



**LOCAL GOVERNMENT
ENERGY AUDIT PROGRAM:
ADMINISTRATION,
ATHLETIC CONCESSION STAND,
VEHICLE MAINTENANCE,
GROUND MAINTENANCE, &
MAINTENANCE BUILDINGS
ENERGY AUDIT REPORT**

PREPARED FOR: **LOWER CAPE MAY REGIONAL
SCHOOL DISTRICT
687 ROUTE 9 NORTH
CAPE MAY, NJ 08204
ATTN: MR. FRANK ONORATO
BUSINESS ADMINISTRATOR**

PREPARED BY: **CONCORD ENGINEERING GROUP**
 **520 S. BURNT MILL ROAD
VOORHEES, NJ 08043
TELEPHONE: (856) 427-0200
FACSIMILE: (856) 427-6529
WWW.CEG-INC.NET**

CEG CONTACT: **KEVIN C. BLANKENBUEHLER
PROJECT MANAGER
EMAIL: KBLANK@CEG-INC.NET**

REPORT ISSUANCE: **FINAL, MARCH 14, 2011**

PROJECT No: **9C10089**

TABLE OF CONTENTS

I. EXECUTIVE SUMMARY 3

II. INTRODUCTION 8

III. METHOD OF ANALYSIS..... 10

IV. HISTORIC ENERGY CONSUMPTION/COST..... 12

 A. ENERGY USAGE / TARIFFS 12

 B. ENERGY USE INDEX (EUI)..... 22

 C. EPA ENERGY BENCHMARKING SYSTEM..... 25

V. FACILITY DESCRIPTION 27

VI. MAJOR EQUIPMENT LIST 31

VII. ENERGY CONSERVATION MEASURES..... 32

VIII. RENEWABLE/DISTRIBUTED ENERGY MEASURES 60

IX. ENERGY PURCHASING AND PROCUREMENT STRATEGY 63

X. INSTALLATION FUNDING OPTIONS..... 63

XI. ADDITIONAL RECOMMENDATIONS 71

Appendix A – ECM Cost & Savings Breakdown

Appendix B – New Jersey Smart Start® Program Incentives

Appendix C – Portfolio Manager “Statement of Energy Performance”

Appendix D – Major Equipment List

Appendix E – Investment Grade Lighting Audit

Appendix F – Renewable / Distributed Energy Measures Calculations

REPORT DISCLAIMER

The information contained within this report, including any attachment(s), is intended solely for use by the named addressee(s). If you are not the intended recipient, or a person designated as responsible for delivering such messages to the intended recipient, you are not authorized to disclose, copy, distribute or retain this report, in whole or in part, without written authorization from Concord Engineering Group, Inc., 520 S. Burnt Mill Road, Voorhees, NJ 08043.

This report may contain proprietary, confidential or privileged information. If you have received this report in error, please notify the sender immediately. Thank you for your anticipated cooperation.

I. EXECUTIVE SUMMARY

This report presents the findings of the energy audit conducted for:

Lower Cape May Regional School District
 Regional High School
 687 Route 9 North
 Erma, NJ 08204

District Contact Person: Frank Onorato
 Facility Contact Person: Thomas Frisoli Jr.

This report covers the following five (5) facilities on the district's campus.

Ref. #	Facility Name	Area (Sqft)	Address
37	Administration Building	5,500	687 Route 9 N., Erma, NJ
38	Athletic Field Concession Stand	3,500	Route 9 & Bennett Crossing, Erma, N.
39	Vehicle Maintenance Garage	6,000	Route 9 & Bennett Crossing, Erma, N.
40	Maintenance	2,400	Route 9 & Bennett Crossing, Erma, N.
41	Grounds Maintenance	3,200	Route 9 & Bennett Crossing, Erma, N.

This audit is performed in connection with the New Jersey Clean Energy - Local Government Energy Audit Program. The energy audit is conducted to promote the mission of the office of Clean Energy, which is to use innovation and technology to solve energy and environmental problems in a way that improves the State's economy. This can be achieved through the wiser and more efficient use of energy.

The annual energy costs at these facilities are as follows:

Ref. #	Facility Name	Electricity	Natural Gas	Total
37	Administration Building	\$12,727	\$2,671	\$15,398
38	Athletic Field Concession Stand	\$5,512	-	\$5,512
39	Vehicle Maintenance Garage	From HS	\$2,462	\$2,462
40	Maintenance	From HS	-	\$0
41	Grounds Maintenance	From HS	\$926	\$926

The potential annual energy cost savings for each energy conservation measure (ECM) and renewable energy measure (REM) are shown below in Table 1. Be aware that the ECM's and REM's are not additive because of the interrelation of some of the measures. This audit is consistent with an ASHRAE level 2 audit. The cost and savings for each measure is $\pm 20\%$. The evaluations are based on engineering estimations and industry standard calculation methods. More detailed analyses would require engineering simulation models, hard equipment specifications, and contractor bid pricing.

**Table 1
Financial Summary Table**

ENERGY CONSERVATION MEASURES (ECM's)					
ECM NO.	DESCRIPTION	NET INSTALLATION COST^A	ANNUAL SAVINGS^B	SIMPLE PAYBACK (Yrs)	SIMPLE LIFETIME ROI
37 - ECM #1	Lighting Upgrade	\$6,965	\$1,240	5.6	167.0%
37 - ECM #2	Lighting Controls	\$1,385	\$567	2.4	514.1%
37 - ECM #3	Programmable Thermostat Upgrade	\$810	\$595	1.4	1001.9%
37 - ECM #4	Instant Domestic Hot Water Upgrade	\$2,800	\$313	8.9	34.1%
37 - ECM #5	Occupancy Controlled Power Strips	\$900	\$124	7.3	106.3%
38 - ECM #1	Lighting Upgrade	\$1,848	\$140	13.2	13.6%
38 - ECM #2	UH Electric to Gas Conversion	\$2,800	\$624	4.5	234.3%
38 - ECM #3	Gas Fired Hot Water Heater	\$3,300	\$205	16.1	-25.5%
39 - ECM #1	Lighting Upgrade	\$3,490	\$612	5.7	163.0%
39 - ECM #2	Lighting Controls	\$300	\$32	9.4	60.0%
39 - ECM #3	DHW Pipe Insulation	\$28	\$13	2.1	606.1%
40 - ECM #1	Lighting Upgrade	\$462	\$106	4.4	244.2%
40 - ECM #2	HW Pipe Insulation	\$105	\$26	4.1	266.9%
41 - ECM #1	Lighting Upgrade	\$322	\$90	3.6	319.3%
41 - ECM #2	High Efficiency Unit Heater	\$3,600	\$101	35.6	-57.9%
RENEWABLE ENERGY MEASURES (REM's)					
ECM NO.	DESCRIPTION	NET INSTALLATION COST	ANNUAL SAVINGS	SIMPLE PAYBACK (Yrs)	SIMPLE LIFETIME ROI
REM #1	43.7 KW Roof Solar Array	\$349,600	\$25,812	13.5	84.6%

Notes:

A. Cost takes into consideration applicable NJ Smart Start™ incentives.

B. Savings takes into consideration applicable maintenance savings.

The estimated demand and energy savings for each ECM and REM is shown below in Table 2. The descriptions in this table correspond to the ECM's and REM's listed in Table 1.

Table 2
Estimated Energy Savings Summary Table

ENERGY CONSERVATION MEASURES (ECM's)				
ECM NO.	DESCRIPTION	ANNUAL UTILITY REDUCTION		
		ELECTRIC DEMAND (KW)	ELECTRIC CONSUMPTION (KWH)	NATURAL GAS (THERMS)
37 - ECM #1	Lighting Upgrade	3.5	9,159.0	0.0
37 - ECM #2	Lighting Controls	1.4	3,591.0	0.0
37 - ECM #3	Programmable Thermostat Upgrade	0.0	1,759.0	0.23
37 - ECM #4	Instant Domestic Hot Water Upgrade	0.0	2,631.0	(92.0)
37 - ECM #5	Occupancy Controlled Power Strips	0.0	750.0	0.0
38 - ECM #1	Lighting Upgrade	0.9	856.0	0.0
38 - ECM #2	UH Electric to Gas Conversion	6.0	6,003.0	(256.0)
38 - ECM #3	Gas Fired Hot Water Heater	4.5	1,779.0	(62.0)
39 - ECM #1	Lighting Upgrade	1.7	4,820.0	0.0
39 - ECM #2	Lighting Controls	0.1	249.0	0.0
39 - ECM #3	DHW Pipe Insulation	0.0	103.7	0.0
40 - ECM #1	Lighting Upgrade	0.3	837.0	0.0
40 - ECM #2	HW Pipe Insulation	0.0	0.0	21.0
41 - ECM #1	Lighting Upgrade	0.3	710.0	0.0
41 - ECM #2	High Efficiency Unit Heater	0.0	0.0	60.0
RENEWABLE ENERGY MEASURES (REM's)				
ECM NO.	DESCRIPTION	ANNUAL UTILITY REDUCTION		
		ELECTRIC DEMAND (KW)	ELECTRIC CONSUMPTION (KWH)	NATURAL GAS (THERMS)
REM #1	43.7 KW Roof Solar Array	43.7	52463.0	0.0

Concord Engineering Group (CEG) recommends proceeding with the implementation of all ECM's that provide a calculated simple payback at or under ten (10) years. The following Energy Conservation Measures are recommended for the facility:

- 37 - ECM #1: Lighting Upgrade
- 37 - ECM #2: Lighting Controls
- 37 – ECM #3: Programmable Thermostat Upgrade
- 37 – ECM #4: Instant Domestic Hot Water Heater Upgrade
- 37 – ECM #5: Occupancy Controlled Power Strips
- 39 – ECM #1: Lighting Upgrade
- 39 – ECM #2: Lighting Controls
- 39 – ECM#3: Domestic Hot Water Pipe Insulation
- 40 – ECM #1: Lighting Upgrade
- 40 – ECM #2: Hot Water Pipe Insulation
- 41 – ECM #1: Lighting Upgrade

Although 38 - ECM #2 provided a payback of less than 10 years more investigation is required to verify gas service can be provided to the building.

In addition to the ECMs, there are maintenance and operational measures that can provide significant energy savings and provide immediate benefit. The ECMs listed above represent investments that can be made to the facility which are justified by the savings seen overtime. However, the maintenance items and small operational improvements below are typically achievable with on site staff or maintenance contractors and in turn have the potential to provide substantial operational savings compared to the costs associated. The following are recommendations which should be considered a priority in achieving an energy efficient building:

1. Chemically clean the condenser and evaporator coils periodically to optimize efficiency. Poorly maintained heat transfer surfaces can reduce efficiency 5-10%.
2. Maintain all weather stripping on entrance doors.
3. Clean all light fixtures to maximize light output.
4. Provide more frequent air filter changes to decrease overall system power usage and maintain better IAQ.

5. Educate staff on awareness of wasteful energy practices such as leaving lights on unnecessarily, leaving on of non-essential computer and/or equipment at the end of the day, leaving of outside doors/windows open as a means to control room temperature, etc.

Renewable Energy Measures (REMs) were also reviewed for implementation at the facilities CEG utilized a roof mounted solar array on the Administration, Ground Maintenance, and Maintenance Buildings to house a PV system. The recommended 43.7 kW PV system will produce approximately 52,463 kWh of electricity annually and will reduce the schools electrical consumption from the grid by 23%. The system's calculated simple payback of 13.5 years is past the standard 10 year simple payback threshold; however, with alternative funding this payback could be lessened. CEG recommends the Owner review all funding options before deciding to not implement this renewable energy measure.

In addition to the above recommendations, based on the review of the facility's energy bills and discussions with the School District, the energy audit team recommends Retro-Commissioning of these facilities to meet the following objectives:

- Bring existing HVAC equipment to its proper operational state including air and water distribution systems
- Reduce energy use and energy costs
- Improve indoor air quality
- Verify the installation and performance of identified system upgrades
- Address overall building energy use and demand and identify areas of highest energy use and demand
- Identify the location of the most comfort problems or trouble spots in the building
- Review current O&M practices

Through the implementation of a Retro-Commissioning Plan, the School District will be able to continue with their vision of reducing energy usage and operating efficient facilities.

Overall, the District Facilities appear to be operating at a high efficiency level compared to other schools in the region. With the implementation of the above recommended measures the district will be able to realize additional efficiency increases and a reduction in energy costs.

II. INTRODUCTION

The comprehensive energy audit covers the following buildings for the Lower Cape May Regional School District.

Ref. #	Facility Name	Area (Sqft)	Address
37	Administration Building	5,500	687 Route 9 N., Erma, NJ
38	Athletic Field Concession Stand	3,500	Route 9 & Bennett Crossing, Erma, N
39	Vehicle Maintenance Garage	6,000	Route 9 & Bennett Crossing, Erma, N
40	Maintenance	2,400	Route 9 & Bennett Crossing, Erma, N
41	Grounds Maintenance	3,200	Route 9 & Bennett Crossing, Erma, N

Electrical and natural gas utility information is collected and analyzed for one full year's energy use of the buildings. The utility information allows for analysis of each building's operational characteristics; calculate energy benchmarks for comparison to industry averages, estimated savings potential, and baseline usage/cost to monitor the effectiveness of implemented measures. A computer spreadsheet is used to calculate benchmarks and to graph utility information (see the utility profiles below).

The Energy Use Index (EUI) is established for the building. Energy Use Index (EUI) is expressed in British Thermal Units/square foot/year (BTU/ft²/yr), which is used to compare energy consumption to similar building types or to track consumption from year to year in the same building. The EUI is calculated by converting the annual consumption of all energy sources to BTU's and dividing by the area (gross square footage) of the building. Blueprints (where available) are utilized to verify the gross area of the facility. The EUI is a good indicator of the relative potential for energy savings. A low EUI indicates less potential for energy savings, while a high EUI indicates poor building performance therefore a high potential for energy savings.

Existing building architectural and engineering drawings (where available) are utilized for additional background information. The building envelope, lighting systems, HVAC equipment, and controls information gathered from building drawings allow for a more accurate and detailed review of the building. The information is compared to the energy usage profiles developed from utility data. Through the review of the architectural and engineering drawings a building profile can be defined that documents building age, type, usage, major energy consuming equipment or systems, etc.

The preliminary audit information is gathered in preparation for the site survey. The site survey provides critical information in deciphering where energy is spent and opportunities exist within a facility. The entire site is surveyed to inventory the following to gain an understanding of how each facility operates:

- Building envelope (roof, windows, etc.)
- Heating, ventilation, and air conditioning equipment (HVAC)
- Lighting systems and controls

- Facility-specific equipment

The building site visit is performed to survey all major building components and systems. The site visit includes detailed inspection of energy consuming components. Summary of building occupancy schedules, operating and maintenance practices, and energy management programs provided by the building manager are collected along with the system and components to determine a more accurate impact on energy consumption.

III. METHOD OF ANALYSIS

Post site visit work includes evaluation of the information gathered, researching possible conservation opportunities, organizing the audit into a comprehensive report, and making recommendations on HVAC, lighting and building envelope improvements. Data collected is processed using energy engineering calculations to anticipate energy usage for each of the proposed energy conservation measures (ECMs). The actual building's energy usage is entered directly from the utility bills provided by the owner. The anticipated energy usage is compared to the historical data to determine energy savings for the proposed ECMs.

It is pertinent to note, that the savings noted in this report are not additive. The savings for each recommendation is calculated as standalone energy conservation measures. Implementation of more than one ECM may in some cases affect the savings of each ECM. The savings may in some cases be relatively higher if an individual ECM is implemented in lieu of multiple recommended ECMs. For example implementing reduced operating schedules for inefficient lighting will result in a greater relative savings. Implementing reduced operating schedules for newly installed efficient lighting will result in a lower relative savings, because there is less energy to be saved. If multiple ECM's are recommended to be implemented, the combined savings is calculated and identified appropriately.

ECMs are determined by identifying the building's unique properties and deciphering the most beneficial energy saving measures available that meet the specific needs of the facility. The building construction type, function, operational schedule, existing conditions, and foreseen future plans are critical in the evaluation and final recommendations. Energy savings are calculated base on industry standard methods and engineering estimations. Energy consumption is calculated based on manufacturer's cataloged information when new equipment is proposed.

Cost savings are calculated based on the actual historical energy costs for the facility. Installation costs include labor and equipment costs to estimate the full up-front investment required to implement a change. Costs are derived from Means Cost Data, industry publications, and local contractors and equipment suppliers. The NJ Smart Start Building® program incentives savings (where applicable) are included for the appropriate ECM's and subtracted from the installed cost. Maintenance savings are calculated where applicable and added to the energy savings for each ECM. The life-time for each ECM is estimated based on the typical life of the equipment being replaced or altered. The costs and savings are applied and a simple payback, simple lifetime savings, and simple return on investment are calculated. See below for calculation methods:

ECM Calculation Equations:

$$\text{Simple Payback} = \left(\frac{\text{Net Cost}}{\text{Yearly Savings}} \right)$$

$$\text{Simple Lifetime Savings} = (\text{Yearly Savings} \times \text{ECM Lifetime})$$

$$\text{Simple Lifetime ROI} = \frac{(\text{Simple Lifetime Savings} - \text{Net Cost})}{\text{Net Cost}}$$

$$\text{Lifetime Maintenance Savings} = (\text{Yearly Maintenance Savings} \times \text{ECM Lifetime})$$

$$\text{Internal Rate of Return} = \sum_{n=0}^N \left(\frac{\text{Cash Flow of Period}}{(1 + \text{IRR})^n} \right)$$

$$\text{Net Present Value} = \sum_{n=0}^N \left(\frac{\text{Cash Flow of Period}}{(1 + \text{DR})^n} \right)$$

Net Present Value calculations based on Interest Rate of 3%.

IV. HISTORIC ENERGY CONSUMPTION/COST

A. Energy Usage / Tariffs

The energy usage for the facility has been tabulated and plotted in graph form as depicted within this section. Each energy source has been identified and monthly consumption and cost noted per the information provided by the Owner.

The electric usage profile represents the actual electrical usage for the facility. The Administration and Concession buildings receive electric from Atlantic City Electric under the Monthly Annual General Service - MGS rate structure. The Vehicle Maintenance Garage, Maintenance, and Ground Maintenance Building all receive electric service from the High School and are currently not separately metered. The school has contracted South Jersey Energy, a Third Party Supplier (TPS), to provide electric commodity supply (generation) service. The electric utility measures consumption in kilowatt-hours (KWH) and maximum demand in kilowatts (KW). One KWH usage is equivalent to 1000 watts running for one hour. One KW of electric demand is equivalent to 1000 watts running at any given time. The basic usage charges are shown as generation service and delivery charges along with several non-utility generation charges. Rates used in this report reflect the historical data received for the facility.

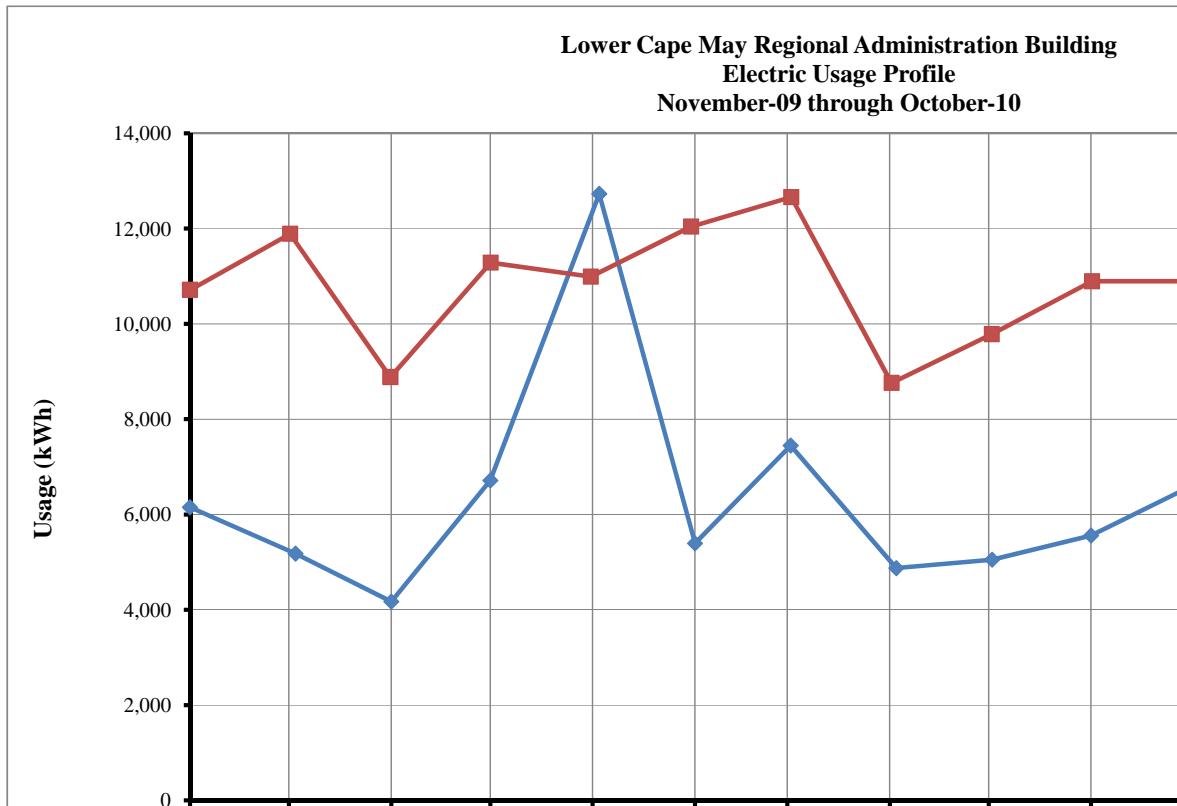
The gas usage profile shows the actual natural gas energy usage for the facility. South Jersey Gas (SJG) provides natural gas to the facility under the Firm Transportation rate structure. A Third Part Supplier (TPS) has been contracted, Pepco Energy Services for the commodity portion of the gas bill. The gas utility measures consumption in cubic feet x 100 (CCF), and converts the quantity into Therms of energy. One Therm is equivalent to 100,000 BTUs of energy.

