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Local Government Energy Program
Energy Audit Report

For

Municipal Annex Building
20 Cooke Avenue
Carteret, NJ 07008

Project Number: LGEA24

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INTRODUCTION

On November 13, 2009 and January 7, 2010, Steven Winter Associates, Inc (SWA) and PMK Group, Inc., a business unit of Birdsall Services Group (BSG-PMK), performed an energy audit and assessment for the Municipal Annex. The building is located at 20 Cooke Ave, Carteret, NJ 07008, in Middlesex County. The current conditions and energy-related information were collected in order to analyze the implementation of energy conservation measures for the building.

The two-story facility, built in 1934 is 6,164 square feet in area. The building includes the borough's several municipal departments and offices. The building is open from 8:00am to 4:00pm

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 buildings.

Launched in 2008, the Local Government Energy Audit (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 the additional 25% will also be paid by the program. The Board of Public Utilities (BPU) Office of Clean Energy has assigned TRC Energy Services to administer the Program.

EXECUTIVE SUMMARY

This document contains the energy audit report for the Municipal Annex, located at 20 Cooke Ave, Carteret, New Jersey 07008.

Based on the field visits performed by SWA and BSG-PMK staff on November 13, 2009 and January 7, 2010 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, March, 2008 through February, 2009, the Municipal Annex consumed a total of 54,000 kWh of electricity for a total cost of $10,121, and 3,847 therms of natural gas for a total cost of $4,050.

With electricity and fossil fuel combined, the building consumed 569.0 MMBtus of energy at a total cost of $14,171.

BSG-PMK has entered energy information about the Municipal Annex in the US Environmental Protection Agency's (EPA) *Energy Star Portfolio Manager* energy benchmarking system. 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. 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 2009 baseline to track the changes in energy consumption associated with the energy improvements.

The building performance rating could not be determined because the electric-utility consumption data provided is greater than 120 days old.

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 Carteret to continue entering utility data in *Energy Star Portfolio Manager* in order to track whether normalized source energy use over time.

(Refer to Section 1.3 for Energy Star Rating)

Category I Recommendations: Capital Improvement Measures

1) Based on the results of BSG-PMK's survey, no capital improvements are recommended, as the facility is well maintained.

Category II Recommendations: Operations and Maintenance

1) Based on the results of BSG-PMK's survey, no operations and maintenance measures are recommended, as the facility is well maintained.

Category III Recommendations: Energy Conservation Measures - Upgrades with associated energy savings

At this time, SWA/BSG-PMK highly recommends a total of three (3) Energy Conservation Measures (ECMs) for the Annex which are summarized in the following Table 1. The total investment cost for these ECMs, without incentives, is **$82,260,** and with incentives, is **$18,050**. SWA/BSG-PMK estimates a first year savings of **$2,793** with a simple payback of **6.5 years**. SWA estimates that implementing the highly recommended ECMs will reduce the carbon footprint of the Annex building by **29,016 lbs of CO_2**. SWA also recommends that the Borough of Carteret 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 $ 0.04/kWh, which would have equated to $2,021.00 for the past 12 months

There are various incentives that the Borough of Carteret could apply for that could also help lower the cost of installing the ECMs. SWA/BSG-PMK recommends that the Borough 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 Annex in the previous year was 30.4 kW.

The following tables summarize the proposed Energy Conservation Measures (ECM) and their economic relevance:

SCOPE OF WORK – SUMMARY TABLE

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 Upgrades	Empirical Data	$800	$0	$800	1,440	0.5	0	0.80	$0.00	$274	15	$3,219	2.92	302%	20%	33%	$2,109	1,973
	Occupancy Sensors		$460	$160	$300	558	0.2	0	0.31	$0.00	$106	10	$895	2.83	198%	20%	33%	$604	764
TOTAL			$1,260	$160	$1,100	1,998	0.7	0	1.11	$0.00	$380	-	$4,114	2.90	-	-	-	$2,713	2,737

Table 2 - Recommended 5-10 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
2	Upgrade Boiler and Install Outdoor Air Reset Control	Similar Projects	$80,000	$64,000	$16,000	0	0.0	2,198	35.67	$0.00	$2,314.48	25	$39,419	6.91	146%	6%	14%	$24,302	25,722
3	Convert Electric Water Heater to Natural Gas	Similar Projects	$1,000	$50	$950	730	0.3	-38	-0.21	$0.00	$99	13	$1,038	9.61	9%	1%	5%	$102	558
TOTAL			$81,000	$64,050	$16,950	730	0.3	2,161	35.46	$0.00	$2,413	-	$40,457	7.02	-	-	-	$24,404	26,280

ROI: Return on Investment (%)

Assumptions:

Discount rate:	3.2%	per DOE FEMP guidelines	Electricity rate:	$0.19 $/kWh
Energy price escalation rate:	0%	per DOE FEMP guidelines	Gas rate:	$1.05 $/therm

Area of Building (SF) 6,164

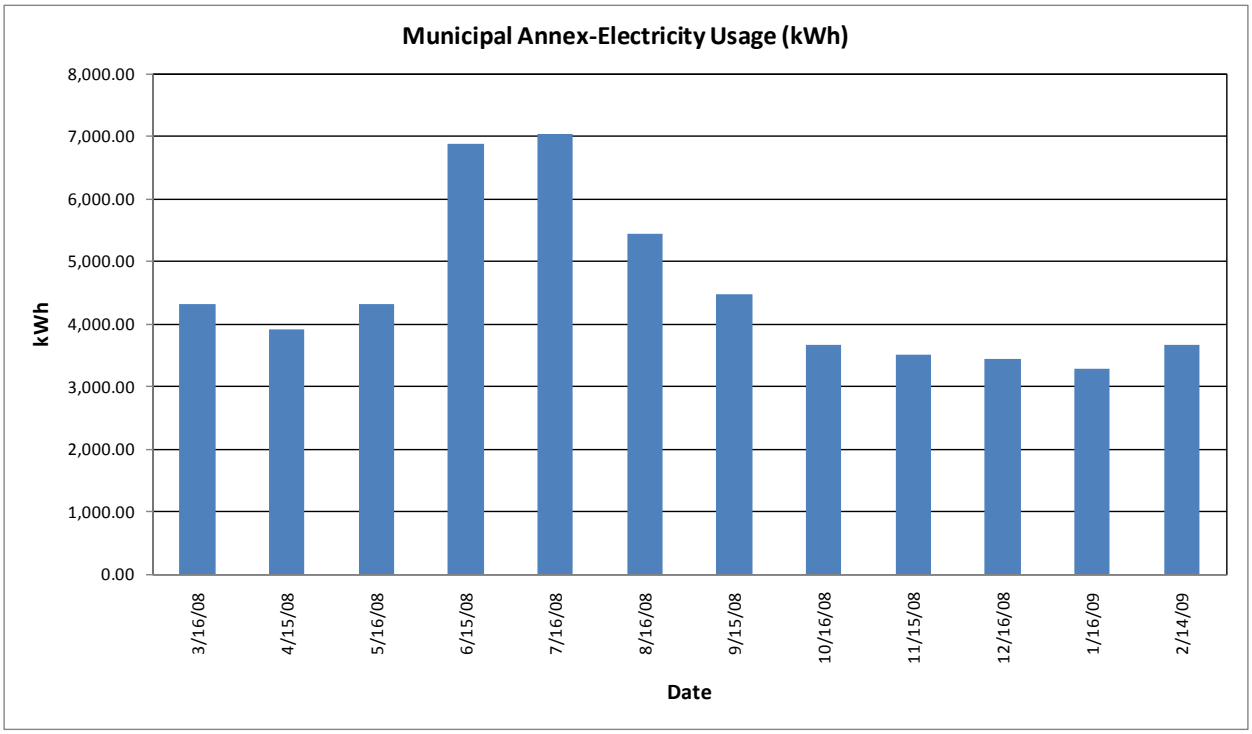
1. HISTORIC ENERGY CONSUMPTION

1.1. Energy usage and cost analysis

SWA/BSG-PMK analyzed utility bills from March, 2008 through February, 2009 that were received from the utility companies supplying the Municipal Annex with electric and natural gas.

