NORTH BRUNSWICK TOWNSHIP
PUBLIC SCHOOL DISTRICT

BOARD OF EDUCATION OFFICE

300 OLD GEORGES ROAD
NORTH BRUNSWICK, NJ 08902

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:	Public Service Electric & Gas
Electric Utility Rate Structure:	General Lighting & Power (GLP)
Third Party Supplier:	South Jersey Energy Company

Natural Gas Utility Provider:	Public Service Electric & Gas
Utility Rate Structure:	Large Volume Gas (LVG)
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 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: PSE&G
Rate: GLP
Meter No: 278006783
Account # E 69-743-641-05
Third Party Utility Provider: South Jersey Energy Compar
TPS Meter / Acct No: -

MONTH OF USE	CONSUMPTION KWH	DEMAND KW	TOTAL BILL
Aug-11	13,170	83.0	$2,762
Sep-11	11,760	44.0	$1,674
Oct-11	10,650	32.0	$1,492
Nov-11	13,440	39.0	$1,875
Dec-11	9,990	41.0	$1,450
Jan-12	11,070	39.0	$1,580
Feb-12	11,550	41.0	$1,646
Mar-12	10,470	50.0	$1,565
Apr-12	9,900	74.0	$1,515
May-12	20,760	80.0	$3,773
Jun-12	20,760	87.0	$3,869
Jul-12	20,370	80.0	$3,726
Totals	**163,890**	**87.0 Max**	**$26,927**

AVERAGE DEMAND **57.5 KW average**
AVERAGE RATE **$0.164** **$/kWh**

Figure 1
Electricity Usage Profile

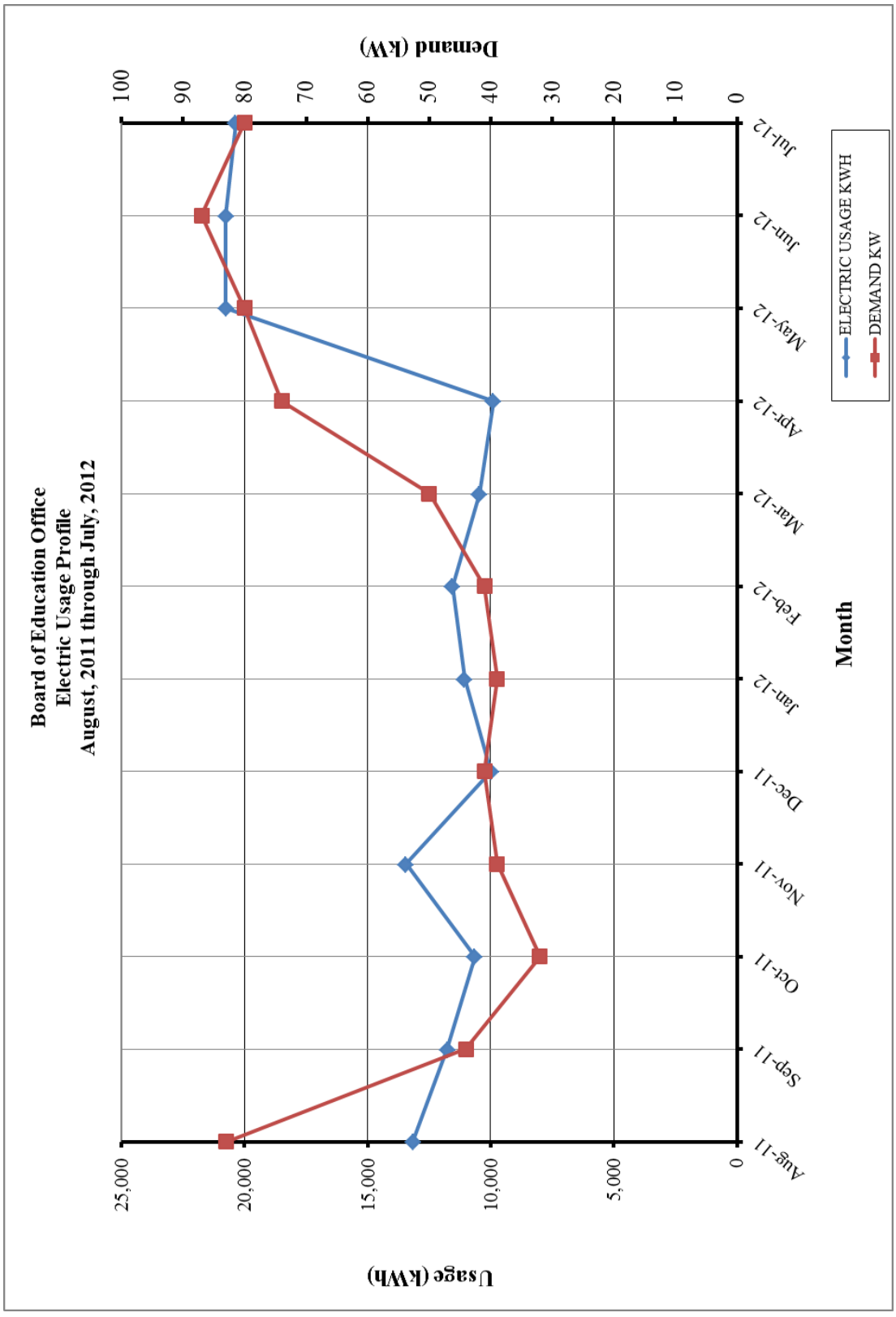
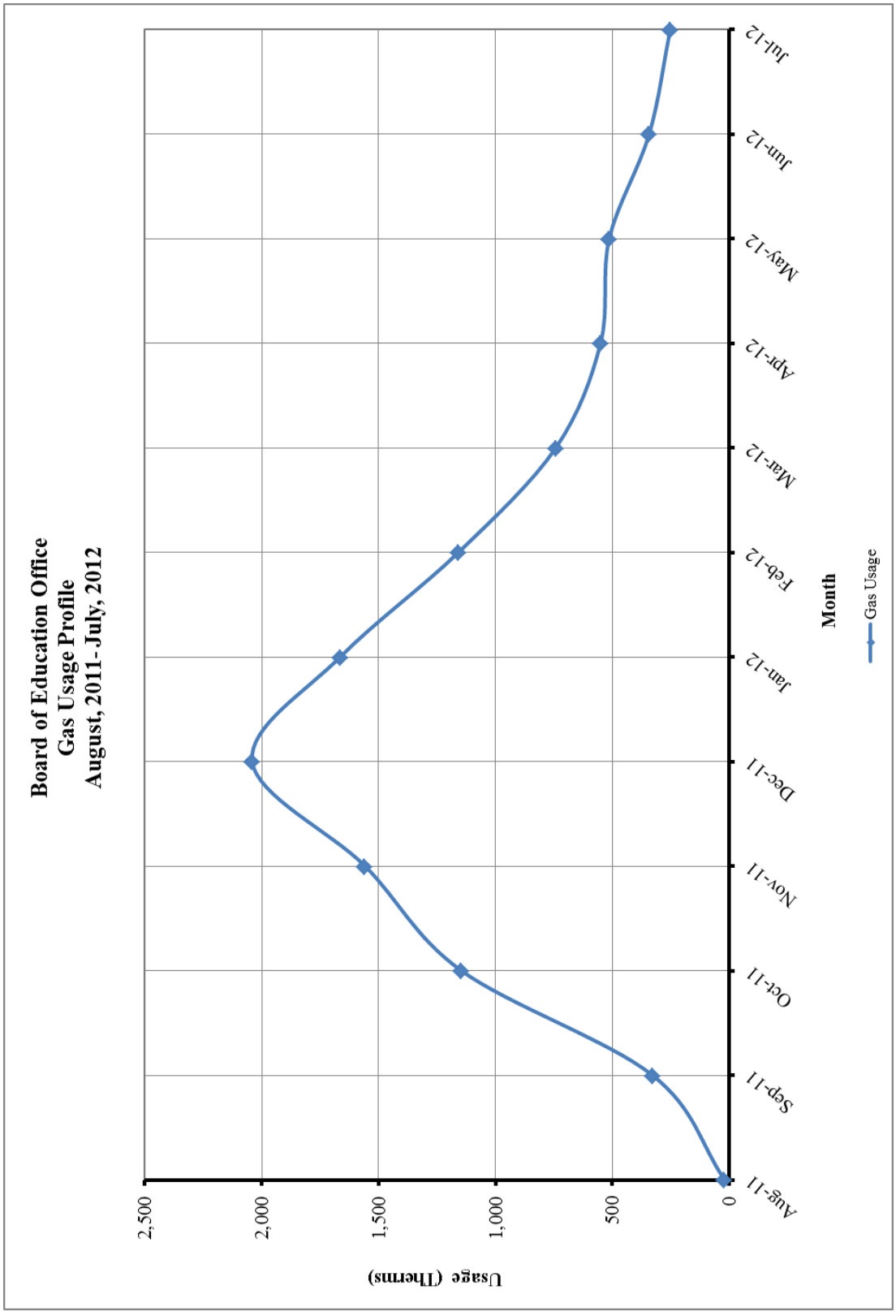


