ENERGY AUDIT – FINAL REPORT

OCEAN TOWNSHIP
TOWN HALL
399 MONMOUTH ROAD
OAKHURST, NJ 07755

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CEG PROJECT. 9C09048

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I. EXECUTIVE SUMMARY

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

Ocean Township
Town Hall
399 Monmouth Rd.
Oakhurst, NJ 07755

Facility Contact Person: Mark Disakias
Municipal Contact Person: Andrew Brannen

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	$105,242
Natural Gas	$ 39,489
Total	$144,731

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	NET INSTALL COST[A]	ANNUAL SAVINGS	SIMPLE PAYBACK (YEARS)	SIMPLE LIFETIME ROI
1	Lighting Upgrade	$5,629	$6,501	0.9	2,579%
2	Replace Incandescent Exit Signs	$322	$386	0.8	2,571%
3	Lighting Controls	$8,540	$915	9.3	61%
4	Boiler Replacement	$67,085	$5,255	12.8	174%
5	DHW Heater Replacement	$4,150	$351	11.8	1.5%
6	Chiller Replacement	$109,939	4.5	21.1	460%

Note: Net Installation Cost includes applicable incentives.

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)	NATURAL GAS (THERMS)
1	Lighting Upgrade	6.62	38,662	-
2	Replace Incandescent Exit Signs	0.25	2,207	-
3	Lighting Controls	-	5.865	-
4	Boiler Replacement	-	-	3,526
5	DHW Heater Replacement	-	25,963	-
6	Chiller Replacement	-	29,672	-

Recommendation:

Concord Engineering Group strongly 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 too great to pass upon. The following Energy Conservation Measures are recommended for the Ocean Township Town Hall:

- **ECM #1: Lighting Upgrade**
- **ECM #2: Replace Incandescent Exit Signs**

II. INTRODUCTION

This comprehensive energy audit covers the 20,220 square foot Town Hall facility that includes the Police Headquarters, Municipal Court, Administrative Offices, File Storage Rooms, Conference Rooms and Communications Room.

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

The Energy Use Index (EUI) is established for the building. Energy Use Index (EUI) is expressed in British Thermal Units/square foot/year (BTU/ft^2/yr), which is used to compare energy consumption to similar building types or to track consumption from year to year in the same building. The EUI is calculated by converting the annual consumption of all energy sources to BTU's and dividing by the area (gross square footage) of the building. Blueprints (where available) are utilized to verify the gross area of the facility. The EUI is a good indicator of the relative potential for energy savings. A low EUI indicates less potential for energy savings, while a high EUI indicates poor building performance therefore a high potential for energy savings.

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

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

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

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

III. METHOD OF ANALYSIS

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

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

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

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

ECM Calculation Equations:

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

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

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

$$Lifetime\ Ma\,\text{int}\,enance\ Savings = \left(Yearly\ Ma\,\text{int}\,enance\ Savings \times ECM\ Lifetime \right)$$

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. Jersey Central Power and Light (JCP&L) provides electricity to the facility under the General Service Secondary Rate Schedule. 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.

Table 4 and Figure 2 show the natural gas energy usage for the surveyed facility from January-08 to December-08. The Ocean Township Town Hall receives natural gas via New Jersey Natural Gas under the Basic Generation Service (BGS) rate. This rate has two component charges that depend on the amount of therms used per month

Description	Average
Electricity	15.6¢ / kWh
Natural Gas	$1.49 / Therm

Table 3
Electricity Billing Data

MONTH OF USE	CONSUMPTION KWH	DEMAND	TOTAL BILL
1/08	48,240	111	$ 7,177
2/08	49,440	109	$ 7,316
3/08	53,280	104	$ 7,494
4/08	51,360	113	$ 7,209
5/08	59,760	126	$ 8,354
6/08*	64,560	152	$ 10,233
7/08	69,360	178	$ 12,340
8/08	58,800	145	$ 10,424
9/08	56,400	140	$ 9,731
10/08	60,240	135	$ 9,075
11/08	49,440	116	$ 7,515
12/08	53,040	105	$ 8,260
Totals	**673,920**	**178 Max**	**$ 105,127**

Note: Information for 6/08 has been estimated for usage and cost.

Figure 1
Electricity Usage Profile

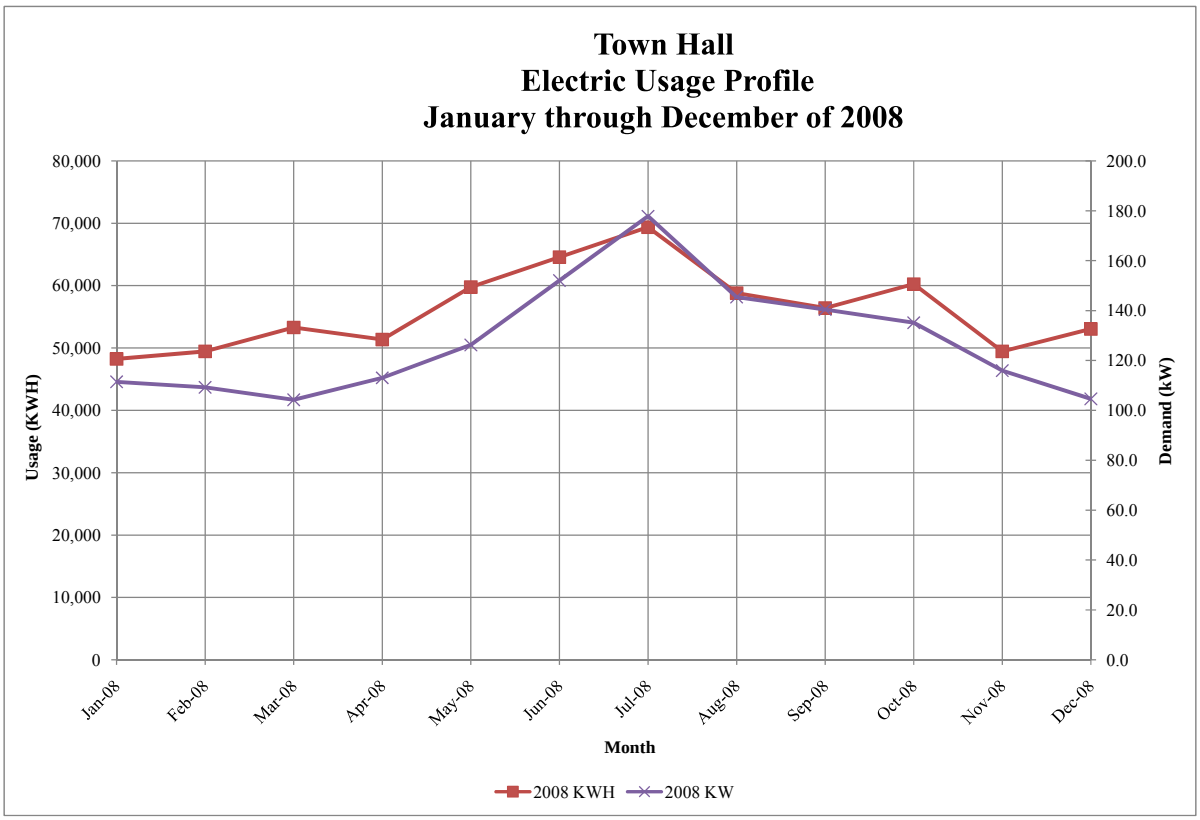
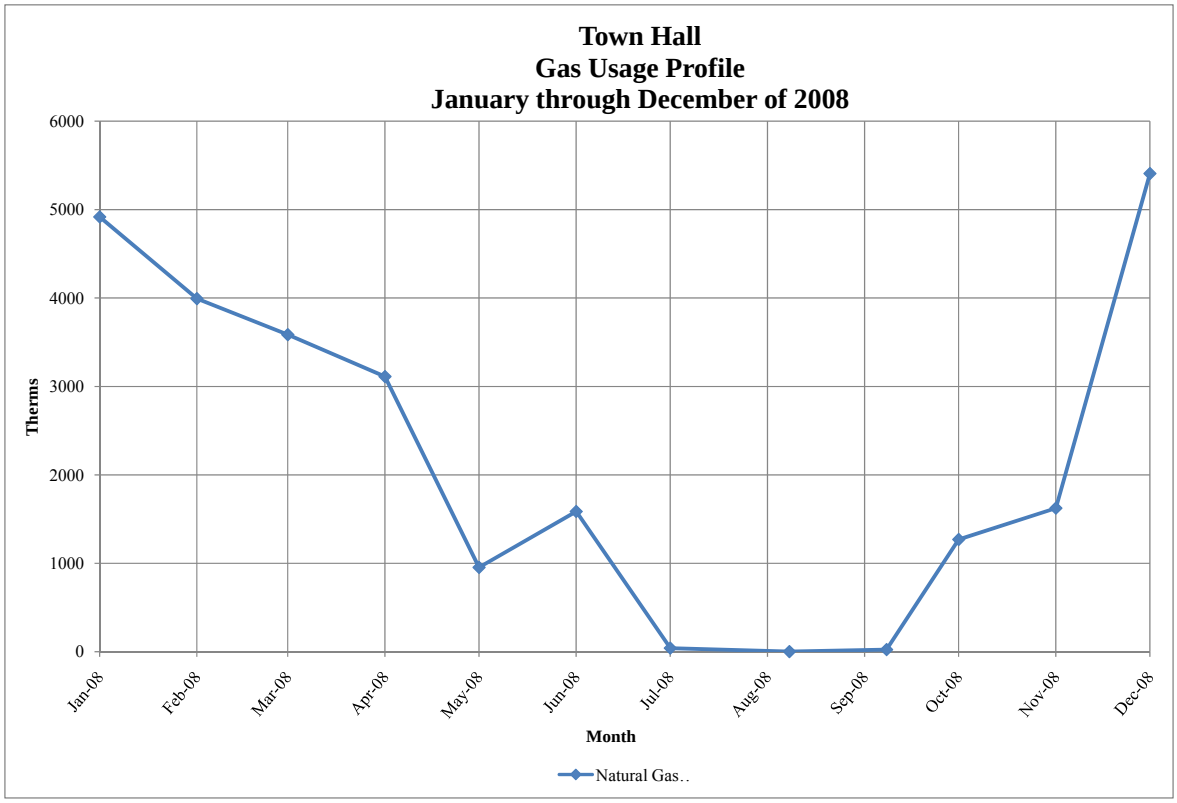


Table 4
Natural Gas Billing Data

MONTH OF USE	CONSUMPTION (THERMS)	TOTAL BILL
1/08	4,917.5	$ 6,464
2/08	3,993.9	$ 5,700
3/08	3,586.4	$ 5,577
4/08	3,112.5	$ 5,015
5/08	954.0	$ 1,707
6/08	1,586.5	$ 2,980
7/08	41.1	$ 97
8/08	2.1	$ 19
9/08	24.2	$ 52
10/08	1,270.1	$ 2,047
11/08	1,623.7	$ 2,448
12/08	5,408.5	$ 7,383
Totals	**26,520.5**	**$ 39,489**

Figure 2
Natural Gas 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 amongst building of similar type. The EUI for this facility is calculated as follows:

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

$$Electric = \frac{(673{,}920\ kWh * 1000\,{}^{W}\!/_{kW} * 3.414\,{}^{btu}\!/_{hW})}{(\frac{1000\ {}^{Btu}\!/_{h}}{1\ {}^{kBtu}\!/_{h}})} = \underline{2{,}300{,}763\ kBtu}$$

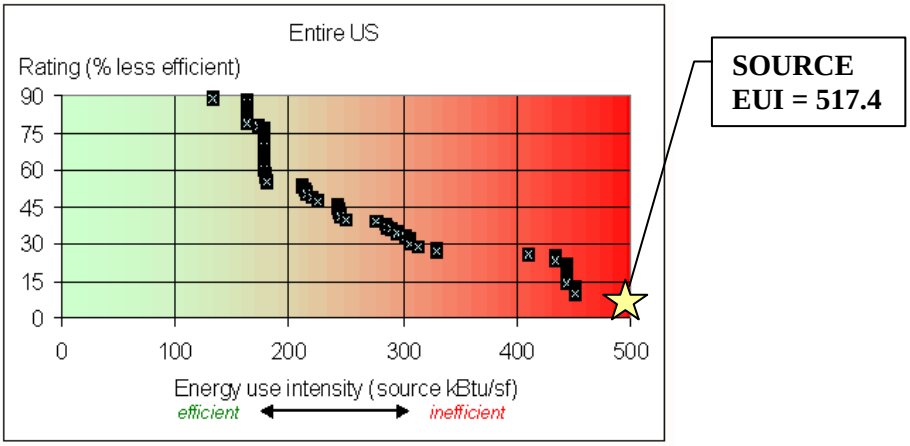
$$Gas = \frac{(26{,}520.5\ therms * 100{,}000\ {}^{Btu}\!/_{1\ therm})}{(\frac{1000\ {}^{Btu}\!/_{h}}{1\ {}^{kBtu}\!/_{h}})} = \underline{2{,}652{,}050\ kBtu}$$

$$Building\ \ EUI = \frac{(2{,}300{,}763\ kBtu + 2{,}652{,}050\ kBtu)}{20{,}220} = \frac{4{,}952{,}813\ kBtu}{20{,}220\ SF}$$

Town Hall Building EUI = 244.9 kBtu/SF Site Energy, 517.4 kBtu/SF Source Energy

Figure 3 below depicts a national EUI grading for the source energy use of typical "Public Order and Safety Buildings" throughout the United States.

