

**NEW BRUNSWICK
BOARD OF EDUCATION**

WOODROW WILSON SCHOOL

**133 TUNISON ROAD
NEW BRUNSWICK, NJ 08901**

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: | Direct Energy |

| | |
|-------------------------------|-------------------------------|
| Natural Gas Utility Provider: | Public Service Electric & Gas |
| Utility Rate Structure: | Large Volume Gas (LVG) |
| Third Party Supplier: | None |

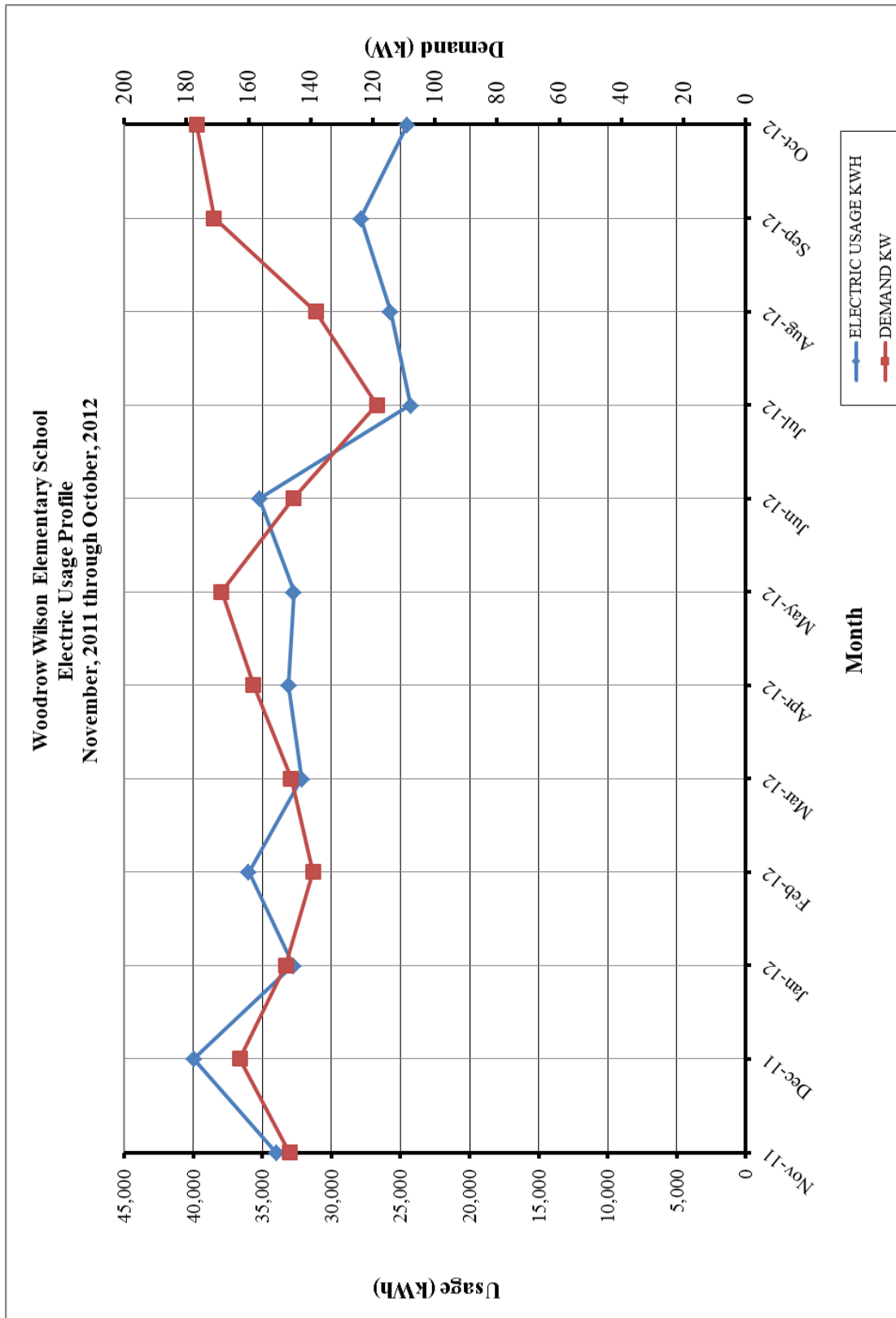
The electric usage profile represents the actual electrical usage for the facility. The electric utility measures consumption in kilowatt-hours (KWH) and maximum demand in kilowatts (KW). One KWH usage is equivalent to 1000 watts running for one hour. One KW of electric demand is equivalent to 1000 watts 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: 728004136 ; 728010040 | | | |
| Account # 70-055-875-02 ; 70-051-337-06 | | | |
| Third Party Utility Provider: Direct Energy | | | |
| TPS Meter / Acct No: N/A | | | |
| MONTH OF USE | CONSUMPTION KWH | DEMAND KW | TOTAL BILL |
| Nov-11 | 34,000 | 146.8 | \$4,868 |
| Dec-11 | 39,960 | 162.8 | \$5,490 |
| Jan-12 | 32,760 | 148.0 | \$4,569 |
| Feb-12 | 36,000 | 139.2 | \$4,921 |
| Mar-12 | 32,160 | 146.4 | \$4,490 |
| Apr-12 | 33,120 | 158.4 | \$3,934 |
| May-12 | 32,720 | 168.8 | \$6,211 |
| Jun-12 | 35,200 | 145.6 | \$5,911 |
| Jul-12 | 24,280 | 118.8 | \$4,556 |
| Aug-12 | 25,720 | 138.4 | \$4,978 |
| Sep-12 | 27,880 | 171.2 | \$4,118 |
| Oct-12 | 24,520 | 176.8 | \$6,449 |
| Totals | 378,320 | 176.8 Max | \$60,496 |
| AVERAGE DEMAND | | 151.8 KW average | |
| AVERAGE RATE | | \$0.160 \$/kWh | |

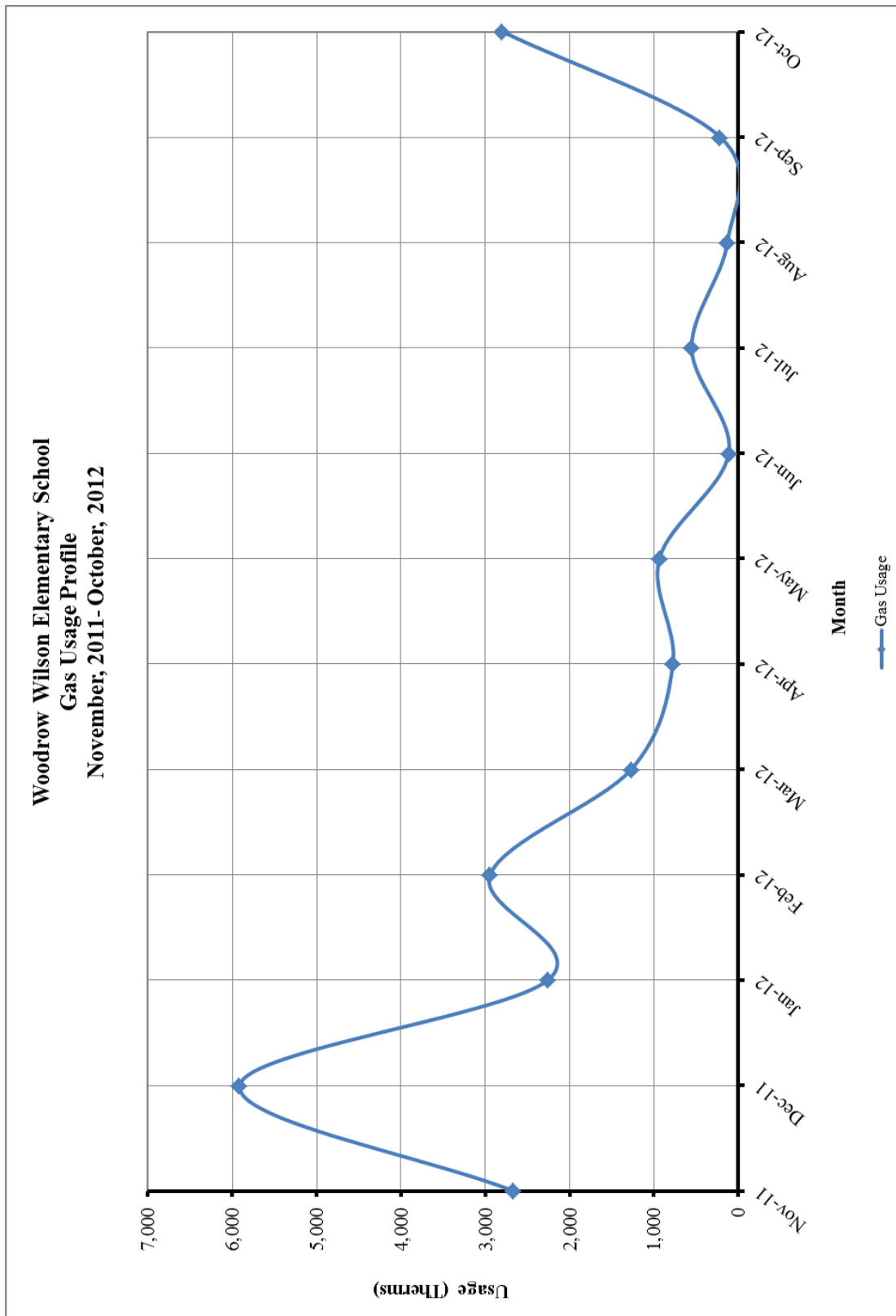
Figure 1
Electricity Usage Profile



**Table 4
Natural Gas Billing Data**

| NATURAL GAS USAGE SUMMARY | | |
|-------------------------------------|---------------------------------|--------------------|
| Utility Provider: PSE&G | | |
| Rate: LVG | | |
| Meter No: 1810091 | | |
| Point of Delivery ID: 42-008-661-02 | | |
| Third Party Utility Provider: N/A | | |
| TPS Meter No: N/A | | |
| MONTH OF USE | CONSUMPTION (THERMS) | TOTAL BILL |
| Nov-11 | 2,674.00 | \$2,561.24 |
| Dec-11 | 5,914.00 | \$5,053.01 |
| Jan-12 | 2,256.00 | \$2,298.27 |
| Feb-12 | 2,943.00 | \$2,684.57 |
| Mar-12 | 1,270.00 | \$877.49 |
| Apr-12 | 777.00 | \$567.40 |
| May-12 | 937.00 | \$681.98 |
| Jun-12 | 115.00 | \$176.04 |
| Jul-12 | 555.00 | \$484.62 |
| Aug-12 | 131.00 | \$188.78 |
| Sep-12 | 218.00 | \$249.66 |
| Oct-12 | 2,801.00 | \$2,916.13 |
| TOTALS | 20,591.00 | \$18,739.19 |
| AVERAGE RATE: | \$0.91 | \$/THERM |

Figure 2
Natural Gas Usage Profile



II. FACILITY DESCRIPTION

The Woodrow Wilson Elementary School is located at 133 Tunison Road in New Brunswick, New Jersey. The 42,000 SF Woodrow Wilson Elementary School was built in 1954 with additions in 1986 and 1998. The building is a single-story structure and consists of office space for administrative use, gymnasium, classrooms, kitchen, media center, cafeteria and mechanical rooms.

Occupancy Profile

The typical hours of operation for Woodrow Wilson Elementary School are Monday through Friday between 8:00 am and 4:30 pm, with custodial services running until 11:00 pm. The elementary school has a student population of 406 present for 10 months, and an administrative occupancy of 40.

Building Envelope

Exterior walls for the Woodrow Wilson Elementary School are brick faced with a concrete block construction. The windows in the original wing are in below average condition with single pane windows and the remaining windows in the elementary school are in average condition with double pane windows. The roof is a flat, built up rubber roof with the original building containing stone ballasts that appears to be in good condition and the newest addition contains EPDM roofing.

Heating Plant

Heating is provided to the original building and 1986 addition from the main Mechanical Room which contains two, natural gas fired, cast iron sectional steam boilers made by H.B. Smith. Both boilers have equivalent heating capacity characteristics having an input capacity of 2,499 MBH and output of 1,965 MBH for a combined output of 3,930 MBH. Both boilers appear to be maintained and in average condition. Combustion tests were not available for review but based on age the estimated fuel-to-thermal efficiency for the boilers is 75%, based on radiation losses and inefficiencies in operation inherent to the older technology. Both boilers are approximately 23 years old. The steam system also contains a condensate return pumping system manufactured by National Pump & Controls. The steam boilers are also connected to a heat exchanger which converts the steam to hot water for the 1986 addition. The heating hot water is circulated throughout the 1986 addition via two constant speed in-line pumps located in the Mechanical Room. The pumps are driven with standard efficiency motors that are recommended to be replaced with NEMA premium efficient motors. The steam and hot water heating systems provide heating hot water and steam to the classroom units, hot water fin-tube radiators and heating and ventilation units throughout the original building and 1986 addition.

Heating for the 1998 Wing is provided by two Caravan Slant fin boilers. The heating hot water is circulated through the 1998 wing via two constant speed in-line pumps located in the New Mechanical Room. The hot water from these boilers is distributed to the Variable Air Volume (VAV) boxes for each classroom.

HVAC Systems

The 1998 wing is conditioned by a packaged rooftop unit manufactured by Trane. This unit is in good condition and contains gas fired heat for pre-conditioning.

The 1986 wing is centrally conditioned by a packaged air conditioning only unit manufactured by Trane. This unit was just installed in 2012 and is in very good condition.

The Multi-Purpose Room is conditioned via an indoor air-handling unit that is of an older vintage but appears to be functioning.

The original classrooms in the building are conditioned via floor mounted unit ventilators with steam coils. The remaining areas within the school are all provided with overhead distribution from VAV's and rooftop units.

Exhaust System

Air is exhausted from the toilet rooms and other areas of the facility through the roof exhaust fans.

HVAC System Controls

The HVAC systems within the Woodrow Wilson Elementary School are controlled by various controls systems. There are Barbara Coleman controls for outside air reset which controls the boiler temperatures and output. There are Trane Controls which control the rooftop units for the 1986 and 1998 additions.

