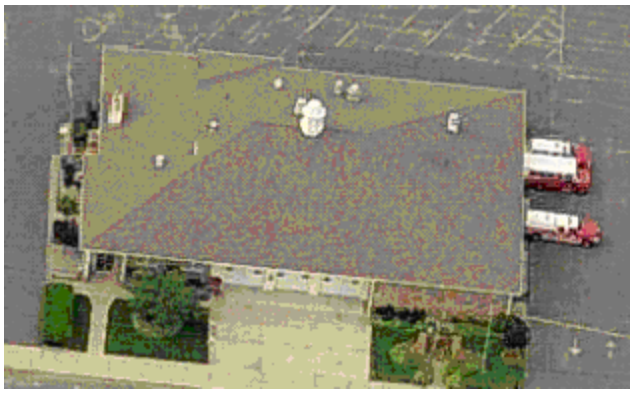

ENERGY AUDIT – FINAL REPORT

LAVALLETTE FIRE STATION

PHILADELPHIA AVENUE
LAVALLETTE, NJ 08735
ATTN: MR. CHRISTOPHER F. PARLOW
Borough Administrator / Municipal Clerk

CEG PROJECT NO. 9P08128

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Table of Contents

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I. EXECUTIVE SUMMARY

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

Lavallette Fire Station
Philadelphia Avenue
Lavallette, NJ 08735

Municipal Contact Person: Mr. Christopher F. Parlow
Borough Administrator / Municipal Clerk

This audit was performed in connection with the New Jersey Clean Energy Local Government Energy Audit Program. These energy audits are conducted to promote the office of Clean Energy's mission, 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 this facility are as follows:

Electricity	$ 6,696
Natural Gas	$ 7,338
Total	$14,034

The potential annual energy cost savings are shown below in Table 1. Be aware that the measures are not additive because of the interrelation of several of the measures. The cost of each measure for this level of auditing is ± 20% until detailed engineering, specifications, and hard proposals are obtained.

Table 1
Energy Conservation Measures (ECM's)

ECM NO.	DESCRIPTION	COST	ANNUAL SAVINGS	SIMPLE PAYBACK (YEARS)	SIMPLE RETURN ON INVESTMENT
1	Condensing Unit Upgrade – Main Hall	$10,600	$4954	10.7	6.7 %
2	Replace Hot Water Heating Boiler	$12,470	$530	23.5	(-2.3 %)
3	Convert Electric Unit Heaters to Hydronic	$13,400	$1405	9.5	8.5 %
4	Upgrade Fluorescent Lighting	$8,273	$1,575	5.3	31.4 %
5	Install Compact Fluorescent Lighting	$2,020	$819	2.5	71 %
6	8.74 KW PV Solar Panel System	$78,660	$6,970	11.29	8 %

The estimated demand and energy savings are shown below in Table 2. The information in this table corresponds to the ECM's in Table 1.

Table 2
Estimated Energy Savings

ECM NO.	DESCRIPTION	ANNUAL UTILITY REDUCTION		
		ELECT DEMAND (KW)	ELECT CONSUMPTION (KWH)	NAT GAS (THERMS)
1	Condensing Unit Upgrade – Main Hall	-	5924	-
2	Replace Hot Water Heating Boiler	-	-	330
3	Convert Electric Unit Heaters to Hydronic	20	15,091	(+585)
4	Upgrade Fluorescent Lighting		9,847	
5	Install Compact Fluorescent Lighting		5,117	
6	8.74 KW PV Solar Panel System	8.74	13,639	

Recommendations:

Concord Engineering Group recommends the implementation of all ECM's that provide a calculated simple payback at or under seven (7) years. The potential energy and cost savings from these ECM's are economically justifiable. The following Energy Conservation Measures are recommended for the Lavallette – Philadelphia Avenue Fire Station:

- **ECM #4:** Upgrade Fluorescent Lighting
- **ECM #5:** Install Compact Fluorescent Lighting

II. INTRODUCTION

This comprehensive energy audit covers the 9,912 square foot Fire Station that includes administrative offices, fire hall, restrooms and engine bays.

The first task was to collect and review one year worth of utility energy data for electricity and natural gas. This information was used to analyze operational characteristics, calculate energy benchmarks for comparison to industry averages, estimate savings potential, and establish a baseline to monitor the effectiveness of implemented measures. A computer spreadsheet was used to enter, sum, and calculate benchmarks and to graph utility information (see Appendix A).

The Energy Use Index (EUI) is expressed in British Thermal Units/square foot/year (BTU/ft^2/yr) and can be 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 annual consumption of all fuels to BTU's then dividing by the area (gross square footage) of the building. EUI is a good indicator of the relative potential for energy savings. A comparatively low EUI indicates less potential for large energy savings. The gross square footage of the building was provided by the township, in the absence of blueprints.

After gathering the utility data and calculating the EUI, the next step in the audit process is obtaining Architectural and Engineering drawings (where available). By reviewing the Architectural and Engineering drawings, questions regarding the building envelope, lighting systems/controls, HVAC equipment and controls are noted. These questions are then compared to the energy usage profiles developed during the utility data gathering step. Furthermore, 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. After this information is gathered the next step in the process is the site visit.

The site visit was spent inspecting the actual systems and answering specific questions from the preliminary review. The building manager provided occupancy schedules, O & M practices, the building energy management program, and other information that has an impact on energy consumption.

The post-site work included evaluation of the information gathered during the site visit, researching possible conservation opportunities, organizing the audit into a comprehensive report, and making recommendations on mechanical, lighting and building envelope improvements.

III. METHOD OF ANALYSIS

CEG completed the preliminary audit tasks noted in Section II preparing for the site survey. The site survey is a critical input in deciphering where energy opportunities exist within a facility. The auditor walks the entire site to inventory the building envelope (roof, windows, etc.), the heating, ventilation, and air conditioning equipment (HVAC), the lighting equipment, other facility-specific equipment, and to gain an understanding of how each facility is used.

The collected data is then processed using energy engineering calculations to calculate the anticipated energy usage for the proposed energy conservation measures (ECM's). The actual energy usage is entered directly from the utility bills provided by the Owner. The anticipated energy usage is compared to the actual usage to determine energy savings for the proposed ECM's.

It is pertinent to note, that the savings noted in this report are not duplicative. The savings for each recommendation may actually be higher if the individual recommendations were installed instead of the entire project. For example, the lighting module calculates the change in wattage and multiplies it by the new operating hours instead of the existing operating hours (if there was a change in the hours at all). The lighting controls module calculates the change in hours and multiplies it by the new system wattage instead of the existing wattage. Therefore, if you chose to install the recommended lighting system but not the lighting controls, the savings achieved with the new lighting system would actually be higher because there would have been no reduction in the hours of use.

The same principal follows for heating, cooling, and temperature recommendations – even with fuel switching. If there are recommendations to change the temperature settings to reduce fuel use, then the savings for the heating/cooling equipment recommendations are reduced, as well.

Our thermal module calculates the savings for temperature reductions utilizing automated engineering calculations within Microsoft Excel™ spreadsheets. The savings are calculated in "output" values – meaning energy, not fuel savings. To show fuel savings we multiply the energy values times the fuel conversion factor (these factors are different for electricity, natural gas, fuel oil, etc.) and also take into account the heating/cooling equipment efficiency. The temperature recommendation savings are lower when the heating/cooling equipment is more efficient or is using a cheaper fuel.

Thermal recommendations (insulation, windows, etc.) are evaluated by taking the difference in the thermal load due to reduced heat transfer. Again, the "thermal load" is the thermal load after the other recommendations have been accounted for.

Lastly, installation costs, refer to Appendix B, are then applied to each recommendation and simple paybacks are calculated. Costs are derived from Means Cost Data, other industry publications, and local contractors and suppliers. The NJ SmartStart Building® program incentives (refer to Appendix C) are calculated for the appropriate ECM's and subtracted from the installed cost prior to calculation of the simple payback. In addition, where applicable, maintenance cost savings are estimated and applied to the net savings. Simple return on

investment is calculated using the standard formula of the difference of gains minus investments, divided by the investments. Included within the gains are the annual energy savings, utility incentives and maintenance savings as a total sum. The calculation is completed assuming the project is 100% direct purchased by the Owner with an energy cost escalation of 2.4% for natural gas and 2.2% for electricity.

IV. HISTORIC ENERGY CONSUMPTION/COST

A. Energy Usage / Tariffs

Electric

Table 3 and Figure 1 represent the electrical usage for the surveyed facility from January-08 to December-08. This electric rate has a component for consumption that is measured in kilowatt-hours (kWh). It is calculated by multiplying the wattage of the equipment times the hours that it operates. For example, a 1,000 Watt lamp operating for 5 hours would measure 5,000 Watt-hours. Since one kilowatt is equal to 1,000 Watts, the measured consumption would be 5 kWh. 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 most current rate structure available.

Natural Gas

Table 4 and Figure 2 show the natural gas energy usage for the surveyed fire station from January-08 to December-08. Below is the average unit cost for the utilities at this facility.

