

OCEAN COUNTY

P.E.E.R. BUILDING & PARKING GARAGE

**129 HOOPER AVENUE
TOMS RIVER, NJ 08753**

FACILITY ENERGY REPORT

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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:	Jersey Central Power & Light
Electric Utility Rate Structure:	General Service Primary (GSP)
Third Party Supplier:	Hess Corporation

Natural Gas Utility Provider:	New Jersey Natural Gas
Utility Rate Structure:	General Service Large (GSL)
Third Party Supplier:	Hess Corporation

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 gas usage profile within each facility report shows the actual natural gas energy usage for the facility. 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.

Table 1
Electricity Billing Data

ELECTRIC USAGE SUMMARY			
Utility Provider: JCP&L Rate: General Service Secondary 3-Phase Meter No: G28073319 Account No: 10-00-16-6705-39 Third Party Utility Provider: Hess TPS Meter / Acct No: -			
MONTH OF USE	CONSUMPTION KWH	DEMAND KW	TOTAL BILL
Jan-13	138,240	275.0	\$15,617
Feb-13	126,720	250.0	\$14,456
Mar-13	141,440	274.6	\$16,096
Apr-13	158,400	292.8	\$17,931
May-13	153,280	291.8	\$17,911
Jun-13	183,040	316.5	\$21,166
Jul-13	174,400	327.7	\$20,349
Aug-13	182,720	313.0	\$21,109
Sep-13	134,080	299.2	\$15,839
Oct-13	124,160	267.2	\$14,609
Nov-13	131,200	274.9	\$15,389
Dec-13	125,440	252.8	\$14,557
Totals	1,773,120	327.7 Max	\$205,028
AVERAGE DEMAND 286.3 KW average AVERAGE RATE \$0.116 \$/kWh			

Figure 1
Electricity Usage Profile

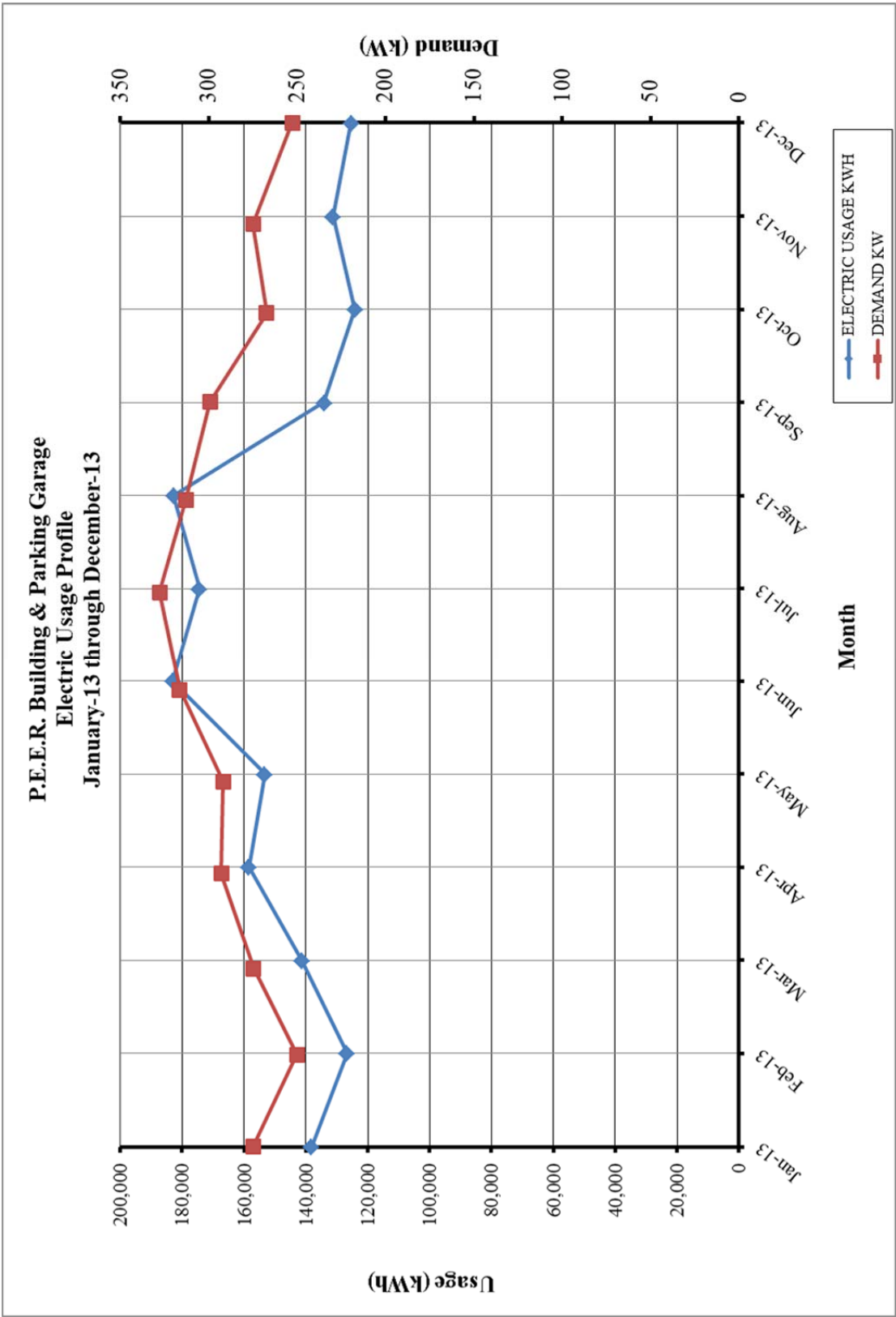
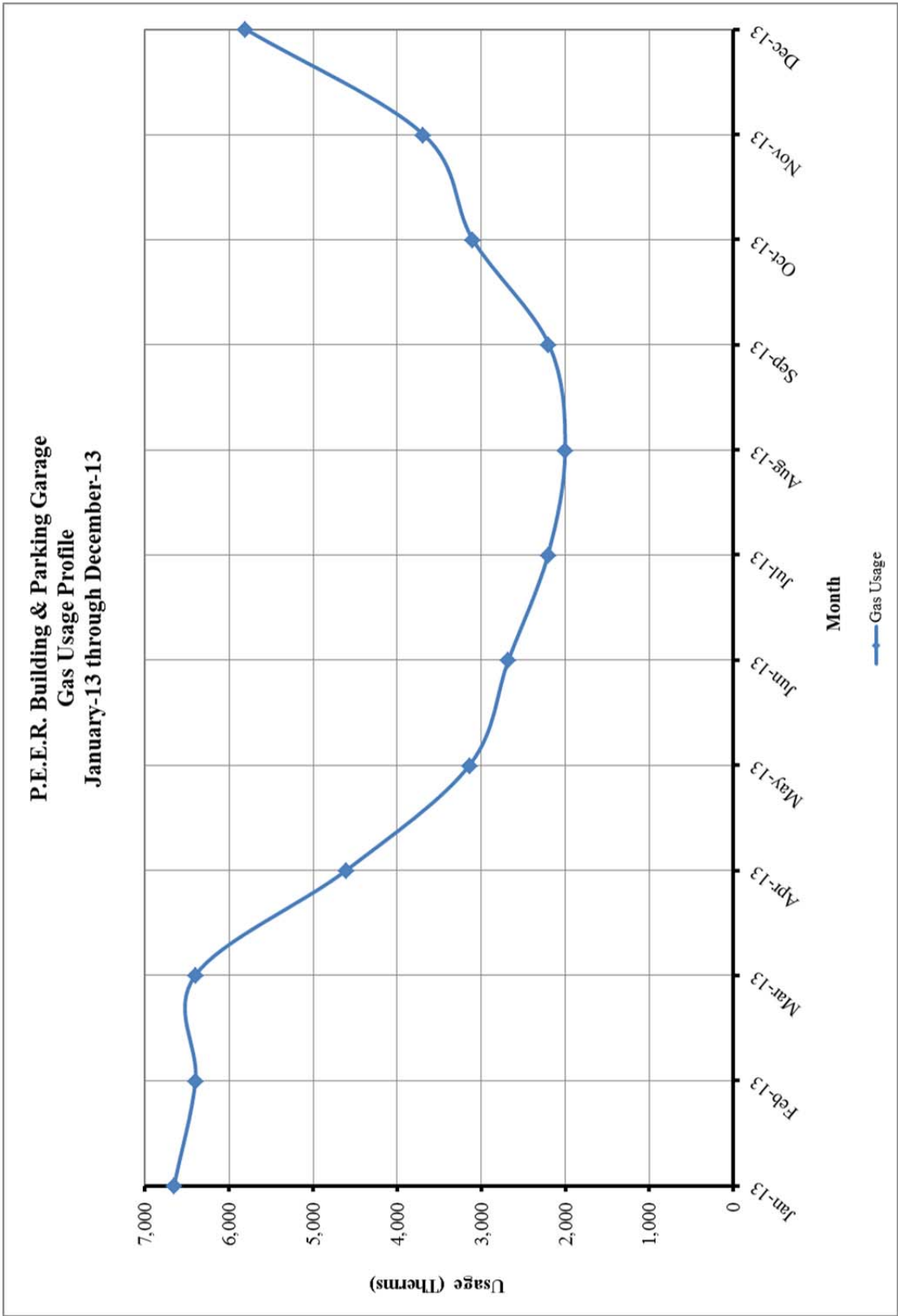


Table 2
Natural Gas Billing Data

NATURAL GAS USAGE SUMMARY		
Utility Provider: New Jersey Natural Gas Rate: GSL Meter No: 00849119 Account No: 19-4510-0200-18 Third Party Utility Provider: Hess TPS Meter No: -		
MONTH OF USE	CONSUMPTION (THERMS)	TOTAL BILL
Jan-13	6,655.15	\$6,816.10
Feb-13	6,400.67	\$6,566.86
Mar-13	6,402.07	\$6,653.88
Apr-13	4,604.99	\$5,137.10
May-13	3,140.32	\$3,718.91
Jun-13	2,677.53	\$2,264.25
Jul-13	2,207.00	\$2,725.09
Aug-13	2,003.58	\$2,449.13
Sep-13	2,196.02	\$2,652.74
Oct-13	3,102.70	\$3,560.15
Nov-13	3,691.78	\$4,026.42
Dec-13	5,806.45	\$6,393.16
TOTALS	48,888.26	\$52,963.79
AVERAGE RATE:	\$1.08	\$/THERM

Figure 2
Natural Gas Usage Profile



II. FACILITY DESCRIPTION

The Planning, Engineering, Elections, and Road Department (P.E.E.R.) Building is located at 129 Hooper Avenue in Toms River, New Jersey. This 504,700 SF facility was designed/built in 1991 to 1994 with no additions. The building is a three-story facility attached to a multi-level parking garage. The facility is comprised of offices and open office space, conference rooms, file storage, cafeteria and mechanical HVAC spaces.

Occupancy Profile

The typical hours of operation for most of the facility are Monday through Friday between 8:00 am and 5:00 pm. There are approximately 135 employees that normally occupy the facility.

Building Envelope

Exterior walls for the building are masonry brick faced with a concrete block construction. The windows throughout the facility are in very good condition. Typical windows are double pane, 1/4" with aluminum frames. The roof consists of a rubber membrane over a concrete slab.

HVAC Systems

The P.E.E.R. Building is heated by a Weil-McLain Series 1088, cast iron, sectional, gas-fired, hot water boiler with an input rating of 3,103 MBH and an output of 2,452 for a thermal efficiency of 79% when new. Based on the age and condition of the boiler, Concord Engineering estimates the present thermal efficiency is 70%. Hot water is circulated to various AHU hot water coils, VAV reheat coils, cabinet unit heaters, and fin-tube radiators via three (3) hot water pumps in the boiler room. Two pumps are 3-HP, Bell & Gossett Series 1510 Model 2BC 7.375 BF base-mounted, end suction, centrifugal pumps and the other pump (feeds the baseboard fin-tube radiators) is a 2-HP Bell & Gossett Model BF 8.25 1.25 BC base-mounted, end suction, centrifugal pump. Most areas are heated by VAV boxes with hot water coils or hot water duct coils and most of the perimeter walls are heated by hot water baseboard fin-tube heaters. The restrooms, entrances, mechanical rooms, storage rooms, etc. have hot water cabinet heaters.

Cooling for the P.E.E.R. Building is provided by the following Trane split air handling systems:

<u>Tag No.</u>	<u>Model No.</u>	<u>Total CFM</u>	<u>DX Cooling</u>	<u>HW Coil</u>	<u>S/A Fan</u>	<u>R/A Fan</u>
AHU-1	MCCA017	10,000	288 MBH	81 MBH	10 HP	3 HP
AHU-2	MCCA025	14,000	450 MBH	108 MBH	15 HP	5 HP
AHU-3	MCCA025	15,200	450 MBH	108 MBH	15 HP	5 HP
AHU-4	MCCA030	16,000	465 MBH	108 MBH	15 HP	5 HP
ACCU-1	RAUCC254		320 MBH			
ACCU-2	RAUCC404		500 MBH			

ACCU-3 RAUCC404 516 MBH

ACCU-4 RAUCC404 516 MBH

Each of these air handling units has a variable speed controller for both the supply and return fans. The split air handling units and split condensing units are 23 years old and past their ASHRAE service life of 20 years. These units should be replaced with high-efficiency units.