Ref. #	Facility Name	Electric Rate (\$/kWh)	Natural Gas (\$/therm)
37	Administration Building	\$0.165	\$1.320
38	Athletic Field Concession Stand	\$0.164	-
39	Vehicle Maintenance Garage	\$0.127	\$1.200
40	Maintenance	\$0.127	-
41	Grounds Maintenance	\$0.127	\$1.700

**Table 3-A - #37 Administration
Electricity Billing Data**

ELECTRIC USAGE SUMMARY			
Utility Provider: Atlantic City Electric			
Rate: Monthly General Service			
Meter No: 76520897			
Account # 0730 3649 9991			
Third Party Utility SJ Energy Co.			
TPS Meter / Acct No: 076523299972			
MONTH OF USE	CONSUMPTION KWH	DEMAND	TOTAL BILL
Jul-10	6,650	27.2	\$1,119
Aug-10	7,049	27.3	\$1,165
Sep-09	6,150	26.8	\$1,017
Oct-09	5,176	29.7	\$874
Nov-09	4,169	22.2	\$991
Dec-09	6,713	28.2	\$1,045
Jan-10	12,730	27.5	\$1,931
Feb-10	5,392	30.1	\$881
Mar-10	7,446	31.7	\$1,180
Apr-10	4,872	21.9	\$785
May-10	5,049	24.5	\$811
Jun-10	5,556	27.2	\$929
Totals	76,952	31.7 Max	\$12,727
AVERAGE DEMAND		27.0 KW average	
AVERAGE RATE		\$0.165 \$/kWh	

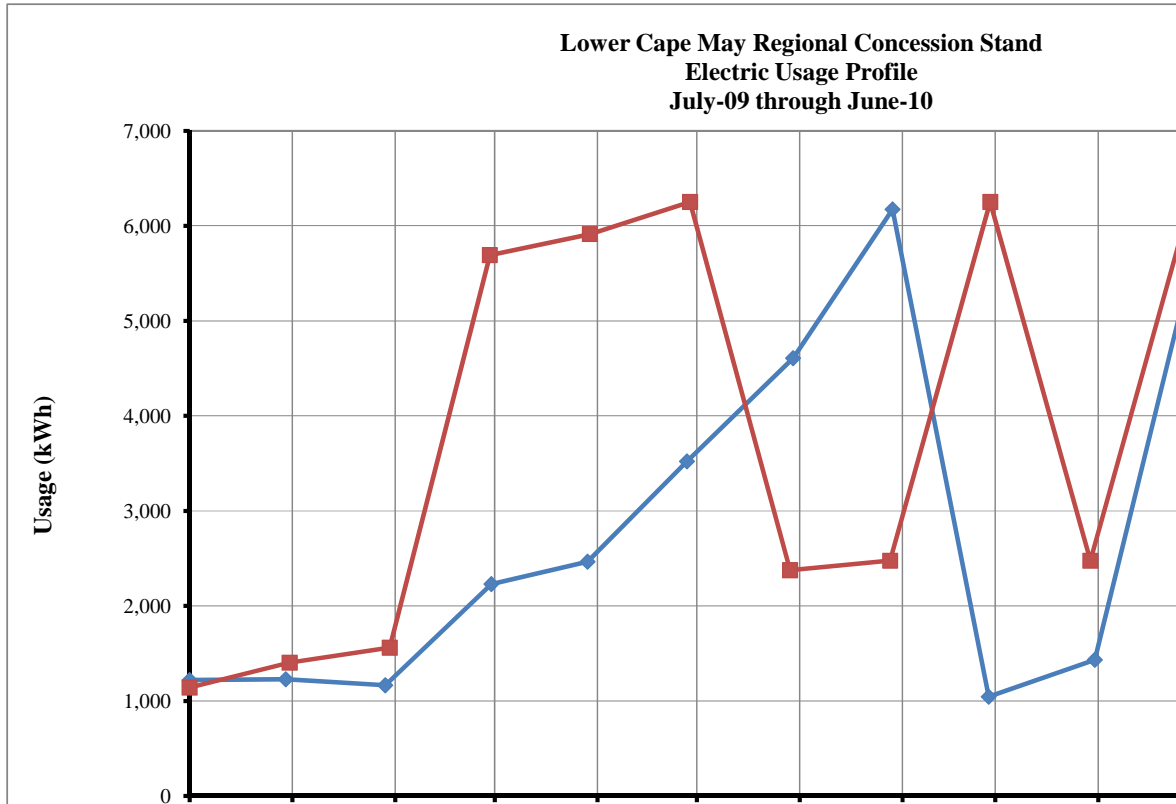
**Figure 1-A - #37 Administration
Electricity Usage Profile**



**Table 3-B - #38 Concession Stand
Electricity Billing Data**

ELECTRIC USAGE SUMMARY			
Utility Provider: Atlantic City Electric			
Rate: Monthly General Service			
Meter No: 54456957			
Account # 0765 2329 9972			
Third Party Utility SJ Energy Co.			
TPS Meter / Acct No: 076523299972			
MONTH OF USE	CONSUMPTION KWH	DEMAND	TOTAL BILL
Jul-09	1,218	5.7	\$205
Aug-09	1,228	7.0	\$209
Sep-09	1,164	7.8	\$204
Oct-09	2,230	28.5	\$382
Nov-09	2,465	29.6	\$421
Dec-09	3,522	31.3	\$621
Jan-10	4,608	11.9	\$705
Feb-10	6,175	12.4	\$928
Mar-10	1,044	31.3	\$181
Apr-10	1,432	12.4	\$254
May-10	5,561	31.3	\$908
Jun-10	2,884	31.3	\$494
Totals	33,531	31.3 Max	\$5,512
AVERAGE DEMAND		20.0 KW average	
AVERAGE RATE		\$0.164 \$/kWh	

**Figure 1-B - #38 Concession Stand
Electricity Usage Profile**



**Table 4 -A - #37 Administration
Natural Gas Billing Data**

NATURAL GAS USAGE SUMMARY		
Utility Provider: South Jersey Gas		
Rate: Firm Transportation		
Meter No: 0512162 (1 of 5 Meters on Account)		
Point of Delivery ID: 4 15 55 5784 0 4		
Third Party Utility Provider: Pepco Energy Services		
TPS Meter No: 50542		
MONTH OF USE	CONSUMPTION (THERMS)	TOTAL BILL
Jul-09	69.35	\$167.23
Aug-09	30.96	\$104.62
Sep-09	42.03	\$94.91
Oct-09	69.63	\$92.32
Nov-09	178.35	\$220.72
Dec-09	246.48	\$288.54
Jan-10	449.83	\$516.71
Feb-10	354.66	\$433.15
Mar-10	282.15	\$348.80
Apr-10	177.50	\$226.74
May-10	93.46	\$120.03
Jun-10	30.84	\$57.49
TOTALS	2,025.24	\$2,671.26
AVERAGE RATE:	\$1.32	\$/THERM

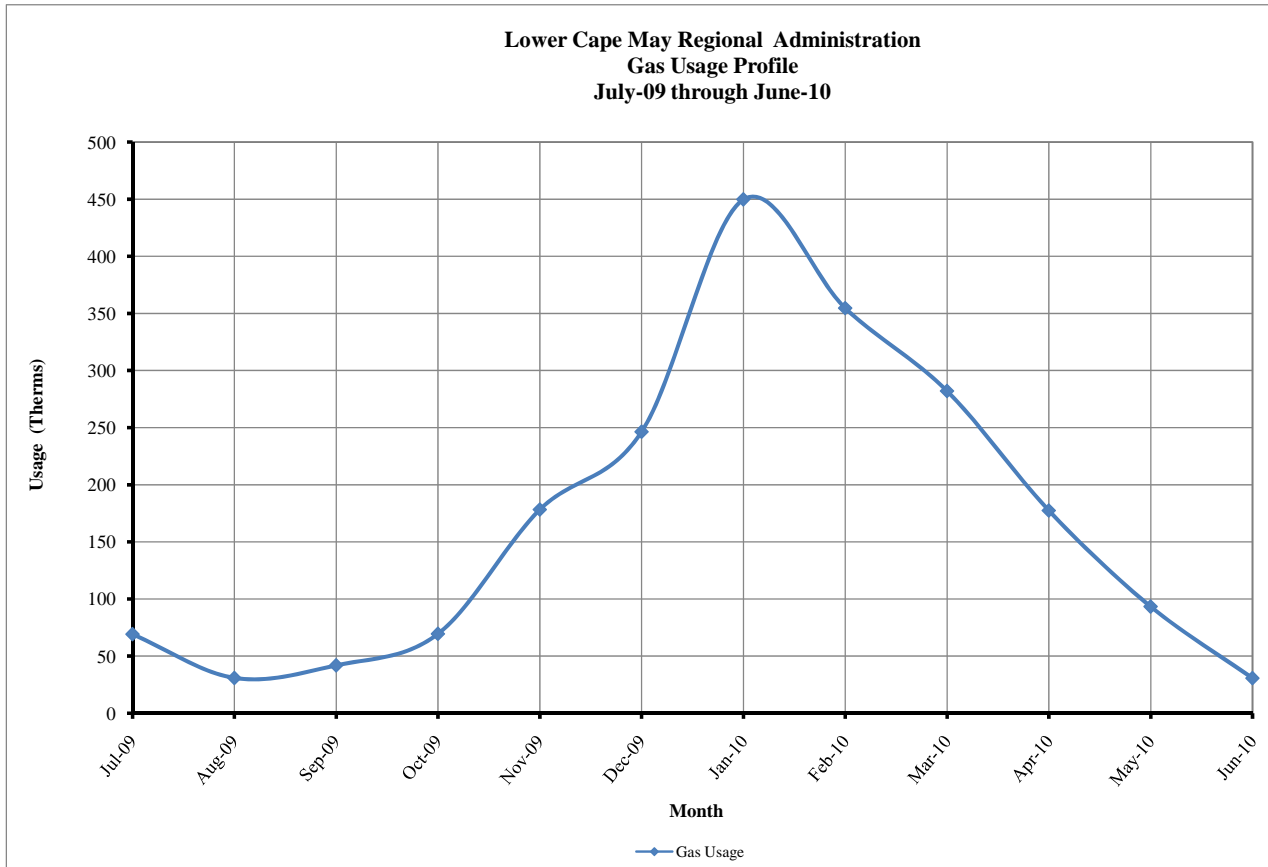
**Table 4 -B - #39 Vehicle Maintenance Garage
Natural Gas Billing Data**

NATURAL GAS USAGE SUMMARY		
Utility Provider: South Jersey Gas		
Rate: Firm Transportation		
Meter No: 514795		
Point of Delivery ID: 4 15 55 5784 0 4		
Third Party Utility Provider: Pepco Energy Services		
TPS Meter No: 50542		
MONTH OF USE	CONSUMPTION (THERMS)	TOTAL BILL
Jul-09	0.00	\$0.00
Aug-09	0.00	\$0.00
Sep-09	0.00	\$0.00
Oct-09	46.08	\$61.09
Nov-09	55.35	\$68.50
Dec-09	248.53	\$290.94
Jan-10	651.12	\$747.93
Feb-10	647.47	\$790.76
Mar-10	261.63	\$323.43
Apr-10	99.52	\$127.13
May-10	35.95	\$46.17
Jun-10	3.08	\$5.74
TOTALS	2,048.73	\$2,461.70
AVERAGE RATE:	\$1.20	\$/THERM

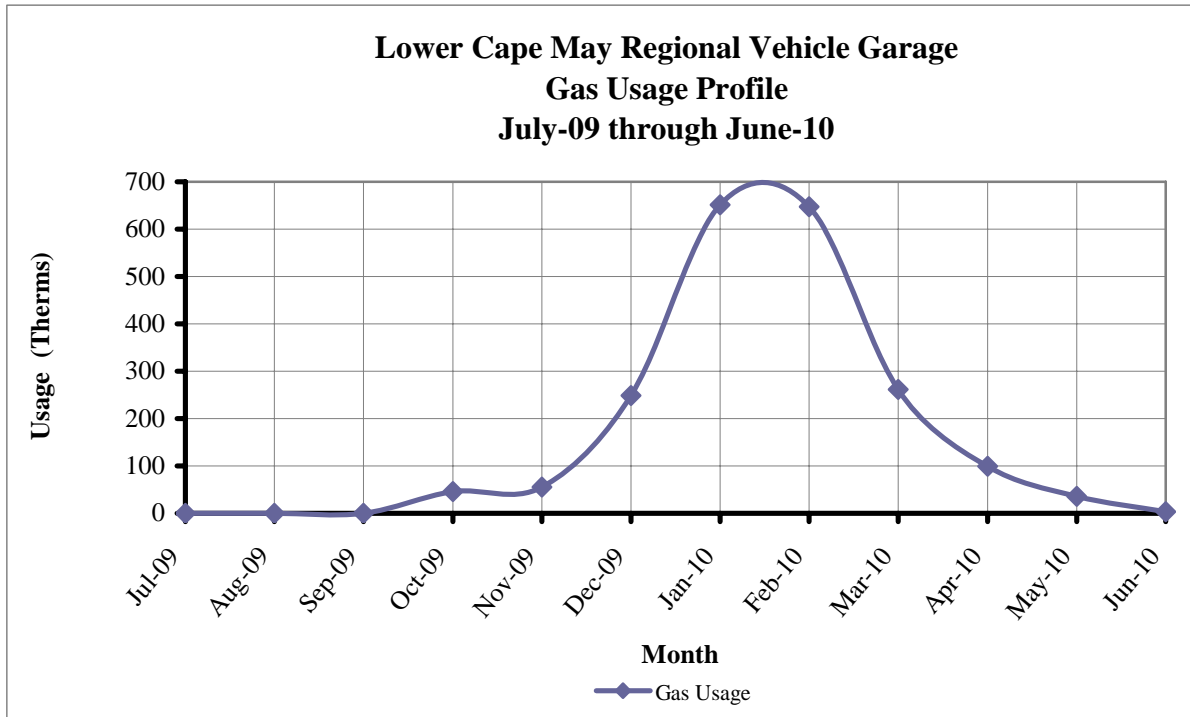
**Table 4 -C - #41 Grounds Maintenance
Natural Gas Billing Data**

NATURAL GAS USAGE SUMMARY		
Utility Provider: South Jersey Gas		
Rate: Firm Transportation		
Meter No: 0433893		
Point of Delivery ID: 4 15 55 5853 0 0		
Third Party Utility Provider: Pepco Energy Services		
TPS Meter No: 50542		
MONTH OF USE	CONSUMPTION (THERMS)	TOTAL BILL
Jul-09	0.00	\$19.35
Aug-09	0.00	\$17.48
Sep-09	0.00	\$18.73
Oct-09	12.29	\$36.70
Nov-09	20.50	\$44.31
Dec-09	73.94	\$114.29
Jan-10	136.59	\$194.03
Feb-10	152.59	\$224.47
Mar-10	95.42	\$146.95
Apr-10	33.86	\$64.39
May-10	18.49	\$45.14
Jun-10	0.00	\$0.00
TOTALS	543.68	\$925.84
AVERAGE RATE:	\$1.70	\$/THERM

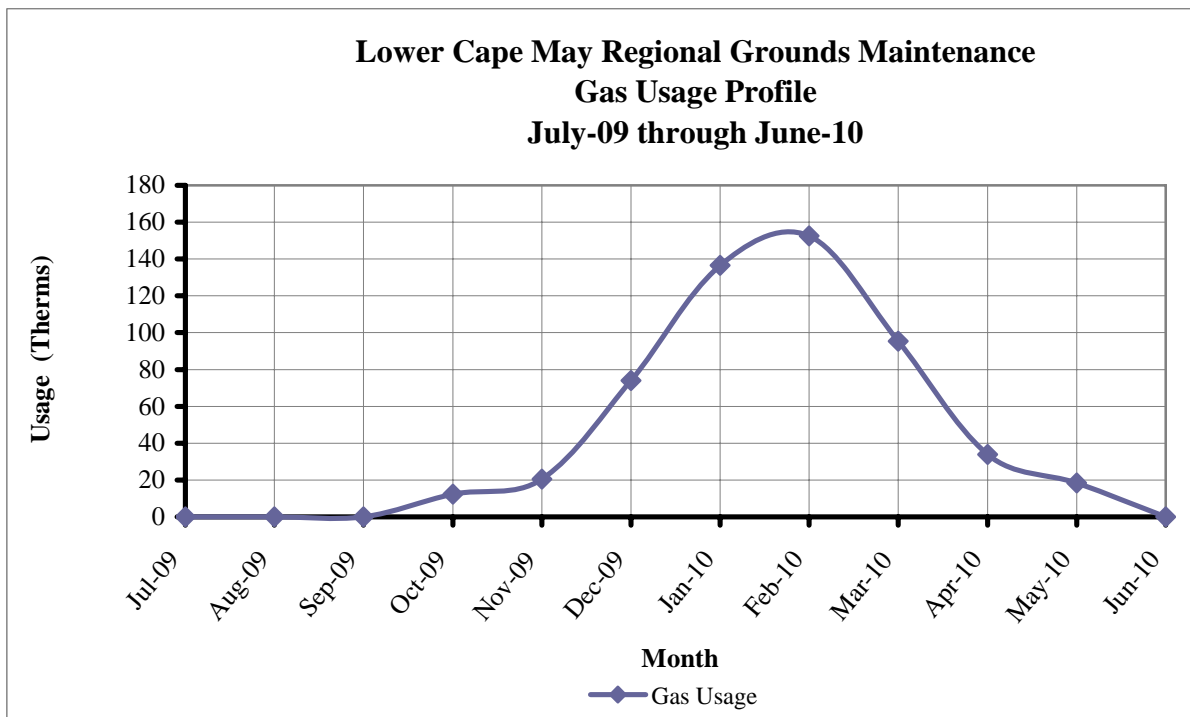
**Figure 2-A - #37 Administration
Natural Gas Usage Profile**



**Figure 2-B - #39 Vehicle Maintenance Garage
Natural Gas Usage Profile**



**Figure 2-C - #41 Grounds Maintenance
Natural Gas Usage Profile**



B. Energy Use Index (EUI)

Energy Use Index (EUI) is a measure of a building's annual energy utilization per square foot of building. This calculation is completed by converting all utility usage consumed by a building for one year, to British Thermal Units (BTU) and dividing this number by the building square footage. EUI is a good measure of a building's energy use and is utilized regularly for comparison of energy performance for similar building types. The Oak Ridge National Laboratory (ORNL) Buildings Technology Center under a contract with the U.S. Department of Energy maintains a Benchmarking Building Energy Performance Program. The ORNL website determines how a building's energy use compares with similar facilities throughout the U.S. and in a specific region or state.

Source use differs from site usage when comparing a building's energy consumption with the national average. Site energy use is the energy consumed by the building at the building site only. Source energy use includes the site energy use as well as all of the losses to create and distribute the energy to the building. Source energy represents the total amount of raw fuel that is required to operate the building. It incorporates all transmission, delivery, and production losses, which allows for a complete assessment of energy efficiency in a building. The type of utility purchased has a substantial impact on the source energy use of a building. The EPA has determined that source energy is the most comparable unit for evaluation purposes and overall global impact. Both the site and source EUI ratings for the building are provided to understand and compare the differences in energy use.

