



ENERGY AUDIT – FINAL REPORT

**OCEAN TOWNSHIP
SUNSET AVENUE GARAGE
3605 Sunset Avenue
Ocean, NJ 07712**

**ATTN: MR. ANDREW BRANNEN,
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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
Sunset Avenue Garage
3605 Sunset Avenue
Ocean, NJ 07712

Municipal Contact Person: Bill McMahon
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 | \$17,025 |
| Natural Gas | \$13,193 |
| Total | \$30,218 |

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 $\pm 20\%$ 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 – Garage Bay Area | \$9,000 | \$1,871 | 4.8 | 419% |
| 2 | Lighting Upgrade – General | \$2,995 | \$599 | 5.0 | 400% |
| 3 | Air-to-Air Heat Pump Replacement | \$3,192 | \$138 | 23.1 | (35%) |
| 4 | Garage Bay Heating Upgrade | \$10,000 | \$6,565 | 1.5 | 753% |

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 – Garage Bay Area | 3.9 | 10,101 | - |
| 2 | Lighting Upgrade – General | 1.2 | 2,995 | - |
| 3 | Air-to-Air Heat Pump Replacement | - | 864 | - |
| 4 | Garage Bay Heating Upgrade | - | 5,450 | 3,803 |

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 Sunset Avenue Garage:

- **ECM #1:** Lighting Upgrade – Garage Bay Area
- **ECM #2:** Lighting Upgrade – General
- **ECM #4:** Garage Bay Heating Upgrade

II. INTRODUCTION

This comprehensive energy audit covers the 6,550 square foot Sunset Avenue Garage facility that includes a large bay, storage rooms, offices, and an upstairs and downstairs stock 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/ft²/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:

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

$$\text{Simple Lifetime Savings} = (\text{Yearly Savings} \times \text{ECM Lifetime})$$

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

$$\text{Lifetime Maintenance Savings} = (\text{Yearly Maintenance Savings} \times \text{ECM Lifetime})$$

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 3 Phase 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.

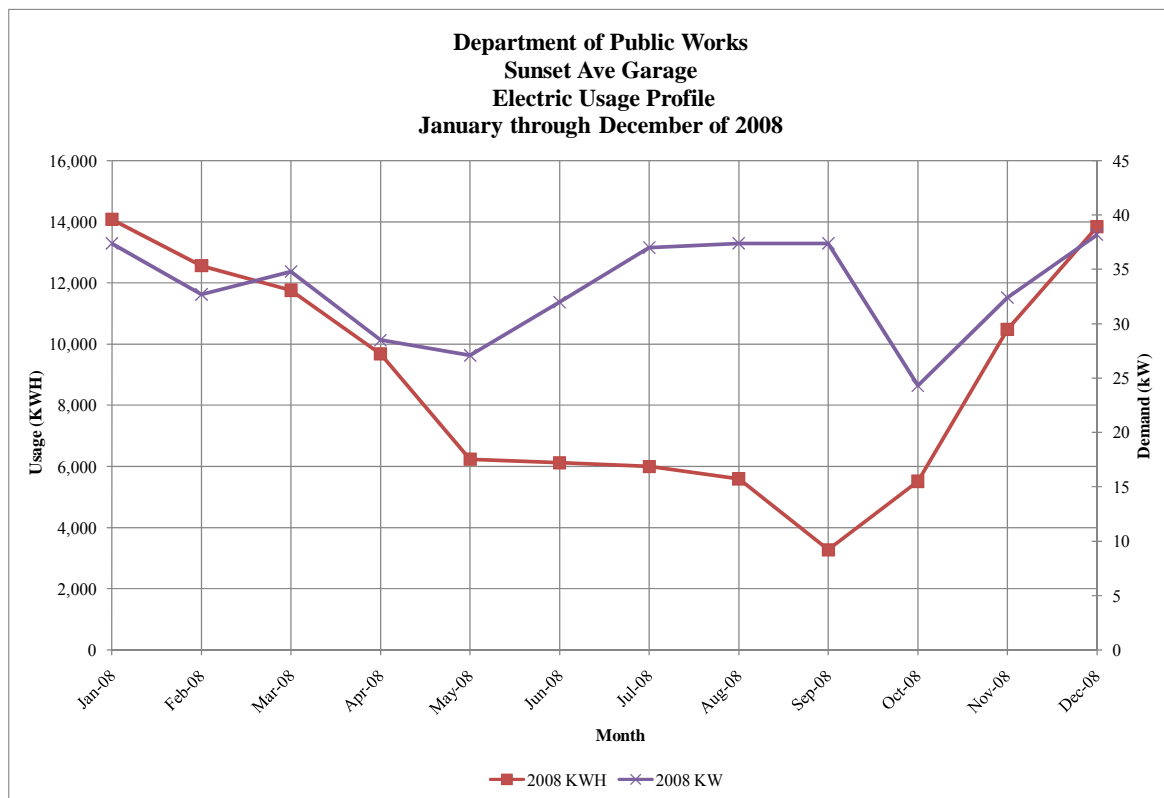
Table 4 and Figure 2 show the natural gas energy usage for the surveyed facility from January-08 to December-08. The Sunset Avenue Garage receives natural gas via New Jersey Natural Gas under the Basic Generation Service (BGS) rate. This rate has two component charges that depend on the amount of therms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

| <u>Description</u> | <u>Average</u> |
|--------------------|-----------------|
| Electricity | 16¢ / kWh |
| Natural Gas | \$1.497 / Therm |

**Table 3
Electricity Billing Data**

| MONTH OF USE | CONSUMPTION KWH | DEMAND | TOTAL BILL |
|---------------|--------------------|---------------|-----------------|
| 1/08 | 14,080 | 37 | \$2,129 |
| 2/08 | 12,560 | 33 | \$1,890 |
| 3/08 | 11,760 | 35 | \$1,749 |
| 4/08 | 9,680 | 29 | \$1,405 |
| 5/08 | 6,240 | 27 | \$ 962 |
| 6/08 | 6,120 | 32 | \$ 954 |
| 7/08 | 6,000 | 37 | \$1,116 |
| 8/08 | 5,600 | 37 | \$1,052 |
| 9/08 | 3,280 | 37 | \$1,020 |
| 10/08 | 5,520 | 24 | \$ 907 |
| 11/08 | 10,480 | 32 | \$1,641 |
| 12/08 | 13,840 | 38 | \$2,200 |
| Totals | 105,160 | 38 Max | \$17,025 |