The kitchen make-up air unit is a Trane gas-fired, rooftop unit rated at 112 MBH input and 89.6 output for a thermal efficiency of 80% when new. This unit has a 2-stage modulation gas burner, a 2-HP supply fan, a 100% outside air inlet hood and is interlocked with the kitchen exhaust hood fan. This unit is 23 years old, in poor condition with an estimated thermal efficiency of 70% at full load and should be replaced with a high-efficiency direct-fired make-up air unit with a thermal efficiency of 92% at full load.

The security office in the parking garage is cooled by a Mitsubishi Electric Model PUZ-A18NHA4 split-system heat pump rated at 1½ -Tons.

Exhaust System

There are numerous rooftop exhaust fans that serve the restrooms, staff/kitchen rooms, reproduction room, conference rooms, employee kitchen, elevator room, kitchen ceiling, and mechanical/electrical rooms. The kitchen hood exhaust fan is a Greenheck fan rated at 2,600 CFM with a 1.5-HP fan.

HVAC System Controls

The heating and cooling is controlled by various thermostats throughout the facility. The heating hot water boiler is controlled by a boiler control panel that includes outside air temperature reset. The Trane split air handling units contain standalone thermostat controls within each space they condition. The cabinet unit heaters, fin-tube radiators and VAV boxes have wall-mounted thermostats.

Domestic Hot Water

The domestic water for this facility (except for the kitchen) is produced by an A. O. Smith Model ECT 40P 200 electric storage tank water heater with a capacity of 40 gallons and an input capacity of 9 kW (2 @ 4.5 kW).

Lighting

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 1
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 - General	\$54,800	\$6,184	8.9	69.3%
ECM #2	Lighting Upgrade - Exterior & Garage	\$248,527	\$103,848	2.4	526.8%
ECM #3	Lighting Controls Upgrade	\$10,445	\$1,126	9.3	61.7%
ECM #4	Boiler Upgrade	\$193,750	\$12,243	15.8	58.0%
ECM #5	Split System Replacements	\$140,225	\$4,132	33.9	-55.8%
ECM #6	NEMA Premium Motor Replacements	\$2,184	\$168	13.0	38.5%
ECM #7	Domestic Hot Water Heater Upgrade	\$11,416	\$522	21.9	-45.1%
RENEWABLE ENERGY MEASURES (REM's)					
ECM NO.	DESCRIPTION	NET INSTALLATION COST	ANNUAL SAVINGS	SIMPLE PAYBACK (Yrs)	SIMPLE LIFETIME ROI
REM #1	340 kW Solar Array	\$1,631,135	\$111,783	14.6	2.8%

Notes: A. Cost takes into consideration applicable NJ Smart StartTM incentives.

B. Savings takes into consideration applicable maintenance savings.

Table 2
ECM Energy Summary

ENERGY CONSERVATION MEASURES (ECM's)				
ECM NO.	DESCRIPTION	ANNUAL UTILITY REDUCTION		
		ELECTRIC DEMAND (KW)	ELECTRIC CONSUMPTION (KWH)	NATURAL GAS (THERMS)
ECM #1	Lighting Upgrade - General	15.0	51,531	0
ECM #2	Lighting Upgrade - Exterior & Garage	100.8	865,403	0
ECM #3	Lighting Controls Upgrade	0.0	9,381	0
ECM #4	Boiler Upgrade	0.0	0	11,336
ECM #5	Split System Replacements	29.7	35,617	0
ECM #6	NEMA Premium Motor Replacements	0.5	1,450	0
ECM #7	Domestic Hot Water Heater Upgrade	0.0	7,723	(346)
RENEWABLE ENERGY MEASURES (REM's)				
ECM NO.	DESCRIPTION	ANNUAL UTILITY REDUCTION		
		ELECTRIC DEMAND (KW)	ELECTRIC CONSUMPTION (KWH)	NATURAL GAS (THERMS)
REM #1	340 kW Solar Array	340.0	411,719	0

Table 3
ECM Emissions Summary

ENERGY CONSERVATION MEASURES (ECM's)				
ECM NO.	DESCRIPTION	GREENHOUSE GAS EMISSIONS REDUCTION		
		CO₂ EMISSIONS (LBS)	NO_x EMISSIONS (LBS)	SO₂ EMISSIONS (LBS)
ECM #1	Lighting Upgrade - General	78,327	144	335
ECM #2	Lighting Upgrade - Exterior & Garage	1,315,413	2,423	5,625
ECM #3	Lighting Controls Upgrade	14,259	26	61
ECM #4	Boiler Upgrade	132,631	104	0
ECM #5	Split System Replacements	54,138	100	232
ECM #6	NEMA Premium Motor Replacements	2,204	4	9
ECM #7	Domestic Hot Water Heater Upgrade	7,691	18	50
Notes:		A. Emissions Reduction based on NJCEP published factors for electric & gas.		

Table 4
Facility Project Summary

FACILITY PROJECT SUMMARY TABLE					
ENERGY CONSERVATION MEASURES	ANNUAL ENERGY SAVINGS (\$)	PROJECT COST (\$)	SMART START INCENTIVES	CUSTOMER COST	SIMPLE PAYBACK
Lighting Upgrade - General	\$6,184	\$65,970	\$11,170	\$54,800	8.9
Lighting Upgrade - Exterior & Garage	\$103,848	\$284,255	\$35,728	\$248,527	2.4
Lighting Controls Upgrade	\$1,126	\$11,100	\$655	\$10,445	9.3
Boiler Upgrade	\$12,243	\$199,000	\$5,250	\$193,750	15.8
Split System Replacements	\$4,132	\$147,000	\$6,775	\$140,225	33.9
NEMA Premium Motor Replacements	\$168	\$2,184	\$0	\$2,184	13.0
Domestic Hot Water Heater Upgrade	\$522	\$11,466	\$50	\$11,416	21.9
Total Project	\$128,223	\$720,975	\$59,628	\$661,347	5.2

Note the measure totals in this table do not take into account interactive effects of measures; see Method of Analysis Section III in Executive Report for further explanation.

The facility peak electrical demand and total project savings meet the qualifications for the Pay for Performance Program. If the owner were to pursue this program option they would receive an estimated \$236,364 in incentive dollars, see the Installation Funding Options Section for more detail.

ECM #1: Lighting Upgrade – General

Description:

The majority of the interior lighting throughout P.E.E.R. building is provided with fluorescent fixtures with older generation, 32W T8 lamps and electronic ballasts as well as several areas that contain T12 lamps with magnetic ballasts. Energy savings can be achieved by replacing the existing T8 and T12 lamps with new LED style fixtures. In addition to the fluorescent tube lamps there are additional fixture types consisting of metal halide lamps and incandescent lamps. These too can be retrofitted to LED style lamps.

This ECM includes retrofitting the interior lighting with new LED type fixtures and screw in lamps. It is recommended the County consult with a professional engineer prior to retrofitting fixtures to ensure code required minimum light levels will be met. Additional savings may also be able to be found if it is discovered fixture quantities can be reduced.

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.

LIGHTING UPGRADE SAVINGS SUMMARY	
DESCRIPTION	SAVINGS
Electric Demand Savings (kW)	15.0
Electric Usage Savings (kWh)	51,531
Electric Cost Savings (\$)	\$6,184

Energy Savings Summary:

ECM #1 - ENERGY SAVINGS SUMMARY	
Installation Cost (\$):	\$65,970
NJ Smart Start Equipment Incentive (\$):	\$11,170
Net Installation Cost (\$):	\$54,800
Maintenance Savings (\$/Yr):	\$0
Energy Savings (\$/Yr):	\$6,184
Total Yearly Savings (\$/Yr):	\$6,184
Estimated ECM Lifetime (Yr):	15
Simple Payback	8.9
Simple Lifetime ROI	69.3%
Simple Lifetime Maintenance Savings	\$0
Simple Lifetime Savings	\$92,760
Internal Rate of Return (IRR)	7%
Net Present Value (NPV)	\$19,024.19

ECM #2: Lighting Upgrade – Exterior Lighting

Description:

The exterior and garage lighting at the P.E.E.R building is currently lit by metal halide and high pressure sodium fixtures. The exterior would be better served with more efficient LED lighting system. Concord Engineering recommends upgrading the lighting to an energy-efficient LED lighting system that includes LED lamps and fixtures for the existing exterior lighting.

This ECM would replace the existing exterior lamps and fixtures with equivalent LED lamps and fixtures.

Energy Savings Calculations:

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

LIGHTING UPGRADE SAVINGS SUMMARY	
DESCRIPTION	SAVINGS
Electric Demand Savings (kW)	100.8
Electric Usage Savings (kWh)	865,403
Electric Cost Savings (\$)	\$103,848

Energy Savings Summary:

ECM #2 - ENERGY SAVINGS SUMMARY	
Installation Cost (\$):	\$284,255
NJ Smart Start Equipment Incentive (\$):	\$35,728
Net Installation Cost (\$):	\$248,527
Maintenance Savings (\$/Yr):	\$0
Energy Savings (\$/Yr):	\$103,848
Total Yearly Savings (\$/Yr):	\$103,848
Estimated ECM Lifetime (Yr):	15
Simple Payback	2.4
Simple Lifetime ROI	526.8%
Simple Lifetime Maintenance Savings	\$0
Simple Lifetime Savings	\$1,557,720
Internal Rate of Return (IRR)	42%
Net Present Value (NPV)	\$991,203.68

ECM #3: Lighting Controls Upgrade – Occupancy Sensors

Description:

Some of the lights in the P.E.E.R. 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.

This ECM includes installation of ceiling or switch mount sensors for mostly offices. 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:

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

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

LIGHTING CONTROLS SAVINGS SUMMARY	
DESCRIPTION	SAVINGS
Electric Demand Savings (kW)	0.0
Electric Usage Savings (kWh)	9,381
Electric Cost Savings (\$)	\$1,126

Rebates and Incentives:

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

Smart Start Incentive

$$= (\# \text{ Wall mount sensors} \times \$20 \text{ per sensor}) \\ + (\# \text{ Ceiling mount sensors} \times \$35 \text{ per sensor})$$

Energy Savings Summary:

ECM #3 - ENERGY SAVINGS SUMMARY	
Installation Cost (\$):	\$11,100
NJ Smart Start Equipment Incentive (\$):	\$655
Net Installation Cost (\$):	\$10,445
Maintenance Savings (\$/Yr):	\$0
Energy Savings (\$/Yr):	\$1,126
Total Yearly Savings (\$/Yr):	\$1,126
Estimated ECM Lifetime (Yr):	15
Simple Payback	9.3
Simple Lifetime ROI	61.7%
Simple Lifetime Maintenance Savings	\$0
Simple Lifetime Savings	\$16,890
Internal Rate of Return (IRR)	7%
Net Present Value (NPV)	\$2,997.11

ECM # 4: Boiler Replacement

Description:

The Ocean County PEER offices are heated by a central hot water boiler located in the boiler room of the building. Hot water is provided by a Weil-McLain Model 1088 gas-fired, cast iron sectional boiler rated for an input capacity of 3,103 MBH and a rated output capacity of 2,452 MBH when new. The boiler was manufactured in 1991, is in average condition, but can be replaced by much more efficient condensing, modular boilers.

CEG recommends replacing this boiler with two 1,500 MBH high-efficiency condensing modular hot water boilers. Condensing boilers can substantially improve the operating efficiency of the heating system of the building. A condensing boiler's peak efficiency tops out at 98% depending on return water temperature. The natural gas to water efficiency for a 1,500 MBH boiler with digital burner controls is approximately 92% over its operating range and with the advanced controls and a 20:1 turn down ratio.

This energy conservation measure will replace the existing Weil-McLain gas-fired, cast iron, sectional boiler serving the facility with two, high-efficiency, modular, condensing heating hot water boilers. Calculation is based on the following equipment: Aerco Benchmark 1500, modular, condensing hot water boiler or equivalent.

Energy Savings Calculations:

Gas consumption of the boiler plant is gathered in order to calculate the estimated heat output of the existing boiler. It is confirmed that the boiler is for space heating only and does not provide domestic hot water heating.

The annual gas consumption is used in a reverse calculation in the below equations to obtain proposed annual gas consumption based on improved efficiency. Calculations are summarized in the table below.

$$\text{Annual Output, MMBTU} = \frac{\text{Consumption (Therms)} \times 100,000 \frac{\text{BTU}}{\text{Therm}} \times \text{Current Boiler Effc}}{1,000,000}$$

$$\text{Proposed Gas Consumption, Therms} = \frac{\text{Annual Output (MMBTU)} \times 1,000,000}{100,000 \frac{\text{BTU}}{\text{Therm}} \times \text{New Boiler Efficiency}}$$

HIGH EFFICIENCY BOILER CALCULATIONS			
ECM INPUTS	EXISTING	PROPOSED	SAVINGS
ECM INPUTS	Existing Cast Iron Boiler	New High Efficiency Boilers	
Existing Nat Gas (Therms)	47,405		
Boiler Efficiency (%)	70.0%	92.0%	22%
Nat Gas Heat Value (BTU/Therm)	100,000	100,000	
Equivalent Building Heat Usage (MMBTUs)	3,318	3,318	
Gas Cost (\$/Therm)	\$1.08	\$1.08	
ENERGY SAVINGS CALCULATIONS			
ECM RESULTS	EXISTING	PROPOSED	SAVINGS
Natural Gas Usage (Therms)	47,405	36,069	11,336
Energy Cost (\$)	\$51,197	\$38,955	\$12,243
COMMENTS:	Boiler Efficiency Based on age of boiler		

Energy Savings Summary:

ECM #4 - ENERGY SAVINGS SUMMARY	
Installation Cost (\$):	\$199,000
NJ Smart Start Equipment Incentive (\$):	\$5,250
Net Installation Cost (\$):	\$193,750
Maintenance Savings (\$/Yr):	\$0
Energy Savings (\$/Yr):	\$12,243
Total Yearly Savings (\$/Yr):	\$12,243
Estimated ECM Lifetime (Yr):	25
Simple Payback	15.8
Simple Lifetime ROI	58.0%
Simple Lifetime Maintenance Savings	\$0
Simple Lifetime Savings	\$306,075
Internal Rate of Return (IRR)	4%
Net Present Value (NPV)	\$19,439.17

ECM #5: Split System Replacements

Description:

The PEER building has four (4) Trane Model RAUCC split system air conditioning only units which serve the main four air handling units for the building. The estimated existing unit efficiencies are 9.8 EER. These split system units have surpassed their ASHRAE service life expectancy of 15 years. Replacing these units with newer more efficient units would result in significant energy savings.

