BOROUGH OF CAPE MAY POINT
FIRE DEPARTMENT

ENERGY AUDIT PROGRAM:
ENERGY AUDIT REPORT

PREPARED FOR: **CAPE MAY POINT FIRE DEPT.**
412 YALE AVENUE
CAPE MAY POINT, NJ 08212
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PREPARED BY: **CONCORD ENGINEERING GROUP**

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REPORT ISSUANCE: FINAL, MAY 26, 2011

PROJECT NO: 9C10102

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I. EXECUTIVE SUMMARY

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

Borough of Cape May Point Fire Department
412 Yale Avenue
Cape May Point, NJ 08212

Municipal Contact Person: Jim Smith

This report covers the following facility owned by the Borough of Cape May Point Fire Department.

Ref. #	Facility Name	Area (Sqft)	Address
85	Fire Station/Meeting House	5,000	412 Yale

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 cost at this facility is as follows:

Ref. #	Facility Name	Electricity	Propane	Water	Total
85	Fire Station/Meeting House	$3,689	$3,205	-	$6,894

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 ± 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**
85 - ECM #1	Lighting Upgrade	$3,688	$593	6.2	141.2%
85 - ECM #2	Lighting Controls Upgrade	$500	$87	5.8	159.5%
85 - ECM #3	HVAC System Upgrade	$24,532	$1,628	15.1	-0.5%
85 - ECM #4	Propane to NG Conversion	$500	$1,842	0.3	5426.0%

Notes: A. Cost takes into consideration applicable NJ Smart StartTM 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 (THERM)**	**PROPANE (GAL)**
85 - ECM #1	Lighting Upgrade	2.3	3,350.0	0.0	0.0
85 - ECM #2	Lighting Controls Upgrade	0.3	488.7	0.0	0.0
85 - ECM #3	HVAC System Upgrade	0.0	1,498.0	0.0	547.00
85 - ECM #4	Propane to NG Conversion	0.0	0.0	1,180.0	1,288.0

The Energy Conservation Measures (ECMs) identified within the report represents the potential annual savings at the facility. It is recommended to consider all ECMs as part of the Department's initiative to save energy, reduce emissions, and lower operating costs. 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. All of the ECM's presented in this report have been categorized into three groups defined as Short-term (or Fast) Paybacks ranging from 0 to 5 years, Medium-term Paybacks ranging from 5 to 10 years, and Long-term Paybacks of over 10 years to assist the Department in prioritizing projects.

Short-term Payback Energy Conservation Measures:

The following Energy Conservation Measures (ECMs) identified with a simple payback of 0 to 5 years are considered very cost effective and should be considered a high priority for the Department It should be noted that in many cases ECM's lying in this range can be performed utilizing qualified "in house" staff that can further reduce the payback period.

- 85 - ECM #1: Lighting Controls Upgrade
- 85 – ECM #4: Propane to Natural Gas Conversion

While Natural Gas is not currently available at the facility it is expected to be within the next year to two years.

Medium-term Payback Energy Conservation Measures:

The following Energy Conservation Measures (ECMs) identified with a simple payback of 5 to 10 years are considered cost effective and should be considered by the Department. In many cases these measures can provide significant savings, however the costs to implement are higher, stretching the payback beyond five years.

- 85 – ECM #2: Lighting Upgrade

Long-term Payback Energy Conservation Measures:

The following Energy Conservation Measures (ECMs) identified with a simple payback of over 10 years. The ECMs that have much longer paybacks are considered capital improvement ECMs. These typically have high installation costs that are more difficult to justify based solely on the energy savings associated with the improvement. Despite the long paybacks, these ECMs in many cases provide valuable and much needed infrastructure improvements for the facility. These ECMs include boiler upgrades, HVAC equipment upgrades, etc. It should also be noted that projects under a 15 year payback should be reviewed in the event the Department wishes to move forward with an Energy Savings Improvement Program where these projects could be included that program.

- ECM #3: HVAC System Upgrade

In addition to the ECMs and REMs, 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 windows and 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. Verify all thermostats are utilizing setback and scheduling capabilities.
6. The Fire House currently has sinks rated at 2.2 gallons per minute. While water usage is likely low due to its intermittent usage we still recommend the installation of 0.5 gallons per minute aerators on all sinks. Aerators are a relatively inexpensive item and can likely be self-installed.

Overall, the Fire House appears to be operating at a high efficiency level and taking full advantage of turning off and setting back equipment while unoccupied. With the implementation of the above recommended measures the Cape May Point Fire Department will realize further energy savings at the Fire House.

II. INTRODUCTION

The comprehensive energy audit covers the following building for the Cape May Point Fire Department.

Ref. #	Facility Name	Area (Sqft)	Address
85	Fire Station/Meeting House	5,000	412 Yale

Electrical and natural gas utility information is collected and analyzed for one full year's energy use of the building. The utility information allows for analysis of the 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/ft^2/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:

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

$$Simple\ Lifetime\ Savings = \left(Yearly\ Savings \times ECM\ \ Lifetime \right)$$

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

$$Lifetime\ Maintenance\ Savings = \left(Yearly\ Maintenance\ Savings \times ECM\ \ Lifetime \right)$$

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

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

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, Atlantic City Electric (ACE) provides electricity to the facilities under their Monthly General Service rate structure. A Third Part Supplier (TPS), South Jersey Energy Co., has contracted to provide electric commodity services. 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 propane usage profile shows the actual propane consumption for the facility. Propane is provided by Modern Gas to the facility. The propane provider measures consumption in gallons. One Gallon of propane is equivalent to 91,600 BTUs of energy.

The Borough is responsible for providing water and sewer services for the entire town. It then bills the residents directly for their water usage on a bi-annual basis. While the Borough does not own and operate its own Water Treatment Facility it receives it via the Cape May County Municipal Utilities Authority. The Fire Department receives water service through the Borough however its usage is not metered. The information depicted in table 5 is the entire annual usage for the town.

The overall cost for utilities is calculated by dividing the total cost by the total usage. Based on the utility history provided, the average cost for utilities at this facility is as follows:

Table 3
Electricity Billing Data

ELECTRIC USAGE SUMMARY

Utility Provider: Atlantic City Electric
Rate: Monthly General Service
Meter No: 84059328
Account # 0343 2249 9996
Third Party Utility South Jersey Energy Co.
TPS Meter / Acct No: -

MONTH OF USE	CONSUMPTION KWH	DEMAND	TOTAL BILL
Aug-09	1,063	0.0	$213
Sep-09	1,258	0.0	$240
Oct-09	1,388	0.0	$238
Nov-09	2,222	0.0	$389
Dec-09	3,474	0.0	$570
Jan-10	2,935	0.0	$500
Feb-10	2,366	0.0	$402
Mar-10	1,509	0.0	$259
Jul-10	1,303	0.0	$219
Jun-10	1,309	0.0	$240
May-10	1,117	0.0	$233
Apr-10	887	0.0	$186
Totals	**20,831**	**0.0 Max**	**$3,689**