Description	Average
Electricity	16.1¢/kWh
Natural Gas	$1.736/Therm

Table 3
Electricity Billing Data

Phila Ave Fire Station

Provider	Month	Start Date	End Date	Account	Utility Type	Billing Days	Total Consumption	Units	Minimum Charge	Rate $/Kwh	Total $
Lavallette Electric Utility	January	1/25/2008	2/24/2008	2299	Electric	33	3,725	kwh	$ 14.75	$ 0.143	$ 547.43
Lavallette Electric Utility	February	2/25/2008	3/24/2008	2299	Electric	30	3,413	kwh	$ 14.75	$ 0.143	$ 502.81
Lavallette Electric Utility	March	3/25/2008	4/23/2008	2299	Electric	32	4,083	kwh	$ 14.75	$ 0.143	$ 598.62
Lavallette Electric Utility	April	4/24/2008	5/25/2008	2299	Electric	29	1,730	kwh	$ 14.75	$ 0.143	$ 262.14
Lavallette Electric Utility	May	5/26/2008	6/25/2008	2299	Electric	29	1,523	kwh	$ 14.75	$ 0.143	$ 232.54
Lavallette Electric Utility	June	6/26/2008	7/25/2008	2299	Electric	32	8,895	kwh	$ 14.75	$ 0.170	$ 1,526.90
Lavallette Electric Utility	July	7/26/2008	8/26/2008	2299	Electric	30	8,987	kwh	$ 14.75	$ 0.170	$ 1,542.54
Lavallette Electric Utility	August	8/27/2008	9/23/2008	2299	Electric	29	1,534	kwh	$ 14.75	$ 0.170	$ 275.53
Lavallette Electric Utility	September	9/24/2008	10/22/2008	2299	Electric	32	1,203	kwh	$ 14.75	$ 0.170	$ 219.26
Lavallette Electric Utility	October	10/23/2008	12/9/2008	2299	Electric	31	947	kwh	$ 14.75	$ 0.143	$ 150.17
Lavallette Electric Utility	November	12/9/2008	1/12/2009	2299	Electric	28	2,819	kwh	$ 14.75	$ 0.143	$ 417.87
Lavallette Electric Utility	December	1/12/2009	1/13/2009	2299	Electric	32	2,835	kwh	$ 14.75	$ 0.143	$ 420.16
						Total:	41694	kwh		**Total:**	$ 6,695.97
										Avg. Cost per kwh:	$ 0.161

Avg. Cost per kBtu: $ 0.047

Figure 1
Electricity Usage Profile

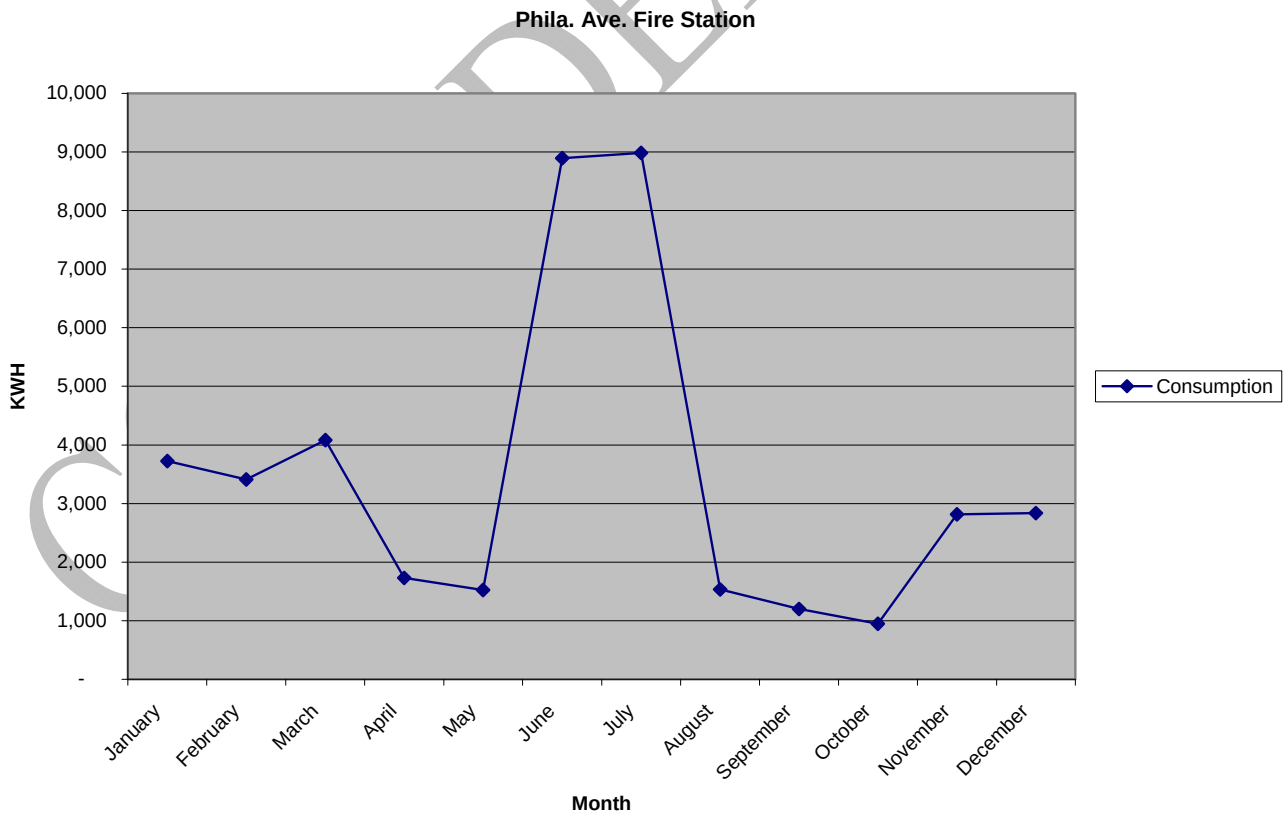
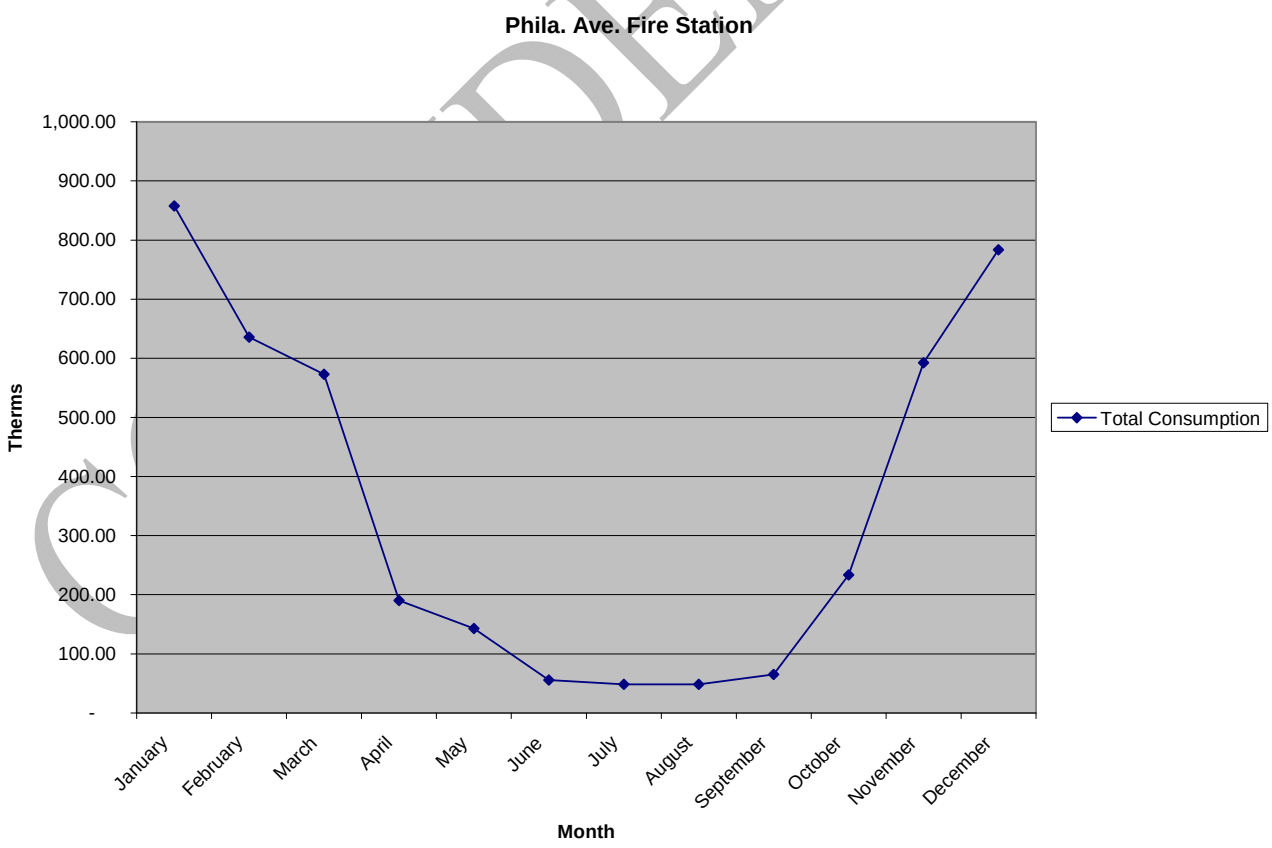


Table 4
Natural Gas Billing Data

Phila Ave Fire Station

Provider	Month	Start Date	End Date	Account	Utility Type	Billing Days	Consumption	Units	Total $
NJ Natural Gas	January	1/10/2008	2/11/2008	19-4792-3500-14	Gas	32	857.62	therms	1,251.53
NJ Natural Gas	February	2/11/2008	3/11/2008	19-4792-3500-14	Gas	28	635.86	therms	974.73
NJ Natural Gas	March	3/11/2008	4/8/2008	19-4792-3500-14	Gas	28	572.80	therms	945.87
NJ Natural Gas	April	4/8/2008	5/9/2008	19-4792-3500-14	Gas	31	190.05	therms	390.58
NJ Natural Gas	May	5/9/2008	6/10/2008	19-4792-3500-14	Gas	32	142.66	therms	343.54
NJ Natural Gas	June	6/10/2008	7/10/2008	19-4792-3500-14	Gas	30	55.81	therms	195.97
NJ Natural Gas	July	7/10/2008	8/9/2008	19-4792-3500-14	Gas	30	48.53	therms	189.10
NJ Natural Gas	August	8/9/2008	9/8/2008	19-4792-3500-14	Gas	30	48.44	therms	180.34
NJ Natural Gas	September	9/8/2008	10/8/2008	19-4792-3500-14	Gas	30	65.16	therms	185.34
NJ Natural Gas	October	10/8/2008	11/6/2008	19-4792-3500-14	Gas	29	233.54	therms	450.63
NJ Natural Gas	November	11/6/2008	12/8/2008	19-4792-3500-14	Gas	32	592.20	therms	965.08
NJ Natural Gas	December	12/8/2008	1/9/2009	19-4792-3500-14	Gas	32	783.74	therms	1,265.49
						12 Month Total:	4226.403	therms	$ 7,338.20
						Average Cost per therm:	$ 1.736		

Figure 2
Natural Gas Usage Profile



B. Energy Use Index (EUI)

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. Their website allows the user to determine how well the client's building energy use intensity (EUI) compares with similar facilities throughout the U.S. and in your specific region or state.

