ENERGY AUDIT – FINAL REPORT

LAVALLETTE BOROUGH HALL

1306 GRAND CENTRAL AVENUE
LAVALLETTE, NJ 08735
ATTN: MR. CHRISTOPHER F. PARLOW
Borough Administrator / Municipal Clerk

CEG PROJECT NO. 9P08128

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I. EXECUTIVE SUMMARY

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

Lavallette Borough Hall
1306 Grand Avenue
Lavallette, NJ 08735

Municipal Contact: 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	$ 34,898
Natural Gas	$ 0
Total	$ 34,898

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	Gas-Fired Hydronic Heating System	$54,505	$9,863	5.5	18.7 %
2	Gas-Fired Instantaneous HWH	$2,900	$482	5.9	17 %
3	Upgrade the Fluorescent Lighting	$2,053	$357	5.8	40.8 %
4	Install Compact Fluorescent Lighting	$274	$236	1.2	93.8 %
5	Install Lighting Controls	$385	$50	7.7	(-1.5 %)
6	6.44 KW PV Solar Panel System	$57,960	$5,165	11.2	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	Gas-Fired Hydronic Heating System	-	115,436	(+4,284)
2	Gas-Fired Instantaneous HWH	-	4,680	(+143)
3	Upgrade the Fluorescent Lighting	-	2,202	-
4	Install Compact Fluorescent Lighting	-	1,454	-
5	Install Lighting Controls	-	311	-
6	6.44 KW PV Solar Panel System	6.44	10,050	-

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 Borough Hall:

- **ECM #1:** Gas-Fired Hydronic Heating System
- **ECM #2:** Gas-Fired Instantaneous HWH
- **ECM #3:** Upgrade Fluorescent Lighting
- **ECM #4:** Install Compact Fluorescent Lighting
- **ECM #5:** Install Lighting Controls

II. INTRODUCTION

This comprehensive energy audit covers the 4,972 square foot Borough Hall building located at 1306 Grand Avenue. The building is used for municipal offices and includes general administrative offices, municipal clerk, finance, tax assessor, land use, building official and municipal court.

The first task was to collect and review one year's 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. Blueprints (where available) were obtained from the municipality and were utilized to calculate/verify the gross area of the facility.

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 includes 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

Table 3 and Figure 1 represent the electrical usage for the surveyed facility from January-08 to December-08. Borough of Lavallette Electric Utility provides electricity to the facility. 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.

Below is the average unit cost for the utilities at this facility. This building does not have a gas service. For purposes of this report, *Natural gas costs for the Public Works Garage was used in calculations.

Description	Average
Electricity	16.4¢ / kWh (4.8¢ / kBtu)
*Natural Gas	$1.709 / therm (1.7¢ / kBtu)

Table 3
Electricity Billing Data

Borough Hall - #1 Meter

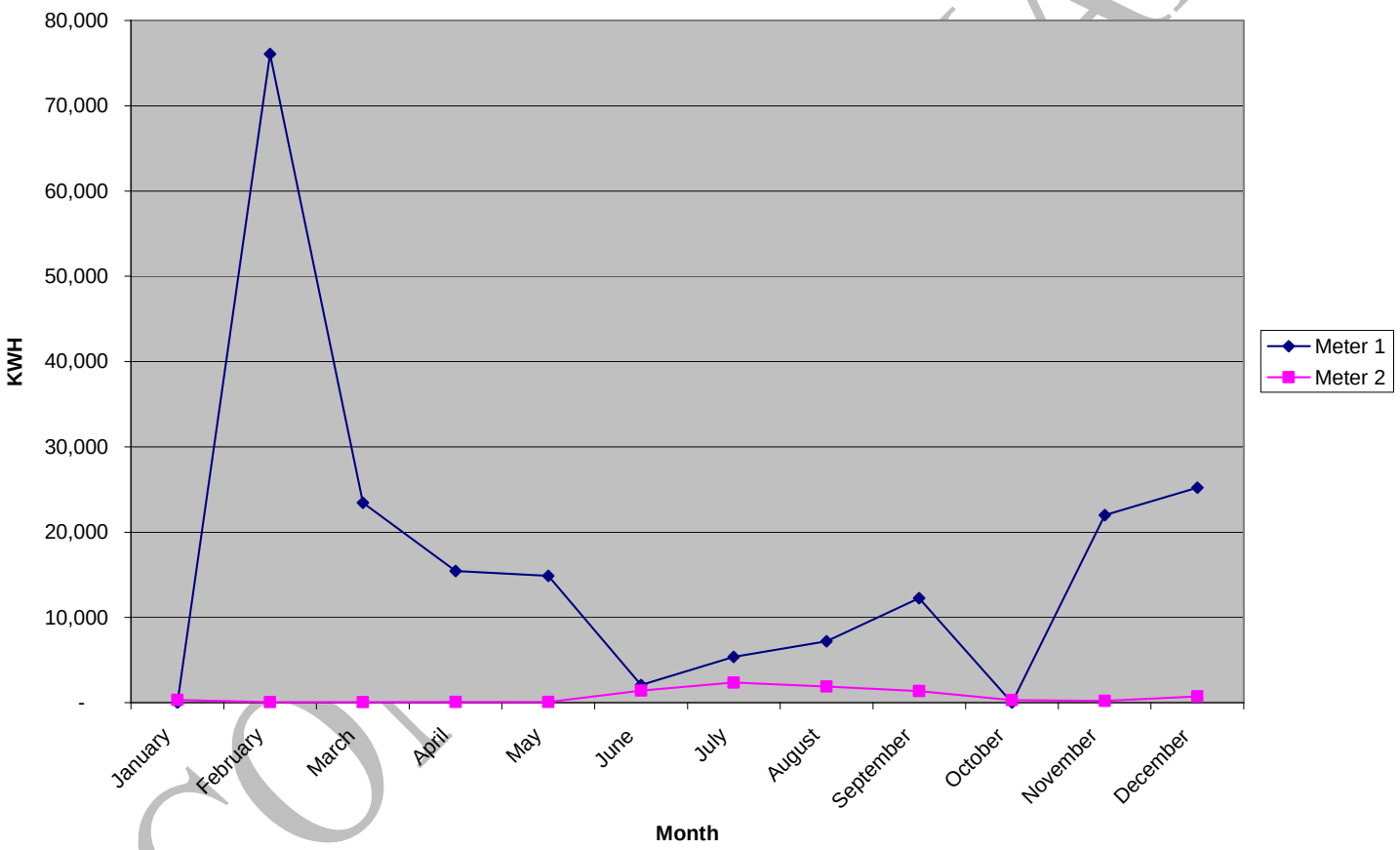
Provider	Month	Start Date	End Date	Account	Utility Type	Billing Days	Total Consumption	Units	Minimum Charge	Rate $/Kwh	Total $
Lavallette Electric Utility	January	1/25/2008	2/24/2008	1799	Electric	33	0	kwh	$ 14.75	$ 0.158	$ 14.75
Lavallette Electric Utility	February	2/25/2008	3/24/2008	1799	Electric	30	76,080	kwh	$ 14.75	$ 0.158	$ 12,035.39
Lavallette Electric Utility	March	3/25/2008	4/23/2008	1799	Electric	32	23,440	kwh	$ 14.75	$ 0.158	$ 3,718.27
Lavallette Electric Utility	April	4/24/2008	5/25/2008	1799	Electric	29	15,440	kwh	$ 14.75	$ 0.158	$ 2,454.27
Lavallette Electric Utility	May	5/26/2008	6/25/2008	1799	Electric	29	14,880	kwh	$ 14.75	$ 0.158	$ 2,365.79
Lavallette Electric Utility	June	6/26/2008	7/25/2008	1799	Electric	32	2,080	kwh	$ 14.75	$ 0.185	$ 399.55
Lavallette Electric Utility	July	7/26/2008	8/26/2008	1799	Electric	30	5,360	kwh	$ 14.75	$ 0.185	$ 1,006.35
Lavallette Electric Utility	August	8/27/2008	9/23/2008	1799	Electric	29	7,200	kwh	$ 14.75	$ 0.185	$ 1,346.75
Lavallette Electric Utility	September	9/24/2008	10/22/2008	1799	Electric	32	12,240	kwh	$ 14.75	$ 0.185	$ 2,279.15
Lavallette Electric Utility	October	10/23/2008	12/9/2008	1799	Electric	31	0	kwh	$ 14.75	$ 0.158	$ 14.75
Lavallette Electric Utility	November	12/9/2008	1/12/2009	1799	Electric	28	22,000	kwh	$ 14.75	$ 0.158	$ 3,490.75
Lavallette Electric Utility	December	1/12/2009	1/13/2009	1799	Electric	32	25,200	kwh	$ 14.75	$ 0.158	$ 3,996.35
						Total:	203920	kwh		**Total:**	$ 33,122.12
										Avg. Cost per kwh:	$ 0.162