The units currently installed have lower efficiencies compared to modern high-efficiency units. New units provide higher full load and part load efficiencies due to advances in inverter motor technologies, higher efficiency refrigerants such as R410A which would be used in place of R22 that is currently used in the units.

This ECM includes replacement of this older condensing units and evaporator coils within each air handler with a new higher efficiency condensing units and R-410A coils. It is recommended to fully evaluate the capacity needed for the new split system units prior to moving forward with this ECM. A summary of the unit replacements for this ECM can be found in the table below:

IMPLEMENTATION SUMMARY					
ECM INPUTS	SERVICE FOR	NUMBER OF UNITS	COOLING CAPACITY, BTU/HR	TOTAL CAPACITY, TONS	REPLACE UNIT WITH
SS	Split System	1	300,000	25.0	Trane RAUJ
SS	Split System	1	480,000	40.0	Trane RAUJ
SS	Split System	1	480,000	40.0	Trane RAUJ
SS	Split System	1	480,000	40.0	Trane RAUJ
Total		4	1,740,000	145.0	

The high-efficiency split system used as the basis for the calculation is a Trane Model RAUJ. The unit pricing and install costs were estimated based on current rates quotes and labor rates. The payback may change based on actual unit pricing and installed costs if the ECM is implemented.

Energy Savings Calculations:

Cooling Energy Savings:

Seasonal energy consumption of the air conditioners at the cooling mode is calculated with the equation below:

$$\text{Energy Savings, kWh} = \text{Cooling Capacity, } \frac{\text{BTU}}{\text{Hr}} \times \left(\frac{1}{\text{SEER}_{\text{Old}}} - \frac{1}{\text{SEER}_{\text{New}}} \right) \times \frac{\text{Operation Hours}}{1000 \frac{\text{W}}{\text{kWh}}}$$

$$\text{Demand Savings, kW} = \frac{\text{Energy Savings (kWh)}}{\text{Hours of Cooling}}$$

$$\text{Cooling Cost Savings} = \text{Energy Savings, kWh} \times \text{Cost of Electricity} \left(\frac{\$}{\text{kWh}} \right)$$

ENERGY SAVINGS CALCULATIONS							
ECM INPUTS	EXISTING COOLING CAPACITY, BTU/Hr	ANNUAL COOLING HOURS	EXISTING UNIT EER	NEW UNIT EER	# OF UNITS	ENERGY SAVINGS kWh	DEMAND SAVINGS kW
SS	300,000	1,200	9.8	12.1	1	6,983	5.8
SS	480,000	1,200	9.8	11.7	1	9,545	8.0
SS	480,000	1,200	9.8	11.7	1	9,545	8.0
SS	480,000	1,200	9.8	11.7	1	9,545	8.0
Total					4	35,617	29.7

Project Cost, Incentives and Maintenance Savings

From the NJ Smart Start[®] Program appendix, the replacement of split system AC units and unitary systems with high efficiency AC systems falls under the category “Unitary HVAC Split System” and warrants an incentive based on efficiency (EER/SEER). The program incentives are calculated as follows:

$$\text{SmartStart}^{\text{®}} \text{ Incentive} = (\text{CoolingTons} \times \$/\text{Ton Incentive})$$

AC UNITS REBATE SUMMARY				
UNIT DESCRIPTION	UNIT EFFICIENCY	REBATE \$/TON	PROPOSED CAPACITY TONS	TOTAL REBATE \$
≥20 to 30 tons	10.5 EER	79	25	\$1,975
> 30 to < 63 tons	9.5 EER	40	120	\$4,800
TOTAL			145	\$6,775

Summary of cost, savings and payback for this ECM is below.

COST & SAVINGS SUMMARY							
ECM INPUTS	INSTALLED COST	# OF UNITS	TOTAL COST	REBATES	NET COST	ENERGY SAVINGS	PAY BACK YEARS
SS	\$25,800	1	\$25,800	\$1,975	\$23,825	\$810	29.4
SS	\$40,400	1	\$40,400	\$1,600	\$38,800	\$1,107	35.0
SS	\$40,400	1	\$40,400	\$1,600	\$38,800	\$1,107	35.0
SS	\$40,400	1	\$40,400	\$1,600	\$38,800	\$1,107	35.0
Total	\$147,000	4	\$147,000	\$6,775	\$140,225	\$4,132	33.9

Energy Savings Summary:

ECM #5 - ENERGY SAVINGS SUMMARY	
Installation Cost (\$):	\$147,000
NJ Smart Start Equipment Incentive (\$):	\$6,775
Net Installation Cost (\$):	\$140,225
Maintenance Savings (\$/Yr):	\$0
Energy Savings (\$/Yr):	\$4,132
Total Yearly Savings (\$/Yr):	\$4,132
Estimated ECM Lifetime (Yr):	15
Simple Payback	33.9
Simple Lifetime ROI	-55.8%
Simple Lifetime Maintenance Savings	\$0
Simple Lifetime Savings	\$61,980
Internal Rate of Return (IRR)	-9%
Net Present Value (NPV)	(\$90,897.45)

ECM #6: Install NEMA Premium® Efficiency Motors

Description:

The improved efficiency of the NEMA Premium® efficient motors is primarily due to better designs with use of better materials to reduce losses. Surprisingly, the electricity used to power a motor represents 95 % of its total lifetime operating cost. Because many motors operate continuously 24 hours a day, even small increases in efficiency can yield substantial energy and dollar savings.

The electric motors driving three hot water pumps (P-1 and P-2) are candidates for replacing with premium efficiency motors. These standard efficiency motors run considerable amount of time over a year.

This energy conservation measure replaces existing inefficient electric motors with NEMA Premium® efficiency motors. NEMA Premium® is the most efficient motor designation in the marketplace today. (Note: There are currently no NJ OCE incentives for premium efficiency motors.)

IMPLEMENTATION SUMMARY					
EQMT ID	FUNCTION	MOTOR HP	HOURS OF OPERATION	EXISTING EFFICIENCY	NEMA PREMIUM EFFICIENCY
P-1	Heating Hot Water Pump	3	2,745	78.5%	89.5%
P-2	Heating Hot Water Pump	3	2,745	78.5%	89.5%

Energy Savings Calculations:

$$\text{Electric usage, kWh} = \frac{\text{HP} \times \text{LF} \times 0.746 \times \text{Hours of Operation}}{\text{Motor Efficiency}}$$

where, HP = Motor Nameplate Horsepower Rating

LF = Load Factor

Motor Efficiency = Motor Nameplate Efficiency

$$\text{Electric Usage Savings, kWh} = \text{Electric Usage}_{\text{Existing}} - \text{Electric Usage}_{\text{Proposed}}$$

$$\text{Electric Usage Savings, kWh} = \text{Electric Usage}_{\text{Existing}} - \text{Electric Usage}_{\text{Proposed}}$$

$$\text{Electric cost savings} = \text{Electric Usage Savings} \times \text{Electric Rate} \left(\frac{\$}{\text{kWh}} \right)$$

The calculations were carried out and the results are tabulated in the table below:

PREMIUM EFFICIENCY MOTOR CALCULATIONS								
EQMT ID	QTY	MOTOR HP	LOAD FACTOR	EXISTING EFFICIENCY	PROPOSED EFFICIENCY	POWER SAVINGS kW	ENERGY SAVINGS kWh	COST SAVINGS
P-1	1	3	75%	78.5%	89.5%	0.26	725	\$84
P-2	1	3	75%	78.5%	89.5%	0.26	725	\$84
TOTAL						0.5	1,450	\$168

Equipment Cost

The following table outlines the summary of motor replacement costs:

MOTOR REPLACEMENT SUMMARY						
EQMT ID	MOTOR POWER HP	INSTALLED COST	SMART START INCENTIVE	NET COST	TOTAL SAVINGS	SIMPLE PAYBACK
P-1	3	\$1,092	\$0	\$1,092	\$84	13.0
P-2	3	\$1,092	\$0	\$1,092	\$84	13.0
TOTAL		\$2,184	\$0	\$2,184	\$168	13.0

Energy Savings Summary:

ECM #6 - ENERGY SAVINGS SUMMARY	
Installation Cost (\$):	\$2,184
NJ Smart Start Equipment Incentive (\$):	\$0
Net Installation Cost (\$):	\$2,184
Maintenance Savings (\$/Yr):	\$0
Energy Savings (\$/Yr):	\$168
Total Yearly Savings (\$/Yr):	\$168
Estimated ECM Lifetime (Yr):	18
Simple Payback	13.0
Simple Lifetime ROI	38.5%
Simple Lifetime Maintenance Savings	0
Simple Lifetime Savings	\$3,024
Internal Rate of Return (IRR)	4%
Net Present Value (NPV)	\$126.59

ECM #8: Domestic Hot Water Heater Upgrade

Description:

The domestic water for this facility (except for the kitchen) is produced by an A. O. Smith Model ECT 40P 200 electric storage tank water heater with a capacity of 40 gallons and an input capacity of 9 kW (2 @ 4.5 kW). Maintaining an electric hot water heater for a building this size is not cost effective and upgrading to a natural gas-fired unit may incur significant cost savings.

This ECM will replace this electric domestic water heater with a natural gas-fired 0.70 energy factor A.O. Smith Effex Series water heater. This unit will be replaced with a 40 MBH, 40 gallon tank water heater. (Before proceeding with installation of aforementioned system, Concord Engineering suggests consulting a mechanical engineer to evaluate the system fully.)

Energy Savings Calculations:

DOM. HOT WATER HEATER CALCULATIONS			
ECM INPUTS	EXISTING	PROPOSED	SAVINGS
ECM INPUTS	Existing Electric Hot Water Heaters	High Efficiency Heaters	
Building Type	Office		
Building Square-foot	48,500	48,500	
Domestic Water Usage, kBtu	24,250.00	24,250.00	
DHW Heating Fuel Type	Electric	Gas	
Heating Efficiency	98%	95%	-3%
Total Usage (kBtu)	24,745	25,526	-781
Electric Cost (\$/kWh)	\$ 0.116	\$ -	
Nat Gas Cost (\$/Therm)		\$ 1.080	
ENERGY SAVINGS CALCULATIONS			
ECM RESULTS	EXISTING	PROPOSED	SAVINGS
Electric Usage (kWh)	7,250	0	7,250
Natural Gas Usage (Therms)	0	255	-255
Energy Cost (\$)	\$841	\$276	\$565
COMMENTS:	Savings are based on Energy Information Administration Commercial Building Energy Consumption Survey 2003 Information		

Energy Density for “Other” type building = 0.5 kBtu / SF / year

$$DHW \text{ Heat Usage} = \text{Energy Density} \left(\frac{\text{kBtu yr}}{\text{SF}} \right) \times \text{Building Square Footage (SF)}$$

$$DHW \text{ Total Usage} = \frac{\text{Dom HW Heat Cons. (Btu)}}{\text{Heating Eff. (\%)} \times \text{Fuel Heat Value} \left(\frac{\text{BTU}}{\text{Fuel Unit}} \right)}$$

$$\text{Energy Cost} = \text{Heating Fuel Usage (Fuel Units)} \times \text{Ave Fuel Cost} \left(\frac{\$}{\text{Fuel Unit}} \right)$$

Energy Savings Summary:

ECM #8 - ENERGY SAVINGS SUMMARY	
Installation Cost (\$):	\$11,466
NJ Smart Start Equipment Incentive (\$):	\$50
Net Installation Cost (\$):	\$11,416
Maintenance Savings (\$/Yr):	\$0
Energy Savings (\$/Yr):	\$522
Total Yearly Savings (\$/Yr):	\$522
Estimated ECM Lifetime (Yr):	12
Simple Payback	21.9
Simple Lifetime ROI	-45.1%
Simple Lifetime Maintenance Savings	\$0
Simple Lifetime Savings	\$6,264
Internal Rate of Return (IRR)	-8%
Net Present Value (NPV)	(\$6,220.01)

REM #1: 342.96 kW Solar System**Description:**

The P.E.E.R. building and garage has available roof space that could accommodate a significant amount of solar generation. Based on the available areas a 342.96 kilowatt solar array could be installed. The array will produce approximately 411,719 kilowatt-hours annually that will reduce the overall electric usage of the facility by 23.22%.