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

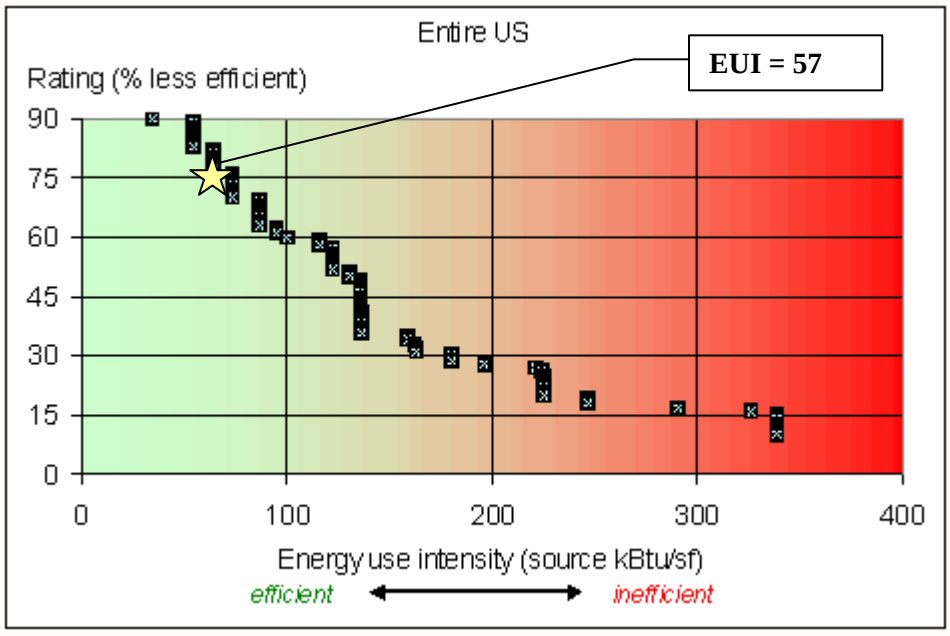
Electric = ((41,694 kWh) * (1000 W/kW) * (3.414 Btu/h / 1 W))/ (1000 Btu/ 1 kBtu)
= 142,343 kBtu

Gas = ((4,226 therms) * (100,000 Btu/h / 1 Therm)) / (1000 Btu / 1 kBtu) = 422,640 kBtu

$$Building\ \ EUI = \frac{(142{,}343\ kBtu + 422{,}640\ kBtu)}{9{,}912\ SF} = \frac{564{,}984\ kBtu}{9{,}912\ SF}$$

Philadelphia Avenue Fire Station EUI = 57.0 kBtu/SF

Figure 3
Energy Use Intensity Distributions – Fire & Police Stations



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 you to track and assess 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 more emphasis is being placed throughout multiple arenas 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. Therefore, it is vital that local government municipalities assess their energy usage, benchmark this usage utilizing Portfolio Manager, set priorities and goals to lessen their energy usage and move forward with these priorites and goals. Saving energy will in-turn save the environment.

In accordance with the Local Government Energy Audit Program, CEG has created an Energy Star account for the municipality in order to allow access to monitor their 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:	lavalletteboro
Password:	lgeaceg09007

Utilizing the utility bills and other information gathered during the energy audit process, CEG entered the respective data into Portfolio Manager and the following is a summary of the results:

Table 5
ENERGY STAR Performance Rating

FACILITY DESCRIPTION	ENERGY PERFORMANCE RATING	NATIONAL AVERAGE
Phila. Ave. Fire Station	N/A	N/A

Specific building types are detailed on the ENERGY STAR website. Non-typical buildings are covered by an "Other" category. The Lavallette Fire House falls under this "Other" category. The "Other" category is used if your building type or a section of the building is not represented by one of the specific categories. An Energy Performance Rating cannot be calculated if more then 10% of a building is classified as "Other." The majority of the Fire Station would be classified as "Other" and therefore cannot be given an Energy Performance Rating. Despite this, the Portfolio Manager calculates the building EUI. The EUI is an important tool that can be used to track the energy efficiency if the building. Baselines for improvement can be set that the municipality can strive to meet. CEG recommends that the Borough of Lavallette keep their Portfolio Manager account up to date to monitor the performance of the building.

The EUI calculated in the previous section is a good indicator of the energy performance of the Philadelphia Avenue Fire Station in the absence of the Energy Star Portfolio Manager Program. The EUI distribution, figure 3, is specific for fire houses and police stations. The fire company has an EUI of 57.0 which is low for this type of facility. The lower the EUI the less energy the facilty uses per square foot. A low EUI indicates a more efficient building. The facility runs very efficiently for its size due to the low permanant staff size stationed at the facility on a day to day basis. There is still room for improvement making the facility more energy efficient and saving more on the utility costs.

V. FACILITY DESCRIPTION

Lavallette's Fire Station consists of offices, six(6) engine bays, a hall, kitchen, generator room, boiler room, and members lounge / meeting area; totaling approximately 9,912 SF. The engine garage is a metal frame building with well insulated walls and ceiling. The building is a one story and constructed of typical brick and block construction. The first section of the facility was built in 1958 with a 2,350 sq. ft. rear addition in 1999. The Fire House is normally occupied by a few people for 8 hours a day during the week. Lavallette is a volunteer fire company that only fully operates when an emergency occurs in their response area. Additionally, there is a fire hall that is rented out once or twice a month throughout the year.

Heating System

The fire engine and truck bays are heated by a combination of gas-fired and electric unit heaters. Unit heaters that are ceiling mounted, each with a propeller fan, electric controls and wall mounted or integral thermostat. Gas-fired units include a galvanized flue pipe which discharges to the rooftop. The engine and truck bays make-up approximately 50% of the sq. ft. of the fire house.

The three (3) main large engine bays facing Philadelphia Avenue are heated by two (2) McCord Detroit Brand hydronic unit heaters, each with a capacity of approximate xxx mbh, age unknown.

The three (3) garage bays facing the parking lot are heated by two (2) Q-mark brand electric unit heaters, each with a heating capacity of 5 kw installed in 1999.

The rear truck bay is heated by three (2) Modine electric unit heaters, 5 kw each, 208v, 3 ph, installed in 1999.

The kitchen storage room is heated by a Modine ceiling mounted vertical electric unit heater, 5kw capacity, 208v, 3ph, installed in 1999.

The Main Hall, offices, generator room and restrooms are provided with hot water baseboard heat. The Kitchen has a ceiling mounted hydronic cabinet unit heater.

Hydronic equipment is piped to the boiler room to a Hydraulics Institute CAC/BDP Series PWB-90 hot water boiler, 280,000 Btuh input. It is a Category 1, minimum efficiency appliance. A Bell & Gossett pump circulates hot water.

Domestic Hot Water

Domestic hot water needs for the facility are provided by a gas-fired commercial grade unit. The Hot water heater is an A.O. Smith ProMax+ high recovery, 74 gallon, 75,100 Btuh input.

Cooling System

The Main Hall is the only part of the fire house with air conditioning. A 1995 vintage York "Sunline 2000" model H4CE090A25A 7-1/2 ton capacity condensing unit is mounted on grade adjacent to the hall. Refrigerant piping connects to an indoor blower-coil unit. This is a standard grade commercial unit, with minimum efficiency. A Honeywell programmable thermostat controls the unit. Four (4) ceiling fans also exist in the Main hall.

Controls System

There are local thermostats located throughout the facility that control the various heating and air conditioning systems. Except the Main Hall cooling unit, the use of programmable thermostats was absent from the fire house. The heating and air conditioning set points are manually changed based upon the occupancy of the building.

Exhaust Fans

A 12 foot long kitchen hood is ducted to a rooftop kitchen exhaust fan. Control is on/off as needed. No make-up air is provided as the kitchen space is open the main engine bay. Additional rooftop exhaust fans are provided for the restrooms and janitors closet.

Lighting

The truck bays are lit using 8-foot fixtures containing T12 lamps and magnetic ballasts. Standard switching is utilized and there are no other types of lighting controls present.

The hall is lit with a combination of 2-foot by 4-foot lay-in fixtures containing T12 lamps with magnetic ballasts, and recessed incandescent fixtures. Standard and dimmable switching is utilized and there are no other types of lighting controls present.

The members lounge/meeting area is lit with a combination of 3-foot and 4-foot linear fixtures containing T8 lamps with electronic ballasts, and recessed incandescent fixtures with dimmable switches.

The kitchen, kitchen storage area and corridor are lit using 4-foot linear fixtures containing T8 lamps with electronic ballasts.

The offices and toilet rooms are lit by 4-foot lay-in fixtures containing T12 lamps with magnetic ballasts.

Exit signs throughout the building contain incandescent lamps and consume an estimated 40 watts of electricity per sign.

The exterior lighting is mounted to the building and includes an assortment of wall packs and incandescent fixtures.

VI. MAJOR EQUIPMENT LIST

Following the completion of the field survey a detailed equipment list was created. The equipment within this list is considered major energy consuming equipment whose replacement could yield substantial energy savings. Additionally, 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 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.

Equipment denoted by an asterisk indicates an estimate of the equipment ratings due to equipment inaccessibility, worn nameplates, lack of nameplates, etc.

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

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VII. ENERGY CONSERVATION MEASURES (ECM)

ECM #1: Condensing Unit Upgrade – Main Hall

Description:

Cooling for the Main hall is provided by a split system air conditioner. The condensing unit is inefficient with an energy efficiency ratio (EER) of 9.2. The NJ State Energy Code (ASHRAE 90.1-2004) mandates a minimum energy efficiency of 12.0 SEER for units of this type. The existing units are 1995 vintage and are at the end of their service life as outlined in Chapter 36 of the 2007 ASHRAE Applications Handbook. The estimated service life for packaged air-conditioning units is 15 years.

This ECM would replace the exterior condensing unit with more efficient unit. The existing equipment will be replaced with equipment having heating and cooling capacities equal to the existing units. The average EER of the new cooling equipment will be 16SEER / 12EER. The energy efficiency of the new equipment is based on a Lennox S-class SSB 4 ton, with R-410A refrigerant.