Domestic Hot Water

The main source of domestic hot water for Woodrow Wilson Elementary School is a State 260 MBH gas fired water heater with an integrated storage capacity of 100 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 | \$16,277 | \$1,838 | 8.9 | 69.4% |
| ECM #2 | Gym Lighting Upgrade | \$6,550 | \$624 | 10.5 | 42.9% |
| ECM #3 | Exterior Lighting Upgrade | \$4,610 | \$1,105 | 4.2 | 259.5% |
| ECM #4 | Lighting Controls Upgrade | \$11,525 | \$2,195 | 5.3 | 185.7% |
| ECM #5 | Computer Automatic Standby or Hibernate Modes | \$2,134 | \$3,161 | 0.7 | 640.6% |
| ECM #6 | Rooftop Unit Replacements | \$90,188 | \$1,687 | 53.5 | -71.9% |
| ECM #7 | Domestic Hot Water Heater Upgrade | \$11,101 | \$622 | 17.8 | -32.8% |
| ECM #8 | Boiler Burner and Controls Upgrade | \$22,000 | \$684 | 32.2 | -34.7% |
| RENEWABLE ENERGY MEASURES (REM's) | | | | | |
| ECM NO. | DESCRIPTION | NET INSTALLATION COST | ANNUAL SAVINGS | SIMPLE PAYBACK (Yrs) | SIMPLE LIFETIME ROI |
| REM #1 | 169.44 KW PV System | \$1,022,169 | \$68,741 | 14.9 | 0.9% |
| Notes: | A. Cost takes into consideration applicable NJ Smart Start TM 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 | 4.0 | 11,486 | - |
| ECM #2 | Gym Lighting Upgrade | 2 | 3,900 | - |
| ECM #3 | Exterior Lighting Upgrade | 2.0 | 6,904 | - |
| ECM #4 | Lighting Controls Upgrade | - | 13,718 | - |
| ECM #5 | Computer Automatic Standby or Hibernate Modes | - | 19,757 | - |
| ECM #6 | Rooftop Unit Replacements | 4.8 | 10,545 | - |
| ECM #7 | Domestic Hot Water Heater Upgrade | - | - | 683 |
| ECM #8 | Boiler Burner and Controls Upgrade | - | - | 752 |
| RENEWABLE ENERGY MEASURES (REM's) | | | | |
| ECM NO. | DESCRIPTION | ANNUAL UTILITY REDUCTION | | |
| | | ELECTRIC DEMAND (KW) | ELECTRIC CONSUMPTION (KWH) | NATURAL GAS (THERMS) |
| REM #1 | 169.44 KW PV System | 169.4 | 195,796 | - |

**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 | \$1,838 | \$16,277 | \$0 | \$16,277 | 8.9 |
| Gym Lighting Upgrade | \$624 | \$7,550 | \$1,000 | \$6,550 | 10.5 |
| Exterior Lighting Upgrade | \$1,105 | \$4,610 | \$0 | \$4,610 | 4.2 |
| Lighting Controls Upgrade | \$2,195 | \$12,600 | \$1,075 | \$11,525 | 5.3 |
| Computer Automatic Standby or Hibernate | \$3,161 | \$2,134 | \$0 | \$2,134 | 0.7 |
| Rooftop Unit Replacements | \$1,687 | \$90,188 | \$0 | \$90,188 | 53.5 |
| Domestic Hot Water Heater Upgrade | \$622 | \$11,500 | \$399 | \$11,101 | 17.8 |
| Boiler Burner and Controls Upgrade | \$684 | \$22,000 | \$0 | \$22,000 | 32.2 |
| <i>Design / Construction Extras (15%)</i> | <i>\$0</i> | <i>\$25,029</i> | <i>\$0</i> | <i>\$25,029</i> | |
| Total Project | \$11,916 | \$191,887 | \$2,474 | \$189,413 | 16 |

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 Woodrow Wilson Elementary School is provided with fluorescent fixtures with older generation, 700 series and 741/ECO 32W T8 lamps and electronic ballasts. Although these T8 lamps are considered fairly efficient, further energy savings can be achieved by replacing the existing T8 lamps with new generation, 800 series 28W T8 lamps without compromising light output. Concord Engineering recommends that these fixtures remain unmodified due to the extensive costs which will be incurred if these fixtures are to be re-lamped and re-ballasted, which results in a long payback period unless said fixtures reside in an area which is over-lit, in which case the fixtures will be de-lamped and given a new reflector. 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.

The ECM also includes replacement of any incandescent lamps with compact fluorescent lamps. Compact fluorescent lamps (CFL's) were designed to be direct replacements for the standard incandescent lamps which are common to table lamps, spot lights, hi-hats, bathroom vanity lighting, etc. The light output of the CFL has been designed to resemble the incandescent lamp. The color rendering index (CRI) of the CFL is much higher than standard fluorescent lighting, and therefore provides a much "truer" light. The CFL is available in a myriad of shapes and sizes depending on the specific application. Typical replacements are: a 13-Watt CFL for a 60-Watt incandescent lamp, an 18-Watt CFL for a 75-Watt incandescent lamp, and a 26-Watt CFL for a 100-Watt incandescent lamp. The CFL is also available for a number of "brightness colors" that is indicated by the Kelvin rating. A 2700K CFL is the "warmest" color available and is closest in color to the incandescent lamp. CFL's are also available in 3000K, 3500K, and 4100K. The 4100K would be the "brightest" or "coolest" output. A CFL can be chosen to screw right into your existing fixtures, or hardwired into your existing fixtures. Where the existing fixture is controlled by a dimmer switch, the CFL bulb must be compatible with a dimmer switch. In some locations the bulb replacement will need to be tested to make sure the larger base of the CFL will fit into the existing fixture. The energy usage of an incandescent compared to a compact fluorescent approximately 3 to 4 times greater. In addition to the energy savings, compact fluorescent fixtures burn-hours are 8 to 15 times longer than incandescent fixtures ranging from 6,000 to 15,000 burn-hours compared to incandescent fixtures ranging from 750 to 1000 burn-hours. However, the maintenance savings due to reduced lamp replacement is offset by the higher cost of the CFL's compared to the incandescent lamps.

Additionally, there is a corridor area which contains an incandescent recessed down-light fixture which is to be replaced with a 18 watt LED.

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.

Energy Savings Summary:

| ECM #1 - ENERGY SAVINGS SUMMARY | |
|---|------------|
| Installation Cost (\$): | \$16,277 |
| NJ Smart Start Equipment Incentive (\$): | \$0 |
| Net Installation Cost (\$): | \$16,277 |
| Maintenance Savings (\$/Yr): | \$0 |
| Energy Savings (\$/Yr): | \$1,838 |
| Total Yearly Savings (\$/Yr): | \$1,838 |
| Estimated ECM Lifetime (Yr): | 15 |
| Simple Payback | 8.9 |
| Simple Lifetime ROI | 69.4% |
| Simple Lifetime Maintenance Savings | \$0 |
| Simple Lifetime Savings | \$27,570 |
| Internal Rate of Return (IRR) | 7% |
| Net Present Value (NPV) | \$5,664.92 |

ECM #2: Lighting Upgrade – Gymnasium

Description:

The gymnasium at Woodrow Wilson School is currently lit via Twenty-eight 400W Metal Halide fixtures. The space would be better served with a more efficient, fluorescent lighting system. Concord Engineering recommends upgrading the lighting to an energy-efficient T5 High Output lighting system.

This measure replaces all the HID, 400 W HID MH fixtures with a well-designed T5HO lighting system. Ten, 54 watt, 6-Lamp T5HO fixtures will be required in order to meet the mandated 50 foot-candle average within the spaces.

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

Energy Savings Summary:

| ECM #2 - ENERGY SAVINGS SUMMARY | |
|---|----------|
| Installation Cost (\$): | \$7,550 |
| NJ Smart Start Equipment Incentive (\$): | \$1,000 |
| Net Installation Cost (\$): | \$6,550 |
| Maintenance Savings (\$/Yr): | \$0 |
| Energy Savings (\$/Yr): | \$624 |
| Total Yearly Savings (\$/Yr): | \$624 |
| Estimated ECM Lifetime (Yr): | 15 |
| Simple Payback | 10.5 |
| Simple Lifetime ROI | 42.9% |
| Simple Lifetime Maintenance Savings | \$0 |
| Simple Lifetime Savings | \$9,360 |
| Internal Rate of Return (IRR) | 5% |
| Net Present Value (NPV) | \$899.27 |

ECM #3: Lighting Upgrade – Exterior Lighting

Description:

The exterior lighting at Woodrow Wilson School is currently lit via metal halide fixtures. The exterior would be better served with more efficient LED lighting system. CE recommends upgrading the lighting to an energy-efficient LED lighting system that includes retrofit kits for the existing 250 watt metal halide shoebox lights on the exterior with Neu-Tech 73 watt LED retrofit kits.

This measure replaces all the 250 watt metal halide shoebox fixtures with 73 Watt LED retrofit kits and all 175 watt metal halide flood lights with 150 watt metal halide Energy Master Lamps.

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.

Energy Savings Summary:

| ECM #3 - ENERGY SAVINGS SUMMARY | |
|---|------------|
| Installation Cost (\$): | \$4,610 |
| NJ Smart Start Equipment Incentive (\$): | \$0 |
| Net Installation Cost (\$): | \$4,610 |
| Maintenance Savings (\$/Yr): | \$0 |
| Energy Savings (\$/Yr): | \$1,105 |
| Total Yearly Savings (\$/Yr): | \$1,105 |
| Estimated ECM Lifetime (Yr): | 15 |
| Simple Payback | 4.2 |
| Simple Lifetime ROI | 259.5% |
| Simple Lifetime Maintenance Savings | \$0 |
| Simple Lifetime Savings | \$16,575 |
| Internal Rate of Return (IRR) | 23% |
| Net Present Value (NPV) | \$8,581.42 |

ECM #4: Lighting Controls Upgrade – Occupancy Sensors

Description:

Some of the lights in the Woodrow Wilson Elementary School 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:

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

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

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 #4 - ENERGY SAVINGS SUMMARY | |
|---|-------------|
| Installation Cost (\$): | \$12,600 |
| NJ Smart Start Equipment Incentive (\$): | \$1,075 |
| Net Installation Cost (\$): | \$11,525 |
| Maintenance Savings (\$/Yr): | \$0 |
| Energy Savings (\$/Yr): | \$2,195 |
| Total Yearly Savings (\$/Yr): | \$2,195 |
| Estimated ECM Lifetime (Yr): | 15 |
| Simple Payback | 5.3 |
| Simple Lifetime ROI | 185.7% |
| Simple Lifetime Maintenance Savings | \$0 |
| Simple Lifetime Savings | \$32,923 |
| Internal Rate of Return (IRR) | 17% |
| Net Present Value (NPV) | \$14,676.80 |

ECM #5: 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 computers in the classrooms and 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 Computers: | 231 |
| Operating Weeks per Yr: | 42 |
| Estimated percentage of computers left ON over night: | 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
 = 128 Computers X 10 Minutes/Computer X \$100 per Hour
 = \$2,134

| AUTOMATIC SLEEP OR HIBERNATE MODES FOR COMPUTERS | | | |
|---|--|-----------------|----------------|
| ECM INPUTS | EXISTING | PROPOSED | SAVINGS |
| ECM INPUTS | Manual Operation | Auto Power Save | - |
| # of Computers | 128 | 128 | - |
| % 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) | 0.160 | 0.160 | - |
| ENERGY SAVINGS CALCULATIONS | | | |
| ECM RESULTS | EXISTING | PROPOSED | SAVINGS |
| Electric Usage (kWh) | 24,192 | 4,435 | 19,757 |
| Energy Cost (\$) | \$3,871 | \$710 | \$3,161 |
| COMMENTS: | Calculation assumes computers currently run throughout work week and get shut down over the weekend. | | |

Energy Savings Summary:

| ECM #5 - ENERGY SAVINGS SUMMARY | |
|---|-------------|
| Installation Cost (\$): | \$2,134 |
| NJ Smart Start Equipment Incentive (\$): | \$0 |
| Net Installation Cost (\$): | \$2,134 |
| Maintenance Savings (\$/Yr): | \$0 |
| Energy Savings (\$/Yr): | \$3,161 |
| Total Yearly Savings (\$/Yr): | \$3,161 |
| Estimated ECM Lifetime (Yr): | 5 |
| Simple Payback | 0.7 |
| Simple Lifetime ROI | 640.6% |
| Simple Lifetime Maintenance Savings | \$0 |
| Simple Lifetime Savings | \$15,805 |
| Internal Rate of Return (IRR) | 147% |
| Net Present Value (NPV) | \$12,342.86 |

ECM #6: Rooftop Unit Replacement

Description:

The 1998 wing of the Woodrow Wilson School is conditioned by a Trane 25 ton packaged rooftop unit with gas heating. This unit is in fair condition and has approached its useful ASHRAE service life. The unit currently installed is less efficient compared to modern equipment and can be replaced with a new high efficiency unit. New air conditioners provide higher full load and part load efficiencies due to advances in inverter motor technologies, heat exchangers and refrigerants.

This ECM includes one-for-one replacement of the older rooftop unit with new higher efficiency system. 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 | UNIT TAG | NUMBER OF UNITS | COOLING CAPACITY, BTU/HR | TOTAL CAPACITY, TONS | REPLACE UNIT WITH |
| RTU | 1998 Wing | 1 | 300,000 | 25.0 | Carrier Weathermaster 48HC |
| Total | | 1 | 300,000 | 25 | |

The manufacturer used as the basis for this calculation is Carrier. The unit is one for one style replacement with matching capacity of the new unit to the old unit. The unit pricing and install cost were estimated based on current 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 (S)EER | NEW UNITS (S)EER | # OF UNITS | ENERGY SAVINGS kWh | DEMAND SAVINGS kW |
| RTU | 300,000 | 2,200 | 9.5 EER | 11.2 EER | 1 | 10,545 | 4.8 |
| Total | | | | | 1 | 10,545 | 4.8 |

Energy Savings Summary:

| ECM #6 - ENERGY SAVINGS SUMMARY | |
|---|----------------------|
| Installation Cost (\$): | \$90,188 |
| NJ Smart Start Equipment Incentive (\$): | \$0 |
| Net Installation Cost (\$): | \$90,188 |
| Maintenance Savings (\$/Yr): | \$0 |
| Energy Savings (\$/Yr): | \$1,687 |
| Total Yearly Savings (\$/Yr): | \$1,687 |
| Estimated ECM Lifetime (Yr): | 15 |
| Simple Payback | 53.5 |
| Simple Lifetime ROI | -71.9% |
| Simple Lifetime Maintenance Savings | 0 |
| Simple Lifetime Savings | \$25,308 |
| Internal Rate of Return (IRR) | -13% |
| Net Present Value (NPV) | (\$70,045.60) |

ECM #7: High Efficiency Gas Hot Water Heater

Description:

The Woodrow Wilson School has one State gas-fired hot water heater that serves the entirety of the building. The gas fired heater has surpassed its life expectancy of a typical hot water heater.

This ECM will replace the original gas fired domestic water heaters with Natural Gas fired 98.5% thermal efficient Bradford White eF Series. The unit will be replaced with a 199 MBH and 100 gallon heater. (Before proceeding with installation of aforementioned system, Concord Engineering suggests consulting a plumber to evaluate the system fully.)

