improving the efficiency of existing generator but will recommend that if the generator is ever replaced to be sure that it is properly sized and the most efficient generator is always purchased.

3. EQUIPMENT LIST

Building System	Description	Make/Model	Fuel	Space Served	Estimated Remaining Useful Life (%)
Heating	Five (5) Carrier atmospheric furnaces, input 125,000 Btu/hr	Model #58GS125-4	Natural Gas	Entire floor area	0% (equipment is no longer performing efficiently as designed)
Cooling	Two (2) Luxaire 5-ton split-system condensing units	Model #HABA-T060SG	Electric	Entire floor area	15%/80%
Cooling	One (1) Commercial Comfort 7.5-ton split-system condensing units	Model #CAE090HBA	Electric	Entire floor area	15%
Cooling	One (1) Carrier window AC unit	Carrier High Efficiency (model unclear)	Electric	Radio Dispatch Room	20%
Cooling	One (1) Friedrich window AC unit with EER 10.8	Model #KS10E10-A	Electric	Detective Bureau	20%
Generator	One (1) Kohler generator	Model #20R82	Natural Gas	Entire floor area	Unknown
Domestic Hot Water	One (1) Rheem Guardian System with Fury gas water heater (50,000 Btu/hr)	Model #42V60F	Natural Gas	Entire floor area	92%
Pumps	One (1) Bell & Gossett Series 100, 1/12th HP DHW booster pump	Bell & Gossett Series 100	Electric	Entire floor area	85%
Central Vac	Budd Central Vacuum system	Model #7811	Electric	Entire floor area	Unknown

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.

4. ENERGY CONSERVATION MEASURES

Based on the assessment of this building, SWA has separated the investment opportunities into two categories of recommendations:

General Recommendations: Operations and Maintenance

- Weather Stripping/Air Sealing - SWA observed that exterior door weather-stripping was beginning to deteriorate. 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 frame. Any other accessible gaps or penetrations in the thermal envelope penetrations should also be sealed with caulk or spray foam.
- Water Efficient Fixtures & Controls - Adding controlled on/off timers on all lavatory faucets is a cost-effect 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-consuming fixtures and appliances will save both energy and money through reduced energy consumption for water heating, while also decreasing water and sewer bills.

Specified Recommendations: Energy Conservation Measures

Summary table

ECM#	Description
1	**Replace Existing five (5) hot air furnaces: Upgrade the existing hot air furnaces with newer, higher efficiency furnaces. Manual thermostats should be replaced with programmable thermostats.**
2	**Lighting Upgrade; See appendix A for entire lighting retrofit schedule.**

ECM#1: *Replace Existing five (5) Hot Air Furnaces*

Description:

The existing five (5) hot air furnaces have been maintained properly but are now past their useful life expectancy. The furnaces typically have been reasonably well-maintained but they are inefficient relative to newer technology and they have reached the end of their useful life. The recommendation provided here cannot be cost justified by energy savings alone. However, the age and condition of the equipment warrant attention and this recommendation is intended to provide guidance to help the building management staff prioritize upgrades within the facility. SWA recommends incorporating the replacement of the furnaces into a capital improvement plan that accounts for energy efficiency but also includes safety and reducing building maintenance.

The existing equipment is approximately 79% efficient. To improve heating plant energy performance, SWA recommends replacement of the existing furnaces with new furnaces that have a higher efficiency. The atmospheric type furnaces should be replaced with new sealed-combustion type furnaces for better efficiency and improved safety. Based on difficult experiences with sealed-combustion appliances however, the Borough of Cresskill recommends that they replace the existing atmospheric furnaces with similar atmospheric furnaces with better efficiency instead of upgrading technologies at this time. If the furnaces are replaced with similar atmospheric furnaces, SWA recommends that the greatest efficiency is chosen. Newer atmospheric furnaces can reach efficiencies of 82% or greater. For each room that a combustion appliance is installed, active CO detectors should also be replaced or installed to ensure that CO will be detected if it were to leak outside of the furnace. Furnace capacity should be properly sized. As part of this upgrade, programmable thermostats should be installed where there are currently manual thermostats. Once the furnaces are installed, the system should be calibrated to operate in accordance with typical use of the building. The furnaces have a negative return on investment but will also save on maintenance costs and increase occupant safety.

Installation cost:

Estimated installed cost: $42,500
Source of cost estimate: RS *Means*

Economics:

1st year energy savings					SPP	LoM	lifetime		Annual Carbon Reduction (lbs of CO2)
usage	unit	demand	unit	$ savings/yr			cost savings	ROI	
176	therms	0.0	-	$ 278	152.8	25	$ 6,952	-3.3%	1,940

Assumptions: SWA calculated the savings for this measure using information collected during the field visit and analysis of historical utility consumption information. SWA assumed that the efficiency of the existing heating plant is 79% based on combustion efficiency tests. SWA also assumes that the efficiency of a newly installed atmospheric furnace will be 82%. Pricing is based on removal of all existing furnaces and replacement with an equal number of furnaces..

Rebates/financial incentives:

New Jersey Clean Energy – SmartStart Building program – This measure may qualify for up to $400 per gas furnace if entered into the SmartStart Building program.
Maximum incentive amount is $2,000.

Options for funding ECM:
Additional information may be found on the NJ Clean Energy website.

ECM#2: *Lighting Upgrade*

Description:

The Cresskill Borough Hall building consists of mostly outdated T12 fluorescent lighting with magnetic ballasts. SWA recommends that each T12 fixture is replaced with a T8 fixture with electronic ballasts. Typically, T8 fluorescent lights with electronic ballasts have an electrical savings of 30% over T12 fixtures with magnetic ballasts. T8 fluorescent fixtures also have a better quality light output and can save on maintenance costs over T12 fixtures. There are currently only 4 incandescent light bulbs that were found during the audit, but these should be replaced with newer type CFL bulbs. The Borough Hall building also has 2 fluorescent exit signs installed in the building that should be changed to LED exit signs. Exit signs are one good opportunity for energy efficiency since they are required to operate 24 hours per day. See Appendix A for complete existing and proposed lighting schedules.