The site and source EUI for this facility is calculated as follows:

$$\text{Building Site EUI} = \frac{(\text{Electric Usage in kBtu} + \text{Gas Usage in kBtu})}{\text{Building Square Footage}}$$

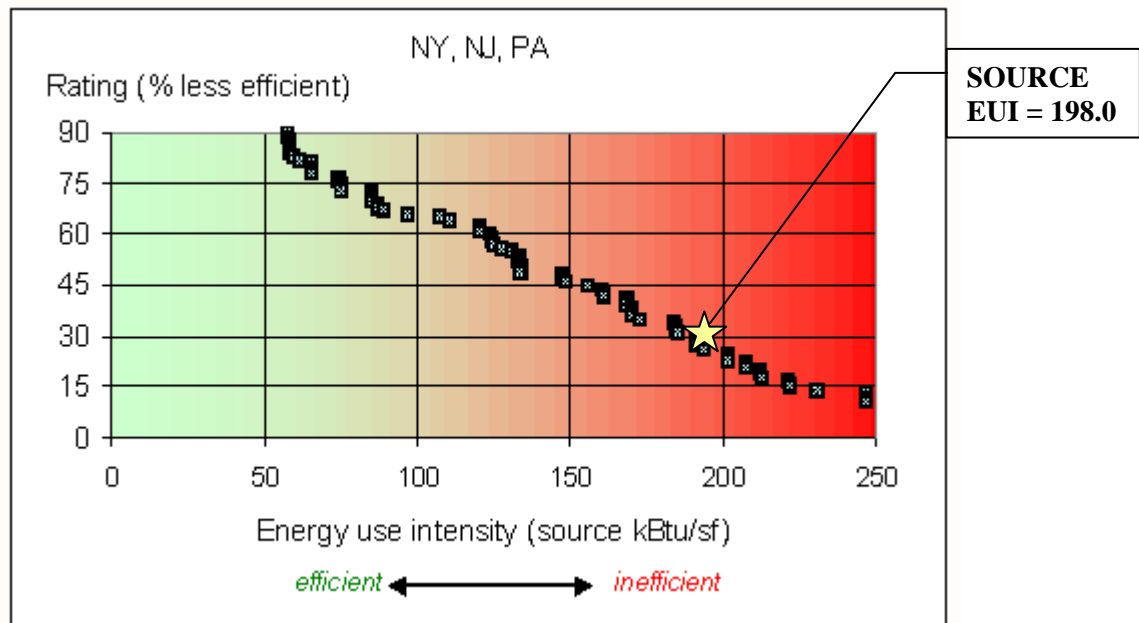
$$\text{Building Source EUI} = \frac{(\text{Electric Usage in kBtu} \times \text{SS Ratio} + \text{Gas Usage in kBtu} \times \text{SS Ratio})}{\text{Building Square Footage}}$$

**Table 5-A - #37 Administration
Facility Energy Use Index (EUI) Calculation**

ENERGY USE INTENSITY CALCULATION						
ENERGY TYPE	BUILDING USE			SITE ENERGY kBtu	SITE-SOURCE RATIO	SOURCE ENERGY kBtu
	kWh	Therms	Gallons			
ELECTRIC	76,952.0			262,714	3.340	877,465
NATURAL GAS		2,025.2		202,524	1.047	212,043
TOTAL				465,238		1,089,508
*Site - Source Ratio data is provided by the Energy Star Performance Rating Methodology for Incorporating Source Energy Use document issued Dec 2007.						
BUILDING AREA	5,500		SQUARE FEET			
BUILDING SITE EUI	84.59		kBtu/SF/YR			
BUILDING SOURCE EUI	198.09		kBtu/SF/YR			

Figure 3 below depicts a national EUI grading for the source use of *Office Buildings*

**Figure 3
Source Energy Use Intensity Distributions: Office Buildings**



**Table 5-B - #38 Concession Stand
Facility Energy Use Index (EUI) Calculation**

ENERGY USE INTENSITY CALCULATION						
ENERGY TYPE	BUILDING USE			SITE ENERGY	SITE-SOURCE RATIO	SOURCE ENERGY
	kWh	Therms	Gallons	kBtu		kBtu
ELECTRIC	33,531.0			114,475	3.340	382,346
NATURAL GAS		0.0		0	1.047	0
TOTAL				114,475		382,346
*Site - Source Ratio data is provided by the Energy Star Performance Rating Methodology for Incorporating Source Energy Use document issued Dec 2007.						
BUILDING AREA	3,500 SQUARE FEET					
BUILDING SITE EUI	32.71 kBtu/SF/YR					
BUILDING SOURCE EUI	109.24 kBtu/SF/YR					

There is no basis for comparison of Source Energy Use Intensity for the Concession Stand. Facility use type.

The Vehicle Maintenance Garage, Grounds Maintenance, and Maintenance Buildings are all supplied electric from the High School service that is not sub-metered, therefore an exact Source EUI cannot be calculated for these spaces.

C. EPA Energy Benchmarking System

The United States Environmental Protection Agency (EPA) in an effort to promote energy management has created a system for benchmarking energy use amongst various end users. The benchmarking tool utilized for this analysis is entitled Portfolio Manager. The Portfolio Manager tool allows tracking and assessment of energy consumption via the template forms located on the ENERGY STAR website (www.energystar.gov). The importance of benchmarking for local government municipalities is becoming more important as utility costs continue to increase and emphasis is being placed on carbon reduction, greenhouse gas emissions and other environmental impacts.

Based on information gathered from the ENERGY STAR website, Government agencies spend more than \$10 billion a year on energy to provide public services and meet constituent needs. Furthermore, energy use in commercial buildings and industrial facilities is responsible for more than 50 percent of U.S. carbon dioxide emissions. It is vital that local government municipalities assess facility energy usage, benchmark energy usage utilizing Portfolio Manager, set priorities and goals to lessen energy usage and move forward with priorities and goals.

In accordance with the Local Government Energy Audit Program, CEG has created an ENERGY STAR account for the municipality to access and monitoring the facility's yearly energy usage as it compares to facilities of similar type. The login page for the account can be accessed at the following web address; the username and password are also listed below:

<https://www.energystar.gov/istar/pmpam/index.cfm?fuseaction=login.login>

User Name: LCMRSDBOE
 Password: lgeaceg2010
 Security Question: What city were you born in?
 Security Answer: cape may

The utility bills and other information gathered during the energy audit process are entered into the Portfolio Manager. The following is a summary of the results for the facility:

Table 6
ENERGY STAR Performance Rating

ENERGY STAR PERFORMANCE RATING			
Ref. #	Facility Description	Energy Performance Rating	National Average
37	Administration	7	50
38	Concession Stand	N/A	N/A
39	Vehicle Maintenance	N/A	N/A
40	Maintenance	N/A	N/A
41	Ground Maintenance	N/A	N/A

Refer to **Statement of Energy Performance Appendix** for the detailed energy summary.

The Concession Stand could not be rated due to the space being categorized in the “Other” designation in Portfolio manager as “Convenience Store” was the most similar type available. Also the building is scarcely used, and a rating would not provide significant insight into potential energy waste.

The Vehicle Maintenance, and Ground Maintenance have dedicated natural gas meters for each facility, however electric service is supplied from the high school and is not submetered. These buildings also fall under the “Other” designation in Portfolio Manager as “Vehicle Service/Repair” and “Storage/Warehouse” which do not designate ratings.

The Maintenance building cannot be rated due to electric service being supplied by the high school and not submetered. Additional hot water is supplied to the building from the high school boiler plant which is not submetered. This building also falls under the “Other” designation in Portfolio Manager as “Storage/Warehouse” which do not designate ratings.

V. FACILITY DESCRIPTION

#37 - Administration Building

The 5,500 square-foot Administration Building is a one story facility comprised of office space, reception area, file storage, mechanical room, and conference rooms. The typical hours of operation are from 8:00 AM to 5:00 PM, and there are generally ten employees working in the building throughout the day. Exterior walls are brick construction with minimum insulation typical of the time period. The amount of insulation within the wall is unknown. The windows throughout the facility are in good condition and appear to be maintained. Typical windows throughout the facility are double pane, 1/4" clear glass with vinyl frames. The building has a standard A-frame roof with shingles and R-30 BATT insulation in the attic space. The building was built in 1989 with no additions since the original construction.

HVAC Systems

The building has two Trane split system heat pump air condition units coupled with a natural gas fired furnace and blower unit. The Trane Units are rated at 3 and 5 tons of cooling with an efficiency of 10 SEER. Additionally there is a standard 3 ton ICP split system with direct expansion cooling and a Rheem gas fired furnace and blower fan.

Entrance doorways are heated via electric cabinet heaters.

Exhaust System

Air is exhausted from the toilet rooms through the roof exhausters. The toilet room exhaust fan is operated based on the facility occupancy schedule.

HVAC System Controls

The HVAC systems within the facility are controlled via dial type standalone thermostat controls with temperature set point capability but no setback scheduling. The heat pumps however are fitted with day/night setback controller relays for the furnaces and heat pumps located in the mechanical room.

Domestic Hot Water

Domestic hot water for the restrooms and office lounge is provided by a RUUD 50 gallon electric hot water heater rated at 6 kilowatts.

Lighting

Typical lighting throughout building is fluorescent tube lay-in fixtures with T-12 lamps and magnetic ballasts, however some of the lighting has been converted to T8 lamps with electronic ballasts. Lighting is controlled via wall switches located in each room.

#38 – Athletic Field Concession Stand

The 3,500 square-foot Athletic Field Concession Stand is a one story facility comprised of men's and women's restrooms, storage closet, and concessions room. The building is utilized sporadically throughout the year operating during sporting events. Exterior walls are concrete block construction with minimum insulation. The building has no glass windows however window cut outs are located on the front and sides of the building where over the counter service is provide. These windows are covered by metal roll down doors. The building has a standard A-frame roof metal roofing and R-30 BATT insulation in the attic space. The building was built in 2001 with no additions since the original construction.

HVAC Systems

The building is heated only via ceiling mounted electric unit heaters rated at approximately 3 kilowatts. The units are controlled individually via on unit controls.

Exhaust System

Air is exhausted from the toilet rooms through the roof exhausters. The toilet room exhaust fan is operated based on the facility occupancy schedule. The concession area has a single exhaust power fan.

Domestic Hot Water

Domestic hot water for the restrooms and concession area is provided by a Bradford & White 30 gallon 4.5 kilowatt electric hot water heater.

Lighting

Typical lighting throughout building is fluorescent tube lay-in fixtures with T-8 lamps in vapor tight surface mounted type fixtures. The exterior perimeter is light by eight 70 watt metal halide side wall fixtures.

#39 – Vehicle Maintenance Garage

The 6,000 square-foot Vehicle Maintenance Garage is a one story facility comprised of vehicle maintenance area, offices, lounge, restrooms, and small attic storage space. The typical hours of operation for the facility vary based on staff being in and out of the building; however staff is generally there from 7:00 AM to 3:00 PM. Exterior walls are metal construction with BATT insulation on the walls. The building has a standard A-frame roof with shingles and insulation underneath. The building was built in 1980 with no additions since the original construction. The building receives electrical service from the High School and is not sub-metered.

HVAC Systems

The vehicle maintenance and storage areas are heated only by ceiling hung gas fired radiant tube heaters. These units are controlled via a Honeywell Dial temperature setting thermostat located on the wall, which at the time of survey was set to 70 degree Fahrenheit. The office area is

conditioned by a 3 ton split system with direct expansion cooling and RUUD gas fired furnace with blower unit.

Domestic Hot Water

Domestic hot water for the restrooms and office lounge is provided by a Bradford & White Electric heater rated at 4.5 kilowatts and 50 gallons of storage.

Lighting

Typical lighting throughout building is fluorescent tube utility fixtures with T-12 lamps and magnetic ballasts. Exterior lighting is high pressure sodium wall pack fixtures.

#40 – Maintenance

The 2,400 square-foot Maintenance Building is a one story facility comprised of a small office, restroom, shop area, and storage area. The typical hours of operation for the facility vary based on staff being in and out of the building; however staff is generally there from 7:00 AM to 3:00 PM. Exterior walls are metal construction with BATT insulation on the walls. The building has a standing seam metal roof with BATT insulation underneath. The building was built in 1985 with no additions since the original construction. The building receives electrical service from the High School and is not sub-metered.

HVAC Systems

The building has one hot water Modine unit heater that receives hot water from the High School boiler plant. The unit heater has a thermostat controlled valve mounted directly below the unit and a 1/12 horsepower booster pump. This unit only heats approximately a third of the building, with the remaining storage section being unheated.

Domestic Hot Water

Domestic hot water is received from the High School.

Lighting

The majority of the lighting in the building is T8 lamps with electronic ballasts, and a small amount of T12 lamps with magnetic ballasts. The exterior fixtures are 100 watt high pressure sodium wall packs along the building perimeter.

#41 – Grounds Maintenance

The 3,200 square-foot Ground Maintenance Building is a one story facility comprised of lounge, shop area, restroom, kitchenette, and vehicle storage. The typical hours of operation for the facility vary based on staff being in and out of the building; however staff is generally there from 7:00 AM to 3:00 PM. Exterior walls are metal construction with BATT insulation on the walls. The building has a standing seam metal roof with BATT insulation underneath. The building

was built in 2002 with no additions since the original construction. The building receives electrical service from the High School and is not sub-metered.

HVAC Systems

The building has one Trane natural gas fired unit heater that services the shop, lounge, and kitchenette area. The heater is controlled by a unit mounted thermostat. The vehicle storage section of the building is unheated.

Exhaust System

The toilet room is exhaust via a light switch operated exhaust fan.

Domestic Hot Water

Domestic hot water for the restroom is provided by an EemaX electric 2 kilowatt instant hot water heater,

Lighting

Typical lighting throughout building is fluorescent tube fixtures with 32 watt T-8 lamps and electronic ballasts. Lighting is controlled via wall switches located in each room.

VI. MAJOR EQUIPMENT LIST

The equipment list contains major energy consuming equipment that through implementation of energy conservation measures could yield substantial energy savings. The list shows the major equipment in the facility and all pertinent information utilized in energy savings calculations. An approximate age was assigned to the equipment in some cases if a manufactures date was not shown on the equipment's nameplate. The ASHRAE service life for the equipment along with the remaining useful life is also shown in the Appendix.

Refer to the **Major Equipment List Appendix** for this facility.

VII. ENERGY CONSERVATION MEASURES

#37 - ADMINISTRATION BUILDING

37 - ECM #1: Lighting Upgrade

Description:

The majority of the lighting at the Administration Building is 34 watt T-12 lamps with magnetic ballasts. There are a few locations with existing 32 watt T-8 fixtures with electronic ballasts.

This ECM includes re-lamping of the existing fluorescent fixtures with 800 series, 28W T8 lamps. The ECM also includes de-lamping of all T12 fixtures to T8 fixtures with electronic ballasts in the building. The new, energy efficient T8 fixtures will provide adequate lighting and will save on electrical costs due to better performance of the lamp and ballasts. This ECM also includes maintenance savings through the reduced number of lamps replaced per year. The expected lamp life of a T8 lamp is approximately 30,000 burn-hours, in comparison to the existing T12 lamps which is approximately 20,000 burn-hours. The facility will need approximately 33% less lamps replaced per year for each one for one fixture replaced.

Energy Savings Calculations:

The **Investment Grade Lighting Audit Appendix** outlines the hours of operation, proposed retrofits, costs, savings, and payback periods for each set of fixtures in the each building.

From the **NJ Smart Start Incentive Appendix**, the replacement of a T-12 fixture to a T-5 or T-8 fixture warrants the following incentive: T-5 or T-8 (1-4 lamps) = \$10 per fixture

$$\text{Smart Start}^{\text{®}} \text{ Incentive} = (\# \text{ of } 1-4 \text{ lamp fixtures} \times \$10)$$

$$\text{Smart Start}^{\text{®}} \text{ Incentive} = (64 \text{ fixtures} \times \$10) = \$640$$

T-12 to T-8 fixtures by permanent de-lamping & new reflectors with electronic ballast

replacement required for all eligible de-lamped fixtures = \$20 per fixture

$$\text{Smart Start}^{\text{®}} \text{ Incentive} = (\# \text{ of } (T12 \text{ to } T8 \text{ Retrofits \& delamping}) \times \$20)$$

$$\text{Smart Start}^{\text{®}} \text{ Incentive} = (20 \text{ fixtures} \times \$20) = \$400$$

Replacement and Maintenance Savings are calculated as follows:

$$\text{Savings} = (\text{reduction in lamps replaced per year}) \times (\text{replacement } \$ \text{ per lamp} + \text{Labor } \$ \text{ per lamp})$$

$$\text{Savings} = (20 \text{ lamps per year}) \times (\$2.00 + \$5.00) = \$200$$

Energy Savings Summary:

37 - ECM #1 - ENERGY SAVINGS SUMMARY	
Installation Cost (\$):	\$8,245
NJ Smart Start Equipment Incentive (\$):	\$1,280
Net Installation Cost (\$):	\$6,965
Maintenance Savings (\$/Yr):	\$200
Energy Savings (\$/Yr):	\$1,040
Total Yearly Savings (\$/Yr):	\$1,240
Estimated ECM Lifetime (Yr):	15
Simple Payback	5.6
Simple Lifetime ROI	167.0%
Simple Lifetime Maintenance Savings	\$3,000
Simple Lifetime Savings	\$18,600
Internal Rate of Return (IRR)	16%
Net Present Value (NPV)	\$7,838.04

Installation cost per dual-technology sensors (Basis: Sensor switch or equivalent) as well as other details are shown in the **Investment Grade Lighting Audit Appendix**.

From the **NJ Smart Start® Program Incentives Appendix**, the installation of a lighting control device warrants the following incentive:

Occupancy Sensor Wall Mounted (existing facility only) = \$20 per sensor.

Occupancy Sensor Remote Mounted (existing facility only) = \$35 per sensor

$$\begin{aligned} \text{Smart Start}^\circledast \text{ Incentive} &= (\# \text{ of wall mount} \times \$ 20) + (\# \text{ of ceiling mount} \times 35) \\ &= (0 \times \$20) + (9 \times \$35) = \$315 \end{aligned}$$

Energy Savings Summary:

37 - ECM #2 - ENERGY SAVINGS SUMMARY	
Installation Cost (\$):	\$1,700
NJ Smart Start Equipment Incentive (\$):	\$315
Net Installation Cost (\$):	\$1,385
Maintenance Savings (\$/Yr):	\$0
Energy Savings (\$/Yr):	\$567
Total Yearly Savings (\$/Yr):	\$567
Estimated ECM Lifetime (Yr):	15
Simple Payback	2.4
Simple Lifetime ROI	514.1%
Simple Lifetime Maintenance Savings	\$0
Simple Lifetime Savings	\$8,505
Internal Rate of Return (IRR)	41%
Net Present Value (NPV)	\$5,383.81

37 - ECM #3: Install Programmable Thermostats

Description:

The Administration Building is cooled by three (3) rooftop units and is heated by gas fired furnaces that do most of the building. The thermostats controlling the cooling and heating units are standard Dial Type thermostats with no set point capability.

Programmable thermostats provide automatic control of the space temperature during occupied and unoccupied periods of the day. When the space is not occupied the equipment can operate at the unoccupied set point. Once the space becomes occupied the thermostat raises the temperature of the space to the occupied set point. This control system approach is ideal for facilities with low occupancy levels and long unoccupied periods. New programmable have built in capability to adjust heating start times to ensure the space is up to temperature by the specified occupancy period. This is an added comfort feature so programming does not need to be re-adjusted as the season heating load changes.

This ECM includes replacement of the unit thermostats with programmable 7-day thermostats with night time setback control. The recommended thermostat set points for heating and cooling in the Shelter as follows:

Occupied Heating =	70° F (8:00AM – 4:00 PM)
Unoccupied Heating =	65° F (4:00 PM – 8:00 AM)
Occupied Cooling =	72° F (8:00AM – 4:00 PM)
Unoccupied Cooling =	78° F (4:00 PM – 8:00 AM)

CEG recommends installing a new Honeywell RTH7500D 7-day programmable thermostat or equivalent to control the main air handling unit.

Energy Savings Calculations:

The energy savings of the 7-day programmable thermostats was calculated by using Energy Star Life Cycle Cost Estimate software for qualified programmable thermostats. Additional information on the referenced calculator can be found at www.energystar.gov or refer to the **Programmable Thermostats Calculator Appendix** for a detailed energy savings calculation for the replacement of the thermostats in the facility.

Energy Savings Summary:

37 - ECM #3 - ENERGY SAVINGS SUMMARY	
Installation Cost (\$):	\$810
NJ Smart Start Equipment Incentive (\$):	\$0
Net Installation Cost (\$):	\$810
Maintenance Savings (\$/Yr):	\$0
Energy Savings (\$/Yr):	\$595
Total Yearly Savings (\$/Yr):	\$595
Estimated ECM Lifetime (Yr):	15
Simple Payback	1.4
Simple Lifetime ROI	1001.9%
Simple Lifetime Maintenance Savings	\$0
Simple Lifetime Savings	\$8,925
Internal Rate of Return (IRR)	73%
Net Present Value (NPV)	\$6,293.07

37 - ECM #4: DHW Heater Upgrade

Description:

The Administration Building's existing electric hot water heater is a 50 gallon 6 kilowatt Ruud boiler located in the mechanical room. Electric water heating, although potentially 100% efficient (100% of Btu's from electricity transferred into heating the water), is generally more expensive due to the high cost of electricity. The heater appears to be past its useful life and could be replaced with a much more cost effective natural gas fired tank-less hot water heating system, given the low hot water demand requirements of the office environment.

It is recommended the existing hot water heater be replaced with a Rinnai Model RC98HPi natural gas fired tank-less hot water heater. The unit is rated at 199 MBH max output and 96% thermal efficiency.

Energy Savings Calculations:

Savings calculations are based on the Energy Information Administration Commercial Building Energy Consumption Survey 2003 data for office type water heating. The below table shows savings calculations based on existing and proposed conditions.

Incentive value is based on NJ SmartStart Program which provides \$300 dollars per tank-less natural gas fired heater.