Energy Savings Calculations:

| DOM. HOT WATER HEATER CALCULATIONS | | | |
|------------------------------------|---|------------------------|---------|
| ECM INPUTS | EXISTING | PROPOSED | SAVINGS |
| ECM INPUTS | Existing Gas Hot Water Heater | High Efficiency Heater | |
| Building Type | Education | | |
| Building Square-foot | 42,000 | 42,000 | |
| Domestic Water Usage, kBtu | 218,400.00 | 218,400.00 | |
| DHW Heating Fuel Type | Gas | Gas | |
| Heating Efficiency | 75% | 98% | 23% |
| Total Usage (kBtu) | 291,200 | 222,857 | 68,343 |
| Nat Gas Cost (\$/Therm) | \$ 0.910 | \$ 0.910 | |
| ENERGY SAVINGS CALCULATIONS | | | |
| ECM RESULTS | EXISTING | PROPOSED | SAVINGS |
| Natural Gas Usage (Therms) | 2,912 | 2,229 | 683 |
| Energy Cost (\$) | \$2,650 | \$2,028 | \$622 |
| COMMENTS: | Savings are based on Energy Information Administration Commercial Building Energy Consumption Survey 2003 Information | | |

Energy Density for “Education” type building = 5.2 kBtu / SF / year

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

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

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

Energy Savings Summary:

| ECM #7 - ENERGY SAVINGS SUMMARY | |
|---|---------------------|
| Installation Cost (\$): | \$11,500 |
| NJ Smart Start Equipment Incentive (\$): | \$399 |
| Net Installation Cost (\$): | \$11,101 |
| Maintenance Savings (\$/Yr): | \$0 |
| Energy Savings (\$/Yr): | \$622 |
| Total Yearly Savings (\$/Yr): | \$622 |
| Estimated ECM Lifetime (Yr): | 12 |
| Simple Payback | 17.8 |
| Simple Lifetime ROI | -32.8% |
| Simple Lifetime Maintenance Savings | \$0 |
| Simple Lifetime Savings | \$7,463 |
| Internal Rate of Return (IRR) | -6% |
| Net Present Value (NPV) | (\$4,910.41) |

ECM #8: Steam Boiler Burner & Controls Upgrade

Description:

The majority of the heating is provided to the Woodrow Wilson School by Weil McLain 59 Boiler Horsepower (BHP) natural gas-fired boilers that produces steam for the heating season. The boilers are 1990 vintage and are well maintained and currently should be capable of achieving an efficiency rating of 70 to 75 percent while operating. Given the limitations of the current system burner and controls and the vast improvement in boiler controls today over what was available then, it is recommended that a burner and new controls upgrade be performed.

This ECM will install new Cleaver Brooks Profire burner with Honeywell controls on each of these boilers with separate motors that will control fuel flow, excess air oxygen trim and variable speed on the blower. Installation of this system will result in improved operating efficiency of the boilers and less cycling of boilers since the boilers can operate closer to the demanded load requirement.

Energy Savings Using Hand Calculations:

Annual Heating Energy Savings = Existing Fuel Consumption x 8% Efficiency Increase

Heating Cost Savings = Annual Heating Energy Savings x Fuel Cost (\$/Unit)**Error! Bookmark not defined.**

Error! Bookmark not defined.

Energy Savings Summary:

| ECM #8 - ENERGY SAVINGS SUMMARY | |
|--|---------------|
| Installation Cost (\$): | \$22,000 |
| NJ Smart Start Equipment Incentive (\$): | \$0 |
| Net Installation Cost (\$): | \$22,000 |
| Maintenance Savings (\$/Yr): | \$0 |
| Energy Savings (\$/Yr): | \$684 |
| Total Yearly Savings (\$/Yr): | \$684 |
| Estimated ECM Lifetime (Yr): | 21 |
| Simple Payback | 32.2 |
| Simple Lifetime ROI | -34.7% |
| Simple Lifetime Maintenance Savings | \$0 |
| Simple Lifetime Savings | \$14,364 |
| Internal Rate of Return (IRR) | -4% |
| Net Present Value (NPV) | (\$11,456.12) |

REM #1: 169.44 kW Solar System**Description:**

The Woodrow Wilson School has available roof space that could accommodate a significant amount of solar generation. Based on the available areas a 169.44 kilowatt solar array could be installed, assuming the existing roof structure is capable of supporting an array. The array will produce approximately 195,796 kilowatt-hours annually that will reduce the overall electric usage of the facility by 51.75%.

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}): | 169.44 |
| Electric Generation (KWH/Yr): | 195,796 |
| Installation Cost (\$): | \$1,022,169 |
| SREC Revenue (\$/Yr): | \$37,414 |
| Energy Savings (\$/Yr): | \$31,327 |
| Total Yearly Savings (\$/Yr): | \$68,741 |
| ECM Analysis Period (Yr): | 15 |
| Simple Payback (Yrs): | 14.9 |
| Analysis Period Electric Savings (\$): | \$582,655 |
| Analysis Period SREC Revenue (\$): | \$541,981 |
| Net Present Value (NPV) | (\$328,492.10) |

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. Steam Trap Replacement Survey and Analysis by Spirax/Sarco is a recommendation for the school to provide additional energy and operational savings.

APPENDIX A

ECM COST & SAVINGS BREAKDOWN

CONCORD ENGINEERING GROUP

New Brunswick Board of Education - Woodrow Wilson School

| 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 Saving * ECM Lifetime) | (Lifetime Savings - Net Cost) / (Net Cost) | (Net cost / Yearly Savings) | $\sum_{n=0}^N \frac{C_n}{[1 + DR]^n}$ | $\sum_{n=0}^N \frac{C_n}{[1 + DR]^n}$ |
| | | (\$) | (\$) | (\$) | (\$) | (\$/yr) | (\$/yr) | (\$/yr) | | (Yr) | (\$) | (\$) | (%) | (Yr) | (\$) |
| ECM #1 | Lighting Upgrade - General | \$6,507 | \$9,770 | \$0 | \$16,277 | \$1,838 | \$0 | \$1,838 | 15 | \$27,570 | \$0 | 69.4% | 8.9 | 7.45% | \$5,664.92 |
| ECM #2 | Gym Lighting Upgrade | \$2,500 | \$5,050 | \$1,000 | \$6,550 | \$624 | \$0 | \$624 | 15 | \$9,360 | \$0 | 42.9% | 10.5 | 4.83% | \$899.27 |
| ECM #3 | Exterior Lighting Upgrade | \$3,190 | \$1,420 | \$0 | \$4,610 | \$1,105 | \$0 | \$1,105 | 15 | \$16,575 | \$0 | 259.5% | 4.2 | 22.88% | \$8,581.42 |
| ECM #4 | Lighting Controls Upgrade | \$10,650 | \$1,950 | \$1,075 | \$11,525 | \$2,195 | \$0 | \$2,195 | 15 | \$32,923 | \$0 | 185.7% | 5.3 | 17.31% | \$14,676.80 |
| ECM #5 | Computer Automatic Standby or Hibernate Modes | \$0 | \$2,134 | \$0 | \$2,134 | \$3,161 | \$0 | \$3,161 | 5 | \$15,805 | \$0 | 640.6% | 0.7 | 146.50% | \$12,342.86 |
| ECM #6 | Rooftop Unit Replacements | \$46,250 | \$43,938 | \$0 | \$90,188 | \$1,687 | \$0 | \$1,687 | 15 | \$25,308 | \$0 | -71.9% | 53.5 | -12.85% | (\$70,045.60) |
| ECM #7 | Domestic Hot Water Heater Upgrade | \$10,000 | \$1,500 | \$399 | \$11,101 | \$622 | \$0 | \$622 | 12 | \$7,463 | \$0 | -32.8% | 17.8 | -5.64% | (\$4,910.41) |
| ECM #8 | Boiler Burner and Controls Upgrade | \$22,000 | \$0 | \$0 | \$22,000 | \$684 | \$0 | \$684 | 21 | \$14,364 | \$0 | -34.7% | 32.2 | -3.59% | (\$11,456.12) |
| REM RENEWABLE ENERGY AND FINANCIAL COSTS AND SAVINGS SUMMARY | | | | | | | | | | | | | | | |
| REM #1 | 169.44 KW PV System | \$1,022,169 | \$0 | \$0 | \$1,022,169 | \$31,327 | \$37,414 | \$68,741 | 15 | \$1,031,114 | \$561,204 | 0.9% | 14.9 | 0.11% | (\$201,544.28) |

- 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 11, 2013:

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 - \$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 |
| 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 |

Energy Efficiency must comply with ASHRAE 90.1-2007

Variable Frequency Drives

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

| | |
|--|------------------------------|
| Retro fit of T12 to T-5 or T-8 Lamps w/Electronic Ballast in Existing Facilities (Expires 3/1/2013) | \$10 per fixture (1-4 lamps) |
| Replacement of T12 with new T-5 or T-8 Lamps w/Electronic Ballast in Existing Facilities (Expires 3/1/2013) | \$25 per fixture (1-4 lamps) |
| 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 | \$25 per fixture |
| HID \geq 100w Retrofit with induction lamp, power coupler and generator (must be 30% less watts/fixture than HID system) | \$50 per fixture |
| HID \geq 100w Replacement with new HID \geq 100w | \$70 per fixture |

Prescriptive Lighting - LED

| | |
|--|---|
| LED 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 (1x4, 2x2, 2x4 Troffers only) | \$100 per fixture |
| LED Fuel Pump Canopy | \$100 per fixture |
| LED Screw-based & Pin-based (PAR, MR, BR, R) Standards (A-Style) and Decorative Lamps | \$20 per 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 | \$20 per control |
| Remote Mounted | \$35 per control |
| Daylight Dimmers | \$25-\$50 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 |

Premium Motors

| | |
|---|--------------------------------------|
| Three-Phase Motors (<i>Expires 3/1/2013</i>) | \$45 - \$700 per motor |
| Fractional HP Motors Electronic Commutated Motors (replacing shaded pole motors in refrigerator/freezer cases) | \$40 per electronic commutated motor |

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



STATEMENT OF ENERGY PERFORMANCE

5-New Brunswick BOE - Woodrow Wilson School

Building ID: 3415935
For 12-month Period Ending: October 31, 2012¹
Date SEP becomes ineligible: N/A

Date SEP Generated: February 04, 2013

Facility

5-New Brunswick BOE - Woodrow Wilson School
 133 Tunison Road
 New Brunswick, NJ 08901

Facility Owner

New Brunswick Board of Education
 268 Baldwin Street 3rd Floor
 New Brunswick, NJ 08901

Primary Contact for this Facility

Jack Humma
 268 Baldwin Street 3rd Floor
 New Brunswick, NJ 08901

Year Built: 1954

Gross Floor Area (ft²): 42,000

Energy Performance Rating² (1-100) 56

Site Energy Use Summary³

| | |
|-----------------------------------|-----------|
| Electricity - Grid Purchase(kBtu) | 1,301,118 |
| Natural Gas (kBtu) ⁴ | 1,996,584 |
| Total Energy (kBtu) | 3,297,702 |

Energy Intensity⁴

| | |
|-----------------------------------|-----|
| Site (kBtu/ft ² /yr) | 79 |
| Source (kBtu/ft ² /yr) | 153 |

Emissions (based on site energy use)

| | |
|---|-----|
| Greenhouse Gas Emissions (MtCO ₂ e/year) | 290 |
|---|-----|

Electric Distribution Utility

Public Service Electric & Gas Co

National Median Comparison

| | |
|--|-------------|
| National Median Site EUI | 83 |
| National Median Source EUI | 163 |
| % Difference from National Median Source EUI | -6% |
| Building Type | K-12 School |

Meets Industry Standards⁵ for Indoor Environmental Conditions:

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

Notes:

- Application for the ENERGY STAR must be submitted to EPA within 4 months of the Period Ending date. Award of the ENERGY STAR is not final until approval is received from EPA.
- The EPA Energy Performance Rating is based on total source energy. A rating of 75 is the minimum to be eligible for the ENERGY STAR.
- Values represent energy consumption, annualized to a 12-month period.
- Values represent energy intensity, annualized to a 12-month period.
- Based on Meeting ASHRAE Standard 62 for ventilation for acceptable indoor air quality, ASHRAE Standard 55 for thermal comfort, and IESNA Lighting Handbook for lighting quality.

| |
|--|
| |
| 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. |

Certifying Professional

Michael Fischette
 520 South Burnt Mill Road
 Voorhees, NJ 08043

ENERGY STAR® Data Checklist for Commercial Buildings

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

Please complete and sign this checklist and include it with the stamped, signed Statement of Energy Performance.

NOTE: You must check each box to indicate that each value is correct, OR include a note.

| CRITERION | VALUE AS ENTERED IN PORTFOLIO MANAGER | VERIFICATION QUESTIONS | NOTES | <input checked="" type="checkbox"/> |
|--|---|---|-------|-------------------------------------|
| Building Name | 5-New Brunswick BOE - Woodrow Wilson School | Is this the official building name to be displayed in the ENERGY STAR Registry of Labeled Buildings? | | <input type="checkbox"/> |
| Type | K-12 School | Is this an accurate description of the space in question? | | <input type="checkbox"/> |
| Location | 133 Tunison Road, New Brunswick, NJ 08901 | Is this address accurate and complete? Correct weather normalization requires an accurate zip code. | | <input type="checkbox"/> |
| Single Structure | Single Facility | Does this SEP represent a single structure? SEPs cannot be submitted for multiple-building campuses (with the exception of a hospital, k-12 school, hotel and senior care facility) nor can they be submitted as representing only a portion of a building. | | <input type="checkbox"/> |
| Woodrow Wilson ES (K-12 School) | | | | |
| CRITERION | VALUE AS ENTERED IN PORTFOLIO MANAGER | VERIFICATION QUESTIONS | NOTES | <input checked="" type="checkbox"/> |
| Gross Floor Area | 42,000 Sq. Ft. | Does this square footage include all supporting functions such as kitchens and break rooms used by staff, storage areas, administrative areas, elevators, stairwells, atria, vent shafts, etc. Also note that existing atriums should only include the base floor area that it occupies. Interstitial (plenum) space between floors should not be included in the total. Finally gross floor area is not the same as leasable space. Leasable space is a subset of gross floor area. | | <input type="checkbox"/> |
| Open Weekends? | No | Is this building normally open at all on the weekends? This includes activities beyond the work conducted by maintenance, cleaning, and security personnel. Weekend activity could include any time when the space is used for classes, performances or other school or community activities. If the building is open on the weekend as part of the standard schedule during one or more seasons, the building should select ?yes? for open weekends. The ?yes? response should apply whether the building is open for one or both of the weekend days. | | <input type="checkbox"/> |
| Number of PCs | 128 | Is this the number of personal computers in the K12 School? | | <input type="checkbox"/> |
| Number of walk-in refrigeration/freezer units | 1 | Is this the total number of commercial walk-in type freezers and coolers? These units are typically found in storage and receiving areas. | | <input type="checkbox"/> |
| Presence of cooking facilities | Yes | Does this school have a dedicated space in which food is prepared and served to students? If the school has space in which food for students is only kept warm and/or served to students, or has only a galley that is used by teachers and staff then the answer is "no". | | <input type="checkbox"/> |
| Percent Cooled | 60 % | Is this the percentage of the total floor space within the facility that is served by mechanical cooling equipment? | | <input type="checkbox"/> |
| Percent Heated | 100 % | Is this the percentage of the total floor space within the facility that is served by mechanical heating equipment? | | <input type="checkbox"/> |
| Months | 10(Optional) | Is this school in operation for at least 8 months of the year? | | <input type="checkbox"/> |

| | | | | |
|---------------------|----|--|--|--------------------------|
| High School? | No | Is this building a high school (teaching grades 10, 11, and/or 12)? If the building teaches to high school students at all, the user should check 'yes' to 'high school'. For example, if the school teaches to grades K-12 (elementary/middle and high school), the user should check 'yes' to 'high school'. | | <input type="checkbox"/> |
|---------------------|----|--|--|--------------------------|