Table 4
Natural Gas Billing Data

NATURAL GAS USAGE SUMMARY		
Utility Provider:	PSE&G	
Rate:	LVG	
Meter No:	3127553	
Point of Delivery ID:	G 69-740-496-09	
Third Party Utility Provider:	N/A	
TPS Meter No:	N/A	
MONTH OF USE	**CONSUMPTION (THERMS)**	**TOTAL BILL**
Aug-11	21.00	$215.45
Sep-11	330.00	$349.62
Oct-11	1,148.00	$1,187.31
Nov-11	1,559.00	$1,570.66
Dec-11	2,041.00	$1,960.25
Jan-12	1,664.00	$1,564.35
Feb-12	1,158.00	$1,174.47
Mar-12	742.00	$555.08
Apr-12	551.00	$407.72
May-12	514.00	$423.88
Jun-12	343.00	$330.97
Jul-12	253.00	$276.72
TOTALS	**10,324.00**	**$10,016.48**
AVERAGE RATE:	**$0.97**	**$/THERM**

Figure 2
Natural Gas Usage Profile



II. FACILITY DESCRIPTION

The North Brunswick Township Board of Education office Building is located at 300 Old Georges Road in North Brunswick, New Jersey. The 24,642 SF building was renovated in 2002 to create a board room to accommodate the regular meetings of the Board of Education. The building is a two story building with a basement and is comprised of office space for administrative use and contains a large board room for regular meetings.

Occupancy Profile

The typical hours of operation for Administrative Building are Monday through Friday between 7:30 am and 6:00 pm with at least one board meeting each month during evening hours. The office building has a total occupancy of approximately 30 people.

Building Envelope

Exterior walls for the Administrative Building are brick faced with metal stud construction. The amount of insulation within the walls is unknown. The windows throughout the office building are in varying condition and some appear to have been replaced with the renovations. Typical windows throughout the office building are single pane, ¼" clear glass with aluminum frames. Blinds are utilized throughout the building per occupant comfort. The blinds are valuable because they help to reduce heat loss in the winter and reduce solar heat gain in the summer. The roof is a pitched roof with asphalt shingles attached to a layer of plywood over an attic space. The amount of insulation below the roof is unknown.

HVAC Systems

The office building is conditioned by one packaged unit, four split ac units, and window ac units with steam radiators and baseboard for heat throughout the building.

The board meeting room and adjacent offices are served by an AAC Commercial packaged unit located outside on grade. This unit provides heat via a gas fired heat exchanger and cooling via a direct expansion coil.

The offices and corridors throughout the rest of the building are served by four fan coil units with split AC condensers located outside on grade. The heat for this area is provided by steam radiators and baseboard heaters. Some of the offices on the perimeter of the building use older window ac units as well.

Steam for the radiators and baseboard heat is generated by two HB Smith boilers. The boilers are both natural gas fired. One boiler has an input rating of 1,645 MBH and an output rating of 987.2 MBH while the other has an input rating of 1,589 MBH and an output rating of 1,093 MBH.

Exhaust System

Air is exhausted from the toilet rooms through roof exhausters.

HVAC System Controls

The Administrative Building is controlled by individual programmable thermostats.

Domestic Hot Water

The main source of domestic hot water for administrative building is an A.O. Smith gas fired water heater with an integrated storage capacity of 40 gallons.

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	$375	$241	1.6	864.0%
ECM #2	Lighting Controls Upgrade	$5,220	$744	7.0	113.8%
ECM #3	Computer Stand-by or Hibernate	$833	$1,266	0.7	2179.7%
ECM #4	AC Unit Replacement	$8,461	$560	15.1	-0.7%
ECM #5	Boiler Burner Controls	$4,730	$473	10.0	50.0%
ECM #6	Replace Steam Boiler	$45,547	$2,581	17.6	98.3%
RENEWABLE ENERGY MEASURES (REM's)					
ECM NO.	**DESCRIPTION**	**NET INSTALLATION COST**	**ANNUAL SAVINGS**	**SIMPLE PAYBACK (Yrs)**	**SIMPLE LIFETIME ROI**
REM #1	45.8 kW Solar Array	$310,613	$18,945	16.4	-8.5%

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	1.2	3,042	0
ECM #2	Lighting Controls Upgrade	0	23,690	0
ECM #3	Computer Stand-by or Hibernate	0.2	687	0
ECM #4	AC Unit Replacement	10.9	21,837	0
ECM #5	Boiler Burner Controls	0.0	0	7,728
ECM #6	Replace Steam Boiler	0.0	26,085	0
RENEWABLE ENERGY MEASURES (REM's)				
ECM NO.	**DESCRIPTION**	**ANNUAL UTILITY REDUCTION**		
		ELECTRIC DEMAND (KW)	**ELECTRIC CONSUMPTION (KWH)**	**NATURAL GAS (THERMS)**
REM #1	45.8 kW Solar Array	45.8	53,352	0

Table 3
Facility Project Summary

ENERGY SAVINGS IMPROVEMENT PROGRAM - POTENTIAL PROJECT					
ENERGY CONSERVATION MEASURES	**ANNUAL ENERGY SAVINGS ($)**	**PROJECT COST ($)**	**SMART START INCENTIVES**	**CUSTOMER COST**	**SIMPLE PAYBACK**
Lighting Upgrade General	$241	$375	$0	$375	1.6
Lighting Controls Upgrade	$744	$5,800	$580	$5,220	7.0
Computer Stand-by or Hibernate	$1,266	$833	$0	$833	0.7
AC Unit Replacement	$560	$9,335	$874	$8,461	15.1
Boiler Burner Controls	$473	$4,730	$0	$4,730	10.0
~~Replace Steam Boiler~~	~~$2,581~~	~~$45,547~~	~~$0~~	~~$45,547~~	~~17.6~~
Design / Construction Extras (15%)	*$0*	*$3,161*	*$0*	*$3,161*	
Total Project	**$3,284**	**$24,234**	**$1,454**	**$22,780**	**6.9**

Note: ECM's with the strike-through font are not included in the ESIP.

