CITY OF PLEASANTVILLE
POLICE DEPARTMENT

17 NORTH FIRST STREET
PLEASANTVILLE, NJ 08232

FACILITY ENERGY REPORT

TABLE OF CONTENTS

I. HISTORIC ENERGY CONSUMPTION/COST

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.

Electric Utility Provider:	Atlantic City Electric
Electric Utility Rate Structure:	Monthly General Service (MGS) & Annual General Service (AGS)
Third Party Supplier:	Liberty Power
Fuel Oil Utility Provider:	Pomona Heating & Cooling LLC
Utility Rate Structure:	N/A
Third Party Supplier:	None

The electric usage profile represents the actual electrical usage for the facility. 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 oil usage profile shows the actual oil consumption for the facility. The oil provider measures consumption in gallons. One Gallon of #2 oil is equivalent to 140,000 BTUs of energy.

Table 1
Electricity Billing Data

ELECTRIC USAGE SUMMARY			
Utility Provider:	Atlantic City Electric		
Rate:	MGS	AGS	
Meter No:	N/A		
Account #	0254 5809 9915	0254 3839 9997	
Third Party Utility Provider:	Liberty Power		
TPS Meter / Acct No:	N/A		

MONTH OF USE	CONSUMPTION KWH	DEMAND	TOTAL BILL
Mar-10	22,181	49.2	$3,200
Apr-10	18,083	52.4	$2,700
May-10	13,540	57.8	$2,137
Jun-10	23,894	57.3	$3,484
Jul-10	31,218	60.0	$4,483
Aug-10	30,860	65.6	$4,425
Sep-10	27,821	66.4	$4,110
Oct-10	21,567	59.2	$3,264
Nov-10	14,257	39.4	$2,285
Dec-10	17,440	42.5	$2,749
Jan-11	21,739	39.3	$3,510
Feb-11	17,566	41.6	$2,913
Totals	**260,166**	**66.4 Max**	**$39,261**

AVERAGE DEMAND **52.6 KW average**

AVERAGE RATE **$0.151** **$/kWh**

Figure 1
Electricity Usage Profile

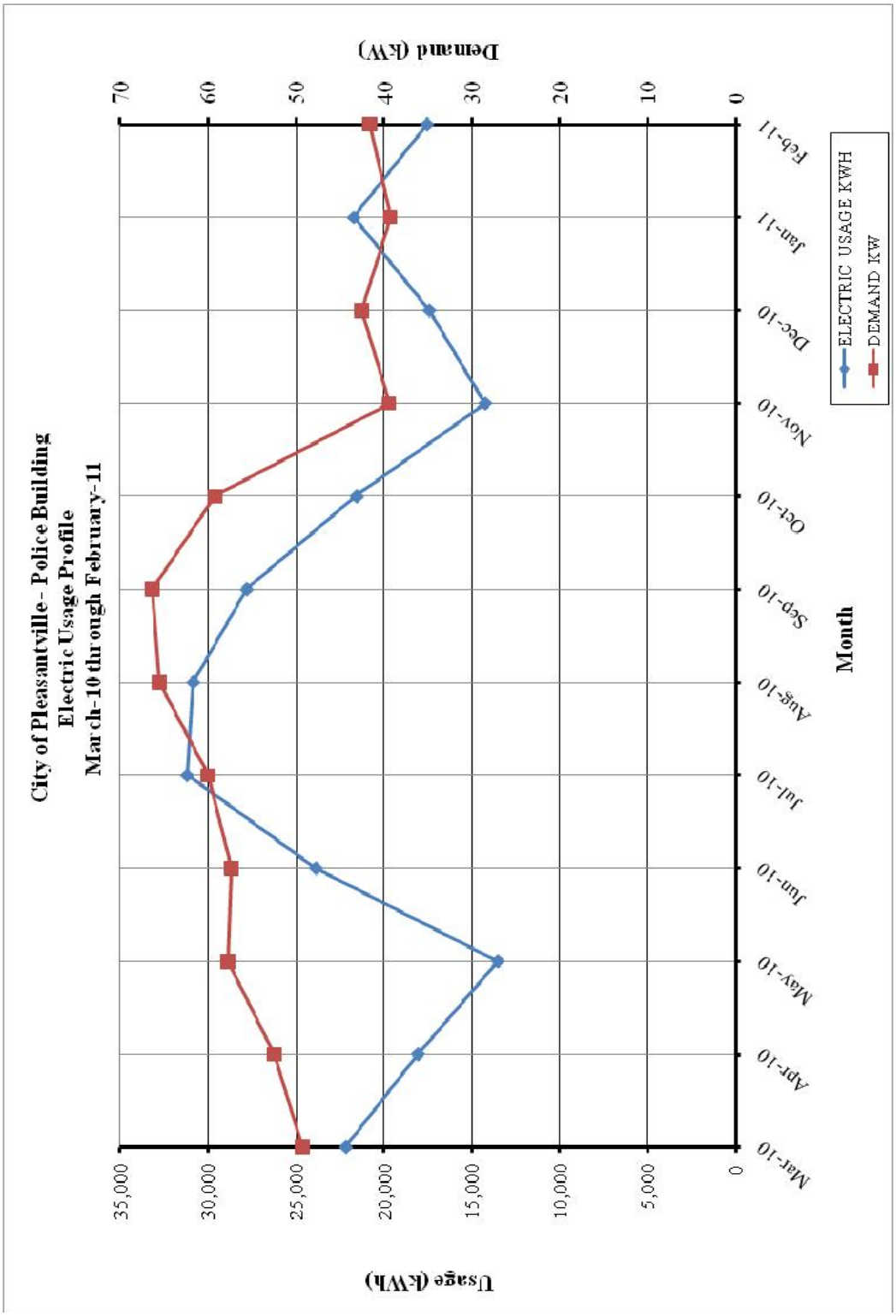
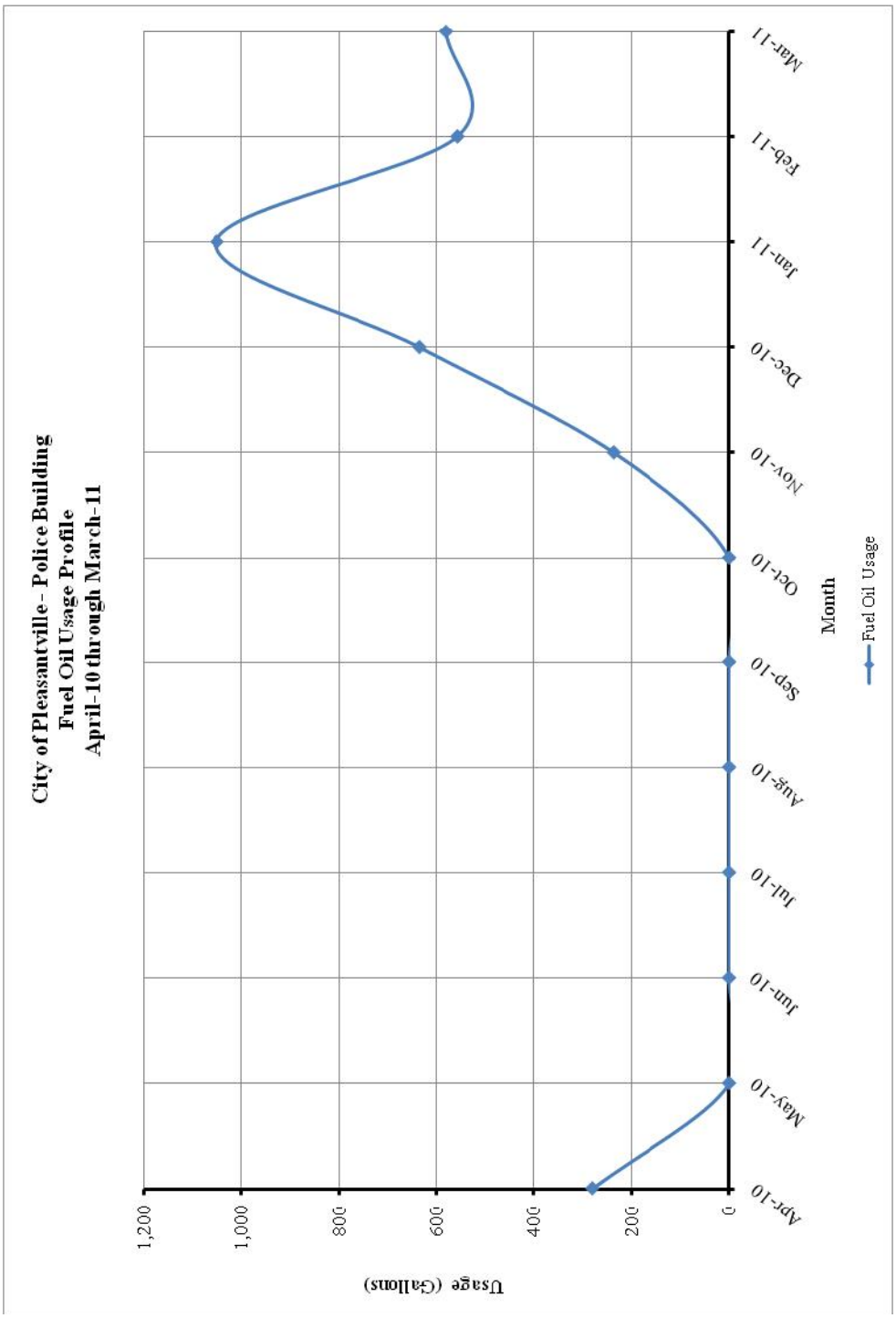


Table 4
Fuel Oil Billing Data

FUEL OIL USAGE SUMMARY		
Utility Provider:	Pomona Heating & Cooling LLC	
Rate:		
Meter No:		
Point of Delivery ID:	15584	
Third Party Utility Provider:		
TPS Meter No:		
MONTH OF USE	**CONSUMPTION (GALLONS)**	**TOTAL BILL**
Mar-11	580.80	$2,090.30
Feb-11	557.40	$1,838.87
Jan-11	1,050.50	$3,392.92
Dec-10	634.90	$1,912.60
Nov-10	237.00	$687.06
Oct-10	0.00	$0.00
Sep-10	0.00	$0.00
Aug-10	0.00	$0.00
Jul-10	0.00	$0.00
Jun-10	0.00	$0.00
May-10	0.00	$0.00
Apr-10	280.60	$757.34
TOTALS	**3,341.20**	**$10,679.09**
AVERAGE RATE:	**$3.20**	**$/GALLONS**

Figure 2
Fuel Oil Usage Profile



II. FACILITY DESCRIPTION

Pleasantville Police Department is located at 17 North First Street in Pleasantville New Jersey. The facility is approximately 9,728 SF, built in 1978. The facility is a two story building comprised of offices, reception area, and court room on the first floor and IT department, mechanical rooms in the basement.