Figure 3
Source Energy Use Intensity Distributions: Public Order Buildings



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 priorities 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 facility in order to allow the municipal access to monitoring their yearly energy usage as it compares to facilities of similar type. The following is the user name and password for this account:

User Name:	oceantwp
Password:	lgeaceg2009
Security Question:	What is your birth city? ocean township

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
Town Hall	4	50

Refer to Appendix F for detailed energy benchmarking report entitled “STATEMENT OF ENERGY PERFORMANCE.”

V. FACILITY DESCRIPTION

The Ocean Township Town Hall Complex houses the Town Hall, Police Department and Municipal Court; totaling approximately 20,220 SF. The facility was originally constructed in 1955 and received major renovations to portions of the facility in 2008. The basic building construction consists of block walls with face-brick exterior finish. The windows in the facility are double-pane, aluminum frame windows that are operable. There are two roofing types utilized within the facility; built-up roof with dark shingles on the pitched roof sections and EPDM roofing system on the flat roof sections. The Ocean Township Town Hall Complex operated on two separate occupancy schedules due to the multi-function use of the complex. The Town Hall and Municipal Court portions of the Complex operate approximately forty (40) hours per week for five (5) days and the Police Department is a twenty-four hours per day, seven (7) days per week facility.

Heating Plant

Town Hall has two (2) boiler plants located within the facility. The boiler plant located in the mechanical equipment room outside of the first floor court area consists of an HB Smith Century III gas-fired hot water boiler (M/N CCC-9-W) with a 600 MBH input and 480 MBH output that is approximately forty-four (44) years of age. This boiler serves the first floor Courts, DPW Office, east radiators, west radiators and VAV box hot water reheat coils. The condition of this boiler appears to be declining as it continues to age. According to 2007 ASHRAE Applications Handbook, the expected service life for a boiler of this type is thirty-five (35) years. With the boiler being approximately nine (9) years past its service life it is a great candidate for replacement.

The second boiler plant is located in the mechanical equipment room in the basement of the facility. The boiler is a Weil McLain "84" Series gas-fired hot water boiler (M/N BL-884-WF) with a 1,435 MBH input and 1,013.9 MBH output. The burner that is associated with this boiler is approximately fourteen (14) years of age and appears to be a replacement burner. This boiler serves the mezzanine area, Police Department and air-handling unit hot water coils. The condition of the boiler appears average, however it was noted by the Owner that the boiler is running inefficiently due to the non-existence of DDC controls. New DDC controls, typical of the other boiler, are definitely recommended as a future upgrade to the Weil McLain boiler.

Each boiler plant is outfitted with hot water circulating pumps that circulate hot water to the heating zones that each boiler plant serves.

Cooling Plant

The cooling plant consists of two (2) Dunham-Bush (M/N ACDRB050D) air-cooled chillers located at roof level that provide approximately fifty (50) cooling tons each. The chillers appear to be sized to function as one (1) primary and one (1) stand-by during normal operation. However, based on review of the condition of the chillers and discussions with the Owner, at some points both chillers are required to run at the same time in order to meet load because of compressors being non-functional in one (1) chiller or the other. Both chillers are approximately nine (9) years of age and have an estimated remaining service life of eleven (11) years per 2007 ASHRAE Applications Handbook. During CEG's site survey "Chiller #2" was deemed inoperable by the

Owner because of a compressor failure which was the result of the evaporator barrel rupturing on the refrigerant circuit. The cause of the barrel rupture was not determined at this time. CEG recommends that the Owner review a replacement of the chiller rather than attempting to fix the non-functioning compressors. With a replacement of the chiller the Owner will be able to gain an upgrade in both efficiency and refrigerant type.

The chilled water for the facility is pumped to the air-handling units' chilled water coils via two (2) Taco (M/N M3218T) base-mounted, end-suction pumps located in the second floor mechanical equipment room. These pumps are approximately nine (9) years old and have an estimated remaining service life of eleven (11) years per 2007 ASHRAE Applications Handbook.

Domestic Hot Water System

The facility is provided domestic hot water via two (2) separate systems. The domestic hot water system located in the mechanical equipment room outside of the first floor court area consists of an AO Smith PROMAX gas-fired domestic hot water heater with 40-gallon storage capacity, 40 MBH input and 39.3 gallon per hour recovery rate. The domestic hot water heater is approximately five (5) years of age and has an estimated seven (7) years of service life remaining.

The second domestic hot water system is located in the mechanical equipment room in the basement of the facility. The domestic hot water heater is an AO Smith Energy Saver™ electric type with 30-gallon storage capacity and 4.5 kW upper and lower elements (4.5 kW max input). The domestic hot water heater is approximately nine (9) years of age and has an estimated three (3) years of service life remaining.

Air-Handling Systems

There are various air-handling systems throughout the facility that provide tempered air via duct distribution systems to the spaces for heating and cooling. The following is a brief summary of the main air-handling units located within the facility, their characteristics and area served:

- AHU-1: Unit is a Carrier indoor air-handling unit with hot water and chilled water coils that serves the Municipal area. The supply fan operates on a variable frequency drive and the unit appears to be in decent operating condition based on the field inspection. However, based on the 2007 ASHRAE Applications Handbook, this unit is approximately eight (8) years past its useful service life.

- AHU-2: Unit is a Carrier indoor air-handling unit with chilled water coil only that serves the Municipal area. There are heating coils throughout the duct distribution system that meet the zone heating requirements. The air-handling unit appears to be in decent operating condition based on the field inspection. However, based on the 2007 ASHRAE Applications Handbook, this unit is approximately nine (8) years past its useful service life.

- AHU-3: Unit is a Carrier indoor air-handling unit with hot water and chilled water coils that serves the Police/Detective Bureau. The air-handling unit appears to be functioning, however, there was visible rust and corrosion most likely from a leak in the hot water or chilled water piping. AHU-3 is approximately fifteen (15) years of

age and has met its useful service life as outlined in 2007 ASHRAE Applications Handbook.

Also, there is multiple packaged rooftop units located at roof level serving various zones within the facility. These units and their capacities, characteristics and estimated remaining service life are noted in the "Major Equipment List" contained in Appendix E.

HVAC Controls

The HVAC controls within the facility are a mix of direct digital controls (DDC) by KMC and standard pneumatic or electronic controls. There were certain pieces of equipment such as the Weil McLain "84" Series gas-fired hot water boiler located in the basement mechanical equipment room and the VAV boxes serving the Township Manager Office that have not been placed under DDC control. This equipment should be included in any future control work conducted within the facility.

Lighting

The lighting throughout the Town Hall, Police Department and Municipal Court consists primarily of fluorescent fixtures with T5, T8 and T12 linear fluorescent lamps. The T5 and T8 fixtures contain electronic ballasts and the T12 fixtures contain magnetic ballasts. The fixture size, number of lamps, and mounting type varies per room. Standard switching is utilized throughout the facility and there are no other types of lighting controls present. Other lighting types located within the facility are: incandescent bulbs in porcelain sockets and 13W CFL lamps in recessed high-hat fixtures.

Exit signs throughout the facility vary in type. There are both incandescent and LED types presently installed.

The exterior building and parking lot lighting is provided by both pole-mounted and building mounted fixtures. Each standard fixture contains a single 250W HID Metal Halide lamp. The exterior lighting is controlled by time-clock located within the facility.

Refer to Appendix F for further detail in regards to the facility lighting.

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. 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 manufactures date was not shown on the equipment's nameplate. The ASHRAE service life for the equipment along with the remaining useful life is also shown in the Appendix.

Refer to Appendix E for the detailed Major Equipment List.

VII. ENERGY CONSERVATION MEASURES

ECM #1: Interior Upgrade

Description:

New fluorescent lamps and ballasts are available as direct replacements for the existing lamps and ballasts. A simple change from the old to the new can provide substantial savings. A typical drop-ceiling lay in fixture with four, 4-foot lamps (40 Watt lamps) has a total wattage of about 188 Watts. By retrofitting with new lamps, reflector and electronic ballasts the total wattage would be reduced to 91 Watts per fixture and the space light levels and light quality would increase by about 15% and 35%, respectively.

CEG recommends a replacement of the existing fixtures containing T12 lamps and magnetic ballasts with fixtures containing T8 lamps and electronic ballasts. The new energy efficient, T8 fixtures 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 lesser number of lamps that will be required to be replaced per year. The expected lamp life of a T8 lamp, approximately 30,000 burn-hours, in comparison to the existing T12 lamps, approximately 20,000 burn-hours, will provide the Owner with fewer lamps to replace per year. Based on the operating hours of this facility, the owner will be changing approximately 33% less lamps per year.

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 40-Watt incandescent lamp, a 15-Watt CFL for a 60-Watt incandescent lamp, an 18-Watt CFL for a 75-Watt incandescent lamp, and a 23-Watt CFL for a 100-Watt incandescent lamp.

The CFL is also available for a number of "brightness colors" that is indicated by the Kelvin rating. A 2700K CFL is the "warmest" color available and is closest in color to the incandescent lamp. CFL's are also available in 3000K, 3500K, and 4100K. The 4100K would be the "brightest" or "coolest" output. A CFL can be chosen to screw right into your existing fixtures, or hardwired into your existing fixtures.

This ECM shall replace all T12 fixtures throughout the facility with new T8 fixtures. In addition, this ECM also replaces all incandescent lamps with their compact fluorescent equivalents.

Energy Savings Calculations:

A detailed Investment Grade Lighting Audit can be found in Appendix F that outlines the proposed retrofits, costs, savings, and payback periods.
NJ Smart Start® Program Incentives are calculated as follows:

From Appendix C, the replacement of a T-12 fixture to a T-5 or T-8 fixture warrants the following incentive: T-5 or T-8 (1-2 lamp) = $25 per fixture; T-5 or T-8 (3-4 lamp) = $30 per fixture.

$$\text{Smart Start®}\ Incentive = (\#\ of\ 1-2\ lamp\ \ fixtures \times\ \$\ 25) + (\#\ of\ \ 3-4\ lamp\ \ fixtures \times\ \$\ 30)$$

$$\text{Smart Start®}\ Incentive = (23 \times\ \$\ 25) + (\ 39 \times\ \$\ 30) = \$1{,}745$$

Maintenance Savings are calculated as follows:

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

$$Maintenance\ Savings = (\ 202 \times 33\%\ reduction \times \$\ 2.00) + (\$5 \times 67) = \$470$$

Energy Savings Summary:

ECM #1 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$7,374
NJ Smart Start Equipment Incentive ($):	($1,745)
Net Installation Cost ($):	*$5,629*
Annual Maintenance Savings ($ / yr):	*$470*
Annual Energy Savings ($ / yr):	*$6,031*
Annual Net Savings ($ / yr):	*$6,501*
Simple Payback (yrs):	*0.9*
Simple Lifetime Return On Investment (%):	*2,579%*
Estimated ECM Lifetime (yr):	*25*
Simple Lifetime Maintenance Savings ($)	*$11,750*
Simple Lifetime Energy Savings ($):	*$150,775*

ECM #2: Replace Incandescent Exit Signs

Description:

Exit signs are lit all year long and are typically a forgotten energy hog. Exits signs have replacement lamps ranging from 4 volt, 3.6 watt to 120volt or 277 volt, 25 watt depending on the existing fixture. Exit signs are usually electrically powered using incandescent bulbs, compact fluorescent lamps (CFL) or light emitting diode (LED) arrays. Most LED exit signs and some CFL exit signs meet Energy Star requirements.

