ENERGY AUDIT – FINAL REPORT

OCEAN TOWNSHIP
BUILDINGS AND GROUNDS OFFICE

240 WHALEPOND RD.
OAKHURST, NJ 07755
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TOWNSHIP MANAGER

CEG PROJECT NO. 9C09048

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Table of Contents

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I. EXECUTIVE SUMMARY

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

Ocean Township
Building and Grounds Office
240 Whalepond Rd
Oakhurst, NJ 07755

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

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	$ 2,476
Oil	$ 7,262
Total	$ 9,738

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 INSTALLATION COST[A]	ANNUAL SAVINGS	SIMPLE PAYBACK (YEARS)	SIMPLE LIFETIME ROI
1	Lighting Replacement	$3,440	$712	7.0	178%
2	Lighting Controls	$1,260	$162	7.8	93%
3	Window Replacement	$7,688	$120	64.1	(61%)
4	Boiler Replacement	$26,825	$1,672	16.0	118%
5	Air Conditioning Upgrade	$1,840	$130	13.9	(28%)

Notes: A. 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)	OIL (GAL)
1	Lighting Replacement	1.1	1,957	-
2	Lighting Controls	-	829	-
3	Window Replacement	-	-	40.5
4	Boiler Replacement	-	-	565
5	Air Conditioning Upgrade	-	911	-

Recommendation:

Concord Engineering Group (CEG) recommends the following Energy Conservation Measures for the Ocean Township Buildings and Grounds Office:

- **ECM #1:** Lighting Replacement
- **ECM#2:** Lighting Controls

In addition to the above recommendations, CEG has a secondary recommendation that the Owner review the possible implementation of **ECM#4:** Boiler Replacement. The existing boiler is well past its useful service life as outlined in 2007 ASHRAE Applications Handbook and the addition of a new boiler system with updated controls will allow the heating system to operate more effectively and efficiently. Overall, the Owner needs to review the actual use of the building and make decisions based on the future operation of the facility.

II. INTRODUCTION

This comprehensive energy audit covers the 4,745 square foot Buildings and Grounds office facility that includes offices, locker rooms, a wood shop and equipment storage area.

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:

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

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

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

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

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. 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.

Oil was delivered 4 times in the year 2008. The date, volume, and cost are listed below:

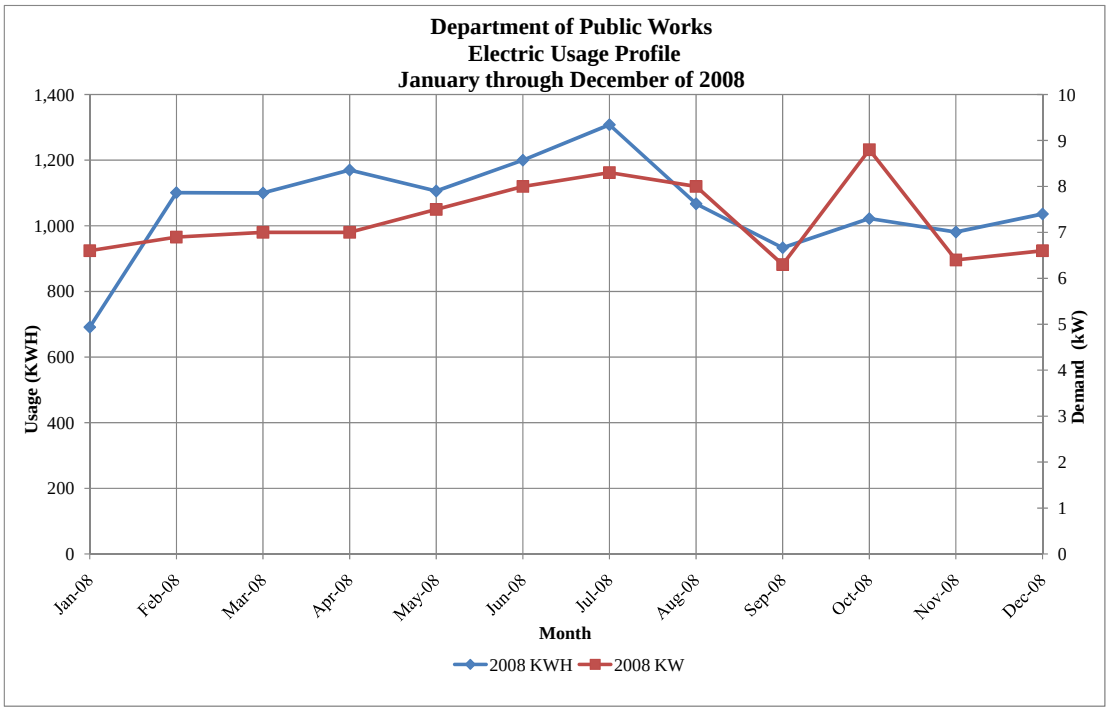
DATE	VOLUME (gallons)	COST
1/23/08	970.2	$ 2,765
3/11/08	950.4	$ 3,126
10/23/08	529.8	$ 1,372
Totals	2,450.4	$ 7,262