Energy Savings Calculations:

See **Renewable / Distributed Energy Measures Calculations Appendix** for detailed financial summary and proposed solar layout areas. Financial results in table below are based on 100% financing of the system over a fifteen year period.

Energy Savings Summary:

REM #1 - ENERGY SAVINGS SUMMARY	
System Size (KW_{DC}):	342.96
Electric Generation (KWH/Yr):	411,719
Installation Cost (\$):	\$1,631,135
SREC Revenue (\$/Yr):	\$62,377
Energy Savings (\$/Yr):	\$49,406
Total Yearly Savings (\$/Yr):	\$111,783
ECM Analysis Period (Yr):	15
Simple Payback (Yrs):	14.6
Analysis Period Electric Savings (\$):	\$918,903
Analysis Period SREC Revenue (\$):	\$903,605
Net Present Value (NPV)	(\$492,574.78)

V. ADDITIONAL RECOMMENDATIONS

The following recommendations include no cost/low cost measures, Operation & Maintenance (O&M) items, and water conservation measures. While facility staff may already perform some of these items, they are stated to remind the owner of the energy savings benefit of continual performance. These measures are typically 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.
- F. Replace any old CRT Monitors with LED/LCD Type Monitors, which can draw as much as a quarter the power of an equivalent CRT monitor.
- G. Ensure outside air dampers are functioning properly and only open during occupied mode.

APPENDIX A

ECM COST & SAVINGS BREAKDOWN

CONCORD ENGINEERING GROUP

Ocean County - P.E.E.R. Building & Parking Garage

ECM ENERGY AND FINANCIAL COSTS AND SAVINGS SUMMARY

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)	(\$)	(\$)
ECM #1	Lighting Upgrade - General	\$33,330	\$32,640	\$11,170	\$54,800	\$6,184	\$0	\$6,184	15	\$92,760	\$0	69.3%	8.9	7.44%	\$19,024.19
ECM #2	Lighting Upgrade - Exterior & Garage	\$144,090	\$140,165	\$35,728	\$248,527	\$103,848	\$0	\$103,848	15	\$1,557,720	\$0	526.8%	2.4	41.56%	\$991,203.68
ECM #3	Lighting Controls Upgrade	\$7,700	\$3,400	\$655	\$10,445	\$1,126	\$0	\$1,126	15	\$16,890	\$0	61.7%	9.3	6.71%	\$2,997.11
ECM #4	Boiler Upgrade	\$95,000	\$104,000	\$5,250	\$193,750	\$12,243	\$0	\$12,243	25	\$306,075	\$0	58.0%	15.8	3.88%	\$19,439.17
ECM #5	Split System Replacements	\$93,500	\$53,500	\$6,775	\$140,225	\$4,132	\$0	\$4,132	15	\$61,980	\$0	-55.8%	33.9	-8.81%	(\$90,897.45)
ECM #6	NEMA Premium Motor Replacements	\$1,500	\$684	\$0	\$2,184	\$168	\$0	\$168	18	\$3,024	\$0	38.5%	13.0	3.68%	\$126.59
ECM #7	Domestic Hot Water Heater Upgrade	\$5,755	\$5,711	\$50	\$11,416	\$522	\$0	\$522	12	\$6,264	\$0	-45.1%	21.9	-8.21%	(\$6,220.01)
REM RENEWABLE ENERGY AND FINANCIAL COSTS AND SAVINGS SUMMARY															
REM #1	340 kW Solar Array	\$978,681	\$652,454	\$0	\$1,631,135	\$49,406	\$62,377	\$111,783	15	\$1,676,745	\$935,655	2.8%	14.6	0.35%	(\$296,676.80)

- 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 from July 1, 2013 to June 30, 2014:

Electric Chillers

Water-Cooled Chillers	\$16 - \$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 - \$450 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
A/C Economizing Controls	≤ 5 tons \$85/unit; >5 tons \$170/unit

Energy Efficiency must comply with ASHRAE 90.1-2007

Gas Heating

Gas Fired Boilers < 300 MBH	\$2.00 per MBH, but not less than \$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	\$400 per unit, AFUE ≥ 95%
Boiler Economizing Controls	\$1,200 - \$2,700
Low Intensity Infrared Heating	\$300 - \$500 per unit

Ground Source Heat Pumps

Closed Loop	\$450 per ton, EER \geq 16 \$600 per ton, EER \geq 18 \$750 per ton, EER \geq 20
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Energy Efficiency must comply with ASHRAE 90.1-2007

Variable Frequency Drives

Variable Air Volume	\$65 - \$155 per hp
Chilled-Water Pumps \geq 20 hp	\$60 per VFD rated hp
Rotary Screw Air Compressors \geq 25 hp	\$5,250 to \$12,500 per drive
Cooling Towers \geq 10 hp	\$60 per VFD rated hp
Boiler Fans \geq 5 HP	\$65 to \$155 per hp
Boiler Feed Water Pumps \geq 5 HP	\$60 to \$155 per hp
Commercial Kitchen Hood up to 50 HP	Retrofit \$55 – \$300 per hp New Hood \$55 - \$250 per 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

T-8 reduced Wattage (28w/25w 4', 1-4 lamps) Lamp & ballast replacement	\$10 per fixture
For retrofit of T-8 fixtures by permanent de-lamping & new reflectors (Electronic ballast replacement required)	\$15 per fixture
T-5 and T-8 High Bay Fixtures	\$16 - \$200 per fixture
Metal Halide w/Pulse Start Including Parking Lot (For fixtures \geq 150w)	\$25 per fixture
HID \geq 100w Replace with new induction fixture. (must be 30% less watts/fixture than HID system)	\$70 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

Prescriptive Lighting - LED

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 Stairwell and Passageway Luminaires	\$40 per fixture
LED Bollard Fixtures	\$50 per fixture
Luminaires for Ambient Lighting of Interior Commercial Spaces (1x4, 2x2, 2x4)	\$50 per fixture
LED Fuel Pump Canopy	\$100 per fixture
LED Screw-based & Pin-based (PAR, MR, BR, R) Standards (A-Style) and Decorative Lamps	\$10 per lamp for R/PAR20,MR/PAR16,Globe,Candelabra or Misc \$20 per lamp for R/BR/PAR 30, R/BR/PAR 38-40, A-Lamp
LED Refrigerator/Freezer case lighting replacement of fluorescent in medium and low temperature display case	\$30 per 4 foot \$42 per 5 foot \$65 per 6 foot
LED Retrofit Kits	To be evaluated through the customer measure path

Lighting Controls – Occupancy Sensors

Wall Mounted (Existing Facilities Only)	\$20 per control
Remote Mounted (Existing Facilities Only)	\$35 per control
Daylight Dimming Controls	\$45 per fixture controlled
Occupancy Based hi-low Dimming Control	\$35 per fixture controlled
Occupancy Sensor Remote Mounted	\$35 per control

Refrigeration Doors/Covers

Energy-Efficient Doors/Covers for Installation on Open Refrigerated Cases	\$100 per door
Aluminum Night Curtains for Installation on Open Refrigerated Cases	\$3.50 per linear foot

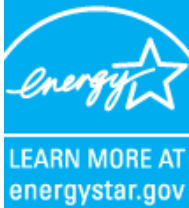
Refrigeration Controls

Door Heater Controls	\$50 per control
Electric Defrost Controls	\$50 per control
Evaporator Fan Controls	\$75 per control
Novelty Cooler Shutoff	\$50 per control

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 an IRR of at least 10%.

APPENDIX C



ENERGY STAR[®] Statement of Energy Performance

N/A

ENERGY STAR[®]
Score¹

PEER - Parking Garage

Primary Property Function: Parking
Gross Floor Area (ft²): 48,500
Built: 1992

For Year Ending: December 31, 2013
Date Generated: May 23, 2014

1. The ENERGY STAR score is a 1-100 assessment of a building's energy efficiency as compared with similar buildings nationwide, adjusting for climate and business activity.

Property & Contact Information

Property Address

PEER - Parking Garage
129 Hooper Avenue
Toms River, New Jersey 08753

Property Owner

Ocean County
239 Washington Street
Building #5
Toms River, NJ 08753
() -

Primary Contact

Joseph Meyers
239 Washington Street
Building #5
Toms River, NJ 08753
732-929-2039
JosephMeyers@co.ocean.nj.us

Property ID: 4046943

Energy Consumption and Energy Use Intensity (EUI)

Site EUI

129.4 kBtu/ft²

Annual Energy by Fuel

Natural Gas (kBtu)	4,919,875 (78%)
Electric - Grid (kBtu)	1,355,101 (22%)

National Median Comparison

National Median Site EUI ()	N/A
National Median Source EUI ()	N/A
% Diff from National Median Source EUI	N/A%

Source EUI

194.2 kBtu/ft²

Annual Emissions

Greenhouse Gas Emissions (Metric Tons CO ₂ e/year)	433
---	-----

Signature & Stamp of Verifying Professional

I _____ (Name) verify that the above information is true and correct to the best of my knowledge.

Signature: _____ Date: _____

Licensed Professional

,
() -



Professional Engineer Stamp
(if applicable)

APPENDIX D

MAJOR EQUIPMENT LIST

Concord Engineering Group

P.E.E.R. BUILDING

Split System Units

Tag	ACCU-1	ACCU-2	ACCU-3	ACCU-4
Unit Type	Split Air-Cooled Condensing Unit	Split Air-Cooled Condensing Unit	Split Air-Cooled Condensing Unit	Split Air-Cooled Condensing Unit
Qty	1	1	1	1
Location	Roof	Roof	Roof	Roof
Unit Served	AHU-1	AHU-2	AHU-3	AHU-4
Manufacturer	Trane	Trane	Trane	Trane
Model #	RAUCC254	RAUCC404	RAUCC404	RAUCC404
Serial #	J91K82192	J91K82193	J91K82194	J91K82195
Cooling Type	DX Coil	DX Coil	DX Coil	DX Coil
Cooling Capacity	25 Tons	40 Tons	40 Tons	40 Tons
Cooling Efficiency (SEER/EER)	11.1 EER	11.5 EER	11.5 EER	11.5 EER
Fuel	Electric	Electric	Electric	Electric
Approx Age	23	23	23	23
ASHRAE Service Life	20	20	20	20
Remaining Life	(3)	(3)	(3)	(3)
Comments				

Note:

"N/A" = Not Applicable.

"-" = Info Not Available

MAJOR EQUIPMENT LIST

Concord Engineering Group

P.E.E.R. BUILDING

AHUs

Tag	AHU-1	AHU-2	AHU-3	AHU-4
Unit Type	Split Air Handling Unit	Split Air Handling Unit	Split Air Handling Unit	Split Air Handling Unit
Qty	1	1	1	1
Location	Mechanical Room	Mechanical Room	Mechanical Room	Mechanical Room
Area Served				
Manufacturer	Trane Modular Climate Changer	Trane Modular Climate Changer	Trane Modular Climate Changer	Trane Modular Climate Changer
Model #	MCCA017	MCCA025	MCCA025	MCCA030
Serial #	K91M47455	K91L43671	K91L43675	K91L43679
Cooling Type	DX Coil	DX Coil	DX Coil	DX Coil
Cooling Capacity	288 MBH	450 MBH	450 MBH	465 MBH
Heating Type	HW Coil	HW Coil	HW Coil	HW Coil
Heating Capacity	81 MBH	108 MBH	108 MBH	108 MBH
Heating Efficiency	79% (Plant)	79% (Plant)	79% (Plant)	79% (Plant)
Supply Fan (HP)	10	15	15	15
Return Fan (HP)	3	5	3	5
Approx Age	23	23	23	23
ASHRAE Service Life	20	20	20	20
Remaining Life	(3)	(3)	(3)	(3)
Comments	VFD on Supply & Return Fans	VFD on Supply & Return Fans	VFD on Supply & Return Fans	VFD on Supply & Return Fans

Note:

"N/A" = Not Applicable.

"-" = Info Not Available

MAJOR EQUIPMENT LIST

Concord Engineering Group

P.E.E.R. BUILDING

Domestic Water Heaters

Tag	DHW-1	
Unit Type	Electric Storage Tank Water Heater	
Qty	1	
Location	Mechanical Room	
Area Served	Entire Facility (Except Kitchen)	
Manufacturer	A. O. Smith	
Model #	ECT 40P 200	
Serial #	1339A021071	
Size (Gallons)	40	
Input Capacity (MBH/KW)	9 kW (2 @ 4.5 kW)	
Recovery (Gal/Hr)	-	
Efficiency %	95%	
Fuel	Electric	
Approx Age	1	
ASHRAE Service Life	15	
Remaining Life	14	
Comments		

Note:

"N/A" = Not Applicable.

"-" = Info Not Available

MAJOR EQUIPMENT LIST

Concord Engineering Group

PEER BUILDING

Boilers

Tag	B-1
Unit Type	Cast Iron Sectional
Qty	1
Location	Boiler Room
Area Served	Entire Facility
Manufacturer	Weil-McLain
Model #	1088
Serial #	
Input Capacity	3,103 MBH
Rated Output Capacity	2,452 MBH
Approx. Efficiency %	79%
Fuel	Natural Gas
Approx Age	23
ASHRAE Service Life	30
Remaining Life	7
Comments	Power Flame Burner Model No. WCR2-GO-20B 1 HP Marathon Blower Motor

Note:

"N/A" = Not Applicable.

