



**LOCAL GOVERNMENT
ENERGY AUDIT PROGRAM:
ENERGY AUDIT REPORT
PLEASANTVILLE
TOWERS ANNEX**

PREPARED FOR:

**PLEASANTVILLE HOUSING
AUTHORITY
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PLEASANTVILLE, NJ 08232
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I. EXECUTIVE SUMMARY

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

Pleasantville Housing Authority
Pleasantville Tower Annex
156 North Main Street
Pleasantville, NJ 08232

Authority Contact Person: Vernon Lawrence, Executive Director
Facility Contact Person: Joe Culligan, Facilities Supervisor

This audit is performed in connection with the New Jersey Clean Energy - Local Government Energy Audit Program. The energy audit is conducted to promote the mission of the office of Clean Energy, 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	\$ 32,429
Natural Gas	\$ 20,744
<hr/>	
Total	\$ 53,174

The potential annual energy cost savings for each energy conservation measure (ECM) and renewable energy measure (REM) are shown below in Table 1. Be aware that the ECM's and REM's are not additive because of the interrelation of some of the measures. This audit is consistent with an ASHRAE level 2 audit. The cost and savings for each measure is $\pm 20\%$. The evaluations are based on engineering estimations and industry standard calculation methods. More detailed analyses would require engineering simulation models, hard equipment specifications, and contractor bid pricing.

Table 1
Financial Summary Table

ENERGY CONSERVATION MEASURES (ECM's)					
ECM NO.	DESCRIPTION	NET INSTALLATION COST^A	ANNUAL SAVINGS^B	SIMPLE PAYBACK (Yrs)	SIMPLE LIFETIME ROI
ECM #1	Lighting Upgrade	\$22,476	\$15,892	1.4	960.6%
ECM #2	Lighting Controls	\$5,150	\$1,023	5.0	198.0%
ECM #3	Laundry Gas DHW Boiler	\$14,100	\$629	22.4	-33.1%
ECM #4	Rooftop Energy Recovery	\$70,356	\$1,485	47.4	-62.0%
ECM #5	Replace Thru-wall Units 1 for 1	\$70,000	\$3,664	19.1	-21.5%
ECM #6	Install VRV Cooling	\$246,640	\$6,224	39.6	-62.1%
ECM #7	Low Flow Toilets	\$21,000	\$807	26.0	-23.1%
RENEWABLE ENERGY MEASURES (REM's)					
ECM NO.	DESCRIPTION	NET INSTALLATION COST	ANNUAL SAVINGS	SIMPLE PAYBACK (Yrs)	SIMPLE LIFETIME ROI
REM #1	14 kW Parking Lot PV Array	\$98,676	\$8,507	11.6	115.5%
Notes:	A. Cost takes into consideration applicable NJ Smart Start TM incentives.				
	B. Savings takes into consideration applicable maintenance savings.				

The estimated demand and energy savings for each ECM and REM is shown below in Table 2. The descriptions in this table correspond to the ECM's and REM's listed in Table 1.

Table 2
Estimated Energy Savings Summary Table

ENERGY CONSERVATION MEASURES (ECM's)				
ECM NO.	DESCRIPTION	ANNUAL UTILITY REDUCTION		
		ELECTRIC DEMAND (KW)	ELECTRIC CONSUMPTION (KWH)	NATURAL GAS (THERMS)
ECM #1	Lighting Upgrade	0.0	0.0	0.0
ECM #2	Lighting Controls	1.5	6602.0	0.0
ECM #3	Laundry Gas DHW Boiler	1.0	6022.0	-274.0
ECM #4	Rooftop Energy Recovery	-4.0	-30747.0	5622.0
ECM #5	Replace Thru-wall Units 1 for 1	13.0	24263.0	0.0
ECM #6	Install VRV Cooling	3.0	40953.0	37.0
ECM #7	Low Flow Toilets	0.0	0.0	0.0
RENEWABLE ENERGY MEASURES (REM's)				
ECM NO.	DESCRIPTION	ANNUAL UTILITY REDUCTION		
		ELECTRIC DEMAND (KW)	ELECTRIC CONSUMPTION (KWH)	NATURAL GAS (THERMS)
REM #1	14 kW Parking Lot PV Array	10.9	15737.0	0.0

The Energy Conservation Measures (ECMs) identified within the report represents the potential annual savings at the facility. It is recommended to consider all ECMs as part of the Authority's initiative to save energy, reduce emissions, and lower operating costs. Concord Engineering Group (CEG) recommends proceeding with the implementation of all ECM's that provide a calculated simple payback at or under ten (10) years. All of the ECM's presented in this report have been categorized into three groups defined as Short-term (or Fast) Paybacks ranging from 0 to 5 years, Medium-term Paybacks ranging from 5 to 10 years, and Long-term Paybacks of over 10 years to assist the Authority in prioritizing projects.

Short-term Payback Energy Conservation Measures:

The following Energy Conservation Measures (ECMs) identified with a simple payback of 0 to 5 years are considered very cost effective and should be considered a high priority for the Authority. It should be noted that in many cases ECM's lying in this range can be performed utilizing qualified "in house" staff that can further reduce the payback period. It is recommended if the Authority proceeds with "in house" installation they review equipment being purchased to ensure the energy efficiency equipment standards outlined in this report are met or exceeded.

- ECM #1 – Lighting Upgrade
- ECM #2 – Lighting Controls

Long-term Payback Energy Conservation Measures:

The following Energy Conservation Measures (ECMs) identified with a simple payback of over 10 years. The ECMs that have much longer paybacks are considered capital improvement ECMs. These typically have high installation costs that are more difficult to justify based solely on the energy savings associated with the improvement. Despite the long paybacks, these ECMs in many cases provide valuable and much needed infrastructure improvements for the facility. These ECMs include boiler upgrades, HVAC equipment upgrades, etc. It should also be noted that projects under a 15 year payback should be reviewed in the event the Authority wishes to move forward with an Energy Savings Improvement Program where these projects could be included that program.

- ECM #3 – Laundry Gas Domestic Hot Water Boiler
- ECM #4 – Rooftop Energy Recovery
- ECM #5 – Replace Thru-wall Units 1 for 1
- ECM #6 – Install VRV Cooling
- ECM #7 – Low Flow Toilets

Renewable Energy Conservation Measures:

Pleasantville Towers has an estimated solar system potential of 14.1 kW DC that could generate 15,737 kilowatt-hours annually offsetting 7.54% of the total energy purchased from the grid. While solar is an economically viable option for the Authority to pursue, using either existing financing methods or alternative routes, such as a Power Purchase Agreement, the technical feasibility is currently in question. Given Atlantic Electric has currently closed this section of the grid to new applications for renewable energy development, any applications for this type of development would likely be rejected by the utility company to be interconnected with the grid. If the Authority is truly interested in pursuing renewable energy generation at its site we recommend reaching out to ACE prior to investing money into any necessary project development.

Energy Procurement Recommendations:

The Authority is currently not contracted with a third party supplier for electric and natural gas. CEG recommends they pursue contracting with a Third Party Supplier for commodity services in order to reduce energy costs.

Maintenance and Operational Recommendations:

In addition to the ECMs and REMs, there are maintenance and operational measures that can provide significant energy savings and provide immediate benefit. The ECMs listed above represent investments that can be made to the facility which are justified by the savings seen overtime. However, the maintenance items and small operational improvements below are typically achievable with on site staff or maintenance contractors and in turn have the potential to provide substantial operational savings compared to the costs associated. The following are recommendations which should be considered a priority in achieving an energy efficient building, further recommendations per building our provided in the building reports:

1. Chemically clean the condenser and evaporator coils periodically to optimize efficiency. Poorly maintained heat transfer surfaces can reduce efficiency 5-10%.
2. Maintain all weather stripping on windows and doors.
3. Clean all light fixtures to maximize light output.
4. Provide more frequent air filter changes to decrease overall system power usage and maintain better IAQ.
5. Verify all thermostats are utilizing setback and scheduling capabilities.

Implementation Strategy Moving Forward:

It is recommended the Authority strongly consider all projects with a simple payback of ten years and under for implementation. However consideration should be taken on projects over ten years as they may be necessary capital improvements such as the thru-wall unit replacement and low flow toilets. It should be noted while the thru-wall units energy expenditures are paid by the tenant it appears to be the Authority's responsibility for maintaining those units, as such a new more efficient unit will not only lower their tenants utility costs but reduce maintenance costs for the Authority. For the Low Flow toilets it is recommended the Authority pursue this upgrade over time and perhaps installing an allotted amount per year until all have been upgraded.

Overall Assessment:

Overall, the Pleasantville Towers Annex is maintained and operating fairly efficiently. There are numerous ECMs that can be implemented to further reduce energy use and save on the facility's operating costs. It is recommended the Authority review its long term planning and goals to assist in its decision making for install recommendations.

II. INTRODUCTION

The comprehensive energy audit covers the 35,379 square foot Pleasantville Tower Annex, which is a multi-family low rise that includes the following spaces laundry room, mechanical room, elevators, corridors, lobby, community room, offices, lounge, and fifty apartment units.

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 costs 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:

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

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

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

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

$$\text{Internal Rate of Return} = \sum_{n=0}^N \left(\frac{\text{Cash Flow of Period}}{(1 + \text{IRR})^n} \right)$$

$$\text{Net Present Value} = \sum_{n=0}^N \left(\frac{\text{Cash Flow of Period}}{(1 + \text{DR})^n} \right)$$

Net Present Value calculations based on Interest Rate of 3%.

IV. HISTORIC ENERGY CONSUMPTION/COST

A. Energy Usage / Tariffs

The energy usage for the facility has been tabulated and plotted in graph form as depicted within this section. Each energy source has been identified and monthly consumption and cost noted per the information provided by the Owner.

The electric usage profile represents the actual electrical usage for the facility. Atlantic City Electric (ACE) provides electricity to the facility under their Annual General Service rate structure. A Third Part Supplier (TPS) has not been contracted. The electric utility measures consumption in kilowatt-hours (KWH) and maximum demand in kilowatts (KW). One KWH usage is equivalent to 1000 watts running for one hour. One KW of electric demand is equivalent to 1000 watts running at any given time. 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 historical data received for the facility.

The gas usage profile shows the actual natural gas energy usage for the facility. South Jersey Gas provides natural gas to the facility under the General Service Gas (GSG) rate structure. A Third Part Supplier (TPS) has not been contracted. The gas utility measures consumption in cubic feet x 100 (CCF), and converts the quantity into Therms of energy. One Therm is equivalent to 100,000 BTUs of energy.

<u>Description</u>	<u>Average</u>
Electricity	15.5¢ / kWh
Natural Gas	\$1.11 / Therm

Table 4
Electricity Billing Data

ELECTRIC USAGE SUMMARY			
Utility Provider: Atlantic City Electric Rate: AGS Meter No: 58994166 Account # 0502 9819 9998 Third Party Utility N/A TPS Meter / Acct No: N/A			
MONTH OF USE	CONSUMPTION KWH	DEMAND	TOTAL BILL
Mar-11	18,320	34.4	\$2,796
Feb-11	16,800	33.6	\$2,640
Jan-11	19,360	32.8	\$2,862
Dec-10	16,960	32.8	\$2,412
Nov-10	15,440	29.6	\$2,183
Oct-10	17,280	31.2	\$2,609
Sep-10	18,000	34.4	\$3,119
Aug-10	17,760	37.6	\$3,043
Jul-10	20,000	37.6	\$3,417
Jun-10	16,640	35.2	\$2,662
May-10	15,040	32.0	\$2,151
Apr-10	17,200	47.2	\$2,536
Totals	208,800	47.2 Max	\$32,429
AVERAGE DEMAND 34.9 KW average AVERAGE RATE \$0.155 \$/kWh			

Figure 1
Electricity Usage Profile

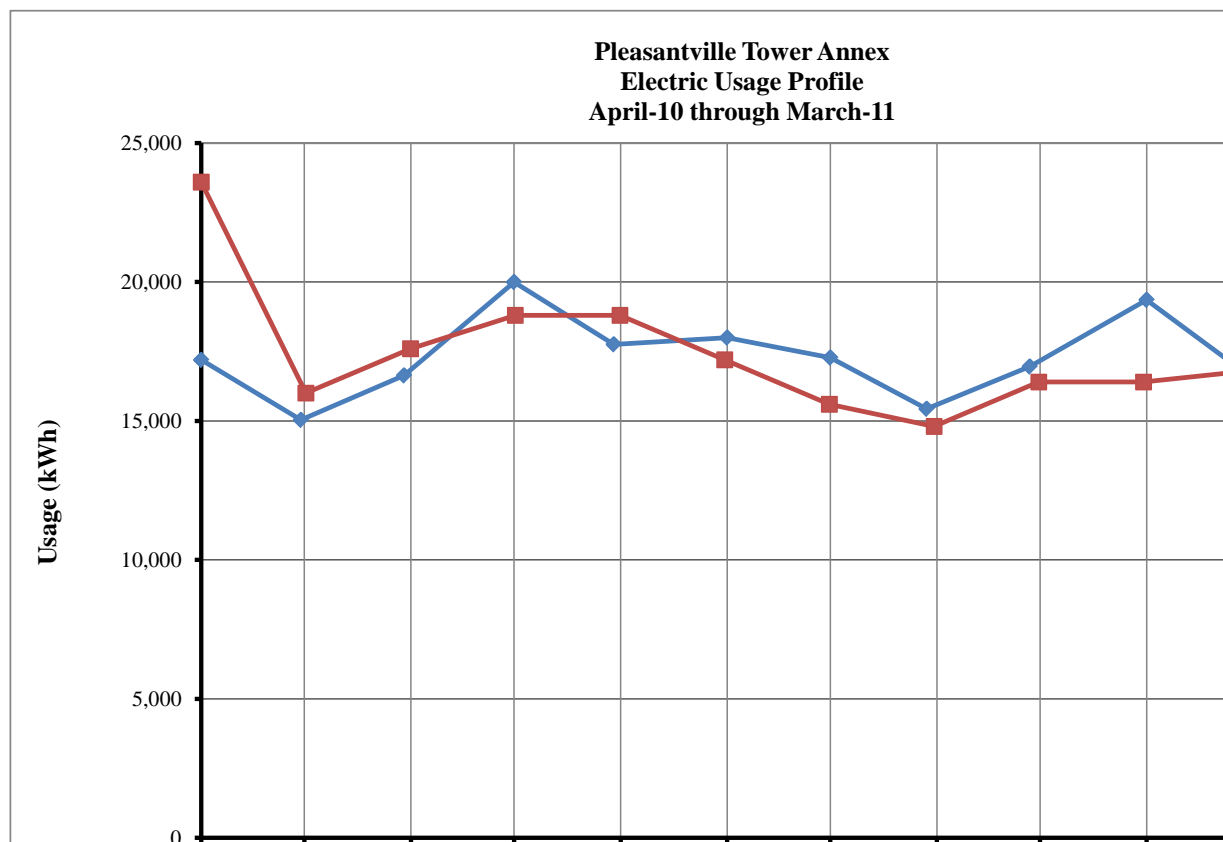
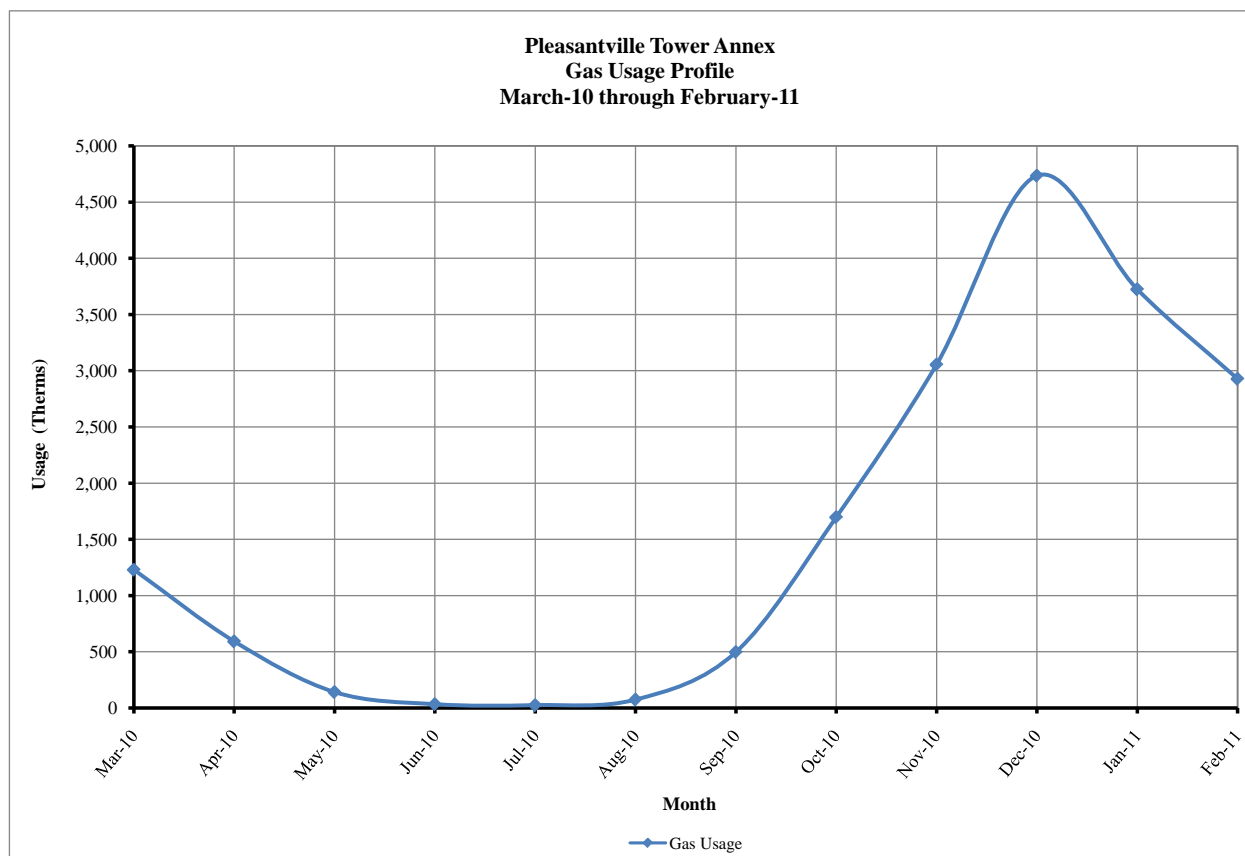


