LOCAL GOVERNMENT ENERGY AUDIT PROGRAM: ENERGY AUDIT REPORT

PREPARED FOR:

BURLINGTON TOWNSHIP BOARD OF EDUCATION

BURLINGTON TOWNSHIP HIGH SCHOOL - MAIN BUILDING

610 Fountain Avenue
Burlington, NJ 08016

ATTN: MRS. MARY ANN BELL
BUSINESS ADMINISTRATOR

PREPARED BY:

CONCORD ENGINEERING GROUP

520 S. BURNT MILL ROAD
VOORHEES, NJ 08043
TELEPHONE: (856) 427-0200
FACSIMILE: (856) 427-6529
WWW.CEG-INC.NET

CEG CONTACT:

ERSIN GERCEK, PE, CEM
LEAD MECHANICAL ENGINEER
EMAIL: EGERCEK@CEG-INC.NET

REPORT ISSUANCE: **FINAL, JANUARY 27, 2011**
PROJECT NO: **9C10054**

TABLE OF CONTENTS

REPORT DISCLAIMER

The information contained within this report, including any attachment(s), is intended solely for use by the named addressee(s). If you are not the intended recipient, or a person designated as responsible for delivering such messages to the intended recipient, you are not authorized to disclose, copy, distribute or retain this report, in whole or in part, without written authorization from Concord Engineering Group, Inc., 520 S. Burnt Mill Road, Voorhees, NJ 08043.

This report may contain proprietary, confidential or privileged information. If you have received this report in error, please notify the sender immediately. Thank you for your anticipated cooperation.

I. EXECUTIVE SUMMARY

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

Burlington Township High School
Main Building
610 Fountain Avenue
Burlington, NJ 08016

Municipal Contact Person: Mary Ann Bell

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	$263,092
Natural Gas	$95,442
Total	$358,533

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	Lighting Upgrade – Gymnasium and Interior	$9,314	$3,898	2.4	527.8%
ECM #2	Lighting Occupancy & Daylight Sensors	$18,946	$5,441	3.5	330.8%
ECM #3	Replace CRT Monitor	$10,800	$1,813	6.0	151.7%
ECM #4	Install Premium Efficiency Motors	$22,622	$1,147	19.7	-24.0%
ECM #5	Install Water Cooled Chiller	$247,000	$9,412	26.2	-12.4%
ECM #6	Variable Speed Drives for Cooling Tower	$10,000	$768	13.0	15.3%
ECM #7	Commercial Kitchen Exhaust Hood Controls	$34,225	$2,037	16.8	-10.7%
ECM #8	HVAC Unit Upgrades	$93,008	$1,707	54.5	-72.5%
ECM #9	Window Replacement	$91,360	$1,953	46.8	-35.9%
ECM #10	Low Flow WC, Urinals and Faucets	$60,000	$3,973	15.1	-0.7%
RENEWABLE ENERGY MEASURES (REM's)					
ECM NO.	**DESCRIPTION**	**NET INSTALLATION COST**	**ANNUAL SAVINGS**	**SIMPLE PAYBACK (Yrs)**	**SIMPLE LIFETIME ROI**
REM #1	155 kW Solar Photovoltaic System	$1,395,180	$95,928	14.5	3.1%
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	Lighting Upgrade – Gymnasium and Interior	10.7	26,341	0
ECM #2	Lighting Occupancy & Daylight Sensors	0	36,762	0
ECM #3	Replace CRT Monitor	0	12,247	0
ECM #4	Install Premium Efficiency Motors	2.7	7,747	0
ECM #5	Install Water Cooled Chiller	55.9	67,121	0
ECM #6	Variable Speed Drives for Cooling Tower	0	5,192	0
ECM #7	Commercial Kitchen Exhaust Hood Controls	0	10,693	375
ECM #8	HVAC Unit Upgrades	7	7,496	0
ECM #9	Window Replacement	1	2,885	1,261
ECM #10	Low Flow WC, Urinals and Faucets	0	0	812
RENEWABLE ENERGY MEASURES (REM's)				
ECM NO.	**DESCRIPTION**	**ANNUAL UTILITY REDUCTION**		
		ELECTRIC DEMAND (KW)	**ELECTRIC CONSUMPTION (KWH)**	**NATURAL GAS (THERMS)**
REM #1	155 kW Solar Photovoltaic System	124	192,627	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:** Lighting Upgrade Gymnasium Area and Interior Spaces
- **ECM #2:** Lighting Controls
- **ECM #3:** CRT Monitor Replacement

ECM #1 Lighting Upgrade – Gymnasium Area and Interior Spaces

The gymnasium, wrestling and weight rooms utilize older style, probe start metal halide fixtures. These fixtures have direct replacements that save considerable energy. The lighting retrofit includes new T-5 high output fluorescent fixtures to replace the metal halide fixtures. Advantages include extended life, instant lamp start and superior light quality, making this ECM financially and aesthetically beneficial. The fluorescent fixtures selected will provide adequate light levels required for this space, while savings energy. In addition, there are several locations in the school where the lighting is provided with various types of incandescent lamps. This ECM also includes replacing these fixtures as well. With a combined simple payback of 2.4 years, this ECM is highly recommended for this facility.

ECM #2 Lighting Occupancy & Daylight Sensors

Lighting controls provide a simple and effective solution to the problem of lights being unnecessarily left on. Occupancy sensors alone provide fast payback since there is no retrofit needed for the existing lighting. Daylight Sensors were included in this ECM to show the relative effect of daylight harvesting in addition to occupancy sensors. The combination of both options still pays back in 3.5 years and therefore is recommended to be installed.

ECM #3 CRT Monitor Replacements

Some of the computers in the building utilize CRT computer monitors. This type of monitors are outdated and have several disadvantages such as; significantly increased higher energy consumption, large amount of desk space usage, poor picture quality, distortions and flickering image, secular glare problems, and high weight, and electromagnetic emissions. Many of the 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 as well. This ECM has a simple payback of 6 years and it is recommended for the building.

Operation and Maintenance Considerations

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.
5. Utilize premium efficiency motors for all new motor replacements in the future as part of maintenance or replacement needs. It is understood that new exhaust fans are intended to be installed to ventilate the crawlspace under 'C' Wing. It is highly recommended to utilize high efficiency motors as part of this installation.

Renewable Energy Measures

Renewable Energy Measures (REMs) were also reviewed for implementation at the High School Main Building. CEG utilized a parking lot canopy mounted solar array to house a substantial PV system. The recommended 155 kW PV system will produce approximately 192,242 kWh of electricity annually and will reduce the schools electrical consumption from the grid by approximately 11%. 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. CEG recommends the Owner review all funding options before deciding to not implement this renewable energy measure.

Retro Commissioning

In addition to the above recommendations, based on the review of the facility's energy bills and discussions with the School District, the energy audit team recommends Retro-Commissioning of this facility to meet the following objectives:

- Bring existing HVAC equipment to its proper operational state including air and water distribution systems
- Reduce energy use and energy costs
- Improve indoor air quality
- Verify the installation and performance of identified system upgrades
- Address overall building energy use and demand and identify areas of highest energy use and demand
- Identify the location of the most comfort problems or trouble spots in the building
- Review current O&M practices

Through the implementation of a Retro-Commissioning Plan, the School District will be able to continue with their vision of reducing energy usage and operating efficient facilities.

Other Recommendations

To provide assistance to small public entities in the effort to implement valuable ECMs, the NJ Clean Energy program in combination with the BPU has initiated the "Direct Install Program". This program provides extremely large incentives to facilities such as the High School Main Building, to jump start energy projects. The direct install program offers incentives up to 60% of the installation costs through the services of pre-approved contractors. The program is directed towards one for one replacement projects that save energy and provide valuable upgrades for the facility for only 40% of the installation cost. Moreover, the program currently has a 200 kW maximum demand limit for applicability. This demand limit is capable of being waived if the School District is able to receive a portion of their respective Township Local Government's American Recovery and Reinvestment Act (ARRA) funding towards energy efficiency improvements. Therefore, for facilities over the 200 kW maximum demand limit, such as the High School Main Building, the School District will need to coordinate Direct Install efforts with the Township's Local Government.