Design / Construction Extras is shown as an additional cost for the facility project summary. This cost is included to estimate the costs associated with construction management fees for a larger combined project.

ECM #1: Lighting Upgrade – General

Description:

The majority of the interior lighting throughout Board of Education Office is provided with fluorescent fixtures with 32W T8 lamps and electronic ballasts. In addition, there are a number of older and outdated fixtures with T12 lamps and magnetic ballasts. It is recommended to replace all of the T12 fixtures in these areas with higher efficiency fluorescent T8 fixtures with electronic ballasts.

This ECM includes retrofit of all older fluorescent fixtures with T8 or T5 fluorescent fixtures with electronic ballasts in the building. 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.

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 existing fixtures, or hardwired into 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 is 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 building.

Energy Savings Summary:

ECM #1 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$375
NJ Smart Start Equipment Incentive ($):	$0
Net Installation Cost ($):	$375
Maintenance Savings ($/Yr):	$0
Energy Savings ($/Yr):	$241
Total Yearly Savings ($/Yr):	$241
Estimated ECM Lifetime (Yr):	15
Simple Payback	1.6
Simple Lifetime ROI	864.0%
Simple Lifetime Maintenance Savings	$0
Simple Lifetime Savings	$3,615
Internal Rate of Return (IRR)	64%
Net Present Value (NPV)	$2,502.04

ECM #2: Lighting Controls Upgrade – Occupancy Sensors

Description:

Some of the lights in the Board of Education Office 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 (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 Media Centers. 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:

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

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

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
= (# Wall mount sensors × $20 per sensor)
+ (# Ceiling mount sensors × $35 per sensor)

Energy Savings Summary:

ECM #2 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$5,800
NJ Smart Start Equipment Incentive ($):	$580
Net Installation Cost ($):	$5,220
Maintenance Savings ($/Yr):	$0
Energy Savings ($/Yr):	$744
Total Yearly Savings ($/Yr):	$744
Estimated ECM Lifetime (Yr):	15
Simple Payback	7.0
Simple Lifetime ROI	113.8%
Simple Lifetime Maintenance Savings	$0
Simple Lifetime Savings	$11,160
Internal Rate of Return (IRR)	11%
Net Present Value (NPV)	$3,661.82

ECM #3: Set Computers to Automatic Stand-by or Hibernate Modes

Description:

During the survey, it was noticed that the majority of the computers were left at ON position with the monitors at Screen Saver or OFF positions.

Many personal computers (PC) came equipped with automatic Sleep Mode or Hibernate (power down) mode features. Normally computers boot up from Sleep Mode or Hibernate mode much faster than powering up from Shut Down position.

Based on an independent study by the U.S. Department of Energy, Energy star® rated computers use approximately 70% less power during Sleep Mode. It is recommended to set up the PCs at this facility to switch into Sleep Mode after a short period of inactivity and Hibernate mode after a long period of inactivity.

This ECM includes configuring the offices such that they automatically switch into:

- Sleep Mode after 15 minutes of inactivity
- Hibernate after 60 minutes of inactivity

The inactivity times above can be adjusted based on experience or preference. Even though this ECM can be implemented easily in house, the calculations assume an independent computer technician performing the task at a typical market rate.

Energy Savings Calculations:

No. of CRT Monitors:	50
Operating Weeks per Yr:	42
Estimated percentage of computers left ON overnight:	75%

$$\text{Electric Usage} = \frac{\#\text{ of Computers} \times \text{Computer Power (W)} \times \text{Operation (Hrs)}}{1000\left(\frac{\text{W}}{\text{KW}}\right)}$$

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

The cost of configuring the computers to automatically sleep or hibernate is based on 10 minutes per computer per technician at an hourly rate indicated below.

Implementation Costs: = # Computers X Configuration Time X Cost per Hour
= 50 Monitors X 10 Minutes/Computer X $100 per Hour
= $833

AUTOMATIC SLEEP OR HIBERNATE MODES FOR COMPUTERS			
ECM INPUTS	**EXISTING**	**PROPOSED**	**SAVINGS**
ECM INPUTS	Manual Operation	Auto Power Save	-
# of Computers	50	50	-
% Computers left ON	75%	75%	-
Power when left ON (Watt)	50	50	-
Power at Stand-by (Watt)	5	5	-
Power at Hibernate (Watt)	4	4	-
Power when OFF (Watt)	0	0	-
Operating Weeks per Yr	42	42	-
Operating Hours per Week	168	168	-
Hours/Wk Computers ON	120	20	-
Hours/Wk at Sleep Mode	0	20	-
Hours/Wk at Hibernate Mode	0	80	-
Hours/Wk at Power Down	48	48	-
Elec Cost ($/kWh)	0.164	0.164	-
ENERGY SAVINGS CALCULATIONS			
ECM RESULTS	**EXISTING**	**PROPOSED**	**SAVINGS**
Electric Usage (kWh)	9,450	1,733	7,718
Energy Cost ($)	$1,550	$284	$1,266
COMMENTS:	Calculation assumes computers currently run throughout work week and are shut down over the weekend.		

Energy Savings Summary:

ECM #3 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$833
NJ Smart Start Equipment Incentive ($):	$0
Net Installation Cost ($):	$833
Maintenance Savings ($/Yr):	$0
Energy Savings ($/Yr):	$1,266
Total Yearly Savings ($/Yr):	$1,266
Estimated ECM Lifetime (Yr):	15
Simple Payback	0.7
Simple Lifetime ROI	2179.7%
Simple Lifetime Maintenance Savings	$0
Simple Lifetime Savings	$18,990
Internal Rate of Return (IRR)	152%
Net Present Value (NPV)	$14,280.43

ECM #4: Replace Split System Units with High Efficiency Units

Description:

The majority of the office spaces are cooled by split systems at the North Brunswick Township Board of Education. The units are all 1.5 tons in capacity, and all of the condensing units are outside on grade. Please refer to the **Major Equipment List Appendix** for further information about these units.

These units are in average condition though the current units in operation are not high efficiency units. Two of the units, a leibert model and an Arcoaire model are beyond their useful life and are good candidates for replacement.

These units can be replaced with new higher efficiency units. New split system units provide higher full load and part load efficiencies due to advances in inverter motor technologies, heat exchangers and higher efficiency refrigerants such as R410A which would be used in place of R22 that is currently used in the units.