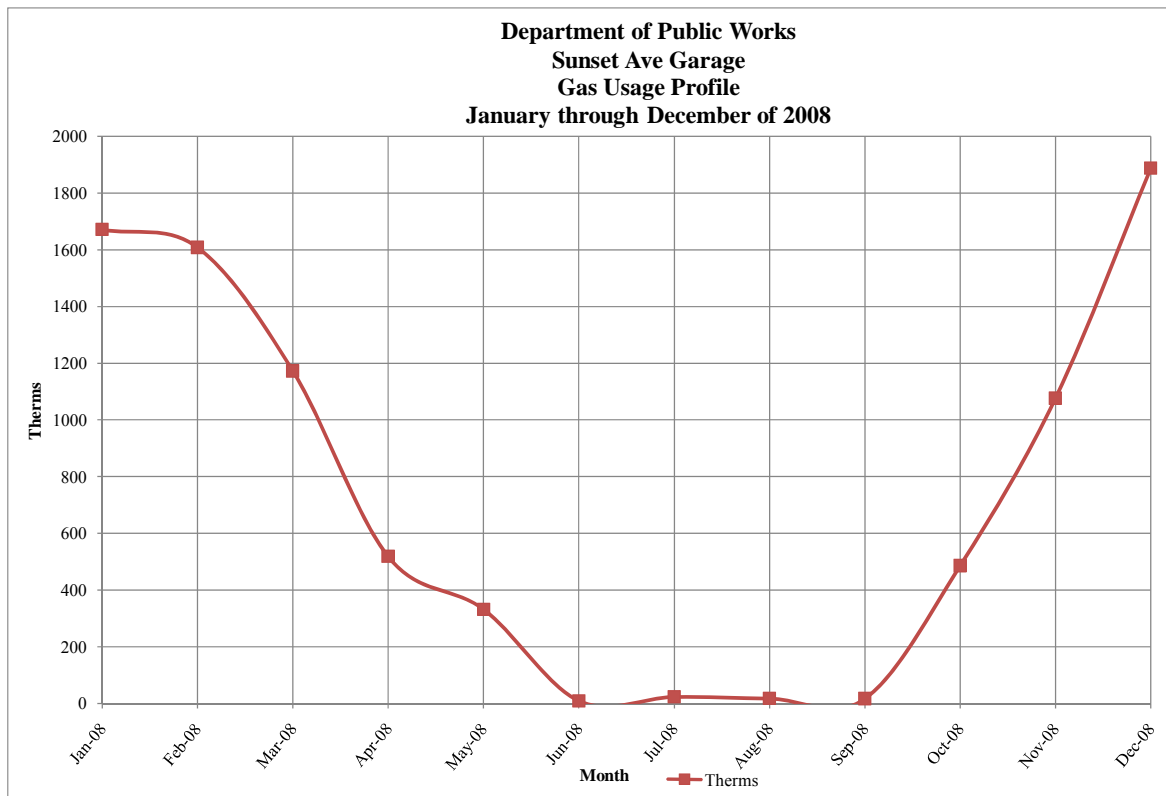
**Figure 1
Electricity Usage Profile**



**Table 4
Natural Gas Billing Data**

| MONTH OF USE | CONSUMPTION (THERMS) | TOTAL BILL |
|---------------|----------------------|-------------------|
| 1/08 | 1671.02 | \$2,312.62 |
| 2/08 | 1607.58 | \$2,398.25 |
| 3/08 | 1172.34 | \$1,847.46 |
| 4/08 | 517.867 | \$ 874.15 |
| 5/08 | 331.11 | \$ 619.08 |
| 6/08 | 8.19 | \$ 30.89 |
| 7/08 | 22.42 | \$ 57.1 |
| 8/08 | 17.55 | \$ 42.73 |
| 9/08 | 16.408 | \$ 55.23 |
| 10/08 | 485.55 | \$ 825.97 |
| 11/08 | 1075.9 | \$ 1,522.1 |
| 12/08 | 1886.92 | \$2,607.59 |
| Totals | 8812.85 | \$13,193.2 |

**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:

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

$$\text{Electric} = \frac{(105,160 \text{ kWh} * 1000 \text{ W/kW} * 3.414 \text{ btu/hW})}{\left(\frac{1000 \text{ Btu/h}}{1 \text{ kBtu/h}}\right)} = \underline{359,016.24 \text{ kBtu}}$$

$$\text{Natural Gas} = \frac{(8,812.8 \text{ therms} * 100,000 \text{ Btu/1 therm})}{\left(\frac{1000 \text{ Btu/h}}{1 \text{ kBtu/h}}\right)} = \underline{881,280 \text{ kBtu}}$$

$$\text{Building EUI} = \frac{(359,016.24 \text{ kBtu} + 881,280 \text{ kBtu})}{6,550 \text{ SF}} = \frac{1,240,296.24 \text{ kBtu}}{6,550 \text{ SF}}$$

Sunset Avenue Garage EUI = 189.4 kBtu/SF Site Energy, 323.9 kBtu/SF Source Energy

As a comparison, data has been gathered by the US Department of Energy (DOE) for various facilities cataloging 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:

- Service (Vehicle Repair): 77 Btu/SF Site Energy, 150 kBtu/SF Source Energy.

Based on the information compiled for the studied facility, as compared to the national average the energy usage is approximately 245% higher than the baseline data.

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>

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

Specific building types are detailed on the ENERGY STAR website. Non-typical buildings are covered by an “Other” category. The Sunset Avenue Garage 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 Sunset Avenue Garage 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 of 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 date in order to monitor the performance of the building’s energy consuming systems.

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

V. FACILITY DESCRIPTION

The Ocean Township Garage on Sunset Avenue is a 6,550 square foot building constructed in 1979. The facility is split between offices, the garage bays and stock areas on the first and second floors. Twenty-seven (27) employees occupy the building for approximately fifty (50) hours during a typical work week. The facility is of steel-frame construction with an A-frame roof, and contains insulated ceiling and perimeter walls. The thickness and R-value of the insulation was unable to be determined. In the rear of the garage there are three (3) un-heated storage containers used for additional storage.

It is also pertinent to note, that the roof over the garage bays has large sky-lights that are utilized to provide natural daylight to the garage area during the day time. However, these sky-lights are extremely dirty and do not provide much daylight to the facility. During a typical work day the majority of the fluorescent and HID lighting remains on.

Heating System

The Sunset Avenue Garage facility is heated with two separate systems. The offices are heated via a Goodman split system heat pump unit located in the first floor stock room. The split system heat pump is approximately ten (10) years of age and has about (5) years service life remaining based on 2007 ASHRAE Applications Handbook.

The garage bays are heated via a gas-fired, heating and ventilating air-handling unit located in the second floor stock room. This unit provides forced hot air to the garage space via a ceiling mounted duct distribution system. The air-handling unit appears to be original to the facility (approximately thirty (30) years of age), however, the Power-Flame natural-gas burner associated with the unit is only seven (7) years of age with a manufactured date of November 2002.

Cooling System

Cooling is provided to the office and stock room area via the Goodman split system heat pump as described in the “Heating System” section.

The garage bay area is not cooled, but does have six (6) ceiling fans for air circulation.

Lighting

The garage lighting consists of 8’ T-12 light fixtures with magnetic ballasts, combined with 200 W metal halide wall packs and 400 W metal halide high bay lights.

The storage containers in the rear of the building contain 8’ T-12 lighting fixtures with magnetic ballasts and 95 W T-12 lamps.

The offices and stock room are lit by T-12 and T-8 fixtures of varying size and number of lamps.

VI. MAJOR EQUIPMENT LIST

Following the completion of the field survey a detailed equipment list was created. The equipment within this list is considered major energy consuming equipment whose replacement could yield substantial 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: Lighting Upgrade – Garage Bay Area

Description:

The Garage Bay Area is currently lit via fifteen (15) HID, 400 W Metal Halide fixtures that are mounted approximately 20'-0" above the finished floor. The lighting system is antiquated and the space would be better served with a more efficient, fluorescent lighting system. Studies have shown that metal halide lighting systems have a steep lumen depreciation rate (rate at which light is produced from fixture) which equates to approximately a 26% to 35% reduction in lighting output at 40% of the rated lamp life. In addition, the new fluorescent system will provide a better quality of light and save the Owner many dollars on replacement of the highly expensive metal halide lamps.

CEG recommends upgrading the lighting within the Garage Bay Area to an energy-efficient T-5 lighting system that includes new lighting fixtures with high efficiency, electronic ballasts and T-5 high output (HO) lamps. The T-5 HO lamps are rated for 20,000 hours versus the 10,000 hours for the 400W Metal Halide lamps so there would be a savings in replacement cost and labor. In addition to the standard lighting features of the T-5 fixtures; an occupancy sensor option should be selected for the lights in order to take advantage of reduced light levels when the Garage Bay is not occupied during the day. CEG also recommends the Township review cleaning the existing skylights that have become covered with debris over the years from the local trees and outdoors. If the skylights were clean the Owner could see savings from not having to keep all of the new fluorescent lighting on.

In addition to the above HID lighting, there are also five (5) 8'-0" long T12 fluorescent fixtures that are utilized for general lighting that should be replaced with more energy efficient T8 fixtures. The three (3) HID, 250 W Metal Halide wall-packs will remain as there is no "efficient" replacement to replace this fixture with at this time.

This measure will consist of the following:

- Replacement of all the HID, 400 W Metal Halide fixtures in the Garage Bay Area with approximately fifteen (15), 4-lamp T5HO high bay fixtures with reflectors and high-efficiency, electronic ballasts.
- Replacement of the 8'-0" long T12 fixtures with more energy efficient T8 fixtures.

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:

HID Replacement: Replacement of a 250 W HID fixture to a T-5 or T-8 fixture warrants the following incentive: \$50 per fixture.

$$\text{Smart Start}^{\circledR} \text{ Incentive} = (\# \text{ of fixtures} \times \$50) = (15 \times \$50) = \underline{\$750}$$

T12 Replacement: 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.

$$\text{Smart Start}^{\circledR} \text{ Incentive} = (\# \text{ of 1-2 lamp fixtures} \times \$25) = (5 \times \$25) = \underline{\$125}$$

$$\text{Total Smart Start Incentive} = \$750 + \$125 = \underline{\$875}$$

Maintenance savings are calculated based on the facility operational hours as indicated by the Owner. For the Garage Bay the estimated operational hours are 2,600 hours per year. Based on the lamp life comparison, there will be two (2) complete lamp replacements required for the metal halide system at the time when one (1) complete lamp replacement would be required for the fluorescent lighting system. Based on industry pricing, the lamp cost for a 400W metal halide lamp is approximately ±\$35 per lamp and a T-5 54HO fluorescent lamp is approximately ±\$5 per lamp. Maintenance savings can also be realized with the replacement of a T12 fixture with a comparable T8 fixture. Therefore, the maintenance savings for this ECM are calculated as follows:

HID Replacement Maintenance Savings:

$$\text{Maintenance Savings} = (\# \text{ of MH lamps} \times \$35 \text{ per lamp}) - (\# \text{ of T5HO lamps} \times \$5 \text{ per lamp})$$

$$\text{Maintenance Savings} = (15 \text{ lamps} \times \$35 \text{ per lamp}) - (60 \text{ lamps} \times \$5 \text{ per lamp}) = \underline{\$225}$$

It is pertinent to note, that installation labor was not included in the maintenance savings.