Conclusion

Overall, the Burlington Township High School appears to be operating at a lower efficiency level compared to other schools in the region. With the implementation of the above recommended measures the Burlington BOE will realize further energy savings at the High School Main Building.

II. INTRODUCTION

The comprehensive energy audit covers the 170,000 square foot High School Main Building, which includes the following spaces: classrooms, offices, media center, music room, wood shop, exercise room, gymnasium, bathrooms, storage spaces, kitchen, cafeteria, mechanical rooms, custodian spaces and Performing Arts Center (PAC).

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:

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

$$\text{Simple Lifetime Savings} = (\text{Yearly Savings} \times \text{ECM Lifetime})$$

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

$$\text{Lifetime Maintenanc e Savings} = (\text{Yearly Maintenanc e Savings} \times \text{ECM Lifetime})$$

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

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

Net Present Value calculations based on Interest 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. Public Service Electric and Gas (PSE&G) provides electricity to the facility under their Large Power and Lighting Service (LPLS) Secondary Three-Phase rate structure. 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 Supply Service (LVG) rate structure. 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 third party commodity provider Hess is responsible for providing the supply of gas to the buildings. Commodity (Supply) and delivery is billed separately for each respective utility service.

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	14.8¢ / kWh
Natural Gas	$1.21 / Therm

Table 3
Electricity Billing Data

ELECTRIC USAGE SUMMARY

Utility Provider: PSE&G
Rate: LPLS
Meter No: 778009256
Account No. 42 003 778 02
Third Party Utility South Jersey Energy
TPS Meter / Acct No: -

MONTH OF USE	CONSUMPTION	DEMAND	TOTAL BILL
Mar-09	185,600	428.8	$25,888
Apr-09	*137,600*	*432.8*	*$21,835*
May-09	*137,600*	*432.8*	*$21,835*
Jun-09	*137,600*	*432.8*	*$21,835*
Jul-09	*137,600*	*432.8*	*$21,835*
Aug-09	116,800	377.6	$19,623
Sep-09	161,600	492.8	$22,815
Oct-09	143,360	428.8	$20,210
Nov-09	154,240	412.8	$21,630
Dec-09	152,960	441.6	$21,583
Jan-10	151,040	422.4	$21,526
Feb-10	158,400	419.2	$22,476
Totals	**1,774,400**	**492.8 Max**	**$263,092**

AVERAGE DEMAND **429.6 KW average**

AVERAGE RATE **$0.148** **$/kWh**

Apr-July averaged from August statement.

Figure 1

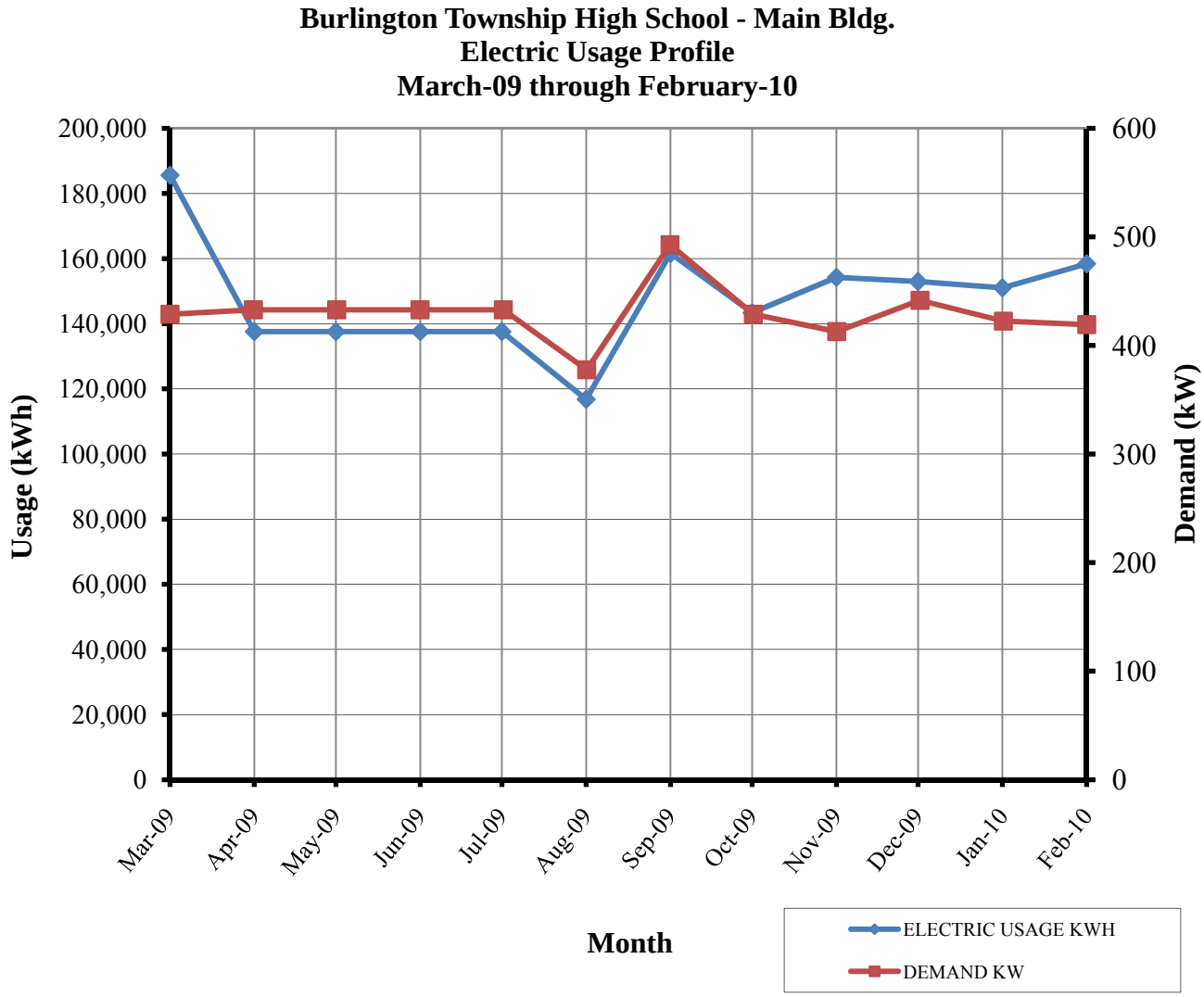
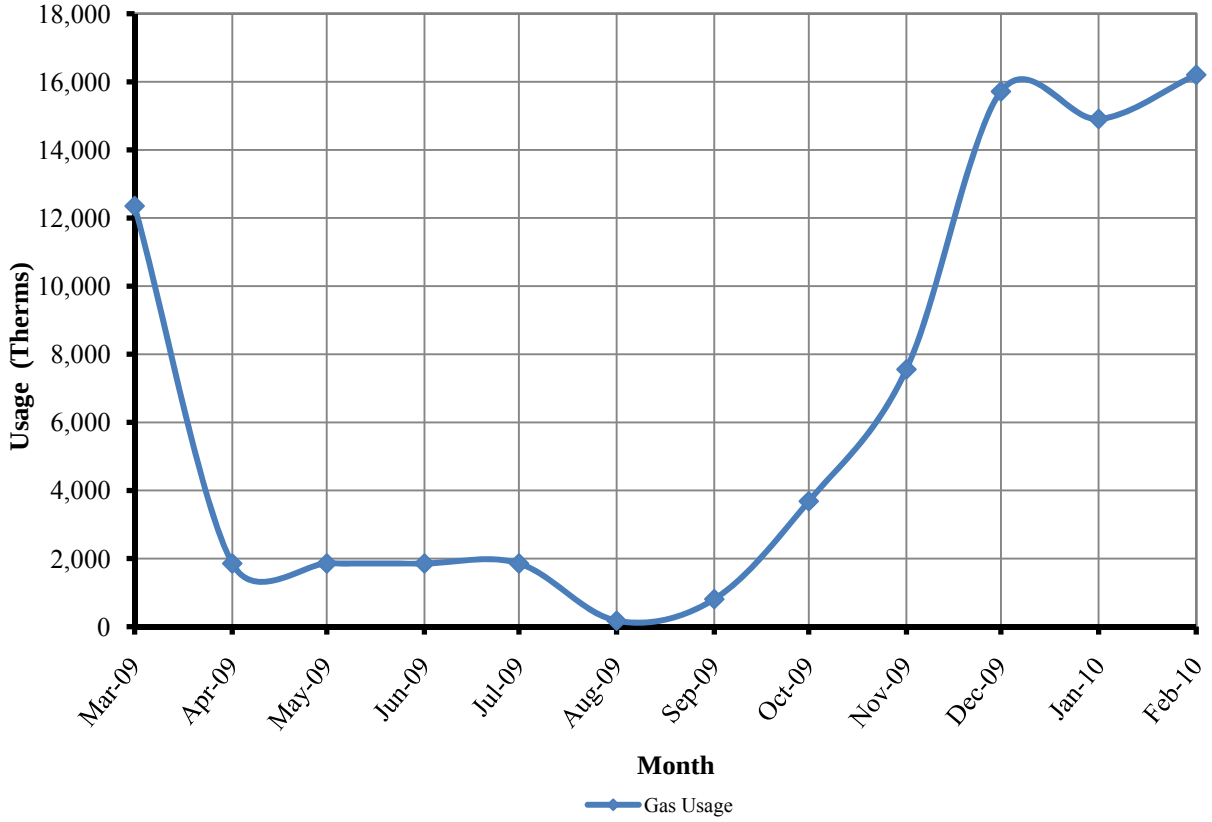