Installation cost:

Estimated installed cost: $35,220
Source of cost estimate: RS *Means*

Economics:

1st year energy savings					SPP	LoM	lifetime		Annual Carbon Reduction (lbs of CO2)
usage	unit	demand	unit	$ savings/yr			cost savings	ROI	
26,609	kWh	3.0	kW	$ 4,257	8.3	20	$ 85,149	7.1%	47,643

Assumptions: SWA calculated the savings for this measure using measurements taken the day of the field visit, and billing analysis.

Rebates/financial incentives:

NJ Clean Energy – Prescriptive Lighting Incentive, Incentive based on installing T5 or T8 lamps with electronic ballasts in existing facilities ($10-$30 per fixture, depending on quantity of lamps).
Maximum incentive amount is $5,520.

NJ Clean Energy – Prescriptive Lighting Incentive, Incentive based on installing LED Exit signs ($10/$20 per fixture).
Maximum incentive amount is $40.

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

5. RENEWABLE AND DISTRIBUTED ENERGY MEASURES

5.1. Existing systems

There are currently no existing renewable energy systems.

5.2. Solar Photovoltaic

Photovoltaic (PV) technology would not be cost beneficial to this project since there is such little electric demand. The building also does not have a clear unobstructed Southern exposure.

5.3. Solar Thermal Collectors

Solar thermal collectors are not cost effective for this project and are not recommended due to the low amount of domestic hot water use throughout the building.

5.4. Combined Heat and Power

CHP is not applicable to this project because of the HVAC system type and limited domestic hot water usage.

5.5. Geothermal

Geothermal is not applicable to this project because it would require modifications to the existing heat distribution system, which would not be cost effective.

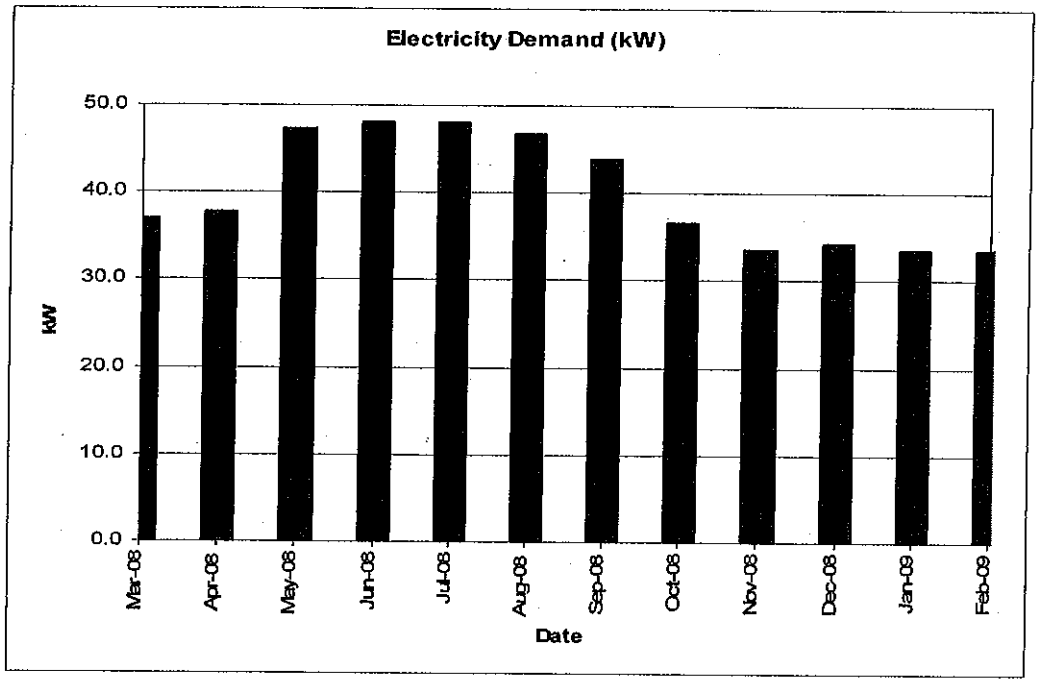
5.6. Wind

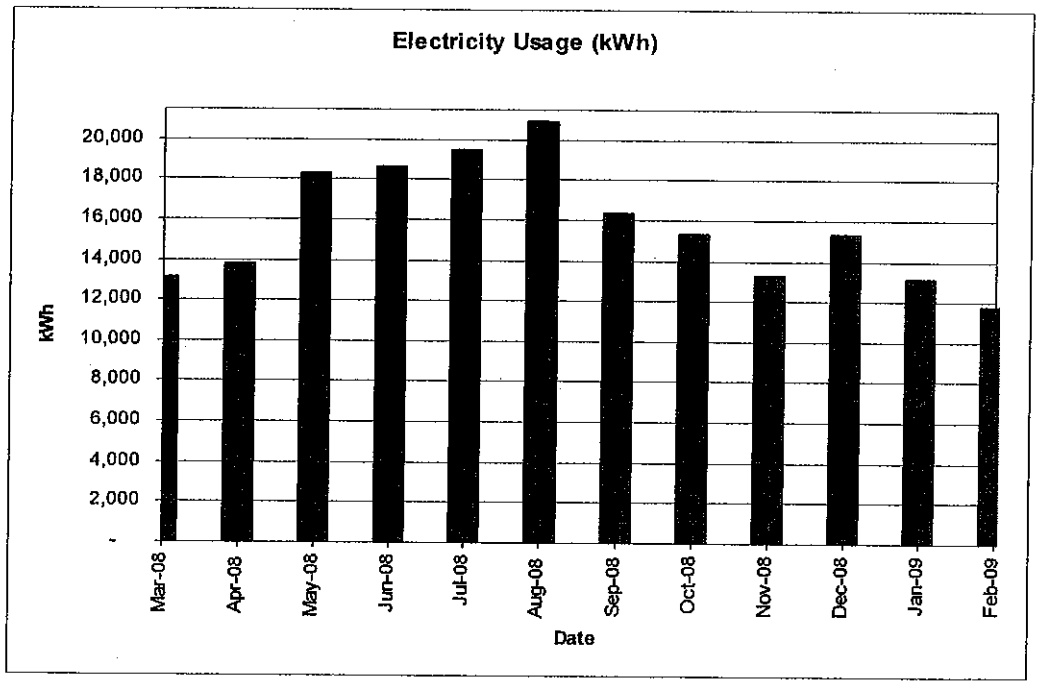
Wind power production is not appropriate for this location because required land is not available for the wind turbine. Also, the available wind energy resource is very low.