This ECM includes one-for-one replacement of the older split system units with new higher efficiency systems which include new evaporator coils and refrigerant lines. It is recommended to fully evaluate the capacity needed for all new systems 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	Attic AHU	1	18,000	1.5	Carrier 24ANA1
SS	Attic AHU	1	18,000	1.5	Carrier 24ANA1
Total		**2**	**36,000**	**3.0**	

The manufacturers used as the basis for the calculation is Carrier. The unit pricing and install cost were estimated based on current rates quotes and labor rates. The payback may change based on actual unit pricing and install 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	**COOLING CAPACITY, BTU/Hr**	**ANNUAL COOLING HOURS**	**EXISTING UNITS SEER**	**SPLIT UNITS SEER**	**# OF UNITS**	**ENERGY SAVINGS kWh**	**DEMAND SAVINGS kW**
SS	18,000	2,000	10 SEER	19 SEER	1	1,705	0.9
SS	18,000	2,000	10 SEER	19 SEER	1	1,705	0.9
Total					2	3,411	1.7

Project Cost, Incentives and Maintenance Savings

From the NJ Smart Start® Program appendix, the rebate are $92 per ton for units below 5.4 tons & $73 per ton for units ranging from 5.4 tons to 11.25 tons..

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 SAVING**	**PAY BACK YEARS**
SS	$4,667	1	$4,667	$138	$4,529	$280	16.2
SS	$4,667	1	$4,667	$138	$4,529	$280	16.2
Total	$9,334	2	$9,334	$874	$8,460	$559	15.1

Energy Savings Summary:

ECM #4 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$9,335
NJ Smart Start Equipment Incentive ($):	$874
Net Installation Cost ($):	$8,461
Maintenance Savings ($/Yr):	$0
Energy Savings ($/Yr):	$560
Total Yearly Savings ($/Yr):	$560
Estimated ECM Lifetime (Yr):	15
Simple Payback	15.1
Simple Lifetime ROI	-0.7%
Simple Lifetime Maintenance Savings	$0
Simple Lifetime Savings	$8,400
Internal Rate of Return (IRR)	0%
Net Present Value (NPV)	($1,775.76)

ECM #5: Boiler Controls Upgrade – Economizer

Description:

The space heating for the Board of Education office is provided from a central boiler plant. The boiler plant houses two gas-fired boilers. These boilers do not currently have any advanced controls to get them to operate at peak efficiency. Heating energy consumption of the facility can be reduced by approximately 10% by installing an Intellicon LCS steam boiler burner controller.

The Intellicon LCS uses intelligent Dynamic Cycle Management technology to save energy by adjusting the burner run pattern to match the system's heat load. Its function is similar to the method of outdoor air reset, but requires no outdoor temperature sensor, and there is no need to profile the building to adjust the reset the controls properly. The Intellicon LCS instead determines the heat load by using a pressure sensor that monitors the boiler's steam pressure and the rate that this pressure is changing.

This energy conservation measure will install two Intellicon LCS steam boiler controls, one on each boiler burner. This will allow the controller to program the burner and maximize the system's efficiency.

Energy Savings Calculations:

The Intellicon LCS fuel economizer is guaranteed by the manufacturer (Intellidyne) to reduce fuel consumption by 10%.

The annual fuel usage for the two gas-fired boilers has been approximated by subtracting the gas fired packaged unit and domestic load from the annual gas bills which are provided.

Total Annual Fuel Usage:	10,324 Therms
Approximate Domestic/Packaged Unit Fuel Usage:	5,447 Therms
Annual Boiler Fuel Usage:	4,877 Therms

Boiler Savings with Intellicon CWH: 4,877 Therms x 10% = 487.7 Therms Saved

Energy Savings Summary:

ECM #5 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$4,730
NJ Smart Start Equipment Incentive ($):	$0
Net Installation Cost ($):	$4,730
Maintenance Savings ($/Yr):	$0
Energy Savings ($/Yr):	$473
Total Yearly Savings ($/Yr):	$473
Estimated ECM Lifetime (Yr):	15
Simple Payback	10.0
Simple Lifetime ROI	50.0%
Simple Lifetime Maintenance Savings	$0
Simple Lifetime Savings	$7,095
Internal Rate of Return (IRR)	6%
Net Present Value (NPV)	$916.64

ECM #6: Steam Boiler Replacement

Description:

The heating for the Board of Education office is provided via two (2) HB Smith gas fired cast iron steam boilers located in the basement. One of the boilers is particularly old and has surpassed its expected useful service life. It is reported that usually a single boiler can satisfy the load throughout the year. This means boilers often run at partial load conditions. Current average combustion efficiency of each boiler is estimated to be 65% due to limited turn down ratio, age of the equipment, rusting and sediment build-up on the heat transfer surfaces, deteriorating or missing insulation and outdated controls.

CEG recommends that one of the two (2) steam boilers be replaced by a 30 BHP high-efficiency steam boiler that would carry the steam load during most of heating season. The natural gas to steam efficiency for a 30 BHP steam boiler with digital burner controls is approximately 84% over its operating range and with the advanced digital controls will have a 5:1 turn down ratio.

This energy conservation measure will replace one of the gas fired steam boilers serving the facility. Calculations are based on the following equipment: Cleaver Brooks ClearFire H model boiler or equivalent. The existing boiler can remain as a backup for the new boiler.

Energy Savings Calculations:

Gas consumption of the steam boiler plant is gathered in order to calculate an estimated steam production of the boiler plant. Then, the steam production info is used in a reverse calculation to obtain proposed annual gas consumption based on improved efficiency. Calculations are summarized in the table below.

$$\text{Steam Production, Lb} = \frac{\text{Gas Consumption (Therms)} \times 100{,}000\,\frac{\text{BTU}}{\text{Therm}} \times \text{ Boiler Efficiency}}{1000\,\frac{\text{BTU}}{\text{Lbs}}}$$

$$\text{Gas Consumption, Therms} = \frac{\text{Steam Production (Lbs)} \times 1000\,\frac{\text{BTU}}{\text{Lbs}}}{100{,}000\,\frac{\text{BTU}}{\text{Therm}} \times \text{ Boiler Efficiency}}$$

Cost of the replacement equipment and installation is estimated based on RS Means Cost Works data.

Energy Savings Summary:

ECM #6 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$45,547
NJ Smart Start Equipment Incentive ($):	$0
Net Installation Cost ($):	$45,547
Maintenance Savings ($/Yr):	$0
Energy Savings ($/Yr):	$2,581
Total Yearly Savings ($/Yr):	$2,581
Estimated ECM Lifetime (Yr):	15
Simple Payback	17.6
Simple Lifetime ROI	-15.0%
Simple Lifetime Maintenance Savings	0
Simple Lifetime Savings	$38,715
Internal Rate of Return (IRR)	-2%
Net Present Value (NPV)	($14,735.19)

REM #1: 45.83 kW Solar System

Description:

The North Brunswick Board of Education Office has available parking lot space that could accommodate a significant amount of solar generation. Based on the available areas a 45.83 KW DC solar array could be installed, assuming the existing roof structure is capable of supporting an array. The array will produce approximately 53,352 kilowatt-hours annually that will reduce the overall electric usage of the facility by 32.55%.