Burlington Township High School - Main Bldg.
Electric Usage Profile
March-09 through February-10
Usage (kWh)
Demand (kW)
200,000
180,000
160,000
140,000
120,000
100,000
80,000
60,000
40,000
20,000
0
600
500
400
300
200
100
0
Mar-09
Apr-09
May-09
Jun-09
Jul-09
Aug-09
Sep-09
Oct-09
Nov-09
Dec-09
Jan-10
Feb-10
Month
ELECTRIC USAGE KWH
DEMAND KW

Table 4
Natural Gas Billing Data

NATURAL GAS USAGE SUMMARY		
Utility Provider: PSE&G Rate: LVG Meter No: 3010371 Account No. 2 20 31 0290 0 6 Third Party Utility Provider: HESS TPS Meter No: 349100/349106		
MONTH OF USE	**CONSUMPTION (THERMS)**	**TOTAL BILL**
Mar-09	12,353.13	$15,363.00
Apr-09	*1,858.19*	*$6,451.50*
May-09	*1,858.19*	*$1,816.53*
Jun-09	*1,858.19*	*$738.91*
Jul-09	*1,858.19*	*$473.29*
Aug-09	174.94	$248.24
Sep-09	808.83	$771.36
Oct-09	3,684.44	$6,116.68
Nov-09	7,557.03	$9,972.85
Dec-09	15,715.03	$18,252.31
Jan-10	14,907.85	$16,917.80
Feb-10	16,205.50	$18,319.33
TOTALS	**78,839.52**	**$95,441.80**
AVERAGE RATE:	**$1.21**	**$/THERM**
Apr-July averaged from August statement., August and Feb. Third party Cost is estimated		

Figure 2
Burlington Township High School - Main Bldg.
Natural Gas Usage Profile
March-09 through February-10



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:

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

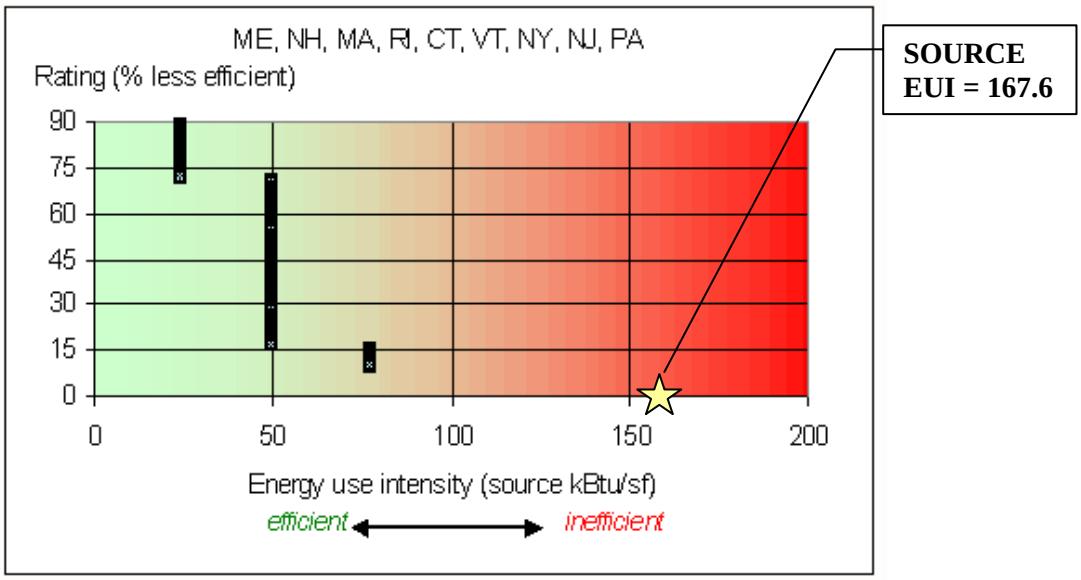
$$\text{Building Source EUI} = \frac{(\text{Electric Usage in kBtu X SS Ratio} + \text{Gas Usage in kBtu X SS Ratio})}{\text{Building Square Footage}}$$

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	1,774,400			6,057,802	3.340	20,233,057
NATURAL GAS		78,840		7,883,952	1.047	8,254,497
TOTAL				13,941,753		28,487,555
*Site - Source Ratio data is provided by the Energy Star Performance Rating Methodology for Incorporating Source Energy Use document issued Dec 2007.						
BUILDING AREA		170,000	SQUARE FEET			
BUILDING SITE EUI		*82.0*	kBtu/SF/YR			
BUILDING SOURCE EUI		*167.6*	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



CEG believes part of the reason for the high Source EUI is the large amount of electricity that is in use at the High School Main Building. With the Performing Arts Center operating similar to a professional play-house as far as multiple lighting systems and controls, large HVAC systems, etc., there is a major electrical requirement. This is not a fair comparison to other High Schools throughout the region as most do not have a performing arts facility of this caliber.

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

User Name: burlingtonboe
Password: lgeaceg2010

Security Question: What city were you born in?
Security Answer: "burlington"

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**
Burlington Township Main High School	22	50

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

V. FACILITY DESCRIPTION

The 170,000 SF Burlington Township High School Main Building is a one story facility comprised of classrooms, offices, media center, music room, wood shop, exercise room, gymnasium, bathrooms, storage spaces, kitchen, cafeteria, mechanical rooms, custodian spaces and Performing Arts Center (PAC).

The total occupancy at the Burlington High School Main Building is approximately 984 including students, teachers and the custodial staff. The facility is open between the hours of 5:30 AM and 11:30 PM for school hours, afterschool programs and custodial services. The school hours of operation are typical for a high school; between 7:00AM and 3:30 PM. The facility is closed on weekends. The school is used minimally in the summer. However, the owner keeps buildings at occupied conditions to control temperature and humidity for staff and programs that may be occurring at the facility.