Table 5
Natural Gas Billing Data

NATURAL GAS USAGE SUMMARY		
Utility Provider: South Jersey Gas Rate: GSG Meter No: 0518589 Point of Delivery ID: 1 07 36 0026 0 0 Third Party Utility Provider: N/A TPS Meter No: N/A		
MONTH OF USE	CONSUMPTION (THERMS)	TOTAL BILL
Feb-11	2,927.98	\$3,218.53
Jan-11	3,724.74	\$4,204.88
Dec-10	4,734.98	\$5,318.81
Nov-10	3,054.76	\$3,377.62
Oct-10	1,697.40	\$1,840.50
Sep-10	497.61	\$543.10
Aug-10	74.75	\$94.78
Jul-10	25.65	\$45.70
Jun-10	34.02	\$55.48
May-10	141.86	\$162.14
Apr-10	592.58	\$610.42
Mar-10	1,230.17	\$1,272.12
TOTALS	18,736.50	\$20,744.08
AVERAGE RATE:	\$1.11	\$/THERM

Figure 2
Natural Gas Usage Profile



B. Energy Use Index (EUI)

Energy Use Index (EUI) is a measure of a building's annual energy utilization per square foot of building. This calculation is completed by converting all utility usage consumed by a building for 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 for similar building types. The Oak Ridge National Laboratory (ORNL) Buildings Technology Center under a contract with the U.S. Department of Energy maintains a Benchmarking Building Energy Performance Program. The ORNL website determines how a building's energy use compares with similar facilities throughout the U.S. and in a specific region or state.

Source use differs from site usage when comparing a building's energy consumption with the national average. Site energy use is the energy consumed by the building at the building site only. Source energy use includes the site energy use as well as all of the losses to create and distribute the energy to the building. Source energy represents the total amount of raw fuel that is required to operate the building. It incorporates all transmission, delivery, and production losses, which allows for a complete assessment of energy efficiency in a building. The type of utility purchased has a substantial impact on the source energy use of a building. The EPA has determined that source energy is the most comparable unit for evaluation purposes and overall global impact. Both the site and source EUI ratings for the building are provided to understand and compare the differences in energy use.

The site and source EUI for this facility is calculated as follows:

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

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

Table 6
Facility Energy Use Index (EUI) Calculation

ENERGY USE INTENSITY CALCULATION						
ENERGY TYPE	BUILDING USE			SITE ENERGY	SITE-SOURCE RATIO	SOURCE ENERGY
	kWh	Therms	Gallons	kBtu		kBtu
ELECTRIC	208,800.0			712,843	3.340	2,380,896
NATURAL GAS		18,736.5		1,873,650	1.047	1,961,712
TOTAL				2,586,493		4,342,608
*Site - Source Ratio data is provided by the Energy Star Performance Rating Methodology for Incorporating Source Energy Use document issued Dec 2007.						
BUILDING AREA	35,379			SQUARE FEET		
BUILDING SITE EUI	73.11			kBtu/SF/YR		
BUILDING SOURCE EUI	122.75			kBtu/SF/YR		

To date the US Department of Energy (DOE) has not published comparable energy use intensity data for Multi-Family type residences.

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 tracking and assessment of 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 emphasis is being placed on carbon reduction, greenhouse gas emissions and other environmental impacts.

Based on information gathered from the ENERGY STAR website, Government agencies spend more than \$10 billion a year on energy to provide public services and meet constituent needs. Furthermore, energy use in commercial buildings and industrial facilities is responsible for more than 50 percent of U.S. carbon dioxide emissions. It is vital that local government municipalities assess facility energy usage, benchmark energy usage utilizing Portfolio Manager, set priorities and goals to lessen energy usage and move forward with priorities and goals.

In accordance with the Local Government Energy Audit Program, CEG has created an ENERGY STAR account for the municipality to access and monitoring the facility's 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: PleasantvilleHousing
 Password: lgeaceg2011
 Security Question: What city were you born in?
 Security Answer: "Pleasantville"

The utility bills and other information gathered during the energy audit process are entered into the Portfolio Manager. The following is a summary of the results for the facility:

Table 7
ENERGY STAR Performance Rating

ENERGY STAR PERFORMANCE RATING		
FACILITY DESCRIPTION	ENERGY PERFORMANCE RATING	NATIONAL AVERAGE
Pleasantville Tower Annex	N/A	N/A

Refer to **Statement of Energy Performance Appendix** for the detailed energy summary. Energy Star currently has not created a performance rating system for Multi-Family residences.

V. FACILITY DESCRIPTION

The 35,379 SF Pleasantville Tower Annex is a 4 story low-rise Multi-family housing facility consisting of fifty units. Exterior walls have 1 1/2" EPS board, 1/2" gypsum sheathing, R-13 insulation, and 1/2" gypsum wallboard construction with a U-Value of approximately 0.067 Btu/h-ft²-°F. Typical windows in the facility are double pane, 1/4" coated glass with aluminum frames and are operable. The roof consists of built-up system with 8 inch concrete block base and gravel overlay top with a U-Value of approximately 0.088 Btu/h-ft²-°F. The building currently has no vacant apartments and is occupied throughout the entire year.

HVAC Systems

The apartments are provided heating and cooling by two separate systems. Each unit has a McQuay thru-wall heat pump unit with electric heating coil back up. The second system is a natural gas fired furnace that is located in a mechanical closet in each room. The furnace acts as the main heating unit for the apartment, while the thru-the wall is to be utilized for cooling only, however some tenants may operate both unit simultaneously.

The first floor offices are conditioned by a 4 ton RUUD split system unit with a gas-fired furnace rated at 120 MBH and over 93.5% efficient. The front and rear community rooms are conditioned by the same type of system with 2 and 3 tons of cooling and 45 and 75 MBH of heating.

The basement, hallway, laundry room, and electric room are all heated only by a RUUD 105 MBH gas-fired furnace rated 92% efficient.

Exhaust System

Air is exhausted from the apartments through thirteen rooftop exhaust fans that operate 24/7

HVAC System Controls

The apartments have individual controls for the thru-wall and furnace units. The thru-walls have unit mounted controls with fan speed settings and dial controlled setting. The furnace is controlled by a separate standard set point controlled thermostat.

The Rear community room is controlled via a programmable Honeywell thermostat mounted on the back wall. The front community room is controlled by a set point controlled thermostat that is not programmable.

The offices operate via a Honeywell set point controlled thermostat that is not programmable.

The hallway, basement, laundry room, and electric room unit is controlled by a single thermostat located in the hallway that is set point controlled and not programmable.

Domestic Hot Water

The apartments each have a dedicated 30 gallon electric hot water heater. The laundry room has a single Bradford & White 4500 watt with 119 gallons of storage capacity.

Lighting

Typical lighting throughout building is fluorescent tube lay-in fixtures with T-12 lamps and magnetic ballasts. Storage rooms and closets lit with a mixture of incandescent lamps. The typical apartment consists of a T12 fluorescent fixture in the kitchen, 18" T12 vanity light in the bathroom, and 60 watt incandescent lamps in the bedroom, breakfast area, and hall. The exterior lighting consists of 400 W high pressure sodium wall packs, located in on and around the building exterior. Further detail of the lighting survey is provided in the Lighting Appendix.

VI. MAJOR EQUIPMENT LIST

The equipment list contains major energy consuming equipment that through implementation of energy conservation measures could yield substantial energy savings. 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 in some cases 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 the **Major Equipment List Appendix** for this facility.

VII. ENERGY CONSERVATION MEASURES

ECM #1: Lighting Upgrade

Description:

The lighting is a mixture of older T12 technology fluorescent fixtures, incandescent lamps, and metal halide fixtures located in the common areas, apartments, and exterior of the building.

This ECM includes 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 lamp and ballasts. This ECM also replaced any older incandescent lamps with more efficient compact fluorescent lamps. The energy usage of an incandescent compared to a compact fluorescent approximately 3 to 4 times greater. In addition to the energy savings, compact fluorescent fixtures burn-hours are 8 to 15 times longer than incandescent fixtures ranging from 6,000 to 15,000 burn-hours compared to incandescent fixtures ranging from 750 to 1000 burn-hours. Additional exterior metal halide lamps are retrofitted with lower wattage induction type lamps that provide the same lighting quality and foot candles at lower wattages.

Energy Savings Calculations:

The **Investment Grade Lighting Audit Appendix – ECM#1** outlines the proposed retrofits, costs, savings, and payback periods.

NJ Smart Start[®] Program Incentives are calculated as follows:

From the **Smart Start Incentive Appendix**, the following incentives are warranted:

Retrofit fluorescent T12 lamps and magnetic ballast with T-5 or T-8 lamps w/electronic ballast (1-4 lamp retrofitted) = \$10 per fixture.

$$\text{Smart Start}^{\circledR} \text{ Incentive} = (\# \text{ of } 1 - 4 \text{ lamp fixtures retrofitted} \times \$10)$$

$$\text{Smart Start}^{\circledR} \text{ Incentive} = (113 \times \$10) = \underline{\$1130}$$

From the Smart Start Incentive appendix, there is no incentive for replacing incandescent lamps with compact fluorescent lamps. The incentive is only available if the entire light fixture is replaced. In most cases, the existing fixtures can be re-lamped by the facility's staff to obtain the energy savings without the expense of a new fixture and the involvement of an electrician to install a new fixture.

Energy Savings Summary:

ECM #1 - ENERGY SAVINGS SUMMARY	
Installation Cost (\$):	\$23,796
NJ Smart Start Equipment Incentive (\$):	\$1,320
Net Installation Cost (\$):	\$22,476
Maintenance Savings (\$/Yr):	\$0
Energy Savings (\$/Yr):	\$15,892
Total Yearly Savings (\$/Yr):	\$15,892
Estimated ECM Lifetime (Yr):	15
Simple Payback	1.4
Simple Lifetime ROI	960.6%
Simple Lifetime Maintenance Savings	\$0
Simple Lifetime Savings	\$238,380
Internal Rate of Return (IRR)	71%
Net Present Value (NPV)	\$167,241.66

ECM #2: Lighting Controls

Description:

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

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

Energy Savings Calculations:

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

Energy Savings Summary:

ECM #2 - ENERGY SAVINGS SUMMARY	
Installation Cost (\$):	\$5,150
NJ Smart Start Equipment Incentive (\$):	\$0
Net Installation Cost (\$):	\$5,150
Maintenance Savings (\$/Yr):	\$0
Energy Savings (\$/Yr):	\$1,023
Total Yearly Savings (\$/Yr):	\$1,023
Estimated ECM Lifetime (Yr):	15
Simple Payback	5.0
Simple Lifetime ROI	198.0%
Simple Lifetime Maintenance Savings	\$0
Simple Lifetime Savings	\$15,345
Internal Rate of Return (IRR)	18%
Net Present Value (NPV)	\$7,062.51

ECM #3: High Efficiency Domestic Hot Water Boiler

Description:

The existing Domestic Hot Water Boiler in the laundry room is a 4.5 kilowatt A.O. Smith natural electric hot water boiler.

The proposed ECM replaced the existing domestic boiler with a new high efficiency Bradford and White EF60T Series 125 MBH natural gas fired boiler rated up to 99% efficient in condensing mode. The existing boiler will be removed, extension of gas piping to boiler, and installation of new venting for boiler.

Energy Savings Calculations:

Savings Calculations were calculated utilizing energy modeling software, Trane Trace 700 version 6.2.6.5, to compare the existing conditions to the alternative energy conservation measure. The model was built using existing information collected and provided by Housing Authority regarding lighting power density, occupancy profiles, HVAC information, and available floor plans.

ENERGY USAGE SAVINGS	
Electric Demand (kW)	1.00
Electric Consumption (kWh)	6,022
Natural Gas Consumption (therms)	(274)
ENERGY COST SAVINGS	
Electric Cost	\$933
Natural Gas Cost	(\$304)
Total Energy Cost	\$629

Energy Savings Summary:

ECM #3 - ENERGY SAVINGS SUMMARY	
Installation Cost (\$):	\$14,100
NJ Smart Start Equipment Incentive (\$):	\$0
Net Installation Cost (\$):	\$14,100
Maintenance Savings (\$/Yr):	\$0
Energy Savings (\$/Yr):	\$629
Total Yearly Savings (\$/Yr):	\$629
Estimated ECM Lifetime (Yr):	15
Simple Payback	22.4
Simple Lifetime ROI	-33.1%
Simple Lifetime Maintenance Savings	\$0
Simple Lifetime Savings	\$9,435
Internal Rate of Return (IRR)	-5%
Net Present Value (NPV)	(\$6,591.04)

ECM #4: Energy Recovery Unit

Description:

The existing 100% fresh air units on the roof are heating only that supplies air to the corridors which is pulled into the apartments and then exhausted out the roof. While the units are heating only they still operate year round to circulate air through the corridors.

To heat raw outside air to a neutral supply temperature is very energy intensive process. The installation of an energy recovery unit takes conditioned exhaust air streams and passes it through an wheel medium that extracts sensible and latent energy from the exhaust air and transfers it to the raw outdoor air to precondition the outdoor air prior to the coil. In general these units range in efficiency from 50% to 80%+ in some instances and can significantly reduce the cost of conditioning supply air.

