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June 28, 2010

Local Government Energy Program
Energy Audit Report

For

Township of Sparta

Public Works Facility
9 Prices Lane
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 Public Works Facility building located at 9 Prices Lane, 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.

The Public Works Facility was built in 2001 and consists of 2 floors and a total floor area of 23,900 square feet. The building serves as the Main Building for the DPW and consists of vehicle storage, a mechanics garage, office space, a locker room, and meeting room.

The goal of this Local Government Energy Audit (LGEA) is to provide sufficient information to 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 Public Works Facility building located at 9 Prices Lane, Sparta, NJ. The building is a two-story commercial building with a total floor area of 23,900 square feet. The building was built in 2001 and serves as the main building for the DPW department. The building houses vehicle storage, a mechanics garage, office space, a locker room and a meeting room. 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 3rdth, 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 91,120 kWh or $15,590 worth of electricity at an approximate rate of $0.171/kWh and 12,529 gallons or $15,278 worth of propane at an approximate rate of $1.219/gallon. The joint energy consumption for the building, including both electricity and fossil fuel, was 1,501 MMBtus of energy that cost a total of $30,868.

SWA has entered energy information about the Public Works Facility building in the U.S. Environmental Protection Agency's (EPA) *Energy Star Portfolio Manager* Energy benchmarking system. The building was benchmarked as a DPW building and therefore was not able to receive an Energy Star performance rating. 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 61.0 kBtu/ft^2yr.

Recommendations

Implementing this report's recommendations will reduce use by approximately 25.1 kBtu/ft^2yr, which would decrease the building's energy use intensity to 35.9 kBtu/ft^2yr.

SWA recommends a package of measures that addresses lighting, cooling and renewable energy systems. Inefficient lighting such as T12 fluorescent fixtures, fluorescent exit signs and probe start metal halide bulbs are recommended to upgrade to more efficient options. There is one thru-wall air-conditioner located in an office that is recommended to be replaced. A large portion of the savings comes from offsetting electricity usage through the use of a 77 kW solar PV system. As an alternative to solar PV, SWA evaluated the installation of a 100 kW wind turbine, but found that this improvement would not be cost effective.

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

- Increase attic insulation levels

Category II Recommendations: Operations and Maintenance

- Repair flashing where exterior mason base meets vertical wall panels above
- Perform bi-annual inspections to maintain building weather-stripping and air-sealing
- Maintain roofs

- Maintain gutters
- Provide weather stripping / air sealing
- Provide water efficient fixtures and controls
- Use Energy Star labeled appliances

Category III Recommendations: Energy Conservation Measures

At this time, SWA highly recommends a total of **1** Energy Conservation Measures (ECMs) for the Public Works Facility building that is summarized in the following Table 1. The total investment cost for this ECM with incentives is **$705**. SWA estimates a first year savings of **$163** with a simple payback of **4.3 years**. SWA also recommends **3** ECMs with a 5-10 year payback and **2** ECMs with a payback of greater than 10 years that is summarized in Tables 2 and 3, respectively.

The implementation of all the recommended ECMs would reduce the building electric usage beyond the current usage through energy efficiency measures as well as be offsets from solar PV panels and a wind turbine. A total of 175,665 kWh would be saved/offset each year. There are no recommended measures that would reduce propane usage. SWA estimates that implementing these ECMs will reduce the carbon footprint of the Public Works Facility building by **314,527 lbs of CO_2**, which is equivalent to removing approximately 11 cars from the roads each year or avoiding the need of 757 trees to absorb the annual CO_2 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 $0.021/kWh, which would have equated to $1,914 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 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.

The following three 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	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	Replace Room Air-Conditioners	RSMeans	705	0	705	951	0.1	0	0.1	0	163	13	1,708	4.3	142.2	10.9	21.2	1,024	1,703
	TOTALS		**705**	**0**	**705**	**951**	**0.1**	**0**	**0.1**	**0**	**163**	**-**	**1,708**	**4.3**	**-**	**-**	**-**	**1,024**	**1,703**

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	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 77 kW ground-mounted PV system	Similar Projects	539,000	0	539,000	90,381	77.0	0	12.9	$0	69,455	25	1,182,917	7.8	119.5	4.8	10.4	374,771	161,827
3	Install 22 new Pulse Start Metal Halide fixtures	RSMeans	7,254	550	6,704	3,209	0.7	0	0.5	264	813	15	9,564	8.2	42.7	2.8	8.6	2,998	5,746
4	Install 1 new LED exit sign	RSMeans	200	20	180	105	0.0	0	0.0	2	20	15	235	9.0	30.5	2.0	7.2	58	188
	TOTALS		**546,454**	**570**	**545,884**	**93,695**	**77.7**	**0**	**13.4**	**266**	**70,288**	**-**	**1,192,715**	**7.8**	**-**	**-**	**-**	**377,828**	**167,761**

Table 3 – End of Life Cycle ECMs (>10 year payback)																			
ECM #	ECM description	Source	est. installed cost, $	est. incentives, $	net est. ECM cost with incentives, $	kWh, 1st yr savings	kW, demand reduction	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
5	Install 100 kW wind turbine	Similar Projects	500,000	83,640	416,360	80,881	100.0	0	11.5	0	13,831	25	235,555	30.1	-43.4	-1.7	-1.4	(175,525)	144,817
6	Install 6 new T8 fluorescent fixtures	RSMeans	1,290	180	1,110	137	0.0	0	0.0	13	36	15	429	30.5	-61.4	-4.1	-7.8	(675)	245
	TOTALS		**501,290**	**83,820**	**417,470**	**81,018**	**100.0**	**0**	**11.6**	**13**	**13,867**	**-**	**235,984**	**30.1**	**-**	**-**	**-**	**-176,200**	**145,063**

1. HISTORIC ENERGY CONSUMPTION

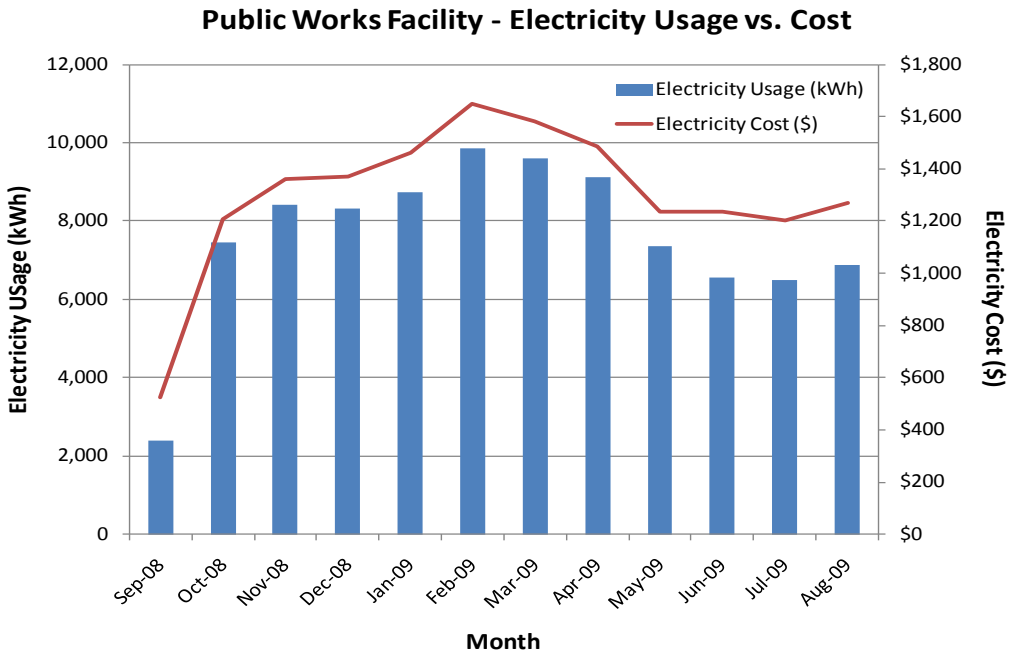
1.1. Energy usage, load profiles and cost analysis

