



Steven Winter Associates, Inc.
Architects and Engineers

50 Washington Street
Norwalk, CT 06854
www.swinter.com

Telephone
Facsimile
E-mail:

(203) 857-0200
(203) 852-0741
swinter@swinter.com

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**Local Government Energy Program
Final Energy Audit Report**

For

***Borough of Spring Lake
Police Dept/Goodwill Fire Company
311 Washington Ave
Spring Lake, NJ 07762***

Project Number: LGEA29



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INTRODUCTION

On October 23rd, 26th and 28th, Steven Winter Associates, Inc. (SWA) and PMK Group, a business unit of Birdsall Services Group, (BSG-PMK) performed an energy audit and assessment of the Police Department/Goodwill Fire Company building located in Spring Lake, 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 Police Department/Goodwill Fire Company building structure was built in 1989 and houses the Police Department for the borough as well as the Goodwill Fire Company. The building consists of 16,500 square feet over three floors. There are 14 full time police officers and 12-15 seasonal part-time police officers in the Police Department section of the building. There 16 firemen in the Goodwill Fire Company that occupy the building at various irregular hours. The building is open 24 hours a day 7 days a week.

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 and BSG-PMK estimated the energy and cost savings associated with the installation of each of the recommended energy conservation measures. The findings for the building are 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.

Launched in 2008, the LGEA Program provides subsidized energy audits for municipal and local government-owned facilities, including offices, courtrooms, town halls, police and fire stations, sanitation buildings, transportation structures, schools and community centers. The Program will subsidize 75% of the cost of the audit. If the net cost of the installed measures recommended by the audit, after applying eligible NJ SmartStart Buildings incentives, exceeds the remaining cost of the audit, then that additional 25% will also be paid by the program. The Board of Public Utilities (BPUs) Office of Clean Energy has assigned TRC Energy Services to administer the Program.

EXECUTIVE SUMMARY

This document contains the energy audit report for the Police Department/Goodwill Fire Company building located at 311 Washington Ave, Spring Lake, NJ 07762.

Based on the field visit performed by Steven Winter Associates (SWA) and PMK Group, a business unit of Birdsall Services Group, (BSG-PMK) staff on October 23rd 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.

Current conditions

In the most recent full year of data collected (10/1/08-9/30/09), the building consumed 151,040 kWh or \$22,855.89 worth of electricity and 6,544 therms or \$8,869.77 worth of natural gas. The average aggregated cost of electricity was calculated to be \$0.151/kWh and the average aggregated cost of natural gas was calculated to be \$1.36/therm. With electricity and fossil fuel combined, the building consumed 1,169 MMBtus of energy at a total cost of \$31,725.66.

BSG-PMK has entered energy information about the Police Department/Goodwill Fire Company building in the U.S. Environmental Protection Agency's (EPA) *Energy Star Portfolio Manager* Energy benchmarking system. The building performance rating could not be determined because this mixed use facility is comprised of non-eligible (Other) space type.



Buildings achieving an Energy Star rating of 75 are eligible to apply for the Energy Star award and receive the Energy Star plaque to convey superior performance. These ratings also greatly help when applying for Leadership in Energy and Environmental Design (LEED) building certification through the United States Green Building Council (USGBC). BSG-PMK encourages the Borough of Spring Lake to continue entering utility data in *Energy Star Portfolio Manager* in order to track weather normalized source energy use over time.

The Site Energy Use Intensity is 70.9 kBtu/ft²yr compared to the national average of a police station/fire station building consuming 157 kBtu/ft²yr. Implementing this report's recommendations will reduce use by approximately 24.8 kBtu/ft²yr, which when implemented would make the building energy consumption even lower.

Recommendations (Summary)

Category I Recommendations: Capital Improvements.

- 1) It is recommended that the Borough replace the shingle roof sections immediately in an effort to avoid water infiltration and substrate damage.
- 2) It is recommended that the Borough investigate site drainage, and the integrity of the footing drains as well as the condition of the below grade waterproofing.

Category II Recommendations: Operations & Maintenance

- 1) It is recommended that caulking and sealant around the windows be checked and replaced as it dries and cracks.
- 2) All sink faucets and toilets should be converted to low-flow unit. Low-flow toilets use 1.6 gallons per flush, compared to 3.5 for standard units. Water consumptions for different types of faucets vary. These units are inexpensive, but due to the fact that public buildings in Spring Lake are not billed for water, the payback would be infinitely long, and therefore, this cannot be recommended as an ECM.
- 3) It is recommended to replace and repair all exterior door weather stripping.
- 4) The refrigerant suction line for C-1 (Fire House 2nd floor condenser) that crossing the upper flat roof adjacent to the roof ladder is unsupported. It is recommended that this line be strapped to the refrigerant line in order to avoid future leaks.

Category III: ECMs

At this time, SWA/PMK highly recommends a total of **2** Energy Conservation Measures (ECMs) for the Spring Lake Police Department/Goodwill Fire Company building that are summarized in the following Table 1. The total investment cost for these ECMs with incentives is **\$75,603**. SWA/PMK estimates a first year savings of **\$9,763** with a simple payback of **7.7 years**. SWA/PMK estimates that implementing the highly recommended ECMs will reduce the carbon footprint of the Police Department/Goodwill Fire Company building by **86,837 lbs of CO₂**, which is equivalent to removing approximately 6 cars from the roads each year or avoiding the need of 211 trees to absorb the annual CO₂ generated. SWA also recommends that the Borough of Spring Lake contacts third party energy suppliers in order to negotiate a lower electricity rate. Comparing the current electric rate to average utility rates of similar type buildings in New Jersey, it may be possible to save up to \$0.001/kWh, which would have equated to \$151 for the past 12 months

There are various incentives that the Borough of Spring Lake could apply for that could also help lower the cost of installing the ECMs. SWA/PMK recommends that the Borough of Spring Lake apply 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. A new NJ Clean Power program, Direct Install, could also assist to cover up to 80% of the capital investment. In order to qualify, the facility being upgraded must not have had a peak demand that exceeded 200 kW in any of the preceding 12 months; the highest peak demand for the Police Department/Goodwill Fire Company in the previous year was 45.4 kW.

SCOPE OF WORK – SUMMARY TABLE

Definitions:

SPP: Simple Payback (years)

LoM: Life of Measure (years)

ROI: Return on Investment (%)

Assumptions:

Discount rate:

3.2% per DOE FEMP guidelines

Electricity rate

\$0.15 \$/kWh

Energy price escalation rate:

0% per DOE FEMP guidelines

Gas rate

\$1.36 \$/therm

Avg. Annual Demand: 0.0025132

Area of Building (SF)

16,500

Table 1 - Highly Recommended 0-5 Year Payback ECMs																			
ECM #	ECM description	Source	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	Lighting Upgrade	Similar Projects	\$15,242	\$2,405	\$12,837	40,062	8.39	0	8.28	\$0	\$6,061	15	\$71,324	2.12	3037%	202%	47%	\$59,523	54,884
TOTAL			\$15,242	\$2,405	\$12,837	40,062	8.39	0	8.28	\$0.00	\$6,061	-	\$71,324	2.12	-	-	-	\$59,523	54,884

Table 2 - Recommended Extended-Payback ECMs																			
ECM #	ECM description	Source	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
2	Boiler Upgrade with Outdoor Air Reset and Water Heater Replacement	Contractor - Struble Mechanical Associates, Fairfield, NJ	\$65,000	\$2,234	\$62,766	0	0.00	2,731	16.55	\$0	\$3,701	25	\$63,038	16.96	2%	0%	3%	\$1,685	31,952
TOTAL			\$65,000	\$2,234	\$62,766	0	0.00	2,731	16.55	\$0.00	\$3,701	-	\$63,038	16.96	-	-	-	\$1,685	31,952