Description	Average
Electricity	19.5¢/kWh
Oil	$2.96/gallon

Table 3
Electricity Billing Data

MONTH OF USE	CONSUMPTION (KWH)	DEMAND (KW)	TOTAL BILL
1/08	691	7	$ 132
2/08	1,101	7	$ 203
3/08	1,100	7	$ 203
4/08	1,170	7	$ 203
5/08	1,106	8	$ 195
6/08	1,200	8	$ 250
7/08	1,308	8	$ 270
8/08	1,067	8	$ 231
9/08	933	6	$ 201
10/08	1,022	9	$ 195
11/08	981	6	$ 189
12/08	1,036	7	$ 204
Totals	**12,715**	**9 MAX**	**$2,476**

Figure 1
Electricity Usage Profile



B. Energy Use Index (EUI)

Energy Use Index (EUI) is a measure of a building's energy utilization per square foot of building. This calculation is completed by converting all utility usage (gas, electric, oil) consumed by a building over a specified time period, typically one year, to British Thermal Units (BTU) and dividing this number by the building square footage. EUI is a good measure of a building's energy use and is utilized regularly for comparison of energy performance amongst building of similar type. The EUI for this facility is calculated as follows:

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

$$Electric = \frac{(12{,}715 kWh \times 1{,}000 \frac{W}{kW} \times \frac{3.414\ Btu/h}{1\,W})}{1000\ Btu/h/1\ kBtu/h} = 43{,}409.1\ kBtu/h$$

$$Heating\ \ Oil = \frac{(2450.4\ gallons \times 139{,}400 \frac{Btu/h}{1\ gallon})}{1000\,Btu/h/1\ kBtu/h} = 341{,}585.7\ kBtu/h$$

$$Building\ \ EUI = \frac{(43{,}409.1\ kBtu/h + 341{,}585.76\ kBtu/h)}{4{,}745\ SF} = \frac{384{,}994.9\ kBtu/h}{4{,}745\ SF}$$

Buildings and Grounds Office EUI = 81.14 kBtu/SF (Site Energy); 103.3 kBtu/SF (Source Energy)

As a comparison, data has been gathered by the US Department of Energy (DOE) for various facilities cataloguing the standard site and source energy utilization. This data has been published in the 2003 Commercial Building Energy Consumption Survey and is noted as follows for facilities of this type:

- Office: 77 kBtu/SF Site Energy, 182 kBtu/SF Source Energy.

Based on the information compiled for the studied facility, as compared to the national average the energy usage is approximately 5% higher than the baseline data for site energy.

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.

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

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

Username: oceantwp
Password: lgeaceg2009

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

Refer to Appendix D for the Portfolio Manager "Statement of Energy Performance."

V. FACILITY DESCRIPTION

The Ocean Township Buildings and Grounds Office is a single-floor, concrete block building built in 1950 that is typically in operation by thirteen (13) employees for forty (40) hours per week. The building functions as the main office of the Head of Buildings and Grounds and his associates. As noted above, the building structure is constructed of concrete block walls that are un-insulated. The exterior walls are finished with a parget coating. There are multiple, single-pane wood frame windows throughout the building exterior with many windows boarded up with plywood. From CEG's visual inspection, the windows appeared to be in poor condition. The roof structure is a shingled "a-frame" structure constructed of steel with a ply-wood covering below the shingles.

Heating System

A Weil-McLain Co. No. 87 Size 1187 Boiler provides heat to the facility. The boiler has an integral Weil-McLain oil burner; M/N HXL0500. The boiler's heating output is approximately 642 MBH which equates to 19 Boiler HP. A Marathon electric pump circulates the oil with a 1/8 HP motor and operates at 115 V/ 1 PH/ 60 HZ. The boiler appears to be original to the building, which places its approximate age at fifty-nine (59) years old. This boiler is a good candidate for replacement.

A 2" Bell and Gossett inline hot water circulation pump (fractional HP) is responsible for moving the heated water throughout the facility to the cast iron radiators that heat the individual rooms. The inline pump appears to have been replaced at one time and is approximately fifteen (15) years old.

A 1,500 gallon, above-ground oil tank located behind the building is the storage site for the oil necessary to supply heat to the building.

Domestic Hot Water

Domestic hot water for the restrooms/showers is provided by a 4.5 kW, 50 gallon electric domestic hot water heater; A. O. Smith "Energy Saver." The water heater was manufactured in 1998 and appears to be in decent condition based on its intermittent use in the facility.

Cooling System

There are two window A/C units that supply cooling to the building. There is one (1) Frigidaire window A/C unit that serves the Lunch Room and one (1) Friedrich window A/C unit that serves the Office. The unit capacity of the window A/C units is estimated at approximately 12,000 btu/h of cooling each. The window A/C units appear to be approximately 10-12 years old. The estimated service life is approximately ten (10) years in accordance with 2007 ASHRAE Applications; therefore, the window A/C units are a good candidate for replacement.

Controls System

The existing boiler contains electronic controls that operate the boiler based on the return water temperature only. However, CEG believes that the Owner manually operates the boiler during typical operation in heating season.

Exhaust System

The original ductwork of the building is abandoned and serves no purpose. The bathroom has a small Broan exhaust fan that is operated on a light switch.