CONDENSING DOM. HOT WATER HEATER CALCULATIONS			
ECM INPUTS	EXISTING	PROPOSED	SAVINGS
ECM INPUTS	Existing Hot Water Heater	Separate DHW	
Building Type	Office		
Building Square-foot	5,500	5,500	
Domestic Water Usage, kBtu	8,800.00	8,800.00	
DHW Heating Fuel Type	Electric	Gas	
Heating Efficiency	98%	96%	-2%
Total Usage (kBtu)	8,980	9,167	-187
Electric Cost (\$/kWh)	\$ 0.165	\$ 0.165	
Nat Gas Cost (\$/Therm)	\$ 1.320	\$ 1.320	
ENERGY SAVINGS CALCULATIONS			
ECM RESULTS	EXISTING	PROPOSED	SAVINGS
Electric Consumption (kWh)	2,631	0	2,631
Nat Gas Consumption (Therms)	0	92	-92
Energy Cost (\$)	\$434	\$121	\$313
COMMENTS:	Savings are based on Energy Information Administration Commercial Building Energy Consumption Survey 2003 Information		

Energy Savings Summary:

37 - ECM #4 - ENERGY SAVINGS SUMMARY	
Installation Cost (\$):	\$2,925
NJ Smart Start Equipment Incentive (\$):	\$300
Net Installation Cost (\$):	\$2,625
Maintenance Savings (\$/Yr):	\$0
Energy Savings (\$/Yr):	\$313
Total Yearly Savings (\$/Yr):	\$313
Estimated ECM Lifetime (Yr):	12
Simple Payback	8.4
Simple Lifetime ROI	43.1%
Simple Lifetime Maintenance Savings	\$0
Simple Lifetime Savings	\$3,756
Internal Rate of Return (IRR)	6%
Net Present Value (NPV)	\$490.60

37 - ECM #5: Occupancy Controlled Power Strips

Description:

Plug loads in buildings are increasingly becoming a majority share of electrical consumption annually, as HVAC and lighting technologies are becoming more efficient and more energy is being utilized other equipment. The Administration Building has approximately ten computers and/or laptops used by staff. During the survey it was noted that many of these computers were on and operating while no one was using the work station. To reduce idle power draw load from the computer and peripheral equipment while not in use, CEG recommends the installation of Watt Stopper IDP-3050 occupancy controlled power strip. The power strip has the same features of a typical strip except it is fitted with an infrared occupancy sensor. The sensor reads when an occupant is using their workstation and insures all equipment is fully powered, however when an occupant is not present the strip shuts power off to devices plugged into the control outlets of the strip. Installing these power strips could substantially reduce energy waste due to plugged in equipment. The intent of this ECM is to provide control of ancillary devices such as computer monitors, speakers, printers, phone charges, task lights, and etc. that can be shut off by the control outlets when the user is not present.

Energy Savings Calculations:

The manufacturer has estimated that typical savings for their power strip can save 75 kilowatt-hours per work station or more.

POWER STRIP SAVINGS CALCULATIONS	
ECM INPUTS	
Number of Computers	10
Power Strip Information	
Manufacturer	Watt Stopper
Model	IDP-3050
Savings per Workstation (kWh/yr)	75
Electric Cost (\$/kWh)	\$0.165
Total Electric Savings, kWh	750
Total Cost Savings	\$123.75

Energy Savings Summary:

37 - ECM #5 - ENERGY SAVINGS SUMMARY	
Installation Cost (\$):	\$900
NJ Smart Start Equipment Incentive (\$):	\$0
Net Installation Cost (\$):	\$900
Maintenance Savings (\$/Yr):	\$0
Energy Savings (\$/Yr):	\$124
Total Yearly Savings (\$/Yr):	\$124
Estimated ECM Lifetime (Yr):	15
Simple Payback	7.3
Simple Lifetime ROI	106.3%
Simple Lifetime Maintenance Savings	\$0
Simple Lifetime Savings	\$1,856
Internal Rate of Return (IRR)	11%
Net Present Value (NPV)	\$577.32

#38 – ATHLETIC FIELD CONCESSION STAND**38 - ECM #1: Lighting Upgrade****Description:**

The majority of the lighting at the Concession Stand is 34 watt T-8 lamps with electronic ballasts. The exterior lights are 70 watt high pressure sodium wall packs.

This ECM includes re-lamping of the existing fluorescent fixtures with 800 series, 28W T8 lamps. The new, energy efficient T8 lamps will provide adequate lighting and will save on electrical costs due to better performance of the lamp and ballasts. The exterior wall pack lights will be replaced with new LED wall packs.

Energy Savings Calculations:

The **Investment Grade Lighting Audit Appendix** outlines the hours of operation, proposed retrofits, costs, savings, and payback periods for each set of fixtures in the each building.

Energy Savings Summary:

38 - ECM #1 - ENERGY SAVINGS SUMMARY	
Installation Cost (\$):	\$1,848
NJ Smart Start Equipment Incentive (\$):	\$0
Net Installation Cost (\$):	\$1,848
Maintenance Savings (\$/Yr):	\$0
Energy Savings (\$/Yr):	\$140
Total Yearly Savings (\$/Yr):	\$140
Estimated ECM Lifetime (Yr):	15
Simple Payback	13.2
Simple Lifetime ROI	13.6%
Simple Lifetime Maintenance Savings	0
Simple Lifetime Savings	\$2,100
Internal Rate of Return (IRR)	2%
Net Present Value (NPV)	(\$176.69)

38 - ECM #2: Gas Fired Unit Heaters

Description:

The restrooms in the Concession Stand are heated via electric ceiling mounted unit heaters. These units have on board dial setting controls to maintain space temperature. The units are generally set to prevent freezing of the domestic water piping in the facility. While the electric heat is 100% efficient it is most costly to operate on a per Btu basis compared with Natural Gas Fired Heat.

This ECM proposes replacing the electric unit heaters with new natural gas fired unit heaters that can be ceiling mounted. Note: Natural Gas will need to be supplied to this facility in order to implement this measure, prior to installation the District should consult the gas company and a professional engineer to verify its availability.)

Energy Savings Calculations:

UNIT HEATER CALCULATIONS			
ECM INPUTS	EXISTING	PROPOSED	SAVINGS
ECM INPUTS	Electric UH	Gas UH	
HDD (55F)	2,293		
Quantity	2		
Unit Size Ea.	3 kW		
Heating Fuel Type	Electric	Gas	
<i>Fuel Heat Value Electricity(BTU/KWH)</i>	3,413	3,413	
<i>Fuel Heat Value Nat Gas (Btu/Therms)</i>	100,000	100,000	
Heating Efficiency	100%	80%	-20%
Total Usage (kBTU)	20,490	25,612	-5,122
Electric Cost (\$/kWh)	\$ 0.164	\$ 0.164	
Nat Gas Cost (\$/Therm)	\$ 1.407	\$ 1.407	
ENERGY SAVINGS CALCULATIONS			
ECM RESULTS	EXISTING	PROPOSED	SAVINGS
Electric Consumption (kWh)	6,003	0	6,003
Nat Gas Consumption (Therms)	0	256	-256
Energy Cost (\$)	\$985	\$360	\$624
COMMENTS:	Modified HDD to span October to March		

Energy Savings Summary:

38 - ECM #2 - ENERGY SAVINGS SUMMARY	
Installation Cost (\$):	\$2,800
NJ Smart Start Equipment Incentive (\$):	\$0
Net Installation Cost (\$):	\$2,800
Maintenance Savings (\$/Yr):	\$0
Energy Savings (\$/Yr):	\$624
Total Yearly Savings (\$/Yr):	\$624
Estimated ECM Lifetime (Yr):	15
Simple Payback	4.5
Simple Lifetime ROI	234.3%
Simple Lifetime Maintenance Savings	\$0
Simple Lifetime Savings	\$9,360
Internal Rate of Return (IRR)	21%
Net Present Value (NPV)	\$4,649.27

38 - ECM #3: Gas Fired Hot Water Heater**Description:**

The Concession Stand's potable hot water is supplied by a single Bradford and White 30 gallon 4500 watt electric boilers. The unit is approximately half way through its expected life. Electric water heating, although potentially 100% efficient (100% of Btu's from electricity transferred into heating the water), is generally more expensive due to the high cost of electricity. The heater could be replaced with a much more cost effective natural gas fired tank-less hot water heating system, given the low hot water demand requirements and intermittent use of the facility this will also reduce storage losses.

It is recommended the existing hot water heater be replaced with a Rinnai Model RC98HPi natural gas fired tank-less hot water heater. The unit is rated at 199 MBH max output and 96% thermal efficiency. (Note: Natural Gas will need to be supplied to this facility in order to implement this measure, prior to installation the District should consult the gas company and a professional engineer to verify its availability.)

Energy Savings Calculations:

CONDENSING DOM. HOT WATER HEATER CALCULATIONS			
ECM INPUTS	EXISTING	PROPOSED	SAVINGS
ECM INPUTS	Existing Hot Water Heater	Instant Gas HWH	
Building Type	Other		
Building Square-foot	3,500	3,500	
Domestic Water Usage, kBtu	5,950.00	5,950.00	
DHW Heating Fuel Type	Electric	Gas	
Heating Efficiency	98%	96%	-2%
Total Usage (kBtu)	6,071	6,198	-126
Electric Cost (\$/kWh)	\$ 0.164	\$ 0.164	
Nat Gas Cost (\$/Therm)	\$ 1.407	\$ 1.407	
ENERGY SAVINGS CALCULATIONS			
ECM RESULTS	EXISTING	PROPOSED	SAVINGS
Electric Consumption (kWh)	1,779	0	1,779
Nat Gas Consumption (Therms)	0	62	-62
Energy Cost (\$)	\$292	\$87	\$205
COMMENTS:	Savings are based on Energy Information Administration Commercial Building Energy Consumption Survey 2003 Information		

Energy Savings Summary:

38 - ECM #3 - ENERGY SAVINGS SUMMARY	
Installation Cost (\$):	\$3,600
NJ Smart Start Equipment Incentive (\$):	\$300
Net Installation Cost (\$):	\$3,300
Maintenance Savings (\$/Yr):	\$0
Energy Savings (\$/Yr):	\$205
Total Yearly Savings (\$/Yr):	\$205
Estimated ECM Lifetime (Yr):	12
Simple Payback	16.1
Simple Lifetime ROI	-25.5%
Simple Lifetime Maintenance Savings	\$0
Simple Lifetime Savings	\$2,460
Internal Rate of Return (IRR)	-4%
Net Present Value (NPV)	(\$1,259.43)

#39 – VEHICLE MAINTENANCE GARAGE**39 - ECM #1: Lighting Upgrade****Description:**

The majority of lighting at the Vehicle Maintenance is 34 watt T-12 lamps with magnetic ballasts. Additionally there are 8 foot 75 watt T12 fluorescent lamps.

The ECM includes replacing of all T12 fixtures to T8 fixtures with electronic ballasts in the building. The new, energy efficient T8 fixtures will provide adequate lighting and will save on electrical costs due to better performance of the lamp and ballasts.

Energy Savings Calculations:

The **Investment Grade Lighting Audit Appendix** outlines the hours of operation, proposed retrofits, costs, savings, and payback periods for each set of fixtures in the each building.

From the **NJ Smart Start Incentive Appendix**, the replacement of a T-12 fixture to a T-5 or T-8 fixture warrants the following incentive: T-5 or T-8 (1-4 lamps) = \$10 per fixture

$$\text{Smart Start}^{\circledR} \text{ Incentive} = (\# \text{ of } 1-4 \text{ lamp fixtures} \times \$10)$$

$$\text{Smart Start}^{\circledR} \text{ Incentive} = (36 \text{ fixtures} \times \$10) = \$360$$

Energy Savings Summary:

39 - ECM #1 - ENERGY SAVINGS SUMMARY	
Installation Cost (\$):	\$3,850
NJ Smart Start Equipment Incentive (\$):	\$360
Net Installation Cost (\$):	\$3,490
Maintenance Savings (\$/Yr):	\$0
Energy Savings (\$/Yr):	\$612
Total Yearly Savings (\$/Yr):	\$612
Estimated ECM Lifetime (Yr):	15
Simple Payback	5.7
Simple Lifetime ROI	163.0%
Simple Lifetime Maintenance Savings	\$0
Simple Lifetime Savings	\$9,180
Internal Rate of Return (IRR)	16%
Net Present Value (NPV)	\$3,816.02

39 - ECM #2: Lighting Controls

Description:

In some areas the lighting is left on unnecessarily. In many cases the lights are left on because of the inconvenience to manually switch lights off when a room is left or on when a room is first occupied. This is common in rooms that are occupied for only short periods and only a few times per day. In some instances lights are left on due to the misconception that it is better to keep the lights on rather than to continuously switch lights on and off. Although increased switching reduces lamp life, the energy savings outweigh the lamp replacement costs. The payback timeframe for when to turn the lights off is approximately two minutes. If the lights are expected to be off for at least a two minute interval, then it pays to shut them off.

Lighting controls come in many forms. Sometimes an additional switch is adequate to provide reduced lighting levels when full light output is not needed. Occupancy sensors detect motion and will switch the lights on when the room is occupied. Occupancy sensors can either be mounted in place of a current wall switch, or on the ceiling to cover large areas.

The U.S. Department of Energy sponsored a study to analyze energy savings achieved through various types of building system controls. The referenced savings is based on the "Advanced Sensors and Controls for Building Applications: Market Assessment and Potential R&D Pathways," document posted for public use April 2005. The study has found that commercial buildings have the potential to achieve significant energy savings through the use of building controls. The average energy savings are as follows based on the report:

- Occupancy Sensors for Lighting Control 20% - 28% energy savings.

Savings resulting from the implementation of this ECM for energy management controls are estimated to be 10% of the total light energy controlled by occupancy sensors.

This ECM includes replacement of standard wall switches with remote mounted sensors for the various office areas. Sensors shall be manufactured by Sensorswitch, Watt Stopper or equivalent.

The **Investment Grade Lighting Audit Appendix** of this report includes the summary of lighting controls implemented in this ECM and outlines the proposed controls, costs, savings, and payback periods. The calculations adjust the lighting power usage by the applicable percent savings for each area that includes lighting controls.

Energy Savings Calculations:

$$\text{Energy Savings} = (\% \text{ Savings} \times \text{Occupancy Sensored Light Energy (kWh/Yr)})$$

$$\text{Savings.} = \text{Energy Savings (kWh)} \times \text{Ave Elec Cost} \left(\frac{\$}{\text{kWh}} \right)$$

Installation cost per dual-technology sensors (Basis: Sensor switch or equivalent) as well as other details are shown in the **Investment Grade Lighting Audit Appendix**.

Energy Savings Summary:

39 - ECM #2 - ENERGY SAVINGS SUMMARY	
Installation Cost (\$):	\$300
NJ Smart Start Equipment Incentive (\$):	\$0
Net Installation Cost (\$):	\$300
Maintenance Savings (\$/Yr):	\$0
Energy Savings (\$/Yr):	\$32
Total Yearly Savings (\$/Yr):	\$32
Estimated ECM Lifetime (Yr):	15
Simple Payback	9.4
Simple Lifetime ROI	60.0%
Simple Lifetime Maintenance Savings	\$0
Simple Lifetime Savings	\$480
Internal Rate of Return (IRR)	7%
Net Present Value (NPV)	\$82.01

39 - ECM #3: DHW Pipe Insulation

Description:

There is an approximate 4 foot length of un-insulated domestic hot water pipe from the boiler to the entrance point into the wall. The un-insulated pipe is contributing to heat loss for the boiler and causing it to operate more frequently to make up for these losses.

This ECM would insulate this small section of bare hot water pipes with ½ inch fiberglass insulation.

Energy Savings Calculations:

Hot Water Pipe Insulation Savings Calculation

Existing: Un-Insulated Copper Pipe

Proposed: Addition of 0.5" Fiberglass Insulation

Nominal Pipe Size, In.	Length, Feet	Heat Loss Coefficient	Heat Loss, Btu/Hr	Heat Loss Coefficient	Heat Loss, Btu/Hr		Heat Loss Saved, Btu/Hr
3/4	4	0.43	94.6	0.25	55.0		39.6
		Total Loss Btu/Hr	94.6	Total Loss Btu/Hr	55.0	Total Saved Btu/Hr	39.6
		kWh per year	247.8	kWh per year	144.1	kWh Saved per year	103.7
						Cost Savings	\$13.18

Calculation Constants	
Heating Season Months	12.0
Heating Operating Days	365
Hot Water Boiler Efficiency	98%
Hot Water Supply Temp, F	120
Outdoor Air Base Temp, F	65
Electric Cost (\$/kWh)	\$0.13

*Source: Engineering Methods for Estimated the Impacts of Demand-Side Management Programs, Volume 2, EPRI 1993

Energy Savings Summary:

39 - ECM #3 - ENERGY SAVINGS SUMMARY	
Installation Cost (\$):	\$28
NJ Smart Start Equipment Incentive (\$):	\$0
Net Installation Cost (\$):	\$28
Maintenance Savings (\$/Yr):	\$0
Energy Savings (\$/Yr):	\$13
Total Yearly Savings (\$/Yr):	\$13
Estimated ECM Lifetime (Yr):	15
Simple Payback	2.1
Simple Lifetime ROI	606.1%
Simple Lifetime Maintenance Savings	\$0
Simple Lifetime Savings	\$198
Internal Rate of Return (IRR)	47%
Net Present Value (NPV)	\$129.34

#40 – MAINTENANCE BUILDING**40 - ECM #1: Lighting Upgrade****Description:**

The majority of lighting at the Maintenance Building is 32 watt T-8 lamps with electronic ballasts. There are a small number of T12 fluorescent fixtures with magnetic ballasts.

The ECM includes re-lamping of 32 watt T8 lamps to 28 watt T8 lamps. The new, energy efficient T8 fixtures will provide adequate lighting and will save on electrical costs due to better performance of the lamp and ballasts. The T12 fixtures will be re-lamped and re-ballasted with T8 lamps and electronic ballasts.

Energy Savings Calculations:

The **Investment Grade Lighting Audit Appendix** outlines the hours of operation, proposed retrofits, costs, savings, and payback periods for each set of fixtures in the each building.

From the **NJ Smart Start Incentive Appendix**, the replacement of a T-12 fixture to a T-5 or T-8 fixture warrants the following incentive: T-5 or T-8 (1-4 lamps) = \$10 per fixture

$$\text{Smart Start}^{\circledR} \text{ Incentive} = (\# \text{ of } 1-4 \text{ lamp fixtures} \times \$10)$$

$$\text{Smart Start}^{\circledR} \text{ Incentive} = (2 \text{ fixtures} \times \$10) = \$20$$

Energy Savings Summary:

40 - ECM #1 - ENERGY SAVINGS SUMMARY	
Installation Cost (\$):	\$482
NJ Smart Start Equipment Incentive (\$):	\$20
Net Installation Cost (\$):	\$462
Maintenance Savings (\$/Yr):	\$0
Energy Savings (\$/Yr):	\$106
Total Yearly Savings (\$/Yr):	\$106
Estimated ECM Lifetime (Yr):	15
Simple Payback	4.4
Simple Lifetime ROI	244.2%
Simple Lifetime Maintenance Savings	\$0
Simple Lifetime Savings	\$1,590
Internal Rate of Return (IRR)	22%
Net Present Value (NPV)	\$803.42

40 - ECM #2: HW Pipe Insulation

Description:

The hot water heating pipe from the wall to the hot water unit heater is mostly un-insulated and is irradiating heat to the space. These system losses are being exacerbated when the main garage door is open for long periods of time letting cold air enter the space.

This ECM would insulate the section of bare hot water pipes with ½ inch fiberglass insulation.

Energy Savings Calculations:

Hot Water Pipe Insulation Savings Calculation

Existing: Un-Insulated Copper Pipe

Proposed: Addition of 0.5" Fiberglass Insulation

Nominal Pipe Size, In.	Length, Feet	Heat Loss Coefficient	Heat Loss, Btu/Hr	Heat Loss Coefficient	Heat Loss, Btu/Hr		Heat Loss Saved, Btu/Hr
3/4	15	0.43	741.8	0.25	431.3		310.5
		Total Loss Btu/Hr	741.8	Total Loss Btu/Hr	431.3	Total Saved Btu/Hr	310.5
		Therms per year	50.3	Therms per year	29.2	Therms Saved per year	21.0
						Cost Savings	\$25.68

Calculation Constants	
Heating Season Months	6.5
Heating Operating Days	198
Hot Water Boiler Efficiency	70%
Hot Water Supply Temp, F	180
Outdoor Air Base Temp, F	65
Natural Gas Cost (\$/therm)	\$1.22

*Source: Engineering Methods for Estimated the Impacts of Demand-Side Management Programs, Volume 2, EPRI 1993

Energy Savings Summary:

40 - ECM #2 - ENERGY SAVINGS SUMMARY	
Installation Cost (\$):	\$105
NJ Smart Start Equipment Incentive (\$):	\$0
Net Installation Cost (\$):	\$105
Maintenance Savings (\$/Yr):	\$0
Energy Savings (\$/Yr):	\$26
Total Yearly Savings (\$/Yr):	\$26
Estimated ECM Lifetime (Yr):	15
Simple Payback	4.1
Simple Lifetime ROI	266.9%
Simple Lifetime Maintenance Savings	\$0
Simple Lifetime Savings	\$385
Internal Rate of Return (IRR)	23%
Net Present Value (NPV)	\$201.57

#41 – GROUNDS MAINTENANCE BUILDING

41 - ECM #1: Lighting Upgrade**Description:**

The lighting throughout the Grounds Maintenance building consists of 32 watt T8 lamps with electronic ballasts.

The ECM includes re-lamping of 32 watt T8 lamps to 28 watt T8 lamps. The new, energy efficient T8 fixtures will provide adequate lighting and will save on electrical costs due to better performance of the lamp and ballasts.

Energy Savings Calculations:

The **Investment Grade Lighting Audit Appendix** outlines the hours of operation, proposed retrofits, costs, savings, and payback periods for each set of fixtures in the each building.

Energy Savings Summary:

41 - ECM #1 - ENERGY SAVINGS SUMMARY	
Installation Cost (\$):	\$322
NJ Smart Start Equipment Incentive (\$):	\$0
Net Installation Cost (\$):	\$322
Maintenance Savings (\$/Yr):	\$0
Energy Savings (\$/Yr):	\$90
Total Yearly Savings (\$/Yr):	\$90
Estimated ECM Lifetime (Yr):	15
Simple Payback	3.6
Simple Lifetime ROI	319.3%
Simple Lifetime Maintenance Savings	\$0
Simple Lifetime Savings	\$1,350
Internal Rate of Return (IRR)	27%
Net Present Value (NPV)	\$752.41

41 - ECM #2: High Efficiency Gas Fired UH**Description:**

The Grounds Maintenance Building is heated via one Trane gas fired unit heater. The unit is rated at 62 MBH and has an efficiency of 81%.