The High School Main Building was originally constructed in 1964 and has received additions in 1985, 1999 and 2001. Exterior walls are brick construction with insulation of varying thickness throughout the various additions.. The actual insulation thickness within the wall is unknown. The windows throughout the facility are in good condition and appear to be maintained. Typical windows throughout the facility are double pane, ¼" clear glass with vinyl frames. However, there are still some areas throughout the building that contain single-pane windows that should eventually be replaced. Blinds are utilized throughout the facility for occupant comfort. The blinds are valuable because they help to reduce heat loss in the winter and reduce solar heat in the summer. The majority of the roof is comprised of shingles on an A-frame roof. The A-frame roofs were constructed overtop of the existing flat roofs as part of a past roofing project implemented by the school district. A small portion of the roof is constructed of a built-up roof with light color stone covering near the PAC and is where rooftop HVAC equipment is located. All other HVAC systems are located within the A-frame roofing sections which act as equipment mezzanines. The amount of insulation below the roofing is unknown and is considered to be equal to the minimum thickness required for the construction time period.

HVAC Systems

The HVAC systems for the High School Main Building vary with the additions in the facility. The central heating system is located in the facility's original boiler room and has been upgraded with new boilers, pumps, etc., manufactured in 2000. The central heating system consists of five gas-fired Aerco Benchmark 2.0 condensing hot water boilers that are controlled via the manufacturer's sequencing panel. The boilers are capable of being modulated via the sequencing panel in order to meet varying load requirements. The heating hot water is distributed throughout the facility via two 20 HP constant volume end suction pumps located within the original boiler room. The manufacturer's boiler controls include outside air reset that reset the boiler supply water temperature based on the outside ambient temperature. This system provides heating to all areas of the building minus the "D" wing. Typical terminal heating equipment throughout the facility consists of vertical unit ventilators with fin-tube radiation in classrooms, horizontal unit ventilators for the athletic training area, indoor air-handling units providing heating and ventilation for the gymnasium, weight room and wrestling room and basic fin-tube

radiation or cabinet heaters for entrance areas and spaces that require heating only. Unit ventilators have begun to be replaced in some classrooms such as M8 and M10. In these rooms, the existing unit ventilator was removed and replaced with a unit ventilator with cooling. Classrooms such as those found in the "C" wing contain unit ventilators retrofitted in 1985 (original units are 1968) and should be included as part of a maintenance plan for replacement.

Cooling for the majority of the facility is provided by multiple systems. Some spaces contain window or through-the-wall air conditioning units of various sizes and efficiencies. This equipment is operated via their unit mounted controls and could be left on unnecessarily if not shutdown by the room occupant. Other areas contain split-system air conditioning systems with the air-handling unit being located being located near the space and the air-cooled condensing unit being located remotely either at grade or at roof level. This is the case for parts of the "A" wing (Rooms A9, A11, A13, A15 and A17), the cafeteria, kitchen, main office, guidance, nurse and parts of the PAC. The PAC also contains large air-handling units that are fed chilled water from the air-cooled chiller located at grade outside of the boiler room. The air-cooled chiller is manufactured by McQuay and contains two compressors at 60 horsepower each. Chilled water is distributed to the PAC via two 10 HP end suction pumps with insulated boxes located in the boiler room. The air cooled chiller is in great condition and as long as the general maintenance is continued will continue to operate efficiently for the school district.

The "D" wing is heated and cooled via a conventional water-source heat pump system. The equipment for this system is located in a mechanical equipment room at the end of the "D" wing that can be accessed from the building exterior. Located in this mechanical room are two Aerco KC Series gas-fired hot water boilers in addition to multiple sets of pumps for the heat pump loop, condenser water loop and hot water loop. The various systems have separated heat exchange to the heat pump loop via a plate heat exchanger for the condenser water loop and a shell-and-tube heat exchanger for the hot water loop. A Baltimore Air Coil cooling tower is located at grade outside of the "D" wing mechanical equipment room and provides the heat rejection for the heat pump loop. Each area in "D" wing is served via a horizontal heat pump located in the "D" wing mezzanine. The "D" wing mezzanine is utilized as a large plenum and outside air is supplied and exhausted from the mezzanine via energy recovery units located on equipment platforms in the mezzanine. The heat pump units are ducted into the spaces within "D" wing but have open plenum return and outside air intake.

Exhaust System

Air is exhausted from the building through the air handling units, heat recovery units, unit ventilators and centrifugal roof exhausters. Dedicated exhaust is provided for toilet rooms, specialty rooms (such as art rooms, wood shop, chemistry rooms, and biology rooms, etc.) and large assembly areas (such as the auditorium and gymnasium). The exhaust for the specialty areas is manually controlled by the maintenance staff based on temperature and occupancy comfort. The toilet rooms exhaust fans are manually controlled by bath room wall switches. It was noted that some exhaust fans do not include dampers when fans are not running. The commercial kitchen includes two 20 feet by 4 feet commercial exhaust hoods. The hoods are utilized for heat and smoke exhaust over cooking ovens steamers, and a gas fired range. The kitchen hood is manually controlled by a wall switch and operates approximately 8 hrs per day.

HVAC System Controls

The HVAC system includes a central DDC control system made by Delta Controls. The system integrates into the majority of the equipment including boilers, chiller, packaged units, condensing units, air handling units and the unit ventilators. The front end controller has the capability to monitor and control all schedules, thermostat temperatures and set points. The control system also automates the on / off control and temperature setbacks based on occupancy schedules. The system includes electronic controls for sensors and a combination of electronic and pneumatic actuators and control valves. Based on review of temperature set points currently programmed for this facility, CEG recommends the Owner review the current occupied cooling setpoint of 74 deg F as this is a little low. Raising the setpoint to 75 or 76 deg F should show savings. Also, in some cases system setback temperatures are very extreme (upwards of 13 to 20 degrees different than set point) and could be causing higher loading on the HVAC equipment than is required to meet the room temperature set point when the occupied mode begins.

Domestic Hot Water

Domestic hot water for the restrooms, laboratories, custodian spaces, kitchen and the cafeteria is provided with three KC-1000 condensing domestic hot water heaters made by Aerco. Each water heater has a 1000 Mbh natural gas input capacity and 797 Gallon per hour hot water recovery capacity. A small pipe mounted circulator circulates domestic hot water throughout the facility. During the survey, it was observed that the aqua-stat for the domestic hot water line wasn't wired to the pump. In addition, a small, tank type gas fired domestic hot water heater is also utilized to supplement domestic hot water for the building. The domestic hot water piping insulation appeared to be in good condition.

Lighting

Typical lighting throughout building is fluorescent tube lay-in fixtures with modern T-/8 lamps and electronic ballasts. Some of the classrooms and bathrooms are equipped with compact fluorescent lamps (CFL) in recessed down light fixtures. There are only a small number of spaces with older fixtures with T12 lamps and magnetic ballasts. The gymnasium lighting is provided with 400W probe start metal halide fixtures with prismatic lenses.

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: Lighting Upgrade – Gymnasium and Interior Spaces

Description:

The lighting in the facility is primarily made up of fluorescent fixtures with T-8 lamps with electronic ballasts and small number of incandescent lamps in the interior spaces; and metal halide fixtures in the gymnasium and exercise rooms.

Gymnasium, Wrestling Room and Weight Rooms

The High School Gymnasium utilizes 400W fixtures with metal halide lamps for its lighting and the wrestling and the weight rooms utilize 175W metal halide lamps. Metal halide lamps 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). The typical value 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 gymnasium, wrestling room and the weight room metal halide light fixtures 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. In addition to the gym upgrade, the lighting provided for the center corridor is in excess of normal lighting levels. Therefore, this ECM also includes the de-lamping of the corridor fixtures. There is no ballast change required and the removal of only 1 lamp will save a substantial amount of energy.