Occupancy Profile

The Police Department is open 24 hours per day 7 days per week. The typical operation of the majority of the offices within the facility is 8:00AM to 5:00PM. The occupancy varies considerably, however generally there is minimal occupancy at night. The Police Department employs 52 people.

Building Envelope

Exterior wall construction is comprised of block walls with brick facing. Insulation within the wall construction is estimated to be minimal. The roof is a flat built up roof with insulation below the roof weather membrane. The insulation thickness is unknown. Windows throughout the building are double pane metal framed operable windows within each of the perimeter offices. The windows appear to be tinted and in good condition.

HVAC Systems

Heating and cooling is provided to the Police building through a water source heat pump system. Individual rooms are conditioned with console style water source heat pumps made by Singer. The original units have on board control with manual settings for heating, cooling and fan speed. No programmability is available with the existing units. In some locations it was noted that electric unit heaters were being utilized in lieu of the water source heat pumps. In some locations, the water source heat pumps have been replaced due to failures with new units made by Ice Air. New units have been installed within the break room and main open office area.

Two inline pumps are used for circulation of the heat pump water throughout the building. The pumps are estimated to be 2-3 HP each. Only one pump operates at a time with the 2nd pump utilized as a backup. The heat pump circulation pumps operate continuously to provide condenser water to the heat pumps year round. The circulation pump motors for the heat pump loop appear to be standard efficiency motors and in fair condition.

Supplemental heat is provided to the water source system by a central oil fired boiler. The boiler is made by Weil McLain with a max output capacity of 720 MBH. The central boiler provides supplemental heat for the water source heat pumps as well as hot water for the perimeter zones such as the stairway and waiting area. Two zone pumps are included on the boiler system. One zone pump for the heat pump supplemental heat and one zone pump for the perimeter baseboard and unit heaters. The boiler zone pumps are small pumps estimated to be ¼ to ½ HP each.

Cooling for the water source heat pump system is provided by a closed circuit cooling tower made by BAC. The existing cooling tower is currently disconnected and in the process of being

replaced. The cooling tower utilizes a "spray" pump for evaporative cooling over the cooling tower heat exchanger and large centrifugal fans for heat rejection. The closed circuit cooler is located within an outdoor mechanical room. The intake and relief air is ducted to the cooling tower and includes large dampers which are intended to be closed when the cooling tower is not operating. A hot water unit heater is located within the cooling tower mechanical room to keep the room above freezing. Intake and relief dampers are stuck open due to the decommissioning of the cooling tower. The unit heater is operational and running continuously in an effort to maintain a heating set point of 60°F.

The IT department is conditioned with a small 1.5 ton split system made by York. The IT department requires cooling for extended periods due to the internal heat gain from the computer equipment. The split system is in fair condition and appears to be operating correctly.

Exhaust System

Air is exhausted from the toilet rooms through room mounted exhaust fans. The toilet room exhaust fans are controlled by the light switch.

HVAC System Controls

The HVAC systems within the building utilize "stand alone" packaged controls. The heat pumps include heating mode, cooling mode and fan speed controls only. There is no central control of the systems or programmability. The heating water make-up is controlled by an aqua-stat within the heat pump loop and a 3-way control valve on the boiler piping to a shell and tube heat exchanger. This system appears to be operating correctly providing only supplemental heat when the heat pump loop is at or below 60°F (estimated set point based on field observations).

The perimeter zones with baseboard heat are controlled with stand alone thermostats and zone control valves located within the space (typical for stairways, reception area, bathrooms, etc.)

The unit heater thermostats are non programmable and located within the space being served by the equipment. The engine bays have three zones of infrared heating each with individual thermostats. The rooftop units are controlled by "stand alone" programmable thermostats, however the programmable functionality of these thermostats are not being utilized due to the various occupancy profile and manual adjustments by the occupants on a continuous basis. Typical temperature setting is 75°F for cooling and 67°F for heating.

Domestic Hot Water

Domestic hot water for the police building is provided by a tank type electric hot water heater made by Bradford White. The hot water heater appears to be recently replaced and in good condition.

Lighting

Lighting throughout the building is comprised of T-12 fluorescent fixtures with magnetic ballasts. All lighting is controlled by manual wall switch. Typical lighting hours are extended

due to the 24/7 occupancy of the facility. Refer to the Investment Grade lighting Audit Appendix for a detailed list of the lighting throughout the facility and estimated operating hours per space.

III. 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.

IV. ENERGY CONSERVATION MEASURES

Energy Conservation Measures are developed specifically for this facility. The energy savings and calculations are highly dependent on the information received from the site survey and interviews with operations personnel. The assumptions and calculations should be reviewed by the owner to ensure accurate representation of this facility. The following ECMs were analyzed:

Table 5
ECM Financial Summary

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	$10,710	$6,642	1.6	830.3%
ECM #2	Lighting Controls	$1,755	$851	2.1	627.4%
ECM #3	Fan VFD on Cooling Tower	$5,419	$2,453	2.2	579.0%
ECM #4	Condensing Boiler Upgrade: Oil to Natural Gas	$113,689	$5,460	20.8	-3.9%
RENEWABLE ENERGY MEASURES (REM's)					
ECM NO.	**DESCRIPTION**	**NET INSTALLATION COST**	**ANNUAL SAVINGS**	**SIMPLE PAYBACK (Yrs)**	**SIMPLE LIFETIME ROI**
REM #1	22 kW Roof Solar Array	$129,461	$14,638	8.8	69.6%

Notes: A. Cost takes into consideration applicable NJ Smart StartTM incentives.
B. Savings takes into consideration applicable maintenance savings.

Table 6
ECM Energy Summary

ENERGY CONSERVATION MEASURES (ECM's)					
ECM NO.	DESCRIPTION	ANNUAL UTILITY REDUCTION			
		ELECTRIC DEMAND (KW)	ELECTRIC CONSUMPTION (KWH)	FUEL OIL (GALLONS)	NATURAL GAS (THERMS)
ECM #1	Lighting Upgrade	7.4	43989.0	0.0	0.0
ECM #2	Lighting Controls	1.5	5634.0	0.0	0.0
ECM #3	Fan VFD on Cooling Tower	0.0	16245.0	0.0	0.0
ECM #4	Condensing Boiler Upgrade: Oil to Natural Gas	0.0	0.0	3259.0	(3,548.0)
RENEWABLE ENERGY MEASURES (REM's)					
ECM NO.	DESCRIPTION	ANNUAL UTILITY REDUCTION			
		ELECTRIC DEMAND (KW)	ELECTRIC CONSUMPTION (KWH)	FUEL OIL (GALLONS)	NATURAL GAS (THERMS)
REM #1	22 kW Roof Solar Array	18.1	27280.0	0.0	0.0

ECM #1: Lighting Upgrade

Description:

There are still a large amount of T-12 fixtures throughout the Police Building. Improved fluorescent lamps and ballasts are available as direct replacements for the existing lamps and ballasts. A simple retrofit of the existing fixture can provide substantial savings. For example, a conventional drop-ceiling lay in fixture with four, 4-foot lamps (34 Watt lamps with magnetic ballast) has a total wattage of 144 Watts per fixture. By using T-8 lamps and electronic ballasts, the total wattage would be reduced to 86 Watts. The light levels would increase by about 15% and the light quality would increase by 35%.

Some of the remaining interior lighting at the Pleasantville Police building is provided with fluorescent fixtures with older generation, 700 series 32W T8 lamps and electronic ballasts. Although 700 series T8 lamps are considered fairly efficient, further energy savings can be achieved by replacing the existing T8 lamps with new generation, 800 series 28W T8 lamps without compromising light output. CEG recommends, re-lamping all of the fixtures with 28W T8 lamps.

This ECM includes retrofitting each of the existing T-12 fluorescent lamp and magnetic ballast fixtures with T-8 lamps and high-power electronic ballasts. High efficiency electronic ballasts reduce overall wattage while maintaining the existing lumen levels of the various rooms. This ECM also includes re-lamping of the existing fluorescent fixtures with 800 series, 28W T8 lamps. Additionally, the retrofit of all older fluorescent fixtures with T8 or T5 fluorescent fixtures with electronic ballasts in the building would prove to be more energy efficient. The new, energy efficient T8 fixtures will provide adequate lighting and will save on electrical costs due to better performance of the lamp and ballasts. This ECM also includes maintenance savings through the reduced number of lamps replaced per year. The expected lamp life of a T8 lamp is approximately 30,000 burn-hours, in comparison to the existing T12 lamps which is approximately 20,000 burn-hours. The facility will need approximately 33% less lamps replaced per year for each one for one fixture replaced.

The ECM also includes replacement of any incandescent lamps with compact fluorescent lamps. Compact fluorescent lamps (CFL's) were designed to be direct replacements for the standard incandescent lamps which are common to table lamps, spot lights, hi-hats, bathroom vanity lighting, etc. The light output of the CFL has been designed to resemble the incandescent lamp. The color rendering index (CRI) of the CFL is much higher than standard fluorescent lighting, and therefore provides a much "truer" light. The CFL is available in a myriad of shapes and sizes depending on the specific application. Typical replacements are: a 13-Watt CFL for a 60-Watt incandescent lamp, an 18-Watt CFL for a 75-Watt incandescent lamp, and a 26-Watt CFL for a 100-Watt incandescent lamp. The CFL is also available for a number of "brightness colors" that is indicated by the Kelvin rating. A 2700K CFL is the "warmest" color available and is closest in color to the incandescent lamp. CFL's are also available in 3000K, 3500K, and 4100K. The 4100K would be the "brightest" or "coolest" output. A CFL can be chosen to screw right into your existing fixtures, or hardwired into your existing fixtures. Where the existing fixture is controlled by a dimmer switch, the CFL bulb must be compatible with a dimmer switch. In some

locations the bulb replacement will need to be tested to make sure the larger base of the CFL will fit into the existing fixture. 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. However, the maintenance savings due to reduced lamp replacement is offset by the higher cost of the CFL's compared to the incandescent lamps.