1. HISTORIC ENERGY CONSUMPTION

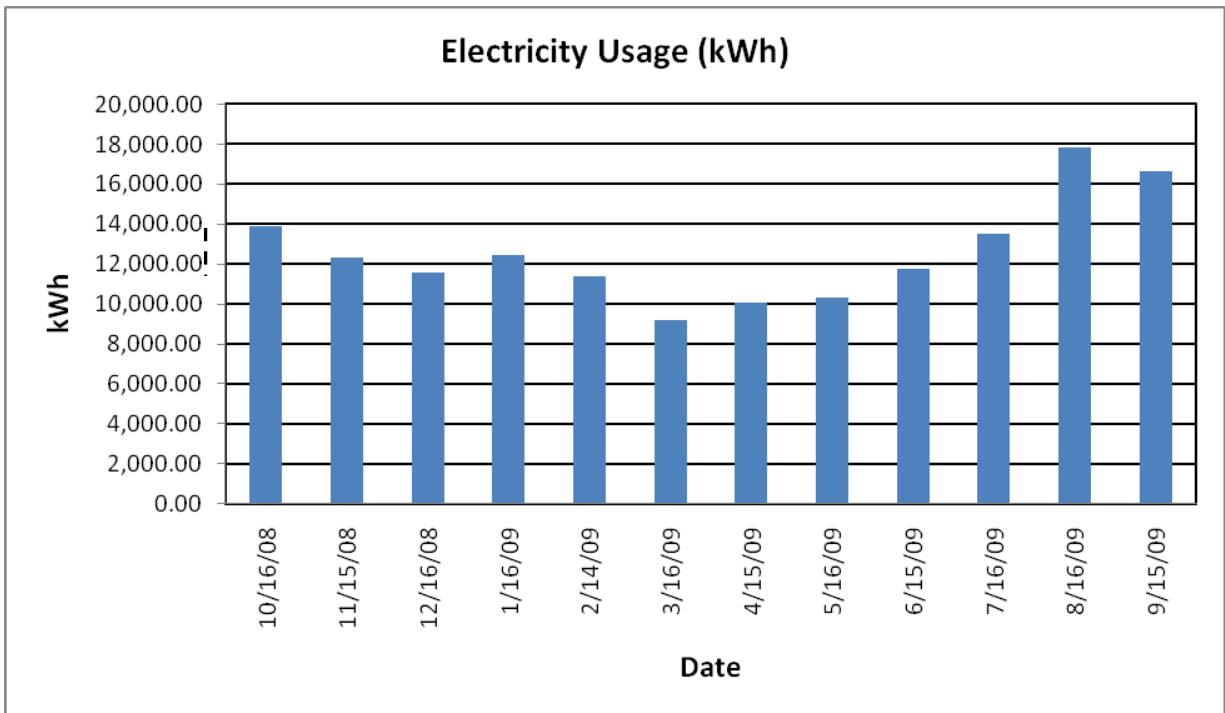
1.1. Energy usage and cost analysis

SWA and BSG-PMK analyzed utility bills from October 2007 through September 2009 that were received from the utility companies supplying the Police Department/Goodwill Fire Company building with electric and natural gas.

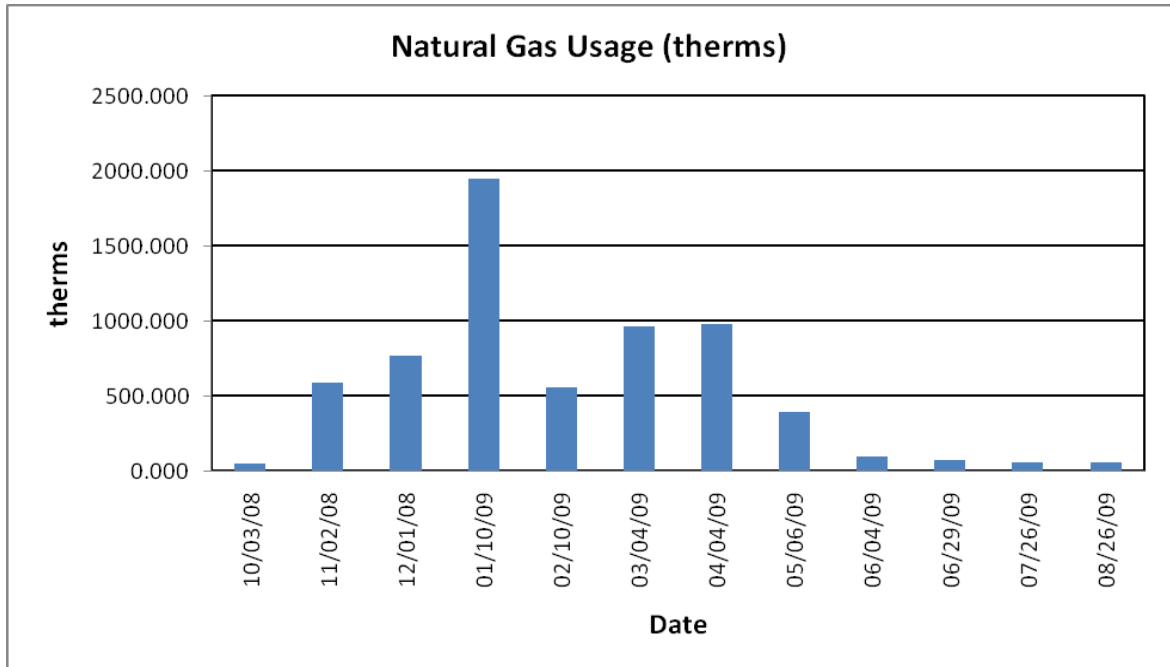
Electricity - The Police Department/Goodwill Fire Company building is currently served by one electric meter. The Police Department/Goodwill Fire Company building currently buys electricity from Jersey Central Power & Light at **an average rate of \$0.15/kWh** based on 12 months of utility bills from October 2008 to September 2009. The Police Department/Goodwill Fire Company building purchased **approximately 151,040 kWh or \$22,855.89 worth of electricity** in the previous year. The average monthly demand was 31.6 kW.

Natural gas - The Police Department/Goodwill Fire Company building is currently served by one meter for natural gas. The Police Department/Goodwill Fire Company building currently buys natural gas from New Jersey Natural Gas at **an average aggregated rate of \$1.36/therm** based on 12 months of utility bills for October 2008 to September 2009. The Police Department/Goodwill Fire Company building purchased **approximately 6,544 therms or \$8,869.77 worth of natural gas** in the previous year.

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



The following chart shows the natural gas usage for the Building based on utility bills for the 2008-2009 billing year



1.2. Utility rate

The Police Department/Goodwill Fire Company building currently purchases electricity from Jersey Central Power & Light at an average rate of \$0.15/kWh based on 12 months of utility bills from October 2008 to September 2009.

The Police Department/Goodwill Fire Company building currently purchases natural gas supply from New Jersey Natural Gas at an average aggregated rate of \$1.36/therm based on 12 months of utility bills for October 2008 to September 2009.

Some of the minor unusual utility fluctuations that showed up for a couple of months on the utility bills may be due to adjustments between estimated and actual meter readings.

1.3. Energy benchmarking

The building information and utility data were entered into the U.S. Environmental Protection Agency’s (EPA) *Energy Star Portfolio Manager* Energy benchmarking system. SWA recommends that the Borough of Spring Lake maintain the Portfolio Manager account at the link below. The account username is *springlakeboro* and the account password is *springlake*. As the account is maintained, SWA can share with the Borough of Spring Lake and allow future data to be added and tracked using the benchmarking tool.

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

2. FACILITY AND SYSTEMS DESCRIPTION

2.1. Building Characteristics

The Police Department/Goodwill Fire Company building consists of one, 16,500 sq. ft. three-story building. The Police Department/Goodwill Fire Company building was built in 1989 consisting of offices, a small jail, two radio rooms, an exercise room, an engine room, a recreation/meeting room, a kitchen, as well as an emergency response conference room.

2.2. Building occupancy profiles

The peak occupancy for the Police Department/Goodwill Fire Company building is approximately 14 employees at any given time during weekdays, during summer there may be 12-15 part time, seasonal employees. The building is typically occupied 24 hours a day 7 days a week by the Police Department. The Goodwill Fire Company occupies the building during irregular hours, weekends and evenings.

2.3. Building envelope

2.3.1. Exterior walls

The exterior walls consist of 4” brick on 8” concrete block with insulated core. The interior walls are painted concrete block and metal stud with insulation, and drywall. The total thickness of the outside walls is about 14”. Overall, exterior and interior finishes of the envelope were found to be in age-appropriate, good condition. None of the regular occupants complained of drafts. On the top floor there seemed to be some water seepage into the walls from the roof, which was repaired recently. Also in the basement there was damage from mold and excess water that was in the process of being repaired. Given the condition and the accounts of the occupants there are no recommendations to upgrade the building exterior.



2.3.2. Roof

The roof at the Police Department is corrugated decking with 2 ½” iso board and a new EPDM white membrane with a Mansard perimeter with asphalt shingles and metal coping. The interior vertical surface of the mansard is clad with vinyl siding. The /Goodwill Fire Company has a pitch roof made up of 6” heavy gauge studs with 8” bat insulation, ¾” exterior grade plywood, 30# felt and asphalt shingles. The lower EPDM roof area contains all of the HVAC equipment.

Visible signs of water damage were noticed in the interior of the 2nd floor that remains from before the EPDM roof was redone. The new EPDM roof was in good condition; however the shingled roof is showing signs of being well beyond its useful life. There were noticeably deteriorated areas containing little or no granular surface, as well as worn or torn edges that fall short of the edge flashing.

As a category I Recommendation, it is recommended that the Borough replace the shingle roof sections immediately in an effort to avoid water infiltration and substrate damage.



2.3.3. Base

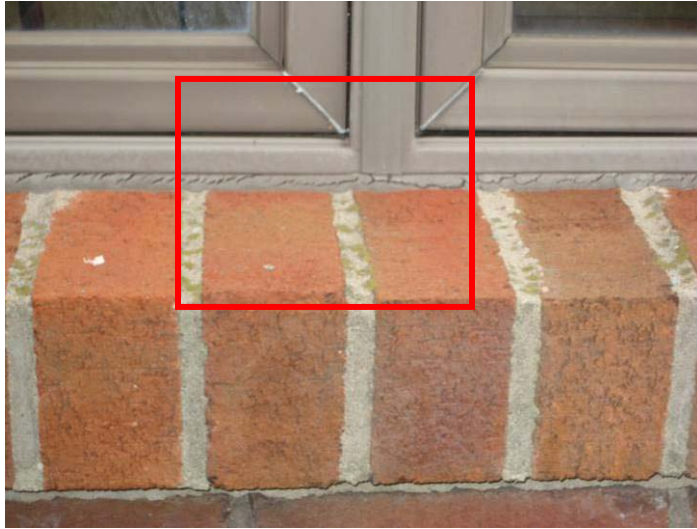
The building's base is a 4” to 7” concrete slab-on grade with a perimeter footing and poured concrete walls. No water seepage through the slab was detected, but occupant complaints of flooding in the pits alongside the building and excess moisture causing mold problems.