This energy conservation measure will replace the one (1) gas fired unit heater serving the Grounds Building. Calculation is based a Reznor model high efficiency unit heater with 91% combustion efficiency or equivalent. The existing unit heater will be replaced with a higher energy efficient unit with capacity typical of the existing units.

Energy Savings Calculations:

UNIT HEATER CALCULATIONS			
ECM INPUTS	EXISTING	PROPOSED	SAVINGS
ECM INPUTS	Gas UH	High Eff. Gas UH	
Natural Gas Usage	543		
Quantity	1		
Unit Size Ea.	62 MBH		
Heating Fuel Type	Gas	Gas	
Fuel Heat Value Nat Gas (Btu/Therms)	100,000	100,000	
Heating Efficiency	81%	91%	10%
Building Heat Usage (kBtu)	440	440	0
Nat Gas Cost (\$/Therm)	\$ 1.700	\$ 1.700	
ENERGY SAVINGS CALCULATIONS			
ECM RESULTS	EXISTING	PROPOSED	SAVINGS
Nat Gas Consumption (Therms)	543	483	60
Energy Cost (\$)	\$923	\$822	\$101
COMMENTS:	Heating Savings Based on Actual Building Natural Gas Usage		

Energy Savings Summary:

41 - ECM #2 - ENERGY SAVINGS SUMMARY	
Installation Cost (\$):	\$3,600
NJ Smart Start Equipment Incentive (\$):	\$0
Net Installation Cost (\$):	\$3,600
Maintenance Savings (\$/Yr):	\$0
Energy Savings (\$/Yr):	\$101
Total Yearly Savings (\$/Yr):	\$101
Estimated ECM Lifetime (Yr):	15
Simple Payback	35.6
Simple Lifetime ROI	-57.9%
Simple Lifetime Maintenance Savings	\$0
Simple Lifetime Savings	\$1,515
Internal Rate of Return (IRR)	-9%
Net Present Value (NPV)	(\$2,394.27)

VIII. RENEWABLE/DISTRIBUTED ENERGY MEASURES

Globally, renewable energy has become a priority affecting international and domestic energy policy. The State of New Jersey has taken a proactive approach, and has recently adopted in its Energy Master Plan a goal of 30% renewable energy by 2020. To help reach this goal New Jersey created the Office of Clean Energy under the direction of the Board of Public Utilities and instituted a Renewable Energy Incentive Program to provide additional funding to private and public entities for installing qualified renewable technologies. A renewable energy source can greatly reduce a building's operating expenses while producing clean environmentally friendly energy. CEG has assessed the feasibility of installing renewable energy measures (REM) for the municipality utilizing renewable technologies and concluded that there is potential for solar energy generation. The solar photovoltaic system calculation summary will be concluded as **REM#1** within this report.

Solar Generation

Solar energy produces clean energy and reduces a building's carbon footprint. This is accomplished via photovoltaic panels which are mounted on all south and southwestern facades of the building. Flat roof, as well as sloped areas can be utilized; flat areas will have the panels turned to an optimum solar absorbing angle. (A structural survey of the roof would be necessary before the installation of PV panels is considered). The state of NJ has instituted a program in which one Solar Renewable Energy Certificate (SREC) is given to the Owner for every 1000 kWh of generation. SREC's can be sold anytime on the market at their current market value. The value of the credit varies upon the current need of the power companies. The average value per credit is around \$350, this value was used in our financial calculations. This equates to \$0.35 per kWh generated.

CEG has reviewed the existing roof area of the Administration, Ground Maintenance, and Maintenance Buildings for the purposes of determining a potential for a roof mounted photovoltaic system. A total roof area of 3,060 S.F. can be utilized for a PV system. A depiction of the area utilized is shown in **Renewable / Distributed Energy Measures Calculation Appendix**. Using this square footage it was determined that a system size of 43.7 kilowatts could be installed. A system of this size has an estimated kilowatt hour production of 52,463 KWh annually. A detailed financial analysis can be found in the **Renewable / Distributed Energy Measures Calculation Appendix**. This analysis illustrates the payback of the system over a 25 year period. The eventual degradation of the solar panels and the price of accumulated SREC's are factored into the payback.

The proposed photovoltaic array layout is designed based on the specifications for the Sun Power SPR-230 panel. This panel has a "DC" rated full load output of 230 watts, and has a total panel conversion efficiency of 18%. Although panels rated at higher wattages are available through Sun Power and other various manufacturers, in general most manufacturers who produce commercially available solar panels produce a similar panel in the 200 to 250 watt range. This provides more manufacturer options to the public entity if they wish to pursue the proposed solar recommendation without losing significant system capacity.

The array system capacity was sized on available roof space on the existing facility. Estimated solar array generation was then calculated based on the National Renewable Energy Laboratory PVWatts Version 1.0 Calculator. In order to calculate the array generation an appropriate location with solar data on file must be selected. In addition the system DC rated kilowatt (kW) capacity must be inputted, a DC to AC de-rate factor, panel tilt angle, and array azimuth angle. The DC to AC de-rate factor is based on the panel nameplate DC rating, inverter and transformer efficiencies (95%), mismatch factor (98%), diodes and connections (100%), dc and ac wiring(98%, 99%), soiling, (95%), system availability (95%), shading (if applicable), and age(new/100%). The overall DC to AC de-rate factor has been calculated at an overall rating of 81%. The PVWatts Calculator program then calculates estimated system generation based on average monthly solar irradiance and user provided inputs. The monthly energy generation and offset electric costs from the PVWatts calculator is shown in the **Renewable/Distributed Energy Measures Calculation Appendix**.

The proposed solar array is qualified by the New Jersey Board of Public Utilities Net Metering Guidelines as a Class I Renewable Energy Source. These guidelines allow onsite customer generation using renewable energy sources such as solar and wind with a capacity of 2 megawatts (MW) or less. This limits a customer system design capacity to being a net user and not a net generator of electricity on an annual basis. Although these guidelines state that if a customer does net generate (produce more electricity than they use), the customer will be credited those kilowatt-hours generated to be carried over for future usage on a month to month basis. Then, on an annual basis if the customer is a net generator the customer will then be compensated by the utility the average annual PJM Grid LMP price per kilowatt-hour for the over generation. Due to the aforementioned legislation, the customer is at limited risk if they generate more than they use at times throughout the year. With the inefficiency of today’s energy storage systems, such as batteries, the added cost of storage systems is not warranted and was not considered in the proposed design.

Direct purchase involves the District paying for 100% of the total project cost upfront via one of the methods noted in the Installation Funding Options section below. Calculations include a utility inflation rate as well as the degradation of the solar panels over time. Based on our calculations the following is the payback period:

**Table 7
Financial Summary – Photovoltaic System**

FINANCIAL SUMMARY - PHOTOVOLTAIC SYSTEM		
PAYMENT TYPE	SIMPLE PAYBACK	INTERNAL RATE OF RETURN
Direct Purchase	13.5 Years	5.0%

*The solar energy measure is shown for reference in the executive summary Renewable Energy Measure (REM) table

Given the large amount of capital required by the District to invest in a solar system through a Direct Purchase CEG does not recommend the District pursue this route. It would be more

advantageous for the District to solicit Power Purchase Agreement (PPA) Providers who will own, operate, and maintain the system for a period of 15 years. During this time the PPA Provider would sell all of the electric generated by Solar Arrays to the District at a reduced rate compared to their existing electric rate.

Wind Generation

Wind Analysis is included in Energy Audit Reports for the Regional High School and RMT Middle School.

IX. ENERGY PURCHASING AND PROCUREMENT STRATEGY

Load Profile:

Load Profile analysis was performed to determine the seasonal energy usage of the facilities. Irregularities in the load profile will indicate potential problems within the facility. Consequently based on the profile a recommendation will be made to remedy the irregularity in energy usage. For this report, the facility's energy consumption data was gathered in table format and plotted in graph form to create the load profile. Refer to The Electric and Natural Gas Usage Profiles included within this report to reference the respective electricity and natural gas usage load profiles.

Electricity:

The electricity usage profile demonstrates a steady year long load profile for facilities that have occupancy during the summer months.

The historical usage profile is beneficial and will allow for more competitive energy prices when shopping for alternative suppliers mainly due to the relatively flat load profile. Third Party Supplier (TPS) electric commodity contracts that offer's a firm, fixed price for 100% of the facilities electric requirements and are lower than the Atlantic City Electric's (AECO) BGS-FP default rate are recommended.

Natural Gas:

The Natural Gas Usage Profile demonstrates a very typical natural gas (heat load) profile. The summer months June – August have little consumption.

This load profile will yield less favorable natural gas pricing when shopping for alternative suppliers. This is because the higher winter month consumption will yield higher pricing which will not be offset by the summer month consumption. Nymex commodity pricing is generally higher in the winter months of November – March and lower in the summer months of April – October. Obtaining a flat load profile, (usage is similar each month), will yield optimum natural gas pricing when shopping for alternative suppliers. Third Party Supplier (TPS) natural gas commodity contracts that offer a product structure to include either 1) a fixed basis rate with a market based Nymex/commodity rate or 2) a fixed basis rate with fixed Nymex/commodity winter rate (Nov – March) and market based Nymex/commodity rate for the summer months (April – October) for 100% of the facilities metered natural gas requirements are both recommended due to current market pricing.

Tariff Analysis:Electricity:

The facilities receive electrical service through Atlantic City Electric (AECO) on AGS-Sec (Annual General Service Secondary) rate and MGS (Monthly General Service). The facilities have contracted a Third Party Supplier (TPS) to provide electric commodity service on a fixed price through South Jersey Energy as of May 2009. The current electric supply contract expires May 2012. The current electric commodity rate is below the AECO BGS-FP thus providing a savings. For electric supply (generation) service, the client has a choice to either use AECO's default service rate BGS-FP or contract with a Third Party Supplier (TPS) to supply electric.

Each year since 2002, the four New Jersey Electric Distribution Companies (EDCs) - Public Service Gas & Electric Company (PSE&G), Atlantic City Electric Company (ACE), Jersey Central Power & Light Company (JCP&L), and Rockland Electric Company (RECO) - have procured several billion dollars of electric supply to serve their Basic Generation Service (BGS) customers through a statewide auction process held in February.

BGS refers to the service of customers who are not served by a third party supplier or competitive retailer. This service is sometimes known as Standard Offer Service, Default Service, or Provider of Last Resort Service.

The Auction Process has consisted of two auctions that are held concurrently, one for larger customers on an hourly price plan (BGS-CIEP) and one for smaller commercial and residential customers on a fixed-price plan (BGS-FP). This facility's rate structure is based on the fixed-price plan (BGS-FP).

The utility, Atlantic City Electric will continue to be responsible for maintaining the existing network of wires, pipes and poles that make up the delivery system, which will serve all consumers, regardless of whom they choose to purchase their electricity or natural gas from. AECO's delivery service rate includes the following charges: Customer Service Charge, Distribution Charge, Market Transition, Transition Bond Charge, Non Utility Generation Charge, Societal Benefits Charge (SBC), Infrastructure Investment Charge, System Control Charge, Regulatory Assets Recovery Charge, and Regional Greenhouse Gas Initiative Charge.

Natural Gas:

The facilities currently receive natural gas distribution service through South Jersey Gas on rate schedules General Service Gas - Firm Transportation (GSG-FT) and have a master billing account which eliminates individual customer service charges and provides long term savings. Pepco Energy is the contracted Third Party Supplier (TPS) which provides natural gas commodity supply service. The terms and conditions of the natural gas contract with Pepco Energy is not available, however historical billings suggest the current commodity pricing under contract is much higher (approx \$.30/therm or \$3.00/decatherm) than current market pricing and South Jersey Gas BGSS' price to compare.

South Jersey Gas provides basic gas supply service (BGSS) to customers who choose not to shop from a Third Party Supplier (TPS) for natural gas commodity. The option is essential to protect the reliability of service to consumers as well as protecting consumers if a third party supplier defaults or fails to provide commodity service. Please refer to the link below for a recap of natural gas BGSS charges from South Jersey Gas for rate schedule GSG.

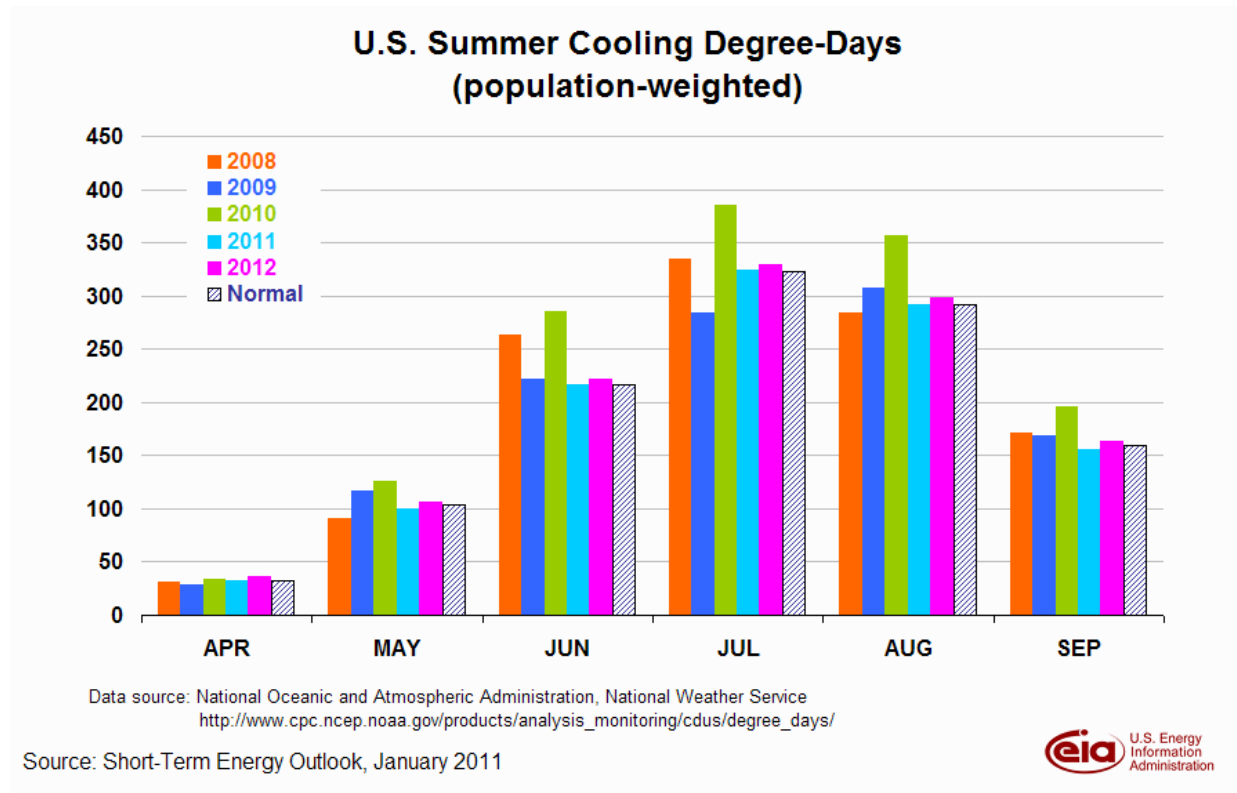
<http://www.southjerseygas.com/108/tariff/bgssrates.pdf>

The utility, South Jersey Gas is responsible for maintaining the existing network of wires, pipes and poles that make up the delivery system, which will serve all consumers, regardless of whom they choose to purchase their electricity or natural gas from. South Jersey Gas's delivery service rate includes the following charges: Customer Service Charge, Distribution Charge, & Societal Benefits Charge (SBC).

Electric and Natural Gas Commodities Market Overview:

Current electricity and natural gas market pricing has remained relatively stable over the last year. Commodity pricing in 2008 marked historical highs in both natural gas and electricity commodity. Commodity pricing commencing spring of 2009 continuing through 2010, has decreased dramatically over 2008 historic highs and continues to be favorable for locking in long term (2-5 year) contracts with 3rd Party Supplier's for both natural gas and electricity supply requirements.

It is important to note that both natural gas and electric commodity market prices are moved by supply and demand, political conditions, market technicals and trader sentiment. This market is continuously changing Energy commodity pricing is also correlated to weather forecasts. Because weather forecasts are dependable only in the short-term, prolonged temperature extremes can really cause extreme price swings.



Short Term Energy Outlook - US Energy Information Administration (1/11/2011):

U.S. Natural Gas Prices. The Henry Hub spot price averaged \$4.25 per MMBtu during December, an increase of about 54 cents from November's price of \$3.71 per MMBtu. EIA expects the higher forecast production during the first half of 2011 compared with the same period last year, combined with a decline in consumption, to moderate natural gas spot prices. The projected spot price falls to a low of \$3.73 per MMBtu in June then rises to \$4.61 in December, averaging \$4.02 per MMBtu for all of 2011, which is \$0.37 per MMBtu lower than the 2010 average and \$0.31 per MMBtu lower than in last month's *Outlook*. In 2012, the spot price rises to an average of \$4.50 per MMBtu.

Uncertainty over future natural gas prices is slightly lower this year compared with last year at this time. Natural gas futures for March 2011 delivery (for the 5-day period ending January 6) averaged \$4.39 per MMBtu, and the average implied volatility over the same period was 43 percent. This produced lower and upper bounds for the 95-percent confidence interval for March 2011 contracts of \$3.21 per MMBtu and \$6.02 per MMBtu, respectively. At this time last year, the natural gas March 2010 futures contract averaged \$5.73 per MMBtu and implied volatility averaged 57 percent. The corresponding lower and upper limits of the 95-percent confidence interval were \$3.88 per MMBtu and \$8.47 per MMBtu.

U.S. Electricity Retail Prices. EIA expects the U.S. retail price for electricity distributed to the residential sector during 2010 to average 11.6 cents per kilowatt-hour, about the same level as in 2009. EIA expects the U.S. residential price to increase only slightly over the forecast period--by 0.6 percent in 2011 and by 1.0 percent in 2012.

Recommendations:

1. CEG recommends a continued aggregated approach for 3rd party commodity supply procurement strategies for electric and natural gas supply service. Aggregating the usage of all facilities for electricity and natural gas supply service, would allow the facilities to achieve a reduction in commodity supply costs. Energy commodities are among the most volatile of all commodities, however at this point and time, energy is extremely competitive. Contracts due to expire in the near term would yield more favorable pricing than previously realized. It is important to aggregate usage where available and take advantage of these current market prices quickly, before energy increases.

Overall, after review of the utility consumption, billing, and current commodity pricing outlook, CEG recommends that the school facilities continue to participate in the ACES energy supply aggregation groups for both electricity and natural gas. Both aggregation groups utilize the advisement of 3rd party unbiased Energy Consulting Firm experienced in the aggregation of and procurement of retail electricity and natural gas commodity. It is important to note that the Energy Consulting Firm should incorporate a rational, defensible strategy for purchasing commodity in volatile markets based upon the following:

- Budgets that reflect sound market intelligence
 - An understanding of historical prices and trends
 - Awareness of seasonal opportunities (e.g. shoulder months)
 - Negotiation of fair contractual terms
 - An aggressive, market based price
2. CEG recommends that the school district consider utilizing a third party utility billing-auditing service to further analyze historical utility invoices such as water, sewer, natural gas and electric for incorrect billings and rate tariff optimization services. This service can be based on a shared savings model with no cost to the school district. The service could provide refunds on potential incorrect billings that may have been passed through by the utilities and paid by the school.

X. INSTALLATION FUNDING OPTIONS

CEG has reviewed various funding options for the facility owner to utilize in subsidizing the costs for installing the energy conservation measures noted within this report. Below are a few alternative funding methods:

- i. *Energy Savings Improvement Program (ESIP)* – Public Law 2009, Chapter 4 authorizes government entities to make energy related improvements to their facilities and pay for the costs using the value of energy savings that result from the improvements. The “Energy Savings Improvement Program (ESIP)” law provides a flexible approach that can allow all government agencies in New Jersey to improve and reduce energy usage with minimal expenditure of new financial resources.
- ii. *Municipal Bonds* – Municipal bonds are a bond issued by a city or other local government, or their agencies. Potential issuers of municipal bonds include cities, counties, redevelopment agencies, school districts, publicly owned airports and seaports, and any other governmental entity (or group of governments) below the state level. 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.
- iii. *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. These renewable energy systems are typically solar panels, windmills or other systems that create renewable energy. In exchange for the third party’s work of installing, maintaining and owning the renewable energy system, the contracting unit (Owner) agrees to purchase the power generated by the renewable energy system from the third party at agreed upon energy rates.
- iv. *Pay For Performance* – The New Jersey Smart Start Pay for Performance program includes incentives based on savings resulted from implemented ECMs. The program is available for all buildings that were audited as part of the NJ Clean Energy’s Local Government Energy Audit Program. The facility’s participation in the program is assisted by an approved program partner. An “Energy Reduction Plan” is created with the facility and approved partner to show at least 15% reduction in the building’s current energy use. Multiple energy conservation measures implemented together are applicable toward the total savings of at least 15%. No more than 50% of the total energy savings can result from lighting upgrades / changes.