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}):	45.83
Electric Generation (KWH/Yr):	53,352
Installation Cost ($):	$310,613
SREC Revenue ($/Yr):	$10,195
Energy Savings ($/Yr):	$8,750
Total Yearly Savings ($/Yr):	$18,944
ECM Analysis Period (Yr):	15
Simple Payback (Yrs):	16.4
Analysis Period Electric Savings ($):	$162,735
Analysis Period SREC Revenue ($):	$147,683
Net Present Value (NPV)	($126,837.81)

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. Ensure steam traps are functioning properly and replace traps as needed.

APPENDIX A

ECM COST & SAVINGS BREAKDOWN

CONCORD ENGINEERING GROUP

North Brunswick Township Public Schools - Board of Education Office

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)	($/Yr)	(Yr)	($)	($)	(%)	(Yr)	($)	($)
ECM #1	Lighting Upgrade General	$75	$300	$0	$375	$241	$0	$241	15	$3,615	$0	864.0%	1.6	64.23%	$2,502.04
ECM #2	Lighting Controls Upgrade	$4,650	$1,150	$580	$5,220	$744	$0	$744	15	$11,160	$0	113.8%	7.0	11.45%	$3,661.82
ECM #3	Computer Stand-by or Hibernate	$0	$833	$0	$833	$1,266	$0	$1,266	15	$18,990	$0	2179.7%	0.7	151.98%	$14,280.43
ECM #4	AC Unit Replacement	$4,447	$4,888	$874	$8,461	$560	$0	$560	15	$8,400	$0	-0.7%	15.1	-0.09%	($1,775.76)
ECM #5	Boiler Burner Controls	$2,730	$2,000	$0	$4,730	$473	$0	$473	15	$7,095	$0	50.0%	10.0	5.56%	$916.64
ECM #6	Replace Steam Boiler	$20,810	$24,737	$0	$45,547	$2,581	$0	$2,581	35	$90,335	$0	98.3%	17.6	4.42%	$9,911.52
REM RENEWABLE ENERGY AND FINANCIAL COSTS AND SAVINGS SUMMARY															
REM #1	45.8 kW Solar Array	$310,613	$0	$0	$310,613	$8,750	$10,195	$18,945	15	$284,175	$152,925	-8.5%	16.4	-1.09%	($126,837.81)

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

OMB No. 2060-0347

STATEMENT OF ENERGY PERFORMANCE
North Brunswick BOE - Board of education office

Building ID: 3316345
For 12-month Period Ending: July 31, 2012[1]
Date SEP becomes ineligible: N/A
Date SEP Generated: November 07, 2012

Facility
North Brunswick BOE - Board of education office
300 Old Georges Road
North Brunswick, NJ 08902

Facility Owner
North Brunswick Township Board of Education
300 Old Georges Road
North Brunswick, NJ 08902

Primary Contact for this Facility
Susan Irons
300 Old Georges Road
North Brunswick, NJ 08902

Year Built: 1986
Gross Floor Area (ft²): 24,642

Energy Performance Rating[2] (1-100) 77

Site Energy Use Summary[3]

Electricity - Grid Purchase(kBtu)	536,071
Natural Gas (kBtu)[4]	1,090,193
Total Energy (kBtu)	1,626,264

Energy Intensity[4]

Site (kBtu/ft²/yr)	66
Source (kBtu/ft²/yr)	119

Emissions (based on site energy use)

Greenhouse Gas Emissions ($MtCO_2e$/year)	134

Electric Distribution Utility
Public Service Electric & Gas Co

National Median Comparison

National Median Site EUI	92
National Median Source EUI	166
% Difference from National Median Source EUI	-28%
Building Type	Office

Stamp of Certifying Professional

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

Meets Industry Standards[5] **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.

ENERGY STAR® Data Checklist for Commercial Buildings

In order for a building to qualify for the ENERGY STAR, a Professional Engineer (PE) or a Registered Architect (RA) must validate the accuracy of the data underlying the building's energy performance rating. This checklist is designed to provide an at-a-glance summary of a property's physical and operating characteristics, as well as its total energy consumption, to assist the PE or RA in double-checking the information that the building owner or operator has entered into Portfolio Manager.

Please complete and sign this checklist and include it with the stamped, signed Statement of Energy Performance.
NOTE: You must check each box to indicate that each value is correct, OR include a note.

CRITERION	VALUE AS ENTERED IN PORTFOLIO MANAGER	VERIFICATION QUESTIONS	NOTES	☑
Building Name	North Brunswick BOE - Board of education office	Is this the official building name to be displayed in the ENERGY STAR Registry of Labeled Buildings?		☐
Type	Office	Is this an accurate description of the space in question?		☐
Location	300 Old Georges Road, North Brunswick, NJ 08902	Is this address accurate and complete? Correct weather normalization requires an accurate zip code.		☐
Single Structure	Single Facility	Does this SEP represent a single structure? SEPs cannot be submitted for multiple-building campuses (with the exception of a hospital, k-12 school, hotel and senior care facility) nor can they be submitted as representing only a portion of a building.		☐
BOE Office (Office)				
CRITERION	**VALUE AS ENTERED IN PORTFOLIO MANAGER**	**VERIFICATION QUESTIONS**	**NOTES**	☑
Gross Floor Area	24,642 Sq. Ft.	Does this square footage include all supporting functions such as kitchens and break rooms used by staff, storage areas, administrative areas, elevators, stairwells, atria, vent shafts, etc. Also note that existing atriums should only include the base floor area that it occupies. Interstitial (plenum) space between floors should not be included in the total. Finally gross floor area is not the same as leasable space. Leasable space is a subset of gross floor area.		☐
Weekly operating hours	40 Hours	Is this the total number of hours per week that the Office space is 75% occupied? This number should exclude hours when the facility is occupied only by maintenance, security, or other support personnel. For facilities with a schedule that varies during the year, "operating hours/week" refers to the total weekly hours for the schedule most often followed.		☐
Workers on Main Shift	40	Is this the number of employees present during the main shift? Note this is not the total number of employees or visitors who are in a building during an entire 24 hour period. For example, if there are two daily 8 hour shifts of 100 workers each, the Workers on Main Shift value is 100. The normal worker density ranges between 0.3 and 5.3 workers per 1000 square feet (92.8 square meters)		☐
Number of PCs	40	Is this the number of personal computers in the Office?		☐
Percent Cooled	50% or more	Is this the percentage of the total floor space within the facility that is served by mechanical cooling equipment?		☐
Percent Heated	50% or more	Is this the percentage of the total floor space within the facility that is served by mechanical heating equipment?		☐

ENERGY STAR® Data Checklist for Commercial Buildings

Energy Consumption

Power Generation Plant or Distribution Utility: Public Service Electric & Gas Co

Fuel Type: Electricity

Meter: electric (kWh (thousand Watt-hours))
Space(s): Entire Facility
Generation Method: Grid Purchase

Start Date	End Date	Energy Use (kWh (thousand Watt-hours))
06/29/2012	07/28/2012	20,760.00
05/29/2012	06/28/2012	20,760.00
04/29/2012	05/28/2012	9,900.00
03/29/2012	04/28/2012	10,470.00
02/29/2012	03/28/2012	11,550.00
01/29/2012	02/28/2012	11,070.00
12/29/2011	01/28/2012	9,990.00
11/29/2011	12/28/2011	13,440.00
10/29/2011	11/28/2011	10,650.00
09/29/2011	10/28/2011	11,760.00
08/29/2011	09/28/2011	13,170.00
electric Consumption (kWh (thousand Watt-hours))		**143,520.00**
electric Consumption (kBtu (thousand Btu))		**489,690.24**
Total Electricity (Grid Purchase) Consumption (kBtu (thousand Btu))		**489,690.24**
Is this the total Electricity (Grid Purchase) consumption at this building including all Electricity meters?		☐

