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November 18, 2010

Local Government Energy Program
Final Energy Audit Report

For

Lakewood Township
EMS & OEM Building
1555 Pine St
Lakewood, NJ 08701

Project Number: LGEA80

TABLE OF CONTENTS

INTRODUCTION

On August 23rd, 2010 Steven Winter Associates, Inc. (SWA) and Birdsall Services Group (BSG) performed an energy audit and assessment of the Lakewood Inspection Building in Lakewood Township, NJ. Current conditions and energy-related information were collected in order to analyze and facilitate the implementation of energy conservation measures for the building.

The Township of Lakewood Department of Emergency Medical Services and Offices of Emergency Management (EMS/OEM) Building is a one story, slab-on-grade building comprised of having a floor area comprised of 12,720 square feet. The building was built in 1978 as new construction, and there have been no major renovations or additions since then.

The Lakewood EMS/OEM Building is occupied by approximately 30 to 55 occupants on a daily basis, Monday through Friday, 50 hours per week, with reduced staff on 24 hour, 7 days per week, according to staff personnel. The building was initially designed for 54 occupants at the EMS, 124 occupants at the Multi-purpose Room, and 55 occupants at the OEM.

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

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

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

EXECUTIVE SUMMARY

This document contains the energy audit report for the EMS/OEM Building in the Township of Lakewood, NJ 08701.

Based on the field visit performed by Steven Winter Associates (SWA) and BSG staff on August 23rd, 2010, and the results of a comprehensive energy analysis, this report describes the site's current conditions and recommendations for improvements. Suggestions for measures related to energy conservation and improved comfort are provided in the scope of work. Energy and resource savings are estimated for each measure that results in a reduction of heating, cooling, and electric usage.

Current conditions

In the most recent full year of data collected, July, 2009 through June, 2010, the EMS/OEM Building consumed a total of 88,080 kWh of electricity for a total cost of $12,079. In the most recent full year of natural gas data collected, July, 2009 through June, 2010, 8,653 therms of gas were consumed for a total cost of $11,136. With electricity and natural gas combined, the building consumed 1,166 MMBtus of energy at a total cost of $23,215.

SWA/BSG has entered energy information about the Lakewood EMS/OEM Building in the U.S. Environmental Protection Agency's (EPA) *Energy Star Portfolio Manager* Energy benchmarking system. The building was classified as building type Public Order and Safety not allowing it to receive a performance rating.. Buildings achieving an Energy Star rating of 75 are eligible to apply for the Energy Star award and receive the Energy Star plaque to convey superior performance. These ratings also greatly help when applying for Leadership in Energy and Environmental Design (LEED) building certification through the United States Green Building Council (USGBC).

The Site Energy Use Intensity is 191 kBtu/ft^{2}yr compared to the national average of a similar building consuming 90 kBtu/ft^{2}yr. Implementing the recommendations included in this report will reduce the building energy consumption by approximately 20.6 kBtu/ft^{2}yr.

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

Category I Recommendations: Capital Improvements:

Replace the six (6) unit heaters, which have reached the end of their useful life. Due to the low energy savings and long payback period of this measure, it cannot be recommended as an ECM.

Replace the water heater, which has reached the end of its useful life. This measure would provide very little energy savings, if any, and therefore cannot be considered an ECM.

Category II: Operations & Maintenance:

- Replace aging and deteriorating sealants around exterior wall penetrations
- Weather-strip jambs and the bottoms of exterior doors
- Replace damaged roof insulation

Category III: Energy Conservation Measures:

At this time, SWA/BSG highly recommends a total of **4** Energy Conservation Measures (ECMs) for the EMS/OEM Building, summarized in the following table. The total investment cost for these ECMs, with incentives, is **$191,178** (based on a projected eligibility for New Jersey's Office of Clean Energy current incentive and rebate programs). SWA/BSG-PMK estimates a first year savings of **$19,740** with an aggregated simple payback of **9.7 years**. SWA/BSG-PMK estimates that implementing the highly recommended ECMs will reduce the carbon footprint of the facility by **76,190 lbs of CO_2**.

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

The following table summarizes the proposed Energy Conservation Measures (ECM) and their economic relevance:

ROI: Return on Investment (%)

Assumptions:

Discount rate:	3.2%	per DOE FEMP guidelines	Electricity rate	$0.14	$/kWh
Energy price escalation rate:	0%	per DOE FEMP guidelines	Gas rate	$1.29	$/therm

Avg. Annual Demand: 0.00431 Area of Building (SF): 12,200

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 Surge Protectors with Smart Strips	Similar Projects	$600	$0	$600	2,751	0.99	0	0.77	$0.00	$385	10	$3,252	1.56	442%	44%	64%	$2,685	3,769
2	Lighting Upgrades	Empirical Data	$8,638	$1,515	$7,123	10,408	3.74	0	2.91	$0	$1,457	15	$17,146	4.89	141%	9%	19%	$10,272	14,259
	Occupancy Sensors		$780	$105	$675	1,830	0.66	0	0.51	$0	$256	10	$2,164	2.63	221%	22%	36%	$1,511	2,508
TOTAL			$10,018	$1,620	$8,398	14,989	5.38	0	4.19	$0.00	$2,099	-	$22,562	4.00	-	-	-	$14,468	20,535

Table 2 - Recommended 5-10 Year Payback ECMs

ECM #	ECM description	Source	Est. Installed Cost, $	Est. Incentives, $	Net Est. ECM Cost with Incentives, $	kWh, 1st Yr Savings	kW, Demand Reduction/Mo	Therms, 1st Yr Savings	kBtu/sq ft, 1st Yr Savings	Est. Operating Cost, 1st Yr Savings, $	Total 1st Yr Savings $	Life of Measure, Yrs	Est. Lifetime Energy Cost Savings, $	Simple Payback, Yrs	Lifetime Return on Investment, %	Annual Return on Investment, %	Internal Rate of Return, %	Net Present Value, $	CO_2 Reduced, lbs/yr
3	22-kW Roof-Mounted PV System	Similar Projects	$154,560	$22,080	$132,480	24,743	8.88	0	6.92	$0	$15,336	30	$292,968	8.64	121%	4%	11%	$168,112	33,898
TOTAL			$154,560	$22,080	$132,480	24,743	8.88	0	6.92	$0.00	$15,336	-	$292,968	8.64	-	-	-	$168,112	33,898

Table 3 - Recommended End-of-Life Cycle 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
4	Replace Furnaces & Condensing Units	Contractor	$55,000	$4,700	$50,300	8,448	3.03	870.34	9.50	$0	$2,305	18	$31,178	21.82	-38%	-2%	-2%	-$18,592	21,757
TOTAL			$55,000	$4,700	$50,300	8,448	3.03	870	9.50	$0.00	$2,305	-	$31,178	21.82	-	-	-	-$18,592	21,757

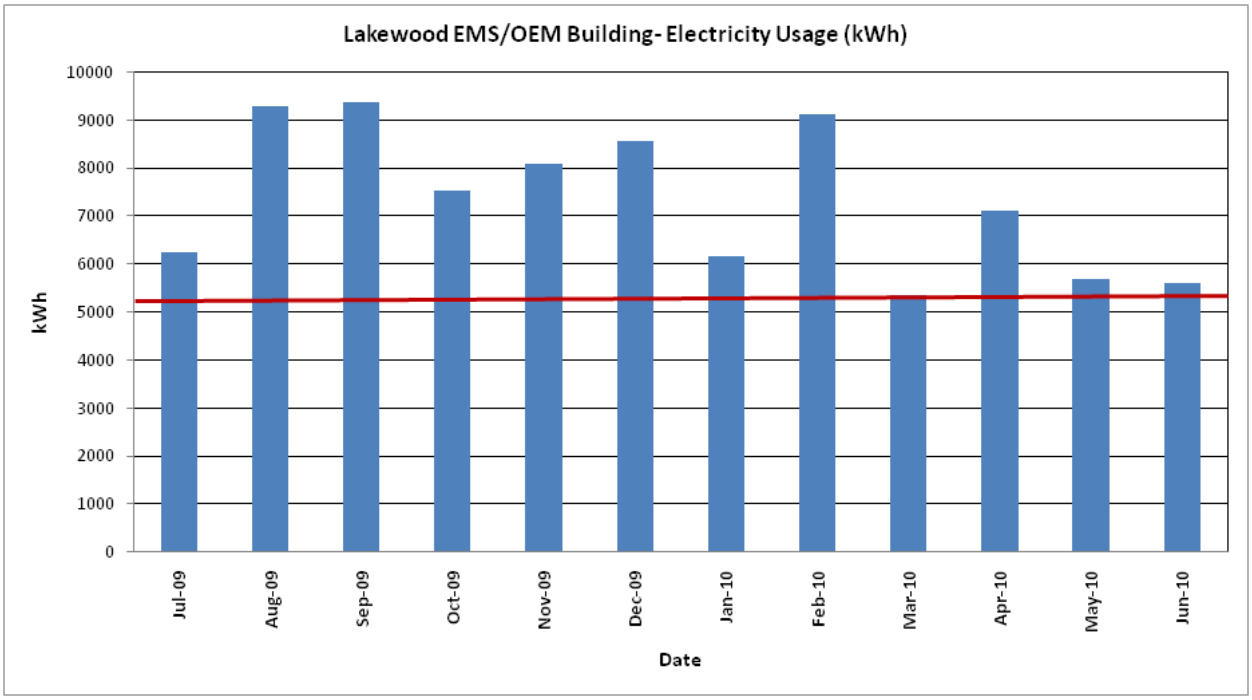
1. HISTORIC ENERGY CONSUMPTION

1.1. Energy Usage and Cost Analysis

SWA/BSG analyzed utility bills that were received from the utility company supplying the Lakewood EMS/OEM Building with electric and natural gas from July, 2009 through June, 2010.

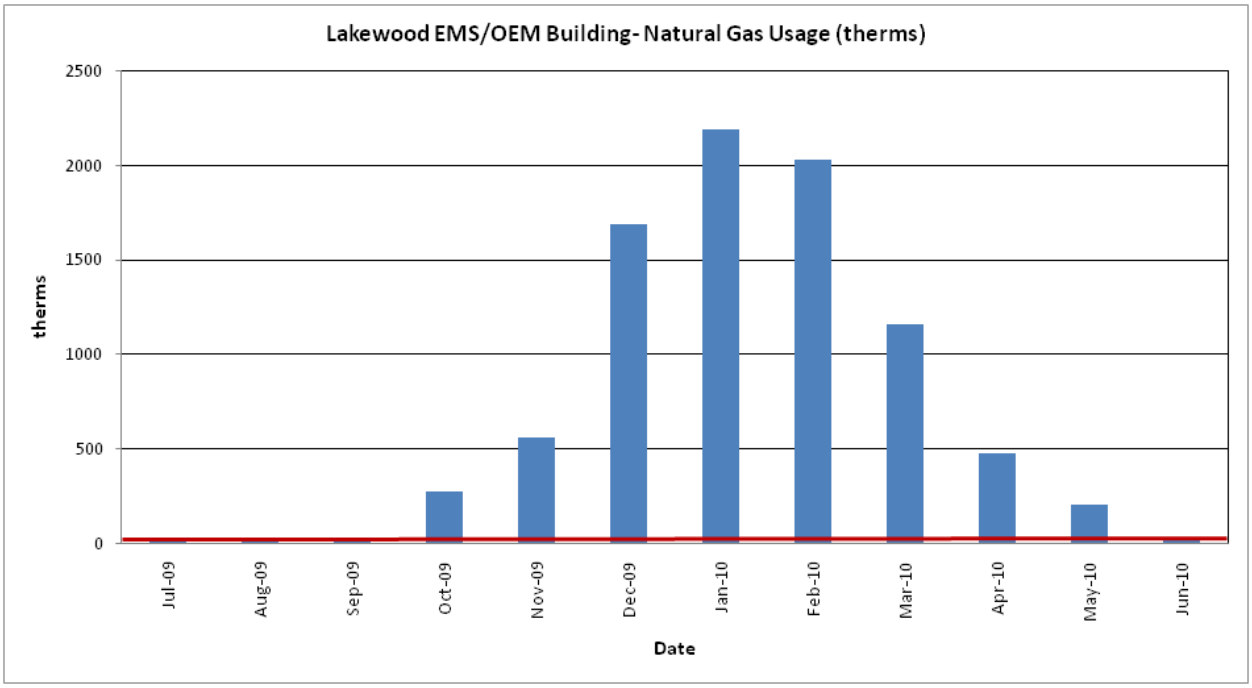
Electricity – The Lakewood EMS/OEM Building is currently served by one electric meter. The facility currently receives electricity from Jersey Central Power & Light at **an average rate of $0.14/kWh** based on 12 months of utility bills from July, 2009 through June, 2010. The facility consumed **approximately 88,080 kWh or $12,078 worth of electricity** in the previous year with an average monthly demand of 31.6 kW.