Lighting

The building is lit by multiple T-12 light fixtures with magnetic ballasts that vary in size and lamp number. The sizes are 1'x8' and 2'x4', with either two (2) lamps or four (4) lamps each. There are two (2) 150 W A-lamps that are located in the storage room and boiler room, respectively. Refer to Appendix E for a complete listing of all lighting fixtures within the facility.

VI. MAJOR EQUIPMENT LIST

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

Table 5 thru 7
Existing Equipment Listing

HEATING EQUIPMENT						
Description	**Qty**	**Rated Capacity (BTUH)**	**Fuel Type**	**Approx. Age (yrs)**	**ASHRAE Service Life (yrs)**	**Remaining Life (yrs)**
Weil-McLain No. 87 Series 3 Boiler; Size 1187	1	836 MBH_{IN}; 642 MBH_{OUT}	Oil	59	35	(24)

COOLING EQUIPMENT						
Description	**Qty**	**Cooling Capacity (Tons)**	**Fuel Type**	**Approx. Age (yrs)**	**ASHRAE Service Life (yrs)**	**Remaining Life (yrs)**
Frigidaire Cooling Unit	1	12,000 Btu/h	DX Electric	12	10	(2)
Friedrich Cooling Unit	1	12,000 Btu/h	DX Electric	15	10	(5)

DOMESTIC HOT WATER SYSTEM						
Description	**Qty**	**Capacity**	**Fuel Type**	**Approx. Age (yrs)**	**ASHRAE Service Life (yrs)**	**Remaining Life (yrs)**
A.O. Smith "Energy Saver" M/N EES-40-917 S/N MA98-0019473-917	1	40 Gallon	Elect	11	12	1

Note: Equipment noted as having a negative (#) remaining life is considered past its standard service life as described in 2007 ASHRAE Applications Handbook and is most likely a good candidate for replacement.

VII. ENERGY CONSERVATION MEASURES

ECM #1: Lighting Replacement

Description:

The existing lighting within the Buildings and Grounds Office consists of inefficient fluorescent fixtures containing T12 lamps and magnetic ballasts. The standard fixture type throughout is an industrial-type fixture with symmetrical reflectors. The inefficiency in the existing magnetic ballasts causes the existing fixtures to have a high input wattage as compared to new electronic ballasted fixtures.

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 portion of the facility, approximately 2080 hours per year, the Owner will be changing approximately 33% less lamps per year.

In addition, CEG recommends the replacement of all incandescent lamps with compact fluorescent bulbs of similar lumens.

Energy Savings Calculations:

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

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.

$$\text{Smart Start®}\ Incentive = (\#\ of\ 1-2\ lamp\ \ fixtures \times\ \$\ 25) + (\#\ of\ \ 3-4\ lamp\ \ fixtures \times\ \$\ 30)$$
$$\text{Smart Start®}\ Incentive = (22x\$25) + (1x\ \$\ 30) = \underline{\$580}$$

Maintenance Savings are calculated as follows:

$$Ma\,\text{int}\,enance\ Savings = (\#\ of\ \ lamps \times \%\ reduction \times \$\ \ per\ lamp) + Installation\ Labor$$

$$Ma\,\text{int}\,enance\ Savings = (47 \times 33\%\ reduction \times \$\ 2.00) + (\$5 \times 15) = \underline{\$106}$$

Energy Savings Summary:

ECM #1 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$4,020
NJ Smart Start Equipment Incentive ($):	($580)
Net Installation Cost ($):	$3,440
Annual Maintenance Savings ($ / yr):	*$106*
Annual Energy Savings ($ / yr):	*$382*
Annual Net Savings ($ / yr):	*$488*
Simple Payback (yrs):	*7.0*
Simple Lifetime Return On Investment (%):	*178%*
Estimated ECM Lifetime (yr):	*25*
Simple Lifetime Maintenance Savings ($)	*$2,650*
Simple Lifetime Energy Savings ($):	*$9,550*

ECM #2: 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 4,745 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 ±0.84 Watts/SF. Ten percent of this value is the resultant energy savings due to installation of occupancy sensors:

Savings = 10% x 0.84 Watts/SF x 4,745 SF x 2,080 hrs/yr. = 829 kWh x $0.195/kWh

Savings = $\underline{\$162}$ 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 7 with a total of 9 sensors required.

Total cost to install sensors is $140/unit x 9 units = $\underline{\$1,260}$

Energy Savings Summary:

ECM #2 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$1,440
NJ Smart Start Equipment Incentive ($):	($180)
Net Installation Cost ($):	$1,260
Annual Maintenance Savings ($ / yr):	-
Annual Energy Savings ($ / yr):	*$162*
Annual Net Savings ($ / yr):	*$162*
Simple Payback (yrs):	*7.8*
Simple Lifetime Return On Investment (%):	*93%*
Estimated ECM Lifetime (yr):	*15*
Simple Lifetime Maintenance Savings ($)	-
Simple Lifetime Energy Savings ($):	*$2,430*

ECM #3: Window Replacement

Description:

The Buildings and Grounds Office currently has single-pane, wood-framed windows throughout the facility which allow excess heat loss and gain resulting in cooler interior surfaces during the heating season and warmer interior surfaces during the cooling season. In addition, these windows are a source of cold air leakage into the facility during the winter months. Due to the air leakage issue the Owner has chosen to board up the majority of the windows with plywood. During our survey CEG noted four (4) 10' L and 6'H window sections west of the building entrance that should be replaced if the Owner plans on continuing to use these sections for natural daylight and ventilation. Based on CEG research, high-performance windows can provide many benefits including:

- Improved comfort by reducing radiant heat exchange
- Improved indoor air quality by reducing air leakage that can bring dirt, dust, and other impurities into the building
- Lower utility bills since these windows are better insulated and more air-tight
- Fewer condensation problems since these windows stay warmer in the heating season resulting in drier windows
- Reduced wear on furnishings, carpeting, window treatments, etc. since low-e coatings block up to 98 % of the ultraviolet radiation of the sun.