Gymnasium Hours of Operation:	2,600 Hours/Yr
Wrestling and Weight Room Hours of Operation:	2,600 Hours/Yr

Interior Spaces

The lighting throughout the High School School building is provided with modern fixtures with T8 lamps and electronic ballasts. There are only a small number of interior spaces where incandescent lamps were utilized.

This ECM also includes replacement of various types of incandescent lamps to compact fluorescent lamps and LED lamps. The energy usage of an incandescent compared to a compact fluorescent approximately 3 to 4 times greater. In addition to the energy savings, compact fluorescent fixtures burn-hours are 8 to 15 times longer than incandescent fixtures ranging from 6,000 to 15,000 burn-hours compared to incandescent fixtures ranging from 750 to 1000 burn-hours. However, this does not generate maintenance savings due to fractional cost of the compact fluorescent lamps.

Energy Savings Calculations:

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

Rebates and Incentives:

Metal Halide Fixtures

There are incentives available from NJ Smart Start® Program for the retrofits in this ECM. Incentives are calculated as follows:

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
For replacement of HID (175-259W) with new T-5 or T-8 fixtures = $43/Fixture

$$\text{Smart Start® Incentive} = (\#\text{ of 400W MH Fixtures} \times \$100) + (\#\text{ of 175W MH Fixtures} \times \$43)$$

$$\text{Smart Start ® Incentive} = (30 \times \$100) + (21 \times \$43) = \$3{,}903$$

There isn't any significant Replacement and Maintenance Savings generated by this ECM.

Energy Savings Summary:

ECM #1 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$13,217
NJ Smart Start Equipment Incentive ($):	$3,903
Net Installation Cost ($):	$9,314
Maintenance Savings ($/Yr):	$0
Energy Savings ($/Yr):	$3,898
Total Yearly Savings ($/Yr):	$3,898
Estimated ECM Lifetime (Yr):	15
Simple Payback	2.4
Simple Lifetime ROI	527.8%
Simple Lifetime Maintenance Savings	$0
Simple Lifetime Savings	$58,476
Internal Rate of Return (IRR)	42%
Net Present Value (NPV)	$37,224.95

ECM #2: Lighting Occupancy Sensors / Daylight Sensors

Description:

In some areas the lighting is 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 on or 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. Photocell control senses light levels and turn off or reduce lights when there is adequate daylight. Photocells are mostly used outside, but are becoming more popular in energy-efficient interior lighting designs as well.

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.

Estimated energy savings resulting from the implementation of this ECM for energy management controls in this facility:

- 10% of the total light energy controlled by occupancy sensors
- 25% of the total light energy controlled by daylight sensors
- 25% of the total light energy controlled by occupancy sensors with 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 type sensors for individual offices, classrooms, offices, meeting rooms, locker areas and cafeteria areas. 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:

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

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

Installation Cost and Rebates:

Installation cost per dual-technology sensors (Basis: Sensor switch or equivalent) are as follows:

- Dual Technology Occupancy Sensor & Day Light Sensor $360 per installation
- Daylight Sensor (Sensorswitch PP-20 & CM-PC or equal) $160 per installation
- 2 Pole Power Pack w/Dual Tech. Occupancy Sensor $225 per installation
- Dual Technology Occupancy Sensor - Remote Mount $160 per installation
- Dual Technology Occupancy Sensor - Switch Mount $75 per installation
- Dual Technology Occupancy Sensor - Fixture Mount. $100 per installation

Cost includes material and labor.

See the **Investment Grade Lighting Audit Appendix** for details.

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

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

$$\text{Smart Start® Incentive} = (\#\ \text{of wall mount} \times\ \$\ 20) + (\#\ \text{of ceiling mount} \times 35)$$
$$\text{Smart Start® Incentive} = (22 \times\ \$\ 20) + (90 \times \$35) = \$3{,}634$$

Energy Savings Summary:

ECM #2 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$22,580
NJ Smart Start Equipment Incentive ($):	$3,634
Net Installation Cost ($):	$18,946
Maintenance Savings ($/Yr):	$0
Energy Savings ($/Yr):	$5,441
Total Yearly Savings ($/Yr):	$5,441
Estimated ECM Lifetime (Yr):	15
Simple Payback	3.5
Simple Lifetime ROI	330.8%
Simple Lifetime Maintenance Savings	$0
Simple Lifetime Savings	$81,612
Internal Rate of Return (IRR)	28%
Net Present Value (NPV)	$46,006.16

ECM #3: Computer Monitor Replacement

Description:

A significant number of the computers in the classrooms and offices utilize CRT computer monitors. These computer monitors are outdated and have several disadvantages such as; significantly increased higher energy consumption, uses large amount of desk space, poor picture quality, distortions and flickering image, secular glare problems, and high weight, and electromagnetic emissions. Many of the 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 as well.

Based on the site survey it was noted that a number of the computers were left on and allowed to run 24 / 7. The majority of the monitors were left in screen saver mode, which is deceiving since this mode 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 are based on manufacture's specifications.

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

Energy Savings Calculations:

# of Computers:	108
Run Time %:	90%
Weeks per Yr:	42
Hrs per Week:	60

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

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

COMPUTER MONITOR CALCULATIONS			
ECM INPUTS	**EXISTING**	**PROPOSED**	**SAVINGS**
ECM INPUTS	CRT Monitors	LCD Monitor	
# of Computers	108	108	
Monitor Power Cons. (W)	75	25	
Run Time %	90%	90%	
Operating Hrs per Week	60	60	
Operating Weeks per Yr	42	42	
Elec Cost ($/kWh)	0.148	0.148	
ENERGY SAVINGS CALCULATIONS			
ECM RESULTS	**EXISTING**	**PROPOSED**	**SAVINGS**
Electric Usage (kWh)	18,371	6,124	12,247
Energy Cost ($)	$2,719	$906	$1,813
COMMENTS:			

Installation cost of new monitors is estimated based on current pricing for a 17" 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 $100. Cost of installation is summarized in the table below.

COST & SAVINGS SUMMARY			
ECM INPUT	**# OF UNITS**	**UNIT COST**	**TOTAL COST**
CRT MONITORS	108	$100	$10,800
Total	108		$10,800

Energy Savings Summary:

ECM #3 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$10,800
NJ Smart Start Equipment Incentive ($):	$0
Net Installation Cost ($):	$10,800
Maintenance Savings ($/Yr):	$0
Energy Savings ($/Yr):	$1,813
Total Yearly Savings ($/Yr):	$1,813
Estimated ECM Lifetime (Yr):	15
Simple Payback	6.0
Simple Lifetime ROI	151.7%
Simple Lifetime Maintenance Savings	$0
Simple Lifetime Savings	$27,189
Internal Rate of Return (IRR)	15%
Net Present Value (NPV)	$10,838.53

ECM #4: 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.

Some of the existing electric motors driving the primary hot water pumps and the water source heat pump loops 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 electric motors over 5 HP or more 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-3	Hot Water Pump	20	2,160	91.0%	93.0%
P-4	Hot Water Pump	20	2,160	91.0%	93.0%
P-1	Chilled Water Pump	10	2,160	85.5%	92.4%
P-2	Chilled Water Pump	10	2,160	85.5%	92.4%
1	Heat Pump Condenser Loop	7.5	4,380	88.5%	91.7%
2	Heat Pump Condenser Loop	7.5	4,380	88.5%	91.7%
3	Heat Pump Return Loop	10	4,380	89.5%	92.4%
4	Heat Pump Return Loop	10	4,380	89.5%	92.4%

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-3	20	90%	91.0%	93.0%	0.32	689	$102
P-4	20	90%	91.0%	93.0%	0.32	689	$102
P-1	10	90%	85.5%	92.4%	0.59	1,273	$188
P-2	10	90%	85.5%	92.4%	0.59	1,273	$188
1	7.5	90%	88.5%	91.7%	0.20	874	$129
2	7.5	90%	88.5%	91.7%	0.20	874	$129
3	10	90%	89.5%	92.4%	0.24	1,037	$153
4	10	90%	89.5%	92.4%	0.24	1,037	$153
TOTAL					**2.7**	**7,747**	**$1,147**

