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**Local Government Energy Program
Energy Audit Report**

For

***Township of Sparta
Fire Headquarters
141A Woodport Road
Sparta, NJ 07871***

Project Number: LGEA21



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INTRODUCTION

As an approved energy consulting firm under the Local Government Energy Audit Program (LGEA), Steven Winter Associates, Inc. (SWA) was selected to perform an energy audit and assessment for the Township of Sparta buildings. For this audit, the PMK Group, an approved subcontractor under the LGEA, performed the assessment of the large mechanical and electrical systems including HVAC equipment. The audit included a review of Germany Flats – 12 Park Lake Road, Germany Flats – Storage Garage, Fire Headquarters, Library, Public Works Facility, Public Works Facility – Satellite Garage, Eagle’s Nest Well House as well as the Sparta Municipal building. The buildings are located in Sparta, NJ. A separate energy audit report is issued for each of the referenced buildings.

This report addresses the Fire Headquarters building located at 141A Woodport Road, Sparta, NJ. The current conditions and energy-related information were collected in order to analyze and suggest the implementation of building improvements and energy conservation measures.

Sparta Fire Headquarters was built in 2005 and consists of two stories and a total floor area of 23,500 square feet. The building is accessible 24 hours per day and is estimated to be operated approximately 48 hours per week.

The goal of this Local Government Energy Audit (LGEA) is to provide sufficient information to the Township of Sparta 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 (BPU’s) Office of Clean Energy has assigned TRC Energy Services to administer the Program.

- Section 1 and section 2 of the report cover a description and analysis of the building existing conditions.
- Section 3 provides a detail inventory of major electrical and mechanical systems in the building.
- Sections 4 through 7 provide a description of our recommendations.
- Appendices include further details and information supporting our recommendations.

EXECUTIVE SUMMARY

The energy audit performed by Steven Winter Associates (SWA) encompasses the Fire Headquarters building located at 141A Woodport Road, Sparta, NJ. The building is a two-story firehouse building with a total floor area of 23,500 square feet. The building was built in 2005 and contains office areas, a large meeting room, a lounge area, a kitchen area and garage bays for fire equipment. The original structure has not undergone any major renovations or additions.

Based on the field visits performed by the SWA staff on August 25th and September 3rd, 2009 and the results of a comprehensive energy analysis, this report describes the site's current conditions and recommendations for improvements. Suggestions for measures related to energy conservation and improved comfort are provided in the scope of work. Energy and resource savings are estimated for each measure that results in a reduction of heating, cooling, and electric usage.

Existing conditions

From September 2008 through September 2009, the period of analysis for this audit, the building consumed 113,280 kWh or \$19,021 worth of electricity at an approximate rate of \$0.168/kWh and 7,971 gallons or \$11,115 worth of propane at an approximate rate of \$1.39/gallon. The joint energy consumption for the building, including both electricity and fossil fuel, was 1,117 MMBtus of energy that cost a total of \$30,136.

SWA has entered energy information about the Fire Headquarters building in the U.S. Environmental Protection Agency's (EPA) *Energy Star Portfolio Manager* Energy benchmarking system. The building was benchmarked as a firehouse building. The building was not able to receive an Energy Star performance rating since the building is classified as a firehouse building, which is currently ineligible for a performance score through the Benchmarking tool. SWA encourages the Township of Sparta to continue entering utility data in *Energy Star Portfolio Manager* in order to track weather normalized source energy use over time. The current Site Energy Use Intensity is 50.2 kBtu/ft²yr. The Fire Headquarters building has a relatively low Site Energy Use Intensity; compare to office buildings that average 75 kBtu/ft²yr. A low Site Energy Use Intensity is a good indicator that the building is relatively energy efficient.

Recommendations

Implementing this report's recommendations will reduce use by approximately 16.8 kBtu/ft²yr, which would decrease the building's energy use intensity to 33.4 kBtu/ft²yr.

Due to the age of the building and the current building performance, energy efficiency improvements are limited. SWA recommends a package of lighting upgrades combined with a recommendation for installing Photovoltaic panels. The Fire Headquarters building has limited use due to the nature of the building, but could benefit from installing PV panels. Photovoltaic panels will provide an opportunity to offset most, if not all of the annual electricity use as well as generate revenue through selling electricity back to the grid and earning Solar Renewable Energy Credits (SRECs) for the township of Sparta. In an effort to reduce electricity usage as well as carbon emissions, SWA recommends a 95.9 kW PV solar array to offset a portion of the building's electric use.

Based on the assessment of the building, SWA has separated the recommendations into three categories (See Section 4 for more details). These are summarized as follows:

Category I Recommendations: Capital Improvement Measures

- None

Category II Recommendations: Operations and Maintenance

- None

Category III Recommendations: Energy Conservation Measures

At this time, SWA highly recommends a total of **3** Energy Conservation Measures (ECMs) for the Fire Headquarters building that is summarized in the following Table 1. The total investment cost for these ECMs with incentives is **\$1,330**. SWA estimates a first year savings of **\$678** with a simple payback of **1.8 years**. SWA also recommends **1** ECM (PV system) with a 5-10 year payback that is summarized in Table 2.

The implementation of all the recommended ECMs would reduce the building electric usage by 115,030 kWh annually, or over 100% of the building's current electric consumption. SWA estimates that implementing these ECMs will reduce the carbon footprint of the Fire Headquarters building by **207,752 lbs of CO₂**, which is equivalent to removing approximately 15 cars from the roads each year or avoiding the need of 415 trees to absorb the annual CO₂ produced. SWA also recommends that the Township of Sparta 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 \$0.018/kWh, which would have equated to \$2,039 for the past 12 months.

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, Direct Install, 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>

The Direct Install program offers incentives for prescriptive measures that can offset up to 80% of the installed cost. The benefits and requirements of this program can be found at:

<http://www.njcleanenergy.com/commercial-industrial/programs/direct-install>

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 pay 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.

Renewable ECMs require application approval and negotiations with the utility and proof of performance. There is also a utility-sponsored loan program through JCP&L that would allow the building to pay for the installation of the PV system through a loan issued by JCP&L.

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

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	Propane (gallons), 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	Install 28 new CFL bulbs	RS Means, lit search	560	0	560	2,573	0.5	0	0.4	84	516	5	2,351	1.1	319.8	64.0	88.3	1,804	4,607	
2	Install 4 new occupancy sensors	RS Means, lit search	440	80	360	574	0.1	0	0.1	0	96	15	1,135	3.7	215.2	14.3	25.9	791	1,028	
3	Install 1 new Pulse Start Metal Halide	RS Means, lit search	330	25	305	318	0.1	0	0.0	12	65	15	770	4.7	152.4	10.2	20.1	476	569	
TOTALS			-	1,330	105	1,225	3,465	0.7	0	0.5	96	678	-	4,255	1.8	-	-	-	3,072	6,204

Assumptions: Discount Rate: 3.2% per DOE FEMP; Energy Price Escalation Rate: 0% per DOE FEMP Guidelines

Note: A 0.0 electrical demand reduction / month indicates that it is very low / negligible

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	Propane (gallons), 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
4	Install 95.9 kW PV system	Similar Projects	671,300	95,900	575,400	112,565	23.5	0	16.3	0	86,111	15	1,013,272	6.7	76.1	5.1	12.4	452,587	201,548
	TOTALS	-	671,300	95,900	575,400	112,565	23.5	0	16.3	0	86,111	-	1,013,272	6.7	-	-	-	452,587	201,548