This energy conservation measure would replace all of the single-pane windows with high performance, low-e window units (nominal 3' x 6' units) by Andersen or equivalent.

Energy Savings Calculations:

General Data:

For Colts Neck, NJ; Monmouth County the following is the Degree Days for January through December 2008:

Heating Degree Days (65°F Base) = 4,981 HDD
Cooling Degree Days (65°F Base) = 1,112 CDD

Total window area to be retrofitted = (4) 10'L x 6'H Windows; approximately 240 SF

Energy Calculation:

Existing Single Pane, Wood-Frame Windows Thermal Value; U_{exist} = 0.87 Btu/hr – ft^2 - °F

New Double Pane, Aluminum Frame Windows (Basis of Design: Andersen with Low-E4 glass or equivalent) Thermal Value; Unew = 0.28 Btu/hr – ft^2 - °F, 0.43 SHGC

$$Annual\ Energy\ Savings = Hrs\ per\ Day \times WindowArea \times (U_{EXIST} - U_{NEW}) \times HDD$$

$$Annual\ \ Energy\ \ Savings = 8\ \frac{hrs}{day} \times 240\ SF \times (0.87 - 0.28) \times 4{,}981 = 5{,}642\ kBtu\ /\ yr$$

Conversion to Oil = (5,642 kBtu * 1000 Btu per kBtu) / 139,400 Btu per gallon = 40.5 gallons of Oil

Annual Energy Cost Savings = 40.5 gallons of Oil x $2.96 per gallon = $120

Note: Annual Energy Savings during cooling season were not calculated due to the fact that the effect of the windows on the window A/C units will be minimal. This is because of the basic control and operation of the existing window A/C units; they are operated manually and do not contain thermostatic controls.

Energy Savings Summary:

ECM #3 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$7,688
NJ Smart Start Equipment Incentive ($):	-
Net Installation Cost ($):	$7,688
Annual Maintenance Savings ($ / yr):	-
Annual Energy Savings ($ / yr):	*$120*
Annual Net Savings ($ / yr):	*$120*
Simple Payback (yrs):	*64.1*
Simple Lifetime Return On Investment (%):	*(61%)*
Estimated ECM Lifetime (yr):	*25*
Simple Lifetime Maintenance Savings ($)	-
Simple Lifetime Energy Savings ($):	*$3,000*

ECM #4: Boiler Replacement

Description:

The Buildings and Grounds Office is heated by an oil-fired Weil-McLain hot water boiler which presently appears to be operating at a nominal 70% efficiency. Combustion efficiency tests were not available from the Owner. Based on manufacturer's product data the boiler operates at 836 MBH input and 642 MBH output; equaling approximately 77% thermal efficiency. It is pertinent to note that the 77% thermal efficiency was when the boiler was brand new. The existing boiler appears to be original to the facility which would make the boiler approximately fifty-nine (59) years old and a great candidate for replacement to provide energy savings through better operational efficiency.

This energy conservation measure replaces the existing oil-fired hot water boiler with three (3) new higher-efficiency oil-fired hot water boilers by Weil-McLain; Series WGO-7 or equivalent. A boiler sequencing control package is also included in order for the Owner to take advantage of part load operation and boiler staging.

Note: Boiler sizing is based on a one-for-one replacement; CEG believes that based on the facilities current use, the existing boiler is oversized for the building requirements. CEG recommends the Owner investigate further the heating requirements of the building with a HVAC Design Engineer.

Existing Heating Hot Water Boiler:

Rated Capacity = 642 MBH_{OUT} (Fuel Oil)
Combustion Efficiency = 70%
Radiation Losses = 5%
Thermal Efficiency = 65%

Replacement Boiler:

High Efficiency Weil-McLain; Series WGO-7 or Equal (with Sequencing Control & O/A HW Reset)
Rated Capacity = 210 MBH Net IBR Rating; 630 MBH_{OUT} Total (Fuel Oil)
Combustion Efficiency = 85%
Radiation Losses = 0.5%
Thermal Efficiency = 84.5%

Operating Data:

Heating Season Fuel Consumption = 2,450 gallons of #2 heating oil
(**Note:** Fuel consumption based on 2008 heating oil bills)

Average Cost of Heating Oil = $2.96/Therm

Energy Savings Calculations:

Energy Savings = Old Boiler Energy Input x ((New Boiler Efficiency – Old Boiler) / New Boiler Efficiency)

Energy Savings = 2,450 gallons of #2 heating oil x ((0.845-0.65) / 0.845)
= 565 gallons of #2 heating oil

Cost Savings = Annual Energy Savings x $ / gallon of fuel oil
= 565 gallons of #2 heating oil x $2.96/Therm = $1,672 / yr.