Energy Savings Calculations:

The **Investment Grade Lighting Audit Appendix** outlines the hours of operation, proposed retrofits, costs, savings, and payback periods for each set of fixtures in the each building.

Rebates and Incentives:

From the **NJ Smart Start Incentive Appendix**, the retrofit of a T-12 fixture to a T-5 or T-8 fixture or the retrofit of existing 32 watt T-8 system to reduced wattage (28w/25w 4') warrants the following incentive: $10 per fixture.

$$\text{SmartStart® Incentive} = (\#\text{ of } 1-4 \text{ lamp fixtures} \times \$10)$$

Energy Savings Summary:

ECM #1 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$11,820
NJ Smart Start Equipment Incentive ($):	$1,110
Net Installation Cost ($):	$10,710
Maintenance Savings ($/Yr):	$0
Energy Savings ($/Yr):	$6,642
Total Yearly Savings ($/Yr):	$6,642
Estimated ECM Lifetime (Yr):	15
Simple Payback	1.6
Simple Lifetime ROI	830.3%
Simple Lifetime Maintenance Savings	$0
Simple Lifetime Savings	$99,630
Internal Rate of Return (IRR)	62%
Net Present Value (NPV)	$68,581.76

ECM #2: Lighting Controls Upgrade – Occupancy Sensors

Description:

Some of the lights in the Pleasantville Police building are left on unnecessarily. In many cases the lights are left on because of the inconvenience to manually switch lights off when a room is left or on when a room is first occupied. This is common in rooms that are occupied for only short periods and only a few times per day. In some instances lights are left on due to the misconception that it is better to keep the lights on rather than to continuously switch lights on and off. Although increased switching reduces lamp life, the energy savings outweigh the lamp replacement costs. The payback timeframe for when to turn the lights off is approximately two minutes. If the lights are expected to be off for at least a two minute interval, then it pays to shut them off.

Lighting controls come in many forms. Sometimes an additional switch is adequate to provide reduced lighting levels when full light output is not needed. Occupancy sensors detect motion and will switch the lights on when the room is occupied. Occupancy sensors can either be mounted in place of a current wall switch, or on the ceiling to cover large areas.

The U.S. Department of Energy sponsored a study to analyze energy savings achieved through various types of building system controls. The referenced savings is based on the "Advanced Sensors and Controls for Building Applications: Market Assessment and Potential R&D Pathways," document posted for public use April 2005. The study has found that commercial buildings have the potential to achieve significant energy savings through the use of building controls. The average energy savings are as follows based on the report:

- Occupancy Sensors for Lighting Control 20% - 28% energy savings.

Savings resulting from the implementation of this ECM for energy management controls are estimated to be 20% of the total light energy controlled by occupancy sensors and daylight sensors (The majority of the savings is expected to be after school hours when rooms are left with lights on)

This ECM includes installation of ceiling or switch mount sensors for individual offices, classrooms, large bathrooms, and libraries. Sensors shall be manufactured by Sensorswitch, Watt Stopper or equivalent. The **Investment Grade Lighting Audit Appendix** of this report includes the summary of lighting controls implemented in this ECM and outlines the proposed controls, costs, savings, and payback periods. The calculations adjust the lighting power usage by the applicable percent savings for each area that includes lighting controls.

Energy Savings Calculations:

$$\text{Energy Savings} = \left(\%\ \text{Savings} \times \text{Controlled Light Energy}\ \left(\text{kWh/Yr}\right)\right)$$

$$\text{Savings.} = \text{Energy Savings}\,(\text{kWh}) \times \text{Ave Elec Cost}\left(\frac{\$}{\text{kWh}}\right)$$

From the **NJ Smart Start® Program Incentives Appendix**, the installation of a lighting control device warrants the following incentive:

Occupancy Sensor Fixture Mounted (existing facility only) = $20 per sensor
Occupancy Sensor Remote Mounted (existing facility only) = $35 per sensor

$$\text{Smart Start® Incentive} = (\#\text{ of wall mount} \times \$\,20) + (\#\text{ of ceiling mount} \times \$35)$$

Energy Savings Summary:

ECM #2 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$2,210
NJ Smart Start Equipment Incentive ($):	$455
Net Installation Cost ($):	$1,755
Maintenance Savings ($/Yr):	$0
Energy Savings ($/Yr):	$851
Total Yearly Savings ($/Yr):	$851
Estimated ECM Lifetime (Yr):	15
Simple Payback	2.1
Simple Lifetime ROI	627.4%
Simple Lifetime Maintenance Savings	$0
Simple Lifetime Savings	$12,765
Internal Rate of Return (IRR)	48%
Net Present Value (NPV)	$8,404.18

ECM #3: Install VFD on Cooling Tower Fan

Description:

Currently the Cooling Tower at the Police Building is being replaced. Specifications provided by the City for the new cooling tower currently do not show variable speed drive controls for the tower fan. This ECM recommends the addition of these controls to the new tower being installed and estimates only the cost to add these controls to the new tower.

In a typical variable speed system, cooling tower air volume is varied based on a relationship between the condenser water supply temperature and the ambient air wet bulb temperature. This allows system to modulate fan speed to the optimum speed required for the load conditions and minimizes full speed operation.

This ECM includes the installation of new variable frequency drive (VFD) and controls for the new cooling tower being purchased for this facility. The drive will be connected to the 7.5 HP motor. The VFD shall be programmed to modulate fan speed based on condenser water supply temperature. In addition, a sub-routine should be added to the control algorithm to reset condenser water supply temperature based on the wet-bulb temperature of the ambient air.

Energy Savings Calculations:

For energy and cost savings calculations please refer to Appendix G – Fan VSD Calculations.

Hours of operation for the cooling tower operation: 6,000 Hours/year

Appendix G calculates fan energy consumption savings based on the principles below.

$$\text{Fan Energy Consumption (kWh)} = \text{Motor HP} \times 0.746 \frac{\text{kW}}{\text{HP}} \times \text{Hours of operation (Hr)}$$

$$\text{Total Fan Energy Consumption (kWh)} = \sum \text{Energy Consumption of Each Motor}$$

$$\text{Fan Energy Cost (\$)} = \text{Total Comsumption(kWh)} \times \text{Average Cost of Electric} \left(\frac{\$}{\text{kWh}}\right)$$

Appendix G uses Affinity Laws in order to calculate energy savings by reducing fan speed. Affinity laws, also known as Fan Laws are as following:

Q = Flow, n = Fan Speed, p = total pressure

$$\frac{Q_2}{Q_1} = \frac{n_2}{n_1} \qquad \frac{p_2}{p_1} = \left(\frac{n_2}{n_1}\right)^2 \qquad \frac{HP_2}{HP_1} = \left(\frac{n_2}{n_1}\right)^3$$

Cooling Tower:
Fan #1 = 7.5 HP (Install VFD)

The results for the fan are as follows:

% Full Load	% Run Hours at Load	Hours/yr at Load	Load kWh Annual	Proposed Electric Cost, $	Total Cost, $	Annual kWh Savings	Annual Electric Savings, $
	100.00%	6,000	17,135	$2,587	$5,419	16,245	$2,453
100.00%	10.00%	600	3,709	$560			
90.00%	15.00%	900	4,056	$612			
80.00%	15.00%	900	2,848	$430			
70.00%	40.00%	2,400	5,088	$768			
60.00%	15.00%	900	1,202	$181			
50.00%	5.00%	300	232	$35			
40.00%	0.00%	0	0	$0			
30.00%	0.00%	0	0	$0			

Energy Savings Summary:

ECM #3 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$5,419
NJ Smart Start Equipment Incentive ($):	$0
Net Installation Cost ($):	$5,419
Maintenance Savings ($/Yr):	$0
Energy Savings ($/Yr):	$2,453
Total Yearly Savings ($/Yr):	$2,453
Estimated ECM Lifetime (Yr):	15
Simple Payback	2.2
Simple Lifetime ROI	579.0%
Simple Lifetime Maintenance Savings	$0
Simple Lifetime Savings	$36,795
Internal Rate of Return (IRR)	45%
Net Present Value (NPV)	$23,864.75

ECM #4: Condensing Boiler Installation

Description:

The Pleasantville Police building is heated via fin tube radiation along the perimeter as well as water source heat pump units that are supplied by a Cast Iron Boiler rated at 720,000 Btu/hr. The boiler is oil fired and is approximately 33 years old. The expected efficiency rating for the boiler is 70%.

Standard (non-condensing) boilers provide lower than nominal efficiency compared to condensing boilers. Standard boilers suffer further efficiency losses at part load operating conditions mainly due to limitations in the reduction of the flue gas temperature. Current average combustion efficiency of the boiler is estimated to be 70% due to standard non-condensing boiler technology, limited turn down ratio, cycling losses and outdated design and controls. A new condensing boiler could substantially improve the operating efficiency of the heating system of the building. Condensing boiler's peak efficiency tops out at 99% depending on return water temperature.

This ECM is based on the replacement of the one (1) boiler with a condensing hot water boiler to provide the building with heating throughout the year. The annual average operating efficiency of the proposed boiler set is expected to be 96%, which gives the heating system a 26% increase in efficiency. The boiler efficiency is dependent on return water temperature, therefore since this system is a water source heat pump system, the return water temperature for the boiler will be very high. This ECM is based on variable supply water temperature adjusted based on outdoor temperature.

This ECM includes installation of one (1) new condensing gas fired boiler to replace the (1) existing hot water boiler. The basis for this ECM is Aerco MLX606 high efficiency condensing hot water boiler or equivalent. The new boiler shall be setup and programmed to be the primary source of heating for the building during entire year. The owner is recommended to retain a professional engineer to confirm equipment sizing and finalize design.