Equipment Cost and Incentives

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

INCENTIVES	
HORSE POWER	**NJ SMART START INCENTIVE**
5	$60
7.5	$90
10	$100
15	$115
20	$125
25	$130

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-3	20	$4,635	$125	$4,510	$102	44.2
P-4	20	$4,635	$125	$4,510	$102	44.2
P-1	10	$2,560	$100	$2,460	$188	13.1
P-2	10	$2,560	$100	$2,460	$188	13.1
1	7.5	$1,971	$90	$1,881	$129	14.5
2	7.5	$1,971	$90	$1,881	$129	14.5
3	10	$2,560	$100	$2,460	$153	16.0
4	10	$2,560	$100	$2,460	$153	16.0
TOTAL	**Totals:**	**$23,452**	**$830**	**$22,622**	**$1,147**	**19.7**

Energy Savings Summary:

ECM #4 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$23,452
NJ Smart Start Equipment Incentive ($):	$830
Net Installation Cost ($):	$22,622
Maintenance Savings ($/Yr):	$0
Energy Savings ($/Yr):	$1,147
Total Yearly Savings ($/Yr):	$1,147
Estimated ECM Lifetime (Yr):	15
Simple Payback	19.7
Simple Lifetime ROI	-24.0%
Simple Lifetime Maintenance Savings	$0
Simple Lifetime Savings	$17,199
Internal Rate of Return (IRR)	-3%
Net Present Value (NPV)	($8,934.04)

ECM #5: Water Cooled Chiller Installation

Description:

One of the major sources of cooling for the Burlington High School Main Building is a 100 ton air cooled chiller made by McQuay. The air cooled chiller is approximately 9 years old and in good condition. However the unit is far less efficient compared to water cooled chillers.

Water cooled chillers provide significant energy savings over air cooled chillers due to the efficiency increase. The part load cooling efficiency of the existing air cooled chillers is 1.08 KW/Ton (IPLV). The part load efficiency of similar size water cooled chiller is approximately 0.52 KW/Ton (IPLV). The ancillary pumping energy and cooling tower fan energy is approximately 0.14 KW/Ton. Cooling tower make-up water requirements is calculated to be 1.7 Gal/Ton-Hr.

This ECM includes the installation of a new water cooled chiller to replace the air cooled chiller. The equipment includes an outdoor water-cooled chiller package with condenser water pumps and a cooling tower. The installation also includes all associated piping, labor, and controls. The ECM is based on 100 Ton York model number YCWL0104SE water-cooled chillers with scroll compressors or equivalent. Sizing indicated within the calculation of this ECM is based on a one for one replacement of the existing equipment capacity. The owner should have a Professional Engineer verify heating and cooling loads to verify actual building cooling requirements.

Parameters:

Seasonal Cooling Hrs.	= 1200 hrs/yr.
Average Cost of Electricity	= $0.148/kWh
Total Cooling Capacity	= 100 Tons
Existing Unit Eff.	= 1.08 KW/Ton (IPLV)
New Unit Eff.*	= 0.66 KW/Ton (IPLV)

*Eff including ancillary equipment energy

Energy Savings Calculations:

Cooling Energy:

$$\text{Cooling Energy} = \text{Cooling(Tons)} \times \text{ Efficiency } \left(\frac{\text{kW}}{\text{Ton}}\right) \times \text{ Full Load Hours}$$

$$\text{Demand Savings} = \frac{\text{Energy Savings, kWh}}{\text{Hours of Operation}}$$

$$\text{Electric Savings} = \text{Electric Energy Savings (kWh)x Average Electric Cost } \left(\frac{\$}{\text{kWh}}\right)$$

$$\text{Cooling Tower Make up,} \frac{\text{Gallons}}{\text{TonHr}} = \frac{\text{Chiller Capacity(Ton)} \times 12{,}000 \frac{\text{BTU}}{\text{Hr}} \times \left(1 + \frac{1}{\text{COP}}\right)}{950 \frac{\text{BTU}}{\text{Lb}} \times 8.34 \frac{\text{Lb}}{\text{Gal}}}$$

$$\text{COP} = \frac{12{,}000 \frac{\text{Btu}}{\text{Ton Hr}}}{\text{Chiler Efficiency} \left(\frac{\text{kW}}{\text{Ton}}\right) \times 3412 \frac{\text{Btu}}{\text{kWh}}}$$

$$\text{Water Usage} = \text{Makeup Water } \left(\frac{\text{Gal}}{\text{TonHr}}\right) \times \text{ Cooling Capacity(Tons)} \times \text{ Hours of Operation}$$

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

Energy savings calculations are summarized in the table below.

WATER COOLED CHILLER CALCULATIONS			
ECM INPUTS	**EXISTING**	**PROPOSED**	**SAVINGS**
ECM INPUTS	Existing Air Cooled Chiller	Water Cooled Chiller & Cooling Tower	-
Operating Capacity (Tons)	100	100	-
Part Load Efficiency IPLV (EER)	11.1	23.0	-
Part Load Efficiency IPLV (KW/Ton)	1.08	0.52	-
Ancillary pumping energy (kW/Ton)	0	0.14	
Seasonal Cooling Hrs (Est.)	1,200	1,200	-
Make-Up Water Use (Gal/Ton Hr)	0	1.74	(1.74)
Cooling Energy (kWh)	129,730	62,609	-
Water Cost ($/Gallon)	0.0025	0.0025	-
Elec Cost ($/kWh)	0.148	0.148	-
ENERGY SAVINGS CALCULATIONS			
ECM RESULTS	**EXISTING**	**PROPOSED**	**SAVINGS**
Water Usage (Gallons)	0	208,711	(208,711)
Electric Energy (kWh)	129,730	62,609	67,121
Electric Demand (KW)	108.1	52	56
Water Cost ($)	$0	$522	($522)
Electric Energy Cost ($)	$19,200	$9,266	$9,934
Total Cost ($)	$19,200	$9,788	$9,412
COMMENTS:			

Installation cost and Equipment Incentives

Installation cost for the packaged water cooled chiller, condenser water pumps, outdoor housing, cooling tower and controls is estimated to be $250,000.

From the NJ Smart Start® Program appendix, the unit falls under the category "Electric Chiller" and warrants an incentive based on the full load efficiency (kW/Ton) of the unit. The program incentives are calculated as follows:

$$\text{Smart Start ® Incentive} = \text{Total Capacity (Tons)} \times \frac{\$}{\text{Ton}} \text{Incentive}$$

The full load efficiency of the proposed unit is 0.7 kW/Ton. This warrants a $30/Ton incentive.

$$\text{Smart Start ® Incentive} = 100 \text{ (Tons)} \times \frac{\$30}{\text{Ton}} = \$3{,}000$$

Energy Savings Summary:

ECM #5 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$250,000
NJ Smart Start Equipment Incentive ($):	$3,000
Net Installation Cost ($):	$247,000
Maintenance Savings ($/Yr):	($522)
Energy Savings ($/Yr):	$9,934
Total Yearly Savings ($/Yr):	$9,412
Estimated ECM Lifetime (Yr):	23
Simple Payback	26.2
Simple Lifetime ROI	-12.4%
Simple Lifetime Maintenance Savings	($12,001)
Simple Lifetime Savings	$216,479
Internal Rate of Return (IRR)	-1%
Net Present Value (NPV)	($92,230.55)

ECM #6: Install VFD on Cooling Tower Fans

Description:

The cooling tower is equipped with a single fan directly driven with two motors to operate the fan at two different speeds. The smaller motor operates the fan at lower speed when the cooling load is low. The larger motor is energized to run the cooling tower fan at high speed.