This ECM would install two SEMCO energy recovery wheel unit rated for 4,000 CFM. This would require all of the existing roof exhaust fans to be removed and ducted to the exhaust section of the recovery unit, and supply side of the energy recovery unit would then be directly ducted to the outdoor air intake of the existing rooftop units.

Energy Savings Calculations:

Savings Calculations were calculated utilizing energy modeling software, Trane Trace 700 version 6.2.6.5, to compare the existing conditions to the alternative energy conservation measure. The model was built using existing information collected and provided by Housing Authority regarding lighting power density, occupancy profiles, HVAC information, and available floor plans.

ENERGY USAGE SAVINGS	
Electric Demand (kW)	(4.00)
Electric Consumption (kWh)	(30,747)
Natural Gas Consumption (therms)	5,622
ENERGY COST SAVINGS	
Electric Cost	(\$4,643)
Natural Gas Cost	\$6,128
Total Energy Cost	\$1,485

Energy Savings Summary:

ECM #4 - ENERGY SAVINGS SUMMARY	
Installation Cost (\$):	\$70,356
NJ Smart Start Equipment Incentive (\$):	\$0
Net Installation Cost (\$):	\$70,356
Maintenance Savings (\$/Yr):	\$0
Energy Savings (\$/Yr):	\$1,485
Total Yearly Savings (\$/Yr):	\$1,485
Estimated ECM Lifetime (Yr):	18
Simple Payback	47.4
Simple Lifetime ROI	-62.0%
Simple Lifetime Maintenance Savings	\$0
Simple Lifetime Savings	\$26,730
Internal Rate of Return (IRR)	-9%
Net Present Value (NPV)	(\$49,932.03)

ECM #5: Replace Apartment Thru-wall A/C Units**Description:**

The apartments are conditioned by two systems, air conditioning being provided by thru-wall McQuay units, and heating by a gas fired furnace. The units operate independent of one another and could potentially cause simultaneous heating and cooling.

This ECM recommends replacing the existing thru-wall units with new more efficient units of like kind and size that have improved on board temperature controls. It should be noted while this ECM will reduce energy it will only be seen on the tenants' bills as the apartments are individually metered.

Energy Savings Calculations:

Savings Calculations were calculated utilizing energy modeling software, Trane Trace 700 version 6.2.6.5, to compare the existing conditions to the alternative energy conservation measure. The model was built using existing information collected and provided by Housing Authority regarding lighting power density, occupancy profiles, HVAC information, and available floor plans.

ENERGY USAGE SAVINGS	
Electric Demand (kW)	13.00
Electric Consumption (kWh)	24,263
Natural Gas Consumption (therms)	0
ENERGY COST SAVINGS	
Electric Cost	\$3,664
Natural Gas Cost	\$0
Total Energy Cost	\$3,664

Energy Savings Summary:

ECM #5 - ENERGY SAVINGS SUMMARY	
Installation Cost (\$):	\$70,000
NJ Smart Start Equipment Incentive (\$):	\$0
Net Installation Cost (\$):	\$70,000
Maintenance Savings (\$/Yr):	\$0
Energy Savings (\$/Yr):	\$3,664
Total Yearly Savings (\$/Yr):	\$3,664
Estimated ECM Lifetime (Yr):	15
Simple Payback	19.1
Simple Lifetime ROI	-21.5%
Simple Lifetime Maintenance Savings	\$0
Simple Lifetime Savings	\$54,960
Internal Rate of Return (IRR)	-3%
Net Present Value (NPV)	(\$26,259.41)

ECM #6: Replace Apartment Thru-wall A/C Units with VRV Cooling**Description:**

The apartments are conditioned by two systems, air conditioning being provided by thru-wall McQuay units, and heating by a gas fired furnace. The units operate independent of one another and could potentially cause simultaneous heating and cooling.

This ECM recommends removing the existing McQuay thru-walls and installing a Variable Refrigerant Volume unit mounted in the supply ductwork downstream of the furnace. The VRV unit would provide cooling for the apartment through the existing ductwork and the controls could be integrated with the furnace to alleviate simultaneous heating and cooling. The apartment VRV units would be piped back to approximately 5 or 6 common condensing units located on the roof. It should be noted while this ECM will reduce energy it will only be seen on the tenants' bills as the apartments are individually metered.

Energy Savings Calculations:

Savings Calculations were calculated utilizing energy modeling software, Trane Trace 700 version 6.2.6.5, to compare the existing conditions to the alternative energy conservation measure. The model was built using existing information collected and provided by Housing Authority regarding lighting power density, occupancy profiles, HVAC information, and available floor plans.

ENERGY USAGE SAVINGS	
Electric Demand (kW)	3.00
Electric Consumption (kWh)	40,953
Natural Gas Consumption (therms)	37
ENERGY COST SAVINGS	
Electric Cost	\$6,184
Natural Gas Cost	\$40
Total Energy Cost	\$6,224

Energy Savings Summary:

ECM #6 - ENERGY SAVINGS SUMMARY	
Installation Cost (\$):	\$246,640
NJ Smart Start Equipment Incentive (\$):	\$0
Net Installation Cost (\$):	\$246,640
Maintenance Savings (\$/Yr):	\$0
Energy Savings (\$/Yr):	\$6,224
Total Yearly Savings (\$/Yr):	\$6,224
Estimated ECM Lifetime (Yr):	15
Simple Payback	39.6
Simple Lifetime ROI	-62.1%
Simple Lifetime Maintenance Savings	0
Simple Lifetime Savings	\$93,360
Internal Rate of Return (IRR)	-10%
Net Present Value (NPV)	(\$172,338.29)

ECM #7: Low Flow Toilets**Description:**

The Apartments currently have approximately 3.0 gallon per flush toilets. Current water saving toilets are available down to 1.6 gallons per flush, and many come with dual flush technology that provides two flush settings for liquid waste and solid waste disposal. The replacement toilet is based on a dual flush technology Sterling Product # 402024.

Energy Savings Calculations:

LOW FLOW TOILETS CALCULATIONS			
ECM INPUTS	EXISTING	PROPOSED	SAVINGS
Number of Toilets	50	50	
Rated Gallons per Flush (GPF)	3.0	1.6	
Flushes per Day	5	-	
Days per Year	365	-	
Annual Water Usage (Gallons)	273,750	146,000	127,750
Water Cost (\$/1000 gal)	\$6.32	-	
COST SAVINGS CALCULATIONS			
Water Usage (1,000 gallons)	274	146	128
Water Cost (\$)	\$1,730	\$923	\$807
COMMENTS:	Calculations based on Sterling Rockton Dual Force Technology Toilet Product #402024		

Energy Savings Summary:

ECM #7 - ENERGY SAVINGS SUMMARY	
Installation Cost (\$):	\$21,000
NJ Smart Start Equipment Incentive (\$):	\$0
Net Installation Cost (\$):	\$21,000
Maintenance Savings (\$/Yr):	\$0
Energy Savings (\$/Yr):	\$807
Total Yearly Savings (\$/Yr):	\$807
Estimated ECM Lifetime (Yr):	20
Simple Payback	26.0
Simple Lifetime ROI	-23.1%
Simple Lifetime Maintenance Savings	\$0
Simple Lifetime Savings	\$16,140
Internal Rate of Return (IRR)	-2%
Net Present Value (NPV)	(\$8,993.88)

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 measures (REM) for the Authority at Pleasantville Towers utilizing renewable technologies and concluded that there is potential for solar energy generation. The solar photovoltaic system calculation summary will be concluded as **REM#1** within this report.

Solar Generation

Solar energy produces clean energy and reduces a building's carbon footprint. This is accomplished via photovoltaic panels which are mounted on all south and southwestern facades of the building. Flat roof, as well as sloped areas can be utilized; flat areas will have the panels turned to an optimum solar absorbing angle. (A structural survey of the roof would be necessary before the installation of PV panels is considered). Parking lots can also be utilized for the installation of a solar array. A truss system can be installed that is high enough to park vehicles under the array and no parking lot area is lost.

The state of NJ has instituted a program in which one Solar Renewable Energy Certificate (SREC) is given to the Owner for every 1000 kWh of generation. SREC's can be sold anytime on the market at their current market value. The value of the credit varies upon the current need of the power companies. The average value per credit is around \$350, this equates to \$0.35 per kWh generated.

CEG has reviewed the existing roof area and site of Pleasantville Towers for the purposes of determining a potential for a photovoltaic system. CEG believes a ground mounted parking lot canopy system is best suited for this site. An area of 1,400 S.F. can be utilized for a PV system as depicted in the **Renewable / Distributed Energy Measures Calculation Appendix**. Using this square footage it was determined that a system size of 14.1 kilowatts could be installed. A system of this size has an estimated kilowatt hour production of 15,737 KWh annually, reducing the overall utility bill by approximately 7.54% percent. A detailed financial analysis can be found in the **Renewable / Distributed Energy Measures Calculation Appendix**. This analysis illustrates the payback of the system over a 15 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 SHARP NU-U235F2 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 array system capacity was sized on available parking lot space at the existing facility. Estimated solar array generation was then calculated based on the National Renewable Energy Laboratory PVWatts Version 1.0 Calculator. In order to calculate the array generation an appropriate location with solar data on file must be selected. In addition the system DC rated kilowatt (kW) capacity must be inputted, a DC to AC de-rate factor, panel tilt angle, and array azimuth angle. The DC to AC de-rate factor is based on the panel nameplate DC rating, inverter and transformer efficiencies (95%), mismatch factor (98%), diodes and connections (100%), dc and ac wiring (98%, 99%), soiling, (95%), system availability (95%), shading (if applicable), and age (new/100%). The overall DC to AC de-rate factor has been calculated at an overall rating of 81%. The PVWatts Calculator program then calculates estimated system generation based on average monthly solar irradiance and user provided inputs. The monthly energy generation and offset electric costs from the PVWatts calculator is shown in the **Renewable/Distributed Energy Measures Calculation Appendix**.

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 not 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.

Direct purchase involves the Authority paying for 100% of the total project cost upfront via one of the methods noted in the Installation Funding Options section below. Calculations include a utility inflation rate as well as the degradation of the solar panels over time. Based on our calculations the following is the payback period:

Table 8
Financial Summary – Photovoltaic System

FINANCIAL SUMMARY - PHOTOVOLTAIC SYSTEM		
PAYMENT TYPE	SIMPLE PAYBACK, Yrs.	NET PRESENT VALUE
Finance 100% - 15 yr	11.60	(\$11,732)

*The solar energy measure is shown for reference in the executive summary Renewable Energy Measure (REM) table

It should be noted that while a solar system was proposed, Atlantic Electric has currently closed this section of the grid to new applications for renewable energy development, and any applications for this type of development may be rejected by the utility company to be interconnected with the grid.

Wind Generation

In addition to the Solar Analysis, CEG also conducted a review of the applicability of wind energy for the facility. Wind energy production is another option available through the Renewable Energy Incentive Program. Wind turbines of various types can be utilized to produce clean energy on a per building basis. Cash incentives are available per kWh of electric usage. Based on CEG's review of the applicability of wind energy for the facility, it was determined that the average wind speed of 6.0 m/s is adequate, but available space is very limited for the purchase of a commercial wind turbine at Pleasantville Towers. Therefore, wind energy has not been further recommended as a viable option.

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 could indicate potential problems within the each 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 The Electric and Natural Gas Usage Profiles included within this report to reference the respective electricity and natural gas usage load profiles.

Electricity:

The electricity usage profile demonstrates a steady year long load profile for a facility that is occupied year round. The profiles all show typical increases and decreases in usage due to changing of the seasons and the subsequent switch from cooling to heating.

The historical usage profile is beneficial and will allow for more competitive energy prices when shopping for alternative suppliers mainly due to the relatively flat load profile. Third Party Supplier (TPS) electric commodity contracts that offer's a firm, fixed price for 100% of the facilities electric requirements and are lower than the Atlantic City Electric's (AECO) BGS-FP default rate are recommended.

Natural Gas:

The Natural Gas Usage Profile demonstrates a very typical natural gas (heat load) profile. The summer months June – August have little consumption.

This load profile will yield less favorable natural gas pricing when shopping for alternative suppliers. This is because the higher winter month consumption will yield higher pricing which will not be offset by the summer month consumption. Nymex commodity pricing is generally higher in the winter months of November – March and lower in the summer months of April – October. Obtaining a flat load profile, (usage is similar each month), will yield optimum natural gas pricing when shopping for alternative suppliers. Third Party Supplier (TPS) natural gas commodity contracts that offer a product structure to include either 1) a fixed basis rate with a market based Nymex/commodity rate or 2) a fixed basis rate with fixed Nymex/commodity winter rate (Nov – March) and market based Nymex/commodity rate for the summer months (April – October) for 100% of the facilities **metered** natural gas requirements are both recommended due to current market pricing.

Tariff Analysis:Electricity:

The facility receive electrical service through Atlantic City Electric (AECO) on AGS (Annual General Service). The facility has not currently contracted a Third Party Supplier (TPS), and purchases it's electric through the utility's BGS (Basic Generation Service) rate structure.

Each year since 2002, the four New Jersey Electric Distribution Companies (EDCs) - Public Service Gas & Electric Company (PSE&G), Atlantic City Electric Company (ACE), Jersey Central Power & Light Company (JCP&L), and Rockland Electric Company (RECO) - have procured several billion dollars of electric supply to serve their Basic Generation Service (BGS) customers through a statewide auction process held in February.

BGS refers to the service of customers who are not served by a third party supplier or competitive retailer. This service is sometimes known as Standard Offer Service, Default Service, or Provider of Last Resort Service.

The Auction Process has consisted of two auctions that are held concurrently, one for larger customers on an hourly price plan (BGS-CIEP) and one for smaller commercial and residential customers on a fixed-price plan (BGS-FP). This facility's rate structure is based on the fixed-price plan (BGS-FP).

The utility, Atlantic City Electric will continue to be responsible for maintaining the existing network of wires, pipes and poles that make up the delivery system, which will serve all consumers, regardless of whom they choose to purchase their electricity or natural gas from. AECO's delivery service rate includes the following charges: Customer Service Charge, Distribution Charge, Market Transition, Transition Bond Charge, Non Utility Generation Charge, Societal Benefits Charge (SBC), Infrastructure Investment Charge, System Control Charge, Regulatory Assets Recovery Charge, and Regional Greenhouse Gas Initiative Charge.

Natural Gas:

The facilities currently receive natural gas distribution service through South Jersey Gas on rate schedules General Service Gas (GSG), and have not contracted a Third Party Supplier (TPS) to provide natural gas commodity supply service.

South Jersey Gas provides basic gas supply service (BGSS) to customers who choose not to shop from a Third Party Supplier (TPS) for natural gas commodity. The option is essential to protect the reliability of service to consumers as well as protecting consumers if a third party supplier defaults or fails to provide commodity service. Please refer to the link below for a recap of natural gas BGSS charges from South Jersey Gas for rate schedule GSG.