1. HISTORIC ENERGY CONSUMPTION

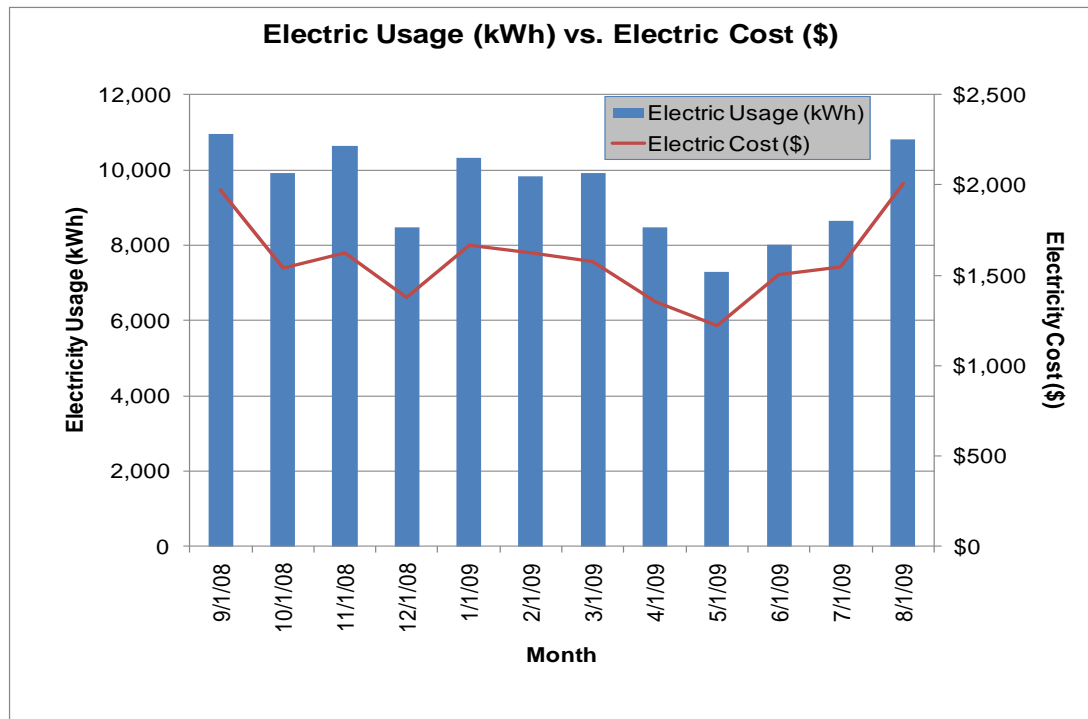
1.1. Energy usage, load profiles and cost analysis

SWA analyzed utility bills from **August 2008 through August 2009** (period of analysis) that were received from the utility companies supplying the Fire Headquarters building with electricity and propane. The Fire Headquarters currently contains one meter for electricity and accepts deliveries for propane.

Electricity – Fire Headquarters currently buys electricity from JCP&L at an **average rate of \$0.168/kWh** based on 12 months of utility bills from September 2008 to September 2009. Fire Headquarters purchased **approximately 113,280 kWh or \$19,021 worth of electricity** in the previous year. Based on the same time period, the electric meter also had an **average monthly demand of 30.4 kW and a monthly peak demand of 45.0 kW**.

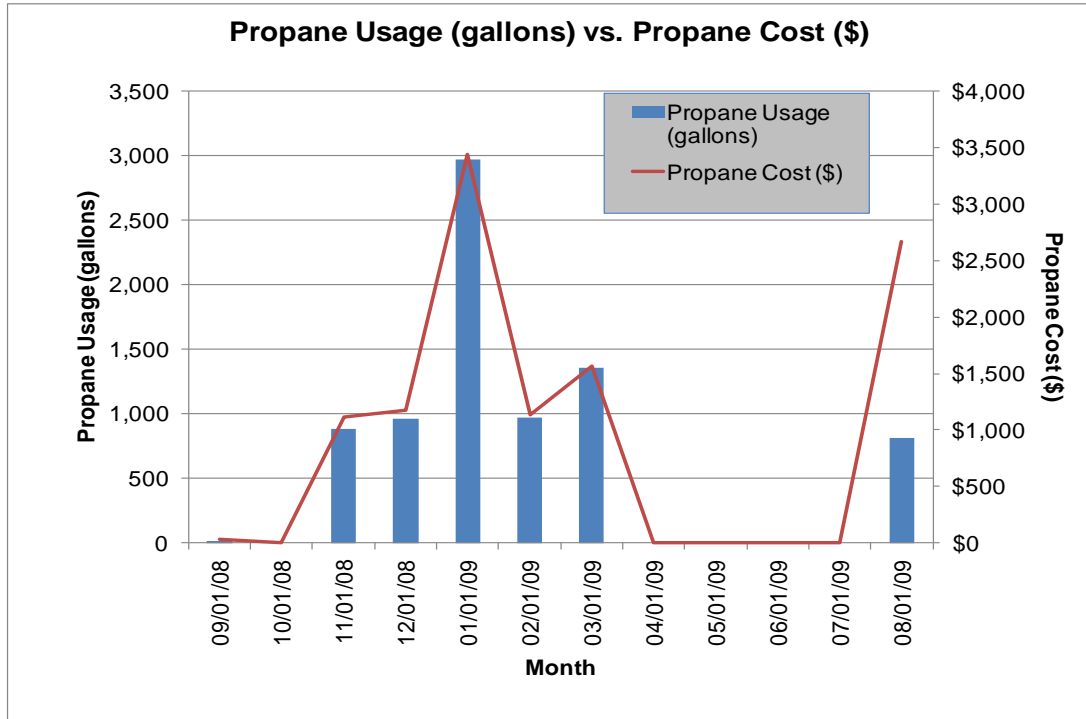
Propane – Fire Headquarters currently purchases propane through Amerigas which delivers gas by truck to the 2,000 gallon tank located on-site. Fire Headquarters currently buys propane at an **average rate of \$1.39/gallon** based on 12 months of utility bills from September 2008 to September 2009. The building purchased **approximately 7,971 gallons or \$11,115 worth of propane** in the previous year.

The following chart shows electricity use versus cost for Fire Headquarters based on utility bills for the 12 month period of September 2008 to September 2009.

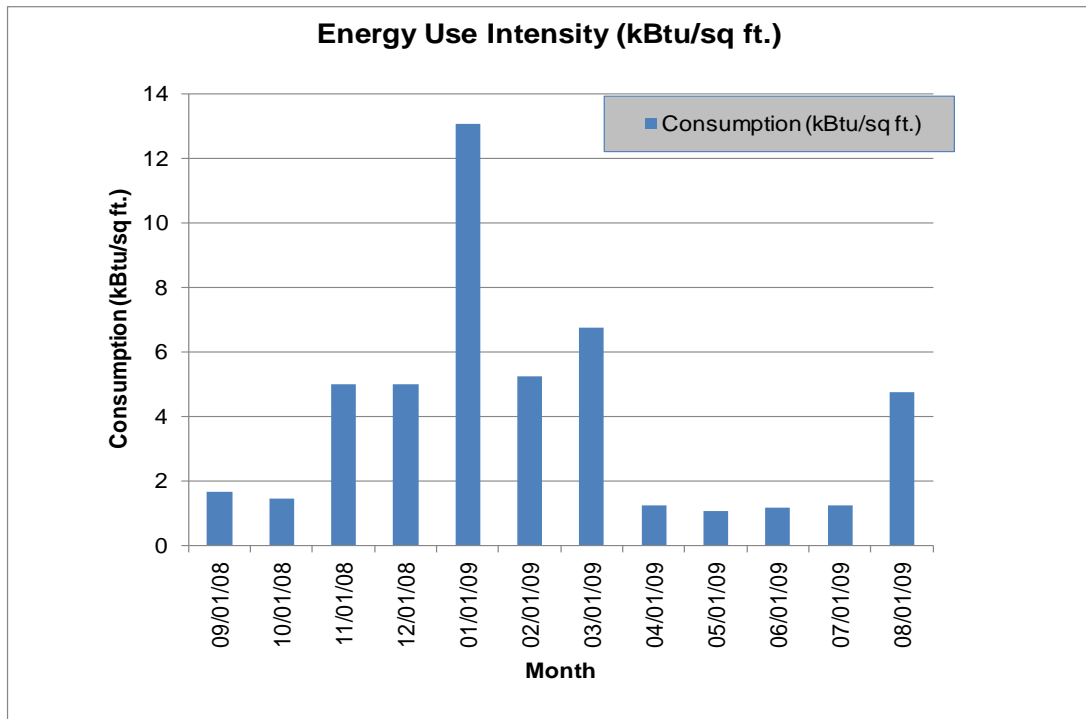


The electricity cost follows a similar curve to the electricity usage, as expected.

Propane is delivered to the building when the existing 2,000 gallon tank needs to be filled. Since there is no set delivery schedule, some months will show no usage. The following chart shows propane as it was delivered including associated costs from September 2008 to September 2009.