Energy Savings Summary:

ECM #4 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$26,825
NJ Smart Start Equipment Incentive ($):	-
Net Installation Cost ($):	*$26,825*
Annual Maintenance Savings ($ / yr):	-
Annual Energy Savings ($ / yr):	*$1,672*
Annual Net Savings ($ / yr):	*$1,672*
Simple Payback (yrs):	*16.0*
Simple Lifetime Return On Investment (%):	*118%*
Estimated ECM Lifetime (yr):	*35*
Simple Lifetime Maintenance Savings ($)	-
Simple Lifetime Energy Savings ($):	*$58,520*

ECM #5: Air-Conditioning Upgrade

Description:

Air-conditioning is provided within certain areas of the building via residential-style window air-conditioning units. The existing window air-conditioning units are inefficient with an estimated seasonal energy efficiency ratio (SEER) of 9.0. The NJ State Energy Code (ASHRAE 90.1-2004) mandates a minimum energy efficiency of 10.6 SEER for units of this type. The existing window air-conditioning units appear to be approximately ten (10) to twelve (12) years old and are past their service life as outlined in Chapter 36 of the 2007 ASHRAE Applications Handbook. The estimated service life for a window air-conditioning unit is 10 years.

This energy conservation measure would replace the window-air conditioning units serving the Lunch Room and the Office; total two (2) window air-conditioning units. The existing units will be replaced with high energy efficient, window air-conditioning units with cooling capacities typical of the existing units. The average EER of the new equipment will be upwards of 11.8 EER. Basis of Design: Friedrich Model SS12L 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 Air Conditioning Units

Rated Capacity = 1 Tons (x2 Unit)

Condenser Unit Efficiency = 9.0 EER

Cooling Season Hrs. of Operation = 1,800 hrs/yr.

Average Cost of Electricity - $0.195/kWh

Proposed High-Efficiency Air Conditioning Unit

Rated Capacity = 1 Tons (x2 Unit)

New Condenser Unit Efficiency = 11.8 EER

$$EnergySavings = \frac{[1\,tons \times 12{,}000\,Btu/ton]}{[1000W/kW]} \times \left(\frac{1}{9.0} - \frac{1}{11.8} \right) \times 0.80 \times 1800\,hrs \times 2\,units = 911\,kWh/yr$$

Energy Cost Savings = 911 kWh * $0.195/kWh = $178 / Yr.

Smart Start Equipment Incentive = ($65/Ton) = (2 Tons x $65) = $130

Energy Savings Summary:

ECM #5 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$1,940
NJ Smart Start Equipment Incentive ($):	($130)
Net Installation Cost ($):	$1,810
Annual Maintenance Savings ($ / yr):	-
Annual Energy Savings ($ / yr):	*$130*
Annual Net Savings ($ / yr):	*$130*
Simple Payback (yrs):	*13.9*
Simple Lifetime Return On Investment (%):	*(28%)*
Estimated ECM Lifetime (yr):	*10*
Simple Lifetime Maintenance Savings ($)	
Simple Lifetime Energy Savings ($):	*$1,300*

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 the Building and Grounds Office, and concluded that there is not feasible potential for solar and wind energy generation at this site. In regards to renewable energy, CEG comments and findings are as follows:

- *Photovoltaic System*: CEG does not recommend the installation of a PV system for the Buildings and Grounds Office due to the fact that the facility is a very low consumer of energy and the cost / benefit of the PV system installation does not favor the Owner's interest.

- *Wind Energy*: CEG does not recommend the installation of a Wind system because of the lack of free land available on the site to accommodate the installation of a wind turbine and the ground issues surrounding the facility. Furthermore, the electric demand on the facility is moderate to low because of facility size and operational characteristics. The afore-mentioned characteristics do not lend themselves to a successful wind energy application.

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 typical base load profile for a facility that is minimally cooled and does not contain electric heat. The base load is consists of the facility lighting consumption and demand. The peak demand for the study period occurs in October 2008 which is the beginning month for the hot water circulation pump to begin its seasonal operation.

Fuel Oil:

Fuel oil is utilized as the heating fuel source for the facility. There was no fluctuation in oil use during the study period.

Tariff Analysis:

Electricity:

Ocean Township's Buildings and Grounds Office receives electrical service through Jersey Central Power and Light Company (JCP&L) on a General Service Secondary (GS) rate. This utility tariff is for delivery service for general purposes at secondary distribution voltages. The rate schedule has a Delivery Charge, Societal Benefits Charge and other standard charges. The customer can elect to have the Commodity Charge serviced through the utility or by a Third Party Supplier (TPS).

Recommendations:

Based on CEG's review of Ocean Township's utility bills and charges for the Buildings and Grounds Office, our recommendation is to continue purchasing energy in the current manner. As compared to current market pricing, it does not appear that the electricity rates are very far from standard average for facilities on the same consumption level as the Building and Grounds Office.

CEG recommends that Ocean Township schedule a meeting with their current utility providers to review their utility charges and current tariff structures for electricity. This meeting would provide insight regarding alternative procurement options that are currently available. Through its meeting with the Local Distribution Company (LDC), Ocean Township will learn more about

the competitive supply process. Ocean Township can acquire 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.