Borough Hall - #2 Meter

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	1800	Electric	33	335	kwh	$ 14.75	$ 0.158	$ 67.68
Lavallette Electric Utility	February	2/25/2008	3/24/2008	1800	Electric	30	64	kwh	$ 14.75	$ 0.158	$ 24.86
Lavallette Electric Utility	March	3/25/2008	4/23/2008	1800	Electric	32	69	kwh	$ 14.75	$ 0.158	$ 25.65
Lavallette Electric Utility	April	4/24/2008	5/25/2008	1800	Electric	29	88	kwh	$ 14.75	$ 0.158	$ 28.65
Lavallette Electric Utility	May	5/26/2008	6/25/2008	1800	Electric	29	96	kwh	$ 14.75	$ 0.158	$ 29.92
Lavallette Electric Utility	June	6/26/2008	7/25/2008	1800	Electric	32	1405	kwh	$ 14.75	$ 0.185	$ 274.68
Lavallette Electric Utility	July	7/26/2008	8/26/2008	1800	Electric	30	2369	kwh	$ 14.75	$ 0.185	$ 453.02
Lavallette Electric Utility	August	8/27/2008	9/23/2008	1800	Electric	29	1902	kwh	$ 14.75	$ 0.185	$ 366.62
Lavallette Electric Utility	September	9/24/2008	10/22/2008	1800	Electric	32	1352	kwh	$ 14.75	$ 0.185	$ 264.87
Lavallette Electric Utility	October	10/23/2008	12/9/2008	1800	Electric	31	302	kwh	$ 14.75	$ 0.158	$ 62.47
Lavallette Electric Utility	November	12/9/2008	1/12/2009	1800	Electric	28	208	kwh	$ 14.75	$ 0.158	$ 47.61
Lavallette Electric Utility	December	1/12/2009	1/13/2009	1800	Electric	32	732	kwh	$ 14.75	$ 0.158	$ 130.41
						Total:	8922	kwh		**Total:**	$ 1,776.44
										Avg. Cost per kwh:	$ 0.199

Total:	212842 kwh	**Total:**	$ 34,898.56
		Avg. Cost per kwh:	$ 0.164

Figure 1
Electricity Usage Profile



B. Energy Use Index (EUI)

Energy Use Index (EUI) is a measure of a building's energy utilization per square foot of building. This calculation is completed by converting all utility usage (gas, electric, oil) consumed by a building over a specified time period, typically 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 among buildings of similar type. The EUI for this facility is calculated as follows:

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

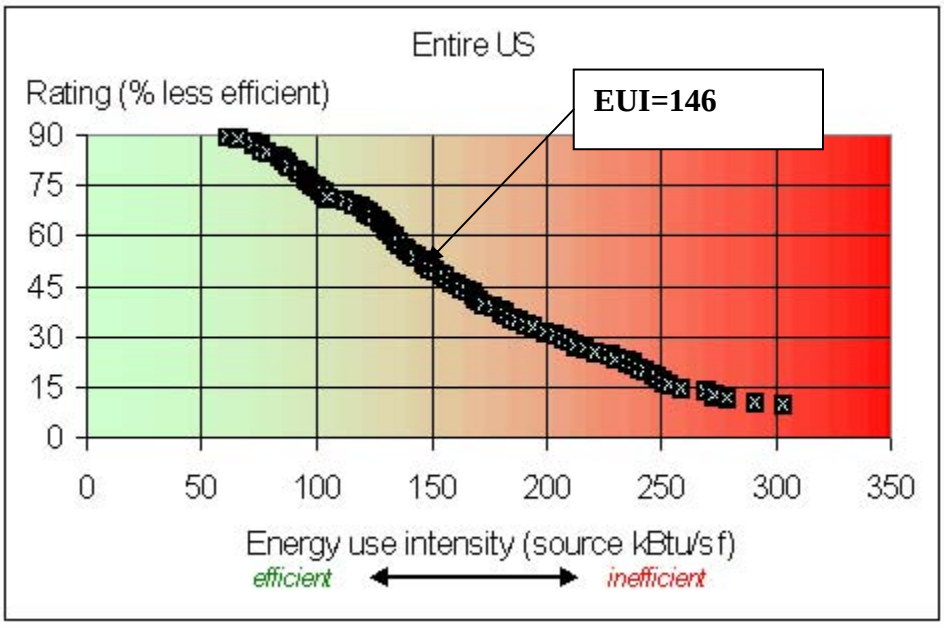
Electric = ((212,842 kWh) * (1000 W/kW) * (3.414 Btu/h / 1 W))/ (1000 Btu / 1 kBtu)
= 726,642 kBtu

Gas = 0 kBtu (no gas service exists for this building)

$$\text{Building EUI} = \frac{\text{(726,642 kBtu + 0 kBtu)}}{\text{4,972 SF}} = 146.1 \text{ kBtu/SF}$$

Borough Hall EUI = 146 kBtu/SF

Figure 2
Energy Use Intensity Distributions – Offices



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
Borough Hall	1	50

Specific building types are detailed on the ENERGY STAR website. Non-typical buildings are covered by an “Other” category. Refer to Appendix G for detailed energy benchmarking report entitled “STATEMENT OF ENERGY PERFORMANCE.”