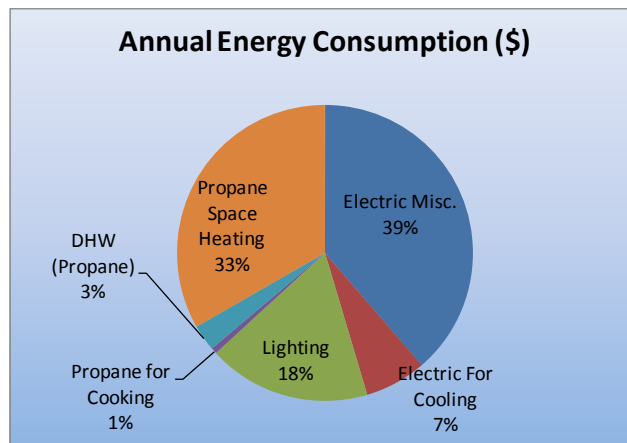
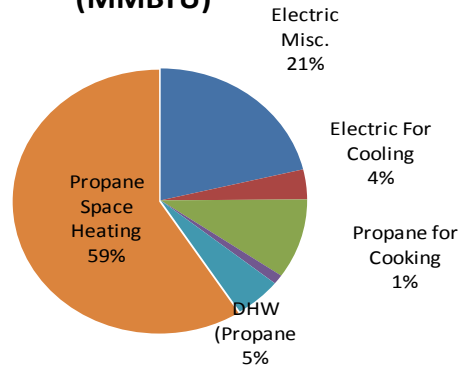
The following chart shows combined propane and electric consumption in kBtu/sq ft for the Fire Headquarters building based on utility bills for the 12 month period of September 2008 to September 2009.



The following table and chart pies show energy use for the Fire Headquarters building based on utility bills for the 12 month period of September 2008 to September 2009. Note electrical cost at \$49.2/MMBtu of energy is more than 3 times the cost of propane at \$15.2/MMBtu.

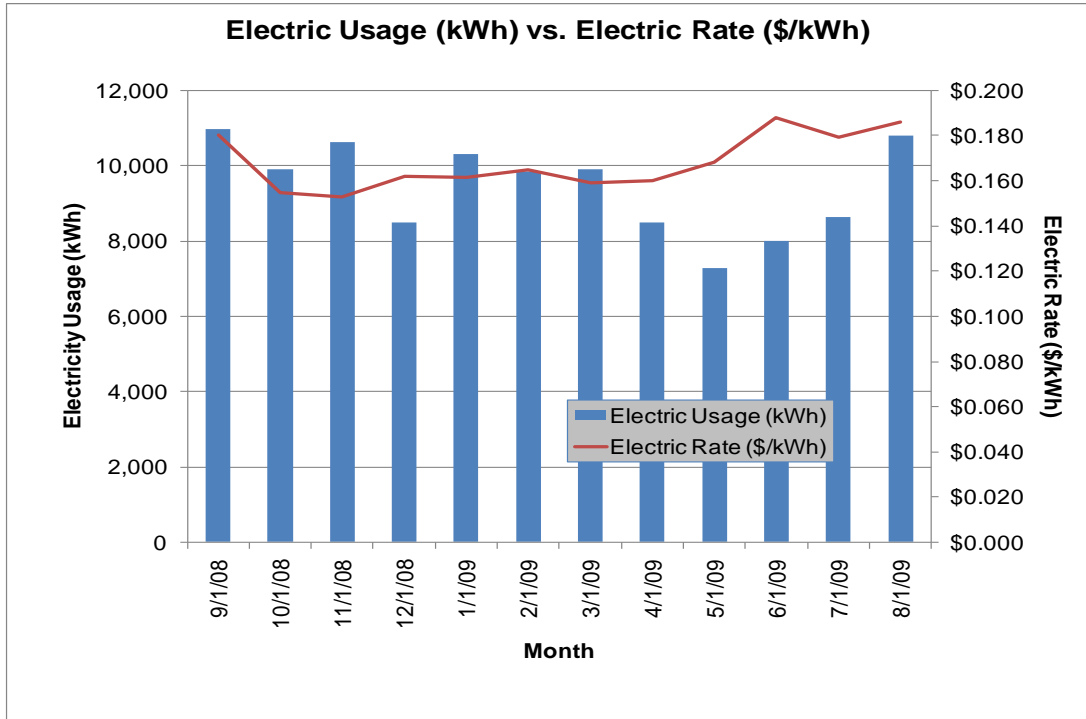
2008 Annual Energy Consumption / Costs					
	MMBtu	% MMBtu	\$	% \$	\$/MMBtu
Electric Miscellaneous	237	21%	\$11,660	39%	49.2
Electric For Cooling	41	4%	\$2,017	7%	49.2
Lighting	109	10%	\$5,363	18%	49.2
Propane for Cooking	13	1%	\$198	1%	15.2
Domestic Hot Water (Propane)	57	5%	\$866	3%	15.2
Propane Space Heating	660	59%	\$10,032	33%	15.2
Totals	1,117	100%	\$30,136	100%	-
Total Electric Usage	387	35%	\$19,021	63.1%	49.1
Total Gas Usage	730	65%	\$11,115	36.9%	15.2
Totals	1,117	100%	\$30,136	100%	-

Annual Energy Consumption (MMBTU)



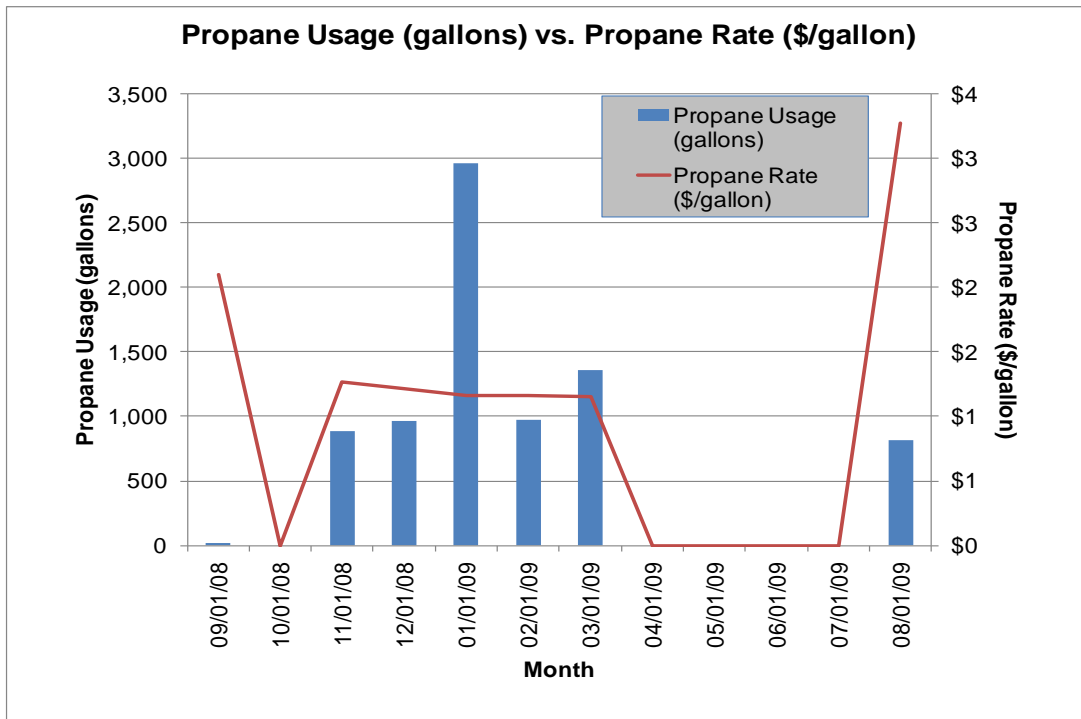
1.2. Utility rate analysis

The Fire Headquarters building currently purchases electricity from JCP&L at a general service market rate for electricity use (kWh) including a separate (kW) demand charge that is factored into each monthly bill. Fire Headquarters currently pays an average rate of approximately \$0.168/kWh based on the 12 months of utility bills of September 2008 to September 2009. Demand prices are reflected in the utility bills and can be verified by observing the price fluctuations throughout the year. The electric rate does not show large fluctuations throughout the year and therefore appears to be the appropriate rate for the building.



The electricity rate fluctuates inversely proportional to usage, as expected. Typically, the more units of electricity that are used by the building, the cheaper electricity becomes per unit.

The Fire Headquarters building currently purchases propane from Amerigas at a general service market rate for propane (gallons). Fire Headquarters currently pays an average rate of approximately \$1.39/gallon based on the 12 months of utility bills of September 2008 to September 2009. The propane rate does not show large fluctuations throughout the year and therefore appears to be the appropriate rate for the building.



The appears to fluctuate greatly from month to month since propane is delivered when a tank needs to be filled as opposed to a demand based system like natural gas or electricity. Although propane rates appear to fluctuate greatly throughout the year, an annual analysis of the propane delivery shows that the actual propane rate is appropriate for this building based on annual billing.