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. Recalibrate existing temperature sensors to provide more accurate control.

D. Clean all light fixtures to maximize light output.

Electric Cost Summary

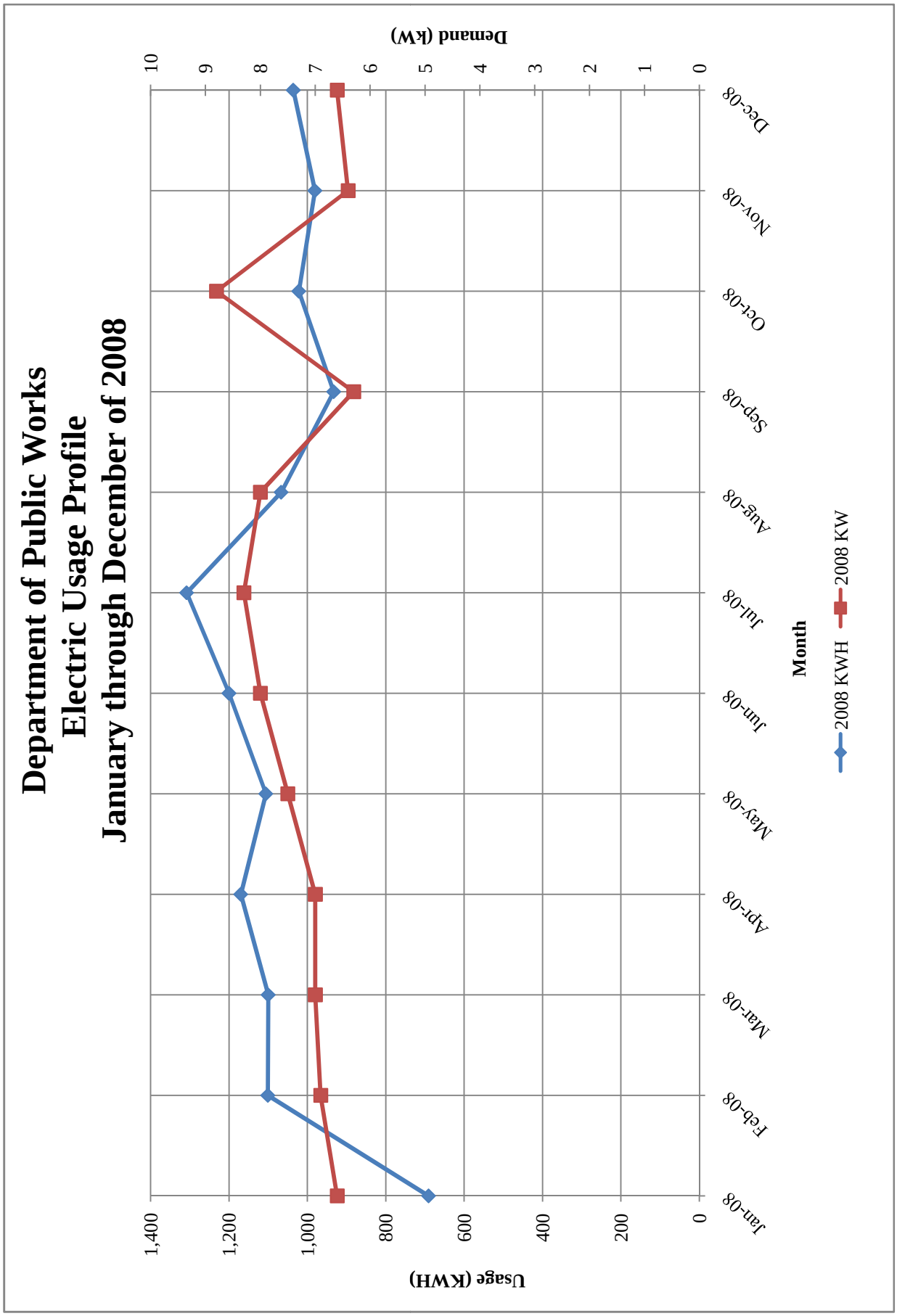
JCP&L

Ocean Township Office 5004 **2008**

Account # 10 00 29 3298 0 0

Meter # G17783691

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	365	
KWH	691	1,101	1,100	1,170	1,106	1,200	1,308	1,067	933	1,022	981	1,036	12,715	
KW	7	7	7	7	8	8	8	8	6	9	6	7	9	Max
Monthly Load Factor	14%	24%	21%	23%	20%	21%	21%	18%	21%	16%	21%	21%	20%	
Electric Delivery, $	$ 54	$ 80	$ 77	$ 73	$ 72	$ 75	$ 82	$ 77	$ 67	$ 66	$ 64	$ 72	$860	
Delivery $/kwh	$0.078	$0.073	$0.070	$0.063	$0.065	$0.063	$0.063	$0.073	$0.071	$0.065	$0.066	$0.070	$0.068	
Electric Supply, $	$ 78	$ 122	$ 125	$ 130	$ 123	$ 150	$ 188	$ 154	$ 135	$ 129	$ 125	$ 131	$1,589	
Supply $/kwh	$0.113	$0.111	$0.114	$0.111	$0.111	$0.125	$0.144	$0.144	$0.145	$0.126	$0.127	$0.127	$0.125	
Total Cost, $	$132	$203	$203	$203	$195	$250	$270	$231	$201	$195	$189	$204	$2,476	
$/KWH	$0.191	$0.184	$0.185	$0.174	$0.176	$0.208	$0.206	$0.217	$0.216	$0.191	$0.193	$0.197	**$0.195**	