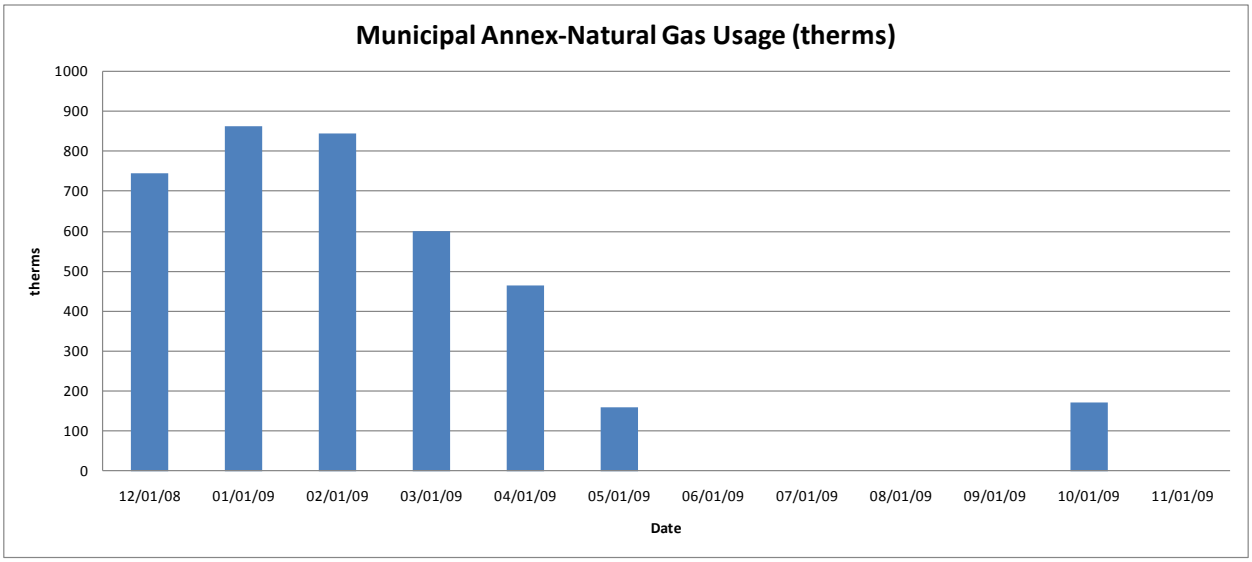
Electricity - The Municipal Annex is currently served by one electric meter and purchases electricity from Public Service Electric & Gas at **an average rate of $0.19/kWh** based on 12 months of utility bills from March, 2008 through February, 2009. The building purchased **54,000 kWh or $10,121 worth of electricity** during that time span.

The following chart shows electricity usage for the building based on utility bills from March, 2008 through February, 2009:



Natural Gas - The Municipal Annex is currently served by one natural gas meter and buys gas from Elizabethtown Gas at **an average rate of $1.05/therm** based on 12 months of utility bills from December, 2008 through November, 2009. The building purchased **3,847 therms or $4,050.39 worth of natural gas** during that time span.

The following chart shows the natural gas consumption for the complex based on natural gas bills for the 12 month period of December, 2008 through November, 2009:



1.2. Utility rate

The Municipal Annex currently purchases electricity from Public Service Electric & Gas for electricity use (kWh) with a separate (kW) demand charge. The complex currently pays an average rate of approximately $0.19/kWh based on the 12 months of utility bills of March, 2008 through February, 2009.

The Municipal Annex currently purchases natural gas supply and transmission from Elizabethtown Gas at an average aggregated rate of $1.05/therm based on 12 months of utility bills from December, 2008 through November, 2009.

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. BSG-PMK and SWA recommend that the Borough maintain the Portfolio Manager account at the link below. As the account is maintained, BSG-PMK and SWA can share with the Borough and allow future data to be added and tracked using the benchmarking tool.

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

Username: boroughofcarteret
Password: carteret

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

to continue entering utility data in Energy Star Portfolio Manager in order to track whether normalized source energy use over time.

The calculated Site Energy Use Intensity is 92.0 kBtu/ft^{2}yr. Implementing this report‘s recommendations will reduce use by approximately 36.6 kBtu/ft^{2}yr, which when implemented would lower the buildings energy consumption.

OMB No. 2060-0347

STATEMENT OF ENERGY PERFORMANCE
Municipal Annex

Building ID: 2035779
For 12-month Period Ending: October 31, 2009[1]
Date SEP becomes ineligible: N/A
Date SEP Generated: March 18, 2010

Facility	Facility Owner	Primary Contact for this Facility
Municipal Annex 20 Cooke Ave Carteret, NJ 07008	Borough of Carteret 61 Cooke Ave Carteret, NJ 07008	Anthony Neibert 61 Cooke Ave Carteret, NJ 07008

Year Built: 1934
Gross Floor Area (ft²): 6,164

Energy Performance Rating[2] (1-100) 29

Site Energy Use Summary[3]	
Electricity - Grid Purchase(kBtu)	184,248
Natural Gas (kBtu)[4]	419,183
Total Energy (kBtu)	603,431
Energy Intensity[5]	
Site (kBtu/ft²/yr)	98
Source (kBtu/ft²/yr)	171
Emissions (based on site energy use)	
Greenhouse Gas Emissions ($MtCO_2e$/year)	50
Electric Distribution Utility	
Public Service Elec & Gas Co	
National Average Comparison	
National Average Site EUI	79
National Average Source EUI	137
% Difference from National Average Source EUI	25%
Building Type	Office

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.

Certifying Professional
N/A

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**

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

The Municipal Annex was built in 1934, and was originally used as a bank until it was purchased by the Borough. The building's two-stories have a total area of 6,164 square feet. The Municipal Annex houses the tax assessor's office, municipal utilities administrative offices and various other administrative offices.

2.2. Building occupancy profiles

The building is open from 8:00am to 4:00pm Monday through Friday.

2.3. Building envelope

2.3.1. Exterior walls

The exterior walls are constructed from brick and mortar with a masonry substrate and finished with an EFIS. The walls are in good condition as well as the insulation.

2.3.2. Roof

The built-up roof is constructed from multiple piles of roof felts laminated together and finished with an asphalt layer. The insulation appears to be in good condition.

2.3.3. Base

There is a basement on this building. The base of the building is 6" of poured concrete.

2.3.4. Windows

There are 24 thermal-pane aluminum framed windows on the building. All are new and in excellent condition.

2.3.5. Exterior doors

The exterior doors are in good condition. The front doors are aluminum doors with large glass panes, and there are two sets of doors. There is a steel door in the back of the building.

2.3.6. Building air tightness

The building is air tight and there are no occupant complaints or signs of outside air infiltration.

2.4. HVAC systems

2.4.1. Heating

The Annex's heating is generated by a Weil McLain gas-fired steam boiler, with model #028-S-6 and a capacity of 3,000 lb/hr (equivalent to about 3,000 MBH). The unit was installed in 1955. The building's heating system was converted from steam to hot water after the installation of the boiler, but the unit itself was not replaced. Instead, a heat exchanger was installed to convert the steam generated to hot water. The age of the boiler, along with the extra process of converting steam to hot water, makes the efficiency of this unit less than 50%. The boiler is also oversized; using the gas bills as an indicator of how much the unit operates, a much smaller unit could have produced the same amount of heat as this one. The heat is circulated to heating coils in the ducts, and to baseboard radiators. The set point temperature is 180ºF, and outdoor air reset control is not employed.

Category III Recommendations – ECM #2: Replace the current boiler with a high-efficiency, condensing hot water boiler. Re-size the boiler, as the current one is unnecessarily large. Also install hot water outdoor air reset control. These controllers reduce the maximum boiler water temperature depending on the outside air temperature; for instance, if the outside air temperature is 0°F, the boiler temperature will be 180°F, but if the outside air temperature is 40°F, the boiler temperature will only need to be 130°F

2.4.2. Cooling

Cooling is provided by two rooftop units, both about 7.5-10 tons and are about two years old. At the time of BSG-PMK's survey, the rooftop access could not be granted, due to inclement weather, and therefore the nameplates could not be viewed.