SWA analyzed utility bills from **September 2008 through September 2009** (period of analysis) that were received from the utility companies supplying the Public Works Facility building with electricity and propane. The Public Works Facility building is currently contains one electric meter and receives truck deliveries of propane when necessary.

Electricity – The Public Works Facility building currently buys electricity from JCP&L at **an average rate of $0.171/kWh** based on 12 months of utility bills from September 2008 to September 2009. The building purchased **approximately 91,120kWh or $15,590 worth of electricity** in the previous year. The Public Works Facility building is charged separately for demand (kW) which has been factored into each monthly bill. Based on the same time period, the electric meter also has **an average monthly demand of 30.1 kW and a monthly peak demand of 34.2 kW.**

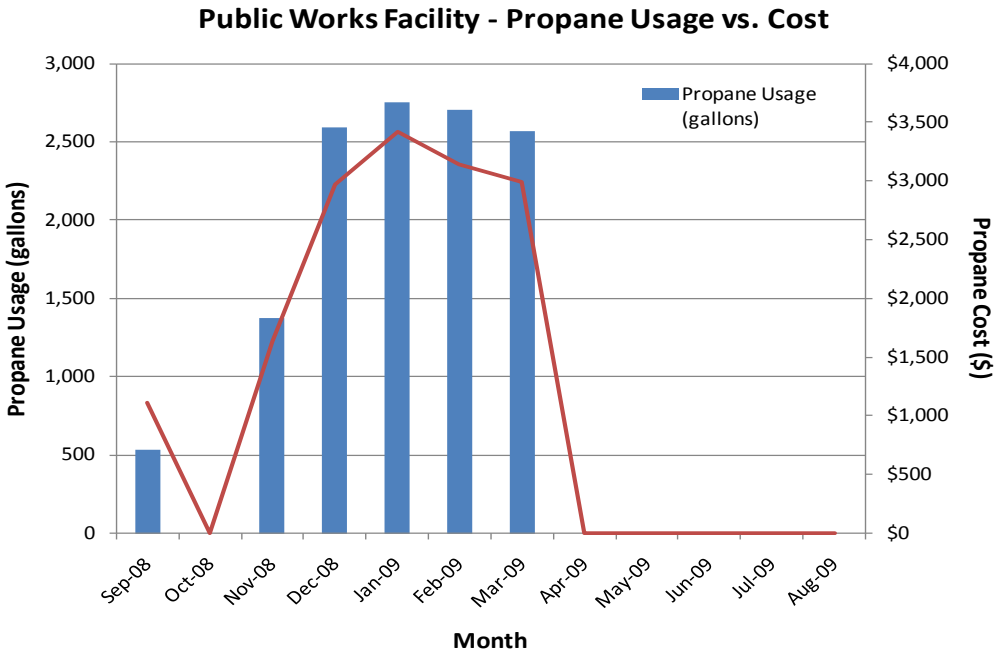
Propane – The Public Works Facility building currently receives truck deliveries of propane as necessary to a 4,000 gallon storage tank. The building currently buys propane from Amerigas at **an average rate of $1.219/gallon** based on 12 months of utility bills from September 2008 to September 2009. The building purchased **approximately 12,529 gallons or $15,278 worth of propane** in the previous year.

The following chart shows electricity use versus cost for the Public Works Facility building based on utility bills for the 12 month period of September 2008 to September 2009.

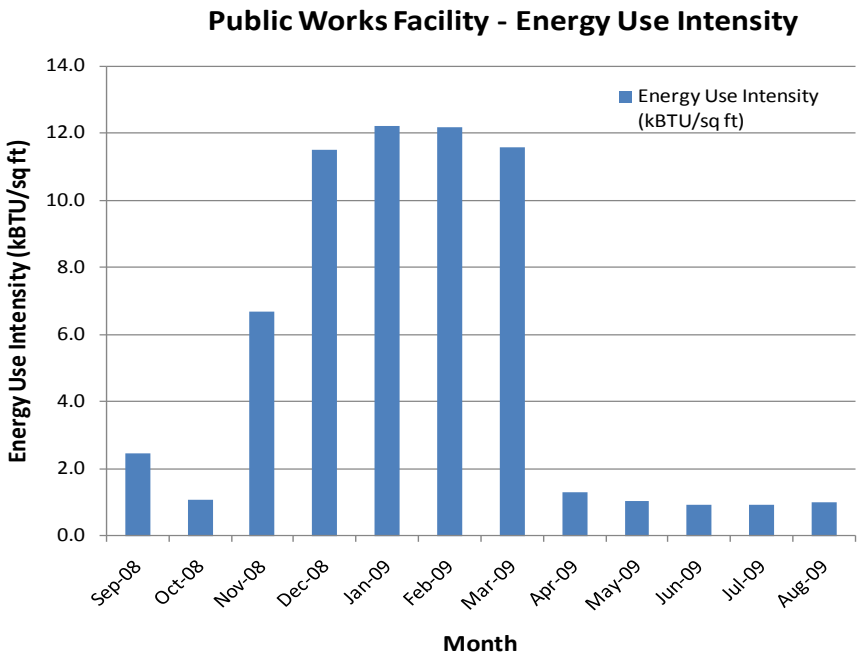


The electricity cost follows a trend line similar to that of the electricity usage as expected.

The following chart shows propane use versus cost for the Public Works Facility building based on utility bills for the 12 month period of September 2008 to September 2009.



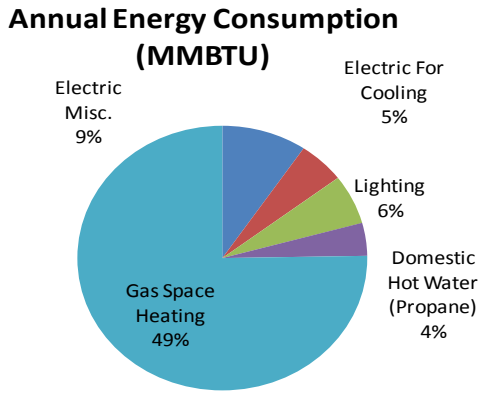
The following chart shows combined propane and electric consumption in kBtu/sq ft for the Public Works Facility building based on utility bills for the 12 month period of September 2008 to September 2009.