1.3. Energy benchmarking

SWA has entered energy information about Fire Headquarters in the U.S. Environmental Protection Agency’s (EPA) *Energy Star Portfolio Manager* Energy benchmarking system. The building was benchmarked as firehouse building. The building was not able to receive an Energy Star performance rating since the building is classified as a firehouse building, which is currently ineligible for a performance score through the Benchmarking tool. SWA encourages the Township of Sparta to continue entering utility data in *Energy Star Portfolio Manager* in order to track weather normalized source energy use over time. The current Site Energy Use Intensity is 50.2 kBtu/ft²yr, which is relatively low compared to the average Site Energy Use Intensity of an office building, 75 kBtu/ft²yr.

Implementing this report’s highly recommended Energy Conservations Measures (ECMs) will reduce use by approximately 0.5 kBtu/sqft yr, with an additional 16.3 kBtu/sq ft yr from the recommended ECMs.

Per the LGEA program requirements, SWA has assisted the Township of Sparta to create an *Energy Star Portfolio Manager* account and has shared the Fire Headquarters building facility information to allow future data to be added and tracked using the benchmarking tool. SWA is sharing this Portfolio Manager Site information with TRC Energy Services. As per requirements, the account information is provided below:

Username: SpartaTownship
 Password: SPARTA2009

Also, below is a performance rating that is generated based on historical energy consumption from the Portfolio Manager Benchmarking tool.

STATEMENT OF ENERGY PERFORMANCE

Township of Sparta - Fire Headquarters

Building ID: 1857365
For 12-month Period Ending: August 31, 2009¹
Date SEP becomes ineligible: N/A

Date SEP Generated: December 15, 2009

Facility Township of Sparta - Fire Headquarters 141A Woodport Road Sparta, NJ 07871	Facility Owner N/A	Primary Contact for this Facility N/A
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Year Built: 2005
Gross Floor Area (ft²): 23,500

Energy Performance Rating² (1-100) N/A

Site Energy Use Summary³

Electricity - Grid Purchase(kBtu)	386,511
Propane (kBtu)	729,528
Natural Gas - (kBtu) ⁴	0
Total Energy (kBtu)	1,116,039

Energy Intensity⁵

Site (kBtu/ft ² /yr)	50
Source (kBtu/ft ² /yr)	86

Emissions (based on site energy use)

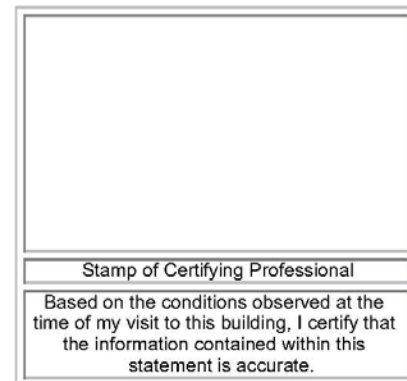
Greenhouse Gas Emissions (MtCO ₂ e/year)	105
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Electric Distribution Utility

FirstEnergy - Jersey Central Power & Lt Co

National Average Comparison

National Average Site EUI	78
National Average Source EUI	157
% Difference from National Average Source EUI	-45%
Building Type	Fire Station/Police Station



Meets Industry Standards⁶ for Indoor Environmental Conditions:

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

Certifying Professional
N/A

Notes:

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

The government estimates the average time needed to fill out this form is 5 hours (includes the time for entering energy data, PE facility inspection, and notarizing the SEP) and welcomes suggestions for reducing this level of effort. Send comments (referencing OMB control number) to the Director, Collection Strategies Division, U.S., EPA (2822T), 1200 Pennsylvania Ave., NW, Washington, D.C. 20460.

EPA Form 5900-16

2. FACILITY AND SYSTEMS DESCRIPTION

2.1. Building Characteristics

The Sparta Fire Headquarters was built in 2005. The two-story building contains 23,500 square feet of floor area and houses office areas, a large meeting room, a lounge area, a kitchen area and garage bays for fire and emergency equipment.

2.2. Building occupancy profiles

The building is operated approximately 48 hours per week. The building is accessible 24 hours per day with an average occupancy of approximately 15 people.

2.3. Building envelope

2.3.1.Exterior Walls

The building is a wood-framed, two-story building with brick veneer. The building was built in 2005 and appears to be in age appropriate condition. It was observed that the building contains R-13 fiberglass batt insulation in each stud bay. The interior surface of the walls consist of gypsum board set on wood studs spaced 16” on center. Overall, exterior and interior wall finishes of the envelope were found to be in age-appropriate, good condition with no major deficiencies.



2.3.2.Roof

The Fire Headquarter pitched roof line is formed from wooden trusses. The roof surface consists of dark grey asphalt shingles. The roof was well within the expected lifetime and no major issues were observed.

In an effort to get the maximum life expectancy out of the roofing material installed, SWA recommends following the installer’s or manufacturer’s recommended maintenance and inspection schedule.

2.3.3.Base

The building’s base is 4” concrete slab in a basement below grade. There were no reported problems with water penetration or moisture.

2.3.4.Windows

The windows of the building are wood-framed, double hung windows with double-paned, low e coated glass. Due to the age of the building, the windows have not yet reached the end of their useful lifetime. Weather-stripping and seals were observed to be intact and in good condition. As a best practice, SWA recommends that all windows be inspected at least once a year. Any gaps, cracks, or damage to weather-stripping or caulking should be repaired or replaced, as needed, to minimize energy loss around those openings. Building staff should also verify that windows open and close properly and repair, as needed.

2.3.5.Exterior doors

The entrance ways for the Fire Headquarters building were observed to have weather-stripping and sealing that was intact. Exterior doors were observed to be insulated steel doors. As a best practice, SWA recommends checking the weather-stripping of each door on a regular basis and replacing any broken seals immediately. This will help optimize comfort and energy performance.

2.3.6.Building air tightness

Based on a visual inspection, there are very few areas that could use improvement with air-sealing. Due to the nature of the garage area, conditioned air is lost when garage doors open and closed. Building staff should limit the amount of time that overhead garage doors are left open, especially during the heating season. As a best practice, weather-stripping on doors and windows should be checked every 6 months for deficiencies and replaced as they fail.

2.4. HVAC Systems

2.4.1.Heating

There are ten York Diamond 90 propane-fired furnaces throughout the building, which provide heating to all the rooms except the apparatus/engine garage. The apparatus/engine garage is heated by three Reznor propane-fired infrared units hung from the ceiling. All heating units were found to be in good condition and are not recommended for replacement.



Typical Reznor unit heater found in garage area

Unit	Model #	Propane Input MBH	Heating Input MBH
UH-1	FT-250	250	200
UH-2	FT-250	250	200
UH-3	FT-125	125	100

2.4.2. Cooling

On the exterior of the building, there are nine York condensing units each providing cooling to their respective Diamond 90 units, mentioned above, that are located throughout the building. All of the cooling units were found in good condition and are not recommended for replacement.



Condensing units located outside the building

Furnace	Servicing	Input MBH	Efficiency	Tons	SEER	Condensing Unit	Model #	Tons	SEER
GF-1	Storage	100	91%	4	13	CU-1	H4DH048S06	4	12
GF-2	Gym	100	91%	3	13	CU-2	H4DH036S06	3	12
GF-3	1st Floor Rec	100	91%	4	13	CU-3	H4DH048S06	4	12
GF-4	Meeting Room	100	91%	5	13	CU-4	H4DH060S06	5	12
GF-5	Meeting Room	100	91%	5	13	CU-5	H4DH060S06	5	12
GF-6	2nd Floor Rec	100	91%	4	13	CU-6	H4DH048S06	4	12
GF-7	Bunk Room	100	91%	3	13	CU-7	H4DH036S06	3	12
GF-8	1st Floor Offices	100	91%	4	13	CU-8	H4DH048S06	4	12
GF-9	2nd Floor Offices	100	91%	5	13	CU-9	H4DH060S06	5	12
GF-10	Kitchen	50	91%	-	-	-	-	-	-

2.4.3. Ventilation

Ventilation is provided by 5 rooftop Greenheck exhaust fans as well as 4 rooftop Greenheck intake air hoods. On the interior of the building, there are 3 Nutone relief fans, ceiling vents, manually operated windows and louvers.

2.4.4.Domestic Hot Water

Water is heated by an AO Smith Model #BTH 120 973, propane-fired water heater. The water heater has a storage capacity of 60 gallons with an input heating capacity of 120 MBH and a recovery of 138.18 gallons per hour. The hot water unit was found to be well within the remaining useful life.