2.4.3. Ventilation

Ventilation is provided by the rooftop units, exhaust fans on the roof, doors, and operable windows.

2.4.4. Domestic Hot Water

Water is heated by a 10 gallon, 2 kW electric water heater, which is about 5 years old. The heater is a Vanguard unit with model # 1PZ78.

Category III Recommendation – ECM #3: Replace the current water heater with a 10 gallon, gas-fired unit. Natural gas is much more cost efficient source of energy than electricity, and due to the fact that the gas-fired boiler is in the same room as the water heater, only a few feet of piping are needed to bring gas to the unit.

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 $379.54 based on the current $0.19/kWh and the current occupancy schedule. Implementation of this ECM will cost approximately $1,260.00. Currently the Board of Public Utilities (BPU) would offer an estimated rebate of $160, yielding a net cost of $1,100.00 for this project. The payback on this ECM would about 2.9 years.

Category III Recommendation - ECM #1: Recommend upgrading all T-12 lighting fixtures with magnetic ballasts to T-8 fixtures with electronic ballasts, as well as various other lighting upgrades outlined in Appendix A. Also recommend installing lighting sensors to certain areas where lights typically remain lit when unoccupied for long periods of time.

Refer to Appendix A for further details.

2.5.2. Appliances and process

There are several computers (not all areas were accessible for an accurate count), a coffee maker, a refrigerator and microwave in the break room.

2.5.3. Elevators

This facility does not have an elevator.

2.5.4. Other electrical systems

There are currently no other significant energy impacting electrical systems installed at the Annex.

3. EQUIPMENT LIST

Building System	Description	Location	Model #	Fuel	Space Served	Year Installed	Estimated Remaining Useful Life %
Domestic hot water	Electric domestic water heater; 10 gallons, 2 kW	Boiler room	Vanguard M# 1PZ78	Electricity	Entire building	2005	73%
Heating	Gas-fired (converted from oil) steam boiler; steam converted to hot water through a heat exchanger; 3,000 lbs/hr (about 3,000 MBH)	Boiler room	Weil McLain Series 1 M# 028-S-6	Natural Gas	Entire building	1955	0%
Heating	Boiler pump	Attached to boiler	Marathon Electric M# 9 PL 48S345394FP	Electricity	Boiler	Unknown	Unknown
Heating	Hot water circulation pump	Boiler room	Bell & Gosset M# PR A20	Electricity	Boiler	Unknown	Unknown
Cooling	Two rooftop units, both about 7.5-10 tons; roof was not accessible	Roof	Nameplate not accessible	Electricity	Entire building	approx. 2007	85%

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 BSG-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 Improvement Measures

1) Based on the results of BSG-PMK's survey, no capital improvements are recommended, as the facility is well maintained.

Category II Recommendations: Operations and Maintenance

1) Based on the results of BSG-PMK's survey, no operations and maintenance measures are recommended, as the facility is well maintained.

Category III Recommendations: Energy Conservation Measures

Summary table

ECM #	ECM Description
1	Lighting Upgrades and Occupancy Sensors
2	Replace Boiler and Install Outdoor Air Reset Control
3	Convert Electric Water Heater to Natural Gas

ECM#1: Lighting Upgrades and Occupancy Sensors

Description:

Lighting at the Carteret Municipal Annex building consists primarily of energy efficient T-8 lamps with electronic ballasts. Some standard efficient T-12 fixtures with magnetic ballasts still remain in areas of minimal use. It is recommended that all remaining T-12 fixtures with magnetic ballasts be retrofit with T-8 lamps and electronic ballasts. There are also some incandescent lamps which should be replaced with compact fluorescents. Lighting replacement generally yields a very good payback, due to the fact that most lighting usage in commercial buildings is fairly high and the installation is relatively inexpensive.

The use of occupancy sensors, which is a lighting control that will turn off power to the lights when a room is not occupied, is also recommended. Rooms that were determined to be prime candidates for occupancy sensors are marked on the lighting spreadsheet (Appendix A).

Installation cost:

Estimated installed cost:

	Lighting (Only)	Sensors (Only)	Complete Lighting Upgrade
Cost	$800.00	$460.00	$1,260.00
Rebate	$0.00	$160.00	$160.00
Net Cost	$800.00	$300.00	**$1,100.00**
Savings (kWh)	1,440	558	**1,998**
Savings ($)	$273.58	$105.96	**$379.54**
Payback	2.9	2.8	**2.9**

Source of cost estimate: RS Means/Empirical Data

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 Upgrades	Empirical Data	$800	$0	$800	1,440	0.5	0	0.80	$0.00	$274	15	$3,219	2.92	302%	20%	33%	$2,109	1,973
	Occupancy Sensors		$460	$160	$300	558	0.2	0	0.31	$0.00	$106	10	$895	2.83	198%	20%	33%	$604	764

Assumptions:

The electric cost used in this ECM was $0.19/kWh, which was the facilities average rate for the 12-month period ranging from March 1, 2008 through February 30, 2009. The replacements for each lighting fixture, the costs to replace or retrofit each one, and the rebates and wattages for each fixture are located in Appendix A.

Rebates/financial incentives:

The New Jersey SmartStart offers rebates for upgrading lighting fixtures and installing lighting controls. The total rebate this ECM qualifies for is $160.

ECM#2: Upgrade Boiler and Install Outdoor Air Reset Control

Description:

Heating is provided to the Municipal Annex by a 3,000 lbs/hr (equivalent to about 3,000 MBH), steam Weil McLain boiler, which is fueled by natural gas. The building's heating system was converted to hot water, and rather than purchasing a hot water boiler, the current one, now 55 years old, was left in place, and a heat exchanger was installed to convert the steam to hot water. Due to the boiler's age, and the fact that converting steam to hot water is an inefficient process, the current efficiency of the unit is below 50% an efficiency of 50% will be used in this ECM. Not only is the boiler inefficient, an evaluation of the buildings utility bills indicate that the boiler is oversized. The Fire Department Headquarters, which has a square-footage over four times higher than the Annex, uses a boiler that is almost half the size as the one at this facility, and consumes two-and-a-half times the amount of natural gas. It is recommended that the current boiler be replaced with a high-efficiency condensing hot water unit, of a lower capacity. It is also recommended that outdoor air reset control be installed to control the temperature of the heating system. Outdoor air reset controllers reduce the maximum boiler water temperature depending on the outside air temperature; for instance, if the outside air temperature is 0°F, the boiler temperature will be 180°F, but if the outside air temperature is 40°F, the boiler temperature will only need to be 130°F.

Installation cost:

Estimated installed cost: $80,000
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
2	Upgrade Boiler and Install Outdoor Air Reset Control	Similar Projects	$80,000	$64,000	$16,000	0	0.0	2,198	35.67	$0.00	$2,314.48	25	$39,419	6.91	146%	6%	14%	$24,302	25,722

Assumptions:

The cost per therm of natural gas that was used, taken from twelve months of Annex's energy bills, was $0.94. During the calendar year of December, 2008 through November, 2009, the facility consumed 4,305 therms of natural gas, all by the boiler. (Note: No gas bill for November, 2009 was available, so the gas consumption was assumed to be the midpoint between the amounts of gas consumed in October, 2009 and December, 2008, and the cost of gas was assumed to be the same as the previous month, October, 2009.)