Department of Public Works
Electric Usage Profile
January through December of 2008
Usage (KWH)
Demand (kW)
Month
2008 KWH
2008 KW
1,400
1,200
1,000
800
600
400
200
0
10
9
8
7
6
5
4
3
2
1
0
Jan-08
Feb-08
Mar-08
Apr-08
May-08
Jun-08
Jul-08
Aug-08
Sep-08
Oct-08
Nov-08
Dec-08

CONSTRUCTION COST AND REBATES

CONCORD ENGINEERING GROUP

Ocean Township - Buildings and Grounds Office

ECM 1 LIGHTING REPLACEMENT

	Qty	Unit Cost $	Material $	Labor $	Total $
Lighting Fixture Replacement	LS	$4,020	$0	$0	$4,020
Total Cost			$0	$0	$4,020
Utility Incentive - NJ Smart Start					($580)
Total Cost Less Incentive					$3,440

ECM 2 LIGHTING CONTROLS - OFFICE/STORAGE AREAS

	Qty	Unit Cost $	Material $	Labor $	Total $
Dual - Technology Sensor	9	$160	$720	$720	$1,440
Total Cost			$720	$720	$1,440
Utility Incentive - NJ Smart Start					($180)
Total Cost Less Incentive					$1,260

ECM 3 WINDOW REPLACEMENT

	Qty	Unit Cost $	Material $	Labor $	Total $
Demolition of Existing Windows	LS	$11,000	$0	$600	$600
New Windows - Anderson Replacement	12	$11,000	$5,670	$1,418	$7,088
Total Cost			$5,670	$2,018	$7,688
Utility Incentive - NJ Smart Start					$0
Total Cost Less Incentive					$7,688

ECM 4 BOILER REPLACEMENT

	Qty	Unit Cost $	Material $	Labor $	Total $
Demolition of Existing Boiler	1	$1,500	$1,000	$500	$1,500
New Oil Fired Boilers w/ Sequencer	3	$7,875	$5,250	$2,625	$23,625
Venting Modifications	1	$1,000	$600	$400	$1,000
Piping Modifications (Oil, HW, etc.)	1	$700	$200	$500	$700
Total Cost			$1,000	$500	$26,825
Utility Incentive - NJ Smart Start					$0
Total Cost Less Incentive					$26,825

ECM 5 AIR CONDITIONING UPGRADE

	Qty	Unit Cost $	Material $	Labor $	Total $
Demolition of Existing A/C Units	2	$100	$0	$100	$200
New A/C Units	2	$825	$660	$165	$1,650
Mounting Kit	2	$45	$45	$0	$90
Total Cost			$0	$100	$1,940
Utility Incentive - NJ Smart Start					($130)
Total Cost Less Incentive					$1,810

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
Buildings and Grounds Office

Building ID: 1774562
For 12-month Period Ending: December 31, 2008[1]
Date SEP becomes ineligible: N/A

Date SEP Generated: July 31, 2009

Facility
Buildings and Grounds Office
240 Whalepond Rd
Oakhurst, NJ 07755

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

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

Year Built: 1950
Gross Floor Area (ft²): 4,745

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

Site Energy Use Summary[3]	
Electricity (kBtu)	43,384
Natural Gas (kBtu)[4]	0
Total Energy (kBtu)	43,384

Energy Intensity[5]	
Site (kBtu/ft²/yr)	9
Source (kBtu/ft²/yr)	31

Emissions (based on site energy use)	
Greenhouse Gas Emissions ($MtCO_2e$/year)	7

Electric Distribution Utility
Jersey Central Power & Lt Co

National Average Comparison	
National Average Site EUI	77
National Average Source EUI	182
% Difference from National Average Source EUI	-83%
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	Buildings and Grounds Office	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	240 Whalepond 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		☐

Office (Office)

CRITERION	VALUE AS ENTERED IN PORTFOLIO MANAGER	VERIFICATION QUESTIONS	NOTES	☑
Gross Floor Area	4,745 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	13	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	1	Is this the number of personal computers in the Office?		☐
Percent Cooled	Less than 50%	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	1,036.00
11/01/2008	11/30/2008	981.00
10/01/2008	10/31/2008	1,022.00
09/01/2008	09/30/2008	933.00
08/01/2008	08/31/2008	1,067.00
07/01/2008	07/31/2008	1,308.00
06/01/2008	06/30/2008	1,200.00
05/01/2008	05/31/2008	1,106.00
04/01/2008	04/30/2008	1,170.00
03/01/2008	03/31/2008	1,100.00
02/01/2008	02/29/2008	1,101.00
01/01/2008	01/31/2008	691.00
Electric Consumption (kWh (thousand Watt-hours))		**12,715.00**
Electric Consumption (kBtu)		**43,383.58**
Total Electricity Consumption (kBtu)		**43,383.58**
Is this the total Electricity consumption at this building including all Electricity meters?		☐

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

Certifying Professional

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

Name: _____ Date: _____

Signature: _____

Signature is required when applying for the ENERGY STAR.