2.5. Electrical systems

2.5.1.Lighting

Interior Lighting – The Fire Headquarters building contains mostly efficient interior lighting due to its age. The majority of general areas contain fluorescent T8 fixtures with magnetic ballasts. There are approximately 28 lights that are incandescent or halogen that should be upgraded to CFLs. The areas that contain incandescent or halogens are closets, mechanical rooms and the area directly above the bar. SWA recommends changing these existing lights to CFLs that have equivalent light output but use less energy to operate. SWA also identified 4 areas that would benefit from installing occupancy sensors. SWA recommends that the areas such as the restroom hallway, large storage area and excess lights located in stairwells are updated with occupancy sensors. See attached existing and proposed lighting schedule in Appendix A.

Exit Lights – All of the exit signs were found to be efficient LED exit signs. LED exit signs are the most cost-effective option since they use such little power and operate 24 hours a day, 365 days a year. See attached existing and proposed lighting schedule in Appendix A.

Exterior Lighting - The exterior lighting surveyed revealed that there was 1 exterior fixture that contained probe-start metal halide fixtures. SWA recommends upgrading this probe-start metal halide fixture with a new pulse-start metal halide fixture. In addition there were also 4 fixtures that contained three 60W incandescent bulbs. These incandescent bulbs should be replaced with CFLs that use less energy to operate but provide equivalent light output.

2.5.2.Appliances

SWA performed a basic survey of appliances installed at the Fire Headquarters building. Appliances, such as refrigerators, that are over 10 years of age should be replaced with newer efficient models with the Energy Star label. When compared to the average electrical consumption of older equipment, Energy Star equipment results in a large energy as well as cost savings. Look for the Energy Star label when replacing appliances and equipment including; window air conditioners, refrigerators, printers, computers, copy machines, etc. More information can be found in the “Products” section of the Energy Star website at: <http://www.energystar.gov>

2.5.3.Elevators

The Fire Headquarters does not contain an elevator.

2.5.4.Process and others electrical systems

There are no other electrical systems present within the building.

3. EQUIPMENT LIST

Inventory

Building System	Description	Physical Location	Model #	Fuel	Space Served	Estimated Remaining Useful Life %
Lighting	See Details - Appendix A	-	-	Electric	All	Varies, no less than 50%
Heating/Cooling	Furnace with DX cooling coil (100 MBH, 91% efficient, 4 tons, 13 SEER)	Mechanical Room	York Diamond 90	Propane/electric	Storage	65%
	4-ton condensing unit (12 SEER)	Mechanical Room	York Stellar Plus # H4DH048S06	Electric		53%
	Furnace with DX cooling coil (100 MBH, 91% efficient, 3 tons, 13 SEER)	Mechanical Room	York Diamond 90	Propane/electric	Gym	65%
	3-ton condensing unit (12 SEER)	Outside/East facing wall	York Stellar Plus # H4DH036S06	Electric		53%
	Furnace with DX cooling coil (100 MBH, 91% efficient, 4 tons, 13 SEER)	Mechanical Room	York Diamond 90	Propane/electric	1st Floor Rec	65%
	4-ton condensing unit (12 SEER)	Outside/East facing wall	York Stellar Plus # H4DH048S06	Electric		53%
	Furnace with DX cooling coil (100 MBH, 91% efficient, 5 tons, 13 SEER)	Mechanical Room	York Diamond 90	Propane/electric	Meeting Room	65%
	5-ton condensing unit (12 SEER)	Outside/East facing wall	York Stellar Plus # H4DH060S06	Electric		53%
	Furnace with DX cooling coil (100 MBH, 91% efficient, 5 tons, 13 SEER)	Mechanical Room	York Diamond 90	Propane/electric	Meeting Room	65%
	5-ton condensing unit (12 SEER)	Outside/East facing wall	York Stellar Plus # H4DH060S06	Electric		53%
	Furnace with DX cooling coil (100 MBH, 91% efficient, 4 tons, 13 SEER)	Mechanical Room	York Diamond 90	Propane/electric	2nd Floor Rec	65%
	4-ton condensing unit (12 SEER)	Outside/East facing wall	York Stellar Plus # H4DH048S06	Electric		53%
	Furnace with DX cooling coil (100 MBH, 91% efficient, 3 tons, 13 SEER)	Mechanical Room	York Diamond 90	Propane/electric	Bunk Room	65%
	3-ton condensing unit (12 SEER)	Outside/East facing wall	York Stellar Plus # H4DH036S06	Electric		53%
	Furnace with DX cooling coil (100 MBH, 91% efficient, 4 tons, 13 SEER)	Mechanical Room	York Diamond 90	Propane/electric	1st Floor Offices	65%
	4-ton condensing unit (12 SEER)	Outside/East facing wall	York Stellar Plus # H4DH048S06	Electric		53%
	Furnace with DX cooling coil (100 MBH, 91% efficient, 5 tons, 13 SEER)	Mechanical Room	York Diamond 90	Propane/electric	2nd Floor Offices	65%
	5-ton condensing unit (12 SEER)	Outside/East facing wall	York Stellar Plus # H4DH060S06	Electric		53%
	Furnace (50 MBH, 91% efficient)	Mechanical Room	York Diamond 90	Propane	2nd Floor Offices	65%
	2 unit heaters (250 MBH, 80% efficient)	Garage Bay	Reznor FT-250	Propane	Garage	53%
Unit heater (125 MBH, 80% efficient)	Garage Bay	Reznor FT-125	Propane	Garage	53%	
Domestic Hot Water	Water heater (60 gal, 120 MBH, 138.18 gal/hr recovery)	Mechanical Room	AO Smith # BTH 120 973	Propane	Entire building	62%
Controls	Setback thermostats	Various locations	Totaline	Electric	Various locations	30%
Ventilation	5 exhaust fans	Exterior	Greenheck	Electric	Entire building	30%
	4 intake air hoods	Exterior	Greenheck	Electric	Entire building	30%
	3 relief fans	Exterior	Nutone	Electric	Entire building	30%

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

4. ENERGY CONSERVATION MEASURES

Based on the assessment of the Fire Headquarters building, SWA has separated the investment opportunities into three recommended categories:

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

- There are no recommended capital improvements due to the relatively young age of the building and its operating system.

Category II Recommendations: Operations and Maintenance

- There are no recommended operations and maintenance measures due to the relatively young age of the building and its operating systems, as well as the small number of mechanical systems at this site.

Category III Recommendations: Energy Conservation Measures

Summary table

ECM#	Description of Highly Recommended 0-5 Year Payback ECMs
1	Install 28 new CFL bulbs
2	Install 4 new occupancy sensors
3	Install 1 new Pulse Start Metal Halide
	Description of Recommended 5-10 Year Payback ECMs
4	Install 95.9 kW Ground-mounted PV system

ECM#1: *Install 28 new CFL lamps*

Description:

The Fire Headquarters building contains approximately 28 incandescent or halogen bulbs that should be upgraded to CFLs. CFLs are capable of generating the same light output, while using approximately 1/3 of the energy of an incandescent or halogen bulb. Areas such as mechanical rooms, storage closets and the above bar lighting all contained inefficient light bulbs. See Appendix A for a complete existing and proposed lighting schedule.

Installation cost:

Estimated installed cost: \$560

Source of cost estimate: *RS Means; Published and established costs*

Economics:

ECM #	ECM description	Source	est. installed cost, \$	est. incentives, \$	net est. ECM cost with incentives, \$	kWh, 1st yr savings	kW, demand reduction/mo	Propane (gallons), 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	Install 28 new CFL lamps	RSMeans	560	0	560	2,573	0.5	0	0.4	84	516	5	2,351	1.1	319.8	64.0	88.3	1,804	4,607

Assumptions: SWA calculated the savings for this measure using measurements taken the days of the field visits and using the billing analysis. SWA assumes operation cost savings based on avoided bulb replacement when upgrading to lighting that consists of longer rated burn hours.

Rebates / financial incentives:

There are currently no incentives for this measure at this time.

Options for funding ECM:

NJ Office of Clean Energy – SmartStart, Direct Install programs

ECM#2: Install 4 new occupancy sensors

Description:

Based on field observations, there are 4 areas within the Fire Headquarters building that would benefit from the installation of occupancy sensors. SWA recommends that these 4 areas are upgraded to occupancy sensors in order to reduce the amount of runtime based on occupancy schedules. See Appendix A for complete lighting schedule and analysis.

