LOCAL GOVERNMENT ENERGY AUDIT PROGRAM: ENERGY AUDIT REPORT

PREPARED FOR:
NORTHERN HIGHLANDS REGIONAL HIGH SCHOOL

298 HILLSIDE AVE. ALLENDALE, NJ 07401

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I. EXECUTIVE SUMMARY

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

Northern Highlands Regional High School District
298 Hillside Ave.
Allendale, NJ 07401

District Contact Person: Roderic McLaughlin, School Business Administrator

This audit is performed in connection with the New Jersey Clean Energy - Local Government Energy Audit Program. The energy audit is conducted to promote the mission of the office of Clean Energy, which is to use innovation and technology to solve energy and environmental problems in a way that improves the State's economy. This can be achieved through the wiser and more efficient use of energy.

The annual energy costs at this facility are as follows:

Electricity	$ 426,423
Natural Gas	$ 61,854
Total	$ 488,277

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

Table 1
Financial Summary Table

ENERGY CONSERVATION MEASURES (ECM's)					
ECM NO.	**DESCRIPTION**	**NET INSTALLATION COST[A]**	**ANNUAL SAVINGS[B]**	**SIMPLE PAYBACK (Yrs)**	**SIMPLE LIFETIME ROI**
ECM #1	General Lighting Equipment Upgrade	$127,401	$25,283	5.0	198%
ECM #2	General Lighting Controls Upgrade	$50,685	$15,788	3.2	367%
ECM #3	Gymnasium Lighting & Controls Upgrade - T5s	$9,775	$3,044	3.2	367%
ECM #4	Replace CRT Monitors	$20,300	$2,265	9.0	11.6%
ECM #5	NEMA Premium Efficiency Motors	$17,510	$1,117	15.7	-4.3%
ECM #6	Demand Controlled Ventilation	$164,000	$5,812	28	-47%
ECM #7	Window Replacement	$1,070,000	$14,184	75	-80%
ECM #8	Upgrade Window AC Units	$85,000	$4,875	17	-43%
ECM #9	Modify 3-way Valves and Install Variable Frequency	$63,586	$7,534	8.4	78%
ECM #10	Hot Water Pipe and Valve Jacket Insulation	$9,900	$1,808	5.5	174%
ECM #11	Water Efficiency Measures	$74,000	$1,187	62	-76%
ECM #12	Building Management System Expansion	$300,000	$24,454	12	22%
RENEWABLE ENERGY MEASURES (REM's)					
ECM NO.	**DESCRIPTION**	**NET INSTALLATION COST**	**ANNUAL SAVINGS**	**SIMPLE PAYBACK (Yrs)**	**SIMPLE LIFETIME ROI**
REM #1	172 kW Solar PV System	$1,037,154	$72,612	14.3	5.0%

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

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

Table 2
Estimated Energy Savings Summary Table

ENERGY CONSERVATION MEASURES (ECM's)				
ECM NO.	DESCRIPTION	ANNUAL UTILITY REDUCTION		
		ELECTRIC DEMAND (KW)	ELECTRIC CONSUMPTION (KWH)	NATURAL GAS (THERMS)
ECM #1	General Lighting Equipment Upgrade	58	156,976	0
ECM #2	General Lighting Controls Upgrade	0	98,063	0
ECM #3	Gymnasium Lighting & Controls Upgrade - T5s	4	18,907	0
ECM #4	Replace CRT Monitors	0	14,068	0
ECM #5	NEMA Premium Efficiency Motors	3.4	6,936	0
ECM #6	Demand Controlled Ventilation	0	19,360	6,297
ECM #7	Window Replacement	8	23,200	9,766
ECM #8	Upgrade Window AC Units	38	30,280	0
ECM #9	Modify 3-way Valves and Install Variable Frequency	0	46,793	0
ECM #10	Hot Water Pipe and Valve Jacket Insulation	0	0	1,689
ECM #11	Water Efficiency Measures	0	0	281.5
ECM #12	Building Management System Expansion	0	132,653	2,894
RENEWABLE ENERGY MEASURES (REM's)				
ECM NO.	DESCRIPTION	ANNUAL UTILITY REDUCTION		
		ELECTRIC DEMAND (KW)	ELECTRIC CONSUMPTION (KWH)	NATURAL GAS (THERMS)
REM #1	172 kW Solar PV System	139	198,754	0

Concord Engineering Group (CEG) recommends proceeding with the implementation of all ECM's that provide a calculated simple payback at or under ten (10) years. The following Energy Conservation Measures are recommended for the facility:

- **ECM #1:** General Lighting Equipment Upgrade
- **ECM #2:** General Lighting Controls Upgrade
- **ECM #3:** Gymnasium Lighting & Controls Upgrade - T5s
- **ECM #4:** Replace CRT Monitors
- **ECM #9:** 3-way Valves and Variable Frequency Drives
- **ECM #10:** Hot Water Pipe and Valve Jacket Insulation

Although ECM #12 does not provide a payback less than 10 years, it is recommended to proceed with the expansion of the building management system to cover all the HVAC equipments in this facility.

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

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

Renewable Energy Measures (REMs) were also reviewed for implementation at the High School. Concord Engineering utilized a roof mounted solar array to house a substantial PV system. The recommended 172 kW PV system will produce approximately 199,000 kWh of electricity annually and will reduce the schools electrical consumption from the grid by 7.5%. The system's calculated simple payback of 14.5 years is past the standard 10 year simple payback threshold; however, with alternative funding this payback could be lessened. Concord Engineering recommends the Owner review all funding options before deciding to not implement this renewable energy measure.

Overall, the Northern Highlands Regional High School appears to be operating at a high efficiency level compared to other schools in the region. With the implementation of the above recommended measures the School District will realize further energy savings at the High School.

II. INTRODUCTION

The comprehensive energy audit covers the 300,797 square foot Northern Highlands Regional High School. The facility includes following spaces: classrooms, library/media center, computer room, cafeteria, kitchen, gymnasiums, administration offices, auditorium, restrooms, custodial spaces, mechanical spaces and storage spaces.

Electrical and natural gas utility information is collected and analyzed for one full year's energy use of the building. The utility information allows for analysis of the building's operational characteristics; calculate energy benchmarks for comparison to industry averages, estimated savings potential, and baseline usage/cost to monitor the effectiveness of implemented measures. A computer spreadsheet is used to calculate benchmarks and to graph utility information (see the utility profiles below).

The Energy Use Index (EUI) is established for the building. Energy Use Index (EUI) is expressed in British Thermal Units/square foot/year (BTU/ft^2/yr), which is used to compare energy consumption to similar building types or to track consumption from year to year in the same building. The EUI is calculated by converting the annual consumption of all energy sources to BTU's and dividing by the area (gross square footage) of the building. Blueprints (where available) are utilized to verify the gross area of the facility. The EUI is a good indicator of the relative potential for energy savings. A low EUI indicates less potential for energy savings, while a high EUI indicates poor building performance therefore a high potential for energy savings.

Existing building architectural and engineering drawings (where available) are utilized for additional background information. The building envelope, lighting systems, HVAC equipment, and controls information gathered from building drawings allow for a more accurate and detailed review of the building. The information is compared to the energy usage profiles developed from utility data. Through the review of the architectural and engineering drawings a building profile can be defined that documents building age, type, usage, major energy consuming equipment or systems, etc.

The preliminary audit information is gathered in preparation for the site survey. The site survey provides critical information in deciphering where energy is spent and opportunities exist within a facility. The entire site is surveyed to inventory the following to gain an understanding of how each facility operates:

- Building envelope (roof, windows, etc.)
- Heating, ventilation, and air conditioning equipment (HVAC)
- Lighting systems and controls
- Facility-specific equipment

The building site visit is performed to survey all major building components and systems. The site visit includes detailed inspection of energy consuming components. Summary of building occupancy schedules, operating and maintenance practices, and energy management programs provided by the building manager are collected along with the system and components to determine a more accurate impact on energy consumption.

III. METHOD OF ANALYSIS

Post site visit work includes evaluation of the information gathered, researching possible conservation opportunities, organizing the audit into a comprehensive report, and making recommendations on HVAC, lighting and building envelope improvements. Data collected is processed using energy engineering calculations to anticipate energy usage for each of the proposed energy conservation measures (ECMs). The actual building's energy usage is entered directly from the utility bills provided by the owner. The anticipated energy usage is compared to the historical data to determine energy savings for the proposed ECMs.

It is pertinent to note, that the savings noted in this report are not additive. The savings for each recommendation is calculated as standalone energy conservation measures. Implementation of more than one ECM may in some cases affect the savings of each ECM. The savings may in some cases be relatively higher if an individual ECM is implemented in lieu of multiple recommended ECMs. For example implementing reduced operating schedules for inefficient lighting will result in a greater relative savings. Implementing reduced operating schedules for newly installed efficient lighting will result in a lower relative savings, because there is less energy to be saved. If multiple ECM's are recommended to be implemented, the combined savings is calculated and identified appropriately.

ECMs are determined by identifying the building's unique properties and deciphering the most beneficial energy saving measures available that meet the specific needs of the facility. The building construction type, function, operational schedule, existing conditions, and foreseen future plans are critical in the evaluation and final recommendations. Energy savings are calculated base on industry standard methods and engineering estimations. Energy consumption is calculated based on manufacturer's cataloged information when new equipment is proposed.

Cost savings are calculated based on the actual historical energy costs for the facility. Installation costs include labor and equipment costs to estimate the full up-front investment required to implement a change. Costs are derived from Means Cost Data, industry publications, and local contractors and equipment suppliers. The NJ Smart Start Building® program incentives savings (where applicable) are included for the appropriate ECM's and subtracted from the installed cost. Maintenance savings are calculated where applicable and added to the energy savings for each ECM. The life-time for each ECM is estimated based on the typical life of the equipment being replaced or altered. The costs and savings are applied and a simple payback, simple lifetime savings, and simple return on investment are calculated. See below for calculation methods:

ECM Calculation Equations:

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

$$Simple\ Lifetime\ Savings = (Yearly\ Savings \times ECM\ Lifetime)$$

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

$$Lifetime\ Maintenance\ Savings = (Yearly\ Maintenance\ Savings \times ECM\ Lifetime)$$

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

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

Net Present Value calculations based on a Discount Rate of 3%.

IV. HISTORIC ENERGY CONSUMPTION/COST

A. Energy Usage / Tariffs

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

The electric usage profile represents the actual electrical usage for the facility. Rockland Electric Company provides electricity to the facility under their Large Commercial Secondary Three-Phase rate structure. A Third Party Supplier (TPS) has not been contracted. The electric utility measures consumption in kilowatt-hours (KWH) and maximum demand in kilowatts (KW). One KWH usage is equivalent to 1000 watts running for one hour. One KW of electric demand is equivalent to 1000 watts running at any given time. The basic usage charges are shown as generation service and delivery charges along with several non-utility generation charges. Rates used in this report reflect the historical data received for the facility.

The gas usage profile shows the actual natural gas energy usage for the facility. Public Service Electric and Gas (PSE&G) provides natural gas to the facility under the Large Volume Gas (LVG) rate structure. HESS Corporation is contracted as Third Part Suppliers (TPS). 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.

The overall cost for utilities is calculated by dividing the total cost by the total usage. Based on the utility history provided, the average cost for utilities at this facility is as follows:

Description	Average
Electricity	16.1¢ / kWh
Natural Gas	$1.07 / Therm

Table 3
Electricity Billing Data

ELECTRIC USAGE SUMMARY			
Utility Provider:	Rockland Electric Co.		
Rate:	Large Commercial Secondary		
Meter No:	601013711, 601004383, 605000545, 601003743		
Account #	54429-59001, 67859-27000, 67649-27000, 19720-91009		
Third Party Utility Provider:	None		
TPS Meter / Acct No:	-		

MONTH OF USE	CONSUMPTION KWH	DEMAND KW	TOTAL BILL
Dec-10	235,141	644	$34,834
Jan-11	237,613	625	$36,277
Feb-11	239,410	606	$40,090
Mar-11	235,650	613	$37,890
Apr-11	204,678	618	$32,388
May-11	193,924	586	$30,296
Jun-11	251,482	798	$42,270
Jul-11	211,013	576	$36,361
Aug-11	182,188	504	$33,948
Sep-11	229,399	721	$38,991
Oct-11	230,173	692	$33,666
Nov-11	202,396	600	$29,411
Totals	**2,653,067**	**798 Max**	**$426,423**

AVERAGE DEMAND **632 KW average**

AVERAGE RATE **$0.161** **$/kWh**

Figure 1
Northern Highland Regional High School
Electric Usage Profile
December-10 through November-11

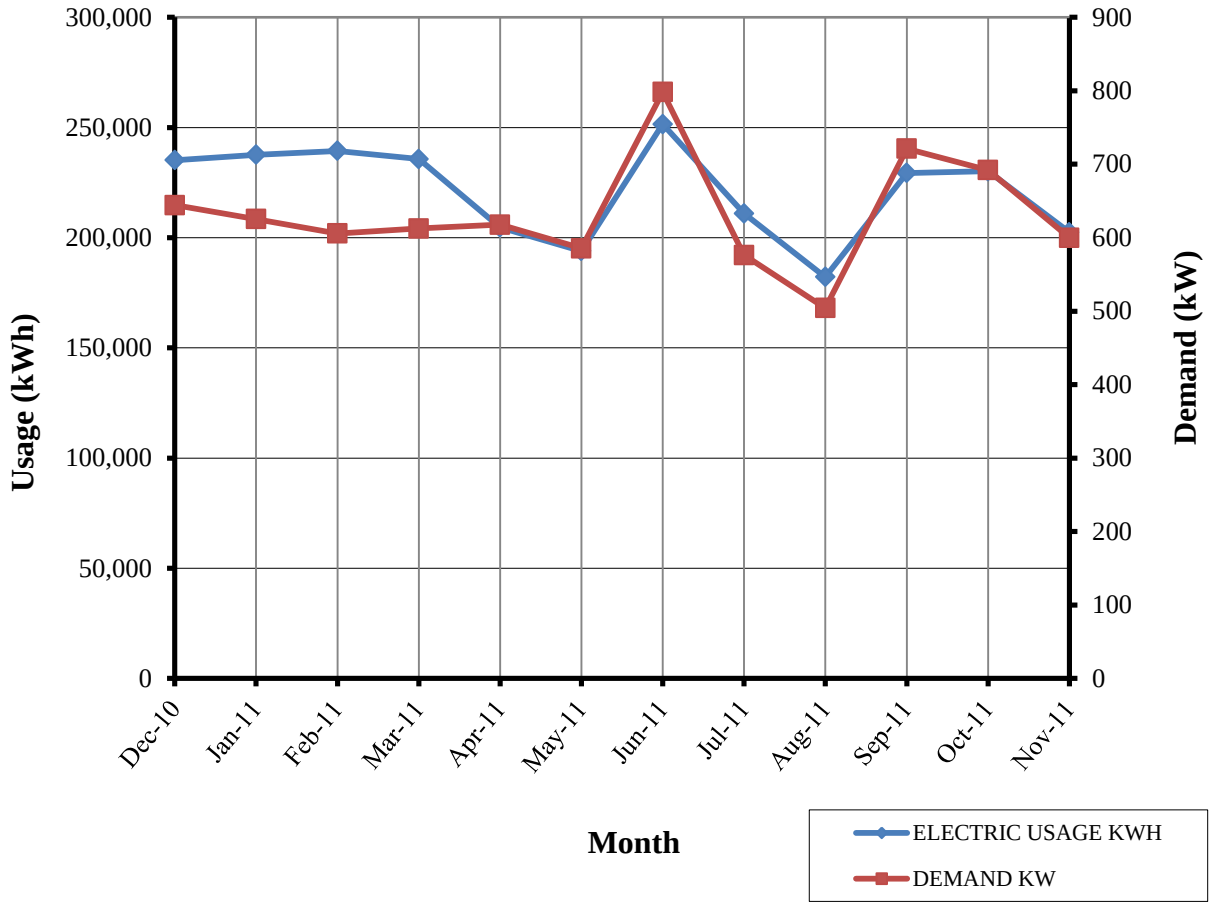
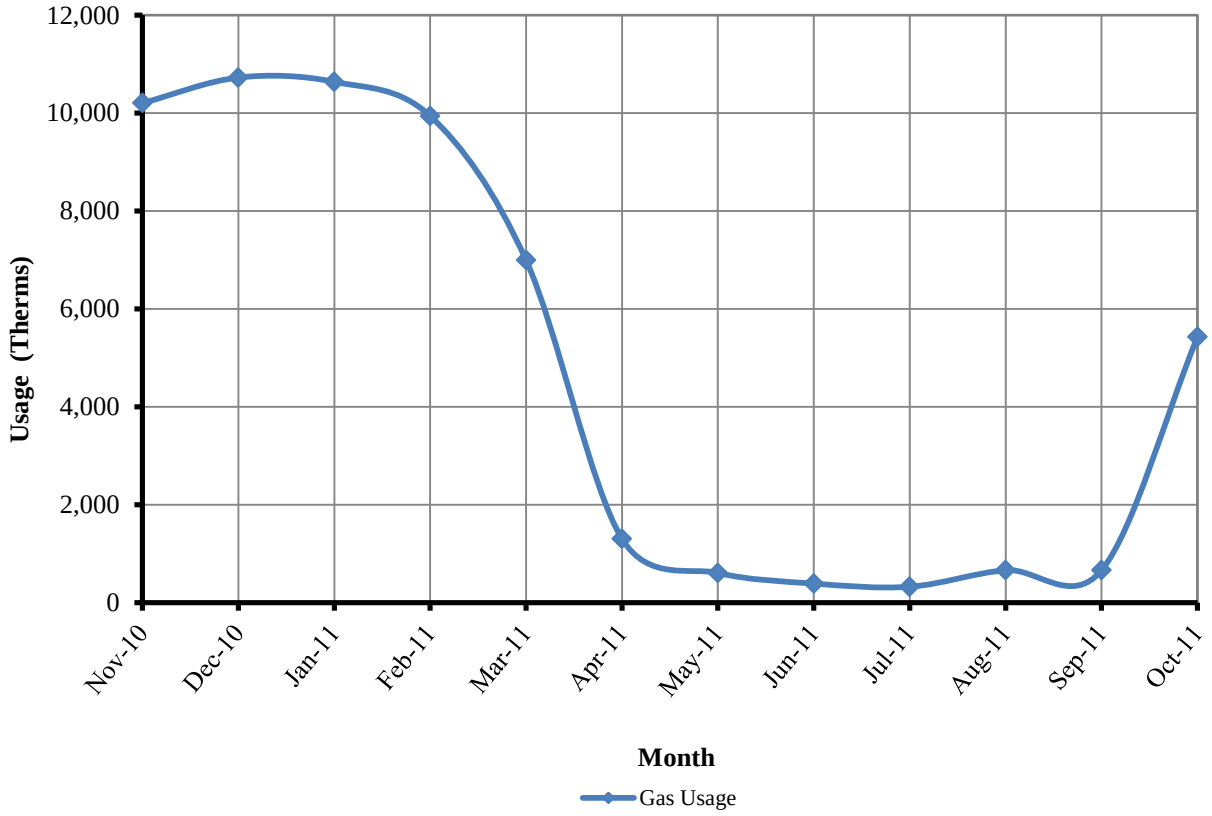


Table 4
Natural Gas Billing Data

NATURAL GAS USAGE SUMMARY		
Utility Provider:	PSE&G	
Rate:	Large Volume Gas (LVG)	
Meter No:	3341869	
Account Number	6645715501	
Third Party Utility Provider:	HESS	
TPS Account No:	6653/447347	
MONTH OF USE	**CONSUMPTION (THERMS)**	**TOTAL BILL**
Nov-10	10,207	$15,819
Dec-10	10,727	$10,144
Jan-11	10,640	$9,956
Feb-11	9,942	$9,452
Mar-11	6,997	$5,807
Apr-11	1,303	$1,313
May-11	606	$752
Jun-11	389	$554
Jul-11	324	$542
Aug-11	663	$782
Sep-11	661	$999
Oct-11	5,429	$5,733
TOTALS	**57,888**	**$61,854**
AVERAGE RATE:	**$1.07**	**$/THERM**

Figure 2
Northern Highlands Regional High School
Gas Usage Profile
November-10 through October-11



B. Energy Use Index (EUI)

Energy Use Index (EUI) is a measure of a building's annual energy utilization per square foot of building. This calculation is completed by converting all utility usage consumed by a building for one year, to British Thermal Units (BTU) and dividing this number by the building square footage. EUI is a good measure of a building's energy use and is utilized regularly for comparison of energy performance for similar building types. The Oak Ridge National Laboratory (ORNL) Buildings Technology Center under a contract with the U.S. Department of Energy maintains a Benchmarking Building Energy Performance Program. The ORNL website determines how a building's energy use compares with similar facilities throughout the U.S. and in a specific region or state.

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

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

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

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

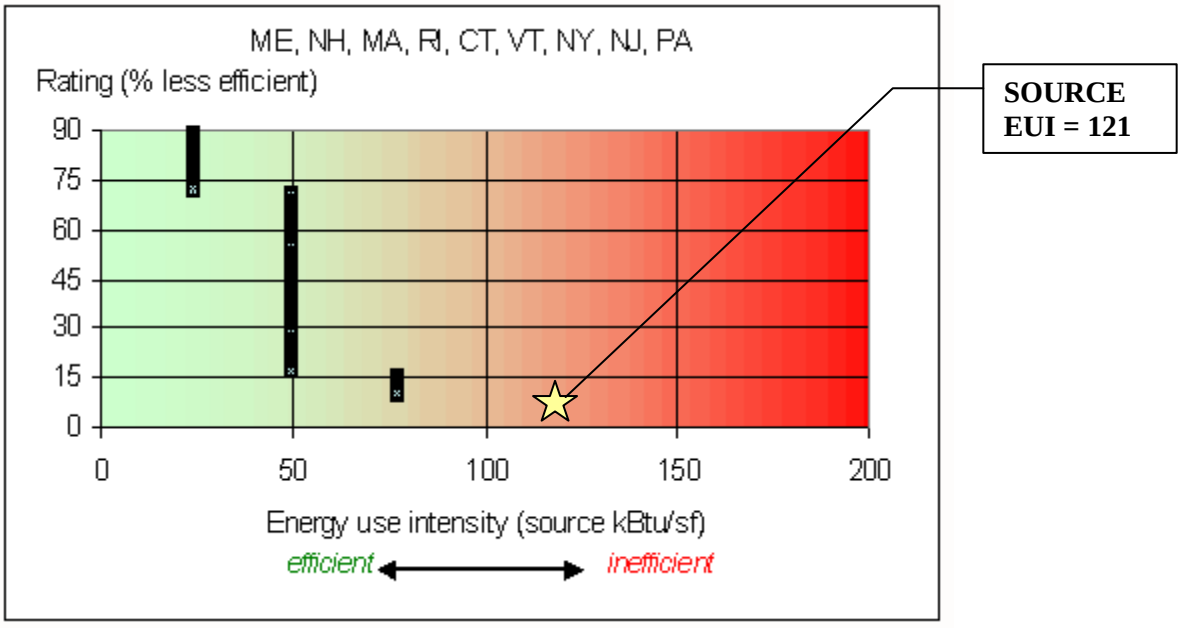
Table 5
Facility Energy Use Index (EUI) Calculation

ENERGY USE INTENSITY CALCULATION						
ENERGY TYPE	**BUILDING USE**			**SITE ENERGY**	**SITE-SOURCE RATIO**	**SOURCE ENERGY**
	kWh	**Therms**	**Gallons**	**kBtu**		**kBtu**
ELECTRIC	2,653,067			9,057,571	3.340	30,252,286
NATURAL GAS		57,888		5,788,839	1.047	6,060,915
TOTAL				14,846,410		36,313,201
*Site - Source Ratio data is provided by the Energy Star Performance Rating Methodology for Incorporating Source Energy Use document issued Dec 2007.						
BUILDING AREA		300,797	SQUARE FEET			
BUILDING SITE EUI		*49*	kBtu/SF/YR			
BUILDING SOURCE EUI		*121*	kBtu/SF/YR			

Figure 3 below depicts a national EUI grading for the source use of *High School Buildings*.

Figure 3

Source Energy Use Intensity Distributions: High School Buildings



C. EPA Energy Benchmarking System

The United States Environmental Protection Agency (EPA) in an effort to promote energy management has created a system for benchmarking energy use amongst various end users. The benchmarking tool utilized for this analysis is entitled Portfolio Manager. The Portfolio Manager tool allows tracking and assessment of energy consumption via the template forms located on the ENERGY STAR website (www.energystar.gov). The importance of benchmarking for local government municipalities is becoming more important as utility costs continue to increase and emphasis is being placed on carbon reduction, greenhouse gas emissions and other environmental impacts.

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

In accordance with the Local Government Energy Audit Program, CEG has created an ENERGY STAR account for the municipality to access and monitoring the facility's yearly energy usage as it compares to facilities of similar type. The login page for the account can be accessed at the following web address; the username and password are also listed below:

https://www.energystar.gov/istar/pmpam/index.cfm?fuseaction=login.login

[redacted]

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

Table 6
ENERGY STAR Performance Rating

ENERGY STAR PERFORMANCE RATING		
FACILITY DESCRIPTION	**ENERGY PERFORMANCE RATING**	**NATIONAL AVERAGE**
Northern Highlands Regional High School	69	50

Refer to **Statement of Energy Performance Appendix** for the detailed energy summary.

V. FACILITY DESCRIPTION

The 300,747 SF High School is a multi story facility comprised of classrooms, science laboratories, workshops, media center, computer rooms, cafeteria, kitchen, two (2) gymnasium, auditorium, administration offices, restrooms, mechanical rooms and storage spaces. The High School was built in 1965 and expanded in 2006 with the addition of the Science Wing.

Building Profile

The normal hours of operation for the school students and teachers are between 7:30 AM and 2:40 PM on the weekdays. The facility remains occupied till 10:00 PM for various after school activities, sports practices and detention as well as the custodial services. The facility is utilized on Saturdays for various sports activities and some of the spaces are rented on Sundays. The student enrollment at the Northern Highlands Regional High School is approximately 1350. Estimated total number of staff is 178.

Building Envelope

The facility is constructed of multiple levels of integrated structures with varying roof heights. Majority of the roof is constructed of built up metal roof decking system with asphalt and gravel covering. The major HVAC systems are located on the roof of the facility. There is estimated 1" of rigid insulation within the roof structure. The amount of insulation could not be verified.

The facility exterior consists of a masonry block construction with brick and concrete panel façade. Insulation within the walls is not known. Windows constitute significant amount of the envelope of this facility. Estimated window ratio of the building perimeter is 38%.

The original building windows consist of single pane, operable windows with aluminum frames in fair condition. The Science Wing windows consist of double pane, tinted operable windows with aluminum frames in good condition. The facility has over 10 entrance and exit doors. The exit doors are in good condition.

HVAC Systems

a. Boilers

Heating is provided by two central hot water heating systems. The boilers in the original building boiler room provide heat for the majority of the school's heating equipment with the exception of the Science Wing added in 2006. The boiler plant in the Science Wing services the Science Wing terminal and rooftop equipment.

The boiler plant located in the original building is comprised of seven (7) medium efficiency RBI water tube boilers with a total input capacity of 14,000 MBH. These boilers provide heating hot water to the unit ventilators, heating and ventilation unit, packaged rooftop heating and air conditioning units and hot water baseboard heaters throughout the school. The boilers are in good condition and appear to be well maintained. The hydronic system consists of seven (7) small circulators for the primary boiler loop and four (4) constant-speed base mounted end

suction pumps serving as the secondary loop. The secondary loop pumps are driven with 10 and 25 horse power standard efficiency motors. The secondary pumps serve two main hydronic circuits and operate based on a lead/lag arrangement. The pumps are in good to fair condition. The hot water supply temperature is reset based on outside air temperature.

The Science Wing boiler room is comprised of two standard efficiency hot boilers made by Raypak. Each boiler has an input capacity of 2,000 MBH with 4:1 modulating atmospheric burners. Each boiler is coupled with a 2 HP primary hot water loop circulator. The secondary loop consists of two pipe mounted constant speed pumps driven by 7.5 HP standard efficiency motors. The new boiler room and equipment within the new boiler plant is in good condition. The hot water supply temperature is reset based on outside air temperature.

b. Unit Ventilators and Window Air Conditioners

Terminal heating equipment for the classrooms consists of unit ventilators. The unit ventilators serve the classrooms throughout the entire school. The units in the original portion of the school are made by Nesbitt and they appear to be in fair condition. These unit ventilators are controlled by the original building pneumatic system. Several units were opened for observation. It was noticed that the units' outside air dampers function properly in response to the thermostats located on an adjacent wall in each classroom. There were a minimal number of open windows in the classrooms during the survey. This indicates that the temperature controls in these spaces function properly and the spaces are not overheated. It was also reported that the pneumatic control system does have a set-back controls, which is one of the most simple and critical energy saving strategy in this type of facilities. All the unit ventilators in this facility utilize hot water heating coils fed from the corresponding boiler plant in each building. The hot water supply temperature is reset based on outside air temperature. In addition, many of the classrooms in the original building have a window mounted A/C unit. The window A/C units are standard efficiency units with approximately 2 Ton cooling capacity. There are an estimated total of 50 window A/C units serving the spaces in this school.

The unit ventilators in the Science Wing are in good condition. These units are controlled via the central energy management system, which utilize time of day scheduling and temperature set-back controls. Only six (6) of the unit ventilators are equipped with DX cooling.

c. Indoor Air Handling Units

The facility utilizes large heating and ventilation units for larger spaces like the back gymnasium, library, auditorium, nurse's office, guidance office, planetarium, TV Studio, and the administration offices. Several of these units are equipped with direct expansion cooling coils as well. Majority of these units are original to the building and they are in fair condition. The air handling units are located in three penthouses above the Back Gym, Auditorium and planetarium as well as mechanical rooms on the first floor of the original building. Each of the HV and HVAC units is equipped with constant speed centrifugal supply fans and centrifugal or axial return fans, standard efficiency electric motors, hot water heating coils and three-way (3-way) temperature control valves and direct expansion cooling coils (if equipped). Majority of the 3-way hot water control valves are coupled with electric actuators, which are monitored and controlled by the central DDC control system.

d. Packaged Rooftop HVAC Units

In addition to the air handling units, several spaces utilize packaged rooftop heating and/or air conditioning units. The packaged units provide heat and air conditioning for various spaces such as; the Main Cafeteria, Locker Rooms, Room 220, Library and science wing hallways.

Majority of the packaged rooftop units in this facility are made by Trane. The units range from new and excellent condition to fair condition. The units are equipped with supply fans with standard efficiency motors and 100% outside air economizer functionality. Only the unit serving the science wing hallways is equipped with mechanical cooling as well as heating.

Fresh (make-up) air for the Auditorium is provided with two (2) energy recovery ventilators made by Aaon. These units have 26-Ton cooling capacity and 432 MBH heating capacity. Each unit is equipped with a total energy (enthalpy) wheel, which tampers the fresh make-up air by recovering the energy in the exhaust air, which is otherwise lost. The Aaon units are in good condition and appear to be well maintained.

Heating and Air conditioning for the Library is provided with two (2) 26-ton Aaon units similar to the units serving the auditorium. However, these units provide heating and air conditioning to the Library with minimal outside air. The Library units are not equipped with energy recovery ventilators.

Make-up air for the laboratories with exhaust hoods are provided with four (4) Greenheck rooftop make-up air units with natural gas furnaces. The make-up air units are interlocked with the laboratory exhaust hoods.

Another make-up air unit provides 100% fresh air to the boiler room for the boiler combustion air. The unit is made by Trane and equipped with a gas fired furnace. It was reported that the unit's furnace runs seldom during extreme weather conditions.

e. Ductless Split AC Units

Some of the smaller spaces such as computer rooms, small offices and utility closets are air conditioned with mini split air conditioning systems. There are a total of four (4) Sanyo ductless split units with 2.5 to 3 ton cooling capacities and one (1) Quietside 0.75 Ton unit. The Sanyo units are older models using R22 refrigerants as opposed to new inverter motor driven mini split systems with R410A refrigerant.

Kitchen and Cafeteria

The Northern Highlands Regional High School houses a full service kitchen and cafeteria. The kitchen prepares full meals for the students of the School. The kitchen operates between the hours of 6:00AM and 2:30 PM.

The kitchen houses one (1) walk-in refrigerator and one (1) walk-in freezer in addition to several reach-in type refrigerators. The walk-in units and the condensing units are in good condition. The

school has ten (10) refrigerated wending machines. It was reported that the vending machines are connected to timers, which shut the units off during the nights and weekends.

Exhaust System

Air is exhausted from the toilet rooms, gymnasium, auditorium, lockers rooms, storage areas and corridors through roof mounted exhaust fans. It was reported that the exhaust fans are either interlocked with the rooftop units or controlled directly via building management system. Labs and science rooms utilize small dedicated exhaust systems located on the roof.

The kitchen utilizes one (1) 5' x 20' exhaust hood, which is connected to an approximately 10,000 CFM exhaust fan located on the roof. The commercial dishwasher within the facility also utilizes an exhaust hood, which is connected to a smaller exhaust fan located on the roof. The cooking exhaust hood is controlled manually via a switch and operates as needed. The exhaust equipment appears to be in good condition.

HVAC System Controls

Majority of the building central HVAC systems are controlled by Automated Logics DDC BMS (Building Management System). The BMS provides control over all HVAC equipment throughout the building and determines scheduling, temperature sensors, equipment start stop, supply air temperature reset etc. The digital control system appears to be providing adequate control for conditioning of the building and occupant comfort.

The BMS system controls all of the equipments in the Science Wing including the HVAC units on the roof as well as the unit ventilators in the classrooms. The BMS system also controls all the HVAC units in the original building except for the main office HV unit, guidance suite and the library HV unit. These units are controlled via a variety of digital and mechanical thermostats. The unit ventilators in the original section are controlled via pneumatic thermostats. The central air pressure to the thermostats are modulated to provide night time set-back.

The BMS currently does not have optimal start/stop controls. Optimal start/stop controls are recommended to be added to the BMS system as they will provide better equipment runtimes and efficiencies. Optimal start / stop controls vary the start times of building heating and cooling systems depending on the weather and the indoor temperature of the building. For instance, if it was a mild day outside in the winter, the BMS would delay the heating start time resulting in energy savings. Typically, these controls will also improve occupant comfort because there will be less likely conditions for over-heating or over-cooling.

Domestic Hot Water

Domestic hot water for the original High School building is provided with a set of 1000 MBH split hot water boiler and a 200 gallon retainer tank. The boiler is a Lochinvar Power-fin series high efficiency non-condensing boiler with 86% thermal efficiency. The system provides domestic hot water for the kitchen and bathrooms throughout the facility. The domestic hot water is distributed throughout the building by three (3) small circulation pumps. The hot water heater, piping, and insulation are in good condition.

Domestic hot water for the Science Wing is provided with a standard efficiency 80 gallon domestic hot water heater tank made by Bradford White. The system provides domestic hot water for the bathrooms and the faucets in the science laboratories. The domestic hot water is distributed throughout the building by a small circulation pumps. The hot water heater, piping, and insulation are in good condition.

Lighting

Typical lighting throughout the building is fluorescent tube fixtures with 700 series T-8 lamps and electronic ballasts. These fixtures can be re-lamped with more efficient 800 series T-8 lamps without compromising the lighting levels in these spaces. It was also noted that some of the spaces were over-lit. This also can be corrected by de-lamping these fixture by one, which will also reduce energy consumption. In addition, several spaces use incandescent lamps in recessed or pendant fixtures. It is recommended to replace these lamps with screw-in type compact fluorescent lamps. The Main Gymnasium and the back gymnasium use 400 Watt metal halide lamps. It is recommended to upgrade these fixtures with fluorescent T5 lamps and add occupancy sensors. A space by space breakdown of the lighting throughout the facility is provided in the **Investment Grade Lighting Appendix**.

VI. MAJOR EQUIPMENT LIST

The equipment list contains major energy consuming equipment that through implementation of energy conservation measures could yield substantial energy savings. The list shows the major equipment in the facility and all pertinent information utilized in energy savings calculations. An approximate age was assigned to the equipment in some cases if a manufactures date was not shown on the equipment's nameplate. The ASHRAE service life for the equipment along with the remaining useful life is also shown in the Appendix.

Refer to the **Major Equipment List Appendix** for this facility.

VII. ENERGY CONSERVATION MEASURES

ECM #1: General Lighting Equipment Upgrade

Description:

Fluorescent Fixtures

The majority of the interior lighting throughout this facility is provided with fluorescent fixtures with older generation, 700 series 32W T8 lamps and electronic ballasts. Although 700 series T8 lamps are considered fairly efficient, further energy savings can be achieved by replacing the existing T8 lamps with new generation, 800 series 28W T8 lamps without compromising light output. CEG recommends, re-lamping all of the fixtures with 28W T8 lamps. In addition, there are a number of older and outdated fixtures with T12 lamps and magnetic ballasts. It is recommended to replace all of the T12 fixtures in these areas with higher efficiency fluorescent T8 fixtures with electronic ballasts.

This ECM includes re-lamping of the existing fluorescent fixtures with 800 series 28W T8 lamps. The new, energy efficient fixtures with supersaver T8 lamps will provide adequate lighting and will save on electrical costs due to better performance of the lamp and ballasts. This ECM also includes maintenance savings through the reduced number of lamps replaced per year. The expected lamp life of a T8 lamp is approximately 30,000 burn-hours, in comparison to the existing T12 lamps which is approximately 20,000 burn-hours. The facility will need approximately 33% less lamps replaced per year for each one for one fixture replaced.

Incandescent Lamps

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 energy usage of an incandescent lamp compared to a compact fluorescent lamp is approximately 3 to 4 times greater. In addition to the energy savings, compact fluorescent fixtures burn-hours are 8 to 15 times longer than incandescent fixtures ranging from 6,000 to 15,000 burn-hours compared to incandescent fixtures ranging from 750 to 1000 burn-hours. However, the maintenance savings due to reduced lamp replacement is offset by the higher cost of the CFL's compared to the incandescent lamps.

De-lamping Opportunities

During the walk through it was noticed that some of the spaces were overly lit. Lighting measurements were taken at sample locations to confirm high lighting intensities. The lighting fixtures in these spaces can be de-lamped by one (remove one lamp) in order to restore comfortable lighting levels and improve energy efficiency.

Energy Savings Calculations:

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

Rebates and Incentives:

NJ Smart Start® Program Incentives are calculated using the **Smart Start® Incentive Appendix** as follows:

Retrofit of T-12 fixtures to T-5 or T-8 with electric ballasts	$10 per fixture (1-4 lamp retrofits)

$$\text{Smart Start® Incentive} = (\#\text{ of fixtures} \times \$10) = 15 \times \$10 = \$150$$

Replacement and Maintenance Savings:

Replacement and Maintenance Savings are calculated as follows:

Savings = (Reduction in lamps replaced/year) x (Replacement $/lamp + Labor $/lamp)

Savings = 1.35 x ($2/lamp + $5/lamp) = $9

ECM #1 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$127,551
NJ Smart Start Equipment Incentive ($):	$150
Net Installation Cost ($):	$127,401
Maintenance Savings ($/Yr):	$9
Energy Savings ($/Yr):	$25,273
Total Yearly Savings ($/Yr):	$25,283
Estimated ECM Lifetime (Yr):	15
Simple Payback	5.0
Simple Lifetime ROI	198%
Simple Lifetime Maintenance Savings	$142
Simple Lifetime Savings	$379,240
Internal Rate of Return (IRR)	18%
Net Present Value (NPV)	$174,422

ECM #2: General Lighting Controls Upgrade

Description:

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

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

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

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

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

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

Energy Savings Calculations:

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

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

Estimated total number of rooms to be retrofitted is 210. Remote mounted sensors are to be used in 150 rooms and switch mounted sensors are to be used in 60 rooms. The total cost to install sensors is $57,100.

This ECM does not include occupancy sensors for the Main Gymnasium and the Wrestling Gymnasium, which is handled in the ECM #3.

Incentives:

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

Occupancy Sensor Fixture Mounted = $20 per sensor
Occupancy Sensor Remote Mounted = $35 per sensor

Energy Savings Summary:

ECM #2 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$57,100
NJ Smart Start Equipment Incentive ($):	$6,415
Net Installation Cost ($):	$50,685
Maintenance Savings ($/Yr):	$0
Energy Savings ($/Yr):	$15,788
Total Yearly Savings ($/Yr):	$15,788
Estimated ECM Lifetime (Yr):	15
Simple Payback	3.2
Simple Lifetime ROI	367.2%
Simple Lifetime Maintenance Savings	$0
Simple Lifetime Savings	$236,822
Internal Rate of Return (IRR)	31%
Net Present Value (NPV)	$137,792

ECM #3: Gymnasium Lighting Equipment and Controls Upgrade

Description:

The Main Gymnasium and the Wrestling Gymnasium at the Northern Highlands Regional High School utilizes 400W metal halide fixtures for its lighting. Metal halide bulbs provide a reasonably efficient option for bay lighting however a few draw-backs that are common. Metal halide fixtures often have poor overall efficacy which limits the amount of light actually leaving the fixture. Also metal halide bulbs require a significant warm-up period and even longer cool down period eliminating the potential for occupancy sensors frequent switching. This symptom encourages the gymnasium lighting to be left on continuously during the day. Another drawback is the reduced lumen output (Lumen Maintenance) of the metal halide bulb over its life time. Average bulb output or "mean lumens," is approximately 25% less than the bulb's initial lumens for typical metal halide lamps. In addition the most rapid rate of light output decline is during the beginning of its life, approximately 15-20% light loss within the first 20% of its rated life. It is important to note that the light loss has no savings in energy used; therefore the overall light efficiency is continuously decreasing with age. The final drawback is the light quality or Color Rendering Index (CRI). Typical values for metal halide bulbs is 65, which is a measure of how close the light is to true "full spectrum" light produced by sunlight or incandescent lighting. Metal halide bulbs also show noticeable color shifting when the bulb is reaching the end of its life. Utilizing fluorescent fixtures in low and high bay spaces is a superior option over metal halide fixtures in all areas described above. Although metal halide fixtures provide light very efficiently at the start of the bulb life, the average efficiency over the life is below that of fluorescent fixtures.

This ECM includes replacement of each of the existing high bay metal halide light fixtures in the Main Gymnasium and the Wrestling Gymnasium with T5HO fixtures with reflective lenses. The retrofit for the metal halide fixtures includes a one for one fixture replacement. The fluorescent fixtures selected will provide equivalent light compared to the average light output of the existing metal halide fixtures. The bulb replacement cost for T-5 HO lamps compared to the existing metal halide lamps were found to be approximately equal and therefore not included in the savings calculations.

This ECM also includes installation of occupancy sensors for the proposed fluorescent gymnasium light fixtures. 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. 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.

Energy Savings Calculations:

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

Project Cost and NJ Smart Start® Program Incentives

Total installed cost of replacing 40 metal halide fixtures in the Main Gym and Wrestling Gym with T5HO fixtures and occupancy sensors is $13,950.