In order to calculate the amount of energy consumed by a boiler when gas bills are not available, the heating degree day equation is used:

$$\text{Energy Consumption (Therms)} = \frac{\text{Boiler Capacity(BTUH)} \times \text{Degree Days} \times 24 \frac{\text{hours}}{\text{day}} \times 0.77}{\text{Boiler Efficiency} \times \Delta\text{Temperature (°F)}} \times \frac{1 \text{ therm}}{100{,}000.4 \text{ BTU}}$$

In this case, however, the energy consumption is known, and the boiler capacity that is needed is not. When performing the calculations, values were used that would be more likely to calculate a boiler capacity that was too big rather than too small, as a boiler too small would not produce enough heat to reach the desired indoor temperature over 99% of the time. The following values were used to for the calculations:
Desired indoor temperature: 70ºF (indoor temperature for offices usually around 68-70ºF)
99.6% Heating Dry-Bulb Temperature (outdoor temperature that would be exceeded 99.6% of the year): 10ºF
Correction Factor (used when 65ºF is arbitrarily selected as the base temperature, or the outdoor temperature at which the heating system would not operate): 0.77
Heating Degree Days: 5,007 (this value will be decreased, as the heating system would not operate when the building is unoccupied)
Operating hours per week: 40 (assuming a higher number operating hours would decrease the boiler capacity)

Solving for boiler capacity, the above equation becomes:

$$\text{Boiler Capacity (BTUH)} = \frac{\text{Energy Consumption (Therms)} \times \text{Boiler Efficiency} \times \Delta\text{Temperature}}{\text{Degree Days} \times 24\frac{\text{hours}}{\text{day}} \times 0.77} \times 100{,}000.4\frac{\text{BTU}}{\text{therm}}$$

$$= \frac{4{,}305\ \text{therms} \times 50\% \times (70°\text{F} - 10°\text{F})}{5{,}007\ (°\text{F} \times \text{days}) \times \frac{40\frac{\text{operating hours}}{\text{week}}}{24 \times 7\frac{\text{total hours}}{\text{week}}} \times \frac{24\text{hours}}{\text{day}} \times 0.77} \times 100{,}000.4\frac{\text{BTU}}{\text{therm}} = 586{,}261\ \text{BTUH}$$

Based on these calculations, despite a 3,000 MBH boiler being used, only a 586 MBH boiler, with the same efficiency, was needed to consume the amount of energy that the Annex used during this 12-month period. By comparison, a 586 MBH, 94% efficient boiler would have consumed much less energy:

$$\frac{586{,}261\ \text{BTUH} \times 5{,}007(°\text{F} \times \text{days}) \times \frac{40\frac{\text{operating hours}}{\text{week}}}{24 \times 7\frac{(\text{total hours})}{\text{week}}} \times 24\frac{\text{hours}}{\text{day}} \times 0.77}{94\% \times (70°\text{F} - 10°\text{F})} \times \frac{1\ \text{therm}}{100{,}000.4\ \text{BTU}} = 2{,}290\ \text{Therms}$$

The energy savings by replacing the boiler would be the difference between the 4,305 therms of gas purchased and the 2,290 therms calculated above.

As stated above, it is better to size a boiler slightly larger rather than too small. A good fit would be the Weil McLain Ultra Commercial model #750, which is 750 MBH and 94% efficient.

An additional 8% of the proposed annual fuel consumption was added to the savings, representing the energy saved by the outdoor air reset control.

Rebates/financial incentives:
This ECM is eligible for New Jersey's Direct Install rebate, which pays up to 80% of the total cost of installation, or $64,000.

ECM #3: Convert Electric Water Heater to Natural Gas

Description:
Domestic hot water is provided by an electric water heater, which has a volume of 10 gallons. A natural gas fired water heater would be much more cost-efficient. The current water heater is located in the same room as a gas-fired boiler, so switching to a gas-fired water heater is economically feasible.

Installation cost:
Estimated installed cost: Installation: $1,000; rebates/incentives: $50; total: $950
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
3	Convert Electric Water Heater to Natural Gas	Similar Projects	$1,000	$50	$950	730	0.3	-38	-0.21	$0.00	$99	13	$1,038	9.61	9%	1%	5%	$102	558

Assumptions:

Using the facility's electricity bills from March, 2008 through February, 2009, it was determined that the cost of electricity is currently $0.19/kWh. The cost of natural gas, using bills from December, 2008 through November, 2009, is $0.94/therm.

To calculate the savings from switching from electricity to gas, a spreadsheet created by Rheem was used. The temperature rise of the heated water was set at 77°F on the spreadsheet, and the energy factor (a unit that specifies the efficiency of water heaters) is specified as 0.94 for new electric units and 0.62 for gas units. Weight of water was set at 8.33 pounds/ft.^{3}. Using this data, the BTUs of output heat used for heating the water were calculated by the following equation:

$$BTUs_{output} = Vol. \times Wt._{Water} \times \Delta Temp.$$

This value would be the same for the current and proposed units. The actual BTUs purchased by each unit are calculated using this value and the energy factors:

$$BTUs_{input} = \frac{BTUs_{output}}{\text{Energy Factor}}$$

The annual costs for heating the water can now be calculated using this data:

Current

Volume of Hot Water Heated	H2O Weight	Temperature Rise in ºF	BTUs Required to Heat Water	Energy Factor	BTUs Purchased to Heat Water	Cost per kWh	Actual Daily Cost to Heat	Actual Annual Cost to Heat Water
10	8.33	77	6,414	0.94	6,824	$0.19	$0.38	$138.65

Natural Gas

Volume of Hot Water Heated	H2O Weight	Temperature Rise in ºF	BTUs Required to Heat Water	Energy Factor	BTUs Purchased to Heat Water	Cost per Therm	Actual Daily Cost to Heat	Actual Annual Cost to Heat Water
10	8.33	77	6,414	0.62	10,345	$1.05	$0.11	$39.75

Rebates/financial incentives:

This ECM qualifies for a New Jersey SmartStart rebate of $50.

BSG-PMK/SWA has reviewed several funding options for the purposes of subsidizing the costs for installing the energy conservation measures noted within this report.

Although funding options are constantly changing and updating this project may benefit from enrolling in a number of alternative programs such as the; The NJ SmartStart program with Technical Assistance, ARRA grants available through the NJ Office of Clean Energy, alternate funding by applying for financing and competitive grants through the United States Department of Energy as well as local utility incentive programs in an effort to offset a portion of the cost of ECM implementation.

The Smart Start program offers reimbursement incentives for various equipment purchases, and lighting incentives. The benefits and requirements of this program can be found at:

http://www.njcleanenergy.com/commercial-industrial/programs/nj-smartstart-buildings/nj-smartstart-buildings

Financial assistance is also available through the United States Department of Energy in the form of; Grants, Cooperative Research and development agreements, small business innovation research, and Loan Guarantee Programs. Further information for these programs is available at:

http://www1.eere.energy.gov/financing/types_assistance.html

Local Utility incentives such as a Direct Install Program, offer incentives that can provide up to 80% subsidy of the cost to install particular ECM's. As each utility company has different guidelines and incentives it is important to contact your local utility authority for eligibility in these programs.

Additional funding may also be found through the following funding methods:

- Energy Savings Improvement Program (ESIP) – Public Law 2009, Chapter 4 authorizes government entities to make energy related improvements to their facilities and par for the costs using the value of energy savings that result from the improvements.

- Municipal Bonds – Municipal bonds are a bond issued by a city or other local government, or their agencies. Municipal bonds may be general obligations of the issuer or secured by specified revenues. Interest income received by holders of municipal bonds is often exempt from the federal income tax and from the income tax of the state in which they are issued, although municipal bonds issued for certain purposes may not be tax exempt.

- Power Purchase Agreement – Public Law 2008, Chapter 3 authorizes contractor of up to fifteen (15) years for contracts commonly known as "power purchase agreements." These are programs where the contracting unit (Owner) procures a contract for, in most cases, a third party to install, maintain, and own a renewable energy system.

BSG-PMK/SWA recommends the Owner review the use of the above-listed funding options in addition to utilizing their standard method of financing for facilities upgrades in order to fund the proposed energy conservation measures.

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 feasible because of the orientation of the building and the limited amount of unobstructed (shaded) roof space.

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.