There is a LED Thermoplastic Universal Architectural Exit sign with battery back-up available that is relatively inexpensive that will replace existing exit signs to a more efficient fixture, meeting the Energy Star requirements. Typical replacements are 2 watt for green text or 4 watt for red text fixture.

Energy Savings Calculations:

There are seven (7) exit signs in the facility (assumed to be 40 watt due to inaccessibility) that can be upgraded to standard 120/277 volt input, high out-put LED 4 watt (red) or 2 watt (green) fixtures with the Thermoplastic Universal Architectural Exit sign with battery back-up. The operating hours for these fixtures is continuous all year long at 8760 hours per year.

Energy cost savings:

7 units * (40W – 4W)]* 8760 hours * 1 kW/1,000 W * $0.156 kWh] = $344/yr

The installed cost of each 4-Watt LED exit signs is $56.
7 units * $56 = $392.

There is a NJ Smart Start Equipment Incentive of $10 per new LED exit sign for buildings with ≥75kW demand.
7 units * $10 = $70

Maintenance Savings are calculated as follows:

$$Maintenance\ Savings = (14 lamps \times 100\%\ reduction \times \$\ 3.00\ per lamp) = \$42.00$$

Energy Savings Summary:

ECM #2 – ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$392
NJ Smart Start Equipment Incentive ($):	($70)
Net Installation Cost ($):	*$322*
Annual Maintenance Savings ($ / yr):	*$42*
Annual Energy Savings ($ / yr):	*$344*
Annual Net Savings ($ / yr):	*$386*
Simple Payback (yrs):	*0.8*
Simple Lifetime Return On Investment (%):	*2,571%*
Estimated ECM Lifetime (yr):	*25*
Simple Lifetime Maintenance Savings ($)	*$1,050*
Simple Lifetime Energy Savings ($):	*$8,600*

ECM #3: Lighting Controls

Description:

In some areas the lighting is left on unnecessarily. Many times this is due to the idea 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 found that the best option is to turn the lights off whenever possible. Although this does reduce the lamp life, the energy savings far outweigh the lamp replacement costs. The cutoff for when to turn the lights off is around two minutes. If the lights can be off for only a two minute interval, then it pays to shut them off.

Lighting controls come in many forms. Sometimes an additional switch is all it would take. 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 of the referenced standard, 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 all private offices, restrooms, lunch rooms, storage rooms, locker rooms, workshops, etc. (approximately 14,100 SF).

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

Energy Savings Calculations:

From Appendix E of this report, we calculated the lighting power density (Watts/ft^2) of the existing offices, locker rooms, storage rooms, small shops, etc. to be ±2.0 Watts/SF. Ten percent of this value is the resultant energy savings due to installation of occupancy sensors:

Savings = 10% x 2.0 Watts/SF x 14,100 SF x 2,080 hrs/yr. = 5,865.6 kWh x $0.156/kWh

Savings = $915 per year

Installation cost per dual-technology sensor (Basis: Sensorswitch or equivalent) is $160/unit including material and labor.

The SmartStart Buildings® incentive is $20 per control which equates to an installed cost of $140/unit. Total number of rooms to be retrofitted is 61 with a total of 61 sensors required.

Total cost to install sensors is $140/unit x 61 units = $8,540

Energy Savings Summary:

ECM #3 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$9,760
NJ Smart Start Equipment Incentive ($):	($1,220)
Net Installation Cost ($):	*$8,540*
Annual Maintenance Savings ($ / yr):	-
Annual Energy Savings ($ / yr):	*$915*
Annual Net Savings ($ / yr):	*$915*
Simple Payback (yrs):	*9.3*
Simple Lifetime Return On Investment (%):	*61%*
Estimated ECM Lifetime (yr):	*15*
Simple Lifetime Maintenance Savings ($)	
Simple Lifetime Energy Savings ($):	*$13,725*

ECM #4: Boiler Replacement

Description:

Heating is provided to the facility by an outdated hot water heating plant. Two existing hot water plant are present at the facility, each serving their own section of the building. The first of the existing units, a 600 MBh HB Smith Sectional boiler has an estimated combustion efficiency of 80% for heating, when new. The HB Smith boiler has surpassed its expected service like of thirty-five (35) years; the boiler is approximately 44 years old. The second boiler is a 1,435 MBh Weil McLain sectional with an approximate combustion efficiency of 70%. The Weil McLain boiler is approximately twenty-five (25) years old, although this unit has not surpassed its expected useful service life of thirty-five (35) years substantial energy savings will be realized though the replacement.

This energy conservation measure will replace the gas fired boilers serving the facility. Calculation is based on the following equipment: Aerco, Modulex MLX-606h and MLX-1060H condensing boiler or equivalent. The existing units will be replaced with high energy efficient units with capacities typical of the existing units.

Energy Savings Calculations:

Existing 600 MBh Gas Fired Boiler:

Rated Capacity = 600 MBh Input, 480 MBh Output (Natural Gas)

Combustion Efficiency = 80%
Age & Radiation Losses = 5%
Thermal Efficiency = 75%

Replacement Gas Fired Boiler:

High-Efficiency Gas Fired Boiler

Rated Capacity = 606 MBh Input, 558 MBh Output (Natural Gas)

Combustion Efficiency = 92%
Radiation Losses = 0.5%
Thermal Efficiency = 91.5%

Operating Data:

Heating Season Fuel Consumption = 5,765 Therms of natural (based on natural gas billing data and the square footage of the facility).

$$Heating\ Energy\ Savings = Fuel\ Consumption \times (New\ Furnace\ Efficiency - Old\ Furnace\ Efficiency)$$

Heating Energy Savings = 5,765 Therms x ((91.5% - 75%) / (91.5%)) = 1,040 Therms
Existing 1,435 MBh Gas Fired Boiler:

Rated Capacity = 1,435 MBh Input, 1,014 MBh Output (Natural Gas)

Combustion Efficiency = 70%
Age & Radiation Losses = 5%
Thermal Efficiency = 65%

Replacement Gas Fired Boiler:

High-Efficiency Gas Fired Boiler

Rated Capacity = 1,060 MBh Input, 975 MBh Output (Natural Gas)

Combustion Efficiency = 92%
Radiation Losses = 0.5%
Thermal Efficiency = 91.5%

Operating Data:

Heating Season Fuel Consumption = 13,790 Therms of natural (based on natural gas billing data and the square footage of the facility).

$$Heating\ Energy\ Savings = Fuel\ Consumption \times (New\ Furnace\ Efficiency - Old\ Furnace\ Efficiency)$$

Heating Energy Savings = 13,790 Therms x ((91.5% - 75%) / (91.5%)) = 2,486 Therms

Total Heating Cost savings

Heating Energy Cost Savings = Annual Energy Savings x $/Therm

Heating Energy Cost Savings = (1,040 Therms + 2,486 Therms) x $1.49/Therm = $5,255/ yr.

Installed cost of a new gas fired boilers $70,000.

Equipment Incentives:

Heating Smart Start Equipment Incentive = ($1.75/MBh) = (606 MBh + 1060 MBH) x $1.75 = $2,915

Energy Savings Summary:

ECM #4 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$70,000
NJ Smart Start Equipment Incentive ($):	($2,915)
Net Installation Cost ($):	*$67,085*
Annual Maintenance Savings ($ / yr):	-
Annual Energy Savings ($ / yr):	*$5,255*
Annual Net Savings ($ / yr):	*$5,255*
Simple Payback (yrs):	*12.8*
Simple Lifetime Return On Investment (%):	*174%*
Estimated ECM Lifetime (yr):	*35*
Simple Lifetime Maintenance Savings ($)	-
Simple Lifetime Energy Savings ($):	*$183,925*

ECM #5: DHW Heater Replacement

Description:

One of the existing domestic hot water heaters is powered by a 4,500W electric heating element. This style of hot water heating, although 100% efficient (100% of Btu's from electricity transferred into heating the water), is very expensive due to the high cost of electricity.

This energy conservation measure will replace the existing electric, 40-gallon capacity domestic hot water heater with a 96% thermal efficient A.O. Smith Cyclone HE gas fired domestic hot water heater with 50-gallon storage capacity or equivalent. This ECM requires coordination with the utility due to increase in natural gas demand for the facility. CEG advises the owner to contact the utility provider regarding the installation of this ECM.

Energy Savings Calculations:

Existing Electric DHW Heater

Rated Capacity = 4,500 Watt (154 MBH) input; 40 gallons storage

Proposed Natural Gas-Fired, High-Efficiency DHW Heater

Rated Capacity = 76 MBH input; 50 gallons storage

Thermal Efficiency = 90%
Radiation Losses = 0.5%
Net Efficiency = 89.5%

Operating Data for DHW Heater

Estimated Daily DHW Load = 40 gal/h

DHW Boiler Operating Hrs/Yr. = 2,750 Hrs.

Electric Heating Consumption = 4,674.5 kWh = $529.45/year

Natural Gas Heating Consumption = 165.8 Therms = $178.30/year

Yearly Savings = $529.45/year - $178.30/year = $351.15/year

Cost of Domestic Hot Water Heater and Installation = $4,200

Refer to Appendix G for a detailed domestic hot water calculation.

Energy Savings Summary:

ECM #5 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$4,200
NJ Smart Start Equipment Incentive ($):	($50)
Net Installation Cost ($):	*$4,150*
Annual Maintenance Savings ($ / yr):	-
Annual Energy Savings ($ / yr):	*$351*
Annual Net Savings ($ / yr):	*$351*
Simple Payback (yrs):	*11.8*
Simple Lifetime Return On Investment (%):	*1.5%*
Estimated ECM Lifetime (yr):	*12*
Simple Lifetime Maintenance Savings ($)	-
Simple Lifetime Energy Savings ($):	*$4,212*

ECM #6: Chiller Replacement

Description:

Two (2) Dunham Bush air cooled chillers, located on the roof of the facility are excellent candidates for replacement. These units are 2000 vintage and are in need of serious repairs. Due to escalating owning and maintenance costs, these units should be replaced.

This measure would replace these two (2) units with new energy-efficient air cooled chillers, manufactured by Trane, Aquastream Series or equivalent.

Energy Savings Calculations:

$$EnergySavings = \frac{[CoolingTons \times 12{,}000\,Btu/ton]}{[1000W/kW]} \times \left(\frac{1}{EER_{OLD}} - \frac{1}{EER_{NEW}} \right) \times Avg.LoadFactor \times Hrs.ofCooling$$

Existing 50-Ton Chiller (Qty. 2)

Rated Capacity = 50 Tons per unit
Chiller Efficiency = 9.9 EER
Cooling Season Hrs. of Operation = 1,800 hrs/yr.

Average Cost of Electricity - $0.156/kWh

Proposed High-Efficiency 50-Ton Chiller (Qty. 2)

Rated Capacity = 50 Tons per Unit
New Cooling Unit Efficiency = 15.0 EER

$$EnergySavings = \frac{[50\,Tons \times 12{,}000\,Btu/ton]}{[1000W/kW]} \times \left(\frac{1}{9.9_{OLD}} - \frac{1}{15.0_{NEW}} \right) \times 0.8 \times 1{,}800\ Hrs = 29{,}672\ kWh$$

Energy Cost Savings = 29,672 kWh x $0.156 = $4,629

Installation cost for two (2) 50-Ton is estimated at $112,500. It is pertinent to note that this estimate includes the demolition of the existing units and curb modifications (if required).