As a category I Recommendation, it is recommended that the Borough investigate site drainage, and the integrity of the footing drains as well as the condition of the below grade waterproofing.

2.3.4. Windows

There are 22 triple section thermal casement style windows with 6 of them made from riot proof glass. A visual inspection found the windows to be in good condition.

As an O&M recommendation, it is recommended that caulking and sealant around the windows be checked and replaced as it dries and cracks.



Red box highlights dry, cracked caulking and sealant that will allow air and water to infiltrate the building.

2.3.5. Exterior doors

The vinyl roll up doors were inspected and found to be in good condition with a tight fit to the door jams. The (5) exterior metal door and frames throughout the fire house were found to be in good working and latching condition however, each door was found to have poor to missing weather stripping as was found on the Kawneer aluminum vestibule doors as well creating significant infiltration and heat loss.

It is recommended to replace and repair all exterior weather stripping.

2.3.6. Building air tightness

The building was found to be of very tight construction with the exception of the above noted exterior door openings. In addition there were no indications or complaints of drafts or cold areas throughout the building.

2.4. HVAC systems

2.4.1. Heating

Heating is provided by a gas fired 488R Weil McLain hot water boiler located in the lower level mechanical room. There are four (4) hot water zone pumps and valves controlled return water temperature. Zone 4 supplies the Fire House unit heaters. Zone 3 feeds the 2nd floor baseboard, cabinet heaters, and AC-1 Rh coil (firehouse mtg rm). Zone 2 supplies the 1st and 2nd floor Reheat coils located down stream of RT-1, and RT-2. Zone 1 feeds the basement AC-2 Rh coil, lower lever unit heaters, and basement and 1st Floor fine tube and cabinet heaters. The control valves for the fine tube, cabinet heaters, and Rh coils are non programmable thermostats, pictured below. The boiler, ancillary devices were found to be in fair condition and functioning well. Pump # 2

Category III Recommendation ECM #2;

It is recommended to replace inefficient boiler and ancillary equipment with outdoor reset.



This boiler provides heat Electromechanical thermostat

2.4.2. Cooling

Cooling in the Police Department is provided by (2) Dx roof top units RT-1 and RT-2 that feed the 1st and 2nd floor respectively with 100% economizer mode. One Carrier Split system with ceiling mounted air handler, and roof top condenser cool the basement level. The Goodwill Fire Company has cooling on the second floor only supplied by one Carrier split system. The Condenser is located on the flat roof with the air handler located in the attic space above the 2nd floor bathrooms. Additional cooling is provided to the fire house radio room via split system AC-3. The condenser is located on the flat roof with the internal air handler located just above the radio room of the equipment bays.

The Police Department/Goodwill Fire Company building cooling is controlled through digital, programmable thermostats.

2.4.3. Ventilation

RT-1 and RT-2 provide minimum outside air intake from the roof level and AC-2 (basement level) provides minimum outside air through an external louver.

Exhaust fans located in all bathrooms and above the fire house second floor break/meeting rooms are all controlled by dial timer switches.

2.4.4. Domestic Hot Water

Domestic Hot Water is provided by a 125 gallon gas fired A.O. Smith BTP125199 water heater that is located in the lower level mechanical room. A 1/6 hp circulating pump provides available hot water to restrooms throughout the building. The water heater was found to be in good condition but lacking insulation. BSG-PMK recommends wrapping the unit in a blanket wrap for insulation purposes.

Category III Recommendation ECM #2 ;

It is recommended to replace the existing water heater with high efficiency unit at the same time as the above noted boiler.



A.O. Smith Water Heater to be replaced

2.5. Electrical systems

2.5.1. Lighting

A complete inventory of all interior, exterior, and exit sign light fixtures were examined and documented in Appendix A of this report including an estimated total lighting power consumption. Our initial findings indicate that performing a detailed lighting upgrade per the recommendations in Appendix A will result in an annual savings of \$ 6,061.31 based on the current \$0.15/Kwh and the current occupancy schedule. Implementation of this ECM will cost approximately \$15,242. Currently the Board of Public Utilities (BPU) would offer an estimated Rebate of \$2,405 yielding a net cost of \$12,837 for this project. With a yearly savings of \$6,061.31 the payback on this ECM would be just over 2 years.

2.5.2. Appliances and process

Appliances are limited to 16 personal computers, and dispatch equipment.

2.5.3. Elevators

There is a 25 Hp Cemcolift 3 stop Hydraulic dual door elevator located off the front lobby that service the basement, 1st and 2nd floors. At the time of our inspection this elevator was found to be operating properly and due to infrequent use, there is no proposed energy savings alternative.

2.5.4. Kitchen

There is a kitchen on the second floor in the Goodwill Fire Company portion of the building that houses an older Hobart dishwasher, a newer Turbo Air refrigerator, a six burner natural gas stove and dual oven set up. All are in good condition and do not seem to be used frequently.

2.5.5. Other electrical systems

There are servers and radio rooms with computers and large screens that could have significant energy impacting electrical systems installed at the Police Department/Goodwill Fire Company building, but are vital to the operation of the Police and Fire Departments.

3. EQUIPMENT LIST

Building System	Description	Physical Location	Make/model	Fuel	Space served	Estimated Remaining useful life %
Cooling/ Heating	AC-2 Air Handler Unit, Dx Coil w/ Hw reheat, 208/230 V, 1 ph, 60 Hz, Motor HP 1/2, Motor FLA 3.2	In ceiling of lower storage room/ Roof top condenser	Carrier/ Serial No. 4389H03042/ Product No. 40QHS042320	Electricity	Basement level	80%
Cooling/Heating	RT- 1 Dx, 1 fan, 208/230 volts, 3 ph, 60 hz, 16 RLA, 114 LRA, Serial Number 2107G40364	Roof Top	Carrier/ 50TM- 006-A-501--	Electricity	1 st floor level	80%
Cooling/Heating	RT- 2 Dx, 1 fan, 208/230 volts, 3 ph, 60 hz Serial Number 3499g30457	Roof Top	Carrier/ 50TJ-008- 521GA-	Electricity	2nd floor level	80%
Cooling	Split System Heat Pump, 208/230 V, 1ph, 60 Hz, 0.8 FLA, 12.0 RLA, 37 LRA	Roof Top unit	Mitsubishi/ PUH18G6.US	Electricity	Fire House radio rm	60%
Cooling/Heating	C-1 / Commercial Air Cooled Condensing Unit, Single circuit scroll compressor, aluminum, 208/230V, 3 ph, 60 Hz, 38 RLA 239 LRA 1.5 FLA, 9.3 tons	Roof top	Carrier Gemini/ 38ARZ012---501--	Electricity	Firehouse 2 nd Floor	60%
	AC-1 Air Handler	2 nd floor ceiling	Carrier Gemini/	Firehouse 2 nd Floor		
Heating	Zone 1 Pump, Thermally Protected, AC motor, 3/4 hp, 1.25sf, 1ph 60 hz 208-230/115V, 5.4-5.5/11 Amp	Boiler room Basement	A.O. Smith Century AC Motor/ Catalog No. C429V1/ Part No. 7-193914-20? Serial No. 211075M	Electricity	Basement, 1 st floor fintube & AC-1 Rh	60%
Heating	Zone 2 Pump, Thermally Protected, AC Motor, 1/4 hp, 115V, 60 Hz, 1 ph, 4 Amp, 1.35 SF	Boiler room Basement	General Electric/ 5XBJ003	Electricity	1 st & 2 nd floor Rh's for RT- 1,2	60%

Heating	Zone 3 Pump, Thermally Protected, Cataloge No. 132-096, 1/2 hp, 1.25 SF, 115/230V, 60Hz, 1Ph, 7.0/3.5Amps	Boiler room Basement	Emerson Motor Technology/ S55CXJFM-4927	Electricity	2 nd floor fintub/cab htrs AC-1 Rh (firehouse mtg rm)	60%
Heating	Zone 4 Pump, Thermally Protected, 1/2 hp, 1.25 SF, 115/230V, 60Hz, 8.9/4.5 Amps	Boiler room Basement	General Electric Motors & Industrial Systems/ 5KH36MN3127T	Electricity	Fire house UH-2,3,4	60%
Heating	No. 88 Gas Boiler w/ burner unit,	Boiler room Basement	Weil- McLain/ 488R	Natural Gas	Entire Building	80%
	Boiler Burner & Control Unit, Control Unit: 120 V, 60Hz, 1Ph, 5.0 amps	Boiler room Basement	Gordon Piatt/ WR8-G-05	Natural Gas	Entire Building	30%
DHW	Hot Water Circulation Pump, AC Motor, 1/6 hp, sf 1.75 ph 1, 60 Hz, 115V, 4.0 Amps,	Boiler room Basement	A. O. Smith Century AC Motor/ Catalog No. HW20148/ Serial CA05-16/ Part No. 2-193962-03	Electricity	Domestic hot water circulation	60%
	125 gal capacity, Natural gas water heater, 115V, 1 ph, 5.7 Amps, 1/12 hp	Boiler room Basement	A.O. Smith/ BTP-125-199/ Serial No. SF89-Z9387-Y3	Natural Gas	Building Restrooms	60%
Domestic Water	10, Toilets	Through out building : 1st floor lobby, 2nd floor hall way, Fire house	American Standard	Water	Bathrooms	20%
Domestic Water	12, Sinks	Through out building : 1st floor lobby, 2nd floor hall way, Fire house	-	Water	Bathrooms	60%
Domestic Water	4 Urinals	Mens Rooms in Firehouse	American Standard	Water	Bathrooms	60%
Domestic Water	2 Showers	Mens and Womens room in firehouse	-	Water	Bathrooms	60%

Note: The remaining useful life of a system (in %) is the relationship between the system manufactured and / or installed date and the standard life expectancy of similar equipment based on ASHRAE (2003), ASHRAE Handbook: HVAC Applications, Chapter 36.