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 Meter # 728010040 (kWh (thousand Watt-hours)) | | |
| Space(s): Entire Facility | | |
| Generation Method: Grid Purchase | | |
| Start Date | End Date | Energy Use (kWh (thousand Watt-hours)) |
| 09/17/2012 | 10/16/2012 | 4,880.00 |
| 08/17/2012 | 09/16/2012 | 6,320.00 |
| 07/17/2012 | 08/16/2012 | 2,480.00 |
| 06/17/2012 | 07/16/2012 | 13,200.00 |
| 05/17/2012 | 06/16/2012 | 5,520.00 |
| 04/17/2012 | 05/16/2012 | 12,720.00 |
| 03/17/2012 | 04/16/2012 | 14,560.00 |
| 02/17/2012 | 03/16/2012 | 14,400.00 |
| 01/17/2012 | 02/16/2012 | 20,560.00 |
| 12/17/2011 | 01/16/2012 | 14,960.00 |
| 11/17/2011 | 12/16/2011 | 13,600.00 |
| Electric Meter # 728010040 Consumption (kWh (thousand Watt-hours)) | | 123,200.00 |
| Electric Meter # 728010040 Consumption (kBtu (thousand Btu)) | | 420,358.40 |
| Meter: Electric Meter # 728004136 (kWh (thousand Watt-hours)) | | |
| Space(s): Entire Facility | | |
| Generation Method: Grid Purchase | | |
| Start Date | End Date | Energy Use (kWh (thousand Watt-hours)) |
| 09/17/2012 | 10/16/2012 | 23,000.00 |
| 08/17/2012 | 09/16/2012 | 19,400.00 |
| 07/17/2012 | 08/16/2012 | 21,800.00 |
| 06/17/2012 | 07/16/2012 | 22,000.00 |
| 05/17/2012 | 06/16/2012 | 27,200.00 |
| 04/17/2012 | 05/16/2012 | 20,400.00 |
| 03/17/2012 | 04/16/2012 | 17,600.00 |
| 02/17/2012 | 03/16/2012 | 21,600.00 |
| 01/17/2012 | 02/16/2012 | 12,200.00 |
| 12/17/2011 | 01/16/2012 | 25,000.00 |
| 11/17/2011 | 12/16/2011 | 20,400.00 |
| Electric Meter # 728004136 Consumption (kWh (thousand Watt-hours)) | | 230,600.00 |
| Electric Meter # 728004136 Consumption (kBtu (thousand Btu)) | | 786,807.20 |
| Total Electricity (Grid Purchase) Consumption (kBtu (thousand Btu)) | | 1,207,165.60 |

| | | |
|--|-----------------|----------------------------|
| Is this the total Electricity (Grid Purchase) consumption at this building including all Electricity meters? | | <input type="checkbox"/> |
| Fuel Type: Natural Gas | | |
| Meter: Gas Meter # 2413351 (therms) Space(s): Entire Facility | | |
| Start Date | End Date | Energy Use (therms) |
| 09/17/2012 | 10/16/2012 | 218.00 |
| 08/17/2012 | 09/16/2012 | 131.00 |
| 07/17/2012 | 08/16/2012 | 555.00 |
| 06/17/2012 | 07/16/2012 | 115.00 |
| 05/17/2012 | 06/16/2012 | 937.00 |
| 04/17/2012 | 05/16/2012 | 777.00 |
| 03/17/2012 | 04/16/2012 | 1,270.00 |
| 02/17/2012 | 03/16/2012 | 2,943.00 |
| 01/17/2012 | 02/16/2012 | 2,256.00 |
| 12/17/2011 | 01/16/2012 | 5,914.00 |
| 11/17/2011 | 12/16/2011 | 2,674.00 |
| Gas Meter # 2413351 Consumption (therms) | | 17,790.00 |
| Gas Meter # 2413351 Consumption (kBtu (thousand Btu)) | | 1,779,000.00 |
| Total Natural Gas Consumption (kBtu (thousand Btu)) | | 1,779,000.00 |
| Is this the total Natural Gas consumption at this building including all Natural Gas meters? | | <input type="checkbox"/> |

| | |
|---|--------------------------|
| Additional Fuels | |
| Do the fuel consumption totals shown above represent the total energy use of this building? Please confirm there are no additional fuels (district energy, generator fuel oil) used in this facility. | <input type="checkbox"/> |

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

Certifying Professional

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

Name: _____ Date: _____

Signature: _____

Signature is required when applying for the ENERGY STAR.

FOR YOUR RECORDS ONLY. DO NOT SUBMIT TO EPA.

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

Facility

5-New Brunswick BOE - Woodrow Wilson School
Wilson School
133 Tunison Road
New Brunswick, NJ 08901

Facility Owner

New Brunswick Board of Education
268 Baldwin Street 3rd Floor
New Brunswick, NJ 08901

Primary Contact for this Facility

Jack Humma
268 Baldwin Street 3rd Floor
New Brunswick, NJ 08901

General Information

| 5-New Brunswick BOE - Woodrow Wilson School | |
|--|------------------|
| Gross Floor Area Excluding Parking: (ft ²) | 42,000 |
| Year Built | 1954 |
| For 12-month Evaluation Period Ending Date: | October 31, 2012 |

Facility Space Use Summary

| Woodrow Wilson ES | |
|---|---------------|
| Space Type | K-12 School |
| Gross Floor Area (ft ²) | 42,000 |
| Open Weekends? | No |
| Number of PCs | 128 |
| Number of walk-in refrigeration/freezer units | 1 |
| Presence of cooking facilities | Yes |
| Percent Cooled | 60 |
| Percent Heated | 100 |
| Months ° | 10 |
| High School? | No |
| School District ° | new brunswick |

Energy Performance Comparison

| Performance Metrics | Evaluation Periods | | Comparisons | | |
|---|-------------------------------------|--------------------------------------|--------------|--------|-----------------|
| | Current (Ending Date 10/31/2012) | Baseline (Ending Date 10/31/2012) | Rating of 75 | Target | National Median |
| Energy Performance Rating | 56 | 56 | 75 | N/A | 50 |
| Energy Intensity | | | | | |
| Site (kBtu/ft ²) | 79 | 79 | 65 | N/A | 83 |
| Source (kBtu/ft ²) | 153 | 153 | 127 | N/A | 163 |
| Energy Cost | | | | | |
| \$/year | \$ 74,402.11 | \$ 74,402.11 | \$ 61,790.14 | N/A | \$ 79,016.71 |
| \$/ft ² /year | \$ 1.77 | \$ 1.77 | \$ 1.47 | N/A | \$ 1.88 |
| Greenhouse Gas Emissions | | | | | |
| MtCO ₂ e/year | 290 | 290 | 241 | N/A | 308 |
| kgCO ₂ e/ft ² /year | 7 | 7 | 6 | N/A | 7 |

More than 50% of your building is defined as K-12 School. 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.

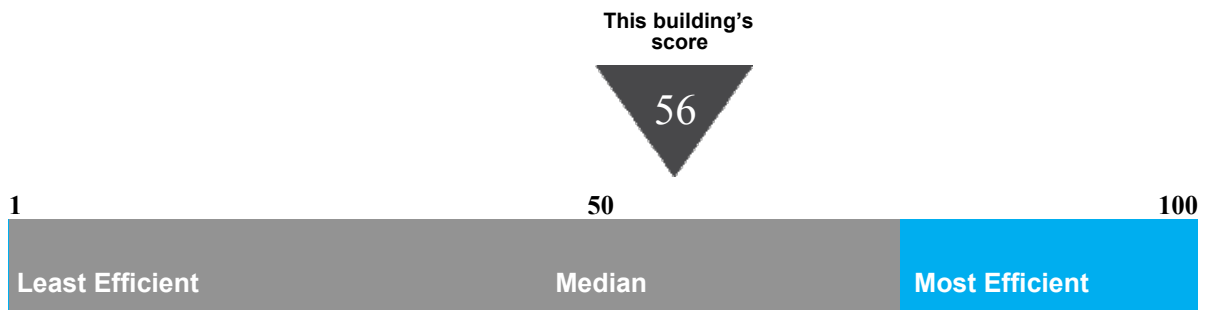
Statement of Energy Performance

2012

5-New Brunswick BOE - Woodrow Wilson School
133 Tunison Road
New Brunswick, NJ 08901

Portfolio Manager Building ID: 3415935

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 153 kBtu per square foot per year.*

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



APPENDIX D

MAJOR EQUIPMENT LIST

Concord Engineering Group

Woodrow Wilson Elementary School

AC Units

| | | | |
|--------------------------------------|----------------------------------|-------------------------------------|------------------------|
| Tag | | | |
| Unit Type | Packaged Rooftop Unit | Packaged Rooftop Unit | Split System Heat Pump |
| Qty | 1 | 1 | 1 |
| Location | 1998 Wing Roof | 1986 Wing Roof | Outside near Kitchen |
| Area Served | 1998 Wing | 1986 Wing | Converted Offices |
| Manufacturer | Trane | Trane | Mitsubishi |
| Model # | SFHFC25EJP36E5ED3 001AEGKRTV6 | TCD600BE0J6B4NH1 AB0D000HHB0M00R | PUMY-P48NHMU |
| Serial # | J98D71161 | C12F03800 | 12U02157B |
| Cooling Type | Dx, R-22 | Dx, R-410A | DX, R-410A |
| Cooling Capacity (Tons) | 25 Tons | 50 Tons | 4 Tons |
| Cooling Efficiency (SEER/EER) | 9.5 EER | 10 EER | 2.83 COP |
| Heating Type | Natural Gas | N/A | Heat Pump |
| Heating Input (MBH) | 500 MBH | N/A | 54 MBH |
| Efficiency | 80% | N/A | 3.23 COP |
| Fuel | Natural Gas | N/A | Heat Pump |
| Approx Age | 15 | 1 | 1 |
| ASHRAE Service Life | 15 | 15 | 15 |
| Remaining Life | 0 | 14 | 14 |
| Comments | | | |

Note:

"N/A" = Not Applicable.

"-" = Info Not Available

MAJOR EQUIPMENT LIST

Concord Engineering Group

Woodrow Wilson Elementary School

Boilers

| | | | |
|---------------------------------------|-------------------------|-------------------|--|
| Tag | | | |
| Unit Type | Cast Iron Steam Boilers | Modular Boilers | |
| Qty | 2 | 2 | |
| Location | Boiler Room | 1998 Mech Room | |
| Area Served | 1954 Section | 1998 VAV's | |
| Manufacturer | H.B. Smith | Caravan Slant/Fin | |
| Model # | Series 28A-8 | GG-200 HEC | |
| Serial # | N90 453 | - | |
| Input Capacity (Btu/Hr) | 2,499 | 200 | |
| Rated Output Capacity (Btu/Hr) | 1,965 | 167 | |
| Approx. Efficiency % | 75.0% | 83.0% | |
| Fuel | Natural Gas | Natural Gas | |
| Approx Age | 23 | 15 | |
| ASHRAE Service Life | 35 | 24 | |
| Remaining Life | 12 | 9 | |
| Comments | | | |

Note:

"N/A" = Not Applicable.

"-" = Info Not Available

MAJOR EQUIPMENT LIST

Concord Engineering Group

Woodrow Wilson Elementary School

Domestic Water Heaters

| | | | |
|------------------------------------|--|----|--|
| Tag | | | |
| Unit Type | Gas Fired Domestic Hot Water Heater | | |
| Qty | 1 | | |
| Location | Boiler Room | | |
| Area Served | Wilson ES | | |
| Manufacturer | State | | |
| Model # | SBF100 260 NET1 ASME | | |
| Serial # | E96608921 | | |
| Size (Gallons) | 100 Gallons | | |
| Input Capacity (MBH/KW) | 260 MBH | | |
| Recovery (Gal/Hr) | 236.4 Gal/hr | | |
| Efficiency % | 75% | | |
| Fuel | Natural Gas | | |
| Approx Age | 17 | | |
| ASHRAE Service Life | 12 | 12 | |
| Remaining Life | (5) | 12 | |
| Comments | | | |

Note:

"N/A" = Not Applicable.

"-" = Info Not Available

MAJOR EQUIPMENT LIST

**Concord Engineering Group
Woodrow Wilson Elementary School**

Pumps

| | | | |
|----------------------------|-------------------|--------------------------|--------------------------|
| Tag | | | |
| Unit Type | In-Line Pump | Boiler Feed Pump | In-Line Pumps |
| Qty | 2 | 1 | 2 |
| Location | Boiler Room | Boiler Room | 1998 Mech Room |
| Area Served | Hot Water Loop | | 1998 Wing Hot Water Loop |
| Manufacturer | Bell & Gossett | National Pump & Controls | - |
| Model # | 5X9.5 | CVDS 2520 | - |
| Serial # | - | 2481 | - |
| Horse Power | 1.5 HP | - | Unknown |
| Flow | 26 GPM @ 55 FT/HD | - | Unknown |
| Motor Info | Unimount 123 | - | Baldor |
| Electrical Power | 200/3/60 | - | Unknown |
| RPM | 1730 RPM | - | Unknown |
| Motor Efficiency % | 80.0% | - | Unknown |
| Approx Age | 23 | 23 | 15 |
| ASHRAE Service Life | 18 | 18 | 18 |
| Remaining Life | (5) | (5) | 3 |
| Comments | | | |

Note:

"N/A" = Not Applicable.