Total incentive is capped at 50% of the project cost. The program savings is broken down into three benchmarks; Energy Reduction Plan, Project Implementation, and Measurement and Verification. Each step provides additional incentives as the energy reduction project continues. The benchmark incentives are as follows:

1. Energy Reduction Plan – Upon completion of an energy reduction plan by an approved program partner, the incentive will grant \$0.10 per square foot between \$5,000 and \$50,000, and not to exceed 50% of the facility’s annual energy expense. (Benchmark #1 is not provided in addition to the local government energy audit program incentive.)
 2. Project Implementation – Upon installation of the recommended measures along with the “Substantial Completion Construction Report,” the incentive will grant savings per KWH or Therm based on the program’s rates. Minimum saving must be 15%. (Example \$0.11 / kWh for 15% savings, \$0.12/ kWh for 17% savings, ... and \$1.10 / Therm for 15% savings, \$1.20 / Therm for 17% saving, ...) Increased incentives result from projected savings above 15%.
 3. Measurement and Verification – Upon verification 12 months after implementation of all recommended measures, that actual savings have been achieved, based on a completed verification report, the incentive will grant additional savings per kWh or Therm based on the program’s rates. Minimum savings must be 15%. (Example \$0.07 / kWh for 15% savings, \$0.08/ kWh for 17% savings, ... and \$0.70 / Therm for 15% savings, \$0.80 / Therm for 17% saving, ...) Increased incentives result from verified savings above 15%.
- v. *Direct Install Program* – The New Jersey Clean Energy’s Direct Install Program is a state funded program that targets small commercial and industrial facilities with peak demand of less than 100 kW. This turnkey program is aimed at providing owners a seamless, comprehensive process for analysis, equipment replacement and financial incentives to reduce consumption, lower utility costs and improve profitability. The program covers up to 60% of the cost for eligible upgrades including lighting, lighting controls, refrigeration, HVAC, motors, variable speed drives, natural gas and food service. Participating contractors (refer to www.njcleanenergy.com) conduct energy assessments in addition to your standard local government energy audit and install the cost-effective measures.
- vi. *Energy Efficiency and Conservation Block Grants* – The EECGB rebate provides supplemental funding up to \$50,000 for counties and local government entities to implement energy conservation measures. The EECGB funding is provided through the American Recovery and Reinvestment Act (ARRA). The local

government must be among the eligible local government entities listed on the NJ Clean Energy website as follows - <http://njcleanenergy.com/commercial-industrial/programs/eecbg-eligible-entities>. This program is limited to municipalities and counties that have not already received grants directly through the US department of Energy.

This incentive is provided in addition to the other NJ Clean Energy program funding. This program's incentive is considered the entity's capital and therefore can be applied to the LGEA program's requirements to implement the recommended energy conservation measures totaling at least 25% of the energy audit cost. Additional requirements of this program are as follows:

1. The entity must utilize additional funding through one or more of the NJ Clean Energy programs such as Smart Start, Direct Install, and Pay for Performance.
2. The EECBG funding in combination with other NJ Clean Energy programs may not exceed the total cost of the energy conservation measures being implemented.
3. Envelope measures are applicable only if recommended by the LGEA energy audit and if the energy audit was completed within the past 12 months.
4. New construction and previously installed measures are not eligible for the EECBG rebate.
5. Energy conservation measures eligible for the EECBG must fall within the list of approved energy conservation measures. The complete list of eligible measures and other program requirements are included in the "EECBG Complete Application Package." The application package is available on the NJ Clean Energy website - <http://njcleanenergy.com/commercial-industrial/programs/energy-efficiency-and-conservation-block-grants>.

CEG 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.

XI. ADDITIONAL RECOMMENDATIONS

The following recommendations include no cost/low cost measures, Operation & Maintenance (O&M) items, and water conservation measures with attractive paybacks. These measures are not eligible for the Smart Start Buildings incentives from the office of Clean Energy but save energy none the less.

- A. Chemically clean the condenser and evaporator coils periodically to optimize efficiency. Poorly maintained heat transfer surfaces can reduce efficiency 5-10%.
- B. Maintain all weather stripping on windows and doors.
- C. Clean all light fixtures to maximize light output.
- D. Provide more frequent air filter changes to decrease overall system power usage and maintain better IAQ.
- E. Confirm that outside air economizers on the rooftop units are functioning properly to take advantage of free cooling and avoid excess outside air during occupied periods.
- F. Educate staff on awareness of wasteful energy practices such as leaving lights on unnecessarily, leaving on of non-essential computer and/or equipment at the end of the day, leaving of outside doors/windows open as a means to control room temperature, etc.

In addition to the recommendations above, implementing Retro-Commissioning would be beneficial for these facilities. Retro-Commissioning is a means to verify your current equipment is operating at its designed efficiency, capacity, airflow, and overall performance. Retro-Commissioning provides valuable insight into systems or components not performing correctly or efficiently. The commissioning process defines the original system design parameters and recommends revisions to the current system operating characteristics.

XII. ENERGY AUDIT ASSUMPTIONS

The assumptions utilized in this energy audit include but are not limited to following:

- A. Cost Estimates noted within this report are based on industry accepted costing data such as RS MeansTM Cost Data, contractor pricing and engineering estimates. All cost estimates for this level of auditing are +/- 20%. Prevailing wage rates for the specified region has been utilized to calculate installation costs. The cost estimates indicated within this audit should be utilized by the owner for prioritizing further project development post the energy audit. Project development would include investment grade auditing and detailed engineering.
- B. Energy savings noted within this audit are calculated utilizing industry standard procedures and accepted engineering assumptions. For this level of auditing, energy savings are not guaranteed.
- C. Information gathering for each facility is strongly based on interviews with operations personnel. Information dependent on verbal feedback is used for calculation assumptions including but not limited to the following:
 - a. operating hours
 - b. equipment type
 - c. control strategies
 - d. scheduling
- D. Information contained within the major equipment list is based on the existing owner documentation where available (drawings, O&M manuals, etc.). If existing owner documentation is not available, catalog information is utilized to populate the required information.
- E. Equipment incentives and energy credits are based on current pricing and status of rebate programs. Rebate availability is dependent on the individual program funding and applicability.
- F. Equipment (HVAC, Plumbing, Electrical, & Lighting) noted within an ECM recommendation is strictly noted as a **basis for calculation** of energy savings. The owner should use this equipment information as a benchmark when pursuing further investment grade project development and detailed engineering for specific energy conservation measures.

Utility bill annual averages are utilized for calculation of all energy costs unless otherwise noted. Accuracy of the utility energy usage and costs are based on the information provided. Utility information including usage and costs is estimated where incomplete data is provided.

APPENDIX A

ECM COST & SAVINGS BREAKDOWN

CONCORD ENGINEERING GROUP

Lower Cape May Regional Administration, Concession Stand, Vehicle Maint. Garage, Maintenance, Grounds Maint. Buildings

ECM ENERGY AND FINANCIAL COSTS AND SAVINGS SUMMARY

ECM NO.	DESCRIPTION	INSTALLATION COST				YEARLY SAVINGS			ECM LIFETIME (Yr)	LIFETIME ENERGY SAVINGS	LIFETIME MAINTENANCE SAVINGS	LIFETIME ROI	SIMPLE PAYBACK	INTERNAL RATE OF RETURN	NET PRESENT VALUE (NPV)
		MATERIAL	LABOR	REBATES, INCENTIVES	NET INSTALLATION COST	ENERGY	MAINT. / SREC	TOTAL		(Yearly Saving * ECM Lifetime)	(Yearly Maint Saving * ECM Lifetime)	(Lifetime Savings - Net Cost) / (Net Cost)	(Net cost / Yearly Savings)	$\sum_{n=0}^N \frac{C_n}{(1+IRR)^n}$	$\sum_{n=0}^N \frac{C_n}{(1+DR)^n}$
		(\$)	(\$)	(\$)	(\$)	(\$/Yr)	(\$/Yr)	(\$/Yr)		(\$)	(\$)	(%)	(Yr)	(\$)	(\$)
37 - ECM #1	Lighting Upgrade	\$6,596	\$1,649	\$1,280	\$6,965	\$1,040	\$200	\$1,240	15	\$18,600	\$3,000	167.0%	5.6	15.84%	\$7,838.04
37 - ECM #2	Lighting Controls	\$1,360	\$340	\$315	\$1,385	\$567	\$0	\$567	15	\$8,505	\$0	514.1%	2.4	40.69%	\$5,383.81
37 - ECM #3	Programmable Thermostat Upgrade	\$540	\$270	\$0	\$810	\$595	\$0	\$595	15	\$8,925	\$0	1001.9%	1.4	73.44%	\$6,293.07
37 - ECM #4	Instant Domestic Hot Water Upgrade	\$1,600	\$1,500	\$300	\$2,800	\$313	\$0	\$313	12	\$3,756	\$0	34.1%	8.9	4.84%	\$315.60
37 - ECM #5	Occupancy Controlled Power Strips	\$900	\$0	\$0	\$900	\$124	\$0	\$124	15	\$1,856	\$0	106.3%	7.3	10.80%	\$577.32
38 - ECM #1	Lighting Upgrade	\$1,848	\$0	\$0	\$1,848	\$140	\$0	\$140	15	\$2,100	\$0	13.6%	13.2	1.64%	(\$176.69)
38 - ECM #2	UH Electric to Gas Conversion	\$1,000	\$1,800	\$0	\$2,800	\$624	\$0	\$624	15	\$9,360	\$0	234.3%	4.5	21.01%	\$4,649.27
38 - ECM #3	Gas Fired Hot Water Heater	\$1,600	\$2,000	\$300	\$3,300	\$205	\$0	\$205	12	\$2,460	\$0	-25.5%	16.1	-4.25%	(\$1,259.43)
39 - ECM #1	Lighting Upgrade	\$3,850	\$0	\$360	\$3,490	\$612	\$0	\$612	15	\$9,180	\$0	163.0%	5.7	15.52%	\$3,816.02
39 - ECM #2	Lighting Controls	\$300	\$0	\$0	\$300	\$32	\$0	\$32	15	\$480	\$0	60.0%	9.4	6.55%	\$82.01
39 - ECM #3	DHW Pipe Insulation	\$16	\$12	\$0	\$28	\$13	\$0	\$13	15	\$198	\$0	606.1%	2.1	46.92%	\$129.34
40 - ECM #1	Lighting Upgrade	\$482	\$0	\$20	\$462	\$106	\$0	\$106	15	\$1,590	\$0	244.2%	4.4	21.74%	\$803.42
40 - ECM #2	HW Pipe Insulation	\$60	\$45	\$0	\$105	\$26	\$0	\$26	15	\$385	\$0	266.9%	4.1	23.42%	\$201.57
41 - ECM #1	Lighting Upgrade	\$322	\$0	\$0	\$322	\$90	\$0	\$90	15	\$1,350	\$0	319.3%	3.6	27.19%	\$752.41
41 - ECM #2	High Efficiency Unit Heater	\$2,600	\$1,000	\$0	\$3,600	\$101	\$0	\$101	15	\$1,515	\$0	-57.9%	35.6	-9.27%	(\$2,394.27)
REM RENEWABLE ENERGY AND FINANCIAL COSTS AND SAVINGS SUMMARY															
REM #1	43.7 KW Roof Solar Array	\$349,600	\$0	\$0	\$349,600	\$7,450	\$18,362	\$25,812	25	\$645,300	\$459,050	84.6%	13.5	5.40%	\$99,868.17

- Notes: 1) The variable Cn in the formulas for Internal Rate of Return and Net Present Value stands for the cash flow during each period.
 2) The variable DR in the NPV equation stands for Discount Rate
 3) For NPV and IRR calculations: From n=0 to N periods where N is the *lifetime of ECM* and Cn is the *cash flow during each period*.

APPENDIX B



Concord Engineering Group, Inc.

520 BURNT MILL ROAD
VOORHEES, NEW JERSEY 08043
PHONE: (856) 427-0200
FAX: (856) 427-6508

SmartStart Building Incentives

The NJ SmartStart Buildings Program offers financial incentives on a wide variety of building system equipment. The incentives were developed to help offset the initial cost of energy-efficient equipment. The following tables show the current available incentives as of February, 2010:

Electric Chillers

Water-Cooled Chillers	\$12 - \$170 per ton
Air-Cooled Chillers	\$8 - \$52 per ton

Energy Efficiency must comply with ASHRAE 90.1-2004

Gas Cooling

Gas Absorption Chillers	\$185 - \$400 per ton
Gas Engine-Driven Chillers	Calculated through custom measure path)

Desiccant Systems

\$1.00 per cfm – gas or electric

Electric Unitary HVAC

Unitary AC and Split Systems	\$73 - \$93 per ton
Air-to-Air Heat Pumps	\$73 - \$92 per ton
Water-Source Heat Pumps	\$81 per ton
Packaged Terminal AC & HP	\$65 per ton
Central DX AC Systems	\$40- \$72 per ton
Dual Enthalpy Economizer Controls	\$250
Occupancy Controlled Thermostat (Hospitality & Institutional Facility)	\$75 per thermostat

Energy Efficiency must comply with ASHRAE 90.1-2004

Ground Source Heat Pumps

Closed Loop & Open Loop	\$450 per ton, EER ≥ 16
	\$600 per ton, EER ≥ 18
	\$750 per ton, EER ≥ 20

Energy Efficiency must comply with ASHRAE 90.1-2004

Gas Heating

Gas Fired Boilers < 300 MBH	\$300 per unit
Gas Fired Boilers ≥ 300 - 1500 MBH	\$1.75 per MBH
Gas Fired Boilers ≥1500 - ≤ 4000 MBH	\$1.00 per MBH
Gas Fired Boilers > 4000 MBH	(Calculated through Custom Measure Path)
Gas Furnaces	\$300 - \$400 per unit, AFUE ≥ 92%

Variable Frequency Drives

Variable Air Volume	\$65 - \$155 per hp
Chilled-Water Pumps	\$60 per hp
Compressors	\$5,250 to \$12,500 per drive

Natural Gas Water Heating

Gas Water Heaters ≤ 50 gallons	\$50 per unit
Gas-Fired Water Heaters > 50 gallons	\$1.00 - \$2.00 per MBH
Gas-Fired Booster Water Heaters	\$17 - \$35 per MBH
Gas Fired Tankless Water Heaters	\$300 per unit

Prescriptive Lighting

Retro fit of T12 to T-5 or T-8 Lamps w/Electronic Ballast in Existing Facilities	\$10 per fixture (1-4 lamps)
Replacement of T12 with new T-5 or T-8 Lamps w/Electronic Ballast in Existing Facilities	\$25 per fixture (1-2 lamps) \$30 per fixture (3-4 lamps)
Replacement of incandescent with screw-in PAR 38 or PAR 30 (CFL) bulb	\$7 per bulb
T-8 reduced Wattage (28w/25w 4', 1-4 lamps) Lamp & ballast replacement	\$10 per fixture
Hard-Wired Compact Fluorescent	\$25 - \$30 per fixture
Metal Halide w/Pulse Start	\$25 per fixture
LED Exit Signs	\$10 - \$20 per fixture
T-5 and T-8 High Bay Fixtures	\$16 - \$284 per fixture
HID ≥ 100w Retrofit with induction lamp, power coupler and generator (must be 30% less watts/fixture than HID system)	\$50 per fixture
HID ≥ 100w Replacement with new HID ≥ 100w	\$70 per fixture
LED Refrigerator/Freezer case lighting replacement of fluorescent in medium and low temperature display case	\$42 per 5 foot \$65 per 6 foot

Lighting Controls – Occupancy Sensors

Wall Mounted	\$20 per control
Remote Mounted	\$35 per control
Daylight Dimmers	\$25 per fixture
Occupancy Controlled hi-low Fluorescent Controls	\$25 per fixture controlled

Lighting Controls – HID or Fluorescent Hi-Bay Controls

Occupancy hi-low	\$75 per fixture controlled
Daylight Dimming	\$75 per fixture controlled
Daylight Dimming - office	\$50 per fixture controlled

Premium Motors

Three-Phase Motors	\$45 - \$700 per motor
Fractional HP Motors Electronic Communicated Motors (replacing shaded pole motors in refrigerator/freezer cases)	\$40 per electronic communicated motor

Other Equipment Incentives

Performance Lighting	\$1.00 per watt per SF below program incentive threshold, currently 5% more energy efficient than ASHRAE 90.1- 2004 for New Construction and Complete Renovation
Custom Electric and Gas Equipment Incentives	not prescriptive
Custom Measures	\$0.16 KWh and \$1.60/Therm of 1st year savings, or a buy down to a 1 year payback on estimated savings. Minimum required savings of 75,000 KWh or 1,500 Therms and a IRR of at least 10%.
Multi Measures Bonus	15%

APPENDIX C



STATEMENT OF ENERGY PERFORMANCE

LCMSD Administration Building

Building ID: 2555716
For 12-month Period Ending: May 31, 2010¹
Date SEP becomes ineligible: N/A

Date SEP Generated: February 17, 2011

Facility
 LCMSD Administration Building
 687 Route 9
 Erma, NJ 08204

Facility Owner
 Lower Cape May Regional School District
 BOE
 687 Route 9
 Cape May, NJ 08204

Primary Contact for this Facility
 James Rutala
 717 River Drive
 Linwood, NJ 08221

Year Built: 1989
Gross Floor Area (ft²): 5,500

Energy Performance Rating² (1-100) 7

Site Energy Use Summary³

Electricity - Grid Purchase(kBtu)	264,119
Natural Gas (kBtu) ⁴	211,146
Total Energy (kBtu)	475,265

Energy Intensity⁵

Site (kBtu/ft ² /yr)	86
Source (kBtu/ft ² /yr)	201

Emissions (based on site energy use)

Greenhouse Gas Emissions (MtCO ₂ e/year)	N/A
---	-----

Electric Distribution Utility

N/A

National Average Comparison

National Average Site EUI	49
National Average Source EUI	113
% Difference from National Average Source EUI	78%
Building Type	Office

Meets Industry Standards⁶ for Indoor Environmental Conditions:

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

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

Certifying Professional
 Michael Fischette
 520 South Burnt Mill Road
 Voorhees, NJ 08043

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.

Statement of Energy Performance

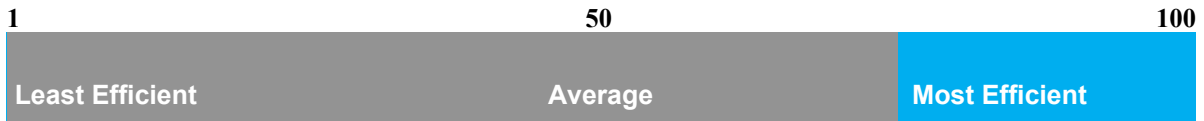
2010

LCMSD Administration Building
687 Route 9
Erma, NJ 08204

Portfolio Manager Building ID: 2555716

The energy use of this building has been measured and compared to other similar buildings using the Environmental Protection Agency's (EPA's) Energy Performance Scale of 1–100, with 1 being the least energy efficient and 100 the most energy efficient. For more information, visit energystar.gov/benchmark.

This building's score



This building uses 201 kBtu per square foot per year.*

*Based on source energy intensity for the 12 month period ending May 2010

Buildings with a score of 75 or higher may qualify for EPA's ENERGY STAR.

I certify that the information contained within this statement is accurate and in accordance with U.S. Environmental Protection Agency's measurement standards, found at energystar.gov

Date of certification





STATEMENT OF ENERGY PERFORMANCE

LCMSD Athletic Field Concession

Building ID: 2555928

For 12-month Period Ending: May 31, 2010¹

Date SEP becomes ineligible: N/A

Date SEP Generated: February 17, 2011

Facility

LCMSD Athletic Field Concession
Route 9 & Bennett Crossing
Erma, NJ 08204

Facility Owner

Lower Cape May Regional School District
BOE
687 Route 9
Cape May, NJ 08204

Primary Contact for this Facility

James Rutala
717 River Drive
Linwood, NJ 08221

Year Built: 2001

Gross Floor Area (ft²): 3,500Energy Performance Rating² (1-100) N/A**Site Energy Use Summary³**

Electricity - Grid Purchase(kBtu)	114,332
Natural Gas - (kBtu) ⁴	0
Total Energy (kBtu)	114,332

Energy Intensity⁵

Site (kBtu/ft ² /yr)	33
Source (kBtu/ft ² /yr)	109

Emissions (based on site energy use)

Greenhouse Gas Emissions (MtCO ₂ e/year)	N/A
---	-----

Electric Distribution Utility

N/A

National Average Comparison

National Average Site EUI	241
National Average Source EUI	753
% Difference from National Average Source EUI	-85%
Building Type	Convenience Store (with or without Gas Station)

Meets Industry Standards⁶ for Indoor Environmental Conditions:

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

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

Certifying Professional

Michael Fischette
520 South Burnt Mill Road
Voorhees, NJ 08043

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.



STATEMENT OF ENERGY PERFORMANCE

LCMSD Grounds Maintenance

Building ID: 2555934
For 12-month Period Ending: May 31, 2010¹
Date SEP becomes ineligible: N/A

Date SEP Generated: February 17, 2011

Facility
 LCMSD Grounds Maintenance
 Route 9 & Bennett Crossing
 Erma, NJ 08204

Facility Owner
 Lower Cape May Regional School District
 BOE
 687 Route 9
 Cape May, NJ 08204

Primary Contact for this Facility
 James Rutala
 717 River Drive
 Linwood, NJ 08221

Year Built: 2002
Gross Floor Area (ft²): 3,200

Energy Performance Rating² (1-100) N/A

Site Energy Use Summary³

Natural Gas (kBtu) ⁴	57,190
Electricity - (kBtu)	0
Total Energy (kBtu)	57,190

Energy Intensity⁵

Site (kBtu/ft ² /yr)	18
Source (kBtu/ft ² /yr)	19

Emissions (based on site energy use)

Greenhouse Gas Emissions (MtCO ₂ e/year)	N/A
---	-----

Electric Distribution Utility

N/A

National Average Comparison

National Average Site EUI	25
National Average Source EUI	56
% Difference from National Average Source EUI	-67%
Building Type	Storage/Shipping/Non-Refrigerated Warehouse

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 Standards⁶ for Indoor Environmental Conditions:

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

Certifying Professional

Michael Fischette
 520 South Burnt Mill Road
 Voorhees, NJ 08043

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.