"-" = Info Not Available

MAJOR EQUIPMENT LIST

Concord Engineering Group

P.E.E.R. BUILDING

Pumps

Tag	P-1	P-2	P-3
Unit Type	Base Mounted End Suction Pump	Base Mounted End Suction Pump	Base Mounted End Suction Pump
Qty	1	1	1
Location	Mechanical Room	Mechanical Room	Mechanical Room
Area Served	Boiler Main Pump	Boiler Aux. Pump	Baseboard HHW Pump
Manufacturer	Bell & Gossett 1510	Bell & Gossett 1510	Bell & Gossett 1510
Model #	2BC 7.375 BF	2BC 7.375 BF	BF 8.25 1.25 BC
Serial #	1727418	" - "	C000339 D50
Horse Power	3	3	2
Flow	125 GPM @ 50' TDH	125 GPM @ 50' TDH	40GPM @ 70 TDH
Motor Info	U. S. Electric	U. S. Electric	A. O. Smith
Electrical Power	208-230/460	208-230/460	208-230/460
RPM	1730	1730	1745
Motor Efficiency %	78.5%	78.5%	84.0%
Approx Age	23	23	23
ASHRAE Service Life	20	20	20
Remaining Life	(3)	(3)	(3)
Comments			

Note:

"N/A" = Not Applicable.

" - " = Info Not Available

MAJOR EQUIPMENT LIST

Concord Engineering Group

P.E.E.R. BUILDING

Make-Up Air

Tag	MUA-1		
Unit Type	Rooftop Unit		
Qty	1		
Location	Roof		
Area Served	Kitchen		
Manufacturer	Trane		
Model #	"_"		
Serial #	"_"		
Heating Type	Heat Exchanger		
Heating Input (MBH)	112		
Heating Output (MBH)	89.6		
Efficiency	70% (Existing Condition)		
Fuel	Natural Gas		
Approx Age	23		
ASHRAE Service Life	20		
Remaining Life	(3)		
Comments	Interlocked with Kitchen Hood Fan		

Note:

"N/A" = Not Applicable.

"_" = Info Not Available

APPENDIX E

CEG Project #: 1C14065
 Facility Name: P.E.E.R. & Parking Garage
 Address: 120 Hunter Avenue
 City, State, Zip: Juneau, AK 99801

	Location	Average Burn Hours	EXISTING FIXTURES					Total kW	Usage kWh/Yr	Work Description	PROPOSED FIXTURE RETIREMENT					Total kW	Usage kWh/Yr	RETIREMENT ENERGY SAVINGS			PROPOSED LIGHTING CONTROLS				LIGHTING RETIREMENT COSTS				LIGHTING CONTROLS COSTS					
			Lamps per Fixture	Watts per Fixture	Qty of Fixtures	Total kW	Usage kWh/Yr				Lamps per Fixture	Watts per Fixture	Qty of Fixtures	Total kW	Usage kWh/Yr			Energy Savings, kW	Energy Savings, kWh	Energy Savings, \$	Control Ref.	Controls Description	Qty of Controls	Hours Reduction %	Energy Savings, kWh	Energy Savings, \$	Material	Total Labor	Total All	Rebate Estimate	Simple Payback	Total Materials	Total Labor	Total All
3rd Floor																																		
900	Conf. Room A	3000	Recessed Down Light, 2 Lamp, 15w PL	2	36	20	0.72	2,160	Existing to Remain	No Change	2	36	0	0.72	2,160	0.00	0	\$0	6	Dual Technology Occupancy Sensor - Switch Mnt.	1	20.0%	432	\$52	\$0.00	\$0.00	\$0.00	\$0.00	-	\$50.00	\$50.00	\$100.00	\$20.00	1.54
222.22	Corridor	3600	2x4, 2 Lamp, 32w TR, Elec. Ballast, Recessed Mnt., Parabolic Lens	2	62	6	0.37	1,339	Bypass Ballast, Relamp	4' Aladdin 18w LED, LLT-X-TR, Y-SW-120-Z-S-N	2	36	6	0.22	778	0.16	562	\$67	0	No New Controls	0	0.0%	0	\$0	\$360.00	\$360.00	\$720.00	\$120.00	8.90	\$0.00	\$0.00	\$0.00	FALSE	-
227.21	Corridor	3600	2x2, 2 Lamp, 17w U-TR, Elec. Ballast, Recessed Mnt., Parabolic Lens	2	62	1	0.06	223	Remove Fixture; Install New Fixture	1xtonia LED 2x2	1	31	1	0.03	112	0.03	112	\$13	0	No New Controls	0	0.0%	0	\$0	\$120.00	\$40.00	\$160.00	\$20.00	10.45	\$0.00	\$0.00	\$0.00	FALSE	-
902	Men's Restroom	2600	100w R40 Flood	1	100	1	0.10	260	Relamp	12w LED R40	1	12	1	0.01	31	0.09	229	\$27	6	Dual Technology Occupancy Sensor - Switch Mnt.	0.5	20.0%	6	\$1	\$20.00	\$20.00	\$40.00	\$10.00	1.09	\$25.00	\$25.00	\$50.00	FALSE	66.77
221.21	Men's Restroom	2600	1x4, 2 Lamp, 32w TR, Elec. Ballast, Recessed Mnt., Prismatic Lens	2	62	1	0.06	161	Bypass Ballast, Relamp	4' Aladdin 18w LED, LLT-X-TR, Y-SW-120-Z-S-N	2	36	1	0.04	94	0.03	68	\$8	6	Dual Technology Occupancy Sensor - Switch Mnt.	0.5	20.0%	19	\$2	\$60.00	\$60.00	\$120.00	\$20.00	12.33	\$25.00	\$25.00	\$50.00	FALSE	22.26
902	Women's Restroom	2600	100w R40 Flood	1	100	1	0.10	260	Relamp	12w LED R40	1	12	1	0.01	31	0.09	229	\$27	6	Dual Technology Occupancy Sensor - Switch Mnt.	0.5	20.0%	6	\$1	\$20.00	\$20.00	\$40.00	\$10.00	1.09	\$25.00	\$25.00	\$50.00	FALSE	66.77
221.21	Women's Restroom	2600	1x4, 2 Lamp, 32w TR, Elec. Ballast, Recessed Mnt., Prismatic Lens	2	62	1	0.06	161	Bypass Ballast, Relamp	4' Aladdin 18w LED, LLT-X-TR, Y-SW-120-Z-S-N	2	36	1	0.04	94	0.03	68	\$8	6	Dual Technology Occupancy Sensor - Switch Mnt.	0.5	20.0%	19	\$2	\$60.00	\$60.00	\$120.00	\$20.00	12.33	\$25.00	\$25.00	\$50.00	FALSE	22.26
Engineering Dept.																																		
222.22	Receptionist	3000	2x4, 2 Lamp, 32w TR, Elec. Ballast, Recessed Mnt., Parabolic Lens	2	62	6	0.37	1,116	Bypass Ballast, Relamp	4' Aladdin 18w LED, LLT-X-TR, Y-SW-120-Z-S-N	2	36	6	0.22	648	0.16	468	\$56	0	No New Controls	0	0.0%	0	\$0	\$360.00	\$360.00	\$720.00	\$120.00	10.68	\$0.00	\$0.00	\$0.00	FALSE	-
222.22	Conf. Room B	3000	2x4, 2 Lamp, 32w TR, Elec. Ballast, Recessed Mnt., Parabolic Lens	2	62	2	0.12	372	Bypass Ballast, Relamp	4' Aladdin 18w LED, LLT-X-TR, Y-SW-120-Z-S-N	2	36	2	0.07	216	0.05	156	\$19	6	Dual Technology Occupancy Sensor - Switch Mnt.	1	20.0%	43	\$5	\$120.00	\$120.00	\$240.00	\$40.00	10.68	\$50.00	\$50.00	\$100.00	FALSE	19.29
222.22	Open Office - West	3000	2x4, 2 Lamp, 32w TR, Elec. Ballast, Recessed Mnt., Parabolic Lens	2	62	32	1.98	5,952	Bypass Ballast, Relamp	4' Aladdin 18w LED, LLT-X-TR, Y-SW-120-Z-S-N	2	36	32	1.15	3,456	0.83	2,496	\$300	5	Dual Technology Occupancy Sensor - Remote Mnt.	3	20.0%	691	\$83	\$1,920.00	\$1,920.00	\$3,840.00	\$640.00	10.68	\$600.00	\$150.00	\$750.00	\$35.00	8.62
227.221	Open Office - West	3000	2x2, 2 Lamp, 17w TR, Elec. Ballast, Recessed Mnt., Parabolic Lens	2	34	1	0.03	102	Existing to Remain	No Change	2	34	0	0.03	102	0.00	0	\$0	0	No New Controls	0	0.0%	0	\$0	\$0.00	\$0.00	\$0.00	\$0.00	-	\$0.00	\$0.00	\$0.00	FALSE	-
222.22	Copy Files	3000	2x4, 2 Lamp, 32w TR, Elec. Ballast, Recessed Mnt., Parabolic Lens	2	62	3	0.19	558	Bypass Ballast, Relamp	4' Aladdin 18w LED, LLT-X-TR, Y-SW-120-Z-S-N	2	36	3	0.11	324	0.08	234	\$28	6	Dual Technology Occupancy Sensor - Switch Mnt.	1	20.0%	65	\$8	\$180.00	\$180.00	\$360.00	\$60.00	10.68	\$50.00	\$50.00	\$100.00	\$20.00	10.29
222.22	Side Offices (3) - North Corner	3000	2x4, 2 Lamp, 32w TR, Elec. Ballast, Recessed Mnt., Parabolic Lens	2	62	13	0.81	2,418	Bypass Ballast, Relamp	4' Aladdin 18w LED, LLT-X-TR, Y-SW-120-Z-S-N	2	36	13	0.47	1,404	0.34	1,014	\$122	6	Dual Technology Occupancy Sensor - Switch Mnt.	3	20.0%	281	\$34	\$780.00	\$780.00	\$1,560.00	\$260.00	10.68	\$150.00	\$150.00	\$300.00	\$20.00	8.31
222.22	Conf. Room C	3000	2x4, 2 Lamp, 32w TR, Elec. Ballast, Recessed Mnt., Parabolic Lens	2	62	6	0.37	1,116	Bypass Ballast, Relamp	4' Aladdin 18w LED, LLT-X-TR, Y-SW-120-Z-S-N	2	36	6	0.22	648	0.16	468	\$56	6	Dual Technology Occupancy Sensor - Switch Mnt.	1	20.0%	130	\$16	\$360.00	\$360.00	\$720.00	\$120.00	10.68	\$50.00	\$50.00	\$100.00	\$20.00	5.14
227.221	Kitchenette	3000	2x2, 2 Lamp, 17w TR, Elec. Ballast, Recessed Mnt., Parabolic Lens	2	34	3	0.10	306	Existing to Remain	No Change	2	34	0	0.10	306	0.00	0	\$0	0	No New Controls	0	0.0%	0	\$0	\$0.00	\$0.00	\$0.00	\$0.00	-	\$0.00	\$0.00	\$0.00	FALSE	-
221.21	Men's Restroom	2600	1x4, 2 Lamp, 32w TR, Elec. Ballast, Recessed Mnt., Prismatic Lens	2	62	2	0.12	322	Bypass Ballast, Relamp	4' Aladdin 18w LED, LLT-X-TR, Y-SW-120-Z-S-N	2	36	2	0.07	187	0.05	135	\$16	6	Dual Technology Occupancy Sensor - Switch Mnt.	1	20.0%	37	\$4	\$120.00	\$120.00	\$240.00	\$40.00	12.33	\$50.00	\$50.00	\$100.00	FALSE	22.26
221.21	Women's Restroom	2600	1x4, 2 Lamp, 32w TR, Elec. Ballast, Recessed Mnt., Prismatic Lens	2	62	2	0.12	322	Bypass Ballast, Relamp	4' Aladdin 18w LED, LLT-X-TR, Y-SW-120-Z-S-N	2	36	2	0.07	187	0.05	135	\$16	6	Dual Technology Occupancy Sensor - Switch Mnt.	1	20.0%	37	\$4	\$120.00	\$120.00	\$240.00	\$40.00	12.33	\$50.00	\$50.00	\$100.00	FALSE	22.26
222.21	Open Office - East Corner	3000	2x4, 2 Lamp, 32w TR, Elec. Ballast, Recessed Mnt., Prismatic Lens	2	62	28	1.74	5,208	Bypass Ballast, Relamp	4' Aladdin 18w LED, LLT-X-TR, Y-SW-120-Z-S-N	2	36	28	1.01	3,024	0.73	2,184	\$262	5	Dual Technology Occupancy Sensor - Remote Mnt.	3	20.0%	605	\$73	\$1,680.00	\$1,680.00	\$3,360.00	\$560.00	10.68	\$600.00	\$150.00	\$750.00	\$35.00	9.85
227.221	Open Office - East Corner	3000	2x2, 2 Lamp, 17w TR, Elec. Ballast, Recessed Mnt., Parabolic Lens	2	34	2	0.07	204	Existing to Remain	No Change	2	34	0	0.07	204	0.00	0	\$0	0	No New Controls	0	0.0%	0	\$0	\$0.00	\$0.00	\$0.00	\$0.00	-	\$0.00	\$0.00	\$0.00	FALSE	-
222.22	Corner Office - East	3000	2x4, 2 Lamp, 32w TR, Elec. Ballast, Recessed Mnt., Parabolic Lens	2	62	4	0.25	744	Bypass Ballast, Relamp	4' Aladdin 18w LED, LLT-X-TR, Y-SW-120-Z-S-N	2	36	4	0.14	432	0.10	312	\$37	6	Dual Technology Occupancy Sensor - Switch Mnt.	1	20.0%	86	\$10	\$240.00	\$240.00	\$480.00	\$80.00	10.68	\$50.00	\$50.00	\$100.00	\$20.00	7.72
222.22	File Room	3000	2x4, 2 Lamp, 32w TR, Elec. Ballast, Recessed Mnt., Parabolic Lens	2	62	6	0.37	1,116	Bypass Ballast, Relamp	4' Aladdin 18w LED, LLT-X-TR, Y-SW-120-Z-S-N	2	36	6	0.22	648	0.16	468	\$56	6	Dual Technology Occupancy Sensor - Switch Mnt.	0.5	20.0%	130	\$16	\$360.00	\$360.00	\$720.00	\$120.00	10.68	\$25.00	\$25.00	\$50.00	\$20.00	1.93
227.221	File Room	3000	2x2, 2 Lamp, 17w TR, Elec. Ballast, Recessed Mnt., Parabolic Lens	2	34	3	0.10	306	Existing to Remain	No Change	2	34	0	0.10	306	0.00	0	\$0	6	Dual Technology Occupancy Sensor - Switch Mnt.	0.5	20.0%	61	\$7	\$0.00	\$0.00	\$0.00	\$0.00	-	\$25.00	\$25.00	\$50.00	FALSE	6.81
222.22	Open Office - South	3000	2x4, 2 Lamp, 32w TR, Elec. Ballast, Recessed Mnt., Parabolic Lens	2	62	25	1.55	4,650	Bypass Ballast, Relamp	4' Aladdin 18w LED, LLT-X-TR, Y-SW-120-Z-S-N	2	36	25	0.90	2,700	0.65	1,950	\$234	5	Dual Technology Occupancy Sensor - Remote Mnt.	3	20.0%	540	\$65	\$1,500.00	\$1,500.00	\$3,000.00	\$500.00	10.68	\$600.00	\$150.00	\$750.00	\$35.00	11.03
222.22	Print Room	3000	2x4, 2 Lamp, 32w TR, Elec. Ballast, Recessed Mnt., Parabolic Lens	2	62	2	0.12	372	Bypass Ballast, Relamp	4' Aladdin 18w LED, LLT-X-TR, Y-SW-120-Z-S-N	2	36	2	0.07	216	0.05	156	\$19	6	Dual Technology Occupancy Sensor - Switch Mnt.	1	20.0%	43	\$5	\$120.00	\$120.00	\$240.00	\$40.00	10.68	\$50.00	\$50.00	\$100.00	FALSE	19.29
222.22	Corner Office - South	3000	2x4, 2 Lamp, 32w TR, Elec. Ballast, Recessed Mnt., Parabolic Lens	2	62	11	0.68	2,046	Bypass Ballast, Relamp	4' Aladdin 18w LED, LLT-X-TR, Y-SW-120-Z-S-N	2	36	11	0.40	1,188	0.29	858	\$103	6	Dual Technology Occupancy Sensor - Switch Mnt.	1	20.0%	238	\$29	\$660.00	\$660.00	\$1,320.00	\$220.00	10.68	\$50.00	\$50.00	\$100.00	\$20.00	2.81
2nd Floor																																		
222.22	Lobby	3600	2x4, 2 Lamp, 32w TR, Elec. Ballast, Recessed Mnt., Parabolic Lens	2	62	6	0.37	1,339	Bypass Ballast, Relamp	4' Aladdin 18w LED, LLT-X-TR, Y-SW-120-Z-S-N	2	36	6	0.22	778	0.16	562	\$67	0	No New Controls	0	0.0%	0	\$0	\$360.00	\$360.00	\$720.00	\$120.00	8.90	\$0.00	\$0.00	\$0.00	FALSE	-
227.221	Lobby	3600	2x2, 2 Lamp, 17w TR, Elec. Ballast, Recessed Mnt., Parabolic Lens	2	34	6	0.20	734	Existing to Remain	No Change	2	34	0	0.20	734	0.00	0	\$0	0	No New Controls	0	0.0%	0	\$0	\$0.00	\$0.00	\$0.00	\$0.00	-	\$0.00	\$0.00	\$0.00	FALSE	-
902	Men's Restroom	2600	100w R40 Flood	1	100	1	0.10	260	Relamp	12w LED R40	1	12	1	0.01	31	0.09	229	\$27	6	Dual Technology Occupancy Sensor - Switch Mnt.	0.5	20.0%	6	\$1	\$20.00	\$20.00	\$40.00	\$10.00	1.09	\$25.00	\$25.00	\$50.00	FALSE	66.77