6. ENERGY PURCHASING AND PROCUREMENT STRATEGIES

6.1. Load profiles

The average electrical peak demand for the previous year was 40.0 kW and the maximum peak demand was 48.0 kW. The electric and gas load profiles for this project are presented in the following charts. The first chart shows electric demand (in kW) for the previous 12 months and the other two charts show electric and gas usage (in kWh), respectively.


Electricity Demand (kW)
50.0
40.0
30.0
20.0
10.0
0.0
kW
Mar-08
Apr-08
May-08
Jun-08
Jul-08
Aug-08
Sep-08
Oct-08
Nov-08
Dec-08
Jan-09
Feb-09
Date


Electricity Usage (kWh)
20,000
18,000
16,000
14,000
12,000
10,000
8,000
6,000
4,000
2,000
-
kWh
Mar-08
Apr-08
May-08
Jun-08
Jul-08
Aug-08
Sep-08
Oct-08
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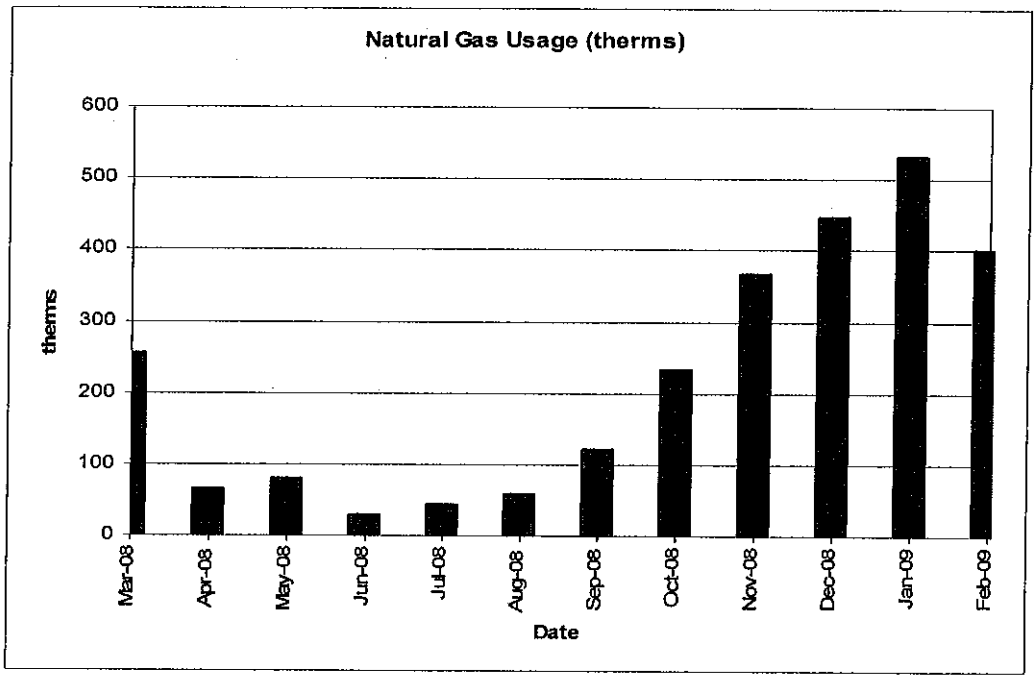
Jan-09
Feb-09
Date