V. FACILITY DESCRIPTION

The Lavallette Borough Hall building is a 2-story slab on grade building with a small 300 sq.ft. crawl space area located in the rear of the building. General construction is masonry with face brick and decorative features. When the present Borough Hall was erected in 1928, the Fire Company was allotted space in the new building for a meeting room and engine room. The fire company has since moved to it's own facility. A 1997 renovation added a new 2-story front entrance vestibule with wheelchair lift flanked by new 1-story office area addditions on either side. An attic exists, accesable via a pull down step ladder located in the rear of the second floor. Roof trusses from hip roofs with asphalt shingles and a ventilated attic space. Windows are clear, double-pane, insulating type. Exterior masonry walls are approximatley 1 foot thick. The building houses the general administrative offices, municipal clerk, finance, tax assessor, land use, building official and municipal court. The first floor is approximately 2700 square feet, the second floor is 2272 square feet.

Heating System

The primary heating system for the building consists of electric baseboard heaters. The rear office on the first floor is heated with two 2'x 4' radient ceiling panels. These panels were added due to the installation of a raised computer room type floor which covered the electric baseboard heat. The electric heat is controlled by multiple wall thermostats, recently upgraded to digital programmable type. An exception is the front vestibule addition which has thermostats integral to the heating unit. The heating thermostats are independent from the cooling unit thermostats.

The high cost of electric heating makes these units the major contributor to this buildings high electric bills. Electric heating energy costs are approximately 3 times that of natural gas when compared on a $ per Btu basis.

Domestic Hot Water

An electric Domestic Hot Water Heater, located in the crawl space, provides hot water for Men's and Women's toilet rooms on the first and second floors. The hot water heater is an American Standard with 4,500 watts input and a 30 gallon capacity. This unit appears to be in good condition.

Cooling System

Cooling for the building is provided by a number of independent air conditioning systems. A 4-ton packaged rooftop unit manufactured by Rudd serves the first floor. It is located on a small section of 1st foor roof at the rear of the building. The unit was manufactiurered in 2005 and appears to be in good condition. Three(3) window air conditioners are utilized for the compuer office, building official office and building official public lobby area.

A 5-ton split system with indoor air handler and outdoor condensing unit manufactured by American Standard serves the large municipal court room on the second floor. An identical 5-ton split system serves the remainder of the second floor offices and common corridor. The split systems were installed in 2006 and appear to be in good condition. The indoor air handlers are located in the attic with ducted supply and return ducts. The outdoor condensing units are located on grade at the rear of the building. The ductwork appears to be internally insulated, as it should be since it is exposed in an unconditioned attic space. The attic is open at the eaves and has 3 ventilation fans.

Ceiling fans exist in the first floor main office and second floor courtroom.

Lighting System

The first floor public areas and offices are lit with a combination of 2-foot by 2-foot lay-in fixtures and 2-foot by 4-foot lay-in fixtures, both containing T8 lamps and electronic ballasts. Standard switching is utilized and there are no other types of lighting controls present.

The second floor public areas and offices are lit with a combination of 2-foot by 4-foot lay-in fixtures containing T12 lamps and magnetic ballasts and some incandescent fixtures. Standard switching is utilized and there are no other types of lighting controls present.

The first and second toilet rooms and closets are lit with incandescent ceiling fixtures. Standard switching is utilized and there are no other types of lighting controls present.

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 wall mounted fixtures fitted with compact fluorescent lamps.

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 savings. In addition, 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 manufacturers 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.

VII. ENERGY CONSERVATION MEASURE (ECM)

ECM #1 Gas-Fired Hydronic Heating System

Description:

The heating system for the building is 100% electric, consisting of primarily ofelectric baseboard heaters. 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 $0.048 /kBtu versus natural gas at $0.017 /kBtu. (3 times the cost) The winter electric bills are approximately $2500 per month higher than the spring / fall due to the electric heat.

We considered an alternative to this ECM which was to replace the existing Rooftop unit and two Attic air handlerd with gas-fired heating units. However, proposing replacement of these systems was abondoned since they are only 3 years old. In addition, hydronic heat is superior to air side heating systems from both comfort and efficiency perspectives.

This ECM proposes to replace the electric baseboard heaters with hydronic baseboard heat. In addition to the baseboard units, this conversion will require the installation of new gas service, high efficiency hot water boiler, hydronic supply & return piping, circulating pump, control valves, and accessories.

It is proposed that the boiler, circulating pump, expansion tank, etc. be installed in the storage room at the rear of the building. This location will facilitate easy routing of the boiler flue and combustion air vents. The new gas service shall also be routed to this location. A hydronic piping loop could be routed in the first floor ceiling at the perimeter, with branch piping up to second floor baseboard and down to first floor baseboard. This arrangement will minimize piping costs. A high capacity forced air hydronic cabinet heater is recommended for the entrance area. The recently installed digital programmable thermostats and wiring could be re-used to operate the baseboard control valves. Existing electric baseboard power feed could likewise be re-used to power the hydronic control valves.

A Weil-McLain “Ultra PHD” condensing 92% efficiency gas boiler, 230 MBH input, was used for the basis of design for this ECM. The system capacity was estimated based upon a 40 Btuh per square foot “rule of thumb” heating load estimate for very older buildings in northern climates. Circulator would be an in-line type and the baseboard would be standard commercial copper finned-tube.

The following calculations show the potential energy savings from this ECM.

Energy Savings Calculations:

Heating Degree Days (HDD) = 4,954°F – day/yr.

Heating Load (HL) = 40 Btuh / SF * 4,972 SF = 198,880 Btuh

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

Energy Use (Electric @100% eff) = (198,880 * 4954 * 24) / (60 * 1 * 1) = 394,100 kBtu / yr

Energy Use (Gas @ 92% eff) = (198,880 * 4954 * 24) / (60 * 0.92 * 1) = 428,363 kBtu / yr

Annual Electric Heating Cost = 394,100 kBtu * $0.048 /kBtu = $18,916

Annual Natural Gas Heating Cost = 428,363 kBtu * $0.017 /kBtu = $7283

Annual Energy Savings = $18,916 - $7283 = $11,663

The Gas-fired system will incur additional annual maintenance costs vs. the existing electric which has essentially zero maintenance costs.

Annual Gas Boiler System Maintenance Cost = 36 man-hours * $75 / hr. = $1800

Annual ECM Savings = Annual energy Savings – Annual Maintenance Costs

Annual ECM Savings = $11,663 - $ 1800 = $9,863

The SmartStart Buildings® incentive for high efficiency boilers less than 300 MBH is $300.