Installation cost:

Estimated installed cost: \$360
 Source of cost estimate: *RS Means; Published and established costs*

Economics:

ECM #	ECM description	Source	est. installed cost, \$	est. incentives, \$	net est. ECM cost with incentives, \$	kWh, 1st yr savings	kW, demand reduction/mo	Propane (gallons), 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	Install 4 new occupancy sensors	RS Means	440	80	360	574	0.1	0	0.1	0	96	15	1,135	3.7	215.2	14.3	25.9	791	1,028

Assumptions: SWA calculated the savings for this measure using measurements taken the days of the field visits and using the billing analysis. SWA assumes amount of reduced hours based on field observations.

Rebates / financial incentives:

NJ Clean Energy Prescriptive Lighting Controls – Wall-mounted occupancy sensors (\$20 per control)
 Maximum incentive amount is \$80.

Options for funding ECM:

NJ Office of Clean Energy – SmartStart, Direct Install programs

ECM#3: Install 1 new Pulse Start Metal Halide fixtures

Description:

The Fire Headquarters building currently contains 1 exterior probe start metal halide fixture that is inefficient and consumes an unnecessary amount of power. SWA recommends upgrading this probe-start metal halide to a pulse-start metal halide. A complete lighting schedule has been attached in Appendix A of this report.

Installation cost:

Estimated installed cost: \$305
 Source of cost estimate: RS Means; Published and established costs

Economics:

ECM #	ECM description	Source	est. installed cost, \$	est. incentives, \$	net est. ECM cost with incentives, \$	kWh, 1st yr savings	kW, demand reduction/mo	Propane (gallons), 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	Install 1 new pulse start metal halide fixtures	RSMeans	330	25	305	318	0.1	0	0.0	12	65	15	770	4.7	152.4	10.2	20.1	476	569

Assumptions: SWA calculated the savings for this measure using measurements taken the days of the field visits and using the billing analysis. SWA assumes operation cost savings based on avoided bulb replacement when upgrading to lighting that consists of longer rated burn hours.

Rebates / financial incentives:

NJ Clean Energy Prescriptive Lighting – Metal halide w/pulse start (\$25 per fixture)
 Maximum incentive amount is \$25.

Options for funding ECM:

NJ Office of Clean Energy – SmartStart, Direct Install programs

ECM#4: Install 95.9 kW Ground-mounted PV system

Description:

Currently, the Fire Headquarters building does not use any renewable energy systems. Renewable energy systems, such as photovoltaic panels, can be mounted on the ground, in an open area behind the facility, and can offset a significant portion of the purchased electricity for the building. Power stations generally have two separate electrical charges; usage and demand. Usage is the amount of electricity in kilowatt-hours that a building uses from month to month. Demand is the amount of electrical power that a building uses at any given instance in a month period. During the summer periods, when electric demand at a power station is high due to the amount of air conditioners, lights, equipment, etc... being used within the region, demand charges go up to offset the utility’s cost to provide enough electricity at that given time. Photovoltaic systems not only offset the amount of electricity used by a building but also reduce the building’s electrical demand, resulting in a higher cost savings as well. Presented below are the economics of installing a 95.9 kW PV system to offset electrical demand for the building and reduce the annual net electric consumption for the building. A system of 780 multi-crystalline 123W panels would generate 112,565 kWh per year or 99.4% of the Fire Headquarters’ electric bill. The panels would be located in the Northwest corner of the building’s lot.

Installation cost:

Estimated installed cost: \$575,400
 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	Propane (gallons), 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
4	Install 95.9 kW Ground-mounted PV System	Similar Projects	671,300	95,900	575,400	112,565	23.5	0	16.3	0	86,111	15	1,013,272	6.7	76.1	5.1	12.4	452,587	201,548

Assumptions: SWA estimated the cost and savings of the system based on past PV projects. SWA projected physical dimensions based on a typical Polycrystalline Solar Panel (123 Watts, model #ND-123UJF). PV systems are sized based on Watts and physical dimensions for an array will differ with the efficiency of a given solar panel (W/sq ft).

Rebates/financial incentives:

NJ Clean Energy - Renewable Energy Incentive Program, Incentive based on \$1.00 / watt Solar PV application. Incentive amount for this application is \$95,900.

<http://www.njcleanenergy.com/renewable-energy/programs/renewable-energy-incentive-program>

NJ Clean Energy - Solar Renewable Energy Certificate Program. Each time a solar electric system generates 1000kWh (1MWh) of electricity, a SREC is issued which can then be sold or traded separately from the power. The buildings must also become net-metered in order to earn SRECs as well as sell power back to the electric grid. \$57,540 has been incorporated in the above costs; however it requires proof of performance, application approval and negotiations with the utility.

Options for funding ECM:

NJ Office of Clean Energy – Renewable Energy Incentive Program (REIP), NJ SREC registration program

5. RENEWABLE AND DISTRIBUTED ENERGY MEASURES

5.1. Existing systems

There are not currently any existing renewable energy systems.

5.2. Wind

A Wind system is not applicable for this building because the area does not have winds of sufficient velocity to justify installing a wind turbine system.

5.3. Solar Photovoltaic

Please see the above recommended ECM #4.

5.4. 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 and high cost of installation.

5.5. Combined Heat and Power

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

5.6. Geothermal

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

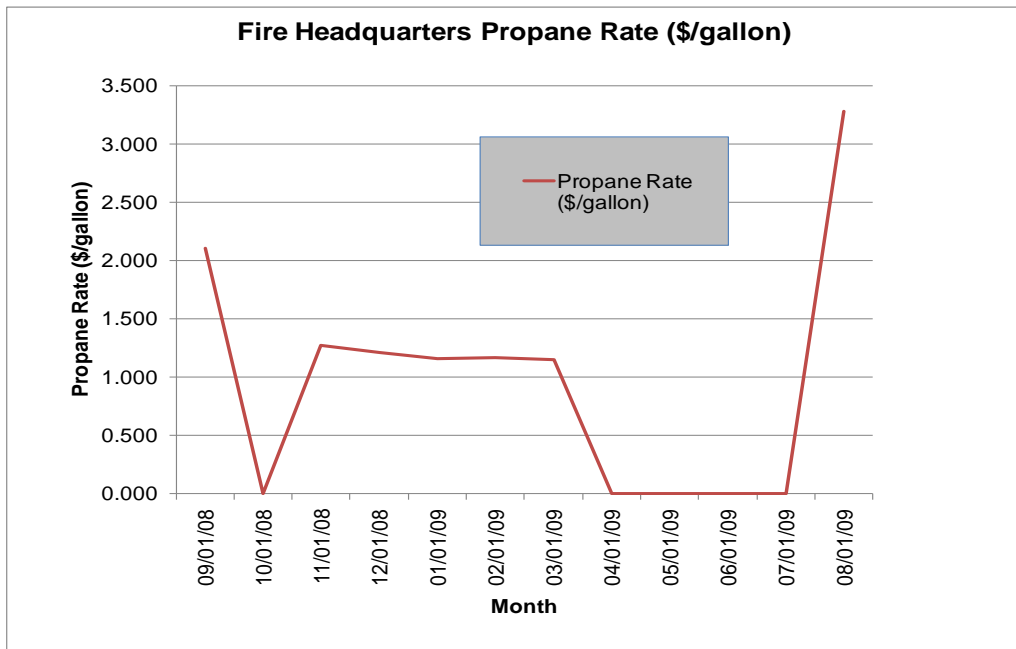
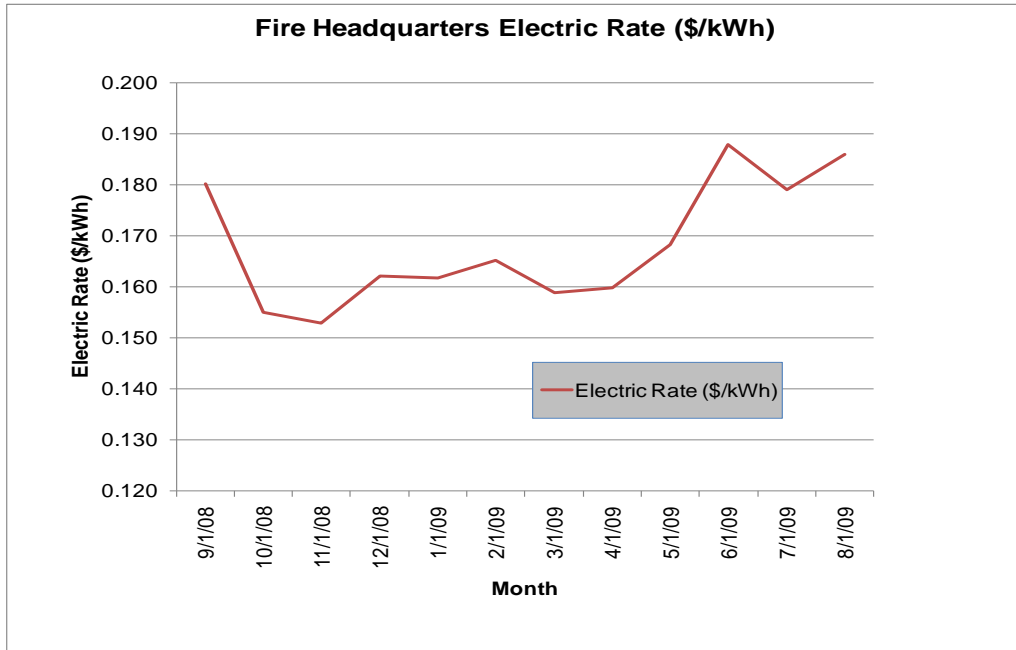
6. ENERGY PURCHASING AND PROCUREMENT STRATEGIES