Metal Halide Fixtures

From the **Smart Start Incentive Appendix**, the following incentives are warranted:
For replacement of HID (400-999W) with new T-5 or T-8 fixtures = $100/Fixture
Smart Start ® Incentive = (# of Metal Halide Fixture Replaced × $100)
Smart Start ® Incentive = (40 × $100) = $4,000

Occupancy Sensors

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

Occupancy Sensor Remote Mounted (existing facility only) = $35 per sensor
Smart Start ® Incentive = (5 × $35) = $175

Total incentives = $4,175

There is no significant replacement or maintenance savings generated with this ECM.

Energy Savings Summary:

ECM #3 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$13,950
NJ Smart Start Equipment Incentive ($):	$4,175
Net Installation Cost ($):	$9,775
Maintenance Savings ($/Yr):	$0
Energy Savings ($/Yr):	$3,044
Total Yearly Savings ($/Yr):	$3,044
Estimated ECM Lifetime (Yr):	15
Simple Payback	3.2
Simple Lifetime ROI	367.1%
Simple Lifetime Maintenance Savings	$0
Simple Lifetime Savings	$45,661
Internal Rate of Return (IRR)	31%
Net Present Value (NPV)	$26,565

ECM #4: Computer Monitor Replacement

Description:

The computers throughout the facility utilize a mixture of CRT computer monitors and LCD computer monitors. The CRT computer monitors within the offices and classrooms are outdated and have several disadvantages such as; significantly increased energy consumption, uses large amount of desk space, poor picture quality, distortions and flickering image, secular glare problems, high weight, and electromagnetic emissions. Many of these drawbacks are difficult to quantify except for the energy use. CRT monitors use considerably more energy than an alternative flat panel LCD monitor. Replacement of the existing CRT monitors with LCD monitors saves considerable energy as well as provides other ergonomic benefits.

By choosing LCD monitors with an LED backlighting system the resulting energy consumption can be reduced even further. LED based LCD monitor's use less energy than conventional LCD monitor, and due to recent advancements have a comparable cost to conventional LCD monitors. For example a typical LCD with LED technology will use an estimated 2 watts when in sleep mode, and 20 watts while in operation (Based on 18.5 inch display).

Based on the site survey it was noted that there are 49 CRT monitors. Some of the monitors were left in screen saver mode, which only saves the computer screen from image burn in, however it does not save on energy consumption. The average operating hours for all computers and monitors is estimated based on the site survey observations. Energy consumption of computer monitors is based on averages for power usage of various computer monitors.

This ECM includes replacement of all existing CRT monitors with LCD flat panel monitors throughout the facility. Installation costs were neglected for this ECM with the intention that this ECM would be replaced by the school district. The calculations are based on the following operating assumptions:

Energy Savings Calculations:

No. of CRT Monitors:	208
Operating Weeks per Yr:	40
Hrs per Week:	30 (6 hrs per day estimated average)

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

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

Installation cost of new monitors is estimated based on current pricing for an 18.5" LCD monitor on the market today. No labor costs were included for replacing the existing monitors with the new monitors. No incentives are available for installation of computer monitors. Net cost per monitor was estimated to be $120.

Installation Costs: # Monitors X Cost per Monitor
203 Monitors X $100 per Monitor
$20,300

COMPUTER MONITOR CALCULATIONS			
ECM INPUTS	**EXISTING**	**PROPOSED**	**SAVINGS**
ECM INPUTS	CRT Monitors	LCD Monitor	-
# of Computers	203	203	-
Monitor Power Cons. (W)	75	20	-
Operating Hrs per Week	30	30	-
Operating Weeks per Yr	42	42	-
Elec Cost ($/kWh)	0.161	0.161	-
ENERGY SAVINGS CALCULATIONS			
ECM RESULTS	**EXISTING**	**PROPOSED**	**SAVINGS**
Electric Usage (kWh)	19,184	5,116	14,068
Energy Cost ($)	$3,089	$824	$2,265
COMMENTS:	CRT Monitor consumption based on Dell CRT monitor M/N: CRT-E771MM. LCD Monitor based on Dell IN1930 LCD LED. Operating hours estimated.		

Energy Savings Summary:

ECM #4 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$20,300
NJ Smart Start Equipment Incentive ($):	$0
Net Installation Cost ($):	$20,300
Maintenance Savings ($/Yr):	$0
Energy Savings ($/Yr):	$2,265
Total Yearly Savings ($/Yr):	$2,265
Estimated ECM Lifetime (Yr):	10
Simple Payback	9.0
Simple Lifetime ROI	11.6%
Simple Lifetime Maintenance Savings	$0
Simple Lifetime Savings	$22,649
Internal Rate of Return (IRR)	2%
Net Present Value (NPV)	($979.67)

ECM #5: Install NEMA Premium® Efficiency Motors

Description:

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

The electric motors driving the hot water pumps and supply fans in some of the HVAC equipment are candidates for replacing with premium efficiency motors. These standard efficiency motors run considerable amount of time over a year.

This energy conservation measure replaces existing inefficient electric motors with NEMA Premium® efficiency motors. NEMA Premium® is the most efficient motor designation in the marketplace today.

IMPLEMENTATION SUMMARY					
EQMT ID	**FUNCTION**	**MOTOR HP**	**HOURS OF OPERATION**	**EXISTING EFFICIENCY**	**NEMA PREMIUM EFFICIENCY**
P	Floor Mounted, boiler Secondary Loop	10	2,190	89.5%	92.4%
P	Floor Mounted, boiler Secondary Loop	10	2,190	89.5%	92.4%
P3	Pipe mounted boiler loop	7.5	2,190	84.0%	91.7%
P4	Pipe mounted boiler loop	7.5	2,190	84.0%	91.7%
CU - HV2 Admin Offices	Supply Air Fan	5	2,500	86.0%	90.2%
ERV-1 Auditorium	Supply Air Fan #1	5	1,600	81.5%	90.2%
ERV-1 Auditorium	Supply Air Fan #2	5	1,600	81.5%	90.2%
Library RTU	Supply Air Fan #1	5	2,000	81.5%	90.2%
Library RTU	Supply Air Fan #2	5	2,000	81.5%	90.2%
MUA Boiler Room	Supply Air Fan	5	2,190	86.5%	90.2%

Energy Savings Calculations:

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

where, HP = Motor Nameplate Horsepower Rating

LF = Load Factor Motor Efficiency = Motor Nameplate Efficiency

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

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

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

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

PREMIUM EFFICIENCY MOTOR CALCULATIONS							
EQMT ID	**MOTOR HP**	**LOAD FACTOR**	**EXISTING EFFICIENCY**	**NEMA PREMIUM EFFICIENCY**	**POWER SAVINGS kW**	**ENERGY SAVINGS kWH**	**COST SAVINGS**
P	10	90%	89.5%	92.4%	0.24	518	$83
P	10	90%	89.5%	92.4%	0.24	518	$83
P3	7.5	90%	84.0%	91.7%	0.50	1,108	$178
P4	7.5	90%	84.0%	91.7%	0.50	1,108	$178
CU - HV2 Admin Offices	5	90%	86.0%	90.2%	0.18	457	$74
ERV-1 Auditorium	5	90%	81.5%	90.2%	0.40	639	$103
ERV-1 Auditorium	5	90%	81.5%	90.2%	0.40	639	$103
Library RTU	5	90%	81.5%	90.2%	0.40	799	$129
Library RTU	5	90%	81.5%	90.2%	0.40	799	$129
MUA Boiler Room	5	90%	86.5%	90.2%	0.16	351	$56
TOTAL					**3.4**	**6,936**	**$1,117**

Equipment Cost and Incentives

Below is a summary of SmartStart Building® incentives for premium efficiency motors:

INCENTIVES	
HORSE POWER	**NJ SMART START INCENTIVE**
5	$54
7.5	$81
10	$90
15	$104

The following table outlines the summary of motor replacement costs and incentives:

MOTOR REPLACEMENT SUMMARY						
EQMT ID	**MOTOR POWER HP**	**INSTALLED COST**	**SMART START INCENTIVE**	**NET COST**	**TOTAL SAVINGS**	**SIMPLE PAYBACK**
P	10	$2,560	$90	$2,470	$83	29.6
P	10	$2,560	$90	$2,470	$83	29.6
P3	7.5	$1,971	$81	$1,890	$178	10.6
P4	7.5	$1,971	$81	$1,890	$178	10.6
CU - HV2 Admin Offices	5	$1,519	$54	$1,465	$74	19.9
ERV-1 Auditorium	5	$1,519	$54	$1,465	$103	14.2
ERV-1 Auditorium	5	$1,519	$54	$1,465	$103	14.2
Library RTU	5	$1,519	$54	$1,465	$129	11.4
Library RTU	5	$1,519	$54	$1,465	$129	11.4
MUA Boiler Room	5	$1,519	$54	$1,465	$56	26.0
TOTAL		**$18,176**	**$666**	**$17,510**	**$1,117**	**15.7**

Energy Savings Summary:

ECM #5 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$18,176
NJ Smart Start Equipment Incentive ($):	$666
Net Installation Cost ($):	$17,510
Maintenance Savings ($/Yr):	$0
Energy Savings ($/Yr):	$1,117
Total Yearly Savings ($/Yr):	$1,117
Estimated ECM Lifetime (Yr):	15
Simple Payback	15.7
Simple Lifetime ROI	-4.3%
Simple Lifetime Maintenance Savings	$0
Simple Lifetime Savings	$16,752
Internal Rate of Return (IRR)	-1%
Net Present Value (NPV)	($4,178.01)

ECM #6: Demand Controlled Ventilation

Demand Controlled Ventilation (DCV) is a means to provide active, zone level control of ventilation for spaces within a facility. The basic premise behind DCV is monitoring indoor CO2 levels versus outdoor CO2 levels in order to provide proper ventilation to the spaces within the facility as well as saving costly dollars treating unconditioned ventilation air. Carbon dioxide ventilation control or demand controlled ventilation (DCV) allows for the measurement and control of outside air ventilation levels to a target cfm/person ventilation rate in the space (i.e., 15 cfm/person) based on the number of people in the space. It is a direct measure of ventilation effectiveness and is a method whereby buildings can regain active and automatic zone level ventilation control, without having to open windows. The fixed ventilation approach depends on a set-it-and-forget-it methodology that is completely unresponsive to changes in the way spaces are utilized/occupied or how equipment is maintained. A DCV system utilizes various control algorithms to maintain a base ventilation rate. The system monitors space CO2 levels and the algorithm automatically adjusts the outdoor and return air dampers to provide the quantity of outdoor air to maintain the required CO2 level in the space. System designs are normally designed for maximum occupancy and the ventilation rates are designed for this (maximum) occupancy. In areas where occupancy swings are prevalent there is ample opportunity to reduce outdoor air quantity to satisfy the needs of the actual number of occupants present. By installing the DCV controls, energy savings are realized by the reduced quantities of outdoor air that do not require heating and cooling energy from the steam and chilled water plants.

Packaged rooftop units serving offices, classrooms and activity rooms are standard air conditioning units with constant minimum outside air setup. When these units are on unoccupied mode, the outside air dampers shut. The outside air volume is typically based on the maximum occupancy of the space conditioned. When a given space is not fully occupied the outside air quantity delivered to the space is greater than the amount actually needed for adequate ventilation, which results in waste of heating or air conditioning energy.

This ECM includes the installation of CO_2 sensors integrated into a demand control ventilation system, for the units mentioned above. This system allows the air handling unit to respond to changes in occupancy and therefore reduce the amount of outside air that has to be conditioned. Outside air accounts for a large portion of the energy consumption in the HVAC system, especially in high occupancy spaces.

The components required for the demand control ventilation system installation include damper actuators, Variable Frequency Drives for larger units, CO2 sensors, wiring, Energy Management System equipment expansion and programming. Each occupied zone would require minimum one CO_2 sensor installed to monitor occupancy levels.

Often heating and air conditioning units switch to occupied mode several hours before the actual occupancy in order to provide pre-heating or pre-cooling of the space. Energy savings achieved through “Demand Control Ventilation” is calculated based on actual occupancy of the spaces and the hours the units are in occupied mode.

Energy Savings Calculations:

Following table summarizes the estimated occupancy characteristics of the spaces and the HVAC equipment at this school.

DAILY OUTSIDE AIR SAVINGS	
ECM INPUTS	**DCV**
Average Occupancy Hours	8:00 AM - 4:00 PM
Estimated Equivalent Full Occupancy Hours	6
HVAC Eqp. On Occupied Mode	6:00 AM - 4:00 PM
Total Occupied Hours per day	10
HVAC occupied / spaces not occupied	4
Est. Conditioned outside air savings	40%

$$\text{Cooling Energy Usage} = \frac{\text{Cooling(Tons)} \times 12{,}000 \left(\frac{\text{Btu}}{\text{Ton hr}}\right) \times \text{Annual Full Load Cooling Hrs.}}{1000 \left(\frac{\text{Wh}}{\text{kWh}}\right) \times \text{EER}\left(\frac{\text{Btu}}{\text{Wh}}\right)}$$

$$\text{Energy Savings} = \text{Cooling Energy (kwh)} \times \text{Saving \%}$$

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

$$\text{Heating Energy (Therms)} = \frac{\text{Outside Air Heating Capacity}\left(\frac{\text{Btu}}{\text{Hr.}}\right) \times \text{HDD(Day °F)} \times 12\left(\frac{\text{Hr.}}{\text{Day}}\right) \times (0.60)}{65(°\text{F}) \times \text{Fuel Heat Value}\left(\frac{\text{Btu}}{\text{Therms}}\right) \times \text{Heating Efficiency (\%)}}$$

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

Following is a list of HVAC equipment and corresponding spaces identified for Demand Controlled Ventilation.

IMPLEMENTATION SUMMARY							
INPUTS	**HVAC UNIT**	**Service**	**# of Units**	**# of CO2 Sensors**	**Total Cooling Capacity, Tons**	**Outside Air Cooling, Tons**	**Outside Air Heating, MBH**
DCV-1	**RTU-1**	Senior Cafeteria	1	2	-	-	263
DCV-2	**RTU-2**	New Girls Locker Room	1	1	-	-	82
DCV-3	**RTU-3**	Room 220	1	1	-	-	56
DCV-4	**ERV Units**	Auditorium	2	2	52	13.0	351
DCV-5	**RTU**	Library	2	2	52	13.0	351
DCV-6	**Split AC Unit**	Planatorium	1	1	10	3	53
DCV-7	**HVAC-1**	Guidence Suite	1	1	10	3	70
DCV-8	**RTU**	Science Wing Hallways	1	4	50	13	188
DCV-9	**HVAC 2**	Nurses Office	1	2	7.5	2	88
DCV-10	**HV-3**	-	1	1	-	-	53
DCV-11	**HV-4**	-	1	1	-	-	100
DCV-12	**HV-5**	Backgym	1	2	-	-	88
DCV-13	**HV-7**	Backgym	1	2	-	-	53
DCV-14	**HV-4 (Other)**	Auditorium	1	1	-	-	53
DCV-15	**HV**	Library	1	2	-	-	158
Total			11	**25**	**182**	**45**	**1,502**

Assumptions: 400 CFM/Ton, 25% average fresh air, 65°F design day ΔT

Max outside air heating capacity = 1.08 x Fresh Air CFM x design day ΔT

Results of the energy savings calculations are summarized in the table below:

DEMAND CONTROLLED VENTILATION	
ECM INPUTS	**DCV**
Equipment	Rooftop Units and Air Handlers
OA Cooling Capacity, Tons	45
Average Efficiency (EER)	9
Annual Full Load Cooling Hours	800
OA Heating Capacity, MBh	1502
Net Heating Efficiency (Gas)	80%
Typical Heating Degree Days (65°F)	4542
Occupied Hours per day	8
Heating Energy Saving	40%
A/C Energy Savings	40%
Elec Cost ($/kWh)	$0.161
Natural Gas Cost ($/Therm)	$1.07
ENERGY SAVINGS	
ECM RESULTS	**DCV**
Cooling Energy Consmption, kWh	48,400
Heating Energy (Therms)	6,297
Cooling Energy Savings kWh	19,360
Heating Energy Savings (Therms)	2,519
Electric Energy Cost Savings ($)	$3,117
Total Gas Cost Savings ($)	$2,695
Total Cost Savings ($)	$5,812
COMMENTS:	HDD estimated based on Newark Liberty Airport. OA: Outside Air

Cost and Incentives:

The components included to install for a demand control ventilation system include damper actuators (if do not exist), Variable Frequency Drives (for larger AC units/motors), CO2 sensors, wiring, Energy Management System equipment expansion and programming. Each occupied zone would require minimum one CO_2 sensor installed to monitor occupancy levels.

Estimated installed cost for demand controlled ventilation for the rooftop heating and air conditioning units is $164,000. Estimated cost includes CO2 sensors, control wiring, electrical wiring, control system equipment expansion and programming.

There are currently no Smart Start ® incentives available for a Demand Control Ventilation System.

Energy Savings Summary:

ECM #6 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$164,000
NJ Smart Start Equipment Incentive ($):	$0
Net Installation Cost ($):	$164,000
Maintenance Savings ($/Yr):	$0
Energy Savings ($/Yr):	$5,812
Total Yearly Savings ($/Yr):	$5,812
Estimated ECM Lifetime (Yr):	15
Simple Payback	28.2
Simple Lifetime ROI	-46.8%
Simple Lifetime Maintenance Savings	0
Simple Lifetime Savings	$87,179
Internal Rate of Return (IRR)	-7%
Net Present Value (NPV)	($94,617.64)

ECM #7: Window Replacement

Description:

The majority of the original High School building envelope consists of older windows with single pane glass and standard metal frames. The windows account for significant energy use through leakage heat loss and conductive heat loss. The age and condition of the windows contribute to the leakage rate of the building. The single pane construction allows higher thermal (conductive) energy loss. These factors lead to increased energy use in the heating season. The heating loss due to single pane glass is combined with heat loss due to poor seals at each operable window. New double pane windows with low E glazing offer a substantial improvement in thermal performance in the summer months.

This ECM includes the replacement of all older windows with single pane glass in the facility with double pane windows with low emissivity glass. The proposed windows include reduced outside air leakage. In addition the double pane structure will significantly increase the insulation value compared to the existing single pane window structure.

The basis for this ECM is Anderson Windows at $65 per SF of window installed. Below is a list of areas with older and inefficient windows:

WINDOW REPLACEMENT SUMMARY			
ECM INPUTS	**NUMBER OF WINDOWS**	**SIZE**	**AREA (SF)**
South	236	3'x6'	4254
West	137	3'x6'	2466
North	143	3'x6'	2580
East	72	3'x6'	870
Courtyard (Long)	317	3'x6'	5700
Courtyard (Short)	1	100'x6'	600
TOTAL	**906**	**-**	**16470**

Energy Savings Calculations:

$$\text{Infiltration}\left(\frac{\text{Ft}^3}{\text{Min.}}\right) = \text{T}otalBuildi\,ngVolume\left(\text{Ft}^3\right) \times \text{Estimated Air Changes}\ \left(\frac{\text{Ft}^3}{\text{Hr}} \times \frac{1\,\text{Hr}}{60 Mins}\right)$$

$$\text{Heat Load}\left(\frac{\text{Btu}}{\text{Hr.}}\right) = 1.1 \times \text{Infiltration}\left(\frac{\text{Ft}^3}{\text{Min}}\right) \times \text{Design Temperature Difference}\ (^{\circ}\text{F})$$

$$\text{Cooling Load}\left(\text{Ton}\right)=\text{Infiltration}\left(\frac{\text{Ft}^3}{\text{Min}}\right)\times\frac{1\,\text{Ton Cooling}}{400\left(\frac{\text{Ft}^3}{\text{Min}}\right)}$$

$$\text{Heating Leakage Energy}\left(\text{Therms}\right)=\frac{\text{Heat Load}\left(\frac{\text{Btu}}{\text{Hr.}}\right)\times\text{HDD}\left(\text{Day}\,^\circ\text{F}\right)\times 24\left(\frac{\text{Hr.}}{\text{Day}}\right)\times\left(0.60\right)}{65\left(^\circ\text{F}\right)\times\text{Fuel Heat Value}\left(\frac{\text{Btu}}{\text{Therms}}\right)\times\text{Heating Efficiency}\ \left(\%\right)}$$

$$\text{Cooling Leakage Energy}\left(\text{kWh}\right)=\frac{\text{Cooling Load}\left(\text{Ton}\right)\ \times\left(\frac{12{,}000\,\text{Btu}}{\text{Ton Hr.}}\right)\ \times\ \text{Full Load Cooling Hours}}{\frac{1000\,\text{W.h}}{\text{kWh}}\times\text{Cooling Efficiency}\ \left(\text{EER}\right)}$$

$$\text{Conductive Energy}\left(\text{Therms}\right)=\frac{\text{U}-\text{Value}\times\text{Area}\left(\text{Ft}^2\right)\times\text{HDD}\left(\text{Day}\,^\circ\text{F}\right)\times 24\left(\frac{\text{Hr.}}{\text{Day}}\right)\times\left(0.60\right)}{65\left(^\circ\text{F}\right)\times\text{Fuel Heat Value}\left(\frac{\text{Btu}}{\text{Therms}}\right)\times\text{Heating Efficiency}\ \left(\%\right)}$$

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

$$\text{Cooling Energy Cost}=\text{Total Cooling Energy}\left(\text{kWh}\right)\times\text{Ave Fuel Cost}\left(\frac{\$}{\text{kWh}}\right)$$

WINDOW REPLACEMENT CALCULATIONS			
ECM INPUTS	**EXISTING**	**PROPOSED**	**SAVINGS**
Description:	Existing Single Pane Windows	Double Pane Low-E Windows	-
Window (SF)	16,470	16,470	-
U-Value (BTU/HR/SF*°F)	0.8	0.45	0.35
Total Facility Area (SF)	261,000	261,000	-
Average Ceiling Height (ft)	10	10	-
Estimated Infiltration (Air Changes / Hour)	0.5	0.3	0.20
Infiltration through Windows, CFM	21,750	13,050	8,700
Heating System Efficiency (%)	80%	80%	-
Heating Degree Days (HDD)	3,538	3,538	-
Design Day Temp Diff (°F)	65	65	-
Heating Hrs Per Day (Hrs)	24	24	-
Full Load Cooling Hours	800	800	-
Average Cooling Efficiency, EER	9	9	-
Gas Cost ($/Therm)	1.07	1.07	-
Electric Cost ($/kWh)	0.161	0.161	-
Gas Heat Value (BTU/Therm)	100,000	100,000	-
ENERGY SAVINGS CALCULATIONS			
ECM RESULTS	**EXISTING**	**PROPOSED**	**SAVINGS**
Heat Load (BTU/Hr)	1,555,125	933,075	622,050
Leakage Energy (Therms)	15,236	9,142	6,095
Conductive Energy (Therms)	8,391	4,720	3,671
Total Heating Energy (Therms)	23,627	13,862	9,766
Cooling Load (Ton)	54	33	22
Cooling Demand (kW)	20.6	12.4	8.2
Total Cooling Energy (kWh)	58,000	34,800	23,200
Gas Energy Cost ($)	$25,281	$14,832	$10,449
Electric Energy Cost ($)	$9,338	$5,603	$3,735
Comments:	1. Proposed window U-value Based on ASHRAE 90.1 - 2007 HDD Based on 65°F base temp for 12 hours/day and 55°F for the remainder of the day to account for temperature set-back controls		

Estimated cost for replacing the inefficient windows at this facility $1,070,000.

Energy Savings Summary:

ECM #7 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$1,070,000
NJ Smart Start Equipment Incentive ($):	$0
Net Installation Cost ($):	$1,070,000
Maintenance Savings ($/Yr):	$0
Energy Savings ($/Yr):	$14,184
Total Yearly Savings ($/Yr):	$14,184
Estimated ECM Lifetime (Yr):	15
Simple Payback	75.4
Simple Lifetime ROI	-80.1%
Simple Lifetime Maintenance Savings	$0
Simple Lifetime Savings	$212,766
Internal Rate of Return (IRR)	-16%
Net Present Value (NPV)	($900,667.36)

ECM #8: Air Conditioning Unit Upgrades

Description:

The classrooms of the school are served by window air conditioning units. There are approximately fifty (50) window air conditioning units throughout the school with approximately 2-ton cooling capacity each.

These units vary in age, but on average, these units are older and can be replaced with new high efficiency units for energy savings. 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 air conditioning units with new higher efficiency systems. It is recommended to fully evaluate the capacity needed for all new systems prior to moving forward with this ECM. A summary of the unit replacements for this ECM can be found in the table below:

IMPLEMENTATION SUMMARY					
ECM INPUTS	**SERVICE FOR**	**NUMBER OF UNITS**	**COOLING CAPACITY, BTU/HR**	**TOTAL CAPACITY, TONS**	**REPLACE UNIT WITH**
Window AC Units	Classrooms	50	24,000	100	Freidrich Kuhl Model
Total		**50**	**24,000**	**100**	

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**
Window AC Units	24,000	800	9	10.7 EER	50	30,280	37.9
Total					50	30,280	37.9

Project Cost, Incentives and Maintenance Savings

This ECM does not qualify for any NJ Smart Start® Rebates.

There is no significant maintenance savings due to implementation of this ECM.

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

COST & SAVINGS SUMMARY							
ECM INPUTS	**INSTALLED COST**	**# OF UNITS**	**TOTAL COST**	**REBATES**	**NET COST**	**ENERGY SAVING**	**PAY BACK YEARS**
Replace Window AC Units	$1,700	50	$85,000	$0	$85,000	$4,875	17.4
Total		50	$85,000	$0	$85,000	$4,875	17.4

Energy Savings Summary:

ECM #8 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$85,000
NJ Smart Start Equipment Incentive ($):	$0
Net Installation Cost ($):	$85,000
Maintenance Savings ($/Yr):	$0
Energy Savings ($/Yr):	$4,875
Total Yearly Savings ($/Yr):	$4,875
Estimated ECM Lifetime (Yr):	10
Simple Payback	17.4
Simple Lifetime ROI	-42.6%
Simple Lifetime Maintenance Savings	$0
Simple Lifetime Savings	$48,751
Internal Rate of Return (IRR)	-9%
Net Present Value (NPV)	($43,414.07)

ECM #9: Modify 3-Way Control Valves and Install Pump VFD's

Description:

The heating system at Northern Highlands Regional High School utilizes constant speed pumps to circulate hot water throughout the building. Based on the survey of the existing equipment it appears that the majority of the existing unit ventilators utilize 2-way control valves and air handling units utilize 3-way control valves for flow control.

2-way control valves provide flow through the heat exchanger equipment only when there is a call for heating or cooling, unlike 3-way control valves that allow constant flow of the water loop. 3-way control valves require full pumping energy continuously, while 2-way control valves allow the system to reduce flow when it is not needed. The result of this mixed control system forces the system flow to vary with load; however the pump speed remains the same. Therefore, overall pump energy increases due to the constant speed of the pump.

This measure includes capping off the bypass port on the 3-way control valves which effectively turns the valves into "2-way" control valves. When the unit ventilator or heating and ventilation unit is not calling for heating, the control valve closes reducing overall flow of the system. Variable frequency drives allow the pumps to slow down in response to a reduction in overall system flow. The reduction in operating flow allows the pumps to reduce energy consumption for all hours that the heating system is not at its peak load.

This ECM also includes the installation of Variable Frequency Drives on the four (4) existing hot water pumps in conjunction with piping modifications at all units with 3-way control valves to cap off the bypass port. There are two (2) 10 HP and (2) 25 HP pumps operating at lead-lag configuration. The VFD control is based on a differential pressure sensor in the water loop to measure demand for water. The furthest equipment from the loop pumps would remain as 3-way control valves (constant flow) to eliminate dead heading potential. This ECM also includes replacement of the existing pump motors with inverter duty motors that meet NEMA Premium Efficiency Standard, which also helps to reduce energy consumption.

Energy and cost savings calculations are based on calculation software "PumpSave v4.2," provided by ABB. The PumpSave calculation software is used to estimate the pumping energy for variable speed pump systems. The boiler water loop pump operation is estimated to be 4,380 Hrs per year since this system is used for about 6 months total. The pump flow, HD, and resultant energy are calculated based on the existing pump horse power installed.

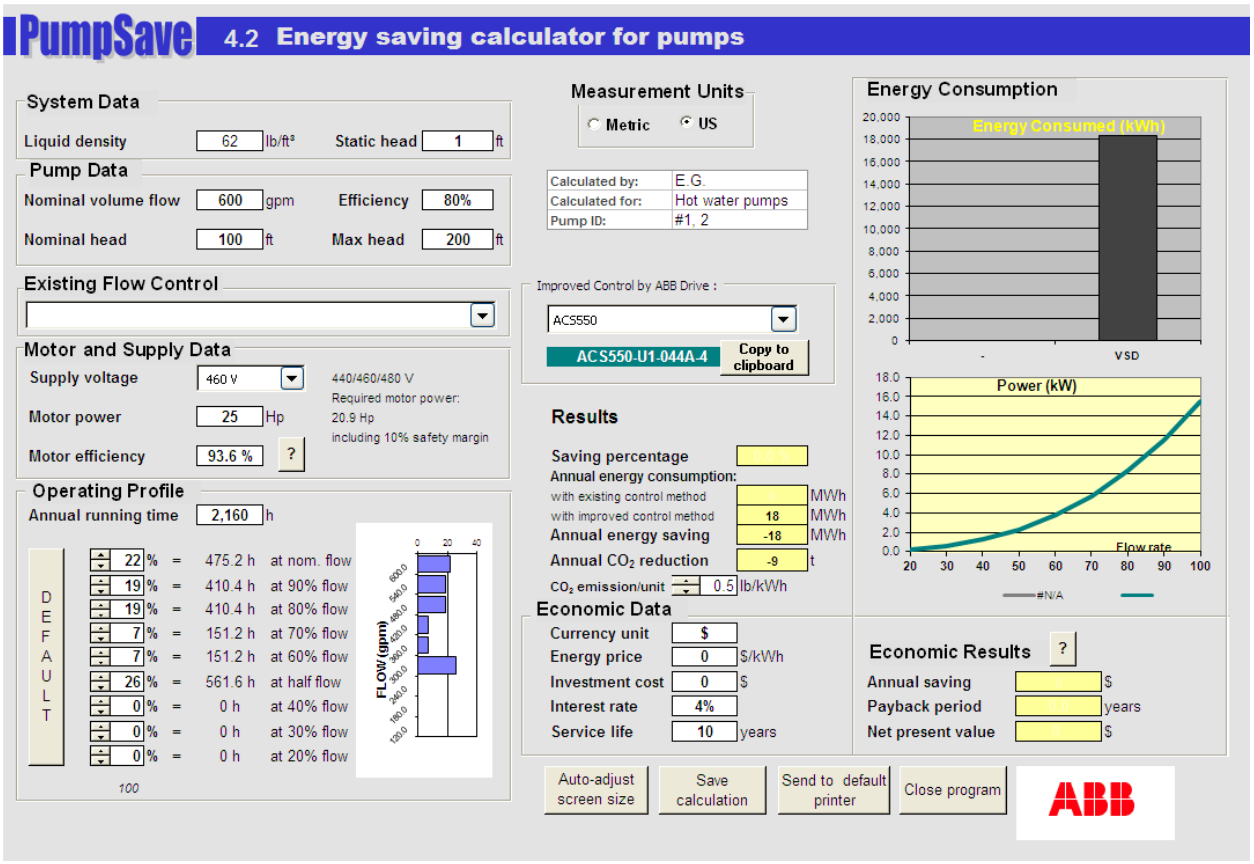
Energy Savings Calculations:

The existing energy consumption is based a typical pump energy curve for "Throttled flow control" for the 10 HP pump and no flow control for the 25 HP pumps. The throttled flow control is compared with variable speed control as a result of the VFD installation.

$$\text{Energy Cons.}\left(\text{kWh}\right) = \text{Power}\left(\text{HP}\right) \times 0.746 \left(\frac{\text{KW}}{\text{HP}}\right) \times \text{Operation}\left(\text{Hrs.}\right)$$

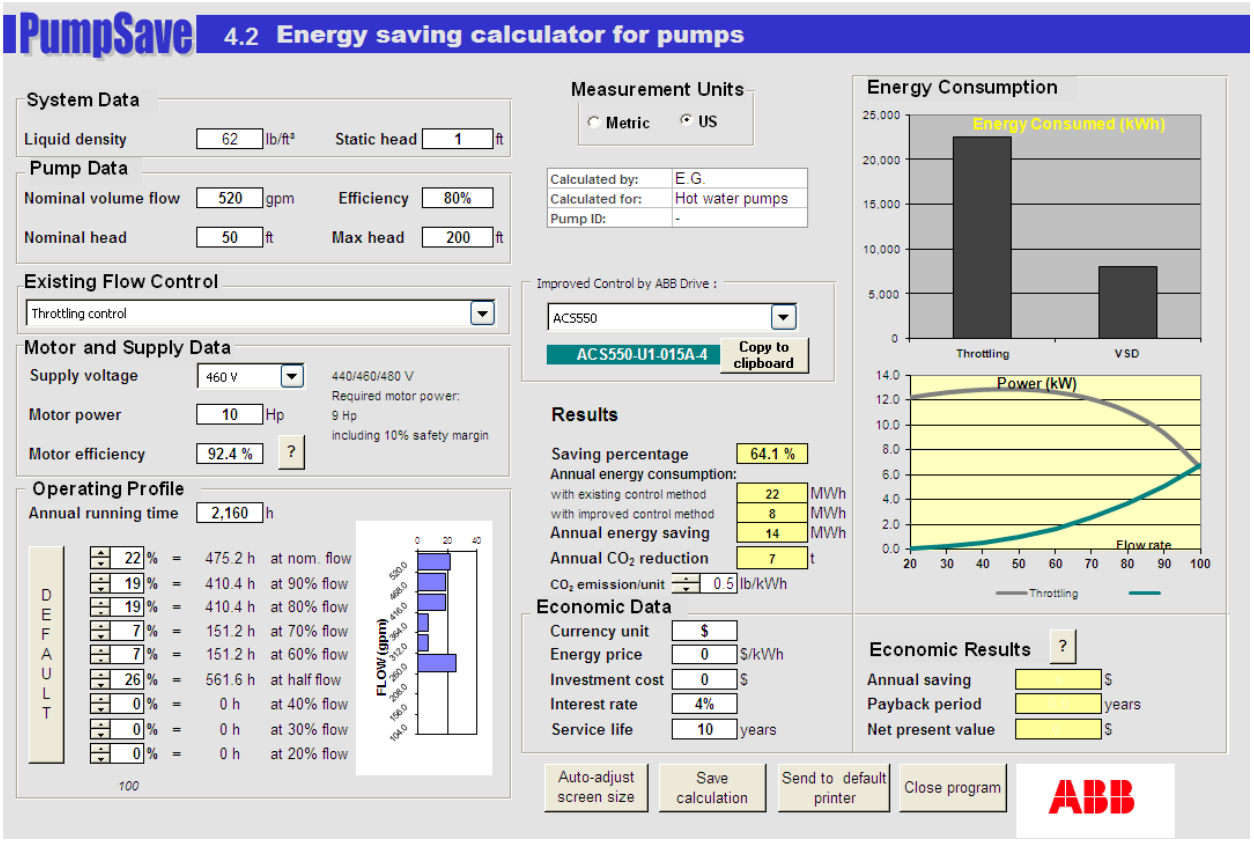
$$\text{Energy Cost} = \text{Energy Usage}\left(\text{kWh}\right) \times \text{Ave Electric Cost}\left(\frac{\$}{\text{kWh}}\right)$$

Estimated Boiler Hot Water Pumping Energy (25 HP Pumps) and Savings:



HOT WATER PUMPS VFD CALULATION - 25 HP PUMPS			
ECM INPUTS	**EXISTING**	**PROPOSED**	**SAVINGS**
ECM INPUTS	CV Pumps	VFD Pumps	
Flow Control	Constant Flow	VFD	-
Number of Pumps	2	2	
Flow* (GPM)	600	600	-
Head* (Ft)	100	100	-
Pump Efficiency (%)	80%	80%	-
Load Factor	90%	Variable	
Motor Efficiency (%)	89.5%	93.6%	4.1%
Operating Hrs per Pump	2,160	2,160	-
Estimated Power (HP)	21.2	20.2	0.93
Elec Cost ($/kWh)	0.161	0.161	-
ENERGY SAVINGS CALCULATIONS			
ECM RESULTS	**EXISTING**	**PROPOSED**	**SAVINGS**
Electric Energy (kWh)	68,197	36,534	31,663
Electric Energy Cost ($)	$10,980	$5,882	$5,098
COMMENTS:	- VFD pump energy is based on ABB energy savings calculator for pumps, "Pump Save," version 4.2. Flow rate for VFD Pump calculation is summarized in the operating profile shown in the Pump Save output. - Hot water flow & head estimated based on original design documents		

Estimated Boiler Hot Water Pumping Energy (10 HP Pumps):



HOT WATER PUMPS VFD CALULATION - 10 HP PUMPS			
ECM INPUTS	**EXISTING**	**PROPOSED**	**SAVINGS**
ECM INPUTS	CV Pumps	VFD Pumps	
Flow Control	Throttling Controls	VFD	-
Number of Pumps	2	2	
Flow* (GPM)	520	520	-
Head* (Ft)	50	50	-
Pump Efficiency (%)	80%	80%	-
Load Factor	90%	Variable	
Motor Efficiency (%)	89.5%	92.4%	2.9%
Operating Hrs per Pump	2160	2160	-
Estimated Power (HP)	9.2	8.9	0.29
Elec Cost ($/kWh)	0.161	0.161	-
ENERGY SAVINGS CALCULATIONS			
ECM RESULTS	**EXISTING**	**PROPOSED**	**SAVINGS**
Electric Energy (kWh)	23,184	8,054	15,130
Electric Energy Cost ($)	$3,733	$1,297	$2,436
COMMENTS:	- VFD pump energy is based on ABB energy savings calculator for pumps, "Pump Save," version 4.2. Flow rate for VFD Pump calculation is summarized in the operating profile shown in the Pump Save output. - Hot water flow & head estimated based on boiler capacity		

Installation cost for four (4) VFDs, piping work, capping of a branch of each 3-way valves, re-balancing and controls is estimated to be $64,000.

Currently there are no **NJ Smart Start® Program Incentives** for installation of hot water pump Variable Frequency Drives.

From the **NJ Smart Start® Program Incentives Appendix**, the installation of premium efficiency motors warrants the following incentive:

Premium Efficiency Motor (10 HP) = $per motor
Premium Efficiency Motor (25 HP) = $per motor

$$\text{Smart Start® Incentive} = (2 \times \$90 + 2 \times \$117) = \$414$$

Energy Savings Summary:

ECM #9 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$64,000
NJ Smart Start Equipment Incentive ($):	$414
Net Installation Cost ($):	$63,586
Maintenance Savings ($/Yr):	$0
Energy Savings ($/Yr):	$7,534
Total Yearly Savings ($/Yr):	$7,534
Estimated ECM Lifetime (Yr):	15
Simple Payback	8.4
Simple Lifetime ROI	77.7%
Simple Lifetime Maintenance Savings	$0
Simple Lifetime Savings	$113,005
Internal Rate of Return (IRR)	8%
Net Present Value (NPV)	$26,350.57

ECM #10: Valve Blanket and Pipe Insulation

Description:

The original boiler plant supplies hot water to the facility during the heating season. The piping remains heated at over 140°F continuously during this period (approximately 6 months). Un-insulated piping has significant heat losses due to the exposure of the steel piping to the surrounding air. Insulated piping has a heat loss which is a small fraction of the heat loss from un-insulated piping. It was noted that the piping around some of the air handling units, pumps and boilers were missing insulation including some of the larger valves throughout the facility.

Based on the site survey insulation was missing on approximately 100 ft of average 2" steel pipe in addition to approximately 20 large diameter (4 – 10") pipe valves/fittings. Valve blankets are designed to provide insulation value over large hydronic valves that must remain accessible. This ECM includes installation of valve blankets on all exposed boiler system valves and insulation of all un-insulated piping within the boiler room.

Estimated length of un-insulated pipe (2 inch):	100 ft
Estimated number of 4" pipe insulation jackets:	7
Estimated number of 6" pipe insulation jackets:	4
Estimated number of 10" pipe insulation jackets:	8

Energy Savings Calculations:

Heat Loss for un-insulated steel piping is based on ASHRAE 2009 Fundamentals – "Insulation for Mechanical Systems"

$$\text{Heat Loss}\frac{\text{BTU}}{\text{HR}}\text{ per Linear FT} = \frac{1}{\text{R} - \text{Value}} \times \text{Pipe Dia (FT)} \times 3.14 \times (\text{Pipe Temp (°F)} - \text{Ambient Temp(°F)})$$

$$\text{Heat Loss}\frac{\text{BTU}}{\text{HR}} = \text{Heat Loss}\frac{\text{BTU}}{\text{HR}}\text{ per Linear FT} \times \text{Length of Uninsulated Pipe}$$

$$\text{Energy Use, Therms} = \frac{\text{Heat Loss}\frac{\text{BTU}}{\text{HR}} \times \text{Operating Hrs}}{\text{Heating System Eff. (\%)} \times \text{Fuel Heat Value}\frac{\text{BTU}}{\text{Therm}}}$$

$$\text{Heating Energy Cost Savings} = \text{Energy Use, Therms} \times \text{Cost of Nat Gas}\left(\frac{\$}{\text{Therm}}\right)$$

Below is the summary input and output for the heat loss calculation:

PIPE & VALVE HEAT LOSS CALCULATIONS				
ECM INPUTS		**EXISTING**	**PROPOSED**	**SAVINGS**
		Bare Pipe	Insulation Blanket	
Temperature Difference Pipe to Ambient (°F)		75	75	-
Blanket Insulation R-value		0	6	6
2-inch Pipe	Length of Un-Insulated Pipe Including Valves	100	100	-
	Unit Heat Loss (BTU/Hr per FT)	98	7	91
	Heat Loss (BTU/Hr)	9,750	654	9,096
4-inch Pipe	Length of Un-Insulated Pipe Including Valves	28	28	-
	Unit Heat Loss (BTU/Hr per FT)	185	13	171
	Heat Loss (BTU/Hr)	5,166	366	4,800
6-inch Pipe	Length of Un-Insulated Pipe Including Valves	16	16	-
	Unit Heat Loss (BTU/Hr per FT)	271	20	251
	Heat Loss (BTU/Hr)	4,336	314	4,022
10-inch Pipe	Length of Un-Insulated Pipe Including Valves	32	32	-
	Unit Heat Loss (BTU/Hr per FT)	431	26	404
	Heat Loss (BTU/Hr)	13,776	837	12,939
TOTAL		33,028	2,172	30,856
COMMENTS		Valve convection heat loss is estimated to be equvalent to 4 x Diameter of straight pipe heat loss.		