"-" = Info Not Available

APPENDIX E

CEG Project #: 9C12064
 Facility Name: Woodrow Wilson School
 Address: 133 Tunison Road
 City, State, Zip: New Brunswick, NJ 08901

| Fixture Reference # | Location | Average Burn Hours | Description | Existing Fixtures | | | | Proposed Fixtures Retrofit | | | | Retrofit Energy Savings | | | | Lighting Retrofit Costs | | | | Proposed Lighting Controls | | | | | | | | | |
|---------------------|-------------------------|--------------------|---|-------------------|-------------------|-----------------|----------|----------------------------|--------------------|--|-------------------|-------------------------|-----------------|----------|--------------|-------------------------|---------------------|--------------------|----------|----------------------------|-----------|-----------------|----------------|---------------|---|-----------------|------------------|---------------------|--------------------|
| | | | | 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, \$ |
| 232.21 | Nurse | 2600 | 2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mt., Prismatic Lens | 3 | 86 | 4 | 0.34 | 894 | Existing to Remain | Existing to Remain | 3 | 86 | 0 | 0.34 | 894 | 0.00 | 0 | \$0 | \$0.00 | \$0.00 | \$0.00 | \$0.00 | - | 0 | No New Controls | 0 | 0.0% | 0 | \$0 |
| 232.21 | Nurse Restroom | 1200 | 2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mt., Prismatic Lens | 3 | 86 | 1 | 0.09 | 103 | Existing to Remain | Existing to Remain | 3 | 86 | 0 | 0.09 | 103 | 0.00 | 0 | \$0 | \$0.00 | \$0.00 | \$0.00 | \$0.00 | - | 0 | No New Controls | 0 | 0.0% | 0 | \$0 |
| 221.11 | Faculty Lounge | 2600 | 1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mt., Prismatic Lens | 2 | 62 | 4 | 0.25 | 645 | Existing to Remain | Existing to Remain | 2 | 62 | 0 | 0.25 | 645 | 0.00 | 0 | \$0 | \$0.00 | \$0.00 | \$0.00 | \$0.00 | - | 4 | Dual Technology Occupancy Sensor - Remote Mt. | 0.5 | 20.0% | 129 | \$21 |
| 33 | Faculty Lounge | 2600 | Recessed Down Light, 60w A19 Lamp | 1 | 60 | 1 | 0.06 | 156 | Relamp | Energy Star Rated, Dimmable 13w CFL Lamp | 1 | 13 | 1 | 0.01 | 34 | 0.05 | 122 | \$20 | \$10.00 | \$10.00 | \$20.00 | \$0.00 | 1.02 | 4 | Dual Technology Occupancy Sensor - Remote Mt. | 0.5 | 20.0% | 7 | \$1 |
| 612 | Faculty Lounge Restroom | 1200 | Pendant Mt., 100w A19 Lamp | 1 | 100 | 1 | 0.10 | 120 | Relamp | (1) 26w CFL Lamp | 1 | 26 | 1 | 0.03 | 31 | 0.07 | 89 | \$14 | \$14.00 | \$10.00 | \$24.00 | \$0.00 | 1.69 | 0 | No New Controls | 0 | 0.0% | 0 | \$0 |
| 221.11 | 18 Classroom | 2600 | 1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mt., Prismatic Lens | 2 | 62 | 14 | 0.87 | 2,257 | Existing to Remain | Existing to Remain | 2 | 62 | 0 | 0.87 | 2,257 | 0.00 | 0 | \$0 | \$0.00 | \$0.00 | \$0.00 | \$0.00 | - | 4 | Dual Technology Occupancy Sensor - Remote Mt. | 1 | 20.0% | 451 | \$72 |
| 221.11 | Boys Restroom | 2600 | 1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mt., Prismatic Lens | 2 | 62 | 2 | 0.12 | 322 | Existing to Remain | Existing to Remain | 2 | 62 | 0 | 0.12 | 322 | 0.00 | 0 | \$0 | \$0.00 | \$0.00 | \$0.00 | \$0.00 | - | 0 | No New Controls | 0 | 0.0% | 0 | \$0 |
| 562 | Custodial Closet | 1200 | Recessed Down Light, (1) 42w CFL Lamp | 1 | 42 | 1 | 0.04 | 50 | Existing to Remain | Existing to Remain | 1 | 42 | 0 | 0.04 | 50 | 0.00 | 0 | \$0 | \$0.00 | \$0.00 | \$0.00 | \$0.00 | - | 0 | No New Controls | 0 | 0.0% | 0 | \$0 |
| 221.11 | Girls Restroom | 2600 | 1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mt., Prismatic Lens | 2 | 62 | 2 | 0.12 | 322 | Existing to Remain | Existing to Remain | 2 | 62 | 0 | 0.12 | 322 | 0.00 | 0 | \$0 | \$0.00 | \$0.00 | \$0.00 | \$0.00 | - | 0 | No New Controls | 0 | 0.0% | 0 | \$0 |
| 221.11 | 19 Classroom | 2600 | 1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mt., Prismatic Lens | 2 | 62 | 14 | 0.87 | 2,257 | Existing to Remain | Existing to Remain | 2 | 62 | 0 | 0.87 | 2,257 | 0.00 | 0 | \$0 | \$0.00 | \$0.00 | \$0.00 | \$0.00 | - | 4 | Dual Technology Occupancy Sensor - Remote Mt. | 1 | 20.0% | 451 | \$72 |
| 221.11 | 20 Classroom | 2600 | 1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mt., Prismatic Lens | 2 | 62 | 14 | 0.87 | 2,257 | Existing to Remain | Existing to Remain | 2 | 62 | 0 | 0.87 | 2,257 | 0.00 | 0 | \$0 | \$0.00 | \$0.00 | \$0.00 | \$0.00 | - | 4 | Dual Technology Occupancy Sensor - Remote Mt. | 1 | 20.0% | 451 | \$72 |
| 221.11 | 21 Classroom | 2600 | 1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mt., Prismatic Lens | 2 | 62 | 21 | 1.30 | 3,385 | Existing to Remain | Existing to Remain | 2 | 62 | 0 | 1.30 | 3,385 | 0.00 | 0 | \$0 | \$0.00 | \$0.00 | \$0.00 | \$0.00 | - | 4 | Dual Technology Occupancy Sensor - Remote Mt. | 1 | 20.0% | 677 | \$108 |
| 33 | 21 Classroom | 2600 | Recessed Down Light, 60w A19 Lamp | 1 | 60 | 1 | 0.06 | 156 | Relamp | Energy Star Rated, Dimmable 13w CFL Lamp | 1 | 13 | 1 | 0.01 | 34 | 0.05 | 122 | \$20 | \$10.00 | \$10.00 | \$20.00 | \$0.00 | 1.02 | 4 | Dual Technology Occupancy Sensor - Remote Mt. | 1 | 20.0% | 7 | \$1 |
| 221.11 | 21 Restroom | 1200 | 1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mt., Prismatic Lens | 2 | 62 | 2 | 0.12 | 149 | Existing to Remain | Existing to Remain | 2 | 62 | 0 | 0.12 | 149 | 0.00 | 0 | \$0 | \$0.00 | \$0.00 | \$0.00 | \$0.00 | - | 0 | No New Controls | 0 | 0.0% | 0 | \$0 |
| 221.11 | 21 Closet | 1200 | 1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mt., Prismatic Lens | 2 | 62 | 1 | 0.06 | 74 | Existing to Remain | Existing to Remain | 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 |
| 221.11 | 22 Classroom | 2600 | 1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mt., Prismatic Lens | 2 | 62 | 21 | 1.30 | 3,385 | Existing to Remain | Existing to Remain | 2 | 62 | 0 | 1.30 | 3,385 | 0.00 | 0 | \$0 | \$0.00 | \$0.00 | \$0.00 | \$0.00 | - | 4 | Dual Technology Occupancy Sensor - Remote Mt. | 1 | 20.0% | 677 | \$108 |
| 33 | 22 Classroom | 2600 | Recessed Down Light, 60w A19 Lamp | 1 | 60 | 1 | 0.06 | 156 | Relamp | Energy Star Rated, Dimmable 13w CFL Lamp | 1 | 13 | 1 | 0.01 | 34 | 0.05 | 122 | \$20 | \$10.00 | \$10.00 | \$20.00 | \$0.00 | 1.02 | 4 | Dual Technology Occupancy Sensor - Remote Mt. | 1 | 20.0% | 7 | \$1 |
| 221.11 | 22 Restroom | 1200 | 1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mt., Prismatic Lens | 2 | 62 | 2 | 0.12 | 149 | Existing to Remain | Existing to Remain | 2 | 62 | 0 | 0.12 | 149 | 0.00 | 0 | \$0 | \$0.00 | \$0.00 | \$0.00 | \$0.00 | - | 0 | No New Controls | 0 | 0.0% | 0 | \$0 |
| 221.11 | 22 Closet | 1200 | 1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mt., Prismatic Lens | 2 | 62 | 1 | 0.06 | 74 | Existing to Remain | Existing to Remain | 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 |
| 221.11 | 23 Classroom | 2600 | 1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mt., Prismatic Lens | 2 | 62 | 14 | 0.87 | 2,257 | Existing to Remain | Existing to Remain | 2 | 62 | 0 | 0.87 | 2,257 | 0.00 | 0 | \$0 | \$0.00 | \$0.00 | \$0.00 | \$0.00 | - | 4 | Dual Technology Occupancy Sensor - Remote Mt. | 1 | 20.0% | 451 | \$72 |
| 221.11 | 24 Classroom | 2600 | 1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mt., Prismatic Lens | 2 | 62 | 14 | 0.87 | 2,257 | Existing to Remain | Existing to Remain | 2 | 62 | 0 | 0.87 | 2,257 | 0.00 | 0 | \$0 | \$0.00 | \$0.00 | \$0.00 | \$0.00 | - | 4 | Dual Technology Occupancy Sensor - Remote Mt. | 1 | 20.0% | 451 | \$72 |
| 221.11 | 25 Classroom | 2600 | 1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mt., Prismatic Lens | 2 | 62 | 14 | 0.87 | 2,257 | Existing to Remain | Existing to Remain | 2 | 62 | 0 | 0.87 | 2,257 | 0.00 | 0 | \$0 | \$0.00 | \$0.00 | \$0.00 | \$0.00 | - | 4 | Dual Technology Occupancy Sensor - Remote Mt. | 1 | 20.0% | 451 | \$72 |
| 221.11 | 26 Classroom | 2600 | 1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mt., Prismatic Lens | 2 | 62 | 14 | 0.87 | 2,257 | Existing to Remain | Existing to Remain | 2 | 62 | 0 | 0.87 | 2,257 | 0.00 | 0 | \$0 | \$0.00 | \$0.00 | \$0.00 | \$0.00 | - | 4 | Dual Technology Occupancy Sensor - Remote Mt. | 1 | 20.0% | 451 | \$72 |
| 232.22 | 27A Classroom | 2600 | 2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mt., Parabolic Lens | 3 | 86 | 2 | 0.17 | 447 | Existing to Remain | Existing to Remain | 3 | 86 | 0 | 0.17 | 447 | 0.00 | 0 | \$0 | \$0.00 | \$0.00 | \$0.00 | \$0.00 | - | 4 | Dual Technology Occupancy Sensor - Remote Mt. | 1 | 20.0% | 89 | \$14 |