Cooling Energy Savings Calculations:

$$EnergySavings = \frac{[CoolingTons \times 12{,}000\ Btu/ton \div 1000\ W/kW]}{[(EER_{NEW} - EER_{OLD})]} \times Avg.\ Load\ \ Factor \times Hrs.\ of\ \ Cooling$$

Existing Air Conditioning Units
Rated Capacity = 4 Tons
Unit Efficiency = 9.2 EER

Proposed High-Efficiency Air Conditioning Unit
Rated Capacity = 4 Tons
New Unit Efficiency = 12 EER
Cooling Season Hrs. of Operation = 432 hrs/yr. (12 hrs/day, 3 days/wk, 12 weeks)
Average Cost of Electricity - $0.161/kWh

$$EnergySavings = \frac{[CoolingTons \times 12{,}000\,Btu/ton \div 1000 W/kW]}{[(EER_{NEW} - EER_{OLD})]} \times Avg.LoadFactor \times Hrs.ofCooling$$

$$EnergySavings = \frac{[4CoolingTons \times 12{,}000\,Btu/ton \div 1000 W/kW]}{[(12\,EER_{NEW} - 9.2\,EER_{OLD})]} \times 0.80 \times 432$$

$$= 5{,}924\ kWh/yr./Unit$$

Cost Savings = 5,924 kWh/Yr/ x $0.161/kWh = $954 / Yr.

Energy Savings Summary:

ECM #1 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	**$10,600**
NJ Smart Start Equipment Incentive ($):	**($372)**
Maintenance Savings ($):	**($0)**
Net Installation Cost ($):	**$10,228**
Total Energy Savings ($ / yr):	**$954**
Simple Payback (yrs):	**10.7**
Simple Return on Investment:	**6.7 %**

ECM #2: Replace Heating Hot Water Boiler

Description:

The Fire Station is heated by a 280 Mbh input hot water boiler which presently is about 78% efficient. As an alternative energy conservation measure, the Concord team recommends that this boiler be replaced by an Aerco Modulex MLX-303 high-efficiency boiler rated at 303 MBH and 88% efficient.

Energy Use Calculations:

Area Heated by Hydronic Heat = 6,500 sq.ft.
Heating Degree Days (HDD) = 4,954°F – day/yr.
Average Cost of Natural Gas = $1.736 / Therm
Heating Load (HL) = 20 Btuh / SF * 6,500 SF = 130,000 Btuh

Energy Use (Btu/yr) = (HL* HDD *2 4) / (60°f * efficiency * 1 Btu/Btu)

Energy Use (Gas @ 78% eff) = (130,000 * 4954 * 24) / (60 * 0.78 * 1) = 330,266 kBtu / yr

Annual Natural Gas Space Heating Cost = 330,226 kBtu * $0.01736 /kBtu = $5733

Annual Natural Gas Cost = $7338 (Based on gas billing data)

Annual Natural Gas HWH & Cooking Cost = $7338 – 5733 = $1605

Energy Savings Calculations:

Energy Savings = Old Boiler Energy Cost x ((New Boiler Efficiency – Old Boiler) / New Boiler Efficiency))
Energy Savings = $5733 x (0.88-0.78) = $573 / yr.

The SmartStart Buildings® incentive is $1.75 per MBH which equates to $530.

Energy Savings Summary:

ECM #2 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	**$13,000**
NJ Smart Start Equipment Incentive ($):	**($530)**
Maintenance Savings ($):	**-**
Net Installation Cost ($):	**$12,470**
Total Energy Savings ($ / yr):	**$573**
Simple Payback (yrs):	**23.5**
Simple Return on Investment:	**(-2.3 %)**

ECM #3: Convert Electric Unit Heaters to Hydronic

Description:

The Fire Station Garage bay additions are heated using horizontal electric unit heaters. The Concord team proposes replacement of these with hydronic Unit Heaters. The existing boiler plant is sized such that it could handle the increase in load. The electric heating elements are technically 100% efficient but due to the high cost of electric these units become incredibly expensive to operate. The prices can be compared on a $/kBtu basis where electricity costs $0.047 /kBtu versus natural gas at $0.017 /kBtu. (3 times the cost)

Energy Use Calculations:

Area Heated by Electric Heat = 2,600 sq.ft.
Heating Degree Days (HDD) = 4,954°F – day/yr.
Average Cost of Natural Gas = $1.736 / Therm
Heating Load (HL) = 10 Btuh / SF * 2,600 SF = 26,000 Btuh

Energy Use (Btu/yr) = (HL* HDD *24) / (60ºf * efficiency * 1 Btu/Btu)

Energy Use (Electric @ 100% eff) = (26,000 * 4954 * 24) / (60 * 1 * 1) = 51,522 kBtu / yr

Energy Use (Gas @ 88% eff) = (26,000 * 4954 * 24) / (60 * 0.88 * 1) = 58,547 kBtu / yr

Energy Savings Calculations:

Annual Electric Heating Cost = 51,522 kBtu * $0.047 /kBtu = $2,421

Annual Natural Gas Heating Cost = 58,547 kBtu * $0.01736 /kBtu = $1,016

Annual Energy Savings = $2,421 - $1,016 = $1,405

Energy Savings Summary:

ECM #3 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	**$13,400**
NJ Smart Start Equipment Incentive ($):	**-**
Maintenance Savings ($):	**-**
Net Installation Cost ($):	**$13,400**
Total Energy Savings ($ / yr):	**$1,405**
Simple Payback (yrs):	**9.5**
Simple Return on Investment:	**8.5 %**

ECM #4: Lighting Upgrade - Upgrade the Fluorescent Lighting

Description:

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. A conventional drop-ceiling lay in fixture with four, 4-foot lamps has a total wattage of 154 Watts per fixture. By using the improved lamps and ballasts, the total wattage would be reduced to 95 Watts. The light levels would increase by about 15% and the light quality would increase by 35%.

CEG recommends replacement of the existing T12 and T8 lamps and ballasts with the latest technology T8 lamps and high efficiency electronic ballasts. The new energy efficient, T8 lamps will provide adequate lighting and will save the Owner on electrical costs due to the better performance of the electronic ballasts. In addition to functional cost savings, the fixture replacement will also provide operational cost savings. The operational cost savings will be realized through the decreased number of lamps that will be required to be replaced per year.

The expected lamp life of the latest high efficiency T8 lamps is approximately 30,000 burn-hours, requiring fewer lamps to replace per year. Based on the operating hours of this portion of the facility, approximately 2000-3000 hours per year, the Owner will be changing approximately 33% less lamps per year.

In addition, a single electronic ballast can operate one, two, three, or four lamps in a fixture. The existing magnetic ballasts can only operate up to two lamps. The electronic ballasts could reduce the amount of ballasts in the facility by half. This can be taken advantage of with "tandem wiring" of ballasts. Instead of using one electronic ballast for every one fixture it is sometimes feasible to use one electronic ballast for every two or more fixtures. The electrician wires a single ballast to operate the lamps in adjacent light fixtures which further reduces the amount of ballasts needed.

Energy Savings Calculations:

A detailed Investment Grade Lighting Audit can be found in Appendix E that outlines the proposed retrofits, costs, savings, and payback periods.

Maintenance Savings are calculated as follows:

Maintenance Savings = (*# of lamps* x % *reduction* x $ *per lamp*) + *Installation Labor*

Maintenance Savings = (183 x 33% *reduction* x $2.00) + ($20 x 60) = $1,321

Energy Savings Summary:

ECM #4 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	**$10,484**
NJ Smart Start Equipment Incentive ($):	**($890)**
Maintenance Savings ($):	**($1,321)**
Net Installation Cost ($):	**$8,273**
Total Energy Savings ($ / yr):	**$1,575**
Simple Payback (yrs):	**5.3**
Simple Return on Investment:	**31.4 %**

ECM #5: Lighting Upgrade – Install Compact Fluorescent Lighting

Description:

Compact fluorescent lamps (CFL's) were created 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 25-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 existing fixtures, or hardwired into existing fixtures.

Energy Savings Calculations:

A detailed Investment Grade Lighting Audit can be found in Appendix E that outlines the proposed retrofits, costs, savings, and payback periods.

Maintenance Savings are calculated as follows:

Maintenance Savings = (*# of lamps* x *% reduction* x $ *per lamp*) + *Installation Labor*

Maintenance Savings = (50 x 75% *reduction* x $5) + ($15 x 38) = $758

Energy Savings Summary:

ECM #5 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	**$2,778**
NJ Smart Start Equipment Incentive ($):	**$0**
Annual Maintenance Savings ($):	**($758)**
Net Installation Cost ($) After 1 Year:	**$2,020**
Total Energy Savings ($ / yr):	**$819**
Simple Payback (yrs):	**2.5**
Simple Return on Investment:	**71 %**

VIII. RENEWABLE/DISTRIBUTED ENERGY MEASURES (ECM #6)

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 technologies for Lavallette, and concluded that there is potential for solar energy generation.

Solar energy produces clean energy and reduces a building's carbon footprint. This is accomplished via photovoltaic panels which will be 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). Parking lots can also be utilized for the installation of a solar array. A truss system can be installed that is high enough to park a vehicle under the array, this way no parking lot area is lost. 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 area of the building and its grounds for the building being audited for the purposes of determining the potential for the installation of a PV system. An area of 560 S.F. can be utilized for the PV system on the Fire Station roof. A depiction of the area utilized is shown in Appendix F. Using this square footage it was determined that a system size of 8.74 kilowatts could be installed to match the maximum peak monthly demand. The required square footage for a system of this size is 559 S.F. and has an estimated kilowatt hour production of 13,639 KWh annually, reducing the overall utility bill by 32% percent. A detailed financial analysis can be found in Appendix F. 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.

CEG has reviewed financing options for the owner. Two options were studied and they are as follows: Self-financed and direct purchase without finance. Self-finance was calculated with 95% of the total project cost financed at a 7% interest rate over 25 years. Direct purchase involves the local government paying for 100% of the total project cost upfront. Both of these calculations include a utility inflation rate as well as the degradation of the solar panels over time. Based on our calculations the following are the payback periods for the respective method of payment:

PAYMENT TYPE	SIMPLE PAYBACK	INTERNAL RATE OF RETURN
Self-Finance	11.29 Years	12.1 %
Direct Purchase	11.29 Years	8.0 %

The above information is concluded as ECM #6 showing installation costs, energy savings and other pertinent summarized information in Section I of this report.