The following chart show electricity usage for the Lakewood EMS/OEM Building based on utility bills for the billing analysis period. The red line indicates the estimated base-load in kWh.



Natural Gas – The Lakewood EMS/OEM Building is currently served by one meter for natural gas. The facility currently receives natural gas from New Jersey Natural Gas at **an average aggregated rate of $1.29/therm** based on 12 months of utility bills for July, 2009 through June, 2010. The facility consumed **approximately 8,652 therms or $11,136 worth of natural gas** in the previous year.

The following charts show the natural gas usage for the Lakewood EMS/OEM Building based on utility bills for the analysis period of July, 2009 through June, 2010.



The natural gas usage mimics seasonal needs for heating the buildings showing that natural gas is primarily used for heating. The red line indicates the base-load level for the domestic hot water. The natural gas usage above the red line shows the amount of natural gas used for heating.

1.2. Utility Rate

The Lakewood EMS/OEM Building currently receives electricity from Jersey Central Power & Light at a general service market rate for electricity use (kWh) with (kW) demand charge. The facility currently pays an average rate of approximately $0.14/kWh based on the most recent 12 months of utility bills.

The Lakewood EMS/OEM Building currently receives natural gas supply from New Jersey Natural Gas at a general service market rate for natural gas in (therms). There is one gas meter that provides natural gas service to the facility. The average aggregated rate (supply and transport) for the meter is approximately $1.29/therm based on the most recent 12 months of utility bills.

1.3. Energy Benchmarking

SWA/BSG has entered energy information about the Lakewood EMS/OEM Building in the U.S. Environmental Protection Agency's (EPA) *Energy Star Portfolio Manager* Energy benchmarking system. The username is *lakewoodtwp* and the password is *lakewood*. The building type was classified as Public Order and Safety because the building is used by the first aid squad, EMS and office of emergency management. A classification of Public Order and Safety does not allow it to receive a performance rating which could be used to achieve an Energy Star building certification.

The Site Energy Use Intensity is 191 kBtu/sq.ft/yr compared to the national average of buildings classified as Public Order and Safety consuming 90 kBtu/sq.ft./yr. Implementing this report's recommended Energy Conservations Measures (ECMs) will reduce use by approximately 20.6 kBtu/sq.ft./yr.

SWA/BSG has created the Portfolio Manager site information for Lakewood EMS/OEM Building. This information can be accessed at: https://www.energystar.gov/istar/pmpam/, with the following:

Username: *lakewoodtwp*
Password: *lakewood*

OMB No. 2060-0347

STATEMENT OF ENERGY PERFORMANCE
Lakewood EMS Building

Building ID: 2427827
For 12-month Period Ending: May 31, 2010[1]
Date SEP becomes ineligible: N/A
Date SEP Generated: September 16, 2010

Facility
Lakewood EMS Building
1555 Pine Street
Lakewood, NJ 08701

Facility Owner
Township of Lakewood
231 Third St
Lakewood, NJ 08701

Primary Contact for this Facility
Tony Arecchi
1 America Ave
Lakewood, NJ 08701

Year Built: 1978
Gross Floor Area (ft²): 6,350

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

Site Energy Use Summary[3]	
Electricity - Grid Purchase(kBtu)	305,375
Natural Gas (kBtu)[4]	910,517
Total Energy (kBtu)	1,215,892
Energy Intensity[5]	
Site (kBtu/ft²/yr)	191
Source (kBtu/ft²/yr)	311
Emissions (based on site energy use)	
Greenhouse Gas Emissions ($MtCO_2e$/year)	95
Electric Distribution Utility	
FirstEnergy - Jersey Central Power & Lt Co	
National Average Comparison	
National Average Site EUI	90
National Average Source EUI	189
% Difference from National Average Source EUI	64%
Building Type	Public Order and Safety

Stamp of Certifying Professional

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

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

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

Certifying Professional
N/A

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

EPA Form 5900-16

2. FACILITY AND SYSTEMS DESCRIPTION

This section gives an overview of the current state of the facility and systems. Please refer to the Proposed Further Recommendations section for recommendations for improvement.

Based on visits from Steven Winters Associates (SWA) and PMK staff on Monday, August 23, 2010 the following data was collected and analyzed.

2.1. Building Characteristics

The one-story, slab-on-grade 12,720 square feet building originally constructed in 1978 as new construction. The slab on grade is uniform through the center section of the building, with a step down into east and west sections housing the maintenance and Garage Areas.

2.2. Building occupancy profiles

Its occupancy is approximately 30 to 55 occupants on a daily basis, Monday through Friday, 50 hours per week, with reduced staff on 24 hour, 7 days per week, according to staff personnel. The building was initially designed for 54 occupants at the EMS, 124 occupants at the Multi-purpose Room, and 55 occupants at the OEM.

2.3. Building Envelope

Due to unfavorable weather conditions, no exterior envelope infrared (IR) images were taken during the field audit.

General Note: All findings and recommendations on the exterior envelope (base, walls, roofs, doors and windows) are based on the energy auditors' experience and expertise, on construction document reviews (if available) and on detailed visual analysis, as far as accessibility and weather conditions allowed at the time of the field audit.

East Facade – Side Elevation

Partial North Facade – Front Elevation

Partial North/West Facade – Front/Side Elevation

Partial West/South Facade - Side/Rear Elevation

Partial South Facade – Rear Elevation

Partial South Facade – Rear Elevation

Partial South Facade – Rear Elevation

2.3.1. Exterior Walls

The exterior wall construction is comprised of one basic assembly that repeats throughout the building.

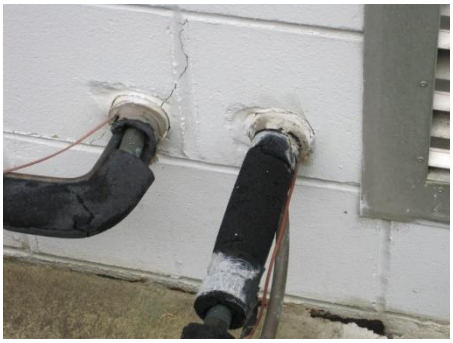
The wall assembly is comprised of a single-wythe, 12-inch concrete masonry unit (fluted and split-faced in front and sides and standard unit in rear) exposed surface in utility spaces and metal furring and gypsum board interior finish in occupied spaces. Exterior masonry is insulated with Korfil insulating inserts.

Note: Wall insulation levels (R-value) could not be verified in the field. Insulation type is identified from reviewing the construction plans and specifications.

Exterior and interior wall surfaces were inspected during the field audit. They were found to be in overall acceptable condition with some signs of uncontrolled moisture, air-leakage and other energy-compromising issues.

The following specific exterior wall problem spots and areas were identified:

Unsealed Pipe Sleeve



Bldg. Crack & Aged Sealant

2.3.2.Roof

The building is comprised of two types of roof assembly.

The gable-shaped roofing assembly is comprised of single span wood trusses 2'-0" O.C. spanning between exterior bearing walls with batt-type roof insulation (R-30), comprised of R-19 batts installed between the bottom chords of trusses and R-11 batts installed in the opposite direction to the joist span. However, some roof insulation has been removed/and or damaged due to squirrels in the above ceiling space. Composition shingle roofing system is applied to ½" plywood roof sheathing installed over roof trusses. Roof trusses overhang exterior walls and are comprised of vented soffits. Roof ridge venting and/or roof relief vents do not exist.

The center roof section assembly is comprised of single-slope wood trusses 2'-0" O.C. spanning between exterior bearing walls with batt-type roof insulation (R-30), comprised of R-19 batts installed between the bottom chords of trusses and R-11 batts installed in the opposite direction to the joist span. In the areas of the Lobby and Corridors (2 story space), batt-type roof insulation (R-21) is installed between the roof joists However, some roof insulation has been removed/and or damaged due to squirrels in the above ceiling space. Composition shingle roofing system is applied to ½" plywood roof sheathing installed over roof trusses. Roof trusses overhang exterior walls and are comprised of vented soffits. Roof ridge venting and or roof relief vents do not exist.

Transitions between high and low roofs are constructed of metal stud framing with exterior wood siding. Vertical transitions are not insulated. Roof trusses overhang exterior walls and are comprised of vented soffits. Roof ridge venting does not exist.

2.3.3. Base

The building's base is comprised of a slab-on-grade floor with a perimeter foundation and 2'-0" perimeter insulation (R-4.9) is installed vertically on the outboard face of the exterior foundation wall from bottom of slab downward and horizontally under the slab-on-grade.

The building's base and its perimeter were inspected for signs of uncontrolled moisture or water presence and other energy-compromising issues. Overall the base was observed to be in acceptable condition with no signs of uncontrolled moisture, air-leakage, and/or other energy-compromising issues.

2.3.4. Windows

The building contains two window types (awning and casement).

1. Windows are aluminum-clad wood construction with double glazed, un-insulated units consisting of clear exterior pane, air space, clear interior pane. The windows are original and have never been replaced. Interior wall mounted shading devices include vertical blinds.

Windows, shading devices, sills, related flashings and sealants were inspected where accessible for signs of moisture, air-leakage, and other compromising issues. Overall, the vision panels were found to be in acceptable condition with no signs of uncontrolled moisture, air-leakage and/or other energy-comprising issues.

Typical Casement Window

Vision Panel over Entrance

2.3.5. Exterior Doors

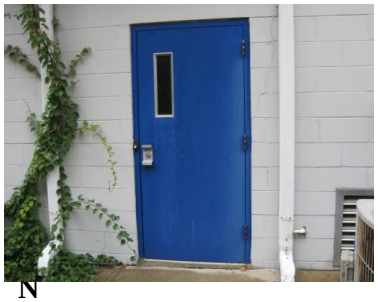
The building contains aluminum storefronts, aluminum entry doors and frames, steel insulated and un-insulated doors and steel frames, and steel insulated roll-up doors.

1. Aluminum entry doors in storefront are narrow stile (2 1/4-inch nominal width) un-insulated doors, glazed with sealed clear insulating units consisting of 1/4-inch tempered clear exterior pane, air space, 1/4-inch tempered clear interior pane. Weather-stripping is not installed at the bottom of each door. Doors have integral weather-stripping at head or jambs.
2. Aluminum storefront system is comprised of thermally broken construction, glazed with sealed clear insulating units consisting of 1/4-inch tempered clear exterior pane, air space, 1/4-inch tempered clear interior pane. Storefront system is installed at two entrance locations.
3. Steel doors are insulated. Steel frame is not insulated, but is filled solid with grout. No weather-stripping is installed at the bottom of each door. Only some doors have weather-

stripping at head or jambs. No weather-stripping is installed at bottom of each door. Vision panels are glazed with ¼-inch wire glass.