T12 Replacement Maintenance Savings:

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

$$\text{Maintenance Savings} = (10 \times 33\% \text{ reduction} \times \$4.00) + (\$5 \times 3) = \underline{\$30}$$

$$\text{Total Maintenance Savings} = \$225 + \$30 = \underline{\$255}$$

Energy Savings Summary:

| ECM #1 - ENERGY SAVINGS SUMMARY | |
|--|----------|
| Installation Cost (\$): | \$9,875 |
| NJ Smart Start Equipment Incentive (\$): | (\$875) |
| Net Installation Cost (\$): | \$9,000 |
| Annual Maintenance Savings (\$ / yr): | \$255 |
| Annual Energy Savings (\$ / yr): | \$1,616 |
| Annual Net Savings (\$ / yr): | \$1,871 |
| Simple Payback (yrs): | 4.8 |
| Simple Lifetime Return On Investment (%): | 419% |
| Estimated ECM Lifetime (yr): | 25 |
| Simple Lifetime Maintenance Savings (\$) | \$6,375 |
| Simple Lifetime Energy Savings (\$): | \$40,400 |

ECM #2: Lighting Upgrade - General

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.

This ECM shall replace all T12 fixtures throughout the facility with new T8 fixtures.

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.

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

$$\text{Smart Start}^{\circledR} \text{ Incentive} = (23 \times \$ 25) + (2 \times \$ 30) = \underline{\$635}$$

Maintenance Savings are calculated as follows:

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

$$\text{Maintenance Savings} = (52 \times 33\% \text{ reduction} \times \$ 2.00) + (\$5 \times 17) = \underline{\$120}$$

Energy Savings Summary:

| ECM #2 - ENERGY SAVINGS SUMMARY | |
|--|----------------|
| Installation Cost (\$): | \$3,630 |
| NJ Smart Start Equipment Incentive (\$): | (\$635) |
| Net Installation Cost (\$): | \$2,995 |
| Annual Maintenance Savings (\$ / yr): | \$120 |
| Annual Energy Savings (\$ / yr): | \$479 |
| Annual Net Savings (\$ / yr): | \$599 |
| Simple Payback (yrs): | 5.0 |
| Simple Lifetime Return On Investment (%): | 400% |
| Estimated ECM Lifetime (yr): | 25 |
| Simple Lifetime Maintenance Savings (\$) | 3,000 |
| Simple Lifetime Energy Savings (\$): | \$11,975 |

ECM #3: Air-to-Air Heat Pump Replacement

Description:

Air-conditioning and heating is provided to the 1st Floor Office Area by a Goodman split system heat pump unit that is located in the Stock Room. The existing heat pump is inefficient with a Seasonal Energy Efficiency Ratio (SEER) of 10.0 for cooling performance and Coefficient of Performance (COP) of 3.0 for heating performance. The NJ State Energy Code (ASHRAE 90.1-2004) mandates a minimum energy efficiency of 12.0 SEER for units of this type. The existing split system unit is operating below the Energy Code baseline efficiency. The existing split system heat pump is ten (10) years old and has approximately five (5) years remaining of expected service life according to the 2007 ASHRAE Applications Handbook. However, with the rising cost of energy, the efficiency increase due to the new equipment could save significant energy costs making the early replacement valid.

This energy conservation measure will replace the existing split system heat pump unit serving the 1st Floor Office Area. The replacement of the heat pump system will include the following: replacement of heat pump condensing unit located at grade, replacement of the cased evaporator coil and air handling unit located in the 1st Floor Stock Room. The Energy Calculation is based on the following equipment: Arcoaire (R-410a refrigerant) heat pump air-handling unit with matching cased evaporator coil and remote air-cooled condensing unit. The capacity of the new unit for heating and cooling is based on the capacity of the existing unit. It is pertinent to note that calculations for the heating performance of the heat pump have not been conducted because negligible savings for heating will occur for this upgrade. The heating performance of the new heat pump will be comparable to the existing unit.

Energy Savings Calculations:

Existing Air Conditioning Unit

Rated Capacity = 1.5 Tons

Condenser Unit Efficiency = 10.0 SEER

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

Average Cost of Electricity = \$0.16/kWh

Proposed High-Efficiency Air Conditioning Unit

Rated Capacity = 1.5 Tons

New Condenser Unit Efficiency = 15.0 SEER

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

$$EnergySavings = \frac{[1.5 CoolingTons \times 12,000 Btu / ton]}{[1000W / kW]} \times \left(\frac{1}{10.0} - \frac{1}{15.0} \right) \times 0.80 \times 1,800 hours = 864 kWh / yr$$

Energy Cost Savings = 864 kWh * \$0.16/kWh = \$138 / Yr.

NJ Smart Start® Program Incentives are calculated as follows:

From Appendix C, the replacement of an air-to-air heat pump system totaling less than 5.4 cooling tons with efficiency greater than 14 SEER, warrants an incentive of \$92 per cooling ton.

Smart Start® Equipment Incentive = (1.5 Tons x \$92 per ton) = \$138

Energy Savings Summary:

| ECM #3 - ENERGY SAVINGS SUMMARY | |
|--|----------------|
| Installation Cost (\$): | \$3,330 |
| NJ Smart Start Equipment Incentive (\$): | (\$138) |
| Net Installation Cost (\$): | \$3,192 |
| Annual Maintenance Savings (\$ / yr): | - |
| Annual Energy Savings (\$ / yr): | \$138 |
| Annual Net Savings (\$ / yr): | \$138 |
| Simple Payback (yrs): | 23.1 |
| Simple Lifetime Return On Investment (%): | (35%) |
| Estimated ECM Lifetime (yr): | 15 |
| Simple Lifetime Maintenance Savings (\$) | - |
| Simple Lifetime Energy Savings (\$): | \$2,070 |

ECM #4: Garage Bay Heating Upgrade

Description:

The Garage Bay Area is heated via a gas-fired, heating and ventilating air-handling unit located in the second floor stock room. This unit provides forced hot air to the garage space via a ceiling mounted duct distribution system. The air-handling unit appears to be original to the facility (approximately thirty (30) years of age); however, the Power-Flame natural-gas burner associated with the unit is only seven (7) years of age with a manufactured date of November 2002. Heating a large space like the Garage Bay Area with a forced hot air system is not the most efficient means of heating a space of this type. The workers did not complain of inadequate working conditions during the winter time, however, CEG believes there could be efficiency and cost savings in utilizing a low intensity infrared (IR) tube heating system in-lieu of the forced air heating system.

Our team recommends replacing the existing gas-fired unit heaters with a low intensity infrared (IR) tube heating system. When compared to convective heating systems, IR heaters provide more efficient heating in large areas and warehouses for two reasons: they only heat people and objects (not air) and they can be conveniently located and directed to provide heat to only a smaller section occupied by workers.

This ECM recommends the installation of IR heaters by Sterling Model SLR or equivalent in place of the air handling unit currently utilized. The Owner can choose to abandon the existing air-handling unit in place or remove the heater. CEG believes that abandoning the heater in place is the best option because the demolition will be very costly.

Energy Savings Calculations:

Garage Heat Loss Calculations:

Based on the size of the existing gas-fired heating unit and the use of engineering calculations, the heat loss for the Garage has been calculated to be approximately 325,000 Btu/h (65 Btu/h per SF, 5,000 SF). The Base Building Heat Loss calculation is based on maintaining a 60 ° F delta in temperature between indoor and outdoor ambient, respectively.