Wind energy production is another option available through the Renewable Energy Incentive Program. Small wind turbines can be utilized to produce clean energy on a per building basis. Cash incentives are available per kWh of electric usage. CEG has reviewed the applicability of wind energy for Lavallette and has determined it is not a viable option. Low average wind speeds for the area are not adequate for wind turbine generation. Typical wind turbines start producing energy at 8 mph wind speeds. The nearest wind station to Lavallette is Toms River. Average 5.4 mph wind speeds making this application impractical.

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 Section IV, Figures 1 and 2 included within this report to reference the respective electricity and natural gas usage load profile for January 2008 through December 2008.

Electricity:

Section IV, Figure 1 demonstrates a typical cooling profile, (April –October), complimenting the heating load (November – March). There is a distinct increase in consumption from May through August and a spike in consumption from July through August (the typical hottest months). The balance of this load-profile is fairly flat or base-load in shape (due to presence of electric heaters). Base-load shaping is important because a flat consumption profile will yield more competitive pricing. The distinct summer spike (July, August) may be caused by the 7.5 ton condensing unit. The refrigerant connects to an indoor blower-coil. The unit is said to have minimal efficiency. The control system is also changed by local occupancy. This may also have a hand in the summertime electric spike.

Natural Gas:

Section IV, Figure 2 demonstrates a typical heating load (November –March), and a very complimentary cooling load (April –October). Consequently there is a clear separation between summer and winter loads consistent with energy commodity prices traded on the New York Mercantile Exchange. Heating loads carry a much higher average cost because of the higher demand for natural gas during the winter for heating purposes. The fire-truck bays are heated by a mix of natural gas and electric heaters. The 3 largest bays are heated by hydronic unit heaters. The main room is heated by hot water baseboard units. Hot water is supplied by a gas fired commercial grade unit.

Tariff Analysis:

Electricity:

This facility receives electrical service from the Lavallette Electric Utility on a General Service tariff rate. General Service is for electric service for customers other than Residential and/or Residential Total Electric. Lavallette has installed new rates for the period October 1 through May 31, 2009 of $.14050/kWh, (this represents a 12% decrease in rates) and June 1 through September 30, 2009 of $.16750 / kWh (this represents a 10% decrease in rates). The General Service customers also pay a Customer Charge of $14.75 per month.

Natural Gas:

The Borough receives natural gas Delivery Service through New Jersey Natural Gas Company on a GSS (General Service Small) or GSL (General Service Large) tariff rate schedule. The Fire Station utilizes the GSS rate schedule, and it is available to any Customer in the entire territory served by the Company who use is *less* than 5,000 therms annually and uses gas for all purposes other than residential and interruptible service. Where the customer uses the Cooling, Air Conditioning and Pool Heating Service (CAC) under Special Provision 1 applicable to customers purchasing gas supply under Rider "A", the Company will, upon application of the Customer, meter the space heating and the "CAC" separately.

This service is considered a "firm" service. Where the customer may either purchase gas from Company's Rider "A", for Basic Gas Supply Service (BGSS) or from a Marketer or Broker.

The basic charges under this tariff are for: Customer Charge, Demand Charge, Delivery Charge and if the customer elects, the BGSS Supply Charge.

The customer can elect to have the Commodity Charge serviced through the utility or by a Third Party Supplier (TPS). It is pertinent to note, should the TPS not deliver, and the customer will receive replacement service from the utility which carries an extremely high penalty cost of service.

Imbalances can occur when Third Party Suppliers are used to supply natural gas, full-delivery is not made, and when a new supplier is contracted or the customer returns to the utility. It is important when utilizing a Third Party Supplier, that an experienced regional supplier is used. Otherwise, under delivery can occur, jeopardizing economics and scheduling.

The information provided by Lavallette represents that they are currently utilizing the service of a Third Party Supplier PEPCO Energy Services. CEG believes there is room within in the "upcharge" for improvement (please see comments below).

Recommendations:

The Borough of Lavallette should consider its options to the electric heat it provides for the Philadelphia Ave Fire Station. The consumption spike that is present is during times of peak (highest consumption demand) usage. Therefore the time of highest cost of energy.

CEG recommends a global approach that will be consistent with all facilities within the Borough. CEG's primary observation is seen in the electricity costs. The Total Weighted Average price per kWh (kilowatt) for all buildings is $.167704 / kWh, (kWh, kilowatt hour is the common unit of electric measure). Energy commodities are among the most volatile of all commodities, however at this point and time, energy is extremely competitive. The Township could see significant savings if it were to take advantage of these current market prices quickly, before energy increases. Based on last year's historical consumption (January – December 2008) and current electric rates, the Borough could improve end-user energy costs by approximately 25%. (Note: Savings were calculated using Lavallette's Total Annual Consumption of 791,483 kWh's

and a variance of approximately $.0427/kWh, utilizing a fixed one-year commodity contract). CEG recommends aggregating the entire electric load to gain the most optimal energy costs. CEG also recommends advisement for alternative sourcing and supply of energy on a "managed approach" basis. CEG realizes that Lavallette is a Municipal Electric Company, but also realizes that energy costs are at historic lows, and that there is an opportunity here if/that the Borough should investigate.

CEG's realizes that The Borough utilizes the services of a Third Party Supplier for Natural Gas. The contract with PEPCO Energy Services will terminate in January 31, 2010. CEG recommends renegotiation of the agreement before winter, when prices intrinsically escalate. When The Borough renegotiates this agreement CEG suggests careful consideration of the basis, "upcharge". CEG believes that this charge could see improvement of 30%. CEG recommends energy advisory services to create a strategy for energy procurement.

CEG also recommends that the Borough of Lavallette schedule a meeting with their current utility providers to review their utility charges and current tariff structures for electricity and natural gas. This meeting would provide insight regarding alternative procurement options that are currently available. Through its meeting with the Local Distribution Company (LDC), the Township will learn more about the competitive supply process and can acquire a list of approved Third Party Suppliers from the New Jersey Board of Public Utilities website at www.nj.gov/bpu. (If competition is allowed). They should also consider using a billing-auditing service to further analyze the utility invoices, manage the data and use the data to manage ongoing demand-side management projects. Furthermore, CEG recommends special attention to credit mechanisms, imbalances, balancing charges and commodity charges when meeting with their utility representative. In addition, The Borough should consider alternative billing options. Some utilities allow for consolidated billing options when utilizing the service of a Third Party Supplier.

Finally, if the Borough of Lavallette frequently changes its supplier for energy (natural gas), it needs to closely monitor balancing, particularly when the contract is close to termination.

X. INSTALLATION FUNDING OPTIONS

CEG has reviewed various funding options for the 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.

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. Use cog-belts instead of v-belts on all belt-driven fans, etc. These can reduce electrical consumption of the motor by 2-5%.

D. Reduce lighting in specified areas where the foot candle levels are above 70 in private offices and above 30 in corridor, lobbies, etc.

E. Provide more frequent air filter changes to decrease overall fan horsepower requirements and maintain better IAQ.

F. Recalibrate existing sensors serving the office spaces

G. Install a Vending Miser system to turn off the vending machines in the lunch room when not in use.

H. Clean all light fixtures to maximize light output.

I. Confirm that outside air economizers on the rooftop units that serve the Office Areas are functioning properly to take advantage of free cooling.

APPENDIX

Electric Cost Summary

Philadelphia Avenue Fire Station

Lavallett Electric Utility

Acct.No: 2299

Appendix A

Month	Jan-08	Feb-08	Mar-08	Apr-08	May-08	Jun-08	Jul-08	Aug-08	Sep-08	Oct-08	Nov-08	Dec-08	Total
Last Meter Read Date	1/25/2008	2/25/2008	3/25/2008	4/24/2008	5/26/2008	6/26/2008	7/26/2008	8/27/2008	9/24/2008	10/23/2008	12/9/2008	1/12/2009	1/25/2008
Current Meter Read Date	2/24/2008	3/24/2008	4/23/2008	5/25/2008	6/25/2008	7/25/2008	8/26/2008	9/23/2008	10/22/2008	12/9/2008	1/12/2009	1/13/2009	1/13/2009
Billing Days	30	28	29	31	30	29	31	27	28	47	34	1	345
KWH	3,725	3,413	4,083	1,730	1,523	8,895	8,987	1,534	1,203	947	2,819	2,835	41,694
KW	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Monthly Load Factor	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Minium Charge	$15	$15	$15	$15	$15	$15	$15	$15	$15	$15	$15	$15	$177
Delivery $/kwh	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Electric Supply, $	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Supply $/kwh	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total Cost, $	$547	$503	$599	$262	$233	$1,527	$1,543	$276	$219	$150	$418	$420	$6,696
$/KWH	$0.1470	$0.1473	$0.1466	$0.1515	$0.1527	$0.1717	$0.1716	$0.1796	$0.1823	$0.1586	$0.1482	$0.1482	$0.1606

Natural Gas Cost Summary

Philadelphia Avenue Fire Station

New Jersey Natural Gas

Acct. No.19 4792 3500 14

Month	Jan-08	Feb-08	Mar-08	Apr-08	May-08	Jun-08	Jul-08	Aug-08	Sep-08	Oct-08	Nov-08	Dec-08	Total
Billing Days	32	29	28	31	32	30	30	30	30	29	32	32	365
Last Meter Read Date	1/10/2008	2/11/2008	3/11/2008	4/8/2008	5/9/2008	6/10/2008	7/10/2008	8/9/2008	9/8/2008	10/8/2008	11/6/2008	12/8/2008	1/10/2008
Current Meter Read Date	2/11/2008	3/11/2008	4/8/2008	5/9/2008	6/10/2008	7/10/2008	8/9/2008	9/8/2008	10/8/2008	11/6/2008	12/8/2008	1/9/2009	1/9/2009
Gas Used per 100 cu ft	816	605	545	181	136	53	46	46	62	222	564	745	4,021
BTU Factor	1.05	1.05	1.05	1.05	1.05	1.05	1.06	1.05	1.05	1.05	1.05	1.05	1.05
Therms (Burner Tip)	858	636	573	190	143	56	49	48	65	234	592	784	4,226
Total Distribution Cost	$358	$266	$249	$146	$133	$110	$108	$108	$103	$184	$333	$413	$2,511
Cost per Therm	$0.417	$0.418	$0.434	$0.768	$0.934	$1.969	$2.224	$2.227	$1.584	$0.788	$0.563	$0.527	$1.071
Total Commodity Cost	$894	$709	$697	$245	$210	$86	$81	$72	$82	$267	$632	$853	$4,828
Cost per Therm	$1.04	$1.11	$1.22	$1.29	$1.47	$1.54	$1.67	$1.50	$1.26	$1.14	$1.07	$1.09	$1.28
Total Cost	$1,252	$975	$946	$391	$344	$196	$189	$180	$185	$451	$965	$1,265	$7,339
Cost per Therm	$1.46	$1.53	$1.65	$2.06	$2.41	$3.51	$3.90	$3.72	$2.84	$1.93	$1.63	$1.61	$1.736