4. ENERGY CONSERVATION MEASURES

Based on the assessment of this building, SWA and PMK have separated the investment opportunities into three categories of recommendations:

1. Capital Improvements – Upgrades not directly associated with energy savings
2. Operations and Maintenance – Low Cost/No Cost Measures
3. Energy Conservation Measures – Higher cost upgrades with associated energy savings

Category I Recommendations: Capital Improvements

- 1) It is recommended that the Borough replace the shingle roof sections immediately in an effort to avoid water infiltration and substrate damage.
- 2) It is recommended that the Borough investigate site drainage, and the integrity of the footing drains as well as the condition of the below grade waterproofing.

Category II Recommendations: Operations and Maintenance

- 1) All sink faucets and toilets should be converted to low-flow unit. Low-flow toilets use 1.6 gallons per flush, compared to 3.5 for standard units. Water consumptions for different types of faucets vary. These units are inexpensive, but due to the fact that public buildings in Spring Lake are not billed for water, the payback would be infinitely long, and therefore, this cannot be recommended as an ECM.
- 2) It is recommended that caulking and sealant around the windows be checked and replaced as it dries and cracks.
- 3) It is recommended to replace and repair all exterior weather stripping.

Category III Recommendations: Energy Conservation Measures

Summary table

ECM #	Description
1	Lighting Upgrade
2	Boiler Upgrade with Outdoor Air Reset and Water Heater Replacement

ECM#1: Lighting Upgrade

Description:

Lighting at the Spring Lake Police/Fire Department building consists primarily of T-12 fluorescent bulbs with magnetic ballasts. Standard 40 watt T-12's, for example, require 48 watts of power; by comparison, equivalent 32 watt T-8 fluorescent bulbs with electronic ballasts require 30 watts and have a near equal lighting output, reducing the energy required to power the bulb by 37.5%. It is recommended that all T-12 fixtures with magnetic ballasts be replaced with T-8 fixtures with electronic ballasts. Lighting replacement generally yields a very good payback, due to the fact that most lighting in commercial buildings is used thousands of hours per year and the installation is fairly inexpensive.

Also in the building are incandescent bulbs, of various wattages. It is recommended that these be replaced with compact fluorescents. Only a 26-watt compact fluorescent is needed to produce quantities of light equivalent to that of a 100-watt incandescent, for a 74% reduction in required energy.

Lighting sensors are another way to save energy in commercial buildings, in rooms where lights typically stay on while the space is unoccupied. These sensors turn the lights on when the room is occupied, and off when it is not. This can lead to a reduction in energy use by 50% or more. In this facility, lighting sensors were only recommended in the Exercise Room.

Recommended lighting upgrades are detailed in Appendix A.

Installation cost:

Estimated installed cost: Installation: \$15,242; rebates/incentives: \$2,405; total: \$12,837

Source of cost estimate: Similar projects

Economics:

ECM #	ECM description	Source	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	Lighting Upgrade	Similar Projects	\$15,242	\$2,405	\$12,837	40,062	8.39	0	8.28	\$0	\$6,061	15	\$71,324	2.12	3037%	202%	47%	\$59,523	54,884

Assumptions:

The electric cost used in this ECM was \$0.15/kWh, which was the Police/Fire Department building's average rate for the 12-month period ranging from October 1st, 2008 through September 30th, 2009. The replacements for each lighting fixture, as well as their costs to replace or retrofit each one, the costs to install the lighting sensors, and the rebates and wattages for each fixture are located in Appendix A. There is also a chart of typical pre- and post-sensor usage values, although these values can vary from building-to-building and room-to-room.

Rebates/financial incentives:

The New Jersey SmartStart rebate for upgrading lighting fixtures to LED exit signs and T-8 lamps range from \$10 to \$20 per bulb. The total rebate this ECM qualifies for is \$2,405.

ECM#2: Boiler Upgrade with Outdoor Air Reset Control and Water Heater Replacement

Description:

Heating is provided by a hot water Weil McLain boiler, which is fueled by natural gas. The unit has surpassed its useful life, as has the domestic water heater, a gas-fired AO Smith unit. It is recommended that the boiler be replaced by a high-efficiency condensing boiler. Along with this unit, it is recommended that domestic water heater be replaced. The pumps associated with the heating system, are also beyond their useful lives, and should be replaced with high-efficiency units. It is also recommended that hot water outdoor air temperature reset control be installed. These controls can decrease the hot water supply temperature during low building heating load conditions, and then reset it when the building load increases. Outdoor air reset generally decreases heating costs by 8-15%.

Installation cost:

Estimated installed cost: Installation: \$65,000; incentives/rebates: \$2,234; total: \$62,766
 Source of cost estimate: Contractor (Struble Mechanical Services, Fairfield, NJ)

Economics:

ECM #	ECM description	Source	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
2	Boiler Upgrade with Outdoor Air Reset and Water Heater Replacement	Contractor - Struble Mechanical Associates, Fairfield, NJ	\$65,000	\$2,234	\$62,766	0	0	2,731	16.55	\$0	\$3,701	25	\$63,038	16.96	2%	0%	3%	\$1,685	31,952

Assumptions:

The cost per therm of natural gas that was used, taken from twelve months of the Police/Fire Department's energy bills, was \$1.36. Also taken from the energy bills was the annual heating consumption for the system, 6,544 therms. The annual savings by the new system was the annual fuel consumption, multiplied by the difference between the efficiencies of the new and old systems. In the new system, all replacement units have a 95% efficiency; in the old system, the efficiency, due to the age and condition of the unit, was assumed to be 64%, or 80% of the original efficiency of the system, which was 80%. An additional 8% of the annual fuel consumption was added to the savings, representing the energy saved by the outdoor air reset control. The

input capacity of the old boiler was 1,195 MBH, but the capacity of the new boiler is recommended to be 1,049 MBH, because due to the difference in efficiencies, the output capacity is still higher.

Rebates/financial incentives:

This ECM qualifies for an NJ SmartStart rebate of \$2,234, at \$1.75 per MBH of the proposed boiler and \$2 per MBH of the proposed water heater.

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 a small area of space available.

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.

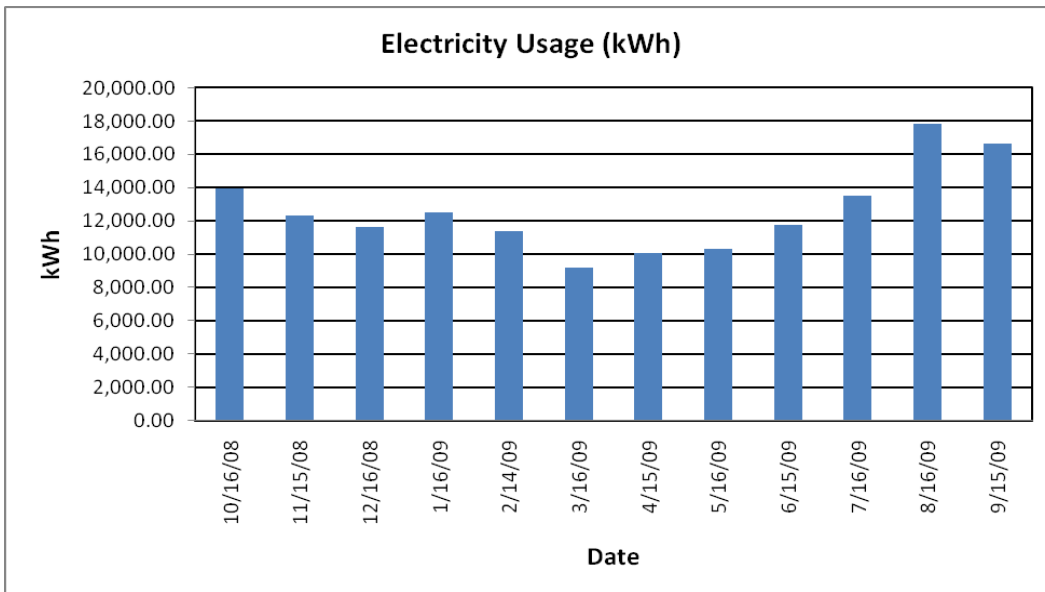
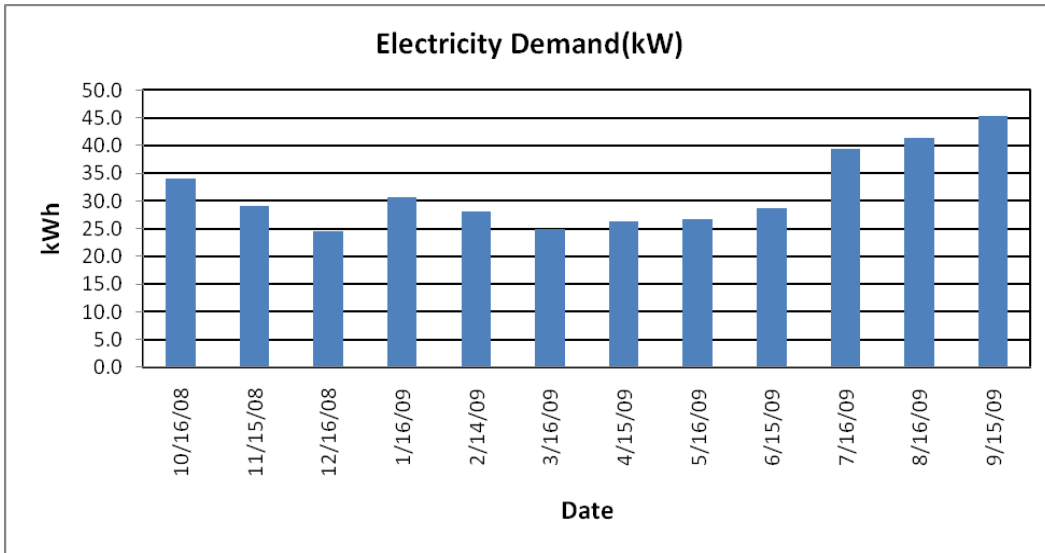
5.6. Wind