| Fixture Reference # | Location | Average Item Hours | Existing Fixtures | | | | | Proposed Fixtures Retrofit | | | | | Retrofit Energy Savings | | | Lighting Retrofit Costs | | | | Simple Payback | Proposed Lighting Controls | | | | | | | | |
|---------------------|-------------------------|--------------------|--|-------------------|-------------------|-----------------|----------|----------------------------|--------------------|--|-------------------|-------------------|-------------------------|----------|--------------|-------------------------|---------------------|--------------------|----------|----------------|----------------------------|-----------|-----------------|---|---|-----------------|------------------|---------------------|--------------------|
| | | | 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 | Control Ref # | Controls Description | Qty of Controls | Hour Reduction % | Energy Savings, kWh | Energy Savings, \$ |
| 227.22 | 27 Classroom | 2600 | 2x2, 2 Lamp U-Tube, 32w T8, Elect. Ballast, Recessed Mt., Parabolic Lens | 2 | 65 | 16 | 1.04 | 2,704 | Existing to Remain | Existing to Remain | 2 | 65 | 0 | 1.04 | 2,704 | 0.00 | 0 | \$0 | \$0.00 | \$0.00 | \$0.00 | \$0.00 | 4 | Dual Technology Occupancy Sensor - Remote Mt. | 1 | 20.0% | 541 | \$87 | |
| 221.11 | 28 ISS | 2600 | 1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mt., Prismatic Lens | 2 | 62 | 2 | 0.12 | 322 | Existing to Remain | Existing to Remain | 2 | 62 | 0 | 0.12 | 322 | 0.00 | 0 | \$0 | \$0.00 | \$0.00 | \$0.00 | \$0.00 | 4 | Dual Technology Occupancy Sensor - Remote Mt. | 1 | 20.0% | 64 | \$10 | |
| 227.22 | Boys Restroom | 2600 | 2x2, 2 Lamp U-Tube, 32w T8, Elect. Ballast, Recessed Mt., Parabolic Lens | 2 | 65 | 2 | 0.13 | 338 | Existing to Remain | Existing to Remain | 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 | |
| 221.41 | Boys Restroom | 2600 | 1x4, 2 Lamp, 32w T8, Elect. Ballast, Wall Mt., Prismatic Lens | 2 | 62 | 1 | 0.06 | 161 | Existing to Remain | Existing to Remain | 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 | |
| 227.22 | Girls Restroom | 2600 | 2x2, 2 Lamp U-Tube, 32w T8, Elect. Ballast, Recessed Mt., Parabolic Lens | 2 | 65 | 2 | 0.13 | 338 | Existing to Remain | Existing to Remain | 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 | |
| 221.41 | Girls Restroom | 2600 | 1x4, 2 Lamp, 32w T8, Elect. Ballast, Wall Mt., Prismatic Lens | 2 | 62 | 1 | 0.06 | 161 | Existing to Remain | Existing to Remain | 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 | |
| 121.41 | Hall Bulletin Board (2) | 3000 | 1x4, 1 Lamp, 34w T12, Magnetic Ballast, Wall Mt, No Lens | 1 | 35 | 4 | 0.14 | 420 | Reballast & Relamp | Reballast & Relamp; 28w T8 Elec. Ballast | 1 | 25 | 4 | 0.10 | 300 | 0.04 | 120 | \$19 | \$120.00 | \$200.00 | \$320.00 | \$0.00 | 16.67 | 0 | No New Controls | 0 | 0.0% | 0 | \$0 |
| 232.22 | 9 Classroom | 2600 | 2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mt., Parabolic Lens | 3 | 86 | 9 | 0.77 | 2,012 | Existing to Remain | Existing to Remain | 3 | 86 | 0 | 0.77 | 2,012 | 0.00 | 0 | \$0 | \$0.00 | \$0.00 | \$0.00 | \$0.00 | 4 | Dual Technology Occupancy Sensor - Remote Mt. | 0.5 | 20.0% | 402 | \$64 | |
| 127.22 | 9 Classroom | 2600 | 1x4, 1 Lamp, 34w T12, Magnetic Ballast, Wall Mt, No Lens | 1 | 35 | 3 | 0.11 | 273 | Reballast & Relamp | Reballast & Relamp; 28w T8 Elec. Ballast | 1 | 25 | 3 | 0.08 | 195 | 0.03 | 78 | \$12 | \$90.00 | \$150.00 | \$240.00 | \$0.00 | 19.23 | 4 | Dual Technology Occupancy Sensor - Remote Mt. | 0.5 | 20.0% | 39 | \$6 |
| 232.22 | 8 Classroom | 2600 | 2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mt., Parabolic Lens | 3 | 86 | 12 | 1.03 | 2,683 | Existing to Remain | Existing to Remain | 3 | 86 | 0 | 1.03 | 2,683 | 0.00 | 0 | \$0 | \$0.00 | \$0.00 | \$0.00 | \$0.00 | 4 | Dual Technology Occupancy Sensor - Remote Mt. | 0.5 | 20.0% | 537 | \$86 | |
| 127.22 | 8 Classroom | 2600 | 1x4, 1 Lamp, 34w T12, Magnetic Ballast, Wall Mt, No Lens | 1 | 35 | 4 | 0.14 | 364 | Reballast & Relamp | Reballast & Relamp; 28w T8 Elec. Ballast | 1 | 25 | 4 | 0.10 | 260 | 0.04 | 104 | \$17 | \$120.00 | \$200.00 | \$320.00 | \$0.00 | 19.23 | 4 | Dual Technology Occupancy Sensor - Remote Mt. | 0.5 | 20.0% | 52 | \$8 |
| 232.22 | 7 Classroom | 2600 | 2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mt., Parabolic Lens | 3 | 86 | 12 | 1.03 | 2,683 | Existing to Remain | Existing to Remain | 3 | 86 | 0 | 1.03 | 2,683 | 0.00 | 0 | \$0 | \$0.00 | \$0.00 | \$0.00 | \$0.00 | 4 | Dual Technology Occupancy Sensor - Remote Mt. | 0.5 | 20.0% | 537 | \$86 | |
| 127.22 | 7 Classroom | 2600 | 1x4, 1 Lamp, 34w T12, Magnetic Ballast, Wall Mt, No Lens | 1 | 35 | 4 | 0.14 | 364 | Reballast & Relamp | Reballast & Relamp; 28w T8 Elec. Ballast | 1 | 25 | 4 | 0.10 | 260 | 0.04 | 104 | \$17 | \$120.00 | \$200.00 | \$320.00 | \$0.00 | 19.23 | 4 | Dual Technology Occupancy Sensor - Remote Mt. | 0.5 | 20.0% | 52 | \$8 |
| 232.22 | 6 Classroom | 2600 | 2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mt., Parabolic Lens | 3 | 86 | 12 | 1.03 | 2,683 | Existing to Remain | Existing to Remain | 3 | 86 | 0 | 1.03 | 2,683 | 0.00 | 0 | \$0 | \$0.00 | \$0.00 | \$0.00 | \$0.00 | 4 | Dual Technology Occupancy Sensor - Remote Mt. | 0.5 | 20.0% | 537 | \$86 | |
| 127.22 | 6 Classroom | 2600 | 1x4, 1 Lamp, 34w T12, Magnetic Ballast, Wall Mt, No Lens | 1 | 35 | 4 | 0.14 | 364 | Reballast & Relamp | Reballast & Relamp; 28w T8 Elec. Ballast | 1 | 25 | 4 | 0.10 | 260 | 0.04 | 104 | \$17 | \$120.00 | \$200.00 | \$320.00 | \$0.00 | 19.23 | 4 | Dual Technology Occupancy Sensor - Remote Mt. | 0.5 | 20.0% | 52 | \$8 |
| 232.22 | 5 Classroom | 2600 | 2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mt., Parabolic Lens | 3 | 86 | 15 | 1.29 | 3,354 | Existing to Remain | Existing to Remain | 3 | 86 | 0 | 1.29 | 3,354 | 0.00 | 0 | \$0 | \$0.00 | \$0.00 | \$0.00 | \$0.00 | 4 | Dual Technology Occupancy Sensor - Remote Mt. | 0.5 | 20.0% | 671 | \$107 | |
| 232.22 | 4 Classroom | 2600 | 2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mt., Parabolic Lens | 3 | 86 | 15 | 1.29 | 3,354 | Existing to Remain | Existing to Remain | 3 | 86 | 0 | 1.29 | 3,354 | 0.00 | 0 | \$0 | \$0.00 | \$0.00 | \$0.00 | \$0.00 | 4 | Dual Technology Occupancy Sensor - Remote Mt. | 0.5 | 20.0% | 671 | \$107 | |
| 232.22 | Library | 2600 | 2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mt., Parabolic Lens | 3 | 86 | 19 | 1.63 | 4,248 | Existing to Remain | Existing to Remain | 3 | 86 | 0 | 1.63 | 4,248 | 0.00 | 0 | \$0 | \$0.00 | \$0.00 | \$0.00 | \$0.00 | 0 | No New Controls | 0 | 0.0% | 0 | \$0 | |
| 612 | Library | 2600 | Pendant Mt., 100w A19 Lamp | 1 | 100 | 4 | 0.40 | 1,040 | Relamp | (1) 26w CFL Lamp | 1 | 26 | 4 | 0.10 | 270 | 0.30 | 770 | \$123 | \$56.00 | \$40.00 | \$96.00 | \$0.00 | 0.78 | 0 | No New Controls | 0 | 0.0% | 0 | \$0 |
| 612 | Library | 2600 | Pendant Mt., 100w A19 Lamp | 1 | 100 | 2 | 0.20 | 520 | Relamp | (1) 26w CFL Lamp | 1 | 26 | 2 | 0.05 | 135 | 0.15 | 385 | \$62 | \$28.00 | \$20.00 | \$48.00 | \$0.00 | 0.78 | 0 | No New Controls | 0 | 0.0% | 0 | \$0 |
| 127.22 | Library Office | 2600 | 1x4, 1 Lamp, 34w T12, Magnetic Ballast, Wall Mt, No Lens | 1 | 35 | 1 | 0.04 | 91 | Reballast & Relamp | Reballast & Relamp; 28w T8 Elec. Ballast | 1 | 25 | 1 | 0.03 | 65 | 0.01 | 26 | \$4 | \$30.00 | \$50.00 | \$80.00 | \$0.00 | 19.23 | 5 | Dual Technology Occupancy Sensor - Switch Mt. | 1 | 20.0% | 13 | \$2 |
| 127.22 | Main Office | 2600 | 1x4, 1 Lamp, 34w T12, Magnetic Ballast, Wall Mt, No Lens | 1 | 35 | 2 | 0.07 | 182 | Reballast & Relamp | Reballast & Relamp; 28w T8 Elec. Ballast | 1 | 25 | 2 | 0.05 | 130 | 0.02 | 52 | \$8 | \$60.00 | \$100.00 | \$160.00 | \$0.00 | 19.23 | 0 | No New Controls | 0 | 0.0% | 0 | \$0 |
| 232.22 | Main Office | 2600 | 2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mt., Parabolic Lens | 3 | 86 | 2 | 0.17 | 447 | Existing to Remain | Existing to Remain | 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 | |
| 232.22 | Files Area | 1200 | 2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mt., Parabolic Lens | 3 | 86 | 1 | 0.09 | 103 | Existing to Remain | Existing to Remain | 3 | 86 | 0 | 0.09 | 103 | 0.00 | 0 | \$0 | \$0.00 | \$0.00 | \$0.00 | \$0.00 | 5 | Dual Technology Occupancy Sensor - Switch Mt. | 0.5 | 20.0% | 21 | \$3 | |
| 121.41 | Files Area | 1200 | 1x4, 1 Lamp, 34w T12, Magnetic Ballast, Wall Mt, No Lens | 1 | 35 | 1 | 0.04 | 42 | Reballast & Relamp | Reballast & Relamp; 28w T8 Elec. Ballast | 1 | 25 | 1 | 0.03 | 30 | 0.01 | 12 | \$2 | \$30.00 | \$50.00 | \$80.00 | \$0.00 | 41.67 | 5 | Dual Technology Occupancy Sensor - Switch Mt. | 0.5 | 20.0% | 6 | \$1 |
| 227.22 | Principal Office | 2600 | 2x2, 2 Lamp U-Tube, 32w T8, Elect. Ballast, Recessed Mt., Parabolic Lens | 2 | 65 | 4 | 0.26 | 676 | Existing to Remain | Existing to Remain | 2 | 65 | 0 | 0.26 | 676 | 0.00 | 0 | \$0 | \$0.00 | \$0.00 | \$0.00 | \$0.00 | 5 | Dual Technology Occupancy Sensor - Switch Mt. | 1 | 20.0% | 135 | \$22 | |