STATEMENT OF ENERGY PERFORMANCE

LCMSD Vehicle Maintenance Garage

Building ID: 2555912
 For 12-month Period Ending: May 31, 2010¹
 Date SEP becomes ineligible: N/A

Date SEP Generated: February 17, 2011

Facility LCMSD Vehicle Maintenance Garage Route 9 & Bennett Crossing Erma, NJ 08204	Facility Owner Lower Cape May Regional School District BOE 687 Route 9 Cape May, NJ 08204	Primary Contact for this Facility James Rutala 717 River Drive Linwood, NJ 08221
---	--	--

Year Built: 1980
 Gross Floor Area (ft²): 6,000

Energy Performance Rating² (1-100) N/A

Site Energy Use Summary³

Natural Gas (kBtu) ⁴	215,329
Electricity - (kBtu)	0
Total Energy (kBtu)	215,329

Energy Intensity⁵

Site (kBtu/ft ² /yr)	36
Source (kBtu/ft ² /yr)	38

Emissions (based on site energy use)

Greenhouse Gas Emissions (MtCO ₂ e/year)	N/A
---	-----

Electric Distribution Utility

N/A

National Average Comparison

National Average Site EUI	77
National Average Source EUI	150
% Difference from National Average Source EUI	-75%
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 Standards⁶ for Indoor Environmental Conditions:

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

Certifying Professional

Michael Fischette
 520 South Burnt Mill Road
 Voorhees, NJ 08043

Notes:

- 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.
- 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.
- Values represent energy consumption, annualized to a 12-month period.
- 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.
- Values represent energy intensity, annualized to a 12-month period.
- 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.

APPENDIX D

MAJOR EQUIPMENT LIST

Concord Engineering Group

Administration Building

Rooftop / AC Units

Tag	AC-1	AHU-1	AC-2
Unit Type	Condensing Unit	Air Handler/Furnace	Condensing Unit
Qty	1	1	1
Location	Building Rear	Mech Room	Building Rear
Area Served	Middle Offices	Middle Offices	Rear Offices
Manufacturer	ICP	Rheem	Trane
Model #	N2A036AHA200	Imperial 80 Plus	2TWA3060A3000AA
Serial #	X062782075	N/A	8241X852F
Cooling Type	DX	DX	DX
Cooling Capacity (Tons)	3	3	5
Cooling Efficiency (SEER/EER)	10 SEER		10 SEER
Heating Type	On Indoor Unit	Furnace	On Indoor Unit
Heating Input (MBH)			N/A
Efficiency		80%	N/A
Fuel		Nat. Gas	N/A
Approx Age	5		3
ASHRAE Service Life	15	15	15
Remaining Life	10		12
Comments			

Rooftop / AC Units

Tag	AHU-2	AC-3	
Unit Type	Air Handler/Furnace	Condensing Unit	
Qty	1	1	
Location	Mech Room	Building Side	
Area Served	Rear Offices	Front Offices	
Manufacturer	Trane	Trane	
Model #	XR80	2TWA3036A3000AA	
Serial #	N/A	739556D4F	
Cooling Type	DX	DX	
Cooling Capacity (Tons)	5	3	
Cooling Efficiency (SEER/EER)		10 SEER	
Heating Type	Furnace	On Indoor Unit	
Heating Input (MBH)	N/A	N/A	
Efficiency	80%	N/A	
Fuel	Nat. Gas	Nat. Gas	
Approx Age	3	4	
ASHRAE Service Life	15	15	
Remaining Life	12	11	
Comments		Couldn't Access Indoor Unit	

MAJOR EQUIPMENT LIST

Concord Engineering Group

Administration Building

Domestic Water Heaters

Tag	HWH-1		
Unit Type	Electric Boiler		
Qty	1		
Location	Mech Room		
Area Served	Building		
Manufacturer	RUUD		
Model #	EGLS50-6-G		
Serial #	0888500121		
Size (Gallons)	50		
Input Capacity (MBH/KW)	6 KW		
Recovery (Gal/Hr)			
Efficiency %	98%		
Fuel	Electric		
Approx Age	23		
ASHRAE Service Life	12		
Remaining Life	(11)		
Comments			

MAJOR EQUIPMENT LIST

Concord Engineering Group

Concession Stand

Domestic Water Heaters

Tag	HWH-1		
Unit Type	Electric Boiler		
Qty	1		
Location	Closet		
Area Served	Concession Stand		
Manufacturer	Bradford & White		
Model #	LD30L33B090		
Serial #	XF4429418		
Size (Gallons)	30		
Input Capacity (MBH/KW)	4.5 KW		
Recovery (Gal/Hr)	N/A		
Efficiency %	98%		
Fuel	Electric		
Approx Age	6		
ASHRAE Service Life	12		
Remaining Life	6		
Comments	208 V		

MAJOR EQUIPMENT LIST

Concord Engineering Group

Ground Maintenance Building

Rooftop / AC Units

Tag	UH-1		
Unit Type	Gas Fired Unit Heater		
Qty	1		
Location	Ground Maint' Ceiling		
Area Served	Shop Area		
Manufacturer	Trane		
Model #	LFM120AA		
Serial #	L02J		
Cooling Type	None		
Cooling Capacity (Tons)	N/A		
Cooling Efficiency (SEER/EER)	N/A		
Heating Type	Furnace		
Heating Input (MBH)	62		
Efficiency	81%		
Fuel	Nat. Gas		
Approx Age	9		
ASHRAE Service Life	15		
Remaining Life	6		
Comments			

MAJOR EQUIPMENT LIST

Concord Engineering Group

Ground Maintenance Building

Domestic Water Heaters

Tag	HWH-1		
Unit Type	Instant Electric		
Qty	1		
Location	Sink Cabinet		
Area Served	Bathroom		
Manufacturer	EemaX		
Model #	SP2412		
Serial #	0335993		
Size (Gallons)	0		
Input Capacity (MBH/KW)	2.0 KW		
Recovery (Gal/Hr)	N/A		
Efficiency %	98%		
Fuel	Electric		
Approx Age	8		
ASHRAE Service Life	12		
Remaining Life	4		
Comments	120V		

MAJOR EQUIPMENT LIST

Concord Engineering Group

Vehicle Maintenance Garage

Rooftop / AC Units

Tag	AC-1	AHU-1	
Unit Type	Condensing Unit	Furnace	
Qty	1	1	
Location	Garage Front	Loft Closet	
Area Served	Offices	Offices	
Manufacturer	Payne	RUUD	
Model #	PA13NR036-H	Quiet 80	
Serial #	3808X60873		
Cooling Type	DX	w/ AC-1	
Cooling Capacity (Tons)	3	3	
Cooling Efficiency (SEER/EER)			
Heating Type	On Indoor Unit	Furnace	
Heating Input (MBH)		N/A	
Efficiency		80%	
Fuel	Nat. Gas	Nat. Gas	
Approx Age	3	3	
ASHRAE Service Life	15	15	
Remaining Life	18	12	
Comments			

MAJOR EQUIPMENT LIST

Concord Engineering Group

Vehicle Maintenance Garage

Domestic Water Heaters

Tag	HWH-1		
Unit Type	Electric Heater		
Qty	1		
Location	Garage		
Area Served	Vehicle Maintenance Building		
Manufacturer	Bradford & White		
Model #	M50B506-B		
Serial #	FD7760345		
Size (Gallons)	50		
Input Capacity (MBH/KW)	4.5 KW		
Recovery (Gal/Hr)	N/A		
Efficiency %	98%		
Fuel	Electric		
Approx Age	31		
ASHRAE Service Life	12		
Remaining Life	(19)		
Comments	240 V		

APPENDIX E

Investment Grade Lighting Audit

CEG Job #: 9C10089

Project: Administration Building

Route 9 & Bennett Crossing

Erma, NJ

Bldg. Sq. Ft. 5,500

Administration Building

KWH COST: \$0.158

ECM #1: Lighting Upgrade - General

EXISTING LIGHTING										PROPOSED LIGHTING								SAVINGS				
CEG Type	Fixture Location	Yearly Usage	No. Fixts	No. Lamps	Fixture Type	Fixt Watts	Total kW	kWh/Yr Fixtures	Yearly \$ Cost	No. Fixts	No. Lamps	Retro-Unit Description	Watts Used	Total kW	kWh/Yr Fixtures	Yearly \$ Cost	Unit Cost (INSTALLED)	Total Cost	kW Savings	kWh/Yr Savings	Yearly \$ Savings	Yearly Simple Payback
232.37	Reception Area	2600	8	3	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.69	1,788.8	\$282.63	8	0	No Change	0	0.00	0	\$0.00	\$0.00	\$0.00	0.00	0	\$0.00	0.00
121.11	Conference Room	2600	24	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Surface Mnt., Prismatic Lens	78	1.87	4,867.2	\$769.02	24	2	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	50	1.20	3120	\$492.96	\$100.00	\$2,400.00	0.67	1747.2	\$276.06	8.69
142.21	Kitchenette	2600	1	4	2x4, 4 Lamp, 34w T12, Mag. Ballast, Recessed Mnt., Prismatic Lens	156	0.16	405.6	\$64.08	1	3	Delamp 1, Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	72	0.07	187.2	\$29.58	\$100.00	\$100.00	0.08	218.4	\$34.51	2.90
127.21	Office	2600	9	2	2x4, 2 Lamp, 34w T12, Mag. Ballast, Recessed Mnt., Prismatic Lens	78	0.70	1,825.2	\$288.38	9	3	3 Lamp, 17w T8, Elect. Ballast; retrofit	47	0.42	1099.8	\$173.77	\$100.00	\$900.00	0.28	725.4	\$114.61	7.85
142.21	Hall	2600	4	4	2x4, 4 Lamp, 34w T12, Mag. Ballast, Recessed Mnt., Prismatic Lens	156	0.62	1,622.4	\$256.34	4	3	Delamp 1, Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	72	0.29	748.8	\$118.31	\$100.00	\$400.00	0.34	873.6	\$138.03	2.90
232.37	2 Side Offices	2600	18	3	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	1.55	4,024.8	\$635.92	18	0	No Change	0	0.00	0	\$0.00	\$0.00	\$0.00	0.00	0	\$0.00	0.00
142.21	BA Reception	2600	2	4	2x4, 4 Lamp, 34w T12, Mag. Ballast, Recessed Mnt., Prismatic Lens	156	0.31	811.2	\$128.17	2	3	Delamp 1, Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	72	0.14	374.4	\$59.16	\$100.00	\$200.00	0.17	436.8	\$69.01	2.90
142.21	BA Office	2600	4	4	2x4, 4 Lamp, 34w T12, Mag. Ballast, Recessed Mnt., Prismatic Lens	156	0.62	1,622.4	\$256.34	4	3	Delamp 1, Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	72	0.29	748.8	\$118.31	\$100.00	\$400.00	0.34	873.6	\$138.03	2.90
142.21	Office	2600	3	4	2x4, 4 Lamp, 34w T12, Mag. Ballast, Recessed Mnt., Prismatic Lens	156	0.47	1,216.8	\$192.25	3	3	Delamp 1, Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	72	0.22	561.6	\$88.73	\$100.00	\$300.00	0.25	655.2	\$103.52	2.90
111.11	Copy Room	2600	3	1	1x4, 1-Lamp, 34w T12, Mag. Ballast, Surface Mnt., Prismatic Lens	48	0.14	374.4	\$59.16	3	1	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	25	0.08	195	\$30.81	\$80.00	\$240.00	0.07	179.4	\$28.35	8.47
142.21	Corner Office	2600	4	4	2x4, 4 Lamp, 34w T12, Mag. Ballast, Recessed Mnt., Prismatic Lens	156	0.62	1,622.4	\$256.34	4	3	Delamp 1, Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	72	0.29	748.8	\$118.31	\$100.00	\$400.00	0.34	873.6	\$138.03	2.90
111.11	File Storage	2600	6	1	1x4, 1-Lamp, 34w T12, Mag. Ballast, Surface Mnt., Prismatic Lens	48	0.29	748.8	\$118.31	6	1	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	25	0.15	390	\$61.62	\$80.00	\$480.00	0.14	358.8	\$56.69	8.47
121.41	Restroom	2600	1	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Wall Mnt., Prismatic Lens	78	0.08	202.8	\$32.04	1	2	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	50	0.05	130	\$20.54	\$80.00	\$80.00	0.03	72.8	\$11.50	6.96
121.11	Conference Room	2600	16	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Surface Mnt., Prismatic Lens	78	1.25	3,244.8	\$512.68	16	2	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	50	0.80	2080	\$328.64	\$100.00	\$1,600.00	0.45	1164.8	\$184.04	8.69
142.21	Vestibule	2600	2	4	2x4, 4 Lamp, 34w T12, Mag. Ballast, Recessed Mnt., Prismatic Lens	156	0.31	811.2	\$128.17	2	3	Delamp 1, Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	72	0.14	374.4	\$59.16	\$100.00	\$200.00	0.17	436.8	\$69.01	2.90
602		8760	1	2	Incandescent Exit Sign	20	0.02	175.2	\$27.68	1	1	LED Exit Sign	2	0.00	17.52	\$2.77	\$65.00	\$65.00	0.02	157.68	\$24.91	2.61
111.11	Men's Restroom	2600	2	1	1x4, 1-Lamp, 34w T12, Mag. Ballast, Surface Mnt., Prismatic Lens	48	0.10	249.6	\$39.44	2	1	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	25	0.05	130	\$20.54	\$80.00	\$160.00	0.05	119.6	\$18.90	8.47
121.41		2600	1	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Wall Mnt., Prismatic Lens	78	0.08	202.8	\$32.04	1	2	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	50	0.05	130	\$20.54	\$80.00	\$80.00	0.03	72.8	\$11.50	6.96

Investment Grade Lighting Audit

111.11	Women's Restroom	2600	2	1	1x4, 1-Lamp, 34w T12, Mag. Ballast, Surface Mnt., Prismatic Lens	48	0.10	249.6	\$39.44	2	1	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	25	0.05	130	\$20.54	\$80.00	\$160.00	0.05	119.6	\$18.90	8.47
121.41		2600	1	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Wall Mnt., Prismatic Lens	78	0.08	202.8	\$32.04	1	2	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	50	0.05	130	\$20.54	\$80.00	\$80.00	0.03	72.8	\$11.50	6.96
713	Exterior	4400	1	1	100w HPS 1x1 w/Prismatic Lens	125	0.13	550.0	\$86.90	1	0	No Change	0	0.00	0	\$0.00	\$0.00	\$0.00	0.00	0	\$0.00	0.00
710		4400	2	1	100w HPS Flood	125	0.25	1,100.0	\$173.80	2	0	No Change	0	0.00	0	\$0.00	\$0.00	\$0.00	0.00	0	\$0.00	0.00
706		4400	7	1	70w HPS Wallpack	92	0.64	2,833.6	\$447.71	7	0	No Change	0	0.00	0	\$0.00	\$0.00	\$0.00	0.00	0	\$0.00	0.00
Totals			122	55			11.08	30,752	\$4,859	122	39			4.3	11,296	\$1,785		\$8,245	3.5	9,159	\$1,447	5.70

CEG Job #: 9C10089
Project: Administration Building
Address: Route 9 & Bennett Crossing
Erma, NJ
Building SF: 5,500

Administration Building

KWH COST: \$0.158

ECM #2: Lighting Controls

not rebate eligible

EXISTING LIGHTING										PROPOSED LIGHTING CONTROLS										SAVINGS					
CEG Type	Fixture Location	Yearly Usage	No. Fixts	No. Lamps	Fixture Type	Fixt Watts	Total kW	kWh/Yr Fixtures	Yearly \$ Cost	No. Fixts	No. Cont.	Controls Description	Watts Used	Total kW	Reduction (%)	kWh/Yr Fixtures	Yearly \$ Cost	Unit Cost (INSTALLED)	Total Cost	kW Savings	kWh/Yr Savings	Yearly \$ Savings	Yearly Simple Payback		
232.37	Reception Area	2600	8	3	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.688	1788.8	\$282.63	8	0	No Change	86	0.69	0%	1788.8	\$282.63	\$0.00	\$0.00	0.00	0	\$0.00	0.00		
121.11	Conference Room	2600	24	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Surface Mnt., Prismatic Lens	78	1.872	4867.2	\$769.02	24	2	Dual Tech. Occupancy Sensor w/2 Pole Powerpack remote mount	78	1.50	20%	3893.76	\$615.21	\$225.00	\$450.00	0.37	973.44	\$153.80	2.93		
142.21	Kitchenette	2600	1	4	2x4, 4 Lamp, 34w T12, Mag. Ballast, Recessed Mnt., Prismatic Lens	156	0.156	405.6	\$64.08	1	0	No Change	156	0.16	0%	405.6	\$64.08	\$0.00	\$0.00	0.00	0	\$0.00	0.00		
127.21	Office	2600	9	2	2x2, 2 Lamp, 34w T12, Mag. Ballast, Recessed Mnt., Prismatic Lens	78	0.702	1825.2	\$288.38	9	1	Dual Technology Occupancy Sensor - Remote Mnt.	78	0.56	20%	1460.16	\$230.71	\$160.00	\$160.00	0.14	365.04	\$57.68	2.77		
142.21	Hall	2600	4	4	2x4, 4 Lamp, 34w T12, Mag. Ballast, Recessed Mnt., Prismatic Lens	156	0.624	1622.4	\$256.34	4	0	No Change	156	0.62	0%	1622.4	\$256.34	\$0.00	\$0.00	0.00	0	\$0.00	0.00		
232.37	2 Side Offices	2600	18	3	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	1.548	4024.8	\$635.92	18	2	Dual Tech. Occupancy Sensor w/2 Pole Powerpack remote mount	86	1.24	20%	3219.84	\$508.73	\$225.00	\$450.00	0.31	804.96	\$127.18	3.54		
142.21	BA Reception	2600	2	4	2x4, 4 Lamp, 34w T12, Mag. Ballast, Recessed Mnt., Prismatic Lens	156	0.312	811.2	\$128.17	2	0	No Change	156	0.31	0%	811.2	\$128.17	\$0.00	\$0.00	0.00	0	\$0.00	0.00		
142.21	BA Office	2600	4	4	2x4, 4 Lamp, 34w T12, Mag. Ballast, Recessed Mnt., Prismatic Lens	156	0.624	1622.4	\$256.34	4	1	Dual Technology Occupancy Sensor - Remote Mnt.	156	0.50	20%	1297.92	\$205.07	\$160.00	\$160.00	0.12	324.48	\$51.27	3.12		
142.21	Office	2600	3	4	2x4, 4 Lamp, 34w T12, Mag. Ballast, Recessed Mnt., Prismatic Lens	156	0.468	1216.8	\$192.25	3	0	No Change	156	0.47	0%	1216.8	\$192.25	\$0.00	\$0.00	0.00	0	\$0.00	0.00		
111.11	Copy Room	2600	3	1	1x4, 1-Lamp, 34w T12, Mag. Ballast, Surface Mnt., Prismatic Lens	48	0.144	374.4	\$59.16	3	0	No Change	48	0.14	0%	374.4	\$59.16	\$0.00	\$0.00	0.00	0	\$0.00	0.00		
142.21	Corner Office	2600	4	4	2x4, 4 Lamp, 34w T12, Mag. Ballast, Recessed Mnt., Prismatic Lens	156	0.624	1622.4	\$256.34	4	1	Dual Technology Occupancy Sensor - Remote Mnt.	156	0.50	20%	1297.92	\$205.07	\$160.00	\$160.00	0.12	324.48	\$51.27	3.12		
111.11	File Storage	2600	6	1	1x4, 1-Lamp, 34w T12, Mag. Ballast, Surface Mnt., Prismatic Lens	48	0.288	748.8	\$118.31	6	1	Dual Technology Occupancy Sensor - Remote Mnt.	48	0.23	20%	599.04	\$94.65	\$160.00	\$160.00	0.06	149.76	\$23.66	6.76		
121.41	Restroom	2600	1	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Wall Mnt., Prismatic Lens	78	0.078	202.8	\$32.04	1	0	No Change	78	0.08	0%	202.8	\$32.04	\$0.00	\$0.00	0.00	0	\$0.00	0.00		
121.11	Conference Room	2600	16	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Surface Mnt., Prismatic Lens	78	1.248	3244.8	\$512.68	16	1	Dual Technology Occupancy Sensor - Remote Mnt.	78	1.00	20%	2595.84	\$410.14	\$160.00	\$160.00	0.25	648.96	\$102.54	1.56		
142.21	Vestibule	2600	2	4	2x4, 4 Lamp, 34w T12, Mag. Ballast, Recessed Mnt., Prismatic Lens	156	0.312	811.2	\$128.17	2	0	No Change	156	0.31	0%	811.2	\$128.17	\$0.00	\$0.00	0.00	0	\$0.00	0.00		
602		8760	1	2	Incandescent Exit Sign	20	0.02	175.2	\$27.68	1	0	No Change	20	0.02	0%	175.2	\$27.68	\$0.00	\$0.00	0.00	0	\$0.00	0.00		
111.11	Men's Restroom	2600	2	1	1x4, 1-Lamp, 34w T12, Mag. Ballast, Surface Mnt., Prismatic Lens	48	0.096	249.6	\$39.44	2	0	No Change	48	0.10	0%	249.6	\$39.44	\$0.00	\$0.00	0.00	0	\$0.00	0.00		
121.41		2600	1	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Wall Mnt., Prismatic Lens	78	0.078	202.8	\$32.04	1	0	No Change	78	0.08	0%	202.8	\$32.04	\$0.00	\$0.00	0.00	0	\$0.00	0.00		
111.11	Women's Restroom	2600	2	1	1x4, 1-Lamp, 34w T12, Mag. Ballast, Surface Mnt., Prismatic Lens	48	0.096	249.6	\$39.44	2	0	No Change	48	0.10	0%	249.6	\$39.44	\$0.00	\$0.00	0.00	0	\$0.00	0.00		
121.41		2600	1	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Wall Mnt., Prismatic Lens	78	0.078	202.8	\$32.04	1	0	No Change	78	0.08	0%	202.8	\$32.04	\$0.00	\$0.00	0.00	0	\$0.00	0.00		