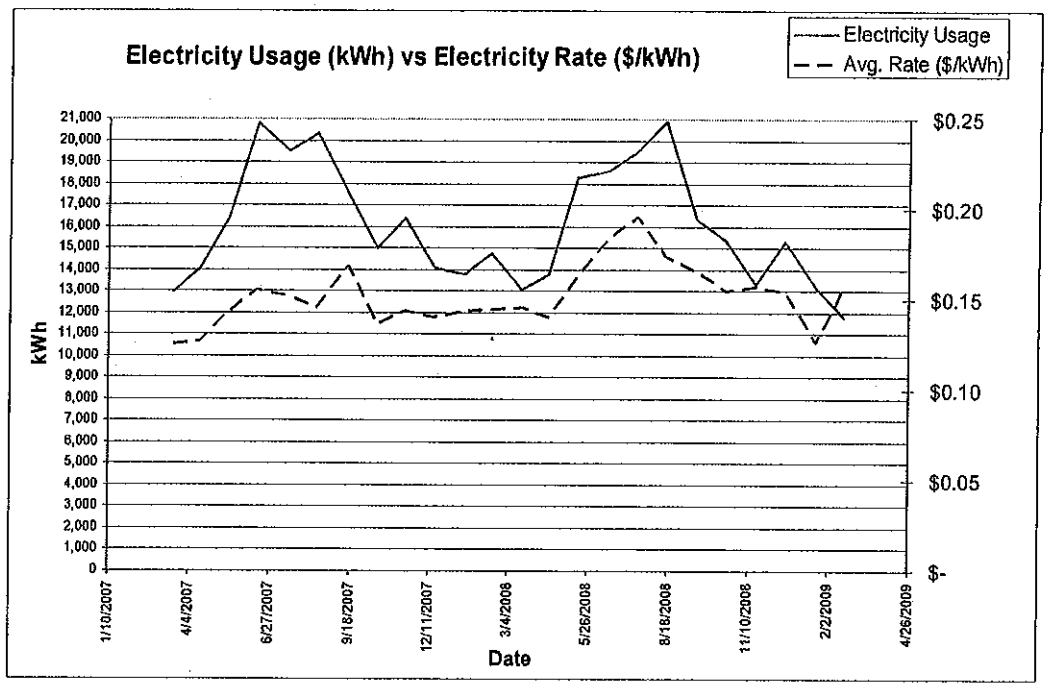


6.2. Tariff analysis

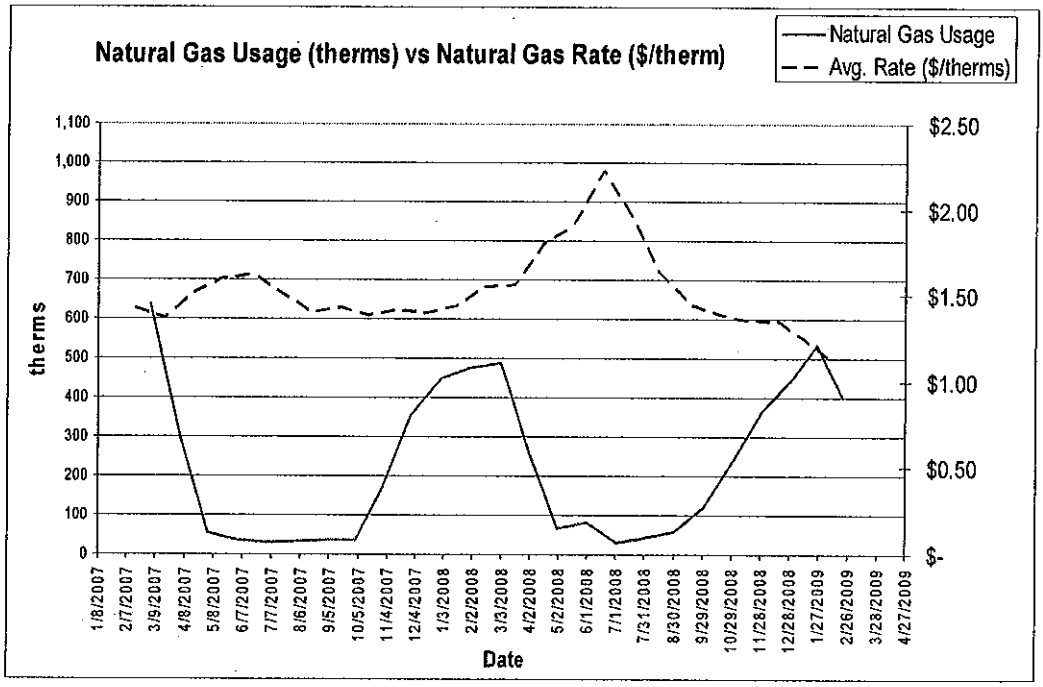
The Cresskill Borough Hall currently buys electricity from Orange & Rockland at the general service rate, which charges customers based on the market rate of electricity usage as well as monthly peak demand. Gas is purchased from PSEG at the BGSS service rate which charges customers based on the market rate of natural gas usage. General Service rates are appropriate for this building due to its size.

6.3. Energy Procurement strategies

Billing analysis shows price fluctuations of over 20% over the course of the year for the building electrical and natural gas accounts. Customers that have a large variation in monthly billing rates can often reduce the costs associated with energy procurement by selecting a third party energy supplier. Contact the NJ Energy Choice Program for further information on Energy Services Companies (ESCOs) that can act as third party energy suppliers. Purchasing electricity from an ESCO can reduce electric rate fluctuation and ultimately reduce the annual cost of energy for the school. Appendix B contains a complete list of third party energy suppliers.



Electricity prices reflect electricity usage



Natural gas prices fluctuate as expected with usage

The building would not be eligible for enrollment in a Demand Response Program because the minimum electric demand each month does not greatly exceed 50 kW, which is the typical threshold for considering this option.

7. METHOD OF ANALYSIS

7.1. Assumptions and methods

Energy modeling method:	Spreadsheet-based calculation methods
Cost estimates:	RS Means 2009 (Facilities Maintenance & Repair Cost Data) RS Means 2009 (Building Construction Cost Data) RS Means 2009 (Mechanical Cost Data) Note: Cost estimates also based on utility bill analysis and prior experience with similar projects.

7.2. 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.