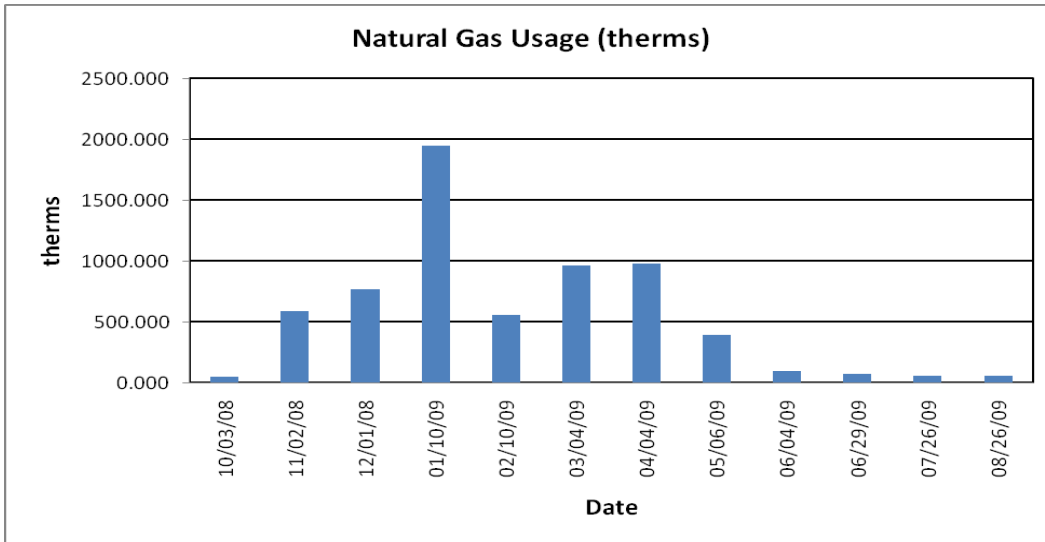
Initial analysis revealed that wind power production could be possible on site. SWA and BSG-PMK recommends installing an anemometer to log data about the wind speed and consistency for one year on the roof or the water tower.

6. ENERGY PURCHASING AND PROCUREMENT STRATEGIES

6.1. Energy Purchasing

The average electrical peak demand for the previous year was 31.6 kW and the maximum peak demand was 39.4 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.

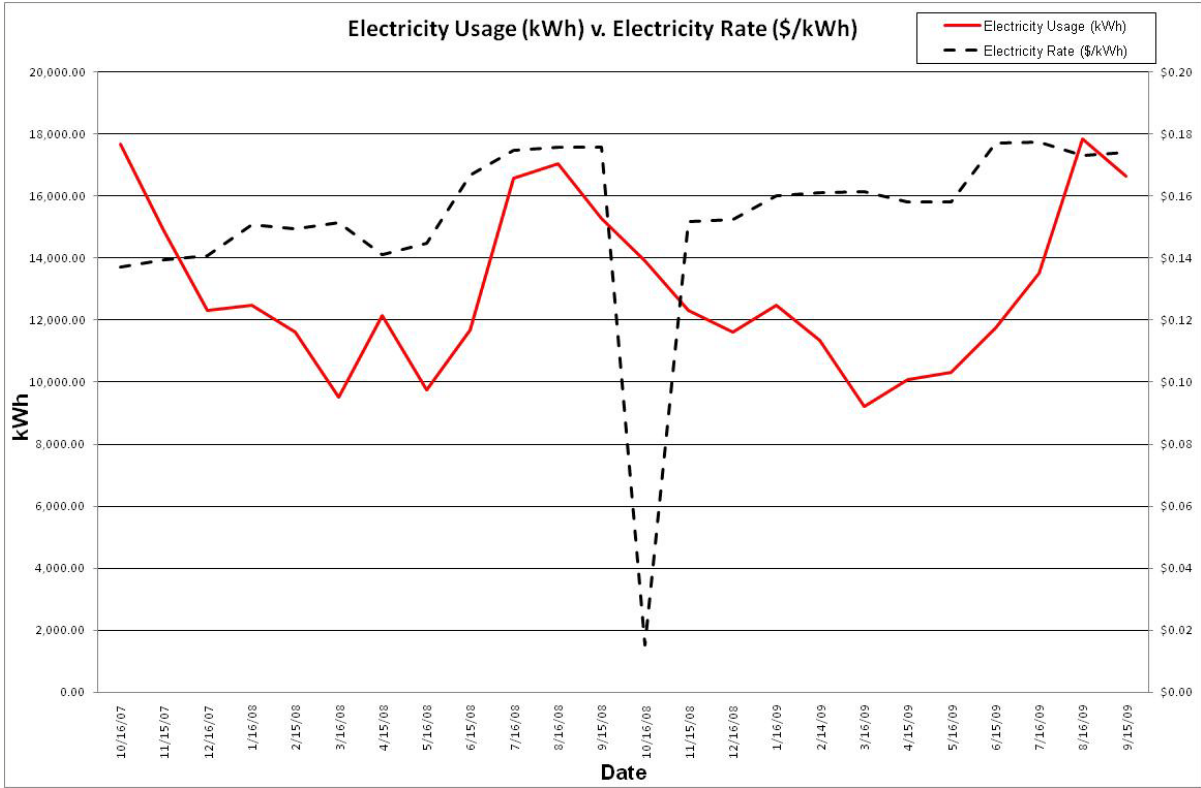




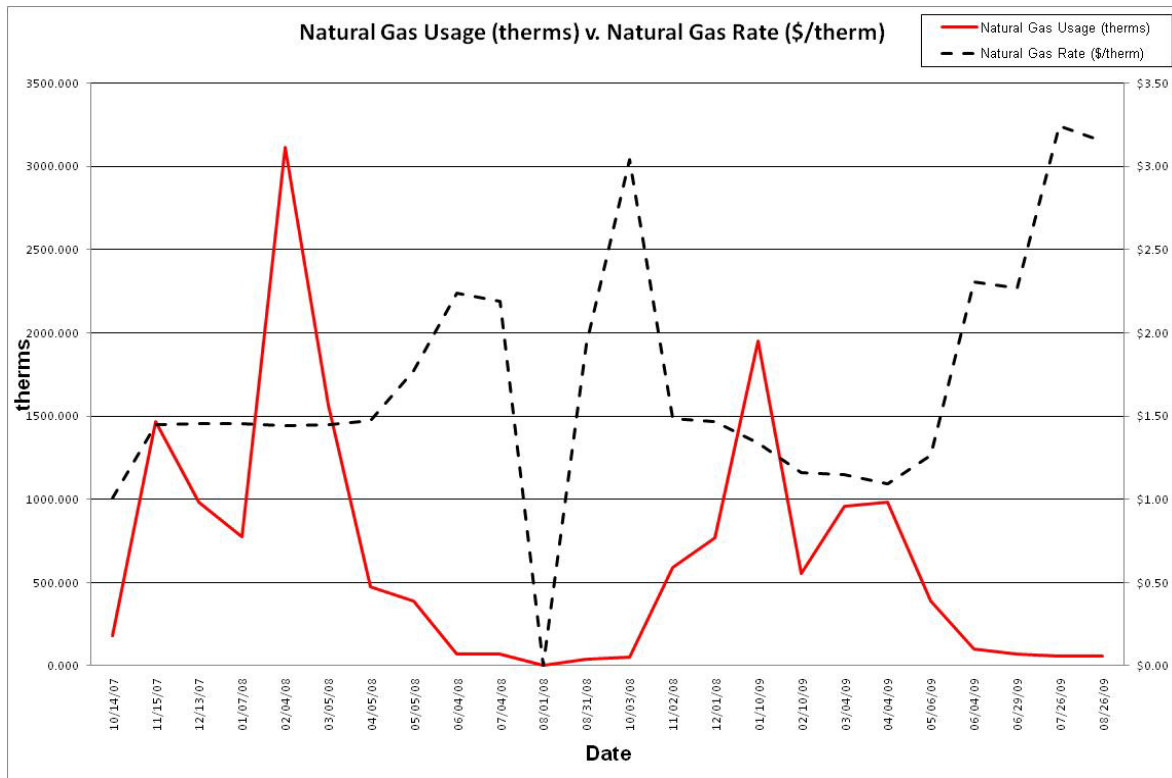
Currently, New Jersey commercial buildings of similar type pay \$0.150/kWh for electricity and \$1.55/therm for natural gas. The electricity rate for the building is \$.151/kWh, which means there is a potential cost savings of \$151 per year. The gas rate for the building is \$1.36/therm which is better than the average gas cost. A small cost savings potential for electricity exists, however this involves contacting third party suppliers and negotiating utility rates. SWA recommends that the Borough of Spring Lake further explore opportunities of purchasing electricity from third party energy suppliers in order to reduce rate fluctuation and ultimately reduce the annual cost of energy for the building. Appendix B contains a complete list of third party energy suppliers for the Borough of Spring Lakes service area.