Below is the summary of total energy and cost savings:

VALVE BLANKET INSULATION CALCULATIONS			
ECM INPUTS	**EXISTING**	**PROPOSED**	**SAVINGS**
ECM INPUTS	Bare Pipe	Insulation Blanket	
Total Heat Loss (BTU/Hr)	33,028	2,172	30,856
Heating System Operating Hrs	4,380	4,380	-
Energy Loss (kBtus)	144,663	9,513	135,150
Heating System Eff (%)	80%	80%	-
Fuel Heat Value (BTU/Therm)	100,000	100,000	-
Nat Gas Cost ($/Therm)*	1.07	1.07	-
ENERGY SAVINGS CALCULATIONS			
ECM RESULTS	**EXISTING**	**PROPOSED**	**SAVINGS**
Nat Gas Usage Usage (Therms)	1,808	119	1,689
Energy Cost ($)	$1,935	$127	$1,808
COMMENTS:	Bare Pipe Heat Loss value is based on ASHRAE 2009 Fundamentals "Insulation for Mechanical Systems" * Natural Gas Cost Estimated		

There is no maintenance savings due to implementation of this ECM.

Energy Savings Summary:

ECM #10 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$9,900
NJ Smart Start Equipment Incentive ($):	$0
Net Installation Cost ($):	$9,900
Maintenance Savings ($/Yr):	$0
Energy Savings ($/Yr):	$1,808
Total Yearly Savings ($/Yr):	$1,808
Estimated ECM Lifetime (Yr):	15
Simple Payback	5.5
Simple Lifetime ROI	173.9%
Simple Lifetime Maintenance Savings	$0
Simple Lifetime Savings	$27,114
Internal Rate of Return (IRR)	16%
Net Present Value (NPV)	$11,679.39

ECM #11: Water Efficiency Measures

Description:

A variety of standard and high efficiency plumbing fixtures are used at the bathrooms in this facility. Standard water closets are utilized in the toilets. Majority of the urinals were already fitted with automatic high efficiency flushometers. Standard water closet water consumption only meet the minimum federally required standard for water efficiency. Only one sensor type water faucets was installed in each bathroom for testing purposes. It is recommended to continue installation of automatic faucets in the bathrooms. New fixtures are available that use less water than today's requirements and can add up to water reduction over a long period.

This ECM includes the replacement of the existing sink faucets, water closets and urinals within the bathrooms of this facility. The estimated usage of the plumbing fixtures is based on the total population of the facility.

The proposed retrofit includes installation of auto flow sink faucets, low flow aerators and low flow flushometer style water closets that utilize 1.28 gallons per flush. The urinal flushometers shall remain in place since they were recently fitted with electronic actuators. For the basis of this calculation the LEED rating system was used to estimate the occupancy usage for students within the school. When water consumption information was not available, the GPF values were estimated for the existing fixtures.

Energy Savings Calculations:

Urinals and Toilets:

$$\text{Water Consumption} = \text{Occupancy}\left(\frac{\text{Days}}{\text{Yr}}\right) \times \text{Use}\left(\frac{\text{Flush}}{\text{Person per Day}}\right) \times \text{Fixture}\left(\frac{\text{Gal}}{\text{Flush}}\right)$$

Faucets:

$$\text{Water Consumption} = \text{Occupancy}\left(\frac{\text{Days}}{\text{Yr}}\right) \times \text{Use}\left(\frac{\text{Use}}{\text{Person per Day}}\right) \times \text{Use Time}\left(\frac{\text{Sec}}{\text{Use}}\right) \times \text{Fixture}\left(\frac{\text{Gal}}{\text{Min}}\right)$$

$$\text{Water Cost} = \frac{\text{Water Consumption (Gallons)} \times \text{Ave Cost}\left(\frac{\$}{1000\ \text{Gal}}\right)}{1000(\text{Gal})}$$

$$\text{Gas Cost (Therms)} = \text{Faucet Water Consumption (Gallons)} \times \frac{8.34\ \text{BTU}}{\text{Gal}} \times \frac{\text{Therm}}{100{,}000\ \text{BTU}}$$

WATER CONSERVATION CALCULATIONS			
ECM INPUTS	**EXISTING**	**PROPOSED**	**SAVINGS**
ECM INPUTS	Existing Fixtures	Low Flow / Auto Flow Fixtures	-
Estimated Average Number of People	1,350	1,350	-
% Male to Female	50%	50%	-
Estimated % Floor Area Served by Older Bathrooms	100%	100%	-
Occupied Days Per Year	200	200	-
Lavatory Uses per Day per Person	3	3	-
Sink flow time per use, sec	5	5	-
Sink Aerator Flow, GPM	1.5	0.5	-
WC Uses per Day per Person	1.0	1.0	-
Urinal Uses per Day per Person	1.0	1.0	-
Total Urinal Flushes Per Day	675	675	-
Total WC Flushes Per Day	675	675	-
Urinal Gallons Per Flush (GPF)	0.1	0.125	0
WC Gallons Per Flush (GPF)	1.6	1.28	0.32
**** Water Cost ($/1000 Gal)**	$8.00	$8.00	-
Gas Cost ($/Therm)	$1.07	$1.07	-
ENERGY SAVINGS CALCULATIONS			
ECM RESULTS	**EXISTING**	**PROPOSED**	**SAVINGS**
Water Consumption, Urinal and WC (Gal)	232,875	189,675	43,200
Water Consumption, Faucets (Gal)	101,250	33,750	67,500
Total Water Consumption, (Gal)	334,125	223,425	110,700
Water Cost ($)	$2,673	$1,787	$886
Gas Consumption (Therms)	422	141	281
Gas Cost ($/Year)	$452	$151	$301
COMMENTS:	*Savings are based on LEED Reference Guide for Green Building Design and Construction - 2009 Edition for WC and Urinal water usage. ** Cost of Water estimated.		

The cost for demolition and installation and materials of 5 water closets, 3 low flow urinals and 6 new auto flow sink faucets throughout the facility is estimated to be $10,091.

There are no Smart Start rebates for installation of low flow plumbing fixtures.

Energy Savings Summary:

ECM #11 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$74,000
NJ Smart Start Equipment Incentive ($):	$0
Net Installation Cost ($):	$74,000
Maintenance Savings ($/Yr):	$886
Energy Savings ($/Yr):	$301
Total Yearly Savings ($/Yr):	$1,187
Estimated ECM Lifetime (Yr):	15
Simple Payback	62.4
Simple Lifetime ROI	-75.9%
Simple Lifetime Maintenance Savings	$13,284
Simple Lifetime Savings	$17,802
Internal Rate of Return (IRR)	-14%
Net Present Value (NPV)	($59,832.32)

ECM #12: DDC Controls Expansion

Description:

Northern Highlands Regional High School is currently controlled with a mixture of pneumatic control systems and central DDC control systems made by Automated Logics. Concord recommends expanding the DDC system to control remaining HVAC systems in the school including some of the air handling units, unit ventilators, wall thermostats and air conditioning units. In addition the existing control systems will be unified under one system allowing easier operation and scheduling for the building facility management personnel.

This ECM includes expansion of the existing Building Automation system to include control of the majority of the HVAC equipment in the facility. The system will include new temperature sensors and new local thermostats with limited over-ride capability, a front end computer and main controller. The system will also include central controls for lighting. With the communication between the control devices and the front end computer interface, the facility manager will be able to take advantage of scheduling for occupied and unoccupied periods based on the actual occupancy of each space in the facility. Due to the fact that the building may have diverse hours of occupancy, including evening and weekend activities, having supervisory control over all of the equipment makes sense. The DDC system will also aid in the response time to service / maintenance issues when the facility is not under normal maintenance supervision, i.e. after-hours.

The new DDC system has the potential to provide significant savings by controlling the HVAC systems as a whole and provide operating schedules and features such as space averaging, night set-back, temperature override control, etc. 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 referenced report:

- Energy Management and Control System Savings: 5%-15%.

Savings resulting from the implementation of this ECM for energy management controls are estimated to be 5% of the electricity utility and gas utility in this building.

The basis for the DDC system expansion is the Automated Logic Energy Management System or similar.

Energy Savings Calculations:

Since some of the key utility consumption and cost information was not available, estimated values are used for the unit cost of natural gas, total electricity usage and unit cost of electricity.

Energy savings for each utility is calculated with the equation below.

$$\text{Energy Savings (Utility)} = \text{Current Energy Consumption} \times \text{Estimated Savings, \%}$$

Following table summarizes energy savings for this facility via implementation of an Energy Management System:

DDC ENERGY MANAGEMENT SYSYEM CALCULATIONS			
ECM INPUTS	**EXISTING**	**PROPOSED**	**SAVINGS**
ECM INPUTS	Existing Controls w/ Local Thermostats	DDC Controls	
Existing Nat Gas Usage (Therms)	57,888	-	
Existing Electricity Usage (kWh)	2,653,067	-	
Energy Savings, Nat. Gas	-	5%	
Energy Savings, Electricity	-	5%	
Gas Cost ($/Therm)	*$1.07*	$1.07	
Electricity Cost ($/kWh)	*$0.161*	$0.161	
ENERGY SAVINGS CALCULATIONS			
ECM RESULTS	**EXISTING**	**PROPOSED**	**SAVINGS**
Natural Gas Usage (Therms)	57,888	54,994	2,894
Electricity Usage (kWh)	2,653,067	2,520,414	132,653
Natural Gas Cost ($)	$61,941	$58,844	$3,097
Electricity Cost ($)	$427,144	$405,787	$21,357
Energy Cost ($)	$489,084	$464,630	$24,454
COMMENTS:			

Demand savings due to implementation of this ECM is minimal.

The cost of the DDC system expansion with new field devices, controllers, computer, software, programming, etc., is approximately $300,000 based on recent Contractor pricing for systems of this magnitude. Savings from the implementation of this ECM will be from the reduced energy consumption currently used by the HVAC system by proper control of schedule and temperatures via the DDC system.

Currently, there are no prequalified NJ Smart Start Incentives for installation of the DDC system.

Energy Savings Summary:

ECM #12 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$300,000
NJ Smart Start Equipment Incentive ($):	$0
Net Installation Cost ($):	$300,000
Maintenance Savings ($/Yr):	$0
Energy Savings ($/Yr):	$24,454
Total Yearly Savings ($/Yr):	$24,454
Estimated ECM Lifetime (Yr):	15
Simple Payback	12.3
Simple Lifetime ROI	22.3%
Simple Lifetime Maintenance Savings	$0
Simple Lifetime Savings	$366,813
Internal Rate of Return (IRR)	3%
Net Present Value (NPV)	($8,067.13)

REM #1: 172 kW Solar Array System

Description:

The Northern Highlands Regional High School has a number of suitable roof spaces for a substantial solar PV (photovoltaic) panel installation for generating on-site electricity.

Total installed capacity of the proposed system is 173 kW, assuming all the existing roof structures are capable of supporting the proposed arrays. The system will produce approximately 199,000 kilowatt-hours annually, which will reduce the overall electric usage of the facility by 7.5%.

Energy Savings Calculations:

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

Energy Savings Summary:

REM #1 - ENERGY SAVINGS SUMMARY	
System Size (KW_{DC}):	173
Electric Generation (KWH/Yr):	198,754
Installation Cost ($):	$1,037,154
SREC Revenue ($/Yr):	$40,613
Energy Savings ($/Yr):	$31,999
Total Yearly Savings ($/Yr):	$72,612
ECM Analysis Period (Yr):	15
Simple Payback (Yrs):	14.3
Analysis Period Electric Savings ($):	$595,154
Analysis Period SREC Revenue ($):	$588,329
Net Present Value (NPV)	($302,175.26)

VIII. RENEWABLE/DISTRIBUTED ENERGY MEASURES

Globally, renewable energy has become a priority affecting international and domestic energy policy. The State of New Jersey has taken a proactive approach, and has recently adopted in its Energy Master Plan a goal of 30% renewable energy by 2020. To help reach this goal New Jersey created the Office of Clean Energy under the direction of the Board of Public Utilities and instituted a Renewable Energy Incentive Program to provide additional funding to private and public entities for installing qualified renewable technologies. A renewable energy source can greatly reduce a building's operating expenses while producing clean environmentally friendly energy. CEG has assessed the feasibility of installing renewable energy measures (REM) for the municipality utilizing renewable technologies and concluded that there is potential for solar energy generation. The solar photovoltaic system calculation summary will be concluded as **REM#1** within this report.

Solar Generation

Solar energy produces clean energy and reduces a building's carbon footprint. This is accomplished via photovoltaic panels which are mounted on all south and southwestern facades of the building. Flat roof, as well as sloped areas can be utilized; flat areas will have the panels turned to an optimum solar absorbing angle. (A structural survey of the roof would be necessary before the installation of PV panels is considered). The state of NJ has instituted a program in which one Solar Renewable Energy Certificate (SREC) is given to the Owner for every 1000 kWh of generation. SREC's can be sold anytime on the market at their current market value. The value of the credit varies upon the current need of the power companies. The average value per credit is around $350, this value was used in our financial calculations. This equates to $0.35 per kWh generated.

CEG has reviewed the existing roof area of the building being audited for the purposes of determining a potential for a roof mounted photovoltaic system. A roof area of 18,000 S.F. can be utilized for a PV system. A depiction of the area utilized is shown in **Renewable / Distributed Energy Measures Calculation Appendix**. Using this square footage it was determined that a system size of 172 kilowatts could be installed. A system of this size has an estimated kilowatt hour production of 199,000 KWh annually, reducing the overall utility bill by approximately 7.5% percent. A detailed financial analysis can be found in the **Renewable / Distributed Energy Measures Calculation Appendix**. This analysis illustrates the payback of the system over a 25 year period. The eventual degradation of the solar panels and the price of accumulated SREC's are factored into the payback.

The proposed photovoltaic array layout is designed based on the specifications for the Sun Power SPR-230 panel. This panel has a "DC" rated full load output of 230 watts, and has a total panel conversion efficiency of 18%. Although panels rated at higher wattages are available through Sun Power and other various manufacturers, in general most manufacturers who produce commercially available solar panels produce a similar panel in the 200 to 250 watt range. This provides more manufacturer options to the public entity if they wish to pursue the proposed solar recommendation without losing significant system capacity.

The array system capacity was sized on available roof space on the existing facility. Estimated solar array generation was then calculated based on the National Renewable Energy Laboratory PVWatts Version 1.0 Calculator. In order to calculate the array generation an appropriate location with solar data on file must be selected. In addition the system DC rated kilowatt (kW) capacity must be inputted, a DC to AC de-rate factor, panel tilt angle, and array azimuth angle. The DC to AC de-rate factor is based on the panel nameplate DC rating, inverter and transformer efficiencies (95%), mismatch factor (98%), diodes and connections (100%), dc and ac wiring(98%, 99%), soiling, (95%), system availability (95%), shading (if applicable), and age(new/100%). The overall DC to AC de-rate factor has been calculated at an overall rating of 81%. The PVWatts Calculator program then calculates estimated system generation based on average monthly solar irradiance and user provided inputs. The monthly energy generation and offset electric costs from the PVWatts calculator is shown in the **Renewable/Distributed Energy Measures Calculation Appendix**.

The proposed solar array is qualified by the New Jersey Board of Public Utilities Net Metering Guidelines as a Class I Renewable Energy Source. These guidelines allow onsite customer generation using renewable energy sources such as solar and wind with a capacity of 2 megawatts (MW) or less. This limits a customer system design capacity to being a net user and not a net generator of electricity on an annual basis. Although these guidelines state that if a customer does net generate (produce more electricity than they use), the customer will be credited those kilowatt-hours generated to be carried over for future usage on a month to month basis. Then, on an annual basis if the customer is a net generator the customer will then be compensated by the utility the average annual PJM Grid LMP price per kilowatt-hour for the over generation. Due to the aforementioned legislation, the customer is at limited risk if they generate more than they use at times throughout the year. With the inefficiency of today's energy storage systems, such as batteries, the added cost of storage systems is not warranted and was not considered in the proposed design.

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

Table 7
Financial Summary – Photovoltaic System

FINANCIAL SUMMARY - PHOTOVOLTAIC SYSTEM			
PAYMENT TYPE	**SIMPLE PAYBACK**	**LIFETIME ROI**	**INTERNAL RATE OF RETURN**
Direct Purchase	14.5 Years	3.7%	0.46%

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

Given the large amount of capital required by the District to invest in a solar system through a Direct Purchase Concord Engineering does not recommend the district pursue this route. It would be more advantageous for the District to solicit Power Purchase Agreement (PPA) Providers who will own, operate, and maintain the system for a period of 15 years. During this time the PPA Provider would sell all of the electric generated by Solar Arrays to the District at a reduced rate compared to their existing electric rate.

Wind Generation

In addition to the Solar Analysis, CEG also conducted a review of the applicability of wind energy for the facility. Wind energy production is another option available through the Renewable Energy Incentive Program. Wind turbines of various types can be utilized to produce clean energy on a per building basis. Cash incentives are available per kWh of electric usage.

Based on CEG's review of the applicability of wind energy for the facility, it was determined that the average wind speed of 4 MPH (based on 2010-2011 data) is not adequate at this site for a viable wind turbine installation. Therefore, wind energy is not a viable option to implement.

IX. ENERGY PURCHASING AND PROCUREMENT STRATEGY

Load Profile:

Load Profile analysis was performed to determine the seasonal energy usage of the facility. The load profile doesn't show any significant irregularities indicating any potential problems within the facility. For this report, the facility's energy consumption data was gathered in table format and plotted in graph form to create the load profile. Refer to the Electric and Natural Gas Usage profiles included within this report to reference the respective electricity and natural gas usage load profiles.

Electricity:

The electricity usage profile demonstrates a typical cooling load profile for school facilities that have occupancy during the summer months. The reduction in the energy usage in August indicates proper shut down of the air conditioning equipment when the school is not occupied. Historical usage is relatively steady throughout the year with an average monthly usage of 221,000 kWh and an average monthly demand of 632 kW. Largest consumption months were January, February, March and June.

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

Natural Gas:

The Natural Gas Usage Profile demonstrates a very typical natural gas (heat load) profile. The summer months May – August have very little consumption. The average monthly winter (Nov-Mar) consumption is 9,700 therms and the average monthly summer (Apr-Oct) consumption is 1,339 therms.

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

Tariff Analysis:

Electricity:

This facility receives electrical service through Rockland Electric Company (RECO) on Large Commercial Secondary service Rate (over 200 kW demand) and General Small Commercial and Industrial Secondary Service Rate (below 200 kW demand). The rates are for single or three phase service at secondary voltages. This facility has not contracted a Third Party Supplier (TPS) to provide electric commodity service. Therefore, the electric supply (generation) service is provided at the RECO default service rate BGS (Basic Generation Service).

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

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

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

The facility's current BGS-FP average price to compare for GS-Sec rate is $0.093/kWh.

The utility, RECO will continue to be responsible for maintaining the existing network of wires, pipes and poles that make up the delivery system, which will serve all consumers, regardless of whom they choose to purchase their electricity or natural gas from. RECO's Delivery Service rate includes the Customer Charge, Supplemental Customer Charge, Distribution Charge (kW Demand), kWh Charge.

Natural Gas:

The facilities currently receives natural gas distribution service through PSE&G on rate schedules GSG (General Service Gas) and LVG (Large Volume Gas) and has contracted a Third Party Supplier (TPS), HESS to provide natural gas commodity service. A copy of the contract was not available to review however it appears from the bills reviewed, that the contract is a floating market based contract with triggers.

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

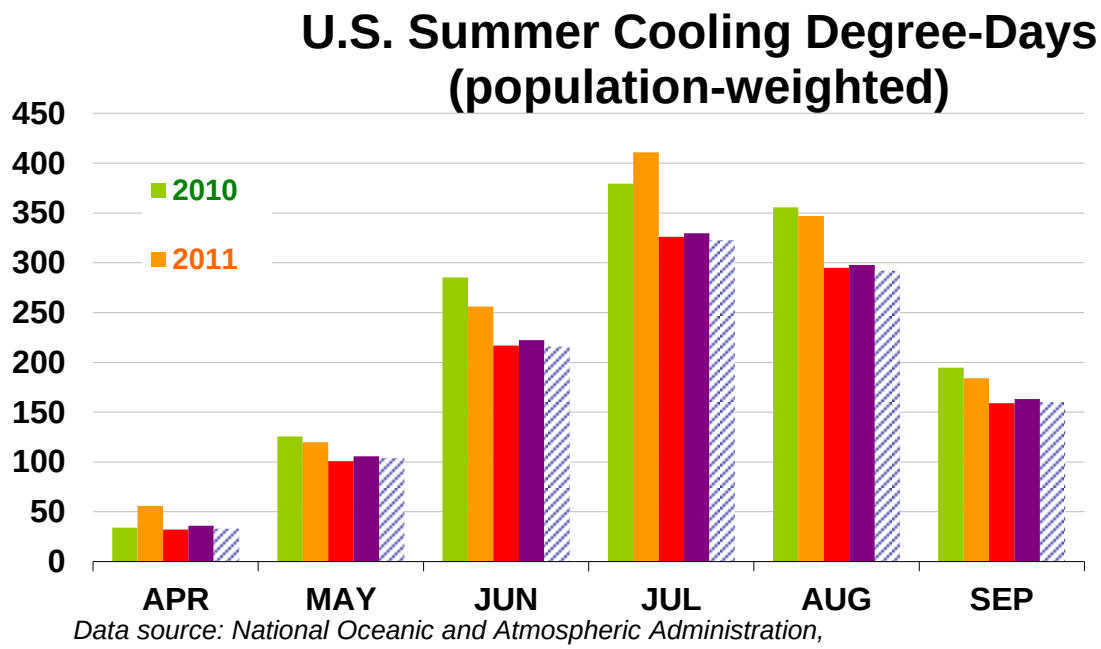
natural gas BGSS charges from PSE&G for rate schedule GSG and LVG. http://www.pseg.com/companies/pseandg/schedules/pdf/commodity.pdf

The utility, PSE&G is responsible for maintaining the existing network of wires, pipes and poles that make up the delivery system, which will serve all consumers, regardless of whom they choose to purchase their electricity or natural gas from. PSE&G's delivery service rate includes the following charges: Customer Service Charge, Distribution Charge, & Societal Benefits Charge (SBC).

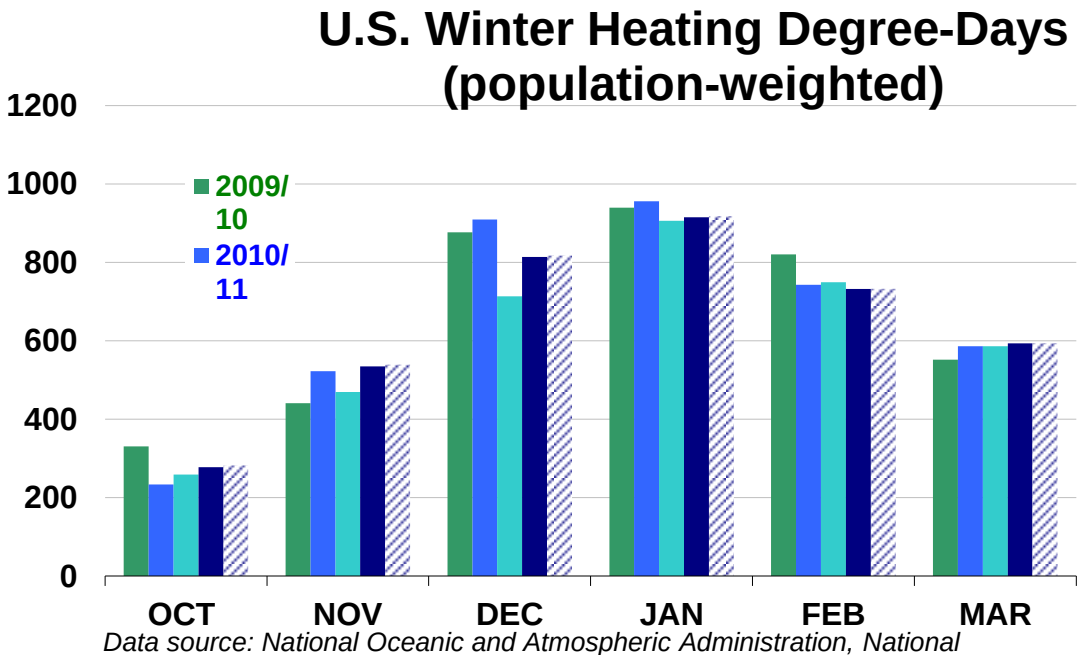
Electric and Natural Gas Commodities Market Overview:

Current electricity and natural gas market pricing has remained relatively stable over the last year. Commodity pricing in 2008 marked historical highs in both natural gas and electricity commodity. Commodity pricing commencing spring of 2009 continuing through 2011, has decreased dramatically over 2008 historic highs and continues to be favorable for locking in long term (2-5 year) contracts with 3rd Party Supplier's for both natural gas and electricity supply requirements.

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



Source: Short-Term Energy Outlook,

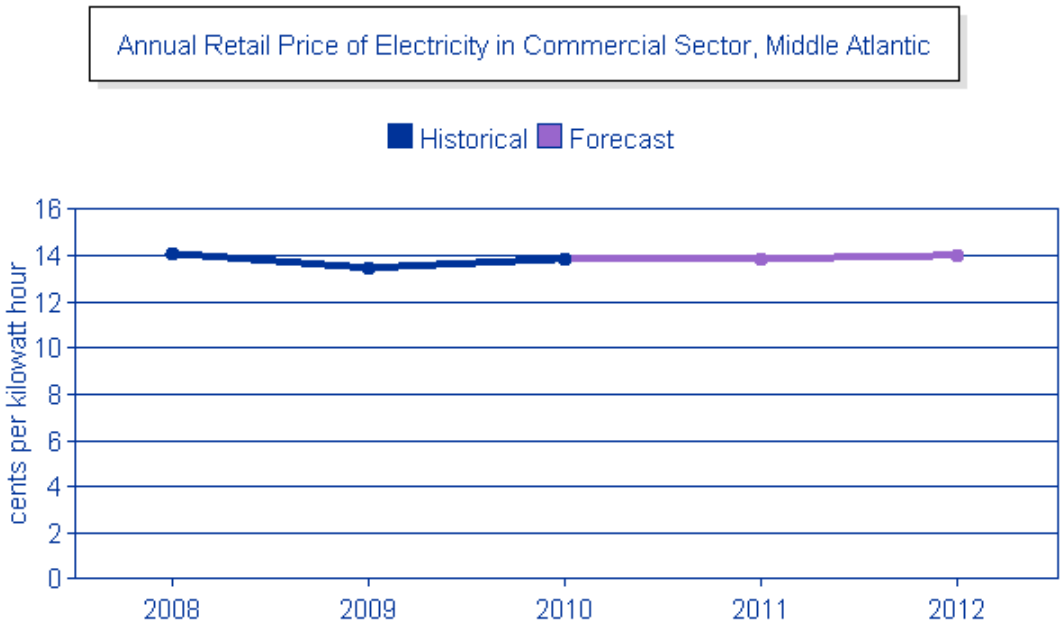


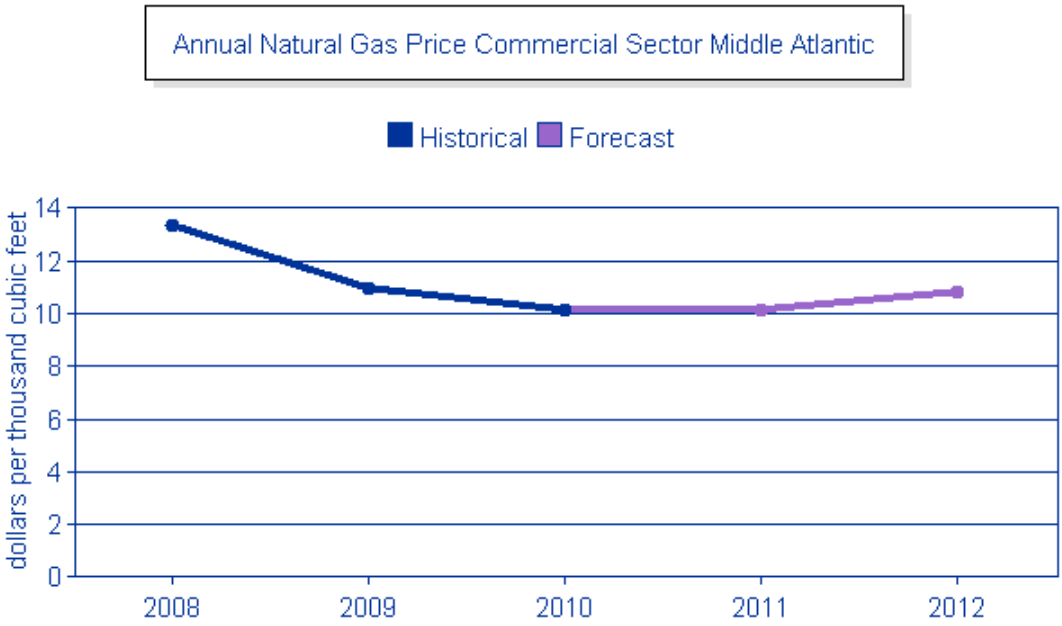
Source: Short-Term Energy Outlook,

Short Term Energy Outlook - US Energy Information Administration (1/10/2012):

U.S. Natural Gas Prices. *At this time last year, EIA had projected that the Henry Hub natural gas spot price would average $4.02 per MMBtu in 2011, rising to an average $4.50 per MMBtu in 2012. The final average Henry Hub spot price for 2011 was $4.00 per MMBtu. The current forecast for 2012 natural gas prices is significantly lower than at this time last year, as continued growth in production and a very warm start to the winter have contributed to record-high natural gas inventories. EIA now expects the Henry Hub spot price will average $3.53 per MMBTU in 2012. In 2013, the forecast spot price rises to an average of $4.14 per MMBtu. Natural gas futures prices for March 2012 delivery (for the 5-day period ending January 5, 2012) averaged $3.05 per MMBtu, and the average implied volatility was 40 percent. The lower and upper bounds for the 95-percent confidence interval for March 2012 contracts are $2.29 per MMBtu and $4.06 per MMBtu. At this time last year, the March 2011 natural gas futures contract averaged $4.39 per MMBtu and implied volatility averaged 43 percent. The corresponding lower and upper limits of the 95-percent confidence interval were $3.21 per MMBtu and $6.02 per MMBtu.*

U.S. Electricity Retail Prices. *After having risen by 2.1 percent between 2010 and 2011, EIA expects average U.S. residential electricity prices to rise only 0.6 percent in 2012 and then stay flat in 2013.*





Pricing in the chart above includes both utility distribution and energy commodity charges.

Recommendations:

1. Concord Engineering recommends that Northern Highlands Regional High School District continue participation in the ACES aggregation for 3rd party commodity supply procurement strategies for natural gas commodity supply service. Third Party Supplier natural gas rates currently under contract will continue to provide savings over the utility's price to compare. Energy commodities are among the most volatile of all commodities, however at this point and time, energy is extremely competitive and contract terms longer than 12 months are desirable.

2. Concord Engineering recommends an aggregated approach for 3rd party commodity supply procurement strategies for electricity supply service. Aggregating the facility for electricity would allow for the facility to achieve cost reductions on electricity supply costs. Energy commodities are among the most volatile of all commodities, however at this point and time, energy is extremely competitive. The facilities could realize up to a 30% reduction in energy supply costs, if it were to take advantage of these current market prices quickly, before energy increases.

   After review of the utility consumption, billing, and current commodity pricing outlook, Concord Engineering recommends that the High School District either consider utilizing the NJSBA "ACES" energy consortium (if capable) for electric commodity procurement or explore the utilization and advisement of their own 3rd party unbiased Energy Consulting Firm to aid them in bidding to approved Third Party Commodity Suppliers. The 3rd party unbiased Energy Consulting Firm should be experienced in the procurement of electricity commodity, New Jersey procurement laws, aggregation of facilities and energy supply risk and commodity management. In addition, the firm should be able to provide full service advisement over the term of the contract to identify additional opportunities to further reduce costs. Many of these opportunities

may include: energy rates; utility bill auditing; energy data analytics; and efficiency improvements.

It is important that a rational, defensible strategy for purchasing commodity in volatile markets is incorporated. Examples include:

- Budgets that reflect sound market intelligence
- An understanding of BGS historical prices and trends
- Awareness of seasonal opportunities (e.g. shoulder months)
- Negotiation of fair contractual terms
- An aggressive, market based price

A list of 3rd party commodity suppliers in the corresponding utility territory (Rockland Electric Company) can be found in the **Third Party Commodity Suppliers Appendix** at the end of this section.

3. Concord Engineering recommends that the High School District consider utilizing a third party utility billing-auditing service to further analyze historical utility invoices such as water, sewer, natural gas and electric for incorrect billings and rate tariff optimization services. This service can be based on a shared savings model with no cost to the School District. The service could provide refunds on potential incorrect billings that may have been passed through by the utilities and or supplier and paid by the High School.

X. INSTALLATION FUNDING OPTIONS

CEG has reviewed various funding options for the facility owner to utilize in subsidizing the costs for installing the energy conservation measures noted within this report. Below are a few alternative funding methods:

i. *Energy Savings Improvement Program (ESIP)* – Public Law 2009, Chapter 4 authorizes government entities to make energy related improvements to their facilities and par for the costs using the value of energy savings that result from the improvements. The "Energy Savings Improvement Program (ESIP)" law provides a flexible approach that can allow all government agencies in New Jersey to improve and reduce energy usage with minimal expenditure of new financial resources.

ii. *Municipal Bonds* – Municipal bonds are a bond issued by a city or other local government, or their agencies. Potential issuers of municipal bonds include cities, counties, redevelopment agencies, school districts, publicly owned airports and seaports, and any other governmental entity (or group of governments) below the state level. Municipal bonds may be general obligations of the issuer or secured by specified revenues. Interest income received by holders of municipal bonds is often exempt from the federal income tax and from the income tax of the state in which they are issued, although municipal bonds issued for certain purposes may not be tax exempt.

iii. *Power Purchase Agreement* – Public Law 2008, Chapter 3 authorizes contractor of up to fifteen (15) years for contracts commonly known as "power purchase agreements." These are programs where the contracting unit (Owner) procures a contract for, in most cases, a third party to install, maintain, and own a renewable energy system. These renewable energy systems are typically solar panels, windmills or other systems that create renewable energy. In exchange for the third party's work of installing, maintaining and owning the renewable energy system, the contracting unit (Owner) agrees to purchase the power generated by the renewable energy system from the third party at agreed upon energy rates.

iv. *Pay For Performance* – The New Jersey Smart Start Pay for Performance program includes incentives based on savings resulted from implemented ECMs. The program is available for all buildings that were audited as part of the NJ Clean Energy's Local Government Energy Audit Program. The facility's participation in the program is assisted by an approved program partner. An "Energy Reduction Plan" is created with the facility and approved partner to shown at least 15% reduction in the building's current energy use. Multiple energy conservation measures implemented together are applicable toward the total savings of at least 15%. No more than 50% of the total energy savings can result from lighting upgrades / changes.

Total incentive is capped at 50% of the project cost. The program savings is broken down into three benchmarks; Energy Reduction Plan, Project Implementation, and Measurement and Verification. Each step provides additional incentives as the energy reduction project continues. The benchmark incentives are as follows:

1. Energy Reduction Plan – Upon completion of an energy reduction plan by an approved program partner, the incentive will grant $0.10 per square foot between $5,000 and $50,000, and not to exceed 50% of the facility's annual energy expense. (Benchmark #1 is not provided in addition to the local government energy audit program incentive.)

2. Project Implementation – Upon installation of the recommended measures along with the "Substantial Completion Construction Report," the incentive will grant savings per KWH or Therm based on the program's rates. Minimum saving must be 15%. (Example $0.11 / kWh for 15% savings, $0.12/ kWh for 17% savings, … and $1.10 / Therm for 15% savings, $1.20 / Therm for 17% saving, …) Increased incentives result from projected savings above 15%.

3. Measurement and Verification – Upon verification 12 months after implementation of all recommended measures, that actual savings have been achieved, based on a completed verification report, the incentive will grant additional savings per kWh or Therm based on the program's rates. Minimum savings must be 15%. (Example $0.07 / kWh for 15% savings, $0.08/ kWh for 17% savings, … and $0.70 / Therm for 15% savings, $0.80 / Therm for 17% saving, …) Increased incentives result from verified savings above 15%.

CEG recommends the Owner review the use of the above-listed funding options in addition to utilizing their standard method of financing for facilities upgrades in order to fund the proposed energy conservation measures.

XI. ADDITIONAL RECOMMENDATIONS

The following recommendations include no cost/low cost measures, Operation & Maintenance (O&M) items, and water conservation measures with attractive paybacks. These measures are not eligible for the Smart Start Buildings incentives from the office of Clean Energy but save energy none the less.

A. Chemically clean the condenser and evaporator coils periodically to optimize efficiency. Poorly maintained heat transfer surfaces can reduce efficiency 5-10%.

B. Maintain all weather stripping on windows and doors.

C. Clean all light fixtures to maximize light output.

D. Provide more frequent air filter changes to decrease overall system power usage and maintain better IAQ.

E. Confirm that outside air economizers on the rooftop units are functioning properly to take advantage of free cooling and avoid excess outside air during occupied periods.

XII. ENERGY AUDIT ASSUMPTIONS

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

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

ECM COST & SAVINGS BREAKDOWN

CONCORD ENGINEERING GROUP

Northern Highlands Regional High School

ECM NO.	DESCRIPTION	INSTALLATION COST				YEARLY SAVINGS			ECM LIFETIME	LIFETIME ENERGY SAVINGS	LIFETIME MAINTENANCE SAVINGS	LIFETIME ROI	SIMPLE PAYBACK	INTERNAL RATE OF RETURN (IRR)	NET PRESENT VALUE (NPV)
		MATERIAL	LABOR	REBATES, INCENTIVES	NET INSTALLATION COST	ENERGY	MAINT. / SREC	TOTAL		(Yearly Saving * ECM Lifetime)	(Yearly Maint Svaing * ECM Lifetime)	(Lifetime Savings - Net Cost) / (Net Cost)	(Net cost / Yearly Savings)	$\sum \frac{C_n}{(1+IRR)^n}$	$\sum \frac{C_n}{(1+DR)^n}$
		($)	($)	($)	($)	($/Yr)	($/Yr)	($/Yr)	(Yr)	($)	($)	(%)	(Yr)	($)	($)
ECM #1	General Lighting Equipment Upgrade	$76,531	$51,020	$150	$127,401	$25,273	$9	$25,283	15	$379,240	$142	197.7%	5.0	18.24%	$174,421.79
ECM #2	General Lighting Controls Upgrade	$57,100	$0	$6,415	$50,685	$15,788	$0	$15,788	15	$236,822	$0	367.2%	3.2	30.58%	$137,792.44
ECM #3	Gymnasium Lighting & Controls Upgrade - T5s	$13,950	$0	$4,175	$9,775	$3,044	$0	$3,044	15	$45,661	$0	367.1%	3.2	30.57%	$26,564.78
ECM #4	Replace CRT Monitors	$20,300	$0	$0	$20,300	$2,265	$0	$2,265	10	$22,649	$0	11.6%	9.0	2.04%	($979.67)
ECM #5	NEMA Premium Efficiency Motors	$18,176	$0	$666	$17,510	$1,117	$0	$1,117	15	$16,752	$0	-4.3%	15.7	-0.55%	($4,178.01)
ECM #6	Demand Controlled Ventilation	$164,000	$0	$0	$164,000	$5,812	$0	$5,812	15	$87,179	$0	-46.8%	28.2	-7.03%	($94,617.64)
ECM #7	Window Replacement	$1,070,000	$0	$0	$1,070,000	$14,184	$0	$14,184	15	$212,766	$0	-80.1%	75.4	-15.62%	($900,667.36)
ECM #8	Upgrade Window AC Units	$55,000	$30,000	$0	$85,000	$4,875	$0	$4,875	10	$48,751	$0	-42.6%	17.4	-9.01%	($43,414.07)
ECM #9	Modify 3-way Valves and Install Variable Frequency Drives	$64,000	$0	$414	$63,586	$7,534	$0	$7,534	15	$113,005	$0	77.7%	8.4	8.23%	$26,350.57
ECM #10	Hot Water Pipe and Valve Jacket Insulation	$2,725	$7,175	$0	$9,900	$1,808	$0	$1,808	15	$27,114	$0	173.9%	5.5	16.38%	$11,679.39
ECM #11	Water Efficiency Measures	$74,000	$0	$0	$74,000	$301	$886	$1,187	15	$17,802	$13,284	-75.9%	62.4	-14.12%	($59,832.32)
ECM #12	Building Management System Expansion	$300,000	$0	$0	$300,000	$24,454	$0	$24,454	15	$366,813	$0	22.3%	12.3	2.63%	($8,067.13)
REM RENEWABLE ENERGY AND FINANCIAL COSTS AND SAVINGS SUMMARY															
REM #1	172 kW Solar PV System	$1,037,154	$0	$0	$1,037,154	$31,999	$40,613	$72,612	15	$1,089,186	$609,195	5.0%	14.3	0.62%	($170,311.60)

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* .

Concord Engineering Group, Inc.