6.1. Energy Purchasing

The Fire Headquarters building purchase propane through Amerigas which delivers gas by truck to the 2,000 gallon tank located on-site. Electricity is purchased via one incoming meter directly all from JCP&L without an ESCO. An Energy Services Company (ESCO) is a consultancy group that engages in a performance based contract with a client firm to implement measures which reduce energy consumption and costs in a technically and financially viable manner. SWA analyzed the utility rate for propane and electricity supply over an extended period. Electric bill analysis shows fluctuations of 19% over the most recent 12 month period. Propane bill analysis shows fluctuations up to 65% over the most recent 12 month period. Some of the electric fluctuations may have been caused by adjustments between estimated and actual meter readings, others may be due to unusual high and escalating energy costs in 2008. Propane fluctuations may be due to the delivery schedule and quantity delivered.

Currently, New Jersey commercial buildings of similar type pay \$0.150/kWh for electricity and \$1.50/gallon for propane. Currently, the electricity rate for Fire Headquarters is \$.168/kWh, which means there is a potential cost savings of \$2,039 per year. The propane rate for the Fire Headquarters building is \$1.39/therm which is better than the average propane cost. A large cost savings potential for electricity exists, however this involves contacting third party suppliers and negotiating utility rates. SWA

recommends that the Township of Sparta 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 Fire Headquarters building. Appendix B contains a complete list of third party energy suppliers for the Township of Sparta service area. The Township of Sparta may want to consider partnering with other school districts, municipalities, townships and communities to aggregate a substantial electric use for better leveraging in negotiations with ESCOs and of improving the pricing structures. This sort of activity is happening in many parts of the country and in New Jersey.



6.2. Energy Procurement strategies

Also, the Fire Headquarters 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.