4. Steel roll-up doors comprised of galvanized steel sheets with an insulated inner core of thermal insulation. No vision panels are located in each door. Continuous weather-stripping is installed at head, jambs and bottom of each door.

All exterior doors, thresholds, related flashings, sealants and weather-stripping were inspected where accessible for signs of moisture, air-leakage, and other energy-compromising issues. Overall, the doors to conditioned spaces were found to be in poor condition with some signs of uncontrolled moisture, air-leakage and/or other energy-comprising issues.
The following specific door/storefront problem spots were identified:



N
No Rain Drip or Weather-stripping

No Weather-stripping on Bottom Half of Jamb

No Weather-stripping

2.3.6. Building Air Tightness

Overall, the field auditors found the building to be not adequately air-tight with numerous areas of suggested improvements, as described in more detail earlier in this chapter.

The air-tightness of buildings helps maximize all other implemented energy measures and investments, and minimize potentially costly long-term maintenance, repair and replacement expenses.

2.4. HVAC systems

2.4.1. Heating

Carrier furnace

Heating is provided by a combination of forced-air furnaces, electric unit heaters, and gas-fired unit heaters. All furnaces, which are equipped with cooling coils, are Carrier units, installed in 1991; all units have reached the end of their useful life. The Furnace #1 and Furnace #4 are located in the EMS electrical room; unit #1, rated at 66 MBH, heats the office and OEM side of the commons area, and unit #4, rated at 110 MBH, heats the EMT side of the commons area. The PD-EMS utility room houses Furnace #2 and Furnace #3, both of which are rated at 88 MBH; unit #2 heats the EMS west area, and unit #3 heats the EMS east area. Furnace #5 and Furnace #6, located in the attic, each provide 115 MBH of heating to the PD-EMS west and PD-EMS east areas, respectively. All furnaces are 80% efficient. There are five (5) 100 MBH, 80% Reznor gas-fired unit heaters that heat the two garages; three (3) units are located in the PD-EMS garage, and two (2) units are in the EMS garage. All units were installed in 1991. The EMS electrical room that houses Furnaces #1 and #4 has a 4 kW TPI electric unit heater, which is not in use; an adjacent electrical room has a 2 kW TPI electric unit heater, which is in use. A second 4 kW unit is located in the PD-EMS electrical room.

Category I Recommendations – Capital Improvements: Replace the gas-fired unit heaters, which have reached the end of their useful life, with 100% efficient, high-intensity infrared radiant heaters.

Category III Recommendations – ECM #6: Replace all furnaces, cooling coils, and condensing units with high-efficiency units.

2.4.2. Cooling

Six (6) condensing units, all with a Seasonal Energy Efficiency Ratio (SEER) of 10, are located outside of the building. Units #1 through #4 are all Carrier units, while the other two are Goodman units. Condensing Unit #1, a 2½ ton unit, feeds the cooling coil on Furnace #1; Condensing Unit #2, a 4 ton unit, feeds the cooling coil on Furnace #2; Condensing Unit #3, a 3½ ton unit, feeds a cooling coil on Furnace #3; and Condensing Units #4 through #6, all 5 ton units, feed the cooling coils on Furnaces #4 through #6, respectively.

(2) Goodman condensing units

Category III Recommendations – ECM #6: Replace all furnaces, cooling coils, and condensing units with high-efficiency units.

2.4.3. Ventilation

There are five (5) Penn exhaust fans at the facility. EF-1, rated at 7,100 CFM and 1 HP, services the EMS garage; EF-2, rated at 400 CFM and 1/10 HP, services the main restrooms; EF-3, rated at 100 CFM and 50 W, services the small restrooms; EF-4, rated at 925 CFM and ½ HP, services the multi-purpose room; and EF-5, rated at 4,300 CFM and 1 HP, services the 1st Aid garage. Additional ventilation is provided by the heating and cooling system, doors, and windows.

2.4.4. Domestic Hot Water

Water is heated by a 50 gallon, 42 MBH American Appliance natural gas water heater, installed in 1991. The unit has reached the end of its useful life.

American Appliance water heater

Category I Recommendations – Capital Improvements: Replace the water heater, which has reached the end of its useful life. This measure would provide very little energy savings, if any, and therefore cannot be considered an ECM.

2.5. Electrical systems

2.5.1. Lighting

A complete inventory of all interior, exterior, and exit sign light fixtures were examined and documented in Appendix A of this report including an estimated total lighting power consumption. The facility consists primarily of T8 fluorescent fixtures with electronic ballasts.

Category III Recommendation - ECM #3: Recommend replacing all 32 Watt T8 lamps with 28 Watt energy saving lamps. This and various other lighting upgrades are outlined in Appendix A.

2.5.2. Appliances and Process

Appliances, such as refrigerators, that are over 10 years of age should be replaced with newer efficient models with the Energy Star label. For example, Energy Star refrigerators use as little as 315 kWh / yr. When compared to the average electrical consumption of older equipment, Energy Star equipment results in a large savings. Building management should select Energy Star label appliances and equipment when replacing: refrigerators, printers, computers, and copy machines, etc.

More information can be found in the "Products" section of the Energy Star website at: http://www.energystar.gov.

In this facility, there are eight (8) computers, two (2) refrigerators, three (3) copy/fax machines, two (2) coffee makers, two (2) microwaves, two (2) gas stoves, two (2) kitchen hoods, one (1) vending machine, one (1) water cooler, and one (1) toaster oven. In this facility, some of the appliances found and noted in the attached equipment list were older than the 10 year threshold and should be considered for the Energy Star program.

2.5.3.Elevators

There are no elevators in the building.

3. Building Systems Equipment List

Lakewood EMS/First Aid							
Building System	Description	Locations	Model #	Fuel	Space Served	Year Installed	Estimated. Remaining Useful Life %
Heating/ Cooling	FURN-1: Furnace w/ cooling coil; 66 MBH gas heating, 80% efficient; 2.5 ton cooling coil	EMS electrical room	Carrier; furnace: M# 58SSC005-GC, S# 3791A07355; cooling coil: M# 519DXS030-000MAAA, S# 3291X99693	Natural gas	Commons - Office and OEM side	1991	5%
	CU-1: 2.5 ton condensing unit, 10 SEER	Outside	Carrier, M# 38TKB030300, S# 3691E05055	Electricity		1991	0%
Heating/ Cooling	FURN-2: Furnace w/ cooling coil; 88 MBH gas heating, 80% efficient; 4 ton cooling coil	PD-EMS utility room	Carrier; furnace: M# 58SSC075-JC, S# 3991AC7901; cooling coil: M# CD5AXA048-000AAAA, S# 6891X40948	Natural gas	EMS west	1991	5%
	CU-2: 4 ton condensing unit, 10 SEER	Outside	Carrier, M# 38TK048310, S# 3891E26812	Electricity		1991	0%
Heating/ Cooling	FURN-3: Furnace w/ cooling coil; 88 MBH gas heating, 80% efficient; 4 ton cooling coil	PD-EMS utility room	Carrier; furnace: M# 58SSC075-JC, S# 3991AC7891; cooling coil: M# CD5AXA048-000AAAA, S# 3891X40945	Natural gas	EMS east	1991	5%
	CU-3: 3.5 ton condensing	Outside	Carrier, M# 38TKB042300, S# 4191E232242	Electricity		1991	0%

	unit, 10 SEER						
Heating/ Cooling	FURN-4: Furnace w/ cooling coil; 110 MBH, 80% efficient; 5-ton cooling coil	EMS electrical room	Carrier; furnace: M# 58SSC090-1LC, S# 4991A15909; cooling coil: M# CD5AXA060-000AAAA, S# 4691X68598	Natural gas	Commons - EMT side	1991	5%
	CU-4: 5 ton condensing unit, 10 SEER	Outside	Carrier, M# 38TH060300, S# 1791E33467	Electricity		1991	0%
Heating/ Cooling	FURN-5: Furnace w/ cooling coil; 115 MBH gas heating, 80% efficient; 5 ton cooling coil	Attic	Carrier, M# 58DHC095101LC	Natural gas	PD-EMS west	1991	5%
	CU-5: 5-ton condensing unit, 10 SEER	Outside	Goodman, M# CRT60-1, S# 0606120787	Electricity		1991	0%
Heating/ Cooling	FURN-6: Furnace w/ cooling coil; 115 MBH gas heating, 80% efficient; 5 ton cooling coil	Attic	Carrier, M# 58DHC095101LC	Natural gas	PD-EMS east	1991	5%
	CU-6: 5-ton condensing unit, 10 SEER	Outside	Goodman, M# CRT60-1, S# 0606120358	Electricity		1991	0%
Heating	Gas-fired unit heater, 100 MBH, 80% efficient	PD-EMS garage	Reznor, M# MFE-100S	Natural gas	PD-EMS garage	1991	0%
Heating	Gas-fired unit heater, 100 MBH,	PD-EMS garage	Reznor, M# MFE-100S	Natural gas	PD-EMS garage	1991	0%

	80% efficient						
Heating	Gas-fired unit heater, 100 MBH, 80% efficient	PD-EMS garage	Reznor, M# MFE-100S	Natural gas	PD-EMS garage	1991	0%
Heating	Gas-fired unit heater, 100 MBH, 80% efficient	EMS garage	Reznor, M# MFE-100S	Natural gas	EMS garage	1991	0%
Heating	Gas-fired unit heater, 100 MBH, 80% efficient	EMS garage	Reznor, M# MFE-100S	Natural gas	EMS garage	1991	0%
Heating	4 kW electric unit heater (not in use)	(Left) EMS utility room	TPI, M# IH2-4PT HF684TN	Electricity	(Left) EMS utility room	Approx. 1991	0%
Heating	2 kW electric unit heater	(Right) EMS utility room	TPI, M# HF682T2M IH2-2PTM	Electricity	(Right) EMS utility room	Approx. 1991	0%
Heating	4 kW electric unit heater	PD-EMS electrical room	TPI, M# IH2-4PT HF684TN	Electricity	PD-EMS electrical room	Approx. 1991	0%
Domestic Hot Water	50 gallon, 42 MBH water heater	(Left) EMS utility room	American Appliance, M# TWDK50T-V, S# 9143302835	Natural gas	Sinks	1991	0%
Appliances	Refrigerator	OEM kitchen	WCI, M# GTN142BK1, S# LA21008036	Electricity	OEM kitchen	1992	5%
Appliances	Coffee maker, 1,025 W	OEM kitchen	Mr. Coffee, M# PR16 4297	Electricity	OEM kitchen	Approx. 2005	67%
Appliances	Microwave, 1,500/800 W input/output	OEM kitchen	Tappan, M# 56-2251-10/-2, S# HG21906464	Electricity	OEM kitchen	1992	0%
Appliances	Gas stove (not in use)	OEM kitchen	Tappan (nameplate not accessible)	Natural gas	OEM kitchen	Approx. 2005	75%
Appliances	Kitchen hood, 200 CFM (not in use)	OEM kitchen	Broan, M# 76,000-D	Electricity	OEM kitchen	Approx. 2005	75%