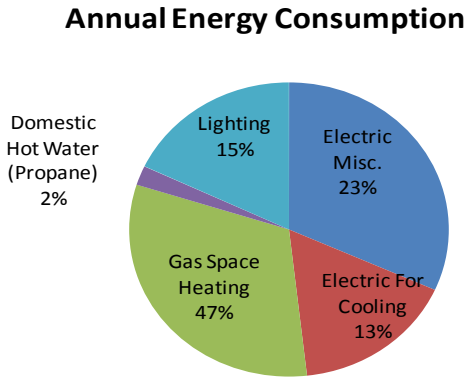


Energy Use Intensity shows minor fluctuations throughout the year during the heating and cooling seasons. The graph shows peaks during months that propane was delivered, since propane is delivered irregularly and corresponding energy use is attributed to the month that it was delivered.

The following table and chart pies show energy use for the Public Works Facility building based on utility bills for the 12 month period of September 2008 to September 2009. Note electrical cost at $50.1/MMBtu of energy is more than 3.5 times the cost of propane at $12.8/MMBtu. Also, miscellaneous electric use accounts for a large percentage of the building electric use due to computers, mechanical ventilation and other plug-loads not accounted for during the audit.

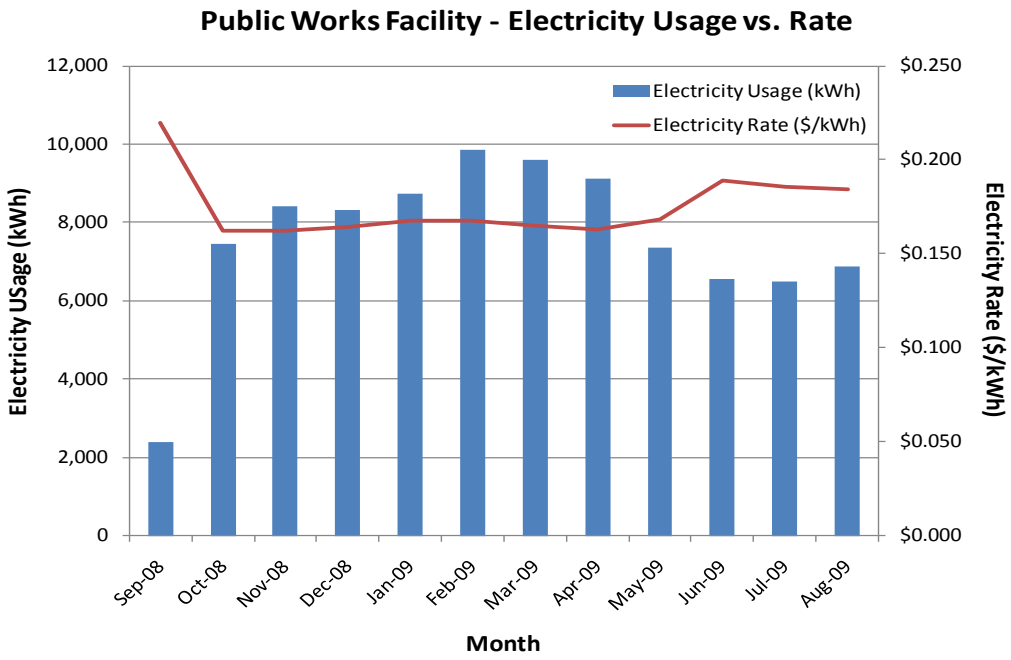
2008 Annual Energy Consumption / Costs					
	MMBtu	% MMBtu	$	% $	$/MMBtu
Electric Miscellaneous	142	9%	$7,114	23%	50.1
Electric For Cooling	78	5%	$3,908	13%	50.1
Lighting	91	6%	$4,559	15%	50.1
Domestic Hot Water (Propane)	60	4%	$768	2%	12.8
Propane Space Heating	1130	75%	$14,464	47%	12.8
Totals		100%	$30,813	100%	
Total Electric Usage	311	21%	$15,590	51%	50.1
Total Propane Usage	1,190	79%	$15,278	49%	12.8
Totals	1,501	100%	$30,868	100%	





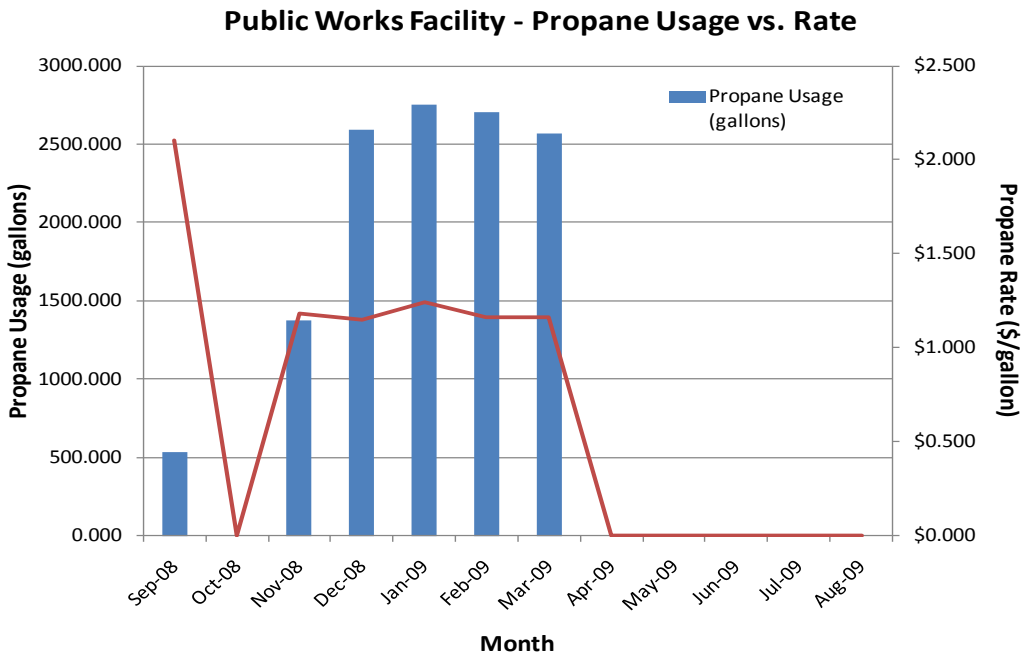
1.2. Utility rate analysis

The Public Works Facility 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. The Public Works Facility building currently pays an average rate of approximately $0.171/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. Some rate fluctuations may be due to estimated utility readings as opposed to actual readings.

The Public Works Facility building currently purchases propane from Amerigas at a general service market rate for propane deliveries (gallons). The building currently pays an average rate of approximately $1.219/gallon based on the 12 months of utility bills of September 2008 to September 2009. The propane rate does not show large fluctuations since it is delivered as needed and not on a continual basis.