Energy Savings Summary:

ECM #1 - ENERGY SAVINGS SUMMARY	
Installation Cost:	**$54,805**
NJ Smart Start Equipment Incentive:	**($300)**
Maintenance Costs (24 man-hrs @ $50/hr.):	**($0)**
Net Installation Cost ($):	**$54,505**
Annual ECM Savings ($ / yr):	**$9,863**
Simple Payback (yrs):	**5.5**
Simple Return on Investment:	**18.7 %**

ECM #2 Domestic HWH Replacement

Description:

This energy conservation measure will replace the existing electric, 4,500 Watt, 30-gallon capacity domestic hot water heater with a gas-fired, tankless water heater. Tankless water heaters heat water directly without the use of a storage tank. Therefore, they avoid the standby heat losses associated with storage water heaters. In a gas-fired tankless water heater, a gas burner heats the water and provides a constant supply of hot water. Therefore, you do not need to wait for the storage tank to fill up with enough hot water as is typical with storage-type hot water heaters.

This ECM is dependant on the implementation of ECM #1, which includes the installation of a gas service to the building. Installing a gas service for this ECM alone would not be of any value due to the relatively small energy consumption of the HWH. The unit would be installed in the rear storage room alongside the boiler discussed in ECM #1.

An Aqua Star GWH-425HN Tankless HWH, 82% efficiency, 4.25 gpm @ 45º rise, 117,000 MBH input, was used for the basis of design for this ECM.

The following calculations show the potential energy savings from this ECM.

Energy Savings Calculations:

Existing Electric DHW Heater

Rated Capacity = 4,500 Watts Energy Factor (EF) = 0.92 30 gallons storage
Average cost of electricity = 16.4¢/kWh
Electric DHW Heater Operating Hrs/Yr. = 1,040 Hrs.
Annual Electric Usage = (1,040 Hrs x 4,500 Watts) ÷ 1,000 Watts/kW = 4,680 kWh
Annual Energy Cost = 16.4¢/kWh x 4,680 kWh = $767

Proposed High-Efficiency Gas-Fired Tankless Water Heater

Rated Capacity = 4.25 gallons per minute Energy Factor (EF) = 0.80
Average cost of natural gas = $1.709 / Therm
Annual Gas Usage = 143 Therms
Annual Energy Cost = 143 Therms x $ 1.709 /Therm = $245

Annual ECM Savings = $767 - $245 = $482

NJ Smart Start® Program Incentives:

From Appendix C, a natural gas-fired domestic hot water heater less than 50 gallons warrants the following incentive:

$$\text{Smart Start®}\ \textit{Incentive} = (\$50\ \textit{per DHW Heater}) = \$50$$

Energy Savings Summary:

ECM #2 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	**$2,900**
NJ Smart Start Equipment Incentive ($):	**($50)**
Maintenance Savings ($):	**($0)**
Net Installation Cost ($):	**$2,850**
Total Energy Savings ($ / yr):	**$482**
Simple Payback (yrs):	**5.9**
Simple Return on Investment:	**17 %**

ECM #3: 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 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 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 <u>one</u> fixture it is sometimes feasible to use <u>one</u> electronic ballast for every <u>two or more</u> 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 = (104 x 33% *reduction* x $2.00) + ($20 x 34) = $749

Energy Savings Summary:

ECM #3 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	**$3,322**
NJ Smart Start Equipment Incentive ($):	**($520)**
Maintenance Savings ($):	**($749)**
Net Installation Cost ($):	**$2,053**
Total Energy Savings ($ / yr):	**$357**
Simple Payback (yrs):	**5.8**
Simple Return on Investment:	**40.8 %**

ECM #4: 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 = (13 x 75% *reduction* x $5) + ($15 x 10) = $199

Energy Savings Summary:

ECM #4 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	**$473**
NJ Smart Start Equipment Incentive ($):	**$0**
Annual Maintenance Savings ($):	**($199)**
Net Installation Cost ($) After 1 Year:	**$274**
Total Energy Savings ($ / yr):	**$236**
Simple Payback (yrs):	**1.2**
Simple Return on Investment:	**93.8 %**

ECM #5: Lighting Upgrade – Install Lighting Controls

Description:

In some areas the lighting is left on unnecessarily. There has been a belief that it is better to keep the lights on rather than to continuously switch them on and off. The on/off dilemma was studied and it was determined that the best option is to turn the lights off whenever possible. Although this practice reduces the lamp life, the energy savings far outweigh the lamp replacement costs.

Lighting controls are available in many forms. Lighting controls can be as simplistic as an additional switch. Time-clocks are often used which allows the user to set an on/off schedule. Time-clocks range from a dial clock with on/off indicators to a small box the size of a thermostat with user programs for on/off schedule in a digital format. Occupancy sensors detect motion and will switch the lights on when the room is occupied. They can either be mounted in place of the current wall switch, or they can be mounted on the ceiling to cover large areas. Lastly, photocells are a lighting control that sense light levels and will turn the lights off when there is adequate daylight. These are mostly used outside, but they are becoming much more popular in energy-efficient office designs as well.

To determine an estimated savings for lighting controls, we used ASHRAE 90.1-2004 (NJ Energy Code). Appendix G states that occupancy sensors have a 10% power adjustment factor for daytime occupancies for buildings over 5,000 SF. CEG recommends the installation of dual technology occupancy sensors in the private offices.

CEG would recommend wall switches for individual rooms, ceiling mount sensors for large office areas, and fixture mount box sensors for some applications as manufactured by Sensorswitch, Watt Stopper, etc.

Energy Savings Calculations:

From Appendix E of this report, we calculated the annual kilowatt hours (kwh) savings for the areas where the proposed occupancy sensors will be located:

Savings = *Total kilowatts* x *Annual Average Burn Hours*

= 3,105 kwh/yr. x 10% x $0.16/kwH

Annual Savings = $50 / yr

Installation cost per dual-technology sensor is $75/unit.

The SmartStart Buildings® incentive is $20 per control which equates to an installed cost of $55/unit. Total number of rooms to be retrofitted is 7.

Total cost to install sensors is $55 x 7 units = $385.

Energy Savings Summary:

ECM #5 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	**$525**
NJ Smart Start Equipment Incentive ($):	**($140)**
Maintenance Savings ($):	**$0**
Net Installation Cost ($):	**$385**
Total Energy Savings ($ / yr):	**$50**
Simple Payback (yrs):	**7.7**
Simple Return on Investment:	**(-1.5 %)**

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 Borough Hall building, 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 roof area of the building being audited for the purposes of determining a potential for a roof mounted photovoltaic system. A roof area of 420 S.F. can be utilized for a PV system on the Borough Hall roof. A depiction of the area utilized is shown in Appendix F following the financial calculations. Using this square footage it was determined that a system size of 6.44 kilowatts could be installed to match the maximum peak monthly demand. The required square footage for a system of this size is 412 S.F. and has an estimated kilowatt hour production of 10,050 KWh annually, reducing the overall electric consumption by approximately 4.7%. 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	11.22 Years	12.8 %
Direct Purchase	11.22 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 heating profile, (November – March), as is typical here with the presence of electric baseboard heaters and radiant ceiling panels. There is a significant spike in consumption from January through March 2008 and a substantial drop and leveling off beginning April 2008. The summertime load is very low even with the presence of a rooftop unit, several window units and two 5-ton split systems. Despite the winter increase, the balance of the year has a relatively flat (base load) pattern. Base-load shaping is important because a flat consumption profile will yield more competitive pricing.