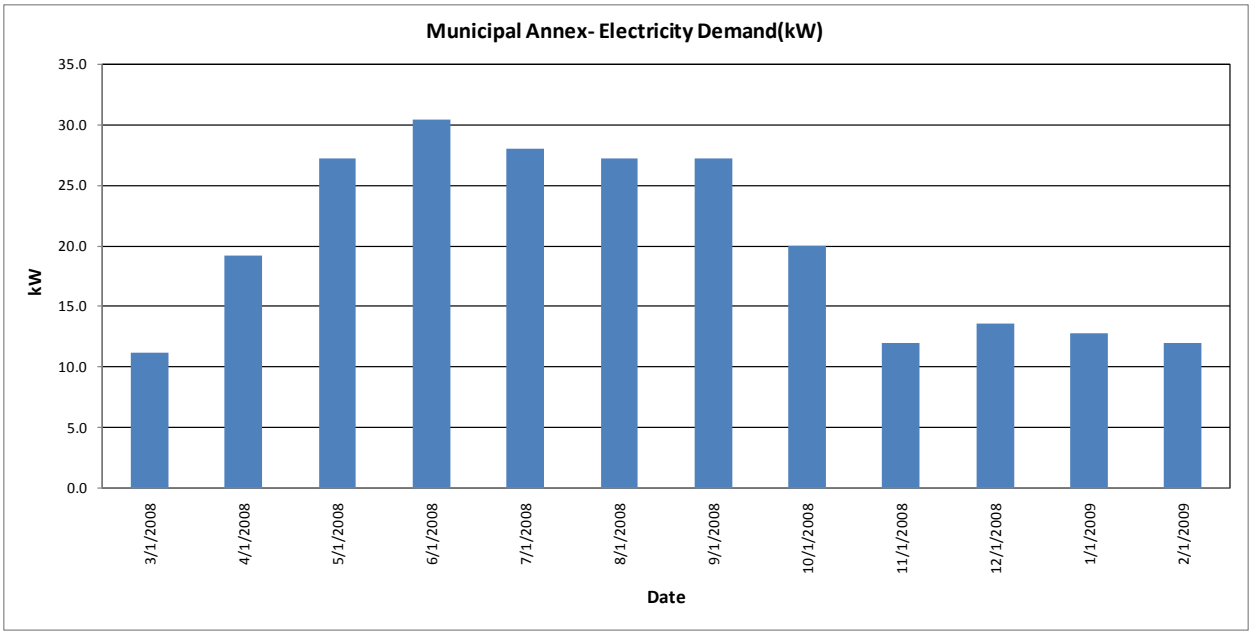
5.6. Wind

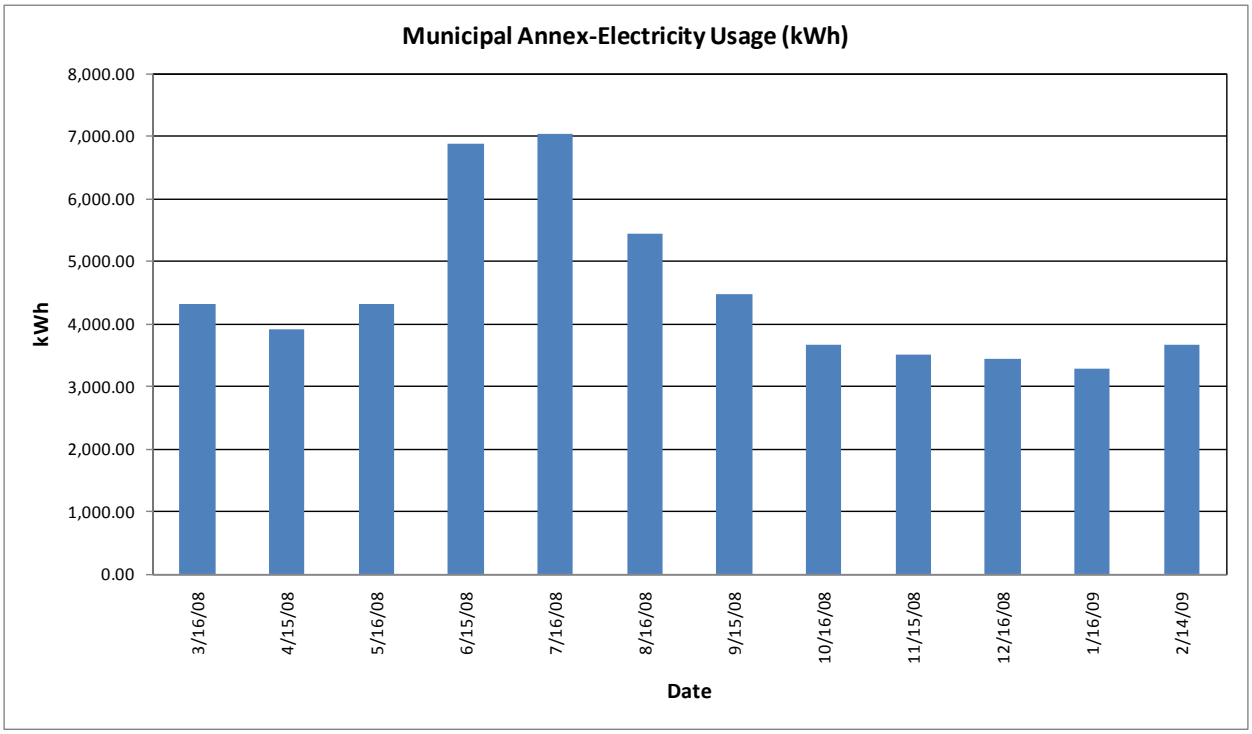
Wind power production is not appropriate for this location because required land is not available for the wind turbine. Also, the available wind energy resource is very low.

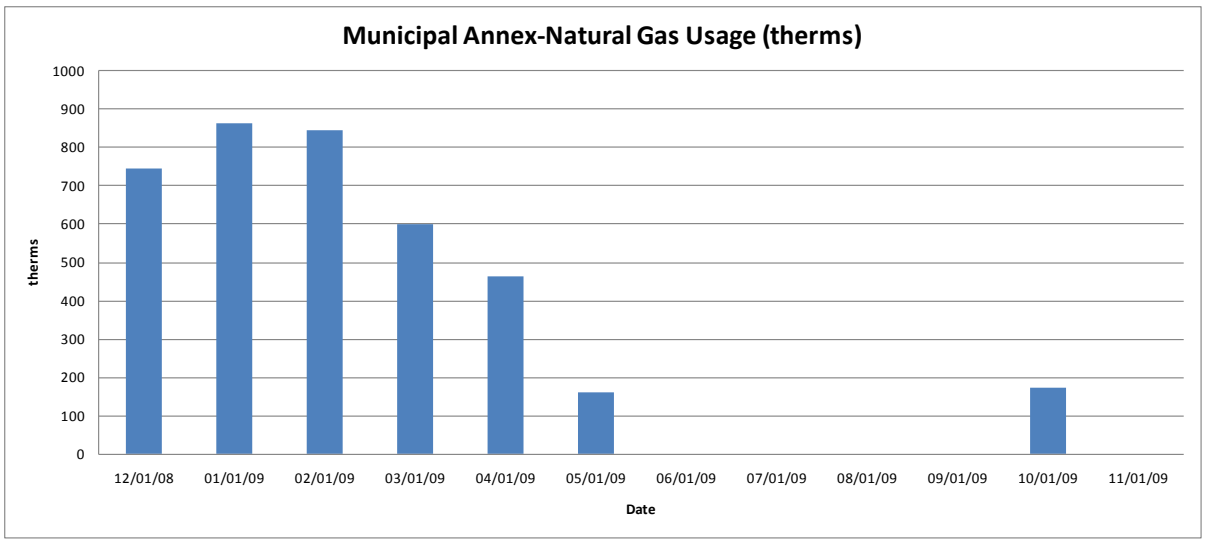
6. ENERGY PURCHASING AND PROCUREMENT STRATEGIES

6.1. Load profiles

The average electrical peak demand for the facility during previous year was 20.1 kW and the maximum peak demand was 30.4 kW. The electric and gas load profiles for this project are presented in the following charts. The first chart shows the electric demand (in kW) for the previous 12 months and the other two charts show electric (in kWh) and gas usage (in therms), respectively.