The above chart confirms that the utility rate for propane shows minor fluctuations throughout the year based on the way that it is delivered and billed.

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

1.3. Energy benchmarking

SWA has entered energy information about the Public Works Facility building in the U.S. Environmental Protection Agency's (EPA) *Energy Star Portfolio Manager* Energy benchmarking system. The building was benchmarked as a DPW building. The building was not able to receive an Energy Star performance rating since the building is classified as a DPW 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 61.0 kBtu/ft^{2}yr.

Implementing this report's highly recommended Energy Conservations Measures (ECMs) will reduce use by approximately 0.1 kBtu/ft^{2}yr, with an additional 13.4 kBtu/ft^{2}yr from the recommended ECMs, and an additional 11.6 kBtu/ft^{2}yr from the recommended End of Life cycle 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 Public Works Facility building information to allow future data to be added and tracked using the benchmarking tool. SWA has shared 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.

OMB No. 2060-0347

STATEMENT OF ENERGY PERFORMANCE
Township of Sparta - Public Works Facility

Building ID: 1857392
For 12-month Period Ending: August 31, 2009[1]
Date SEP becomes ineligible: N/A
Date SEP Generated: January 25, 2010

Facility	Facility Owner	Primary Contact for this Facility
Township of Sparta - Public Works Facility 9 Prices Lane Lafayette, NJ 07848	N/A	N/A

Year Built: 2001
Gross Floor Area (ft²): 23,900

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

Site Energy Use Summary[3]	
Electricity - Grid Purchase(kBtu)	310,901
Liquid Propane (kBtu)	1,148,234
Natural Gas - (kBtu)[4]	0
Total Energy (kBtu)	1,459,135
Energy Intensity[5]	
Site (kBtu/ft²/yr)	61
Source (kBtu/ft²/yr)	92
Emissions (based on site energy use)	
Greenhouse Gas Emissions ($MtCO_2e$/year)	120
Electric Distribution Utility	
FirstEnergy - Jersey Central Power & Lt Co	
National Average Comparison	
National Average Site EUI	77
National Average Source EUI	150
% Difference from National Average Source EUI	-39%
Building Type	Service (Vehicle Repair/Service, Postal Service)

Stamp of Certifying Professional

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

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

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

Certifying Professional
N/A

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

The government estimates the average time needed to fill out this form is 6 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 Public Works Facility was built in 2001 and consists of two stories with a total floor area of 23,900 square feet. The building serves as the main building for the Department of Public works and includes vehicle storage, a mechanics garage, office space, a locker room and a meeting room.

2.2. Building occupancy profiles

The Public Works Facility building is occupied by 17 employees for 45 hours per week.

2.3. Building envelope

2.3.1.Exterior Walls

The main building's exterior walls consist of a steel skeleton frame with vertical steel panel side and gable walls with a masonry base. According to a visual inspection the total wall insulation was found to be approximately R-19.

The metal panel walls were found to be in good condition except in two areas on the main building where the masonry base meets the vertical wall panels above. Signs of water penetrating the metal drip flashing can be attributed to faulty flashing installation or aging caulk. SWA recommends having the flashing repaired to prevent possible future insulation compromising damage.

Water penetration due to flashing problems at metal panel terminations

Overall, exterior and interior wall finishes of the envelope were found to be in age-appropriate, good condition with the exception of some minor damage to exterior walls, missing caulking and slight water damage. SWA recommends that Sparta perform bi-annual inspections to maintain building weather-stripping and sealing as well as perform preventative maintenance to the exterior surfaces. Other than minor water damage, no major signs of unusual water, air leakage or other energy compromising damage.

2.3.2.Roof

The low pitch standing seam metal roof showed no visual signs of leakage. Attic insulation levels in the main building could not be fully inspected but is estimated to be between R-18 and R-25. This is not adequate given the building's partial office use. SWA recommends increasing the attic insulation to R-30 if any major renovations or construction are performed.

Gutters and downspouts were found on the main building and evaluated to be physically in good condition but in need of cleaning and unclogging.

Gutters in need of cleaning

SWA recommends that gutters are cleaned of all current debris to prevent clogging. SWA also recommends bi-annual inspections of the roof and gutters to ensure that debris such as leaves and sediment are cleared to relieve any potential clogs.

2.3.3.Base

The building's base is a 4" concrete slab-on grade with a perimeter footing. There were no visible signs of water or moisture problems found during the inspection of both buildings.

2.3.4.Windows

The buildings contain metal frame fixed double hung vinyl type double pane windows. The windows were in acceptable 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 metal exterior doors were observed to be in functional, acceptable condition except for some missing or worn weather-stripping, including the insulated overhead type doors.

SWA recommends that the exterior doors of the building be weather-stripped in order to decrease the amount of conditioned air that is lost around each door. SWA also recommends checking the weather-stripping of each door on a regular basis and replacing any broken seals immediately. Tight seals around doors will help ensure the building to be kept continuously insulated.

2.3.6.Building air tightness

In addition to the above mentioned recommendations, SWA suggests air sealing, caulking and/or insulating around all plumbing, electrical, HVAC and structural envelope penetrations. This should include bottom and top plates, recessed light fixtures, electrical boxes, chimney walls and window or

sleeve air conditioner units. The air tightness of buildings helps to maximize other implemented energy measures and investments and minimizes long term maintenance and repair cost.

2.4. HVAC Systems

2.4.1. Heating

Servicing the main building and office areas are three high efficiency propane furnaces. Each furnace has been installed with a matching DX coil for cooling (See Section 2.4.2 Cooling).

Unit	Serving	Manufacturer & Model	Gas Input	Efficiency	Tonnage	DX Coil Model	SEER	CFM	Fan HP
GF-1	1st-floor offices	Lennox # G26Q4-100	100 MBH	93%	5	C26-65FCEAP	13	1955	0.75
GF-2	2nd-floor meeting rooms	Lennox # G26Q3-100		91%	3.5	C26-41NFC		1170	
GF-3		Lennox # G26Q3-100							

The garage bay areas are heated by seven radiant heating tube systems. These are typically more efficient than standard space heaters and are used in large areas with high ceilings that are difficult to heat. Supplemental heat is provided by three unit heaters.

Unit	Quantity	Manufacturer & Model	Fuel Input	Heating Output	Fuel	Motor HP	CFM	Location
Radiant Heating Tubes	7	Reflect-O-Ray # 2700-24-15	20 MBH	n/a	Propane	0.167	n/a	Garage
Unit Heater	1	Reznor FE-100	100 MBH	80 MBH	Propane	n/a	1250	Parts storage
Unit Heater	2	Reznor FE-50	50 MBH	40 MBH	Propane	n/a	650	Signs, tools

Reznor unit heater

2.4.2. Cooling

The furnace DX coils are connected to three electric condensing units, located on the ground outside the building. CU-1, CU-2 and CU-3 are the condensing units for GF-1, GF-2 and GF-3, respectively:

Unit	Manufacturer & Model	Tons	SEER
CU-1	Lennox # HS26-060-2Y	5	13
CU-2	Lennox #HS26-042-2Y	3.5	13
CU-3	Lennox #HS26-042-2Y	3.5	13

Condensing units

There is also one older room air-conditioning unit, a Superhurst Energy Saver through-the-wall air conditioner Approx. 10,000 BTU.