Appliances	Soda vending machine	Conference room	No nameplate	Electricity	Conference room	Approx. 2005	74%
Appliances	Gas stove	Ready room kitchen	Caloric - Heritage Series	Natural gas	Ready room kitchen	Approx. 2000	50%
Appliances	Kitchen hood, 200 CFM	Ready room kitchen	Broan, M# 76,000-D	Electricity	Ready room kitchen	Approx. 2005	75%
Appliances	Toaster oven, 470 W	Ready room kitchen	Kitchen Gourmet, M# EH-70401-A, S# W14A4710/686713	Electricity	Ready room kitchen	2007	70%
Appliances	Coffee maker, 700 W	Ready room kitchen	Keurig, M# B30, S# 30.0000.0391676	Electricity	Ready room kitchen	Approx. 2007	70%
Appliances	Refrigerator	Ready room kitchen	Admiral, M# NT17L6A, S# BU39255930	Electricity	Ready room kitchen	Approx. 1991	0%
Appliances	Water cooler	Ready room kitchen	Sunroc, M# TPV1HS-002, S# 020801665	Electricity	Ready room kitchen	Approx. 2008	80%
Appliances	Microwave	Ready room kitchen	Sharp, M# R-306LW, S# 165470	Electricity	Ready room kitchen	2006	60%
Ventilation	EF-1: Exhaust fan, 7,100 CFM, 1 HP	Roof	Penn, M# LC-30A	Electricity	EMS garage	1991	10%
Ventilation	EF-2: Exhaust fan, 400 CFM, 1/10 HP	Roof	Penn, M# XR94L	Electricity	Main restrooms	1991	10%
Ventilation	EF-3: Exhaust fan, 100 CFM, 50 W	Roof	Penn, M# Z5	Electricity	Small restrooms	1991	10%
Ventilation	EF-4: Exhaust fan, 925 CFM, 1/8 HP	Roof	Penn, M# AT-24	Electricity	Multi-purpose room	1991	10%
Ventilation	EF-5: Exhaust fan, 4,300 CFM, 1 HP	Roof	Penn, M# LC-20A	Electricity	1st Aid Garage	1991	10%

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

4. ENERGY CONSERVATION MEASURES

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

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

Category I Recommendations: Capital Improvements:

Replace the six (6) unit heaters, which have reached the end of their useful life. Due to the low energy savings and long payback period of this measure, it cannot be recommended as an ECM.

Replace the water heater, which has reached the end of its useful life. This measure would provide very little energy savings, if any, and therefore cannot be considered an ECM.

Category II: Operations & Maintenance:

- Replace aging and deteriorating sealants around exterior wall penetrations
- Weather-strip jambs and the bottoms of exterior doors
- Replace damaged roof insulation

Category III Recommendations: Energy Conservation Measures:

Summary Table

ECM #	Description
1	Replace Surge Protectors with Smart Strips
2	Lighting Upgrades & Occupancy Sensors
3	22-kW Roof-Mounted PV System
4	Replace Furnaces & Condensing Units

ECM #1: Replace Surge Protectors with SmartStrips

Description:

The computers at the EMS/OEM Building only operate, on average, for about 50 hours per week. Devices such as monitors, printers, and scanners, however, cause the average desktop computer system to have an idle wattage of 56 W. It is recommended that SmartStrips be purchased to replace each computer's surge protector, which would shut off the power supply when the computer system is idle.

Installation cost:

Estimated installed cost: $75 each, $600 total
Source of cost estimate: Similar Projects

Economics:

ECM #	ECM description	Source	Est. Installed Cost, $	Est. Incentives, $	Net Est. ECM Cost with Incentives, $	kWh, 1st Yr Savings	kW, Demand Reduction/Mo	Therms, 1st Yr Savings	kBtu/sq ft, 1st Yr Savings	Est. Operating Cost, 1st Yr Savings, $	Total 1st Yr Savings $	Life of Measure, Yrs	Est. Lifetime Energy Cost Savings, $	Simple Payback, Yrs	Lifetime Return on Investment, %	Annual Return on Investment, %	Internal Rate of Return, %	Net Present Value, $	CO_2 Reduced, lbs/yr
1	Replace Surge Protectors with Smart Strips	Similar Projects	$600	$0	$600	2,751	0.99	0	1.48	$0.00	$385	10	$3,252	1.56	442%	44%	64%	$2,685	3,769

Assumptions:

The cost of electricity, taken from 12 months of the EMS/OEM Building's electricity bills, is $0.14 per kWh. 8 surge protectors are recommended to be replaced with SmartStrips; at an average of 56.04 W of idle wattage per computer system for 118 idle hours per week, 2,751 kWh of electricity are saved per year.

Rebates/financial incentives:

No rebates or incentives available for this measure at this time.

ECM #2: Lighting Upgrades & Occupancy Sensors

Description:

Lighting at the EMS/OEM building primarily consists of standard-efficiency fixtures with T12 lamps and magnetic ballasts. There are also a number of incandescent fixtures. SWA/BSG-PMK recommends retrofitting the T12 fixtures with low-watt T8 lamps and electronic ballasts and replacing the incandescent fixtures with compact fluorescent lamps.

Recommended lighting upgrades are detailed in Appendix A.

Installation cost:

	Lighting (Only)	Sensors (Only)	Complete Lighting Upgrade
Cost	$8,638.00	$780.00	$9,418.00
Rebate	$1,515.00	$105.00	$1,620.00
Net Cost	$7,123.00	$675.00	$7,798.00
Savings (kWh)	10,408	1,830	11,541
Savings ($)	$1,457.13	$256.26	$1,615.69
Payback	4.9	2.6	4.8

Source of cost estimate: Empirical Data

Economics (without incentives):

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	Lighting Upgrades	Empirical Data	$8,638	$1,515	$7,123	10,408	3.74	0	5.59	$0	$1,457	15	$17,146	4.89	141%	9%	19%	$10,272	14,259
	Occupancy Sensors		$780	$105	$675	1,830	0.66	0	0.98	$0	$256	10	$2,164	2.63	221%	22%	36%	$1,511	2,508

Assumptions:

The electric cost used in this ECM was $0.14/kWh, which was the facilities' average rate for the 12-month period from July, 2009 through June, 2010. The replacements for each lighting fixture, the costs to replace or retrofit each one, and the rebates and wattages for each fixture are located in Appendix A.

Rebates/financial incentives:

The New Jersey SmartStart offers rebates for upgrading lighting fixtures and installing lighting controls. The total rebate this ECM qualifies for is $1,620.

ECM #3: 22-kW Roof-Mounted PV System

Description:

Currently, the EMS/OEM Building does not use any renewable energy systems. Renewable energy systems, such as photovoltaic panels, can be mounted on the roof of 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. SWA/BSG-PMK presents below the economics of installing a 22-kW PV system to offset electrical demand for the building and reduce the annual net electric consumption for the building. A system of 96 commercial multi-crystalline 230 watt panels would generate 24,743 kWh of electricity per year, or 28.1% of the EMS/OEM building's annual electric consumption.

Installation cost:

Estimated installed cost: $154,560; SREC revenue included in "Total 1st Year Savings"
Source of cost estimate: Similar projects

Economics:

ECM #	ECM description	Source	Est. Installed Cost, $	Est. Incentives, $	Net Est. ECM Cost with Incentives, $	kWh, 1st Yr Savings	kW, Demand Reduction/Mo	Therms, 1st Yr Savings	kBtu/sq ft, 1st Yr Savings	Est. Operating Cost, 1st Yr Savings, $	Total 1st Yr Savings $	Life of Measure, Yrs	Est. Lifetime Energy Cost Savings, $	Simple Payback, Yrs	Lifetime Return on Investment, %	Annual Return on Investment, %	Internal Rate of Return, %	Net Present Value, $	CO2 Reduced, lbs/yr
3	22-kW Roof-Mounted PV System	Similar Projects	$154,560	$22,080	$132,480	24,743	8.88	0.00	6.92	$0	$15,336	30	$292,968	8.64	121%	4%	11%	$168,112	33,898

Assumptions:

Cost of installation was estimated, using data from similar projects, at approximately $7,000 per kW. Annual energy savings were calculated via "PV Watts", an online tool on the website of the National Renewable Energy Laboratory.

Rebates/financial incentives:

This ECM is eligible for New Jersey's Solar Renewable Energy Certificates (SREC). SRECs are marketable certificates issued to the owner of a PV system for each 1,000 kWh (1MWh) of electricity generated. SRECs are sold or traded separately from the power generated; the income from the sale of the SREC can be used to offset the cost of the system by applying the revenue to a loan payment or debt service. The value of the SREC is market driven, and is controlled by the amount of the Solar Alternative Compliance Payment (SACP) which is set by the NJBPU. The SREC market is derived from New Jersey's Renewable Portfolio Standard (RPS), which requires that all licensed energy suppliers in the state invest in energy generated from renewable sources, with specific requirements for solar power. If a supplier does not invest by purchasing SRECs, the supplier must pay the SACP for a percentage of the total annual

power produced. Since SRECs typically trade just below the SACP, there is an incentive for the supplier to buy SRECs. The SREC Program provides a market for SRECs to be created and verified on the owner's behalf. The New Jersey Clean Energy program facilitates the sale of SRECs to New Jersey electric suppliers. PV system owners in New Jersey with a grid-connected PV system are eligible to participate in New Jersey's SREC Program.

The NJBPU has stated its intention to continue to operate a program of rebates and SRECs, On September 12, 2007, the NJBPU approved an SREC only pilot incentive program. The program set the SACP at an initial value of $711, decreasing annually for an eight (8) year period. SRECs would be generated for fifteen (15) years (referred to as the Qualification Life), and have a two (2) year trading life. The NJBPU believes that to achieve an internal rate of return of twelve (12) percent, the target SREC price would be $611, reducing by three (3) percent per year for the same eight (8) year period that the SACP is set.

ECM #4: Replace Furnaces & Condensing Units

Description:

The EMS/OEM building is heated by six (6) forced-air furnaces, totaling 485 MBH. These furnaces are equipped with cooling coils, which, along with six (6) condensing units, provide 25 tons of cooling. The units have reached the end of their useful life, and should be replaced. Higher-efficiency units are now available; newer condensing units have Seasonal Energy Efficiency Ratio (SEER) values of 21 BTUs of cooling per watt of electricity, and furnaces are now available that have efficiencies up to 95%. The current condensing units had a SEER of 10 and the furnaces had an efficiency of 80% at the time of their purchase, but due to its age and condition, its SEER and efficiency were estimated to decrease by to 8 and 70%, respectively.

Installation cost:

Estimated installed cost: $55,000
Source of cost estimate: Contractor

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	Replace Furnaces & Condensing Units	Contractor	$55,000	$4,700	$50,300	8,448	3.03	870.34	9.50	$0	$2,305	18	$31,178	21.82	-38%	-2%	-2%	-$18,592	21,757

Assumptions:

The cost per therm of natural gas that was used, taken from twelve months of the EMS/OEM building's energy bills, was $1.29. Per the American Society of Heating, Refrigeration & Air-Conditioning Engineers (ASHRAE), the outdoor dry bulb temperature is above 11°F for 99.6% percent of a year, and the number of heating degree-days for one year is 4,947. The desired indoor temperature was estimated to be 68°F. The building operates 50 hours per week. The savings were calculated using the following equations:

The cooling savings can now be calculated. Using 12 months of the facility's electricity bills, it was determined that the cost of electricity is currently $0.14/kWh. Per ASHRAE, the outdoor dry bulb temperature is above 93°F for 0.4% percent of a year, and there are 968 annual cooling degree days at this geographical area. The desired indoor temperature during the cooling season was assumed to be 74°F.

The following equation, the degree-day equation for cooling systems, was used to calculate the electric consumptions of the current and proposed air-conditioners:

Rebates/financial incentives:
This ECM is calculated based on a projected eligibility for New Jersey's SmartStart Rebate, which pays up to $92 per ton for condensing units and $400 for each furnace, for a total of $4,700 for this measure.