<http://www.southjerseygas.com/108/tariff/bgssrates.pdf>

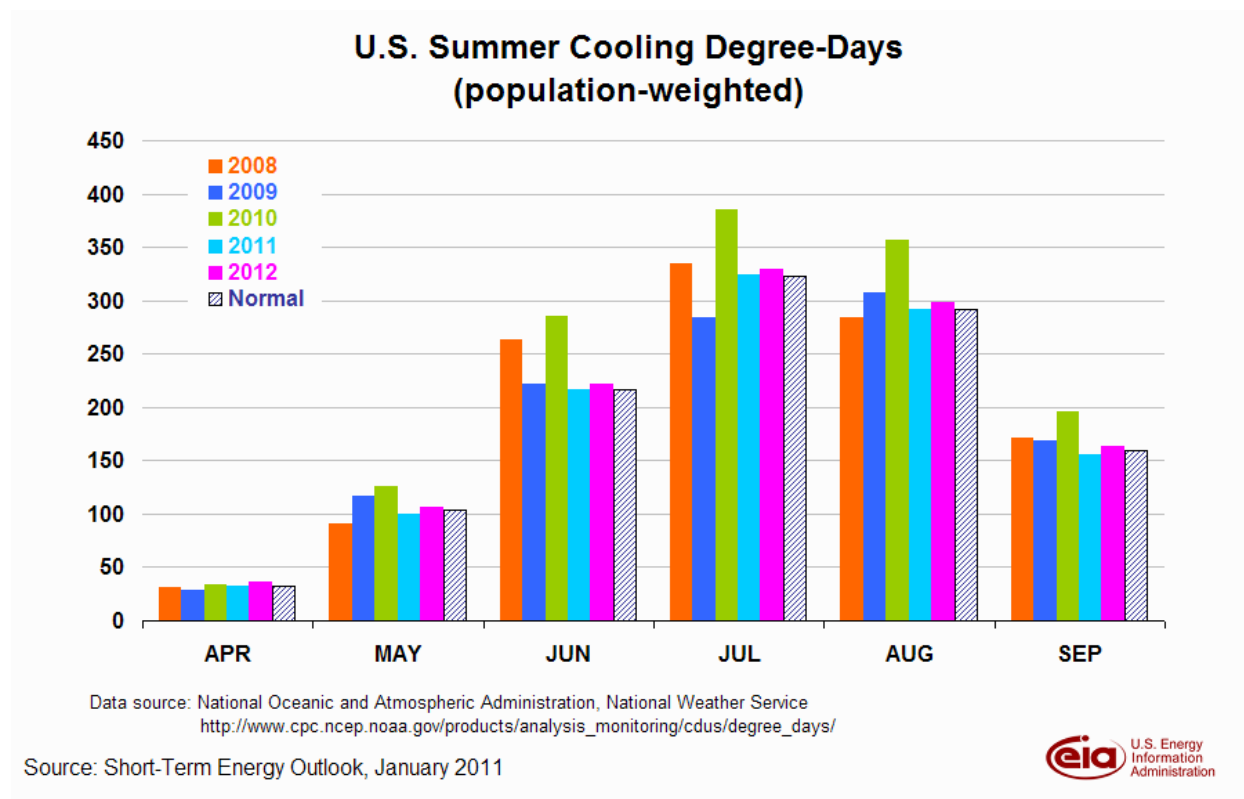
The utility, South Jersey Gas is responsible for maintaining the existing network of wires, pipes and poles that make up the delivery system, which will serve all consumers, regardless of whom

they choose to purchase their electricity or natural gas from. South Jersey Gas's delivery service rate includes the following charges: Customer Service Charge, Distribution Charge, & Societal Benefits Charge (SBC).

Electric and Natural Gas Commodities Market Overview:

Current electricity and natural gas market pricing has remained relatively stable over the last year. Commodity pricing in 2008 marked historical highs in both natural gas and electricity commodity. Commodity pricing commencing spring of 2009 continuing through 2010, has decreased dramatically over 2008 historic highs and continues to be favorable for locking in long term (2-5 year) contracts with 3rd Party Supplier's for both natural gas and electricity supply requirements.

It is important to note that both natural gas and electric commodity market prices are moved by supply and demand, political conditions, market technicals and trader sentiment. This market is continuously changing Energy commodity pricing is also correlated to weather forecasts. Because weather forecasts are dependable only in the short-term, prolonged temperature extremes can really cause extreme price swings.



Short Term Energy Outlook - US Energy Information Administration (1/11/2011):

U.S. Natural Gas Prices. The Henry Hub spot price averaged \$4.25 per MMBtu during December, an increase of about 54 cents from November's price of \$3.71 per MMBtu. EIA expects the higher forecast production during the first half of 2011 compared with the same period last year, combined with a decline in consumption, to moderate natural gas spot prices. The projected spot price falls to a low of \$3.73 per MMBtu in June then rises to \$4.61 in December, averaging \$4.02 per MMBtu for all of 2011, which is \$0.37 per MMBtu lower than the 2010 average and \$0.31 per MMBtu lower than in last month's *Outlook*. In 2012, the spot price rises to an average of \$4.50 per MMBtu.

Uncertainty over future natural gas prices is slightly lower this year compared with last year at this time. Natural gas futures for March 2011 delivery (for the 5-day period ending January 6) averaged \$4.39 per MMBtu, and the average implied volatility over the same period was 43 percent. This produced lower and upper bounds for the 95-percent confidence interval for March 2011 contracts of \$3.21 per MMBtu and \$6.02 per MMBtu, respectively. At this time last year, the natural gas March 2010 futures contract averaged \$5.73 per MMBtu and implied volatility averaged 57 percent. The corresponding lower and upper limits of the 95-percent confidence interval were \$3.88 per MMBtu and \$8.47 per MMBtu.

U.S. Electricity Retail Prices. EIA expects the U.S. retail price for electricity distributed to the residential sector during 2010 to average 11.6 cents per kilowatt-hour, about the same level as in 2009. EIA expects the U.S. residential price to increase only slightly over the forecast period--by 0.6 percent in 2011 and by 1.0 percent in 2012.

Recommendations:

1. CEG recommends the Authority consider contracting for a third party supplier for electric and natural gas at its facilities. It is likely the Authority could see significant savings on its electric and gas bill compared with purchasing from the utility. It should be noted that the Authority should consider hiring a consultant to assist in the procurement of bidding out its energy supply to a third party supplier, and that it is likely that the consultant will roll its fee into the purchase agreement with the supplier, thus requiring the Authority to pay no upfront costs.
2. CEG recommends that the Authority consider utilizing a third party utility billing-auditing service to further analyze historical utility invoices such as water, sewer, natural gas and electric for incorrect billings and rate tariff optimization services. This service can be based on a shared savings model with no cost to the Authority. The service could provide refunds on potential incorrect billings that may have been passed through by the utilities and paid by the Authority.

X. INSTALLATION FUNDING OPTIONS

CEG has reviewed various funding options for the facility 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.
- iv. *Direct Install Program* – The New Jersey Clean Energy’s Direct Install Program is a state funded program that targets small commercial and industrial facilities with peak demand of less than 100 kW. This turnkey program is aimed at providing owners a seamless, comprehensive process for analysis, equipment replacement and financial incentives to reduce consumption, lower utility costs and improve profitability. The program covers up to 60% of the cost for eligible upgrades including lighting, lighting controls, refrigeration, HVAC, motors, variable speed drives, natural gas and food service. Participating contractors (refer to www.njcleanenergy.com) conduct energy assessments in addition to your standard local government energy audit and install the cost-effective measures.

- v. *Energy Efficiency and Conservation Block Grants* – The EECGB rebate provides supplemental funding up to \$20,000 for counties and local government entities to implement energy conservation measures. The EECGB funding is provided through the American Recovery and Reinvestment Act (ARRA). The local government must be among the eligible local government entities listed on the NJ Clean Energy website as follows - <http://njcleanenergy.com/commercial-industrial/programs/eecbg-eligible-entities>. This program is limited to municipalities and counties that have not already received grants directly through the US department of Energy.

This incentive is provided in addition to the other NJ Clean Energy program funding. This program's incentive is considered the entity's capital and therefore can be applied to the LGEA program's requirements to implement the recommended energy conservation measures totaling at least 25% of the energy audit cost. Additional requirements of this program are as follows:

1. The entity must utilize additional funding through one or more of the NJ Clean Energy programs such as Smart Start, Direct Install, and Pay for Performance.
2. The EECBG funding in combination with other NJ Clean Energy programs may not exceed the total cost of the energy conservation measures being implemented.
3. Envelope measures are applicable only if recommended by the LGEA energy audit and if the energy audit was completed within the past 12 months.
4. New construction and previously installed measures are not eligible for the EECBG rebate.
5. Energy conservation measures eligible for the EECBG must fall within the list of approved energy conservation measures. The complete list of eligible measures and other program requirements are included in the "EECBG Complete Application Package." The application package is available on the NJ Clean Energy website - <http://njcleanenergy.com/commercial-industrial/programs/energy-efficiency-and-conservation-block-grants>.

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. Clean all light fixtures to maximize light output.
- D. Provide more frequent air filter changes to decrease overall system power usage and maintain better IAQ.
- E. Verify all thermostats are utilizing setback and scheduling capabilities.

XII. ENERGY AUDIT ASSUMPTIONS

The assumptions utilized in this energy audit include but are not limited to following:

- A. Cost Estimates noted within this report are based on industry accepted costing data such as RS MeansTM Cost Data, contractor pricing and engineering estimates. All cost estimates for this level of auditing are +/- 20%. Prevailing wage rates for the specified region has been utilized to calculate installation costs. The cost estimates indicated within this audit should be utilized by the owner for prioritizing further project development post the energy audit. Project development would include investment grade auditing and detailed engineering.
- B. Energy savings noted within this audit are calculated utilizing industry standard procedures and accepted engineering assumptions. For this level of auditing, energy savings are not guaranteed.
- C. Information gathering for each facility is strongly based on interviews with operations personnel. Information dependent on verbal feedback is used for calculation assumptions including but not limited to the following:
 - a. operating hours
 - b. equipment type
 - c. control strategies
 - d. scheduling
- D. Information contained within the major equipment list is based on the existing owner documentation where available (drawings, O&M manuals, etc.). If existing owner documentation is not available, catalog information is utilized to populate the required information.
- E. Equipment incentives and energy credits are based on current pricing and status of rebate programs. Rebate availability is dependent on the individual program funding and applicability.
- F. Equipment (HVAC, Plumbing, Electrical, & Lighting) noted within an ECM recommendation is strictly noted as a **basis for calculation** of energy savings. The owner should use this equipment information as a benchmark when pursuing further investment grade project development and detailed engineering for specific energy conservation measures.

Utility bill annual averages are utilized for calculation of all energy costs unless otherwise noted. Accuracy of the utility energy usage and costs are based on the information provided. Utility information including usage and costs is estimated where incomplete data is provided.

APPENDIX A

ECM COST & SAVINGS BREAKDOWN

CONCORD ENGINEERING GROUP

Pleasantville Tower Annex 156 N. Main

ECM ENERGY AND FINANCIAL COSTS AND SAVINGS SUMMARY															
ECM NO.	DESCRIPTION	INSTALLATION COST				YEARLY SAVINGS			ECM LIFETIME (Yr)	LIFETIME ENERGY SAVINGS	LIFETIME MAINTENANCE SAVINGS	LIFETIME ROI	SIMPLE PAYBACK	INTERNAL RATE OF RETURN (IRR)	NET PRESENT VALUE (NPV)
		MATERIAL	LABOR	REBATES, INCENTIVES	NET INSTALLATION COST	ENERGY	MAINT. / SREC	TOTAL		(Yearly Saving * ECM Lifetime)	(Yearly Maint Saving * ECM Lifetime)	(Lifetime Savings - Net Cost) / (Net Cost)	(Net cost / Yearly Savings)	$\sum_{n=0}^N \frac{C_n}{(1 + IRR)^n}$	$\sum_{n=0}^N \frac{C_n}{(1 + DR)^n}$
		(\$)	(\$)	(\$)	(\$)	(\$/Yr)	(\$/Yr)	(\$/Yr)		(\$)	(\$)	(%)	(Yr)	(\$)	(\$)
ECM #1	Lighting Upgrade	\$23,796	\$0	\$1,320	\$22,476	\$15,892	\$0	\$15,892	15	\$238,380	\$0	960.6%	1.4	70.68%	\$167,241.66
ECM #2	Lighting Controls	\$3,150	\$2,000	\$0	\$5,150	\$1,023	\$0	\$1,023	15	\$15,345	\$0	198.0%	5.0	18.26%	\$7,062.51
ECM #3	Laundry Gas DHW Boiler	\$8,900	\$5,200	\$0	\$14,100	\$629	\$0	\$629	15	\$9,435	\$0	-33.1%	22.4	-4.65%	(\$6,591.04)
ECM #4	Rooftop Energy Recovery	\$37,950	\$32,406	\$0	\$70,356	\$1,485	\$0	\$1,485	18	\$26,730	\$0	-62.0%	47.4	-8.65%	(\$49,932.03)
ECM #5	Replace Thru-wall Units 1 for 1	\$55,000	\$15,000	\$0	\$70,000	\$3,664	\$0	\$3,664	15	\$54,960	\$0	-21.5%	19.1	-2.88%	(\$26,259.41)
ECM #6	Install VRV Cooling	\$222,750	\$23,890	\$0	\$246,640	\$6,224	\$0	\$6,224	15	\$93,360	\$0	-62.1%	39.6	-10.25%	(\$172,338.29)
ECM #7	Low Flow Toilets	\$14,500	\$6,500	\$0	\$21,000	\$807	\$0	\$807	20	\$16,140	\$0	-23.1%	26.0	-2.39%	(\$8,993.88)
REM RENEWABLE ENERGY AND FINANCIAL COSTS AND SAVINGS SUMMARY															
REM #1	14 kW Parking Lot PV Array	\$98,676	\$0	\$0	\$98,676	\$2,439	\$6,068	\$8,507	25	\$212,675	\$151,700	115.5%	11.6	7.05%	\$49,457.65

Notes: 1) The variable Cn in the formulas for Internal Rate of Return and Net Present Value stands for the cash flow during each period.
2) The variable DR in the NPV equation stands for Discount Rate
3) For NPV and IRR calculations: From n=0 to N periods where N is the *lifetime of ECM* and Cn is the *cash flow during each period*.