Natural Gas:

The Borough Hall does not have natural gas service.

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 Hall does not have natural gas service.

Recommendations:

Borough Hall has 2 meters supplying electricity. Account # 1799 has an average historical (January – December) electric cost of $.162 / kWh (kilowatt hour-is the common unit of electrical consumption measure). Account # 1800 has an average historical electric price of

$.199 /kWh. CEG recommends that the Borough double check these rates with the electric company.

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 provider 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 Borough 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

Lavallette Borough Hall
Lavallett Electric Utility
Acct.No: 1799

Appendix A

Meter #1

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	0	76,080	23,440	15,440	14,880	2,080	5,360	7,200	12,240	0	22,000	25,200	203,920
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, $	$15	$12,035	$3,718	$2,454	$2,366	$400	$1,006	$1,347	$2,279	$15	$3,491	$3,996	$33,122
$/KWH	$0.1580	$0.1580	$0.1580	$0.1580	$0.1580	$0.1850	$0.1850	$0.1850	$0.1850	$0.1580	$0.1580	$0.1580	$0.1624

Electric Cost Summary

Lavallette Borough Hall
Lavallett Electric Utility
Acct.No: 1800

Meter #2

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	335	64	69	88	96	1,405	2,369	1,902	1,352	302	208	732	8,922
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, $	$68	$25	$26	$29	$30	$275	$453	$367	$265	$62	$48	$130	$1,776
$/KWH	$0.1580	$0.1580	$0.1580	$0.1580	$0.1580	$0.1850	$0.1850	$0.1850	$0.1850	$0.1580	$0.1580	$0.1580	$0.1991

Borough of Lavallette - Borough Hall Building

CONSTRUCTION COST AND REBATES					
ECM #1 GAS-FIRED HYDRONIC HEATING SYSTEM	Qty	Unit Cost $	Material $	Labor $	Total $
Weil McLain Ultra 230 Gas Boiler	1	$5,760	$5,760	$8,640	$14,400
Circulating Pump	1	$485	$485	$970	$1,455
Copper Piping, Insulated (per L.F.)	425	$12	$5,100	$7,650	$12,750
Demo Electric Baseboard (per L.F.)	120	$5	$0	$600	$600
Finned-Tube Baseboard (per L.F.)	120	$40	$4,800	$7,200	$12,000
Cabinet Heater, Hydronic	1	$1,200	$1,200	$2,400	$3,600
Gas Piping	1	$500	$500	$2,000	$2,500
Electrical & Controls	1	$2,500	$2,500	$5,000	$7,500
Utility Incentive					$300
Total					**$54,505**
ECM #2 DOMESTIC HWH REPLACEMENT	Qty	Unit Cost $	Material $	Labor $	Total $
Aqua Star GWH-425HN Instant Gas	1	$750	$750	$1,500	$2,250
Copper Piping, Insulated (per L.F.)	20	$12	$240	$360	$600
Demo Electric HWH	1	$50	$0	$50	$50
Utility Incentive					$50
Total					**$2,850**
ECM #3 - LIGHTING RETROFIT	Qty	Unit Cost $	Material $	Labor $	Total $
Lighting Retrofit	1	$3,322	$3,322	included	$3,322
Utility Incentive					$520
Total					**$2,802**
ECM #4 - LIGHTING UPGRADE	Qty	Unit Cost $	Material $	Labor $	Total $
Lighting Retrofit	1	$473	$473	included	$473
Utility Incentive					$0
Total					**$473**
ECM #5 - LIGHTING	Qty	Unit Cost $	Material $	Labor $	Total $
Lighting Controls	1	$525	$525	included	$525
Utility Incentive					$140
Total					**$385**
ECM #6 - PV SOLAR	Qty	Unit Cost $	Material $	Labor $	Total $
PV Solar	28	$2,070	$57,960	included	$57,960
Total					**$57,960**

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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 - Borough Hall Building

MAJOR EQUIPMENT LIST								
TAG	**MAKE**	**MODEL**	**TYPE**	**CAPACITY**	**EFFICIENCY**	**SERVES**	**REMAINING USEFUL LIFE**	**NOTES**
RTU-1	AMERICAN STANDARD	RLKA-A048	PACKAGED ROOFTOP AIR HANDLER	4 TONS	10 SEER	FIRST FLOOR	12 YEARS	PACKAGED ROOFTOP AIR HANDLER. ELECTRIC COOLING, NO HEATING.
AC-1	AMERICAN STANDARD	ALLEGIENCE 10 # 2A7C006A3000AA	OUTDOOR CONDENSING UNIT	5 TONS	10 SEER	2ND FLOOR COURT ROOM	12 YEARS	SPLIT SYSTEM HEAT PUMP
		# 2TEC3F60A	INDOOR FAN COIL				17 YEARS	
AC-2	AMERICAN STANDARD	ALLEGIENCE 10 # 2A7C006A3000AA	OUTDOOR CONDENSING UNIT	5 TONS	10 SEER	2ND FLOOR OFFICES	12 YEARS	SPLIT SYSTEM HEAT PUMP
		# 2TEC3F60A	INDOOR FAN COIL				17 YEARS	
EBB	GENERIC	COMMERCIAL	ELECTRIC BASEBOARD STRIP HEATERS	30 KW	100%	FIRST & SECOND FLOORS	UNKNOWN	APPROXIMATELY 120 LINEAR FEET AT 250 WATTS / FOOT = 30 KW = 103 MBH
HWH-1	AMERICAN STANDARD	NOT AVAILIBLE	DOMESTIC HOT WATER HEATER	30 GAL., 4500 KW INPUT	100%	RESTROOM LAVATORYS & PANTRY SINK	10 YEARS	LOCATED IN CRAWL SPACE

INVESTMENT GRADE LIGHTING AUDIT

CONCORD ENERGY SERVICES

CEG Project #: BS09-007
Project Name : Borough of Lavallette - Borough Hall
Address: 1306 Grand Central Avenue
City, State: Lavallette, NJ
Building SF: 4,972