Borough of Lavallette - Fire Station

CONSTRUCTION COST AND REBATES					
ECM#1 CONDENSING UNIT UPGRADE - MAIN HALL	Qty	Unit Cost $	Material $	Labor $	Total $
Lennox S-Class SSB 4 Ton Condensing Unit	1	$2,500	$2,500	$5,000	$7,500
Matching Evaporator Coil & Exp. Valve, Rerig Piping	1	$1,000	$1,000	$2,000	$3,000
Demo Existing	1	$100	$0	$100	$100
Total					**$10,600**
ECM#2 HIGH EFFICIENCY BOILER	Qty	Unit Cost $	Material $	Labor $	Total $
303 MBH Input Aerco Boiler (88% Eff.)	1	$5,000	$5,000	$5,000	$10,000
Demo Old Boiler	1	$500	$0	$500	$500
Flue Modifications	1	$500	$500	$2,000	$2,500
Total					**$13,000**
ECM#3 CONVERT ELECTRIC UNIT HEATERS TO HYDRONIC	Qty	Unit Cost $	Material $	Labor $	Total $
HW Unit Heaters, 17 Mbh each	4	$500	$2,000	$4,000	$6,000
Hydronic piping with insulation	4	$500	$2,000	$4,000	$6,000
Controls	4	$100	$400	$800	$1,200
Demo Electric Heaters	4	$50	$0	$200	$200
Total					**$13,400**
ECM #4 - LIGHTING	Qty	Unit Cost $	Material $	Labor $	Total $
Lighting Retrofit	1	$10,484	$10,484	included	$10,484
Utility Incentive					$890
Total					**$9,594**
ECM #5 - LIGHTING UPGRADE	Qty	Unit Cost $	Material $	Labor $	Total $
Lighting Retrofit	1	$2,778	$2,778	included	$2,778
Utility Incentive					$0
Total					**$2,778**

Apendix B

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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 January, 2009:

Electric Chillers

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

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

Ground Source Heat Pumps

Closed Loop & Open Loop	$370 per ton

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

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

Premium Motors

Three-Phase Motors	$45 - $700 per motor

Prescriptive Lighting

T-5 and T-8 Lamps w/Electronic Ballast in Existing Facilities	$10 - $30 per fixture, (depending on quantity)
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

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

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

Borough of Lavallette - Fire Station

MAJOR EQUIPMENT LIST								
TAG	**MAKE**	**MODEL**	**TYPE**	**CAPACITY**	**EFFICIENCY**	**SERVES**	**REMAINING USEFUL LIFE**	**NOTES**
AC-1	YORK	"SUNLINE 2000" H4CE090A25A	OUTDOOR CONDENSING UNIT	7-1/2 TONS	9.2 EER	FIRE HALL	1 YEAR	SPLIT SYSTEM AIR CONDITIONING. R-22 REFRIGERANT.
		UNKNOWN	INDOOR BLOWER COIL				6 YEARS	
B-1	HYDRAULICS INSTITUE	CAC/BDP SERIES PWB-90	GAS-FIRED HOT WATER BOILER	280,000 BTUH INPUT	78%	MAIN ENGINE BAY, FIRE HALL, OFFICES, RESTROOMS, KITCHEN	UNKNOWN	MINIMUM EFFICIENCY, GOOD CONDITION
HWP-1	BELL & GOSSETT	SERIES 90	IN-LINE	NOT AVAILABLE	NOT AVAILABLE	MAIN ENGINE BAY, FIRE HALL, OFFICES, RESTROOMS, KITCHEN	UNKNOWN	CONSTANT SPEED
HWH-1	A.O. SMITH	PROMAX+ HIGH RECOVERY	GAS-FIRED DOMESTIC WATER HEATER & STORAGE TANK	74 GALLONS, 75,100 BTUH INPUT	78%	HOT WATER	UNKNOWN	COMMERCIAL GRADE, GOOD CONDITION
UH-1,2,3	McCORD DETROIT BRAND	NOT AVAILABLE	HYDRONIC HORIZONTAL UNIT HEATER	NOT AVAILABLE	-	MAIN ENGINE BAYS	UNKNOWN	AGED BUT STILL OPERATING
UH-4, 5	QMARK	NOT AVAILABLE	ELECTRIC HORIZONTAL UNIT HEATER	5 KW	100%	GARAGE BAYS FACING PARKING LOT	5 YEARS	
UH-6,7	MODINE	NOT AVAILABLE	ELECTRIC HORIZONTAL UNIT HEATER	5 KW	100%	REAR TRUCK BAY ADDITION	5 YEARS	
UH-8	MODINE	NOT AVAILABLE	ELECTRIC VERTICAL UNIT HEATER	5 KW	100%	KITCHEN STORAGE	5 YEARS	
UH-9	UNKNOWN	NOT AVAILABLE	HYDRONIC CEILING MOUNTED CABINET UNIT HEATER	NOT AVAILABLE	-	KITCHEN	UNKNOWN	
BB	SLANT FIN & OTHERS	NOT AVAILABLE	HYDRONIC BASEBOARD HEAT	NOT AVAILABLE	-	MAIN ENGINE BAY, FIRE HALL, OFFICES, RESTROOMS, KITCHEN	UNKNOWN	

INVESTMENT GRADE LIGHTING AUDIT

CONCORD ENERGY SERVICES

CEG Project #: BS09-007
Project Name : Borough of Lavallette - Fire Department
Address: Philadelphia Avenue
City, State: Lavallette, NJ
Building SF: 9,912

	Existing Fixtures						Proposed Fixtures									Fixtures Retrofitted			Unit Installation Cost							
Existing Lighting Fixture Type	**Room Name**	**Lighting Fixture Description**	**Lamps per Fixture**	**Watts**	**Qty of Fixtures**	**Total Watts**	**Existing/Replace**	**Description**	**Lamps per Fixture**	**Watts**	**Qty of Fixtures**	**Total Watts**	**Wattage Reduction**	**Average Burn Hours**	**Ave $/kwh**	**Energy Savings, kWh**	**Energy Savings, $**	**Qty**	**Material Each**	**Labor Each**	**Total Each**	**Total Materials**	**Total Labor**	**Total All**	**Rebate Estimate**	**Simple Payback**
	First Floor																									
A	Truck Bay #1	2L-T12-8' Linear	2	160	13	2080	Relamp, Reballast	Sylvania Lamps FO96/835/XP/SS/ECO Sylvania Ballast QHE 2X59T8/UNV ISL-SC	2	89	13	1157	923	3120	$0.16	2,880	$460.76	13	$ 137.20	$ 60.00	$197.20	$1,783.60	$780.00	$2,563.60	$130.00	5.3
B		1L-CFL-13w pin-base	1	13	2	26	Existing to Remain	Existing to Remain	1	13	2	26	0	3120	$0.16	0	$0.00	0	$ -	$ -	$0.00	$0.00	$0.00	$0.00	$0.00	
C		2L-T12-8' Linear	2	160	3	480	Relamp, Reballast	Sylvania Lamps FO96/835/XP/SS/ECO Sylvania Ballast QHE 2X59T8/UNV ISL-SC	2	89	3	267	213	3120	$0.16	665	$106.33	3	$ 137.20	$ 60.00	$197.20	$411.60	$180.00	$591.60	$30.00	5.3
D		2L-T12-40W 4' Linear	2	77	1	77	Relamp, Reballast	Sylvania Lamps FO32/835/XP/ECO Sylvania Ballast QHE 2X32T8/UNV ISL-SC	2	48	1	48	29	3120	$0.16	90	$14.48	1	$ 29.05	$ 60.00	$89.05	$29.05	$60.00	$89.05	$10.00	5.5
C	Truck Bay #2	2L-T12-8' Linear	2	160	12	1920	Relamp, Reballast	Sylvania Lamps FO96/835/XP/SS/ECO Sylvania Ballast QHE 2X59T8/UNV ISL-SC	2	89	12	1068	852	3120	$0.16	2,658	$425.32	12	$ 137.20	$ 60.00	$197.20	$1,646.40	$720.00	$2,366.40	$120.00	5.3
B		1L-CFL-13w pin-base	1	13	2	26	Existing to Remain	Existing to Remain	1	13	2	26	0	3120	$0.16	0	$0.00	0	$ -	$ -	$0.00	$0.00	$0.00	$0.00	$0.00	
J	Existing Hall	4L-T12-40W 4' Linear	4	154	18	2772	Reballast, Relamp	Sylvania Lamps FO32/835/XP/ECO Sylvania Ballast QHE 4X32T8/UNV ISN-SC	4	95	18	1710	1062	2080	$0.16	2,209	$353.43	18	$ 42.70	$ 60.00	$102.70	$768.60	$1,080.00	$1,848.60	$360.00	4.2
E		1L-Incand.-BR30-65w	1	65	25	1625	Relamp	Sylvania Lamp/Integral Ballast CF15EL/BR30/DIM/830/BL	1	17	25	425	1200	2080	$0.16	2,496	$399.36	25	$ 18.05	$ 37.50	$55.55	$451.25	$937.50	$1,388.75	$0.00	3.5
E	Memebers Lounge/Meeting Area	1L-Incand.-BR30-65w	1	65	25	1625	Relamp	Sylvania Lamp/Integral Ballast CF15EL/BR30/DIM/830/BL	1	17	25	425	1200	2184	$0.16	2,621	$419.33	25	$ 18.05	$ 37.50	$55.55	$451.25	$937.50	$1,388.75	$0.00	3.3
F		1L-T8-3' Linear	1	22	6	132	Existing to Remain	Existing to Remain	1	22	6	132	0	2184	$0.16	0	$0.00	0	$ -	$ -	$0.00	$0.00	$0.00	$0.00	$0.00	
G		1L-T8-4' Linear	1	22	10	220	Existing to Remain	Existing to Remain	1	22	10	220	0	2184	$0.16	0	$0.00	0	$ -	$ -	$0.00	$0.00	$0.00	$0.00	$0.00	
F	Memebers Lounge/Meeting Area Storage Closet	1L-T8-3' Linear	1	22	1	22	Existing to Remain	Existing to Remain	1	22	1	22	0	200	$0.16	0	$0.00	0	$ -	$ -	$0.00	$0.00	$0.00	$0.00	$0.00	
A	Truck Bay #3	2L-T12-8' Linear	2	160	8	1280	Relamp, Reballast	Sylvania Lamps FO96/835/XP/SS/ECO Sylvania Ballast QHE 2X59T8/UNV ISL-SC	2	89	8	712	568	520	$0.16	295	$47.26	8	$ 137.20	$ 60.00	$197.20	$1,097.60	$480.00	$1,577.60	$80.00	31.7
B		1L-CFL-13w pin-base	1	13	1	13	Existing to Remain	Existing to Remain	1	13	1	13	0	520	$0.16	0	$0.00	0	$ -	$ -	$0.00	$0.00	$0.00	$0.00	$0.00	
H	Kitchen	4L-T8-32w-2'x4'	4	108	11	1188	Existing to Remain	Existing to Remain	4	108	11	1188	0	2080	$0.16	0	$0.00	0	$ -	$ -	$0.00	$0.00	$0.00	$0.00	$0.00	
I	Corridor	2L-T8-32w- 4' Linear	2	59	2	118	Relamp, Reballast	Sylvania Lamps FO28/835/XP/SS/ECO Sylvania Ballast QHE 2X32T8/UNV ISL-SC	2	42	2	84	34	3120	$0.16	106	$16.97	2	$ 32.60	$ 60.00	$92.60	$65.20	$120.00	$185.20	$0.00	10.9
I	Kitchen Storage	2L-T8-32w- 4' Linear	2	59	2	118	Relamp, Reballast	Sylvania Lamps FO28/835/XP/SS/ECO Sylvania Ballast QHE 2X32T8/UNV ISL-SC	2	42	2	84	34	500	$0.16	17	$2.72	2	$ 32.60	$ 60.00	$92.60	$65.20	$120.00	$185.20	$0.00	68.1
J	Men's Toilet Room	4L-T12-40W 4' Linear	4	154	2	308	Reballast, Relamp	Sylvania Lamps FO32/835/XP/ECO Sylvania Ballast QHE 4X32T8/UNV ISN-SC	4	95	2	190	118	3120	$0.16	368	$58.91	2	$ 42.70	$ 60.00	$102.70	$85.40	$120.00	$205.40	$40.00	2.8
J	Women's Toilet Room	4L-T12-40W 4' Linear	4	154	2	308	Reballast, Relamp	Sylvania Lamps FO32/835/XP/ECO Sylvania Ballast QHE 4X32T8/UNV ISN-SC	4	95	2	190	118	3120	$0.16	368	$58.91	2	$ 42.70	$ 60.00	$102.70	$85.40	$120.00	$205.40	$40.00	2.8
K	Office	3L-T12-40W 2'X4' Recessed Troffer	3	121	3	363	Reballast, Relamp	Sylvania Lamps FO32/835/XP/ECO Sylvania Ballast QHE 3X32T8/UNV ISL-SC	3	72	3	216	147	1040	$0.16	153	$24.46	3	$ 30.60	$ 60.00	$90.60	$91.80	$180.00	$271.80	$60.00	8.7