APPENDIX B



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 February 15, 2011:

Electric Chillers

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

Energy Efficiency must comply with ASHRAE 90.1-2007

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 - \$92 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
Occupancy Controlled Thermostat (Hospitality & Institutional Facility)	\$75 per thermostat

Energy Efficiency must comply with ASHRAE 90.1-2007

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, AFUE ≥ 92%

Ground Source Heat Pumps

Closed Loop	\$450 per ton, EER \geq 16 \$600 per ton, EER \geq 18 \$750 per ton, EER \geq 20
-------------	--

Energy Efficiency must comply with ASHRAE 90.1-2007

Variable Frequency Drives

Variable Air Volume	\$65 - \$155 per hp
Chilled-Water Pumps	\$60 per VFD rated hp
Compressors	\$5,250 to \$12,500 per drive
Cooling Towers \geq 10 hp	\$60 per VFD rated hp

Natural Gas Water Heating

Gas Water Heaters \leq 50 gallons, 0.67 energy factor or better	\$50 per unit
Gas-Fired Water Heaters $>$ 50 gallons	\$1.00 - \$2.00 per MBH
Gas-Fired Booster Water Heaters	\$17 - \$35 per MBH
Gas Fired Tankless Water Heaters	\$300 per unit

Prescriptive Lighting

Retro fit of T12 to T-5 or T-8 Lamps w/Electronic Ballast in Existing Facilities	\$10 per fixture (1-4 lamps)
Replacement of T12 with new T-5 or T-8 Lamps w/Electronic Ballast in Existing Facilities	\$25 per fixture (1-4 lamps)
Replacement of incandescent with screw-in PAR 38 or PAR 30 (CFL) bulb	\$7 per bulb
T-8 reduced Wattage (28w/25w 4', 1-4 lamps) Lamp & ballast replacement	\$10 per fixture
Hard-Wired Compact Fluorescent	\$25 - \$30 per fixture
Metal Halide w/Pulse Start Including Parking Lot	\$25 per fixture
T-5 and T-8 High Bay Fixtures	\$16 - \$200 per fixture
HID \geq 100w Retrofit with induction lamp, power coupler and generator (must be 30% less watts/fixture than HID system)	\$50 per fixture
HID \geq 100w Replacement with new HID \geq 100w	\$70 per fixture

Prescriptive Lighting - LED

LED New Exit Sign Fixture	
Existing Facility < 75 kw	\$20 per fixture
Existing Facility > 75 kw	\$10 per fixture
LED Display Case Lighting	\$30 per display case
LED Shelf-Mtd. Display & Task Lights	\$15 per linear foot
LED Portable Desk Lamp	\$20 per fixture
LED Wall-wash Lights	\$30 per fixture
LED Recessed Down Lights	\$35 per fixture
LED Outdoor Pole/Arm-Mounted Area and Roadway Luminaries	\$175 per fixture
LED Outdoor Pole/Arm-Mounted Decorative Luminaries	\$175 per fixture
LED Outdoor Wall-Mounted Area Luminaries	\$100 per fixture
LED Parking Garage Luminaries	\$100 per fixture
LED Track or Mono-Point Directional Lighting Fixtures	\$50 per fixture
LED High-Bay and Low-Bay Fixtures for Commercial & Industrial Bldgs.	\$150 per fixture
LED High-Bay-Aisle Lighting	\$150 per fixture
LED Bollard Fixtures	\$50 per fixture
LED Linear Panels (2x2 Troffers only)	\$100 per fixture
LED Fuel Pump Canopy	\$100 per fixture
LED Refrigerator/Freezer case lighting replacement of fluorescent in medium and low temperature display case	\$42 per 5 foot \$65 per 6 foot

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
Daylight Dimming - office	\$50 per fixture controlled

Premium Motors

Three-Phase Motors	\$45 - \$700 per motor
Fractional HP Motors Electronic Communicated Motors (replacing shaded pole motors in refrigerator/freezer cases)	\$40 per electronic communicated motor

Other Equipment Incentives

Performance Lighting	\$1.00 per watt per SF below program incentive threshold, currently 5% more energy efficient than ASHRAE 90.1- 2007 for New Construction and Complete Renovation
Custom Electric and Gas Equipment Incentives	not prescriptive
Custom Measures	\$0.16 KWh and \$1.60/Therm of 1st year savings, or a buy down to a 1 year payback on estimated savings. Minimum required savings of 75,000 KWh or 1,500 Therms and a IRR of at least 10%.
Multi Measures Bonus	15%

APPENDIX C



STATEMENT OF ENERGY PERFORMANCE

Tower Annex

Building ID: 2721169

For 12-month Period Ending: February 28, 2011¹

Date SEP becomes ineligible: N/A

Date SEP Generated: June 22, 2011

Facility

Tower Annex
156 North Main Street
Pleasantville, NJ 08232

Facility Owner

N/A

Primary Contact for this Facility

N/A

Year Built: 1985**Gross Floor Area (ft²):** 35,379**Energy Performance Rating²** (1-100) N/A**Site Energy Use Summary³**

Electricity - Grid Purchase(kBtu)	707,540
Natural Gas (kBtu) ⁴	1,786,882
Total Energy (kBtu)	2,494,422

Energy Intensity⁵

Site (kBtu/ft ² /yr)	71
Source (kBtu/ft ² /yr)	120

Emissions (based on site energy use)

Greenhouse Gas Emissions (MtCO ₂ e/year)	195
---	-----

Electric Distribution Utility

Atlantic City Electric Co [Pepco Holdings Inc]

National Average Comparison

National Average Site EUI

National Average Source EUI

% Difference from National Average Source EUI

Building Type	Multifamily Housing
---------------	------------------------

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

N/A

Notes:

1. Application for the ENERGY STAR must be submitted to EPA within 4 months of the Period Ending date. Award of the ENERGY STAR is not final until approval is received from EPA.
2. The EPA Energy Performance Rating is based on total source energy. A rating of 75 is the minimum to be eligible for the ENERGY STAR.
3. Values represent energy consumption, annualized to a 12-month period.
4. Values represent energy intensity, annualized to a 12-month period.
5. 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) or a Registered Architect (RA) 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 or RA 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	Tower Annex	Is this the official building name to be displayed in the ENERGY STAR Registry of Labeled Buildings?		<input type="checkbox"/>
Type	Multifamily Housing	Is this an accurate description of the space in question?		<input type="checkbox"/>
Location	156 North Main Street, Pleasantville, NJ 08232	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"/>
Tower Annex (Multifamily Housing)				
CRITERION	VALUE AS ENTERED IN PORTFOLIO MANAGER	VERIFICATION QUESTIONS	NOTES	<input checked="" type="checkbox"/>
Gross Floor Area	35,379 Sq. Ft.	Does the square footage include all supporting functions such as residential units, common areas, elevators, storage areas, vent shafts, lobbies, boiler room and basement, etc? Interstitial (plenum) space between floors should be excluded from the total.		<input type="checkbox"/>
Number of units	50(Optional)	Is this the total number of occupied or unoccupied apartment units in the Multifamily Housing building? This should include apartments on every line of the building and of every floor plan type and the basement apartments. This should exclude storage or maintenance closets, boiler rooms, garbage compactor or receptacle rooms, management offices or laundry facilities.		<input type="checkbox"/>
Total Number of Bedrooms	50(Optional)	Is this the total number of bedrooms located in each individual apartment unit? This should include any additions to the original floor plan performed by the owner. This should exclude in-unit common areas being used as bedrooms by tenants.		<input type="checkbox"/>
Number of Floors	4(Optional)	Is this the total number of floors located within a Multifamily Housing Building? This number should include the total number of floors above the existing grade plane. This number should exclude interstitial space between floors or the roof.		<input type="checkbox"/>
Percent of gross floor area that is common space only	N/A(Optional)	Is this the percentage of square footage that is devoted to occupied and unoccupied apartment units?		<input type="checkbox"/>
Laundry in each unit	0(Optional)	Is this the total number of laundry hookups located in each individual apartment unit? The laundry facility should be accounted for if the machine is inoperable, operable or if there is a laundry hookup available.		<input type="checkbox"/>
Laundry in common area	3(Optional)	Is this the number of laundry hookups located in a common area that are either coin-operated or subsidized by the building owner? The laundry facility should be accounted for if the machine is inoperable, operable or if there is a laundry hookup available.		<input type="checkbox"/>

Dishwashers in each unit	0(Optional)	Is this the total number of dishwashers located in individual apartment units? The dishwasher should be accounted for if the machine is inoperable, operable or if there is a dishwasher hookup available.		<input type="checkbox"/>
Percent Heated	100%(Optional)	Is this the percentage of the total floor space within the facility that is served by mechanical heating equipment? This includes the individual apartment units that are individually mechanically heated. The percent heated cannot be greater than 100%. The percent heated attribute is similar to the percent heated attribute for dormitories. The user should select from a drop-down-menu with options presented in bins of 10 (i.e. 0, 10, 20, 30?).		<input type="checkbox"/>
Percent Cooled	90%(Optional)	Is this the percentage of the total floor space within the facility that is served by mechanical cooling equipment? This includes the individual apartment units that are individually mechanically cooled. The percent cooled cannot be greater than 100%. The percent cooled attribute is similar to the percent cooled attribute for dormitories. The user should select from a drop-down-menu with options presented in bins of 10 (i.e. 0, 10, 20, 30?).		<input type="checkbox"/>
Market Rate or Affordable Housing	N/A(Optional)	Select Affordable Housing when a Multifamily Housing building is regulated by a national, state or local housing agency and offers subsidized housing to lower and moderate income range households. Select Market Rate when a Multifamily Housing building has either no subsidized units or minimal units with allocated subsidies.		<input type="checkbox"/>

ENERGY STAR® Data Checklist for Commercial Buildings

Energy Consumption

Power Generation Plant or Distribution Utility: Atlantic City Electric Co [Pepco Holdings Inc]

Fuel Type: Electricity		
Meter: Electric Meter - #58994166 (kWh (thousand Watt-hours)) Space(s): Tower Annex Generation Method: Grid Purchase		
Start Date	End Date	Energy Use (kWh (thousand Watt-hours))
01/20/2011	02/17/2011	16,800.00
12/17/2010	01/20/2011	19,360.00
11/17/2010	12/17/2010	16,960.00
10/20/2010	11/17/2010	15,440.00
09/20/2010	10/20/2010	17,280.00
08/18/2010	09/20/2010	18,000.00
07/20/2010	08/18/2010	17,760.00
06/18/2010	07/20/2010	20,000.00
05/19/2010	06/18/2010	16,640.00
04/20/2010	05/19/2010	15,040.00
03/19/2010	04/20/2010	17,200.00
Electric Meter - #58994166 Consumption (kWh (thousand Watt-hours))		190,480.00
Electric Meter - #58994166 Consumption (kBtu (thousand Btu))		649,917.76
Total Electricity (Grid Purchase) Consumption (kBtu (thousand Btu))		649,917.76
Is this the total Electricity (Grid Purchase) consumption at this building including all Electricity meters?		<input type="checkbox"/>
Fuel Type: Natural Gas		
Meter: Natural Gas - #0518589 (therms) Space(s): Entire Facility		
Start Date	End Date	Energy Use (therms)
01/19/2011	02/16/2011	3,724.70
12/16/2010	01/19/2011	4,735.00
11/16/2010	12/16/2010	3,054.80
10/19/2010	11/16/2010	1,697.40
09/17/2010	10/19/2010	497.60
08/17/2010	09/17/2010	74.80
07/19/2010	08/17/2010	25.70
06/17/2010	07/19/2010	34.00
05/18/2010	06/17/2010	141.90
04/19/2010	05/18/2010	592.60
03/18/2010	04/19/2010	1,230.20

Natural Gas - #0518589 Consumption (therms)	15,808.70
Natural Gas - #0518589 Consumption (kBtu (thousand Btu))	1,580,870.00
Total Natural Gas Consumption (kBtu (thousand Btu))	1,580,870.00
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"/>

On-Site Solar and Wind Energy	
Do the fuel consumption totals shown above include all on-site solar and/or wind power located at your facility? Please confirm that no on-site solar or wind installations have been omitted from this list. All on-site systems must be reported.	<input type="checkbox"/>

Certifying Professional

(When applying for the ENERGY STAR, the Certifying Professional must be the same PE or RA 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
Tower Annex
156 North Main Street
Pleasantville, NJ 08232

Facility Owner
N/A

Primary Contact for this Facility
N/A

General Information

Tower Annex	
Gross Floor Area Excluding Parking: (ft ²)	35,379
Year Built	1985
For 12-month Evaluation Period Ending Date:	February 28, 2011

Facility Space Use Summary

Tower Annex	
Space Type	Multifamily Housing
Gross Floor Area(ft ²)	35,379
Number of units ^o	50
Total Number of Bedrooms ^o	50
Number of Floors ^o	4
Percent of gross floor area that is common space only ^o	N/A
Laundry in each unit ^o	0
Laundry in common area ^o	3
Dishwashers in each unit ^o	0
Percent Heated ^o	100
Percent Cooled ^o	90
Market Rate or Affordable Housing ^o	N/A

Energy Performance Comparison

Performance Metrics	Evaluation Periods		Comparisons		
	Current (Ending Date 02/28/2011)	Baseline (Ending Date 02/28/2011)	Rating of 75	Target	National Average
Energy Performance Rating	N/A	N/A	75	N/A	N/A
Energy Intensity					
Site (kBtu/ft ²)	71	71	0	N/A	N/A
Source (kBtu/ft ²)	120	120	0	N/A	N/A
Energy Cost					
\$/year	N/A	N/A	N/A	N/A	N/A
\$/ft ² /year	N/A	N/A	N/A	N/A	N/A
Greenhouse Gas Emissions					
MtCO ₂ e/year	195	195	0	N/A	N/A
kgCO ₂ e/ft ² /year	6	6	0	N/A	N/A

Because more than 50% of your building is Multifamily Housing, your building is designated as Multifamily Housing within Portfolio Manager. This type of building is not eligible for an energy performance rating and does not have a reference national average.

Notes:

o - This attribute is optional.

d - A default value has been supplied by Portfolio Manager.

APPENDIX D

MAJOR EQUIPMENT LIST

Concord Engineering Group

Pleasantville Housing Authority - 156 N. Main

Rooftop / AC Units

Tag	TAC-1	FURN-1	AC-1/CU-1
Unit Type	Thru-Wall A/C	Gas Furnace	Split/Furnace
Qty	50	50	1
Location	Below Window	Closet	Office Closet
Area Served	Apartment	Apartment	Offices
Manufacturer	McQuay	RUUD	RUUD
Model #	MQR-012D03325MIY	UGRA-014EMAES	UGRA-12ERAJS / UAND-048JAZ
Serial #	7-6C03881-01	EH5D702F510001868	FY5D707F210508838
Cooling Type	DX	N/A	DX
Cooling Capacity (Tons)	1	N/A	4
Cooling Efficiency (SEER/EER)	8 EER	N/A	10.5 EER
Heating Type	N/A	Gas Furnace	Gas Furnace
Heating Input (MBH)	N/A	45	120
Efficiency	N/A	94%	94%
Fuel	N/A	Natural Gas	Natural Gas
Approx Age	15	5	5
ASHRAE Service Life	15	15	15
Remaining Life	0	10	10
Comments			

Rooftop / AC Units

Tag	AC-2/CU-2	AC-3/CU-3	FURN-2
Unit Type	Split/Furnace	Split/Furnace	Gas Furnace
Qty	1	1	1
Location	Comm Rm Closet	Comm Rm Closet	Elec Rm
Area Served	Rear Community Room	Front Community Room	Basement, Hall, Laundry
Manufacturer	RUUD	RUUD	RUUD
Model #	RGRC-07ERBGS / UANL-037JAZ	UGRA-D4EMAES / 13AJA2401	RGRS-10EZAIJS
Serial #	HM5D702F	7402N190601208	N/A
Cooling Type	DX	DX	N/A
Cooling Capacity (Tons)	3.0	2	N/A
Cooling Efficiency (SEER/EER)	11 EER	12 EER	N/A
Heating Type	Gas Furnace	Gas Furnace	Gas Furnace
Heating Input (MBH)	75	45	105
Efficiency	95%	95%	92%
Fuel	Natural Gas	Natural Gas	Natural Gas
Approx Age	2	2	1
ASHRAE Service Life	15	15	15
Remaining Life	13	13	14
Comments			

Rooftop / AC Units

Tag	H&V-1	H&V-2	
Unit Type	Heating & Ventilating	Heating & Ventilating	
Qty	1	1	
Location	Roof	Roof	
Area Served	East Corridors/Make Up	West Corridors/Make Up	
Manufacturer	Sterling	Sterling	
Model #	EIE-RT30A2C01B	EIE-RT25C2C01B	
Serial #	E99492316002	E99492316001	
Cooling Type	N/A	N/A	
Cooling Capacity (Tons)	N/A	N/A	
Cooling Efficiency (SEER/EER)	N/A	N/A	
Heating Type	Gas Furnace	Gas Furnace	
Heating Input (MBH)	300	250	
Efficiency	78%	78%	
Fuel	Natural Gas	Natural Gas	
Approx Age	12	12	
ASHRAE Service Life	15	15	
Remaining Life	3	3	
Comments	3700 CFM, 2 HP Motors	3000 CFM, 1.5 HP Motors	

MAJOR EQUIPMENT LIST

Concord Engineering Group

Pleasantville Housing Authority - 156 N. Main

Domestic Water Heaters

Tag	DWH-1	DWH-2	
Unit Type	Electric	Electric	
Qty	50	1	
Location	Apartments	Laundry Room	
Area Served	Apartments	Laundry Room	
Manufacturer	Bradford & White	Bradford & White	
Model #	M230LG0S	M2120R6GHS-1NCWW	
Serial #	N/A	DM9945148	
Size (Gallons)	30	119	
Input Capacity (MBH/KW)	4.5 KW	4.5 KW	
Recovery (Gal/Hr)	21	N/A	
Efficiency %	98%	98%	
Fuel	Electric	Electric	
Approx Age	N/A	11	
ASHRAE Service Life	15	15	
Remaining Life		4	
Comments			