AVERAGE DEMAND **0.0 KW average**

AVERAGE RATE **$0.177 $/kWh**

Figure 1
Electricity Usage Profile

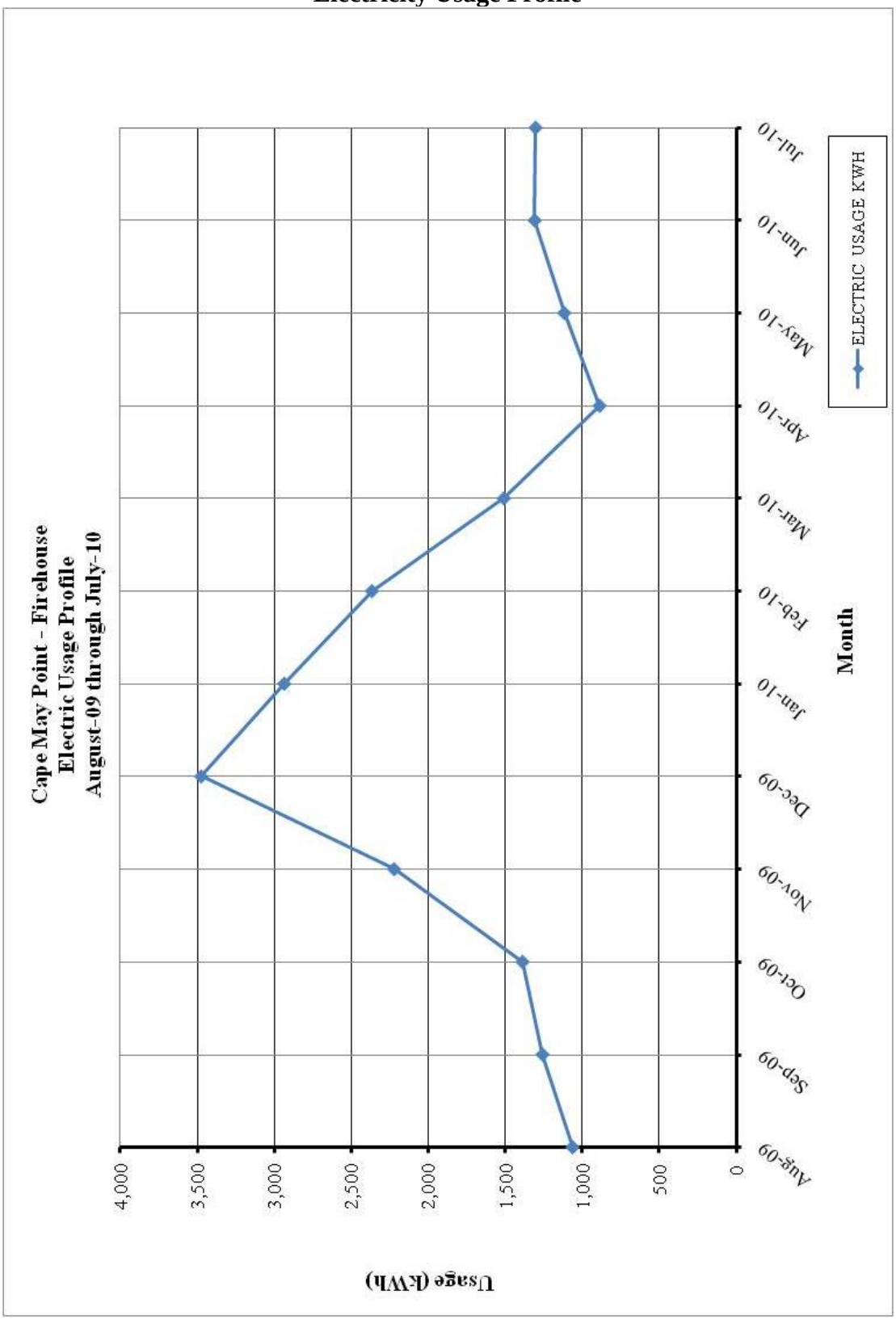


Table 4
Propane Billing Data

PROPANE USAGE SUMMARY		
Utility Provider: Modern Gas		
MONTH OF USE	**CONSUMPTION (GALLONS)**	**TOTAL BILL**
Oct-09	104.00	$258.46
Nov-09	0.00	$0.00
Dec-09	213.00	$531.12
Jan-10	341.00	$847.85
Feb-10	175.00	$435.50
Mar-10	241.00	$599.84
Apr-10	214.00	$532.36
May-10	0.00	$0.00
Jun-10	0.00	$0.00
Jul-10	0.00	$0.00
Aug-10	0.00	$0.00
Sep-10	0.00	$0.00
TOTALS	**1,288.00**	**$3,205.13**
AVERAGE RATE:	**$2.49**	**$/GAL**