Fuel Type: Natural Gas

Meter: gas (therms)
Space(s): Entire Facility

Start Date	End Date	Energy Use (therms)
06/29/2012	07/28/2012	343.00
05/29/2012	06/28/2012	514.00
04/29/2012	05/28/2012	551.00
03/29/2012	04/28/2012	742.00
02/29/2012	03/28/2012	1,158.00
01/29/2012	02/28/2012	1,664.00
12/29/2011	01/28/2012	2,041.00
11/29/2011	12/28/2011	1,559.00
10/29/2011	11/28/2011	1,148.00
09/29/2011	10/28/2011	330.00
08/29/2011	09/28/2011	21.00

gas Consumption (therms)	**10,071.00**
gas Consumption (kBtu (thousand Btu))	**1,007,100.00**
Total Natural Gas Consumption (kBtu (thousand Btu))	**1,007,100.00**
Is this the total Natural Gas consumption at this building including all Natural Gas meters?	☐

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

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

Certifying Professional

(When applying for the ENERGY STAR, the Certifying Professional must be the same PE or RA that signed and stamped the SEP.)

Name: _____ Date: _____

Signature: _____

Signature is required when applying for the ENERGY STAR.

FOR YOUR RECORDS ONLY. DO NOT SUBMIT TO EPA.

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

Facility
North Brunswick BOE - Board of education office
300 Old Georges Road
North Brunswick, NJ 08902

Facility Owner
North Brunswick Township Board of Education
300 Old Georges Road
North Brunswick, NJ 08902

Primary Contact for this Facility
Susan Irons
300 Old Georges Road
North Brunswick, NJ 08902

General Information

North Brunswick BOE - Board of education office	
Gross Floor Area Excluding Parking: (ft^2)	24,642
Year Built	1986
For 12-month Evaluation Period Ending Date:	July 31, 2012

Facility Space Use Summary

BOE Office	
Space Type	Office
Gross Floor Area (ft^2)	24,642
Weekly operating hours	40
Workers on Main Shift	40
Number of PCs	40
Percent Cooled	50% or more
Percent Heated	50% or more

Energy Performance Comparison

	Evaluation Periods		Comparisons		
Performance Metrics	**Current** (Ending Date 07/31/2012)	**Baseline** (Ending Date 07/31/2012)	**Rating of 75**	**Target**	**National Median**
Energy Performance Rating	77	77	75	N/A	50
Energy Intensity					
Site (kBtu/ft^2)	66	66	68	N/A	92
Source (kBtu/ft^2)	119	119	123	N/A	166
Energy Cost					
$/year	N/A	N/A	N/A	N/A	N/A
$/$ft^2$/year	N/A	N/A	N/A	N/A	N/A
Greenhouse Gas Emissions					
$MtCO_2e$/year	134	134	138	N/A	187
$kgCO_2e/ft^2$/year	5	5	5	N/A	7

More than 50% of your building is defined as Office. Please note that your rating accounts for all of the spaces listed. The National Median column presents energy performance data your building would have if your building had a median rating of 50.

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

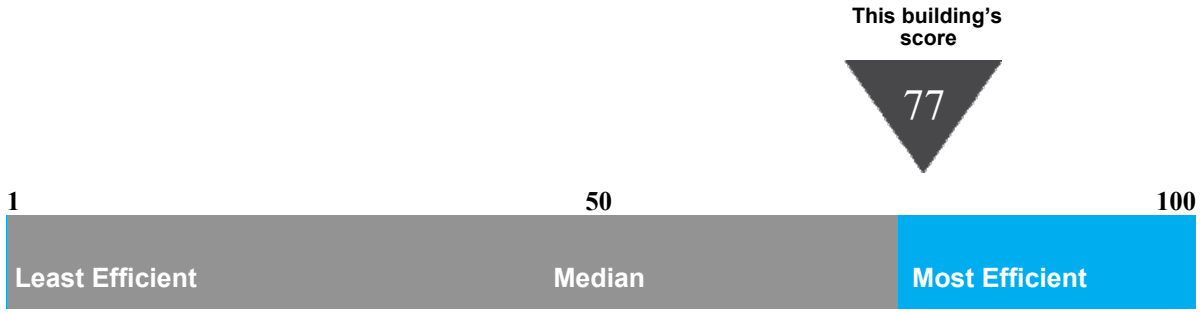
Statement of Energy Performance

2012

North Brunswick BOE - Board of education office
300 Old Georges Road
North Brunswick, NJ 08902

Portfolio Manager Building ID: 3316345

The energy use of this building has been measured and compared to other similar buildings using the Environmental Protection Agency's (EPA's) Energy Performance Scale of 1–100, with 1 being the least energy efficient and 100 the most energy efficient. For more information, visit energystar.gov/benchmark.



This building uses 119 kBtu per square foot per year.*

*Based on source energy intensity for the 12 month period ending July 2012

Buildings with a score of 75 or higher may qualify for EPA's ENERGY STAR.

I certify that the information contained within this statement is accurate and in accordance with U.S. Environmental Protection Agency's measurement standards, found at energystar.gov

Date of certification

EPA United States Environmental Protection Agency

Date Generated: 11/07/2012

APPENDIX D

MAJOR EQUIPMENT LIST

Concord Engineering Group

North Brunswick Twp. BOE

AC Units

Tag			
Unit Type	Condensing Unit	Condensing Unit	Condensing Unit
Qty	1	1	1
Location	Outside on Grade	Outside on Grade	Outside on Grade
Area Served	AC Unit in Attic	AC Unit in Attic	AC Unit in Attic
Manufacturer	Liebert	Sea Breeze	Arcoaire
Model #	-	18A23ZOGA	-
Serial #	-		-
Cooling Type	DX, R-22	DX, R-22	DX, R-22
Cooling Capacity (Tons)	1.5 Tons	1.5 Tons	1.5 Tons
Cooling Efficiency (SEER/EER)	-	13 SEER	-
Heating Type	-	N/A	-
Heating Input (MBH)	-	N/A	-
Efficiency	-	N/A	-
Fuel	-	N/A	-
Approx Age	15	10	20
ASHRAE Service Life	15	15	15
Remaining Life	0	5	(5)
Comments			

Note:
"N/A" = Not Applicable.
"-" = Info Not Available

AC Units

Tag			
Unit Type	Fan Coil Unit	Packaged Unit	
Qty	4	1	
Location	Attic	Outside on Grade	
Area Served	Office Space and Corridors	Board Room and Adjacent Offices	
Manufacturer	International Comfort Products	AAC Commercial	
Model #	NFCX6000C2	GSC16-240-375-1Y	
Serial #	L0208 50060	5602G 00571	
Cooling Type	DX, R-22	DX, R-22	
Cooling Capacity (Tons)	1.5 Tons	20 Tons	
Cooling Efficiency (SEER/EER)	-	9 EER	
Heating Type	N/A	Gas HX	
Heating Input (MBH)	N/A	375	
Efficiency	N/A	80%	
Fuel	N/A	Natural Gas	
Approx Age	10	10	
ASHRAE Service Life	15	15	
Remaining Life	5	5	
Comments			