Energy Savings Calculations:

Currently only the heating boiler is the only piece of equipment that utilizes fuel oil in the building.

$$\text{Bldg Heat Required} = \text{Heating Nat. Gas (Therm)} \times \text{Heating Eff (\%)} \times \text{Fuel Heat Value} \left(\frac{\text{BTU}}{\text{Therm}}\right)$$

$$\text{Proposed Heating Gas Usage} = \frac{\text{Bldg. Heat Required (BTU)}}{\text{New Heating Eff (\%)} \times \text{Fuel Heat Value} \left(\frac{\text{BTU}}{\text{Therm}}\right)}$$

$$\text{Energy Cost} = \text{Heating Gas Usage (Therms)} \times \text{Ave Fuel Cost} \left(\frac{\$}{\text{Therm}}\right)$$

Energy savings calculations are summarized in the table below:

CONDENSING BOILER CALCULATIONS			
ECM INPUTS	**EXISTING**	**PROPOSED**	**SAVINGS**
ECM INPUTS	Existing Hot Water Boilers	New Condensing Boilers	-
Existing Fuel Oil (Gallons)	3,259	-	-
Boiler Efficiency (%)	70%	90%	20%
Fuel Oil Heat Value (BTU/Gallon)	140,000	140,000	-
Nat Gas Heat Value (BTU/Therm)	100,000	100,000	
Equivalent Building Heat Usage (MMBTUs)	319	319	-
Ave. Fuel Oil Cost ($/Gallon)	3.20	3.20	
Ave. Gas Cost ($/Therm)	1.40	1.40	-
ENERGY SAVINGS CALCULATIONS			
ECM RESULTS	**EXISTING**	**PROPOSED**	**SAVINGS**
Fuel Oil Usage (Gallons)	**3258.8**	**0**	**3258.8**
Natural Gas Usage (Therms)	0	3,548	-3,548
Energy Cost ($)	$10,428	$4,968	$5,460
COMMENTS:			

From the **New Jersey Smart Start® Program Incentives Appendix**, installation of a high efficiency hot water boiler falls under the category "Gas Heating" and warrants an incentive based on efficiency at or above 84% for this type of equipment.

Maintenance savings associated with this ECM is estimated to be minimal

Energy Savings Summary:

ECM #4 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$114,750
NJ Smart Start Equipment Incentive ($):	$1,061
Net Installation Cost ($):	$113,689
Maintenance Savings ($/Yr):	$0
Energy Savings ($/Yr):	$5,460
Total Yearly Savings ($/Yr):	$5,460
Estimated ECM Lifetime (Yr):	20
Simple Payback	20.8
Simple Lifetime ROI	-3.9%
Simple Lifetime Maintenance Savings	$0
Simple Lifetime Savings	$109,200
Internal Rate of Return (IRR)	0%
Net Present Value (NPV)	($32,457.99)

REM #1: 22.33 kW Rooftop Solar Array

Description:

The Police Department has approximately 2,350 square-foot of available roof space that can accommodate a 22.33 kilowatt solar array, assuming the existing roof structure is capable of supporting an array. The array will produce approximately 27,280 kilowatt-hours annually that will reduce the overall electric usage of the facility by 10%.

It should be noted that while a solar system was proposed on the Police Department, 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 would be rejected by the utility company to be interconnected with the grid.

Energy Savings Calculations:

See **Renewable / Distributed Energy Measures Calculations Appendix** for detailed financial summary and proposed solar layout areas.

Energy Savings Summary:

REM #1 - ENERGY SAVINGS SUMMARY	
System Size (KW_{DC}):	22.33
Electric Generation (KWH/Yr):	27,280
Installation Cost ($):	$129,461
SREC Revenue ($/Yr):	$10,519
Energy Savings ($/Yr):	$4,119
Total Yearly Savings ($/Yr):	$14,639
ECM Analysis Period (Yr):	15
Simple Payback (Yrs):	8.8
Analysis Period Electric Savings ($):	$76,614
Analysis Period SREC Revenue ($):	$152,385
Net Present Value (NPV)	$25,548.44

V. 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. Turn off computers when not in use. Ensure computers are not running in screen saver mode which saves the monitor screen not energy.

F. Ensure outside air dampers are functioning properly and only open during occupied mode.

G. When replacing water source heat pumps in the facility ensure the most energy efficient units are purchased.

H. Investigate the installation of a basin heater in the cooling tower to reduce the need to operate the hot water unit heater in the mechanical room.

APPENDIX A

ECM COST & SAVINGS BREAKDOWN

CONCORD ENGINEERING GROUP

City of Pleasantville - Police Building

ECM NO.	DESCRIPTION	INSTALLATION COST				YEARLY SAVINGS			ECM LIFETIME	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 Svaing * 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)	($/Yr)	(Yr)	($)	($)	(%)	(Yr)	($)	($)
ECM ENERGY AND FINANCIAL COSTS AND SAVINGS SUMMARY															
ECM #1	Lighting Upgrade	$9,456	$2,364	$1,110	$10,710	$6,642	$0	$6,642	15	$99,630	$0	830.3%	1.6	61.97%	$68,581.76
ECM #2	Lighting Controls	$1,768	$442	$455	$1,755	$851	$0	$851	15	$12,765	$0	627.4%	2.1	48.36%	$8,404.18
ECM #3	Fan VFD on Cooling Tower	$2,426	$2,993	$0	$5,419	$2,453	$0	$2,453	15	$36,795	$0	579.0%	2.2	45.10%	$23,864.75
ECM #4	Condensing Boiler Upgrade: Oil to Natural Gas	$18,500	$96,250	$1,061	$113,689	$5,460	$0	$5,460	20	$109,200	$0	-3.9%	20.8	-0.38%	($32,457.99)
REM RENEWABLE ENERGY AND FINANCIAL COSTS AND SAVINGS SUMMARY															
REM #1	22 kW Roof Solar Array	$77,677	$51,784	$0	$129,461	$4,119	$10,519	$14,638	15	$219,570	$157,785	69.6%	8.8	7.47%	$45,286.49

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 ≥ 16 $600 per ton, EER ≥ 18 $750 per ton, EER ≥ 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 ≥ 10 hp	$60 per VFD rated hp

Natural Gas Water Heating

Gas Water Heaters ≤ 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 ≥ 100w Retrofit with induction lamp, power coupler and generator (must be 30% less watts/fixture than HID system)	$50 per fixture
HID ≥ 100w Replacement with new HID ≥ 100w	$70 per fixture

Prescriptive Lighting - LED

LED New Exit Sign Fixture Existing Facility < 75 kw Existing Facility > 75 kw	 $20 per fixture $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
Pleasantville - Police Bldg

Building ID: 2706214
For 12-month Period Ending: February 28, 2011[1]
Date SEP becomes ineligible: N/A
Date SEP Generated: May 17, 2011

Facility
Pleasantville - Police Bldg
17 North First Street
Pleasantville, NJ 08232

Facility Owner
City of Pleasantville
18 North First Street
Pleasantville, NJ 08232

Primary Contact for this Facility
Marvin Hopkins
18 North First Street
Pleasantville, NJ 08232

Year Built: 1978
Gross Floor Area (ft²): 9,728

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

Site Energy Use Summary[3]

Electricity - Grid Purchase(kBtu)	887,686
Fuel Oil (No. 2) (kBtu)	418,374
Natural Gas - (kBtu)[4]	0
Total Energy (kBtu)	1,306,060

Energy Intensity[5]

Site (kBtu/ft²/yr)	134
Source (kBtu/ft²/yr)	348

Emissions (based on site energy use)

Greenhouse Gas Emissions ($MtCO_2e$/year)	156

Electric Distribution Utility
Atlantic City Electric Co [Pepco Holdings Inc]

National Average Comparison

National Average Site EUI	78
National Average Source EUI	157
% Difference from National Average Source EUI	122%
Building Type	Fire Station/Police Station

Stamp of Certifying Professional

Based on the conditions observed at the time of my visit to this building, I certify that the information contained within this statement is accurate.

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

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

Certifying Professional
Michael Fischette
520 South Burnt Mill Road
Voorhees, NJ 08043

Notes:
1. Application for the ENERGY STAR must be submitted to EPA within 4 months of the Period Ending date. Award of the ENERGY STAR is not final until approval is received from EPA.
2. The EPA Energy Performance Rating is based on total source energy. A rating of 75 is the minimum to be eligible for the ENERGY STAR.
3. Values represent energy consumption, annualized to a 12-month period.
4. 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.

APPENDIX D

MAJOR EQUIPMENT LIST

Concord Engineering Group

Pleasantville - Police Department

Rooftop / AC Units

Tag	WSHP-	WSHP	SS-
Unit Type	Package Water Source Heat Pump	Packaged Rooftop Unit	Split System Air Conditioning
Qty	Multiple	Multiple	1
Location	individual per room	individual per room	IT Room
Area Served	All rooms	Rooms with replaced unit	IT Room
Manufacturer	Singer	Ice Air LLC	York
Model #	N/A	8HPW13	N2AHD06A06
Serial #	N/A	200278, 200269	EEFS147310
Cooling Type	Water Cooled	Water Cooled	DX
Cooling Capacity (Tons)	0.5 to 1.0 Tons	1	1/2 ton
Cooling Efficiency (SEER/EER)	9.0 EER (Est)	13.5 EER	10 SEER
Heating Type	Heat Pump	Heat Pump	None
Heating (MBH)	12.0 to 18.0 (Est)	17.6 MBH	N/A
Efficiency	2.5 COP (Est)	4.5 COP	N/A
Fuel	Nat Gas	Nat Gas	N/A
Approx Age	>15 Yrs (Est)	9	10 Yr (Est)
ASHRAE Service Life	15	15	15
Remaining Life	0	6	5
Comments	Poor Condition, Non-programmable thermostat.	Good Condition, Non-programmable thermostat	Fair Condition.