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

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

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

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

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

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

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

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

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

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

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

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

5. RENEWABLE AND DISTRIBUTED ENERGY MEASURES

5.1. Existing systems

There are currently no existing renewable energy systems.

5.2. Solar Photovoltaic

As a result of our study, the roof of the Lakewood EMS/OEM Building has been identified as conducive for the application of a Photovoltaic (PV) system.

Based on the goal of generating as much of the building's electric load as possible utilizing renewable energy while meeting the limitations of usable space available and rebate requirements, a PV system with a design capacity of 22 kW was selected. The total annual generating capacity of the system is 24,743 kWh as estimated using PV WATTS calculator provided by the Department of Energy (DOE), National Renewable Energy Laboratory (NREL).

PVWatts

AC Energy & Cost Savings

Cautions for Interpreting the Results

(Type comments here to appear on printout; maximum 1 row of 80 characters.)

Station Identification	
City:	Atlantic_City
State:	New_Jersey
Latitude:	39.45° N
Longitude:	74.57° W
Elevation:	20 m
PV System Specifications	
DC Rating:	22.1 kW
DC to AC Derate Factor:	0.770
AC Rating:	17.0 kW
Array Type:	Fixed Tilt
Array Tilt:	20.0°
Array Azimuth:	116.0°
Energy Specifications	
Cost of Electricity:	11.2 ¢/kWh

Results			
Month	Solar Radiation (kWh/m²/day)	AC Energy (kWh)	Energy Value ($)
1	2.49	1305	146.16
2	3.21	1547	173.26
3	4.18	2168	242.82
4	5.02	2462	275.74
5	5.64	2801	313.71
6	5.97	2759	309.01
7	5.87	2760	309.12
8	5.38	2554	286.05
9	4.70	2201	246.51
10	3.68	1806	202.27
11	2.60	1281	143.47
12	2.16	1099	123.09
Year	4.25	24743	2771.22

This proposed PV system would include 96 flat, crystalline PV modules installed on the roof. The system is based on commonly used 230 Watt PV modules, and one (1) inverter for conversion to AC power.

The proposed system would generate approximately 28 percent of the electric power consumed annually by the Lakewood EMS/OEM Building. It is noted this system would supplement the utility power supply since PV electricity production is based on weather and the system size is limited to 28 percent. The estimated cost of construction would be approximately $154,560 for this system. The system that is being recommended would meet the qualifications for a $22,080 upfront incentive through the New Jersey Clean Energy Program. The approximate annual savings would be $15,336, which would make the approximate payback 8.6 years

PV System – Lakewood EMS/OEM Building		
	Savings	**Cost**
Estimated Cost Of Construction		$154,560
REIP Incentive		$22,080
Township Investment		$132,480
First Year Electric Energy Savings	$3,464	
Estimated Annual SREC Revenue	$12,372	
Annual Maintenance		$500
First Year Savings	$15,336	
Simple Payback Analysis	Approximately 8.6 Years	

If the Client is interested in moving forward, a structural analysis of the roofs must be performed to confirm they will support the addition of PV modules.

5.3. Solar Thermal Collectors

Solar thermal collectors are feasible for this location based on the shading and amount of roof area available with unobstructed southern exposure. Installation of a solar thermal hot water heat system would reduce the space available for photovoltaic modules and would be redundant to the current domestic hot water system.

5.4. Combined Heat and Power

Combined Heat Power is not applicable to this project because of the lack of available resources and the demand for heat and hot water is being met by the high efficiency boilers currently in place

5.5. Geothermal

Geothermal is not applicable to this project. A geothermal system would require the existing heating distribution system to be removed and replaced with a heat pump system. Large underground vertical or horizontal loop systems would need to be installed beneath the existing concrete pad and asphalt. These modifications to the existing heat distribution system would be extremely disruptive to the use of the building and the surrounding neighborhood in addition to the high cost of such an installation and retrofit.

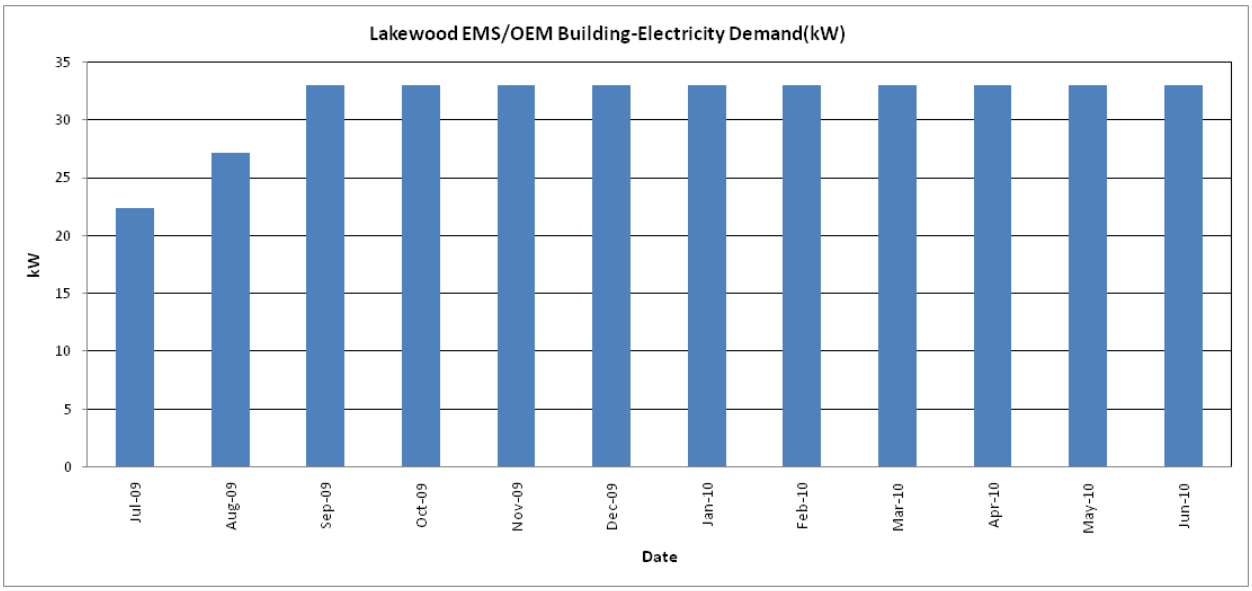
5.6. Wind

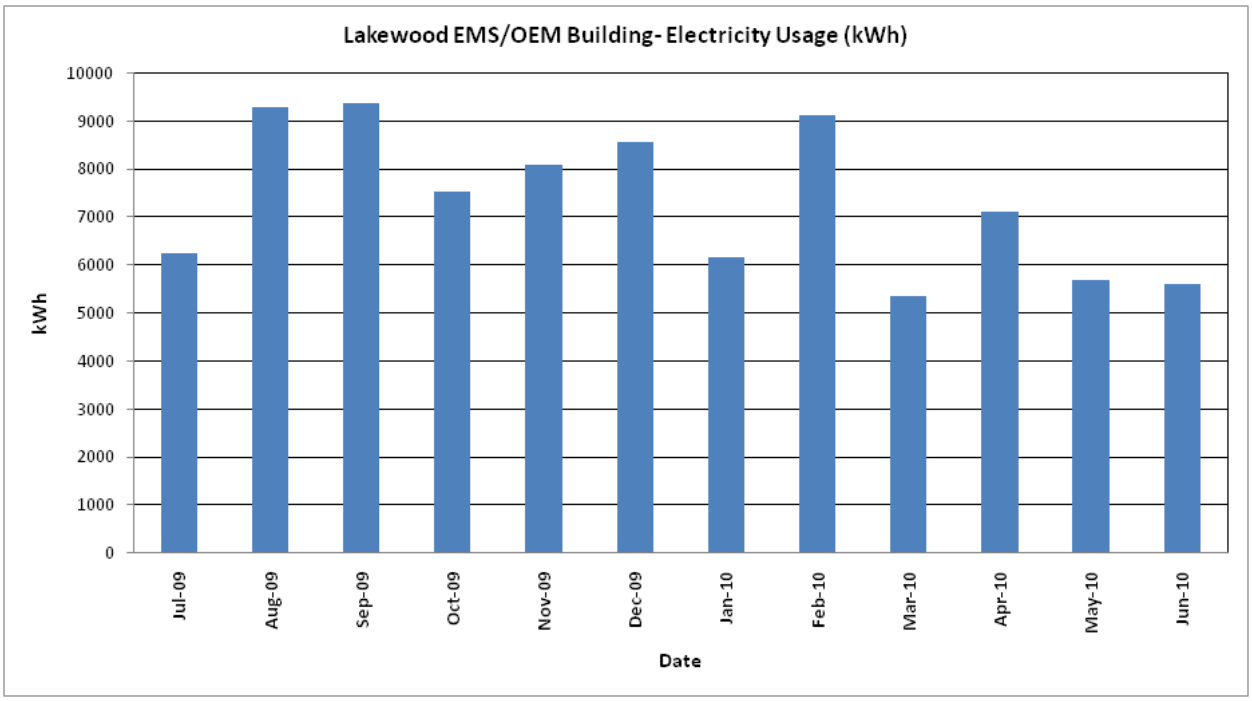
Wind power production is not appropriate for this location because required land is not available for the wind turbine. Also, the available wind energy resource is very low.

6. ENERGY PURCHASING AND PROCUREMENT STRATEGIES

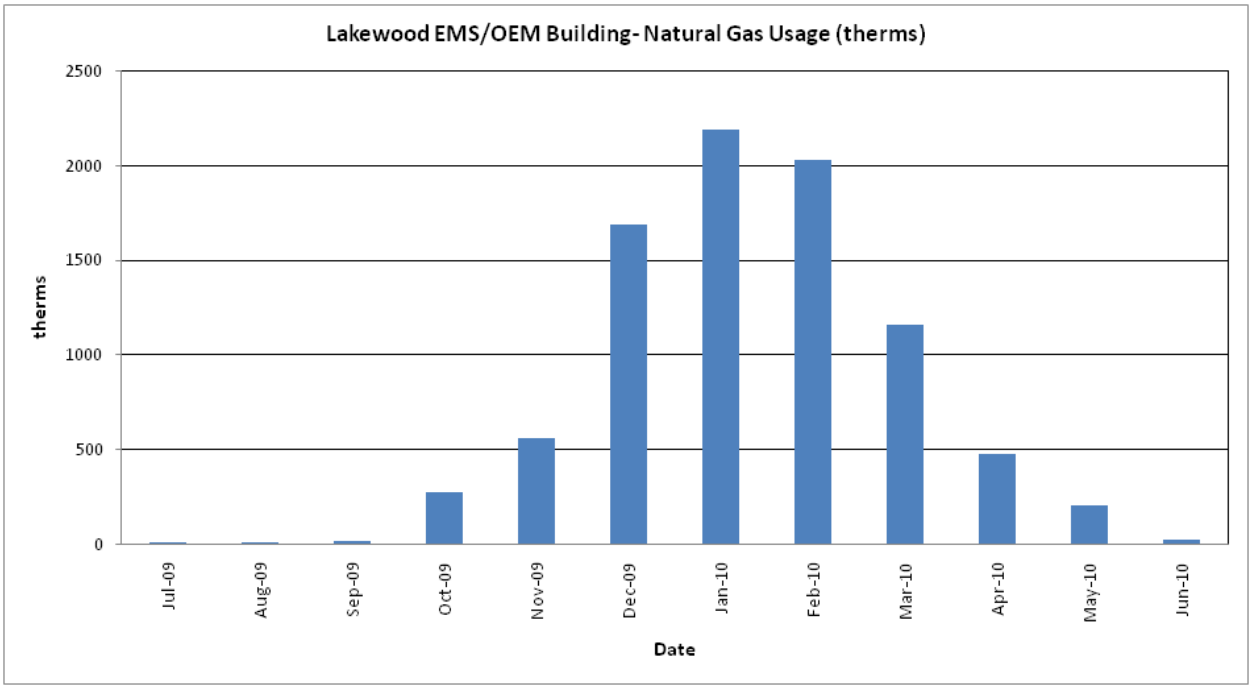
6.1. Energy Purchasing

The average electrical peak demand for the previous year was 31.6 kW and the maximum peak demand was 33 kW. The electric and gas load profiles for this project are presented in the following charts. The first chart shows electric demand (in kW) for the previous 12 months and the other two charts show electric and gas usage (in kWh), respectively.