520 BURNT MILL ROAD
VOORHEES, NEW JERSEY 08043
PHONE: (856) 427-0200
FAX: (856) 427-6508

SmartStart Building Incentives

The NJ SmartStart Buildings Program offers financial incentives on a wide variety of building system equipment. The incentives were developed to help offset the initial cost of energy-efficient equipment. The following tables show the current available incentives as of February 15, 2011:

Electric Chillers

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

Energy Efficiency must comply with ASHRAE 90.1-2007

Gas Cooling

Gas Absorption Chillers	$185 - $400 per ton
Gas Engine-Driven Chillers	Calculated through custom measure path)

Desiccant Systems

$1.00 per cfm – gas or electric

Electric Unitary HVAC

Unitary AC and Split Systems	$73 - $92 per ton
Air-to-Air Heat Pumps	$73 - $92 per ton
Water-Source Heat Pumps	$81 per ton
Packaged Terminal AC & HP	$65 per ton
Central DX AC Systems	$40- $72 per ton
Dual Enthalpy Economizer Controls	$250
Occupancy Controlled Thermostat (Hospitality & Institutional Facility)	$75 per thermostat

Energy Efficiency must comply with ASHRAE 90.1-2007

Gas Heating

Gas Fired Boilers < 300 MBH	$300 per unit
Gas Fired Boilers ≥ 300 - 1500 MBH	$1.75 per MBH
Gas Fired Boilers ≥1500 - ≤ 4000 MBH	$1.00 per MBH
Gas Fired Boilers > 4000 MBH	(Calculated through Custom Measure Path)
Gas Furnaces	$300 - $400 per unit, AFUE ≥ 92%

Ground Source Heat Pumps

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

Energy Efficiency must comply with ASHRAE 90.1-2007

Variable Frequency Drives

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

Natural Gas Water Heating

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

Prescriptive Lighting

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

Prescriptive Lighting - LED

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

Lighting Controls – Occupancy Sensors

Wall Mounted	$20 per control
Remote Mounted	$35 per control
Daylight Dimmers	$25 per fixture
Occupancy Controlled hi-low Fluorescent Controls	$25 per fixture controlled

Lighting Controls – HID or Fluorescent Hi-Bay Controls

Occupancy hi-low	$75 per fixture controlled
Daylight Dimming	$75 per fixture controlled
Daylight Dimming - office	$50 per fixture controlled

Premium Motors

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

Other Equipment Incentives

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

OMB No. 2060-0347

STATEMENT OF ENERGY PERFORMANCE
Northern Highlands Regional High School

Building ID: 2992531
For 12-month Period Ending: October 31, 2011[1]
Date SEP becomes ineligible: N/A
Date SEP Generated: February 17, 2012

Facility
Northern Highlands Regional High School
298 Hillside Ave
Allendale, NJ 07401

Facility Owner
Northern Highlands Regional High School BOE
298 Hillside Ave
Allendale, NJ 07401

Primary Contact for this Facility
Roderic McLaughlin
298 Hillside Ave
Allendale, NJ 07401

Year Built: 1966
Gross Floor Area (ft²): 301,000

Energy Performance Rating[2] (1-100) 69

Site Energy Use Summary[3]

Electricity - Grid Purchase(kBtu)	9,131,781
Natural Gas (kBtu)[4]	5,756,929
Total Energy (kBtu)	14,888,710

Energy Intensity[4]

Site (kBtu/ft²/yr)	49
Source (kBtu/ft²/yr)	121

Emissions (based on site energy use)

Greenhouse Gas Emissions ($MtCO_2e$/year)	1,140

Electric Distribution Utility
Rockland Electric Co [Consolidated Edison Inc]

National Median Comparison

National Median Site EUI	59
National Median Source EUI	146
% Difference from National Median Source EUI	-17%
Building Type	K-12 School

Stamp of Certifying Professional

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

Meets Industry Standards[5] **for Indoor Environmental Conditions:**

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

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

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

ENERGY STAR® Data Checklist for Commercial Buildings

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

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

CRITERION	VALUE AS ENTERED IN PORTFOLIO MANAGER	VERIFICATION QUESTIONS	NOTES	☑
Building Name	Northern Highlands Regional High School	Is this the official building name to be displayed in the ENERGY STAR Registry of Labeled Buildings?		☐
Type	K-12 School	Is this an accurate description of the space in question?		☐
Location	298 Hillside Ave, Allendale, NJ 07401	Is this address accurate and complete? Correct weather normalization requires an accurate zip code.		☐
Single Structure	Single Facility	Does this SEP represent a single structure? SEPs cannot be submitted for multiple-building campuses (with the exception of a hospital, k-12 school, hotel and senior care facility) nor can they be submitted as representing only a portion of a building.		☐
Original High School Building (K-12 School)				
CRITERION	**VALUE AS ENTERED IN PORTFOLIO MANAGER**	**VERIFICATION QUESTIONS**	**NOTES**	☑
Gross Floor Area	261,000 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.		☐
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.		☐
Number of PCs	175	Is this the number of personal computers in the K12 School?		☐
Number of walk-in refrigeration/freezer units	2	Is this the total number of commercial walk-in type freezers and coolers? These units are typically found in storage and receiving areas.		☐
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".		☐
Percent Cooled	10 %	Is this the percentage of the total floor space within the facility that is served by mechanical cooling equipment?		☐
Percent Heated	100 %	Is this the percentage of the total floor space within the facility that is served by mechanical heating equipment?		☐
Months	10(Optional)	Is this school in operation for at least 8 months of the year?		☐

High School?	Yes	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'.		☐
Science Wing (K-12 School)				
CRITERION	**VALUE AS ENTERED IN PORTFOLIO MANAGER**	**VERIFICATION QUESTIONS**	**NOTES**	☑
Gross Floor Area	40,000 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.		☐
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.		☐
Number of PCs	70 (Default)	Is this the number of personal computers in the K12 School?		☐
Number of walk-in refrigeration/freezer units	0	Is this the total number of commercial walk-in type freezers and coolers? These units are typically found in storage and receiving areas.		☐
Presence of cooking facilities	No	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".		☐
Percent Cooled	10 %	Is this the percentage of the total floor space within the facility that is served by mechanical cooling equipment?		☐
Percent Heated	100 %	Is this the percentage of the total floor space within the facility that is served by mechanical heating equipment?		☐
Months	10(Optional)	Is this school in operation for at least 8 months of the year?		☐
High School?	Yes	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'.		☐

ENERGY STAR® Data Checklist for Commercial Buildings

Energy Consumption

Power Generation Plant or Distribution Utility: Rockland Electric Co [Consolidated Edison Inc]

Fuel Type: Electricity

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

Start Date	End Date	Energy Use (kWh (thousand Watt-hours))
09/30/2011	10/29/2011	230,173.00
08/30/2011	09/29/2011	229,399.00
07/30/2011	08/29/2011	182,188.00
06/30/2011	07/29/2011	211,013.00
05/30/2011	06/29/2011	251,482.00
04/30/2011	05/29/2011	193,924.00
03/30/2011	04/29/2011	204,678.00
03/01/2011	03/29/2011	235,650.00
01/30/2011	02/28/2011	239,410.00
12/30/2010	01/29/2011	237,613.00
11/30/2010	12/29/2010	235,141.00
Electricity Consumption (kWh (thousand Watt-hours))		**2,450,671.00**
Electricity Consumption (kBtu (thousand Btu))		**8,361,689.45**
Total Electricity (Grid Purchase) Consumption (kBtu (thousand Btu))		**8,361,689.45**
Is this the total Electricity (Grid Purchase) consumption at this building including all Electricity meters?		☐

Fuel Type: Natural Gas

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

Start Date	End Date	Energy Use (therms)
09/19/2011	10/18/2011	661.00
08/19/2011	09/18/2011	662.00
07/19/2011	08/18/2011	324.00
06/19/2011	07/18/2011	388.00
05/19/2011	06/18/2011	606.00
04/19/2011	05/18/2011	1,302.00
03/19/2011	04/18/2011	6,996.00
02/19/2011	03/18/2011	9,941.00
01/19/2011	02/18/2011	10,640.00
12/19/2010	01/18/2011	10,727.00
11/19/2010	12/18/2010	10,207.00

Gas Consumption (therms)	**52,454.00**
Gas Consumption (kBtu (thousand Btu))	**5,245,400.00**
Total Natural Gas Consumption (kBtu (thousand Btu))	**5,245,400.00**
Is this the total Natural Gas consumption at this building including all Natural Gas meters?	☐

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

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

Certifying Professional

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

Name: _____ Date: _____

Signature: _____

Signature is required when applying for the ENERGY STAR.

FOR YOUR RECORDS ONLY. DO NOT SUBMIT TO EPA.

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

Facility
Northern Highlands Regional High School
298 Hillside Ave
Allendale, NJ 07401

Facility Owner
Northern Highlands Regional High School BOE
298 Hillside Ave
Allendale, NJ 07401

Primary Contact for this Facility
Roderic McLaughlin
298 Hillside Ave
Allendale, NJ 07401

General Information

Northern Highlands Regional High School	
Gross Floor Area Excluding Parking: (ft^2)	301,000
Year Built	1966
For 12-month Evaluation Period Ending Date:	October 31, 2011

Facility Space Use Summary

Original High School Building	
Space Type	K-12 School
Gross Floor Area(ft^2)	261,000
Open Weekends?	No
Number of PCs	175
Number of walk-in refrigeration/freezer units	2
Presence of cooking facilities	Yes
Percent Cooled	10
Percent Heated	100
Months[o]	10
High School?	Yes
School District[o]	Northern Highlands

Science Wing	
Space Type	K-12 School
Gross Floor Area(ft^2)	40,000
Open Weekends?	No
Number of PCs[d]	70
Number of walk-in refrigeration/freezer units	0
Presence of cooking facilities	No
Percent Cooled	10
Percent Heated	100
Months[o]	10
High School?	Yes
School District[o]	Northern Highland Regional High School District

Energy Performance Comparison

	Evaluation Periods		Comparisons		
Performance Metrics	**Current** (Ending Date 10/31/2011)	**Baseline** (Ending Date 10/31/2011)	**Rating of 75**	**Target**	**National Median**
Energy Performance Rating	69	69	75	N/A	50
Energy Intensity					
Site ($kBtu/ft^2$)	49	49	46	N/A	59
Source ($kBtu/ft^2$)	121	121	114	N/A	146
Energy Cost					
$/year	N/A	N/A	N/A	N/A	N/A
$/$ft^2$/year	N/A	N/A	N/A	N/A	N/A
Greenhouse Gas Emissions					
$MtCO_2e$/year	1,140	1,140	1,071	N/A	1,370
$kgCO_2e/ft^2$/year	4	4	4	N/A	5

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.

MAJOR EQUIPMENT LIST

Concord Engineering Group

Northern Highlands Regional High School

Boilers

Tag	Boiler-1 - 7	Boiler-1 - 2	
Unit Type	Medium efficiency, modular, watertube	Standard, atmospheric, watertube	
Qty	7	2	
Location	Original Building Boile Room	Science wing boiler room	
Area Served	Original Building	Science wing	
Manufacturer	RBI	Raypak	
Model #	Future III MB2000	H9 - 2100	
Serial #	060953307 and on	40556055	
Input Capacity (MBH)	1,999	2,100	
Rated Output Capacity (MBH)	1,699	1,722	
Approx. Efficiency %	85%	82%	
Fuel	Natural Gas	Natural Gas	
Approx Age	3	7	
ASHRAE Service Life	30	30	
Remaining Life	27	23	
Comments	Boiler primary loop supply temp 180°F. Secondary (building) loop supply temp 167°F, return 153°F	1:4 turndown ratio.	

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

MAJOR EQUIPMENT LIST

Concord Engineering Group

Northern Highlands Regional High School

Pumps

Tag	Boiler Pumps	Boiler Pumps	P1, P2
Unit Type	Pipe mounted boiler primary loop	Floor Mounted, boiler Secondary Loop	Floor Mounted, boiler Secondary Loop
Qty	7	2	2
Location	Original boiler room	Original boiler room	Original boiler room
Area Served	Boiler primary loop	Boiler secondary loop	Boiler secondary loop
Manufacturer	Armstrong	BG	Armstrong
Model #	-	3BC BF B10 1510	5x4x11.5 4030
Serial #	-	2273336, 2094396	627813
Horse Power	1.5	10	25
Flow (Gpm)	170 (Est)	520 GPM @ 50FT HD (Based on original docs)	600 GPM @ 100FT HD
Motor Info	Marathon Electric	Marathon, Baldor	Armstrong
Electrical Power	208	208	208
RPM	1735	1750	1750
Motor Efficiency %	80%	89.5%	92.4%
Approx Age	3	3	3
ASHRAE Service Life	20	20	20
Remaining Life	17	17	17
Comments			

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

MAJOR EQUIPMENT LIST

Concord Engineering Group

Northern Highlands Regional High School

Pumps

Tag	**-**	**-**	**P1-,P2**
Unit Type	Domestic Hot Water Boiler Pump	Domestic Hot Water Circulators	Pipe mounted boiler loop
Qty	1	3	2
Location	Original boiler room	Original boiler room	Science wing boiler room
Area Served	Original Building	Original Building	Science wing
Manufacturer	Armstrong	BG, Taco	BG
Model #	-	-	-
Serial #	-	-	-
Horse Power	1/2	Fractional	2
Flow (Gpm)	75 GPM @ 20 FT HD	-	174 GPM @ 20 FT HD
Motor Info	-	-	Marathon Electric
Electrical Power	208	-	460 / 3
RPM	1750	1750	1750
Motor Efficiency %	-	-	82.5%
Approx Age	3	3	7
ASHRAE Service Life	20	20	20
Remaining Life	17	17	13
Comments			

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

MAJOR EQUIPMENT LIST

Concord Engineering Group

Northern Highlands Regional High School

Pumps

Tag	P3-,P4	-	
Unit Type	Pipe mounted boiler loop	Domestic Hot Water Boiler Pump	
Qty	2	1	
Location	Science wing boiler room	Science wing boiler room	
Area Served	Science wing	Original Building	
Manufacturer	BG	BG	
Model #	-	-	
Serial #	-	-	
Horse Power	7.5	-	
Flow (Gpm)	348 GPM @ 40 FT HD	-	
Motor Info	Marathon Electric	-	
Electrical Power	460 / 3	208	
RPM	1750	1750	
Motor Efficiency %	84%	-	
Approx Age	7	7	
ASHRAE Service Life	20	20	
Remaining Life	13	13	
Comments			

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

MAJOR EQUIPMENT LIST

Concord Engineering Group

Northern Highlands Regional High School

Air Compressors

Tag	Air Compressor		
Unit Type	Duplex Air Compressor		
Qty	1		
Location	Boiler room		
Area Served	Pneumatic devices / original building		
Manufacturer	Champion		
Model #	R15SR		
Serial #	R15173363		
Tank Capacity (Gal)	100 (Est)		
Compressor Type	Reciprocating		
Number of Compressors	2		
Motor Horsepower	5		
Motor RPM	1760		
Motor Efficiency	87.5%		
Electric Power	208		
Approx Age	2		
ASHRAE Service Life	20		
Remaining Life	18		
Comments			

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

MAJOR EQUIPMENT LIST

Concord Engineering Group

Northern Highlands Regional High School

Domestic Water Heaters

Tag	HWH	HWH	
Unit Type	Split Hot Water Boiler and Tank	Hot Water Tank	
Qty	1	1	
Location	Original Boiler room	Science Wing Boiler room	
Area Served	Original Building	Science Wing	
Manufacturer	Lochinvar	Bradfort White	
Model #	Powerfin PFN1001PM-M9	D80T2503NA	
Serial #	I06H00190531	BG6425611	
Size (Gallons)	Split - 200	80	
Input Capacity (MBH/KW)	1000 MBH 4:1 Modulation	250 MBH	
Recovery (Gal/Hr)	1030	242.4	
Efficiency %	86%	81%	
Fuel	Natural Gas	Natural Gas	
Approx Age	2	7	
ASHRAE Service Life	25	12	
Remaining Life	23	5	
Comments			

Note:

"N/A" = Not Applicable.

"-" = Info Not Available

MAJOR EQUIPMENT LIST

Concord Engineering Group

Northern Highlands Regional High School

AC Units

Tag	RTU-1	RTU-2	RTU-3
Unit Type	Rooftop HV Unit	Rooftop HV Unit	Rooftop HV Unit
Qty	1	1	1
Location	Original Bldg Roof	Original Bldg Roof	Original Bldg Roof
Area Served	Senior Cafeteria	New Girls Locker Room	Room 220
Manufacturer	Trane	Trane	Trane
Model #	Climatechanger TSCA030	Climatechanger TSCA010	Climatechanger TSCA006
Serial #	K04K32434A	K04K32444A	K04K32453A
Flow (CFM)	15,000	4685	3200
Cooling Type	N/A	N/A	N/A
Cooling Capacity (Tons)	-	-	-
Cooling Efficiency (SEER/EER)	-	-	-
Heating Type	Natural Gas Furnace	Hot Water Coil	Natural Gas Furnace
Heating Input / Output (MBH)	875 / 700	-	-
Supply Fan Motor HP	15	5	3
Supply Fan Motor Efcy	91%	87.50%	-
Fuel	N/A	N/A	N/A
Approx Age	8	8	8
ASHRAE Service Life	15	15	15
Remaining Life	7	7	7
Comments	Min OA 8,900 CFM	Min OA 3,980 CFM	2 HP return fan Min OA 915 CFM

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

MAJOR EQUIPMENT LIST

Concord Engineering Group

Northern Highlands Regional High School

AC Units

Tag	CU - HV2	AC	ERV Units
Unit Type	Split HVAC Unit	Ductless Split	Energy Recovery Ventilator
Qty	1	1	2
Location	Original Bldg Roof	Original Bldg Roof	Original Bldg Roof
Area Served	Administrative Offices	Computer room	Auditorium
Manufacturer	Trane CU Buffalo AHU	Sanyo	Aaon
Model #	CU: RAUCC204 AHU: G-153	CL3012	RK-26-3-EQ-217
Serial #	CU: C05F05715 AHU: 64R-15746	0000323	98JKGR56
Flow (CFM)	6000 (Est)	-	10,000 (Est)
Cooling Type	DX	DX	DX
Cooling Capacity (Tons)	20	2.5	26
Cooling Efficiency (SEER/EER)	10.9 EER (CU only)	13 SEER (Est)	10 EER (Est)
Heating Type	Hot Water Coil	N/A	Gas fired furnace
Heating Input / Output (MBH)	-	N/A	540 / 432
Supply Fan Motor HP	5	-	2 x 5 HP
Supply Fan Motor Efcy	86%	-	81.50%
Fuel	N/A	-	Natural Gas
Approx Age	CU: 6 AHU: 30	10 (Est)	6
ASHRAE Service Life	15	15	15
Remaining Life	0	5	9
Comments	Unit controlled with pneumatic controller Small return fan	Refrigerant R22	Equipped with Total Energy (Enthalpy) Wheel

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

MAJOR EQUIPMENT LIST

Concord Engineering Group

Northern Highlands Regional High School

AC Units

Tag	AC	RTU	Split AC Unit
Unit Type	Ductless Split	Rooftop HVAC Unit	Condenser
Qty	1	2	1
Location	Original Bldg Roof	Original Bldg Roof	Original Bldg Roof
Area Served	Computer room	Library	Planatorium
Manufacturer	Sanyo	Aaon	Trane Odyssey
Model #	CL3632	RK-26-3-EO-212	TTA120A400EA
Serial #	0008291	98JKGR58	316309LAD
Flow (CFM)	-	10,000 (Est)	3000 (Est)
Cooling Type	DX	DX	DX
Cooling Capacity (Tons)	3	26	10
Cooling Efficiency (SEER/EER)	13 SEER (Est)	10 EER (Est)	10 EER (Est)
Heating Type	N/A	Gas fired furnace	N/A
Heating Input / Output (MBH)	N/A	540 / 432	-
Supply Fan Motor HP	-	2 x 5 HP	2 (Est)
Supply Fan Motor Efcy	-	81.50%	-
Fuel	-	Natural Gas	N/A
Approx Age	10 (Est)	6	9
ASHRAE Service Life	15	15	15
Remaining Life	5	9	6
Comments	Refrigerant R22	No energy recovery wheel	

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

MAJOR EQUIPMENT LIST

Concord Engineering Group

Northern Highlands Regional High School

AC Units

Tag	Unitary	Split AC Unit	HVAC-1
Unit Type	Window AC Units	Split HVAC System	Split HVAC System
Qty	50	1	1
Location	Classroom Windows	Original Bldg Roof	Original Bldg Roof
Area Served	Classrooms	TV Studio	Guidence Suite
Manufacturer	Panasonic, Friedrich	Liebert	Trane
Model #	-	-	-
Serial #	-	-	-
Flow (CFM)	-	-	-
Cooling Type	DX	DX	DX
Cooling Capacity (Tons)	2 (Ave)	5 (Est)	10 (Est)
Cooling Efficiency (SEER/EER)	9.0 EER (Ave)	9 EER (Est)	11 EER (Est)
Heating Type	N/A	N/A	Gas fired furnace
Heating Input / Output (MBH)	N/A	-	-
Supply Fan Motor HP	-	2 (Est)	3 (Est)
Supply Fan Motor Efcy	-	-	-
Fuel	N/A	N/A	N/A
Approx Age	5 (Ave)	5 (Est)	5 (Est)
ASHRAE Service Life	15	15	15
Remaining Life	10	10	10
Comments			AHU made by AAF

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

MAJOR EQUIPMENT LIST

Concord Engineering Group

Northern Highlands Regional High School

AC Units

Tag	MUA	Split AC Unit	RTU
Unit Type	Boiler Room Makeup Air Unit	Condenser	Rooftop HVAC Unit
Qty	1	2	1
Location	Original Bldg Roof	Original Bldg Roof	Science Wing Roof
Area Served	Boiler room	Cultural Arts	Science Wing Hallways
Manufacturer	Trane	Sanyo	Trane
Model #	GRAA30PDJF	SAP361C	SFHFC504P6
Serial #	F09G1294	33193	C04K08714
Flow (CFM)	3700 - 7000	1000 (Est)	10690
Cooling Type	N/A	DX	DX
Cooling Capacity (Tons)	N/A	3	50
Cooling Efficiency (SEER/EER)	N/A	13 EER (Est)	11 EER (Est)
Heating Type	Hot Water Coil	N/A	Hot Water Coil
Heating Input / Output (MBH)	300 / 240	-	850 / 697
Supply Fan Motor HP	5	-	7.5
Supply Fan Motor Efcy	Standard	-	91%
Fuel	N/A	N/A	N/A
Approx Age	3	10 (Est)	7
ASHRAE Service Life	15	15	15
Remaining Life	12	5	8
Comments			Min OA 7,710 CFM

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

MAJOR EQUIPMENT LIST

Concord Engineering Group

Northern Highlands Regional High School

AC Units

Tag	Mini Split AC	MUA 1-4	
Unit Type	AC Unit	Lab Hood Makeup Air Unit	
Qty	1	4	
Location	Science Wing Roof	Science Wing Roof	
Area Served	-	Science Wing Labs	
Manufacturer	Quiteside	Greenhack	
Model #	QSCC091	IGX-109-H12-DB	
Serial #	2472	04K22621	
Flow (CFM)	300	1900	
Cooling Type	DX	N/A	
Cooling Capacity (Tons)	0.75	N/A	
Cooling Efficiency (SEER/EER)	13 EER (Est)	N/A	
Heating Type	N/A	Built-in Gas Furnace	
Heating Input / Output (MBH)	-	300 / 240	
Supply Fan Motor HP	-	3/4	
Supply Fan Motor Efcy	-	Standard	
Fuel	N/A	N/A	
Approx Age	3 (Est)	7	
ASHRAE Service Life	15	15	
Remaining Life	12	8	
Comments			

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

MAJOR EQUIPMENT LIST

Concord Engineering Group

Northern Highlands Regional High School

Air Handling Units - AHUs

Tag	HVAC 2	HV-3	HV-4
Unit Type	Split HVAC System	Heating and Ventilation Unit	Heating and Ventilation Unit
Qty	1	1	1
Location	Backgym Penthouse	Backgym Penthouse	Backgym Penthouse
Area Served	Nurses Office	-	-
Manufacturer	TRANE CU Nesbitt AHU	AAF	TC Dryer Dynamics
Model #	TTA90A400FA Nesbitt 50892	I 9 LPHVEYA	TC2.RE1
Serial #	3335UR6AD Nesbitt AL6HF	502881-03	8544
Flow (CFM)	5000 (Est)	3000 (Est)	5700
Cooling Type	Split DX	N/A	N/A
Cooling Capacity (Tons)	7.5	N/A	N/A
Cooling Efficiency (SEER/EER)	11 EER (Est)	N/A	N/A
Heating Type	-	Hot Water Coil	Hot Water Coil
Heating Input (MBH)	-	-	-
Supply Fan Motor HP	1	3	5
Supply Fan Motor Efcy	80% (Est)	80% (Est)	87.50%
Fuel	N/A	N/A	N/A
Approx Age	CU - 9 AHU - 30	6	30
ASHRAE Service Life	15	15	15
Remaining Life	0	9	(15)
Comments		Small Axial Return Fan 3-way control valves	2 HP Return Fan 3-way control valves

MAJOR EQUIPMENT LIST

Concord Engineering Group

Northern Highlands Regional High School

Air Handling Units - AHUs

Tag	HV-5	HV-7	HV-4 (Other)
Unit Type	Heating and Ventilation Unit	Heating and Ventilation Unit	Heating and Ventilation Unit
Qty	1	1	1
Location	Backgym Penthouse	Backgym Penthouse	Auditorium Penthouse
Area Served	Backgym	Backgym	Auditorium
Manufacturer	Nesbitt AHU	AAF	Buffalo
Model #	50892	I 15 LPHVEYA	G-122
Serial #	HD25	502881 05	64R - 15748-S
Flow (CFM)	5000 (Est)	3000 (Est)	3000 (Est)
Cooling Type	N/A	N/A	N/A
Cooling Capacity (Tons)	N/A	N/A	N/A
Cooling Efficiency (SEER/EER)	N/A	N/A	N/A
Heating Type	Hot Water Coil	Hot Water Coil	Hot Water Coil
Heating Input (MBH)	-	-	-
Supply Fan Motor HP	5	3	3
Supply Fan Motor Efcy	87.50%	-	Very old
Fuel	N/A	N/A	N/A
Approx Age	30	6	30
ASHRAE Service Life	15	15	15
Remaining Life	(15)	9	(15)
Comments	3-way control valves	3-way control valves	Multiple old return fans 1, 1.5 and 2 HP

MAJOR EQUIPMENT LIST

Concord Engineering Group

Northern Highlands Regional High School

Air Handling Units - AHUs

Tag	HV		
Unit Type	Multiple supply and return fans		
Qty	1		
Location	Auditorium Penthouse		
Area Served	Library		
Manufacturer	Buffalo Fans		
Model #	-		
Serial #	-		
Flow (CFM)	9000		
Cooling Type	N/A		
Cooling Capacity (Tons)	N/A		
Cooling Efficiency (SEER/EER)	N/A		
Heating Type	Hot Water Coil		
Heating Input (MBH)	-		
Supply Fan Motor HP	5		
Supply Fan Motor Efcy	86.5% (Est)		
Fuel	N/A		
Approx Age	30		
ASHRAE Service Life	15		
Remaining Life	(15)		
Comments			

MAJOR EQUIPMENT LIST

Concord Engineering Group

Northern Highlands Regional High School

Unit Ventilators

Tag	UV	UV	UV
Unit Type	Horizontal Below Window	Horizontal Below Window	Horizontal Below Window
Qty	66	14	45
Location	Original Building Classrooms	Original Building Classrooms	Original Building Classrooms
Manufacturer	Nesbitt	Nesbitt	Nesbittaire
Model #	-	-	-
Serial #	-	-	-
Flow (CFM)	500 - 1500	1200 (Est)	800 - 1400
Cooling Capacity (Tons)	N/A	3 (Est)	2.5 - 4.5
Estimated Cooling Efficiency (EER)	N/A	9 (Est)	9 (Est)
Heating Type	Hot Water	Hot Water	Hot Water
Heating Input (MBH)	42 - 134	-	32 - 67
Approx Age	30	30	7
Ashrae Service Life	15	15	15
Remaining Life	-15	-15	8
Comments	Pneumatic Controls	DDC Controls	DDC Controls

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

Investment Grade Lighting Audit

CEG Job #: 9C11054
Project: Northern Highlands Regional HS LGEA
298 Hilldale Avenu
Allendale, NJ 07401
Bldg. Sq. Ft. 301,000

Northern Highland Regional HS

KWH COST: $0.161

ECM 1,3: Lighting Upgrade - General

EXISTING LIGHTING										PROPOSED LIGHTING									SAVINGS			
CEG Type	Fixture Location	Yearly Usage	No. Fixts	No. Lamps	Fixture Type	Fixt Watts	Total kW	kWh/Yr Fixtures	Yearly $ Cost	No. Fixts	No. Lamps	Retro-Unit Description	Watts Used	Total kW	kWh/Yr Fixtures	Yearly $ Cost	Unit Cost (INSTALLED)	Total Cost	kW Savings	kWh/Yr Savings	Yearly $ Savings	Yearly Simple Payback
242.211	Main Lobby	3000	19	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	2.07	6,213.0	$1,000.29	19	3	Remove 1 Lamp, Relamp - Sylvania FO28/841/SS/ECO, Provide 95% Specular Relector, No Ballast Change Required	75	1.43	4275	$688.28	$80.00	$1,520.00	0.65	1938	$312.02	4.87
242.211	Classroom 126/125	2600	16	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	1.74	4,534.4	$730.04	16	3	Remove 1 Lamp, Relamp - Sylvania FO28/841/SS/ECO, Provide 95% Specular Relector, No Ballast Change Required	75	1.20	3120	$502.32	$80.00	$1,280.00	0.54	1414.4	$227.72	5.62
242.211	Classroom 124	2600	8	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.87	2,267.2	$365.02	8	3	Remove 1 Lamp, Relamp - Sylvania FO28/841/SS/ECO, Provide 95% Specular	75	0.60	1560	$251.16	$80.00	$640.00	0.27	707.2	$113.86	5.62
613	Janitors Closet	1000	2	1	Industrial Fixture, 100w A19 Lamp	100	0.20	200.0	$32.20	2	1	(1) 26w CFL Lamp	26	0.05	52	$8.37	$20.00	$40.00	0.15	148	$23.83	1.68
242.211	Classroom 123	2600	8	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.87	2,267.2	$365.02	8	3	Remove 1 Lamp, Relamp - Sylvania FO28/841/SS/ECO, Provide 95% Specular	75	0.60	1560	$251.16	$80.00	$640.00	0.27	707.2	$113.86	5.62
242.211	Classroom 122	2600	8	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.87	2,267.2	$365.02	8	3	Remove 1 Lamp, Relamp - Sylvania FO28/841/SS/ECO, Provide 95% Specular	75	0.60	1560	$251.16	$80.00	$640.00	0.27	707.2	$113.86	5.62
242.211	Classroom 121	2600	8	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.87	2,267.2	$365.02	8	3	Remove 1 Lamp, Relamp - Sylvania FO28/841/SS/ECO, Provide 95% Specular	75	0.60	1560	$251.16	$80.00	$640.00	0.27	707.2	$113.86	5.62
242.211	Classroom 121	2600	8	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.87	2,267.2	$365.02	8	3	Remove 1 Lamp, Relamp - Sylvania FO28/841/SS/ECO, Provide 95% Specular	75	0.60	1560	$251.16	$80.00	$640.00	0.27	707.2	$113.86	5.62
242.211	Classroom 112	2600	8	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.87	2,267.2	$365.02	8	3	Remove 1 Lamp, Relamp - Sylvania FO28/841/SS/ECO, Provide 95% Specular	75	0.60	1560	$251.16	$80.00	$640.00	0.27	707.2	$113.86	5.62
242.211	World Language	2600	2	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.22	566.8	$91.25	2	3	Remove 1 Lamp, Relamp - Sylvania FO28/841/SS/ECO, Provide 95% Specular	75	0.15	390	$62.79	$80.00	$160.00	0.07	176.8	$28.46	5.62
242.211	Classroom 110	2600	8	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.87	2,267.2	$365.02	8	3	Remove 1 Lamp, Relamp - Sylvania FO28/841/SS/ECO, Provide 95% Specular	75	0.60	1560	$251.16	$80.00	$640.00	0.27	707.2	$113.86	5.62
242.211	World Language	2600	4	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.44	1,133.6	$182.51	4	3	Remove 1 Lamp, Relamp - Sylvania FO28/841/SS/ECO, Provide 95% Specular	75	0.30	780	$125.58	$80.00	$320.00	0.14	353.6	$56.93	5.62
222.21	Classroom 111/109	2600	12	2	2x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.74	1,934.4	$311.44	12	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.60	1560	$251.16	$14.00	$168.00	0.14	374.4	$60.28	2.79
242.211	Classroom 108	2600	8	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.87	2,267.2	$365.02	8	3	Remove 1 Lamp, Relamp - Sylvania FO28/841/SS/ECO, Provide 95% Specular	75	0.60	1560	$251.16	$80.00	$640.00	0.27	707.2	$113.86	5.62
242.211	Classroom 107	2600	6	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.65	1,700.4	$273.76	6	3	Remove 1 Lamp, Relamp - Sylvania FO28/841/SS/ECO, Provide 95% Specular	75	0.45	1170	$188.37	$80.00	$480.00	0.20	530.4	$85.39	5.62
242.211	Classroom 106	2600	8	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.87	2,267.2	$365.02	8	3	Remove 1 Lamp, Relamp - Sylvania FO28/841/SS/ECO, Provide 95% Specular	75	0.60	1560	$251.16	$80.00	$640.00	0.27	707.2	$113.86	5.62

Investment Grade Lighting Audit

ECM 1,3: Lighting Upgrade - General

EXISTING LIGHTING										PROPOSED LIGHTING									SAVINGS			
CEG Type	Fixture Location	Yearly Usage	No. Fixts	No. Lamps	Fixture Type	Fixt Watts	Total kW	kWh/Yr Fixtures	Yearly $ Cost	No. Fixts	No. Lamps	Retro-Unit Description	Watts Used	Total kW	kWh/Yr Fixtures	Yearly $ Cost	Unit Cost (INSTALLED)	Total Cost	kW Savings	kWh/Yr Savings	Yearly $ Savings	Yearly Simple Payback
242.211	Classroom 104	2600	8	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.87	2,267.2	$365.02	8	3	Remove 1 Lamp, Relamp - Sylvania FO28/841/SS/ECO, Provide 95% Specular	75	0.60	1560	$251.16	$80.00	$640.00	0.27	707.2	$113.86	5.62
242.211	Classroom 105	2600	8	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.87	2,267.2	$365.02	8	3	Remove 1 Lamp, Relamp - Sylvania FO28/841/SS/ECO, Provide 95% Specular	75	0.60	1560	$251.16	$80.00	$640.00	0.27	707.2	$113.86	5.62
242.211	Classroom 103	2600	8	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.87	2,267.2	$365.02	8	3	Remove 1 Lamp, Relamp - Sylvania FO28/841/SS/ECO, Provide 95% Specular	75	0.60	1560	$251.16	$80.00	$640.00	0.27	707.2	$113.86	5.62
242.211	Classroom 102	2600	8	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.87	2,267.2	$365.02	8	3	Remove 1 Lamp, Relamp - Sylvania FO28/841/SS/ECO, Provide 95% Specular	75	0.60	1560	$251.16	$80.00	$640.00	0.27	707.2	$113.86	5.62
242.211	Office	2600	3	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.33	850.2	$136.88	3	3	Remove 1 Lamp, Relamp - Sylvania FO28/841/SS/ECO, Provide 95% Specular	75	0.23	585	$94.19	$80.00	$240.00	0.10	265.2	$42.70	5.62
242.211	Classroom 101	2600	12	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	1.31	3,400.8	$547.53	12	3	Remove 1 Lamp, Relamp - Sylvania FO28/841/SS/ECO, Provide 95% Specular	75	0.90	2340	$376.74	$80.00	$960.00	0.41	1060.8	$170.79	5.62
242.211	Corridor Att - CL 126	3000	37	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	4.03	12,099.0	$1,947.94	37	3	Remove 1 Lamp, Relamp - Sylvania FO28/841/SS/ECO, Provide 95% Specular	75	2.78	8325	$1,340.33	$80.00	$2,960.00	1.26	3774	$607.61	4.87
34	Corridor Att - CL 126	3000	1	1	Recessed Down Light, 60w A19 Lamp	60	0.06	180.0	$28.98	1	1	Energy Star Rated, 13w CFL Lamp	13	0.01	39	$6.28	$10.00	$10.00	0.05	141	$22.70	0.44
227.21	Corridor Att - CL 126	3000	1	2	2x2, 2 Lamp, 32w 700 series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	65	0.07	195.0	$31.40	1	2	Sylvania Lamp FBO30/841XP/6//SS/ECO	49	0.05	147	$23.67	$24.00	$24.00	0.02	48	$7.73	3.11
222.21	Men's Room	2600	3	2	2x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.19	483.6	$77.86	3	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.15	390	$62.79	$14.00	$42.00	0.04	93.6	$15.07	2.79
242.211	HS Office	2600	5	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.55	1,417.0	$228.14	5	3	Remove 1 Lamp, Relamp - Sylvania FO28/841/SS/ECO, Provide 95% Specular	75	0.38	975	$156.98	$80.00	$400.00	0.17	442	$71.16	5.62
242.211	Student Records	2600	1	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.11	283.4	$45.63	1	3	Remove 1 Lamp, Relamp - Sylvania FO28/841/SS/ECO, Provide 95% Specular	75	0.08	195	$31.40	$80.00	$80.00	0.03	88.4	$14.23	5.62
242.211	Office #1	2600	1	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.11	283.4	$45.63	1	3	Remove 1 Lamp, Relamp - Sylvania FO28/841/SS/ECO, Provide 95% Specular	75	0.08	195	$31.40	$80.00	$80.00	0.03	88.4	$14.23	5.62
242.211	Office #2	2600	1	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.11	283.4	$45.63	1	3	Remove 1 Lamp, Relamp - Sylvania FO28/841/SS/ECO, Provide 95% Specular	75	0.08	195	$31.40	$80.00	$80.00	0.03	88.4	$14.23	5.62
242.211	Office #3	2600	1	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.11	283.4	$45.63	1	3	Remove 1 Lamp, Relamp - Sylvania FO28/841/SS/ECO, Provide 95% Specular	75	0.08	195	$31.40	$80.00	$80.00	0.03	88.4	$14.23	5.62
242.211	Office #4	2600	1	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.11	283.4	$45.63	1	3	Remove 1 Lamp, Relamp - Sylvania FO28/841/SS/ECO, Provide 95% Specular	75	0.08	195	$31.40	$80.00	$80.00	0.03	88.4	$14.23	5.62
227.21	Office #4	2600	2	2	2x2, 2 Lamp, 32w 700 series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	65	0.13	338.0	$54.42	2	2	Sylvania Lamp FBO30/841XP/6//SS/ECO	49	0.10	254.8	$41.02	$24.00	$48.00	0.03	83.2	$13.40	3.58
222.21	Student Records	2600	1	2	2x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.06	161.2	$25.95	1	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.05	130	$20.93	$14.00	$14.00	0.01	31.2	$5.02	2.79
227.21	Student Records	2600	1	2	2x2, 2 Lamp, 32w 700 series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	65	0.07	169.0	$27.21	1	2	Sylvania Lamp FBO30/841XP/6//SS/ECO	49	0.05	127.4	$20.51	$24.00	$24.00	0.02	41.6	$6.70	3.58

Investment Grade Lighting Audit

ECM 1,3: Lighting Upgrade - General

EXISTING LIGHTING										PROPOSED LIGHTING										SAVINGS			
CEG Type	Fixture Location	Yearly Usage	No. Fixts	No. Lamps	Fixture Type	Fixt Watts	Total kW	kWh/Yr Fixtures	Yearly $ Cost	No. Fixts	No. Lamps	Retro-Unit Description	Watts Used	Total kW	kWh/Yr Fixtures	Yearly $ Cost	Unit Cost (INSTALLED)	Total Cost	kW Savings	kWh/Yr Savings	Yearly $ Savings	Yearly Simple Payback
242.211	Office	2600	4	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.44	1,133.6	$182.51	4	3	Remove 1 Lamp, Relamp - Sylvania FO28/841/SS/ECO, Provide 95% Specular	75	0.30	780	$125.58	$80.00	$320.00	0.14	353.6	$56.93	5.62
242.211	Mr. M Koth	2600	2	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.22	566.8	$91.25	2	3	Remove 1 Lamp, Relamp - Sylvania FO28/841/SS/ECO, Provide 95% Specular	75	0.15	390	$62.79	$80.00	$160.00	0.07	176.8	$28.46	5.62
242.211	Superintendent Office	2600	4	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.44	1,133.6	$182.51	4	3	Remove 1 Lamp, Relamp - Sylvania FO28/841/SS/ECO, Provide 95% Specular	75	0.30	780	$125.58	$80.00	$320.00	0.14	353.6	$56.93	5.62
242.211	Keenan Office	2600	1	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.11	283.4	$45.63	1	3	Remove 1 Lamp, Relamp - Sylvania FO28/841/SS/ECO, Provide 95% Specular	75	0.08	195	$31.40	$80.00	$80.00	0.03	88.4	$14.23	5.62
242.211	BOE Conference Room	2600	2	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.22	566.8	$91.25	2	3	Remove 1 Lamp, Relamp - Sylvania FO28/841/SS/ECO, Provide 95% Specular	75	0.15	390	$62.79	$80.00	$160.00	0.07	176.8	$28.46	5.62
610	BOE Toilet Room	2600	4	2	1x1 Surface Mount, Prismatic Lens, (2) 60w A Lamp	120	0.48	1,248.0	$200.93	4	2	13w CFL Lamps	26	0.10	270.4	$43.53	$25.00	$100.00	0.38	977.6	$157.39	0.64
227.21	Superintendent Office	2600	4	2	2x2, 2 Lamp, 32w 700 series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	65	0.26	676.0	$108.84	4	2	Sylvania Lamp FBO30/841XP/6//SS/ECO	49	0.20	509.6	$82.05	$24.00	$96.00	0.06	166.4	$26.79	3.58
242.211	Office	2600	1	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.11	283.4	$45.63	1	3	Remove 1 Lamp, Relamp - Sylvania FO28/841/SS/ECO, Provide 95% Specular	75	0.08	195	$31.40	$80.00	$80.00	0.03	88.4	$14.23	5.62
242.211	Business Office	2600	6	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.65	1,700.4	$273.76	6	3	Remove 1 Lamp, Relamp - Sylvania FO28/841/SS/ECO, Provide 95% Specular	75	0.45	1170	$188.37	$80.00	$480.00	0.20	530.4	$85.39	5.62
242.211	Business Office	2600	2	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.22	566.8	$91.25	2	3	Remove 1 Lamp, Relamp - Sylvania FO28/841/SS/ECO, Provide 95% Specular	75	0.15	390	$62.79	$80.00	$160.00	0.07	176.8	$28.46	5.62
242.211	Corridor Business Office - Superintendent	3000	9	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.98	2,943.0	$473.82	9	3	Remove 1 Lamp, Relamp - Sylvania FO28/841/SS/ECO, Provide 95% Specular	75	0.68	2025	$326.03	$80.00	$720.00	0.31	918	$147.80	4.87
242.211	Library Upper	2600	30	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	3.27	8,502.0	$1,368.82	30	3	Remove 1 Lamp, Relamp - Sylvania FO28/841/SS/ECO, Provide 95% Specular	75	2.25	5850	$941.85	$80.00	$2,400.00	1.02	2652	$426.97	5.62
242.211		2600	15	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	1.64	4,251.0	$684.41	15	3	Remove 1 Lamp, Relamp - Sylvania FO28/841/SS/ECO, Provide 95% Specular	75	1.13	2925	$470.93	$80.00	$1,200.00	0.51	1326	$213.49	5.62
242.211	Library Lower	2600	19	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	2.07	5,384.6	$866.92	19	3	Remove 1 Lamp, Relamp - Sylvania FO28/841/SS/ECO, Provide 95% Specular	75	1.43	3705	$596.51	$80.00	$1,520.00	0.65	1679.6	$270.42	5.62
242.211	Library Lower	2600	16	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	1.74	4,534.4	$730.04	16	3	Remove 1 Lamp, Relamp - Sylvania FO28/841/SS/ECO, Provide 95% Specular	75	1.20	3120	$502.32	$80.00	$1,280.00	0.54	1414.4	$227.72	5.62
242.211	Office #1	2600	1	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.11	283.4	$45.63	1	3	Remove 1 Lamp, Relamp - Sylvania FO28/841/SS/ECO, Provide 95% Specular	75	0.08	195	$31.40	$80.00	$80.00	0.03	88.4	$14.23	5.62
242.211	Office #2	2600	2	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.22	566.8	$91.25	2	3	Remove 1 Lamp, Relamp - Sylvania FO28/841/SS/ECO, Provide 95% Specular	75	0.15	390	$62.79	$80.00	$160.00	0.07	176.8	$28.46	5.62
242.211	Women's Room	2600	3	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.33	850.2	$136.88	3	3	Remove 1 Lamp, Relamp - Sylvania FO28/841/SS/ECO, Provide 95% Specular	75	0.23	585	$94.19	$80.00	$240.00	0.10	265.2	$42.70	5.62
200	B&G	2600	12	2	1x2, 2 Lamp, 17w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	34	0.41	1,060.8	$170.79	12	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00