The heat loss that the warm-air system needs to overcome is actually greater than the base heat loss because infrared systems provides a higher mean radiant temperature (MRT) through warm floors, equipment, etc., and because stratification is lower than forced-air systems. Traditionally, warm air systems in industrial and commercial applications will require approximately 10 ° F higher average air temperatures to provide equivalent comfort as provided by an infrared system. Due to this fact, the following is the calculation of the heat loss the warm air system will be required to meet:

$$\begin{aligned}\text{Heat Loss}_{\text{WA}} &= (\text{Base Building Heat Loss} \times \text{Revised } \Delta T (70 \text{ } ^\circ \text{F})) / \text{Standard } \Delta T (60 \text{ } ^\circ \text{F}) \\ &= (325,000 \text{ Btu/h} \times 70 \text{ } ^\circ \text{F}) / (60 \text{ } ^\circ \text{F}) \\ &= 379,170 \text{ Btu/h}\end{aligned}$$

Estimated Fan Energy Savings:

The gas-fired air-handling unit has a large supply fan (approx. 3 HP) that runs each time the unit calls for heating. Assuming that this motor is 80% efficient and the total run hours is 2,600 hours per year, this equates to an electrical savings of:

$$\text{Fan Energy Savings} = \{0.746 \text{ kW/HP} \times \text{Motor HP} \times \text{Load Factor (0.75)} \times \text{Hours of Operation} \times \text{Cost of Electricity (\$0.16)}\} \div \text{Motor Efficiency}$$

$$\text{Total Fan energy Savings} = \underline{\$872}$$

Natural Gas Energy Savings:

To estimate the amount of energy consumed by the existing unit heaters or the infrared heaters throughout the heating season, the Degree Day method of energy estimating is being utilized. The equation is as follows:

$$\text{EnergyUsed} = \frac{H_L \times HDD \times Hrs}{\Delta t \times Eff \times V}$$

Where:

H_L = Building Heat Loss, BTU/Hr. (Warm Air = 379,170 Btu/h, Infrared = 325,000 Btu/h)

HDD = number of Heating Degree Days as Specified Base Temperature
(Warm Air $DD_{70^\circ F} = 6,280$; Infrared $DD_{60^\circ F} = 3,878$ for Newark, NJ)

Hrs = Hours per Day

Δt = Design temperature difference, °F (Warm Air = 70 °F, Infrared = 60 °F)

Eff = Efficiency of Energy Utilization (Existing NG Heater = 0.60, Vented Infrared Heater = 0.84)

V = Heating value of fuel, BTU/Therm (Natural Gas = 100,000 Btu = 1 Therm)

Estimated Energy Consumption – Gas Fired Air Handling Unit:

$$\text{EnergyUsed} = \frac{(379,170 \text{ Btu/h}) \times (6,280^\circ F) \times 12h}{70^\circ F \times 60\% \times 100,000 \text{ Btu/Therm}}$$

$$\text{Energy Used} = 6,803 \text{ Therms/Year}$$

Estimated Energy Consumption – Infrared Heaters:

$$EnergyUsed = \frac{(325,000Btu / h) \times (3,878^{\circ}F) \times 12h}{60^{\circ}F \times 84\% \times 100,000Btu / Therm}$$

$$Energy Used = 3,000 \text{ Therms/Year}$$

$$Energy Savings = 6,803 - 3,000 = \underline{3,803} \text{ Therms per year}$$

$$Cost Savings = 3,803 \text{ Therms/yr} \times \$1.497/\text{Therm} = \underline{\$5,693} \text{ per year}$$

$$\begin{aligned} \underline{\text{Total Energy Savings}} &= \text{Fan Energy Savings} + \text{Natural Gas Savings} \\ &= \$872 + \$5,693 = \underline{\$6,565} \text{ per year} \end{aligned}$$

Also, incentives for the installation of the infrared heating system are not currently available and maintenance savings could not be adequately calculated because information was not available to baseline the savings.

Energy Savings Summary:

| ECM #4 - ENERGY SAVINGS SUMMARY | |
|--|--------------|
| Installation Cost (\$): | \$10,000 |
| NJ Smart Start Equipment Incentive (\$): | (\$0) |
| Net Installation Cost (\$): | \$10,000 |
| Annual Maintenance Savings (\$ / yr): | - |
| Annual Energy Savings (\$ / yr): | \$6,565 |
| Annual Net Savings (\$ / yr): | \$6,565 |
| Simple Payback (yrs): | 1.5 |
| Simple Lifetime Return On Investment (%): | 753% |
| Estimated ECM Lifetime (yr): | 13 |
| Simple Lifetime Maintenance Savings (\$) | - |
| Simple Lifetime Energy Savings (\$): | \$85,345 |

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 and wind 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 1,012 S.F. can be utilized for a PV system on the Sunset Ave Garage. A depiction of the area utilized is shown in Appendix E. Using this square footage it was determined that a system size of 15.8 kilowatts could be installed. A system of this size has an estimated kilowatt hour production of 24,766 kWh annually, reducing the overall utility bill by 24% percent. A detailed financial analysis can be found in Appendix E. 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 | 11.3 Years | 11.9% |
| Direct Purchase | 11.3 Years | 7.9% |

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 Sunset Avenue Garage 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 typical cooling profile (May-September). The increase in summertime energy consumption is usually due to the use of air-conditioners (air-conditioner load). There is a Goodman Heat Pump that cools the office and stock room. The Garage utilizes ceiling fans. The load profile for the balance of the year is relatively flat and is decreased because heating utilizes natural gas. Base-load shaping is important because a flat consumption profile will yield more competitive pricing when shopping for alternative energy solutions.

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 the manner in which energy 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 season. This facility utilizes natural gas to supply energy to its heating systems.

Tariff Analysis:

Electricity:

This facility 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.

Natural Gas:

The Township receives natural gas Delivery Service through New Jersey Natural Gas Company on a GSS (General Service Small) or GSL (General Service Large) tariff rate schedule. The Sunset Avenue Garage utilizes the GSS rate schedule, and it is available to any Customer in the entire territory served by the Company who use is *less* than 5,000 therms annually and uses gas for all purposes other than residential and interruptible service. Where the customer uses the Cooling, Air Conditioning and Pool Heating Service (CAC) under Special Provision 1 applicable to customers purchasing gas supply under Rider “A”, the Company will, upon application of the Customer, meter the space heating and the “CAC” separately. This service is considered a “firm” service, where the customer may either purchase gas from Company’s Rider “A”, for Basic Gas Supply Service (BGSS) or from a Marketer or Broker. The basic charges under this tariff are for: Customer Charge, Demand Charge, 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 pay 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. Clean existing skylights to take advantage of day-lighting.

Electric Cost Summary

JCP&L (Rate - BGS)

Sunset Avenue Garage
3605 Sunset Ave, Ocean NJ, 07712

2008

Account # 10 00 12 3958 7 5

Meter # G28049454

| 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 | 14,080 | 12,560 | 11,760 | 9,680 | 6,240 | 6,120 | 6,000 | 5,600 | 5,520 | 5,520 | 10,480 | 13,840 | 107,400 |
| KW | 27.4 | 22.7 | 24.8 | 18.5 | 17.1 | 18.5 | 19.9 | 21.0 | 19.5 | 14.3 | 22.4 | 28.2 | 28.2 |
| Monthly Load Factor | 69% | 82% | 64% | 73% | 49% | 46% | 41% | 36% | 39% | 52% | 65% | 66% | 57% |
| Electric Delivery, \$ | \$588 | \$519 | \$464 | \$345 | \$275 | \$266 | \$258 | \$251 | \$230 | \$218 | \$336 | \$478 | \$4,227 |
| Delivery \$/kwh | \$0.042 | \$0.041 | \$0.039 | \$0.036 | \$0.044 | \$0.044 | \$0.043 | \$0.045 | \$0.042 | \$0.039 | \$0.032 | \$0.035 | \$0.04 |
| Electric Supply, \$ | \$1,541 | \$1,371 | \$1,285 | \$1,060 | \$687 | \$774 | \$858 | \$802 | \$790 | \$689 | \$1,305 | \$1,722 | \$12,885 |
| Supply \$/kwh | \$0.109 | \$0.109 | \$0.109 | \$0.109 | \$0.110 | \$0.127 | \$0.143 | \$0.143 | \$0.143 | \$0.125 | \$0.125 | \$0.124 | \$0.12 |
| Total Cost, \$ | \$2,129 | \$1,890 | \$1,749 | \$1,405 | \$962 | \$1,040 | \$1,116 | \$1,052 | \$1,020 | \$907 | \$1,641 | \$2,200 | \$17,112 |
| \$/KWH | \$0.151 | \$0.150 | \$0.149 | \$0.145 | \$0.154 | \$0.170 | \$0.186 | \$0.188 | \$0.185 | \$0.164 | \$0.157 | \$0.159 | \$0.159 |

Estimated utility information. Utility bill not provided by owner.