EXISTING FEATURES																								
	Location	Average Hours Per Year	Description	Lamps per Fixture	Watts per Fixture	Qty of Fixtures	Total kWh	Usage kWh/yr	Work Description	Equipment Description	Lamps per Fixture	Watts per Fixture	Qty of Fixtures	Total kWh	Usage kWh/yr	Energy Savings kWh	Energy Savings kWh	Energy Savings, %	Control Ref	Controls Description	Qty of Controls	Rate Reduction %	Energy Savings kWh	Energy Savings, %
221.21	Men's Restroom	2600	1x4, 2 Lamp, 32w T8, Elec. Ballast, Receased Mnt., Prismatic Lens	2	62	1	0.06	161	Bypass Ballast, Relamp	4' Alledia 18w LED, LLT-X-T8, Y-SW-120-Z-S-N	2	36	1	0.04	94	0.03	68	\$8	6	Dual Technology Occupancy Sensor - Switch Mnt.	0.5	20.0%	19	\$2
902	Women's Restroom	2600	100w R40 Flood	1	100	1	0.10	260	Relamp	12w LED R40	1	12	1	0.01	31	0.09	229	\$27	6	Dual Technology Occupancy Sensor - Switch Mnt.	0.5	20.0%	6	\$1
221.21	Women's Restroom	2600	1x4, 2 Lamp, 32w T8, Elec. Ballast, Receased Mnt., Prismatic Lens	2	62	1	0.06	161	Bypass Ballast, Relamp	4' Alledia 18w LED, LLT-X-T8, Y-SW-120-Z-S-N	2	36	1	0.04	94	0.03	68	\$8	6	Dual Technology Occupancy Sensor - Switch Mnt.	0.5	20.0%	19	\$2
Road Dept																								
222.22	Receptionist	3000	2x4, 2 Lamp, 32w T8, Elec. Ballast, Receased Mnt., Parabolic Lens	2	62	2	0.12	372	Bypass Ballast, Relamp	4' Alledia 18w LED, LLT-X-T8, Y-SW-120-Z-S-N	2	36	2	0.07	216	0.05	156	\$19	0	No New Controls	0	0.0%	0	\$0
222.22	Reception Desk/Office	3000	2x4, 2 Lamp, 32w T8, Elec. Ballast, Receased Mnt., Parabolic Lens	2	62	6	0.37	1,116	Bypass Ballast, Relamp	4' Alledia 18w LED, LLT-X-T8, Y-SW-120-Z-S-N	2	36	6	0.22	648	0.16	468	\$56	0	No New Controls	0	0.0%	0	\$0
222.22	Conf. Room	3000	2x4, 2 Lamp, 32w T8, Elec. Ballast, Receased Mnt., Parabolic Lens	2	62	4	0.25	744	Bypass Ballast, Relamp	4' Alledia 18w LED, LLT-X-T8, Y-SW-120-Z-S-N	2	36	4	0.14	432	0.10	312	\$37	6	Dual Technology Occupancy Sensor - Switch Mnt.	1	20.0%	86	\$10
222.22	Open Office - West	3000	2x4, 2 Lamp, 32w T8, Elec. Ballast, Receased Mnt., Parabolic Lens	2	62	12	0.74	2,332	Bypass Ballast, Relamp	4' Alledia 18w LED, LLT-X-T8, Y-SW-120-Z-S-N	2	36	12	0.43	1,296	0.31	936	\$112	5	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	259	\$31
222.22	Corridor	3000	2x4, 2 Lamp, 32w T8, Elec. Ballast, Receased Mnt., Parabolic Lens	2	62	7	0.43	1,562	Bypass Ballast, Relamp	4' Alledia 18w LED, LLT-X-T8, Y-SW-120-Z-S-N	2	36	7	0.25	907	0.18	655	\$79	0	No New Controls	0	0.0%	0	\$0
222.22	Side Offices (3) - North Corner	3000	2x4, 2 Lamp, 32w T8, Elec. Ballast, Receased Mnt., Parabolic Lens	2	62	13	0.81	2,418	Bypass Ballast, Relamp	4' Alledia 18w LED, LLT-X-T8, Y-SW-120-Z-S-N	2	36	13	0.47	1,404	0.34	1,014	\$122	6	Dual Technology Occupancy Sensor - Switch Mnt.	3	20.0%	281	\$34
222.22	Copy Room	3000	2x4, 2 Lamp, 32w T8, Elec. Ballast, Receased Mnt., Parabolic Lens	2	62	1	0.06	186	Bypass Ballast, Relamp	4' Alledia 18w LED, LLT-X-T8, Y-SW-120-Z-S-N	2	36	1	0.04	108	0.03	78	\$9	0	No New Controls	0	0.0%	0	\$0
227.221	Kitchenette	3000	2x2, 2 Lamp, 17w T8, Elec. Ballast, Receased Mnt., Parabolic Lens	2	34	3	0.10	306	Existing to Remain	No Change	2	34	0	0.10	306	0.00	0	\$0	0	No New Controls	0	0.0%	0	\$0
222.22	File Room	3000	2x4, 2 Lamp, 32w T8, Elec. Ballast, Receased Mnt., Parabolic Lens	2	62	3	0.19	558	Bypass Ballast, Relamp	4' Alledia 18w LED, LLT-X-T8, Y-SW-120-Z-S-N	2	36	3	0.11	324	0.08	234	\$28	6	Dual Technology Occupancy Sensor - Switch Mnt.	1	20.0%	65	\$8
221.21	Men's Restroom	2600	1x4, 2 Lamp, 32w T8, Elec. Ballast, Receased Mnt., Prismatic Lens	2	62	2	0.12	322	Bypass Ballast, Relamp	4' Alledia 18w LED, LLT-X-T8, Y-SW-120-Z-S-N	2	36	2	0.07	187	0.05	135	\$16	6	Dual Technology Occupancy Sensor - Switch Mnt.	1	20.0%	37	\$4
221.21	Women's Restroom	2600	1x4, 2 Lamp, 32w T8, Elec. Ballast, Receased Mnt., Prismatic Lens	2	62	2	0.12	322	Bypass Ballast, Relamp	4' Alledia 18w LED, LLT-X-T8, Y-SW-120-Z-S-N	2	36	2	0.07	187	0.05	135	\$16	6	Dual Technology Occupancy Sensor - Switch Mnt.	1	20.0%	37	\$4
Cafeteria																								
221.37	Training Room	3000	1x4, 2 Lamp, 32w T8, Elec. Ballast, Receased Mnt., Indirect	2	62	8	0.50	1,488	Bypass Ballast, Relamp	4' Alledia 18w LED, LLT-X-T8, Y-SW-120-Z-S-N	2	36	8	0.29	864	0.21	624	\$75	0	No New Controls	0	0.0%	0	\$0
221.37	Cafeteria	3600	1x4, 2 Lamp, 32w T8, Elec. Ballast, Pendant Mnt., Indirect	2	62	54	3.35	12,053	Bypass Ballast, Relamp	4' Alledia 18w LED, LLT-X-T8, Y-SW-120-Z-S-N	2	36	54	1.94	6,998	1.40	5,054	\$607	3	Daylight Sensor (Sensortech PP-20 & CM/PC or equal)	4	20.0%	1,400	\$168
232.21	Elevator Lobby	3600	2x4, 3 Lamp, 32w T8, Elec. Ballast, Receased Mnt., Prismatic Lens	3	94	1	0.09	338	Bypass Ballast, Relamp	4' Alledia 18w LED, LLT-X-T8, Y-SW-120-Z-S-N	3	56	1	0.06	202	0.04	177	\$16	0	No New Controls	0	0.0%	0	\$0
232.21	Serving Line	3600	2x4, 3 Lamp, 32w T8, Elec. Ballast, Receased Mnt., Prismatic Lens	3	94	8	0.75	2,707	Bypass Ballast, Relamp	4' Alledia 18w LED, LLT-X-T8, Y-SW-120-Z-S-N	3	56	8	0.45	1,613	0.30	1,094	\$131	0	No New Controls	0	0.0%	0	\$0
232.21	Kitchen	3600	2x4, 3 Lamp, 32w T8, Elec. Ballast, Receased Mnt., Prismatic Lens	3	94	5	0.47	1,692	Bypass Ballast, Relamp	4' Alledia 18w LED, LLT-X-T8, Y-SW-120-Z-S-N	3	56	5	0.28	1,008	0.19	684	\$82	0	No New Controls	0	0.0%	0	\$0
1st Floor																								
222.22	Lobby	3600	2x4, 2 Lamp, 32w T8, Elec. Ballast, Receased Mnt., Parabolic Lens	2	62	5	0.31	1,116	Bypass Ballast, Relamp	4' Alledia 18w LED, LLT-X-T8, Y-SW-120-Z-S-N	2	36	5	0.18	648	0.13	468	\$56	0	No New Controls	0	0.0%	0	\$0
227.221	Lobby	3600	2x2, 2 Lamp, 17w T8, Elec. Ballast, Receased Mnt., Parabolic Lens	2	34	7	0.24	857	Existing to Remain	No Change	2	34	0	0.24	857	0.00	0	\$0	0	No New Controls	0	0.0%	0	\$0
Planning & Solid Waste																								
222.22	Waiting Area	3000	2x4, 2 Lamp, 32w T8, Elec. Ballast, Receased Mnt., Parabolic Lens	2	62	5	0.31	930	Bypass Ballast, Relamp	4' Alledia 18w LED, LLT-X-T8, Y-SW-120-Z-S-N	2	36	5	0.18	540	0.13	390	\$47	0	No New Controls	0	0.0%	0	\$0
222.22	Reception	3000	2x4, 2 Lamp, 32w T8, Elec. Ballast, Receased Mnt., Parabolic Lens	2	62	5	0.31	930	Bypass Ballast, Relamp	4' Alledia 18w LED, LLT-X-T8, Y-SW-120-Z-S-N	2	36	5	0.18	540	0.13	390	\$47	0	No New Controls	0	0.0%	0	\$0
222.22	Mapping	3000	2x4, 3 Lamp, 32w T8, Elec. Ballast, Receased Mnt., Parabolic Lens	2	62	6	0.37	1,116	Bypass Ballast, Relamp	4' Alledia 18w LED, LLT-X-T8, Y-SW-120-Z-S-N	2	36	6	0.22	648	0.16	468	\$56	5	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	130	\$16
222.22	Open Office - West	3000	2x4, 2 Lamp, 32w T8, Elec. Ballast, Receased Mnt., Parabolic Lens	2	62	20	1.24	3,720	Bypass Ballast, Relamp	4' Alledia 18w LED, LLT-X-T8, Y-SW-120-Z-S-N	2	36	20	0.72	2,160	0.52	1,560	\$187	5	Dual Technology Occupancy Sensor - Remote Mnt.	2	20.0%	432	\$52
222.22	Corridor	3600	2x4, 2 Lamp, 32w T8, Elec. Ballast, Receased Mnt., Parabolic Lens	2	62	8	0.50	1,786	Bypass Ballast, Relamp	4' Alledia 18w LED, LLT-X-T8, Y-SW-120-Z-S-N	2	36	8	0.29	1,037	0.21	749	\$90	0	No New Controls	0	0.0%	0	\$0
232.21	Copy Area	3000	2x4, 3 Lamp, 32w T8, Elec. Ballast, Receased Mnt., Parabolic Lens	3	94	6	0.56	1,692	Bypass Ballast, Relamp	4' Alledia 18w LED, LLT-X-T8, Y-SW-120-Z-S-N	3	56	6	0.34	1,008	0.23	684	\$82	6	Dual Technology Occupancy Sensor - Switch Mnt.	1	20.0%	202	\$24
222.22	Side Offices (3) - North Corner	3000	2x4, 2 Lamp, 32w T8, Elec. Ballast, Receased Mnt., Parabolic Lens	2	62	13	0.81	2,418	Bypass Ballast, Relamp	4' Alledia 18w LED, LLT-X-T8, Y-SW-120-Z-S-N	2	36	13	0.47	1,404	0.34	1,014	\$122	6	Dual Technology Occupancy Sensor - Switch Mnt.	3	20.0%	281	\$34
222.22	Conf. Room B	3000	2x4, 2 Lamp, 32w T8, Elec. Ballast, Receased Mnt., Parabolic Lens	2	62	4	0.25	744	Bypass Ballast, Relamp	4' Alledia 18w LED, LLT-X-T8, Y-SW-120-Z-S-N	2	36	4	0.14	432	0.10	312	\$37	6	Dual Technology Occupancy Sensor - Switch Mnt.	1	20.0%	86	\$10
221.21	Men's Restroom	2600	1x4, 2 Lamp, 32w T8, Elec. Ballast, Receased Mnt., Prismatic Lens	2	62	2	0.12	322	Bypass Ballast, Relamp	4' Alledia 18w LED, LLT-X-T8, Y-SW-120-Z-S-N	2	36	2	0.07	187	0.05	135	\$16	6	Dual Technology Occupancy Sensor - Switch Mnt.	1	20.0%	37	\$4