6.2. Energy Procurement strategies

The building would not be eligible for enrollment in a Demand Response Program, because there isn't the capability at this time to shed a minimum of 150 kW electric demand when requested by the utility during peak demand periods, which is the typical threshold for considering this option.



Electricity prices reflect electricity usage



Natural gas prices fluctuate as expected with usage

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

Room/Area		Existing Fixtures				Upgrade				Recommended Fixtures				Lighting				Occupancy Sensors (ONLY)				Lighting & Occupancy Sensors			
		Type	Ballast	Wattage	Qty.	Type	Type	Ballast	Wattage	Qty.	Fixture Use (hr/yr)	Recommended Controls	Pool-Sensor Use (hr/yr)	Coast (\$)	SmartStart Rebate (\$)	Savings (\$)	Payback (yrs)	Coast (\$)	SmartStart Rebate (\$)	Savings (\$)	Payback (yrs)	Coast (\$)	SmartStart Rebate (\$)	Savings (\$)	Payback (yrs)
<p>Bsg BIRDSALL SERVICES GROUP ENGINEERS & CONSULTANTS</p> <p>Borough of Spring Lake Police/Fire Headquarters 308 Washington Ave, Spring Lake, NJ</p> <p>Lighting Upgrades Estimated Cost: \$14,722.00 SmartStart Rebate: (\$2,570.00) Estimated Cost w/Rebate: \$12,152.00 Estimated Savings: \$6,881.36 Estimated Payback: 2.1</p> <p>Sensor Upgrades (Pre-Lighting Upgrade) Estimated Cost: \$620.00 SmartStart Rebate: (\$35.00) Estimated Cost w/Rebate: \$585.00 Estimated Savings: \$342.78 Estimated Payback: 1.4</p> <p>Lighting & Sensor Upgrades Estimated Cost: \$16,342.00 SmartStart Rebate: (\$2,405.00) Estimated Cost w/Rebate: \$13,937.00 Estimated Savings: \$8,081.51 Estimated Payback: 2.1</p> <p>Average Coef/KW: \$0.15</p>																									
Front Foyer	CFL 14	-	14	4	None	CFL 14	-	14	4	8760		8760	\$0.00	\$0.00	\$0.00	0.00	\$0.00	\$0.00	\$0.00	0.00	\$0.00	\$0.00	\$0.00	\$0.00	0.00
Dispatch Lobby	4F40T12	Magnetic	192	1	Retrofit	4F32T8	Electronic	112	1	8760		8760	\$110.00	\$20.00	\$106.03	0.00	\$0.00	\$0.00	\$0.00	0.00	\$110.00	\$20.00	\$106.03	0.00	0.85
Women's Restroom	2F40T12	Magnetic	96	1	Retrofit	2F32T8	Electronic	60	1	1000		1000	\$70.00	\$10.00	\$65.45	0.00	\$0.00	\$0.00	\$0.00	0.00	\$70.00	\$10.00	\$65.45	0.00	11.00
Men's Restroom	2F40T12	Magnetic	96	1	Retrofit	2F32T8	Electronic	60	1	1000		1000	\$70.00	\$10.00	\$65.45	0.00	\$0.00	\$0.00	\$0.00	0.00	\$70.00	\$10.00	\$65.45	0.00	11.00
Foyer	4F40T12	Magnetic	192	2	Retrofit	4F32T8	Electronic	112	2	8760		8760	\$220.00	\$40.00	\$212.06	0.00	\$0.00	\$0.00	\$0.00	0.00	\$220.00	\$40.00	\$212.06	0.00	0.85
Boiler Room	2F40T12	Magnetic	96	2	Retrofit	2F32T8	Electronic	60	2	600		600	\$140.00	\$30.00	\$65.54	0.00	\$0.00	\$0.00	\$0.00	0.00	\$140.00	\$30.00	\$65.54	0.00	18.36
Electrical Room	2F40T12	Magnetic	96	2	Retrofit	2F32T8	Electronic	60	2	600		600	\$140.00	\$30.00	\$65.54	0.00	\$0.00	\$0.00	\$0.00	0.00	\$140.00	\$30.00	\$65.54	0.00	18.36
Exercise Room	4F40T12	Magnetic	192	6	Retrofit	4F32T8	Electronic	112	6	1000	OBR	400	\$650.00	\$120.00	\$772.62	0.00	\$20.00	\$36.00	\$104.58	4.6	\$1,180.00	\$155.00	\$133.63	7.67	
Hallway	4F40T12	Magnetic	192	2	Retrofit	4F32T8	Electronic	60	2	8760		8760	\$220.00	\$40.00	\$376.41	0.00	\$0.00	\$0.00	\$0.00	0.00	\$220.00	\$40.00	\$376.41	0.00	0.48
Storage Room	2F40T12	Magnetic	96	4	Retrofit	2F32T8	Electronic	60	4	1000		1000	\$280.00	\$40.00	\$21.79	11.02	\$0.00	\$0.00	\$0.00	0.00	\$280.00	\$40.00	\$21.79	11.02	
Hallway	4F40T12	Magnetic	192	1	Retrofit	4F32T8	Electronic	112	1	1000		1000	\$110.00	\$20.00	\$12.10	0.00	\$0.00	\$0.00	\$0.00	0.00	\$110.00	\$20.00	\$12.10	0.00	7.44
Hallway	2F40T12	Magnetic	96	5	Retrofit	2F32T8	Electronic	60	5	1000		1000	\$350.00	\$60.00	\$27.23	0.00	\$0.00	\$0.00	\$0.00	0.00	\$350.00	\$60.00	\$27.23	0.00	11.00
Crime Prevention & Traffic Safety Telephone Room	4F40T12	Magnetic	192	1	Retrofit	4F32T8	Electronic	112	1	600		600	\$110.00	\$20.00	\$7.36	0.00	\$0.00	\$0.00	\$0.00	0.00	\$110.00	\$20.00	\$7.36	0.00	12.39
Photo Laboratory	4F40T12	Magnetic	192	2	Retrofit	4F32T8	Electronic	112	2	2500		2500	\$220.00	\$40.00	\$60.52	0.00	\$0.00	\$0.00	\$0.00	0.00	\$220.00	\$40.00	\$60.52	0.00	2.97
Armory	4F40T12	Magnetic	192	2	Retrofit	4F32T8	Electronic	112	2	2500		2500	\$220.00	\$40.00	\$60.52	0.00	\$0.00	\$0.00	\$0.00	0.00	\$220.00	\$40.00	\$60.52	0.00	2.97
Bottom of Staircase/Elevator area	4F40T12	Magnetic	192	3	Retrofit	4F32T8	Electronic	112	3	8760		8760	\$330.00	\$60.00	\$318.09	0.00	\$0.00	\$0.00	\$0.00	0.00	\$330.00	\$60.00	\$318.09	0.00	0.85
Elevator Room	2F40T12	Magnetic	96	2	Retrofit	2F32T8	Electronic	60	2	600		600	\$140.00	\$30.00	\$65.54	0.00	\$0.00	\$0.00	\$0.00	0.00	\$140.00	\$30.00	\$65.54	0.00	18.36
Apparatus Room	2F40T12	Magnetic	96	41	Retrofit	2F32T8	Electronic	60	41	4380		4380	\$2,870.00	\$410.00	\$978.14	0.00	\$0.00	\$0.00	\$0.00	0.00	\$2,870.00	\$410.00	\$978.14	0.00	2.51
R.C.B.A.	2F40T12	Magnetic	96	3	Retrofit	2F32T8	Electronic	60	3	2000		2000	\$210.00	\$30.00	\$32.68	0.00	\$0.00	\$0.00	\$0.00	0.00	\$210.00	\$30.00	\$32.68	0.00	5.51
Women's Restroom	4F40T12	Magnetic	192	2	Retrofit	4F32T8	Electronic	112	2	1000		1000	\$220.00	\$40.00	\$24.21	0.00	\$0.00	\$0.00	\$0.00	0.00	\$220.00	\$40.00	\$24.21	0.00	7.44
F40T12	Magnetic	48	1	Retrofit	F32T8	Electronic	30	1	1000		1000	\$108.00	\$10.00	\$6.42	0.00	\$0.00	\$0.00	\$0.00	0.00	\$108.00	\$10.00	\$6.42	0.00	37.18	
2F40T12U	Magnetic	96	2	Retrofit	2F32T8U	Electronic	60	2	1000		1000	\$150.00	\$20.00	\$8.59	0.00	\$0.00	\$0.00	\$0.00	0.00	\$150.00	\$20.00	\$8.59	0.00	14.02	
Men's Restroom	inc100	-	60	1	Replace	CFL 14	-	14	1	2000		2000	\$7.00	\$0.00	\$13.92	0.00	\$0.00	\$0.00	\$0.00	0.00	\$7.00	\$0.00	\$13.92	0.00	0.50
Hallway	4F40T12	Magnetic	192	3	Retrofit	4F32T8	Electronic	112	3	2000		2000	\$330.00	\$60.00	\$72.62	1.00	\$0.00	\$0.00	\$0.00	0.00	\$330.00	\$60.00	\$72.62	1.00	3.72
Hallway	2F40T12	Magnetic	96	2	Retrofit	2F17T8	Electronic	31	2	8760		8760	\$140.00	\$20.00	\$66.27	0.00	\$0.00	\$0.00	\$0.00	0.00	\$140.00	\$20.00	\$66.27	0.00	1.81
Hallway	4F40T12	Magnetic	192	1	Replace	4F32T8	Electronic	112	1	8760		8760	\$250.00	\$30.00	\$106.03	0.00	\$0.00	\$0.00	\$0.00	0.00	\$250.00	\$30.00	\$106.03	0.00	2.07
Rear Stairway	2F40T12	Magnetic	96	2	Retrofit	2F32T8	Electronic	60	2	8760		8760	\$140.00	\$20.00	\$96.43	0.00	\$0.00	\$0.00	\$0.00	0.00	\$140.00	\$20.00	\$96.43	0.00	1.26
Hallway	4F40T12	Magnetic	192	2	Retrofit	4F32T8	Electronic	112	2	8760		8760	\$220.00	\$40.00	\$212.06	0.00	\$0.00	\$0.00	\$0.00	0.00	\$220.00	\$40.00	\$212.06	0.00	0.85
Radio Room	2F40T12	Magnetic	96	2	Retrofit	2F32T8	Electronic	60	2	2500		2500	\$140.00	\$30.00	\$27.23	0.00	\$0.00	\$0.00	\$0.00	0.00	\$140.00	\$30.00	\$27.23	0.00	4.41
Front Stairway	4F40T12	Magnetic	192	2	Retrofit	4F32T8	Electronic	112	2	8760		8760	\$220.00	\$40.00	\$212.06	0.00	\$0.00	\$0.00	\$0.00	0.00	\$220.00	\$40.00	\$212.06	0.00	0.85
Firemen's Kitchen	4F40T12	Magnetic	192	2	Retrofit	4F32T8	Electronic	112	2	2000		2000	\$220.00	\$40.00	\$48.42	0.00	\$0.00	\$0.00	\$0.00	0.00	\$220.00	\$40.00	\$48.42	0.00	3.72
Meeting area/ Rec Room	4F40T12	Magnetic	192	11	Retrofit	4F32T8	Electronic	112	11	2000		2000	\$1,210.00	\$200.00	\$356.29	0.00	\$0.00	\$0.00	\$0.00	0.00	\$1,210.00	\$200.00	\$356.29	0.00	3.72
Storage Room	inc100	-	100	7	Replace	CFL 26	-	26	7	2000		2000	\$161.00	\$0.00	\$156.75	0.00	\$0.00	\$0.00	\$0.00	0.00	\$161.00	\$0.00	\$156.75	0.00	1.03
Storage Room	4F40T12	Magnetic	192	2	Retrofit	4F32T8	Electronic	112	2	1000		1000	\$220.00	\$40.00	\$24.21	7.44	\$0.00	\$0.00	\$0.00	0.00	\$220.00	\$40.00	\$24.21	7.44	
Trophy Case	inc100	-	100	3	Replace	CFL 26	-	26	3	1100		1100	\$65.00	\$0.00	\$36.95	1.87	\$0.00	\$0.00	\$0.00	0.00	\$65.00	\$0.00	\$36.95	1.87	
Poker Table & Pool table	inc100	-	100	5	Replace	CFL 26	-	26	5	1100		1100	\$115.00	\$0.00	\$61.58	1.87	\$0.00	\$0.00	\$0.00	0.00	\$115.00	\$0.00	\$61.58	1.87	
Executive Office	4F40T12	Magnetic	192	1	Retrofit	4F32T8	Electronic	112	1	2000		1800	\$110.00	\$20.00	\$24.21	3.72	\$0.00	\$0.00	\$6.81	0.00	\$110.00	\$20.00	\$27.50	3.26	
Goodwill Line Office	4F40T12	Magnetic	192	2	Retrofit	4F32T8	Electronic	112	2	2000		2000	\$220.00	\$40.00	\$48.42	0.00	\$0.00	\$0.00	\$0.00	0.00	\$220.00	\$40.00	\$48.42	0.00	3.72
Chief Assistant Chief	4F40T12	Magnetic	192	1	Retrofit	4F32T8	Electronic	112	1	2000		2000	\$110.00	\$20.00	\$24.21	0.00	\$0.00	\$0.00	\$0.00	0.00	\$110.00	\$20.00	\$24.21	0.00	3.72
Womens Rest room	4F40T12	Magnetic	192	2	Retrofit	4F32T8	Electronic	112	2	1000		1000	\$220.00	\$40.00	\$24.21	0.00	\$0.00	\$0.00	\$0.00	0.00	\$220.00	\$40.00	\$24.21	0.00	7.44
Hallway	2F40T12	Magnetic	96	1	Retrofit	2F32T8	Electronic	60	1	1000		1000	\$70.00	\$10.00	\$65.45	0.00	\$0.00	\$0.00	\$0.00	0.00	\$70.00	\$10.00	\$65.45	0.00	11.00
Men's Restroom	4F40T12	Magnetic	192	2	Retrofit	4F32T8	Electronic	112	2	1000		1000	\$220.00	\$40.00	\$24.21	0.00	\$0.00	\$0.00	\$0.00	0.00	\$220.00	\$40.00	\$24.21	0.00	7.44
Hallway	2F40T12	Magnetic	96	1	Retrofit	2F32T8	Electronic	60	1	1000		1000	\$70.00	\$10.00	\$65.45	0.00	\$0.00	\$0.00	\$0.00	0.00	\$70.00	\$10.00	\$65.45	0.00	11.00
Hallway	2F40T12	Magnetic	96	8	Retrofit	2F32T8	Electronic	60	8	8760		8760	\$560.00	\$80.00	\$381.71	0.00	\$0.00	\$0.00	\$0.00	0.00	\$560.00	\$80.00	\$381.71	0.00	1.26
Hallway	4F40T12	Magnetic	192	10	Retrofit	4F32T8	Electronic	112	10	8760		8760	\$1,100.00	\$200.00	\$1,060.31	0.00	\$0.00	\$0.00	\$0.00	0.00	\$1,100.00	\$200.00	\$1,060.31	0.00	0.85
Chief's Office	4F40T12	Magnetic	192	2	Retrofit	4F32T8	Electronic	112	2	2600		2600	\$220.00	\$40.00	\$62.54	0.00	\$0.00	\$0.00	\$0.0						