Summary of Natural Gas Cost

NJ Natural Gas (Rate - BGS)

Sunset Avenue Garage
3605 Sunset Ave, Ocean NJ, 07712

2008

Account # 22-0008-5860-18

Meter # 00582492

| 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 | |
| Therms (Bumer Tip) | 1,671.02 | 1,607.58 | 1,172.34 | 517.87 | 330.77 | 8.19 | 22.42 | 17.55 | 16.41 | 485.55 | 1,073.88 | 1,886.92 | 8,810.49 |
| Total Distribution Cost | \$1,559 | \$1,672 | \$1,314 | \$630 | \$458 | \$12 | \$35 | \$20 | \$18 | \$58.9 | \$1,355 | \$2,441 | 10,172 |
| Cost per Therm | \$0.933 | \$1.040 | \$1.121 | \$1.217 | \$1.384 | \$1.485 | \$1.568 | \$1.132 | \$1.084 | \$1.357 | \$1.262 | \$1.293 | \$1.155 |
| Total Commodity Cost | \$754 | \$726 | \$534 | \$244 | \$161 | \$19 | \$22 | \$23 | \$37 | \$167 | \$167 | \$167 | 3,021 |
| Cost per Therm | \$0.45 | \$0.45 | \$0.46 | \$0.47 | \$0.49 | \$2.29 | \$0.98 | \$1.30 | \$2.28 | \$0.34 | \$0.16 | \$0.09 | \$0.34 |
| Total Cost | \$2,313 | \$2,398 | \$1,847 | \$874 | \$619 | \$31 | \$57 | \$43 | \$55 | \$826 | \$1,522 | \$2,608 | \$13,193 |
| Cost per Therm | \$1.384 | \$1.492 | \$1.576 | \$1.688 | \$1.872 | \$3.772 | \$2.547 | \$2.435 | \$3.366 | \$1.701 | \$1.417 | \$1.382 | \$1.497 |

CONSTRUCTION COST AND REBATES

CONCORD ENGINEERING GROUP

Sunset Avenue Garage

ECM 1 LIGHTING UPGRADE - GARAGE BAY AREA

| | Qty | Unit Cost \$ | Material \$ | Labor \$ | Total \$ |
|------------------------------------|-----|--------------|-------------|------------|----------------|
| Lighting Fixture Replacement | LS | \$9,875 | <u>\$0</u> | <u>\$0</u> | <u>\$9,875</u> |
| Total Cost | | | \$0 | \$0 | \$9,875 |
| Utility Incentive - NJ Smart Start | | | | | <u>(\$875)</u> |
| Total Cost Less Incentive | | | | | \$9,000 |

ECM 2 LIGHTING UPGRADE - GENERAL

| | Qty | Unit Cost \$ | Material \$ | Labor \$ | Total \$ |
|------------------------------------|-----|--------------|-------------|------------|----------------|
| Lighting Fixture Replacement | LS | \$3,630 | <u>\$0</u> | <u>\$0</u> | <u>\$3,630</u> |
| Total Cost | | | \$0 | \$0 | \$3,630 |
| Utility Incentive - NJ Smart Start | | | | | <u>(\$635)</u> |
| Total Cost Less Incentive | | | | | \$2,995 |

ECM 3 AIR TO AIR HEAT PUMP REPLACEMENT

| | Qty | Unit Cost \$ | Material \$ | Labor \$ | Total \$ |
|------------------------------------|-----|--------------|--------------|--------------|----------------|
| 1.5-Ton Arcoaire Heat Pump | 1 | \$1,800 | \$1,200 | \$600 | \$1,800 |
| 1.5-Ton A-Coil | 1 | \$480 | \$320 | \$160 | \$480 |
| 1.5-Ton Air Handling Unit | 1 | \$1,050 | <u>\$700</u> | <u>\$350</u> | <u>\$1,050</u> |
| Total Cost | | | \$2,220 | \$1,110 | \$3,330 |
| Utility Incentive - NJ Smart Start | | | | | <u>(\$138)</u> |
| Total Cost Less Incentive | | | | | \$3,192 |

ECM 4 GARAGE BAY HEATING UPGRADE

| | Qty | Unit Cost \$ | Material \$ | Labor \$ | Total \$ |
|------------------------------------|-----|--------------|----------------|----------------|----------------|
| IR Heaters | 4 | \$1,275 | \$850 | \$425 | \$5,100 |
| Gas Piping Modifications - LS | 1 | \$4,900 | <u>\$3,270</u> | <u>\$1,630</u> | <u>\$4,900</u> |
| Total Cost | | | \$4,120 | \$2,055 | \$10,000 |
| Utility Incentive - NJ Smart Start | | | | | <u>\$0</u> |
| Total Cost Less Incentive | | | | | \$10,000 |



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SmartStart Building Incentives

The NJ SmartStart Buildings Program offers financial incentives on a wide variety of building system equipment. The incentives were developed to help offset the initial cost of energy-efficient equipment. The following tables show the current available incentives as of January, 2009:

Electric Chillers

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

Gas Cooling

| | |
|----------------------------|---|
| Gas Absorption Chillers | \$185 - \$400 per ton |
| Gas Engine-Driven Chillers | Calculated through custom measure path) |

Desiccant Systems

| | |
|--|----------------------------------|
| | \$1.00 per cfm – gas or electric |
|--|----------------------------------|

Electric Unitary HVAC

| | |
|-----------------------------------|---------------------|
| Unitary AC and Split Systems | \$73 - \$93 per ton |
| Air-to-Air Heat Pumps | \$73 - \$92 per ton |
| Water-Source Heat Pumps | \$81 per ton |
| Packaged Terminal AC & HP | \$65 per ton |
| Central DX AC Systems | \$40- \$72 per ton |
| Dual Enthalpy Economizer Controls | \$250 |

Ground Source Heat Pumps

| | |
|-------------------------|---------------|
| Closed Loop & Open Loop | \$370 per ton |
|-------------------------|---------------|

Gas Heating

| | |
|--------------------------------------|--|
| Gas Fired Boilers < 300 MBH | \$300 per unit |
| Gas Fired Boilers ≥ 300 - 1500 MBH | \$1.75 per MBH |
| Gas Fired Boilers ≥1500 - ≤ 4000 MBH | \$1.00 per MBH |
| Gas Fired Boilers > 4000 MBH | (Calculated through Custom Measure Path) |
| Gas Furnaces | \$300 - \$400 per unit |

Variable Frequency Drives

| | |
|---------------------|-------------------------------|
| Variable Air Volume | \$65 - \$155 per hp |
| Chilled-Water Pumps | \$60 per hp |
| Compressors | \$5,250 to \$12,500 per drive |

Natural Gas Water Heating

| | |
|--|-------------------------|
| Gas Water Heaters ≤ 50 gallons | \$50 per unit |
| Gas-Fired Water Heaters >50 gallons | \$1.00 - \$2.00 per MBH |
| Gas-Fired Booster Water Heaters | \$17 - \$35 per MBH |

Premium Motors

| | |
|--------------------|------------------------|
| Three-Phase Motors | \$45 - \$700 per motor |
|--------------------|------------------------|

Prescriptive Lighting

| | |
|---|---|
| T-5 and T-8 Lamps w/Electronic Ballast in Existing Facilities | \$10 - \$30 per fixture, (depending on quantity) |
| Hard-Wired Compact Fluorescent | \$25 - \$30 per fixture |
| Metal Halide w/Pulse Start | \$25 per fixture |
| LED Exit Signs | \$10 - \$20 per fixture |
| T-5 and T-8 High Bay Fixtures | \$16 - \$284 per fixture |

Lighting Controls – Occupancy Sensors

| | |
|--|-----------------------------|
| Wall Mounted | \$20 per control |
| Remote Mounted | \$35 per control |
| Daylight Dimmers | \$25 per fixture |
| Occupancy Controlled hi- low Fluorescent Controls | \$25 per fixture controlled |

Lighting Controls – HID or Fluorescent Hi-Bay Controls

| | |
|------------------|-----------------------------|
| Occupancy hi-low | \$75 per fixture controlled |
| Daylight Dimming | \$75 per fixture controlled |

Other Equipment Incentives

| | |
|---|---|
| Performance Lighting | \$1.00 per watt per SF below program incentive threshold, currently 5% more energy efficient than ASHRAE 90.1-2004 for New Construction and Complete Renovation |
| Custom Electric and Gas Equipment Incentives | not prescriptive |



STATEMENT OF ENERGY PERFORMANCE

Sunset Avenue Garage

Building ID: 1774611
For 12-month Period Ending: December 31, 2008¹
Date SEP becomes ineligible: N/A

Date SEP Generated: August 11, 2009

Facility
 Sunset Avenue Garage
 3605 Sunset Ave
 Ocean, NJ 07712

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: 1979
Gross Floor Area (ft²): 6,550

Energy Performance Rating² (1-100) N/A

Site Energy Use Summary³

| | |
|---------------------------------|-----------|
| Natural Gas (kBtu) ⁴ | 881,200 |
| Electricity (kBtu) | 358,806 |
| Total Energy (kBtu) | 1,240,006 |

Energy Intensity⁵

| | |
|-----------------------------------|-----|
| Site (kBtu/ft ² /yr) | 189 |
| Source (kBtu/ft ² /yr) | 324 |