	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	Vestibule	2L-T8-32w- 4' Linear	2	55	1	55	Existing to Remain	Existing to Remain	2	55	1	55	0	2320	$0.16	0	$0.00	0	$ -	$ -	$0.00	$0.00	$0.00	$0.00	$0.00	
A	Public Area	2L-T8-32w- 4' Linear	2	55	2	110	Existing to Remain	Existing to Remain	2	55	2	110	0	2320	$0.16	0	$0.00	0	$ -	$ -	$0.00	$0.00	$0.00	$0.00	$0.00	
A	Office Area "A"	2L-T8-32w- 4' Linear	2	55	2	110	Existing to Remain	Existing to Remain	2	55	2	110	0	2080	$0.16	0	$0.00	0	$ -	$ -	$0.00	$0.00	$0.00	$0.00	$0.00	
C	Office Area "B"	2L-T12-U Tube-2'	2	77	4	308	Reballast, Relamp	Sylvania Lamps FBO32/835/XP/6/ECO Sylvania Ballast QHE 2X32T8/UNV ISL-SC	2	48	4	192	116	2080	$0.16	241	$39.09	4	$ 46.20	$ 60.00	$106.20	$184.80	$240.00	$424.80	$40.00	9.8
B		4L-T8-32W 4' Linear	4	108	1	108	Existing to Remain	Existing to Remain	4	108	1	108	0	2080	$0.16	0	$0.00	0	$ -	$ -	$0.00	$0.00	$0.00	$0.00	$0.00	
B	Office Area "C"	4L-T8-32W 4' Linear	4	108	3	324	Existing to Remain	Existing to Remain	4	108	3	324	0	2080	$0.16	0	$0.00	0	$ -	$ -	$0.00	$0.00	$0.00	$0.00	$0.00	
A	Office Area "D"	2L-T8-32w- 4' Linear	2	55	1	55	Existing to Remain	Existing to Remain	2	55	1	55	0	2080	$0.16	0	$0.00	0	$ -	$ -	$0.00	$0.00	$0.00	$0.00	$0.00	
B	Office Area "E"	4L-T8-32W 4' Linear	4	108	3	324	Existing to Remain	Existing to Remain	4	108	3	324	0	2080	$0.16	0	$0.00	0	$ -	$ -	$0.00	$0.00	$0.00	$0.00	$0.00	
E	Toilet Room "A"	1L-A-60w Edison-base	1	60	2	120	Relamp	Sylvania CF19EL/MINI/830	1	18	2	36	84	2080	$0.16	175	$28.30	2	$ 5.86	$ 28.00	$33.86	$11.72	$56.00	$67.72	$0.00	2.4
E	Toilet Room "B"	1L-A-60w Edison-base	1	60	2	120	Relamp	Sylvania CF19EL/MINI/830	1	18	2	36	84	2080	$0.16	175	$28.30	2	$ 5.86	$ 28.00	$33.86	$11.72	$56.00	$67.72	$0.00	2.4
A	Foyer	2L-T8-32w- 4' Linear	2	55	1	55	Existing to Remain	Existing to Remain	2	55	1	55	0	2320	$0.16	0	$0.00	0	$ -	$ -	$0.00	$0.00	$0.00	$0.00	$0.00	
A	Corridor	2L-T8-32w- 4' Linear	2	55	1	55	Existing to Remain	Existing to Remain	2	55	1	55	0	2320	$0.16	0	$0.00	0	$ -	$ -	$0.00	$0.00	$0.00	$0.00	$0.00	
E	Closet "A"	1L-A-60w Edison-base	1	60	1	60	Relamp	Sylvania CF19EL/MINI/830	1	18	1	18	42	400	$0.16	17	$2.72	1	$ 5.86	$ 28.00	$33.86	$5.86	$28.00	$33.86	$0.00	12.4
E	Closet "B"	1L-A-60w Edison-base	1	60	1	60	Relamp	Sylvania CF19EL/MINI/830	1	18	1	18	42	400	$0.16	17	$2.72	1	$ 5.86	$ 28.00	$33.86	$5.86	$28.00	$33.86	$0.00	12.4
D	Storage	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	400	$0.16	12	$1.88	1	$ 25.05	$ 60.00	$85.05	$25.05	$60.00	$85.05	$10.00	39.9
B	General Office	4L-T8-32W 4' Linear	4	108	18	1944	Existing to Remain	Existing to Remain	4	108	18	1944	0	2080	$0.16	0	$0.00	0	$ -	$ -	$0.00	$0.00	$0.00	$0.00	$0.00	
C		2L-T12-U Tube-2'	2	77	5	385	Reballast, Relamp	Sylvania Lamps FBO32/835/XP/6/ECO Sylvania Ballast QHE 2X32T8/UNV ISL-SC	2	48	5	240	145	2080	$0.16	302	$48.86	5	$ 46.20	$ 60.00	$106.20	$231.00	$300.00	$531.00	$50.00	9.8
First Floor Summary					**49**	**4270**					**49**	**3728**	**542**			**937.52**	**151.87824**	**16**				**476.01**	**768**	**1244.01**	**100**	**7.5**
Second Floor																										
D	Limited Access Area	2L-T12-40W 4' Linear	2	77	2	154	Relamp, Reballast	Sylvania Lamps FO32/835/XP/ECO Sylvania Ballast QHE 2X32T8/UNV ISL-SC	2	48	2	96	58	1000	$0.16	58	$9.40	2	$ 25.05	$ 60.00	$85.05	$50.10	$120.00	$170.10	$20.00	16.0
F	Mayor's Office	4L-T12-40W 4' Linear	4	154	4	616	Reballast, Relamp	Sylvania Lamps FO32/835/XP/ECO Sylvania Ballast QHE 4X32T8/UNV ISL-SC	4	95	4	380	236	2080	$0.16	491	$79.52	4	$ 41.05	$ 60.00	$101.05	$164.20	$240.00	$404.20	$80.00	4.1
E	Men's Toilet Room	1L-A-60w Edison-base	1	60	1	60	Relamp	Sylvania CF19EL/MINI/830	1	18	1	18	42	2080	$0.16	87	$14.15	1	$ 5.86	$ 28.00	$33.86	$5.86	$28.00	$33.86	$0.00	2.4
E	Women's Toilet Room	1L-A-60w Edison-base	1	60	1	60	Relamp	Sylvania CF19EL/MINI/830	1	18	1	18	42	2080	$0.16	87	$14.15	1	$ 5.86	$ 28.00	$33.86	$5.86	$28.00	$33.86	$0.00	2.4
F	Violations Office #1	4L-T12-40W 4' Linear	4	154	1	154	Reballast, Relamp	Sylvania Lamps FO32/835/XP/ECO Sylvania Ballast QHE 4X32T8/UNV ISL-SC	4	95	1	95	59	2080	$0.16	123	$19.88	1	$ 41.05	$ 60.00	$101.05	$41.05	$60.00	$101.05	$20.00	4.1
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	2080	$0.16	60	$9.77	1	$ 25.05	$ 60.00	$85.05	$25.05	$60.00	$85.05	$10.00	7.7
G	Violations Office #2	1L-Par-Incandescent-120W	1	120	4	480	Relamp	Sylvania Lamp CF23EL/BR40/830/BL	1	24	4	96	384	2080	$0.16	799	$129.39	4	$ 14.00	$ 28.00	$42.00	$56.00	$112.00	$168.00	$0.00	1.3
F		4L-T12-40W 4' Linear	4	154	1	154	Reballast, Relamp	Sylvania Lamps FO32/835/XP/ECO Sylvania Ballast QHE 4X32T8/UNV ISL-SC	4	95	1	95	59	2080	$0.16	123	$19.88	1	$ 41.05	$ 60.00	$101.05	$41.05	$60.00	$101.05	$20.00	4.1