Two speed cooling towers are typically more energy efficient than single speed cooling towers with on/off controls. However, there is still potential energy savings by converting the two speed system to variable speed systems. In a typical variable speed system, cooling tower air volume is varied based on a relationship between the condenser water supply temperature and the ambient air wet bulb temperature. This allows system to modulate fan speed to the optimum speed required for the load conditions and minimizes full speed operation.

This ECM includes the installation of new variable frequency drives (VFDs) and controls for the cooling tower in this facility. The drive will be connected to the larger of the two motors. The drive belt for the smaller motor is recommended to be removed. The VFDs shall be programmed to modulate fan speed based on condenser water supply temperature. In addition, a sub-routine should be added to the control algorithm to reset condenser water supply temperature based on the wet-bulb temperature of the ambient air.

Energy and cost savings calculations are based on basic engineering principles along with a VFD savings calculation software "FanSave Version 4.0.B," provided by ABB.

Hours of operation for the cooling tower operation: 2,880 Hours/year

Energy Savings Calculations:

FanSave software calculates fan energy consumption savings based on the principles below.

$$\text{Fan Electric HP} = \frac{\text{Q}_{\text{CFM}} \times \text{Total Pressure}_{\text{in WG}}}{6356 \times \eta_{\text{Fan}} \times \eta_{\text{motor}} \times \eta_{\text{transmission}}}$$

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

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

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

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

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

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

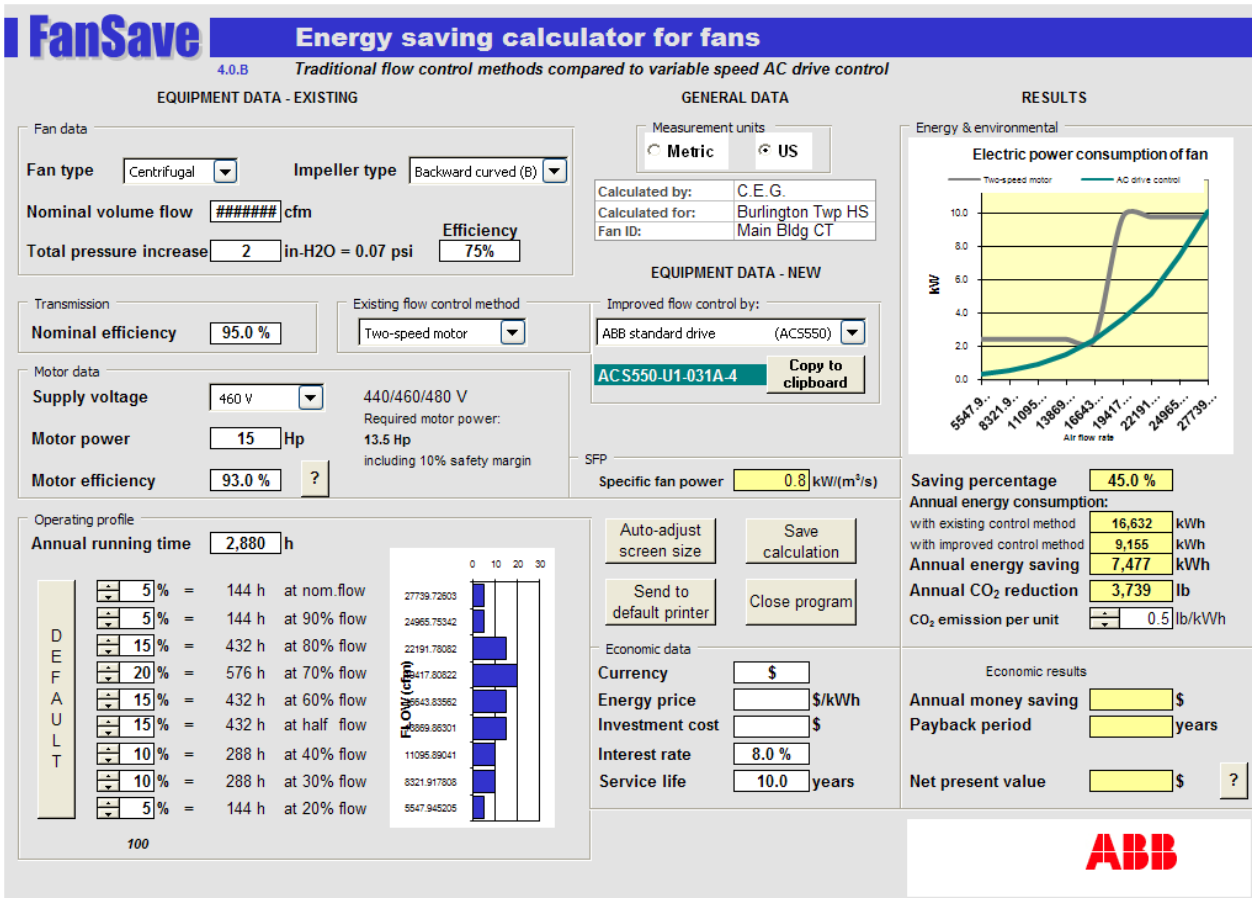
Fan Save Input:

$\eta_{Fan} = 70\%$ $\eta_{motor} = 90\%$ $\eta_{transmission} = 95\%$

Existing Flow Control Method is selected as Two-speed Flow Control. Other input values for each cooling tower can be seen in the screenshot below from the software.

Cooling Tower:

Fan #1 = 15 HP (Install VFD)
Fan #2 = 5 HP (Remove drive belt)



FanSave 4.0.B calculates approximately 45% fan energy savings for each cooling tower by modulating the fan speed throughout the day. The results for the fan are as follows:

CALCULATION SUMMARY						
EQMT ID	**FUNCTION**	**MOTOR HP**	**HOURS OF OPERATION**	**ENERGY SAVINGS %**	**ENERGY SAVINGS kWh**	**COST SAVINGS $**
Cooling Tower	Fan Motor	15	2,000	45%	5,192	$768
TOTAL					**5,192**	**$768**

Cost and Incentives

Estimated installed cost of two sets of variable frequency drives with controllers is $10,000. The basis for this ECM is packaged cooling tower drives and controllers made by BAC or equivalent.

This ECM does not qualify for an incentive from the NJ Smart Start program.

Energy Savings Summary:

ECM #6 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$10,000
NJ Smart Start Equipment Incentive ($):	$0
Net Installation Cost ($):	$10,000
Maintenance Savings ($/Yr):	$0
Energy Savings ($/Yr):	$768
Total Yearly Savings ($/Yr):	$768
Estimated ECM Lifetime (Yr):	15
Simple Payback	13.0
Simple Lifetime ROI	15.3%
Simple Lifetime Maintenance Savings	0
Simple Lifetime Savings	$11,527
Internal Rate of Return (IRR)	2%
Net Present Value (NPV)	($825.89)

ECM #7: Commercial Kitchen Exhaust Hood Controls

Description:

The kitchen in this facility is equipped with two (2) large (12' x 6') commercial kitchen exhaust hoods providing exhaust for the cooking equipment. The total kitchen exhaust from the hoods is approximately 8,400 CFM powered by exhaust fans located on the roof. The make-up air unit provides conditioned air to replace all the air exhausted through the exhaust hood with an estimated 5 HP supply fan power. This system operates based on manual switches located in the kitchen. The installation of kitchen exhaust controls would significantly reduce the total kitchen exhaust and make-up air quantity. The conditioned make up air and exhausted air savings are achieved by monitoring the exhaust hoods and exhaust based on the actual use of the kitchen equipment. Temperature sensors and optical lasers monitor the heat and smoke production at each exhaust hood to reduce the exhaust and make-up airflow based on the need of the kitchen equipment.