Emissions (based on site energy use)

| | |
|---|-----|
| Greenhouse Gas Emissions (MtCO ₂ e/year) | 102 |
|---|-----|

Electric Distribution Utility

Jersey Central Power & Lt Co

National Average Comparison

| | |
|---|---|
| National Average Site EUI | 25 |
| National Average Source EUI | 56 |
| % Difference from National Average Source EUI | 478% |
| Building Type | Storage/Shipping/Non-Refrigerated Warehouse |

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 Standards⁶ 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:

- 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.
- 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.
- Values represent energy consumption, annualized to a 12-month period.
- 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.
- Values represent energy intensity, annualized to a 12-month period.
- 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 | <input checked="" type="checkbox"/> |
|-------------------------|---|---|-------|-------------------------------------|
| Building Name | Sunset Avenue Garage | Is this the official building name to be displayed in the ENERGY STAR Registry of Labeled Buildings? | | <input type="checkbox"/> |
| Type | Storage/Shipping/Non-Refrigerated Warehouse | Is this an accurate description of the space in question? | | <input type="checkbox"/> |
| Location | 3605 Sunset Ave, Ocean, NJ 07712 | Is this address accurate and complete? Correct weather normalization requires an accurate zip code. | | <input type="checkbox"/> |
| 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 | | <input type="checkbox"/> |

Garage (Other)

| CRITERION | VALUE AS ENTERED IN PORTFOLIO MANAGER | VERIFICATION QUESTIONS | NOTES | <input checked="" type="checkbox"/> |
|-------------------------------|---------------------------------------|--|-------|-------------------------------------|
| Gross Floor Area | 6,550 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. | | <input type="checkbox"/> |
| Number of PCs | 1 (Optional) | Is this the number of personal computers in the space? | | <input type="checkbox"/> |
| Weekly operating hours | 50 Hours(Optional) | Is this the total number of hours per week that the space is 75% occupied? This number should exclude hours when the facility is occupied only by maintenance, security, or other support personnel. For facilities with a schedule that varies during the year, "operating hours/week" refers to the total weekly hours for the schedule most often followed. | | <input type="checkbox"/> |
| Workers on Main Shift | 27 (Optional) | Is this the number of employees present during the main shift? Note this is not the total number of employees or visitors who are in a building during an entire 24 hour period. For example, if there are two daily 8 hour shifts of 100 workers each, the Workers on Main Shift value is 100. | | <input type="checkbox"/> |

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 | 13,840.00 |
| 11/01/2008 | 11/30/2008 | 10,480.00 |
| 10/01/2008 | 10/31/2008 | 5,520.00 |
| 09/01/2008 | 09/30/2008 | 3,280.00 |
| 08/01/2008 | 08/31/2008 | 5,600.00 |
| 07/01/2008 | 07/31/2008 | 6,000.00 |
| 06/01/2008 | 06/30/2008 | 6,120.00 |
| 05/01/2008 | 05/31/2008 | 6,240.00 |
| 04/01/2008 | 04/30/2008 | 9,680.00 |
| 03/01/2008 | 03/31/2008 | 11,760.00 |
| 02/01/2008 | 02/29/2008 | 12,560.00 |
| 01/01/2008 | 01/31/2008 | 14,080.00 |
| Electric Consumption (kWh (thousand Watt-hours)) | | 105,160.00 |
| Electric Consumption (kBtu) | | 358,805.92 |
| Total Electricity Consumption (kBtu) | | 358,805.92 |
| Is this the total Electricity consumption at this building including all Electricity meters? | | <input type="checkbox"/> |

| Fuel Type: Natural Gas | | |
|--|------------|---------------------|
| Meter: Gas (therms) Space(s): Entire Facility | | |
| Start Date | End Date | Energy Use (therms) |
| 12/01/2008 | 12/31/2008 | 1,886.90 |
| 11/01/2008 | 11/30/2008 | 1,075.90 |
| 10/01/2008 | 10/31/2008 | 485.60 |
| 09/01/2008 | 09/30/2008 | 16.40 |
| 08/01/2008 | 08/31/2008 | 17.60 |
| 07/01/2008 | 07/31/2008 | 22.40 |
| 06/01/2008 | 06/30/2008 | 8.20 |
| 05/01/2008 | 05/31/2008 | 331.10 |
| 04/01/2008 | 04/30/2008 | 517.90 |

| | | |
|---|------------|--------------------------|
| 03/01/2008 | 03/31/2008 | 1,172.00 |
| 02/01/2008 | 02/29/2008 | 1,607.00 |
| 01/01/2008 | 01/31/2008 | 1,671.00 |
| Gas Consumption (therms) | | 8,812.00 |
| Gas Consumption (kBtu) | | 881,200.00 |
| Total Natural Gas Consumption (kBtu) | | 881,200.00 |
| Is this the total Natural Gas consumption at this building including all Natural Gas meters? | | <input type="checkbox"/> |

| | |
|--|--------------------------|
| 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. | <input type="checkbox"/> |

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
Sunset Avenue Garage
3605 Sunset Ave
Ocean, NJ 07712

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

| Sunset Avenue Garage | |
|--|-------------------|
| Gross Floor Area Excluding Parking: (ft ²) | 6,550 |
| Year Built | 1979 |
| For 12-month Evaluation Period Ending Date: | December 31, 2008 |

Facility Space Use Summary

| Garage | |
|-------------------------------------|---|
| Space Type | Other - Storage/Shipping/Non-Refrigerated Warehouse |
| Gross Floor Area(ft ²) | 6,550 |
| Number of PCs ^a | 1 |
| Weekly operating hours ^a | 50 |
| Workers on Main Shift ^a | 27 |

Energy Performance Comparison

| Performance Metrics | Evaluation Periods | | Comparisons | | |
|---|-------------------------------------|--------------------------------------|--------------|--------|------------------|
| | 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) | 189 | 189 | 0 | N/A | 25 |
| Source (kBtu/ft ²) | 324 | 324 | 0 | N/A | 56 |
| Energy Cost | | | | | |
| \$/year | \$ 30,218.00 | \$ 30,218.00 | N/A | N/A | \$ 3,990.54 |
| \$/ft ² /year | \$ 4.61 | \$ 4.61 | N/A | N/A | \$ 0.61 |
| Greenhouse Gas Emissions | | | | | |
| MtCO ₂ e/year | 102 | 102 | 0 | N/A | 13 |
| kgCO ₂ e/ft ² /year | 15 | 15 | 0 | N/A | 2 |

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

Notes:

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

MAJOR EQUIPMENT LIST
Concord Engineering Group
"Sunset Ave Garage"

Domestic Hot Water Heater

| Location | Area Served | Manufacturer | Qty | Model # | Serial # | Input (MBH) | Recovery (gal/h) | Capacity (gal) | Efficiency (%) | Fuel | Approx. Age | ASIRAE Service Life | Remaining Life | Notes |
|----------|-------------|--------------|-----|---------|----------|-------------|------------------|----------------|----------------|------|-------------|---------------------|----------------|-------|
| | | | - | | | - | - | - | - | - | - | 12 | - | - |

Air Handling Units

| Location | Area Served | Manufacturer | Qty | Model # | Serial # | Cooling Type | Cooling Eff. (BER) | Cooling Capacity | Heating Type | Input (MBH) | Output (MBH) | Heating Eff. (%) | Fuel | Volts | Phase | Amps | Approx. Age | ASIRAE Service Life | Remaining Life | Notes |
|--------------------|------------------|--------------|-----|----------|------------|--------------|--------------------|------------------|--------------------|-------------|--------------|------------------|-------------|-------|-------|------|-------------|---------------------|----------------|---|
| 1st Floor Stock Rm | 1st Floor Office | Goodman | 1 | A1805 | 9901487959 | DX R-22 | See Cond Unit | 17 MBH | Electric Heat Pump | - | 17.4 MBH | See Cond Unit | Electric | 208 | 1 | 60 | 10 | 15 | 5 | Interlocked with Heat Pump Control Unit |
| 2nd Floor Stock Rm | Garage Bay | - | 1 | RE30A-10 | 110252986 | N/A | N/A | N/A | Gas Heat Exchanger | *606 MBH | *485 MBH | 80% | Natural Gas | 115 | 1 | 60 | 30 | 20 | (10) | *Heating Capacity Exceeds Current Capacity. Burners are only 2 years old. |

AC Condensers - Heat Pump

| Location | Area Served | Manufacturer | Qty | Model # | Serial # | Cooling Capacity | Heating Capacity | Refrigerant Type | Heating Efficiency | Volts | Phase | Approx. Age | ASIRAE Service Life | Remaining Life | Notes |
|----------|------------------|--------------|-----|-----------|------------|------------------|------------------|------------------|--------------------|-------|-------|-------------|---------------------|----------------|------------------------------|
| Grade | 1st Floor Office | Goodman | 1 | CPKE18-1A | 9807472590 | 17 MBH | 17.4 MBH | R-22 | 3.0 COP | 208 | 1 | 10 | 15 | 5 | Interlocked with Goodman AHU |