2.4.3. Ventilation

Ventilation is provided by five exhaust fans which have a capacity of 30,725 CFM. Supplemental ventilation is provided manually by opening doors and windows.

2.4.4. Domestic Hot Water

Water is heated by a Rheem Power Vent propane-fired water heater, with model # 21VP40E-1PA, installed in 1999. This 40-gallon unit has a heating capacity of 40 MBH, and has a recovery of 288 gallons/hour.

2.5. Electrical systems

2.5.1. Lighting

Interior Lighting – The Public Works Facility building contains efficient T8 fluorescent fixtures with electronic ballasts for general lighting. A few areas do contain inefficient T12 fluorescent fixtures such as the Staircase, the Truck bay and the Sign room. There are also areas within the Truck Bay and Maintenance Garage that contain Probe Start Metal Halide fixtures that should be upgraded to Pulse Start Metal Halide fixtures. Based on the frequency of use and the required light for DPW

workers, SWA does not recommend occupancy sensors in the building. See Appendix A for complete existing and proposed lighting schedule.

Exit Lights – The exit signs were observed to be mostly efficient LED fixtures with the exception of one fluorescent exit sign located in the Truck Wash bay. SWA recommends replacing this fluorescent exit sign with newer LED technology. LED exit signs are always recommended 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 exterior lighting fixtures were efficient fixtures that do not need to be upgraded at this point in time. Exterior lighting is controlled by a photocell sensor. See attached existing lighting schedule in Appendix A.

2.5.2. Appliances

SWA performed a basic survey of appliances installed at the Public Works Facility building. Appliances, such as refrigerators, that are over 10 years of age should be replaced with newer efficient models with the Energy Star label. For example, Energy Star refrigerators of similar size to the existing units, use as little as 315 kWh/year. 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 Public Works Facility building is a two story building and contains a single hydraulic elevator. There are currently no cost-effective upgrades to this elevator at this point in time.

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	Various	-	Electric	All	Varies, no less than 50%
Heating/Cooling	(7) radiant heating tubes (20 MBH input, 0.167 HP motor)	Garage ceiling	Reflect-O-Ray # 2700-24-15	Propane	Garage	50%
	Unit heater (100 MBH, 80% efficient, 1250 CFM)	Parts Storage Ceiling	Reznor FE-100	Propane	Parts storage	50%
	(2) unit heaters (50 MBH, 80% efficient, 650 CFM)	Sign and Tool Room	Reznor FE-50	Propane	Signs, tool rooms	50%
	Furnace with DX cooling coil (100 MBH heating, 93% efficient, 5 tons, 13 SEER, 1,955 CFM, 0.75 HP fan)	Mechanical Room	Lennox # G26Q4-100	Propane/ Electric	1st floor offices	60%
	Condensing unit (5 tons, 13 SEER)	Mechanical Room	Lennox # HS26-060-2Y	Electric		50%
	(2) furnaces with DX cooling coils (100 MBH heating, 91% efficient, 3.5 tons, 13 SEER, 1,170 CFM, 0.75 HP fan)	Mechanical Room	Lennox # G26Q3-100	Propane/ Electric	2nd floor meeting rooms	60%
	(2) condensing units (3.5 tons, 13 SEER)	Mechanical Room	Lennox # HS26-042-2Y	Electric		50%
	Window air-conditioner (15,000 BTU)- 9.0 EER	Window in Garage	GE # AVM15DAV1	Electric	Garage office	20%
Ventilation	5 exhaust fans	Roof	-	Electric	Entire building	75%
Domestic Hot Water	Water heater (40 gal, 40 MBH, 288 gal/hr recovery)	Mechanical Room	Rheem Power Vent # 21VP40E-1P A	Electric	Entire building	50%
Controls	2 setback thermostats	Offices	Lennox	Electric	Office	75%
	2 non-setback thermostats	Garage areas	Honeywell	Electric	Smaller rooms	75%

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 Municipal 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

- Increase attic insulation levels – SWA recommends that insulation with a minimal insulation value of R-30 is added and maintained in the plenum above the ceiling.

Category II Recommendations: Operations and Maintenance

- Repair flashing where exterior mason base meets vertical wall panels above – SWA recommends repairing flashing to prevent water from penetrating the exterior wall and compromising the insulation value.

- Perform bi-annual inspections to maintain building weather-stripping and air-sealing – SWA recommends bi-annual inspections as a form of preventative maintenance of the exterior surfaces. Building staff should inspect exterior walls for signs of excessive moisture or air leakage.

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

- Maintain gutters – SWA observed gutters that were beginning to show signs of clogging and recommends that the gutters are clogged immediately. As part of a preventative maintenance plan, gutters and drainage areas should be checked monthly to ensure that excess water is drained and diverted away from the building.

- Provide weather stripping / air sealing – SWA observed that all windows and doors had proper weather-stripping and air sealing due to their age. As a best practice, SWA recommends that each window and door is inspected twice per year for deficiencies. Any time that a seal has been compromised, building maintenance staff should repair and replace the seal immediately to ensure that thermal barriers are not breached.

- Provide water efficient fixtures and controls - Adding controlled on / off timers on all lavatory faucets is a cost-effective way to reduce domestic hot water demand and save water. Building staff can also easily install faucet aerators (0.5 gpm on bathroom sinks) and low-flow shower heads (1.2 gpm) to reduce water consumption. There are many retrofit options, which can be installed now or incorporated as equipment is replaced. Routine maintenance practices that identify and quickly address water leaks are a low-cost way to save water and energy. Retrofitting with more efficient water-consumption fixtures / appliances will save both energy and money through reduced energy consumption for water heating, while also decreasing water / sewer bills.

- Use Energy Star labeled appliances - such as Energy Star refrigerators that should replace older energy inefficient equipment.

Category III Recommendations: Energy Conservation Measures

Summary table

ECM#	Description of Highly Recommended 0-5 Year Payback ECMs
1	Replace Room Air-Conditioners
	Description of Recommended 5-10 Year Payback ECMs
2	Install 77 kW ground-mounted PV system
3	Install 22 new Pulse Start Metal Halide fixtures
4	Install 1 new LED exit sign
	Description of Recommended End of Life Cycle ECMs (>10 year payback)
5	Install 100 kW wind turbine
6	Install 6 new T8 fluorescent fixtures

ECM#1: *Replace Room Air-Conditioners*

Description:

One room in the Public Works Facility contains a thru-wall air conditioner. This unit does not have a visible capacity rating, but appeared to be 10,000 BTUs. It is recommended, due to the fact that the unit is old and in poor condition, that it is replaced. Newer room air-conditioner models have higher Energy Efficiency Ratios (EERs) and many of which meet Energy Star specifications.