Note:
"N/A" = Not Applicable.
"-" = Info Not Available

MAJOR EQUIPMENT LIST

Concord Engineering Group

North Brunswick Twp. BOE

Boilers

Tag			
Unit Type	Cast Iron Sectional Boiler	Cast Iron Sectional Boiler	
Qty	1	1	
Location	Boiler Room	Boiler Room	
Area Served	Office Spaces and Corridors	Office Spaces and Corridors	
Manufacturer	HB Smith	HB Smith	
Model #	Series 28-6	2500L	
Serial #	N86 991		
Input Capacity (Btu/Hr)	1,645,000	1,589,000	
Rated Output Capacity (Btu/Hr)	987,200	1,093,900	
Approx. Efficiency %	60.0%	68.8%	
Fuel	Nat Gas	Nat Gas	
Approx Age	26	26	
ASHRAE Service Life	35	35	
Remaining Life	9	9	
Comments			

Note: **15**

"N/A" = Not Applicable.
"-" = Info Not Available

MAJOR EQUIPMENT LIST

Concord Engineering Group

North Brunswick Twp. BOE

Domestic Water Heaters

Tag			
Unit Type	Natural Gas Hot Water Heater		
Qty	1		
Location	Boiler Room		
Area Served	Whole Building		
Manufacturer	A.O. Smith		
Model #	FPSH 40 260		
Serial #	MF02-1782447-260		
Size (Gallons)	40		
Input Capacity (MBH/KW)	48 MBH		
Recovery (Gal/Hr)	48.3		
Efficiency %			
Fuel	Natural Gas		
Approx Age	10		
ASHRAE Service Life	25		
Remaining Life	15		
Comments			

Note:
"N/A" = Not Applicable.
"-" = Info Not Available

MAJOR EQUIPMENT LIST

Concord Engineering Group

North Brunswick Twp. BOE

Pumps

Tag			
Unit Type	Vertical In-Line		
Qty	2		
Location	Boiler Room		
Area Served	B-1 and B-2 Condensate Return		
Manufacturer	Air Flow Pump Corp		
Model #	AFP-20DS-CBF		
Serial #	NSP-1/2		
Horse Power	1		
Flow	-		
Motor Info			
Electrical Power	110/230V		
RPM	3450		
Motor Efficiency %	-		
Approx Age	5		
ASHRAE Service Life	15		
Remaining Life	10		
Comments			

Note:
"N/A" = Not Applicable.
"-" = Info Not Available

APPENDIX E

CEG Project #: 9C12053
Facility Name: BOE Offices
Address: Old Bridges Road
City, State, Zip North Brunswick, NJ 08902

			Existing Fixtures						Proposed Fixtures Retrofit							Retrofit Energy Savings			Lighting Retrofit Costs					Proposed Lighting Controls					
Fixture Reference #	Location	Average Burn Hours	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, kW	Energy Savings, kWh	Energy Savings, $	Material	Total Labor	Total All	Rebate Estimate	Simple Payback	Control Ref #	Controls Description	Qty of Controls	Hour Reduction %	Energy Savings, kWh	Energy Savings, $
222.11	2nd Floor Corridor	3000	2x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	2	62	8	0.50	1,488	Existing to Remain	0	2	62	0	0.50	1,488	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
222.21	2nd Floor Corridor	3000	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	2	62	12	0.74	2,232	Existing to Remain	0	2	62	0	0.74	2,232	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
222.21	Office 28	2600	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	2	62	10	0.62	1,612	Existing to Remain	0	2	62	0	0.62	1,612	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	4	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	322	$53
222.21	Office 28 Testing	2600	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	2	62	4	0.25	645	Existing to Remain	0	2	62	0	0.25	645	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	5	Dual Technology Occupancy Sensor - Switch Mnt.	1	20.0%	129	$21
222.21	Petela Office	2600	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	2	62	4	0.25	645	Existing to Remain	0	2	62	0	0.25	645	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	5	Dual Technology Occupancy Sensor - Switch Mnt.	1	20.0%	129	$21
222.21	Zychowski Office	2600	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	2	62	6	0.37	967	Existing to Remain	0	2	62	0	0.37	967	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	5	Dual Technology Occupancy Sensor - Switch Mnt.	1	20.0%	193	$32
222.21	Office 27 Reception	2600	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	2	62	9	0.56	1,451	Existing to Remain	0	2	62	0	0.56	1,451	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	4	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	290	$48
222.21	Office 27	2600	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	2	62	4	0.25	645	Existing to Remain	0	2	62	0	0.25	645	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	5	Dual Technology Occupancy Sensor - Switch Mnt.	1	20.0%	129	$21
222.21	N-8 Supervisors	2600	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	2	62	4	0.25	645	Existing to Remain	0	2	62	0	0.25	645	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	5	Dual Technology Occupancy Sensor - Switch Mnt.	1	20.0%	129	$21
222.21	Office 25 Reception	2600	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	2	62	4	0.25	645	Existing to Remain	0	2	62	0	0.25	645	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	5	Dual Technology Occupancy Sensor - Switch Mnt.	1	20.0%	129	$21
222.21	Office 25	2600	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	2	62	4	0.25	645	Existing to Remain	0	2	62	0	0.25	645	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	5	Dual Technology Occupancy Sensor - Switch Mnt.	1	20.0%	129	$21
222.21	Conference Room	2600	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	2	62	6	0.37	967	Existing to Remain	0	2	62	0	0.37	967	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	5	Dual Technology Occupancy Sensor - Switch Mnt.	1	20.0%	193	$32
222.21	Work Room	2600	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	2	62	6	0.37	967	Existing to Remain	0	2	62	0	0.37	967	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	5	Dual Technology Occupancy Sensor - Switch Mnt.	1	20.0%	193	$32
222.21	Accounting	2600	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	2	62	12	0.74	1,934	Existing to Remain	0	2	62	0	0.74	1,934	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	4	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	387	$63
222.21	BA Office - Reception	2600	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	2	62	7	0.43	1,128	Existing to Remain	0	2	62	0	0.43	1,128	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	4	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	226	$37
222.21	BA Office	2600	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	2	62	6	0.37	967	Existing to Remain	0	2	62	0	0.37	967	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	5	Dual Technology Occupancy Sensor - Switch Mnt.	1	20.0%	193	$32
222.21	Office 21 - Payroll	2600	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	2	62	7	0.43	1,128	Existing to Remain	0	2	62	0	0.43	1,128	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	4	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	226	$37
232.21	Side Office - 21	2600	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	3	86	3	0.26	671	Existing to Remain	0	3	86	0	0.26	671	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	5	Dual Technology Occupancy Sensor - Switch Mnt.	1	20.0%	134	$22
222.21	Side Office - 21	2600	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	2	62	3	0.19	484	Existing to Remain	0	2	62	0	0.19	484	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	5	Dual Technology Occupancy Sensor - Switch Mnt.	1	20.0%	97	$16
222.21	Women's Restroom	2600	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	2	62	1	0.06	161	Existing to Remain	0	2	62	0	0.06	161	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
222.21	Men's Restroom	2600	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	2	62	1	0.06	161	Existing to Remain	0	2	62	0	0.06	161	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
242.21	Lobby	3000	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	4	107	1	0.11	321	Existing to Remain	0	4	107	0	0.11	321	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
222.21	Basement Corridor	3000	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	2	62	7	0.43	1,302	Existing to Remain	0	2	62	0	0.43	1,302	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
232.22	Board Meeting Room	1800	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	3	86	24	2.06	3,715	Existing to Remain	0	3	86	0	2.06	3,715	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
242.21	Office 11	2600	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	4	107	4	0.43	1,113	Existing to Remain	0	4	107	0	0.43	1,113	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	5	Dual Technology Occupancy Sensor - Switch Mnt.	1	20.0%	223	$36