Investment Grade Lighting Audit

ECM 1,3: Lighting Upgrade - General

EXISTING LIGHTING										PROPOSED LIGHTING									SAVINGS			
CEG Type	Fixture Location	Yearly Usage	No. Fixts	No. Lamps	Fixture Type	Fixt Watts	Total kW	kWh/Yr Fixtures	Yearly $ Cost	No. Fixts	No. Lamps	Retro-Unit Description	Watts Used	Total kW	kWh/Yr Fixtures	Yearly $ Cost	Unit Cost (INSTALLED)	Total Cost	kW Savings	kWh/Yr Savings	Yearly $ Savings	Yearly Simple Payback
221.33	B&G Storage	1000	24	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., Direct/ Indirect	58	1.39	1,392.0	$224.11	24	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	1.20	1200	$193.20	$14.00	$336.00	0.19	192	$30.91	10.87
242.211	Classroom 113	2600	8	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.87	2,267.2	$365.02	8	3	Remove 1 Lamp, Relamp - Sylvania FO28/841/SS/ECO, Provide 95% Specular	75	0.60	1560	$251.16	$80.00	$640.00	0.27	707.2	$113.86	5.62
242.211	Classroom 115	2600	8	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.87	2,267.2	$365.02	8	3	Remove 1 Lamp, Relamp - Sylvania FO28/841/SS/ECO, Provide 95% Specular	75	0.60	1560	$251.16	$80.00	$640.00	0.27	707.2	$113.86	5.62
242.211	Classroom 117	2600	8	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.87	2,267.2	$365.02	8	3	Remove 1 Lamp, Relamp - Sylvania FO28/841/SS/ECO, Provide 95% Specular	75	0.60	1560	$251.16	$80.00	$640.00	0.27	707.2	$113.86	5.62
242.211	Classroom 119	2600	8	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.87	2,267.2	$365.02	8	3	Remove 1 Lamp, Relamp - Sylvania FO28/841/SS/ECO, Provide 95% Specular	75	0.60	1560	$251.16	$80.00	$640.00	0.27	707.2	$113.86	5.62
34	Janitors Closet	1000	2	1	Recessed Down Light, 60w A19 Lamp	60	0.12	120.0	$19.32	2	1	Energy Star Rated, 13w CFL Lamp	13	0.03	26	$4.19	$10.00	$20.00	0.09	94	$15.13	1.32
242.211	Classroom 120	2600	10	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	1.09	2,834.0	$456.27	10	3	Remove 1 Lamp, Relamp - Sylvania FO28/841/SS/ECO, Provide 95% Specular	75	0.75	1950	$313.95	$80.00	$800.00	0.34	884	$142.32	5.62
242.211	Men's Room	2600	2	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.22	566.8	$91.25	2	3	Remove 1 Lamp, Relamp - Sylvania FO28/841/SS/ECO, Provide 95% Specular	75	0.15	390	$62.79	$80.00	$160.00	0.07	176.8	$28.46	5.62
121.14	Display Case	3000	3	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Surface Mnt., No Lens	78	0.23	702.0	$113.02	3	2	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	50	0.15	450	$72.45	$80.00	$240.00	0.08	252	$40.57	5.92
242.211	Women's Room	2600	2	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.22	566.8	$91.25	2	3	Remove 1 Lamp, Relamp - Sylvania FO28/841/SS/ECO, Provide 95% Specular	75	0.15	390	$62.79	$80.00	$160.00	0.07	176.8	$28.46	5.62
613	Mechanical Room	2600	1	1	Industrial Fixture, 100w A19 Lamp	100	0.10	260.0	$41.86	1	1	(1) 26w CFL Lamp	26	0.03	67.6	$10.88	$20.00	$20.00	0.07	192.4	$30.98	0.65
264.21	Guidence Office	2600	14	6	4x4, 6 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic	172	2.41	6,260.8	$1,007.99	14	6	Relamp - Sylvania Lamp FO28/841/SS/ECO	148	2.07	5387.2	$867.34	$42.00	$588.00	0.34	873.6	$140.65	4.18
264.21	Office #1	2600	1	6	4x4, 6 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic	172	0.17	447.2	$72.00	1	6	Relamp - Sylvania Lamp FO28/841/SS/ECO	148	0.15	384.8	$61.95	$42.00	$42.00	0.02	62.4	$10.05	4.18
264.21	Conference Room	2600	2	6	4x4, 6 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic	172	0.34	894.4	$144.00	2	6	Relamp - Sylvania Lamp FO28/841/SS/ECO	148	0.30	769.6	$123.91	$42.00	$84.00	0.05	124.8	$20.09	4.18
264.21	Office #1	2600	1	6	4x4, 6 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic	172	0.17	447.2	$72.00	1	6	Relamp - Sylvania Lamp FO28/841/SS/ECO	148	0.15	384.8	$61.95	$42.00	$42.00	0.02	62.4	$10.05	4.18
264.21	Office #2	2600	1	6	4x4, 6 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic	172	0.17	447.2	$72.00	1	6	Relamp - Sylvania Lamp FO28/841/SS/ECO	148	0.15	384.8	$61.95	$42.00	$42.00	0.02	62.4	$10.05	4.18
264.21	Office #3	2600	1	6	4x4, 6 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic	172	0.17	447.2	$72.00	1	6	Relamp - Sylvania Lamp FO28/841/SS/ECO	148	0.15	384.8	$61.95	$42.00	$42.00	0.02	62.4	$10.05	4.18
264.21	Office #4	2600	1	6	4x4, 6 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic	172	0.17	447.2	$72.00	1	6	Relamp - Sylvania Lamp FO28/841/SS/ECO	148	0.15	384.8	$61.95	$42.00	$42.00	0.02	62.4	$10.05	4.18
264.21	Office #5	2600	1	6	4x4, 6 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic	172	0.17	447.2	$72.00	1	6	Relamp - Sylvania Lamp FO28/841/SS/ECO	148	0.15	384.8	$61.95	$42.00	$42.00	0.02	62.4	$10.05	4.18

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ECM 1,3: Lighting Upgrade - General

EXISTING LIGHTING										PROPOSED LIGHTING										SAVINGS			
CEG Type	Fixture Location	Yearly Usage	No. Fixts	No. Lamps	Fixture Type	Fixt Watts	Total kW	kWh/Yr Fixtures	Yearly $ Cost	No. Fixts	No. Lamps	Retro-Unit Description	Watts Used	Total kW	kWh/Yr Fixtures	Yearly $ Cost	Unit Cost (INSTALLED)	Total Cost	kW Savings	kWh/Yr Savings	Yearly $ Savings	Yearly Simple Payback
264.21	Office #6	2600	1	6	4x4, 6 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic	172	0.17	447.2	$72.00	1	6	Relamp - Sylvania Lamp FO28/841/SS/ECO	148	0.15	384.8	$61.95	$42.00	$42.00	0.02	62.4	$10.05	4.18
221.34	Main Boiler Room	2600	16	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., No Lens	58	0.93	2,412.8	$388.46	16	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.80	2080	$334.88	$14.00	$224.00	0.13	332.8	$53.58	4.18
613	Sub Basement	2000	7	1	Industrial Fixture, 100w A19 Lamp	100	0.70	1,400.0	$225.40	7	1	(1) 26w CFL Lamp	26	0.18	364	$58.60	$20.00	$140.00	0.52	1036	$166.80	0.84
121.34	Sub Basement	2000	1	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Pendant Mnt., No Lens	78	0.08	156.0	$25.12	1	2	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	50	0.05	100	$16.10	$80.00	$80.00	0.03	56	$9.02	8.87
242.211	Faculty Dinning	2600	17	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	1.85	4,817.8	$775.67	17	3	Remove 1 Lamp, Relamp - Sylvania FO28/841/SS/ECO, Provide 95% Specular	75	1.28	3315	$533.72	$80.00	$1,360.00	0.58	1502.8	$241.95	5.62
242.211	Classroom 132	26000	8	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.87	22,672.0	$3,650.19	8	3	Remove 1 Lamp, Relamp - Sylvania FO28/841/SS/ECO, Provide 95% Specular	75	0.60	15600	$2,511.60	$80.00	$640.00	0.27	7072	$1,138.59	0.56
111.11	Men's Room	2600	1	1	1x4, 1-Lamp, 34w T12, Mag. Ballast, Surface Mnt., Prismatic Lens	48	0.05	124.8	$20.09	1	1	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	25	0.03	65	$10.47	$80.00	$80.00	0.02	59.8	$9.63	8.31
111.11	Women's Room	2600	1	1	1x4, 1-Lamp, 34w T12, Mag. Ballast, Surface Mnt., Prismatic Lens	48	0.05	124.8	$20.09	1	1	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	25	0.03	65	$10.47	$80.00	$80.00	0.02	59.8	$9.63	8.31
221.21	Classroom 138	2600	20	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	1.24	3,224.0	$519.06	20	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	1.00	2600	$418.60	$14.00	$280.00	0.24	624	$100.46	2.79
221.21	Classroom 138 Closet	2600	1	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.06	161.2	$25.95	1	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.05	130	$20.93	$14.00	$14.00	0.01	31.2	$5.02	2.79
221.21	Classroom 137	2600	18	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	1.12	2,901.6	$467.16	18	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.90	2340	$376.74	$14.00	$252.00	0.22	561.6	$90.42	2.79
242.211	Girl's Room	2600	2	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.22	566.8	$91.25	2	3	Remove 1 Lamp, Relamp - Sylvania FO28/841/SS/ECO, Provide 95% Specular	75	0.15	390	$62.79	$80.00	$160.00	0.07	176.8	$28.46	5.62
242.211	Boy's Room	2600	2	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.22	566.8	$91.25	2	3	Remove 1 Lamp, Relamp - Sylvania FO28/841/SS/ECO, Provide 95% Specular	75	0.15	390	$62.79	$80.00	$160.00	0.07	176.8	$28.46	5.62
613	Janitors Closet	1000	2	1	Industrial Fixture, 100w A19 Lamp	100	0.20	200.0	$32.20	2	1	(1) 26w CFL Lamp	26	0.05	52	$8.37	$20.00	$40.00	0.15	148	$23.83	1.68
222.23	Classroom 136	2600	10	2	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Direct/ Indirect	58	0.58	1,508.0	$242.79	10	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.50	1300	$209.30	$14.00	$140.00	0.08	208	$33.49	4.18
222.23	Classroom 134	2600	20	2	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Direct/ Indirect	58	1.16	3,016.0	$485.58	20	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	1.00	2600	$418.60	$14.00	$280.00	0.16	416	$66.98	4.18
222.23	Classroom 135	2600	39	2	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Direct/ Indirect	58	2.26	5,881.2	$946.87	39	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	1.95	5070	$816.27	$14.00	$546.00	0.31	811.2	$130.60	4.18
264.21	Office #7	2600	1	6	4x4, 6 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic	172	0.17	447.2	$72.00	1	6	Relamp - Sylvania Lamp FO28/841/SS/ECO	148	0.15	384.8	$61.95	$42.00	$42.00	0.02	62.4	$10.05	4.18
264.21	Office #8	2600	1	6	4x4, 6 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic	172	0.17	447.2	$72.00	1	6	Relamp - Sylvania Lamp FO28/841/SS/ECO	148	0.15	384.8	$61.95	$42.00	$42.00	0.02	62.4	$10.05	4.18

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EXISTING LIGHTING										PROPOSED LIGHTING										SAVINGS			
CEG Type	Fixture Location	Yearly Usage	No. Fixts	No. Lamps	Fixture Type	Fixt Watts	Total kW	kWh/Yr Fixtures	Yearly $ Cost	No. Fixts	No. Lamps	Retro-Unit Description	Watts Used	Total kW	kWh/Yr Fixtures	Yearly $ Cost	Unit Cost (INSTALLED)	Total Cost	kW Savings	kWh/Yr Savings	Yearly $ Savings	Yearly Simple Payback
264.21	Office #9	2600	1	6	4x4, 6 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic	172	0.17	447.2	$72.00	1	6	Relamp - Sylvania Lamp FO28/841/SS/ECO	148	0.15	384.8	$61.95	$42.00	$42.00	0.02	62.4	$10.05	4.18
264.21	Office #10	2600	1	6	4x4, 6 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic	172	0.17	447.2	$72.00	1	6	Relamp - Sylvania Lamp FO28/841/SS/ECO	148	0.15	384.8	$61.95	$42.00	$42.00	0.02	62.4	$10.05	4.18
264.21	Office #11	26000	1	6	4x4, 6 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic	172	0.17	4,472.0	$719.99	1	6	Relamp - Sylvania Lamp FO28/841/SS/ECO	148	0.15	3848	$619.53	$42.00	$42.00	0.02	624	$100.46	0.42
264.21	Office #12	2600	1	6	4x4, 6 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic	172	0.17	447.2	$72.00	1	6	Relamp - Sylvania Lamp FO28/841/SS/ECO	148	0.15	384.8	$61.95	$42.00	$42.00	0.02	62.4	$10.05	4.18
264.21	Conference Room	2600	2	6	4x4, 6 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic	172	0.34	894.4	$144.00	2	6	Relamp - Sylvania Lamp FO28/841/SS/ECO	148	0.30	769.6	$123.91	$42.00	$84.00	0.05	124.8	$20.09	4.18
29	Café #1	2600	10	8	Pendent Mtd Light, (8) 26w PL Lamp	208	2.08	5,408.0	$870.69	10	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
264.21	Senior Café	2600	25	6	4x4, 6 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic	172	4.30	11,180.0	$1,799.98	25	6	Relamp - Sylvania Lamp FO28/841/SS/ECO	148	3.70	9620	$1,548.82	$42.00	$1,050.00	0.60	1560	$251.16	4.18
242.211	Senior Café	2600	1	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.11	283.4	$45.63	1	3	Remove 1 Lamp, Relamp - Sylvania FO28/841/SS/ECO, Provide 95% Specular	75	0.08	195	$31.40	$80.00	$80.00	0.03	88.4	$14.23	5.62
613	Senior Café Closet	1000	2	1	Industrial Fixture, 100w A19 Lamp	100	0.20	200.0	$32.20	2	1	(1) 26w CFL Lamp	26	0.05	52	$8.37	$20.00	$40.00	0.15	148	$23.83	1.68
241.11	Main Café	2600	80	4	1x4, 4 Lamp, 32w T8, Elect. Ballast, Surface Mnt., No Lens	104	8.32	21,632.0	$3,482.75	80	3	Remove 1 Lamp, Relamp - Sylvania FO28/841/SS/ECO, Provide 95% Specular	0	0.00	0	$0.00	$80.00	$6,400.00	0.00	0	$0.00	0.00
241.11		2600	20	4	1x4, 4 Lamp, 32w T8, Elect. Ballast, Surface Mnt., No Lens	104	2.08	5,408.0	$870.69	20	3	Remove 1 Lamp, Relamp - Sylvania FO28/841/SS/ECO, Provide 95% Specular	0	0.00	0	$0.00	$80.00	$1,600.00	0.00	0	$0.00	0.00
242.211	Kitchen	2600	27	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	2.94	7,651.8	$1,231.94	27	3	Remove 1 Lamp, Relamp - Sylvania FO28/841/SS/ECO, Provide 95% Specular	75	2.03	5265	$847.67	$80.00	$2,160.00	0.92	2386.8	$384.27	5.62
242.211	Back Kitchen	2600	10	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	1.09	2,834.0	$456.27	10	3	Remove 1 Lamp, Relamp - Sylvania FO28/841/SS/ECO, Provide 95% Specular	75	0.75	1950	$313.95	$80.00	$800.00	0.34	884	$142.32	5.62
242.211	Kitchen Office	2600	1	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.11	283.4	$45.63	1	3	Remove 1 Lamp, Relamp - Sylvania FO28/841/SS/ECO, Provide 95% Specular	75	0.08	195	$31.40	$80.00	$80.00	0.03	88.4	$14.23	5.62
221.21	Kitchen Storage	1000	1	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.06	62.0	$9.98	1	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.05	50	$8.05	$14.00	$14.00	0.01	12	$1.93	7.25
221.21	Kitchen Office #2	2600	1	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.06	161.2	$25.95	1	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.05	130	$20.93	$14.00	$14.00	0.01	31.2	$5.02	2.79
221.21	Kitchen Office #3	2600	3	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.19	483.6	$77.86	3	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.15	390	$62.79	$14.00	$42.00	0.04	93.6	$15.07	2.79
221.21	Kitchen Toilet Room	2600	1	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.06	161.2	$25.95	1	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.05	130	$20.93	$14.00	$14.00	0.01	31.2	$5.02	2.79
237.21	Boy's Room	2600	7	3	2x2, 3 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens	92	0.64	1,674.4	$269.58	7	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00

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EXISTING LIGHTING										PROPOSED LIGHTING									SAVINGS			
CEG Type	Fixture Location	Yearly Usage	No. Fixts	No. Lamps	Fixture Type	Fixt Watts	Total kW	kWh/Yr Fixtures	Yearly $ Cost	No. Fixts	No. Lamps	Retro-Unit Description	Watts Used	Total kW	kWh/Yr Fixtures	Yearly $ Cost	Unit Cost (INSTALLED)	Total Cost	kW Savings	kWh/Yr Savings	Yearly $ Savings	Yearly Simple Payback
221.31	Boy's Room Closet	1000	1	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens	62	0.06	62.0	$9.98	1	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.05	50	$8.05	$14.00	$14.00	0.01	12	$1.93	7.25
237.21	Girl's Room	2600	7	3	2x2, 3 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens	92	0.64	1,674.4	$269.58	7	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.31	Girl's Room Closet	1000	1	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens	62	0.06	62.0	$9.98	1	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.05	50	$8.05	$14.00	$14.00	0.01	12	$1.93	7.25
222.21	Classroom 301	2600	16	2	2x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.99	2,579.2	$415.25	16	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.80	2080	$334.88	$14.00	$224.00	0.19	499.2	$80.37	2.79
222.21	Prep. Room	2600	4	2	2x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.25	644.8	$103.81	4	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.20	520	$83.72	$14.00	$56.00	0.05	124.8	$20.09	2.79
222.21	Classroom 303	2600	16	2	2x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.99	2,579.2	$415.25	16	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.80	2080	$334.88	$14.00	$224.00	0.19	499.2	$80.37	2.79
222.21	Classroom 305	2600	12	2	2x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.74	1,934.4	$311.44	12	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.60	1560	$251.16	$14.00	$168.00	0.14	374.4	$60.28	2.79
222.21	Classroom 307	2600	16	2	2x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.99	2,579.2	$415.25	16	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.80	2080	$334.88	$14.00	$224.00	0.19	499.2	$80.37	2.79
222.21	Prep. Room	2600	4	2	2x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.25	644.8	$103.81	4	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.20	520	$83.72	$14.00	$56.00	0.05	124.8	$20.09	2.79
222.21	Classroom 309	2600	16	2	2x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.99	2,579.2	$415.25	16	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.80	2080	$334.88	$14.00	$224.00	0.19	499.2	$80.37	2.79
221.31	Electrical Room	1000	5	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens	62	0.31	310.0	$49.91	5	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.25	250	$40.25	$14.00	$70.00	0.06	60	$9.66	7.25
221.31	Mechanical Room	2600	7	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens	62	0.43	1,128.4	$181.67	7	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.35	910	$146.51	$14.00	$98.00	0.08	218.4	$35.16	2.79
221.31	Mechanical Room Closet	2600	2	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens	62	0.12	322.4	$51.91	2	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.10	260	$41.86	$14.00	$28.00	0.02	62.4	$10.05	2.79
221.31	Janitors Closet	1000	1	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens	62	0.06	62.0	$9.98	1	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.05	50	$8.05	$14.00	$14.00	0.01	12	$1.93	7.25
221.11	Elevator Machine Room	2000	1	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	0.06	124.0	$19.96	1	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.05	100	$16.10	$14.00	$14.00	0.01	24	$3.86	3.62
222.21	Storage	1000	11	2	2x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.68	682.0	$109.80	11	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.55	550	$88.55	$14.00	$154.00	0.13	132	$21.25	7.25
222.21	Classroom 308	2600	16	2	2x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.99	2,579.2	$415.25	16	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.80	2080	$334.88	$14.00	$224.00	0.19	499.2	$80.37	2.79
222.21	Prep. Room	2600	4	2	2x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.25	644.8	$103.81	4	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.20	520	$83.72	$14.00	$56.00	0.05	124.8	$20.09	2.79
222.21	Classroom 306	2600	16	2	2x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.99	2,579.2	$415.25	16	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.80	2080	$334.88	$14.00	$224.00	0.19	499.2	$80.37	2.79

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EXISTING LIGHTING										PROPOSED LIGHTING									SAVINGS			
CEG Type	Fixture Location	Yearly Usage	No. Fixts	No. Lamps	Fixture Type	Fixt Watts	Total kW	kWh/Yr Fixtures	Yearly $ Cost	No. Fixts	No. Lamps	Retro-Unit Description	Watts Used	Total kW	kWh/Yr Fixtures	Yearly $ Cost	Unit Cost (INSTALLED)	Total Cost	kW Savings	kWh/Yr Savings	Yearly $ Savings	Yearly Simple Payback
222.21	Classroom 304	2600	16	2	2x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.99	2,579.2	$415.25	16	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.80	2080	$334.88	$14.00	$224.00	0.19	499.2	$80.37	2.79
222.21	Prep. Room	2600	4	2	2x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.25	644.8	$103.81	4	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.20	520	$83.72	$14.00	$56.00	0.05	124.8	$20.09	2.79
222.21	Classroom 302	2600	8	2	2x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.50	1,289.6	$207.63	8	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.40	1040	$167.44	$14.00	$112.00	0.10	249.6	$40.19	2.79
222.21	Classroom 300	2600	12	2	2x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.74	1,934.4	$311.44	12	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.60	1560	$251.16	$14.00	$168.00	0.14	374.4	$60.28	2.79
284.25	Science Corridor	3000	9	8	4x4, 8 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Direct/Indirect	218	1.96	5,886.0	$947.65	9	8	Relamp - Sylvania Lamp FO28/841/SS/ECO	200	1.80	5400	$869.40	$56.00	$504.00	0.16	486	$78.25	6.44
28	Science Corridor	3000	25	1	Recessed Mtd, 6"x2' (1) 40w PL Lamp Wall Washer	40	1.00	3,000.0	$483.00	25	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
242.211	Science Corridor	3000	7	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.76	2,289.0	$368.53	7	3	Remove 1 Lamp, Relamp - Sylvania FO28/841/SS/ECO, Provide 95% Specular	75	0.53	1575	$253.58	$80.00	$560.00	0.24	714	$114.95	4.87
30	Science Corridor	3000	46	2	Recessed Down Light, (2) 26w PL Lamp	54	2.48	7,452.0	$1,199.77	46	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
242.211	Corridor 135	3000	6	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.65	1,962.0	$315.88	6	3	Remove 1 Lamp, Relamp - Sylvania FO28/841/SS/ECO, Provide 95% Specular	75	0.45	1350	$217.35	$80.00	$480.00	0.20	612	$98.53	4.87
264.21	Wood Shop Corridor	3000	12	6	4x4, 6 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic	172	2.06	6,192.0	$996.91	12	6	Relamp - Sylvania Lamp FO28/841/SS/ECO	148	1.78	5328	$857.81	$42.00	$504.00	0.29	864	$139.10	3.62
242.211	Café Corridor	3000	5	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.55	1,635.0	$263.24	5	3	Remove 1 Lamp, Relamp - Sylvania FO28/841/SS/ECO, Provide 95% Specular	75	0.38	1125	$181.13	$80.00	$400.00	0.17	510	$82.11	4.87
242.211	Main Gym Corridor	3000	20	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	2.18	6,540.0	$1,052.94	20	3	Remove 1 Lamp, Relamp - Sylvania FO28/841/SS/ECO, Provide 95% Specular	75	1.50	4500	$724.50	$80.00	$1,600.00	0.68	2040	$328.44	4.87
264.21	Main Gym Corridor	3000	1	6	4x4, 6 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic	172	0.17	516.0	$83.08	1	6	Relamp - Sylvania Lamp FO28/841/SS/ECO	148	0.15	444	$71.48	$42.00	$42.00	0.02	72	$11.59	3.62
242.211	Main Lobby	3000	16	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	1.74	5,232.0	$842.35	16	3	Remove 1 Lamp, Relamp - Sylvania FO28/841/SS/ECO, Provide 95% Specular	75	1.20	3600	$579.60	$80.00	$1,280.00	0.54	1632	$262.75	4.87
242.211	Senior Court Corridor	3000	3	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.33	981.0	$157.94	3	3	Remove 1 Lamp, Relamp - Sylvania FO28/841/SS/ECO, Provide 95% Specular	75	0.23	675	$108.68	$80.00	$240.00	0.10	306	$49.27	4.87
264.21	Guidence Corridor	2600	13	6	4x4, 6 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic	172	2.24	5,813.6	$935.99	13	6	Relamp - Sylvania Lamp FO28/841/SS/ECO	148	1.92	5002.4	$805.39	$42.00	$546.00	0.31	811.2	$130.60	4.18
242.211	Guidence Corridor	2600	13	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	1.42	3,684.2	$593.16	13	3	Remove 1 Lamp, Relamp - Sylvania FO28/841/SS/ECO, Provide 95% Specular	75	0.98	2535	$408.14	$80.00	$1,040.00	0.44	1149.2	$185.02	5.62
30	Girl's Locker	2600	4	2	Recessed Down Light, (2) 26w PL Lamp	54	0.22	561.6	$90.42	4	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
242.211	Girl's Locker	2600	13	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	1.42	3,684.2	$593.16	13	3	Remove 1 Lamp, Relamp - Sylvania FO28/841/SS/ECO, Provide 95% Specular	75	0.98	2535	$408.14	$80.00	$1,040.00	0.44	1149.2	$185.02	5.62

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ECM 1,3: Lighting Upgrade - General

EXISTING LIGHTING										PROPOSED LIGHTING									SAVINGS			
CEG Type	Fixture Location	Yearly Usage	No. Fixts	No. Lamps	Fixture Type	Fixt Watts	Total kW	kWh/Yr Fixtures	Yearly $ Cost	No. Fixts	No. Lamps	Retro-Unit Description	Watts Used	Total kW	kWh/Yr Fixtures	Yearly $ Cost	Unit Cost (INSTALLED)	Total Cost	kW Savings	kWh/Yr Savings	Yearly $ Savings	Yearly Simple Payback
242.211	Girl's Locker Office	2600	2	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.22	566.8	$91.25	2	3	Remove 1 Lamp, Relamp - Sylvania FO28/841/SS/ECO, Provide 95% Specular	75	0.15	390	$62.79	$80.00	$160.00	0.07	176.8	$28.46	5.62
30	Girl's Locker Shower	2600	9	2	Recessed Down Light, (2) 26w PL Lamp	54	0.49	1,263.6	$203.44	9	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
201	Girl's Locker Toilet Room	2600	3	2	1x2, 2 Lamp, 17w T8, Elect. Ballast, Recessed Mnt., Indirect	34	0.10	265.2	$42.70	3	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
30	Girl's Locker Exit	2600	2	2	Recessed Down Light, (2) 26w PL Lamp	54	0.11	280.8	$45.21	2	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
201	Girls Locker Toilet #2	2600	3	2	1x2, 2 Lamp, 17w T8, Elect. Ballast, Recessed Mnt., Indirect	34	0.10	265.2	$42.70	3	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
242.211	Classroom 234	2600	16	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	1.74	4,534.4	$730.04	16	3	Remove 1 Lamp, Relamp - Sylvania FO28/841/SS/ECO, Provide 95% Specular	75	1.20	3120	$502.32	$80.00	$1,280.00	0.54	1414.4	$227.72	5.62
612	Custodial Closet	1200	2	1	Pendant Mnt., 100w A19 Lamp	100	0.20	240.0	$38.64	2	1	(1) 26w CFL Lamp	26	0.05	62.4	$10.05	$20.00	$40.00	0.15	177.6	$28.59	1.40
242.211	Classroom 235	2600	8	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.87	2,267.2	$365.02	8	3	Remove 1 Lamp, Relamp - Sylvania FO28/841/SS/ECO, Provide 95% Specular	75	0.60	1560	$251.16	$80.00	$640.00	0.27	707.2	$113.86	5.62
242.211	Classroom 236	2600	8	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.87	2,267.2	$365.02	8	3	Remove 1 Lamp, Relamp - Sylvania FO28/841/SS/ECO, Provide 95% Specular	75	0.60	1560	$251.16	$80.00	$640.00	0.27	707.2	$113.86	5.62
242.211	Classroom 237	2600	8	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.87	2,267.2	$365.02	8	3	Remove 1 Lamp, Relamp - Sylvania FO28/841/SS/ECO, Provide 95% Specular	75	0.60	1560	$251.16	$80.00	$640.00	0.27	707.2	$113.86	5.62
242.211	Classroom 238	2600	8	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.87	2,267.2	$365.02	8	3	Remove 1 Lamp, Relamp - Sylvania FO28/841/SS/ECO, Provide 95% Specular	75	0.60	1560	$251.16	$80.00	$640.00	0.27	707.2	$113.86	5.62
242.211	Classroom 239	2600	8	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.87	2,267.2	$365.02	8	3	Remove 1 Lamp, Relamp - Sylvania FO28/841/SS/ECO, Provide 95% Specular	75	0.60	1560	$251.16	$80.00	$640.00	0.27	707.2	$113.86	5.62
242.211	Classroom 241	2600	8	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.87	2,267.2	$365.02	8	3	Remove 1 Lamp, Relamp - Sylvania FO28/841/SS/ECO, Provide 95% Specular	75	0.60	1560	$251.16	$80.00	$640.00	0.27	707.2	$113.86	5.62
242.211	Classroom 245	2600	8	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.87	2,267.2	$365.02	8	3	Remove 1 Lamp, Relamp - Sylvania FO28/841/SS/ECO, Provide 95% Specular	75	0.60	1560	$251.16	$80.00	$640.00	0.27	707.2	$113.86	5.62
242.211	240A Office	2600	15	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	1.64	4,251.0	$684.41	15	3	Remove 1 Lamp, Relamp - Sylvania FO28/841/SS/ECO, Provide 95% Specular	75	1.13	2925	$470.93	$80.00	$1,200.00	0.51	1326	$213.49	5.62
242.211	Transition Office	2600	4	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.44	1,133.6	$182.51	4	3	Remove 1 Lamp, Relamp - Sylvania FO28/841/SS/ECO, Provide 95% Specular	75	0.30	780	$125.58	$80.00	$320.00	0.14	353.6	$56.93	5.62
242.211	Classroom 242	2600	11	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	1.20	3,117.4	$501.90	11	3	Remove 1 Lamp, Relamp - Sylvania FO28/841/SS/ECO, Provide 95% Specular	75	0.83	2145	$345.35	$80.00	$880.00	0.37	972.4	$156.56	5.62
242.211	Classroom 243	2600	11	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	1.20	3,117.4	$501.90	11	3	Remove 1 Lamp, Relamp - Sylvania FO28/841/SS/ECO, Provide 95% Specular	75	0.83	2145	$345.35	$80.00	$880.00	0.37	972.4	$156.56	5.62
242.211	Classroom 244	2600	15	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	1.64	4,251.0	$684.41	15	3	Remove 1 Lamp, Relamp - Sylvania FO28/841/SS/ECO, Provide 95% Specular	75	1.13	2925	$470.93	$80.00	$1,200.00	0.51	1326	$213.49	5.62

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ECM 1,3: Lighting Upgrade - General

EXISTING LIGHTING										PROPOSED LIGHTING									SAVINGS			
CEG Type	Fixture Location	Yearly Usage	No. Fixts	No. Lamps	Fixture Type	Fixt Watts	Total kW	kWh/Yr Fixtures	Yearly $ Cost	No. Fixts	No. Lamps	Retro-Unit Description	Watts Used	Total kW	kWh/Yr Fixtures	Yearly $ Cost	Unit Cost (INSTALLED)	Total Cost	kW Savings	kWh/Yr Savings	Yearly $ Savings	Yearly Simple Payback
222.23	Classroom 316	2600	12	2	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Direct/ Indirect	58	0.70	1,809.6	$291.35	12	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.60	1560	$251.16	$14.00	$168.00	0.10	249.6	$40.19	4.18
222.23	316 Prep	2600	4	2	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Direct/ Indirect	58	0.23	603.2	$97.12	4	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.20	520	$83.72	$14.00	$56.00	0.03	83.2	$13.40	4.18
222.23	Classroom 312	2600	16	2	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Direct/ Indirect	58	0.93	2,412.8	$388.46	16	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.80	2080	$334.88	$14.00	$224.00	0.13	332.8	$53.58	4.18
222.23	Prep 312	2600	4	2	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Direct/ Indirect	58	0.23	603.2	$97.12	4	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.20	520	$83.72	$14.00	$56.00	0.03	83.2	$13.40	4.18
222.23	Classroom 310	2600	16	2	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Direct/ Indirect	58	0.93	2,412.8	$388.46	16	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.80	2080	$334.88	$14.00	$224.00	0.13	332.8	$53.58	4.18
222.23	Classroom 311	2600	16	2	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Direct/ Indirect	58	0.93	2,412.8	$388.46	16	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.80	2080	$334.88	$14.00	$224.00	0.13	332.8	$53.58	4.18
222.23	311 Prep	2600	4	2	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Direct/ Indirect	58	0.23	603.2	$97.12	4	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.20	520	$83.72	$14.00	$56.00	0.03	83.2	$13.40	4.18
222.23	Classroom 313	2600	16	2	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Direct/ Indirect	58	0.93	2,412.8	$388.46	16	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.80	2080	$334.88	$14.00	$224.00	0.13	332.8	$53.58	4.18
222.23	Classroom 314	2600	12	2	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Direct/ Indirect	58	0.70	1,809.6	$291.35	12	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.60	1560	$251.16	$14.00	$168.00	0.10	249.6	$40.19	4.18
222.23	Classroom 315	2600	16	2	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Direct/ Indirect	58	0.93	2,412.8	$388.46	16	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.80	2080	$334.88	$14.00	$224.00	0.13	332.8	$53.58	4.18
222.23	315 Prep	2600	4	2	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Direct/ Indirect	58	0.23	603.2	$97.12	4	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.20	520	$83.72	$14.00	$56.00	0.03	83.2	$13.40	4.18
222.23	Classroom 317	2600	16	2	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Direct/ Indirect	58	0.93	2,412.8	$388.46	16	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.80	2080	$334.88	$14.00	$224.00	0.13	332.8	$53.58	4.18
222.23	Classroom 318	2600	16	2	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Direct/ Indirect	58	0.93	2,412.8	$388.46	16	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.80	2080	$334.88	$14.00	$224.00	0.13	332.8	$53.58	4.18
563	Corridor 300	3000	34	2	Recessed Down Light, (2)26w Quad CFL Lamp	52	1.77	5,304.0	$853.94	34	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
28		3000	24	1	Recessed Mtd, 6"x2' (1) 40w PL Lamp Wall Washer	40	0.96	2,880.0	$463.68	24	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
284.25		3000	10	8	4x4, 8 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Direct/Indirect	218	2.18	6,540.0	$1,052.94	10	8	Relamp - Sylvania Lamp FO28/841/SS/ECO	200	2.00	6000	$966.00	$56.00	$560.00	0.18	540	$86.94	6.44
221.31	Custodial Closet	1200	1	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens	62	0.06	74.4	$11.98	1	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.05	60	$9.66	$14.00	$14.00	0.01	14.4	$2.32	6.04
227.21	Men's Room	2600	7	2	2x2, 2 Lamp, 32w 700 series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	65	0.46	1,183.0	$190.46	7	2	Sylvania Lamp FBO30/841XP/6//SS/ECO	49	0.34	891.8	$143.58	$24.00	$168.00	0.11	291.2	$46.88	3.58
227.21	Women's Room	2600	7	2	2x2, 2 Lamp, 32w 700 series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	65	0.46	1,183.0	$190.46	7	2	Sylvania Lamp FBO30/841XP/6//SS/ECO	49	0.34	891.8	$143.58	$24.00	$168.00	0.11	291.2	$46.88	3.58

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EXISTING LIGHTING										PROPOSED LIGHTING										SAVINGS			
CEG Type	Fixture Location	Yearly Usage	No. Fixts	No. Lamps	Fixture Type	Fixt Watts	Total kW	kWh/Yr Fixtures	Yearly $ Cost	No. Fixts	No. Lamps	Retro-Unit Description	Watts Used	Total kW	kWh/Yr Fixtures	Yearly $ Cost	Unit Cost (INSTALLED)	Total Cost	kW Savings	kWh/Yr Savings	Yearly $ Savings	Yearly Simple Payback
614	Auditorium	2600	64	1	300w A Lamp, Recessed Down Light	300	19.20	49,920.0	$8,037.12	64	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.15	Girl's Locker Room	2600	18	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Acrylic Lens	58	1.04	2,714.4	$437.02	18	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.90	2340	$376.74	$14.00	$252.00	0.14	374.4	$60.28	4.18
610	Showers	1200	2	2	1x1 Surface Mount, Prismatic Lens, (2) 60w A Lamp	120	0.24	288.0	$46.37	2	2	13w CFL Lamps	26	0.05	62.4	$10.05	$25.00	$50.00	0.19	225.6	$36.32	1.38
221.15	Locker Room Office	2600	2	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Acrylic Lens	58	0.12	301.6	$48.56	2	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.10	260	$41.86	$14.00	$28.00	0.02	41.6	$6.70	4.18
221.15	Restroom	2600	1	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Acrylic Lens	58	0.06	150.8	$24.28	1	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.05	130	$20.93	$14.00	$14.00	0.01	20.8	$3.35	4.18
221.15	Restroom	2600	2	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Acrylic Lens	58	0.12	301.6	$48.56	2	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.10	260	$41.86	$14.00	$28.00	0.02	41.6	$6.70	4.18
232.21	Men's Locker Room Hall	2600	6	3	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.52	1,341.6	$216.00	6	3	Relamp - Sylvania Lamp FO28/841/SS/ECO	72	0.43	1123.2	$180.84	$21.00	$126.00	0.08	218.4	$35.16	3.58
242.11	Girl's Locker Room	2600	16	4	2x4, 4 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	109	1.74	4,534.4	$730.04	16	3	Remove 1 Lamp, Relamp - Sylvania FO28/841/SS/ECO, Provide 95% Specular	75	1.20	3120	$502.32	$80.00	$1,280.00	0.54	1414.4	$227.72	5.62
111.11		2600	5	1	1x4, 1-Lamp, 34w T12, Mag. Ballast, Surface Mnt., Prismatic Lens	48	0.24	624.0	$100.46	5	1	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	25	0.13	325	$52.33	$80.00	$400.00	0.12	299	$48.14	8.31
242.211	Classroom 131	2600	9	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.98	2,550.6	$410.65	9	3	Remove 1 Lamp, Relamp - Sylvania FO28/841/SS/ECO, Provide 95% Specular	75	0.68	1755	$282.56	$80.00	$720.00	0.31	795.6	$128.09	5.62
221.11	131 Office	2600	2	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	0.12	322.4	$51.91	2	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.10	260	$41.86	$14.00	$28.00	0.02	62.4	$10.05	2.79
242.211	131 Office	2600	4	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.44	1,133.6	$182.51	4	3	Remove 1 Lamp, Relamp - Sylvania FO28/841/SS/ECO, Provide 95% Specular	75	0.30	780	$125.58	$80.00	$320.00	0.14	353.6	$56.93	5.62
621	Practice Rooms (2)	1200	2	1	Recessed Light, 65w BR30	65	0.13	156.0	$25.12	2	1	Energy Star Rated, Dimmable 18w CFL Lamp	18	0.04	43.2	$6.96	$30.00	$60.00	0.09	112.8	$18.16	3.30
227.27	Classroom 130	2600	14	2	2x2, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Indirect	58	0.81	2,111.2	$339.90	14	2	Sylvania Lamp FBO30/841XP/6//SS/ECO	49	0.69	1783.6	$287.16	$24.00	$336.00	0.13	327.6	$52.74	6.37
221.11	Practice Rooms (2)	1200	4	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	0.25	297.6	$47.91	4	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.20	240	$38.64	$14.00	$56.00	0.05	57.6	$9.27	6.04
612	Custodial Closet	1200	1	1	Pendant Mnt., 100w A19 Lamp	100	0.10	120.0	$19.32	1	1	(1) 26w CFL Lamp	26	0.03	31.2	$5.02	$20.00	$20.00	0.07	88.8	$14.30	1.40
242.211	Classroom 246	2600	8	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.87	2,267.2	$365.02	8	3	Remove 1 Lamp, Relamp - Sylvania FO28/841/SS/ECO, Provide 95% Specular	75	0.60	1560	$251.16	$80.00	$640.00	0.27	707.2	$113.86	5.62
242.211	Classroom 247	2600	8	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.87	2,267.2	$365.02	8	3	Remove 1 Lamp, Relamp - Sylvania FO28/841/SS/ECO, Provide 95% Specular	75	0.60	1560	$251.16	$80.00	$640.00	0.27	707.2	$113.86	5.62
242.211	Classroom 248	2600	8	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.87	2,267.2	$365.02	8	3	Remove 1 Lamp, Relamp - Sylvania FO28/841/SS/ECO, Provide 95% Specular	75	0.60	1560	$251.16	$80.00	$640.00	0.27	707.2	$113.86	5.62