APPENDIX E

Investment Grade Lighting Audit

APPENDIX E
1 of 7

CEG Job #: 9C11010
Project: Pleasantville Housing Authority
Main Street
Pleasantville, NJ 08232
Bldg. Sq. Ft. 35,379

Tower Annex

KWH COST: \$0.155

ECM #1: Lighting Upgrade - General

EXISTING LIGHTING										PROPOSED LIGHTING										SAVINGS				
CEG Type	Fixture Location	Yearly Usage	No. Fixts	No. Lamps	Fixture Type	Fixt Watts	Total kW	kWh/Yr Fixtures	Yearly \$ Cost	No. Fixts	No. Lamps	Retro-Unit Description	Watts Used	Total kW	kWh/Yr Fixtures	Yearly \$ Cost	Unit Cost (INSTALLED)	Total Cost	kW Savings	kWh/Yr Savings	Yearly \$ Savings	Yearly Simple Payback		
142.21	Front Community Room	4000	6	4	2x4, 4 Lamp, 34w T12, Mag. Ballast, Recessed Mnt., Prismatic Lens	156	0.94	3,744.0	\$580.32	6	3	3 Lamp , 28w T8, Elect. Ballast, Specular Reflector; retrofit	77	0.46	1848	\$286.44	\$100.00	\$600.00	0.47	1896	\$293.88	2.04		
142.21	Rear Community Room	4000	6	4	2x4, 4 Lamp, 34w T12, Mag. Ballast, Recessed Mnt., Prismatic Lens	156	0.94	3,744.0	\$580.32	6	3	3 Lamp , 28w T8, Elect. Ballast, Specular Reflector; retrofit	77	0.46	1848	\$286.44	\$100.00	\$600.00	0.47	1896	\$293.88	2.04		
128.34	Storage/ Mech. Room	4000	1	2	8' Channel, 2 Lamp, 75w T12, Mag. Ballast, Pendant Mnt., No Lens	142	0.14	568.0	\$88.04	1	4	(2) 8' Lamps to (4) 4' Lamps - 28w T8, Elect Ballast; retrofit	102	0.10	408	\$63.24	\$100.00	\$100.00	0.04	160	\$24.80	4.03		
121.11	Kitchen	4000	1	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Surface Mnt., Prismatic Lens	78	0.08	312.0	\$48.36	1	2	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	50	0.05	200	\$31.00	\$100.00	\$100.00	0.03	112	\$17.36	5.76		
121.11	Women's Restroom	2000	1	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Surface Mnt., Prismatic Lens	78	0.08	156.0	\$24.18	1	2	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	50	0.05	100	\$15.50	\$100.00	\$100.00	0.03	56	\$8.68	11.52		
121.45		2000	1	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Wall Mnt., White Diffuser	78	0.08	156.0	\$24.18	1	2	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	50	0.05	100	\$15.50	\$100.00	\$100.00	0.03	56	\$8.68	11.52		
100	Men's Restroom	2000	1	2	2' Vanity Light, 2-Lamp, 20w T12, Mag. Ballast, Wall Mnt., Glass Lens	42	0.04	84.0	\$13.02	1	2	Reballast & Relamp; 17w T8 Elec. Ballast	33	0.03	66	\$10.23	\$60.00	\$60.00	0.01	18	\$2.79	21.51		
121.11		2000	1	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Surface Mnt., Prismatic Lens	78	0.08	156.0	\$24.18	1	2	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	50	0.05	100	\$15.50	\$100.00	\$100.00	0.03	56	\$8.68	11.52		
612	Cust. Closet	2000	1	1	Pendant Mnt., 100w A19 Lamp	100	0.10	200.0	\$31.00	1	1	(1) 26w CFL Lamp	26	0.03	52	\$8.06	\$20.00	\$20.00	0.07	148	\$22.94	0.87		
127.21	1st Floor Corridor	8760	28	2	2x2, 2 Lamp, 34w T12 U-Tube, Mag. Ballast, Recessed Mnt., Prismatic	78	2.18	19,131.8	\$2,965.44	28	2	Reballast & Relamp; Sylvania Lamp FBO30/841XP/6/SS/ECO	49	1.37	12018.72	\$1,862.90	\$100.00	\$2,800.00	0.81	7113.12	\$1,102.53	2.54		
121.11	Laundry Room	4000	4	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Surface Mnt., Prismatic Lens	78	0.31	1,248.0	\$193.44	4	2	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	50	0.20	800	\$124.00	\$100.00	\$400.00	0.11	448	\$69.44	5.76		
128.34	Elev. Machine Room	1500	1	2	8' Channel, 2 Lamp, 75w T12, Mag. Ballast, Pendant Mnt., No Lens	142	0.14	213.0	\$33.02	1	4	(2) 8' Lamps to (4) 4' Lamps - 28w T8, Elect Ballast; retrofit	102	0.10	153	\$23.72	\$100.00	\$100.00	0.04	60	\$9.30	10.75		
242.21	Main Office	3000	5	4	2x4, 4 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	107	0.54	1,605.0	\$248.78	5	4	Relamp - Sylvania Lamp FO28/841/SS/ECO	98	0.49	1470	\$227.85	\$28.00	\$140.00	0.05	135	\$20.93	6.69		
142.21		3000	4	4	2x4, 4 Lamp, 34w T12, Mag. Ballast, Recessed Mnt., Prismatic Lens	156	0.62	1,872.0	\$290.16	4	3	3 Lamp , 28w T8, Elect. Ballast, Specular Reflector; retrofit	77	0.31	924	\$143.22	\$100.00	\$400.00	0.32	948	\$146.94	2.72		
142.21	Admin Office	3000	4	4	2x4, 4 Lamp, 34w T12, Mag. Ballast, Recessed Mnt., Prismatic Lens	156	0.62	1,872.0	\$290.16	4	3	3 Lamp , 28w T8, Elect. Ballast, Specular Reflector; retrofit	77	0.31	924	\$143.22	\$100.00	\$400.00	0.32	948	\$146.94	2.72		
242.21	Server Room	3000	2	4	2x4, 4 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	107	0.21	642.0	\$99.51	2	4	Relamp - Sylvania Lamp FO28/841/SS/ECO	98	0.20	588	\$91.14	\$28.00	\$56.00	0.02	54	\$8.37	6.69		
242.21	Side Office	3000	2	4	2x4, 4 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	107	0.21	642.0	\$99.51	2	4	Relamp - Sylvania Lamp FO28/841/SS/ECO	98	0.20	588	\$91.14	\$28.00	\$56.00	0.02	54	\$8.37	6.69		
128.14	2nd Floor Trash Room	8760	1	2	8' Channel, 2 Lamp, 75w T12, Mag. Ballast, Surface Mnt., No Lens	142	0.14	1,243.9	\$192.81	1	4	(2) 8' Lamps to (4) 4' Lamps - 32w T8, Elect Ballast; retrofit	104	0.10	911.04	\$141.21	\$100.00	\$100.00	0.04	332.88	\$51.60	1.94		
127.21	2nd Floor Elevator Area	8760	3	2	2x2, 2 Lamp, 34w T12 U-Tube, Mag. Ballast, Recessed Mnt., Prismatic	78	0.23	2,049.8	\$317.73	3	2	Reballast & Relamp; Sylvania Lamp FBO30/841XP/6/SS/ECO	49	0.15	1287.72	\$199.60	\$100.00	\$300.00	0.09	762.12	\$118.13	2.54		
127.21		8760	13	2	2x2, 2 Lamp, 34w T12 U-Tube, Mag. Ballast,	78	1.01	8,882.6	\$1,376.81	13	2	Reballast & Relamp; Sylvania Lamp FBO30/841XP/6/SS/ECO	49	0.64	5580.12	\$864.92	\$100.00	\$1,300.00	0.38	3302.52	\$511.89	2.54		

Investment Grade Lighting Audit

APPENDIX E
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ECM #1: Lighting Upgrade - General

EXISTING LIGHTING										PROPOSED LIGHTING										SAVINGS					
CEG Type	Fixture Location	Yearly Usage	No. Fixts	No. Lamps	Fixture Type	Fixt Watts	Total kW	kWh/Yr Fixtures	Yearly \$ Cost	No. Fixts	No. Lamps	Retro-Unit Description	Watts Used	Total kW	kWh/Yr Fixtures	Yearly \$ Cost	Unit Cost (INSTALLED)	Total Cost	kW Savings	kWh/Yr Savings	Yearly \$ Savings	Yearly Simple Payback			
227.21	2nd Floor Corridor	8760	1	2	2x2, 2 Lamp, 32w 700 series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	65	0.07	569.4	\$88.26	1	2	Sylvania Lamp FBO30/841XP/6/SS/ECO	49	0.05	429.24	\$66.53	\$24.00	\$24.00	0.02	140.16	\$21.72	1.10			
128.14	Storage	1200	1	2	8' Channel, 2 Lamp, 75w T12, Mag. Ballast, Surface Mnt., No Lens	142	0.14	170.4	\$26.41	1	4	(2) 8' Lamps to (4) 4' Lamps - 32w T8, Elect Ballast; retrofit	104	0.10	124.8	\$19.34	\$100.00	\$100.00	0.04	45.6	\$7.07	14.15			
121.15	Stairwell East	8760	9	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Surface Mnt., White Diffuser	78	0.70	6,149.5	\$953.18	9	2	1x4, 2 Lamp, 28w T8, Elec. Ballast, Surface Mnt., White Diffuser	50	0.45	3942	\$611.01	\$130.00	\$1,170.00	0.25	2207.52	\$342.17	3.42			
121.15	Stairwell West	8760	8	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Surface Mnt., White Diffuser	78	0.62	5,466.2	\$847.27	8	2	1x4, 2 Lamp, 28w T8, Elec. Ballast, Surface Mnt., White Diffuser	50	0.40	3504	\$543.12	\$130.00	\$1,040.00	0.22	1962.24	\$304.15	3.42			
128.14		8760	1	2	8' Channel, 2 Lamp, 75w T12, Mag. Ballast, Surface Mnt., No Lens	142	0.14	1,243.9	\$192.81	1	4	(2) 8' Lamps to (4) 4' Lamps - 32w T8, Elect Ballast; retrofit	104	0.10	911.04	\$141.21	\$100.00	\$100.00	0.04	332.88	\$51.60	1.94			
127.21	3rd Floor Corridor	8760	14	2	2x2, 2 Lamp, 34w T12 U-Tube, Mag. Ballast,	78	1.09	9,565.9	\$1,482.72	14	2	Reballast & Relamp; Sylvania Lamp FBO30/841XP/6/SS/ECO	49	0.69	6009.36	\$931.45	\$100.00	\$1,400.00	0.41	3556.56	\$551.27	2.54			
128.14	3rd Fl Storage	1500	1	2	8' Channel, 2 Lamp, 75w T12, Mag. Ballast, Surface Mnt., No Lens	142	0.14	213.0	\$33.02	1	4	(2) 8' Lamps to (4) 4' Lamps - 32w T8, Elect Ballast; retrofit	104	0.10	156	\$24.18	\$100.00	\$100.00	0.04	57	\$8.84	11.32			
128.14	3rd Fl Trash Room	8760	1	2	8' Channel, 2 Lamp, 75w T12, Mag. Ballast, Surface Mnt., No Lens	142	0.14	1,243.9	\$192.81	1	4	(2) 8' Lamps to (4) 4' Lamps - 32w T8, Elect Ballast; retrofit	104	0.10	911.04	\$141.21	\$100.00	\$100.00	0.04	332.88	\$51.60	1.94			
127.21	3rd Fl Elev. Area	8760	3	2	2x2, 2 Lamp, 34w T12 U-Tube, Mag. Ballast, Recessed Mnt., Prismatic Lens	78	0.23	2,049.8	\$317.73	3	2	Reballast & Relamp; Sylvania Lamp FBO30/841XP/6/SS/ECO	49	0.15	1287.72	\$199.60	\$100.00	\$300.00	0.09	762.12	\$118.13	2.54			
1217.21	4th Fl Corridor	8760	14	1	Square, Wall Mntd. Down Light, 75w R30	75	1.05	9,198.0	\$1,425.69	14	1	Energy Star Rated, Dimmable 26w CFL Lamp	26	0.36	3188.64	\$494.24	\$20.00	\$280.00	0.69	6009.36	\$931.45	0.30			
128.14	4th Fl Trash Room	8760	1	2	8' Channel, 2 Lamp, 75w T12, Mag. Ballast, Surface Mnt., No Lens	142	0.14	1,243.9	\$192.81	1	4	(2) 8' Lamps to (4) 4' Lamps - 32w T8, Elect Ballast; retrofit	104	0.10	911.04	\$141.21	\$100.00	\$100.00	0.04	332.88	\$51.60	1.94			
128.14	4th Fl Storage	1500	1	2	8' Channel, 2 Lamp, 75w T12, Mag. Ballast, Surface Mnt., No Lens	142	0.14	213.0	\$33.02	1	4	(2) 8' Lamps to (4) 4' Lamps - 32w T8, Elect Ballast; retrofit	104	0.10	156	\$24.18	\$100.00	\$100.00	0.04	57	\$8.84	11.32			
127.21	4th Fl Elev. Area	8760	3	2	2x2, 2 Lamp, 34w T12 U-Tube, Mag. Ballast,	78	0.23	2,049.8	\$317.73	3	2	Reballast & Relamp; Sylvania Lamp FBO30/841XP/6/SS/ECO	49	0.15	1287.72	\$199.60	\$100.00	\$300.00	0.09	762.12	\$118.13	2.54			
121.11	Maintenance Office	4000	5	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Surface Mnt., Prismatic Lens	78	0.39	1,560.0	\$241.80	5	2	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	50	0.25	1000	\$155.00	\$100.00	\$500.00	0.14	560	\$86.80	5.76			
100		4000	1	2	2' Vanity Light, 2-Lamp, 20w T12, Mag. Ballast, Wall Mnt., Glass Lens	42	0.04	168.0	\$26.04	1	2	Reballast & Relamp; 17w T8 Elec. Ballast	33	0.03	132	\$20.46	\$60.00	\$60.00	0.01	36	\$5.58	10.75			
128.34	156 Shop Area	4000	3	2	8' Channel, 2 Lamp, 75w T12, Mag. Ballast, Pendant Mnt., No Lens	142	0.43	1,704.0	\$264.12	3	4	(2) 8' Lamps to (4) 4' Lamps - 28w T8, Elect Ballast; retrofit	102	0.31	1224	\$189.72	\$100.00	\$300.00	0.12	480	\$74.40	4.03			
128.34	Trash Room	4000	1	2	8' Channel, 2 Lamp, 75w T12, Mag. Ballast, Pendant Mnt., No Lens	142	0.14	568.0	\$88.04	1	4	(2) 8' Lamps to (4) 4' Lamps - 28w T8, Elect Ballast; retrofit	102	0.10	408	\$63.24	\$100.00	\$100.00	0.04	160	\$24.80	4.03			
128.34	Basement	2000	3	2	8' Channel, 2 Lamp, 75w T12, Mag. Ballast, Pendant Mnt., No Lens	142	0.43	852.0	\$132.06	3	4	(2) 8' Lamps to (4) 4' Lamps - 28w T8, Elect Ballast; retrofit	102	0.31	612	\$94.86	\$100.00	\$300.00	0.12	240	\$37.20	8.06			
West End Unit (Unit A407) - 8 Units																									
3520	Kitchen	2500	8	2	Ceiling Mount White Globe, (2) 60w A Lamp	120	0.96	2,400.0	\$372.00	8	2	13w CFL Lamps	26	0.21	520	\$80.60	\$20.00	\$160.00	0.75	1880	\$291.40	0.55			
617	Range Hood	1000	8	1	Hood Light w/Globe & Cage, 100w A Lamp	100	0.80	800.0	\$124.00	8	1	26w CFL Lamp	26	0.21	208	\$32.24	\$20.00	\$160.00	0.59	592	\$91.76	1.74			
624	Breakfast Area	2500	8	3	3 Globe Hanging Light, (3) 60w A Lamp	180	1.44	3,600.0	\$558.00	8	3	13w CFL Lamps	39	0.31	780	\$120.90	\$30.00	\$240.00	1.13	2820	\$437.10	0.55			
3517	Foyer	2500	8	1	Light Fixture, 60w A Lamp	60	0.48	1,200.0	\$186.00	8	1	13w CFL Lamps	13	0.10	260	\$40.30	\$20.00	\$160.00	0.38	940	\$145.70	1.10			
3520	Closet	800	8	2	Ceiling Mount White Globe, (2) 60w A Lamp	120	0.96	768.0	\$119.04	8	2	13w CFL Lamps	26	0.21	166.4	\$25.79	\$20.00	\$160.00	0.75	601.6	\$93.25	1.72			