MAJOR EQUIPMENT LIST

Concord Engineering Group

Pleasantville - Police Department

Domestic Water Heaters

Tag	HWH-		
Unit Type	Tank Type Hot Water Heater		
Qty	1		
Location	Basement Mechanical Room		
Area Served	Whole Building		
Manufacturer	General Electric		
Model #	SE80T12A		
Serial #	1000C10116		
Size (Gallons)	80		
Input Capacity (MBH/KW)	4.1 KW		
Recovery (Gal/Hr)	N/A		
Efficiency %	N/A		
Fuel	Electric		
Approx Age	<3 Yrs (Est)		
ASHRAE Service Life	10		
Remaining Life	7		
Comments	Good Condition, 208V, R-17.3 insulation value		

MAJOR EQUIPMENT LIST

Concord Engineering Group

Pleasantville - Police Department

Boiler

Tag	B-		
Unit Type	Oil Fired Cast Iron Boiler		
Qty	1		
Location	Basement Mechanical Room		
Area Served	Baseboards & Heat Pump Loop		
Manufacturer	Weil McLain		
Model #	BL-486-S-W		
Serial #	N/A		
Input Capacity (MBH)	6.3 GPH Oil or 882 MBH (Gas)		
Rated Output Capacity (MBH)	720 MBH		
Approx. Efficiency %	70% (Est)		
Fuel	Fuel Oil		
Approx Age	33		
ASHRAE Service Life	20		
Remaining Life	(13)		
Comments	Poor Condition		

MAJOR EQUIPMENT LIST

Concord Engineering Group

Pleasantville - Police Department

Pumps

Tag	HW Pump-	HP Pump-	
Unit Type	In-Line Pump	In-Line Pump	
Qty	2	2	
Location	Mechanical Room	Mechanical Room	
Area Served	Baseboard zone & Heat Pump Loop HX	Heat Pump Loop	
Manufacturer	Bell & Gossett	TACO	
Model #	N/A	N/A	
Serial #	N/A	N/A	
Horse Power	1/3 HP	3 HP (Est)	
Flow	N/A	N/A	
Motor Info	N/A	N/A	
Electrical Power	N/A	N/A	
RPM	N/A	N/A	
Motor Efficiency %	N/A	87.5% (Est)	
Approx Age	15 (Est)	15 (Est)	
ASHRAE Service Life	20	20	
Remaining Life	5	5	
Comments	One pump in process of being replaced.	Operating / Standby configuration. Fair	

MAJOR EQUIPMENT LIST

Concord Engineering Group

Pleasantville - Police Department

Cooling Tower

Tag	CT-1		
Unit Type	Closed Circuit Cooler		
Qty	1		
Location	Outdoors Ground Level		
Area Served	Entire Building		
Manufacturer	EVAPCO		
Model #	LSWB 4-4H-Z		
Serial #	N/A		
Rated Flow GPM	96		
EWT / LWT	95/85		
Motor HP	7.5		
Electrical	460/3/60		
Chilled Water GPM / ΔT	-		
Condenser Water GPM / ΔT	0.8		
Approx Age	20		
ASHRAE Service Life	15		
Remaining Life	(5)		
Comments	1 HP Spray Pump Motor		

APPENDIX E

Investment Grade Lighting Audit

CEG Job #: 9C11005
Project: Pleasantville LGEA
17 N First Street
Pleasantville, NJ 08232
Bldg. Sq. Ft. 9,728

Police Building

KWH COST: $0.151

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	Police Chief Office	4400	4	4	2x4, 4 Lamp, 34w T12, Mag. Ballast, Recessed Mnt., Prismatic Lens	156	0.62	2,745.6	$414.59	4	3	3 Lamp , 32w T8, Elect. Ballast, Specular Reflector; retrofit	86	0.34	1513.6	$228.55	$100.00	$400.00	0.28	1232	$186.03	2.15
142.21	Captain Office	4400	4	4	2x4, 4 Lamp, 34w T12, Mag. Ballast, Recessed Mnt., Prismatic Lens	156	0.62	2,745.6	$414.59	4	3	3 Lamp , 32w T8, Elect. Ballast, Specular Reflector; retrofit	86	0.34	1513.6	$228.55	$100.00	$400.00	0.28	1232	$186.03	2.15
142.21	Detectives Offices	4400	10	4	2x4, 4 Lamp, 34w T12, Mag. Ballast, Recessed Mnt., Prismatic Lens	156	1.56	6,864.0	$1,036.46	10	3	3 Lamp , 32w T8, Elect. Ballast, Specular Reflector; retrofit	86	0.86	3784	$571.38	$100.00	$1,000.00	0.70	3080	$465.08	2.15
142.21	Offices	4400	6	4	2x4, 4 Lamp, 34w T12, Mag. Ballast, Recessed Mnt., Prismatic Lens	156	0.94	4,118.4	$621.88	6	3	3 Lamp , 32w T8, Elect. Ballast, Specular Reflector; retrofit	86	0.52	2270.4	$342.83	$100.00	$600.00	0.42	1848	$279.05	2.15
142.21	Reception	8760	14	4	2x4, 4 Lamp, 34w T12, Mag. Ballast, Recessed Mnt., Prismatic Lens	156	2.18	19,131.8	$2,888.91	14	3	3 Lamp , 32w T8, Elect. Ballast, Specular Reflector; retrofit	86	1.20	10547.04	$1,592.60	$100.00	$1,400.00	0.98	8584.8	$1,296.30	1.08
142.21	Office	4400	3	4	2x4, 4 Lamp, 34w T12, Mag. Ballast, Recessed Mnt., Prismatic Lens	156	0.47	2,059.2	$310.94	3	3	3 Lamp , 32w T8, Elect. Ballast, Specular Reflector; retrofit	86	0.26	1135.2	$171.42	$100.00	$300.00	0.21	924	$139.52	2.15
142.21	Captain #2 Office	4400	2	4	2x4, 4 Lamp, 34w T12, Mag. Ballast, Recessed Mnt., Prismatic Lens	156	0.31	1,372.8	$207.29	2	3	3 Lamp , 32w T8, Elect. Ballast, Specular Reflector; retrofit	86	0.17	756.8	$114.28	$100.00	$200.00	0.14	616	$93.02	2.15
142.21	Computer Room	4400	2	4	2x4, 4 Lamp, 34w T12, Mag. Ballast, Recessed Mnt., Prismatic Lens	156	0.31	1,372.8	$207.29	2	3	3 Lamp , 32w T8, Elect. Ballast, Specular Reflector; retrofit	86	0.17	756.8	$114.28	$100.00	$200.00	0.14	616	$93.02	2.15
142.21	Storage	1200	2	4	2x4, 4 Lamp, 34w T12, Mag. Ballast, Recessed Mnt., Prismatic Lens	156	0.31	374.4	$56.53	2	3	3 Lamp , 32w T8, Elect. Ballast, Specular Reflector; retrofit	86	0.17	206.4	$31.17	$100.00	$200.00	0.14	168	$25.37	7.88
142.21	Kitchen	2600	2	4	2x4, 4 Lamp, 34w T12, Mag. Ballast, Recessed Mnt., Prismatic Lens	156	0.31	811.2	$122.49	2	3	3 Lamp , 32w T8, Elect. Ballast, Specular Reflector; retrofit	86	0.17	447.2	$67.53	$100.00	$200.00	0.14	364	$54.96	3.64
105		2600	1	2	3' Channel, 2-Lamp, 30w T12, Mag. Ballast, Surface Mnt., No Lens	60	0.06	156.0	$23.56	1	1	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	25	0.03	65	$9.82	$80.00	$80.00	0.04	91	$13.74	5.82
142.21	Office	4400	1	4	2x4, 4 Lamp, 34w T12, Mag. Ballast, Recessed Mnt., Prismatic Lens	156	0.16	686.4	$103.65	1	3	3 Lamp , 32w T8, Elect. Ballast, Specular Reflector; retrofit	86	0.09	378.4	$57.14	$100.00	$100.00	0.07	308	$46.51	2.15
142.21	Mens	2600	1	4	2x4, 4 Lamp, 34w T12, Mag. Ballast, Recessed Mnt., Prismatic Lens	156	0.16	405.6	$61.25	1	3	3 Lamp , 32w T8, Elect. Ballast, Specular Reflector; retrofit	86	0.09	223.6	$33.76	$100.00	$100.00	0.07	182	$27.48	3.64
142.21	Womens	2600	1	4	2x4, 4 Lamp, 34w T12, Mag. Ballast, Recessed Mnt., Prismatic Lens	156	0.16	405.6	$61.25	1	3	3 Lamp , 32w T8, Elect. Ballast, Specular Reflector; retrofit	86	0.09	223.6	$33.76	$100.00	$100.00	0.07	182	$27.48	3.64
142.21	Closet	1200	1	4	2x4, 4 Lamp, 34w T12, Mag. Ballast, Recessed Mnt., Prismatic Lens	156	0.16	187.2	$28.27	1	3	3 Lamp , 32w T8, Elect. Ballast, Specular Reflector; retrofit	86	0.09	103.2	$15.58	$100.00	$100.00	0.07	84	$12.68	7.88