Air Compressor

| Location | Area Served | Manufacturer | Qty | Model # | CFM | HP | Pressure | Capacity | Volts | Phase | FLA | Approx. Age | ASIRAE Service Life | Remaining Life | Notes |
|------------|---------------------|--------------|-----|---------|------|----------|----------|-------------|-------|-------|------|-------------|---------------------|----------------|---|
| Garage Bay | Tools in Garage Bay | - | 1 | 572688A | 34.2 | (2) 5 HP | 175 PSI | 129 Gallons | 208 | 3 | 14.2 | 10 | 20 | 10 | Intermittent Operation throughout Work Day. |

INVESTMENT GRADE LIGHTING AUDIT

CONCORD ENERGY SERVICES

DATE: 8/14/2009
KWH COST: \$0.160

"Sunset Avenue Garage"

CEG Job #: 9C09048
Project: Ocean Twp.
Address: 3605 Sunset Ave.
City: Ocean, NJ 07712
Building SF: 1,635
ECM#2 - LIGHTING UPGRADE - GENERAL

| EXISTING LIGHTING | | | | | | | | | | PROPOSED LIGHTING | | | | | | | | | | SAVINGS | | | |
|-------------------|----------|----------------------|------------|--|--------------|----------|-----------------|----------------|------------|--|------------|----------|-----------------|----------------|-----------------------|------------|-------------|-------------------|----------------|---------|--|--|--|
| Line No. | CEG Type | Fixture Location | No. eFixts | Fixture eType | Yearly Usage | Total kW | kWh/Yr Fixtures | Yearly \$ Cost | No. eFixts | Retro-Unit Description | Watts Used | Total kW | kWh/Yr Fixtures | Yearly \$ Cost | Unit Cost (INSTALLED) | Total Cost | kWh Savings | Yearly \$ Savings | Yearly Payback | | | | |
| 1 | - | Rear Storage | 3 | 8'-2-Lamp T-12, No Lens, Magnetic Ballast | 2,600 | 0.67 | 1731.6 | \$277.06 | 3 | 8' - 2 Lamp, Metalux DI-296T8 (2)59WF96T8 SPX35 Magnatek Triad Ballast | 123 | 0.37 | 959.4 | \$153.50 | \$175.00 | \$525.00 | 772.2 | \$123.55 | 4.25 | | | | |
| 2 | - | Storage Containers | 6 | 8'-2-Lamp T-12, No Lens, Magnetic Ballast | 2,600 | 1.33 | 3463.2 | \$554.11 | 6 | 8' - 2 Lamp, Metalux DI-296T8 (2)59WF96T8 SPX35 Magnatek Triad Ballast | 123 | 0.74 | 1918.8 | \$307.01 | \$175.00 | \$1,050.00 | 1544.4 | \$247.10 | 4.25 | | | | |
| 3 | - | Office | 1 | 2' x 2'-2-Lamp T-12 U-Tube, Prism Lens, Magnetic Ballast | 2,600 | 0.07 | 182 | \$29.12 | 1 | 2' x 2'-3-Lamp T8 28W Lamps, Prismatic Lens, Electronic Ballast Metalux | 65 | 0.07 | 169 | \$27.04 | \$105.00 | \$105.00 | 13 | \$2.08 | 50.48 | | | | |
| 4 | - | | 4 | 3-Lamp T-8, Prism Lens, Electronic Ballast | 2,600 | 0.33 | 852.8 | \$136.45 | 4 | No Change Required | 82 | 0.33 | 852.8 | \$136.45 | \$0.00 | \$0.00 | 0 | \$0.00 | 0.00 | | | | |
| 5 | - | Office 2 | 4 | 3-Lamp T-8, Prism Lens, Electronic Ballast | 2,600 | 0.33 | 852.8 | \$136.45 | 4 | No Change Required | 82 | 0.33 | 852.8 | \$136.45 | \$0.00 | \$0.00 | 0 | \$0.00 | 0.00 | | | | |
| 6 | - | 1st Floor Stock Room | 4 | 4' x 1'-2-Lamp T-12, No Lens, Magnetic Ballast | 2,600 | 0.32 | 832 | \$133.12 | 4 | 4' - 2 Lamp, 32W T-8 Industrial Strip w/ Elect Ballast; Metalux M/N SNF232 | 73 | 0.29 | 759.2 | \$121.47 | \$125.00 | \$500.00 | 72.8 | \$11.65 | 42.93 | | | | |
| 7 | - | 2nd Floor Stock Room | 8 | 4' x 1'-2-Lamp T-12, No Lens, Magnetic Ballast | 2,600 | 0.64 | 1664 | \$266.24 | 8 | 4' - 2 Lamp, 32W T-8 Industrial Strip w/ Elect Ballast; Metalux M/N SNF232 | 73 | 0.58 | 1518.4 | \$242.94 | \$125.00 | \$1,000.00 | 145.6 | \$23.30 | 42.93 | | | | |
| 8 | - | | 2 | 4-Lamp T-12, No Lens, Magnetic Ballast | 2,600 | 0.32 | 832 | \$133.12 | 2 | 4' - 3 Lamp, Metalux GC-332-UNV (3)F52T8 Lamps, Electronic Ballast | 81 | 0.16 | 421.2 | \$67.39 | \$100.00 | \$200.00 | 410.8 | \$65.73 | 3.04 | | | | |
| 9 | - | Bathroom | 2 | 4' x 1'-2-Lamp T-12, No Lens, Magnetic Ballast | 2,600 | 0.16 | 416 | \$66.56 | 2 | 4' - 2-Lamp 32W T-8 Industrial Strip w/ Elect Ballast; Metalux M/N SNF232 | 73 | 0.15 | 379.6 | \$60.74 | \$125.00 | \$250.00 | 36.4 | \$5.82 | 42.93 | | | | |
| 10 | - | Exterior Lighting | 3 | 250 W Metal Halide | 2,600 | 0.89 | 2301 | \$368.16 | 3 | No Change Required | 295 | 0.89 | 2301 | \$368.16 | \$0.00 | \$0.00 | 0 | \$0.00 | 0.00 | | | | |
| 11 | - | | 1 | 400 W Metal Halides | 2,600 | 0.46 | 1183 | \$189.28 | 1 | No Change Required | 455 | 0.46 | 1183 | \$189.28 | \$0.00 | \$0.00 | 0 | \$0.00 | 0.00 | | | | |
| Totals | | | 38 | | | 5.50 | 14310.4 | \$2,289.66 | 38 | | 4.35 | 11315.2 | \$1,810.43 | | \$3,650.00 | 1.15 | \$479.23 | 7.57 | | | | | |