Investment Grade Lighting Audit

APPENDIX E
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ECM #1: Lighting Upgrade - General

EXISTING LIGHTING										PROPOSED LIGHTING										SAVINGS			
CEG Type	Fixture Location	Yearly Usage	No. Fixts	No. Lamps	Fixture Type	Fixt Watts	Total kW	kWh/Yr Fixtures	Yearly \$ Cost	No. Fixts	No. Lamps	Retro-Unit Description	Watts Used	Total kW	kWh/Yr Fixtures	Yearly \$ Cost	Unit Cost (INSTALLED)	Total Cost	kW Savings	kWh/Yr Savings	Yearly \$ Savings	Yearly Simple Payback	
610	Bathroom	2500	8	2	Wall Mnt Vanity Fixture, (2) 60w A Lamp	120	0.96	2,400.0	\$372.00	8	2	13w CFL Lamps	26	0.21	520	\$80.60	\$20.00	\$160.00	0.75	1880	\$291.40	0.55	
551	Sink Light	2500	8	1	Recessed Down Light, 50w R20	50	0.40	1,000.0	\$155.00	8	1	11w R20 CFL	20	0.16	400	\$62.00	\$20.00	\$160.00	0.24	600	\$93.00	1.72	
East End Unit (Unit A401) - 3 Units																							
3520	Kitchen	2500	3	2	Ceiling Mount White Globe, (2) 60w A Lamp	120	0.36	900.0	\$139.50	3	2	13w CFL Lamps	26	0.08	195	\$30.23	\$20.00	\$60.00	0.28	705	\$109.28	0.55	
617	Range Hood	1000	3	1	Hood Light w/Globe & Cage 100w A Lamp	100	0.30	300.0	\$46.50	3	1	26w CFL Lamp	26	0.08	78	\$12.09	\$20.00	\$60.00	0.22	222	\$34.41	1.74	
624	Breakfast Area	2500	3	3	3 Globe Hanging Light, (3) 60w A Lamp	180	0.54	1,350.0	\$209.25	3	3	13w CFL Lamps	39	0.12	292.5	\$45.34	\$30.00	\$90.00	0.42	1057.5	\$163.91	0.55	
3520	Closet	800	3	2	Ceiling Mount White Globe, (2) 60w A Lamp	120	0.36	288.0	\$44.64	3	2	13w CFL Lamps	26	0.08	62.4	\$9.67	\$20.00	\$60.00	0.28	225.6	\$34.97	1.72	
610	Bathroom	1000	3	2	Wall Mnt Vanity Fixture, (2) 60w A Lamp	120	0.36	360.0	\$55.80	3	2	13w CFL Lamps	26	0.08	78	\$12.09	\$20.00	\$60.00	0.28	282	\$43.71	1.37	
356		1000	3	3	1x4, 3 Lamp, 54w T5HO Fixture	177	0.53	531.0	\$82.31	3	0	No Change	0	0.00	0	\$0.00	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
551	Sink Light	1000	3	1	Recessed Down Light, 50w R20	50	0.15	150.0	\$23.25	3	1	11w R20 CFL	20	0.06	60	\$9.30	\$20.00	\$60.00	0.09	90	\$13.95	4.30	
3756	Hall	2500	3	2	Ceiling Mount Globe, (2) 60w A Lamp	120	0.36	900.0	\$139.50	3	2	13w CFL Lamps	26	0.08	195	\$30.23	\$20.00	\$60.00	0.28	705	\$109.28	0.55	
Standard Unit (Unit A311) - 38 Units																							
3520	Kitchen	2500	38	2	Ceiling Mount White Globe, (2) 60w A Lamp	120	4.56	11,400.0	\$1,767.00	38	2	13w CFL Lamps	26	0.99	2470	\$382.85	\$20.00	\$760.00	3.57	8930	\$1,384.15	0.55	
617	Range Hood	1000	38	1	Hood Light w/Globe & Cage, 100w A Lamp	100	3.80	3,800.0	\$589.00	38	1	26w CFL Lamp	26	0.99	988	\$153.14	\$20.00	\$760.00	2.81	2812	\$435.86	1.74	
624	Breakfast Area	2500	38	3	3 Globe Hanging Light, (3) 60w A Lamp	180	6.84	17,100.0	\$2,650.50	38	3	13w CFL Lamps	39	1.48	3705	\$574.28	\$30.00	\$1,140.00	5.36	13395	\$2,076.23	0.55	
3520	Closet	800	38	2	Ceiling Mount White Globe, (2) 60w A Lamp	120	4.56	3,648.0	\$565.44	38	2	13w CFL Lamps	26	0.99	790.4	\$122.51	\$20.00	\$760.00	3.57	2857.6	\$442.93	1.72	
610	Bathroom	1000	38	2	Wall Mnt Vanity Fixture, (2) 60w A Lamp	120	4.56	4,560.0	\$706.80	38	2	13w CFL Lamps	26	0.99	988	\$153.14	\$20.00	\$760.00	3.57	3572	\$553.66	1.37	
356		1000	38	3	1x4, 3 Lamp, 54w T5HO Fixture	177	6.73	6,726.0	\$1,042.53	38	0	No Change	0	0.00	0	\$0.00	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
551	Sink Light	1000	38	1	Recessed Down Light, 50w R20	50	1.90	1,900.0	\$294.50	38	1	11w R20 CFL	20	0.76	760	\$117.80	\$20.00	\$760.00	1.14	1140	\$176.70	4.30	
3756	Hall	2500	38	2	Ceiling Mount Globe, (2) 60w A Lamp	120	4.56	11,400.0	\$1,767.00	38	2	13w CFL Lamps	26	0.99	2470	\$382.85	\$20.00	\$760.00	3.57	8930	\$1,384.15	0.55	
767.1	Exterior	4400	7	1	400w HPS "Shoebox" Wall Mnt. Fixture	460	3.22	14,168.0	\$2,196.04	7	1	80w Induction Lamp, Wall Pack	80	0.56	2464	\$381.92	\$320.00	\$2,240.00	2.66	11704	\$1,814.12	1.23	
Totals			548	133			64.67	184,400	\$28,582	548	147			18.9	74,612	\$11,565		\$23,796	38.5	102,531	\$15,892	1.50	

CEG Job #:
Project: Pleasantville Housing Authority
Address: Main Street
Pleasantville, NJ 08232
Building SF: 35,379

Tower Annex

KWH COST: \$0.155

FALSE

ECM #2: Lighting Controls

EXISTING LIGHTING										PROPOSED LIGHTING CONTROLS											SAVINGS			
CEG Type	Fixture Location	Yearly Usage	No. Fixts	No. Lamps	Fixture Type	Fixt Watts	Total kW	kWh/Yr Fixtures	Yearly \$ Cost	No. Fixts	No. Cont.	Controls Description	Watts Used	Total kW	Reduction (%)	kWh/Yr Fixtures	Yearly \$ Cost	Unit Cost (INSTALLED)	Total Cost	kW Savings	kWh/Yr Savings	Yearly \$ Savings	Yearly Simple Payback	
142.21	Front Community Room	4000	6	4	2x4, 4 Lamp, 34w T12, Mag. Ballast, Recessed Mnt., Prismatic Lens	156	0.94	3744	\$580.32	6	1	Dual Technology Occupancy Sensor - Switch Mnt.	156	0.75	20%	2995.2	\$464.26	\$150.00	\$150.00	0.19	748.8	\$116.06	1.29	
142.21	Rear Community Room	4000	6	4	2x4, 4 Lamp, 34w T12, Mag. Ballast, Recessed Mnt., Prismatic Lens	156	0.94	3744	\$580.32	6	1	Dual Technology Occupancy Sensor - Switch Mnt.	156	0.75	20%	2995.2	\$464.26	\$150.00	\$150.00	0.19	748.8	\$116.06	1.29	
128.34	Storage/ Mech. Room	4000	1	2	8' Channel, 2 Lamp, 75w T12, Mag. Ballast, Pendant Mnt., No Lens	142	0.14	568	\$88.04	1	0	No Change	142	0.14	0%	568	\$88.04	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
121.11	Kitchen	4000	1	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Surface Mnt., Prismatic Lens	78	0.08	312	\$48.36	1	0	No Change	78	0.08	0%	312	\$48.36	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
121.11	Women's Restroom	2000	1	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Surface Mnt., Prismatic Lens	78	0.08	156	\$24.18	1	0	No Change	78	0.08	0%	156	\$24.18	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
121.45		2000	1	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Wall Mnt., White Diffuser	78	0.08	156	\$24.18	1	0	No Change	78	0.08	0%	156	\$24.18	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
100	Men's Restroom	2000	1	2	2' Vanity Light, 2-Lamp, 20w T12, Mag. Ballast, Wall Mnt., Glass Lens	42	0.04	84	\$13.02	1	0	No Change	42	0.04	0%	84	\$13.02	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
121.11		2000	1	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Surface Mnt., Prismatic Lens	78	0.08	156	\$24.18	1	0	No Change	78	0.08	0%	156	\$24.18	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
612	Cust. Closet	2000	1	1	Pendant Mnt., 100w A19 Lamp	100	0.10	200	\$31.00	1	0	No Change	100	0.10	0%	200	\$31.00	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
127.21	1st Floor Corridor	8760	28	2	2x2, 2 Lamp, 34w T12 U-Tube, Mag. Ballast, Recessed Mnt., Prismatic Lens	78	2.18	19131.84	\$2,965.44	28	0	No Change	78	2.18	0%	19131.84	\$2,965.44	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
121.11	Laundry Room	4000	4	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Surface Mnt., Prismatic Lens	78	0.31	1248	\$193.44	4	1	Dual Technology Occupancy Sensor - Switch Mnt.	78	0.25	20%	998.4	\$154.75	\$150.00	\$150.00	0.06	249.6	\$38.69	3.88	
128.34	Elev. Machine Room	1500	1	2	8' Channel, 2 Lamp, 75w T12, Mag. Ballast, Pendant Mnt., No Lens	142	0.14	213	\$33.02	1	0	No Change	142	0.14	0%	213	\$33.02	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
242.21	Main Office	3000	5	4	2x4, 4 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	107	0.54	1605	\$248.78	5	1	Dual Technology Occupancy Sensor - Switch Mnt.	107	0.43	20%	1284	\$199.02	\$150.00	\$150.00	0.11	321	\$49.76	3.01	
142.21		3000	4	4	2x4, 4 Lamp, 34w T12, Mag. Ballast, Recessed Mnt., Prismatic Lens	156	0.62	1872	\$290.16	4	1	Dual Technology Occupancy Sensor - Switch Mnt.	156	0.50	20%	1497.6	\$232.13	\$150.00	\$150.00	0.12	374.4	\$58.03	2.58	
142.21	Admin Office	3000	4	4	2x4, 4 Lamp, 34w T12, Mag. Ballast, Recessed Mnt., Prismatic Lens	156	0.62	1872	\$290.16	4	1	Dual Technology Occupancy Sensor - Switch Mnt.	156	0.50	20%	1497.6	\$232.13	\$150.00	\$150.00	0.12	374.4	\$58.03	2.58	

ECM #2: Lighting Controls

EXISTING LIGHTING					PROPOSED LIGHTING CONTROLS										SAVINGS									
CEG Type	Fixture Location	Yearly Usage	No. Fixts	No. Lamps	Fixture Type	Fixt Watts	Total kW	kWh/Yr Fixtures	Yearly \$ Cost	No. Fixts	No. Cont.	Controls Description	Watts Used	Total kW	Reduction (%)	kWh/Yr Fixtures	Yearly \$ Cost	Unit Cost (INSTALLED)	Total Cost	kW Savings	kWh/Yr Savings	Yearly \$ Savings	Yearly Simple Payback	
242.21	Server Room	3000	2	4	2x4, 4 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	107	0.21	642	\$99.51	2	1	Dual Technology Occupancy Sensor - Switch Mnt.	107	0.17	20%	513.6	\$79.61	\$150.00	\$150.00	0.04	128.4	\$19.90	7.54	
242.21	Side Office	3000	2	4	2x4, 4 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	107	0.21	642	\$99.51	2	1	Dual Technology Occupancy Sensor - Switch Mnt.	107	0.17	20%	513.6	\$79.61	\$150.00	\$150.00	0.04	128.4	\$19.90	7.54	
128.14	2nd Floor Trash Room	8760	1	2	8' Channel, 2 Lamp, 75w T12, Mag. Ballast, Surface Mnt., No Lens	142	0.14	1243.92	\$192.81	1	1	Dual Technology Occupancy Sensor - Switch Mnt.	142	0.11	20%	995.136	\$154.25	\$150.00	\$150.00	0.03	248.784	\$38.56	3.89	
127.21	2nd Floor Elevator Area	8760	3	2	2x2, 2 Lamp, 34w T12 U-Tube, Mag. Ballast, Recessed Mnt., Prismatic Lens	78	0.23	2049.84	\$317.73	3	1	Daylight Sensor (Sensorswitch PP-20 & CM-PC or equal)	78	0.16	30%	1434.888	\$222.41	\$300.00	\$300.00	0.07	614.952	\$95.32	3.15	
127.21	2nd Floor Corridor	8760	13	2	2x2, 2 Lamp, 34w T12 U-Tube, Mag. Ballast, Recessed Mnt., Prismatic Lens	78	1.01	8882.64	\$1,376.81	13	0	No Change	78	1.01	0%	8882.64	\$1,376.81	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
227.21		8760	1	2	2x2, 2 Lamp, 32w 700 series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	65	0.07	569.4	\$88.26	1	0	No Change	65	0.07	0%	569.4	\$88.26	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
128.14	Storage	1200	1	2	8' Channel, 2 Lamp, 75w T12, Mag. Ballast, Surface Mnt., No Lens	142	0.14	170.4	\$26.41	1	0	No Change	142	0.14	0%	170.4	\$26.41	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
121.15	Stairwell East	8760	9	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Surface Mnt., White Diffuser	78	0.70	6149.52	\$953.18	9	0	No Change	78	0.70	0%	6149.52	\$953.18	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
121.15	Stairwell West	8760	8	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Surface Mnt., White Diffuser	78	0.62	5466.24	\$847.27	8	0	No Change	78	0.62	0%	5466.24	\$847.27	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
128.14		8760	1	2	8' Channel, 2 Lamp, 75w T12, Mag. Ballast, Surface Mnt., No Lens	142	0.14	1243.92	\$192.81	1	0	No Change	142	0.14	0%	1243.92	\$192.81	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
127.21	3rd Floor Corridor	8760	14	2	2x2, 2 Lamp, 34w T12 U-Tube, Mag. Ballast, Recessed Mnt., Prismatic Lens	78	1.09	9565.92	\$1,482.72	14	0	No Change	78	1.09	0%	9565.92	\$1,482.72	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
128.14	3rd Fl Storage	1500	1	2	8' Channel, 2 Lamp, 75w T12, Mag. Ballast, Surface Mnt., No Lens	142	0.14	213	\$33.02	1	0	No Change	142	0.14	0%	213	\$33.02	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
128.14	3rd Fl Trash Room	8760	1	2	8' Channel, 2 Lamp, 75w T12, Mag. Ballast, Surface Mnt., No Lens	142	0.14	1243.92	\$192.81	1	1	Dual Technology Occupancy Sensor - Switch Mnt.	142	0.11	20%	995.136	\$154.25	\$150.00	\$150.00	0.03	248.784	\$38.56	3.89	
127.21	3rd Fl Elev. Area	8760	3	2	2x2, 2 Lamp, 34w T12 U-Tube, Mag. Ballast, Recessed Mnt., Prismatic Lens	78	0.23	2049.84	\$317.73	3	1	Daylight Sensor (Sensorswitch PP-20 & CM-PC or equal)	78	0.16	30%	1434.888	\$222.41	\$300.00	\$300.00	0.07	614.952	\$95.32	3.15	
1217.21	4th Fl Corridor	8760	14	1	Square, Wall Mntd. Down Light, 75w R30	75	1.05	9198	\$1,425.69	14	0	No Change	75	1.05	0%	9198	\$1,425.69	\$0.00	\$0.00	0.00	0	\$0.00	0.00	
128.14	4th Fl Trash Room	8760	1	2	8' Channel, 2 Lamp, 75w T12, Mag. Ballast, Surface Mnt., No Lens	142	0.14	1243.92	\$192.81	1	1	Dual Technology Occupancy Sensor - Switch Mnt.	142	0.11	20%	995.136	\$154.25	\$150.00	\$150.00	0.03	248.784	\$38.56	3.89	