Investment Grade Lighting Audit

ECM 1,3: Lighting Upgrade - General

EXISTING LIGHTING										PROPOSED LIGHTING									SAVINGS			
CEG Type	Fixture Location	Yearly Usage	No. Fixts	No. Lamps	Fixture Type	Fixt Watts	Total kW	kWh/Yr Fixtures	Yearly $ Cost	No. Fixts	No. Lamps	Retro-Unit Description	Watts Used	Total kW	kWh/Yr Fixtures	Yearly $ Cost	Unit Cost (INSTALLED)	Total Cost	kW Savings	kWh/Yr Savings	Yearly $ Savings	Yearly Simple Payback
242.211	Classroom 249	2600	8	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.87	2,267.2	$365.02	8	3	Remove 1 Lamp, Relamp - Sylvania FO28/841/SS/ECO, Provide 95% Specular	75	0.60	1560	$251.16	$80.00	$640.00	0.27	707.2	$113.86	5.62
242.211	Classroom 250	2600	8	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.87	2,267.2	$365.02	8	3	Remove 1 Lamp, Relamp - Sylvania FO28/841/SS/ECO, Provide 95% Specular	75	0.60	1560	$251.16	$80.00	$640.00	0.27	707.2	$113.86	5.62
242.211	Classroom 214	2600	8	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.87	2,267.2	$365.02	8	3	Remove 1 Lamp, Relamp - Sylvania FO28/841/SS/ECO, Provide 95% Specular	75	0.60	1560	$251.16	$80.00	$640.00	0.27	707.2	$113.86	5.62
242.211	Classroom 215	2600	8	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.87	2,267.2	$365.02	8	3	Remove 1 Lamp, Relamp - Sylvania FO28/841/SS/ECO, Provide 95% Specular	75	0.60	1560	$251.16	$80.00	$640.00	0.27	707.2	$113.86	5.62
242.211	Classroom 216	2600	8	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.87	2,267.2	$365.02	8	3	Remove 1 Lamp, Relamp - Sylvania FO28/841/SS/ECO, Provide 95% Specular	75	0.60	1560	$251.16	$80.00	$640.00	0.27	707.2	$113.86	5.62
242.211	Classroom 212	2600	8	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.87	2,267.2	$365.02	8	3	Remove 1 Lamp, Relamp - Sylvania FO28/841/SS/ECO, Provide 95% Specular	75	0.60	1560	$251.16	$80.00	$640.00	0.27	707.2	$113.86	5.62
242.211	Classroom 213	2600	9	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.98	2,550.6	$410.65	9	3	Remove 1 Lamp, Relamp - Sylvania FO28/841/SS/ECO, Provide 95% Specular	75	0.68	1755	$282.56	$80.00	$720.00	0.31	795.6	$128.09	5.62
242.211	Classroom 217	2600	9	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.98	2,550.6	$410.65	9	3	Remove 1 Lamp, Relamp - Sylvania FO28/841/SS/ECO, Provide 95% Specular	75	0.68	1755	$282.56	$80.00	$720.00	0.31	795.6	$128.09	5.62
242.211	Classroom 218	2600	9	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.98	2,550.6	$410.65	9	3	Remove 1 Lamp, Relamp - Sylvania FO28/841/SS/ECO, Provide 95% Specular	75	0.68	1755	$282.56	$80.00	$720.00	0.31	795.6	$128.09	5.62
242.211	Office	2600	3	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.33	850.2	$136.88	3	3	Remove 1 Lamp, Relamp - Sylvania FO28/841/SS/ECO, Provide 95% Specular	75	0.23	585	$94.19	$80.00	$240.00	0.10	265.2	$42.70	5.62
621	Planetarium	2600	10	1	Recessed Light, 65w BR30	65	0.65	1,690.0	$272.09	10	1	Energy Star Rated, Dimmable 18w CFL Lamp	18	0.18	468	$75.35	$30.00	$300.00	0.47	1222	$196.74	1.52
222.23	English Office	2600	8	2	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Direct/ Indirect	58	0.46	1,206.4	$194.23	8	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.40	1040	$167.44	$14.00	$112.00	0.06	166.4	$26.79	4.18
242.211	Classroom 210	2600	9	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.98	2,550.6	$410.65	9	3	Remove 1 Lamp, Relamp - Sylvania FO28/841/SS/ECO, Provide 95% Specular	75	0.68	1755	$282.56	$80.00	$720.00	0.31	795.6	$128.09	5.62
222.23	Classroom 210A	2600	6	2	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Direct/ Indirect	58	0.35	904.8	$145.67	6	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.30	780	$125.58	$14.00	$84.00	0.05	124.8	$20.09	4.18
242.211	Classroom 207	2600	8	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.87	2,267.2	$365.02	8	3	Remove 1 Lamp, Relamp - Sylvania FO28/841/SS/ECO, Provide 95% Specular	75	0.60	1560	$251.16	$80.00	$640.00	0.27	707.2	$113.86	5.62
242.211	Classroom 208	2600	8	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.87	2,267.2	$365.02	8	3	Remove 1 Lamp, Relamp - Sylvania FO28/841/SS/ECO, Provide 95% Specular	75	0.60	1560	$251.16	$80.00	$640.00	0.27	707.2	$113.86	5.62
242.211	Classroom 209	2600	9	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.98	2,550.6	$410.65	9	3	Remove 1 Lamp, Relamp - Sylvania FO28/841/SS/ECO, Provide 95% Specular	75	0.68	1755	$282.56	$80.00	$720.00	0.31	795.6	$128.09	5.62
242.211	Boy's Room	2600	3	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.33	850.2	$136.88	3	3	Remove 1 Lamp, Relamp - Sylvania FO28/841/SS/ECO, Provide 95% Specular	75	0.23	585	$94.19	$80.00	$240.00	0.10	265.2	$42.70	5.62
242.211	Study Room	2600	2	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.22	566.8	$91.25	2	3	Remove 1 Lamp, Relamp - Sylvania FO28/841/SS/ECO, Provide 95% Specular	75	0.15	390	$62.79	$80.00	$160.00	0.07	176.8	$28.46	5.62

Investment Grade Lighting Audit

ECM 1,3: Lighting Upgrade - General

EXISTING LIGHTING										PROPOSED LIGHTING									SAVINGS			
CEG Type	Fixture Location	Yearly Usage	No. Fixts	No. Lamps	Fixture Type	Fixt Watts	Total kW	kWh/Yr Fixtures	Yearly $ Cost	No. Fixts	No. Lamps	Retro-Unit Description	Watts Used	Total kW	kWh/Yr Fixtures	Yearly $ Cost	Unit Cost (INSTALLED)	Total Cost	kW Savings	kWh/Yr Savings	Yearly $ Savings	Yearly Simple Payback
242.211	Classroom 205	2600	8	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.87	2,267.2	$365.02	8	3	Remove 1 Lamp, Relamp - Sylvania FO28/841/SS/ECO, Provide 95% Specular	75	0.60	1560	$251.16	$80.00	$640.00	0.27	707.2	$113.86	5.62
242.211	Classroom 206	2600	8	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.87	2,267.2	$365.02	8	3	Remove 1 Lamp, Relamp - Sylvania FO28/841/SS/ECO, Provide 95% Specular	75	0.60	1560	$251.16	$80.00	$640.00	0.27	707.2	$113.86	5.62
242.211	Room 204	2600	5	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.55	1,417.0	$228.14	5	3	Remove 1 Lamp, Relamp - Sylvania FO28/841/SS/ECO, Provide 95% Specular	75	0.38	975	$156.98	$80.00	$400.00	0.17	442	$71.16	5.62
242.211	Classroom 202	2600	12	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	1.31	3,400.8	$547.53	12	3	Remove 1 Lamp, Relamp - Sylvania FO28/841/SS/ECO, Provide 95% Specular	75	0.90	2340	$376.74	$80.00	$960.00	0.41	1060.8	$170.79	5.62
222.23		2600	10	2	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Direct/ Indirect	58	0.58	1,508.0	$242.79	10	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.50	1300	$209.30	$14.00	$140.00	0.08	208	$33.49	4.18
242.211	Classroom 203	2600	12	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	1.31	3,400.8	$547.53	12	3	Remove 1 Lamp, Relamp - Sylvania FO28/841/SS/ECO, Provide 95% Specular	75	0.90	2340	$376.74	$80.00	$960.00	0.41	1060.8	$170.79	5.62
222.23		2600	10	2	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Direct/ Indirect	58	0.58	1,508.0	$242.79	10	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.50	1300	$209.30	$14.00	$140.00	0.08	208	$33.49	4.18
242.211	Classroom 219	2600	12	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	1.31	3,400.8	$547.53	12	3	Remove 1 Lamp, Relamp - Sylvania FO28/841/SS/ECO, Provide 95% Specular	75	0.90	2340	$376.74	$80.00	$960.00	0.41	1060.8	$170.79	5.62
242.211	Classroom 220	2600	16	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	1.74	4,534.4	$730.04	16	3	Remove 1 Lamp, Relamp - Sylvania FO28/841/SS/ECO, Provide 95% Specular	75	1.20	3120	$502.32	$80.00	$1,280.00	0.54	1414.4	$227.72	5.62
242.211	Classroom 221	2600	12	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	1.31	3,400.8	$547.53	12	3	Remove 1 Lamp, Relamp - Sylvania FO28/841/SS/ECO, Provide 95% Specular	75	0.90	2340	$376.74	$80.00	$960.00	0.41	1060.8	$170.79	5.62
242.211	Yearbook	2600	4	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.44	1,133.6	$182.51	4	3	Remove 1 Lamp, Relamp - Sylvania FO28/841/SS/ECO, Provide 95% Specular	75	0.30	780	$125.58	$80.00	$320.00	0.14	353.6	$56.93	5.62
242.211	Classroom 222	2600	11	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	1.20	3,117.4	$501.90	11	3	Remove 1 Lamp, Relamp - Sylvania FO28/841/SS/ECO, Provide 95% Specular	75	0.83	2145	$345.35	$80.00	$880.00	0.37	972.4	$156.56	5.62
242.211	Sp Services	2600	4	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.44	1,133.6	$182.51	4	3	Remove 1 Lamp, Relamp - Sylvania FO28/841/SS/ECO, Provide 95% Specular	75	0.30	780	$125.58	$80.00	$320.00	0.14	353.6	$56.93	5.62
242.211	Classroom 223	2600	12	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	1.31	3,400.8	$547.53	12	3	Remove 1 Lamp, Relamp - Sylvania FO28/841/SS/ECO, Provide 95% Specular	75	0.90	2340	$376.74	$80.00	$960.00	0.41	1060.8	$170.79	5.62
612	223 Closet	800	1	1	Pendant Mnt., 100w A19 Lamp	100	0.10	80.0	$12.88	1	1	(1) 26w CFL Lamp	26	0.03	20.8	$3.35	$20.00	$20.00	0.07	59.2	$9.53	2.10
242.211	Men's Room	2600	2	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.22	566.8	$91.25	2	3	Remove 1 Lamp, Relamp - Sylvania FO28/841/SS/ECO, Provide 95% Specular	75	0.15	390	$62.79	$80.00	$160.00	0.07	176.8	$28.46	5.62
242.211	Women's Room	2600	2	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.22	566.8	$91.25	2	3	Remove 1 Lamp, Relamp - Sylvania FO28/841/SS/ECO, Provide 95% Specular	75	0.15	390	$62.79	$80.00	$160.00	0.07	176.8	$28.46	5.62
221.31	Classroom 224	2600	16	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens	62	0.99	2,579.2	$415.25	16	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.80	2080	$334.88	$14.00	$224.00	0.19	499.2	$80.37	2.79
242.211	Classroom 225	2600	12	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	1.31	3,400.8	$547.53	12	3	Remove 1 Lamp, Relamp - Sylvania FO28/841/SS/ECO, Provide 95% Specular	75	0.90	2340	$376.74	$80.00	$960.00	0.41	1060.8	$170.79	5.62

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ECM 1,3: Lighting Upgrade - General

EXISTING LIGHTING										PROPOSED LIGHTING										SAVINGS			
CEG Type	Fixture Location	Yearly Usage	No. Fixts	No. Lamps	Fixture Type	Fixt Watts	Total kW	kWh/Yr Fixtures	Yearly $ Cost	No. Fixts	No. Lamps	Retro-Unit Description	Watts Used	Total kW	kWh/Yr Fixtures	Yearly $ Cost	Unit Cost (INSTALLED)	Total Cost	kW Savings	kWh/Yr Savings	Yearly $ Savings	Yearly Simple Payback
242.211	Classroom 226	2600	6	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.65	1,700.4	$273.76	6	3	Remove 1 Lamp, Relamp - Sylvania FO28/841/SS/ECO, Provide 95% Specular	75	0.45	1170	$188.37	$80.00	$480.00	0.20	530.4	$85.39	5.62
242.211	Classroom 227	2600	6	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.65	1,700.4	$273.76	6	3	Remove 1 Lamp, Relamp - Sylvania FO28/841/SS/ECO, Provide 95% Specular	75	0.45	1170	$188.37	$80.00	$480.00	0.20	530.4	$85.39	5.62
242.211	227A Office	2600	6	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.65	1,700.4	$273.76	6	3	Remove 1 Lamp, Relamp - Sylvania FO28/841/SS/ECO, Provide 95% Specular	75	0.45	1170	$188.37	$80.00	$480.00	0.20	530.4	$85.39	5.62
242.211	Classroom 228	2600	9	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.98	2,550.6	$410.65	9	3	Remove 1 Lamp, Relamp - Sylvania FO28/841/SS/ECO, Provide 95% Specular	75	0.68	1755	$282.56	$80.00	$720.00	0.31	795.6	$128.09	5.62
242.211	Classroom 227B	2600	6	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.65	1,700.4	$273.76	6	3	Remove 1 Lamp, Relamp - Sylvania FO28/841/SS/ECO, Provide 95% Specular	75	0.45	1170	$188.37	$80.00	$480.00	0.20	530.4	$85.39	5.62
242.211	229A Office	2600	6	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.65	1,700.4	$273.76	6	3	Remove 1 Lamp, Relamp - Sylvania FO28/841/SS/ECO, Provide 95% Specular	75	0.45	1170	$188.37	$80.00	$480.00	0.20	530.4	$85.39	5.62
222.23	Copy Room	2600	4	2	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Direct/ Indirect	58	0.23	603.2	$97.12	4	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.20	520	$83.72	$14.00	$56.00	0.03	83.2	$13.40	4.18
242.211	Classroom 229	2600	9	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.98	2,550.6	$410.65	9	3	Remove 1 Lamp, Relamp - Sylvania FO28/841/SS/ECO, Provide 95% Specular	75	0.68	1755	$282.56	$80.00	$720.00	0.31	795.6	$128.09	5.62
242.211	Classroom 230	2600	8	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.87	2,267.2	$365.02	8	3	Remove 1 Lamp, Relamp - Sylvania FO28/841/SS/ECO, Provide 95% Specular	75	0.60	1560	$251.16	$80.00	$640.00	0.27	707.2	$113.86	5.62
222.23	Classroom 231	2600	8	2	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Direct/ Indirect	58	0.46	1,206.4	$194.23	8	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.40	1040	$167.44	$14.00	$112.00	0.06	166.4	$26.79	4.18
242.211	Classroom 232	2600	8	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.87	2,267.2	$365.02	8	3	Remove 1 Lamp, Relamp - Sylvania FO28/841/SS/ECO, Provide 95% Specular	75	0.60	1560	$251.16	$80.00	$640.00	0.27	707.2	$113.86	5.62
242.211	Women's Room	2600	2	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.22	566.8	$91.25	2	3	Remove 1 Lamp, Relamp - Sylvania FO28/841/SS/ECO, Provide 95% Specular	75	0.15	390	$62.79	$80.00	$160.00	0.07	176.8	$28.46	5.62
222.23	Classroom 233	2600	10	2	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Direct/ Indirect	58	0.58	1,508.0	$242.79	10	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.50	1300	$209.30	$14.00	$140.00	0.08	208	$33.49	4.18
242.211	Men's Room	2600	2	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.22	566.8	$91.25	2	3	Remove 1 Lamp, Relamp - Sylvania FO28/841/SS/ECO, Provide 95% Specular	75	0.15	390	$62.79	$80.00	$160.00	0.07	176.8	$28.46	5.62
222.23	Conf. Room 140	2600	20	2	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Direct/ Indirect	58	1.16	3,016.0	$485.58	20	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	1.00	2600	$418.60	$14.00	$280.00	0.16	416	$66.98	4.18
164.25	Nurse Reception Area	2600	1	6	4x4, 6-Lamp, 34w T12, Mag. Ballast, Recessed Mnt., White Lens	234	0.23	608.4	$97.95	1	6	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	150	0.15	390	$62.79	$120.00	$120.00	0.08	218.4	$35.16	3.41
242.11		2600	1	4	2x4, 4 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	109	0.11	283.4	$45.63	1	3	Remove 1 Lamp, Relamp - Sylvania FO28/841/SS/ECO, Provide 95% Specular	75	0.08	195	$31.40	$80.00	$80.00	0.03	88.4	$14.23	5.62
264.21	Exam Room	2600	1	6	4x4, 6 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic	172	0.17	447.2	$72.00	1	6	Relamp - Sylvania Lamp FO28/841/SS/ECO	148	0.15	384.8	$61.95	$42.00	$42.00	0.02	62.4	$10.05	4.18
264.21	Exam Room	2600	1	6	4x4, 6 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic	172	0.17	447.2	$72.00	1	6	Relamp - Sylvania Lamp FO28/841/SS/ECO	148	0.15	384.8	$61.95	$42.00	$42.00	0.02	62.4	$10.05	4.18

Investment Grade Lighting Audit

ECM 1,3: Lighting Upgrade - General

EXISTING LIGHTING										PROPOSED LIGHTING									SAVINGS			
CEG Type	Fixture Location	Yearly Usage	No. Fixts	No. Lamps	Fixture Type	Fixt Watts	Total kW	kWh/Yr Fixtures	Yearly $ Cost	No. Fixts	No. Lamps	Retro-Unit Description	Watts Used	Total kW	kWh/Yr Fixtures	Yearly $ Cost	Unit Cost (INSTALLED)	Total Cost	kW Savings	kWh/Yr Savings	Yearly $ Savings	Yearly Simple Payback
610	Nurse's hall	2600	3	2	1x1 Surface Mount, Prismatic Lens, (2) 60w A Lamp	120	0.36	936.0	$150.70	3	2	13w CFL Lamps	26	0.08	202.8	$32.65	$25.00	$75.00	0.28	733.2	$118.05	0.64
264.21	Nurse's Office	2600	2	6	4x4, 6 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic	172	0.34	894.4	$144.00	2	6	Relamp - Sylvania Lamp FO28/841/SS/ECO	148	0.30	769.6	$123.91	$42.00	$84.00	0.05	124.8	$20.09	4.18
612	Nurse's Closet	1200	1	1	Pendant Mnt., 100w A19 Lamp	100	0.10	120.0	$19.32	1	1	(1) 26w CFL Lamp	26	0.03	31.2	$5.02	$20.00	$20.00	0.07	88.8	$14.30	1.40
30	Gym Lobby	2600	7	2	Recessed Down Light, (2) 26w PL Lamp	54	0.38	982.8	$158.23	7	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
227.21		2600	9	2	2x2, 2 Lamp, 32w 700 series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	65	0.59	1,521.0	$244.88	9	2	Sylvania Lamp FBO30/841XP/6//SS/ECO	49	0.44	1146.6	$184.60	$24.00	$216.00	0.14	374.4	$60.28	3.58
362.14	Back Gym	1980	21	6	2x4, 6 Lamp, 54w T5HO Fixture w/Occupancy Sensor	354	7.43	14,719.3	$2,369.81	21	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
612	Back Gym Closet	800	2	1	Pendant Mnt., 100w A19 Lamp	100	0.20	160.0	$25.76	2	1	(1) 26w CFL Lamp	26	0.05	41.6	$6.70	$20.00	$40.00	0.15	118.4	$19.06	2.10
121.34	Penthouse	440	4	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Pendant Mnt., No Lens	78	0.31	137.3	$22.10	4	2	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	50	0.20	88	$14.17	$80.00	$320.00	0.11	49.28	$7.93	40.33
227.21	Locker Room Corridor	3000	21	2	2x2, 2 Lamp, 32w 700 series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	65	1.37	4,095.0	$659.30	21	2	Sylvania Lamp FBO30/841XP/6//SS/ECO	49	1.03	3087	$497.01	$24.00	$504.00	0.34	1008	$162.29	3.11
221.34	Boy's Team Room	2600	12	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., No Lens	58	0.70	1,809.6	$291.35	12	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.60	1560	$251.16	$14.00	$168.00	0.10	249.6	$40.19	4.18
242.11	Boy's Locker Room	2600	12	4	2x4, 4 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	109	1.31	3,400.8	$547.53	12	3	Remove 1 Lamp, Relamp - Sylvania FO28/841/SS/ECO, Provide 95% Specular	75	0.90	2340	$376.74	$80.00	$960.00	0.41	1060.8	$170.79	5.62
221.11	Boy's restroom	2600	2	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	0.12	322.4	$51.91	2	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.10	260	$41.86	$14.00	$28.00	0.02	62.4	$10.05	2.79
121.11	Closet	1200	1	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Surface Mnt., Prismatic Lens	78	0.08	93.6	$15.07	1	2	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	50	0.05	60	$9.66	$80.00	$80.00	0.03	33.6	$5.41	14.79
242.211	Coach's Office	2600	6	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.65	1,700.4	$273.76	6	3	Remove 1 Lamp, Relamp - Sylvania FO28/841/SS/ECO, Provide 95% Specular	75	0.45	1170	$188.37	$80.00	$480.00	0.20	530.4	$85.39	5.62
121.11	Shower	1200	1	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Surface Mnt., Prismatic Lens	78	0.08	93.6	$15.07	1	2	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	50	0.05	60	$9.66	$80.00	$80.00	0.03	33.6	$5.41	14.79
221.11	Coach's Office	2600	2	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	0.12	322.4	$51.91	2	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.10	260	$41.86	$14.00	$28.00	0.02	62.4	$10.05	2.79
242.211	Men's Room	2600	3	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.33	850.2	$136.88	3	3	Remove 1 Lamp, Relamp - Sylvania FO28/841/SS/ECO, Provide 95% Specular	75	0.23	585	$94.19	$80.00	$240.00	0.10	265.2	$42.70	5.62
242.211	Trainor	2600	6	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.65	1,700.4	$273.76	6	3	Remove 1 Lamp, Relamp - Sylvania FO28/841/SS/ECO, Provide 95% Specular	75	0.45	1170	$188.37	$80.00	$480.00	0.20	530.4	$85.39	5.62
610	Trainer - Shower Area	1200	4	2	1x1 Surface Mount, Prismatic Lens, (2) 60w A Lamp	120	0.48	576.0	$92.74	4	2	13w CFL Lamps	26	0.10	124.8	$20.09	$25.00	$100.00	0.38	451.2	$72.64	1.38

Investment Grade Lighting Audit

ECM 1,3: Lighting Upgrade - General

EXISTING LIGHTING										PROPOSED LIGHTING									SAVINGS			
CEG Type	Fixture Location	Yearly Usage	No. Fixts	No. Lamps	Fixture Type	Fixt Watts	Total kW	kWh/Yr Fixtures	Yearly $ Cost	No. Fixts	No. Lamps	Retro-Unit Description	Watts Used	Total kW	kWh/Yr Fixtures	Yearly $ Cost	Unit Cost (INSTALLED)	Total Cost	kW Savings	kWh/Yr Savings	Yearly $ Savings	Yearly Simple Payback
221.11	Varsity Football Locker Room	2600	7	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	0.43	1,128.4	$181.67	7	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.35	910	$146.51	$14.00	$98.00	0.08	218.4	$35.16	2.79
242.211		2600	5	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.55	1,417.0	$228.14	5	3	Remove 1 Lamp, Relamp - Sylvania FO28/841/SS/ECO, Provide 95% Specular	75	0.38	975	$156.98	$80.00	$400.00	0.17	442	$71.16	5.62
610	Showers	1200	4	2	1x1 Surface Mount, Prismatic Lens, (2) 60w A Lamp	120	0.48	576.0	$92.74	4	2	13w CFL Lamps	26	0.10	124.8	$20.09	$25.00	$100.00	0.38	451.2	$72.64	1.38
221.11	Restroom	2600	2	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	0.12	322.4	$51.91	2	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.10	260	$41.86	$14.00	$28.00	0.02	62.4	$10.05	2.79
221.11	Storage	1200	1	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	0.06	74.4	$11.98	1	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.05	60	$9.66	$14.00	$14.00	0.01	14.4	$2.32	6.04
221.11	Ice Room	2600	2	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	0.12	322.4	$51.91	2	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.10	260	$41.86	$14.00	$28.00	0.02	62.4	$10.05	2.79
221.11	Boy's Locker Room	2600	18	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	1.12	2,901.6	$467.16	18	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.90	2340	$376.74	$14.00	$252.00	0.22	561.6	$90.42	2.79
612	Restroom	1200	1	1	Pendant Mnt., 100w A19 Lamp	100	0.10	120.0	$19.32	1	1	(1) 26w CFL Lamp	26	0.03	31.2	$5.02	$20.00	$20.00	0.07	88.8	$14.30	1.40
242.211	Locker Room Office	2600	3	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.33	850.2	$136.88	3	3	Remove 1 Lamp, Relamp - Sylvania FO28/841/SS/ECO, Provide 95% Specular	75	0.23	585	$94.19	$80.00	$240.00	0.10	265.2	$42.70	5.62
221.11	Showers	1200	4	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	0.25	297.6	$47.91	4	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.20	240	$38.64	$14.00	$56.00	0.05	57.6	$9.27	6.04
612		1200	4	1	Pendant Mnt., 100w A19 Lamp	100	0.40	480.0	$77.28	4	1	(1) 26w CFL Lamp	26	0.10	124.8	$20.09	$20.00	$80.00	0.30	355.2	$57.19	1.40
612	Closet	1200	1	1	Pendant Mnt., 100w A19 Lamp	100	0.10	120.0	$19.32	1	1	(1) 26w CFL Lamp	26	0.03	31.2	$5.02	$20.00	$20.00	0.07	88.8	$14.30	1.40
769	Wrestling Gym	2600	8	1	400w MH, Prismatic Lens	465	3.72	9,672.0	$1,557.19	8	6	2x4 54w T5HO 6 Lamp w/Wire Guard	354	2.83	7363.2	$1,185.48	$300.00	$2,400.00	0.89	2308.8	$371.72	6.46
612	Gym Storage	1200	2	1	Pendant Mnt., 100w A19 Lamp	100	0.20	240.0	$38.64	2	1	(1) 26w CFL Lamp	26	0.05	62.4	$10.05	$20.00	$40.00	0.15	177.6	$28.59	1.40
242.211		1200	2	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.22	261.6	$42.12	2	3	Remove 1 Lamp, Relamp - Sylvania FO28/841/SS/ECO, Provide 95% Specular	75	0.15	180	$28.98	$80.00	$160.00	0.07	81.6	$13.14	12.18
769	Main Gym	2600	32	1	400w MH, Prismatic Lens	465	14.88	38,688.0	$6,228.77	32	6	2x4 54w T5HO 6 Lamp w/Wire Guard	354	11.33	29452.8	$4,741.90	$300.00	$9,600.00	3.55	9235.2	$1,486.87	6.46
612	Storage	1200	5	1	Pendant Mnt., 100w A19 Lamp	100	0.50	600.0	$96.60	5	1	(1) 26w CFL Lamp	26	0.13	156	$25.12	$20.00	$100.00	0.37	444	$71.48	1.40
242.211	Classroom 141	2600	20	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	2.18	5,668.0	$912.55	20	3	Remove 1 Lamp, Relamp - Sylvania FO28/841/SS/ECO, Provide 95% Specular	75	1.50	3900	$627.90	$80.00	$1,600.00	0.68	1768	$284.65	5.62
222.23	141 Changing Room	2600	4	2	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Dirrect/ Indirect	58	0.23	603.2	$97.12	4	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.20	520	$83.72	$14.00	$56.00	0.03	83.2	$13.40	4.18

Investment Grade Lighting Audit

ECM 1,3: Lighting Upgrade - General

EXISTING LIGHTING										PROPOSED LIGHTING									SAVINGS			
CEG Type	Fixture Location	Yearly Usage	No. Fixts	No. Lamps	Fixture Type	Fixt Watts	Total kW	kWh/Yr Fixtures	Yearly $ Cost	No. Fixts	No. Lamps	Retro-Unit Description	Watts Used	Total kW	kWh/Yr Fixtures	Yearly $ Cost	Unit Cost (INSTALLED)	Total Cost	kW Savings	kWh/Yr Savings	Yearly $ Savings	Yearly Simple Payback
222.23	141 Office	2600	2	2	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Direct/ Indirect	58	0.12	301.6	$48.56	2	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.10	260	$41.86	$14.00	$28.00	0.02	41.6	$6.70	4.18
222.23	141 Storage	1200	10	2	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Direct/ Indirect	58	0.58	696.0	$112.06	10	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.50	600	$96.60	$14.00	$140.00	0.08	96	$15.46	9.06
242.211	Corridor 200	3000	151	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	16.46	49,377.0	$7,949.70	151	3	Remove 1 Lamp, Relamp - Sylvania FO28/841/SS/ECO, Provide 95% Specular	75	11.33	33975	$5,469.98	$80.00	$12,080.00	5.13	15402	$2,479.72	4.87
264.21		3000	2	6	4x4, 6 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic	172	0.34	1,032.0	$166.15	2	6	Relamp - Sylvania Lamp FO28/841/SS/ECO	148	0.30	888	$142.97	$42.00	$84.00	0.05	144	$23.18	3.62
164.25		3000	2	6	4x4, 6-Lamp, 34w T12, Mag. Ballast, Recessed Mnt., White Lens	234	0.47	1,404.0	$226.04	2	6	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	150	0.30	900	$144.90	$120.00	$240.00	0.17	504	$81.14	2.96
242.211	Corridor 200 between 228 and 229	3000	11	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	1.20	3,597.0	$579.12	11	3	Remove 1 Lamp, Relamp - Sylvania FO28/841/SS/ECO, Provide 95% Specular	75	0.83	2475	$398.48	$80.00	$880.00	0.37	1122	$180.64	4.87
242.211	Corridor 200 between 241 and 242	3000	4	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.44	1,308.0	$210.59	4	3	Remove 1 Lamp, Relamp - Sylvania FO28/841/SS/ECO, Provide 95% Specular	75	0.30	900	$144.90	$80.00	$320.00	0.14	408	$65.69	4.87
711	Exterior	4000	12	1	1x1 100w HPS Surface Mount	125	1.50	6,000.0	$966.00	12	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
712		4000	8	1	1000w MH Flood	1080	8.64	34,560.0	$5,564.16	8	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
710		4000	85	1	1x1 26w CFL Recessed Mount	26	2.21	8,840.0	$1,423.24	85	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
	Totals		2,738	1005				795,445	$128,067	2,738	829			166.1	453,772	$73,057		$139,551	62.8	168,520	$27,132	5.14

Investment Grade Lighting Audit

CEG Job #: 9C11054
Project: Northern Highlands Regional HS LGEA
Address: 298 Hilldale Avenu
Allendale, NJ 07401
Building SF: 301,000

Northern Highland Regional HS

KWH COST: $0.161

ECM 2: Lighting Controls

EXISTING LIGHTING										PROPOSED LIGHTING CONTROLS											SAVINGS			
CEG Type	Fixture Location	Yearly Usage	No. Fixts	No. Lamps	Fixture Type	Fixt Watts	Total kW	kWh/Yr Fixtures	Yearly $ Cost	No. Fixts	No. Cont.	Controls Description	Watts Used	Total kW	Reduction (%)	kWh/Yr Fixtures	Yearly $ Cost	Unit Cost (INSTALLED)	Total Cost	kW Savings	kWh/Yr Savings	Yearly $ Savings	Yearly Simple Payback
242.211	Main Lobby	3000	19	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	2.07	6213	$1,000.29	19	1	Daylight Sensor (Sensorswitch PP-20 & CM-PC or equal)	109	1.66	20%	4970.4	$800.23	$300.00	$300.00	0	1242.6	$200.06	1.50
242.211	Classroom 126/125	2600	16	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	1.74	4534.4	$730.04	16	1	Dual Technology Occupancy Sensor - Remote Mnt.	109	1.40	20%	3627.52	$584.03	$300.00	$300.00	0	906.88	$146.01	2.05
242.211	Classroom 124	2600	8	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.87	2267.2	$365.02	8	1	Dual Technology Occupancy Sensor - Remote Mnt.	109	0.70	20%	1813.76	$292.02	$300.00	$300.00	0	453.44	$73.00	4.11
613	Janitors Closet	1000	2	1	Industrial Fixture, 100w A19 Lamp	100	0.20	200	$32.20	2	0	No Change	100	0.20	0%	200	$32.20	$300.00	$0.00	0	0	$0.00	0.00
242.211	Classroom 123	2600	8	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.87	2267.2	$365.02	8	1	Dual Technology Occupancy Sensor - Remote Mnt.	109	0.70	20%	1813.76	$292.02	$300.00	$300.00	0	453.44	$73.00	4.11
242.211	Classroom 122	2600	8	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.87	2267.2	$365.02	8	1	Dual Technology Occupancy Sensor - Remote Mnt.	109	0.70	20%	1813.76	$292.02	$300.00	$300.00	0	453.44	$73.00	4.11
242.211	Classroom 121	2600	8	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.87	2267.2	$365.02	8	1	Dual Technology Occupancy Sensor - Remote Mnt.	109	0.70	20%	1813.76	$292.02	$300.00	$300.00	0	453.44	$73.00	4.11
242.211	Classroom 121	2600	8	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.87	2267.2	$365.02	8	1	Dual Technology Occupancy Sensor - Remote Mnt.	109	0.70	20%	1813.76	$292.02	$300.00	$300.00	0	453.44	$73.00	4.11
242.211	Classroom 112	2600	8	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.87	2267.2	$365.02	8	1	Dual Technology Occupancy Sensor - Remote Mnt.	109	0.70	20%	1813.76	$292.02	$300.00	$300.00	0	453.44	$73.00	4.11
242.211	World Language	2600	2	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.22	566.8	$91.25	2	1	Dual Technology Occupancy Sensor - Switch Mnt.	109	0.17	20%	453.44	$73.00	$150.00	$150.00	0	113.36	$18.25	8.22
242.211	Classroom 110	2600	8	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.87	2267.2	$365.02	8	1	Dual Technology Occupancy Sensor - Remote Mnt.	109	0.70	20%	1813.76	$292.02	$300.00	$300.00	0	453.44	$73.00	4.11
242.211	World Language	2600	4	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.44	1133.6	$182.51	4	1	Dual Technology Occupancy Sensor - Switch Mnt.	109	0.35	20%	906.88	$146.01	$150.00	$150.00	0	226.72	$36.50	4.11
222.21	Classroom 111/109	2600	12	2	2x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.74	1934.4	$311.44	12	1	Dual Technology Occupancy Sensor - Remote Mnt.	62	0.60	20%	1547.52	$249.15	$300.00	$300.00	0	386.88	$62.29	4.82

ECM 2: Lighting Controls

EXISTING LIGHTING										PROPOSED LIGHTING CONTROLS											SAVINGS			
CEG Type	Fixture Location	Yearly Usage	No. Fixts	No. Lamps	Fixture Type	Fixt Watts	Total kW	kWh/Yr Fixtures	Yearly $ Cost	No. Fixts	No. Cont.	Controls Description	Watts Used	Total kW	Reduction (%)	kWh/Yr Fixtures	Yearly $ Cost	Unit Cost (INSTALLED)	Total Cost	kW Savings	kWh/Yr Savings	Yearly $ Savings	Yearly Simple Payback
242.211	Classroom 108	2600	8	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.87	2267.2	$365.02	8	1	Dual Technology Occupancy Sensor - Remote Mnt.	109	0.70	20%	1813.76	$292.02	$300.00	$300.00	0	453.44	$73.00	4.11
242.211	Classroom 107	2600	6	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.65	1700.4	$273.76	6	1	Dual Technology Occupancy Sensor - Remote Mnt.	109	0.52	20%	1360.32	$219.01	$300.00	$300.00	0	340.08	$54.75	5.48
242.211	Classroom 106	2600	8	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.87	2267.2	$365.02	8	1	Dual Technology Occupancy Sensor - Remote Mnt.	109	0.70	20%	1813.76	$292.02	$300.00	$300.00	0	453.44	$73.00	4.11
242.211	Classroom 104	2600	8	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.87	2267.2	$365.02	8	1	Dual Technology Occupancy Sensor - Remote Mnt.	109	0.70	20%	1813.76	$292.02	$300.00	$300.00	0	453.44	$73.00	4.11
242.211	Classroom 105	2600	8	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.87	2267.2	$365.02	8	1	Dual Technology Occupancy Sensor - Remote Mnt.	109	0.70	20%	1813.76	$292.02	$300.00	$300.00	0	453.44	$73.00	4.11
242.211	Classroom 103	2600	8	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.87	2267.2	$365.02	8	1	Dual Technology Occupancy Sensor - Remote Mnt.	109	0.70	20%	1813.76	$292.02	$300.00	$300.00	0	453.44	$73.00	4.11
242.211	Classroom 102	2600	8	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.87	2267.2	$365.02	8	1	Dual Technology Occupancy Sensor - Remote Mnt.	109	0.70	20%	1813.76	$292.02	$300.00	$300.00	0	453.44	$73.00	4.11
242.211	Office	2600	3	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.33	850.2	$136.88	3	1	Dual Technology Occupancy Sensor - Switch Mnt.	109	0.26	20%	680.16	$109.51	$150.00	$150.00	0	170.04	$27.38	5.48
242.211	Classroom 101	2600	12	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	1.31	3400.8	$547.53	12	1	Dual Technology Occupancy Sensor - Remote Mnt.	109	1.05	20%	2720.64	$438.02	$300.00	$300.00	0	680.16	$109.51	2.74
242.211	Corridor Att - CL 126	3000	37	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	4.03	12099	$1,947.94	37	0	No Change	109	4.03	0%	12099	$1,947.94	$300.00	$0.00	0	0	$0.00	0.00
34	Corridor Att - CL 126	3000	1	1	Recessed Down Light, 60w A19 Lamp	60	0.06	180	$28.98	1	0	No Change	60	0.06	0%	180	$28.98	$300.00	$0.00	0	0	$0.00	0.00
227.21	Corridor Att - CL 126	3000	1	2	2x2, 2 Lamp, 32w 700 series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	65	0.07	195	$31.40	1	0	No Change	65	0.07	0%	195	$31.40	$300.00	$0.00	0	0	$0.00	0.00
222.21	Men's Room	2600	3	2	2x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.19	483.6	$77.86	3	1	Dual Technology Occupancy Sensor - Switch Mnt.	62	0.15	20%	386.88	$62.29	$150.00	$150.00	0	96.72	$15.57	9.63
242.211	HS Office	2600	5	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.55	1417	$228.14	5	1	Dual Technology Occupancy Sensor - Switch Mnt.	109	0.44	20%	1133.6	$182.51	$150.00	$150.00	0	283.4	$45.63	3.29
242.211	Student Records	2600	1	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.11	283.4	$45.63	1	0	No Change	109	0.11	0%	283.4	$45.63	$300.00	$0.00	0	0	$0.00	0.00

ECM 2: Lighting Controls

EXISTING LIGHTING										PROPOSED LIGHTING CONTROLS										SAVINGS			
CEG Type	Fixture Location	Yearly Usage	No. Fixts	No. Lamps	Fixture Type	Fixt Watts	Total kW	kWh/Yr Fixtures	Yearly $ Cost	No. Fixts	No. Cont.	Controls Description	Watts Used	Total kW	Reduction (%)	kWh/Yr Fixtures	Yearly $ Cost	Unit Cost (INSTALLED)	Total Cost	kW Savings	kWh/Yr Savings	Yearly $ Savings	Yearly Simple Payback
242.211	Office #1	2600	1	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.11	283.4	$45.63	1	0	No Change	109	0.11	0%	283.4	$45.63	$300.00	$0.00	0	0	$0.00	0.00
242.211	Office #2	2600	1	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.11	283.4	$45.63	1	0	No Change	109	0.11	0%	283.4	$45.63	$300.00	$0.00	0	0	$0.00	0.00
242.211	Office #3	2600	1	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.11	283.4	$45.63	1	0	No Change	109	0.11	0%	283.4	$45.63	$300.00	$0.00	0	0	$0.00	0.00
242.211	Office #4	2600	1	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.11	283.4	$45.63	1	0	No Change	109	0.11	0%	283.4	$45.63	$300.00	$0.00	0	0	$0.00	0.00
227.21	Office #4	2600	2	2	2x2, 2 Lamp, 32w 700 series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	65	0.13	338	$54.42	2	0	No Change	65	0.13	0%	338	$54.42	$300.00	$0.00	0	0	$0.00	0.00
222.21	Student Records	2600	1	2	2x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.06	161.2	$25.95	1	0	No Change	62	0.06	0%	161.2	$25.95	$300.00	$0.00	0	0	$0.00	0.00
227.21	Student Records	2600	1	2	2x2, 2 Lamp, 32w 700 series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	65	0.07	169	$27.21	1	0	No Change	65	0.07	0%	169	$27.21	$300.00	$0.00	0	0	$0.00	0.00
242.211	Office	2600	4	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.44	1133.6	$182.51	4	1	Dual Technology Occupancy Sensor - Switch Mnt.	109	0.35	20%	906.88	$146.01	$150.00	$150.00	0	226.72	$36.50	4.11
242.211	Mr. M Koth	2600	2	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.22	566.8	$91.25	2	1	Dual Technology Occupancy Sensor - Switch Mnt.	109	0.17	20%	453.44	$73.00	$150.00	$150.00	0	113.36	$18.25	8.22
242.211	Superintendent Office	2600	4	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.44	1133.6	$182.51	4	1	Dual Technology Occupancy Sensor - Switch Mnt.	109	0.35	20%	906.88	$146.01	$150.00	$150.00	0	226.72	$36.50	4.11
242.211	Keenan Office	2600	1	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.11	283.4	$45.63	1	0	No Change	109	0.11	0%	283.4	$45.63	$300.00	$0.00	0	0	$0.00	0.00
242.211	BOE Conference Room	2600	2	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.22	566.8	$91.25	2	1	Dual Technology Occupancy Sensor - Switch Mnt.	109	0.17	20%	453.44	$73.00	$150.00	$150.00	0	113.36	$18.25	8.22
610	BOE Toilet Room	2600	4	2	1x1 Surface Mount, Prismatic Lens, (2) 60w A Lamp	120	0.48	1248	$200.93	4	1	Dual Technology Occupancy Sensor - Switch Mnt.	120	0.38	20%	998.4	$160.74	$150.00	$150.00	0	249.6	$40.19	3.73
227.21	Superintendent Office	2600	4	2	2x2, 2 Lamp, 32w 700 series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	65	0.26	676	$108.84	4	1	Dual Technology Occupancy Sensor - Switch Mnt.	65	0.21	20%	540.8	$87.07	$150.00	$150.00	0	135.2	$21.77	6.89
242.211	Office	2600	1	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.11	283.4	$45.63	1	0	No Change	109	0.11	0%	283.4	$45.63	$300.00	$0.00	0	0	$0.00	0.00