| Project Name: LGEA Solar PV Project - Sunset Avenue Garage | | | | | | | | | | |
|--|------------------------|--|---------------------|------------------------|--------------|------------------|----------------|---------------|------------------------------|---------|
| Location: Ocean, NJ | | | | | | | | | | |
| Description: Photovoltaic System 95% Financing - 20 year | | | | | | | | | | |
| Simple Payback Analysis | | | | | | | | | | |
| | | Photovoltaic System 95% Financing - 20 year | | | | | | | | |
| Total Construction Cost | | \$142,830 | | | | | | | | |
| Annual kWh Production | | 24,766 | | | | | | | | |
| Annual Energy Cost Reduction | | \$3,963 | | | | | | | | |
| Annual SREC Revenue | | \$8,668 | | | | | | | | |
| First Cost Premium | | \$142,830 | | | | | | | | |
| Simple Payback: | | 11.31 Years | | | | | | | | |
| Life Cycle Cost Analysis | | | | | | | | | | |
| Analysis Period (years): | 25 | | | | | | | | Financing %: | 95% |
| Financing Term (mths): | 240 | | | | | | | | Maintenance Escalation Rate: | 3.0% |
| Average Energy Cost (\$/kWh): | \$0.160 | | | | | | | | Energy Cost Escalation Rate: | 3.0% |
| Financing Rate: | 7.00% | | | | | | | | SREC Value (\$/kWh): | \$0.350 |
| Period | Additional Cash Outlay | Energy kWh Production | Energy Cost Savings | Additional Maint Costs | SREC Revenue | Interest Expense | Loan Principal | Net Cash Flow | Cumulative Cash Flow | |
| 0 | \$7,142 | 0 | 0 | 0 | \$0 | 0 | 0 | (7,142) | 0 | |
| 1 | \$0 | 24,766 | \$3,963 | \$0 | \$8,668 | \$9,396 | \$3,228 | \$7 | (\$7,135) | |
| 2 | \$0 | 24,642 | \$4,081 | \$0 | \$8,625 | \$9,163 | \$3,461 | \$82 | (\$7,053) | |
| 3 | \$0 | 24,519 | \$4,204 | \$0 | \$8,582 | \$8,912 | \$3,712 | \$162 | (\$6,891) | |
| 4 | \$0 | 24,396 | \$4,330 | \$0 | \$8,539 | \$8,644 | \$3,980 | \$245 | (\$6,646) | |
| 5 | \$0 | 24,274 | \$4,460 | \$250 | \$8,496 | \$8,356 | \$4,268 | \$82 | (\$6,564) | |
| 6 | \$0 | 24,153 | \$4,594 | \$249 | \$8,454 | \$8,048 | \$4,576 | \$175 | (\$6,390) | |
| 7 | \$0 | 24,032 | \$4,731 | \$248 | \$8,411 | \$7,717 | \$4,907 | \$271 | (\$6,119) | |
| 8 | \$0 | 23,912 | \$4,873 | \$246 | \$8,369 | \$7,362 | \$5,262 | \$372 | (\$5,746) | |
| 9 | \$0 | 23,792 | \$5,020 | \$245 | \$8,327 | \$6,982 | \$5,642 | \$478 | (\$5,268) | |
| 10 | \$0 | 23,673 | \$5,170 | \$244 | \$8,286 | \$6,574 | \$6,050 | \$588 | (\$4,680) | |
| 11 | \$0 | 23,555 | \$5,325 | \$243 | \$8,244 | \$6,137 | \$6,487 | \$703 | (\$3,977) | |
| 12 | \$0 | 23,437 | \$5,485 | \$241 | \$8,203 | \$5,668 | \$6,956 | \$823 | (\$3,154) | |
| 13 | \$0 | 23,320 | \$5,650 | \$240 | \$8,162 | \$5,165 | \$7,459 | \$948 | (\$2,206) | |
| 14 | \$0 | 23,204 | \$5,819 | \$239 | \$8,121 | \$4,626 | \$7,998 | \$1,077 | (\$1,129) | |
| 15 | \$0 | 23,087 | \$5,994 | \$238 | \$8,081 | \$4,048 | \$8,576 | \$1,213 | \$84 | |
| 16 | \$0 | 22,972 | \$6,174 | \$237 | \$8,040 | \$3,428 | \$9,196 | \$1,353 | \$1,437 | |
| 17 | \$0 | 22,857 | \$6,359 | \$235 | \$8,000 | \$2,763 | \$9,861 | \$1,499 | \$2,936 | |
| 18 | \$0 | 22,743 | \$6,549 | \$234 | \$7,960 | \$2,050 | \$10,574 | \$1,651 | \$4,588 | |
| 19 | \$0 | 22,629 | \$6,746 | \$233 | \$7,920 | \$1,286 | \$11,338 | \$1,809 | \$6,397 | |
| 20 | \$0 | 22,516 | \$6,948 | \$232 | \$7,881 | \$466 | \$12,158 | \$1,973 | \$8,370 | |
| 21 | \$0 | 22,403 | \$7,157 | \$231 | \$7,841 | \$395 | \$11,177 | \$3,195 | \$11,565 | |
| 22 | \$0 | 22,291 | \$7,371 | \$230 | \$7,802 | \$270 | \$9,198 | \$5,476 | \$17,041 | |
| 23 | \$0 | 22,180 | \$7,593 | \$228 | \$7,763 | \$0 | \$0 | \$15,127 | \$32,168 | |
| 24 | \$0 | 22,069 | \$7,820 | \$227 | \$7,724 | \$0 | \$0 | \$15,317 | \$47,486 | |
| 25 | \$0 | 21,959 | \$8,055 | \$226 | \$7,686 | \$0 | \$0 | \$15,514 | \$63,000 | |
| Totals: | | 472,481 | \$106,475 | \$3,854 | \$165,368 | \$116,789 | \$135,688 | \$156,063 | \$122,113 | |
| Net Present Value (NPV) | | | | | | | \$8,612 | | | |
| Internal Rate of Return (IRR) | | | | | | | 11.9% | | | |

| Project Name: LGEA Solar PV Project - Sunset Avenue Garage | | | | | | | |
|--|--|-----------------------|---------------------|------------------------------|--------------|------------------|----------------------|
| Location: Ocean, NJ | | | | | | | |
| Description: Photovoltaic System - Direct Purchase | | | | | | | |
| Simple Payback Analysis | | | | | | | |
| | Photovoltaic System - Direct Purchase | | | | | | |
| Total Construction Cost | \$142,830 | | | | | | |
| Annual kWh Production | 24,766 | | | | | | |
| Annual Energy Cost Reduction | \$3,963 | | | | | | |
| Annual SREC Revenue | \$8,668 | | | | | | |
| First Cost Premium | \$142,830 | | | | | | |
| Simple Payback: | 11.31 Years | | | | | | |
| Life Cycle Cost Analysis | | | | | | | |
| Analysis Period (years): | 25 | | | Financing %: | 0% | | |
| Financing Term (mths): | 0 | | | Maintenance Escalation Rate: | 3.0% | | |
| Average Energy Cost (\$/kWh) | \$0.160 | | | 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 | \$142,830 | 0 | 0 | 0 | \$0 | (142,830) | 0 |
| 1 | \$0 | 24,766 | \$3,963 | \$0 | \$8,668 | \$12,631 | (\$130,199) |
| 2 | \$0 | 24,642 | \$4,081 | \$0 | \$8,625 | \$12,706 | (\$117,493) |
| 3 | \$0 | 24,519 | \$4,204 | \$0 | \$8,582 | \$12,785 | (\$104,708) |
| 4 | \$0 | 24,396 | \$4,330 | \$0 | \$8,539 | \$12,869 | (\$91,839) |
| 5 | \$0 | 24,274 | \$4,460 | \$250 | \$8,496 | \$12,706 | (\$79,133) |
| 6 | \$0 | 24,153 | \$4,594 | \$249 | \$8,454 | \$12,798 | (\$66,335) |
| 7 | \$0 | 24,032 | \$4,731 | \$248 | \$8,411 | \$12,895 | (\$53,440) |
| 8 | \$0 | 23,912 | \$4,873 | \$246 | \$8,369 | \$12,996 | (\$40,443) |
| 9 | \$0 | 23,792 | \$5,020 | \$245 | \$8,327 | \$13,102 | (\$27,342) |
| 10 | \$0 | 23,673 | \$5,170 | \$244 | \$8,286 | \$13,212 | (\$14,129) |
| 11 | \$0 | 23,555 | \$5,325 | \$243 | \$8,244 | \$13,327 | (\$802) |
| 12 | \$0 | 23,437 | \$5,485 | \$241 | \$8,203 | \$13,447 | \$12,644 |
| 13 | \$0 | 23,320 | \$5,650 | \$240 | \$8,162 | \$13,571 | \$26,216 |
| 14 | \$0 | 23,204 | \$5,819 | \$239 | \$8,121 | \$13,701 | \$39,917 |
| 15 | \$0 | 23,087 | \$5,994 | \$238 | \$8,081 | \$13,837 | \$53,754 |
| 16 | \$0 | 22,972 | \$6,174 | \$237 | \$8,040 | \$13,977 | \$67,731 |
| 17 | \$0 | 22,857 | \$6,359 | \$235 | \$8,000 | \$14,123 | \$81,854 |
| 18 | \$0 | 22,743 | \$6,549 | \$234 | \$7,960 | \$14,275 | \$96,129 |
| 19 | \$0 | 22,629 | \$6,746 | \$233 | \$7,920 | \$14,433 | \$110,562 |
| 20 | \$0 | 22,516 | \$6,948 | \$232 | \$7,881 | \$14,597 | \$125,159 |
| 21 | \$1 | 22,403 | \$7,157 | \$231 | \$7,841 | \$14,767 | \$139,927 |
| 22 | \$2 | 22,291 | \$7,371 | \$230 | \$7,802 | \$14,944 | \$154,870 |
| 23 | \$3 | 22,180 | \$7,593 | \$228 | \$7,763 | \$15,127 | \$169,998 |
| 24 | \$4 | 22,069 | \$7,820 | \$227 | \$7,724 | \$15,317 | \$185,315 |
| 25 | \$5 | 21,959 | \$8,055 | \$226 | \$7,686 | \$15,514 | \$200,829 |
| Totals: | | 472,481 | \$106,475 | \$3,854 | \$165,368 | \$343,659 | \$267,989 |
| Net Present Value (NPV) | | | | | | \$200,854 | |
| Internal Rate of Return (IRR) | | | | | | 7.9% | |

| 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 |
|----------------------|-------------------|-----------------|-----|-------------|-------------------|----------|------------------|-----------------------|--------|
| Sunset Avenue Garage | 1012.5 | Sunpower SPR230 | 69 | 14.7 | 1,015 | 15.87 | 24,766 | 2,277 | 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.