Investment Grade Lighting Audit

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	Locker Room	4400	3	4	2x4, 4 Lamp, 34w T12, Mag. Ballast, Recessed Mnt., Prismatic Lens	156	0.47	2,059.2	$310.94	3	3	3 Lamp , 32w T8, Elect. Ballast, Specular Reflector; retrofit	86	0.26	1135.2	$171.42	$100.00	$300.00	0.21	924	$139.52	2.15
227.211	Hallway	8760	16	2	2x2, 2 Lamp, 17w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	34	0.54	4,765.4	$719.58	16	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
621	Janitor Closet	1200	1	1	Recessed Light, 100w A Lamp	100	0.10	120.0	$18.12	1	1	(1) 26w CFL Lamp	26	0.03	31.2	$4.71	$20.00	$20.00	0.07	88.8	$13.41	1.49
142.21	Watch Command	8760	2	4	2x4, 4 Lamp, 34w T12, Mag. Ballast, Recessed Mnt., Prismatic Lens	156	0.31	2,733.1	$412.70	2	3	3 Lamp , 32w T8, Elect. Ballast, Specular Reflector; retrofit	86	0.17	1506.72	$227.51	$100.00	$200.00	0.14	1226.4	$185.19	1.08
105	Watch Command Bathroom	2600	1	2	3' Channel, 2-Lamp, 30w T12, Mag. Ballast, Surface Mnt., No Lens	60	0.06	156.0	$23.56	1	1	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	25	0.03	65	$9.82	$80.00	$80.00	0.04	91	$13.74	5.82
121.16	Jail 1	8760	6	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Surface Mnt., Clear Acrylic Lens	78	0.47	4,099.7	$619.05	6	2	2 Lamp, 32w T8, Elect. Ballast; retrofit	58	0.35	3048.48	$460.32	$80.00	$480.00	0.12	1051.2	$158.73	3.02
142.21	Interview Room	4400	2	4	2x4, 4 Lamp, 34w T12, Mag. Ballast, Recessed Mnt., Prismatic Lens	156	0.31	1,372.8	$207.29	2	3	3 Lamp , 32w T8, Elect. Ballast, Specular Reflector; retrofit	86	0.17	756.8	$114.28	$100.00	$200.00	0.14	616	$93.02	2.15
142.21	Communications	8760	6	4	2x4, 4 Lamp, 34w T12, Mag. Ballast, Recessed Mnt., Prismatic Lens	156	0.94	8,199.4	$1,238.10	6	3	3 Lamp , 32w T8, Elect. Ballast, Specular Reflector; retrofit	86	0.52	4520.16	$682.54	$100.00	$600.00	0.42	3679.2	$555.56	1.08
610.1		8760	6	3	3 Lamp 40W Incandescent Ceiling Mount Track Light	120	0.72	6,307.2	$952.39	6	3	13w (3) CFL Lamps	26	0.16	1366.56	$206.35	$25.00	$150.00	0.56	4940.64	$746.04	0.20
613	Garage	8760	4	1	Industrial Fixture, 100w A19 Lamp	100	0.40	3,504.0	$529.10	4	1	(1) 26w CFL Lamp	26	0.10	911.04	$137.57	$20.00	$80.00	0.30	2592.96	$391.54	0.20
725		8760	1	1	150w HPS Wallpack	188	0.19	1,646.9	$248.68	1	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
622		8760	2	1	Double Head Flood, (2) 90w PAR Lamps	180	0.36	3,153.6	$476.19	2	2	(2) 26w CFL PAR Lamp	52	0.10	911.04	$137.57	$40.00	$80.00	0.26	2242.56	$338.63	0.24
613	Jail 2	8760	5	1	Industrial Fixture, 100w A19 Lamp	100	0.50	4,380.0	$661.38	5	1	(1) 26w CFL Lamp	26	0.13	1138.8	$171.96	$20.00	$100.00	0.37	3241.2	$489.42	0.20
730		8760	3	1	150w MH Flood	188	0.56	4,940.6	$746.04	3	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
142.21	Prosecutors Office	2600	2	4	2x4, 4 Lamp, 34w T12, Mag. Ballast, Recessed Mnt., Prismatic Lens	156	0.31	811.2	$122.49	2	3	3 Lamp , 32w T8, Elect. Ballast, Specular Reflector; retrofit	86	0.17	447.2	$67.53	$100.00	$200.00	0.14	364	$54.96	3.64
142.21	Mens	2600	1	4	2x4, 4 Lamp, 34w T12, Mag. Ballast, Recessed Mnt., Prismatic Lens	156	0.16	405.6	$61.25	1	3	3 Lamp , 32w T8, Elect. Ballast, Specular Reflector; retrofit	86	0.09	223.6	$33.76	$100.00	$100.00	0.07	182	$27.48	3.64
142.21	Womens	2600	1	4	2x4, 4 Lamp, 34w T12, Mag. Ballast, Recessed Mnt., Prismatic Lens	156	0.16	405.6	$61.25	1	3	3 Lamp , 32w T8, Elect. Ballast, Specular Reflector; retrofit	86	0.09	223.6	$33.76	$100.00	$100.00	0.07	182	$27.48	3.64

Investment Grade Lighting Audit

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	Mens	2600	1	4	2x4, 4 Lamp, 34w T12, Mag. Ballast, Recessed Mnt., Prismatic Lens	156	0.16	405.6	$61.25	1	3	3 Lamp , 32w T8, Elect. Ballast, Specular Reflector; retrofit	86	0.09	223.6	$33.76	$100.00	$100.00	0.07	182	$27.48	3.64
142.21	Womens	2600	1	4	2x4, 4 Lamp, 34w T12, Mag. Ballast, Recessed Mnt., Prismatic Lens	156	0.16	405.6	$61.25	1	3	3 Lamp , 32w T8, Elect. Ballast, Specular Reflector; retrofit	86	0.09	223.6	$33.76	$100.00	$100.00	0.07	182	$27.48	3.64
127.21	Entrance	8760	6	2	2x2, 2 Lamp, 34w T12 U-Tube, Mag. Ballast, Recessed Mnt., Prismatic Lens	72	0.43	3,784.3	$571.43	6	2	2x2, 2 Lamp, 14w T5, Indirect; Fixture	31	0.19	1629.36	$246.03	$215.00	$1,290.00	0.25	2154.96	$325.40	3.96
127.21	Court	2600	12	2	2x2, 2 Lamp, 34w T12 U-Tube, Mag. Ballast, Recessed Mnt., Prismatic Lens	72	0.86	2,246.4	$339.21	12	2	2x2, 2 Lamp, 14w T5, Indirect; Fixture	31	0.37	967.2	$146.05	$215.00	$2,580.00	0.49	1279.2	$193.16	13.36
619		2600	4	1	Wall Sconce, (1) 60w A19 Lamp	60	0.24	624.0	$94.22	4	1	Energy Star Rated, Dimmable 13w CFL Lamp	13	0.05	135.2	$20.42	$20.00	$80.00	0.19	488.8	$73.81	1.08
621		2600	13	1	Recessed Light, 100w A Lamp	100	1.30	3,380.0	$510.38	13	1	(1) 26w CFL Lamp	26	0.34	878.8	$132.70	$20.00	$260.00	0.96	2501.2	$377.68	0.69
127.21	Hallway	2600	1	2	2x2, 2 Lamp, 34w T12 U-Tube, Mag. Ballast, Recessed Mnt., Prismatic Lens	72	0.07	187.2	$28.27	1	2	2x2, 2 Lamp, 14w T5, Indirect; Fixture	31	0.03	80.6	$12.17	$215.00	$215.00	0.04	106.6	$16.10	13.36
142.21	Judge	2600	2	4	2x4, 4 Lamp, 34w T12, Mag. Ballast, Recessed Mnt., Prismatic Lens	156	0.31	811.2	$122.49	2	3	3 Lamp , 32w T8, Elect. Ballast, Specular Reflector; retrofit	86	0.17	447.2	$67.53	$100.00	$200.00	0.14	364	$54.96	3.64
613		2600	1	1	Industrial Fixture, 100w A19 Lamp	100	0.10	260.0	$39.26	1	1	(1) 26w CFL Lamp	26	0.03	67.6	$10.21	$20.00	$20.00	0.07	192.4	$29.05	0.69
105	Bathroom	2600	1	2	3' Channel, 2-Lamp, 30w T12, Mag. Ballast, Surface Mnt., No Lens	60	0.06	156.0	$23.56	1	1	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	25	0.03	65	$9.82	$80.00	$80.00	0.04	91	$13.74	5.82
621	Office	2600	1	1	Recessed Light, 100w A Lamp	100	0.10	260.0	$39.26	1	1	(1) 26w CFL Lamp	26	0.03	67.6	$10.21	$20.00	$20.00	0.07	192.4	$29.05	0.69
142.21		2600	4	4	2x4, 4 Lamp, 34w T12, Mag. Ballast, Recessed Mnt., Prismatic Lens	156	0.62	1,622.4	$244.98	4	3	3 Lamp , 32w T8, Elect. Ballast, Specular Reflector; retrofit	86	0.34	894.4	$135.05	$100.00	$400.00	0.28	728	$109.93	3.64
127.21		2600	1	2	2x2, 2 Lamp, 34w T12 U-Tube, Mag. Ballast, Recessed Mnt., Prismatic Lens	72	0.07	187.2	$28.27	1	2	2x2, 2 Lamp, 14w T5, Indirect; Fixture	31	0.03	80.6	$12.17	$215.00	$215.00	0.04	106.6	$16.10	13.36
613		2600	2	1	Industrial Fixture, 100w A19 Lamp	100	0.20	520.0	$78.52	2	1	(1) 26w CFL Lamp	26	0.05	135.2	$20.42	$20.00	$40.00	0.15	384.8	$58.10	0.69
127.21	Stairs	8760	2	2	2x2, 2 Lamp, 34w T12 U-Tube, Mag. Ballast, Recessed Mnt., Prismatic Lens	72	0.14	1,261.4	$190.48	2	2	2x2, 2 Lamp, 14w T5, Indirect; Fixture	31	0.06	543.12	$82.01	$215.00	$430.00	0.08	718.32	$108.47	3.96
613		8760	5	1	Industrial Fixture, 100w A19 Lamp	100	0.50	4,380.0	$661.38	5	1	(1) 26w CFL Lamp	26	0.13	1138.8	$171.96	$20.00	$100.00	0.37	3241.2	$489.42	0.20
142.21		2600	2	4	2x4, 4 Lamp, 34w T12, Mag. Ballast, Recessed Mnt., Prismatic Lens	156	0.31	811.2	$122.49	2	3	3 Lamp , 32w T8, Elect. Ballast, Specular Reflector; retrofit	86	0.17	447.2	$67.53	$100.00	$200.00	0.14	364	$54.96	3.64

Investment Grade Lighting Audit

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
221.14	Office	2600	2	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., No Lens	58	0.12	301.6	$45.54	2	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
651		2600	1	1	"Industrial" Relector, 26w CFL	26	0.03	67.6	$10.21	1	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
613	Mech Room	1200	3	1	Industrial Fixture, 100w A19 Lamp	100	0.30	360.0	$54.36	3	1	(1) 26w CFL Lamp	26	0.08	93.6	$14.13	$20.00	$60.00	0.22	266.4	$40.23	1.49
	Totals		136	110				97,217	$14,680	136	83			7.4	41,876	$6,323		$11,820	7.4	43,989	$6,642	1.78