	Existing Fixtures						Proposed Fixtures									Fixtures Retrofitted			Unit Installation Cost							
Existing Lighting Fixture Type	**Room Name**	**Lighting Fixture Description**	**Lamps per Fixture**	**Watts**	**Qty of Fixtures**	**Total Watts**	**Existing/Replace**	**Description**	**Lamps per Fixture**	**Watts**	**Qty of Fixtures**	**Total Watts**	**Wattage Reduction**	**Average Burn Hours**	**Ave $/kwh**	**Energy Savings, kWh**	**Energy Savings, $**	**Qty**	**Material Each**	**Labor Each**	**Total Each**	**Total Materials**	**Total Labor**	**Total All**	**Rebate Estimate**	**Simple Payback**
A	Generator Room	2L-T12-8' Linear	2	160	2	320	Relamp, Reballast	Sylvania Lamps FO96/835/XP/SS/ECO Sylvania Ballast QHE 2X59T8/UNV ISL-SC	2	89	2	178	142	260	$0.16	37	$5.91	2	$ 137.20	$ 60.00	$197.20	$274.40	$120.00	$394.40	$20.00	63.4
L	Mechanical Room	1L-50w-Metal Halide	1	65	1	65	Existing to Remain	Existing to Remain	1	65	1	65	0	260	$0.16	0	$0.00	0	0	0	$0.00	$0.00	$0.00	$0.00	$0.00	
First Floor Summary					**152**	**15086**					**152**	**8446**	**6640**			**14963**	**$2,394**	**105**				**$7,307**	**$5,955**	**$13,262**	**$890**	**5.2**

Project Name: Philadelphia Ave. Fire Station
Location: Lavallette, NJ
Description: Photovoltaic System 95% Financing - 20 year

Simple Payback Analysis

	Photovoltaic System 95% Financing - 20 year
Total Construction Cost	$78,660
Annual kWh Production	13,639
Annual Energy Cost Reduction	$2,196
Annual SREC Revenue	$4,774
First Cost Premium	**$78,660**
Simple Payback:	**11.29** Years

Life Cycle Cost Analysis

Analysis Period (years):	25	Financing %:	95%
Financing Term (mths):	240	Maintenance Escalation Rate:	3.0%
Average Energy Cost ($/kWh)	**$0.161**	Energy Cost Escalation Rate:	3.0%
Financing Rate:	7.00%	SREC Value ($/kWh)	$0.350

Period	Additional Cash Outlay	Energy kWh Production	Energy Cost Savings	Additional Maint Costs	SREC Revenue	Interest Expense	Loan Principal	Net Cash Flow	Cumulative Cash Flow
0	$3,933	0	0	0	$0	0	0	(3,933)	0
1	$0	13,639	$2,196	$0	$4,774	$5,175	$1,778	$17	($3,916)
2	$0	13,571	$2,262	$0	$4,750	$5,046	$1,906	$59	($3,856)
3	$0	13,503	$2,330	$0	$4,726	$4,908	$2,044	$103	($3,753)
4	$0	13,436	$2,400	$0	$4,702	$4,760	$2,192	$150	($3,603)
5	$0	13,368	$2,472	$138	$4,679	$4,602	$2,350	$60	($3,543)
6	$0	13,302	$2,546	$137	$4,656	$4,432	$2,520	$112	($3,431)
7	$0	13,235	$2,622	$136	$4,632	$4,250	$2,702	$166	($3,265)
8	$0	13,169	$2,701	$136	$4,609	$4,055	$2,898	$222	($3,043)
9	$0	13,103	$2,782	$135	$4,586	$3,845	$3,107	$281	($2,763)
10	$0	13,038	$2,865	$134	$4,563	$3,621	$3,332	$342	($2,421)
11	$0	12,972	$2,951	$134	$4,540	$3,380	$3,573	$406	($2,015)
12	$0	12,907	$3,040	$133	$4,518	$3,121	$3,831	$472	($1,543)
13	$0	12,843	$3,131	$132	$4,495	$2,844	$4,108	$541	($1,002)
14	$0	12,779	$3,225	$132	$4,473	$2,548	$4,405	$613	($389)
15	$0	12,715	$3,322	$131	$4,450	$2,229	$4,723	$688	$300
16	$0	12,651	$3,421	$130	$4,428	$1,888	$5,065	$766	$1,066
17	$0	12,588	$3,524	$130	$4,406	$1,522	$5,431	$848	$1,914
18	$0	12,525	$3,629	$129	$4,384	$1,129	$5,823	$932	$2,846
19	$0	12,462	$3,738	$128	$4,362	$708	$6,244	$1,020	$3,865
20	$0	12,400	$3,851	$128	$4,340	$257	$6,696	$1,111	$4,976
21	$0	12,338	$3,966	$127	$4,318	$218	$6,155	$1,784	$6,760
22	$0	12,276	$4,085	$126	$4,297	$149	$5,065	$3,041	$9,801
23	$0	12,215	$4,208	$126	$4,275	$0	$0	$8,357	$18,159
24	$0	12,154	$4,334	$125	$4,254	$0	$0	$8,463	$26,621
25	$0	12,093	$4,464	$125	$4,233	$0	$0	$8,572	$35,193
	Totals:	260,207	$59,005	$2,122	$91,072	$64,319	$74,727	$85,948	$72,958
				Net Present Value (NPV)			**$4,936**		
				Internal Rate of Return (IRR)			**12.1%**		

Project Name: Philadelphia Ave. Fire Station
Location: Lavallette, NJ
Description: Photovoltaic System - Direct Purchase

Simple Payback Analysis

	Photovoltaic System - Direct Purchase
Total Construction Cost	$78,660
Annual kWh Production	13,639
Annual Energy Cost Reduction	$2,196
Annual SREC Revenue	$4,774
First Cost Premium	**$78,660**
Simple Payback:	**11.29** **Years**