	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**
F	Meeting Room	4L-T12-40W 4' Linear	4	154	12	1848	Reballast, Relamp	Sylvania Lamps FO32/835/XP/ECO Sylvania Ballast QHE 4X32T8/UNV ISL-SC	4	95	12	1140	708	832	$0.16	589	$95.43	12	$ 41.05	$ 60.00	$101.05	$492.60	$720.00	$1,212.60	$240.00	10.2
E	Corridor	1L-A-60w Edison-base	1	60	1	60	Relamp	Sylvania CF19EL/MINI/830	1	18	1	18	42	2320	$0.16	97	$15.79	1	$ 5.86	$ 28.00	$33.86	$5.86	$28.00	$33.86	$0.00	2.1
C		2L-T12-U Tube-2'	2	77	1	77	Reballast, Relamp	Sylvania Lamps FBO32/835/XP/6/ECO Sylvania Ballast QHE 2X32T8/UNV ISL-SC	2	48	1	48	29	2320	$0.16	67	$10.90	1	$ 46.20	$ 60.00	$106.20	$46.20	$60.00	$106.20	$10.00	8.8
F		4L-T12-40W 4' Linear	4	154	1	154	Reballast, Relamp	Sylvania Lamps FO32/835/XP/ECO Sylvania Ballast QHE 4X32T8/UNV ISL-SC	4	95	1	95	59	2320	$0.16	137	$22.17	1	$ 41.05	$ 60.00	$101.05	$41.05	$60.00	$101.05	$20.00	3.7
Second Floor Summary					**30**	**3894**					**30**	**2147**	**1747**			**2718.736**	**440.435232**	**30**				**974.88**	**1576**	**2550.88**	**420**	**4.8**

Project Name: Lavallette Borough Hall
Location: Lavallette, NJ
Description: Photovoltaic System 95% Financing - 20 year

Simple Payback Analysis

	Photovoltaic System 95% Financing - 20 year
Total Construction Cost	$57,960
Annual kWh Production	10,050
Annual Energy Cost Reduction	$1,648
Annual SREC Revenue	$3,517
First Cost Premium	**$57,960**
Simple Payback:	**11.22** Years

Life Cycle Cost Analysis

Analysis Period (years): 25
Financing Term (mths): 240
Average Energy Cost ($/kWh) **$0.164**
Financing Rate: 7.00%
Financing %: 95%
Maintenance Escalation Rate: 3.0%
Energy Cost Escalation Rate: 3.0%
SREC Value ($/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	$2,898	0	0	0	$0	0	0	(2,898)	0
1	$0	10,050	$1,648	$0	$3,517	$3,813	$1,310	$43	($2,855)
2	$0	10,000	$1,698	$0	$3,500	$3,718	$1,405	$75	($2,780)
3	$0	9,950	$1,749	$0	$3,482	$3,617	$1,506	$108	($2,672)
4	$0	9,900	$1,801	$0	$3,465	$3,508	$1,615	$143	($2,529)
5	$0	9,850	$1,855	$101	$3,448	$3,391	$1,732	$78	($2,450)
6	$0	9,801	$1,911	$101	$3,430	$3,266	$1,857	$117	($2,333)
7	$0	9,752	$1,968	$100	$3,413	$3,132	$1,991	$158	($2,175)
8	$0	9,703	$2,027	$100	$3,396	$2,988	$2,135	$201	($1,974)
9	$0	9,655	$2,088	$99	$3,379	$2,833	$2,289	$245	($1,729)
10	$0	9,607	$2,151	$99	$3,362	$2,668	$2,455	$291	($1,438)
11	$0	9,559	$2,215	$98	$3,346	$2,490	$2,632	$339	($1,099)
12	$0	9,511	$2,281	$98	$3,329	$2,300	$2,823	$390	($709)
13	$0	9,463	$2,350	$97	$3,312	$2,096	$3,027	$442	($268)
14	$0	9,416	$2,420	$97	$3,296	$1,877	$3,246	$496	$229
15	$0	9,369	$2,493	$96	$3,279	$1,642	$3,480	$553	$782
16	$0	9,322	$2,568	$96	$3,263	$1,391	$3,732	$612	$1,393
17	$0	9,275	$2,645	$96	$3,246	$1,121	$4,002	$673	$2,066
18	$0	9,229	$2,724	$95	$3,230	$832	$4,291	$737	$2,803
19	$0	9,183	$2,806	$95	$3,214	$522	$4,601	$803	$3,605
20	$0	9,137	$2,890	$94	$3,198	$189	$4,934	$871	$4,477
21	$0	9,091	$2,977	$94	$3,182	$160	$4,536	$1,369	$5,846
22	$0	9,046	$3,066	$93	$3,166	$110	$3,732	$2,297	$8,143
23	$0	9,001	$3,158	$93	$3,150	$0	$0	$6,216	$14,358
24	$0	8,956	$3,253	$92	$3,134	$0	$0	$6,295	$20,653
25	$0	8,911	$3,350	$92	$3,119	$0	$0	$6,377	$27,031
	Totals:	191,731	$44,287	$1,564	$67,106	$47,393	$55,062	$63,330	$66,374
				Net Present Value (NPV)			**$4,048**		
				Internal Rate of Return (IRR)			**12.8%**		

Project Name: **Lavallette Borough Hall**
Location: **Lavallette, NJ**
Description: **Photovoltaic System - Direct Purchase**

Simple Payback Analysis

	Photovoltaic System - Direct Purchase
Total Construction Cost	$57,960
Annual kWh Production	10,050
Annual Energy Cost Reduction	$1,648
Annual SREC Revenue	$3,517
First Cost Premium	**$57,960**
Simple Payback:	**11.22** **Years**