Figure 2
Propane Usage Profile

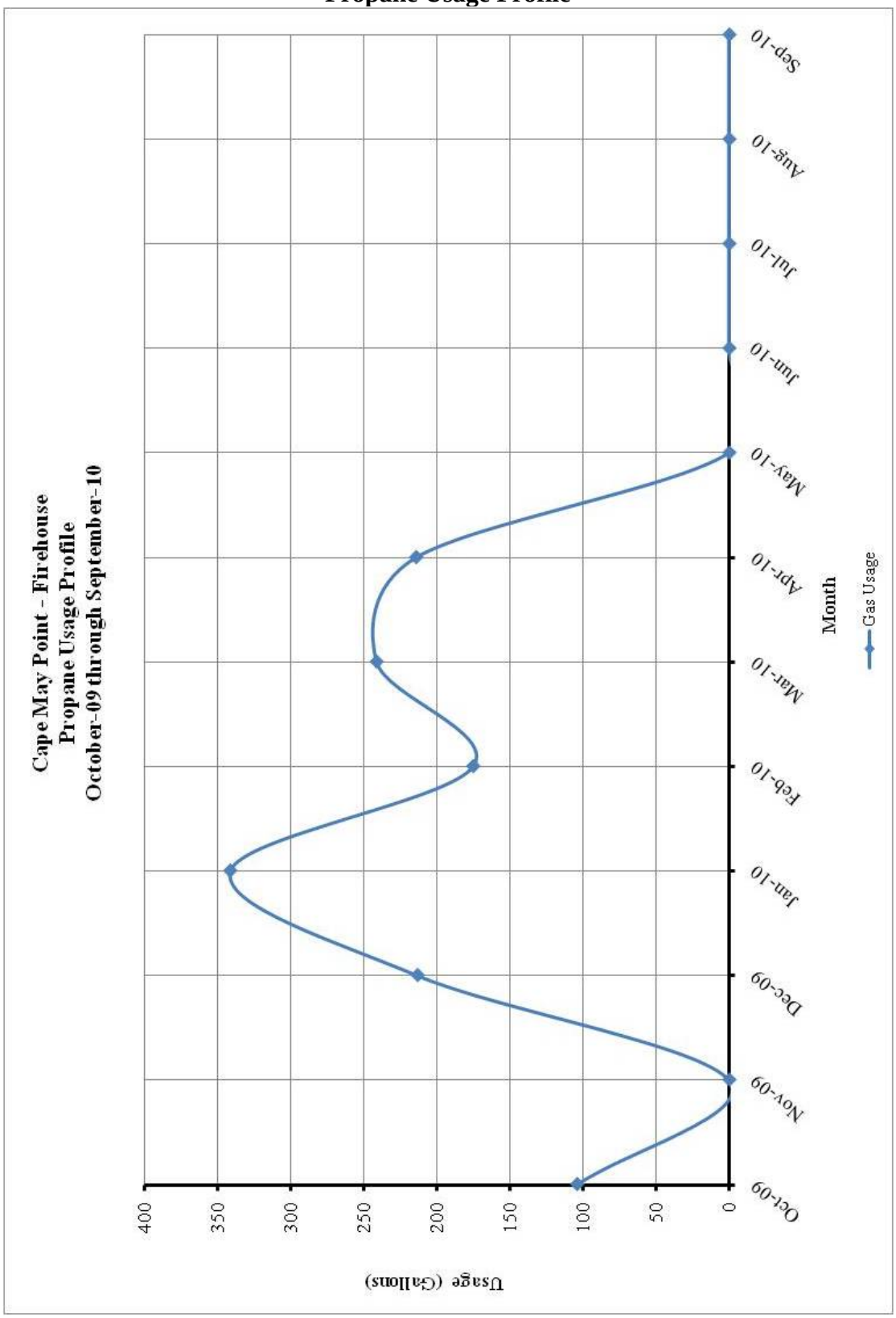
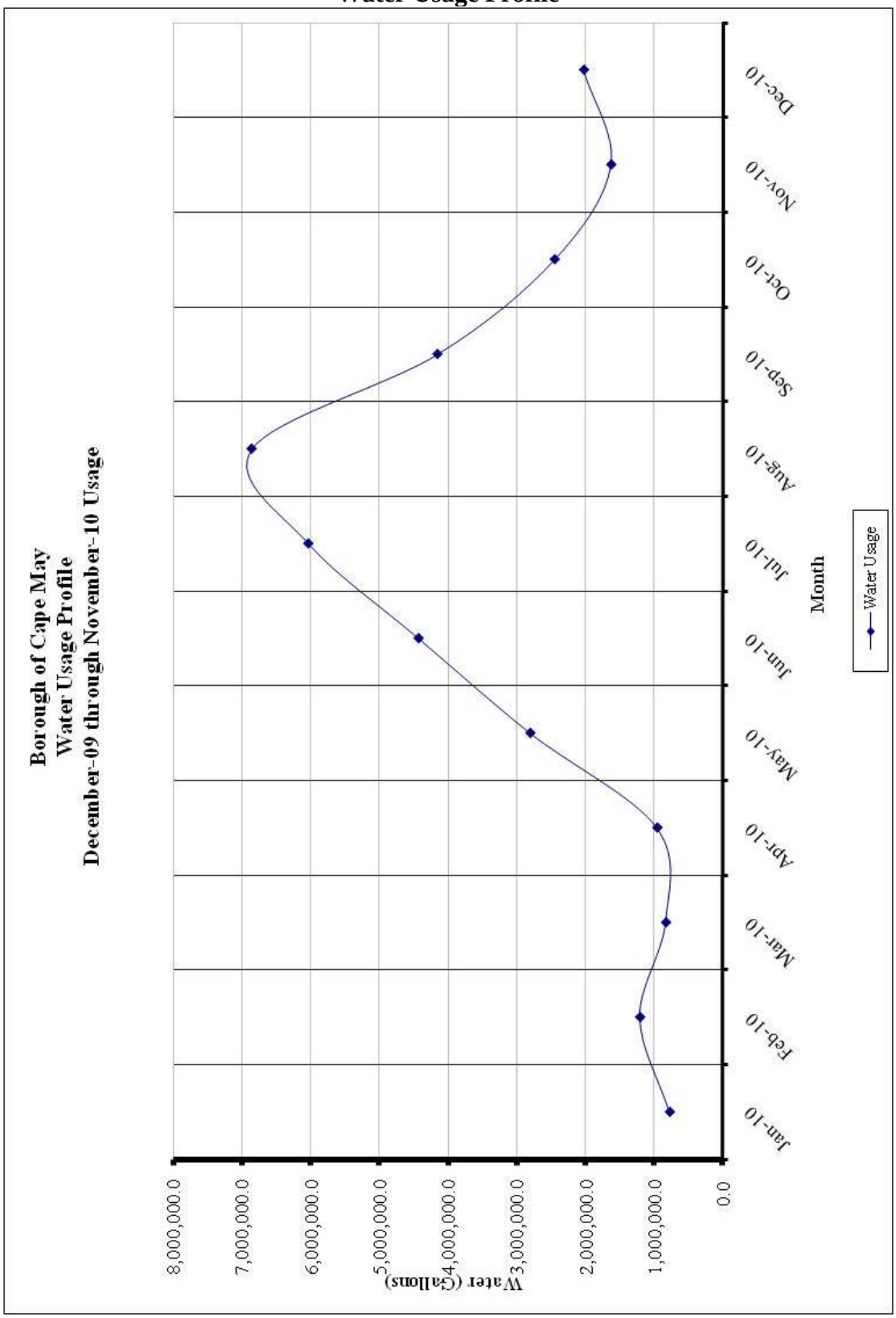


Table 5
Water Usage Billing Data

WATER USAGE SUMMARY		
Utility Provider:	Cape May Point Municipal Water	
Rate:		
Meter No:		
Point of Delivery ID:		
Third Party Utility Provider:		
TPS Meter No:		
MONTH OF USE	**CONSUMPTION (GALLONS)**	**TOTAL BILL**
Jan-10	774,000.0	$4,845.24
Feb-10	1,206,000.0	$7,549.56
Mar-10	830,000.0	$5,195.80
Apr-10	956,000.0	$5,984.56
May-10	2,804,000.0	$17,553.04
Jun-10	4,429,000.0	$27,725.54
Jul-10	6,035,000.0	$37,779.10
Aug-10	6,860,000.0	$42,943.60
Sep-10	4,156,000.0	$26,016.56
Oct-10	2,449,000.0	$15,330.74
Nov-10	1,626,000.0	$10,178.76
Dec-10	2,023,000.0	$12,663.98
TOTALS	**34,148,000.0**	**$213,766.48**
AVERAGE RATE:	**$6.26**	**$/kGAL (1,000 GAL)**

Figure 3
Water 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:

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

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

Table 6
Facility Energy Use Index (EUI) Calculation
Firehouse

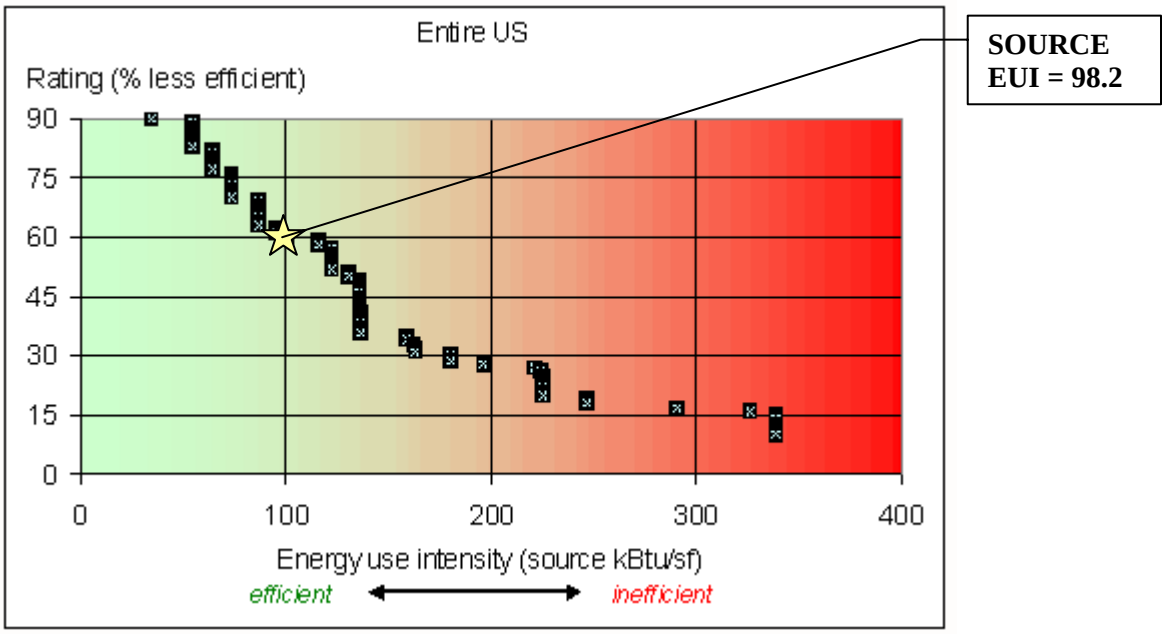
ENERGY USE INTENSITY CALCULATION						
ENERGY TYPE	BUILDING USE			SITE ENERGY	SITE-SOURCE RATIO	SOURCE ENERGY
	kWh	Therms	Gallons	kBtu		kBtu
ELECTRIC	20,831.0			71,117	3.340	237,531
PROPANE			1,288.0	117,633	1.010	118,809
TOTAL				317,550		491,194

*Site - Source Ratio data is provided by the Energy Star Performance Rating Methodology for Incorporating Source Energy Use document issued Dec 2007.