Location		Area	EXISTING FEATURES						PROPOSED FEATURE RETROFIT						RETRIBUTIVE ENERGY SAVINGS						PROPOSED LIGHTING CONTROLS						LIGHTING RETROFIT COSTS				LIGHTING CONTROLS COSTS			
			Description	Lamps per Fixture	Watts per Fixture	Qty of Fixtures	Total kWh	Usage kWh/ft²	Work Description	Equipment Description	Lamps per Fixture	Watts per Fixture	Qty of Fixtures	Total kWh	Usage kWh/ft²	Energy Savings, kW	Energy Savings, kWh	Energy Savings, %	Control Ref	Controls Description	Qty of Controls	Hours Reduction %	Energy Savings, kWh	Energy Savings, %	Material	Total Labor	Total All	Rebate Estimate	Simple Payback	Total Material	Total Labor	Total All	Smart Start Incentive	Simple Payback
221.21	Women's Restroom	2600	1x4, 2 Lamp, 32w T8, Elec. Ballast, Recessed Mnt., Prismatic Lens	2	62	2	0.12	322	Bypass Ballast, Relamp	4' Alidura 18w LED, LLT-X-T8, Y-SW-120-Z-S-N	2	36	2	0.07	187	0.05	135	\$16	6	Dual Technology Occupancy Sensor - Switch Mnt.	1	20.0%	37	\$4	\$120.00	\$120.00	\$240.00	\$40.00	12.33	\$50.00	\$50.00	\$100.00	FALSE	22.26
227.221	Kitchenette	3000	2x2, 2 Lamp, 17w T8, Elec. Ballast, Recessed Mnt., Parabolic Lens	2	34	3	0.10	306	Existing to Remain	No Change	2	34	0	0.10	306	0.00	0	\$0	6	Dual Technology Occupancy Sensor - Switch Mnt.	1	20.0%	61	\$7	\$0.00	\$0.00	\$0.00	\$0.00	-	\$50.00	\$50.00	\$100.00	FALSE	13.62
222.22	Corridor	3600	2x4, 2 Lamp, 32w T8, Elec. Ballast, Recessed Mnt., Parabolic Lens	2	62	3	0.19	670	Bypass Ballast, Relamp	4' Alidura 18w LED, LLT-X-T8, Y-SW-120-Z-S-N	2	36	3	0.11	389	0.08	281	\$34	0	No New Controls	0	0.0%	0	\$0	\$180.00	\$180.00	\$360.00	\$60.00	8.90	\$0.00	\$0.00	\$0.00	FALSE	-
222.22	Side Offices (3) - East Corner	3000	2x4, 2 Lamp, 32w T8, Elec. Ballast, Recessed Mnt., Parabolic Lens	2	62	13	0.81	2,418	Bypass Ballast, Relamp	4' Alidura 18w LED, LLT-X-T8, Y-SW-120-Z-S-N	2	36	13	0.47	1,404	0.34	1,014	\$122	6	Dual Technology Occupancy Sensor - Switch Mnt.	3	20.0%	281	\$34	\$780.00	\$780.00	\$1,560.00	\$260.00	10.68	\$150.00	\$150.00	\$300.00	\$20.00	8.31
222.22	Open Office - South	3000	2x4, 2 Lamp, 32w T8, Elec. Ballast, Recessed Mnt., Parabolic Lens	2	62	25	1.55	4,650	Bypass Ballast, Relamp	4' Alidura 18w LED, LLT-X-T8, Y-SW-120-Z-S-N	2	36	25	0.90	2,700	0.65	1,950	\$234	5	Dual Technology Occupancy Sensor - Remote Mnt.	3	20.0%	540	\$65	\$1,500.00	\$1,500.00	\$3,000.00	\$500.00	10.68	\$600.00	\$150.00	\$750.00	\$35.00	11.03
Basement																																		
221.34	Boiler Room	4000	1x4, 2 Lamp, 32w T8, Elec. Ballast, Pendant Mnt., No Lens	2	62	8	0.50	1,984	Bypass Ballast, Relamp	4' Alidura 18w LED, LLT-X-T8, Y-SW-120-Z-S-N	2	36	8	0.29	1,152	0.21	832	\$100	0	No New Controls	0	0.0%	0	\$0	\$480.00	\$480.00	\$960.00	\$160.00	8.01	\$0.00	\$0.00	\$0.00	FALSE	-
121.34	Boiler Room	4000	1x4, 2 Lamp, 34w T12, Mag. Ballast, Pendant Mount, No Lens	2	72	1	0.07	288	Bypass Ballast, Relamp	4' Alidura 18w LED, LLT-X-T8, Y-SW-120-Z-S-N	2	36	1	0.04	144	0.04	144	\$17	0	No New Controls	0	0.0%	0	\$0	\$60.00	\$60.00	\$120.00	\$20.00	5.79	\$0.00	\$0.00	\$0.00	FALSE	-
222.22	Elevator Lobby	3600	2x4, 2 Lamp, 32w T8, Elec. Ballast, Recessed Mnt., Parabolic Lens	2	62	6	0.37	1,339	Bypass Ballast, Relamp	4' Alidura 18w LED, LLT-X-T8, Y-SW-120-Z-S-N	2	36	6	0.22	778	0.16	562	\$67	0	No New Controls	0	0.0%	0	\$0	\$360.00	\$360.00	\$720.00	\$120.00	8.90	\$0.00	\$0.00	\$0.00	FALSE	-
227.221	Elevator Lobby	3600	2x2, 2 Lamp, 17w T8, Elec. Ballast, Recessed Mnt., Parabolic Lens	2	34	1	0.03	122	Existing to Remain	No Change	2	34	0	0.03	122	0.00	0	\$0	0	No New Controls	0	0.0%	0	\$0	\$0.00	\$0.00	\$0.00	\$0.00	-	\$0.00	\$0.00	\$0.00	FALSE	-
Election Board																																		
222.22	Reception	3000	2x4, 2 Lamp, 32w T8, Elec. Ballast, Recessed Mnt., Parabolic Lens	2	62	13	0.81	2,418	Bypass Ballast, Relamp	4' Alidura 18w LED, LLT-X-T8, Y-SW-120-Z-S-N	2	36	13	0.47	1,404	0.34	1,014	\$122	5	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	281	\$34	\$780.00	\$780.00	\$1,560.00	\$260.00	10.68	\$200.00	\$50.00	\$250.00	\$35.00	6.38
222.22	Open Office	3000	2x4, 2 Lamp, 32w T8, Elec. Ballast, Recessed Mnt., Parabolic Lens	2	62	40	2.48	7,440	Bypass Ballast, Relamp	4' Alidura 18w LED, LLT-X-T8, Y-SW-120-Z-S-N	2	36	40	1.44	4,320	1.04	3,120	\$374	5	Dual Technology Occupancy Sensor - Remote Mnt.	5	20.0%	864	\$104	\$2,400.00	\$2,400.00	\$4,800.00	\$800.00	10.68	\$1,000.00	\$250.00	\$1,250.00	\$35.00	11.72
227.221	Open Office	3000	2x2, 2 Lamp, 17w T8, Elec. Ballast, Recessed Mnt., Parabolic Lens	2	34	6	0.20	612	Existing to Remain	No Change	2	34	0	0.20	612	0.00	0	\$0	0	No New Controls	0	0.0%	0	\$0	\$0.00	\$0.00	\$0.00	\$0.00	-	\$0.00	\$0.00	\$0.00	FALSE	-
222.22	Assist Super Office	3000	2x4, 2 Lamp, 32w T8, Elec. Ballast, Recessed Mnt., Parabolic Lens	2	62	2	0.12	372	Bypass Ballast, Relamp	4' Alidura 18w LED, LLT-X-T8, Y-SW-120-Z-S-N	2	36	2	0.07	216	0.05	156	\$19	6	Dual Technology Occupancy Sensor - Switch Mnt.	0.5	20.0%	43	\$5	\$120.00	\$120.00	\$240.00	\$40.00	10.68	\$25.00	\$25.00	\$50.00	FALSE	9.65
222.22	Assist Super Office	3000	2x4, 2 Lamp, 32w T8, Elec. Ballast, Recessed Mnt., Parabolic Lens	2	62	2	0.12	372	Bypass Ballast, Relamp	4' Alidura 18w LED, LLT-X-T8, Y-SW-120-Z-S-N	2	36	2	0.07	216	0.05	156	\$19	6	Dual Technology Occupancy Sensor - Switch Mnt.	0.5	20.0%	43	\$5	\$120.00	\$120.00	\$240.00	\$40.00	10.68	\$25.00	\$25.00	\$50.00	FALSE	9.65
222.22	Side Offices (2)	3000	2x4, 2 Lamp, 32w T8, Elec. Ballast, Recessed Mnt., Parabolic Lens	2	62	4	0.25	744	Bypass Ballast, Relamp	4' Alidura 18w LED, LLT-X-T8, Y-SW-120-Z-S-N	2	36	4	0.14	432	0.10	312	\$37	6	Dual Technology Occupancy Sensor - Switch Mnt.	2	20.0%	86	\$10	\$240.00	\$240.00	\$480.00	\$80.00	10.68	\$100.00	\$100.00	\$200.00	\$20.00	17.36
221.41	Men's Restroom	2600	1x4, 2 Lamp, 32w T8, Elec. Ballast, Wall/Corner Mnt., Prismatic Lens	2	62	2	0.12	322	Bypass Ballast, Relamp	4' Alidura 18w LED, LLT-X-T8, Y-SW-120-Z-S-N	2	36	2	0.07	187	0.05	135	\$16	6	Dual Technology Occupancy Sensor - Switch Mnt.	1	20.0%	37	\$4	\$120.00	\$120.00	\$240.00	\$40.00	12.33	\$50.00	\$50.00	\$100.00	FALSE	22.26
221.41	Women's Restroom	2600	1x4, 2 Lamp, 32w T8, Elec. Ballast, Wall/Corner Mnt., Prismatic Lens	2	62	2	0.12	322	Bypass Ballast, Relamp	4' Alidura 18w LED, LLT-X-T8, Y-SW-120-Z-S-N	2	36	2	0.07	187	0.05	135	\$16	6	Dual Technology Occupancy Sensor - Switch Mnt.	1	20.0%	37	\$4	\$120.00	\$120.00	\$240.00	\$40.00	12.33	\$50.00	\$50.00	\$100.00	FALSE	22.26
222.22	Kitchenette	3000	2x4, 2 Lamp, 32w T8, Elec. Ballast, Recessed Mnt., Parabolic Lens	2	62	4	0.25	744	Bypass Ballast, Relamp	4' Alidura 18w LED, LLT-X-T8, Y-SW-120-Z-S-N	2	36	4	0.14	432	0.10	312	\$37	6	Dual Technology Occupancy Sensor - Switch Mnt.	1	20.0%	86	\$10	\$240.00	\$240.00	\$480.00	\$80.00	10.68	\$50.00	\$50.00	\$100.00	\$20.00	7.72
222.22	Conf. Room	3000	2x4, 2 Lamp, 32w T8, Elec. Ballast, Recessed Mnt., Parabolic Lens	2	62	6	0.37	1,116	Bypass Ballast, Relamp	4' Alidura 18w LED, LLT-X-T8, Y-SW-120-Z-S-N	2	36	6	0.22	648	0.16	468	\$56	6	Dual Technology Occupancy Sensor - Switch Mnt.	1	20.0%	130	\$16	\$360.00	\$360.00	\$720.00	\$120.00	10.68	\$50.00	\$50.00	\$100.00	\$20.00	5.14
222.22	Storage Room IT	4400	2x4, 2 Lamp, 32w T8, Elec. Ballast, Recessed Mnt., Parabolic Lens	2	62	10	0.62	2,728	Bypass Ballast, Relamp	4' Alidura 18w LED, LLT-X-T8, Y-SW-120-Z-S-N	2	36	10	0.36	1,584	0.26	1,144	\$137	0	No New Controls	0	0.0%	0	\$0	\$600.00	\$600.00	\$1,200.00	\$200.00	7.28	\$0.00	\$0.00	\$0.00	FALSE	-
121.14	Elevator Cars (2)	8760	1x4, 2-Lamp, 34w T12, Mag. Ballast, No Lens	2	72	4	0.29	2,523	Bypass Ballast, Relamp	4' Alidura 18w LED, LLT-X-T8, Y-SW-120-Z-S-N	2	36	4	0.14	1,261	0.14	1,261	\$151	0	No New Controls	0	0.0%	0	\$0	\$240.00	\$240.00	\$480.00	\$80.00	2.64	\$0.00	\$0.00	\$0.00	FALSE	-
221.41	Stairwell A	8760	1x4, 2 Lamp, 32w T8, Elec. Ballast, Wall/Corner Mnt., Prismatic Lens	2	62	15	0.93	8,147	Bypass Ballast, Relamp	4' Alidura 18w LED, LLT-X-T8, Y-SW-120-Z-S-N	2	36	15	0.54	4,730	0.39	3,416	\$410	0	No New Controls	0	0.0%	0	\$0	\$900.00	\$900.00	\$1,800.00	\$300.00	3.66	\$0.00	\$0.00	\$0.00	FALSE	-
221.41	Stairwell B	8760	1x4, 2 Lamp, 32w T8, Elec. Ballast, Wall/Corner Mnt., Prismatic Lens	2	62	13	0.81	7,061	Bypass Ballast, Relamp	4' Alidura 18w LED, LLT-X-T8, Y-SW-120-Z-S-N	2	36	13	0.47	4,100	0.34	2,961	\$355	0	No New Controls	0	0.0%	0	\$0	\$780.00	\$780.00	\$1,560.00	\$260.00	3.66	\$0.00	\$0.00	\$0.00	FALSE	-
131.34	Penthouse	1800	1x4, 2-Lamp, 34w T12, Mag. Ballast, Pendant Mount, No Lens	3	108	7	0.76	1,361	Bypass Ballast, Relamp	4' Alidura 18w LED, LLT-X-T8, Y-SW-120-Z-S-N	3	54	7	0.38	680	0.38	680	\$82	0	No New Controls	0	0.0%	0	\$0	\$630.00	\$420.00	\$1,050.00	\$210.00	10.29	\$0.00	\$0.00	\$0.00	FALSE	-
Exterior																																		
720	Exterior	4400	Recessed Down Light, 175w MH	1	205	25	5.13	22,550	Bypass Ballast, Relamp	45w LED	1	45	25	1.13	4,950	4.00	17,600	\$2,112	0	No New Controls	0	0.0%	0	\$0	\$3,750.00	\$1,625.00	\$5,375.00	\$1,250.00	1.95	\$0.00	\$0.00	\$0.00	FALSE	-
712	Exterior	4400	100w HPS Wall Pack	1	120	1	0.12	528	Replace Fixture	RAB 20w LED Wall Pack	1	26	1	0.03	114	0.09	414	\$50	0	No New Controls	0	0.0%	0	\$0	\$200.00	\$100.00	\$300.00	\$50.00	5.04	\$0.00	\$0.00	\$0.00	FALSE	-
Parking Garage																																		
903	Exterior	8760	175w MH Area Light, Ceiling Mount	1	195	476	92.82	813,303	Replace Fixture	RAB 52w LED Garage Light, GLED52N	1	52	476	24.75	216,828	68.07	596,276	\$71,553	0	No New Controls	0	0.0%	0	\$0	\$95,200.00	\$95,200.00	\$190,400.00	\$23,800.00	2.33	\$0.00	\$0.00	\$0.00	FALSE	-
904	Exterior	8760	150w HPS Area Light, Ceiling Mount	1	170	176	29.92	262,099	Replace Fixture	RAB 52w LED Garage Light, GLED52N	1	52	176	9.15	80,172	20.77	181,928	\$21,831	0	No New Controls	0	0.0%	0	\$0	\$35,200.00	\$35,200.00	\$70,400.00	\$8,800.00	2.82	\$0.00	\$0.00	\$0.00	FALSE	-
905	Exterior	8760	175w MH Wall Pack	1	195	8	1.56	13,666	Replace Fixture	RAB 52w LED Wall Pack	1	52	8	0.42	3,644	1.14	10,021	\$1,203	0	No New Controls	0	0.0%	0	\$0	\$1,600.00	\$1,600.00	\$3,200.00	\$400.00	2.32	\$0.00	\$0.00	\$0.00	FALSE	-
906	Exterior	8760	400w HPS "Shoebox"	1	465	10	4.65	40,734	Replace Fixture	RAB 104w LED Area Light	1	104	10	1.04	9,110	3.61	31,624	\$3,795	0	No New Controls	0	0.0%	0	\$0	\$2,500.00	\$2,000.00	\$4,500.00	\$500.00	1.05	\$0.00	\$0.00	\$0.00	FALSE	-