FOR YOUR RECORDS ONLY. DO NOT SUBMIT TO EPA.

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

Facility
Buildings and Grounds Office
240 Whalepond Rd
Oakhurst, NJ 07755

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

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

General Information

Buildings and Grounds Office	
Gross Floor Area Excluding Parking: (ft^2)	4,745
Year Built	1950
For 12-month Evaluation Period Ending Date:	December 31, 2008

Facility Space Use Summary

Office	
Space Type	Office
Gross Floor Area(ft^2)	4,745
Weekly operating hours	40
Workers on Main Shift	13
Number of PCs	1
Percent Cooled	Less than 50%
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	N/A	N/A	75	N/A	N/A
Energy Intensity					
Site (kBtu/ft^2)	9	9	20	N/A	77
Source (kBtu/ft^2)	31	31	65	N/A	182
Energy Cost					
$/year	$ 2,476.00	$ 2,476.00	$ 5,287.91	N/A	$ 20,859.08
$/$ft^2$/year	$ 0.52	$ 0.52	$ 1.11	N/A	$ 4.38
Greenhouse Gas Emissions					
$MtCO_2e$/year	7	7	15	N/A	59
$kgCO_2e/ft^2$/year	1	1	2	N/A	8

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

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

INVESTMENT GRADE LIGHTING AUDIT

CONCORD ENGINEERING GROUP

CEG Job #: 9C09048
Project: Ocean Twp. Energy Audit
Address: 240 Whalepond Rd
City: Oakhurst, NJ
Building SF: 4,745

"Buildings and Ground Office"

DATE: 07/07/2009
KWH COST: $0.195

EXISTING LIGHTING										PROPOSED LIGHTING								SAVINGS			
Line No.	CEG Type	Fixture Location	No. eFixts	Fixture eType	Yearly Usage	Watts Used	Total kW	kWh/Yr Fixtures	Yearly $ Cost	No. rFixts	Replacement-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	-	Lunch Room	2	1'x8' 2-Lamp T-12 60W Ind Strip w/ Refl	2080	156	0.31	648.96	$126.55	2	Metalux DI-296T8 (2)59WF96T8/SPX35 Magnetek Triad Ballast	123	0.25	511.68	$99.78	$175.00	$350.00	0.07	137.28	$26.77	13.07
2	-	Office	2	1'x8' 2-Lamp T-12 60W Ind Strip w/ Refl	2080	156	0.31	648.96	$126.55	2	Metalux DI-296T8 (2)59WF96T8/SPX35 Magnetek Triad Ballast	123	0.25	511.68	$99.78	$175.00	$350.00	0.07	137.28	$26.77	13.07
4	-	Wood Shop	7	1'x8' 2-Lamp T-12 60W Ind Strip w/ Refl	2080	156	1.09	2271.36	$442.92	7	Metalux DI-296T8 (2)59WF96T8/SPX35 Magnetek Triad Ballast	123	0.86	1790.88	$349.22	$175.00	$1,225.00	0.23	480.48	$93.69	13.07
5	-		1	1'x8' 4-Lamp T-12 60W Ind Strip	2080	240	0.24	499.2	$97.34	1	Metalux DI-296T8 (2)59WF96T8/SPX35 Magnetek Triad Ballast	123	0.12	255.84	$49.89	$175.00	$175.00	0.12	243.36	$47.46	3.69
7	-	Plans Room	3	1'x8' 2-Lamp T-12 60W Ind Strip w/ Refl	2080	156	0.47	973.44	$189.82	3	Metalux DI-296T8 (2)59WF96T8/SPX35 Magnetek Triad Ballast	123	0.37	767.52	$149.67	$175.00	$525.00	0.10	205.92	$40.15	13.07
8	-	Storage Room	1	150 W A-Lamp	520	150	0.15	78	$15.21	1	26 W CFL	26	0.03	13.52	$2.64	$15.00	$15.00	0.12	64.48	$12.57	1.19
9	-	Boiler Room	1	150 W A-Lamp	520	150	0.15	78	$15.21	1	26 W CFL	26	0.03	13.52	$2.64	$15.00	$15.00	0.12	64.48	$12.57	1.19
10	-	Toilet Room	1	2'x4' 4-Lamp T-12 34W Prismatic Lay-in	2080	160	0.16	332.8	$64.90	1	Metalux 2GC8-332-UNV (3)F32T8 Lamps Electronic Ballast	91	0.09	189.28	$36.91	$140.00	$140.00	0.07	143.52	$27.99	5.00
11	-	Locker Room	7	1'x8' 2-Lamp T-12 60W Ind Strip w/ Refl	2080	156	1.09	2271.36	$442.92	7	Metalux DI-296T8 (2)59WF96T8/SPX35 Magnetek Triad Ballast	123	0.86	1790.88	$349.22	$175.00	$1,225.00	0.23	480.48	$93.69	13.07
		Totals	25				3.98	7802.08	$1,521.41	25			2.85	5844.80	$1,139.74		$4,020.00	1.13	1957.28	$381.67	10.53

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