| Fixture Reference # | Location | Average Item Hours | Existing Fixtures | | | | | Proposed Fixtures Retrofit | | | | | Retrofit Energy Savings | | | Lighting Retrofit Costs | | | | Simple Payback | Proposed Lighting Controls | | | | | | | | |
|---------------------|------------------|--------------------|--|-------------------|-------------------|-----------------|----------|----------------------------|--------------------|---|-------------------|-------------------|-------------------------|----------|--------------|-------------------------|---------------------|--------------------|------------|----------------|----------------------------|------------|-----------------|-----------------|---|-----------------|------------------|---------------------|--------------------|
| | | | 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 | Control Ref # | Controls Description | Qty of Controls | Hour Reduction % | Energy Savings, kWh | Energy Savings, \$ |
| 227.21 | Gym Lobby | 3000 | 2x2, 2 Lamp U-Tube, 32w T8, Elect. Ballast, Recessed Mt., Prismatic Lens | 2 | 65 | 8 | 0.52 | 1,560 | Existing to Remain | Existing to Remain | 2 | 65 | 0 | 0.52 | 1,560 | 0.00 | 0 | \$0 | \$0.00 | \$0.00 | \$0.00 | \$0.00 | 0 | No New Controls | 0 | 0.0% | 0 | \$0 | |
| 769 | Gym | 2600 | 400w MH, H6 Bay | 1 | 465 | 10 | 4.65 | 12,090 | Remove and Return | 1x4, 6 Lamp, 54w TSHO, Elect. Dimming Ballast, Lo Bay | 6 | 315 | 10 | 3.15 | 8,190 | 1.50 | 3,900 | \$624 | \$2,500.00 | \$5,050.00 | \$7,550.00 | \$1,000.00 | 10.50 | 0 | No New Controls | 0 | 0.0% | 0 | \$0 |
| 624 | Gym | 2600 | Recessed Auditorium Light, 300w A Lamp Incandescent | 1 | 300 | 8 | 2.40 | 6,240 | Existing to Remain | Existing to Remain | 1 | 300 | 0 | 2.40 | 6,240 | 0.00 | 0 | \$0 | \$0.00 | \$0.00 | \$0.00 | \$0.00 | - | 0 | No New Controls | 0 | 0.0% | 0 | \$0 |
| 221.11 | Kitchen | 2600 | 1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mt., Prismatic Lens | 2 | 62 | 2 | 0.12 | 322 | Existing to Remain | Existing to Remain | 2 | 62 | 0 | 0.12 | 322 | 0.00 | 0 | \$0 | \$0.00 | \$0.00 | \$0.00 | \$0.00 | - | 0 | No New Controls | 0 | 0.0% | 0 | \$0 |
| 613 | Kitchen | 2600 | 150w A19 Lamp | 1 | 150 | 5 | 0.75 | 1,950 | Relamp | (1) 42w CFL Lamp | 1 | 42 | 5 | 0.21 | 546 | 0.54 | 1,404 | \$225 | \$110.00 | \$50.00 | \$160.00 | \$0.00 | 0.71 | 0 | No New Controls | 0 | 0.0% | 0 | \$0 |
| 613 | Kitchen Restroom | 1200 | 150w A19 Lamp | 1 | 150 | 1 | 0.15 | 180 | Relamp | (1) 42w CFL Lamp | 1 | 42 | 1 | 0.04 | 50 | 0.11 | 130 | \$21 | \$22.00 | \$10.00 | \$32.00 | \$0.00 | 1.54 | 0 | No New Controls | 0 | 0.0% | 0 | \$0 |
| 242.11 | Kitchen Storage | 1200 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Surface Mt., Prismatic Lens | 4 | 107 | 1 | 0.11 | 128 | Existing to Remain | Existing to Remain | 4 | 107 | 0 | 0.11 | 128 | 0.00 | 0 | \$0 | \$0.00 | \$0.00 | \$0.00 | \$0.00 | - | 0 | No New Controls | 0 | 0.0% | 0 | \$0 |
| 613 | Kitchen Storage | 1200 | 150w A19 Lamp | 1 | 150 | 1 | 0.15 | 180 | Relamp | (1) 42w CFL Lamp | 1 | 42 | 1 | 0.04 | 50 | 0.11 | 130 | \$21 | \$22.00 | \$10.00 | \$32.00 | \$0.00 | 1.54 | 0 | No New Controls | 0 | 0.0% | 0 | \$0 |
| 232.21 | Copy Area | 2600 | 2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mt., Prismatic Lens | 3 | 86 | 3 | 0.26 | 671 | Existing to Remain | Existing to Remain | 3 | 86 | 0 | 0.26 | 671 | 0.00 | 0 | \$0 | \$0.00 | \$0.00 | \$0.00 | \$0.00 | - | 5 | Dual Technology Occupancy Sensor - Switch Mt. | 1 | 20.0% | 134 | \$21 |
| 232.21 | Vestibule | 3000 | 2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mt., Prismatic Lens | 3 | 86 | 1 | 0.09 | 258 | Existing to Remain | Existing to Remain | 3 | 86 | 0 | 0.09 | 258 | 0.00 | 0 | \$0 | \$0.00 | \$0.00 | \$0.00 | \$0.00 | - | 0 | No New Controls | 0 | 0.0% | 0 | \$0 |
| 232.21 | Storage A | 1200 | 2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mt., Prismatic Lens | 3 | 86 | 2 | 0.17 | 206 | Existing to Remain | Existing to Remain | 3 | 86 | 0 | 0.17 | 206 | 0.00 | 0 | \$0 | \$0.00 | \$0.00 | \$0.00 | \$0.00 | - | 0 | No New Controls | 0 | 0.0% | 0 | \$0 |
| 232.21 | Back Room B | 1200 | 2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mt., Prismatic Lens | 3 | 86 | 2 | 0.17 | 206 | Existing to Remain | Existing to Remain | 3 | 86 | 0 | 0.17 | 206 | 0.00 | 0 | \$0 | \$0.00 | \$0.00 | \$0.00 | \$0.00 | - | 0 | No New Controls | 0 | 0.0% | 0 | \$0 |
| 232.21 | Office C | 2600 | 2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mt., Prismatic Lens | 3 | 86 | 2 | 0.17 | 447 | Existing to Remain | Existing to Remain | 3 | 86 | 0 | 0.17 | 447 | 0.00 | 0 | \$0 | \$0.00 | \$0.00 | \$0.00 | \$0.00 | - | 5 | Dual Technology Occupancy Sensor - Switch Mt. | 1 | 20.0% | 89 | \$14 |
| 232.21 | Office D | 2600 | 2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mt., Prismatic Lens | 3 | 86 | 4 | 0.34 | 894 | Existing to Remain | Existing to Remain | 3 | 86 | 0 | 0.34 | 894 | 0.00 | 0 | \$0 | \$0.00 | \$0.00 | \$0.00 | \$0.00 | - | 5 | Dual Technology Occupancy Sensor - Switch Mt. | 1 | 20.0% | 179 | \$29 |
| 612 | Gym Storage | 1200 | Pendant Mt., 100w A19 Lamp | 1 | 100 | 2 | 0.20 | 240 | Relamp | (1) 26w CFL Lamp | 1 | 26 | 2 | 0.05 | 62 | 0.15 | 178 | \$28 | \$28.00 | \$20.00 | \$48.00 | \$0.00 | 1.69 | 0 | No New Controls | 0 | 0.0% | 0 | \$0 |
| 221.31 | PE Offices | 2600 | 1x4, 2 Lamp, 32w T8, Elect. Ballast, Pendant Mt., Prismatic Lens | 2 | 62 | 1 | 0.06 | 161 | Existing to Remain | Existing to Remain | 2 | 62 | 0 | 0.06 | 161 | 0.00 | 0 | \$0 | \$0.00 | \$0.00 | \$0.00 | \$0.00 | - | 5 | Dual Technology Occupancy Sensor - Switch Mt. | 1 | 20.0% | 32 | \$5 |
| 227.21 | Lobby | 3000 | 2x2, 2 Lamp U-Tube, 32w T8, Elect. Ballast, Recessed Mt., Prismatic Lens | 2 | 65 | 20 | 1.30 | 3,900 | Existing to Remain | Existing to Remain | 2 | 65 | 0 | 1.30 | 3,900 | 0.00 | 0 | \$0 | \$0.00 | \$0.00 | \$0.00 | \$0.00 | - | 0 | No New Controls | 0 | 0.0% | 0 | \$0 |
| 221.11 | Boys Restroom | 2600 | 1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mt., Prismatic Lens | 2 | 62 | 2 | 0.12 | 322 | Existing to Remain | Existing to Remain | 2 | 62 | 0 | 0.12 | 322 | 0.00 | 0 | \$0 | \$0.00 | \$0.00 | \$0.00 | \$0.00 | - | 0 | No New Controls | 0 | 0.0% | 0 | \$0 |
| 232.22 | 13 Classroom | 2600 | 2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mt., Parabolic Lens | 3 | 86 | 12 | 1.03 | 2,683 | Existing to Remain | Existing to Remain | 3 | 86 | 0 | 1.03 | 2,683 | 0.00 | 0 | \$0 | \$0.00 | \$0.00 | \$0.00 | \$0.00 | - | 4 | Dual Technology Occupancy Sensor - Remote Mt. | 0.5 | 20.0% | 537 | \$86 |
| 2 | 13 Classroom | 2600 | 40w bias | 2 | 44 | 2 | 0.09 | 229 | Existing to Remain | Existing to Remain | 2 | 44 | 0 | 0.09 | 229 | 0.00 | 0 | \$0 | \$0.00 | \$0.00 | \$0.00 | \$0.00 | - | 4 | Dual Technology Occupancy Sensor - Remote Mt. | 0.5 | 20.0% | 46 | \$7 |
| 232.22 | 12 Classroom | 2600 | 2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mt., Parabolic Lens | 3 | 86 | 12 | 1.03 | 2,683 | Existing to Remain | Existing to Remain | 3 | 86 | 0 | 1.03 | 2,683 | 0.00 | 0 | \$0 | \$0.00 | \$0.00 | \$0.00 | \$0.00 | - | 4 | Dual Technology Occupancy Sensor - Remote Mt. | 0.5 | 20.0% | 537 | \$86 |
| 2 | 12 Classroom | 2600 | 40w bias | 2 | 44 | 2 | 0.09 | 229 | Existing to Remain | Existing to Remain | 2 | 44 | 0 | 0.09 | 229 | 0.00 | 0 | \$0 | \$0.00 | \$0.00 | \$0.00 | \$0.00 | - | 4 | Dual Technology Occupancy Sensor - Remote Mt. | 0.5 | 20.0% | 46 | \$7 |
| 232.22 | 11 Classroom | 2600 | 2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mt., Parabolic Lens | 3 | 86 | 12 | 1.03 | 2,683 | Existing to Remain | Existing to Remain | 3 | 86 | 0 | 1.03 | 2,683 | 0.00 | 0 | \$0 | \$0.00 | \$0.00 | \$0.00 | \$0.00 | - | 4 | Dual Technology Occupancy Sensor - Remote Mt. | 0.5 | 20.0% | 537 | \$86 |
| 2 | 11 Classroom | 2600 | 40w bias | 2 | 44 | 2 | 0.09 | 229 | Existing to Remain | Existing to Remain | 2 | 44 | 0 | 0.09 | 229 | 0.00 | 0 | \$0 | \$0.00 | \$0.00 | \$0.00 | \$0.00 | - | 4 | Dual Technology Occupancy Sensor - Remote Mt. | 0.5 | 20.0% | 46 | \$7 |
| 232.22 | 10 Classroom | 2600 | 2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mt., Parabolic Lens | 3 | 86 | 12 | 1.03 | 2,683 | Existing to Remain | Existing to Remain | 3 | 86 | 0 | 1.03 | 2,683 | 0.00 | 0 | \$0 | \$0.00 | \$0.00 | \$0.00 | \$0.00 | - | 4 | Dual Technology Occupancy Sensor - Remote Mt. | 0.5 | 20.0% | 537 | \$86 |
| 2 | 10 Classroom | 2600 | 40w bias | 2 | 44 | 2 | 0.09 | 229 | Existing to Remain | Existing to Remain | 2 | 44 | 0 | 0.09 | 229 | 0.00 | 0 | \$0 | \$0.00 | \$0.00 | \$0.00 | \$0.00 | - | 4 | Dual Technology Occupancy Sensor - Remote Mt. | 0.5 | 20.0% | 46 | \$7 |


| Fixture Reference # | Location | Average Item Hours | Existing Fixtures | | | | | Proposed Fixtures Retrofit | | | | | Retrofit Energy Savings | | | Lighting Retrofit Costs | | | | Simple Payback | Proposed Lighting Controls | | | | | | | | |
|---------------------|-----------------------------------|--------------------|--|-------------------|-------------------|-----------------|----------|----------------------------|--------------------|--|-------------------|-------------------|-------------------------|----------|--------------|-------------------------|---------------------|--------------------|----------|----------------|----------------------------|-----------|-----------------|-----------------|---|-----------------|------------------|---------------------|--------------------|
| | | | 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 | Control Ref # | Controls Description | Qty of Controls | Hour Reduction % | Energy Savings, kWh | Energy Savings, \$ |
| 221.11 | Girls Restroom | 2600 | 1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mt., Prismatic Lens | 2 | 62 | 2 | 0.12 | 322 | Existing to Remain | Existing to Remain | 2 | 62 | 0 | 0.12 | 322 | 0.00 | 0 | \$0 | \$0.00 | \$0.00 | \$0.00 | \$0.00 | 0 | No New Controls | 0 | 0.0% | 0 | \$0 | |
| 221.34 | Custodial Closet | 1200 | 1x4, 2 Lamp, 32w T8, Elect. Ballast, Pendant Mt., No Lens | 2 | 62 | 1 | 0.06 | 74 | Existing to Remain | Existing to Remain | 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 | |
| 221.34 | Electrical Closet | 1200 | 1x4, 2 Lamp, 32w T8, Elect. Ballast, Pendant Mt., No Lens | 2 | 62 | 1 | 0.06 | 74 | Existing to Remain | Existing to Remain | 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 | |
| 121.11 | Trailer Classroom 1 | 2600 | 1x4, 1 Lamp, 34w T12, Magnetic Ballast, Wall Mt, No Lens | 1 | 35 | 18 | 0.63 | 1,638 | Reballast & Relamp | Reballast & Relamp; 28w T8 Elec. Ballast | 1 | 25 | 18 | 0.45 | 1,170 | 0.18 | 468 | \$75 | \$540.00 | \$900.00 | \$1,440.00 | \$0.00 | 19.23 | 4 | Dual Technology Occupancy Sensor - Remote Mt. | 1 | 20.0% | 234 | \$37 |
| 612 | Trailer Classroom 1 outdoor light | 4000 | Pendant Mt., 100w A19 Lamp | 1 | 100 | 1 | 0.10 | 400 | Relamp | (1) 26w CFL Lamp | 1 | 26 | 1 | 0.03 | 104 | 0.07 | 296 | \$47 | \$14.00 | \$10.00 | \$24.00 | \$0.00 | 0.51 | 0 | No New Controls | 0 | 0.0% | 0 | \$0 |
| 121.11 | Trailer Classroom 1 restroom | 1200 | 1x4, 1 Lamp, 34w T12, Magnetic Ballast, Wall Mt, No Lens | 1 | 35 | 1 | 0.04 | 42 | Reballast & Relamp | Reballast & Relamp; 28w T8 Elec. Ballast | 1 | 25 | 1 | 0.03 | 30 | 0.01 | 12 | \$2 | \$30.00 | \$50.00 | \$80.00 | \$0.00 | 41.67 | 0 | No New Controls | 0 | 0.0% | 0 | \$0 |
| 121.11 | Trailer Classroom 2 | 2600 | 1x4, 1 Lamp, 34w T12, Magnetic Ballast, Wall Mt, No Lens | 1 | 35 | 18 | 0.63 | 1,638 | Reballast & Relamp | Reballast & Relamp; 28w T8 Elec. Ballast | 1 | 25 | 18 | 0.45 | 1,170 | 0.18 | 468 | \$75 | \$540.00 | \$900.00 | \$1,440.00 | \$0.00 | 19.23 | 4 | Dual Technology Occupancy Sensor - Remote Mt. | 1 | 20.0% | 234 | \$37 |
| 612 | Trailer Classroom 2 outdoor light | 4000 | Pendant Mt., 100w A19 Lamp | 1 | 100 | 1 | 0.10 | 400 | Relamp | (1) 26w CFL Lamp | 1 | 26 | 1 | 0.03 | 104 | 0.07 | 296 | \$47 | \$14.00 | \$10.00 | \$24.00 | \$0.00 | 0.51 | 0 | No New Controls | 0 | 0.0% | 0 | \$0 |
| 121.11 | Trailer Classroom 2 restroom | 1200 | 1x4, 1 Lamp, 34w T12, Magnetic Ballast, Wall Mt, No Lens | 1 | 35 | 1 | 0.04 | 42 | Reballast & Relamp | Reballast & Relamp; 28w T8 Elec. Ballast | 1 | 25 | 1 | 0.03 | 30 | 0.01 | 12 | \$2 | \$30.00 | \$50.00 | \$80.00 | \$0.00 | 41.67 | 0 | No New Controls | 0 | 0.0% | 0 | \$0 |
| 121.11 | Trailer Classroom 3 | 2600 | 1x4, 1 Lamp, 34w T12, Magnetic Ballast, Wall Mt, No Lens | 1 | 35 | 18 | 0.63 | 1,638 | Reballast & Relamp | Reballast & Relamp; 28w T8 Elec. Ballast | 1 | 25 | 18 | 0.45 | 1,170 | 0.18 | 468 | \$75 | \$540.00 | \$900.00 | \$1,440.00 | \$0.00 | 19.23 | 4 | Dual Technology Occupancy Sensor - Remote Mt. | 1 | 20.0% | 234 | \$37 |
| 612 | Trailer Classroom 3 outdoor light | 4000 | Pendant Mt., 100w A19 Lamp | 1 | 100 | 1 | 0.10 | 400 | Relamp | (1) 26w CFL Lamp | 1 | 26 | 1 | 0.03 | 104 | 0.07 | 296 | \$47 | \$14.00 | \$10.00 | \$24.00 | \$0.00 | 0.51 | 0 | No New Controls | 0 | 0.0% | 0 | \$0 |
| 121.11 | Trailer Classroom 3 restroom | 1200 | 1x4, 1 Lamp, 34w T12, Magnetic Ballast, Wall Mt, No Lens | 1 | 35 | 1 | 0.04 | 42 | Reballast & Relamp | Reballast & Relamp; 28w T8 Elec. Ballast | 1 | 25 | 1 | 0.03 | 30 | 0.01 | 12 | \$2 | \$30.00 | \$50.00 | \$80.00 | \$0.00 | 41.67 | 0 | No New Controls | 0 | 0.0% | 0 | \$0 |
| 121.11 | Trailer Classroom 4 | 2600 | 1x4, 1 Lamp, 34w T12, Magnetic Ballast, Wall Mt, No Lens | 1 | 35 | 18 | 0.63 | 1,638 | Reballast & Relamp | Reballast & Relamp; 28w T8 Elec. Ballast | 1 | 25 | 18 | 0.45 | 1,170 | 0.18 | 468 | \$75 | \$540.00 | \$900.00 | \$1,440.00 | \$0.00 | 19.23 | 4 | Dual Technology Occupancy Sensor - Remote Mt. | 1 | 20.0% | 234 | \$37 |
| 612 | Trailer Classroom 4 outdoor light | 4000 | Pendant Mt., 100w A19 Lamp | 1 | 100 | 1 | 0.10 | 400 | Relamp | (1) 26w CFL Lamp | 1 | 26 | 1 | 0.03 | 104 | 0.07 | 296 | \$47 | \$14.00 | \$10.00 | \$24.00 | \$0.00 | 0.51 | 0 | No New Controls | 0 | 0.0% | 0 | \$0 |
| 121.11 | Trailer Classroom 4 restroom | 1200 | 1x4, 1 Lamp, 34w T12, Magnetic Ballast, Wall Mt, No Lens | 1 | 35 | 1 | 0.04 | 42 | Reballast & Relamp | Reballast & Relamp; 28w T8 Elec. Ballast | 1 | 25 | 1 | 0.03 | 30 | 0.01 | 12 | \$2 | \$30.00 | \$50.00 | \$80.00 | \$0.00 | 41.67 | 0 | No New Controls | 0 | 0.0% | 0 | \$0 |
| 121.11 | Trailer Classroom 5 | 2600 | 1x4, 1 Lamp, 34w T12, Magnetic Ballast, Wall Mt, No Lens | 1 | 35 | 18 | 0.63 | 1,638 | Reballast & Relamp | Reballast & Relamp; 28w T8 Elec. Ballast | 1 | 25 | 18 | 0.45 | 1,170 | 0.18 | 468 | \$75 | \$540.00 | \$900.00 | \$1,440.00 | \$0.00 | 19.23 | 4 | Dual Technology Occupancy Sensor - Remote Mt. | 1 | 20.0% | 234 | \$37 |
| 612 | Trailer Classroom 5 outdoor light | 4000 | Pendant Mt., 100w A19 Lamp | 1 | 100 | 1 | 0.10 | 400 | Relamp | (1) 26w CFL Lamp | 1 | 26 | 1 | 0.03 | 104 | 0.07 | 296 | \$47 | \$14.00 | \$10.00 | \$24.00 | \$0.00 | 0.51 | 0 | No New Controls | 0 | 0.0% | 0 | \$0 |
| 121.11 | Trailer Classroom 5 restroom | 1200 | 1x4, 1 Lamp, 34w T12, Magnetic Ballast, Wall Mt, No Lens | 1 | 35 | 1 | 0.04 | 42 | Reballast & Relamp | Reballast & Relamp; 28w T8 Elec. Ballast | 1 | 25 | 1 | 0.03 | 30 | 0.01 | 12 | \$2 | \$30.00 | \$50.00 | \$80.00 | \$0.00 | 41.67 | 0 | No New Controls | 0 | 0.0% | 0 | \$0 |
| 121.11 | Trailer Classroom 6 | 2600 | 1x4, 1 Lamp, 34w T12, Magnetic Ballast, Wall Mt, No Lens | 1 | 35 | 18 | 0.63 | 1,638 | Reballast & Relamp | Reballast & Relamp; 28w T8 Elec. Ballast | 1 | 25 | 18 | 0.45 | 1,170 | 0.18 | 468 | \$75 | \$540.00 | \$900.00 | \$1,440.00 | \$0.00 | 19.23 | 4 | Dual Technology Occupancy Sensor - Remote Mt. | 1 | 20.0% | 234 | \$37 |
| 612 | Trailer Classroom 6 outdoor light | 4000 | Pendant Mt., 100w A19 Lamp | 1 | 100 | 1 | 0.10 | 400 | Relamp | (1) 26w CFL Lamp | 1 | 26 | 1 | 0.03 | 104 | 0.07 | 296 | \$47 | \$14.00 | \$10.00 | \$24.00 | \$0.00 | 0.51 | 0 | No New Controls | 0 | 0.0% | 0 | \$0 |
| 121.11 | Trailer Classroom 6 restroom | 1200 | 1x4, 1 Lamp, 34w T12, Magnetic Ballast, Wall Mt, No Lens | 1 | 35 | 1 | 0.04 | 42 | Reballast & Relamp | Reballast & Relamp; 28w T8 Elec. Ballast | 1 | 25 | 1 | 0.03 | 30 | 0.01 | 12 | \$2 | \$30.00 | \$50.00 | \$80.00 | \$0.00 | 41.67 | 0 | No New Controls | 0 | 0.0% | 0 | \$0 |
| 121.11 | Trailer Classroom 7 | 2600 | 1x4, 1 Lamp, 34w T12, Magnetic Ballast, Wall Mt, No Lens | 1 | 35 | 18 | 0.63 | 1,638 | Reballast & Relamp | Reballast & Relamp; 28w T8 Elec. Ballast | 1 | 25 | 18 | 0.45 | 1,170 | 0.18 | 468 | \$75 | \$540.00 | \$900.00 | \$1,440.00 | \$0.00 | 19.23 | 4 | Dual Technology Occupancy Sensor - Remote Mt. | 1 | 20.0% | 234 | \$37 |
| 612 | Trailer Classroom 7 outdoor light | 4000 | Pendant Mt., 100w A19 Lamp | 1 | 100 | 1 | 0.10 | 400 | Relamp | (1) 26w CFL Lamp | 1 | 26 | 1 | 0.03 | 104 | 0.07 | 296 | \$47 | \$14.00 | \$10.00 | \$24.00 | \$0.00 | 0.51 | 0 | No New Controls | 0 | 0.0% | 0 | \$0 |
| 121.11 | Trailer Classroom 7 restroom | 1200 | 1x4, 1 Lamp, 34w T12, Magnetic Ballast, Wall Mt, No Lens | 1 | 35 | 1 | 0.04 | 42 | Reballast & Relamp | Reballast & Relamp; 28w T8 Elec. Ballast | 1 | 25 | 1 | 0.03 | 30 | 0.01 | 12 | \$2 | \$30.00 | \$50.00 | \$80.00 | \$0.00 | 41.67 | 0 | No New Controls | 0 | 0.0% | 0 | \$0 |
| 121.11 | Trailer Classroom 8 | 2600 | 1x4, 1 Lamp, 34w T12, Magnetic Ballast, Wall Mt, No Lens | 1 | 35 | 18 | 0.63 | 1,638 | Reballast & Relamp | Reballast & Relamp; 28w T8 Elec. Ballast | 1 | 25 | 18 | 0.45 | 1,170 | 0.18 | 468 | \$75 | \$540.00 | \$900.00 | \$1,440.00 | \$0.00 | 19.23 | 4 | Dual Technology Occupancy Sensor - Remote Mt. | 1 | 20.0% | 234 | \$37 |
| 612 | Trailer Classroom 8 outdoor light | 4000 | Pendant Mt., 100w A19 Lamp | 1 | 100 | 1 | 0.10 | 400 | Relamp | (1) 26w CFL Lamp | 1 | 26 | 1 | 0.03 | 104 | 0.07 | 296 | \$47 | \$14.00 | \$10.00 | \$24.00 | \$0.00 | 0.51 | 0 | No New Controls | 0 | 0.0% | 0 | \$0 |