EXISTING FEATURES										PROPOSED FEATURE RETROFIT										RETROFIT ENERGY SAVINGS					PROPOSED LIGHTING CONTROLS					LIGHTING RETROFIT COSTS					LIGHTING CONTROLS COST				
	Location	Average Hours/Year	Description	Lamps per Fixture	Watts per Fixture	Qty of Fixtures	Total kW	Usage kWh/Yr	Work Description	Equipment Description	Lamps per Fixture	Watts per Fixture	Qty of Fixtures	Total kW	Usage kWh/Yr	Energy Savings, kWh	Energy Savings, kWh	Energy Savings, \$/Yr	Control Ref #	Controls Description	Qty of Controls	Load Reduction %	Energy Savings, kWh	Energy Savings, \$/Yr	Material	Total Labor	Total All	Rebate Estimate	Simple Payback	Total Materials	Total Labor	Total All	Smart Start Incentive	Simple Payback					
907	Exterior	8760	1x4, 2-Lamp, 34w T12, Mag. Ballast, White Lens	2	72	34	2.45	21,444	Bypass Ballast, Relamp	4' Alledia 18w LED, LLT-X-T8, Y-SW-120-Z-6-N	2	36	34	1.22	10,722	1,22	10,722	\$1,287	0	No New Controls	0	0.0%	0	\$0	\$2,040.00	\$2,040.00	\$4,080.00	\$680.00	2.64	\$0.00	\$0.00	\$0.00	FALSE	-					
908	Exterior	8760	100w HPS White Globe Area Light - Pier Mount	1	120	24	2.88	25,229	Bypass Ballast, Relamp	40w LED 360 Degree Lamp	1	40	24	0.96	8,410	1.92	16,819	\$2,018	0	No New Controls	0	0.0%	0	\$0	\$3,600.00	\$2,400.00	\$6,000.00	\$240.00	2.85	\$0.00	\$0.00	\$0.00	FALSE	-					
TOTAL						628	177	1,326,498					1,301	61	489,560	116	916,938	\$110,032			68		9,301	\$1,126	\$177,420	\$172,805	\$350,225	\$46,808	2.76	\$7,700	\$3,400	\$11,100	\$655.00	6.28					

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
PEER-Parking Garage	82000	SHARP ND-240QCJ	1429	17.5	25,066	342.96	411,719	277.8	59,875	13.68



Roof Total kW_{DC} = 11.76

Parking Lot Total kW_{DC} = 331.2

= Proposed PV Roof Layout

= Proposed PV Parking Canopy Layout

= Alternative Proposed PV Parking Canopy Layout

Notes:

1. Estimated kWh based on the National Renewable Energy Laboratory PVWatts Version 1 Calculator Program.
2. Alternative Location for Parking Lot Array in Center of Garage with built up structure will yield a similar capacity.

Project Name: LGEA Solar PV Project - PEER-Parking Garage										
Location: Toms River, NJ										
Description: Photovoltaic System 100% Financing - 15 year										
Simple Payback Analysis										
		Photovoltaic System 100% Financing - 15 year								
Total Construction Cost		\$1,631,135								
Annual kWh Production		411,719								
Annual Energy Cost Reduction		\$49,406								
Average Annual SREC Revenue		\$62,377								
Simple Payback:		14.59						Years		
Life Cycle Cost Analysis										
Analysis Period (years):		15						Financing %:		100%
Discount Rate:		3%						Maintenance Escalation Rate:		3.0%
Average Energy Cost (\$/kWh)		\$0.120						Energy Cost Escalation Rate:		3.0%
Financing Rate:		6.00%						Average SREC Value (\$/kWh)		\$0.152
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	411,719	\$49,406	\$0	\$102,930	\$95,986	\$69,187	(\$12,837)	(\$12,837)	
2	\$0	409,660	\$50,888	\$0	\$102,415	\$91,719	\$73,455	(\$11,870)	(\$24,707)	
3	\$0	407,612	\$52,415	\$0	\$101,903	\$87,188	\$77,985	(\$10,855)	(\$35,562)	
4	\$0	405,574	\$53,988	\$0	\$81,115	\$82,378	\$82,795	(\$30,071)	(\$65,633)	
5	\$0	403,546	\$55,607	\$4,157	\$80,709	\$77,272	\$87,902	(\$33,013)	(\$98,646)	
6	\$0	401,528	\$57,275	\$4,136	\$80,306	\$71,850	\$93,323	(\$31,728)	(\$130,374)	
7	\$0	399,521	\$58,994	\$4,115	\$59,928	\$66,094	\$99,079	(\$50,367)	(\$180,741)	
8	\$0	397,523	\$60,763	\$4,094	\$59,628	\$59,983	\$105,190	(\$48,876)	(\$229,617)	
9	\$0	395,536	\$62,586	\$4,074	\$59,330	\$53,495	\$111,678	(\$47,331)	(\$276,947)	
10	\$0	393,558	\$64,464	\$4,054	\$39,356	\$46,607	\$118,566	(\$65,407)	(\$342,354)	
11	\$0	391,590	\$66,398	\$4,033	\$39,159	\$39,294	\$125,879	(\$63,650)	(\$406,004)	
12	\$0	389,632	\$68,390	\$4,013	\$38,963	\$31,530	\$133,643	(\$61,833)	(\$467,837)	
13	\$0	387,684	\$70,442	\$3,993	\$19,384	\$23,287	\$141,886	(\$79,341)	(\$547,178)	
14	\$0	385,746	\$72,555	\$3,973	\$19,287	\$14,536	\$150,637	(\$77,304)	(\$624,483)	
15	\$0	383,817	\$74,731	\$3,953	\$19,191	\$5,245	\$159,928	(\$75,204)	(\$699,687)	
Totals:		5,964,246	\$918,903	\$44,596	\$903,605	\$846,465	\$1,631,135	(\$699,687)	(\$4,142,608)	
Net Present Value (NPV)							(\$492,575)			