Municipal Annex- Electricity Demand(kW)
35.0
30.0
25.0
20.0
15.0
10.0
5.0
0.0
kW
3/1/2008
4/1/2008
5/1/2008
6/1/2008
7/1/2008
8/1/2008
9/1/2008
10/1/2008
11/1/2008
12/1/2008
1/1/2009
2/1/2009
Date

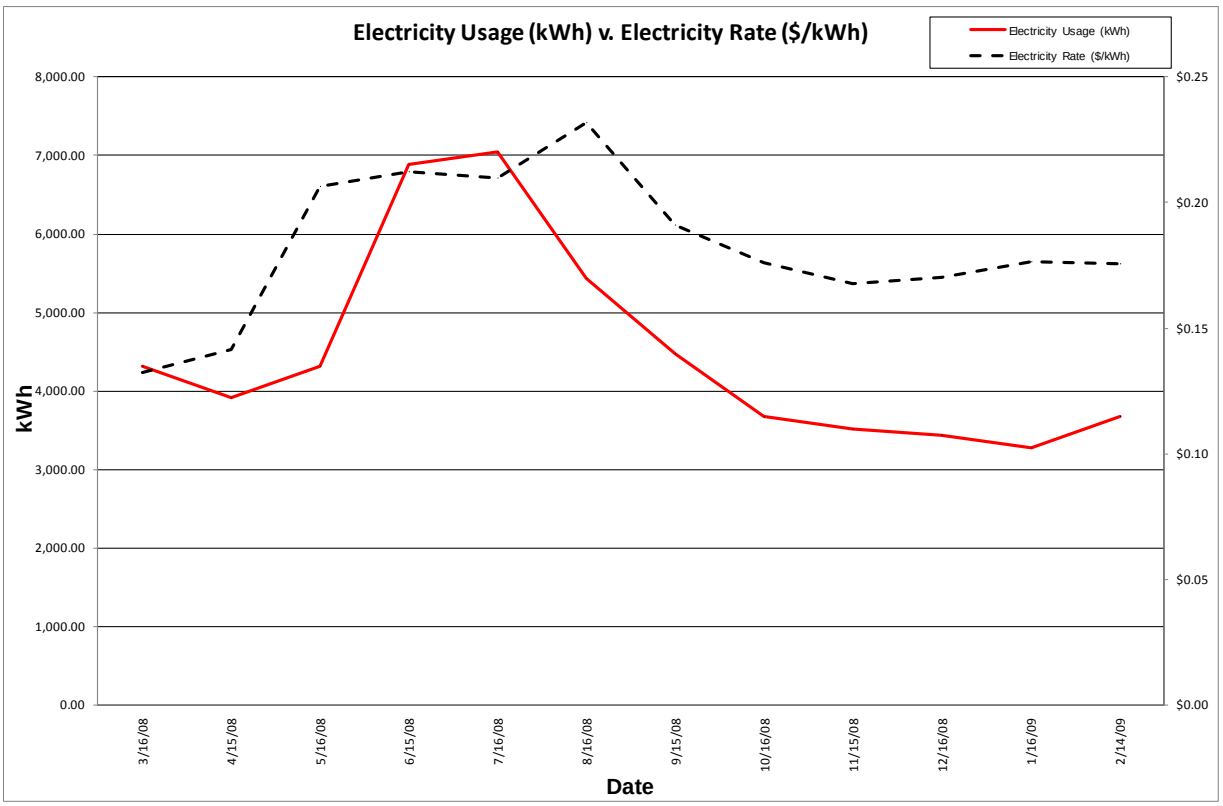

Municipal Annex-Electricity Usage (kWh)
8,000.00
7,000.00
6,000.00
5,000.00
4,000.00
3,000.00
2,000.00
1,000.00
0.00
kWh
3/16/08
4/15/08
5/16/08
6/15/08
7/16/08
8/16/08
9/15/08
10/16/08
11/15/08
12/16/08
1/16/09
2/14/09
Date



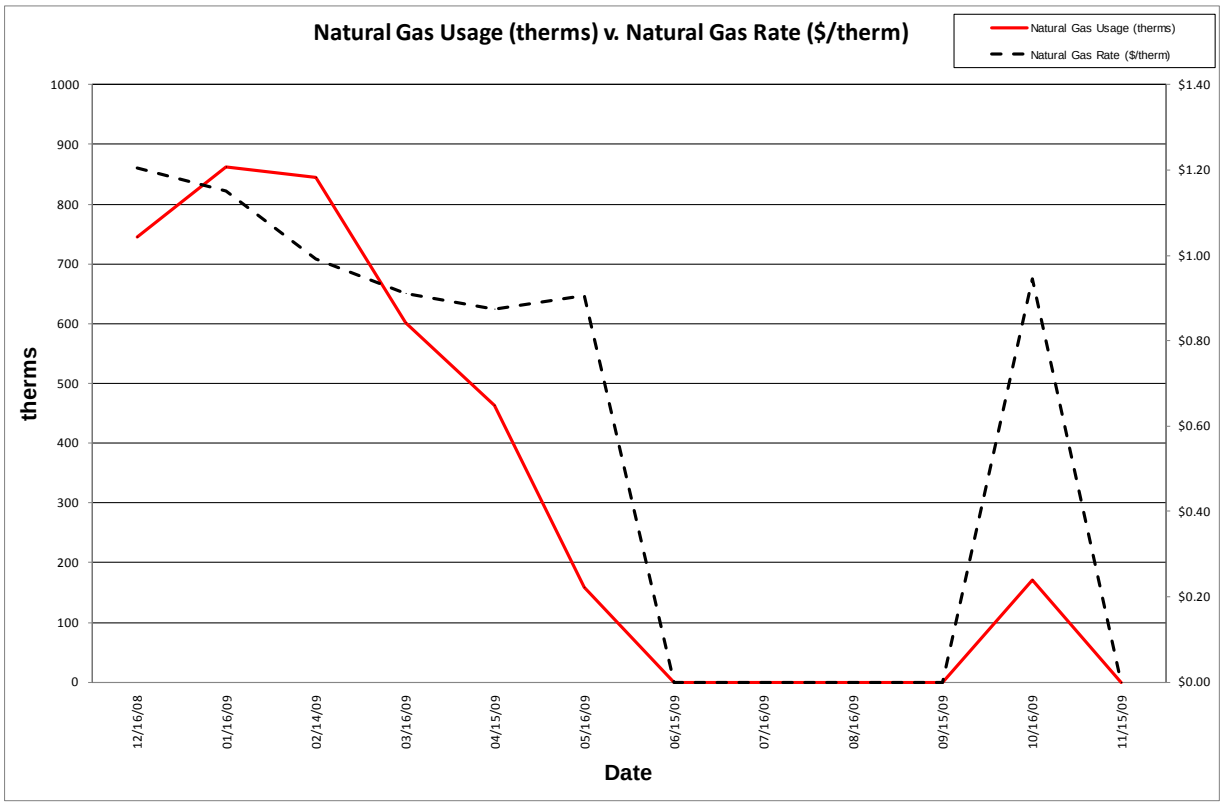
Currently, New Jersey commercial buildings of similar type pay $0.150/kWh for electricity and $1.55/therm for natural gas. The electricity rate for the building is $.19/kWh, which means there is a potential cost savings of $2,021.00 per year. The gas rate for the building is $1.05/therm which is better than the average gas cost. A savings potential for electricity exists, however this involves contacting third party suppliers and negotiating utility rates. SWA recommends that the Borough of Carteret 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 Carteret service area.

6.2. Energy Procurement strategies

Billing analysis shows price fluctuations 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

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.