BUILDING AREA	5,000	SQUARE FEET
BUILDING SITE EUI	*63.51*	kBtu/SF/YR
BUILDING SOURCE EUI	*98.24*	kBtu/SF/YR

Figure 3 below depicts a national EUI grading for the source use of Fire/Police Station.

Figure 4
Source Energy Use Intensity Distributions: Fire/Police Station



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

[redacted]

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 7
ENERGY STAR Performance Rating

ENERGY STAR PERFORMANCE RATING			
Ref. #	**Facility Description**	**Energy Performance Rating**	**National Average**
85	Fire Station/Meeting Hous	N/A	N/A

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

The Fire house is unable to be rated within energy due to being categorized as "Other" that cannot be rated.

V. FACILITY DESCRIPTION

#85 Fire House

The 5,000 SF Fire House is a two story building comprised of kitchen area, truck bays, council room, lounge, restrooms, office, and small lobby area. Typically this building is most significantly used for Borough and Fire Meetings on Monday nights, the usage outside of these scheduled events varies day to day based on activities and fire calls. Exterior walls are brick construction with typical lay-in insulation within the walls. The specific R value for the insulation is unknown however appears to more than adequately insulate the building. The windows throughout the facility are in good condition and appear to be maintained. Typical windows throughout the facility are operable double pane, ¼" clear glass. Blinds are utilized through the facility per occupant comfort. The blinds are valuable because they help to reduce heat loss in the winter and reduce solar heat in the summer. The roof is a standard A-frame shingle room with insulation located in the attic space that is likely rated at R-30. The building was built in 1924 with various additions since the original construction.

HVAC Systems

The facility is heating and cooled through a variety of systems based on the area of the building being served. The truck bays are heating only via propane fired unit heaters mounted from the ceiling generally in the rear of the bay. The down stairs office is heating via electric baseboard and cooled with a window unit. The upstairs council chamber, small kitchenette, and lounge area is conditioned via a 5 ton split system and gas fired furnace.

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 large kitchen has one small kitchen hood overtop the kitchen equipment, the fan only operates while the kitchen is in use.

HVAC System Controls

The HVAC systems within the facility are controlled via individual wall mounted thermostats with 7-day program setback capability.

Domestic Hot Water

Domestic hot water for the building is provided by a 40 gallon A.O. Smith electric hot water heater, capacity of 4,500 watts. The domestic hot water is circulated throughout the building by a hot water re-circ pump.

Lighting

Typical lighting throughout building is fluorescent tube lay-in fixtures with T-12 lamps and magnetic ballasts. Storage rooms and closets lit with compact fluorescent lamps.

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

85 - ECM #1: Lighting Upgrade

Description:

There are still a large amount of T-12 fixtures throughout the Fire House. Improved fluorescent lamps and ballasts are available as direct replacements for the existing lamps and ballasts. A simple retrofit of the existing fixture can provide substantial savings. For example, a conventional drop-ceiling lay in fixture with four, 4-foot lamps (34 Watt lamps with magnetic ballast) has a total wattage of 144 Watts per fixture. By using T-8 lamps and electronic ballasts, the total wattage would be reduced to 86 Watts. The light levels would increase by about 15% and the light quality would increase by 35%.

This ECM includes retrofitting each of the existing T-12 fluorescent lamp and magnetic ballast fixtures with T-8 lamps and high-power electronic ballasts. High efficiency electronic ballasts reduce overall wattage while maintaining the existing lumen levels of the various rooms. This ECM also includes re-lamping of the existing fluorescent fixtures with 800 series, 28W T8 lamps. Additionally, the retrofit of all older fluorescent fixtures with T8 or T5 fluorescent fixtures with electronic ballasts in the building would prove to be more energy efficient. 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.

The ECM also includes replacement of any incandescent lamps with compact fluorescent lamps. Compact fluorescent lamps (CFL's) were designed to be direct replacements for the standard incandescent lamps which are common to table lamps, spot lights, hi-hats, bathroom vanity lighting, etc. The light output of the CFL has been designed to resemble the incandescent lamp. The color rendering index (CRI) of the CFL is much higher than standard fluorescent lighting, and therefore provides a much "truer" light. The CFL is available in a myriad of shapes and sizes depending on the specific application. Typical replacements are: a 13-Watt CFL for a 60-Watt incandescent lamp, an 18-Watt CFL for a 75-Watt incandescent lamp, and a 26-Watt CFL for a 100-Watt incandescent lamp. The CFL is also available for a number of "brightness colors" that is indicated by the Kelvin rating. A 2700K CFL is the "warmest" color available and is closest in color to the incandescent lamp. CFL's are also available in 3000K, 3500K, and 4100K. The 4100K would be the "brightest" or "coolest" output. A CFL can be chosen to screw right into your existing fixtures, or hardwired into your existing fixtures. Where the existing fixture is controlled by a dimmer switch, the CFL bulb must be compatible with a dimmer switch. In some locations the bulb replacement will need to be tested to make sure the larger base of the CFL will fit into the existing fixture. The energy usage of an incandescent compared to a compact fluorescent approximately 3 to 4 times greater. In addition to the energy savings, compact fluorescent fixtures burn-hours are 8 to 15 times longer than incandescent fixtures ranging from 6,000 to 15,000 burn-hours compared to incandescent fixtures ranging from 750 to 1000 burn-

hours. However, the maintenance savings due to reduced lamp replacement is offset by the higher cost of the CFL's compared to the incandescent lamps.

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.

Rebates and Incentives:

From the **NJ Smart Start Incentive Appendix**, the retrofit of a T-12 fixture to a T-5 or T-8 fixture or the retrofit of existing 32 watt T-8 system to reduced wattage (28w/25w 4') warrants the following incentive: $10 per fixture.

$$\text{SmartStart® Incentive} = (\#\text{ of } 1-4 \text{ lamp fixtures} \times \$10) = 33 \times \$10 = \$330$$

Energy Savings Summary:

85 - ECM #1 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$4,018
NJ Smart Start Equipment Incentive ($):	$330
Net Installation Cost ($):	$3,688
Maintenance Savings ($/Yr):	$0
Energy Savings ($/Yr):	$593
Total Yearly Savings ($/Yr):	$593
Estimated ECM Lifetime (Yr):	15
Simple Payback	6.2
Simple Lifetime ROI	141.2%
Simple Lifetime Maintenance Savings	$0
Simple Lifetime Savings	$8,895
Internal Rate of Return (IRR)	14%
Net Present Value (NPV)	$3,391.20

85 - ECM #2: Lighting Controls Upgrade – Occupancy Sensors

Description:

Some of the lights in the Cape May Point Fire House are 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 20% of the total light energy controlled by occupancy sensors and daylight sensors (The majority of the savings is expected to be after school hours when rooms are left with lights on)

This ECM includes installation of ceiling or switch mount sensors for individual offices, classrooms, large bathrooms, and libraries. 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:

$$\text{Energy Savings} = \left(\%\ \text{Savings} \times \text{Controlled Light Energy}\ \left(\text{kWh/Yr}\right)\right)$$

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

Cost and Incentives:

Installation cost per dual-technology sensors (Basis: Sensor switch or equivalent) are as follows:

Dual Technology Occupancy Sensor - Remote Mount	$160 per installation
Dual Technology Occupancy Sensor - Switch Mount	$75 per installation

Cost includes material and labor.