Installation cost:
Estimated installed cost: $705
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	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	Replace Room Air-Conditioners	RSMeans	705	0	705	951	0.1	0	0.1	0	163	13	1,708	4.3	142.2	10.9	21.2	1,024	1,703

Assumptions: SWA calculated the savings for this measure using measurements taken the days of the field visits and using the billing analysis. SWA assumes that EER values for a new thru-wall unit are 9.8. SEER values are more accurate for calculating energy savings, and several equations for converting EER to SEER have been formed, all of which increase EER by 14-25% in the conversion. A conservative estimate would be to use the lower end of this range, which would increase the units' ratings from 9.8 to 11.2. The original SEER values for the current unit were estimated to be slightly lower, 11.0 and their age and condition decreased their SEERs by 25%, to 8.25. Climate data was provided by the American Society of Heating, Refrigeration and Air-Conditioning Engineers (ASHRAE). The values of 1,024 cooling degree-days and a 0.4% dry-bulb temperature of 93°F were used. The desired indoor temperature during the cooling season was assumed to be 74°F.

Rebates / financial incentives:
There are currently no incentives available for this recommendation.

Options for funding ECM:
NJ Office of Clean Energy – SmartStart, Direct Install programs

ECM#2: *Install 77 kW ground-mounted PV system*

Description:

Currently, the Department of Public Works 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 use 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 77-kW PV system to offset electrical demand for the building and reduce the annual net electric consumption for the building. A system of 440 commercial multi-crystalline 175 W panels would generate 90,381 kWh per year, or 99.2% of the main building's annual electric bill. The area where the panels will be mounted, however, must be leveled before the installation begins.

Installation cost:

Estimated installed cost: $539,000
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	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	Install 77 kW ground-mounted PV system	Similar Projects	539,000	0	539,000	90,381	77.0	0	12.9	0	69,455	25	1,182,917	7.8	119.5	4.8	10.4	374,771	161,827

Assumptions: SWA calculated the savings for this measure using measurements taken the days of the field visits and using the billing analysis. Cost of installation was estimated, using data from similar projects, at $7,000 per kW. Annual energy savings were calculated PV Watts, an online tool on the website of the National Renewable Energy Laboratory.

Rebates / financial incentives:

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. $54,000 has been incorporated in the above costs on an annual basis for up to 15 years; 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

ECM#3: *Install 22 new Pulse Start Metal Halide fixtures*

Description:

The Public Works Facility building currently contains 22 probe start metal halide fixtures throughout the building in areas such as the Truck Bay and Maintenance Garages that are older and consume an unnecessary amount of power. SWA recommends upgrading each probe-start metal halide to pulse-start metal halides. A complete lighting schedule has been attached in Appendix A of this report.

Installation cost:
Estimated installed cost: $6,704
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	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	Install 22 new Pulse Start Metal Halide fixtures	RSMeans	7,254	550	6,704	3,209	0.7	0	0.5	264	813	15	9,564	8.2	42.7	2.8	8.6	2,998	5,746

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 $550

Options for funding ECM:
NJ Office of Clean Energy – SmartStart, Direct Install programs

ECM#4: *Install 1 new LED exit sign*

Description:

The Public Works Facility building contains 1 fluorescent exit sign located in the Truck Wash Bay. SWA recommends replacing this fluorescent exit sign with newer LED technology. Exit signs present a good opportunity for energy savings since they are operated 24 hours per day, 7 days per week. See Appendix A for existing and proposed lighting schedule.

Installation cost:

Estimated installed cost: $180
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	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
4	Install 1 new LED exit sign	RSMeans	200	20	180	105	0.0	0	0.0	2	20	15	235	9.0	30.5	2.0	7.2	58	188

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 – LED Exit signs ($10/$20 per fixture)
Maximum incentive amount is $20

Options for funding ECM:
NJ Office of Clean Energy – SmartStart, Direct Install programs

ECM#5: *Install 100 kW wind turbine*

Description:

The Department of Public Works building does not use any renewable energy systems. Renewable energy systems, including Wind Turbines can offset a significant portion of the purchased electricity for the building. Power stations generally have two separate electrical charges: consumption and demand. Consumption or 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 given period. During the summer months, when electric demand at a power station is high due to seasonal loads from 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. Wind Turbines not only offset the amount of electricity use 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 100-kW Wind Turbine to offset electrical demand for the building and reduce the annual net electric consumption for the building. Based on site data collected during our visit, a 100kW turbine would generate 80,881 kWh per year, or 88.7% of the main building's annual electric bill.

The average annual wind speed at the specific DPW building site, at a height of 50 meters, is estimated to be about 5 m/s or 11 mph. This number is obtained by averaging the data of three wind resource maps required by the New Jersey Clean Energy Program to apply for the Renewable Energy Incentive Program (REIP). The installation of a Northwind 100-kW Wind Turbine at a height of 95 feet would have an expected output of 80,881 kWh. This would substitute electricity purchased from JCP&L at the averaged $0.17/kWh for the DPW. This creates an annual savings of approximately $13,750.

Installation cost:

Estimated installed cost: $416,360
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	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
5	Install 100 kW wind turbine	Similar Projects	500,000	83,640	416,360	80,881	16.0	0	11.5	0	13,831	25	235,555	30.1	-43.4	-1.7	-1.4	(175,525)	144,817

Assumptions: SWA calculated the savings for this measure using measurements taken the days of the field visits and using the billing analysis. Annual energy savings were calculated using the 7th Wind Calculator which is an REIP-approved wind EPBB calculator.

Rebates / financial incentives:
NJ Clean Energy – The Renewable Energy Incentive Program (REIP) offers an upfront incentive which is based on expected output, $3.20/kWh up to 16,000 kWh and $0.50 for every kWh past that and capped off at 750,000 kWh. The 7th Wind Calculator is an REIP-approved wind EPBB calculator, so the expected 80,881 kWh annual output would be accepted by this program. This would qualify the Town for an estimated incentive totaling approximately $83,640.

The Northwind 100-kW wind turbine is listed as an accepted product for participation in the REIP. The hub height of 95 feet meets the minimum requirements identified in the REIP.

Options for funding ECM:
None

ECM#6: *Install 6 new T8 fluorescent fixtures*

Description:
The Public Works Facility building currently contains 6 inefficient T12 fluorescent fixtures with magnetic ballasts. SWA recommends replacing each of these fixtures with a new fixture equipped with T8 fluorescent bulbs and electronic ballasts. Typically upgrading from T12 fluorescent with magnetic to T8 fluorescent with electronic ballasts provides a 30% savings. A complete lighting schedule has been attached in Appendix A of this report.