713	Exterior	4400	1	1	100w HPS 1x1 w/Prismatic Lens	125	0.125	550	\$86.90	1	0	No Change		125	0.13	0%	550	\$86.90	\$0.00	\$0.00	0.00	0	\$0.00	0.00
710		4400	2	1	100w HPS Flood	125	0.25	1100	\$173.80	2	0	No Change		125	0.25	0%	1100	\$173.80	\$0.00	\$0.00	0.00	0	\$0.00	0.00
706		4400	7	1	70w HPS Wallpack	92	0.644	2833.6	\$447.71	7	0	No Change		92	0.64	0%	2833.6	\$447.71	\$0.00	\$0.00	0.00	0	\$0.00	0.00
	Totals		122	55			11.1	30752.4	\$4,859	122	0				9.7		27,161.3	\$4,291.48	\$1,700	\$1,700	1.38	3,591	\$567	3.00

Investment Grade Lighting Audit

CEG Job #: 9C10089

Project: Athletic Field Concession Stand

Route 9 & Bennett Crossing

Erma, NJ

Bldg. Sq. Ft. 3,500

Athletic Field Concession Stand

KWH COST: \$0.164

ECM #1: Lighting Upgrade - General

EXISTING LIGHTING										PROPOSED LIGHTING								SAVINGS					
CEG Type	Fixture Location	Yearly Usage	No. Fixts	No. Lamps	Fixture Type	Fixt Watts	Total kW	kWh/Yr Fixtures	Yearly \$ Cost	No. Fixts	No. Lamps	Retro-Unit Description	Watts Used	Total kW	kWh/Yr Fixtures	Yearly \$ Cost	Unit Cost (INSTALLED)	Total Cost	kW Savings	kWh/Yr Savings	Yearly \$ Savings	Yearly Simple Payback	
221.16	Men's Restrom	1000	5	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Acrylic Lens	58	0.29	290.0	\$47.56	5	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.25	250	\$41.00	\$14.00	\$70.00	0.04	40	\$6.56	10.67	
221.16	Women's Restroom	1000	5	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Acrylic Lens	58	0.29	290.0	\$47.56	5	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.25	250	\$41.00	\$14.00	\$70.00	0.04	40	\$6.56	10.67	
222.21	Storage Closet	1000	2	2	2x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.12	124.0	\$20.34	2	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.10	100	\$16.40	\$14.00	\$28.00	0.02	24	\$3.94	7.11	
221.16	Concession Area	1000	10	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Acrylic Lens	58	0.58	580.0	\$95.12	10	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.50	500	\$82.00	\$14.00	\$140.00	0.08	80	\$13.12	10.67	
221.16	Exterior	1000	2	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Acrylic Lens	58	0.12	116.0	\$19.02	2	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.10	100	\$16.40	\$14.00	\$28.00	0.02	16	\$2.62	10.67	
706		1000	8	1	70w HPS Wallpack	92	0.74	736.0	\$120.70	8	1	RAB Lighting - WPLED10S Wall pack	10	0.08	80	\$13.12	\$189.00	\$1,512.00	0.66	656	\$107.58	14.05	
Totals				32	11			2.14	2,136	\$350	32	11			1.3	1,280	\$210		\$1,848	0.9	856	\$140	13.16

CEG Job #: 9C10089
 Project: Athletic Field Concession Stand
 Address: Route 9 & Bennett Crossing
 Erma, NJ
 Building SF: 3,500

Athletic Field Concession Stand

KWH COST: \$0.164

ECM #2: Lighting Controls

not rebate eligible

EXISTING LIGHTING										PROPOSED LIGHTING CONTROLS										SAVINGS				
CEG Type	Fixture Location	Yearly Usage	No. Fixts	No. Lamps	Fixture Type	Fixt Watts	Total kW	kWh/Yr Fixtures	Yearly \$ Cost	No. Fixts	No. Cont.	Controls Description	Watts Used	Total kW	Reduction (%)	kWh/Yr Fixtures	Yearly \$ Cost	Unit Cost (INSTALLED)	Total Cost	kW Savings	kWh/Yr Savings	Yearly \$ Savings	Yearly Simple Payback	
221.16	Men's Restrom	1000	5	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Acrylic Lens	58	0.29	290	\$47.56	5	0	No Change	58	0.29	0%	290	\$47.56	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
221.16	Women's Restroom	1000	5	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Acrylic Lens	58	0.29	290	\$47.56	5	0	No Change	58	0.29	0%	290	\$47.56	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
222.21	Storage Closet	1000	2	2	2x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.124	124	\$20.34	2	0	No Change	62	0.12	0%	124	\$20.34	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
221.16	Concession Area	1000	10	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Acrylic Lens	58	0.58	580	\$95.12	10	1	Dual Technology Occupancy Sensor - Switch Mnt.	58	0.52	10%	522	\$85.61	\$150.00	\$150.00	0.06	58	\$9.51	15.77	
221.16	Exterior	1000	2	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Acrylic Lens	58	0.116	116	\$19.02	2	0	No Change	58	0.12	0%	116	\$19.02	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
706		1000	8	1	70w HPS Wallpack	92	0.736	736	\$120.70	8	0	No Change	92	0.74	0%	736	\$120.70	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
Totals			32	11			2.1	2,136.0	\$350	32	0			2.1		2,078.0	\$340.79		\$150	0.06	58	\$10	15.77	

Investment Grade Lighting Audit

CEG Job #: 9C10089

Project: Grounds Maintenance

Route 9 & Bennett Crossing

Erma, NJ

Bldg. Sq. Ft. 3,200

Grounds Maintenance

KWH COST: \$0.127

ECM #1: Lighting Upgrade - General

EXISTING LIGHTING										PROPOSED LIGHTING								SAVINGS				
CEG Type	Fixture Location	Yearly Usage	No. Fixts	No. Lamps	Fixture Type	Fixt Watts	Total kW	kWh/Yr Fixtures	Yearly \$ Cost	No. Fixts	No. Lamps	Retro-Unit Description	Watts Used	Total kW	kWh/Yr Fixtures	Yearly \$ Cost	Unit Cost (INSTALLED)	Total Cost	kW Savings	kWh/Yr Savings	Yearly \$ Savings	Yearly Simple Payback
221.11	3 Bay Garage	2600	18	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	1.12	2,901.6	\$368.50	18	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.90	2340	\$297.18	\$14.00	\$252.00	0.22	561.6	\$71.32	3.53
211.11	1 Bay Garage/ Offices	2600	6	1	1x4, 1 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	33	0.20	514.8	\$65.38	6	1	Relamp - Sylvania Lamp FO28/841/SS/ECO	25	0.15	390	\$49.53	\$7.00	\$42.00	0.05	124.8	\$15.85	2.65
232.11	Kitchenette	2600	3	3	2x4, 3 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., Direct/ Indirect	86	0.26	670.8	\$85.19	3	0	No Change	0	0.00	0	\$0.00	\$0.00	\$0.00	0.00	0	\$0.00	0.00
242.11	Restroom	2600	1	4	2x4, 4 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	107	0.11	278.2	\$35.33	1	4	Relamp - Sylvania Lamp FO28/841/SS/ECO	98	0.10	254.8	\$32.36	\$28.00	\$28.00	0.01	23.4	\$2.97	9.42
710	Exterior	4400	10	1	100w HPS Wallpack	125	1.25	5,500.0	\$698.50	10	0	No Change	0	0.00	0	\$0.00	\$0.00	\$0.00	0.00	0	\$0.00	0.00
Totals			38	11			2.93	9,865	\$1,253	38	7			1.1	2,985	\$379		\$322	0.3	710	\$90	3.57

Investment Grade Lighting Audit

CEG Job #: 9C10089

Project: Maintenance

Route 9 & Bennett Crossing

Erma, NJ

Bldg. Sq. Ft. 2,400

Maintenace

KWH COST: \$0.127

ECM #1: Lighting Upgrade - General

EXISTING LIGHTING										PROPOSED LIGHTING								SAVINGS					
CEG Type	Fixture Location	Yearly Usage	No. Fixts	No. Lamps	Fixture Type	Fixt Watts	Total kW	kWh/Yr Fixtures	Yearly \$ Cost	No. Fixts	No. Lamps	Retro-Unit Description	Watts Used	Total kW	kWh/Yr Fixtures	Yearly \$ Cost	Unit Cost (INSTALLED)	Total Cost	kW Savings	kWh/Yr Savings	Yearly \$ Savings	Yearly Simple Payback	
221.11	Single Bay/ Storage Area	2600	11	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	0.68	1,773.2	\$225.20	11	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.55	1430	\$181.61	\$14.00	\$154.00	0.13	343.2	\$43.59	3.53	
111.14		2600	2	1	1x4, 1-Lamp, 34w T12, Mag. Ballast, Surface Mnt., No Lens	48	0.10	249.6	\$31.70	2	1	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	25	0.05	130	\$16.51	\$80.00	\$160.00	0.05	119.6	\$15.19	10.53	
221.11	Double Bay/ Storage Area	2600	12	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	0.74	1,934.4	\$245.67	12	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.60	1560	\$198.12	\$14.00	\$168.00	0.14	374.4	\$47.55	3.53	
710	Exterior	4400	12	1	100w HPS Wallpack	125	1.50	6,600.0	\$838.20	12	0	No Change	0	0.00	0	\$0.00	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
Totals			37	6			3.02	10,557	\$1,341	37	5			1.2	3,120	\$396		\$482	0.3	837	\$106	4.53	

Investment Grade Lighting Audit

CEG Job #: 9C10089

Project: Vehicle Maintenance Garage

Route 9 & Bennett Crossing

Erma, NJ

Bldg. Sq. Ft. 6,000

Vehicle Maintenance Garage

KWH COST: \$0.127

ECM #1: Lighting Upgrade - General

EXISTING LIGHTING										PROPOSED LIGHTING										SAVINGS			
CEG Type	Fixture Location	Yearly Usage	No. Fixts	No. Lamps	Fixture Type	Fixt Watts	Total kW	kWh/Yr Fixtures	Yearly \$ Cost	No. Fixts	No. Lamps	Retro-Unit Description	Watts Used	Total kW	kWh/Yr Fixtures	Yearly \$ Cost	Unit Cost (INSTALLED)	Total Cost	kW Savings	kWh/Yr Savings	Yearly \$ Savings	Yearly Simple Payback	
128.14	Service Bays	2600	25	2	8' Channel, 2 Lamp, 75w T12, Mag. Ballast, Surface Mnt., No Lens	142	3.55	9,230.0	\$1,172.21	25	4	(2) 8' Lamps to (4) 4' Lamps - 28w T8, Elect Ballast; retrofit	98	2.45	6370	\$808.99	\$100.00	\$2,500.00	1.10	2860	\$363.22	6.88	
121.14		2600	2	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Surface Mnt., No Lens	78	0.16	405.6	\$51.51	2	2	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	50	0.10	260	\$33.02	\$80.00	\$160.00	0.06	145.6	\$18.49	8.65	
601		8760	2	2	(2) 7w CFL Exit Sign	16	0.03	280.3	\$35.60	2	1	LED Exit Sign	2	0.00	35.04	\$4.45	\$65.00	\$130.00	0.03	245.28	\$31.15	4.17	
128.14	Upper Storage Area	2600	4	2	8' Channel, 2 Lamp, 75w T12, Mag. Ballast, Surface Mnt., No Lens	142	0.57	1,476.8	\$187.55	4	4	(2) 8' Lamps to (4) 4' Lamps - 28w T8, Elect Ballast; retrofit	98	0.39	1019.2	\$129.44	\$100.00	\$400.00	0.18	457.6	\$58.12	6.88	
121.21	Office	2600	4	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Recessed Mnt., Prismatic Lens	78	0.31	811.2	\$103.02	4	2	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	50	0.20	520	\$66.04	\$80.00	\$320.00	0.11	291.2	\$36.98	8.65	
122.21		2600	1	2	2x4, 2-Lamp, 34w T12, Mag. Ballast, Recessed Mnt., Prismatic Lens	78	0.08	202.8	\$25.76	1	2	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	50	0.05	130	\$16.51	\$80.00	\$80.00	0.03	72.8	\$9.25	8.65	
738	Exterior	4400	2	1	175w Mercury Vapor Area Light	210	0.42	1,848.0	\$234.70	2	1	100w HPS Wallpack	125	0.25	1100	\$139.70	\$130.00	\$260.00	0.17	748	\$95.00	2.74	
725		4400	5	1	150w HPS Wallpack	188	0.94	4,136.0	\$525.27	5	0	No Change	0	0.00	0	\$0.00	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
Totals			45	14			6.06	18,391	\$2,336	45	16			3.4	9,434	\$1,198		\$3,850	1.7	4,820	\$612	6.29	

CEG Job #: 9C10089
 Project: Vehicle Maintenance Garage
 Address: Route 9 & Bennett Crossing
 Erma, NJ
 Building SF: 6,000

Vehicle Maintenance Garage

KWH COST: \$0.127

ECM #2: Lighting Controls

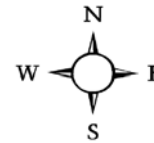
not rebate eligible

EXISTING LIGHTING					PROPOSED LIGHTING CONTROLS										SAVINGS								
CEG Type	Fixture Location	Yearly Usage	No. Fixts	No. Lamps	Fixture Type	Fixt Watts	Total kW	kWh/Yr Fixtures	Yearly \$ Cost	No. Fixts	No. Cont.	Controls Description	Watts Used	Total kW	Reduction (%)	kWh/Yr Fixtures	Yearly \$ Cost	Unit Cost (INSTALLED)	Total Cost	kW Savings	kWh/Yr Savings	Yearly \$ Savings	Yearly Simple Payback
128.14	Service Bays	2600	25	2	8' Channel, 2 Lamp, 75w T12, Mag. Ballast, Surface Mnt., No Lens	142	3.55	9230	\$1,172.21	25	0	No Change	142	3.55	0%	9230	\$1,172.21	\$0.00	\$0.00	0.00	0	\$0.00	0.00
121.14		2600	2	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Surface Mnt., No Lens	78	0.156	405.6	\$51.51	2	0	No Change	78	0.16	0%	405.6	\$51.51	\$0.00	\$0.00	0.00	0	\$0.00	0.00
601		8760	2	2	(2) 7w CFL Exit Sign	16	0.032	280.32	\$35.60	2	0	No Change	16	0.03	0%	280.32	\$35.60	\$0.00	\$0.00	0.00	0	\$0.00	0.00
128.14	Upper Storage Area	2600	4	2	8' Channel, 2 Lamp, 75w T12, Mag. Ballast, Surface Mnt., No Lens	142	0.568	1476.8	\$187.55	4	1	Dual Technology Occupancy Sensor - Switch Mnt.	142	0.51	10%	1329.12	\$168.80	\$150.00	\$150.00	0.06	147.68	\$18.76	8.00
121.21	Office	2600	4	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Recessed Mnt., Prismatic Lens	78	0.312	811.2	\$103.02	4	1	Dual Technology Occupancy Sensor - Switch Mnt.	78	0.28	10%	730.08	\$92.72	\$150.00	\$150.00	0.03	81.12	\$10.30	11.65
122.21		2600	1	2	2x4, 2-Lamp, 34w T12, Mag. Ballast, Recessed Mnt., Prismatic Lens	78	0.078	202.8	\$25.76	1			78	0.07	10%	182.52	\$23.18			0.01	20.28	\$2.58	
738	Exterior	4400	2	1	175w Mercury Vapor Area Light	210	0.42	1848	\$234.70	2	0	No Change	210	0.42	0%	1848	\$234.70	\$0.00	\$0.00	0.00	0	\$0.00	0.00
725		4400	5	1	150w HPS Wallpack	188	0.94	4136	\$525.27	5	0	No Change	188	0.94	0%	4136	\$525.27	\$0.00	\$0.00	0.00	0	\$0.00	0.00
Totals			45	14			6.1	18,390.7	\$2,336	45	0			6.0		18,141.6	\$2,303.99		\$300	0.10	249	\$32	9.48

APPENDIX F

Project Name: LGEA Solar PV Project - Lower Cape May Regional							
Location: 687 Route 9 Erma, NJ							
Description: Photovoltaic System - Direct Purchase							
Simple Payback Analysis							
	Photovoltaic System - Direct Purchase						
Total Construction Cost	\$349,600						
Annual kWh Production	52,463						
Annual Energy Cost Reduction	\$7,450						
Annual SREC Revenue	\$18,362						
First Cost Premium	\$349,600						
Simple Payback:	13.54						Years
Life Cycle Cost Analysis							
Analysis Period (years):	25			Financing %:	0%		
Financing Term (mths):	0			Maintenance Escalation Rate:	3.0%		
Average Energy Cost (\$/kWh)	\$0.142			Energy Cost Escalation Rate:	3.0%		
Financing Rate:	0.00%			SREC Value (\$/kWh)	\$0.350		
Period	Additional Cash Outlay	Energy kWh Production	Energy Cost Savings	Additional Maint Costs	SREC Revenue	Net Cash Flow	Cumulative Cash Flow
0	\$349,600	0	0	0	\$0	(349,600)	0
1	\$0	52,463	\$7,450	\$0	\$18,362	\$25,812	(\$323,788)
2	\$0	52,201	\$7,673	\$0	\$18,270	\$25,943	(\$297,845)
3	\$0	51,940	\$7,903	\$0	\$18,179	\$26,082	(\$271,762)
4	\$0	51,680	\$8,141	\$0	\$18,088	\$26,229	(\$245,534)
5	\$0	51,422	\$8,385	\$530	\$17,998	\$25,853	(\$219,681)
6	\$0	51,164	\$8,636	\$527	\$17,908	\$26,017	(\$193,664)
7	\$0	50,909	\$8,895	\$524	\$17,818	\$26,189	(\$167,475)
8	\$0	50,654	\$9,162	\$522	\$17,729	\$26,369	(\$141,106)
9	\$0	50,401	\$9,437	\$519	\$17,640	\$26,558	(\$114,548)
10	\$0	50,149	\$9,720	\$517	\$17,552	\$26,756	(\$87,792)
11	\$0	49,898	\$10,012	\$514	\$17,464	\$26,962	(\$60,830)
12	\$0	49,649	\$10,312	\$511	\$17,377	\$27,178	(\$33,652)
13	\$0	49,400	\$10,622	\$509	\$17,290	\$27,403	(\$6,249)
14	\$0	49,153	\$10,940	\$506	\$17,204	\$27,638	\$21,389
15	\$0	48,908	\$11,268	\$504	\$17,118	\$27,882	\$49,271
16	\$0	48,663	\$11,606	\$501	\$17,032	\$28,137	\$77,408
17	\$0	48,420	\$11,955	\$499	\$16,947	\$28,403	\$105,811
18	\$0	48,178	\$12,313	\$496	\$16,862	\$28,679	\$134,490
19	\$0	47,937	\$12,683	\$494	\$16,778	\$28,967	\$163,457
20	\$0	47,697	\$13,063	\$491	\$16,694	\$29,266	\$192,723
21	\$1	47,459	\$13,455	\$489	\$16,611	\$29,577	\$222,300
22	\$2	47,221	\$13,859	\$486	\$16,527	\$29,900	\$252,200
23	\$3	46,985	\$14,274	\$484	\$16,445	\$30,235	\$282,435
24	\$4	46,750	\$14,703	\$482	\$16,363	\$30,584	\$313,019
25	\$5	46,517	\$15,144	\$479	\$16,281	\$30,945	\$343,964
Totals:		1,235,816	\$271,612	\$10,584	\$432,536	\$693,564	(\$5,458)
Net Present Value (NPV)						\$343,989	
Internal Rate of Return (IRR)						5.9%	

Building	Roof Area (sq ft)	Panel	Qty	Panel Sq Ft	Panel Total Sq Ft	Total KW _{DC}	Total Annual kWh	Panel Weight (33 lbs)	W/SQFT
Administration	960	Sunpower SPR230	60	14.7	882	13.80	16,916	1,980	15.64
Maintenance	750	Sunpower SPR230	50	14.7	735	11.50	13,672	1,650	15.64
Ground Maintenance	1350	Sunpower SPR230	80	14.7	1,176	18.40	21,875	2,640	15.64



. = Proposed PV Layout

Notes:

1. Estimated kWh based on the National Renewable Energy Laboratory PVWatts Version 1 Calculator Program.