Appendix B: Third Party Energy Suppliers (ESCOs)

Third Party Electric Suppliers for PSEG Service Territory	Telephone & Web Site	Third Party Gas Suppliers for Elizabethtown Gas Co. Service Territory	Telephone & Web Site
Hess Corporation 1 Hess Plaza Woodbridge, NJ 07095	(800) 437-7872 www.hess.com	Cooperative Industries 412-420 Washington Avenue Belleville, NJ 07109	(800) 628-9427 www.cooperativenet.com
American Powernet Management, LP 437 North Grove St. Berlin, NJ 08009	(877) 977-2636 www.americanpowernet.com	Direct Energy Services, LLC 120 Wood Avenue, Suite 611 Iselin, NJ 08830	(866) 547-2722 www.directenergy.com
BOC Energy Services, Inc. 575 Mountain Avenue Murray Hill, NJ 07974	(800) 247-2644 www.boc.com	Gateway Energy Services Corp. 44 Whispering Pines Lane Lakewood, NJ 08701	(800) 805-8586 www.gesc.com
Commerce Energy, Inc. 4400 Route 9 South, Suite 100 Freehold, NJ 07728	(800) 556-8457 www.commerceenergy.com	UGI Energy Services, Inc. 704 East Main Street, Suite 1 Moorestown, NJ 08057	(856) 273-9995 www.ugieneryservices.com
ConEdison Solutions 535 State Highway 38 Cherry Hill, NJ 08002	(888) 665-0955 www.conedsolutions.com	Great Eastern Energy 116 Village Riva, Suite 200 Princeton, NJ 08540	(888) 651-4121 www.greateastern.com
Constellation NewEnergy, Inc. 900A Lake Street, Suite 2 Ramsey, NJ 07446	(888) 635-0827 www.newenergy.com	Glacial Energy of New Jersey, Inc. 207 LaRoche Avenue Harrington Park, NJ 07640	(877) 569-2841 www.glacialenergy.com
Credit Suisse, (USA) Inc. 700 College Road East Princeton, NJ 08450	(212) 538-3124 www.creditsuisse.com	Hess Corporation 1 Hess Plaza Woodbridge, NJ 07095	(800) 437-7872 www.hess.com
Direct Energy Services, LLC 120 Wood Avenue, Suite 611 Iselin, NJ 08830	(866) 547-2722 www.directenergy.com	Intelligent Energy 2050 Center Avenue, Suite 500 Fort Lee, NJ 07024	(800) 724-1880 www.intelligentenergy.org
FirstEnergy Solutions 300 Madison Avenue Morristown, NJ 07926	(800) 977-0500 www.fes.com	Metromedia Energy, Inc. 6 Industrial Way Eatontown, NJ 07724	(877) 750-7046 www.metromediaenergy.com
Glacial Energy of New Jersey, Inc. 207 LaRoche Avenue Harrington Park, NJ 07640	(877) 569-2841 www.glacialenergy.com	MxEnergy, Inc. 510 Thornall Street, Suite 270 Edison, NJ 08837	(800) 375-1277 www.mxenergy.com
Metro Energy Group, LLC 14 Washington Place Hackensack, NJ 07601	(888) 536-3876 www.metroenergy.com	NATGASCO (Mitchell Supreme) 532 Freeman Street Orange, NJ 07050	(800) 840-4427 www.natgasco.com
Integrus Energy Services, Inc. 99 Wood Ave, South, Suite 802 Iselin, NJ 08830	(877) 763-9977 www.integrusenergy.com	Pepco Energy Services, Inc. 112 Main Street Lebanon, NJ 08833	(800) 363-7499 www.pepco-services.com
Liberty Power Delaware, LLC Park 80 West Plaza II, Suite 200 Saddle Brook, NJ 07663	(866) 769-3799 www.libertypowercorp.com	PPL EnergyPlus, LLC 811 Church Road Cherry Hill, NJ 08002	(800) 281-2000 www.pplenergyplus.com
Liberty Power Holdings, LLC Park 80 West Plaza II, Suite 200 Saddle Brook, NJ 07663	(800) 363-7499 www.libertypowercorp.com	South Jersey Energy Company One South Jersey Plaza, Route 54 Folsom, NJ 08037	(800) 756-3749 www.southjerseyenergy.com
Pepco Energy Services, Inc. 112 Main St. Lebanon, NJ 08833	(800) 363-7499 www.pepco-services.com	Sprague Energy Corp. 12 Ridge Road Chatham Township, NJ 07928	(800) 225-1560 www.spragueenergy.com
PPL EnergyPlus, LLC 811 Church Road Cherry Hill, NJ 08002	(800) 281-2000 www.pplenergyplus.com	Woodruff Energy 73 Water Street Bridgeton, NJ 08302	(800) 557-1121 www.woodruffenergy.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		
Strategic Energy, LLC 55 Madison Avenue, Suite 400 Morristown, NJ 07960	(888) 925-9115 www.sel.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 Moorestown, NJ 08057	(856) 273-9995 www.ugieneryservices.com		