Life Cycle Cost Analysis

Analysis Period (years):	25	Financing %:	0%
Financing Term (mths):	0	Maintenance Escalation Rate:	3.0%
Average Energy Cost ($/kWh)	**$0.161**	Energy Cost Escalation Rate:	3.0%
Financing Rate:	0.00%	SREC Value ($/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	$78,660	0	0	0	$0	(78,660)	0
1	$0	13,639	$2,196	$0	$4,774	$6,970	($71,690)
2	$0	13,571	$2,262	$0	$4,750	$7,012	($64,679)
3	$0	13,503	$2,330	$0	$4,726	$7,056	($57,623)
4	$0	13,436	$2,400	$0	$4,702	$7,102	($50,521)
5	$0	13,368	$2,472	$138	$4,679	$7,013	($43,508)
6	$0	13,302	$2,546	$137	$4,656	$7,064	($36,444)
7	$0	13,235	$2,622	$136	$4,632	$7,118	($29,326)
8	$0	13,169	$2,701	$136	$4,609	$7,174	($22,152)
9	$0	13,103	$2,782	$135	$4,586	$7,233	($14,919)
10	$0	13,038	$2,865	$134	$4,563	$7,294	($7,625)
11	$0	12,972	$2,951	$134	$4,540	$7,358	($267)
12	$0	12,907	$3,040	$133	$4,518	$7,424	$7,157
13	$0	12,843	$3,131	$132	$4,495	$7,494	$14,651
14	$0	12,779	$3,225	$132	$4,473	$7,566	$22,216
15	$0	12,715	$3,322	$131	$4,450	$7,641	$29,857
16	$0	12,651	$3,421	$130	$4,428	$7,719	$37,576
17	$0	12,588	$3,524	$130	$4,406	$7,800	$45,376
18	$0	12,525	$3,629	$129	$4,384	$7,884	$53,260
19	$0	12,462	$3,738	$128	$4,362	$7,972	$61,232
20	$0	12,400	$3,851	$128	$4,340	$8,063	$69,295
21	$1	12,338	$3,966	$127	$4,318	$8,157	$77,452
22	$2	12,276	$4,085	$126	$4,297	$8,255	$85,707
23	$3	12,215	$4,208	$126	$4,275	$8,357	$94,065
24	$4	12,154	$4,334	$125	$4,254	$8,463	$102,527
25	$5	12,093	$4,464	$125	$4,233	$8,572	$111,099
	Totals:	260,207	$59,005	$2,122	$91,072	$189,759	$147,955
				Net Present Value (NPV)		**$111,124**	
				Internal Rate of Return (IRR)		**8.0%**	

Building	Usable Roof Area (sq ft)	Panel	Qty	Panel Sq Ft	Panel Total Sq Ft	Total KW	Total Annual kWh	Panel Weight (33 lbs)	W/SQFT
Phila. Ave. Fire Station	560	Sunpower SPR230	38	14.7	559	8.74	13,639	1,254	15.64

Total Roof Area 40 x 20 = 600 x .70 = 560 Sq. Ft.

.= Proposed PV Layout

Notes:

1. Estimated kWH based on 4.68 hours full output per day per 365 day year. Actual kWH will vary day to day.

OMB No. 2060-0347

STATEMENT OF ENERGY PERFORMANCE
Philadelphia Ave. Fire Station

Building ID: 1802271
For 12-month Period Ending: December 31, 2008[1]
Date SEP becomes ineligible: N/A

Date SEP Generated: July 30, 2009

Facility
Philadelphia Ave. Fire Station
Philadelphia Avenue
Lavallette, NJ 08735

Facility Owner
N/A

Primary Contact for this Facility
N/A

Year Built: 1958
Gross Floor Area (ft²): 9,912

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

Site Energy Use Summary[3]

Natural Gas (kBtu)[4]	399,887
Electricity (kBtu)	134,771
Total Energy (kBtu)	534,658

Energy Intensity[5]

Site (kBtu/ft²/yr)	56
Source (kBtu/ft²/yr)	92

Emissions (based on site energy use)

Greenhouse Gas Emissions ($MtCO_2e$/year)	42

Electric Distribution Utility
Borough of Lavallette

National Average Comparison

National Average Site EUI	78
National Average Source EUI	157
% Difference from National Average Source EUI	-42%
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. 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.

ENERGY STAR® Data Checklist for Commercial Buildings

In order for a building to qualify for the ENERGY STAR, a Professional Engineer (PE) must validate the accuracy of the data underlying the building's energy performance rating. This checklist is designed to provide an at-a-glance summary of a property's physical and operating characteristics, as well as its total energy consumption, to assist the PE in double-checking the information that the building owner or operator has entered into Portfolio Manager.

Please complete and sign this checklist and include it with the stamped, signed Statement of Energy Performance.
NOTE: You must check each box to indicate that each value is correct, OR include a note.

CRITERION	VALUE AS ENTERED IN PORTFOLIO MANAGER	VERIFICATION QUESTIONS	NOTES	☑
Building Name	Philadelphia Ave. Fire Station	Is this the official building name to be displayed in the ENERGY STAR Registry of Labeled Buildings?		☐
Type	Fire Station/Police Station	Is this an accurate description of the space in question?		☐
Location	Philadelphia Avenue, Lavallette, NJ 08735	Is this address accurate and complete? Correct weather normalization requires an accurate zip code.		☐
Single Structure	Single Facility	Does this SEP represent a single structure? SEPs cannot be submitted for multiple-building campuses (with the exception of acute care or children's hospitals) nor can they be submitted as representing only a portion of a building		☐
Phila. Ave. Fire Station (Other)				
CRITERION	**VALUE AS ENTERED IN PORTFOLIO MANAGER**	**VERIFICATION QUESTIONS**	**NOTES**	☑
Gross Floor Area	9,912 Sq. Ft.	Does this square footage include all supporting functions such as kitchens and break rooms used by staff, storage areas, administrative areas, elevators, stairwells, atria, vent shafts, etc. Also note that existing atriums should only include the base floor area that it occupies. Interstitial (plenum) space between floors should not be included in the total. Finally gross floor area is not the same as leasable space. Leasable space is a subset of gross floor area.		☐
Number of PCs	4 (Optional)	Is this the number of personal computers in the space?		☐
Weekly operating hours	168 Hours(Optional)	Is this the total number of hours per week that the space is 75% occupied? This number should exclude hours when the facility is occupied only by maintenance, security, or other support personnel. For facilities with a schedule that varies during the year, "operating hours/week" refers to the total weekly hours for the schedule most often followed.		☐
Workers on Main Shift	6 (Optional)	Is this the number of employees present during the main shift? Note this is not the total number of employees or visitors who are in a building during an entire 24 hour period. For example, if there are two daily 8 hour shifts of 100 workers each, the Workers on Main Shift value is 100.		☐

ENERGY STAR® Data Checklist for Commercial Buildings

Energy Consumption

Power Generation Plant or Distribution Utility: Borough of Lavallette

Fuel Type: Electricity		
Meter: Electric (kWh (thousand Watt-hours)) **Space(s):** Entire Facility		
Start Date	**End Date**	**Energy Use (kWh (thousand Watt-hours))**
11/25/2008	12/24/2008	2,819.00
10/25/2008	11/24/2008	947.00
09/25/2008	10/24/2008	1,203.00
08/25/2008	09/24/2008	1,534.00
07/25/2008	08/24/2008	8,987.00
06/25/2008	07/24/2008	8,895.00
05/25/2008	06/24/2008	1,523.00
04/25/2008	05/24/2008	1,730.00
03/25/2008	04/24/2008	4,083.00
02/25/2008	03/24/2008	3,413.00
01/25/2008	02/24/2008	3,725.00
Electric Consumption (kWh (thousand Watt-hours))		**38,859.00**
Electric Consumption (kBtu)		**132,586.91**
Total Electricity Consumption (kBtu)		**132,586.91**
Is this the total Electricity consumption at this building including all Electricity meters?		☐

Fuel Type: Natural Gas		
Meter: Natural Gas (therms) **Space(s):** Entire Facility		
Start Date	**End Date**	**Energy Use (therms)**
11/10/2008	12/09/2008	592.20
10/10/2008	11/09/2008	233.54
09/10/2008	10/09/2008	65.16
08/10/2008	09/09/2008	48.44
07/10/2008	08/09/2008	48.53
06/10/2008	07/09/2008	55.81
05/10/2008	06/09/2008	142.66
04/10/2008	05/09/2008	190.05
03/10/2008	04/09/2008	572.80
02/10/2008	03/09/2008	635.86

01/10/2008	02/09/2008	857.62
Natural Gas Consumption (therms)		**3,442.67**
Natural Gas Consumption (kBtu)		**344,267.00**
Total Natural Gas Consumption (kBtu)		**344,267.00**
Is this the total Natural Gas consumption at this building including all Natural Gas meters?		☐

Additional Fuels	
Do the fuel consumption totals shown above represent the total energy use of this building? Please confirm there are no additional fuels (district energy, generator fuel oil) used in this facility.	☐

Certifying Professional

(When applying for the ENERGY STAR, this must be the same PE that signed and stamped the SEP.)

Name: _____ Date: _____

Signature: _____

Signature is required when applying for the ENERGY STAR.

FOR YOUR RECORDS ONLY. DO NOT SUBMIT TO EPA.

Please keep this Facility Summary for your own records; do not submit it to EPA. Only the Statement of Energy Performance (SEP), Data Checklist and Letter of Agreement need to be submitted to EPA when applying for the ENERGY STAR.

Facility
Philadelphia Ave. Fire Station
Philadelphia Avenue
Lavallette, NJ 08735

Facility Owner
N/A

Primary Contact for this Facility
N/A

General Information

Philadelphia Ave. Fire Station	
Gross Floor Area Excluding Parking: (ft^2)	9,912
Year Built	1958
For 12-month Evaluation Period Ending Date:	December 31, 2008

Facility Space Use Summary

Phila. Ave. Fire Station	
Space Type	Other - Fire Station/Police Station
Gross Floor Area(ft^2)	9,912
Number of PCs[o]	4
Weekly operating hours[o]	168
Workers on Main Shift[o]	6

Energy Performance Comparison

	Evaluation Periods		Comparisons		
Performance Metrics	**Current** (Ending Date 12/31/2008)	**Baseline** (Ending Date 12/31/2008)	**Rating of 75**	**Target**	**National Average**
Energy Performance Rating	N/A	N/A	75	N/A	N/A
Energy Intensity					
Site (kBtu/ft^2)	56	56	0	N/A	78
Source (kBtu/ft^2)	92	92	0	N/A	157
Energy Cost					
$/year	$ 13,341.48	$ 13,341.48	N/A	N/A	$ 18,662.76
$/$ft^2$/year	$ 1.35	$ 1.35	N/A	N/A	$ 1.89
Greenhouse Gas Emissions					
$MtCO_2e$/year	42	42	0	N/A	59
$kgCO_2e/ft^2$/year	4	4	0	N/A	6

More than 50% of your building is defined as Fire Station/Police Station. This building is currently ineligible for a rating. Please note the National Average column represents the CBECS national average data for Fire Station/Police Station. This building uses X% less energy per square foot than the CBECS national average for Fire Station/Police Station.

Notes:
o - This attribute is optional.
d - A default value has been supplied by Portfolio Manager.