7. METHOD OF ANALYSIS

7.1. Assumptions and tools

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

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

Location			Existing Fixture Information											Retrofit Information											Annual Savings					
Marker	Floor	Room Identification	Fixture Type	Ballast	Lamp Type	# of Fixtures	# of Lamps per Fixture	Watts per Lamp	Controls	Operational Hours per Day	Operational Days per Year	Ballast Wattage	Total Watts	Energy Use kWh/year	Category	Fixture Type	Lamp Type	Ballast	Controls	# of Fixtures	# of Lamps per Fixture	Watts per Lamp	Operational Hours per Day	Operational Days per Year	Ballast Watts	Total Watts	Energy Use kWh/year	Fixture Savings (kWh)	Controls Savings (kWh)	Total Savings (kWh)
1	1	Captain's Office	Parabolic	E	4T8	2	2	32	S	4	261	0	128	134	N/A	Parabolic	4T8	None	S	2	2	32	4	261	0	128	134	0	0	0
2	1	Lounge	Parabolic	E	4T8	10	2	32	S	4	261	0	640	668	N/A	Parabolic	4T8	None	S	10	2	32	4	261	0	640	668	0	0	0
3	1	Lounge	Exit sign	None	LED Exit	1	1	5	N	24	365	0	5	44	N/A	Exit sign	LED Exit	None	N	1	1	5	24	365	0	5	44	0	0	0
4	1	Banquet Hall	Parabolic	E	4T8	28	2	32	S	4	261	0	1,792	1,871	N/A	Parabolic	4T8	None	S	28	2	32	4	261	0	1,792	1,871	0	0	0
5	1	Banquet Hall	Exit sign	None	LED Exit	2	1	5	N	24	365	0	10	88	N/A	Exit sign	LED Exit	None	N	2	1	5	24	365	0	10	88	0	0	0
8	1	Banquet Hall - Closet 1	Parabolic	E	4T8	1	2	32	S	1	52	0	64	3	N/A	Parabolic	4T8	None	S	1	2	32	1	52	0	64	3	0	0	0
9	1	Banquet Hall - Closet 2	Parabolic	E	4T8	1	2	32	S	1	52	0	64	3	N/A	Parabolic	4T8	None	S	1	2	32	1	52	0	64	3	0	0	0
10	1	Banquet Hall - Women's Room	Parabolic	E	4T8	2	2	32	OS	2	261	0	128	67	N/A	Parabolic	4T8	None	OS	2	2	32	2	261	0	128	67	0	0	0
11	1	Banquet Hall - Women's Room	Parabolic	E	4T8	1	1	32	OS	2	261	0	32	17	N/A	Parabolic	4T8	None	OS	1	1	32	2	261	0	32	17	0	0	0
12	1	Banquet Hall - Men's Room	Parabolic	E	4T8	2	2	32	S	2	261	0	128	67	N/A	Parabolic	4T8	None	S	2	2	32	2	261	0	128	67	0	0	0
13	1	Banquet Hall - Men's Room	Parabolic	E	4T8	1	1	32	S	2	261	0	32	17	N/A	Parabolic	4T8	None	S	1	1	32	2	261	0	32	17	0	0	0
14	1	Banquet Hall - Men's Room Closet	Screw-in	None	CFL	1	2	13	S	1	52	0	26	1	N/A	Screw-in	CFL	None	S	1	2	13	1	52	0	26	1	0	0	0
15	1	Banquet Hall	Screw-in	None	Hal	1	1	50	S	4	261	0	50	52	CFL	Screw-in	CFL	None	S	1	1	16.667	4	261	0	17	17	35	0	35
16	1	Lounge - Closet	Parabolic	E	4T8	1	2	32	S	1	52	0	64	3	N/A	Parabolic	4T8	None	S	1	2	32	1	52	0	64	3	0	0	0
17	1	Kitchen	Exit sign	None	LED Exit	1	1	5	N	24	365	0	5	44	N/A	Exit sign	LED Exit	None	N	1	1	5	24	365	0	5	44	0	0	0
18	1	Kitchen	Parabolic	E	4T8	10	2	32	S	4	261	0	640	668	N/A	Parabolic	4T8	None	S	10	2	32	4	261	0	640	668	0	0	0
19	1	Lounge - Bar Area	Screw-in	None	Hal	21	1	50	S	4	261	0	1,050	1,096	CFL	Screw-in	CFL	None	S	21	1	16.667	4	261	0	350	365	731	0	731
20	B	Stairs down to Gym	Parabolic	E	4T8	3	1	32	S	4	312	0	96	120	N/A	Parabolic	4T8	None	S	3	1	32	4	312	0	96	120	0	0	0
21	B	Stairs down to Gym	Exit sign	None	LED Exit	1	1	5	N	24	365	0	5	44	N/A	Exit sign	LED Exit	None	N	1	1	5	24	365	0	5	44	0	0	0
22	B	Gym	Parabolic	E	4T8	16	2	32	OS	4	261	0	1,024	1,069	N/A	Parabolic	4T8	None	OS	16	2	32	4	261	0	1,024	1,069	0	0	0
23	B	Gym	Parabolic	E	4T8	1	1	5	N	24	365	0	5	44	N/A	Parabolic	4T8	None	N	1	1	32	24	365	0	32	280	-237	0	-237
24	B	Large Storage Area	Parabolic	E	4T8	20	2	32	S	4	261	0	1,280	1,336	C	Parabolic	4T8	None	OS	20	2	32	3	261	0	1,280	1,002	0	334	334
25	B	Large Storage Area	Exit sign	None	LED Exit	1	1	5	N	24	365	0	5	44	N/A	Exit sign	LED Exit	None	N	1	1	5	24	365	0	5	44	0	0	0
26	B	Boiler Room	Parabolic	E	4T8	2	2	32	S	2	104	0	128	27	N/A	Parabolic	4T8	None	S	2	2	32	2	104	0	128	27	0	0	0
27	2	Left Stairs Up	Parabolic	E	4T8	2	2	32	S	8	312	0	128	319	C	Parabolic	4T8	None	OS	2	2	32	6	312	0	128	240	0	80	80
28	2	Stairs to Trophy Room	Parabolic	E	4T8	1	2	32	S	8	312	0	64	160	N/A	Parabolic	4T8	None	S	1	2	32	8	312	0	64	160	0	0	0
29	2	Trophy Room	Parabolic	E	4T8	11	2	32	S	4	261	0	704	735	N/A	Parabolic	4T8	None	S	11	2	32	4	261	0	704	735	0	0	0
30	2	Trophy Room	Exit sign	None	LED Exit	2	1	5	N	24	365	0	10	88	N/A	Exit sign	LED Exit	None	N	2	1	5	24	365	0	10	88	0	0	0
31	2	Stairs down to Kitchen	Parabolic	E	4T8	3	2	32	S	2	312	0	192	120	N/A	Parabolic	4T8	None	S	3	2	32	2	312	0	192	120	0	0	0
32	2	Men's Room	Parabolic	E	4T8	1	2	32	OS	2	261	0	64	33	N/A	Parabolic	4T8	None	OS	1	2	32	2	261	0	64	33	0	0	0
33	2	Women's room	Parabolic	E	4T8	1	2	32	OS	2	261	0	64	33	N/A	Parabolic	4T8	None	OS	1	2	32	2	261	0	64	33	0	0	0
34	2	Rooms with Murphy beds	Parabolic	E	4T8	8	2	32	S	4	261	0	512	535	N/A	Parabolic	4T8	None	S	8	2	32	4	261	0	512	535	0	0	0
35	2	Furnace Room	Screw-in	None	Inc	1	1	100	S	2	52	0	100	10	CFL	Screw-in	CFL	None	S	1	1	33.333	2	52	0	33	3	7	0	7
36	2	Storage Area	Screw-in	None	Inc	1	1	100	S	1	52	0	100	5	CFL	Screw-in	CFL	None	S	1	1	33.333	1	52	0	33	2	3	0	3
37	2	Mechanical Room (Trophy room)	Parabolic	E	4T8	2	2	32	S	2	52	0	128	13	N/A	Parabolic	4T8	None	S	2	2	32	2	52	0	128	13	0	0	0
38	1	Garage Area	Parabolic	E	4T8	78	2	32	S	8	312	0	4,992	12,460	N/A	Parabolic	4T8	None	S	78	2	32	8	312	0	4,992	12,460	0	0	0
39	2	Chief's Office	Parabolic	E	4T8	2	2	32	S	2	261	0	128	67	N/A	Parabolic	4T8	None	S	2	2	32	2	261	0	128	67	0	0	0
40	2	Deputy Chief	Parabolic	E	4T8	2	2	32	S	2	261	0	128	67	N/A	Parabolic	4T8	None	S	2	2	32	2	261	0	128	67	0	0	0
41	2	Fire Prevention	Parabolic	E	4T8	5	2	32	S	2	261	0	320	167	N/A	Parabolic	4T8	None	S	5	2	32	2	261	0	320	167	0	0	0
42	2	Communication Center	Parabolic	E	4T8	2	2	32	S	2	312	0	128	80	N/A	Parabolic	4T8	None	S	2	2	32	2	312	0	128	80	0	0	0
43	2	Assurer/Secretary/Business Administrat	Parabolic	E	4T8	3	2	32	S	2	261	0	192	100	N/A	Parabolic	4T8	None	S	3	2	32	2	261	0	192	100	0	0	0
44	2	Conference Room	Parabolic	E	4T8	6	2	32	S	6	312	0	384	719	N/A	Parabolic	4T8	None	S	6	2	32	6	312	0	384	719	0	0	0
45	2	Conference Room - Mechanical Room	Parabolic	E	4T8	1	2	32	S	1	52	0	64	3	N/A	Parabolic	4T8	None	S	1	2	32	1	52	0	64	3	0	0	0
46	2	Right staircase	Parabolic	E	4T8	2	2	32	S	8	312	0	128	319	C	Parabolic	4T8	None	OS	2	2	32	6	312	0	128	240	0	80	80
47	1	Garage - lower ceiling lights	Parabolic	E	4T8	24	2	32	S	8	312	0	1,536	3,834	N/A	Parabolic	4T8	None	S	24	2	32	8	312	0	1,536	3,834	0	0	0
48	1	Equipment Room	Parabolic	E	4T8	6	2	32	S	8	52	0	384	160	N/A	Parabolic	4T8	None	S	6	2	32	8	52	0	384	160	0	0	0
49	1	Restroom Hallway	Parabolic	E	4T8	2	2	32	S	8	312	0	128	319	C	Parabolic	4T8	None	OS	2	2	32	6	312	0	128	240	0	80	80
50	1	Women's Room	Parabolic	E	4T8	2	2	32	OS	4	312	0	128	160	N/A	Parabolic	4T8	None	OS	2	2	32	4	312	0	128	160	0	0	0
51	1	Women's room	Parabolic	E	4T8	1	1	32	OS	4	312	0	32	40	N/A	Parabolic	4T8	None	OS	1	1	32	4	312	0	32	40	0	0	0
52	1	Men's Room	Parabolic	E	4T8	2	2	32	OS	4	312	0	128	160	N/A	Parabolic	4T8	None	OS	2	2	32	4	312	0	128	160	0	0	0
53	1	Men's Room	Parabolic	E	4T8	1	1	32	OS	4	312	0	32	40	N/A	Parabolic	4T8	None	OS	1	1	32	4	312	0	32	40	0	0	0
54	Ext	Exterior Lights	Exterior	None	Inc	4	3	60	T	12	312	0	720	2,696	CFL	Exterior	CFL	None	T	4	3	20	12	312	0	240	899	1,797	0	1,797
55	Ext	Front lighting	Exterior	None	MH	1	1	250	T	12	312	0	250	936	PSMH	Exterior	PSH	None	T	1	1	165	12	312	0	165	618	318	0	318
Totals:						307	90	1,906	0				19,269	31,904							307	90	1,608			17,864	28,676	2,655	574	3,229

Appendix B: Third Party Energy Suppliers (ESCOs)
<http://www.state.nj.us/bpu/commercial/shopping.html>

Third Party Electric Suppliers for JCPL Service Territory	Telephone & Web Site
Hess Corporation 1 Hess Plaza Woodbridge, NJ 07095	(800) 437-7872 www.hess.com
BOC Energy Services, Inc. 575 Mountain Avenue Murray Hill, NJ 07974	(800) 247-2644 www.boc.com
Commerce Energy, Inc. 4400 Route 9 South, Suite 100 Freehold, NJ 07728	(800) 556-8457 www.commerceenergy.com
Constellation NewEnergy, Inc. 900A Lake Street, Suite 2 Ramsey, NJ 07446	(888) 635-0827 www.newenergy.com
Direct Energy Services, LLC 120 Wood Avenue, Suite 611 Iselin, NJ 08830	(866) 547-2722 www.directenergy.com
FirstEnergy Solutions 300 Madison Avenue Morristown, NJ 07926	(800) 977-0500 www.fes.com
Glacial Energy of New Jersey, Inc. 207 LaRoche Avenue Harrington Park, NJ 07640	(877) 569-2841 www.glacialenergy.com
IntegrYS Energy Services, Inc. 99 Wood Ave, South, Suite 802 Iselin, NJ 08830	(877) 763-9977 www.integrYSenergy.com
Liberty Power Delaware, LLC Park 80 West Plaza II, Suite 200 Saddle Brook, NJ 07663	(866) 769-3799 www.libertypowercorp.com
Liberty Power Holdings, LLC Park 80 West Plaza II, Suite 200 Saddle Brook, NJ 07663	(800) 363-7499 www.libertypowercorp.com
Pepco Energy Services, Inc. 112 Main St. Lebanon, NJ 08833	(800) 363-7499 www.pepco-services.com
PPL EnergyPlus, LLC 811 Church Road Cherry Hill, NJ 08002	(800) 281-2000 www.pplenergyplus.com
Sempra Energy Solutions 581 Main Street, 8th Floor Woodbridge, NJ 07095	(877) 273-6772 www.semprasolutions.com
South Jersey Energy Company One South Jersey Plaza, Route 54 Folsom, NJ 08037	(800) 756-3749 www.southjerseyenergy.com
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.ugienergyservices.com