The electrical demand peaks (except for a few fluctuations) reflect the electrical consumption peaks.



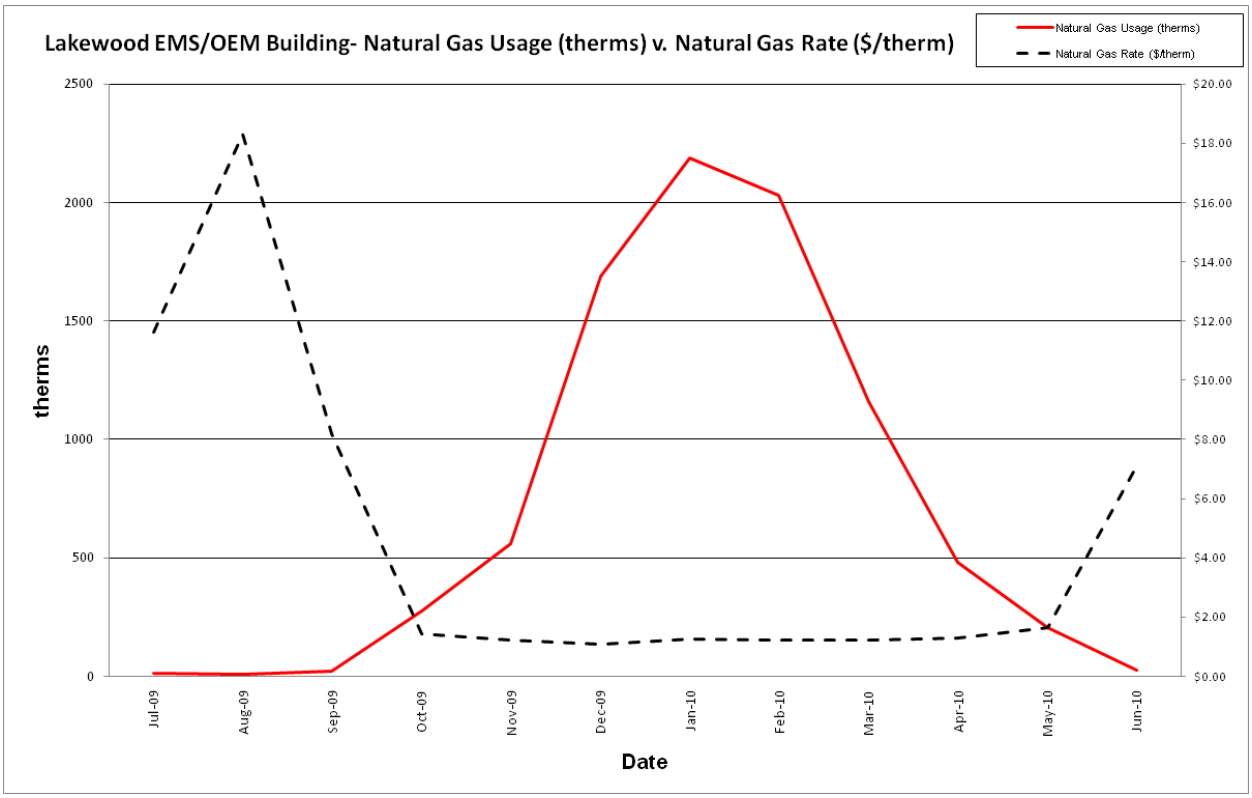
The natural gas usage shows that the most natural gas is consumed in the winter months, meaning the majority of natural gas use in this building is for heating.

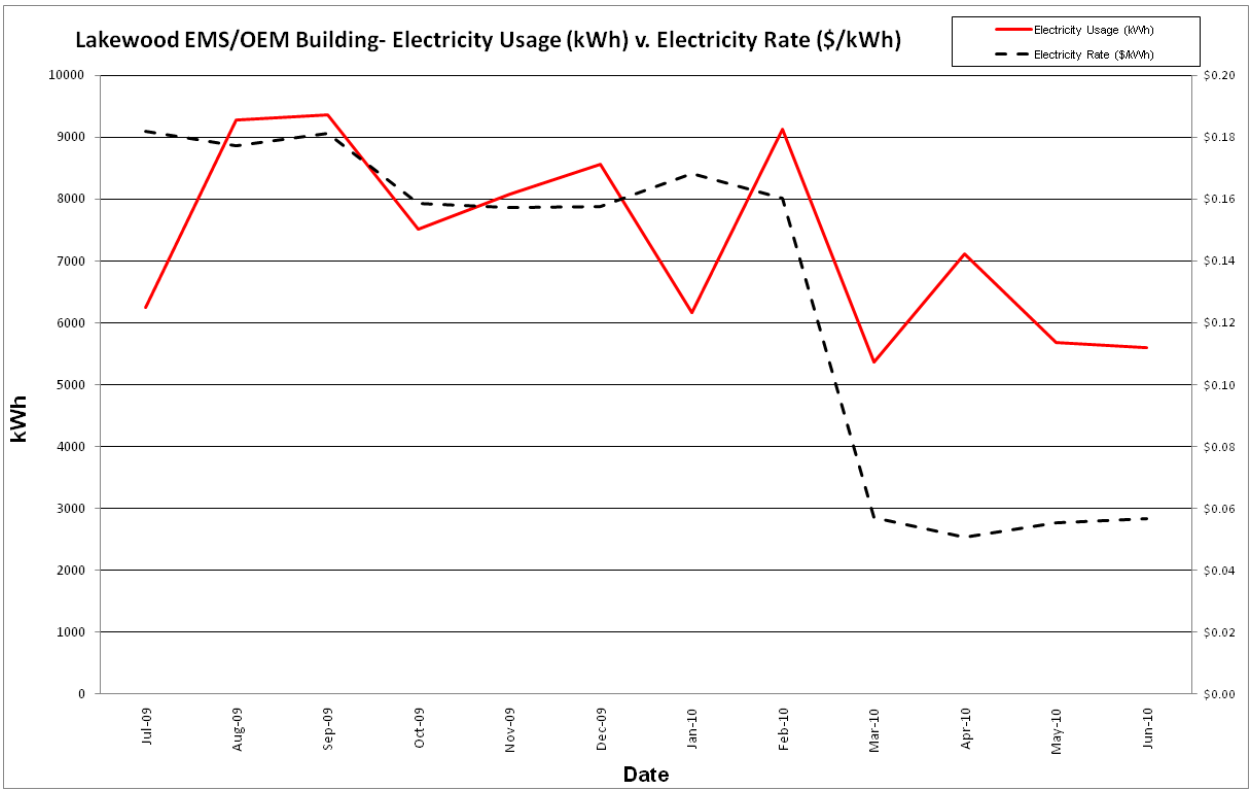
6.2. Tariff analysis

Currently, natural gas is provided via one gas meter with New Jersey Natural Gas serving as transmission and supply provider. The general service rate for natural gas charges a market-rate price based on use and the Lakewood EMS/OEM Building billing data does not breakdown demand costs for all periods. Typically, the natural gas prices increase during the cooling months when natural gas is less of a demand.

The Lakewood EMS/OEM Building is direct-metered (via one meter) and currently purchases electricity distribution service from Jersey Central Power& Light at a general service rate. The general service rate for electric charges are market-rate based on use and the building billing does show a breakdown of demand costs. Demand prices are reflected in the utility bills and can be verified by observing the price fluctuations throughout the year. Typically, the electricity prices increase during the cooling months when electricity is used by the HVAC condensing units and air handlers.

The following charts compare the utility consumption and utility rates for the natural gas and electricity over the previous 12 month period.


Lakewood EMS/OEM Building- Natural Gas Usage (therms) v. Natural Gas Rate ($/therm)
Natural Gas Usage (therms)
Natural Gas Rate ($/therm)
therms
2500
2000
1500
1000
500
0
$20.00
$18.00
$16.00
$14.00
$12.00
$10.00
$8.00
$6.00
$4.00
$2.00
$0.00
Jul-09
Aug-09
Sep-09
Oct-09
Nov-09
Dec-09
Jan-10
Feb-10
Mar-10
Apr-10
May-10
Jun-10
Date


Lakewood EMS/OEM Building- Electricity Usage (kWh) v. Electricity Rate ($/kWh)
Electricity Usage (kWh)
Electricity Rate ($/kWh)
kWh
10000
9000
8000
7000
6000
5000
4000
3000
2000
1000
0
$0.20
$0.18
$0.16
$0.14
$0.12
$0.10
$0.08
$0.06
$0.04
$0.02
$0.00
Jul-09
Aug-09
Sep-09
Oct-09
Nov-09
Dec-09
Jan-10
Feb-10
Mar-10
Apr-10
May-10
Jun-10
Date

6.3. Energy Procurement strategies

Billing analysis shows large price fluctuations of over the course of the year for the Lakewood EMS/OEM Building natural gas account. Selecting third party suppliers could reduce the cost associated with energy procurement. Customers that have a large variation in monthly billing rates can often reduce the costs associated with energy procurement by selecting a third party energy supplier. Contact the NJ Energy Choice Program for further information on Energy Services Companies (ESCOs) that can act as third party energy suppliers. Appendix B contains a complete list of third party energy suppliers.

Lakewood already purchases natural gas for lower rate than the average rate. Electricity is purchased through the third party supplier, Glacial Energy of New Jersey, but since the beginning of this supply the cost per kWh has been higher than the price per kWh from Jersey Central Power & Light. It is our understanding that Lakewood has already sought a new third party supplier, Liberty Power, and expects a lower price per kWh.

7. METHOD OF ANALYSIS

7.1. Assumptions and methods

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

7.2. Disclaimer

This engineering audit was prepared using the most current and accurate fuel consumption data available for the site. The estimates that it projects are intended to help guide the owner toward best energy choices. The costs and savings are subject to fluctuations in weather, variations in quality of maintenance, changes in prices of fuel, materials, and labor, and other factors. Although we cannot guarantee savings or costs, we suggest that you use this report for economic analysis of the building and as a means to estimate future cash flow.

THE RECOMMENDATIONS PRESENTED IN THIS REPORT ARE BASED ON THE RESULTS OF ANALYSIS, INSPECTION, AND PERFORMANCE TESTING OF A SAMPLE OF COMPONENTS OF THE BUILDING SITE. ALTHOUGH CODE-RELATED ISSUES MAY BE NOTED, SWA STAFF HAVE NOT COMPLETED A COMPREHENSIVE EVALUATION FOR CODE-COMPLIANCE OR HEALTH AND SAFETY ISSUES. THE OWNER(S) AND MANAGER(S) OF THE BUILDING(S) CONTAINED IN THIS REPORT ARE REMINDED THAT ANY IMPROVEMENTS SUGGESTED IN THIS SCOPE OF WORK MUST BE PERFORMED IN ACCORDANCE WITH ALL LOCAL, STATE, AND FEDERAL LAWS AND REGULATIONS THAT APPLY TO SAID WORK. PARTICULAR ATTENTION MUST BE PAID TO ANY WORK WHICH INVOLVES HEATING AND AIR MOVEMENT SYSTEMS, AND ANY WORK WHICH WILL INVOLVE THE DISTURBANCE OF PRODUCTS CONTAINING MOLD, ASBESTOS, OR LEAD.