CEG Job #:
Project: Pleasantville LGEA
Address: 17 N First Street
Pleasantville, NJ 08232
Building SF: 9,728

Police Building

KWH COST: $0.151

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	Police Chief Office	4400	4	4	2x4, 4 Lamp, 34w T12, Mag. Ballast, Recessed Mnt., Prismatic Lens	156	0.62	2745.6	$414.59	4	1	Dual Technology Occupancy Sensor - Remote Mnt.	156	0.50	20%	2196.48	$331.67	$160.00	$160.00	0.12	549.12	$82.92	1.93
142.21	Captain Office	4400	4	4	2x4, 4 Lamp, 34w T12, Mag. Ballast, Recessed Mnt., Prismatic Lens	156	0.62	2745.6	$414.59	4	1	Dual Technology Occupancy Sensor - Remote Mnt.	156	0.50	20%	2196.48	$331.67	$160.00	$160.00	0.12	549.12	$82.92	1.93
142.21	Detectives Offices	4400	10	4	2x4, 4 Lamp, 34w T12, Mag. Ballast, Recessed Mnt., Prismatic Lens	156	1.56	6864	$1,036.46	10	1	Dual Technology Occupancy Sensor - Remote Mnt.	156	1.25	20%	5491.2	$829.17	$160.00	$160.00	0.31	1372.8	$207.29	0.77
142.21	Offices	4400	6	4	2x4, 4 Lamp, 34w T12, Mag. Ballast, Recessed Mnt., Prismatic Lens	156	0.94	4118.4	$621.88	6	1	Dual Technology Occupancy Sensor - Remote Mnt.	156	0.75	20%	3294.72	$497.50	$160.00	$160.00	0.19	823.68	$124.38	1.29
142.21	Reception	8760	14	4	2x4, 4 Lamp, 34w T12, Mag. Ballast, Recessed Mnt., Prismatic Lens	156	2.18	19131.84	$2,888.91	14	0	No Change	156	2.18	0%	19131.84	$2,888.91	$0.00	$0.00	0.00	0	$0.00	0.00
142.21	Office	4400	3	4	2x4, 4 Lamp, 34w T12, Mag. Ballast, Recessed Mnt., Prismatic Lens	156	0.47	2059.2	$310.94	3	1	Dual Technology Occupancy Sensor - Remote Mnt.	156	0.37	20%	1647.36	$248.75	$160.00	$160.00	0.09	411.84	$62.19	2.57
142.21	Captain #2 Office	4400	2	4	2x4, 4 Lamp, 34w T12, Mag. Ballast, Recessed Mnt., Prismatic Lens	156	0.31	1372.8	$207.29	2	1	Dual Technology Occupancy Sensor - Remote Mnt.	156	0.25	20%	1098.24	$165.83	$160.00	$160.00	0.06	274.56	$41.46	3.86
142.21	Computer Room	4400	2	4	2x4, 4 Lamp, 34w T12, Mag. Ballast, Recessed Mnt., Prismatic Lens	156	0.31	1372.8	$207.29	2	1	Dual Technology Occupancy Sensor - Remote Mnt.	156	0.25	20%	1098.24	$165.83	$160.00	$160.00	0.06	274.56	$41.46	3.86
142.21	Storage	1200	2	4	2x4, 4 Lamp, 34w T12, Mag. Ballast, Recessed Mnt., Prismatic Lens	156	0.31	374.4	$56.53	2	0	No Change	156	0.31	0%	374.4	$56.53	$0.00	$0.00	0.00	0	$0.00	0.00
142.21	Kitchen	2600	2	4	2x4, 4 Lamp, 34w T12, Mag. Ballast, Recessed Mnt., Prismatic Lens	156	0.31	811.2	$122.49	2	1	Dual Technology Occupancy Sensor - Remote Mnt.	156	0.25	20%	648.96	$97.99	$160.00	$160.00	0.06	162.24	$24.50	6.53
105		2600	1	2	3' Channel, 2-Lamp, 30w T12, Mag. Ballast, Surface Mnt., No Lens	60	0.06	156	$23.56	1	0	No Change	60	0.06	0%	156	$23.56	$0.00	$0.00	0.00	0	$0.00	0.00
142.21	Office	4400	1	4	2x4, 4 Lamp, 34w T12, Mag. Ballast, Recessed Mnt., Prismatic Lens	156	0.16	686.4	$103.65	1	0	No Change	156	0.16	0%	686.4	$103.65	$0.00	$0.00	0.00	0	$0.00	0.00
142.21	Mens	2600	1	4	2x4, 4 Lamp, 34w T12, Mag. Ballast, Recessed Mnt., Prismatic Lens	156	0.16	405.6	$61.25	1	0	No Change	156	0.16	0%	405.6	$61.25	$0.00	$0.00	0.00	0	$0.00	0.00
142.21	Womens	2600	1	4	2x4, 4 Lamp, 34w T12, Mag. Ballast, Recessed Mnt., Prismatic Lens	156	0.16	405.6	$61.25	1	0	No Change	156	0.16	0%	405.6	$61.25	$0.00	$0.00	0.00	0	$0.00	0.00
142.21	Closet	1200	1	4	2x4, 4 Lamp, 34w T12, Mag. Ballast, Recessed Mnt., Prismatic Lens	156	0.16	187.2	$28.27	1	0	No Change	156	0.16	0%	187.2	$28.27	$0.00	$0.00	0.00	0	$0.00	0.00
142.21	Locker Room	4400	3	4	2x4, 4 Lamp, 34w T12, Mag. Ballast, Recessed Mnt., Prismatic Lens	156	0.47	2059.2	$310.94	3	1	Dual Technology Occupancy Sensor - Remote Mnt.	156	0.37	20%	1647.36	$248.75	$160.00	$160.00	0.09	411.84	$62.19	2.57
227.211	Hallway	8760	16	2	2x2, 2 Lamp, 17w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	34	0.54	4765.44	$719.58	16	0	No Change	34	0.54	0%	4765.44	$719.58	$0.00	$0.00	0.00	0	$0.00	0.00
621	Janitor Closet	1200	1	1	Recessed Light, 100w A Lamp	100	0.10	120	$18.12	1	0	No Change	100	0.10	0%	120	$18.12	$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
142.21	Watch Command	8760	2	4	2x4, 4 Lamp, 34w T12, Mag. Ballast, Recessed Mnt., Prismatic Lens	156	0.31	2733.12	$412.70	2	0	No Change	156	0.31	0%	2733.12	$412.70	$0.00	$0.00	0.00	0	$0.00	0.00
105	Watch Command Bathroom	2600	1	2	3' Channel, 2-Lamp, 30w T12, Mag. Ballast, Surface Mnt., No Lens	60	0.06	156	$23.56	1	0	No Change	60	0.06	0%	156	$23.56	$0.00	$0.00	0.00	0	$0.00	0.00
121.16	Jail 1	8760	6	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Surface Mnt., Clear Acrylic Lens	78	0.47	4099.68	$619.05	6	0	No Change	78	0.47	0%	4099.68	$619.05	$0.00	$0.00	0.00	0	$0.00	0.00
142.21	Interview Room	4400	2	4	2x4, 4 Lamp, 34w T12, Mag. Ballast, Recessed Mnt., Prismatic Lens	156	0.31	1372.8	$207.29	2	1	Dual Technology Occupancy Sensor - Remote Mnt.	156	0.25	20%	1098.24	$165.83	$160.00	$160.00	0.06	274.56	$41.46	3.86
142.21	Communications	8760	6	4	2x4, 4 Lamp, 34w T12, Mag. Ballast, Recessed Mnt., Prismatic Lens	156	0.94	8199.36	$1,238.10	6	0	No Change	156	0.94	0%	8199.36	$1,238.10	$0.00	$0.00	0.00	0	$0.00	0.00
610.1		8760	6	3	3 Lamp 40W Incandescent Ceiling Mount Track Light	120	0.72	6307.2	$952.39	6	0	No Change	120	0.72	0%	6307.2	$952.39	$0.00	$0.00	0.00	0	$0.00	0.00
613	Garage	8760	4	1	Industrial Fixture, 100w A19 Lamp	100	0.40	3504	$529.10	4	0	No Change	100	0.40	0%	3504	$529.10	$0.00	$0.00	0.00	0	$0.00	0.00
725		8760	1	1	150w HPS Wallpack	188	0.19	1646.88	$248.68	1	0	No Change	188	0.19	0%	1646.88	$248.68	$0.00	$0.00	0.00	0	$0.00	0.00
622		8760	2	1	Double Head Flood, (2) 90w PAR Lamps	180	0.36	3153.6	$476.19	2	0	No Change	180	0.36	0%	3153.6	$476.19	$0.00	$0.00	0.00	0	$0.00	0.00
613	Jail 2	8760	5	1	Industrial Fixture, 100w A19 Lamp	100	0.50	4380	$661.38	5	0	No Change	100	0.50	0%	4380	$661.38	$0.00	$0.00	0.00	0	$0.00	0.00
730		8760	3	1	150w MH Flood	188	0.56	4940.64	$746.04	3	0	No Change	188	0.56	0%	4940.64	$746.04	$0.00	$0.00	0.00	0	$0.00	0.00
142.21	Prosecutors Office	2600	2	4	2x4, 4 Lamp, 34w T12, Mag. Ballast, Recessed Mnt., Prismatic Lens	156	0.31	811.2	$122.49	2	1	Dual Technology Occupancy Sensor - Remote Mnt.	156	0.25	20%	648.96	$97.99	$160.00	$160.00	0.06	162.24	$24.50	6.53
142.21	Mens	2600	1	4	2x4, 4 Lamp, 34w T12, Mag. Ballast, Recessed Mnt., Prismatic Lens	156	0.16	405.6	$61.25	1	0	No Change	156	0.16	0%	405.6	$61.25	$0.00	$0.00	0.00	0	$0.00	0.00
142.21	Womens	2600	1	4	2x4, 4 Lamp, 34w T12, Mag. Ballast, Recessed Mnt., Prismatic Lens	156	0.16	405.6	$61.25	1	0	No Change	156	0.16	0%	405.6	$61.25	$0.00	$0.00	0.00	0	$0.00	0.00
142.21	Mens	2600	1	4	2x4, 4 Lamp, 34w T12, Mag. Ballast, Recessed Mnt., Prismatic Lens	156	0.16	405.6	$61.25	1	0	No Change	156	0.16	0%	405.6	$61.25	$0.00	$0.00	0.00	0	$0.00	0.00
142.21	Womens	2600	1	4	2x4, 4 Lamp, 34w T12, Mag. Ballast, Recessed Mnt., Prismatic Lens	156	0.16	405.6	$61.25	1	0	No Change	156	0.16	0%	405.6	$61.25	$0.00	$0.00	0.00	0	$0.00	0.00
127.21	Entrance	8760	6	2	2x2, 2 Lamp, 34w T12 U-Tube, Mag. Ballast, Recessed Mnt., Prismatic Lens	72	0.43	3784.32	$571.43	6	0	No Change	72	0.43	0%	3784.32	$571.43	$0.00	$0.00	0.00	0	$0.00	0.00
127.21	Court	2600	12	2	2x2, 2 Lamp, 34w T12 U-Tube, Mag. Ballast, Recessed Mnt., Prismatic Lens	72	0.86	2246.4	$339.21	12	0	No Change	72	0.86	0%	2246.4	$339.21	$0.00	$0.00	0.00	0	$0.00	0.00
619		2600	4	1	Wall Sconce, (1) 60w A19 Lamp	60	0.24	624	$94.22	4	0	No Change	60	0.24	0%	624	$94.22	$0.00	$0.00	0.00	0	$0.00	0.00
621		2600	13	1	Recessed Light, 100w A Lamp	100	1.30	3380	$510.38	13	0	No Change	100	1.30	0%	3380	$510.38	$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
127.21	Hallway	2600	1	2	2x2, 2 Lamp, 34w T12 U-Tube, Mag. Ballast, Recessed Mnt., Prismatic Lens	72	0.07	187.2	$28.27	1	0	No Change	72	0.07	0%	187.2	$28.27	$0.00	$0.00	0.00	0	$0.00	0.00
142.21	Judge	2600	2	4	2x4, 4 Lamp, 34w T12, Mag. Ballast, Recessed Mnt., Prismatic Lens	156	0.31	811.2	$122.49	2	1	Dual Technology Occupancy Sensor - Remote Mnt.	156	0.25	20%	648.96	$97.99	$160.00	$160.00	0.06	162.24	$24.50	6.53
613		2600	1	1	Industrial Fixture, 100w A19 Lamp	100	0.10	260	$39.26	1	0	No Change	100	0.10	0%	260	$39.26	$0.00	$0.00	0.00	0	$0.00	0.00
105	Bathroom	2600	1	2	3' Channel, 2-Lamp, 30w T12, Mag. Ballast, Surface Mnt., No Lens	60	0.06	156	$23.56	1	0	No Change	60	0.06	0%	156	$23.56	$0.00	$0.00	0.00	0	$0.00	0.00
621	Office	2600	1	1	Recessed Light, 100w A Lamp	100	0.10	260	$39.26	1	1	Dual Tech. Occupancy Sensor w/2 Pole Powerpack Remote Mnt.	100	0.08	20%	208	$31.41	$225.00	$225.00	0.02	52	$7.85	28.66
142.21		2600	4	4	2x4, 4 Lamp, 34w T12, Mag. Ballast, Recessed Mnt., Prismatic Lens	156	0.62	1622.4	$244.98	4	0		156	0.50	20%	1297.92	$195.99	$0.00	$0.00	0.12	324.48	$49.00	0.00
127.21		2600	1	2	2x2, 2 Lamp, 34w T12 U-Tube, Mag. Ballast, Recessed Mnt., Prismatic Lens	72	0.07	187.2	$28.27	1	0		72	0.06	20%	149.76	$22.61	$0.00	$0.00	0.01	37.44	$5.65	0.00
613		2600	2	1	Industrial Fixture, 100w A19 Lamp	100	0.20	520	$78.52	2	0		100	0.16	20%	416	$62.82	$0.00	$0.00	0.04	104	$15.70	0.00
127.21	Stairs	8760	2	2	2x2, 2 Lamp, 34w T12 U-Tube, Mag. Ballast, Recessed Mnt., Prismatic Lens	72	0.14	1261.44	$190.48	2	0	No Change	72	0.14	0%	1261.44	$190.48	$0.00	$0.00	0.00	0	$0.00	0.00
613		8760	5	1	Industrial Fixture, 100w A19 Lamp	100	0.50	4380	$661.38	5	0	No Change	100	0.50	0%	4380	$661.38	$0.00	$0.00	0.00	0	$0.00	0.00
142.21	Office	2600	2	4	2x4, 4 Lamp, 34w T12, Mag. Ballast, Recessed Mnt., Prismatic Lens	156	0.31	811.2	$122.49	2	1	Dual Tech. Occupancy Sensor w/2 Pole Powerpack Remote Mnt.	156	0.25	20%	648.96	$97.99	$225.00	$225.00	0.06	162.24	$24.50	9.18
221.14		2600	2	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., No Lens	58	0.12	301.6	$45.54	2	0		58	0.09	20%	241.28	$36.43	$0.00	$0.00	0.02	60.32	$9.11	0.00
651		2600	1	1	"Industrial" Relector, 26w CFL	26	0.03	67.6	$10.21	1	0		26	0.02	20%	54.08	$8.17	$0.00	$0.00	0.01	13.52	$2.04	0.00
613	Mech Room	1200	3	1	Industrial Fixture, 100w A19 Lamp	100	0.30	360	$54.36	3	0	No Change	100	0.30	0%	360	$54.36	$0.00	$0.00	0.00	0	$0.00	0.00
	Totals		136	110			20.3	97217.28	$16,879	177	13			18.9		106,149.4	$16,028.57		$2,210	1.48	5,634	$851	2.60