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

Occupancy Sensor Fixture Mounted (existing facility only) = $20 per sensor
Occupancy Sensor Remote Mounted (existing facility only) = $35 per sensor

$$\text{Smart Start® Incentive} = (\#\text{ of wall mount} \times \$\,20) + (\#\text{of ceiling mount} \times \$35)$$
$$\text{Smart Start® Incentive} = (0\,\text{wall mount} \times \$\,20) + (4\,\text{ceiling mount} \times \$35) = \$140$$

Energy Savings Summary:

85 - ECM #2 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$640
NJ Smart Start Equipment Incentive ($):	$140
Net Installation Cost ($):	$500
Maintenance Savings ($/Yr):	$0
Energy Savings ($/Yr):	$87
Total Yearly Savings ($/Yr):	$87
Estimated ECM Lifetime (Yr):	15
Simple Payback	5.8
Simple Lifetime ROI	159.5%
Simple Lifetime Maintenance Savings	$0
Simple Lifetime Savings	$1,298
Internal Rate of Return (IRR)	15%
Net Present Value (NPV)	$532.63

82 - ECM #3: HVAC System Replacement

Description:

The Fire House HVAC system is current six years old Halfway through its useful life expectancy and could be replaced with a newer much more efficient system. The system currently utilized one propane fired furnaces coupled with an outdoor condensing unit to serve the building. The unit is controlled via a centrally located thermostat.

This ECM proposed replacing the system with a hybrid heat pump system. This system would utilize two stages of heating, the heat pump would handle the first stage of heating down to an outdoor air temperature of approximately 40 degrees Fahrenheit, and then the system would go into its second stage of heating being provided by a gas furnace. System specifications are based on the installation of a Lennox XP21 heat pump units and SL98UH high efficiency natural gas fired furnace that can also be utilized with propane.

Energy Savings Calculations:

Cooling savings were calculated based equivalent full load hours for a standard cooling system compared with that of a heat pump unit utilizing the following equation.

$$Electric\ Usage = \frac{Cooling\,(Tons) \times 12{,}000\left(\frac{Btu}{Ton\ hr}\right)}{1000\left(\frac{W}{kW}\right)} \times \left(\frac{1}{SEER}\right) \times Equivalent\ Full\ Load\ Hrs.$$

Heating savings were calculated based on the existing heating requirements of the building utilizing the previous year's propane bills and removing the portion of the bill associated with domestic hot water heating. Stage 1 heat pump heating usage was calculated based on the percentage of Heating Degree Days from 45 to 65 degrees Fahrenheit, and stage 2 furnace heating usage was calculation based on the percentage of Heating Degree Days below 45 degrees Fahrenheit. The following equations were utilized in calculation these savings.

$$Heating\ Usage\ Stage\ One = \frac{\%HDD(45\,to\,65\,F) \times Heating\ Load\ (kBtu)}{1000\left(\frac{Btu}{kBtu}\right)} \times \left(\frac{1}{HSPF}\right) \times \left(\frac{1}{1000\frac{Wh}{kWh}}\right)$$

$$Heating\ Usage\ Stage\ Two = \frac{\%HDD(45\,F) \times Heating\ Load\ (kBtu)}{1000\left(\frac{Btu}{kBtu}\right)} \times \left(\frac{1}{Efficiency}\right) \times \left(\frac{1}{91{,}600\frac{Btu}{gal}}\right)$$

HVAC SYSTEM CONV TO HP W/ GAS FURNACE CALCULATION			
ECM INPUTS	**EXISTING**	**PROPOSED**	**SAVINGS**
HEATING SAVINGS CALCULATION			
Annual Fuel Usage (kBtu)	117,981	117,981	
Building Heating Usage (kbtu)	62,423		
Existing Heating System Efficiency	80%		
Building Heat Load (kBtu)	49,938	49,938	
Heating Degree Days (65 F)	4,328	4,328	
Percent HDD less than 45 F	N/A	24%	
Percent HDD between 45 F to 65 F	N/A	76%	
Heating Stage 1 [Heat Pump] (kBtu)	N/A	38,019	
Heating Stage 2 [Gas Furnace] (kBtu)	N/A	11,919	
Electric Usage (kWh)	0	3,920	
Propane Usage (Gallons)	681	134	
COOLING SAVINGS CALCULATION			
Cooling Equivalent Full Load Hours	1,131	381	
Electric Usage (kWh)	6,786	1,369	
Electric Cost ($/kWh)	0.18	0.18	
Propane Cost ($/Gal)	2.49	2.49	
ENERGY SAVINGS CALCULATIONS			
ECM RESULTS	**EXISTING**	**PROPOSED**	**SAVINGS**
Electric Usage (kWh)	6,786	5,288	1,498
Propane Usage (Gallons)	681	134	547
Energy Cost ($)	$2,898	$1,270	$1,628
COMMENTS:	HP Operation Above 45 F for Heating, Below 45 F Gas Furnace; HDD(45F) 1033		

Currently South Jersey Gas is extending natural gas service to the Borough in the coming year. As a result ECM savings that effect propane usage have also been reviewed based on natural gas being available. The following table projects potential savings with natural gas service at the building using a natural gas cost of $1.1553 per therm. (Current rate information on SJG GSG and BGSS tariffs)

SAVINGS ADJUSTMENT FOR NATURAL GAS		
ECM Results	**Usage**	**Cost ($)**
Existing Propane (gal)	681	$1,288
Proposed Natural Gas (therm)	123	$142
Adjusted Savings		$1,146
Electric Savings (kWh)	1,498	$265
New Total Savings		$1,411

Energy Savings Summary:

85 - ECM #3 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$25,200
NJ Smart Start Equipment Incentive ($):	$668
Net Installation Cost ($):	$24,532
Maintenance Savings ($/Yr):	$0
Energy Savings ($/Yr):	$1,628
Total Yearly Savings ($/Yr):	$1,628
Estimated ECM Lifetime (Yr):	15
Simple Payback	15.1
Simple Lifetime ROI	-0.5%
Simple Lifetime Maintenance Savings	$0
Simple Lifetime Savings	$24,420
Internal Rate of Return (IRR)	0%
Net Present Value (NPV)	($5,097.04)

85 - ECM #4: Propane to Natural Gas Conversion All Buildings

Description:

To date South Jersey Gas is currently in the process of providing Natural Gas service to the Borough and its residents. The Fire House currently operates its systems on propane that is delivered on an as needed basis to storage tanks located the building. While still an efficient way to heat propane is much more expensive per Btu than natural gas. The switchover would require gas pipe be run to the Fire House and a gas meter installed. In many cases the existing pipe can be reused for natural gas; however each propane/gas piece of equipment would require a nozzle change out to accept the Natural Gas. Assuming the utility pays for the meter and gas piping from the main to the building the Fire House would only be required to pay for the equipment alterations and any account set fees and deposits, which are determined when the account is setup.

Energy Savings Calculations:

The current Propane pricing from previously bills was compared to the current pricing for Natural Gas using SJG General Service Gas and Basic Gas Supply Service tariffs

PROPANE TO NATURAL GAS CONVERSION					
	PROPANE		NATURAL GAS		SAVINGS
BUILDING	Usage (Gal)	Cost ($)	Usage (therm)	Cost ($)	($)
Fire House	1288	$3,205	1,179.8	$1,363	$1,842

Energy Savings Summary:

85 - ECM #4 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$500
NJ Smart Start Equipment Incentive ($):	$0
Net Installation Cost ($):	$500
Maintenance Savings ($/Yr):	$0
Energy Savings ($/Yr):	$1,842
Total Yearly Savings ($/Yr):	$1,842
Estimated ECM Lifetime (Yr):	15
Simple Payback	0.3
Simple Lifetime ROI	5426.0%
Simple Lifetime Maintenance Savings	$0
Simple Lifetime Savings	$27,630
Internal Rate of Return (IRR)	368%
Net Present Value (NPV)	$21,489.68

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

While the fire house has open roof space available for the installation of solar, the orientation and pitch of the roof would position the system in a way it could not achieve its optimal output. Furthermore tree coverage located on adjacent properties that shade the roof would further impede the systems capability to generate electricity. Considering the age of the current structure and the structural enhancements necessary to accommodate a solar system would significantly increase the cost of the system. In conclusion, the shading, poor orientation, and high cost of a solar system make it financially and technically infeasible as a renewable energy alternative for the Fire House.