ECM #2: Lighting Controls

EXISTING LIGHTING					PROPOSED LIGHTING CONTROLS										SAVINGS											
CEG Type	Fixture Location	Yearly Usage	No. Fixts	No. Lamps	Fixture Type	Fixt Watts	Total kW	kWh/Yr Fixtures	Yearly \$ Cost	No. Fixts	No. Cont.	Controls Description	Watts Used	Total kW	Reduction (%)	kWh/Yr Fixtures	Yearly \$ Cost	Unit Cost (INSTALLED)	Total Cost	kW Savings	kWh/Yr Savings	Yearly \$ Savings	Yearly Simple Payback			
128.14	4th Fl Storage	1500	1	2	8' Channel, 2 Lamp, 75w T12, Mag. Ballast, Surface Mnt., No Lens	142	0.14	213	\$33.02	1	0	No Change	142	0.14	0%	213	\$33.02	\$0.00	\$0.00	0.00	0	\$0.00	0.00			
127.21	4th Fl Elev. Area	8760	3	2	2x2, 2 Lamp, 34w T12 U-Tube, Mag. Ballast, Recessed Mnt., Prismatic Lens	78	0.23	2049.84	\$317.73	3	1	Daylight Sensor (Sensorswitch PP-20 & CM-PC or equal)	78	0.16	30%	1434.888	\$222.41	\$300.00	\$300.00	0.07	614.952	\$95.32	3.15			
121.11	Maintenance Office	4000	5	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Surface Mnt., Prismatic Lens	78	0.39	1560	\$241.80	5	1	Dual Technology Occupancy Sensor - Switch Mnt.	78	0.31	20%	1248	\$193.44	\$150.00	\$150.00	0.08	312	\$48.36	3.10			
100		4000	1	2	2' Vanity Light, 2-Lamp, 20w T12, Mag. Ballast, Wall Mnt., Glass Lens	42	0.04	168	\$26.04	1	0	No Change	42	0.04	0%	168	\$26.04	\$0.00	\$0.00	0.00	0	\$0.00	0.00			
128.34	156 Shop Area	4000	3	2	8' Channel, 2 Lamp, 75w T12, Mag. Ballast, Pendant Mnt., No Lens	142	0.43	1704	\$264.12	3	1	Dual Technology Occupancy Sensor - Switch Mnt.	142	0.34	20%	1363.2	\$211.30	\$150.00	\$150.00	0.09	340.8	\$52.82	2.84			
128.34	Trash Room	4000	1	2	8' Channel, 2 Lamp, 75w T12, Mag. Ballast, Pendant Mnt., No Lens	142	0.14	568	\$88.04	1	1	Dual Technology Occupancy Sensor - Switch Mnt.	142	0.11	20%	454.4	\$70.43	\$150.00	\$150.00	0.03	113.6	\$17.61	8.52			
128.34	Basement	2000	3	2	8' Channel, 2 Lamp, 75w T12, Mag. Ballast, Pendant Mnt., No Lens	142	0.43	852	\$132.06	3	1	Dual Technology Occupancy Sensor - Switch Mnt.	142	0.34	20%	681.6	\$105.65	\$150.00	\$150.00	0.09	170.4	\$26.41	5.68			
West End Unit (Unit A407) - 8 Units																										
3520	Kitchen	2500	8	2	Ceiling Mount White Globe, (2) 60w A Lamp	120	0.96	2400	\$372.00	8	0	No Change	120	0.96	0%	2400	\$372.00	\$0.00	\$0.00	0.00	0	\$0.00	0.00			
617	Range Hood	1000	8	1	Hood Light w/Globe & Cage, 100w A Lamp	100	0.80	800	\$124.00	8	0	No Change	100	0.80	0%	800	\$124.00	\$0.00	\$0.00	0.00	0	\$0.00	0.00			
624	Breakfast Area	2500	8	3	3 Globe Hanging Light, (3) 60w A Lamp	180	1.44	3600	\$558.00	8	0	No Change	180	1.44	0%	3600	\$558.00	\$0.00	\$0.00	0.00	0	\$0.00	0.00			
3517	Foyer	2500	8	1	Light Fixture, 60w A Lamp	60	0.48	1200	\$186.00	8	0	No Change	60	0.48	0%	1200	\$186.00	\$0.00	\$0.00	0.00	0	\$0.00	0.00			
3520	Closet	800	8	2	Ceiling Mount White Globe, (2) 60w A Lamp	120	0.96	768	\$119.04	8	0	No Change	120	0.96	0%	768	\$119.04	\$0.00	\$0.00	0.00	0	\$0.00	0.00			
610	Bathroom	2500	8	2	Wall Mnt Vanity Fixture, (2) 60w A Lamp	120	0.96	2400	\$372.00	8	0	No Change	120	0.96	0%	2400	\$372.00	\$0.00	\$0.00	0.00	0	\$0.00	0.00			
551	Sink Light	2500	8	1	Recessed Down Light, 50w R20	50	0.40	1000	\$155.00	8	0	No Change	50	0.40	0%	1000	\$155.00	\$0.00	\$0.00	0.00	0	\$0.00	0.00			
East End Unit (Unit A401) - 3 Units																										
3520	Kitchen	2500	3	2	Ceiling Mount White Globe, (2) 60w A Lamp	120	0.36	900	\$139.50	3	0	No Change	120	0.36	0%	900	\$139.50	\$0.00	\$0.00	0.00	0	\$0.00	0.00			
617	Range Hood	1000	3	1	Hood Light w/Globe & Cage, 100w A Lamp	100	0.30	300	\$46.50	3	0	No Change	100	0.30	0%	300	\$46.50	\$0.00	\$0.00	0.00	0	\$0.00	0.00			

ECM #2: Lighting Controls

EXISTING LIGHTING					PROPOSED LIGHTING CONTROLS																		SAVINGS			
CEG Type	Fixture Location	Yearly Usage	No. Fixts	No. Lamps	Fixture Type	Fixt Watts	Total kW	kWh/Yr Fixtures	Yearly \$ Cost	No. Fixts	No. Cont.	Controls Description	Watts Used	Total kW	Reduction (%)	kWh/Yr Fixtures	Yearly \$ Cost	Unit Cost (INSTALLED)	Total Cost	kW Savings	kWh/Yr Savings	Yearly \$ Savings	Yearly Simple Payback			
624	Breakfast Area	2500	3	3	3 Globe Hanging Light, (3) 60w A Lamp	180	0.54	1350	\$209.25	3	0	No Change	180	0.54	0%	1350	\$209.25	\$0.00	\$0.00	0.00	0	\$0.00	0.00			
3520	Closet	800	3	2	Ceiling Mount White Globe, (2) 60w A Lamp	120	0.36	288	\$44.64	3	0	No Change	120	0.36	0%	288	\$44.64	\$0.00	\$0.00	0.00	0	\$0.00	0.00			
610	Bathroom	1000	3	2	Wall Mnt Vanity Fixture, (2) 60w A Lamp	120	0.36	360	\$55.80	3	0	No Change	120	0.36	0%	360	\$55.80	\$0.00	\$0.00	0.00	0	\$0.00	0.00			
356		1000	3	3	1x4, 3 Lamp, 54w T5HO Fixture	177	0.53	531	\$82.31	3	0	No Change	177	0.53	0%	531	\$82.31	\$0.00	\$0.00	0.00	0	\$0.00	0.00			
551	Sink Light	1000	3	1	Recessed Down Light, 50w R20	50	0.15	150	\$23.25	3	0	No Change	50	0.15	0%	150	\$23.25	\$0.00	\$0.00	0.00	0	\$0.00	0.00			
3756	Hall	2500	3	2	Ceiling Mount Globe, (2) 60w A Lamp	120	0.36	900	\$139.50	3	0	No Change	120	0.36	0%	900	\$139.50	\$0.00	\$0.00	0.00	0	\$0.00	0.00			
Standard Unit (Unit A311) - 38 Units																										
3520	Kitchen	2500	38	2	Ceiling Mount White Globe, (2) 60w A Lamp	120	4.56	11400	\$1,767.00	38	0	No Change	120	4.56	0%	11400	\$1,767.00	\$0.00	\$0.00	0.00	0	\$0.00	0.00			
617	Range Hood	1000	38	1	Hood Light w/Globe & Cage, 100w A Lamp	100	3.80	3800	\$589.00	38	0	No Change	100	3.80	0%	3800	\$589.00	\$0.00	\$0.00	0.00	0	\$0.00	0.00			
624	Breakfast Area	2500	38	3	3 Globe Hanging Light, (3) 60w A Lamp	180	6.84	17100	\$2,650.50	38	0	No Change	180	6.84	0%	17100	\$2,650.50	\$0.00	\$0.00	0.00	0	\$0.00	0.00			
3520	Closet	800	38	2	Ceiling Mount White Globe, (2) 60w A Lamp	120	4.56	3648	\$565.44	38	0	No Change	120	4.56	0%	3648	\$565.44	\$0.00	\$0.00	0.00	0	\$0.00	0.00			
610	Bathroom	1000	38	2	Wall Mnt Vanity Fixture, (2) 60w A Lamp	120	4.56	4560	\$706.80	38	0	No Change	120	4.56	0%	4560	\$706.80	\$0.00	\$0.00	0.00	0	\$0.00	0.00			
356		1000	38	3	1x4, 3 Lamp, 54w T5HO Fixture	177	6.73	6726	\$1,042.53	38	0	No Change	177	6.73	0%	6726	\$1,042.53	\$0.00	\$0.00	0.00	0	\$0.00	0.00			
551	Sink Light	1000	38	1	Recessed Down Light, 50w R20	50	1.90	1900	\$294.50	38	0	No Change	50	1.90	0%	1900	\$294.50	\$0.00	\$0.00	0.00	0	\$0.00	0.00			
3756	Hall	2500	38	2	Ceiling Mount Globe, (2) 60w A Lamp	120	4.56	11400	\$1,767.00	38	0	No Change	120	4.56	0%	11400	\$1,767.00	\$0.00	\$0.00	0.00	0	\$0.00	0.00			
767.1	Exterior	4400	7	1	400w HPS "Shoebox" Wall Mnt. Fixture	460	3.22	14168	\$2,196.04	7	0	No Change	460	3.22	0%	14168	\$2,196.04	\$0.00	\$0.00	0.00	0	\$0.00	0.00			
	Totals		548	133			64.7	184,400.2	\$28,582	548	18			63.2		177,798.4	\$27,558.74		\$3,150	1.45	6,602	\$1,023	3.08			

APPENDIX F

Location Description	Area (Sq FT)	Panel	Qty	Panel Sq Ft	Panel Total Sq Ft	Total KW _{DC}	Total Annual kWh	Total KW _{AC}	Panel Weight (41.9 lbs)	W/SQFT
Parking Lot	1400	SHARP NU-U235F2	60	17.5	1,052	14.10	15,737	10.9	2,514	13.40



= Proposed PV Layout

Notes:

1. Estimated kWh based on the National Renewable Energy Laboratory PVWatts Version 1 Calculator Program.

Project Name: LGEA Solar PV Project - Pleasantville Tower Annex

Location: Pleasantville, NJ

Description: Photovoltaic System 100% Financing - 15 year

Simple Payback Analysis

	Photovoltaic System 100% Financing - 15 year
Total Construction Cost	\$98,676
Annual kWh Production	15,737
Annual Energy Cost Reduction	\$2,439
Average Annual SREC Revenue	\$6,068
Simple Payback:	11.60 Years

Life Cycle Cost Analysis

Analysis Period (years):	15	Financing %:	100%
Discount Rate:	3%	Maintenance Escalation Rate:	3.0%
Average Energy Cost (\$/kWh)	\$0.155	Energy Cost Escalation Rate:	3.0%
Financing Rate:	6.00%	Average SREC Value (\$/kWh)	\$0.386

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	\$0	0	0	0	\$0	0	0	0	0
1	\$0	15,737	\$2,439	\$0	\$8,655	\$5,807	\$4,186	\$1,102	\$1,102
2	\$0	15,658	\$2,512	\$0	\$8,612	\$5,549	\$4,444	\$1,132	\$2,235
3	\$0	15,580	\$2,588	\$0	\$7,790	\$5,274	\$4,718	\$386	\$2,620
4	\$0	15,502	\$2,665	\$0	\$6,976	\$4,983	\$5,009	(\$351)	\$2,269
5	\$0	15,425	\$2,745	\$159	\$6,941	\$4,675	\$5,318	(\$465)	\$1,805
6	\$0	15,347	\$2,828	\$158	\$6,906	\$4,347	\$5,646	(\$416)	\$1,389
7	\$0	15,271	\$2,913	\$157	\$6,108	\$3,998	\$5,994	(\$1,129)	\$260
8	\$0	15,194	\$3,000	\$157	\$6,078	\$3,629	\$6,364	(\$1,071)	(\$811)
9	\$0	15,118	\$3,090	\$156	\$5,291	\$3,236	\$6,756	(\$1,767)	(\$2,578)
10	\$0	15,043	\$3,183	\$155	\$5,265	\$2,820	\$7,173	(\$1,700)	(\$4,277)
11	\$0	14,968	\$3,278	\$154	\$4,490	\$2,377	\$7,615	(\$2,378)	(\$6,655)
12	\$0	14,893	\$3,376	\$153	\$4,468	\$1,907	\$8,085	(\$2,301)	(\$8,956)
13	\$0	14,818	\$3,478	\$153	\$3,705	\$1,409	\$8,583	(\$2,962)	(\$11,919)
14	\$0	14,744	\$3,582	\$152	\$3,686	\$879	\$9,113	(\$2,876)	(\$14,795)
15	\$0	14,671	\$3,690	\$151	\$2,934	\$317	\$9,675	(\$3,520)	(\$18,314)
Totals:		227,969	\$45,367	\$1,705	\$87,906	\$51,207	\$98,676	(\$18,314)	(\$56,625)
Net Present Value (NPV)								(\$11,732)	