NJ Smart Start® Program Incentives are calculated as follows:

$$\text{Smart Start®}\ Incentive\ (50\ Tons) = (Cooling\ Tons \times\ RTU\ \ Incentive)$$
$$= (50\,Tons \times \$52/Ton) \times 2\ units = \$5{,}200$$

Energy Savings Summary:

ECM #6 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$112,500
NJ Smart Start Equipment Incentive ($):	($2,561)
Net Installation Cost ($):	$109,939
Annual Maintenance Savings ($ / yr):	*$20,000*
Annual Energy Savings ($ / yr):	*$4,629*
Annual Net Savings ($ / yr):	*$24,629*
Simple Payback (yrs):	*4.5*
Simple Lifetime Return On Investment (%):	*460%*
Estimated ECM Lifetime (yr):	*25*
Simple Lifetime Maintenance Savings ($)	*$500,000*
Simple Lifetime Energy Savings ($):	*$115,725*

NOTE: Based on conversation with owner approximately $20,000 dollars a year are spend on maintaining the existing air cooled chillers.

VIII. RENEWABLE/DISTRIBUTED ENERGY MEASURES

Globally, renewable energy has become a priority affecting international and domestic energy policy. The State of New Jersey has taken a proactive approach, and has recently adopted in its Energy Master Plan a goal of 30% renewable energy by 2020. To help reach this goal New Jersey created the Office of Clean Energy under the direction of the Board of Public Utilities and instituted a Renewable Energy Incentive Program to provide additional funding to private and public entities for installing qualified renewable technologies. A renewable energy source can greatly reduce a building's operating expenses while producing clean environmentally friendly energy. CEG has assessed the feasibility of installing renewable energy technologies for Ocean Township, 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). 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 3,312 S.F. can be utilized for a PV system on the facility. A depiction of the area utilized is shown in Appendix G. Using this square footage it was determined that a system size of 52.0 kilowatts could be installed. A system of this size has an estimated kilowatt hour production of 81,117 KWh annually, reducing the overall utility bill by 12% percent. A detailed financial analysis can be found in Appendix G. This analysis illustrates the payback of the system over a 25 year period. The eventual degradation of the solar panels and the price of accumulated SREC's are factored into the payback.

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

The proposed solar array is qualified by the New Jersey Board of Public Utilities Net Metering Guidelines as a Class I Renewable Energy Source. These guidelines allow onsite customer generation using renewable energy sources such as solar and wind with a capacity of 2 megawatts (MW) or less. This limits a customer system design capacity to being a net user and not a net generator of electricity on an annual basis. Although these guidelines state that if a customer does net generate (produce more electricity than they use), the customer will be credited those kilowatt-hours generated to be carried over for future usage on a month to month basis. Then, on an annual

basis if the customer is a net generator the customer will then be compensated by the utility the average annual PJM Grid LMP price per kilowatt-hour for the over generation. Due to the aforementioned legislation, the customer is at limited risk if they generate more than they use at times throughout the year. With the inefficiency of today's energy storage systems, such as batteries, the added cost of storage systems is not warranted and was not considered in the proposed design.

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	11.4 Years	11.1%
Direct Purchase	11.4 Years	7.8%

The resultant Internal Rate of Return indicates that if the Owner was able to "self-finance" the solar project, the project would be slightly more beneficial to the Owner. However, if the Owner was able to work out a Power Purchase Agreement with a third-party and agree upon a decent base energy rate for kilowatt hour production, the "direct purchase" option could also, prove to be a beneficial route.

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 Town Hall and has determined it is not a viable option. There is not enough free land available on the site to accommodate the installation of a wind turbine.

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, Figure 1 included within this report to reference the electricity usage load profile for January 2008 through December 2008.

Electricity:

Section IV, Figure 1 demonstrates a flat load profile basically throughout the year. There is a slight increase in consumption in the summer season as demonstrated by the multiple roof-top units and the air-cooled chillers supplying cooling throughout the facility. Also the year-long consumption is augmented by the presence of electric hot-water heaters. The base-load shaping is important because a flat consumption profile will yield more competitive energy price when shopping for an alternative supply source.

Natural Gas:

Section IV, Figure 2 demonstrates a typical heating load (November –March), and complimentary cooling load (April –October). Consequently there is a clear separation between summer and winter loads consistent with energy as it is 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.

Tariff Analysis:

Electricity:

Town Hall receives electrical service through Jersey Central Power & Light (JCP&L) on a GSS (General Service Secondary) rate. Service classification GS is available for general service purposes on secondary voltages not included under Service Classifications RS, RT, RGT or GST. This is a single or three phase service at secondary voltages. For electric supply (generation), the customer will use the utilities Basic Generation Service (BGS) or a Third Party Supplier (TPS). If they use the utility BGS then they will pay according to the BGS default service. The Delivery Service includes the following charges: Customer Charge, Supplemental Customer Charge, Distribution Charge (kW Demand), kWh Charge, Non-utility Generation Charge, TEFA, SBC, SCC, Standby Fee and RGGI Charge.

Natural Gas:

Town Hall receives natural gas Delivery Service through New Jersey Natural Gas Company on a GSS (General Service Small) tariff rate schedule. This rate schedule 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, and 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.

Recommendations:

CEG recommends a global approach that will be consistent with all facilities within The Township of Ocean. CEG's observations are seen in both commodities. The average price per kWh (kilowatt hour) for all buildings is $.134/kWh (kWh is the common unit of electric measure). The average price per decatherm for natural gas is $11.52/dth (dth is the common unit of measure). Energy commodities are among the most volatile of all commodities, however at this point and time, energy is extremely competitive. Ocean Township could realize 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 fixed electric rates, the Township could see an improvement of 20%. (Note: Savings were calculated using Ocean Townships Average Annual Consumption of 1,382,755 kWh and an Average fixed one-year commodity contract). CEG recommends aggregating the entire electric load to gain the most optimal energy costs. CEG recommends advisement for alternative sourcing and supply of energy on a "managed approach".

CEG's other recommendation coincides with the natural gas cost. CEG recognized that the Township could also see improvement in its natural gas costs by a factor of over 20%. And CEG recommends further advisement on these prices. The Township should consider procuring energy (natural gas) on its own. CEG recommends alternative sourcing strategies through energy advisement.

CEG recommends that the Township 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 town will learn more about the competitive supply process. The utility can provide a list of approved Third Party Suppliers from the New Jersey Board of Public Utilities website at www.nj.gov/bpu, and 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, Ocean Township should also ask the utility representative about alternative billing options. Some utilities allow for consolidated billing options when utilizing the service of a Third Party Supplier. Finally, if Ocean decides to utilize a TPS, it is recommended that the account balancing is closely monitored, 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. Provide more frequent air filter changes to decrease overall fan horsepower requirements and maintain better IAQ.

E. Recalibrate existing temperature sensors to provide more accurate temperature control.

F. Clean all light fixtures to maximize light output.

G. Confirm that outside air economizers on the rooftop units are functioning properly to take advantage of free cooling.

Electric Cost Summary

Jersey Centrel Power and Light (Rate - BGS)

Town Hall

399 Monmouth Rd, Oakhurst NJ, 07755

2008

Account # 10 00 15 7506 8 8

Meter # G28742571

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	31	28	31	30	31	30	31	31	30	31	30	31	0	
KWH	48,240	49,440	53,280	51,360	59,760	64,560	69,360	58,800	56,400	60,240	49,440	53,040	**673,920**	
KW	111.4	109.2	104.2	113.0	126.2	152.0	177.8	145.4	140.4	135.1	115.9	104.6	177.8	Max
Monthly Load Factor	58%	67%	69%	63%	64%	59%	52%	54%	56%	60%	59%	68%	61%	
Electric Delivery, $	$1,936	$1,952	$1,715	$1,637	$1,873	$2,195	$2,545	$2,119	$1,765	$1,659	$1,392	$1,693	$22,481	
Delivery $/kwh	$0.040	$0.039	$0.032	$0.032	$0.031	$0.034	$0.037	$0.036	$0.031	$0.028	$0.028	$0.032	$0.033	
Electric Supply, $	$5,241	$5,364	$5,780	$5,572	$6,481	$8,038	$9,794	$8,305	$7,967	$7,416	$6,123	$6,568	$82,646	
Supply $/kwh	$0.109	$0.108	$0.108	$0.108	$0.108	$0.125	$0.141	$0.141	$0.141	$0.123	$0.124	$0.124	$0.123	
Total Cost, $	$7,177	$7,316	$7,494	$7,209	$8,354	$10,233	$12,340	$10,424	$9,731	$9,075	$7,515	$8,260	$105,127	
$/KWH	$0.149	$0.148	$0.141	$0.140	$0.140	$0.159	$0.178	$0.177	$0.173	$0.151	$0.152	$0.156	**$0.156**	

Estimated utility information. Utility bill not provided by owner.

Summary of Natural Gas Cost

New Jersey Natural Gas (Rate - BGS)

Town Hall

399 Monmouth Rd, Oakhurst NJ, 07755

2008

Account # 06-3107-3305-13

Meter # 00849520

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	31	28	31	30	31	30	31	31	31	30	31	30	365
Therms (Burner Tip)	4,917.52	3,993.89	3,586.38	3,112.47	954.00	1,586.54	41.06	2.11	24.21	1,270.09	1,623.70	5,408.53	**26,520.50**
Total Distribution Cost	$6,110	$3,951	$3,995	$3,628	$1,270	$2,264	$64	$3	$26	$1,255	$2,095	$7,029	$31,689
Cost per Therm	$1.243	$0.989	$1.114	$1.166	$1.331	$1.427	$1.547	$1.270	$1.083	$0.988	$1.290	$1.300	$1.195
Total Commodity Cost	$354	$1,749	$1,582	$1,388	$437	$717	$33	$16	$26	$792	$354	$354	$7,800
Cost per Therm	$0.07	$0.44	$0.44	$0.45	$0.46	$0.45	$0.81	$7.60	$1.07	$0.62	$0.22	$0.07	$0.29
Total Cost	$6,464	$5,700	$5,577	$5,015	$1,707	$2,980	$97	$19	$52	$2,047	$2,448	$7,383	$39,489
Cost per Therm	$1.314	$1.427	$1.555	$1.611	$1.789	$1.878	$2.357	$9.005	$2.148	$1.611	$1.508	$1.365	**$1.489**

CONSTRUCTION COST AND REBATES

CONCORD ENGINEERING GROUP

Ocean Township - Town Hall

ECM 1 LIGHTING UPGRADE

	Qty	Unit Cost $	Material $	Labor $	Total $
General Lighting Upgrade	LS	$7,374	$0	$0	$7,374
Total Cost			$0	$0	$7,374
Utility Incentive - NJ Smart Start					($1,745)
Total Cost Less Incentive					$5,629

ECM 2 REPLACE INCANDESCENT EXIT SIGNS

	Qty	Unit Cost $	Material $	Labor $	Total $
New Led Exit Sign	7	$56	$0	$0	$392
Total Cost			$0	$0	$392
Utility Incentive - NJ Smart Start					($70)
Total Cost Less Incentive					$322

ECM 3 LIGHTING CONTROLS

	Qty	Unit Cost $	Material $	Labor $	Total $
Dual - Technology Sensor	61	$160	$4,880	$4,880	$9,760
Total Cost			$4,880	$4,880	$9,760
Utility Incentive - NJ Smart Start					($1,220)
Total Cost Less Incentive					$8,540

ECM 4 BOILER REPLACEMENT

	Qty	Unit Cost $	Material $	Labor $	Total $
Aerco MLX-1,060H Condensing Boiler	1	$41,000	$20,500	$20,500	$41,000
Aerco MLX-606H Condensing Boiler	1	$29,000	$14,500	$14,500	$29,000
Total Cost			$14,500	$14,500	$70,000
Utility Incentive - NJ Smart Start					($1,060)
Total Cost Less Incentive					$68,940

ECM 5 DHW HEATER REPLACEMENT

	Qty	Unit Cost $	Material $	Labor $	Total $
New DHW Heater	1	$4,200	$0	$0	$4,200
Total Cost			$0	$0	$4,200
Utility Incentive - NJ Smart Start					($50)
Total Cost Less Incentive					$4,150

ECM 6 Chiller Replacement

	Qty	Unit Cost $	Material $	Labor $	Total $
New Air Cooled Chillers	2	$112,500	$75,000	$37,500	$112,500
Total Cost			$75,000	$37,500	$112,500
Utility Incentive - NJ Smart Start					($2,561)
Total Cost Less Incentive					$109,939

Concord Engineering Group, Inc.