LIGHTING ANALYSIS

Lakewood Township
Lakewood EMS/OEM Bldg
1555 Pine Street

BIRDSALL SERVICES GROUP
ENGINEERS & CONSULTANTS

Upgrade Code	Description	Existing Fixture	Existing Watts	Proposed Fixture	Proposed Watts	Lighting: Total # of Upgrades	Lighting: Cost per Upgrade ($)	Lighting: SmartStart Rebate per Upgrade
1	Ceiling Mounted 8' fixture with (2) T12 Lamps and a Magnetic Ballast / retrofit the fixture with T8 Lamps and an Electronic Ballast	2L8' EE/STD	138	2L8' T8/ELEC	118	35	$70.00	$15.00
2	Ceiling Mounted 4' fixture with (2) T12 Lamps and a Magnetic ballast / retrofit the fixture with (2) 28W T8 Lamps and an Electronic Ballast	2L4' EE/STD	80	2L4' T8/ELEC LO	55	1	$60.00	$15.00
3	Ceiling Mounted 4' fixture with (2) 4' T8 Lamps / replace the (2) 32w lamps with 28w energy saving lamps	2L4' T8/ELEC	61	2L4' T8/ELEC LO	55	1	$25.00	$0.00
4	Recessed 4' fixture with (2) T12 Lamps and a Magnetic ballast / retrofit the fixture with (2) 28W T8 Lamps and an Electronic Ballast	2L4' EE/STD	80	2L4' T8/ELEC LO	55	13	$60.00	$15.00
5	Recessed 4' fixture with (4) T12 Lamps and a Magnetic ballast / retrofit the fixture with (4) 28W T8 Lamps and an Electronic Ballast	4L4' EE/STD	160	4L4' T8/ELEC LO	99	28	$80.00	$15.00
6	Wall Mounted 4' fixture with (2) 4' T8 Lamps / replace the (2) 32w lamps with 28w energy saving lamps	2L4' T8/ELEC	61	2L4' T8/ELEC LO	55	2	$25.00	$0.00
7	Wall Mounted 4' fixture with (2) T12 Lamps and a Magnetic ballast / retrofit the fixture with (2) 28W T8 Lamps and an Electronic Ballast	2L4' EE/STD	80	2L4' T8/ELEC LO	55	8	$60.00	$15.00
8	Ceiling Mounted 4' fixture with (4) T12 Lamps and a Magnetic ballast / retrofit the fixture with (4) 28W T8 Lamps and an Electronic Ballast	4L4' EE/STD	160	4L4' T8/ELEC LO	99	16	$80.00	$15.00
9	Wall Mounted 4' fixture with (2) 4' T8 Lamps / replace the (2) 32w lamps with 28w energy saving lamps	2L4' T8/ELEC	61	2L4' T8/ELEC LO	55	1	$25.00	$0.00
10	100W Mercury Vapor Wall Pack/ Replace with 100W Metal Halide Wall Pack	100W MV/BALLAST	120	100W MH/BALLAST	120	6	$200.00	$0.00
11	60W Incandescent Lamp / Replace with 15W Compact Fluorescent	60W Incandescent	60	13W CF/SI	15	8	$6.00	$0.00
12						0	$0.00	$0.00

Summary

	Lighting (Only)	Sensors (Only)	Complete Lighting Upgrade
Cost	$8,638.00	$780.00	$9,418.00
Rebate	$1,515.00	$105.00	$1,620.00
Net Cost	$7,123.00	$675.00	**$7,798.00**
Savings (kWh)	10,408	1,830	**11,541**
Savings ($)	$1,457.13	$256.26	**$1,615.69**
Payback	4.9	2.6	**4.8**

Variables:

$0.14	Avg. Electric Rate ($/kWh)
	Avg. Demand Rate ($/kW)
2080	Operating Hours/Year
8	Operating Hours/Work Day

Assumptions:

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

Notes:

Seq. #	Upgrade Code	Room/Area	Hrs/ Work Day	Hrs/ Year	Existing Fixture	Existing Qty.	Existing Watts	Foot Candles	Proposed Fixture	Proposed Qty.	Proposed Watts	kW Reduction	Lighting: Energy Savings, kWh	Lighting: Cost ($)	Lighting: Savings ($)	Lighting: Payback (yrs)	Controls: Type	Controls: Qty.	Occupancy Sensors (ONLY): Energy Savings, kWh	Occupancy Sensors (ONLY): Cost ($)	Occupancy Sensors (ONLY): Savings ($)	Occupancy Sensors (ONLY): Payback (yrs)	SmartStart Rebate: Lighting	SmartStart Rebate: Sensors	Lighting & Occupancy Sensors: Energy Savings, kWh	Lighting & Occupancy Sensors: Post-Rebate Cost ($)	Lighting & Occupancy Sensors: Savings ($)	Lighting & Occupancy Sensors: Payback (yrs)
				Totals:			15074				10756	4.318	10408	$8,638.00	$1,457.13	5.9			1830	$780.00	$256.26	3.0	$1,515.00	$105.00	11541	$7,798.00	$1,615.69	4.8
1	1	First Aid Garage	10	2600	2L8' EE/STD	14	1932		2L8' T8/ELEC	14	1652	0.28	728	$980.00	$101.92	9.6			0	$0.00	$0.00		$210.00	$0.00	728	$770.00	$101.92	7.6
2	1	Utility Room	1	260	2L8' EE/STD	1	138		2L8' T8/ELEC	1	118	0.02	5	$70.00	$0.73	96.2			0	$0.00	$0.00		$15.00	$0.00	5	$55.00	$0.73	75.5
3	2	Oxygen Room	1	260	2L4' EE/STD	1	80		2L4' T8/ELEC LO	1	55	0.025	7	$60.00	$0.91	65.9			0	$0.00	$0.00		$15.00	$0.00	7	$45.00	$0.91	49.5
4	3	Utility Room	1	260	2L4' T8/ELEC	1	61		2L4' T8/ELEC LO	1	55	0.006	2	$25.00	$0.22	114.5			0	$0.00	$0.00		$0.00	$0.00	2	$25.00	$0.22	114.5
5	4	Hallway	24	6240	2L4' EE/STD	3	240		2L4' T8/ELEC LO	3	165	0.075	468	$180.00	$65.52	2.7			0	$0.00	$0.00		$45.00	$0.00	468	$135.00	$65.52	2.1
6	4	Locker Room	4	1040	2L4' EE/STD	1	80		2L4' T8/ELEC LO	1	55	0.025	26	$60.00	$3.64	16.5			0	$0.00	$0.00		$15.00	$0.00	26	$45.00	$3.64	12.4
7	5		4	1040	4L4' EE/STD	4	640		4L4' T8/ELEC LO	4	396	0.244	254	$320.00	$35.53	9.0			0	$0.00	$0.00		$60.00	$0.00	254	$260.00	$35.53	7.3
8	6	BR	3	780	2L4' T8/ELEC	1	61		2L4' T8/ELEC LO	1	55	0.006	5	$25.00	$0.66	38.2			0	$0.00	$0.00		$0.00	$0.00	5	$25.00	$0.66	38.2
9	6	BR	3	780	2L4' T8/ELEC	1	61		2L4' T8/ELEC LO	1	55	0.006	5	$25.00	$0.66	38.2			0	$0.00	$0.00		$0.00	$0.00	5	$25.00	$0.66	38.2
10	5	Lounge	8	2080	4L4' EE/STD	6	960		4L4' T8/ELEC LO	6	594	0.366	761	$480.00	$106.58	4.5	OSR	1	499	$260.00	$69.89	3.7	$90.00	$35.00	1070	$615.00	$149.82	4.1
11	5	Kitchen	4	1040	4L4' EE/STD	1	160		4L4' T8/ELEC LO	1	99	0.061	63	$80.00	$8.88	9.0			0	$0.00	$0.00		$15.00	$0.00	63	$65.00	$8.88	7.3
12	5	EMS Supplies	1	260	4L4' EE/STD	2	320		4L4' T8/ELEC LO	2	198	0.122	32	$160.00	$4.44	36.0			0	$0.00	$0.00		$30.00	$0.00	32	$130.00	$4.44	29.3
13	5	Office	4	1040	4L4' EE/STD	2	320		4L4' T8/ELEC LO	2	198	0.122	127	$160.00	$17.76	9.0			0	$0.00	$0.00		$30.00	$0.00	127	$130.00	$17.76	7.3
14	7	Lobby	24	6240	2L4' EE/STD	2	160		2L4' T8/ELEC LO	2	110	0.05	312	$120.00	$43.68	2.7			0	$0.00	$0.00		$30.00	$0.00	312	$90.00	$43.68	2.1
15	5	Office	4	1040	4L4' EE/STD	2	320		4L4' T8/ELEC LO	2	198	0.122	127	$160.00	$17.76	9.0			0	$0.00	$0.00		$30.00	$0.00	127	$130.00	$17.76	7.3
16	7	Lobby	24	6240	2L4' EE/STD	6	480		2L4' T8/ELEC LO	6	330	0.15	936	$360.00	$131.04	2.7			0	$0.00	$0.00		$90.00	$0.00	936	$270.00	$131.04	2.1
17	8	Multipurpose Room	8	2080	4L4' EE/STD	16	2560		4L4' T8/ELEC LO	16	1584	0.976	2030	$1,280.00	$284.21	4.5	OSR	2	1331	$520.00	$186.37	2.8	$240.00	$70.00	2854	$1,490.00	$399.53	3.7
18	5	General Supplies	1	260	4L4' EE/STD	2	320		4L4' T8/ELEC LO	2	198	0.122	32	$160.00	$4.44	36.0			0	$0.00	$0.00		$30.00	$0.00	32	$130.00	$4.44	29.3
19	4	BR	3	780	2L4' EE/STD	2	160		2L4' T8/ELEC LO	2	110	0.05	39	$120.00	$5.46	22.0			0	$0.00	$0.00		$30.00	$0.00	39	$90.00	$5.46	16.5
20	4	BR	3	780	2L4' EE/STD	2	160		2L4' T8/ELEC LO	2	110	0.05	39	$120.00	$5.46	22.0			0	$0.00	$0.00		$30.00	$0.00	39	$90.00	$5.46	16.5
21	4	Hallway	24	6240	2L4' EE/STD	2	160		2L4' T8/ELEC LO	2	110	0.05	312	$120.00	$43.68	2.7			0	$0.00	$0.00		$30.00	$0.00	312	$90.00	$43.68	2.1