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
Police Building	2350	SHARP NU-U235F2	95	17.5	1,666	22.33	27,280	18	3,981	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 Police Building**
Location: **Pleasantville, NJ**
Description: **Photovoltaic System 100% Financing - 15 year**

Simple Payback Analysis

	Photovoltaic System 100% Financing - 15 year
Total Construction Cost	$129,461
Annual kWh Production	27,280
Annual Energy Cost Reduction	$4,119
Average Annual SREC Revenue	$10,519

Simple Payback: **8.84** Years

Life Cycle Cost Analysis

Analysis Period (years):	15	Financing %:	100%
Discount Rate:	3%	Maintenance Escalation Rate:	3.0%
Average Energy Cost ($/kWh)	**$0.151**	Energy Cost Escalation Rate:	3.0%
Financing Rate:	6.00%	Average SREC Value ($/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	27,280	$4,119	$0	$15,004	$7,618	$5,491	$6,014	$6,014
2	$0	27,144	$4,243	$0	$14,929	$7,280	$5,830	$6,062	$12,076
3	$0	27,008	$4,370	$0	$13,504	$6,920	$6,190	$4,764	$16,840
4	$0	26,873	$4,501	$0	$12,093	$6,538	$6,571	$3,484	$20,325
5	$0	26,738	$4,636	$275	$12,032	$6,133	$6,977	$3,284	$23,608
6	$0	26,605	$4,775	$274	$11,972	$5,703	$7,407	$3,364	$26,972
7	$0	26,472	$4,919	$273	$10,589	$5,246	$7,864	$2,125	$29,098
8	$0	26,339	$5,066	$271	$10,536	$4,761	$8,349	$2,221	$31,319
9	$0	26,208	$5,218	$270	$9,173	$4,246	$8,864	$1,011	$32,330
10	$0	26,077	$5,375	$269	$9,127	$3,699	$9,410	$1,123	$33,453
11	$0	25,946	$5,536	$267	$7,784	$3,119	$9,991	($57)	$33,396
12	$0	25,817	$5,702	$266	$7,745	$2,503	$10,607	$72	$33,468
13	$0	25,687	$5,873	$265	$6,422	$1,848	$11,261	($1,079)	$32,389
14	$0	25,559	$6,049	$263	$6,390	$1,154	$11,956	($934)	$31,455
15	$0	25,431	$6,231	$262	$5,086	$416	$12,693	($2,054)	$29,400
	Totals:	395,184	$76,614	$2,955	$152,385	$67,183	$129,461	$29,400	$392,143

Net Present Value (NPV) **$25,548**

APPENDIX G

PLEASANTVILLE POLICE BUILDING COOLING TOWER SUPPLY FAN VARIABLE SPEED DRIVE

Assumptions: 6,000 Hours of Operation

kWh = HP * 0.75(Conversion Factor) * Hours of Op / Motor Efficiency * 0.9 (Load Factor)

kWh = HP * (%Full Load)^3 * 0.75(Conversion Factor) * Hours of Op at Load/ Motor Efficien

$0.1510

Location	Equipt ID	Purpose	Motor Manufacturer	Horse Power	RPM	Frame Type	V/PH/HZ	CFM	Static, in. wg.	Hours/ Year	Existing Efficiency	Existing kWh Annual	Existing Electric Cost, $	Proposed Efficiency		% Full Load	% Run Hours at Load	Hours/yr at Load	Load kWh Annual	Proposed Electric Cost, $	Total Cost, $	Annual kWh Savings	Annual Electric Savings, $	Simple Payback, years
Outdoor Area	CT-1	Cooling Tower	Century	7.5	1750	254T	460/3/60	17,500	4.4	6,000	91.00%	33,379	$5,040	91.00%	-		100.00%	6,000	17,135	$2,587	$5,419	16,245	$2,453	2.21
															Calcs	100.00%	10.00%	600	3,709	$560				
																90.00%	15.00%	900	4,056	$612				
																80.00%	15.00%	900	2,848	$430				
																70.00%	40.00%	2,400	5,088	$768				
																60.00%	15.00%	900	1,202	$181				
																50.00%	5.00%	300	232	$35				
																40.00%	0.00%	0	0	$0				
																30.00%	0.00%	0	0	$0				