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

SmartStart Building Incentives

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

STATEMENT OF ENERGY PERFORMANCE
Town Hall

Building ID: 1773871
For 12-month Period Ending: December 31, 2008[1]
Date SEP becomes ineligible: N/A

Date SEP Generated: August 11, 2009

Facility
Town Hall
399 Monmouth Rd
Oakhurst, NJ 07755

Facility Owner
Township of Ocean
399 Monmouth Rd.
Oakhurst, NJ 07755

Primary Contact for this Facility
Andrew Brannen
399 Monmouth Rd.
Oakhurst, NJ 07755

Year Built: 1955
Gross Floor Area (ft²): 20,199

Energy Performance Rating[2] (1-100) 4

Site Energy Use Summary[3]

Natural Gas (kBtu)[4]	2,651,820
Electricity (kBtu)	2,299,415
Total Energy (kBtu)	4,951,235

Energy Intensity[5]

Site (kBtu/ft²/yr)	245
Source (kBtu/ft²/yr)	518

Emissions (based on site energy use)

Greenhouse Gas Emissions ($MtCO_2e$/year)	491

Electric Distribution Utility
Jersey Central Power & Lt Co

National Average Comparison

National Average Site EUI	126
National Average Source EUI	266
% Difference from National Average Source EUI	94%
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.

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

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

Certifying Professional
Raymond Johnson
520 S. Burnt Mill Rd
Voorhees, NJ 08043

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

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	Town 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	399 Monmouth Rd, Oakhurst, NJ 07755	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		☐
Police Station (Office)				
CRITERION	**VALUE AS ENTERED IN PORTFOLIO MANAGER**	**VERIFICATION QUESTIONS**	**NOTES**	☑
Gross Floor Area	6,733 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	168 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	30	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	37	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?		☐
Town Hall (Office)				
CRITERION	**VALUE AS ENTERED IN PORTFOLIO MANAGER**	**VERIFICATION QUESTIONS**	**NOTES**	☑

Gross Floor Area	13,466 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	75	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	62	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: Jersey Central Power & Lt Co

Fuel Type: Electricity

Meter: Electric (kWh (thousand Watt-hours))
Space(s): Entire Facility

Start Date	End Date	Energy Use (kWh (thousand Watt-hours))
12/01/2008	12/31/2008	53,040.00
11/01/2008	11/30/2008	49,440.00
10/01/2008	10/31/2008	60,240.00
09/01/2008	09/30/2008	56,400.00
08/01/2008	08/31/2008	58,800.00
07/01/2008	07/31/2008	69,360.00
06/01/2008	06/30/2008	64,560.00
05/01/2008	05/31/2008	59,760.00
04/01/2008	04/30/2008	51,360.00
03/01/2008	03/31/2008	53,280.00
02/01/2008	02/29/2008	49,440.00
01/01/2008	01/31/2008	48,240.00
Electric Consumption (kWh (thousand Watt-hours))		**673,920.00**
Electric Consumption (kBtu)		**2,299,415.04**
Total Electricity Consumption (kBtu)		**2,299,415.04**
Is this the total Electricity consumption at this building including all Electricity meters?		☐

Fuel Type: Natural Gas

Meter: Gas (therms)
Space(s): Entire Facility

Start Date	End Date	Energy Use (therms)
12/01/2008	12/31/2008	5,407.50
11/01/2008	11/30/2008	1,623.20
10/01/2008	10/31/2008	1,269.60
09/01/2008	09/30/2008	24.20
08/01/2008	08/31/2008	2.10
07/01/2008	07/31/2008	41.10
06/01/2008	06/30/2008	1,586.10
05/01/2008	05/31/2008	954.50
04/01/2008	04/30/2008	3,113.10

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
Town Hall
399 Monmouth Rd
Oakhurst, NJ 07755

Facility Owner
Township of Ocean
399 Monmouth Rd.
Oakhurst, NJ 07755

Primary Contact for this Facility
Andrew Brannen
399 Monmouth Rd.
Oakhurst, NJ 07755

General Information

Town Hall	
Gross Floor Area Excluding Parking: (ft^2)	20,199
Year Built	1955
For 12-month Evaluation Period Ending Date:	December 31, 2008

Facility Space Use Summary

Police Station		Town Hall	
Space Type	Office	Space Type	Office
Gross Floor Area(ft^2)	6,733	Gross Floor Area(ft^2)	13,466
Weekly operating hours	168	Weekly operating hours	40
Workers on Main Shift	30	Workers on Main Shift	75
Number of PCs	37	Number of PCs	62
Percent Cooled	50% or more	Percent Cooled	50% or more
Percent Heated	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	4	4	75	N/A	50
Energy Intensity					
Site (kBtu/ft^2)	245	245	93	N/A	126
Source (kBtu/ft^2)	518	518	197	N/A	266
Energy Cost					
$/year	$ 144,731.00	$ 144,731.00	$ 55,083.04	N/A	$ 74,473.40
$/$ft^2$/year	$ 7.17	$ 7.17	$ 2.73	N/A	$ 3.69
Greenhouse Gas Emissions					
$MtCO_2e$/year	491	491	187	N/A	253
$kgCO_2e/ft^2$/year	24	24	9	N/A	12

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.

MAJOR EQUIPMENT LIST

Concord Engineering Group

"Town Hall"

Boiler

Location	Area Served	Manufacturer	Qty.	Model #	Serial #	Input (MBh)	Output (MBh)	Efficiency (%)	Fuel	Approx. Age	ASHRAE Service Life	Remaining Life
Municipal Boiler room	1st flr Court, DPW Office, East Rads, West Rads and VAV Box Reheat	HB Smith	1	CCC-9-W	29139000M	600	480	80%	Nat. Gas	44	35	-9
Police Boiler Room	Mezz, Police, AHU-2	Weil McLain	1	BL 884 WF	-	1435	1013.9	70%	Nat. Gas	25	35	10

Boiler - Burner

Location	Area Served	Manufacturer	Qty.	Model #	Serial #	Input Max (MBh)	Fuel	Approx. Age	ASHRAE Service Life	Remaining Life
Police Boiler Room	Serves Weil McLain	Power Flame	1	JR50A-15	19512435	1527	Nat. Gas	14	21	7

Boiler - Pumps

Location	Area Served	Manufacturer	Qty.	Model #	Serial #	Unit Tag	HP	RPM	GPM	Ft. Hd	Frame Size	Volts	Phase	Approx. Age	ASHRAE Service Life	Remaining Life
Municipal Boiler Room		Bell and Gosset	1	AVA48T1701T3AP	-	P-1	3/4	1725	-	-	-	208-230/460	-	5	10	5
Municipal Boiler Room		Bell and Gosset	1	-	-	P-2	3/4	1725	-	-	-	208-230/460	-	6	10	4
Police Boiler Room		Baldor	2	109238	35B15-754		2	1725	-	-	-	208-230/460	-	8	10	2

Chilled Water - Pumps

Location	Area Served	Manufacturer	Qty.	Model #	Serial #	HP	RPM	GPM	Ft. Hd	Frame Size	Volts	Phase	Hz	Approx. Age	ASHRAE Service Life	Remaining Life
Municipal Building		Taco	2	M3218T	5813101469 7H1	5	1750	-	-	184T	208-230/460	3	60	9	20	11

Domestic Hot Water Heater

Location	Area Served	Manufacturer	Qty	Model #	Serial #	Input	Recovery (gal/h)	Capacity (gal)	Energy Factor	Fuel	Volts	Phase	Hz	Approx. Age	ASHRAE Service Life	Remaining Life
Basement M.E.R		AO Smith	1	EES 30 917	EES-30-F202172000	4500 W	17	30	0.93	Electric	220-240	1	60	9	12	3
1st Flr M.E.R		AO Smith	1	GCV 40 100	GC040018076	40 MBh	39.3	40	0.60	Nat. Gas	120	1	60	5	12	7

DHW - Pumps

Location	Area Served	Manufacturer	Qty.	Model #	Serial #	HP	Volts	Hz	Approx. Age	ASHRAE Service Life	Remaining Life
Municipal Boiler Room		Bell and Gosset	1	-	-	3/4	-	60	5	10	5

Air Handling Units

Location	Area Served	Manufacturer	Qty	Model #	Serial #	Unit Tag	Cooling Coil	Cooling Eff.	Cooling Capacity	Heating Type	Input (MBh)	Output (MBh)	Heating Eff. (%)	Fuel	Volts	Phase	Hz	Approx. Age	ASHRAE Service Life	Remaining Life	Notes
Media Rm off of Data Rm		Carrier	1	39ED08	750587986	AHU #1	CW		8 Ton	HW					208-230		60	34	15	-19	
Police Building	Police Detective Bureau	Carrier	1	39ED18	750787985	AHU #2	CW		18 Ton	HW					208-230		60	34	15	-19	
Media Room off of Data	Police Lower Flr	Carrier	1	39BA040018	7450509 4B	AHU #3	CW		18 Ton	HW				Electric	208-230		60	34	15	-19	1/6 Hp Jockey Pump.
Police Roof	Weight Room	York	1	DAYA-TO36N090A	NFEM073842	Unit #5	DX R-22		3 Ton	Gas Furnace	90	72	80%	Nat. Gas	208-230	3	60		15	15	
Muni Roof		Lennox	1	LGA102H2BM44	5608G00571		DX	11.2 EER	101 MBH	Gas Furnace	180	144	80%	Nat. Gas	208-230	1	60		15	15	
Roof		American Standard	1	YCH090C3H0BE	R27100204D		DX	10.1 SEER	7.5 Ton	Gas Furnace	205	166	81%	Nat. Gas	208-230	3	60	5	15	10	
Roof		American Standard	1	YCC048F3H0B6	P4555052H	RTU B	DX	10.1 SEER	4 Ton	Gas Furnace	125	100	80%	Nat. Gas	208-230	3	60	10	15	5	
		Carrier	1	48KHA048-500CF	4487C64755	RTU A	DX	9.55 SEER	4 Ton	Gas Furnace	125	93.75	75%	Nat. Gas	208-230	3	60	22	15	-7	

Chillers

Location	Area Served	Manufacturer	Qty.	Model #	Serial #	Unit Tag	Cooling Capacity	Eff.	Refrigerant	Volts	Phase	Hz	Approx. Age	ASHRAE Service Life	Remaining Life
Muni Roof	AHU #1, 2 & 3	Dunham Bush	1	ACDRB050D	13795901B00H	Chiller 1	50 Tons	9.9 EER	R-22	208-230	3	60	9	20	11
Muni Roof	AHU #1, 2 & 3	Dunham Bush	1	ACDRB050D	13795901A00H	Chiller 2	50 Tons	9.9 EER	R-22	208-230	3	60	9	20	11

AC Condensers & Split Systems

Location	Area Served	Manufacturer	Qty.	Model #	Serial #	Cooling Capacity	Eff.	Refrigerant	Volts	Phase	Hz	Approx. Age	ASHRAE Service Life	Remaining Life
Roof		Fujitsu	1	AOU36CLX	EBN 006142	33,100 Btu	11.1 EER	R-410A	208-230	1	60	9	15	6
Muni Roof	IT Room	Mitsubishi	1	PUY A18NHA2	8YU01175A	18,000 Btu	13.4 SEER	R-410A	208-230	1	60	8	15	7
Police Roof		Fujitsu	1	AOU18CL	DCN005619	18,000 Btu	12.5 EER	R-410A	208-230	1	60	9	15	6
Muni Building	Data Processing Room	Friedrich	1	KS12J10	JHGS15810	12,000 Btu	9.5 EER	R-22	120	1	60	4	10	6
Muni Building	Construction Office	Friedrich	1	KS15L10-A	LFFR07305	14,500 Btu	10 EER	R-22	120	1	60	2	10	8
Muni Building	Construction Office	York	1	Vintage Unit No Tag		12,000 Btu	Unknown	R-22	120	1	60	20	10	-10