LIGHTING ANALYSIS

Borough of Carteret
Municipal Annex
20 Cooke Avenue

BIRDSALL SERVICES GROUP
ENGINEERS & CONSULTANTS

Upgrade Code	Upgrade Description	Existing Fixture	Existing Watts	Proposed Fixture	Proposed Watts	Lighting Total # of Upgrades	Lighting Cost per Upgrade ($)	Lighting SmartStart Rebate per Upgrade
1	(4) 4' 32W T8 Lamps, Electronic Ballast / No Upgrade	4L4' T8/ELEC	110	No Upgrade	110	38	$0.00	$0.00
2	(8) 4' 32W T8 Lamps, Electronic Ballast / No Upgrade	8L4' T8/ELEC	220	No Upgrade	220	16	$0.00	$0.00
3	(2) 4' 32W T8 Lamps, Electronic Ballast / No Upgrade	2L4' T8/ELEC	61	No Upgrade	61	38	$0.00	$0.00
4	100W Incandescent / Replace with 26W, Screw-In, Compact Flourescent	100W INCANDESCENT	100	26W CF/SI	28	6	$10.00	$0.00
5	75W Incandescent Flood Lamps	75W INCANDESCENT	75	23W CF/SI	24	1	$10.00	$0.00
6	(3) 4' 32W T8 Lamps, Electronic Ballast / No Upgrade	3L4' T8/ELEC	89	No Upgrade	89	2	$0.00	$0.00
7	(1) 4' 32W T8 Lamps, Electronic Ballast / No Upgrade	1L4' T8/ELEC	31	No Upgrade	31	1	$0.00	$0.00
8	(2) 34W T12 Lamps, Magnetic Ballasts / Retrofit with T8 Lamps, Electronic Ballast	2L4' EE/STD	80	2L4' T8/ELEC	61	5	$80.00	$0.00
9	120W Incandescent Flood Lamps / Replace with 44W, Screw-In, Compact Fluorescent	120W INCANDESCENT	120	44W CF/SI	44	11	$30.00	$0.00
10	26W Compact Fluorescent	26W CF/SI	28	No Upgrade	28	1	$0.00	$0.00
11	150 Metal Halide Wall Mount Perimiter Lighting	150W MH/BALLAST	195	No Upgrade	195	2	$0.00	$0.00
12	LED Exit Sign	LED	2	No Upgrade	2	4	$0.00	$0.00

Summary

	Lighting (Only)	Sensors (Only)	Complete Lighting Upgrade
Cost	$800.00	$460.00	$1,260.00
Rebate	$0.00	$160.00	$160.00
Net Cost	$800.00	$300.00	**$1,100.00**
Savings (kWh)	1,440	558	**1,998**
Savings ($)	$273.58	$105.96	**$379.54**
Payback	2.9	2.8	**2.9**

Variables:

$0.19	Avg. Electric Rate ($/kWh)
	Avg. Demand Rate ($/kW)
2080	Operating Hours/Year
8	Operating Hours/Work Day

Assumptions:

25%	Occupancy Sensor Savings (Avg)
40%	Occupancy Sensor Savings(>Avg)

Notes:

Seq. #	Upgrade Code	Room/Area	Hrs/ Work Day	Hrs/ Year	Existing Fixture	Existing Qty.	Existing Watts	Existing Foot Candles	Proposed Fixture	Proposed Qty.	Proposed Watts	kW Reduction	Lighting Energy Savings, kWh	Lighting Cost ($)	Lighting Savings ($)	Lighting Payback (yrs)	Controls Type	Controls Qty.	Occupancy Sensors (ONLY) Energy Savings, kWh	Occupancy Sensors (ONLY) Cost ($)	Occupancy Sensors (ONLY) Savings ($)	Occupancy Sensors (ONLY) Payback (yrs)	SmartStart Rebate Lighting	SmartStart Rebate Sensors	Lighting & Occupancy Sensors Energy Savings, kWh	Lighting & Occupancy Sensors Post-Rebate Cost ($)	Lighting & Occupancy Sensors Savings ($)	Lighting & Occupancy Sensors Payback (yrs)
		Totals:					13048				11634	1.414	1440	$800.00	$273.58	2.9			558	$460.00	$105.96	4.3	$0.00	$160.00	1998	$1,100.00	$379.54	2.9
1	1	Open Office	10	2600	4L4' T8/ELEC	16	1760		No Upgrade	16	1760	0	0	$0.00	$0.00				0	$0.00	$0.00		$0.00	$0.00	0	$0.00	$0.00	
2	1	P Office	8	2080	4L4' T8/ELEC	6	660		No Upgrade	6	660	0	0	$0.00	$0.00		OSW	1	343	$200.00	$65.21	3.1	$0.00	$20.00	343	$180.00	$65.21	2.8
3	2	Lobby	8	2080	8L4' T8/ELEC	16	3520		No Upgrade	16	3520	0	0	$0.00	$0.00				0	$0.00	$0.00		$0.00	$0.00	0	$0.00	$0.00	
4	1		8	2080	4L4' T8/ELEC	1	110		No Upgrade	1	110	0	0	$0.00	$0.00				0	$0.00	$0.00		$0.00	$0.00	0	$0.00	$0.00	
5	3		8	2080	2L4' T8/ELEC	6	366		No Upgrade	6	366	0	0	$0.00	$0.00				0	$0.00	$0.00		$0.00	$0.00	0	$0.00	$0.00	
6	3	Tellers Den Office	9	2340	2L4' T8/ELEC	12	732		No Upgrade	12	732	0	0	$0.00	$0.00				0	$0.00	$0.00		$0.00	$0.00	0	$0.00	$0.00	
7	1	O Office	10	2600	4L4' T8/ELEC	12	1320		No Upgrade	12	1320	0	0	$0.00	$0.00				0	$0.00	$0.00		$0.00	$0.00	0	$0.00	$0.00	
8	4	Restroom	8	2080	100W INCANDES	2	200		26W CF/SI	2	56	0.144	300	$20.00	$56.91	0.4			0	$0.00	$0.00		$0.00	$0.00	300	$20.00	$56.91	0.4
9	1		8	2080	4L4' T8/ELEC	1	110		No Upgrade	1	110	0	0	$0.00	$0.00				0	$0.00	$0.00		$0.00	$0.00	0	$0.00	$0.00	
10	4	Closet	8	2080	100W INCANDES	1	100		26W CF/SI	1	28	0.072	150	$10.00	$28.45	0.4			0	$0.00	$0.00		$0.00	$0.00	150	$10.00	$28.45	0.4
11	5	Basement	8	2080	75W INCANDES	1	75		23W CF/SI	1	24	0.051	106	$10.00	$20.16	0.5			0	$0.00	$0.00		$0.00	$0.00	106	$10.00	$20.16	0.5
12	6		8	2080	3L4' T8/ELEC	2	178		No Upgrade	2	178	0	0	$0.00	$0.00				0	$0.00	$0.00		$0.00	$0.00	0	$0.00	$0.00	
13	3	Break Room	12	3120	2L4' T8/ELEC	4	244		No Upgrade	4	244	0	0	$0.00	$0.00		OSR	1	190	$260.00	$36.16	7.2	$0.00	$140.00	190	$120.00	$36.16	3.3
14	7		12	3120	1L4' T8/ELEC	1	31		No Upgrade	1	31	0	0	$0.00	$0.00		OSR		24	$0.00	$4.59	0.0	$0.00	$0.00	24	$0.00	$4.59	0.0
15	3	Storage	2	520	2L4' T8/ELEC	2	122		No Upgrade	2	122	0	0	$0.00	$0.00				0	$0.00	$0.00		$0.00	$0.00	0	$0.00	$0.00	
16	1		2	520	4L4' T8/ELEC	1	110		No Upgrade	1	110	0	0	$0.00	$0.00				0	$0.00	$0.00		$0.00	$0.00	0	$0.00	$0.00	
17	3	Boiler	2	520	2L4' T8/ELEC	4	244		No Upgrade	4	244	0	0	$0.00	$0.00				0	$0.00	$0.00		$0.00	$0.00	0	$0.00	$0.00	
18	8		2	520	2L4' EE/STD	5	400		2L4' T8/ELEC	5	305	0.095	49	$400.00	$9.39	42.6			0	$0.00	$0.00		$0.00	$0.00	49	$400.00	$9.39	42.6
19	9	Upstairs	1	260	120W INCANDES	11	1320		44W CF/SI	11	484	0.836	217	$330.00	$41.30	8.0			0	$0.00	$0.00		$0.00	$0.00	217	$330.00	$41.30	8.0
20	1	Restroom	1	260	4L4' T8/ELEC	1	110		No Upgrade	1	110	0	0	$0.00	$0.00				0	$0.00	$0.00		$0.00	$0.00	0	$0.00	$0.00	
21	10	Tellers Den Closet	8	2080	26W CF/SI	1	28		No Upgrade	1	28	0	0	$0.00	$0.00				0	$0.00	$0.00		$0.00	$0.00	0	$0.00	$0.00	