| Fixture Reference # | Location | Average Burn Hours | Existing Fixtures | | | | | Proposed Fixtures Retrofit | | | | | Retrofit Energy Savings | | | Lighting Retrofit Costs | | | | Proposed Lighting Controls | | | | | | | | | |
|---------------------|------------------------------|--------------------|--|-------------------|-------------------|-----------------|-----------|----------------------------|--------------------|--|-------------------|-------------------|-------------------------|-----------|----------------|-------------------------|---------------------|--------------------|---------------|----------------------------|---------------|-----------------|----------------|---------------|----------------------|-----------------|------------------|---------------------|--------------------|
| | | | 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, \$ |
| 121.11 | Trailer Classroom 8 restroom | 1200 | 1x4, 1 Lamp, 34w T12, Magnetic Ballast, Wall Mnt, No Lens | 1 | 35 | 1 | 0.04 | 42 | Reballast & Relamp | Reballast & Relamp; 28w T8 Elec. Ballast | 1 | 25 | 1 | 0.03 | 30 | 0.01 | 12 | \$2 | \$30.00 | \$50.00 | \$80.00 | \$0.00 | 41.67 | 0 | No New Controls | 0 | 0.0% | 0 | \$0 |
| 221.31 | Boiler Room | 1200 | 1x4, 2 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., Prismatic Lens | 2 | 62 | 5 | 0.31 | 372 | Existing to Remain | Existing to Remain | 2 | 62 | 0 | 0.31 | 372 | 0.00 | 0 | \$0 | \$0.00 | \$0.00 | \$0.00 | \$0.00 | - | 0 | No New Controls | 0 | 0.0% | 0 | \$0 |
| 242.31 | Boiler Room | 1200 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., Prismatic Lens | 4 | 107 | 3 | 0.32 | 385 | Existing to Remain | Existing to Remain | 4 | 107 | 0 | 0.32 | 385 | 0.00 | 0 | \$0 | \$0.00 | \$0.00 | \$0.00 | \$0.00 | - | 0 | No New Controls | 0 | 0.0% | 0 | \$0 |
| 221.11 | Corridors | 3000 | 1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 2 | 62 | 17 | 1.05 | 3,162 | Existing to Remain | Existing to Remain | 2 | 62 | 0 | 1.05 | 3,162 | 0.00 | 0 | \$0 | \$0.00 | \$0.00 | \$0.00 | \$0.00 | - | 0 | No New Controls | 0 | 0.0% | 0 | \$0 |
| 222.21 | Corridors | 3000 | 2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 2 | 62 | 8 | 0.50 | 1,488 | Existing to Remain | Existing to Remain | 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 |
| 127.22 | Corridors | 3000 | 1x4, 1 Lamp, 34w T12, Magnetic Ballast, Wall Mnt, No Lens | 1 | 35 | 8 | 0.28 | 840 | Reballast & Relamp | Reballast & Relamp; 28w T8 Elec. Ballast | 1 | 25 | 8 | 0.20 | 600 | 0.08 | 240 | \$38 | \$240.00 | \$400.00 | \$640.00 | \$0.00 | 16.67 | 0 | No New Controls | 0 | 0.0% | 0 | \$0 |
| 561 | Corridors | 3000 | Recessed Down Light, (1) 65w R40 | 1 | 65 | 7 | 0.46 | 1,365 | Relamp | 18w LED PAR38 | 1 | 18 | 7 | 0.13 | 378 | 0.33 | 987 | \$158 | \$595.00 | \$350.00 | \$945.00 | \$0.00 | 5.98 | 0 | No New Controls | 0 | 0.0% | 0 | \$0 |
| 735 | Exterior | 4000 | 175w MH Flood Light | 1 | 210 | 1 | 0.21 | 840 | Relamp | 150w MH Energy Master Lamp; Venture Lighting | 1 | 185 | 1 | 0.19 | 740 | 0.03 | 100 | \$16 | \$40.00 | \$20.00 | \$60.00 | \$0.00 | 3.75 | 0 | No New Controls | 0 | 0.0% | 0 | \$0 |
| 560 | Exterior | 4000 | Recessed 40w CFL | 1 | 40 | 4 | 0.16 | 640 | Existing to Remain | Existing to Remain | 1 | 40 | 0 | 0.16 | 640 | 0.00 | 0 | \$0 | \$0.00 | \$0.00 | \$0.00 | \$0.00 | - | 0 | No New Controls | 0 | 0.0% | 0 | \$0 |
| 738 | Exterior | 4000 | 250w MH Socrates Walk Light | 1 | 285 | 7 | 2.00 | 7,980 | Relamp | New-Tech NT-4203-TR-HO, 73w LED Retrofit | 1 | 42 | 7 | 0.29 | 1,176 | 1.70 | 6,804 | \$1,089 | \$3,150.00 | \$1,400.00 | \$4,550.00 | \$0.00 | 4.18 | 0 | No New Controls | 0 | 0.0% | 0 | \$0 |
| TOTAL | | | | | | 675 | 80 | 132,106 | | | | | 235 | 42 | 109,816 | 8 | 22,290 | 3,566 | 12,197 | 16,240 | 28,437 | 1,000 | 7.97 | | | 39 | | 13,718 | 2,195 |

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 |
|----------------------|--------------|-----------------|-----|-------------|-------------------|------------------------|------------------|------------------------|-------------------------|--------|
| Woodrow Wilson ES | 17650 | SHARP NU-U235F2 | 721 | 17.5 | 12,647 | 169.44 | 195,796 | 137.2 | 30,210 | 13.40 |



 = Proposed PV Layout

Notes:

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

| Project Name: LGEA Solar PV Project - Woodrow Wilson ES Location: New Brunswick, NJ Description: Photovoltaic System 100% Financing - 15 year | | | | | | | | | | |
|--|------------------------|---|---------------------|------------------------|--------------|------------------------------|--------------------|---------------|----------------------|-------|
| Simple Payback Analysis | | | | | | | | | | |
| | | Photovoltaic System 100% Financing - 15 year | | | | | | | | |
| Total Construction Cost | | \$1,022,169 | | | | | | | | |
| Annual kWh Production | | 195,796 | | | | | | | | |
| Annual Energy Cost Reduction | | \$31,327 | | | | | | | | |
| Average Annual SREC Revenue | | \$37,414 | | | | | | | | |
| Simple Payback: | | 14.87 | | | | | | | | Years |
| Life Cycle Cost Analysis | | | | | | | | | | |
| Analysis Period (years): | | 15 | | | | Financing %: | | 100% | | |
| Discount Rate: | | 3% | | | | Maintenance Escalation Rate: | | 3.0% | | |
| Average Energy Cost (\$/kWh) | | \$0.160 | | | | 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 | 195,796 | \$31,327 | \$0 | \$48,949 | \$60,151 | \$43,357 | (\$23,231) | (\$23,231) | |
| 2 | \$0 | 194,817 | \$32,267 | \$0 | \$48,704 | \$57,477 | \$46,031 | (\$22,536) | (\$45,768) | |
| 3 | \$0 | 193,843 | \$33,235 | \$0 | \$48,461 | \$54,637 | \$48,870 | (\$21,812) | (\$67,580) | |
| 4 | \$0 | 192,874 | \$34,232 | \$0 | \$48,218 | \$51,623 | \$51,885 | (\$21,057) | (\$88,637) | |
| 5 | \$0 | 191,909 | \$35,259 | \$1,977 | \$47,977 | \$48,423 | \$55,085 | (\$22,248) | (\$110,884) | |
| 6 | \$0 | 190,950 | \$36,317 | \$1,967 | \$38,190 | \$45,026 | \$58,482 | (\$30,968) | (\$141,852) | |
| 7 | \$0 | 189,995 | \$37,407 | \$1,957 | \$37,999 | \$41,419 | \$62,089 | (\$30,059) | (\$171,911) | |
| 8 | \$0 | 189,045 | \$38,529 | \$1,947 | \$37,809 | \$37,589 | \$65,919 | (\$29,117) | (\$201,028) | |
| 9 | \$0 | 188,100 | \$39,685 | \$1,937 | \$37,620 | \$33,523 | \$69,984 | (\$28,141) | (\$229,169) | |
| 10 | \$0 | 187,159 | \$40,875 | \$1,928 | \$28,074 | \$29,207 | \$74,301 | (\$36,486) | (\$265,656) | |
| 11 | \$0 | 186,224 | \$42,101 | \$1,918 | \$27,934 | \$24,624 | \$78,884 | (\$35,391) | (\$301,046) | |
| 12 | \$0 | 185,292 | \$43,364 | \$1,909 | \$27,794 | \$19,759 | \$83,749 | (\$34,258) | (\$335,304) | |
| 13 | \$0 | 184,366 | \$44,665 | \$1,899 | \$27,655 | \$14,593 | \$88,914 | (\$33,086) | (\$368,391) | |
| 14 | \$0 | 183,444 | \$46,005 | \$1,889 | \$18,344 | \$9,109 | \$94,398 | (\$41,048) | (\$409,438) | |
| 15 | \$0 | 182,527 | \$47,385 | \$1,880 | \$18,253 | \$3,287 | \$100,221 | (\$39,750) | (\$449,188) | |
| Totals: | | 2,836,341 | \$582,655 | \$21,208 | \$541,981 | \$530,447 | \$1,022,169 | (\$449,188) | (\$3,209,084) | |
| Net Present Value (NPV) | | | | | | | (\$328,492) | | | |