ECM 2: Lighting Controls

EXISTING LIGHTING										PROPOSED LIGHTING CONTROLS										SAVINGS			
CEG Type	Fixture Location	Yearly Usage	No. Fixts	No. Lamps	Fixture Type	Fixt Watts	Total kW	kWh/Yr Fixtures	Yearly $ Cost	No. Fixts	No. Cont.	Controls Description	Watts Used	Total kW	Reduction (%)	kWh/Yr Fixtures	Yearly $ Cost	Unit Cost (INSTALLED)	Total Cost	kW Savings	kWh/Yr Savings	Yearly $ Savings	Yearly Simple Payback
242.211	Business Office	2600	6	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.65	1700.4	$273.76	6	1	Dual Technology Occupancy Sensor - Switch Mnt.	109	0.52	20%	1360.32	$219.01	$150.00	$150.00	0	340.08	$54.75	2.74
242.211	Business Office	2600	2	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.22	566.8	$91.25	2	1	Dual Technology Occupancy Sensor - Switch Mnt.	109	0.17	20%	453.44	$73.00	$150.00	$150.00	0	113.36	$18.25	8.22
242.211	Corridor Business Office - Superintendent	3000	9	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.98	2943	$473.82	9	0	No Change	109	0.98	0%	2943	$473.82	$300.00	$0.00	0	0	$0.00	0.00
242.211	Library Upper	2600	30	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	3.27	8502	$1,368.82	30	2	Dual Technology Occupancy Sensor - Remote Mnt.	109	2.62	20%	6801.6	$1,095.06	$300.00	$600.00	0	1700.4	$273.76	2.19
242.211		2600	15	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	1.64	4251	$684.41	15	1	Dual Technology Occupancy Sensor with Daylight Sensor- Remote Mnt.	109	0.98	40%	2550.6	$410.65	$500.00	$500.00	0	1700.4	$273.76	1.83
242.211	Library Lower	2600	19	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	2.07	5384.6	$866.92	19	1	Dual Technology Occupancy Sensor - Remote Mnt.	109	1.66	20%	4307.68	$693.54	$300.00	$300.00	0	1076.92	$173.38	1.73
242.211	Library Lower	2600	16	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	1.74	4534.4	$730.04	16	1	Dual Technology Occupancy Sensor - Remote Mnt.	109	1.40	20%	3627.52	$584.03	$300.00	$300.00	0	906.88	$146.01	2.05
242.211	Office #1	2600	1	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.11	283.4	$45.63	1	0	No Change	109	0.11	0%	283.4	$45.63	$300.00	$0.00	0	0	$0.00	0.00
242.211	Office #2	2600	2	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.22	566.8	$91.25	2	1	Dual Technology Occupancy Sensor - Switch Mnt.	109	0.17	20%	453.44	$73.00	$150.00	$150.00	0	113.36	$18.25	8.22
242.211	Women's Room	2600	3	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.33	850.2	$136.88	3	1	Dual Technology Occupancy Sensor - Switch Mnt.	109	0.26	20%	680.16	$109.51	$150.00	$150.00	0	170.04	$27.38	5.48
200	B&G	2600	12	2	1x2, 2 Lamp, 17w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	34	0.41	1060.8	$170.79	12	1	Dual Technology Occupancy Sensor - Remote Mnt.	34	0.33	20%	848.64	$136.63	$300.00	$300.00	0	212.16	$34.16	8.78
221.33	B&G Storage	1000	24	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., Direct/ Indirect	58	1.39	1392	$224.11	24	2	Dual Technology Occupancy Sensor - Remote Mnt.	58	1.11	20%	1113.6	$179.29	$300.00	$600.00	0	278.4	$44.82	13.39
242.211	Classroom 113	2600	8	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.87	2267.2	$365.02	8	1	Dual Technology Occupancy Sensor - Remote Mnt.	109	0.70	20%	1813.76	$292.02	$300.00	$300.00	0	453.44	$73.00	4.11
242.211	Classroom 115	2600	8	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.87	2267.2	$365.02	8	1	Dual Technology Occupancy Sensor - Remote Mnt.	109	0.70	20%	1813.76	$292.02	$300.00	$300.00	0	453.44	$73.00	4.11
242.211	Classroom 117	2600	8	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.87	2267.2	$365.02	8	1	Dual Technology Occupancy Sensor - Remote Mnt.	109	0.70	20%	1813.76	$292.02	$300.00	$300.00	0	453.44	$73.00	4.11

Investment Grade Lighting Audit

ECM 2: Lighting Controls

EXISTING LIGHTING										PROPOSED LIGHTING CONTROLS										SAVINGS			
CEG Type	Fixture Location	Yearly Usage	No. Fixts	No. Lamps	Fixture Type	Fixt Watts	Total kW	kWh/Yr Fixtures	Yearly $ Cost	No. Fixts	No. Cont.	Controls Description	Watts Used	Total kW	Reduction (%)	kWh/Yr Fixtures	Yearly $ Cost	Unit Cost (INSTALLED)	Total Cost	kW Savings	kWh/Yr Savings	Yearly $ Savings	Yearly Simple Payback
242.211	Classroom 119	2600	8	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.87	2267.2	$365.02	8	1	Dual Technology Occupancy Sensor - Remote Mnt.	109	0.70	20%	1813.76	$292.02	$300.00	$300.00	0	453.44	$73.00	4.11
34	Janitors Closet	1000	2	1	Recessed Down Light, 60w A19 Lamp	60	0.12	120	$19.32	2	0	No Change	60	0.12	0%	120	$19.32	$300.00	$0.00	0	0	$0.00	0.00
242.211	Classroom 120	2600	10	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	1.09	2834	$456.27	10	1	Dual Technology Occupancy Sensor - Remote Mnt.	109	0.87	20%	2267.2	$365.02	$300.00	$300.00	0	566.8	$91.25	3.29
242.211	Men's Room	2600	2	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.22	566.8	$91.25	2	1	Dual Technology Occupancy Sensor - Switch Mnt.	109	0.17	20%	453.44	$73.00	$150.00	$150.00	0	113.36	$18.25	8.22
121.14	Display Case	3000	3	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Surface Mnt., No Lens	78	0.23	702	$113.02	3	0	No Change	78	0.23	0%	702	$113.02	$300.00	$0.00	0	0	$0.00	0.00
242.211	Women's Room	2600	2	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.22	566.8	$91.25	2	1	Dual Technology Occupancy Sensor - Switch Mnt.	109	0.17	20%	453.44	$73.00	$150.00	$150.00	0	113.36	$18.25	8.22
613	Mechanical Room	2600	1	1	Industrial Fixture, 100w A19 Lamp	100	0.10	260	$41.86	1	0	No Change	100	0.10	0%	260	$41.86	$300.00	$0.00	0	0	$0.00	0.00
264.21	Guidence Office	2600	14	6	4x4, 6 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens	172	2.41	6260.8	$1,007.99	14	1	Dual Technology Occupancy Sensor - Remote Mnt.	172	1.93	20%	5008.64	$806.39	$300.00	$300.00	0	1252.16	$201.60	1.49
264.21	Office #1	2600	1	6	4x4, 6 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens	172	0.17	447.2	$72.00	1	0	No Change	172	0.17	0%	447.2	$72.00	$300.00	$0.00	0	0	$0.00	0.00
264.21	Conference Room	2600	2	6	4x4, 6 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens	172	0.34	894.4	$144.00	2	1	Dual Technology Occupancy Sensor - Switch Mnt.	172	0.28	20%	715.52	$115.20	$150.00	$150.00	0	178.88	$28.80	5.21
264.21	Office #1	2600	1	6	4x4, 6 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens	172	0.17	447.2	$72.00	1	0	No Change	172	0.17	0%	447.2	$72.00	$300.00	$0.00	0	0	$0.00	0.00
264.21	Office #2	2600	1	6	4x4, 6 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens	172	0.17	447.2	$72.00	1	0	No Change	172	0.17	0%	447.2	$72.00	$300.00	$0.00	0	0	$0.00	0.00
264.21	Office #3	2600	1	6	4x4, 6 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens	172	0.17	447.2	$72.00	1	0	No Change	172	0.17	0%	447.2	$72.00	$300.00	$0.00	0	0	$0.00	0.00
264.21	Office #4	2600	1	6	4x4, 6 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens	172	0.17	447.2	$72.00	1	0	No Change	172	0.17	0%	447.2	$72.00	$300.00	$0.00	0	0	$0.00	0.00
264.21	Office #5	2600	1	6	4x4, 6 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens	172	0.17	447.2	$72.00	1	0	No Change	172	0.17	0%	447.2	$72.00	$300.00	$0.00	0	0	$0.00	0.00

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ECM 2: Lighting Controls

EXISTING LIGHTING										PROPOSED LIGHTING CONTROLS										SAVINGS			
CEG Type	Fixture Location	Yearly Usage	No. Fixts	No. Lamps	Fixture Type	Fixt Watts	Total kW	kWh/Yr Fixtures	Yearly $ Cost	No. Fixts	No. Cont.	Controls Description	Watts Used	Total kW	Reduction (%)	kWh/Yr Fixtures	Yearly $ Cost	Unit Cost (INSTALLED)	Total Cost	kW Savings	kWh/Yr Savings	Yearly $ Savings	Yearly Simple Payback
264.21	Office #6	2600	1	6	4x4, 6 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens	172	0.17	447.2	$72.00	1	0	No Change	172	0.17	0%	447.2	$72.00	$300.00	$0.00	0	0	$0.00	0.00
221.34	Main Boiler Room	2600	16	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., No Lens	58	0.93	2412.8	$388.46	16	1	Dual Technology Occupancy Sensor - Remote Mnt.	58	0.74	20%	1930.24	$310.77	$300.00	$300.00	0	482.56	$77.69	3.86
613	Sub Basement	2000	7	1	Industrial Fixture, 100w A19 Lamp	100	0.70	1400	$225.40	7	1	Dual Technology Occupancy Sensor - Remote Mnt.	100	0.56	20%	1120	$180.32	$300.00	$300.00	0	280	$45.08	6.65
121.34	Sub Basement	2000	1	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Pendant Mnt., No Lens	78	0.08	156	$25.12	1	0	No Change	78	0.08	0%	156	$25.12	$300.00	$0.00	0	0	$0.00	0.00
242.211	Faculty Dinning	2600	17	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	1.85	4817.8	$775.67	17	1	Dual Technology Occupancy Sensor - Remote Mnt.	109	1.48	20%	3854.24	$620.53	$300.00	$300.00	0	963.56	$155.13	1.93
242.211	Classroom 132	26000	8	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.87	22672	$3,650.19	8	1	Dual Technology Occupancy Sensor - Remote Mnt.	109	0.70	20%	18137.6	$2,920.15	$300.00	$300.00	0	4534.4	$730.04	0.41
111.11	Men's Room	2600	1	1	1x4, 1-Lamp, 34w T12, Mag. Ballast, Surface Mnt., Prismatic Lens	48	0.05	124.8	$20.09	1	0	No Change	48	0.05	0%	124.8	$20.09	$300.00	$0.00	0	0	$0.00	0.00
111.11	Women's Room	2600	1	1	1x4, 1-Lamp, 34w T12, Mag. Ballast, Surface Mnt., Prismatic Lens	48	0.05	124.8	$20.09	1	0	No Change	48	0.05	0%	124.8	$20.09	$300.00	$0.00	0	0	$0.00	0.00
221.21	Classroom 138	2600	20	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	1.24	3224	$519.06	20	1	Dual Tech. Occupancy Sensor w/2 Pole Powerpack - Remote Mnt.	62	0.99	20%	2579.2	$415.25	$450.00	$450.00	0	644.8	$103.81	4.33
221.21	Classroom 138 Closet	2600	1	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.06	161.2	$25.95	1	0	No Change	62	0.06	0%	161.2	$25.95	$300.00	$0.00	0	0	$0.00	0.00
221.21	Classroom 137	2600	18	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	1.12	2901.6	$467.16	18	1	Dual Tech. Occupancy Sensor w/2 Pole Powerpack - Remote Mnt.	62	0.89	20%	2321.28	$373.73	$450.00	$450.00	0	580.32	$93.43	4.82
242.211	Girl's Room	2600	2	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.22	566.8	$91.25	2	1	Dual Technology Occupancy Sensor - Switch Mnt.	109	0.17	20%	453.44	$73.00	$150.00	$150.00	0	113.36	$18.25	8.22
242.211	Boy's Room	2600	2	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.22	566.8	$91.25	2	1	Dual Technology Occupancy Sensor - Switch Mnt.	109	0.17	20%	453.44	$73.00	$150.00	$150.00	0	113.36	$18.25	8.22
613	Janitors Closet	1000	2	1	Industrial Fixture, 100w A19 Lamp	100	0.20	200	$32.20	2	0	No Change	100	0.20	0%	200	$32.20	$300.00	$0.00	0	0	$0.00	0.00
222.23	Classroom 136	2600	10	2	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Dirrect/ Indirect	58	0.58	1508	$242.79	10	1	Dual Technology Occupancy Sensor - Remote Mnt.	58	0.46	20%	1206.4	$194.23	$300.00	$300.00	0	301.6	$48.56	6.18

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ECM 2: Lighting Controls

EXISTING LIGHTING										PROPOSED LIGHTING CONTROLS										SAVINGS			
CEG Type	Fixture Location	Yearly Usage	No. Fixts	No. Lamps	Fixture Type	Fixt Watts	Total kW	kWh/Yr Fixtures	Yearly $ Cost	No. Fixts	No. Cont.	Controls Description	Watts Used	Total kW	Reduction (%)	kWh/Yr Fixtures	Yearly $ Cost	Unit Cost (INSTALLED)	Total Cost	kW Savings	kWh/Yr Savings	Yearly $ Savings	Yearly Simple Payback
222.23	Classroom 134	2600	20	2	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Direct/ Indirect	58	1.16	3016	$485.58	20	1	Dual Tech. Occupancy Sensor w/2 Pole Powerpack - Remote Mnt.	58	0.93	20%	2412.8	$388.46	$450.00	$450.00	0	603.2	$97.12	4.63
222.23	Classroom 135	2600	39	2	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Direct/ Indirect	58	2.26	5881.2	$946.87	39	1	Dual Tech. Occupancy Sensor w/2 Pole Powerpack - Remote Mnt.	58	1.81	20%	4704.96	$757.50	$450.00	$450.00	0	1176.24	$189.37	2.38
264.21	Office #7	2600	1	6	4x4, 6 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens	172	0.17	447.2	$72.00	1	0	No Change	172	0.17	0%	447.2	$72.00	$300.00	$0.00	0	0	$0.00	0.00
264.21	Office #8	2600	1	6	4x4, 6 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens	172	0.17	447.2	$72.00	1	0	No Change	172	0.17	0%	447.2	$72.00	$300.00	$0.00	0	0	$0.00	0.00
264.21	Office #9	2600	1	6	4x4, 6 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens	172	0.17	447.2	$72.00	1	0	No Change	172	0.17	0%	447.2	$72.00	$300.00	$0.00	0	0	$0.00	0.00
264.21	Office #10	2600	1	6	4x4, 6 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens	172	0.17	447.2	$72.00	1	0	No Change	172	0.17	0%	447.2	$72.00	$300.00	$0.00	0	0	$0.00	0.00
264.21	Office #11	26000	1	6	4x4, 6 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens	172	0.17	4472	$719.99	1	0	No Change	172	0.17	0%	4472	$719.99	$300.00	$0.00	0	0	$0.00	0.00
264.21	Office #12	2600	1	6	4x4, 6 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens	172	0.17	447.2	$72.00	1	0	No Change	172	0.17	0%	447.2	$72.00	$300.00	$0.00	0	0	$0.00	0.00
264.21	Conference Room	2600	2	6	4x4, 6 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens	172	0.34	894.4	$144.00	2	1	Dual Technology Occupancy Sensor - Switch Mnt.	172	0.28	20%	715.52	$115.20	$150.00	$150.00	0	178.88	$28.80	5.21
29	Café #1	2600	10	8	Pendent Mtd Light, (8) 26w PL Lamp	208	2.08	5408	$870.69	10	1	Dual Technology Occupancy Sensor - Remote Mnt.	208	1.66	20%	4326.4	$696.55	$300.00	$300.00	0	1081.6	$174.14	1.72
264.21	Senior Café	2600	25	6	4x4, 6 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens	172	4.30	11180	$1,799.98	25	1	Dual Tech. Occupancy Sensor w/2 Pole Powerpack - Remote Mnt.	172	3.44	20%	8944	$1,439.98	$450.00	$450.00	0	2236	$360.00	1.25
242.211	Senior Café	2600	1	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.11	283.4	$45.63	1	0	No Change	109	0.11	0%	283.4	$45.63	$300.00	$0.00	0	0	$0.00	0.00
613	Senior Café Closet	1000	2	1	Industrial Fixture, 100w A19 Lamp	100	0.20	200	$32.20	2	0	No Change	100	0.20	0%	200	$32.20	$300.00	$0.00	0	0	$0.00	0.00
241.11	Main Café	2600	80	4	1x4, 4 Lamp, 32w T8, Elect. Ballast, Surface Mnt., No Lens	104	8.32	21632	$3,482.75	80	13	Dual Tech. Occupancy Sensor w/2 Pole Powerpack - Remote Mnt.	104	6.66	20%	17305.6	$2,786.20	$450.00	$5,850.00	0	4326.4	$696.55	8.40
241.11		2600	20	4	1x4, 4 Lamp, 32w T8, Elect. Ballast, Surface Mnt., No Lens	104	2.08	5408	$870.69	20	1	Dual Technology Occupancy Sensor with Daylight Sensor- Remote Mnt.	104	1.25	40%	3244.8	$522.41	$500.00	$500.00	0	2163.2	$348.28	1.44

ECM 2: Lighting Controls

EXISTING LIGHTING										PROPOSED LIGHTING CONTROLS										SAVINGS			
CEG Type	Fixture Location	Yearly Usage	No. Fixts	No. Lamps	Fixture Type	Fixt Watts	Total kW	kWh/Yr Fixtures	Yearly $ Cost	No. Fixts	No. Cont.	Controls Description	Watts Used	Total kW	Reduction (%)	kWh/Yr Fixtures	Yearly $ Cost	Unit Cost (INSTALLED)	Total Cost	kW Savings	kWh/Yr Savings	Yearly $ Savings	Yearly Simple Payback
242.211	Kitchen	2600	27	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	2.94	7651.8	$1,231.94	27	1	Dual Tech. Occupancy Sensor w/2 Pole Powerpack - Remote Mnt.	109	2.35	20%	6121.44	$985.55	$450.00	$450.00	0	1530.36	$246.39	1.83
242.211	Back Kitchen	2600	10	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	1.09	2834	$456.27	10	1	Dual Technology Occupancy Sensor - Remote Mnt.	109	0.87	20%	2267.2	$365.02	$300.00	$300.00	0	566.8	$91.25	3.29
242.211	Kitchen Office	2600	1	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.11	283.4	$45.63	1	0	No Change	109	0.11	0%	283.4	$45.63	$300.00	$0.00	0	0	$0.00	0.00
221.21	Kitchen Storage	1000	1	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.06	62	$9.98	1	0	No Change	62	0.06	0%	62	$9.98	$300.00	$0.00	0	0	$0.00	0.00
221.21	Kitchen Office #2	2600	1	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.06	161.2	$25.95	1	0	No Change	62	0.06	0%	161.2	$25.95	$300.00	$0.00	0	0	$0.00	0.00
221.21	Kitchen Office #3	2600	3	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.19	483.6	$77.86	3	1	Dual Technology Occupancy Sensor - Switch Mnt.	62	0.15	20%	386.88	$62.29	$150.00	$150.00	0	96.72	$15.57	9.63
221.21	Kitchen Toilet Room	2600	1	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.06	161.2	$25.95	1	0	No Change	62	0.06	0%	161.2	$25.95	$300.00	$0.00	0	0	$0.00	0.00
237.21	Boy's Room	2600	7	3	2x2, 3 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens	92	0.64	1674.4	$269.58	7	1	Dual Technology Occupancy Sensor - Remote Mnt.	92	0.52	20%	1339.52	$215.66	$300.00	$300.00	0	334.88	$53.92	5.56
221.31	Boy's Room Closet	1000	1	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens	62	0.06	62	$9.98	1	0	No Change	62	0.06	0%	62	$9.98	$300.00	$0.00	0	0	$0.00	0.00
237.21	Girl's Room	2600	7	3	2x2, 3 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens	92	0.64	1674.4	$269.58	7	1	Dual Technology Occupancy Sensor - Remote Mnt.	92	0.52	20%	1339.52	$215.66	$300.00	$300.00	0	334.88	$53.92	5.56
221.31	Girl's Room Closet	1000	1	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens	62	0.06	62	$9.98	1	0	No Change	62	0.06	0%	62	$9.98	$300.00	$0.00	0	0	$0.00	0.00
222.21	Classroom 301	2600	16	2	2x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.99	2579.2	$415.25	16	1	Dual Technology Occupancy Sensor - Remote Mnt.	62	0.79	20%	2063.36	$332.20	$300.00	$300.00	0	515.84	$83.05	3.61
222.21	Prep. Room	2600	4	2	2x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.25	644.8	$103.81	4	1	Dual Technology Occupancy Sensor - Switch Mnt.	62	0.20	20%	515.84	$83.05	$150.00	$150.00	0	128.96	$20.76	7.22
222.21	Classroom 303	2600	16	2	2x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.99	2579.2	$415.25	16	1	Dual Technology Occupancy Sensor - Remote Mnt.	62	0.79	20%	2063.36	$332.20	$300.00	$300.00	0	515.84	$83.05	3.61
222.21	Classroom 305	2600	12	2	2x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.74	1934.4	$311.44	12	1	Dual Technology Occupancy Sensor - Remote Mnt.	62	0.60	20%	1547.52	$249.15	$300.00	$300.00	0	386.88	$62.29	4.82

ECM 2: Lighting Controls

EXISTING LIGHTING										PROPOSED LIGHTING CONTROLS										SAVINGS			
CEG Type	Fixture Location	Yearly Usage	No. Fixts	No. Lamps	Fixture Type	Fixt Watts	Total kW	kWh/Yr Fixtures	Yearly $ Cost	No. Fixts	No. Cont.	Controls Description	Watts Used	Total kW	Reduction (%)	kWh/Yr Fixtures	Yearly $ Cost	Unit Cost (INSTALLED)	Total Cost	kW Savings	kWh/Yr Savings	Yearly $ Savings	Yearly Simple Payback
222.21	Classroom 307	2600	16	2	2x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.99	2579.2	$415.25	16	1	Dual Technology Occupancy Sensor - Remote Mnt.	62	0.79	20%	2063.36	$332.20	$300.00	$300.00	0	515.84	$83.05	3.61
222.21	Prep. Room	2600	4	2	2x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.25	644.8	$103.81	4	1	Dual Technology Occupancy Sensor - Switch Mnt.	62	0.20	20%	515.84	$83.05	$150.00	$150.00	0	128.96	$20.76	7.22
222.21	Classroom 309	2600	16	2	2x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.99	2579.2	$415.25	16	1	Dual Technology Occupancy Sensor - Remote Mnt.	62	0.79	20%	2063.36	$332.20	$300.00	$300.00	0	515.84	$83.05	3.61
221.31	Electrical Room	1000	5	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens	62	0.31	310	$49.91	5	1	Dual Technology Occupancy Sensor - Switch Mnt.	62	0.25	20%	248	$39.93	$150.00	$150.00	0	62	$9.98	15.03
221.31	Mechanical Room	2600	7	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens	62	0.43	1128.4	$181.67	7	1	Dual Technology Occupancy Sensor - Switch Mnt.	62	0.35	20%	902.72	$145.34	$150.00	$150.00	0	225.68	$36.33	4.13
221.31	Mechanical Room Closet	2600	2	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens	62	0.12	322.4	$51.91	2	0	No Change	62	0.12	0%	322.4	$51.91	$300.00	$0.00	0	0	$0.00	0.00
221.31	Janitors Closet	1000	1	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens	62	0.06	62	$9.98	1	0	No Change	62	0.06	0%	62	$9.98	$300.00	$0.00	0	0	$0.00	0.00
221.11	Elevator Machine Room	2000	1	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	0.06	124	$19.96	1	0	No Change	62	0.06	0%	124	$19.96	$300.00	$0.00	0	0	$0.00	0.00
222.21	Storage	1000	11	2	2x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.68	682	$109.80	11	1	Dual Technology Occupancy Sensor - Remote Mnt.	62	0.55	20%	545.6	$87.84	$300.00	$300.00	0	136.4	$21.96	13.66
222.21	Classroom 308	2600	16	2	2x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.99	2579.2	$415.25	16	1	Dual Technology Occupancy Sensor - Remote Mnt.	62	0.79	20%	2063.36	$332.20	$300.00	$300.00	0	515.84	$83.05	3.61
222.21	Prep. Room	2600	4	2	2x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.25	644.8	$103.81	4	1	Dual Technology Occupancy Sensor - Switch Mnt.	62	0.20	20%	515.84	$83.05	$150.00	$150.00	0	128.96	$20.76	7.22
222.21	Classroom 306	2600	16	2	2x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.99	2579.2	$415.25	16	1	Dual Technology Occupancy Sensor - Remote Mnt.	62	0.79	20%	2063.36	$332.20	$300.00	$300.00	0	515.84	$83.05	3.61
222.21	Classroom 304	2600	16	2	2x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.99	2579.2	$415.25	16	1	Dual Technology Occupancy Sensor - Remote Mnt.	62	0.79	20%	2063.36	$332.20	$300.00	$300.00	0	515.84	$83.05	3.61
222.21	Prep. Room	2600	4	2	2x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.25	644.8	$103.81	4	1	Dual Technology Occupancy Sensor - Switch Mnt.	62	0.20	20%	515.84	$83.05	$150.00	$150.00	0	128.96	$20.76	7.22
222.21	Classroom 302	2600	8	2	2x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.50	1289.6	$207.63	8	1	Dual Technology Occupancy Sensor - Remote Mnt.	62	0.40	20%	1031.68	$166.10	$300.00	$300.00	0	257.92	$41.53	7.22

Investment Grade Lighting Audit

ECM 2: Lighting Controls

EXISTING LIGHTING										PROPOSED LIGHTING CONTROLS										SAVINGS			
CEG Type	Fixture Location	Yearly Usage	No. Fixts	No. Lamps	Fixture Type	Fixt Watts	Total kW	kWh/Yr Fixtures	Yearly $ Cost	No. Fixts	No. Cont.	Controls Description	Watts Used	Total kW	Reduction (%)	kWh/Yr Fixtures	Yearly $ Cost	Unit Cost (INSTALLED)	Total Cost	kW Savings	kWh/Yr Savings	Yearly $ Savings	Yearly Simple Payback
222.21	Classroom 300	2600	12	2	2x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.74	1934.4	$311.44	12	1	Dual Technology Occupancy Sensor - Remote Mnt.	62	0.60	20%	1547.52	$249.15	$300.00	$300.00	0	386.88	$62.29	4.82
284.25	Science Corridor	3000	9	8	4x4, 8 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Direct/Indirect	218	1.96	5886	$947.65	9	0	No Change	218	1.96	0%	5886	$947.65	$300.00	$0.00	0	0	$0.00	0.00
28	Science Corridor	3000	25	1	Recessed Mtd, 6"x2' (1) 40w PL Lamp Wall Washer	40	1.00	3000	$483.00	25	0	No Change	40	1.00	0%	3000	$483.00	$300.00	$0.00	0	0	$0.00	0.00
242.211	Science Corridor	3000	7	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.76	2289	$368.53	7	0	No Change	109	0.76	0%	2289	$368.53	$300.00	$0.00	0	0	$0.00	0.00
30	Science Corridor	3000	46	2	Recessed Down Light, (2) 26w PL Lamp	54	2.48	7452	$1,199.77	46	0	No Change	54	2.48	0%	7452	$1,199.77	$300.00	$0.00	0	0	$0.00	0.00
242.211	Corridor 135	3000	6	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.65	1962	$315.88	6	0	No Change	109	0.65	0%	1962	$315.88	$300.00	$0.00	0	0	$0.00	0.00
264.21	Wood Shop Corridor	3000	12	6	4x4, 6 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens	172	2.06	6192	$996.91	12	0	No Change	172	2.06	0%	6192	$996.91	$300.00	$0.00	0	0	$0.00	0.00
242.211	Café Corridor	3000	5	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.55	1635	$263.24	5	0	No Change	109	0.55	0%	1635	$263.24	$300.00	$0.00	0	0	$0.00	0.00
242.211	Main Gym Corridor	3000	20	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	2.18	6540	$1,052.94	20	0	No Change	109	2.18	0%	6540	$1,052.94	$300.00	$0.00	0	0	$0.00	0.00
264.21	Main Gym Corridor	3000	1	6	4x4, 6 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens	172	0.17	516	$83.08	1	0	No Change	172	0.17	0%	516	$83.08	$300.00	$0.00	0	0	$0.00	0.00
242.211	Main Lobby	3000	16	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	1.74	5232	$842.35	16	1	Daylight Sensor (Sensorswitch PP-20 & CM-PC or equal)	109	1.40	20%	4185.6	$673.88	$300.00	$300.00	0	1046.4	$168.47	1.78
242.211	Senior Court Corridor	3000	3	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.33	981	$157.94	3	0	No Change	109	0.33	0%	981	$157.94	$300.00	$0.00	0	0	$0.00	0.00
264.21	Guidence Corridor	2600	13	6	4x4, 6 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens	172	2.24	5813.6	$935.99	13	0	No Change	172	2.24	0%	5813.6	$935.99	$300.00	$0.00	0	0	$0.00	0.00
242.211	Guidence Corridor	2600	13	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	1.42	3684.2	$593.16	13	0	No Change	109	1.42	0%	3684.2	$593.16	$300.00	$0.00	0	0	$0.00	0.00
30	Girl's Locker	2600	4	2	Recessed Down Light, (2) 26w PL Lamp	54	0.22	561.6	$90.42	4	1	Dual Technology Occupancy Sensor - Switch Mnt.	54	0.17	20%	449.28	$72.33	$150.00	$150.00	0	112.32	$18.08	8.29

ECM 2: Lighting Controls

EXISTING LIGHTING										PROPOSED LIGHTING CONTROLS										SAVINGS			
CEG Type	Fixture Location	Yearly Usage	No. Fixts	No. Lamps	Fixture Type	Fixt Watts	Total kW	kWh/Yr Fixtures	Yearly $ Cost	No. Fixts	No. Cont.	Controls Description	Watts Used	Total kW	Reduction (%)	kWh/Yr Fixtures	Yearly $ Cost	Unit Cost (INSTALLED)	Total Cost	kW Savings	kWh/Yr Savings	Yearly $ Savings	Yearly Simple Payback
242.211	Girl's Locker	2600	13	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	1.42	3684.2	$593.16	13	1	Dual Technology Occupancy Sensor - Remote Mnt.	109	1.13	20%	2947.36	$474.52	$300.00	$300.00	0	736.84	$118.63	2.53
242.211	Girl's Locker Office	2600	2	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.22	566.8	$91.25	2	1	Dual Technology Occupancy Sensor - Switch Mnt.	109	0.17	20%	453.44	$73.00	$150.00	$150.00	0	113.36	$18.25	8.22
30	Girl's Locker Shower	2600	9	2	Recessed Down Light, (2) 26w PL Lamp	54	0.49	1263.6	$203.44	9	0	No Change	54	0.49	0%	1263.6	$203.44	$300.00	$0.00	0	0	$0.00	0.00
201	Girl's Locker Toilet Room	2600	3	2	1x2, 2 Lamp, 17w T8, Elect. Ballast, Recessed Mnt., Indirect	34	0.10	265.2	$42.70	3	0	No Change	34	0.10	0%	265.2	$42.70	$300.00	$0.00	0	0	$0.00	0.00
30	Girl's Locker Exit	2600	2	2	Recessed Down Light, (2) 26w PL Lamp	54	0.11	280.8	$45.21	2	0	No Change	54	0.11	0%	280.8	$45.21	$300.00	$0.00	0	0	$0.00	0.00
201	Girls Locker Toilet #2	2600	3	2	1x2, 2 Lamp, 17w T8, Elect. Ballast, Recessed Mnt., Indirect	34	0.10	265.2	$42.70	3	0	No Change	34	0.10	0%	265.2	$42.70	$300.00	$0.00	0	0	$0.00	0.00
242.211	Classroom 234	2600	16	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	1.74	4534.4	$730.04	16	1	Dual Technology Occupancy Sensor - Remote Mnt.	109	1.40	20%	3627.52	$584.03	$300.00	$300.00	0	906.88	$146.01	2.05
612	Custodial Closet	1200	2	1	Pendant Mnt., 100w A19 Lamp	100	0.20	240	$38.64	2	0	No Change	100	0.20	0%	240	$38.64	$300.00	$0.00	0	0	$0.00	0.00
242.211	Classroom 235	2600	8	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.87	2267.2	$365.02	8	1	Dual Technology Occupancy Sensor - Remote Mnt.	109	0.70	20%	1813.76	$292.02	$300.00	$300.00	0	453.44	$73.00	4.11
242.211	Classroom 236	2600	8	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.87	2267.2	$365.02	8	1	Dual Technology Occupancy Sensor - Remote Mnt.	109	0.70	20%	1813.76	$292.02	$300.00	$300.00	0	453.44	$73.00	4.11
242.211	Classroom 237	2600	8	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.87	2267.2	$365.02	8	1	Dual Technology Occupancy Sensor - Remote Mnt.	109	0.70	20%	1813.76	$292.02	$300.00	$300.00	0	453.44	$73.00	4.11
242.211	Classroom 238	2600	8	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.87	2267.2	$365.02	8	1	Dual Technology Occupancy Sensor - Remote Mnt.	109	0.70	20%	1813.76	$292.02	$300.00	$300.00	0	453.44	$73.00	4.11
242.211	Classroom 239	2600	8	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.87	2267.2	$365.02	8	1	Dual Technology Occupancy Sensor - Remote Mnt.	109	0.70	20%	1813.76	$292.02	$300.00	$300.00	0	453.44	$73.00	4.11
242.211	Classroom 241	2600	8	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.87	2267.2	$365.02	8	1	Dual Technology Occupancy Sensor - Remote Mnt.	109	0.70	20%	1813.76	$292.02	$300.00	$300.00	0	453.44	$73.00	4.11
242.211	Classroom 245	2600	8	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.87	2267.2	$365.02	8	1	Dual Technology Occupancy Sensor - Remote Mnt.	109	0.70	20%	1813.76	$292.02	$300.00	$300.00	0	453.44	$73.00	4.11

ECM 2: Lighting Controls

EXISTING LIGHTING										PROPOSED LIGHTING CONTROLS										SAVINGS			
CEG Type	Fixture Location	Yearly Usage	No. Fixts	No. Lamps	Fixture Type	Fixt Watts	Total kW	kWh/Yr Fixtures	Yearly $ Cost	No. Fixts	No. Cont.	Controls Description	Watts Used	Total kW	Reduction (%)	kWh/Yr Fixtures	Yearly $ Cost	Unit Cost (INSTALLED)	Total Cost	kW Savings	kWh/Yr Savings	Yearly $ Savings	Yearly Simple Payback
242.211	240A Office	2600	15	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	1.64	4251	$684.41	15	1	Dual Technology Occupancy Sensor - Remote Mnt.	109	1.31	20%	3400.8	$547.53	$300.00	$300.00	0	850.2	$136.88	2.19
242.211	Transition Office	2600	4	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.44	1133.6	$182.51	4	1	Dual Technology Occupancy Sensor - Switch Mnt.	109	0.35	20%	906.88	$146.01	$150.00	$150.00	0	226.72	$36.50	4.11
242.211	Classroom 242	2600	11	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	1.20	3117.4	$501.90	11	1	Dual Technology Occupancy Sensor - Remote Mnt.	109	0.96	20%	2493.92	$401.52	$300.00	$300.00	0	623.48	$100.38	2.99
242.211	Classroom 243	2600	11	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	1.20	3117.4	$501.90	11	1	Dual Technology Occupancy Sensor - Remote Mnt.	109	0.96	20%	2493.92	$401.52	$300.00	$300.00	0	623.48	$100.38	2.99
242.211	Classroom 244	2600	15	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	1.64	4251	$684.41	15	1	Dual Technology Occupancy Sensor - Remote Mnt.	109	1.31	20%	3400.8	$547.53	$300.00	$300.00	0	850.2	$136.88	2.19
222.23	Classroom 316	2600	12	2	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Direct/ Indirect	58	0.70	1809.6	$291.35	12	1	Dual Technology Occupancy Sensor - Remote Mnt.	58	0.56	20%	1447.68	$233.08	$300.00	$300.00	0	361.92	$58.27	5.15
222.23	316 Prep	2600	4	2	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Direct/ Indirect	58	0.23	603.2	$97.12	4	1	Dual Technology Occupancy Sensor - Switch Mnt.	58	0.19	20%	482.56	$77.69	$150.00	$150.00	0	120.64	$19.42	7.72
222.23	Classroom 312	2600	16	2	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Direct/ Indirect	58	0.93	2412.8	$388.46	16	1	Dual Technology Occupancy Sensor - Remote Mnt.	58	0.74	20%	1930.24	$310.77	$300.00	$300.00	0	482.56	$77.69	3.86
222.23	Prep 312	2600	4	2	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Direct/ Indirect	58	0.23	603.2	$97.12	4	1	Dual Technology Occupancy Sensor - Switch Mnt.	58	0.19	20%	482.56	$77.69	$150.00	$150.00	0	120.64	$19.42	7.72
222.23	Classroom 310	2600	16	2	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Direct/ Indirect	58	0.93	2412.8	$388.46	16	1	Dual Technology Occupancy Sensor - Remote Mnt.	58	0.74	20%	1930.24	$310.77	$300.00	$300.00	0	482.56	$77.69	3.86
222.23	Classroom 311	2600	16	2	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Direct/ Indirect	58	0.93	2412.8	$388.46	16	1	Dual Technology Occupancy Sensor - Remote Mnt.	58	0.74	20%	1930.24	$310.77	$300.00	$300.00	0	482.56	$77.69	3.86
222.23	311 Prep	2600	4	2	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Direct/ Indirect	58	0.23	603.2	$97.12	4	1	Dual Technology Occupancy Sensor - Switch Mnt.	58	0.19	20%	482.56	$77.69	$150.00	$150.00	0	120.64	$19.42	7.72
222.23	Classroom 313	2600	16	2	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Direct/ Indirect	58	0.93	2412.8	$388.46	16	1	Dual Technology Occupancy Sensor - Remote Mnt.	58	0.74	20%	1930.24	$310.77	$300.00	$300.00	0	482.56	$77.69	3.86
222.23	Classroom 314	2600	12	2	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Direct/ Indirect	58	0.70	1809.6	$291.35	12	1	Dual Technology Occupancy Sensor - Remote Mnt.	58	0.56	20%	1447.68	$233.08	$300.00	$300.00	0	361.92	$58.27	5.15
222.23	Classroom 315	2600	16	2	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Direct/ Indirect	58	0.93	2412.8	$388.46	16	1	Dual Technology Occupancy Sensor - Remote Mnt.	58	0.74	20%	1930.24	$310.77	$300.00	$300.00	0	482.56	$77.69	3.86

ECM 2: Lighting Controls

EXISTING LIGHTING										PROPOSED LIGHTING CONTROLS										SAVINGS			
CEG Type	Fixture Location	Yearly Usage	No. Fixts	No. Lamps	Fixture Type	Fixt Watts	Total kW	kWh/Yr Fixtures	Yearly $ Cost	No. Fixts	No. Cont.	Controls Description	Watts Used	Total kW	Reduction (%)	kWh/Yr Fixtures	Yearly $ Cost	Unit Cost (INSTALLED)	Total Cost	kW Savings	kWh/Yr Savings	Yearly $ Savings	Yearly Simple Payback
222.23	315 Prep	2600	4	2	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Direct/ Indirect	58	0.23	603.2	$97.12	4	1	Dual Technology Occupancy Sensor - Switch Mnt.	58	0.19	20%	482.56	$77.69	$150.00	$150.00	0	120.64	$19.42	7.72
222.23	Classroom 317	2600	16	2	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Direct/ Indirect	58	0.93	2412.8	$388.46	16	1	Dual Technology Occupancy Sensor - Remote Mnt.	58	0.74	20%	1930.24	$310.77	$300.00	$300.00	0	482.56	$77.69	3.86
222.23	Classroom 318	2600	16	2	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Direct/ Indirect	58	0.93	2412.8	$388.46	16	1	Dual Technology Occupancy Sensor - Remote Mnt.	58	0.74	20%	1930.24	$310.77	$300.00	$300.00	0	482.56	$77.69	3.86
563	Corridor 300	3000	34	2	Recessed Down Light, (2)26w Quad CFL Lamp	52	1.77	5304	$853.94	34	0	No Change	52	1.77	0%	5304	$853.94	$300.00	$0.00	0	0	$0.00	0.00
28		3000	24	1	Recessed Mtd, 6"x2' (1) 40w PL Lamp Wall Washer	40	0.96	2880	$463.68	24	0	No Change	40	0.96	0%	2880	$463.68	$300.00	$0.00	0	0	$0.00	0.00
284.25		3000	10	8	4x4, 8 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Direct/Indirect	218	2.18	6540	$1,052.94	10	0	No Change	218	2.18	0%	6540	$1,052.94	$300.00	$0.00	0	0	$0.00	0.00
221.31	Custodial Closet	1200	1	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens	62	0.06	74.4	$11.98	1	0	No Change	62	0.06	0%	74.4	$11.98	$300.00	$0.00	0	0	$0.00	0.00
227.21	Men's Room	2600	7	2	2x2, 2 Lamp, 32w 700 series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	65	0.46	1183	$190.46	7	1	Dual Technology Occupancy Sensor - Remote Mnt.	65	0.36	20%	946.4	$152.37	$300.00	$300.00	0	236.6	$38.09	7.88
227.21	Women's Room	2600	7	2	2x2, 2 Lamp, 32w 700 series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	65	0.46	1183	$190.46	7	1	Dual Technology Occupancy Sensor - Remote Mnt.	65	0.36	20%	946.4	$152.37	$300.00	$300.00	0	236.6	$38.09	7.88
614	Auditorium	2600	64	1	300w A Lamp, Recessed Down Light	300	19.20	49920	$8,037.12	64	0	No Change	300	19.20	0%	49920	$8,037.12	$300.00	$0.00	0	0	$0.00	0.00
221.15	Girl's Locker Room	2600	18	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Acrylic Lens	58	1.04	2714.4	$437.02	18	1	Dual Technology Occupancy Sensor - Remote Mnt.	58	0.84	20%	2171.52	$349.61	$300.00	$300.00	0	542.88	$87.40	3.43
610	Showers	1200	2	2	1x1 Surface Mount, Prismatic Lens, (2) 60w A Lamp	120	0.24	288	$46.37	2	0	No Change	120	0.24	0%	288	$46.37	$300.00	$0.00	0	0	$0.00	0.00
221.15	Locker Room Office	2600	2	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Acrylic Lens	58	0.12	301.6	$48.56	2	0	No Change	58	0.12	0%	301.6	$48.56	$300.00	$0.00	0	0	$0.00	0.00
221.15	Restroom	2600	1	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Acrylic Lens	58	0.06	150.8	$24.28	1	0	No Change	58	0.06	0%	150.8	$24.28	$300.00	$0.00	0	0	$0.00	0.00
221.15	Restroom	2600	2	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Acrylic Lens	58	0.12	301.6	$48.56	2	0	No Change	58	0.12	0%	301.6	$48.56	$300.00	$0.00	0	0	$0.00	0.00