					Existing				Proposed				Lighting					Controls		Occupancy Sensors (ONLY)				SmartStart Rebate		Lighting & Occupancy Sensors			
Seq. #	Upgrade Code	Room/Area	Hrs/ Work Day	Hrs/ Year	Fixture	Qty.	Watts	Foot Candles	Fixture	Qty.	Watts	kW Reduction	Energy Savings, kWh	Cost ($)	Savings ($)	Payback (yrs)	Type	Qty.	Energy Savings, kWh	Cost ($)	Savings ($)	Payback (yrs)	Lighting	Sensors	Energy Savings, kWh	Post-Rebate Cost ($)	Savings ($)	Payback (yrs)
22	9	BR	3	780	2L4' T8/ELEC	1	61		2L4' T8/ELEC LO	1	55	0.006	5	$25.00	$0.66	38.2			0	$0.00	$0.00		$0.00	$0.00	5	$25.00	$0.66	38.2
23	4	Hallway	24	6240	2L4' EE/STD	3	240		2L4' T8/ELEC LO	3	165	0.075	468	$180.00	$65.52	2.7			0	$0.00	$0.00		$45.00	$0.00	468	$135.00	$65.52	2.1
24	5	Kitchen	4	1040	4L4' EE/STD	1	160		4L4' T8/ELEC LO	1	99	0.061	63	$80.00	$8.88	9.0			0	$0.00	$0.00		$15.00	$0.00	63	$65.00	$8.88	7.3
25	5	Storage	1	260	4L4' EE/STD	1	160		4L4' T8/ELEC LO	1	99	0.061	16	$80.00	$2.22	36.0			0	$0.00	$0.00		$15.00	$0.00	16	$65.00	$2.22	29.3
26	5	Office	4	1040	4L4' EE/STD	2	320		4L4' T8/ELEC LO	2	198	0.122	127	$160.00	$17.76	9.0			0	$0.00	$0.00		$30.00	$0.00	127	$130.00	$17.76	7.3
27	5	Office	4	1040	4L4' EE/STD	2	320		4L4' T8/ELEC LO	2	198	0.122	127	$160.00	$17.76	9.0			0	$0.00	$0.00		$30.00	$0.00	127	$130.00	$17.76	7.3
28	5	Office	4	1040	4L4' EE/STD	2	320		4L4' T8/ELEC LO	2	198	0.122	127	$160.00	$17.76	9.0			0	$0.00	$0.00		$30.00	$0.00	127	$130.00	$17.76	7.3
29	5	Storage	1	260	4L4' EE/STD	1	160		4L4' T8/ELEC LO	1	99	0.061	16	$80.00	$2.22	36.0			0	$0.00	$0.00		$15.00	$0.00	16	$65.00	$2.22	29.3
30	1	OEM Garage	24	6240	2L8' EE/STD	20	2760		2L8' T8/ELEC	20	2360	0.4	2496	$1,400.00	$349.44	4.0			0	$0.00	$0.00		$300.00	$0.00	2496	$1,100.00	$349.44	3.1
31	10	Exterior	7	1820	100W MV/BALLAS	6	720		100W MH/BALLAS	6	720	0	0	$1,200.00	$0.00				0	$0.00	$0.00		$0.00	$0.00	0	$1,200.00	$0.00	
32	11		7	1820	60W Incandescen	8	480		13W CF/SI	8	120	0.36	655	$48.00	$91.73	0.5			0	$0.00	$0.00		$0.00	$0.00	655	$48.00	$91.73	0.5

Appendix B: Third Party Energy Suppliers (ESCOs)

JCP&L SERVICE TERRITORY
Last Updated: 08/26/10

***CUSTOMER CLASS** - R – RESIDENTIAL C – COMMERCIAL I –INDUSTRIAL
****GREEN POWER MARKETER**

Supplier	Telephone & Web Site	*Customer Class
Champion Energy Services, LLC 72 Avenue L Newark, NJ 07105	(877) 653-5090 www.championenergyservices.com	**C/I** **ACTIVE**
Community Energy, Inc.*** 51 Sandbrook Headquarters Road Stockton, NJ 08559	(877) NJWIND-1 (877) 659–4631 www.CommunityEnergyInc.com	**R/C/I** **ACTIVE**
Constellation NewEnergy, Inc. 900A Lake Street, Suite 2 Ramsey, NJ 07446	(888) 635-0827 www.newenergy.com	**C/I** **ACTIVE**
Constellation Energy 900A Lake Street, Suite 2 Ramsey, NJ 07446	(877) 997-9995 www.home.newenergy.com	**R** **ACTIVE**
Direct Energy Business, LLC 120 Wood Avenue Suite 611 Iselin, NJ 08830	(888) 925-9115 www.directenergybusiness.com	**C/I** **ACTIVE**
Direct Energy Services, LLC 120 Wood Avenue Suite 611 Iselin, NJ 08830	(866) 547-2722 www.directenergy.com	**C/I** **ACTIVE**
Dominion Retail, Inc. **d/b/a Dominion Energy Solutions** 395 Route 70, Suite 125 Lakewood, NJ 08701	(866) 645-9802 www.dom.com/products	**R/C/I** **ACTIVE**
FirstEnergy Solutions Corp. 300 Madison Avenue Morristown, NJ 07962	(800) 977-0500 www.fes.com	**C/I** **ACTIVE**

Gateway Energy Services Corp. 44 Whispering Pines Lane Lakewood, NJ 08701	(800) 805-8586 www.gesc.com	**R/C/I** **ACTIVE**
GDF SUEZ Energy Resources NA, Inc. 333 Thornall Street Sixth Floor Edison, NJ 08837	(866) 999-8374 www.gdfsuezenergyresources.com	**C/I** **ACTIVE**
Gexa Energy New Jersey LLC 651 Jernee Mill Road Sayreville, NJ 08872	(866) 961-9399 www.gexaenergy.com	**C/I** **ACTIVE**
Glacial Energy of New Jersey, Inc. 75 Route 15 Building E Lafayette, NJ 07848	(888) 452-2425 www.glacialenergy.com	**C/I** **ACTIVE**
Green Mountain Energy Company*** 3000 Atrium Way Mount Laurel, NJ 08054	(800) 810-7300 www.greenmountain.com	**R/C/I** **ACTIVE**
Hess Corporation 1 Hess Plaza Woodbridge, NJ 07095	(800) 437-7872 www.hess.com	**C/I** **ACTIVE**
Integrys Energy Services, Inc. 99 Wood Ave, South, Suite 802 Iselin, NJ 08830	(877) 763-9977 www.integrysenergy.com	**C/I** **ACTIVE**
Liberty Power Delaware, LLC 3000 Atrium Way Suite 273 Mt. Laurel, NJ 08054	(866) 769-3799 www.libertypowercorp.com	**C/I** **ACTIVE**
Liberty Power Holdings, LLC 3000 Atrium Way Suite 273 Mt. Laurel, NJ 08054	(866) 769-3799 www.libertypowercorp.com	**C/I** **ACTIVE**
Linde Energy Services 575 Mountain Avenue Murray Hill, NJ 07974	(800) 247-2644	**C/I**

	www.linde.com	**ACTIVE**
Palmco Power NJ, LLC One Greentree Centre 10000 Lincoln Drive East, Suite 201 Marlton, NJ 08053	(877) 726-5862 www.PalmcoEnergy.com	**C/I** **ACTIVE**
Pepco Energy Services, Inc. 112 Main St. Lebanon, NJ 08833	(800) ENERGY-9 (363-7499) www.pepco-services.com	**C/I** **ACTIVE**
PPL EnergyPlus, LLC 811 Church Road Cherry Hill, NJ 08002	(800) 281-2000 www.pplenergyplus.com	**C/I** **ACTIVE**
Sempra Energy Solutions The Mac-Cali Building 581 Main Street, 8th Floor Woodbridge, NJ 07095	(877) 273-6772 www.semprasolutions.com	**C/I** **ACTIVE**
South Jersey Energy Company 1 South Jersey Plaza Route 54 Folsom, NJ 08037	(800) 800-266-6020 www.southjerseyenergy.com	**R/C/I** **ACTIVE**
Sterling Planet, Inc.*** 58 Otto Avenue Beverly, NJ 08010	(877) 457-2306 www.sterlingplanet.com	**R/C/I** **ACTIVE**
UGI Energy Services, Inc. 224 Strawbridge Drive Suite 107 Moorestown, NJ 08057	(856) 273-9995 www.ugienergyservices.com	**C/I** **ACTIVE**
Verde Energy USA, Inc. 50 East Palisades Avenue Englewood, NJ 07631	(800) 388-3862 www.lowcostpower.com	**R/C/I** **ACTIVE**
Viridian Energy 2001 Route 46, Waterview Plaza Suite 310	(866) 663-2508	**R/C/I**
Parsippany, NJ 07054	www.viridian.com	**ACTIVE**

NJ NATURAL GAS CO. SERVICE TERRITORY
Last Updated: 08/26/10

***CUSTOMER CLASS** - R – RESIDENTIAL C – COMMERCIAL I – INDUSTRIAL

Supplier	Telephone & Web Site	*Customer Class
Colonial Energy, Inc. 3975 Fair Ridge Dr. Suite T 10 N Fairfax, Va. 22033	845-429-3229 www.colonialgroupinc.com	**C/I** **ACTIVE**
Cooperative Industries 412-420 Washington Avenue Belleville, NJ 07109	800-6-BUYGAS (6-289427) www.cooperativenet.com	**C/I** **ACTIVE**
Direct Energy Services, LLP 120 Wood Avenue, Suite 611 Iselin, NJ 08830	866-547-2722 www.directenergy.com	**R/C/I** **INACTIVE**
Dominion Retail, Inc. **d/b/a Dominion Energy Solutions** 395 Route 70, Suite 125 Lakewood, NJ 08701	866-275-4240 www.dom.com/products	**R/C/I** **ACTIVE**
Gateway Energy Services Corp. 44 Whispering Pines Lane Lakewood, NJ 08701	800-805-8586 www.gesc.com	**R/C/I** **ACTIVE**
UGI Energy Services, Inc. **d/b/a/ GASMARK** 224 Strawbridge Drive, Suite 107 Moorestown, NJ 08057	856-273-9995 www.ugienergyservices.com	**C/I** **ACTIVE**
Hess Energy, Inc. One Hess Plaza Woodbridge, NJ 07095	800-437-7872 www.hess.com	**C/I** **ACTIVE**
Intelligent Energy 2050 Center Avenue, Suite 500 Fort Lee, NJ 07024	800-724-1880 www.intelligentenergy.org	**R/C/I** **ACTIVE**
Metromedia Energy, Inc. 6 Industrial Way Eatontown, NJ 07724	877-750-7046 www.metromediaenergy.com	**C/I** **ACTIVE**
MxEnergy, Inc. 510 Thornall Street, Suite 270Edison, NJ 08837	800-375-1277	**R/C/I**

	www.mxenergy.com	**ACTIVE**
NATGASCO (Mitchell Supreme) 532 Freeman Street Orange, NJ 07050	800-840-4GAS www.natgasco.com	**C** **ACTIVE**
NJ Gas & Electric 1 Bridge Plaza, Fl. 2 Fort Lee, NJ 07024	866-568-0290 www.NJGandE.com	**R/C** **ACTIVE**
Palmco Energy NJ, LLC One Greentree Centre 10000 Lincoln Drive East Suite 201 Marlton, NJ 08053	877-726-5862 www.PalmcoEnergy.com	**C/I** **ACTIVE**
Pepco Energy Services, Inc. 112 Main Street Lebanon, NJ 08833	800-363-7499 www.pepco-services.com	**C/I** **ACTIVE**
PPL EnergyPlus, LLC 811 Church Road - Office 105 Cherry Hill, NJ 08002	800-281-2000 www.pplenergyplus.com	**C/I** **ACTIVE**
South Jersey Energy Company 1 South Jersey Plaza, Route 54 Folsom, NJ 08037	800-266-6020 www.southjerseyenergy.com	**R/C/I** **ACTIVE**
Sprague Energy Corp. 12 Ridge Road Chatham Township, NJ 07928	800-225-1560 www.spragueenergy.com	**C/I** **ACTIVE**
Woodruff Energy 73 Water Street Bridgeton, NJ 08302	800-557-1121 www.woodruffenergy.com	**R/C/I** **ACTIVE**