					Existing				Proposed				Lighting						Occupancy Sensors (ONLY)						Lighting & Occupancy Sensors			
Seq. #	Upgrade Code	Room/Area	Hrs/ Work Day	Hrs/ Year	Fixture	Qty.	Watts	Foot Candles	Fixture	Qty.	Watts	kW Reduction	Energy Savings, kWh	Cost ($)	Savings ($)	Payback (yrs)	Controls Type	Controls Qty.	Energy Savings, kWh	Cost ($)	Savings ($)	Payback (yrs)	SmartStart Rebate Lighting	SmartStart Rebate Sensors	Energy Savings, kWh	Post-Rebate Cost ($)	Savings ($)	Payback (yrs)
22	4	Upstairs	1	260	100W INCANDES	1	100		26W CF/SI	1	28	0.072	19	$10.00	$3.56	2.8			0	$0.00	$0.00		$0.00	$0.00	19	$10.00	$3.56	2.8
23	3		1	260	2L4' T8/ELEC	10	610		No Upgrade	10	610	0	0	$0.00	$0.00				0	$0.00	$0.00		$0.00	$0.00	0	$0.00	$0.00	
24	4	Front/Rear Entry	16	4160	100W INCANDES	2	200		26W CF/SI	2	56	0.144	599	$20.00	$113.82	0.2			0	$0.00	$0.00		$0.00	$0.00	599	$20.00	$113.82	0.2
25	11	Outside	7	1820	150W MH/BALLA	2	390		No Upgrade	2	390	0	0	$0.00	$0.00				0	$0.00	$0.00		$0.00	$0.00	0	$0.00	$0.00	
26	12	Exit Signs	24	8760	LED	4	8		No Upgrade	4	8	0	0	$0.00	$0.00				0	$0.00	$0.00		$0.00	$0.00	0	$0.00	$0.00	

C

Appendix B: Third Party Energy Suppliers (ESCOs)

Third Party Electric Suppliers for PSEG Service Territory	Telephone & Web Site
Hess Corporation	(800) 437-7872
1 Hess Plaza	www.hess.com
Woodbridge, NJ 07095	
American Powernet Management, LP	(877) 977-2636
437 North Grove St.	www.americanpowernet.com
Berlin, NJ 08009	
BOC Energy Services, Inc.	(800) 247-2644
575 Mountain Avenue	www.boc.com
Murray Hill, NJ 07974	
Commerce Energy, Inc.	(800) 556-8457
4400 Route 9 South, Suite 100	www.commerceenergy.com
Freehold, NJ 07728	
ConEdison Solutions	(888) 665-0955
535 State Highway 38	www.conedsolutions.com
Cherry Hill, NJ 08002	
Constellation NewEnergy, Inc.	(888) 635-0827
900A Lake Street, Suite 2	www.newenergy.com
Ramsey, NJ 07446	
Credit Suisse, (USA) Inc.	(212) 538-3124
700 College Road East	www.creditsuisse.com
Princeton, NJ 08450	
Direct Energy Services, LLC	(866) 547-2722
120 Wood Avenue, Suite 611	www.directenergy.com
Iselin, NJ 08830	
FirstEnergy Solutions	(800) 977-0500
300 Madison Avenue	www.fes.com
Morristown, NJ 07926	
Glacial Energy of New Jersey, Inc.	(877) 569-2841
207 LaRoche Avenue	www.glacialenergy.com
Harrington Park, NJ 07640	
Metro Energy Group, LLC	(888) 536-3876
14 Washington Place	www.metroenergy.com
Hackensack, NJ 07601	
Integrys Energy Services, Inc.	(877) 763-9977
99 Wood Ave, South, Suite 802	www.integrysenergy.com
Iselin, NJ 08830	
Liberty Power Delaware, LLC	(866) 769-3799
Park 80 West Plaza II, Suite 200	www.libertypowercorp.com
Saddle Brook, NJ 07663	
Liberty Power Holdings, LLC	(800) 363-7499
Park 80 West Plaza II, Suite 200	www.libertypowercorp.com
Saddle Brook, NJ 07663	
Pepco Energy Services, Inc.	(800) 363-7499
112 Main St.	www.pepco-services.com
Lebanon, NJ 08833	
PPL EnergyPlus, LLC	(800) 281-2000
811 Church Road	www.pplenergyplus.com
Cherry Hill, NJ 08002	
Sempra Energy Solutions	(877) 273-6772
581 Main Street, 8th Floor	www.semprasolutions.com
Woodbridge, NJ 07095	
South Jersey Energy Company	(800) 756-3749
One South Jersey Plaza, Route 54	www.southjerseyenergy.com
Folsom, NJ 08037	
Sprague Energy Corp.	(800) 225-1560
12 Ridge Road	www.spragueenergy.com
Chatham Township, NJ 07928	
Strategic Energy, LLC	(888) 925-9115
55 Madison Avenue, Suite 400	www.sel.com
Morristown, NJ 07960	
Suez Energy Resources NA, Inc.	(888) 644-1014
333 Thornall Street, 6th Floor	www.suezenergyresources.com
Edison, NJ 08837	
UGI Energy Services, Inc.	(856) 273-9995
704 East Main Street, Suite 1	www.ugienergyservices.com
Moorestown, NJ 08057	

Third Party Gas Suppliers for Elizabethtown Gas Co. Service Territory	Telephone & Web Site
Cooperative Industries	(800) 628-9427
412-420 Washington Avenue	www.cooperativenet.com
Belleville, NJ 07109	
Direct Energy Services, LLC	(866) 547-2722
120 Wood Avenue, Suite 611	www.directenergy.com
Iselin, NJ 08830	
Gateway Energy Services Corp.	(800) 805-8586
44 Whispering Pines Lane	www.gesc.com
Lakewood, NJ 08701	
UGI Energy Services, Inc.	(856) 273-9995
704 East Main Street, Suite 1	www.ugienergyservices.com
Moorestown, NJ 08057	
Great Eastern Energy	(888) 651-4121
116 Village Riva, Suite 200	www.greateastern.com
Princeton, NJ 08540	
Glacial Energy of New Jersey, Inc.	(877) 569-2841
207 LaRoche Avenue	www.glacialenergy.com
Harrington Park, NJ 07640	
Hess Corporation	(800) 437-7872
1 Hess Plaza	www.hess.com
Woodbridge, NJ 07095	
Intelligent Energy	(800) 724-1880
2050 Center Avenue, Suite 500	www.intelligentenergy.org
Fort Lee, NJ 07024	
Metromedia Energy, Inc.	(877) 750-7046
6 Industrial Way	www.metromediaenergy.com
Eatontown, NJ 07724	
MxEnergy, Inc.	(800) 375-1277
510 Thornall Street, Suite 270	www.mxenergy.com
Edison, NJ 08837	
NATGASCO (Mitchell Supreme)	(800) 840-4427
532 Freeman Street	www.natgasco.com
Orange, NJ 07050	
Pepco Energy Services, Inc.	(800) 363-7499
112 Main Street	www.pepco-services.com
Lebanon, NJ 08833	
PPL EnergyPlus, LLC	(800) 281-2000
811 Church Road	www.pplenergyplus.com
Cherry Hill, NJ 08002	
South Jersey Energy Company	(800) 756-3749
One South Jersey Plaza, Route 54	www.southjerseyenergy.com
Folsom, NJ 08037	
Sprague Energy Corp.	(800) 225-1560
12 Ridge Road	www.spragueenergy.com
Chatham Township, NJ 07928	
Woodruff Energy	(800) 557-1121
73 Water Street	www.woodruffenergy.com
Bridgeton, NJ 08302	