Investment Grade Lighting Audit

ECM 2: Lighting Controls

EXISTING LIGHTING										PROPOSED LIGHTING CONTROLS										SAVINGS			
CEG Type	Fixture Location	Yearly Usage	No. Fixts	No. Lamps	Fixture Type	Fixt Watts	Total kW	kWh/Yr Fixtures	Yearly $ Cost	No. Fixts	No. Cont.	Controls Description	Watts Used	Total kW	Reduction (%)	kWh/Yr Fixtures	Yearly $ Cost	Unit Cost (INSTALLED)	Total Cost	kW Savings	kWh/Yr Savings	Yearly $ Savings	Yearly Simple Payback
232.21	Men's Locker Room Hall	2600	6	3	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.52	1341.6	$216.00	6	1	Dual Technology Occupancy Sensor - Remote Mnt.	86	0.41	20%	1073.28	$172.80	$300.00	$300.00	0	268.32	$43.20	6.94
242.11	Girl's Locker Room	2600	16	4	2x4, 4 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	109	1.74	4534.4	$730.04	16	1	Dual Technology Occupancy Sensor - Remote Mnt.	109	1.40	20%	3627.52	$584.03	$300.00	$300.00	0	906.88	$146.01	2.05
111.11		2600	5	1	1x4, 1-Lamp, 34w T12, Mag. Ballast, Surface Mnt., Prismatic Lens	48	0.24	624	$100.46	5	1	Dual Technology Occupancy Sensor - Remote Mnt.	48	0.19	20%	499.2	$80.37	$300.00	$300.00	0	124.8	$20.09	14.93
242.211	Classroom 131	2600	9	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.98	2550.6	$410.65	9	1	Dual Technology Occupancy Sensor - Remote Mnt.	109	0.78	20%	2040.48	$328.52	$300.00	$300.00	0	510.12	$82.13	3.65
221.11	131 Office	2600	2	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	0.12	322.4	$51.91	2	0	No Change	62	0.12	0%	322.4	$51.91	$300.00	$0.00	0	0	$0.00	0.00
242.211	131 Office	2600	4	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.44	1133.6	$182.51	4	1	Dual Technology Occupancy Sensor - Switch Mnt.	109	0.35	20%	906.88	$146.01	$150.00	$150.00	0	226.72	$36.50	4.11
621	Practice Rooms (2)	1200	2	1	Recessed Light, 65w BR30	65	0.13	156	$25.12	2	0	No Change	65	0.13	0%	156	$25.12	$300.00	$0.00	0	0	$0.00	0.00
227.27	Classroom 130	2600	14	2	2x2, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Indirect	58	0.81	2111.2	$339.90	14	1	Dual Technology Occupancy Sensor - Remote Mnt.	58	0.65	20%	1688.96	$271.92	$300.00	$300.00	0	422.24	$67.98	4.41
221.11	Practice Rooms (2)	1200	4	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	0.25	297.6	$47.91	4	0	No Change	62	0.25	0%	297.6	$47.91	$300.00	$0.00	0	0	$0.00	0.00
612	Custodial Closet	1200	1	1	Pendant Mnt., 100w A19 Lamp	100	0.10	120	$19.32	1	0	No Change	100	0.10	0%	120	$19.32	$300.00	$0.00	0	0	$0.00	0.00
242.211	Classroom 246	2600	8	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.87	2267.2	$365.02	8	1	Dual Technology Occupancy Sensor - Remote Mnt.	109	0.70	20%	1813.76	$292.02	$300.00	$300.00	0	453.44	$73.00	4.11
242.211	Classroom 247	2600	8	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.87	2267.2	$365.02	8	1	Dual Technology Occupancy Sensor - Remote Mnt.	109	0.70	20%	1813.76	$292.02	$300.00	$300.00	0	453.44	$73.00	4.11
242.211	Classroom 248	2600	8	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.87	2267.2	$365.02	8	1	Dual Technology Occupancy Sensor - Remote Mnt.	109	0.70	20%	1813.76	$292.02	$300.00	$300.00	0	453.44	$73.00	4.11
242.211	Classroom 249	2600	8	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.87	2267.2	$365.02	8	1	Dual Technology Occupancy Sensor - Remote Mnt.	109	0.70	20%	1813.76	$292.02	$300.00	$300.00	0	453.44	$73.00	4.11
242.211	Classroom 250	2600	8	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.87	2267.2	$365.02	8	1	Dual Technology Occupancy Sensor - Remote Mnt.	109	0.70	20%	1813.76	$292.02	$300.00	$300.00	0	453.44	$73.00	4.11

ECM 2: Lighting Controls

EXISTING LIGHTING										PROPOSED LIGHTING CONTROLS										SAVINGS			
CEG Type	Fixture Location	Yearly Usage	No. Fixts	No. Lamps	Fixture Type	Fixt Watts	Total kW	kWh/Yr Fixtures	Yearly $ Cost	No. Fixts	No. Cont.	Controls Description	Watts Used	Total kW	Reduction (%)	kWh/Yr Fixtures	Yearly $ Cost	Unit Cost (INSTALLED)	Total Cost	kW Savings	kWh/Yr Savings	Yearly $ Savings	Yearly Simple Payback
242.211	Classroom 214	2600	8	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.87	2267.2	$365.02	8	1	Dual Technology Occupancy Sensor - Remote Mnt.	109	0.70	20%	1813.76	$292.02	$300.00	$300.00	0	453.44	$73.00	4.11
242.211	Classroom 215	2600	8	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.87	2267.2	$365.02	8	1	Dual Technology Occupancy Sensor - Remote Mnt.	109	0.70	20%	1813.76	$292.02	$300.00	$300.00	0	453.44	$73.00	4.11
242.211	Classroom 216	2600	8	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.87	2267.2	$365.02	8	1	Dual Technology Occupancy Sensor - Remote Mnt.	109	0.70	20%	1813.76	$292.02	$300.00	$300.00	0	453.44	$73.00	4.11
242.211	Classroom 212	2600	8	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.87	2267.2	$365.02	8	1	Dual Technology Occupancy Sensor - Remote Mnt.	109	0.70	20%	1813.76	$292.02	$300.00	$300.00	0	453.44	$73.00	4.11
242.211	Classroom 213	2600	9	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.98	2550.6	$410.65	9	1	Dual Technology Occupancy Sensor - Remote Mnt.	109	0.78	20%	2040.48	$328.52	$300.00	$300.00	0	510.12	$82.13	3.65
242.211	Classroom 217	2600	9	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.98	2550.6	$410.65	9	1	Dual Technology Occupancy Sensor - Remote Mnt.	109	0.78	20%	2040.48	$328.52	$300.00	$300.00	0	510.12	$82.13	3.65
242.211	Classroom 218	2600	9	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.98	2550.6	$410.65	9	1	Dual Technology Occupancy Sensor - Remote Mnt.	109	0.78	20%	2040.48	$328.52	$300.00	$300.00	0	510.12	$82.13	3.65
242.211	Office	2600	3	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.33	850.2	$136.88	3	1	Dual Technology Occupancy Sensor - Switch Mnt.	109	0.26	20%	680.16	$109.51	$150.00	$150.00	0	170.04	$27.38	5.48
621	Planetarium	2600	10	1	Recessed Light, 65w BR30	65	0.65	1690	$272.09	10	0	No Change	65	0.65	0%	1690	$272.09	$300.00	$0.00	0	0	$0.00	0.00
222.23	English Office	2600	8	2	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Direct/ Indirect	58	0.46	1206.4	$194.23	8	1	Dual Technology Occupancy Sensor - Remote Mnt.	58	0.37	20%	965.12	$155.38	$300.00	$300.00	0	241.28	$38.85	7.72
242.211	Classroom 210	2600	9	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.98	2550.6	$410.65	9	1	Dual Technology Occupancy Sensor - Remote Mnt.	109	0.78	20%	2040.48	$328.52	$300.00	$300.00	0	510.12	$82.13	3.65
222.23	Classroom 210A	2600	6	2	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Direct/ Indirect	58	0.35	904.8	$145.67	6	1	Dual Technology Occupancy Sensor - Switch Mnt.	58	0.28	20%	723.84	$116.54	$150.00	$150.00	0	180.96	$29.13	5.15
242.211	Classroom 207	2600	8	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.87	2267.2	$365.02	8	1	Dual Technology Occupancy Sensor - Remote Mnt.	109	0.70	20%	1813.76	$292.02	$300.00	$300.00	0	453.44	$73.00	4.11
242.211	Classroom 208	2600	8	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.87	2267.2	$365.02	8	1	Dual Technology Occupancy Sensor - Remote Mnt.	109	0.70	20%	1813.76	$292.02	$300.00	$300.00	0	453.44	$73.00	4.11
242.211	Classroom 209	2600	9	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.98	2550.6	$410.65	9	1	Dual Technology Occupancy Sensor - Remote Mnt.	109	0.78	20%	2040.48	$328.52	$300.00	$300.00	0	510.12	$82.13	3.65

ECM 2: Lighting Controls

EXISTING LIGHTING										PROPOSED LIGHTING CONTROLS										SAVINGS			
CEG Type	Fixture Location	Yearly Usage	No. Fixts	No. Lamps	Fixture Type	Fixt Watts	Total kW	kWh/Yr Fixtures	Yearly $ Cost	No. Fixts	No. Cont.	Controls Description	Watts Used	Total kW	Reduction (%)	kWh/Yr Fixtures	Yearly $ Cost	Unit Cost (INSTALLED)	Total Cost	kW Savings	kWh/Yr Savings	Yearly $ Savings	Yearly Simple Payback
242.211	Boy's Room	2600	3	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.33	850.2	$136.88	3	1	Dual Technology Occupancy Sensor - Switch Mnt.	109	0.26	20%	680.16	$109.51	$150.00	$150.00	0	170.04	$27.38	5.48
242.211	Study Room	2600	2	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.22	566.8	$91.25	2	1	Dual Technology Occupancy Sensor - Switch Mnt.	109	0.17	20%	453.44	$73.00	$150.00	$150.00	0	113.36	$18.25	8.22
242.211	Classroom 205	2600	8	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.87	2267.2	$365.02	8	1	Dual Technology Occupancy Sensor - Remote Mnt.	109	0.70	20%	1813.76	$292.02	$300.00	$300.00	0	453.44	$73.00	4.11
242.211	Classroom 206	2600	8	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.87	2267.2	$365.02	8	1	Dual Technology Occupancy Sensor - Remote Mnt.	109	0.70	20%	1813.76	$292.02	$300.00	$300.00	0	453.44	$73.00	4.11
242.211	Room 204	2600	5	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.55	1417	$228.14	5	1	Dual Technology Occupancy Sensor - Switch Mnt.	109	0.44	20%	1133.6	$182.51	$150.00	$150.00	0	283.4	$45.63	3.29
242.211	Classroom 202	2600	12	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	1.31	3400.8	$547.53	12	1	Dual Technology Occupancy Sensor - Remote Mnt.	109	1.05	20%	2720.64	$438.02	$300.00	$300.00	0	680.16	$109.51	2.74
222.23		2600	10	2	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Dirrect/ Indirect	58	0.58	1508	$242.79	10	1	Dual Technology Occupancy Sensor - Remote Mnt.	58	0.46	20%	1206.4	$194.23	$300.00	$300.00	0	301.6	$48.56	6.18
242.211	Classroom 203	2600	12	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	1.31	3400.8	$547.53	12	1	Dual Technology Occupancy Sensor - Remote Mnt.	109	1.05	20%	2720.64	$438.02	$300.00	$300.00	0	680.16	$109.51	2.74
222.23		2600	10	2	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Dirrect/ Indirect	58	0.58	1508	$242.79	10	1	Dual Technology Occupancy Sensor - Remote Mnt.	58	0.46	20%	1206.4	$194.23	$300.00	$300.00	0	301.6	$48.56	6.18
242.211	Classroom 219	2600	12	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	1.31	3400.8	$547.53	12	1	Dual Technology Occupancy Sensor - Remote Mnt.	109	1.05	20%	2720.64	$438.02	$300.00	$300.00	0	680.16	$109.51	2.74
242.211	Classroom 220	2600	16	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	1.74	4534.4	$730.04	16	1	Dual Technology Occupancy Sensor - Remote Mnt.	109	1.40	20%	3627.52	$584.03	$300.00	$300.00	0	906.88	$146.01	2.05
242.211	Classroom 221	2600	12	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	1.31	3400.8	$547.53	12	1	Dual Technology Occupancy Sensor - Remote Mnt.	109	1.05	20%	2720.64	$438.02	$300.00	$300.00	0	680.16	$109.51	2.74
242.211	Yearbook	2600	4	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.44	1133.6	$182.51	4	1	Dual Technology Occupancy Sensor - Switch Mnt.	109	0.35	20%	906.88	$146.01	$150.00	$150.00	0	226.72	$36.50	4.11
242.211	Classroom 222	2600	11	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	1.20	3117.4	$501.90	11	1	Dual Technology Occupancy Sensor - Remote Mnt.	109	0.96	20%	2493.92	$401.52	$300.00	$300.00	0	623.48	$100.38	2.99
242.211	Sp Services	2600	4	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.44	1133.6	$182.51	4	1	Dual Technology Occupancy Sensor - Switch Mnt.	109	0.35	20%	906.88	$146.01	$150.00	$150.00	0	226.72	$36.50	4.11

ECM 2: Lighting Controls

EXISTING LIGHTING										PROPOSED LIGHTING CONTROLS										SAVINGS			
CEG Type	Fixture Location	Yearly Usage	No. Fixts	No. Lamps	Fixture Type	Fixt Watts	Total kW	kWh/Yr Fixtures	Yearly $ Cost	No. Fixts	No. Cont.	Controls Description	Watts Used	Total kW	Reduction (%)	kWh/Yr Fixtures	Yearly $ Cost	Unit Cost (INSTALLED)	Total Cost	kW Savings	kWh/Yr Savings	Yearly $ Savings	Yearly Simple Payback
242.211	Classroom 223	2600	12	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	1.31	3400.8	$547.53	12	1	Dual Technology Occupancy Sensor - Remote Mnt.	109	1.05	20%	2720.64	$438.02	$300.00	$300.00	0	680.16	$109.51	2.74
612	223 Closet	800	1	1	Pendant Mnt., 100w A19 Lamp	100	0.10	80	$12.88	1	0	No Change	100	0.10	0%	80	$12.88	$300.00	$0.00	0	0	$0.00	0.00
242.211	Men's Room	2600	2	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.22	566.8	$91.25	2	1	Dual Technology Occupancy Sensor - Switch Mnt.	109	0.17	20%	453.44	$73.00	$150.00	$150.00	0	113.36	$18.25	8.22
242.211	Women's Room	2600	2	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.22	566.8	$91.25	2	1	Dual Technology Occupancy Sensor - Switch Mnt.	109	0.17	20%	453.44	$73.00	$150.00	$150.00	0	113.36	$18.25	8.22
221.31	Classroom 224	2600	16	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens	62	0.99	2579.2	$415.25	16	1	Dual Technology Occupancy Sensor - Remote Mnt.	62	0.79	20%	2063.36	$332.20	$300.00	$300.00	0	515.84	$83.05	3.61
242.211	Classroom 225	2600	12	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	1.31	3400.8	$547.53	12	1	Dual Technology Occupancy Sensor - Remote Mnt.	109	1.05	20%	2720.64	$438.02	$300.00	$300.00	0	680.16	$109.51	2.74
242.211	Classroom 226	2600	6	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.65	1700.4	$273.76	6	1	Dual Technology Occupancy Sensor - Switch Mnt.	109	0.52	20%	1360.32	$219.01	$150.00	$150.00	0	340.08	$54.75	2.74
242.211	Classroom 227	2600	6	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.65	1700.4	$273.76	6	1	Dual Technology Occupancy Sensor - Switch Mnt.	109	0.52	20%	1360.32	$219.01	$150.00	$150.00	0	340.08	$54.75	2.74
242.211	227A Office	2600	6	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.65	1700.4	$273.76	6	1	Dual Technology Occupancy Sensor - Switch Mnt.	109	0.52	20%	1360.32	$219.01	$150.00	$150.00	0	340.08	$54.75	2.74
242.211	Classroom 228	2600	9	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.98	2550.6	$410.65	9	1	Dual Technology Occupancy Sensor - Remote Mnt.	109	0.78	20%	2040.48	$328.52	$300.00	$300.00	0	510.12	$82.13	3.65
242.211	Classroom 227B	2600	6	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.65	1700.4	$273.76	6	1	Dual Technology Occupancy Sensor - Switch Mnt.	109	0.52	20%	1360.32	$219.01	$150.00	$150.00	0	340.08	$54.75	2.74
242.211	229A Office	2600	6	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.65	1700.4	$273.76	6	1	Dual Technology Occupancy Sensor - Switch Mnt.	109	0.52	20%	1360.32	$219.01	$150.00	$150.00	0	340.08	$54.75	2.74
222.23	Copy Room	2600	4	2	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Dirrect/ Indirect	58	0.23	603.2	$97.12	4	1	Dual Technology Occupancy Sensor - Switch Mnt.	58	0.19	20%	482.56	$77.69	$150.00	$150.00	0	120.64	$19.42	7.72
242.211	Classroom 229	2600	9	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.98	2550.6	$410.65	9	1	Dual Technology Occupancy Sensor - Remote Mnt.	109	0.78	20%	2040.48	$328.52	$300.00	$300.00	0	510.12	$82.13	3.65
242.211	Classroom 230	2600	8	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.87	2267.2	$365.02	8	1	Dual Technology Occupancy Sensor - Remote Mnt.	109	0.70	20%	1813.76	$292.02	$300.00	$300.00	0	453.44	$73.00	4.11

Investment Grade Lighting Audit

ECM 2: Lighting Controls

EXISTING LIGHTING										PROPOSED LIGHTING CONTROLS										SAVINGS			
CEG Type	Fixture Location	Yearly Usage	No. Fixts	No. Lamps	Fixture Type	Fixt Watts	Total kW	kWh/Yr Fixtures	Yearly $ Cost	No. Fixts	No. Cont.	Controls Description	Watts Used	Total kW	Reduction (%)	kWh/Yr Fixtures	Yearly $ Cost	Unit Cost (INSTALLED)	Total Cost	kW Savings	kWh/Yr Savings	Yearly $ Savings	Yearly Simple Payback
222.23	Classroom 231	2600	8	2	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Direct/ Indirect	58	0.46	1206.4	$194.23	8	1	Dual Technology Occupancy Sensor - Remote Mnt.	58	0.37	20%	965.12	$155.38	$300.00	$300.00	0	241.28	$38.85	7.72
242.211	Classroom 232	2600	8	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.87	2267.2	$365.02	8	1	Dual Technology Occupancy Sensor - Remote Mnt.	109	0.70	20%	1813.76	$292.02	$300.00	$300.00	0	453.44	$73.00	4.11
242.211	Women's Room	2600	2	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.22	566.8	$91.25	2	1	Dual Technology Occupancy Sensor - Switch Mnt.	109	0.17	20%	453.44	$73.00	$150.00	$150.00	0	113.36	$18.25	8.22
222.23	Classroom 233	2600	10	2	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Direct/ Indirect	58	0.58	1508	$242.79	10	1	Dual Technology Occupancy Sensor - Remote Mnt.	58	0.46	20%	1206.4	$194.23	$300.00	$300.00	0	301.6	$48.56	6.18
242.211	Men's Room	2600	2	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.22	566.8	$91.25	2	1	Dual Technology Occupancy Sensor - Switch Mnt.	109	0.17	20%	453.44	$73.00	$150.00	$150.00	0	113.36	$18.25	8.22
222.23	Conf. Room 140	2600	20	2	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Direct/ Indirect	58	1.16	3016	$485.58	20	1	Dual Tech. Occupancy Sensor w/2 Pole Powerpack - Remote Mnt.	58	0.93	20%	2412.8	$388.46	$450.00	$450.00	0	603.2	$97.12	4.63
164.25	Nurse Reception Area	2600	1	6	4x4, 6-Lamp, 34w T12, Mag. Ballast, Recessed Mnt., White Lens	234	0.23	608.4	$97.95	1	0	No Change	234	0.23	0%	608.4	$97.95	$300.00	$0.00	0	0	$0.00	0.00
242.11		2600	1	4	2x4, 4 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	109	0.11	283.4	$45.63	1	0	No Change	109	0.11	0%	283.4	$45.63	$300.00	$0.00	0	0	$0.00	0.00
264.21	Exam Room	2600	1	6	4x4, 6 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens	172	0.17	447.2	$72.00	1	0	No Change	172	0.17	0%	447.2	$72.00	$300.00	$0.00	0	0	$0.00	0.00
264.21	Exam Room	2600	1	6	4x4, 6 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens	172	0.17	447.2	$72.00	1	0	No Change	172	0.17	0%	447.2	$72.00	$300.00	$0.00	0	0	$0.00	0.00
610	Nurse's hall	2600	3	2	1x1 Surface Mount, Prismatic Lens, (2) 60w A Lamp	120	0.36	936	$150.70	3	1	Dual Technology Occupancy Sensor - Switch Mnt.	120	0.29	20%	748.8	$120.56	$150.00	$150.00	0	187.2	$30.14	4.98
264.21	Nurse's Office	2600	2	6	4x4, 6 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens	172	0.34	894.4	$144.00	2	1	Dual Technology Occupancy Sensor - Switch Mnt.	172	0.28	20%	715.52	$115.20	$150.00	$150.00	0	178.88	$28.80	5.21
612	Nurse's Closet	1200	1	1	Pendant Mnt., 100w A19 Lamp	100	0.10	120	$19.32	1	0	No Change	100	0.10	0%	120	$19.32	$300.00	$0.00	0	0	$0.00	0.00
30	Gym Lobby	2600	7	2	Recessed Down Light, (2) 26w PL Lamp	54	0.38	982.8	$158.23	7	0	No Change	54	0.38	0%	982.8	$158.23	$300.00	$0.00	0	0	$0.00	0.00
227.21		2600	9	2	2x2, 2 Lamp, 32w 700 series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	65	0.59	1521	$244.88	9	0	No Change	65	0.59	0%	1521	$244.88	$300.00	$0.00	0	0	$0.00	0.00

ECM 2: Lighting Controls

EXISTING LIGHTING										PROPOSED LIGHTING CONTROLS										SAVINGS			
CEG Type	Fixture Location	Yearly Usage	No. Fixts	No. Lamps	Fixture Type	Fixt Watts	Total kW	kWh/Yr Fixtures	Yearly $ Cost	No. Fixts	No. Cont.	Controls Description	Watts Used	Total kW	Reduction (%)	kWh/Yr Fixtures	Yearly $ Cost	Unit Cost (INSTALLED)	Total Cost	kW Savings	kWh/Yr Savings	Yearly $ Savings	Yearly Simple Payback
362.14	Back Gym	1980	21	6	2x4, 6 Lamp, 54w T5HO Fixture w/Occupancy Sensor	354	7.43	14719.32	$2,369.81	21	0	No Change	354	7.43	0%	14719.32	$2,369.81	$300.00	$0.00	0	0	$0.00	0.00
612	Back Gym Closet	800	2	1	Pendant Mnt., 100w A19 Lamp	100	0.20	160	$25.76	2	0	No Change	100	0.20	0%	160	$25.76	$300.00	$0.00	0	0	$0.00	0.00
121.34	Penthouse	440	4	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Pendant Mnt., No Lens	78	0.31	137.28	$22.10	4	0	No Change	78	0.31	0%	137.28	$22.10	$300.00	$0.00	0	0	$0.00	0.00
227.21	Locker Room Corridor	3000	21	2	2x2, 2 Lamp, 32w 700 series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	65	1.37	4095	$659.30	21	0	No Change	65	1.37	0%	4095	$659.30	$300.00	$0.00	0	0	$0.00	0.00
221.34	Boy's Team Room	2600	12	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., No Lens	58	0.70	1809.6	$291.35	12	1	Dual Technology Occupancy Sensor - Remote Mnt.	58	0.56	20%	1447.68	$233.08	$300.00	$300.00	0	361.92	$58.27	5.15
242.11	Boy's Locker Room	2600	12	4	2x4, 4 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	109	1.31	3400.8	$547.53	12	1	Dual Technology Occupancy Sensor - Remote Mnt.	109	1.05	20%	2720.64	$438.02	$300.00	$300.00	0	680.16	$109.51	2.74
221.11	Boy's restroom	2600	2	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	0.12	322.4	$51.91	2	0	No Change	62	0.12	0%	322.4	$51.91	$300.00	$0.00	0	0	$0.00	0.00
121.11	Closet	1200	1	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Surface Mnt., Prismatic Lens	78	0.08	93.6	$15.07	1	0	No Change	78	0.08	0%	93.6	$15.07	$300.00	$0.00	0	0	$0.00	0.00
242.211	Coach's Office	2600	6	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.65	1700.4	$273.76	6	1	Dual Technology Occupancy Sensor - Switch Mnt.	109	0.52	20%	1360.32	$219.01	$150.00	$150.00	0	340.08	$54.75	2.74
121.11	Shower	1200	1	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Surface Mnt., Prismatic Lens	78	0.08	93.6	$15.07	1	0	No Change	78	0.08	0%	93.6	$15.07	$300.00	$0.00	0	0	$0.00	0.00
221.11	Coach's Office	2600	2	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	0.12	322.4	$51.91	2	0	No Change	62	0.12	0%	322.4	$51.91	$300.00	$0.00	0	0	$0.00	0.00
242.211	Men's Room	2600	3	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.33	850.2	$136.88	3	1	Dual Technology Occupancy Sensor - Switch Mnt.	109	0.26	20%	680.16	$109.51	$150.00	$150.00	0	170.04	$27.38	5.48
242.211	Trainor	2600	6	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.65	1700.4	$273.76	6	1	Dual Technology Occupancy Sensor - Switch Mnt.	109	0.52	20%	1360.32	$219.01	$150.00	$150.00	0	340.08	$54.75	2.74
610	Trainer - Shower Area	1200	4	2	1x1 Surface Mount, Prismatic Lens, (2) 60w A Lamp	120	0.48	576	$92.74	4	0	No Change	120	0.48	0%	576	$92.74	$300.00	$0.00	0	0	$0.00	0.00
221.11	Varsity Football	2600	7	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	0.43	1128.4	$181.67	7	1	Dual Technology Occupancy Sensor	62	0.35	20%	902.72	$145.34	$300.00	$300.00	0	225.68	$36.33	3.66

ECM 2: Lighting Controls

EXISTING LIGHTING										PROPOSED LIGHTING CONTROLS										SAVINGS			
CEG Type	Fixture Location	Yearly Usage	No. Fixts	No. Lamps	Fixture Type	Fixt Watts	Total kW	kWh/Yr Fixtures	Yearly $ Cost	No. Fixts	No. Cont.	Controls Description	Watts Used	Total kW	Reduction (%)	kWh/Yr Fixtures	Yearly $ Cost	Unit Cost (INSTALLED)	Total Cost	kW Savings	kWh/Yr Savings	Yearly $ Savings	Yearly Simple Payback
242.211	Locker Room	2600	5	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.55	1417	$228.14	5	1	Occupancy Sensor - Remote Mnt.	109	0.44	20%	1133.6	$182.51	$300.00	$300.00	0	283.4	$45.63	5.66
610	Showers	1200	4	2	1x1 Surface Mount, Prismatic Lens, (2) 60w A Lamp	120	0.48	576	$92.74	4	0	No Change	120	0.48	0%	576	$92.74	$300.00	$0.00	0	0	$0.00	0.00
221.11	Restroom	2600	2	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	0.12	322.4	$51.91	2	0	No Change	62	0.12	0%	322.4	$51.91	$300.00	$0.00	0	0	$0.00	0.00
221.11	Storage	1200	1	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	0.06	74.4	$11.98	1	0	No Change	62	0.06	0%	74.4	$11.98	$300.00	$0.00	0	0	$0.00	0.00
221.11	Ice Room	2600	2	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	0.12	322.4	$51.91	2	0	No Change	62	0.12	0%	322.4	$51.91	$300.00	$0.00	0	0	$0.00	0.00
221.11	Boy's Locker Room	2600	18	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	1.12	2901.6	$467.16	18	1	Dual Technology Occupancy Sensor - Remote Mnt.	62	0.89	20%	2321.28	$373.73	$300.00	$300.00	0	580.32	$93.43	3.21
612	Restroom	1200	1	1	Pendant Mnt., 100w A19 Lamp	100	0.10	120	$19.32	1	0	No Change	100	0.10	0%	120	$19.32	$300.00	$0.00	0	0	$0.00	0.00
242.211	Locker Room Office	2600	3	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.33	850.2	$136.88	3	1	Dual Technology Occupancy Sensor - Switch Mnt.	109	0.26	20%	680.16	$109.51	$150.00	$150.00	0	170.04	$27.38	5.48
221.11	Showers	1200	4	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	0.25	297.6	$47.91	4	0	No Change	62	0.25	0%	297.6	$47.91	$300.00	$0.00	0	0	$0.00	0.00
612		1200	4	1	Pendant Mnt., 100w A19 Lamp	100	0.40	480	$77.28	4	0	No Change	100	0.40	0%	480	$77.28	$300.00	$0.00	0	0	$0.00	0.00
612	Closet	1200	1	1	Pendant Mnt., 100w A19 Lamp	100	0.10	120	$19.32	1	0	No Change	100	0.10	0%	120	$19.32	$300.00	$0.00	0	0	$0.00	0.00
769	Wrestling Gym	2600	8	1	400w MH, Prismatic Lens	465	3.72	9672	$1,557.19	8	2	Dual Technology Occupancy Sensor - Remote Mnt.	465	2.98	20%	7737.6	$1,245.75	$300.00	$600.00	0	1934.4	$311.44	1.93
612	Gym Storage	1200	2	1	Pendant Mnt., 100w A19 Lamp	100	0.20	240	$38.64	2	0	No Change	100	0.20	0%	240	$38.64	$300.00	$0.00	0	0	$0.00	0.00
242.211		1200	2	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.22	261.6	$42.12	2	0	No Change	109	0.22	0%	261.6	$42.12	$300.00	$0.00	0	0	$0.00	0.00
769	Main Gym	2600	32	1	400w MH, Prismatic Lens	465	14.88	38688	$6,228.77	32	3	Dual Tech. Occupancy Sensor w/2 Pole Powerpack - Remote Mnt.	465	11.90	20%	30950.4	$4,983.01	$450.00	$1,350.00	0	7737.6	$1,245.75	1.08

Investment Grade Lighting Audit

ECM 2: Lighting Controls

EXISTING LIGHTING										PROPOSED LIGHTING CONTROLS										SAVINGS			
CEG Type	Fixture Location	Yearly Usage	No. Fixts	No. Lamps	Fixture Type	Fixt Watts	Total kW	kWh/Yr Fixtures	Yearly $ Cost	No. Fixts	No. Cont.	Controls Description	Watts Used	Total kW	Reduction (%)	kWh/Yr Fixtures	Yearly $ Cost	Unit Cost (INSTALLED)	Total Cost	kW Savings	kWh/Yr Savings	Yearly $ Savings	Yearly Simple Payback
612	Storage	1200	5	1	Pendant Mnt., 100w A19 Lamp	100	0.50	600	$96.60	5	1	Dual Technology Occupancy Sensor - Switch Mnt.	100	0.40	20%	480	$77.28	$150.00	$150.00	0	120	$19.32	7.76
242.211	Classroom 141	2600	20	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	2.18	5668	$912.55	20	1	Dual Tech. Occupancy Sensor w/2 Pole Powerpack - Remote Mnt.	109	1.74	20%	4534.4	$730.04	$450.00	$450.00	0	1133.6	$182.51	2.47
222.23	141 Changing Room	2600	4	2	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Direct/ Indirect	58	0.23	603.2	$97.12	4	1	Dual Technology Occupancy Sensor - Switch Mnt.	58	0.19	20%	482.56	$77.69	$150.00	$150.00	0	120.64	$19.42	7.72
222.23	141 Office	2600	2	2	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Direct/ Indirect	58	0.12	301.6	$48.56	2	0	No Change	58	0.12	0%	301.6	$48.56	$300.00	$0.00	0	0	$0.00	0.00
222.23	141 Storage	1200	10	2	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Direct/ Indirect	58	0.58	696	$112.06	10	1	Dual Technology Occupancy Sensor - Remote Mnt.	58	0.46	20%	556.8	$89.64	$300.00	$300.00	0	139.2	$22.41	13.39
242.211	Corridor 200	3000	151	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	16.46	49377	$7,949.70	151	0	No Change	109	16.46	0%	49377	$7,949.70	$300.00	$0.00	0	0	$0.00	0.00
264.21		3000	2	6	4x4, 6 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens	172	0.34	1032	$166.15	2	0	No Change	172	0.34	0%	1032	$166.15	$300.00	$0.00	0	0	$0.00	0.00
164.25		3000	2	6	4x4, 6-Lamp, 34w T12, Mag. Ballast, Recessed Mnt., White Lens	234	0.47	1404	$226.04	2	0	No Change	234	0.47	0%	1404	$226.04	$300.00	$0.00	0	0	$0.00	0.00
242.211	Corridor 200 between 228 and 229	3000	11	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	1.20	3597	$579.12	11	1	Daylight Sensor (Sensorswitch PP-20 & CM-PC or equal)	109	0.96	20%	2877.6	$463.29	$300.00	$300.00	0	719.4	$115.82	2.59
242.211	Corridor 200 between 241 and 242	3000	4	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	109	0.44	1308	$210.59	4	1	Daylight Sensor (Sensorswitch PP-20 & CM-PC or equal)	109	0.35	20%	1046.4	$168.47	$300.00	$300.00	0	261.6	$42.12	7.12
711	Exterior	4000	12	1	1x1 100w HPS Surface Mount	125	1.50	6000	$966.00	12	0	No Change	125	1.50	0%	6000	$966.00	$300.00	$0.00	0	0	$0.00	0.00
712		4000	8	1	1000w MH Flood	1080	8.64	34560	$5,564.16	8	0	No Change	1080	8.64	0%	34560	$5,564.16	$300.00	$0.00	0	0	$0.00	0.00
710		4000	85	1	1x1 26w CFL Recessed Mount	26	2.21	8840	$1,423.24	85	0	No Change	26	2.21	0%	8840	$1,423.24	$300.00	$0.00	0	0	$0.00	0.00
	Totals		2,738	1005			289.7	795,444.8	$128,067	2,738	214			250.5		690,018.8	$111,093.03		$59,050	0.00	105,426	$16,974	3.48

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
Northern Highlands Regional HS	18,000	SHARP NU-U235F2	735	17.5	12,892	172.73	198,754	139	30,797	13.40

Proposed PV Layout

Notes:

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

Station Identification	
City:	Newark
State:	New_Jersey
Latitude:	40.70° N
Longitude:	74.17° W
Elevation:	9 m
PV System Specifications	
DC Rating:	172.0 kW
DC to AC Derate Factor:	0.810
AC Rating:	139.3 kW
Array Type:	Fixed Tilt
Array Tilt:	10.0°
Array Azimuth:	180.0°
Energy Specifications	
Cost of Electricity:	16.1 ¢/kWh

Results			
Month	Solar Radiation (kWh/m ^{2}/day)	AC Energy (kWh)	Energy Value ($)
1	2.39	10320	1661.52
2	3.17	12511	2014.27
3	4.07	17510	2819.11
4	4.83	19399	3123.24
5	5.70	23080	3715.88
6	5.94	22553	3631.03
7	5.77	22378	3602.86
8	5.38	20727	3337.05
9	4.65	17833	2871.11
10	3.61	14679	2363.32
11	2.35	9363	1507.44
12	2.01	8401	1352.56
Year	4.16	198754	31999.39

Project Name: **Montville BOE**
Location: **Montville High School**
Description: **Photovoltaic System 100% Financing - 15 year**

Simple Payback Analysis

	Photovoltaic System 100% Financing - 15 year
Total Construction Cost	$1,037,154
Annual kWh Production	198,754
Annual Energy Cost Reduction	$31,999
Average Annual SREC Revenue	$40,613

Simple Payback: **14.28** Years

Life Cycle Cost Analysis

Analysis Period (years): 15
Discount Rate: 3%
Average Energy Cost ($/kWh) **$0.161**
Financing Rate: 6.00%
Financing %: 100%
Maintenance Escalation Rate: 3.0%
Energy Cost Escalation Rate: 3.0%
Average SREC Value ($/kWh) $0.204

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	198,754	$31,999	$0	$59,626	$61,033	$43,993	($13,400)	($13,400)
2	$0	197,760	$32,959	$0	$59,328	$58,319	$46,706	($12,738)	($26,137)
3	$0	196,771	$33,948	$0	$49,193	$55,438	$49,587	($21,884)	($48,021)
4	$0	195,788	$34,967	$0	$48,947	$52,380	$52,645	($21,112)	($69,133)
5	$0	194,809	$36,016	$2,007	$38,962	$49,133	$55,892	($32,054)	($101,187)
6	$0	193,835	$37,096	$1,996	$38,767	$45,686	$59,339	($31,159)	($132,346)
7	$0	192,865	$38,209	$1,987	$38,573	$42,026	$62,999	($30,230)	($162,576)
8	$0	191,901	$39,355	$1,977	$38,380	$38,140	$66,885	($29,266)	($191,842)
9	$0	190,942	$40,536	$1,967	$38,188	$34,015	$71,010	($28,268)	($220,109)
10	$0	189,987	$41,752	$1,957	$37,997	$29,635	$75,390	($27,233)	($247,342)
11	$0	189,037	$43,005	$1,947	$28,356	$24,985	$80,040	($35,612)	($282,954)
12	$0	188,092	$44,295	$1,937	$28,214	$20,048	$84,977	($34,454)	($317,408)
13	$0	187,151	$45,623	$1,928	$28,073	$14,807	$90,218	($33,257)	($350,665)
14	$0	186,216	$46,992	$1,918	$27,932	$9,243	$95,782	($32,019)	($382,684)
15	$0	185,284	$48,402	$1,908	$27,793	$3,335	$101,690	($30,739)	($413,423)
	Totals:	2,879,191	$595,154	$21,528	$588,329	$538,223	$1,037,154	($413,423)	($2,959,227)

Net Present Value (NPV) **($302,175)**

ROCKLAND ELECTRIC SERVICE TERRITORY
Last Updated: 1/10/12

***CUSTOMER CLASS - R – RESIDENTIAL C – COMMERCIAL I – INDUSTRIAL**

Supplier	Telephone & Web Site	Customer Class
Alpha Gas and Electric, LLC 641 5th Street Lakewood, NJ 08701	(855) 553-6374 www.alphagasandelectric.com	**R/C** **ACTIVE**
Ambit Northeast, LLC 103 Carnegie Center Suite 300 Princeton, NJ 08540	(877)-30-AMBIT (877) 302-6248 www.ambitenergy.com	**R/C** **ACTIVE**
ConEdison Solutions Cherry Tree Corporate Center 535 State Highway 38 Cherry Hill, NJ 08002	(888) 665-0955 www.conedsolutions.com	**C/I** **ACTIVE**
Direct Energy Business, LLC 120 Wood Avenue, Suite 611 Iselin, NJ 08830	(888) 925-9115 www.directenergybusiness.com	**C/I** **ACTIVE**
Direct Energy Services, LLC 120 Wood Avenue, Suite 611 Iselin, NJ 08830	(866) 547-2722 www.directenergy.com	**C/I** **ACTIVE**
Energy Plus Holdings 309 Fellowship Road East Gate Center, Suite 200 Mt. Laurel, NJ 08054	(877) 866-9193 www.energypluscompany.com	**R/C** **ACTIVE**
EnerPenn USA, LLC 89 Headquarters Plaza North #1463 Morristown, NJ 07960	(855) 243-3596 www.yepenergyNJ.com	**R/C/I** **ACTIVE**
Gateway Energy Services, Corp. 44 Whispering Pines Lane Lakewood, NJ 08701	(800) 805-8586 www.gesc.com	**R/C/I** **ACTIVE**
GDF Suez Energy Resources NA, Inc. 333 Thornall Street Sixth Floor Edison, NJ 08837	(866) 999-8374 www.gdfsuezenergyresources.com	**C/I** **ACTIVE**

Glacial Energy of New Jersey, Inc. 75 Route 15 Building E Lafayette, NJ 07848	(888) 452-2425 www.glacialenergy.com	**C/I** **ACTIVE**
Hess Corporation 1 Hess Plaza Woodbridge, NJ 07097	(800) 437-7872 www.hess.com	**C/I** **ACTIVE**
Hess Small Business Services, LLC One Hess Plaza Woodbridge, NJ 07095	888-494-4377 www.hessenergy.com	**C/I** **ACTIVE**
Independence Energy Group, LLC 3711 Market Street, 10th Floor Philadelphia, PA 19104	(877) 235-6708 www.chooseindependence.com	**R/C** **ACTIVE**
Liberty Power Delaware, LLC 3000 Atrium Way Suite 273 Mt. Laurel, NJ 08054	(866) 769-3799 www.libertypowercorp.com	**R/C/I** **ACTIVE**
Liberty Power Holdings, LLC 3000 Atrium Way Suite 273 Mt. Laurel, NJ 08054	(866) 769-3799 www.libertypowercorp.com	**R/C/I** **ACTIVE**
Linde Energy Services 575 Mountain Avenue Murray Hill, NJ 07974	(800) 247-2644 www.linde.com	**C/I** **ACTIVE**
NextEra Energy Services New Jersey, LLC 651 Jernee Mill Road Sayreville, NJ 08872	(877) 528-2890 Commercial (800) 882-1276 Residential www.nexteraenergyservices.com	**R/C/I** **ACTIVE**
NJ Gas & Electric 1 Bridge Plaza fl. 2 Fort Lee, NJ 07024	(866) 568-0290 www.NJGandE.com	**R/C/I** **ACTIVE**
Noble Americas Energy Solutions The Mac-Cali Building 581 Main Street, 8th Floor Woodbridge, NJ 07095	(877) 273-6772 www.noblesolutions.com	**C/I** **ACTIVE**
Palmco Power NJ, LLC One Greentree Centre 10000 Lincoln Drive East, Suite 201	(877)726-5862	**R/C**

Marlton, NJ 08053	www.PalmcoEnergy.com	**ACTIVE**
UGI Energy Services, Inc. **d/b/a GASMARK** 224 Strawbridge Drive Moorestown, NJ 08057	(800) 427-8545 www.ugies.com	**C/I** **ACTIVE**
Viridian Energy 2001 Route 46 Waterview Plaza, Suite 310 Parsippany, NJ 07054	866-663-2508 www.viridian.com	**R/C/I** **ACTIVE**
Xoom Energy New Jersey, LLC 744 Broad Street Newark, NJ 07102	888-997-8979 www.xoomenergy.com	**R/C/I** **ACTIVE**

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