Appendix A: Lighting study

Existing Lighting Conditions																
#	Building	Level/Floor	Location in Building	Measured Lighting Level in Footcandles	Fixture Type	Ballast Type	No. of Fixtures	No. of Lamps	Type of Lamp	Watts/Lamp	Hrs/Day	Energy Use (Watt hours/day)	Annual Energy Use (kWh/year)	Controls	Daylighting possible?	Total Power (W)
1	Cresskill	General first floor area	Front entranceway	70	4' linear T12	magnetic	2	4	fluorescent	40	24	7680	2004	keyed switch	Yes	320
2	Cresskill	General first floor area	Mechanical Room near back entrance	20	4' linear T12	magnetic	2	2	fluorescent	40	2	320	84	switch	No	160
3	Cresskill	General first floor area	Public meeting room	25	4' linear T12	magnetic	17	4	fluorescent	40	4	10880	2840	switch	No	2720
4	Cresskill	General first floor area	Public meeting room	-	LED exit sign	-	2	1	LED	5	24	240	63	none	No	10
5	Cresskill	General first floor area	Lobby	35-55	4' linear T12	magnetic	9	4	fluorescent	40	12	17280	4510	switch	No	1440
6	Cresskill	General first floor area	Lobby	-	LED exit sign	-	2	1	LED	5	24	240	63	none	No	10
7	Cresskill	General first floor area	Display case in lobby	35	4' linear T12	magnetic	1	2	fluorescent	40	24	1920	501	none	No	80
8	Cresskill	General first floor area	Multi-purpose room behind public room	50	4' linear T12	magnetic	6	4	fluorescent	40	4	3840	1002	none	No	960
9	Cresskill	General first floor area	Multi-purpose room behind public room	-	LED exit sign	-	2	1	LED	5	24	240	63	none	No	10
10	Cresskill	General first floor area	Men's room in lobby	75	4' linear T12	magnetic	1	4	fluorescent	40	4	640	167	switch	No	160
11	Cresskill	General first floor area	Women's room in lobby	75	4' linear T12	magnetic	1	4	fluorescent	40	4	640	167	switch	No	160
12	Cresskill	General first floor area	ıllway between lobby and multi-purpose roc	55	4' linear T12	magnetic	2	4	fluorescent	40	12	3840	1002	switch	No	320
13	Cresskill	General first floor area	Handicap Restroom	70	2' U-shaped T12	magnetic	1	2	fluorescent	34	2	136	35	switch	No	68
14	Cresskill	General first floor area	Back vestibule in lobby	77	4' linear T12	magnetic	1	4	fluorescent	40	12	1920	501	keyed switch	Yes	160
15	Cresskill	General first floor area	Coat Room	96	4' linear T12	magnetic	1	4	fluorescent	40	12	1920	501	switch	No	160
16	Cresskill	General first floor area	Municipal Courtroom	55	4' linear T12	magnetic	4	4	fluorescent	40	12	7680	2004	switch	No	640
17	Cresskill	General first floor area	Closet next to Municipal Courtroom	75	4' linear T12	magnetic	1	4	fluorescent	40	1	160	42	switch	No	160
18	Cresskill	Office Area	Tax Office	70	4' linear T12	magnetic	2	4	fluorescent	40	12	3840	1002	switch	No	320
19	Cresskill	Office Area	Tax Office	70	2' U-shaped T12	magnetic	2	2	fluorescent	34	12	1632	426	switch	No	136
20	Cresskill	Office Area	Main Office Area	76	4' linear T12	magnetic	12	4	fluorescent	40	12	23040	6013	switch	No	1920
21	Cresskill	Office Area	Main Office Area	76	2' U-shaped T12	magnetic	3	2	fluorescent	34	12	2448	639	switch	No	204
22	Cresskill	Office Area	Main Office Area	-	LED exit sign	-	1	1	LED	5	24	120	31	none	No	5
23	Cresskill	Office Area	File Storage Area	50	4' linear T12	magnetic	3	2	fluorescent	40	12	2880	752	switch	No	240
24	Cresskill	Office Area	Board of Health Office	117	4' linear T12	magnetic	3	4	fluorescent	40	12	5760	1503	switch	No	480
25	Cresskill	Office Area	Borough Clerk Office	135	4' linear T12	magnetic	3	4	fluorescent	40	12	5760	1503	switch	No	480
26	Cresskill	Office Area	Mayor's Office	102	4' linear T12	magnetic	4	4	fluorescent	40	12	7680	2004	switch	No	640
27	Cresskill	Office Area	Mayor's Office	102	75W inc. bulb	-	1	2	ncandescen	75	1	150	39	switch	No	150
28	Cresskill	Office Area	Mayor's Office	102	60W inc. bulb	-	1	1	ncandescen	60	1	60	16	switch	No	60
29	Cresskill	Office Area	Administrator's Office	85	4' linear T12	magnetic	4	4	fluorescent	40	12	7680	2004	switch	No	640
30	Cresskill	Office Area	Construction Official's Office	105	4' linear T12	magnetic	4	4	fluorescent	40	12	7680	2004	switch	No	640
31	Cresskill	Office Area	Construction General's Office	70	4' linear T12	magnetic	2	4	fluorescent	40	12	3840	1002	switch	No	320
32	Cresskill	Office Area	Construction General's Office	70	4' linear T12	magnetic	2	2	fluorescent	40	12	1920	501	switch	No	160
33	Cresskill	Office Area	Hallway between Police Dept. and Office	60	2' U-shaped T12	magnetic	4	2	fluorescent	34	12	3264	852	switch	No	272
34	Cresskill	Office Area	Planning and Zoning - Tax Assessor's Offic	65	4' linear T12	magnetic	2	4	fluorescent	40	12	3840	1002	switch	No	320
35	Cresskill	Office Area	Planning and Zoning - Tax Assessor's Offic	65	2' U-shaped T12	magnetic	2	2	fluorescent	34	12	1632	426	switch	No	136
36	Cresskill	Office Area	Server Room/Storage	60	4' linear T12	magnetic	1	4	fluorescent	40	12	1920	501	switch	No	160
37	Cresskill	Office Area	Mechanical Room	75	4' linear T12	magnetic	12	2	fluorescent	40	12	11520	3007	switch	No	960
38	Cresskill	Office Area	Kitchen Area	67	4' linear T12	magnetic	1	4	fluorescent	40	12	1920	501	switch	No	160
39	Cresskill	Office Area	Back office - Left side office	75	4' linear T12	magnetic	3	4	fluorescent	40	12	5760	1503	switch	No	480
40	Cresskill	Office Area	Back office - Left side office	75	2' U-shaped T12	magnetic	3	2	fluorescent	34	12	2448	639	switch	No	204
41	Cresskill	Office Area	Back office - Right side office	76	4' linear T12	magnetic	2	4	fluorescent	40	12	3840	1002	switch	No	320
42	Cresskill	Office Area	Men's Room	45	4' linear T12	magnetic	1	4	fluorescent	40	12	1920	501	switch	No	160
43	Cresskill	Office Area	Women's Room	45	4' linear T12	magnetic	1	4	fluorescent	40	12	1920	501	switch	No	160
44	Cresskill	Police Department	Captain's Office	26	4' linear T12	magnetic	2	4	fluorescent	40	12	3840	1402	switch	No	320
45	Cresskill	Police Department	Office	88	4' linear T12	magnetic	4	4	fluorescent	40	12	7680	2803	switch	No	640
46	Cresskill	Police Department	Server Room	42	4' linear T12	magnetic	1	2	fluorescent	40	2	160	58	switch	No	80
47	Cresskill	Police Department	Squad Room	42	4' linear T12	magnetic	2	4	fluorescent	40	12	3840	1402	switch	No	320
48	Cresskill	Police Department	Captain/Lieutenant Office	56	4' linear T12	magnetic	8	4	fluorescent	40	12	15360	5606	switch	No	1280
49	Cresskill	Police Department	Women's Locker Room/Bathroom	75	4' linear T12	magnetic	1	4	fluorescent	40	12	1920	701	switch	No	160
50	Cresskill	Police Department	Women's Locker Room/Bathroom	75	2' U-shaped T12	magnetic	1	2	fluorescent	34	12	816	298	switch	No	68
51	Cresskill	Police Department	Janitor's Closet	50	4' linear T12	magnetic	1	2	fluorescent	40	2	160	58	switch	No	80
52	Cresskill	Police Department	Detective's Bureau	70	4' linear T12	magnetic	6	4	fluorescent	40	12	11520	4205	switch	No	960
53	Cresskill	Police Department	Men's Locker Room area	76	4' linear T12	magnetic	1	4	fluorescent	40	12	1920	701	switch	No	160
54	Cresskill	Police Department	Men's Bath in Locker Room area	76	4' linear T12	magnetic	1	4	fluorescent	40	12	1920	701	switch	No	160
55	Cresskill	Police Department	Men's Bath in Locker Room area	76	2' U-shaped T12	magnetic	1	2	fluorescent	34	12	816	298	switch	No	68
56	Cresskill	Police Department	Interrogation Room	90	4' linear T12	magnetic	2	4	fluorescent	40	4	1280	467	switch	No	320
57	Cresskill	Police Department	Holding Cell	25	75W inc. bulb	-	1	1	ncandescen	75	24	1800	657	switch	No	75
58	Cresskill	Police Department	Office/Radio Room	53	4' linear T12	magnetic	11	4	fluorescent	40	24	42240	15418	switch	No	1760
59	Cresskill	Police Department	Office/Radio Room	-	LED exit sign	-	3	1	LED	5	24	360	131	switch	No	15
60	Cresskill	Police Department	Bathroom in Office/Radio Room	40	2' U-shaped T12	magnetic	2	2	fluorescent	34	2	272	99	switch	No	136
61	Cresskill	Police Department	Hallway	45	4' linear T12	magnetic	1	4	fluorescent	40	24	3840	1402	switch	No	160
62	Cresskill	Police Department	Hallway	45	2' U-shaped T12	magnetic	5	2	fluorescent	34	24	8160	2978	switch	No	340
63	Cresskill	Police Department	Hallway	-	Fluorescent Exit Sign	-	2	1	fluorescent	20	24	960	350	switch	No	40
64	Cresskill	Police Department	Sallyport	15	4' linear T12	magnetic	9	2	fluorescent	40	12	8640	3154	switch	No	720