Installation cost:
Estimated installed cost: $1,110
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	therms, 1st yr savings	kBtu/sq ft, 1st yr savings	est. operating cost, 1st yr savings, $	total 1st yr savings, $	life of measure, yrs	est. lifetime energy cost savings, $	simple payback, yrs	lifetime return on investment, %	annual return on investment, %	internal rate of return, %	net present value, $	CO_2 reduced, lbs/yr
6	Install 6 new T8 fluorescent fixtures	RSMeans	1,290	180	1,110	137	0.0	0	0.0	13	36	15	429	30.5	-61.4	-4.1	-7.8	(675)	245

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 – T-8 lamps with electronic ballast in existing facilities ($30 per fixture)
Maximum incentive amount is $180

Options for funding ECM:
NJ Office of Clean Energy – SmartStart, Direct Install programs

5. RENEWABLE AND DISTRIBUTED ENERGY MEASURES

5.1. Existing systems

There are not currently any existing renewable energy systems.

5.2. Wind

See ECM #5 above.

5.3. Solar Photovoltaic

See ECM #2 above.

5.4. Solar Thermal Collectors

Solar thermal collectors are not recommended for this project because they would require modification to the existing domestic hot water system and/or heat distribution system, which would not be cost-effective.

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 significant modifications to the existing HVAC system, which would not be cost effective.

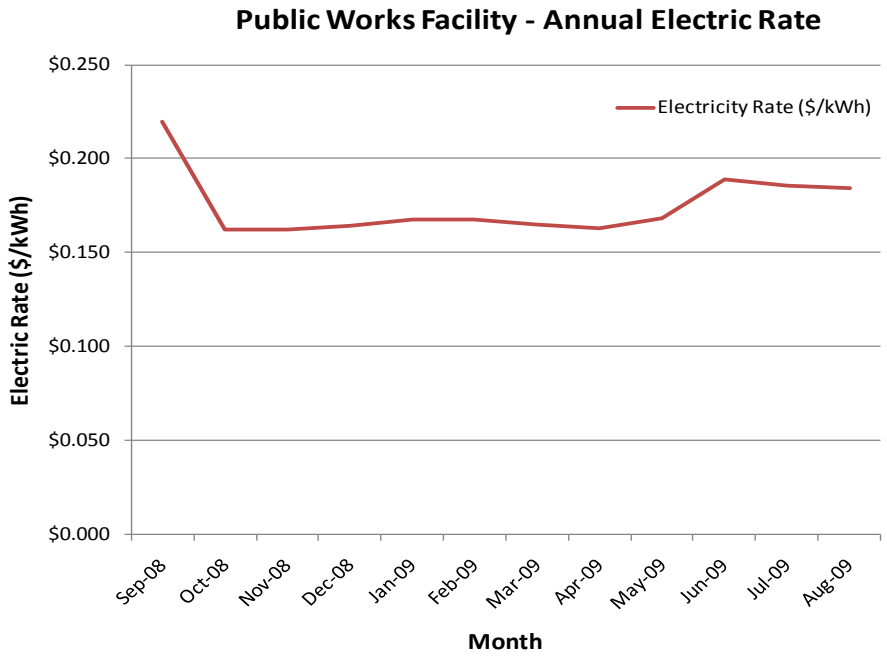
6. ENERGY PURCHASING AND PROCUREMENT STRATEGIES

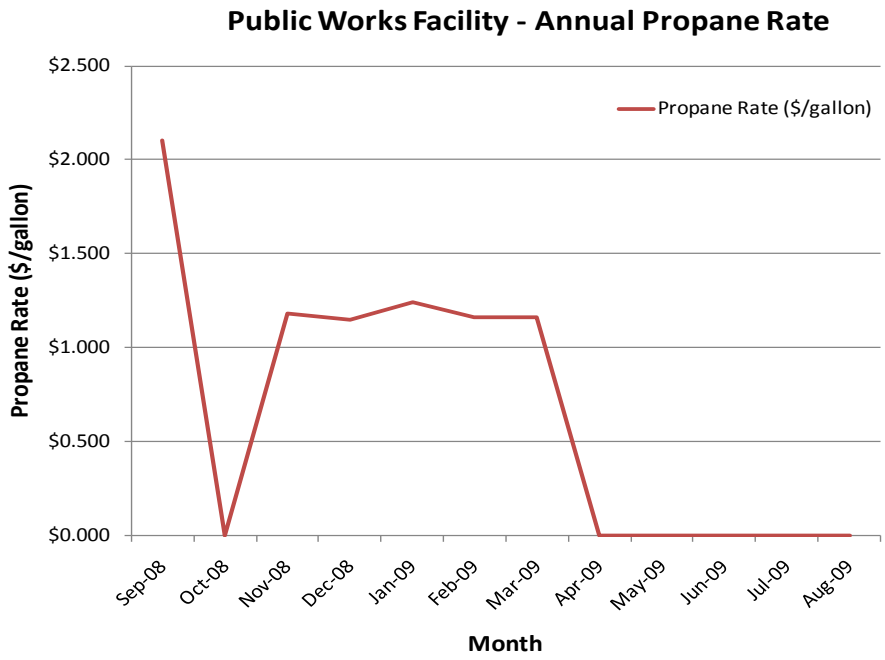
6.1. Energy Purchasing

The Public Works Facility building receives propane via truck deliveries to a 4,000 gallon tank on an as needed basis. Amerigas supplies propane to the building. There is not an ESCO engaged in the process. 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. Electricity is also purchased via one incoming meter from JCP&L without an ESCO. SWA analyzed the utility rate for propane and electricity supply over an extended period. Electric bill analysis shows fluctuations of 26% over the most recent 12 month period. Propane bill analysis shows fluctuations up to 46% over the most recent 12 month period. Some of these 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.