Heat Pumps

Location	Area Served	Manufacturer	Qty.	Model #	Serial #	Unit Tag	Cooling Capacity	Heating Capacity	Eff.	Refrigerant	Volts	Phase	Hz	Approx. Age	ASHRAE Service Life	Remaining Life
Muni Roof	Construction Office	Tempstar	1	NHP036AKA1	L013356798	Unit 2	3 Ton	33,600 Btu	10 SEER	R-22	208-230	1	60	8	15	7
Muni Roof		Tempstar	1	NHP024_KA1	L0135_7721	Unit 1	2 Ton	23,000 Btu	10 SEER	R-22	208-230	1	60	8	15	7

INVESTMENT GRADE LIGHTING AUDIT

CONCORD ENERGY SERVICES

CEG Job #: 9C09048
Project: Ocean Twp.
Address: 399 Monmouth Rd.
City: Oakhurst, NJ 07755
Building SF: 20,220

"Town Hall"

DATE: 8/19/2009
KWH COST: $0.156

EXISTING LIGHTING										PROPOSED LIGHTING								SAVINGS			
Line No.		Fixture Location	No. eFixts	Fixture eType	Yearly Usage	Watts Used	Total kW	kWh/Yr Fixtures	Yearly $ Cost	No. rFixts	Retro-Unit rDescription	Watts Used	Total kW	kWh/Yr Fixtures	Yearly $ Cost	Unit Cost (INSTALLED)	Total Cost	kW Savings	kWh/Yr Savings	Yearly $ Savings	Yearly Payback
1		Parking Lot	16	250 W Metal Halide	8736	295	4.72	41233.9	$6,432.49	0	No Change Required	0	0.00	0	$0.00	$0.00	$0.00	0.00	0.00	$0.00	0.00
2		Front Entrance	5	High Hat 13 W CFL	8736	18	0.09	786.24	$122.65	0	No Change Required	0	0.00	0	$0.00	$0.00	$0.00	0.00	0.00	$0.00	0.00
3		203	8	2' x 4' 2-Lamp T-5, Parabolic, Electronic Ballast	8736	64	0.51	4472.83	$697.76	0	No Change Required	0	0.00	0	$0.00	$0.00	$0.00	0.00	0.00	$0.00	0.00
4		209	2	2' x 4' 2-Lamp T-5, Parabolic, Electronic Ballast	8736	64	0.13	1118.21	$174.44	0	No Change Required	0	0.00	0	$0.00	$0.00	$0.00	0.00	0.00	$0.00	0.00
5		Hall	9	2' x 2' 2-Lamp T-5, Parabolic, Electronic Ballast	8736	36	0.32	2830.46	$441.55	0	No Change Required	0	0.00	0	$0.00	$0.00	$0.00	0.00	0.00	$0.00	0.00
			9	2' x 4' 4-Lamp T-8, Prism Lens, Electronic Ballast	8736	109	0.98	8570.02	$1,336.92	0	No Change Required	0	0.00	0	$0.00	$0.00	$0.00	0.00	0.00	$0.00	0.00
6		L102	4	2' x 4' 2-Lamp T-5, Parabolic, Electronic Ballast	8736	64	0.26	2236.42	$348.88	0	No Change Required	0	0.00	0	$0.00	$0.00	$0.00	0.00	0.00	$0.00	0.00
7		L102a	2	2' x 4' 2-Lamp T-5, Parabolic, Electronic Ballast	8736	64	0.13	1118.21	$174.44	0	No Change Required	0	0.00	0	$0.00	$0.00	$0.00	0.00	0.00	$0.00	0.00
8		L103	4	2' x 2' 2-Lamp U-tube T-8, Prism Lens, Electronic Ballast	8736	73	0.29	2550.91	$397.94	0	No Change Required	0	0.00	0	$0.00	$0.00	$0.00	0.00	0.00	$0.00	0.00
9		L104	2	2' x 4' 2-Lamp T-5, Parabolic, Electronic Ballast	8736	64	0.13	1118.21	$174.44	0	No Change Required	0	0.00	0	$0.00	$0.00	$0.00	0.00	0.00	$0.00	0.00
10		L105	4	2' x 4' 2-Lamp T-5, Parabolic, Electronic Ballast	8736	64	0.26	2236.42	$348.88	0	No Change Required	0	0.00	0	$0.00	$0.00	$0.00	0.00	0.00	$0.00	0.00
11		L106	12	2' x 4' 4-Lamp T-12, Prism Lens, Magnetic Ballast	8736	160	1.92	16773.1	$2,616.61	12	2'X4' 3-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N 2GC8	91	1.09	9539.71	$1,488.20	$120.00	$1,440.00	0.83	7233.41	$1,128.41	1.28
12		L106 Office	1	2' x 4' 4-Lamp T-12, Prism Lens, Magnetic Ballast	8736	160	0.16	1397.76	$218.05	1	2'X4' 3-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N 2GC8	91	0.09	794.976	$124.02	$120.00	$120.00	0.07	602.78	$94.03	1.28

13		L106 Interview	1	2' x 4' 4-Lamp T-12, Prism Lens, Magnetic Ballast	8736	160	0.16	1397.76	$218.05	1	2'X4' 3-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N 2GC8	91	0.09	794.976	$124.02	$120.00	$120.00	0.07	602.78	$94.03	1.28
14			1	4' 2-Lamp T-12, Prism Lens, Magnetic Ballast	8736	80	0.08	698.88	$109.03	1	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	55	0.06	480.48	$74.95	$100.00	$100.00	0.03	218.40	$34.07	2.94
15			5	Halogen	8736	50	0.25	2184	$340.70	0	No Change Required	0	0.00	0	$0.00	$0.00	$0.00	0.00	0.00	$0.00	0.00
16		Interigation #1	2	2' x 4' 4-Lamp T-12, Prism Lens, Magnetic Ballast	8736	160	0.32	2795.52	$436.10	2	2'X4' 3-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N 2GC8	91	0.18	1589.95	$248.03	$120.00	$240.00	0.14	1205.57	$188.07	1.28
17			1	27 W CFL	8736	28	0.03	244.608	$38.16	0	No Change Required	0	0.00	0	$0.00	$0.00	$0.00	0.00	0.00	$0.00	0.00
18		Interigation #2	2	2' x 4' 4-Lamp T-12, Prism Lens, Magnetic Ballast	8736	160	0.32	2795.52	$436.10	2	2'X4' 3-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N 2GC8	91	0.18	1589.95	$248.03	$120.00	$240.00	0.14	1205.57	$188.07	1.28
19			1	27 W CFL	8736	28	0.03	244.608	$38.16	0	No Change Required	0	0.00	0	$0.00	$0.00	$0.00	0.00	0.00	$0.00	0.00
20		L107	5	2' x 4' 4-Lamp T-8, Prism Lens, Electronic Ballast	8736	109	0.55	4761.12	$742.73	0	No Change Required	0	0.00	0	$0.00	$0.00	$0.00	0.00	0.00	$0.00	0.00
21			1	2' x 2' 2-Lamp U-tube T-8, Prism Lens, Electronic Ballast	8736	73	0.07	637.728	$99.49	0	No Change Required	0	0.00	0	$0.00	$0.00	$0.00	0.00	0.00	$0.00	0.00
22		Booking	3	2' x 4' 4-Lamp T-8, Prism Lens, Electronic Ballast	8736	109	0.33	2856.67	$445.64	0	No Change Required	0	0.00	0	$0.00	$0.00	$0.00	0.00	0.00	$0.00	0.00
23			5	4' 2-Lamp T-12, Prism Lens, Magnetic Ballast	8736	80	0.40	3494.4	$545.13	5	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	55	0.28	2402.4	$374.77	$100.00	$500.00	0.13	1092.00	$170.35	2.94
24		BR	1	100 W Incandescent	8736	100	0.10	873.6	$136.28	1	23 W CFL Lamp	23	0.02	200.928	$31.34	$10.00	$10.00	0.08	672.67	$104.94	0.10
25		Youth Holding	1	100 W Incandescent	8736	100	0.10	873.6	$136.28	1	23 W CFL Lamp	23	0.02	200.928	$31.34	$10.00	$10.00	0.08	672.67	$104.94	0.10
26		Cells	3	100 W Incandescent	8736	100	0.30	2620.8	$408.84	3	23 W CFL Lamp	23	0.07	602.784	$94.03	$10.00	$30.00	0.23	2018.02	$314.81	0.10
27		L110	10	2' x 2' 3-Lamp T-8, Parabolic, Electronic Ballast	8736	47	0.47	4105.92	$640.52	0	No Change Required	0	0.00	0	$0.00	$0.00	$0.00	0.00	0.00	$0.00	0.00
28		L111	4	2' x 2' 2-Lamp U-tube T-8, Prism Lens, Electronic Ballast	8736	73	0.29	2550.91	$397.94	0	No Change Required	0	0.00	0	$0.00	$0.00	$0.00	0.00	0.00	$0.00	0.00
29		L113	9	2' x 4' 4-Lamp T-8, Prism Lens, Electronic Ballast	8736	109	0.98	8570.02	$1,336.92	0	No Change Required	0	0.00	0	$0.00	$0.00	$0.00	0.00	0.00	$0.00	0.00
30		112	9	2' x 4' 4-Lamp T-8, Prism Lens, Electronic Ballast	8736	109	0.98	8570.02	$1,336.92	0	No Change Required	0	0.00	0	$0.00	$0.00	$0.00	0.00	0.00	$0.00	0.00
31		L109	3	2' x 2' 2-Lamp U-tube T-8, Prism Lens, Electronic Ballast	8736	73	0.22	1913.18	$298.46	0	No Change Required	0	0.00	0	$0.00	$0.00	$0.00	0.00	0.00	$0.00	0.00
32			1	4' 2-Lamp T-8	8736	58	0.06	506.688	$79.04	0	No Change Required	0	0.00	0	$0.00	$0.00	$0.00	0.00	0.00	$0.00	0.00