Proposed Lighting Conditions																
#	Building	Level/Floor	Location in Building	Measured Lighting Level in Footcandles	Fixture Type	Ballast Type	No. of Fixtures	No. of Lamps	Type of Lamp	Watts/Lamp	Hrs/Day	Energy Use (Watt hours/day)	Annual Energy Use (kWh/year)	Controls	Daylighting possible?	Total Power (W)
1	Cresskill	General first floor area	Front entranceway	70	4' linear T8	electronic	2	4	fluorescent	40	24	5376	1403	keyed switch	Yes	320
2	Cresskill	General first floor area	Mechanical Room near back entrance	20	4' linear T8	electronic	2	2	fluorescent	40	2	224	58	switch	No	160
3	Cresskill	General first floor area	Public meeting room	25	4' linear T8	electronic	17	4	fluorescent	40	4	7616	1988	switch	No	2720
4	Cresskill	General first floor area	Public meeting room	-	LED exit sign	-	2	1	LED	5	24	240	63	none	No	10
5	Cresskill	General first floor area	Lobby	35-55	4' linear T8	electronic	9	4	fluorescent	40	12	12096	3157	switch	No	1440
6	Cresskill	General first floor area	Lobby	-	LED exit sign	-	2	1	LED	5	24	240	63	none	No	10
7	Cresskill	General first floor area	Display case in lobby	35	4' linear T8	electronic	1	2	fluorescent	40	24	1344	351	none	No	80
8	Cresskill	General first floor area	Multi-purpose room behind public room	50	4' linear T8	electronic	6	4	fluorescent	40	4	2688	702	none	No	960
9	Cresskill	General first floor area	Multi-purpose room behind public room	-	LED exit sign	-	2	1	LED	5	24	240	63	none	No	10
10	Cresskill	General first floor area	Men's room in lobby	75	4' linear T8	electronic	1	4	fluorescent	40	4	448	117	switch	No	160
11	Cresskill	General first floor area	Women's room in lobby	75	4' linear T8	electronic	1	4	fluorescent	40	4	448	117	switch	No	160
12	Cresskill	General first floor area	Hallway between lobby and multi-purpose room	55	4' linear T8	electronic	2	4	fluorescent	40	12	2688	702	switch	No	320
13	Cresskill	General first floor area	Handicap Restroom	70	2' U-shaped T8	electronic	1	2	fluorescent	34	2	95	25	switch	No	68
14	Cresskill	General first floor area	Back vestibule in lobby	77	4' linear T8	electronic	1	4	fluorescent	40	12	1344	351	keyed switch	Yes	160
15	Cresskill	General first floor area	Coat Room	96	4' linear T8	electronic	1	4	fluorescent	40	12	1344	351	switch	No	160
16	Cresskill	General first floor area	Municipal Courtroom	55	4' linear T8	electronic	4	4	fluorescent	40	12	5376	1403	switch	No	640
17	Cresskill	General first floor area	Closet next to Municipal Courtroom	75	4' linear T8	electronic	1	4	fluorescent	40	1	112	29	switch	No	160
18	Cresskill	Office Area	Tax Office	70	4' linear T8	electronic	2	4	fluorescent	40	12	2688	702	switch	No	320
19	Cresskill	Office Area	Tax Office	70	2' U-shaped T8	electronic	2	2	fluorescent	34	12	1142	298	switch	No	136
20	Cresskill	Office Area	Main Office Area	76	4' linear T8	electronic	12	4	fluorescent	40	12	16128	4209	switch	No	1920
21	Cresskill	Office Area	Main Office Area	76	2' U-shaped T8	electronic	3	2	fluorescent	34	12	1714	447	switch	No	204
22	Cresskill	Office Area	Main Office Area	-	LED exit sign	-	1	1	LED	5	24	120	31	none	No	5
23	Cresskill	Office Area	File Storage Area	50	4' linear T8	electronic	3	2	fluorescent	40	12	2016	526	switch	No	240
24	Cresskill	Office Area	Board of Health Office	117	4' linear T8	electronic	3	4	fluorescent	40	12	4032	1052	switch	No	480
25	Cresskill	Office Area	Borough Clerk Office	135	4' linear T8	electronic	3	4	fluorescent	40	12	4032	1052	switch	No	480
26	Cresskill	Office Area	Mayor's Office	102	4' linear T8	electronic	4	4	fluorescent	40	12	5376	1403	switch	No	640
27	Cresskill	Office Area	Mayor's Office	102	20W CFL	-	1	2	CFL	20	1	40	10	switch	No	40
28	Cresskill	Office Area	Mayor's Office	102	20W CFL	-	1	1	CFL	20	1	20	5	switch	No	20
29	Cresskill	Office Area	Administrator's Office	85	4' linear T8	electronic	4	4	fluorescent	40	12	5376	1403	switch	No	640
30	Cresskill	Office Area	Construction Official's Office	105	4' linear T8	electronic	4	4	fluorescent	40	12	5376	1403	switch	No	640
31	Cresskill	Office Area	Construction General's Office	70	4' linear T8	electronic	2	4	fluorescent	40	12	2688	702	switch	No	320
32	Cresskill	Office Area	Construction General's Office	70	4' linear T8	electronic	2	2	fluorescent	40	12	1344	351	switch	No	160
33	Cresskill	Office Area	Hallway between Police Dept. and Office	60	2' U-shaped T8	electronic	4	2	fluorescent	34	12	2285	596	switch	No	272
34	Cresskill	Office Area	Planning and Zoning - Tax Assessor's Office	65	4' linear T8	electronic	2	4	fluorescent	40	12	2688	702	switch	No	320
35	Cresskill	Office Area	Planning and Zoning - Tax Assessor's Office	65	2' U-shaped T8	electronic	2	2	fluorescent	34	12	1142	298	switch	No	136
36	Cresskill	Office Area	Server Room/Storage	60	4' linear T8	electronic	1	4	fluorescent	40	12	1344	351	switch	No	160