Wind Generation

In addition to the Solar Analysis, CEG also conducted a review of the applicability of wind energy for the facility. Wind energy production is another option available through the Renewable Energy Incentive Program. Wind turbines of various types can be utilized to produce clean energy on a per building basis. Cash incentives are available per kWh of electric usage. Based on CEG's review of the applicability of wind energy for the facility, it was determined that based on 30 meter wind maps an average wind speed of 7.0 meters per second is available making wind a potential option for the Fire Department. However the Fire House is surrounded by residencies and is situated in a manner that is uses their entire lot. Given there is no space to install a small turbine wind is not recommended for this site.

IX. ENERGY PURCHASING AND PROCUREMENT STRATEGY

Load Profile:

Load Profile analysis was performed to determine the seasonal energy usage of the facility. 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.

Propane:

The Propane profile demonstrates that peak usage occurs during the heating season for the facilities with minimal usage occurring the remaining part of the year.

The historical usage profile is beneficial as it provides information to the propane supplier on expected times of delivery and overall demand throughout the year. The propane pricing structure is currently based on delivery date pricing.

Tariff Analysis:

Electricity:

The facility receives electrical service through Atlantic City Electric (AECO) on MGS (Monthly General Service). The facility has currently contracted a Third Party Supplier (TPS), South Jersey Energy Co. to provide electric commodity service on a fixed price.

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.

Propane:

Propane pricing from South Jersey Propane is currently based on delivery date pricing. The propane market generally follows closely with the petroleum market, which can cause prices to fluctuate throughout the year.

Natural Gas:

The facility currently do not receive natural gas distribution service through South Jersey Gas, however it is the future plan of the Department once service is available to convert, as a result information in this section was left for future reference. At that time the Fire House will be likely placed under a General Service (GS) rate structure, and if do not contract with a third party will purchase commodity through SJG BGSS tariff.

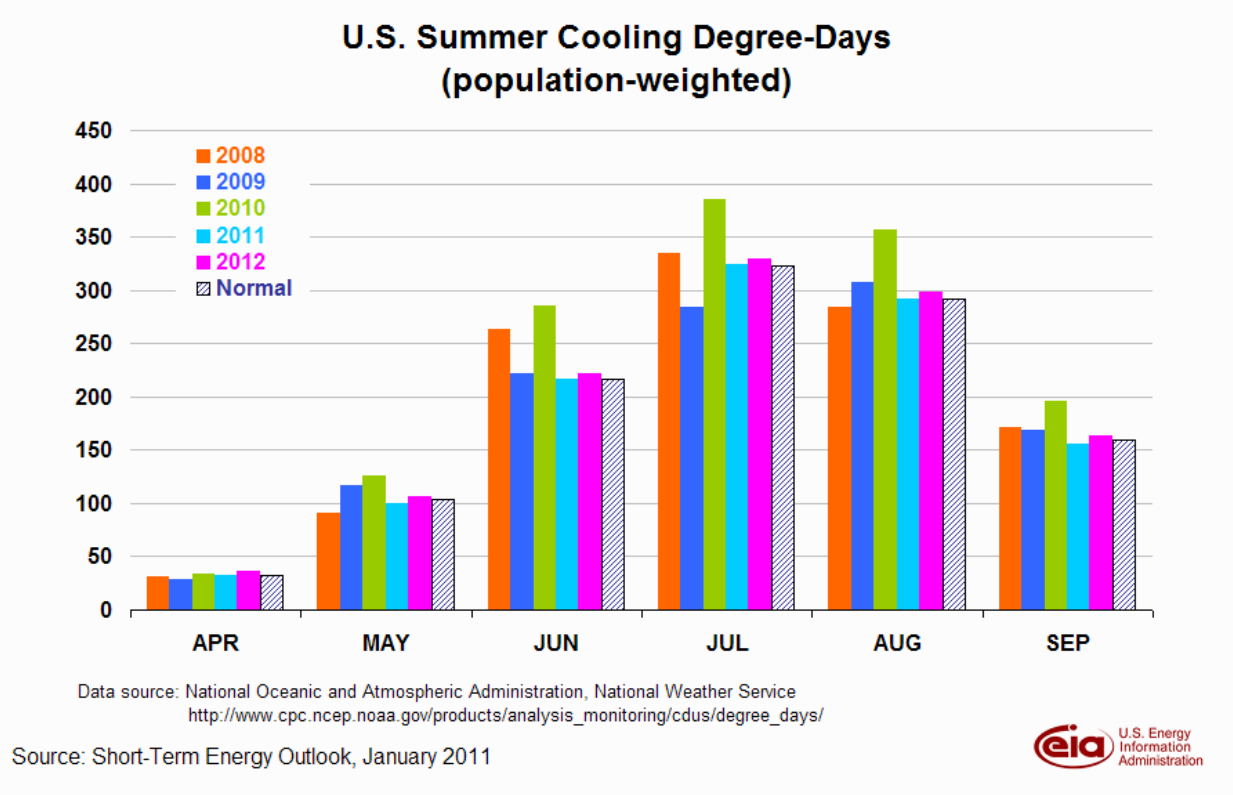
South Jersey Gas provides basic gas supply service (BGSS) to customers who choose not to shop from a Third Party Supplier (TPS) for natural gas commodity. The option is essential to protect the reliability of service to consumers as well as protecting consumers if a third party supplier defaults or fails 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. While the Department already has a third party supplier, CEG recommends at the end of their existing contract to investigate aggregating their building with the Borough's and soliciting for a third party supplier for electricity and potentially natural gas in the future. As the Fire House alone is a small user a shared services approach with the Borough and /or neighboring Municipalities may achieve some economies of scale.

2. CEG also recommends that the Department further investigate shopping its Propane purchasing or perhaps contracting with a provider at a fixed price for the year as an available option.

3. CEG recommends that the Department 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 Borough. The service could provide refunds on potential incorrect billings that may have been passed through by the utilities and paid by the Department.

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 par 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. *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.

v. *Energy Efficiency and Conservation Block Grants* – The EECGB rebate provides supplemental funding up to $20,000 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. Verify all thermostats are utilizing setback and scheduling capabilities.

F. The Fire House currently has sinks rated at 2.2 gallons per minute. While water usage is likely low due to its intermittent usage we still recommend the installation of 0.5 gallons per minute aerators on all sinks. Aerators are a relatively inexpensive item and can likely be self-installed.

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 Means™ 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

Cape May Point - Fire House

ECM ENERGY AND FINANCIAL COSTS AND SAVINGS SUMMARY

ECM NO.	DESCRIPTION	INSTALLATION COST				YEARLY SAVINGS			ECM LIFETIME	LIFETIME ENERGY SAVINGS	LIFETIME MAINTENANCE SAVINGS	LIFETIME ROI	SIMPLE PAYBACK	INTERNAL RATE OF RETURN (IRR)	NET PRESENT VALUE (NPV)
		MATERIAL	LABOR	REBATES, INCENTIVES	NET INSTALLATION COST	ENERGY	MAINT. / SREC	TOTAL		(Yearly Saving * ECM Lifetime)	(Yearly Maint Svaing * 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)	($/Yr)	(Yr)	($)	($)	(%)	(Yr)	($)	($)
85 - ECM #1	Lighting Upgrade	$4,018	$0	$330	$3,688	$593	$0	$593	15	$8,895	$0	141.2%	6.2	13.75%	$3,391.20
85 - ECM #2	Lighting Controls Upgrade	$640	$0	$140	$500	$87	$0	$87	15	$1,298	$0	159.5%	5.8	15.24%	$532.63
85 - ECM #3	HVAC System Upgrade	$11,000	$14,200	$668	$24,532	$1,628	$0	$1,628	15	$24,420	$0	-0.5%	15.1	-0.06%	($5,097.04)
85 - ECM #4	Propane to NG Conversion	$300	$200	$0	$500	$1,842	$0	$1,842	15	$27,630	$0	5426.0%	0.3	#NUM!	$0.00

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.