33		L114	8	2' x 4' 4-Lamp T-12, Prism Lens, Magnetic Ballast	8736	160	1.28	11182.1	$1,744.40	8	2'X4' 3-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N 2GC8	91	0.73	6359.81	$992.13	$120.00	$960.00	0.55	4822.27	$752.27	1.28
34		L115 Kitchen	5	2' x 4' 4-Lamp T-8, Prism Lens, Electronic Ballast	8736	109	0.55	4761.12	$742.73	0	No Change Required	0	0.00	0	$0.00	$0.00	$0.00	0.00	0.00	$0.00	0.00
35		Kitchen Storage	3	2' x 4' 4-Lamp T-12, Prism Lens, Magnetic Ballast	8736	160	0.48	4193.28	$654.15	3	2'X4' 3-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N 2GC8	91	0.27	2384.93	$372.05	$120.00	$360.00	0.21	1808.35	$282.10	1.28
36		L115b	9	2' x 4' 4-Lamp T-12, Prism Lens, Magnetic Ballast	8736	160	1.44	12579.8	$1,962.46	9	2'X4' 3-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N 2GC8	91	0.82	7154.78	$1,116.15	$120.00	$1,080.00	0.62	5425.06	$846.31	1.28
37		Storage	1	4' 2-Lamp T-12, Prism Lens, Magnetic Ballast	8736	80	0.08	698.88	$109.03	1	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	55	0.06	480.48	$74.95	$100.00	$100.00	0.03	218.40	$34.07	2.94
38			5	8' 2-Lamp T-12, No lens, Magnetic Ballast	8736	222	1.11	9696.96	$1,512.73	10	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	55	0.55	4804.8	$749.55	$100.00	$1,000.00	0.56	4892.16	$763.18	1.31
39		Hall	3	2' x 4' 4-Lamp T-8, Prism Lens, Electronic Ballast	2080	109	0.33	680.16	$106.10	0	No Change Required	0	0.00	0	$0.00	$0.00	$0.00	0.00	0.00	$0.00	0.00
40		Court Room	36	4' 3-Lamp T-8, direct/indirect, Electronic Ballast	2080	82	2.95	6140.16	$957.86	0	No Change Required	0	0.00	0	$0.00	$0.00	$0.00	0.00	0.00	$0.00	0.00
41			22	100 W Incandescent High Hat	2080	100	2.20	4576	$713.86	22	23 W CFL Lamp	23	0.51	1052.48	$164.19	$10.00	$220.00	1.69	3523.52	$549.67	0.40
42		Boiler Room	1	4' 2-Lamp T-12, Prism Lens, Electronic Ballast	2080	80	0.08	166.4	$25.96	1	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	55	0.06	114.4	$17.85	$100.00	$100.00	0.03	52.00	$8.11	12.33
43		Court Reception Office	8	2' x 4' 4-Lamp T-8, Prism Lens, Electronic Ballast	2080	109	0.87	1813.76	$282.95	0	No Change Required	0	0.00	0	$0.00	$0.00	$0.00	0.00	0.00	$0.00	0.00
44			3	2' x 2' 2-Lamp T-8, Straight Lamp	2080	34	0.10	212.16	$33.10	0	No Change Required	0	0.00	0	$0.00	$0.00	$0.00	0.00	0.00	$0.00	0.00
45		Violation Storage	6	2' x 4' 3-Lamp T-8, Prism Lens, Magnetic Ballast	2080	82	0.49	1023.36	$159.64	0	No Change Required	0	0.00	0	$0.00	$0.00	$0.00	0.00	0.00	$0.00	0.00
46		Violation BR	1	2' x 4' 2-Lamp T-8	2080	58	0.06	120.64	$18.82	0	No Change Required	0	0.00	0	$0.00	$0.00	$0.00	0.00	0.00	$0.00	0.00
47		Judge's Chambers	3	2' x 4' 4-Lamp T-8, Prism Lens, Electronic Ballast	2080	109	0.33	680.16	$106.10	0	No Change Required	0	0.00	0	$0.00	$0.00	$0.00	0.00	0.00	$0.00	0.00
48		Courtroom Corridor	5	2' x 4' 2-Lamp T-8, Prism Lens, Magnetic Ballast	2080	58	0.29	603.2	$94.10	0	No Change Required	0	0.00	0	$0.00	$0.00	$0.00	0.00	0.00	$0.00	0.00
49		Court Conference	4	2' x 4' 3-Lamp T-8, Prism Lens, Magnetic Ballast	2080	82	0.33	682.24	$106.43	0	No Change Required	0	0.00	0	$0.00	$0.00	$0.00	0.00	0.00	$0.00	0.00

50		Court Vestibule	8	100 W Incandescent High Hat	2080	100	0.80	1664	$259.58	8	23 W CFL Lamp	23	0.18	382.72	$59.70	$10.00	$80.00	0.62	1281.28	$199.88	0.40
51		National Guard	6	2' x 4' 4-Lamp T-8, Prism Lens, Electronic Ballast	2080	109	0.65	1360.32	$212.21	0	No Change Required	0	0.00	0	$0.00	$0.00	$0.00	0.00	0.00	$0.00	0.00
52			4	2' x 4' 3-Lamp T-8, Prism Lens, Magnetic Ballast	2080	82	0.33	682.24	$106.43	0	No Change Required	0	0.00	0	$0.00	$0.00	$0.00	0.00	0.00	$0.00	0.00
53		Conference Room	5	2' x 2' 2-Lamp T-8, Straight Lamp	2080	34	0.17	353.6	$55.16	0	No Change Required	0	0.00	0	$0.00	$0.00	$0.00	0.00	0.00	$0.00	0.00
54			12	High Hat 13 W CFL	2080	18	0.22	449.28	$70.09	0	No Change Required	0	0.00	0	$0.00	$0.00	$0.00	0.00	0.00	$0.00	0.00
55		Corridor	9	2' x 4' 2-Lamp T-8, Prism Lens, Magnetic Ballast	2080	58	0.52	1085.76	$169.38	0	No Change Required	0	0.00	0	$0.00	$0.00	$0.00	0.00	0.00	$0.00	0.00
56		IT	2	2' x 4' 4-Lamp T-8, Prism Lens, Electronic Ballast	2080	109	0.22	453.44	$70.74	0	No Change Required	0	0.00	0	$0.00	$0.00	$0.00	0.00	0.00	$0.00	0.00
57			1	2' x 4' 3-Lamp T-8, Prism Lens, Magnetic Ballast	2080	82	0.08	170.56	$26.61	0	No Change Required	0	0.00	0	$0.00	$0.00	$0.00	0.00	0.00	$0.00	0.00
58		Office #1	2	2' x 4' 4-Lamp T-8, Prism Lens, Electronic Ballast	2080	109	0.22	453.44	$70.74	0	No Change Required	0	0.00	0	$0.00	$0.00	$0.00	0.00	0.00	$0.00	0.00
59		Office #2	4	2' x 2' 2-Lamp U-tube T-8, Prism Lens, Electronic Ballast	2080	73	0.29	607.36	$94.75	0	No Change Required	0	0.00	0	$0.00	$0.00	$0.00	0.00	0.00	$0.00	0.00
60			7	High Hat 13 W CFL	2080	18	0.13	262.08	$40.88	0	No Change Required	0	0.00	0	$0.00	$0.00	$0.00	0.00	0.00	$0.00	0.00
61		Office #3	4	2' x 2' 2-Lamp T-5, Parabolic, Electronic Ballast	2080	36	0.14	299.52	$46.73	0	No Change Required	0	0.00	0	$0.00	$0.00	$0.00	0.00	0.00	$0.00	0.00
62		208 Office	3	2' x 4' 3-Lamp T-8, Prism Lens, Magnetic Ballast	2080	82	0.25	511.68	$79.82	0	No Change Required	0	0.00	0	$0.00	$0.00	$0.00	0.00	0.00	$0.00	0.00
63		207 Office	2	2' x 4' 4-Lamp T-8, Prism Lens, Electronic Ballast	2080	109	0.22	453.44	$70.74	0	No Change Required	0	0.00	0	$0.00	$0.00	$0.00	0.00	0.00	$0.00	0.00
64		219 Office	2	2' x 4' 3-Lamp T-8, Prism Lens, Magnetic Ballast	2080	82	0.16	341.12	$53.21	0	No Change Required	0	0.00	0	$0.00	$0.00	$0.00	0.00	0.00	$0.00	0.00
65		203 Office	7	2' x 4' 4-Lamp T-8, Prism Lens, Electronic Ballast	2080	109	0.76	1587.04	$247.58	0	No Change Required	0	0.00	0	$0.00	$0.00	$0.00	0.00	0.00	$0.00	0.00
66		206 Office	4	2' x 4' 4-Lamp T-8, Prism Lens, Electronic Ballast	2080	109	0.44	906.88	$141.47	0	No Change Required	0	0.00	0	$0.00	$0.00	$0.00	0.00	0.00	$0.00	0.00
67		DPW Bathroom	1	2' x 4' 2-Lamp T-8, Prism Lens, Magnetic Ballast	2080	58	0.06	120.64	$18.82	0	No Change Required	0	0.00	0	$0.00	$0.00	$0.00	0.00	0.00	$0.00	0.00
68		DPW Corridor	4	2' x 2' 2-Lamp T-5, Parabolic, Electronic Ballast	2080	36	0.14	299.52	$46.73	0	No Change Required	0	0.00	0	$0.00	$0.00	$0.00	0.00	0.00	$0.00	0.00

69		Corridor	2	2-Lamp 60 W Incandescent	2080	120	0.24	499.2	$77.88	4	13 W CFL Lamp	13	0.05	108.16	$16.87	$6.00	$24.00	0.19	391.04	$61.00	0.39
70			2	4' 2-Lamp T-12, Prism Lens, Magnetic Ballast	2080	80	0.16	332.8	$51.92	2	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	55	0.11	228.8	$35.69	$100.00	$200.00	0.05	104.00	$16.22	12.33
71		311	2	2' x 4' 4-Lamp T-8, Prism Lens, Electronic Ballast	2080	109	0.22	453.44	$70.74	0	No Change Required	0	0.00	0	$0.00	$0.00	$0.00	0.00	0.00	$0.00	0.00
72		312	2	2' x 4' 4-Lamp T-8, Prism Lens, Electronic Ballast	2080	109	0.22	453.44	$70.74	0	No Change Required	0	0.00	0	$0.00	$0.00	$0.00	0.00	0.00	$0.00	0.00
73		BR	1	2' x 4' 4-Lamp T-8, Prism Lens, Electronic Ballast	2080	109	0.11	226.72	$35.37	0	No Change Required	0	0.00	0	$0.00	$0.00	$0.00	0.00	0.00	$0.00	0.00
74		Receptionist	10	2' x 4' 4-Lamp T-8, Prism Lens, Electronic Ballast	2080	109	1.09	2267.2	$353.68	0	No Change Required	0	0.00	0	$0.00	$0.00	$0.00	0.00	0.00	$0.00	0.00
75		306	2	2' x 4' 4-Lamp T-8, Prism Lens, Electronic Ballast	2080	109	0.22	453.44	$70.74	0	No Change Required	0	0.00	0	$0.00	$0.00	$0.00	0.00	0.00	$0.00	0.00
76		307	4	2' x 2' 3-Lamp T-8, Parabolic, Electronic Ballast	2080	47	0.19	391.04	$61.00	0	No Change Required	0	0.00	0	$0.00	$0.00	$0.00	0.00	0.00	$0.00	0.00
77		309	6	2' x 2' 3-Lamp T-8, Parabolic, Electronic Ballast	2080	47	0.28	586.56	$91.50	0	No Change Required	0	0.00	0	$0.00	$0.00	$0.00	0.00	0.00	$0.00	0.00
78		308	4	2' x 2' 4-Lamp T-8, Parabolic, Electronic Ballast	2080	109	0.44	906.88	$141.47	0	No Change Required	0	0.00	0	$0.00	$0.00	$0.00	0.00	0.00	$0.00	0.00
79		Conference Room	12	2' x 2' 2-Lamp U-tube T-8, Prism Lens, Electronic Ballast	2080	73	0.88	1822.08	$284.24	0	No Change Required	0	0.00	0	$0.00	$0.00	$0.00	0.00	0.00	$0.00	0.00
80		308a	4	2' x 2' 2-Lamp U-tube T-8, Prism Lens, Electronic Ballast	2080	73	0.29	607.36	$94.75	0	No Change Required	0	0.00	0	$0.00	$0.00	$0.00	0.00	0.00	$0.00	0.00
81		305	4	2' x 2' 2-Lamp U-tube T-8, Prism Lens, Electronic Ballast	2080	73	0.29	607.36	$94.75	0	No Change Required	0	0.00	0	$0.00	$0.00	$0.00	0.00	0.00	$0.00	0.00
82		304	6	2' x 4' 3-Lamp T-8, Prism Lens, Magnetic Ballast	2080	82	0.49	1023.36	$159.64	0	No Change Required	0	0.00	0	$0.00	$0.00	$0.00	0.00	0.00	$0.00	0.00
83		303	6	2' x 4' 4-Lamp T-8, Prism Lens, Electronic Ballast	2080	109	0.65	1360.32	$212.21	0	No Change Required	0	0.00	0	$0.00	$0.00	$0.00	0.00	0.00	$0.00	0.00
84			1	2' x 2' 4-Lamp T-8, Parabolic, Electronic Ballast	2080	109	0.11	226.72	$35.37	0	No Change Required	0	0.00	0	$0.00	$0.00	$0.00	0.00	0.00	$0.00	0.00