Currently, New Jersey commercial buildings of similar type pay $0.150/kWh for electricity and $1.30/gallon for propane. Currently, the electricity rate for the Public Works Facility building is $.171/kWh, which means there is a potential cost savings of $1,914 per year. The current propane rate for the Public Works Facility building is $1.219/gallon 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 Public Works Facility 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 and propane 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 Public Works Facility 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	GF	Office Area	Parabolic	E	4'T8	11	4	32	S	9	261	13	1,421	3,643	N/A	Parabolic	4'T8	None	S	11	4	32	9	261	13	1,421	3,643	0	0	0
2	GF	Office Area	Parabolic	E	2'T8	3	2	16	S	9	261	3	99	247	N/A	Parabolic	2'T8	None	S	3	2	16	9	261	3	99	247	0	0	0
3	GF	Office Area	Exit sign	None	LED Exit	2	1	5	N	24	365	1	11	105	N/A	Exit sign	LED Exit	None	N	2	1	5	24	365	1	11	105	0	0	0
4	GF	File rm	Parabolic	E	4'T8	1	2	32	S	2	261	6	70	37	N/A	Parabolic	4'T8	None	S	1	2	32	2	261	6	70	37	0	0	0
5	GF	Office	Parabolic	E	4'T8	2	2	32	S	8	261	6	134	292	N/A	Parabolic	4'T8	None	S	2	2	32	8	261	6	134	292	0	0	0
6	GF	Conference	Parabolic	E	4'T8	4	2	32	S	3	261	6	262	219	N/A	Parabolic	4'T8	None	S	4	2	32	3	261	6	262	219	0	0	0
7	GF	Kitchen	Parabolic	E	2'T8	1	2	16	S	3	261	3	35	27	N/A	Parabolic	2'T8	None	S	1	2	16	3	261	3	35	27	0	0	0
8	GF	Bathroom Women	Parabolic	E	4'T8	2	2	32	S	2	261	6	134	73	N/A	Parabolic	4'T8	None	S	2	2	32	2	261	6	134	73	0	0	0
9	GF	Bathroom Women	Parabolic	E	2'T8	1	2	16	S	2	261	3	35	18	N/A	Parabolic	2'T8	None	S	1	2	16	2	261	3	35	18	0	0	0
10	GF	Bathroom Men	Parabolic	E	4'T8	2	2	32	S	3	261	6	134	110	N/A	Parabolic	4'T8	None	S	2	2	32	3	261	6	134	110	0	0	0
11	GF	Bathroom Men	Parabolic	E	2'T8	2	2	16	S	3	261	3	67	55	N/A	Parabolic	2'T8	None	S	2	2	16	3	261	3	67	55	0	0	0
12	GF	Hallway	Recessed	E	2'T8	2	2	16	S	9	261	3	67	164	N/A	Recessed	2'T8	None	S	2	2	16	9	261	3	67	164	0	0	0
13	GF	Janitor's Closet	2'U-shape	E	T8 U	1	2	32	S	1	261	3	67	17	N/A	2'U-shape	T8 U	None	S	1	2	32	1	261	3	67	17	0	0	0
14	GF	Office	Parabolic	E	4'T8	2	4	32	S	2	261	13	269	147	N/A	Parabolic	4'T8	None	S	2	4	32	2	261	13	269	147	0	0	0
15	GF	Office	Parabolic	E	4'T8	5	2	32	S	2	261	6	326	183	N/A	Parabolic	4'T8	None	S	5	2	32	2	261	6	326	183	0	0	0
16	**GF**	**Staircase**	**Parabolic**	**E**	**2'T12**	**2**	**3**	**34**	**S**	**2**	**261**	**3**	**207**	**110**	**T8**	**parabolic**	**2'T8**	**E**	**S**	**2**	**3**	**16**	**2**	**261**	**4**	**100**	**54**	**55**	**0**	**55**
17	GF	Lunch Rm	Parabolic	E	4'T8	13	4	32	S	3	261	13	1,677	1,435	N/A	Parabolic	4'T8	None	S	13	4	32	3	261	13	1,677	1,435	0	0	0
18	GF	Lunch Rm	Exit sign	None	LED Exit	1	1	5	N	24	365	1	6	53	N/A	Exit sign	LED Exit	None	N	1	1	5	24	365	1	6	53	0	0	0
19	GF	Mechanical Rm	Parabolic	E	4'T8	3	2	32	S	1	261	6	198	55	N/A	Parabolic	4'T8	None	S	3	2	32	1	261	6	198	55	0	0	0
20	**GF**	**Truck Bay**	**HID**	**None**	**MH**	**10**	**1**	**150**	**S**	**9**	**261**	**15**	**1,515**	**3,876**	**PSMH**	**HID**	**PSMH**	**None**	**S**	**10**	**1**	**100**	**9**	**261**	**10**	**1,010**	**2,584**	**1,292**	**0**	**1,292**
21	**GF**	**Truck Bay**	**Parabolic**	**E**	**8'T12**	**3**	**2**	**68**	**S**	**9**	**261**	**16**	**424**	**1,071**	**T8**	**parabolic**	**8'T8**	**E**	**S**	**3**	**2**	**64**	**9**	**261**	**13**	**397**	**994**	**78**	**0**	**78**
22	GF	Truck Bay	Exit sign	None	LED Exit	2	1	5	N	24	365	1	11	105	N/A	Exit sign	LED Exit	None	N	2	1	5	24	365	1	11	105	0	0	0
23	GF	Truck Bay	Parabolic	E	4'T8	3	2	32	S	9	261	6	198	493	N/A	Parabolic	4'T8	None	S	3	2	32	9	261	6	198	493	0	0	0
24	GF	Sign Room	Parabolic	E	4'T8	6	2	32	S	3	261	6	390	329	N/A	Parabolic	4'T8	None	S	6	2	32	3	261	6	390	329	0	0	0
25	**GF**	**Sign Room**	**Parabolic**	**E**	**8'T12**	**1**	**2**	**68**	**S**	**2**	**261**	**16**	**152**	**79**	**T8**	**parabolic**	**8'T8**	**E**	**S**	**1**	**2**	**64**	**2**	**261**	**16**	**144**	**75**	**4**	**0**	**4**
26	GF	Small Engine	Parabolic	E	4'T8	4	2	32	S	2	261	6	262	146	N/A	Parabolic	4'T8	None	S	4	2	32	2	261	6	262	146	0	0	0
27	GF	Truck Wash Bay	Parabolic	E	8'T8	14	2	64	S	9	261	13	1,805	4,637	N/A	Parabolic	8'T8	None	S	14	2	64	9	261	13	1,805	4,637	0	0	0
28	**GF**	**Truck Wash Bay**	**Exit sign**	**None**	**Fl. Exit**	**1**	**1**	**16**	**N**	**24**	**365**	**2**	**18**	**158**	**LEDex**	**Exit sign**	**LED Exit**	**None**	**N**	**1**	**1**	**5**	**24**	**365**	**1**	**6**	**53**	**105**	**0**	**105**
29	**GF**	**Maint Garage**	**HID**	**None**	**MH**	**6**	**1**	**100**	**S**	**9**	**261**	**28**	**628**	**1,804**	**PSMH**	**HID**	**PSMH**	**None**	**S**	**6**	**1**	**65**	**9**	**261**	**7**	**397**	**1,015**	**789**	**0**	**789**
30	**GF**	**Maint Garage**	**HID**	**None**	**MH**	**6**	**1**	**150**	**S**	**9**	**261**	**40**	**940**	**2,678**	**PSMH**	**HID**	**PSMH**	**None**	**S**	**6**	**1**	**100**	**9**	**261**	**10**	**610**	**1,550**	**1,128**	**0**	**1,128**
31	GF	Maint Garage	Parabolic	E	4'T8	10	2	32	S	9	261	6	646	1,644	N/A	Parabolic	4'T8	None	S	10	2	32	9	261	6	646	1,644	0	0	0
32	GF	Office	Parabolic	E	4'T8	2	4	32	S	9	261	13	269	662	N/A	Parabolic	4'T8	None	S	2	4	32	9	261	13	269	662	0	0	0
33	GF	Parts Room	Parabolic	E	4'T8	9	2	32	S	9	261	6	582	1,480	N/A	Parabolic	4'T8	None	S	9	2	32	9	261	6	582	1,480	0	0	0
34	Ext	Exterior	HID	None	HPS	2	1	75	PC	12	365	0	150	657	HID	None	HPS	None	PC	2	1	75	12	365	0	150	657	0	0	0
Totals:						**139**	**69**	**1,364**	**0**				**13,209**	**26,810**						**139**	**69**	**1,192**				**11,989**	**23,359**	**3,451**	**0**	**3,451**

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