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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 15, 2011:

Electric Chillers

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

Energy Efficiency must comply with ASHRAE 90.1-2007

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 - $92 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 90.1-2007

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%

Ground Source Heat Pumps

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

Energy Efficiency must comply with ASHRAE 90.1-2007

Variable Frequency Drives

Variable Air Volume	$65 - $155 per hp
Chilled-Water Pumps	$60 per VFD rated hp
Compressors	$5,250 to $12,500 per drive
Cooling Towers ≥ 10 hp	$60 per VFD rated hp

Natural Gas Water Heating

Gas Water Heaters ≤ 50 gallons, 0.67 energy factor or better	$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 (1-4 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 Including Parking Lot	$25 per fixture
T-5 and T-8 High Bay Fixtures	$16 - $200 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

Prescriptive Lighting - LED

LED New Exit Sign Fixture Existing Facility < 75 kw Existing Facility > 75 kw	 $20 per fixture $10 per fixture
LED Display Case Lighting	$30 per display case
LED Shelf-Mtd. Display & Task Lights	$15 per linear foot
LED Portable Desk Lamp	$20 per fixture
LED Wall-wash Lights	$30 per fixture
LED Recessed Down Lights	$35 per fixture
LED Outdoor Pole/Arm-Mounted Area and Roadway Luminaries	$175 per fixture
LED Outdoor Pole/Arm-Mounted Decorative Luminaries	$175 per fixture
LED Outdoor Wall-Mounted Area Luminaries	$100 per fixture
LED Parking Garage Luminaries	$100 per fixture
LED Track or Mono-Point Directional Lighting Fixtures	$50 per fixture
LED High-Bay and Low-Bay Fixtures for Commercial & Industrial Bldgs.	$150 per fixture
LED High-Bay-Aisle Lighting	$150 per fixture
LED Bollard Fixtures	$50 per fixture
LED Linear Panels (2x2 Troffers only)	$100 per fixture
LED Fuel Pump Canopy	$100 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 90.1-2007 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

OMB No. 2060-0347

STATEMENT OF ENERGY PERFORMANCE
Firehouse

Building ID: 2653935
For 12-month Period Ending: August 31, 2010[1]
Date SEP becomes ineligible: N/A
Date SEP Generated: April 08, 2011

Facility
Firehouse
412 Yale Avenue
Cape May Point, NJ 08212

Facility Owner
Borough of Cape May Point
PO Box 490 215 Lighthouse Avenue
Cape May Point, NJ 08212

Primary Contact for this Facility
Carl Schupp
PO Box 490 215 Lighthouse Avenue
Cape May Point, NJ 08212

Year Built: 1924
Gross Floor Area (ft²): 5,000

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

Site Energy Use Summary[3]

Electricity - Grid Purchase(kBtu)	71,075
Propane (kBtu)	128,613
Natural Gas - (kBtu)[4]	0
Total Energy (kBtu)	199,688

Energy Intensity[5]

Site (kBtu/ft²/yr)	40
Source (kBtu/ft²/yr)	73

Emissions (based on site energy use)

Greenhouse Gas Emissions ($MtCO_2e$/year)	18

Electric Distribution Utility
Atlantic City Electric Co [Pepco Holdings Inc]

National Average Comparison

National Average Site EUI	78
National Average Source EUI	157
% Difference from National Average Source EUI	-53%
Building Type	Fire Station/Police Station

Stamp of Certifying Professional

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

Certifying Professional
N/A

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

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

Notes:
1. Application for the ENERGY STAR must be submitted to EPA within 4 months of the Period Ending date. Award of the ENERGY STAR is not final until approval is received from EPA.
2. The EPA Energy Performance Rating is based on total source energy. A rating of 75 is the minimum to be eligible for the ENERGY STAR.
3. Values represent energy consumption, annualized to a 12-month period.
4. Values represent energy intensity, annualized to a 12-month period.
5. 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

Cape May Point - Fire House

Rooftop / AC Units

Tag	AH-1		
Unit Type	Split System w/ Furnace		
Qty	1		
Location	Roof/Attic		
Area Served	Council Room		
Manufacturer	Ducane		
Model #	N/A		
Serial #	N/A		
Cooling Type	DX		
Cooling Capacity (Tons)	5.00		
Cooling Efficiency (SEER/EER)	10 SEER		
Heating Type	Furnace		
Heating Input (MBH)	125		
Efficiency	80%		
Fuel	Natural Gas		
Approx Age	6		
ASHRAE Service Life	15		
Remaining Life	9		
Comments			

MAJOR EQUIPMENT LIST

Concord Engineering Group

Cape May Point - Fire House

Unit Heaters

Tag			
Unit Type	Propane Unit Heater	Propane Unit Heater	
Qty	1	1	
Location	Garage	Office	
Area Served	Garage	Office	
Manufacturer	Modine	Modine	
Model #	PDP100AE0185	PDP150AE0185	
Serial #	39011011306-6869	39011011906-3348	
Heating Type	Propane	Propane	
Heating Capacity (MBH)	100,000	150,000	
CFM	1490 CFM	2180 CFM	
RPM/HP	1050 RPM / 1/12 HP	1625 RPM / 1/8 HP	
GPM	N/A	N/A	
Approx Age			
Ashrae Service Life	20	20	
Remaining Life	20	20	
Comments			

MAJOR EQUIPMENT LIST

Concord Engineering Group

Cape May Point - Fire House

Domestic Water Heaters

Tag			
Unit Type	Electric Domestic Hot Water		
Qty	1		
Location	Closet		
Area Served	Fire House		
Manufacturer	A.O. Smith		
Model #	KEN 40 913		
Serial #	MJ88-0078220-913		
Size (Gallons)	40 Gallons		
Input Capacity (MBH/KW)	4500 Watts		
Recovery (Gal/Hr)	-		
Efficiency %	100%		
Fuel	Electric		
Approx Age	12		
ASHRAE Service Life	12		
Remaining Life	0		
Comments			

APPENDIX E

Investment Grade Lighting Audit

CEG Job #: 9C10102
Project: Cape May Point LGEA
Address: 412 Yale Avenue
Cap May Point, NJ
Building SF: 5,000