85		302	2	2' x 4' 4-Lamp T-8, Prism Lens, Electronic Ballast	2080	109	0.22	453.44	$70.74	0	No Change Required	0	0.00	0	$0.00	$0.00	$0.00	0.00	0.00	$0.00	0.00
86		301	2	2' x 4' 4-Lamp T-8, Prism Lens, Electronic Ballast	2080	109	0.22	453.44	$70.74	0	No Change Required	0	0.00	0	$0.00	$0.00	$0.00	0.00	0.00	$0.00	0.00
87		Construction Dept.	25	2' x 4' 2-Lamp T-8, Prism Lens, Magnetic Ballast	2080	58	1.45	3016	$470.50	0	No Change Required	0	0.00	0	$0.00	$0.00	$0.00	0.00	0.00	$0.00	0.00
88		Construction Dept. Office	2	2' x 4' 4-Lamp T-8, Prism Lens, Electronic Ballast	2080	109	0.22	453.44	$70.74	0	No Change Required	0	0.00	0	$0.00	$0.00	$0.00	0.00	0.00	$0.00	0.00
89			1	2' x 2' 3-Lamp T-8, Parabolic, Electronic Ballast	2080	47	0.05	97.76	$15.25	0	No Change Required	0	0.00	0	$0.00	$0.00	$0.00	0.00	0.00	$0.00	0.00
90		Construction Dept. Office	4	2' x 4' 3-Lamp T-8, Prism Lens, Magnetic Ballast	2080	82	0.33	682.24	$106.43	0	No Change Required	0	0.00	0	$0.00	$0.00	$0.00	0.00	0.00	$0.00	0.00
91		Tax Office Reception	2	2' 2-Lamp T-8	2080	34	0.07	141.44	$22.06	0	No Change Required	0	0.00	0	$0.00	$0.00	$0.00	0.00	0.00	$0.00	0.00
92			4	2' x 4' 3-Lamp T-8, Prism Lens, Magnetic Ballast	2080	82	0.33	682.24	$106.43	0	No Change Required	0	0.00	0	$0.00	$0.00	$0.00	0.00	0.00	$0.00	0.00
93		Tax Office	12	2' x 4' 4-Lamp T-8, Prism Lens, Electronic Ballast	2080	109	1.31	2720.64	$424.42	0	No Change Required	0	0.00	0	$0.00	$0.00	$0.00	0.00	0.00	$0.00	0.00
94			1	2' x 2' 3-Lamp T-8, Parabolic, Electronic Ballast	2080	47	0.05	97.76	$15.25	0	No Change Required	0	0.00	0	$0.00	$0.00	$0.00	0.00	0.00	$0.00	0.00
95		102 Closet	1	4' 2-Lamp T-8	2080	58	0.06	120.64	$18.82	0	No Change Required	0	0.00	0	$0.00	$0.00	$0.00	0.00	0.00	$0.00	0.00
96		Closet	1	4' 4-Lamp T-12	2080	160	0.16	332.8	$51.92	1	2'X4' 3-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N 2GC8	91	0.09	189.28	$29.53	$120.00	$120.00	0.07	143.52	$22.39	5.36
97		Restroom	1	2' x 4' 3-Lamp T-8, Prism Lens, Magnetic Ballast	2080	82	0.08	170.56	$26.61	0	No Change Required	0	0.00	0	$0.00	$0.00	$0.00	0.00	0.00	$0.00	0.00
98		Boiler Room #2	2	100 W Incandescent	2080	100	0.20	416	$64.90	2	23 W CFL Lamp	23	0.05	95.68	$14.93	$10.00	$20.00	0.15	320.32	$49.97	0.40
99			3	4' 2-Lamp T-12, Prism Lens, Magnetic Ballast	2080	80	0.24	499.2	$77.88	3	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	55	0.17	343.2	$53.54	$100.00	$300.00	0.08	156.00	$24.34	12.33
100		Corridor to Boiler Room #2	1	4' 2-Lamp T-8, Industrial Fixture	2080	58	0.06	120.64	$18.82	0	No Change Required	0	0.00	0	$0.00	$0.00	$0.00	0.00	0.00	$0.00	0.00
101		Police Department	7	Incandescent Exit Sign	8760	40	0.28	2452.8	$382.64	7	Exit Sign - LED	4	0.03	245.28	$38.26	$56.00	$392.00	0.25	2207.52	$344.37	1.14
		Totals	495				45.87	236140	$36,837.77	110			5.75	42141.9	$6,574.13		$7,766.00	6.87	40869.3	$6,375.61	1.22

Police Department
Municipal Building
Old Section of Municipal Building
Recommended Upgrades

Electric Water Heater

Existing

Energy Consumption

Energy Consumption & Cost - Water Heating

Type	Consumption		Cost
	KWH	Decatherm	$
Electric	3393.908968	0	529.45
Gas	0	18.253934	0

Calculate | Reset Default Values

Rates

Electric	0.156	$/KWH
Gas	0	$/Decatherm

Details

Duration	365	Day
Usage Rate	40	Gallon/Day
Source Temperature	50	Fahrenheit
Outlet Temperature	140	Fahrenheit

Electric Specific

Energy Factor	0.93

Gas Specific

Energy Factor	0.59

Gas Water Heater

Replacement

Energy Consumption

Energy Consumption & Cost - Water Heating

Type	Consumption		Cost
	KWH	Decatherm	$
Electric	3430.799283	0	0
Gas	0	11.966468	178.3

Calculate | Reset Default Values

Rates

Electric	0	$/KWH
Gas	14.9	$/Decatherm

Details

Duration	365	Day
Usage Rate	40	Gallon/Day
Source Temperature	50	Fahrenheit
Outlet Temperature	140	Fahrenheit

Electric Specific

Energy Factor	0.92

Gas Specific

Energy Factor	0.9

Project Name: LGEA Solar PV Project - Town Hall
Location: Oakhurst, NJ
Description: Photovoltaic System 95% Financing - 20 year

Simple Payback Analysis

	Photovoltaic System 95% Financing - 20 year
Total Construction Cost	$467,820
Annual kWh Production	81,117
Annual Energy Cost Reduction	$12,654
Annual SREC Revenue	$28,391
First Cost Premium	**$467,820**
Simple Payback:	**11.40** Years

Life Cycle Cost Analysis

Analysis Period (years): 25
Financing Term (mths): 240
Average Energy Cost ($/kWh) **$0.156**
Financing Rate: 7.00%
Financing %: 95%
Maintenance Escalation Rate: 3.0%
Energy Cost Escalation Rate: 3.0%
SREC Value ($/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	$23,391	0	0	0	$0	0	0	(23,391)	0
1	$0	81,117	$12,654	$0	$28,391	$30,775	$10,573	($303)	($23,694)
2	$0	80,712	$13,034	$0	$28,249	$30,011	$11,337	($65)	($23,758)
3	$0	80,308	$13,425	$0	$28,108	$29,191	$12,157	$185	($23,574)
4	$0	79,906	$13,828	$0	$27,967	$28,312	$13,035	$447	($23,126)
5	$0	79,507	$14,243	$819	$27,827	$27,370	$13,978	($97)	($23,223)
6	$0	79,109	$14,670	$815	$27,688	$26,360	$14,988	$195	($23,028)
7	$0	78,714	$15,110	$811	$27,550	$25,276	$16,072	$501	($22,527)
8	$0	78,320	$15,563	$807	$27,412	$24,114	$17,234	$821	($21,706)
9	$0	77,929	$16,030	$803	$27,275	$22,869	$18,479	$1,155	($20,551)
10	$0	77,539	$16,511	$799	$27,139	$21,533	$19,815	$1,503	($19,048)
11	$0	77,151	$17,006	$795	$27,003	$20,100	$21,248	$1,867	($17,181)
12	$0	76,766	$17,516	$791	$26,868	$18,564	$22,784	$2,246	($14,935)
13	$0	76,382	$18,042	$787	$26,734	$16,917	$24,431	$2,641	($12,294)
14	$0	76,000	$18,583	$783	$26,600	$15,151	$26,197	$3,053	($9,242)
15	$0	75,620	$19,141	$779	$26,467	$13,257	$28,091	$3,481	($5,761)
16	$0	75,242	$19,715	$775	$26,335	$11,227	$30,121	$3,927	($1,834)
17	$0	74,866	$20,306	$771	$26,203	$9,049	$32,299	$4,390	$2,556
18	$0	74,491	$20,916	$767	$26,072	$6,714	$34,634	$4,872	$7,429
19	$0	74,119	$21,543	$763	$25,942	$4,211	$37,137	$5,373	$12,802
20	$0	73,748	$22,189	$760	$25,812	$1,526	$39,822	$5,894	$18,696
21	$0	73,379	$22,855	$756	$25,683	$1,294	$36,608	$9,880	$28,576
22	$0	73,013	$23,541	$752	$25,554	$885	$30,125	$17,332	$45,908
23	$0	72,647	$24,247	$748	$25,427	$0	$0	$48,925	$94,833
24	$0	72,284	$24,974	$745	$25,299	$0	$0	$49,529	$144,362
25	$0	71,923	$25,724	$741	$25,173	$0	$0	$50,156	$194,518
	Totals:	1,547,546	$340,025	$12,623	$541,641	$382,528	$444,429	$511,163	$264,196
					Net Present Value (NPV)			**$23,803**	
					Internal Rate of Return (IRR)			**11.1%**	

Project Name: LGEA Solar PV Project - Town Hall
Location: Oakhurst, NJ
Description: Photovoltaic System - Direct Purchase

Simple Payback Analysis

	Photovoltaic System - Direct Purchase
Total Construction Cost	$467,820
Annual kWh Production	81,117
Annual Energy Cost Reduction	$12,654
Annual SREC Revenue	$28,391
First Cost Premium	**$467,820**
Simple Payback:	**11.40** **Years**

Life Cycle Cost Analysis

Analysis Period (years):	25	Financing %:	0%
Financing Term (mths):	0	Maintenance Escalation Rate:	3.0%
Average Energy Cost ($/kWh)	**$0.156**	Energy Cost Escalation Rate:	3.0%
Financing Rate:	0.00%	SREC Value ($/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	$467,820	0	0	0	$0	(467,820)	0
1	$0	81,117	$12,654	$0	$28,391	$41,045	($426,775)
2	$0	80,712	$13,034	$0	$28,249	$41,283	($385,492)
3	$0	80,308	$13,425	$0	$28,108	$41,533	($343,959)
4	$0	79,906	$13,828	$0	$27,967	$41,795	($302,164)
5	$0	79,507	$14,243	$819	$27,827	$41,251	($260,913)
6	$0	79,109	$14,670	$815	$27,688	$41,543	($219,370)
7	$0	78,714	$15,110	$811	$27,550	$41,849	($177,521)
8	$0	78,320	$15,563	$807	$27,412	$42,169	($135,352)
9	$0	77,929	$16,030	$803	$27,275	$42,502	($92,850)
10	$0	77,539	$16,511	$799	$27,139	$42,851	($49,999)
11	$0	77,151	$17,006	$795	$27,003	$43,215	($6,784)
12	$0	76,766	$17,516	$791	$26,868	$43,594	$36,810
13	$0	76,382	$18,042	$787	$26,734	$43,989	$80,798
14	$0	76,000	$18,583	$783	$26,600	$44,400	$125,199
15	$0	75,620	$19,141	$779	$26,467	$44,829	$170,028
16	$0	75,242	$19,715	$775	$26,335	$45,275	$215,302
17	$0	74,866	$20,306	$771	$26,203	$45,738	$261,040
18	$0	74,491	$20,916	$767	$26,072	$46,220	$307,261
19	$0	74,119	$21,543	$763	$25,942	$46,721	$353,982
20	$0	73,748	$22,189	$760	$25,812	$47,242	$401,224
21	$1	73,379	$22,855	$756	$25,683	$47,782	$449,006
22	$2	73,013	$23,541	$752	$25,554	$48,343	$497,349
23	$3	72,647	$24,247	$748	$25,427	$48,925	$546,274
24	$4	72,284	$24,974	$745	$25,299	$49,529	$595,803
25	$5	71,923	$25,724	$741	$25,173	$50,156	$645,959
	Totals:	1,547,546	$340,025	$12,623	$541,641	$1,113,779	$869,044
				Net Present Value (NPV)		**$645,984**	
				Internal Rate of Return (IRR)		**7.8%**	

Building	Roof Area (sq ft)	Panel	Qty	Panel Sq Ft	Panel Total Sq Ft	Total KW	Total Annual kWh	Panel Weight (33 lbs)	W/SQFT
Town Hall	3312	Sunpower SPR230	226	14.7	3,323	51.98	81,117	7,458	15.64

.= 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.