			Existing Fixtures						Proposed Fixtures Retrofit							Retrofit Energy Savings			Lighting Retrofit Costs					Proposed Lighting Controls					
Fixture Reference #	Location	Average Burn Hours	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, kW	Energy Savings, kWh	Energy Savings, $	Material	Total Labor	Total All	Rebate Estimate	Simple Payback	Control Ref #	Controls Description	Qty of Controls	Hour Reduction %	Energy Savings, kWh	Energy Savings, $
221.11	Storage	1200	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	2	62	10	0.62	744	Existing to Remain	0	2	62	0	0.62	744	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	4	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	149	$24
222.21	Science Supply Room	2600	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	2	62	8	0.50	1,290	Existing to Remain	0	2	62	0	0.50	1,290	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	4	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	258	$42
227.21	Science Supply Room	2600	2x2, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	2	65	2	0.13	338	Existing to Remain	0	2	65	0	0.13	338	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
232.21	Office 9	2600	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	3	86	2	0.17	447	Existing to Remain	0	3	86	0	0.17	447	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
242.21	Room 10	2600	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	4	107	10	1.07	2,782	Existing to Remain	0	4	107	0	1.07	2,782	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	4	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	556	$91
232.21	Office 14	2600	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	3	86	5	0.43	1,118	Existing to Remain	0	3	86	0	0.43	1,118	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	5	Dual Technology Occupancy Sensor - Switch Mnt.	1	20.0%	224	$37
247.21	Side Office - 14	2600	2x2, 4 Lamp, 17w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	4	68	2	0.14	354	Existing to Remain	0	4	68	0	0.14	354	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
232.21	Side Office - 14	2600	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	3	86	2	0.17	447	Existing to Remain	0	3	86	0	0.17	447	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
221.41	Custodial Closet	1200	1x4, 2 Lamp, 32w T8, Elect. Ballast, Wall Mnt., Prismatic Lens	2	62	1	0.06	74	Existing to Remain	0	2	62	0	0.06	74	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
242.21	Office 17	2600	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	4	107	4	0.43	1,113	Existing to Remain	0	4	107	0	0.43	1,113	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	5	Dual Technology Occupancy Sensor - Switch Mnt.	1	20.0%	223	$36
242.21	Copy Area - 17	2600	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	4	107	2	0.21	556	Existing to Remain	0	4	107	0	0.21	556	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
242.21	Files - 17	2600	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	4	107	2	0.21	556	Existing to Remain	0	4	107	0	0.21	556	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
242.21	Side Office - 17	2600	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	4	107	2	0.21	556	Existing to Remain	0	4	107	0	0.21	556	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
221.11	18 Mechanical Room	1200	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	2	62	6	0.37	446	Existing to Remain	0	2	62	0	0.37	446	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
613	Boiler Room	3000	Industrial Fixture, 300w A19 Lamp	1	300	2	0.60	1,800	Remove and Return	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., No Lens	2	62	2	0.12	372	0.48	1,428	$234	$50.00	$200.00	$250.00	$0.00	1.07	0	No New Controls	0	0.0%	0	$0
221.11	Corridor to Boiler Room	3000	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	2	62	5	0.31	930	Existing to Remain	0	2	62	0	0.31	930	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
601	Corridor to Boiler Room	3000	(2) 7w CFL Exit Sign	2	16	1	0.02	48	Remove and Return	LED Exit Sign	1	2	1	0.00	6	0.01	42	$7	$25.00	$100.00	$125.00	$0.00	18.15	0	No New Controls	0	0.0%	0	$0
	TOTAL					**94**	**16**	**34,908**					**3**	**15.77**	**33,438**	**0.49**	**1,470**	**$241**	**$75.00**	**$300.00**	**$375.00**	**$0.00**				**23**		**4,539**	**$744**

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
Board of Education Office	3750	SHARP NU-U235F2	195	17.5	3,420	45.83	53,352	37.1	8,171	13.40

= Proposed Parking PV Layout

Notes:

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

Project Name: **LGEA Solar PV Project - Board of Education Office**
Location: **North Brunswick, NJ**
Description: **Photovoltaic System 100% Financing - 15 year**

Simple Payback Analysis

	Photovoltaic System 100% Financing - 15 year
Total Construction Cost	$310,613
Annual kWh Production	53,352
Annual Energy Cost Reduction	$8,750
Average Annual SREC Revenue	$10,195

Simple Payback: **16.40** Years

Life Cycle Cost Analysis

Analysis Period (years):	15	Financing %:	100%
Discount Rate:	3%	Maintenance Escalation Rate:	3.0%
Average Energy Cost ($/kWh)	**$0.164**	Energy Cost Escalation Rate:	3.0%
Financing Rate:	6.00%	Average SREC Value ($/kWh)	$0.191

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	53,352	$8,750	$0	$13,338	$18,278	$13,175	($9,366)	($9,366)
2	$0	53,085	$9,012	$0	$13,271	$17,466	$13,988	($9,170)	($18,536)
3	$0	52,820	$9,283	$0	$13,205	$16,603	$14,851	($8,966)	($27,502)
4	$0	52,556	$9,561	$0	$13,139	$15,687	$15,766	($8,754)	($36,255)
5	$0	52,293	$9,848	$539	$13,073	$14,715	$16,739	($9,071)	($45,326)
6	$0	52,031	$10,143	$536	$10,406	$13,682	$17,771	($11,440)	($56,766)
7	$0	51,771	$10,448	$533	$10,354	$12,586	$18,867	($11,185)	($67,951)
8	$0	51,512	$10,761	$531	$10,302	$11,422	$20,031	($10,921)	($78,871)
9	$0	51,255	$11,084	$528	$10,251	$10,187	$21,267	($10,647)	($89,518)
10	$0	50,999	$11,416	$525	$7,650	$8,875	$22,578	($12,913)	($102,431)
11	$0	50,744	$11,759	$523	$7,612	$7,483	$23,971	($12,606)	($115,036)
12	$0	50,490	$12,112	$520	$7,573	$6,004	$25,449	($12,288)	($127,325)
13	$0	50,237	$12,475	$517	$7,536	$4,435	$27,019	($11,960)	($139,285)
14	$0	49,986	$12,849	$515	$4,999	$2,768	$28,685	($14,120)	($153,405)
15	$0	49,736	$13,235	$512	$4,974	$999	$30,455	($13,757)	($167,163)
	Totals:	772,868	$162,735	$5,779	$147,683	$161,190	$310,613	($167,163)	($1,234,736)

Net Present Value (NPV) **($126,838)**