Fire House

KWH COST: $0.177

ECM #3: Lighting Upgrade - Fire House

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
1	Office	1500	1	4	4 Lamp 32 W T8 2x4 Recessed Prismatic	109	0.11	163.5	$28.94	1	4	Relamp - Sylvania Lamp FO28/841/SS/ECO	98	0.10	147	$26.02	$28.00	$28.00	0.01	16.5	$2.92	9.59
15	Bay #1	1500	4	2	8' Channel, 2 Lamp, 96w T12, Mag. Ballast, Surface Mnt., No Lens	209	0.84	1,254.0	$221.96	4	4	(2) 8' Lamps to (4) 4' Lamps - 32w T8, Elect Ballast; retrofit	104	0.42	624	$110.45	$100.00	$400.00	0.42	630	$111.51	3.59
16	Bathroom	1500	1	2	2x2, 2 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.06	93.0	$16.46	1	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
16	Elev Closet	780	1	2	2x2, 2 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.06	48.4	$8.56	1	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
5	Hall	1500	6	1	13 W Recessed CFL	13	0.08	117.0	$20.71	6	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
15	Bay #2	1500	8	2	8' Channel, 2 Lamp, 96w T12, Mag. Ballast, Surface Mnt., No Lens	209	1.67	2,508.0	$443.92	8	4	(2) 8' Lamps to (4) 4' Lamps - 32w T8, Elect Ballast; retrofit	104	0.83	1248	$220.90	$100.00	$800.00	0.84	1260	$223.02	3.59
16	Back Hall	1500	3	2	2x2, 2 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.19	279.0	$49.38	3	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
7	Kitchen #1	780	8	2	2 Lamp T12 34 Watt 1x4 Surface Mount Wrap	80	0.64	499.2	$88.36	8	2	2 Lamp, 32w T8, Elect. Ballast; retrofit	58	0.46	361.92	$64.06	$100.00	$800.00	0.18	137.28	$24.30	32.92
16	Stair	1500	1	2	2x2, 2 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.06	93.0	$16.46	1	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
5		1500	2	1	13 W Recessed CFL	13	0.03	39.0	$6.90	2	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
16	Bathroom #2	1500	1	2	2x2, 2 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.06	93.0	$16.46	1	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
17	Chamber	1500	15	2	2x4, 2-Lamp, 34w T12, Mag. Ballast, Recessed Mnt., Prismatic Lens	78	1.17	1,755.0	$310.64	15	2	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	50	0.75	1125	$199.13	$80.00	$1,200.00	0.42	630	$111.51	10.76
16	Elev Hall 2nd	1500	1	2	2x2, 2 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.06	93.0	$16.46	1	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00

Investment Grade Lighting Audit

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
17	Side Stair	1500	3	2	2x4, 2-Lamp, 34w T12, Mag. Ballast, Recessed Mnt., Prismatic Lens	78	0.23	351.0	$62.13	3	2	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	50	0.15	225	$39.83	$80.00	$240.00	0.08	126	$22.30	10.76
18	Back Break Room	1500	6	1	1x4, 1-Lamp, 34w T12, Mag. Ballast, Surface Mnt., Prismatic Lens	48	0.29	432.0	$76.46	6	1	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	25	0.15	225	$39.83	$80.00	$480.00	0.14	207	$36.64	13.10
19		1500	2	1	Wall Mnt. Globe, (1) 100w A19 Lamps	100	0.20	300.0	$53.10	2	1	(1) 26w CFL Lamp	26	0.05	78	$13.81	$20.00	$40.00	0.15	222	$39.29	1.02
20		1500	1	3	3 Lamp 40 watt incandescent	120	0.12	180.0	$31.86	1	3	13w CFL Lamps	39	0.04	58.5	$10.35	$30.00	$30.00	0.08	121.5	$21.51	1.39
	Totals		64	33			5.87	8,298.1	$1,468.76	64	23			2.95	4092.42	$724.36		$4,018.00	2.32	3350.3	$593.00	6.78

NOTES: 1. Simple Payback noted in this spreadsheet does not include Maintenance Savings and NJ Smart Start Incentives.
2. Lamp totals only include T-12 tube replacment calculations

CEG Job #: 9C10102
Project: Cape May Point LGEA
Address: 412 Yale Avenue
Cap May Point, NJ
Building SF: 5000

Fire House

KWH COST: $0.177

ECM #4: Lighting Controls - Fire House

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. Lamps	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
1	Office	1500	1	4	4 Lamp 32 W T8 2x4 Recessed Prismatic	109	0.11	163.5	$28.94	1	1	Dual Technology Occupancy Sensor - Remote Mnt.	109	0.09	20%	130.8	$23.15	$160.00	$160.00	0.02	32.7	$5.79	27.64
15	Bay #1	1500	4	2	8' Channel, 2 Lamp, 96w T12, Mag. Ballast, Surface Mnt., No Lens	209	0.84	1254	$221.96	4	1	No Change	209	0.84	0%	1254	$221.96	$0.00	$0.00	0.00	0	$0.00	0.00
16	Bathroom	1500	1	2	2x2, 2 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.06	93	$16.46	1	1	No Change	62	0.06	0%	93	$16.46	$0.00	$0.00	0.00	0	$0.00	0.00
16		780	1	2	2x2, 2 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.06	48.36	$8.56	1	0	No Change	62	0.06	0%	48.36	$8.56	$0.00	$0.00	0.00	0	$0.00	0.00
5	Hall	1500	6	1	13 W Recessed CFL	13	0.08	117	$20.71	6	1	No Change	13	0.08	0%	117	$20.71	$0.00	$0.00	0.00	0	$0.00	0.00
15		1500	8	2	8' Channel, 2 Lamp, 96w T12, Mag. Ballast, Surface Mnt., No Lens	209	1.67	2508	$443.92	8	0	No Change	209	1.67	0%	2508	$443.92	$0.00	$0.00	0.00	0	$0.00	0.00
16	Back Hall	1500	3	2	2x2, 2 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.19	279	$49.38	3	0	No Change	62	0.19	0%	279	$49.38	$0.00	$0.00	0.00	0	$0.00	0.00
7		780	8	2	2 Lamp T12 34 Watt 1x4 Surface Mount Wrap	80	0.64	499.2	$88.36	8	0	No Change	80	0.64	0%	499.2	$88.36	$0.00	$0.00	0.00	0	$0.00	0.00
16	Stair	1500	1	2	2x2, 2 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.06	93	$16.46	1	0	No Change	62	0.06	0%	93	$16.46	$0.00	$0.00	0.00	0	$0.00	0.00
16		1500	1	2	2x2, 2 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.06	93	$16.46	1	0	No Change	62	0.06	0%	93	$16.46	$0.00	$0.00	0.00	0	$0.00	0.00
17	Chamber	1500	15	2	2x4, 2-Lamp, 34w T12, Mag. Ballast, Recessed Mnt., Prismatic Lens	78	1.17	1755	$310.64	15	1	Dual Technology Occupancy Sensor - Remote Mnt.	78	0.94	20%	1404	$248.51	$160.00	$160.00	0.23	351	$62.13	2.58
16		1500	1	2	2x2, 2 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.06	93	$16.46	1	0	Dual Technology Occupancy Sensor - Remote Mnt.	62	0.05	20%	74.4	$13.17	$160.00	$160.00	0.01	18.6	$3.29	48.60
17	Side Stair	1500	3	2	2x4, 2-Lamp, 34w T12, Mag. Ballast, Recessed Mnt., Prismatic Lens	78	0.23	351	$62.13	3	0	No Change	78	0.23	0%	351	$62.13	$0.00	$0.00	0.00	0	$0.00	0.00
18	Back Break Room	1500	6	1	1x4, 1-Lamp, 34w T12, Mag. Ballast, Surface Mnt., Prismatic Lens	48	0.29	432	$76.46	6	0	Dual Technology Occupancy Sensor - Remote Mnt.	48	0.23	20%	345.6	$61.17	$160.00	$160.00	0.06	86.4	$15.29	10.46
19		1500	2	1	Wall Mnt. Globe, (1) 100w A19 Lamps	100	0.20	300	$53.10	2	0	No Change	100	0.20	0%	300	$53.10	$0.00	$0.00	0.00	0	$0.00	0.00

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. Lamps	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
20		1500	1	3	3 Lamp 40 watt incandescent	120	0.12	180	$31.86	1	1	No Change	120	0.12	0%	180	$31.86	$0.00	$0.00	0.00	0	$0.00	0.00
	Totals		62	32			5.84	8,259.1	$1,461.85	62	6			5.5172		7770.36	$1,375.35		$640.00	0.33	488.7	$86.50	7.40

NOTES: 1. Simple Payback noted in this spreadsheet does not include Maintenance Savings and NJ Smart Start Incentives.

2. Lamp totals only include T-12 tube replacment calculations