37	Cresskill	Office Area	Mechanical Room	75	4' linear T8	electronic	12	2	fluorescent	40	12	8064	2105	switch	No	960
38	Cresskill	Office Area	Kitchen Area	67	4' linear T8	electronic	1	4	fluorescent	40	12	1344	351	switch	No	160
39	Cresskill	Office Area	Back office - Left side office	75	4' linear T8	electronic	3	4	fluorescent	40	12	4032	1052	switch	No	480
40	Cresskill	Office Area	Back office - Left side office	75	2' U-shaped T8	electronic	3	2	fluorescent	34	12	1714	447	switch	No	204
41	Cresskill	Office Area	Back office - Right side office	76	4' linear T8	electronic	2	4	fluorescent	40	12	2688	702	switch	No	320
42	Cresskill	Office Area	Men's Room	45	4' linear T8	electronic	1	4	fluorescent	40	12	1344	351	switch	No	160
43	Cresskill	Office Area	Women's Room	45	4' linear T8	electronic	1	4	fluorescent	40	12	1344	351	switch	No	160
44	Cresskill	Police Department	Captain's Office	26	4' linear T8	electronic	2	4	fluorescent	40	12	2688	981	switch	No	320
45	Cresskill	Police Department	Office	88	4' linear T8	electronic	4	4	fluorescent	40	12	5376	1962	switch	No	640
46	Cresskill	Police Department	Server Room	42	4' linear T8	electronic	1	2	fluorescent	40	2	112	41	switch	No	80
47	Cresskill	Police Department	Squad Room	42	4' linear T8	electronic	2	4	fluorescent	40	12	2688	981	switch	No	320
48	Cresskill	Police Department	Captain/Lieutenant Office	56	4' linear T8	electronic	8	4	fluorescent	40	12	10752	3924	switch	No	1280
49	Cresskill	Police Department	Women's Locker Room/Bathroom	75	4' linear T8	electronic	1	4	fluorescent	40	12	1344	491	switch	No	160
50	Cresskill	Police Department	Women's Locker Room/Bathroom	75	2' U-shaped T8	electronic	1	2	fluorescent	34	12	571	208	switch	No	68
51	Cresskill	Police Department	Janitor's Closet	50	4' linear T8	electronic	1	2	fluorescent	40	2	112	41	switch	No	80
52	Cresskill	Police Department	Detective's Bureau	70	4' linear T8	electronic	6	4	fluorescent	40	12	8064	2943	switch	No	960
53	Cresskill	Police Department	Men's Locker Room area	76	4' linear T8	electronic	1	4	fluorescent	40	12	1344	491	switch	No	160
54	Cresskill	Police Department	Men's Bath in Locker Room area	76	4' linear T8	electronic	1	4	fluorescent	40	12	1344	491	switch	No	160
55	Cresskill	Police Department	Men's Bath in Locker Room area	76	2' U-shaped T8	electronic	1	2	fluorescent	34	12	571	208	switch	No	68
56	Cresskill	Police Department	Interrogation Room	90	4' linear T8	electronic	2	4	fluorescent	40	4	896	327	switch	No	320
57	Cresskill	Police Department	Holding Cell	25	32W CFL	-	1	1	CFL	32	24	768	280	switch	No	32
58	Cresskill	Police Department	Office/Radio Room	53	4' linear T8	electronic	11	4	fluorescent	40	24	29568	10792	switch	No	1760
59	Cresskill	Police Department	Office/Radio Room	-	LED exit sign	-	3	1	LED	5	24	360	131	switch	No	15
60	Cresskill	Police Department	Bathroom in Office/Radio Room	40	2' U-shaped T8	electronic	2	2	fluorescent	34	2	190	69	switch	No	136
61	Cresskill	Police Department	Hallway	45	4' linear T8	electronic	1	4	fluorescent	40	24	2688	981	switch	No	160
62	Cresskill	Police Department	Hallway	45	2' U-shaped T8	electronic	5	2	fluorescent	34	24	5712	2085	switch	No	340
63	Cresskill	Police Department	Hallway	-	Fluorescent Exit Sign	-	2	1	fluorescent	13	24	624	228	switch	No	26
64	Cresskill	Police Department	Sallyport	15	4' linear T8	electronic	9	2	fluorescent	40	12	6048	2208	switch	No	720