Appendix C: Historical Utility Billing Data

Electric:

Borough of Spring Lake				Account Number	10016760165 JCP&L							
Police Dept-Goodwill Firehouse				SF	16500							
311 Washington Ave				Rate	GSCM							
Spring Lake, NJ 07762												

From	To	Mid-Period	Month-Year	Usage (kWh)	Demand (kW)	Electric Cost	Season	HDD	Est. Baseload kWh/month	Period Length (days)	Avg. rate \$/kWh
10/1/2007	10/31/2007	10/16/07	Oct-07	17,680.00	38.6	\$2,423.22		182	09200	30	\$0.14
11/1/2007	11/30/2007	11/15/07	Nov-07	14,880.00	37.0	\$2,076.43		642	09200	29	\$0.14
12/1/2007	12/31/2007	12/16/07	Dec-07	12,320.00	47	\$1,734.43		901	09200	30	\$0.14
1/1/2008	1/31/2008	1/16/08	Jan-08	12,480.00	31.8	\$1,882.19		950	09200	30	\$0.15
2/1/2008	2/29/2008	2/15/08	Feb-08	11,600.00	47.0	\$1,731.76		849	09200	28	\$0.15
3/1/2008	3/31/2008	3/16/08	Mar-08	9,520.00	47.0	\$1,441.15		694	09200	30	\$0.15
4/1/2008	4/30/2008	4/15/08	Apr-08	12,160.00	47.0	\$1,714.87		374	09200	29	\$0.14
5/1/2008	5/31/2008	5/16/08	May-08	9,760.00	47.0	\$1,412.14		257	09200	30	\$0.14
6/1/2008	6/30/2008	6/15/08	Jun-08	11,680.00	30.4	\$1,949.65		28	09200	29	\$0.17
7/1/2008	7/31/2008	7/16/08	Jul-08	16,560.00	34.8	\$2,892.57		6	09200	30	\$0.17
8/1/2008	8/31/2008	8/16/08	Aug-08	17,040.00	38.4	\$2,994.41		38	09200	30	\$0.18
9/1/2008	9/30/2008	9/15/08	Sep-08	15,280.00	37.0	\$2,687.41		80	09200	29	\$0.18
10/1/2008	10/31/2008	10/16/08	Oct-08	13,920.00	34.1	\$211.43		380	09200	30	\$0.02
11/1/2008	11/30/2008	11/15/08	Nov-08	12,320.00	29.2	\$1,869.17		628	09200	29	\$0.15
12/1/2008	12/31/2008	12/16/08	Dec-08	11,600.00	24.5	\$1,766.83		848	09200	30	\$0.15
1/1/2009	1/31/2009	1/16/09	Jan-09	12,480.00	30.6	\$1,999.83		1173	09200	30	\$0.16
2/1/2009	2/28/2009	2/14/09	Feb-09	11,360.00	28.1	\$1,830.99		820	09200	27	\$0.16
3/1/2009	3/31/2009	3/16/09	Mar-09	9,200.00	25.0	\$1,484.85		747	09200	30	\$0.16
4/1/2009	4/30/2009	4/15/09	Apr-09	10,080.00	26.4	\$1,595.07		422	09200	29	\$0.16
5/1/2009	5/31/2009	5/16/09	May-09	10,320.00	26.7	\$1,631.13		176	09200	30	\$0.16
6/1/2009	6/30/2009	6/15/09	Jun-09	11,760.00	28.8	\$2,082.31		61	09200	29	\$0.18
7/1/2009	7/31/2009	7/16/09	Jul-09	13,520.00	39.4	\$2,396.59		26	09200	30	\$0.18
8/1/2009	8/31/2009	8/16/09	Aug-09	17,840.00	41.4	\$3,089.10		7	09200	30	\$0.17
9/1/2009	9/30/2009	9/15/09	Sep-09	16,640.00	45.4	\$2,898.59		97	09200	29	\$0.17

Natural Gas:

Account number	33311617010 NJN											
Rate	xxxxxx											
Factor	conversion factor											
SF	16500											

From	To	Mid-Period	CCF	Usage (therms)	Gas Cost (\$)	Season	HDD	Period Length (days)	Therms/day	Btu/sqft/hdd	Avg. Rate (\$/therms)
9/29/2007	10/30/2007	10/14/07		180.217	\$181.31		182	31	5.813	6.001	\$1.01
10/31/2007	11/30/2007	11/15/07		1468.201	\$2,131.22		642	30	48.940	13.860	\$1.45
12/1/2007	12/26/2007	12/13/07		984.742	\$1,434.40		901	25	39.390	6.624	\$1.46
12/27/2007	1/18/2008	01/07/08		775.545	\$1,128.36		950	22	35.252	4.948	\$1.45
1/19/2008	2/20/2008	02/04/08		3117.105	\$4,504.06		849	32	97.410	22.252	\$1.44
2/21/2008	3/19/2008	03/05/08		1565.692	\$2,271.73		694	27	57.989	13.673	\$1.45
3/20/2008	4/21/2008	04/05/08		471.809	\$695.12		374	32	14.744	7.646	\$1.47
4/22/2008	5/19/2008	05/05/08		390.414	\$692.57		257	27	14.460	9.207	\$1.77
5/20/2008	6/20/2008	06/04/08		70.303	\$157.31		28	31	2.268	15.217	\$2.24
6/21/2008	7/18/2008	07/04/08		67.379	\$147.38		6	27	2.496	68.060	\$2.19
7/19/2008	8/15/2008	08/01/08		0.000	\$15.10		38	27	0.000	0.000	
8/16/2008	9/16/2008	08/31/08		37.890	\$73.24		80	31	1.222	2.870	\$1.93
9/17/2008	10/20/2008	10/03/08		53.621	\$163.24		380	33	1.625	0.855	\$3.04
10/21/2008	11/14/2008	11/02/08		590.340	\$875.20		628	24	24.598	5.697	\$1.48
11/15/2008	12/18/2008	12/01/08		767.696	\$1,125.66		848	33	23.264	5.487	\$1.47
12/19/2008	2/2/2009	01/10/09		1950.299	\$2,614.23		1173	45	43.340	10.077	\$1.34
2/3/2009	2/17/2009	02/10/09		556.776	\$646.09		820	14	39.770	4.115	\$1.16
2/18/2009	3/18/2009	03/04/09		961.522	\$1,102.39		747	28	34.340	7.801	\$1.15
3/19/2009	4/20/2009	04/04/09		981.541	\$1,073.27		422	32	30.673	14.097	\$1.09
4/21/2009	5/21/2009	05/06/09		391.575	\$494.49		176	30	13.053	13.484	\$1.26
5/22/2009	6/18/2009	06/04/09		98.371	\$226.63		61	27	3.643	9.774	\$2.30
6/19/2009	7/10/2009	06/29/09		72.284	\$163.92		26	21	3.442	16.850	\$2.27
7/11/2009	8/10/2009	07/26/09		59.628	\$193.44		7	30	1.988	51.626	\$3.24
8/11/2009	9/10/2009	08/26/09		60.668	\$191.21		97	30	2.022	3.791	\$3.15