Life Cycle Cost Analysis

Analysis Period (years):	25	Financing %:	0%
Financing Term (mths):	0	Maintenance Escalation Rate:	3.0%
Average Energy Cost ($/kWh)	**$0.164**	Energy Cost Escalation Rate:	3.0%
Financing Rate:	0.00%	SREC Value ($/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	$57,960	0	0	0	$0	(57,960)	0
1	$0	10,050	$1,648	$0	$3,517	$5,166	($52,794)
2	$0	10,000	$1,698	$0	$3,500	$5,198	($47,597)
3	$0	9,950	$1,749	$0	$3,482	$5,231	($42,366)
4	$0	9,900	$1,801	$0	$3,465	$5,266	($37,100)
5	$0	9,850	$1,855	$101	$3,448	$5,201	($31,899)
6	$0	9,801	$1,911	$101	$3,430	$5,240	($26,659)
7	$0	9,752	$1,968	$100	$3,413	$5,281	($21,378)
8	$0	9,703	$2,027	$100	$3,396	$5,323	($16,054)
9	$0	9,655	$2,088	$99	$3,379	$5,368	($10,687)
10	$0	9,607	$2,151	$99	$3,362	$5,414	($5,273)
11	$0	9,559	$2,215	$98	$3,346	$5,462	$189
12	$0	9,511	$2,281	$98	$3,329	$5,512	$5,702
13	$0	9,463	$2,350	$97	$3,312	$5,565	$11,266
14	$0	9,416	$2,420	$97	$3,296	$5,619	$16,885
15	$0	9,369	$2,493	$96	$3,279	$5,676	$22,561
16	$0	9,322	$2,568	$96	$3,263	$5,735	$28,295
17	$0	9,275	$2,645	$96	$3,246	$5,796	$34,091
18	$0	9,229	$2,724	$95	$3,230	$5,859	$39,950
19	$0	9,183	$2,806	$95	$3,214	$5,925	$45,876
20	$0	9,137	$2,890	$94	$3,198	$5,994	$51,869
21	$1	9,091	$2,977	$94	$3,182	$6,065	$57,935
22	$2	9,046	$3,066	$93	$3,166	$6,139	$64,074
23	$3	9,001	$3,158	$93	$3,150	$6,216	$70,289
24	$4	8,956	$3,253	$92	$3,134	$6,295	$76,584
25	$5	8,911	$3,350	$92	$3,119	$6,377	$82,962
Totals:		191,731	$44,287	$1,564	$67,106	$140,922	$109,829
				Net Present Value (NPV)		**$82,987**	
				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
Borough Hall	420	Sunpower SPR230	28	14.7	412	6.44	10,050	924	15.64

Total Roof Area 40 x 15 = 600 x .70 = 420 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
Borough Hall

Building ID: 1801623
For 12-month Period Ending: December 31, 2008[1]
Date SEP becomes ineligible: N/A

Date SEP Generated: July 27, 2009

Facility
Borough Hall
1306 Grand Central Avenue
Lavallette, NJ 08735

Facility Owner
N/A

Primary Contact for this Facility
N/A

Year Built: 1928
Gross Floor Area (ft²): 5,000

Energy Performance Rating[2] (1-100) 1

Site Energy Use Summary[3]

Electricity (kBtu)	657,716
Natural Gas (kBtu)[4]	0
Total Energy (kBtu)	657,716

Energy Intensity[5]

Site (kBtu/ft²/yr)	140
Source (kBtu/ft²/yr)	469

Emissions (based on site energy use)

Greenhouse Gas Emissions ($MtCO_2e$/year)	109

Electric Distribution Utility
Borough of Lavallette

National Average Comparison

National Average Site EUI	37
National Average Source EUI	125
% Difference from National Average Source EUI	275%
Building Type	Office

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	Borough Hall	Is this the official building name to be displayed in the ENERGY STAR Registry of Labeled Buildings?		☐
Type	Office	Is this an accurate description of the space in question?		☐
Location	1306 Grand Central 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		☐
Borough Hall (Office)				
CRITERION	**VALUE AS ENTERED IN PORTFOLIO MANAGER**	**VERIFICATION QUESTIONS**	**NOTES**	☑
Gross Floor Area	5,000 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.		☐
Weekly operating hours	40 Hours	Is this the total number of hours per week that the Office 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	10	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. The normal worker density ranges between 0.3 and 10 workers per 1000 square feet (92.8 square meters)		☐
Number of PCs	10	Is this the number of personal computers in the Office?		☐
Percent Cooled	50% or more	Is this the percentage of the total floor space within the facility that is served by mechanical cooling equipment?		☐
Percent Heated	50% or more	Is this the percentage of the total floor space within the facility that is served by mechanical heating equipment?		☐

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	22,000.00
10/25/2008	11/24/2008	0.00
09/25/2008	10/24/2008	12,240.00
08/25/2008	09/24/2008	7,200.00
07/25/2008	08/24/2008	5,360.00
06/25/2008	07/24/2008	2,080.00
05/25/2008	06/24/2008	14,880.00
04/25/2008	05/24/2008	15,440.00
03/25/2008	04/24/2008	23,440.00
02/25/2008	03/24/2008	76,080.00
01/25/2008	02/24/2008	0.00
Electric Consumption (kWh (thousand Watt-hours))		**178,720.00**
Electric Consumption (kBtu)		**609,792.64**
Meter: Electric No.2 (kWh (thousand Watt-hours)) **Space(s):** Entire Facility		
Start Date	**End Date**	**Energy Use (kWh (thousand Watt-hours))**
11/25/2008	12/24/2008	208.00
10/25/2008	11/24/2008	302.00
09/25/2008	10/24/2008	1,352.00
08/25/2008	09/24/2008	1,902.00
07/25/2008	08/24/2008	2,369.00
06/25/2008	07/24/2008	1,405.00
05/25/2008	06/24/2008	96.00
04/25/2008	05/24/2008	88.00
03/25/2008	04/24/2008	69.00
02/25/2008	03/24/2008	64.00
01/25/2008	02/24/2008	335.00
Electric No.2 Consumption (kWh (thousand Watt-hours))		**8,190.00**
Electric No.2 Consumption (kBtu)		**27,944.28**
Total Electricity Consumption (kBtu)		**637,736.92**

Is this the total Electricity consumption at this building including all Electricity 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
Borough Hall
1306 Grand Central Avenue
Lavallette, NJ 08735

Facility Owner
N/A

Primary Contact for this Facility
N/A

General Information

Borough Hall	
Gross Floor Area Excluding Parking: (ft^2)	5,000
Year Built	1928
For 12-month Evaluation Period Ending Date:	December 31, 2008

Facility Space Use Summary

Borough Hall	
Space Type	Office
Gross Floor Area(ft^2)	5,000
Weekly operating hours	40
Workers on Main Shift	10
Number of PCs	10
Percent Cooled	50% or more
Percent Heated	50% or more

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	1	1	75	N/A	50
Energy Intensity					
Site (kBtu/ft^2)	140	140	28	N/A	37
Source (kBtu/ft^2)	469	469	92	N/A	125
Energy Cost					
$/year	$ 31,703.65	$ 31,703.65	$ 6,250.85	N/A	$ 8,450.39
$/$ft^2$/year	$ 6.34	$ 6.34	$ 1.25	N/A	$ 1.69
Greenhouse Gas Emissions					
$MtCO_2e$/year	109	109	21	N/A	29
$kgCO_2e/ft^2$/year	22	22	4	N/A	6

More than 50% of your building is defined as Office. Please note that your rating accounts for all of the spaces listed. The National Average column presents energy performance data your building would have if your building had an average rating of 50.

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