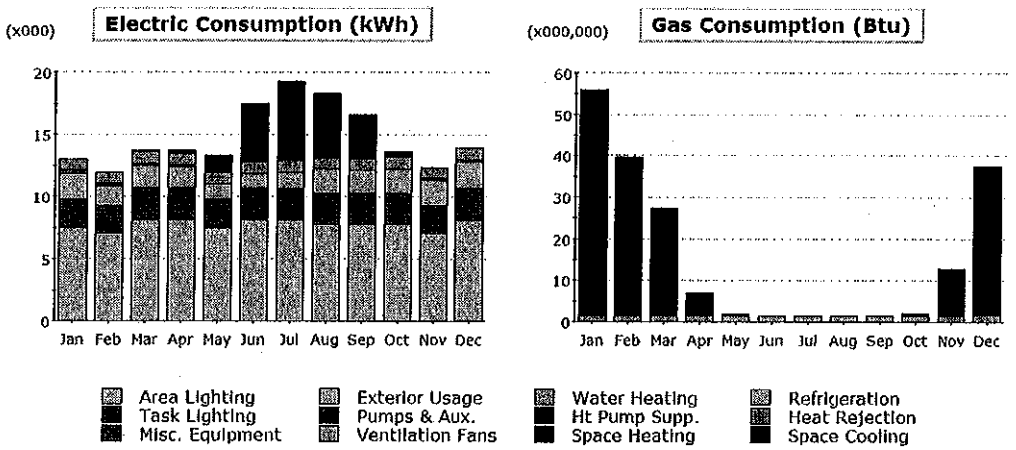
Existing Usage (kWh/year)	86,316
Proposed Usage (kWh/year)	61,707
Annual Existing Cost ($)	$14,131
Annual Proposed Cost ($)	$9,873
Total Savings (kWh)	26,609
Total Savings ($)	$4,258

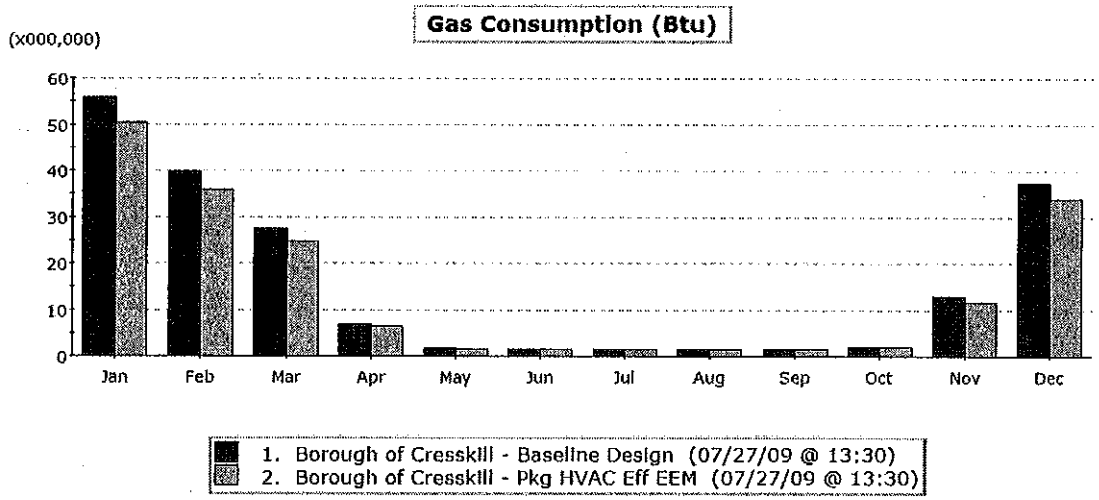
Existing Total Lighting Power (W)	25127	Watts
Existing Lighting Power Density (W/sq.ft)	2.18	W/sq.ft
Proposed Total Lighting Power (W)	24920	Watts
Proposed Lighting Power Density (W/sq.ft)	2.16	W/sq.ft

Appendix B: Third Party Energy Suppliers (ESCOs)

Third Party Electric Suppliers for Orange Rockland Service Territory	Telephone & Web Site
BOC Energy Services, Inc. 575 Mountain Avenue Murray Hill, NJ 07974	(800) 247-2644 www.boc.com
Direct Energy Services, LLC 120 Wood Avenue, Suite 611 Iselin, NJ 08830	(866) 547-2722 www.directenergy.com
Glacial Energy of New Jersey, Inc. 207 LaRoche Avenue Harrington Park, NJ 07640	(877) 569-2841 www.glacialenergy.com
Hess Corporation 1 Hess Plaza Woodbridge, NJ 07097	(800) 437-7872 www.hess.com
Liberty Power Holdings, LLC Park 80 West, Plaza II, Suite 200 Saddle Brook, NJ 07663	(866) 769-03799 www.libertypowercorp.com
Sempra Energy Solutions 581 Main Street, 8th Floor Woodbridge, NJ 07095	(877) 273-6772 www.semprasolutions.com
Strategic Energy, LLC 55 Madison Avenue, Suite 400 Morristown, NJ 07960	(888) 925-9115 www.sel.com
Suez Energy Resources NA, Inc. 333 Thornal Street, 6th Floor Edison, NJ 08837	(888) 999-8374 www.suezenergyresources.com

Third Party Gas Suppliers for PSEG Service Territory	Telephone & Web Site
Cooperative Industries 412-420 Washington Avenue Belleville, NJ 07109	(800) 628-9427 www.cooperativesnet.com
Direct Energy Services, LLC 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 www.retail.dom.com
Gateway Energy Services Corp. 44 Whispering Pines Lane Lakewood, NJ 08701	(800) 805-8586 www.gesc.com
UGI Energy Services, Inc. 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 Corporation 1 Hess Plaza Woodbridge, NJ 07095	(800) 437-7872 www.hess.com
Hudson Energy Services, LLC 545 Route 17 South Ridgewood, NJ 07450	(877) 483-7669 www.hudsonenergyservices.com
Intelligent Energy 2050 Center Avenue, Suite 500 Fort Lee, NJ 07024	(800) 724-1880 www.intelligentenergy.org
Kell & Sons 1 Bergen Blvd. Fairview, NJ 07002	(877) 797-8786 www.systrumenergy.com
Metro Energy Group, LLC 14 Washington Place Hackensack, NJ 07601	(888) 536-3876 www.metroenergy.com
MxEnergy, Inc. 510 Thornall Street, Suite 270 Edison, NJ 08837	(800) 375-1277 www.mxenergy.com
NATGASCO (Mitchell Supreme) 532 Freeman Street Orange, NJ 07050	(800) 840-4427 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 Cherry Hill, NJ 08002	(800) 281-2000 www.pplenergyplus.com
Sempra Energy Solutions 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) 756-3749 www.southjerseyenergy.com
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





Natural Gas Savings from Furnace Replacement