This ECM includes installation of kitchen exhaust controls for the kitchen exhaust hood and VFD's for the constant volume supply and exhaust fans. The hood will be retrofitted with temperature and laser sensors to monitor the activity of each of all equipment installed below the hoods. The work involves installing a Melink Kitchen Hood Variable Air Volume Controller; variable frequency drives on the kitchen hood exhaust fan; and turn off all the kitchen hood exhaust systems when the kitchen is closed. When the cooking appliances are turned on, the hood exhaust fan speed will increase based on the hood exhaust temperature. During heavy cooking, the kitchen hood exhaust fan increases to 100% speed until the smoke/vapor is removed. Energy savings are also realized when the kitchen equipment is operating at less than full load due to minimal cooking operations. During these times the fan speed decreases, removing only the necessary amount of air, saving exhaust fan energy and make up air conditioning energy.

Energy Calculations Summary:

Detailed calculations for the proposed kitchen hood control system can be found in the **Kitchen Exhaust Calculations Appendix.** It is pertinent to note that the calculation assumes the exhaust fans and make-up air unit are manually turned off for approximately 16 hours per day.

Installed cost of the kitchen hood control system is $35,000. The calculated energy savings equals approximately $2,037 per year. From the Smart Start Incentive appendix, the retrofit of fan motors with VFDs warrants the following incentive:

5 to <10HP = $155 per HP
10 to <20HP = $120 per HP

$$\text{Smart Start® Incentive} = (\text{Total HP} \times \$155/\text{HP}) + (\text{Total HP} \times \$120/\text{HP}) + (\text{Total HP} \times \$65/\text{HP})$$

$$\text{Smart Start® Incentive} = (1 \times 5\text{HP} \times \$155/\text{HP})$$

$$\text{SmartStart® Incentive} = \underline{\$775}$$

A summary of energy savings can be seen in the table below:

KITCHEN EXHAUST CONTROLS CALCULATION			
ECM INPUTS	**EXISTING**	**PROPOSED**	**SAVINGS**
ECM INPUTS	Manually Controlled Kitchen Exhaust	MELINK Kitchen Exhaust Controls	-
Fan Power Usage (kWh)	10,340	3,495	6,845
Gas Usage (Therms)	1,073	697	375
Cooling Energy (kWh)	10,996	7,148	3,849
Average Gas Cost ($/Therm)	1.21	1.21	-
Electric Cost ($/KWH)	0.148	0.148	-
SAVINGS CALCULATIONS			
ECM RESULTS	**EXISTING**	**PROPOSED**	**SAVINGS**
Gas Energy Cost ($)	$1,298	$844	$454
Electric Energy Cost ($)	$3,158	$1,575	$1,583
Total Energy Cost ($)	$4,456	$2,419	$2,037
COMMENTS:	*ECM is based on calculations using spreadsheets privded by MELINK Intelli-hood controls manufacturer.		

Energy Savings Summary:

ECM #7 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$35,000
NJ Smart Start Equipment Incentive ($):	$775
Net Installation Cost ($):	$34,225
Maintenance Savings ($/Yr):	$0
Energy Savings ($/Yr):	$2,037
Total Yearly Savings ($/Yr):	$2,037
Estimated ECM Lifetime (Yr):	15
Simple Payback	16.8
Simple Lifetime ROI	-10.7%
Simple Lifetime Maintenance Savings	$0
Simple Lifetime Savings	$30,555
Internal Rate of Return (IRR)	-1%
Net Present Value (NPV)	($9,907.76)

ECM #8: Air Conditioning Unit Upgrades

Description:

Various spaces in the High School are conditioned with older split AC systems made by Carrier and Trane. In addition there are two (2) 2-ton window AC units in two spaces. These units are older and inefficient units compared to today's split systems. New split air conditioner condensers provide higher full load and part load efficiencies due to advances in inverter motor technologies, heat exchangers and refrigerants. This ECM includes one-to-one replacement of the older air conditioning units with new higher efficiency systems. A summary of 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**
Carrier AKS028	AHUs	1	282,000	24	New Condensing Unit
Mitsubishi Mini Split	-	1	9,000	0.8	New Mini Split Unit
Trane TTA90 Condensing Unit	AHUs	1	90,000	7.5	New Condensing Unit
Trane TTA180 Condensing Unit	AHUs	1	180,000	15	New Condensing Unit
LG Window Units	AHUs	2	12,000	2	New ductless split
Total		**6**	**573,000**	**31.8**	

The basis for the energy calculations for each air conditioning unit is summarized in the table below. The replacement units utilize high efficiency R410a refrigerant. Therefore, the retrofit includes replacement of the refrigerant coil in the air handling units.

IMPLEMENTATION SUMMARY					
ECM INPUTS	**SERVICE FOR**	**NUMBER OF UNITS**	**COOLING CAPACITY, BTU/HR**	**TOTAL CAPACITY, TONS**	**REPLACE UNIT WITH**
Carrier AKS028	AHUs	1	282,000	24	New Condensing Unit
Mitsubishi Mini Split	-	1	9,000	0.75	New Mini Split Unit
Trane TTA90 Condensing Unit	AHUs	1	90,000	7.5	New Condensing Unit
Trane TTA180 Condensing Unit	AHUs	1	180,000	15	New Condensing Unit
LG Window Units	AHUs	2	12,000	2	New ductless split
Total		**6**	**573,000**	**48.75**	

Energy Savings Calculations:

Cooling Energy Savings:

Energy consumption of each air conditioner at cooling mode is calculated based on applicable energy efficiency measure with the equations below.

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

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

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

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

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

ENERGY SAVINGS CALCULATIONS							
ECM INPUTS	**COOLING CAPACITY, BTU/Hr**	**ANNUAL COOLING HOURS**	**EXISTING UNIT EFFICIENCY**	**NEW UNIT EFFICIENCY**	**# OF UNITS**	**ENERGY SAVINGS kWh**	**DEMAND SAVINGS kW**
Carrier AKS028	282,000	1,200	12.1 IPLV	15.2 IPLV	1	5,704	4.8
Mitsubishi Mini Split	9,000	1,200	13 SEER	25 SEER	1	399	0.3
Trane TTA90 Condensing Unit	90,000	800	10 EER	12.4 EER	1	1,394	1.7
Trane TTA180 Condensing Unit	180,000	800	9.5 EER	12.6 EER	1	2,971	3.7
LG Window Units	12,000	1,200	11 SEER	25 SEER	2	1,063	0.9
Total					3	7,496	6.8

Project Cost, Incentives and Maintenance Savings

From the NJ Smart Start® Program appendix, the replacement of split AC units falls under the category "Unitary HVAC Split System" and warrants an incentive based on efficiency (SEER, EER) of each type of system. The program incentives are calculated as follows:

$$\text{SmartStart® Incentive} = (\text{Cooling Tons} \times \$/\text{Ton Incentive})$$

REBATE SUMMARY				
UNIT DESCRIPTION	**UNIT EFFICIENCY**	**REBATE $/TON**	**PROPOSED CAPACITY TONS**	**TOTAL REBATE $**
5.4 tons or less Unitary AC and Split System	≥14 SEER	$92	2.75	$253
≥5.4 to <11.25 tons	≥11.5 EER	$73	7.5	$548
≥11.25 to <20 tons	11.5 EER	$79	15	$1,185
≥20 to 30 tons	10.5 EER	$79	24	$1,857
TOTAL			**48.75**	**$3,842**

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**
Carrier AKS028	$46,800	1	$46,800	$1,857	$44,944	$844	53.2
Mitsubishi Mini Split	$3,500	1	$3,500	$69	$3,431	$59	58.1
Trane TTA90 Condensing Unit	$12,950	1	$12,950	$548	$12,403	$206	60.1
Trane TTA180 Condensing Unit	$24,600	1	$24,600	$1,185	$23,415	$440	53.2
LG Window Units	$4,500	2	$9,000	$184	$8,816	$157	56.0
Total		6	$96,850	$3,842	$93,008	$1,707	54.5

Total cost of units includes replacement of the cooling coils in the air handling unit. There is no significant maintenance savings due to implementation of this ECM.

Energy Savings Summary:

ECM #8 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$96,850
NJ Smart Start Equipment Incentive ($):	$3,842
Net Installation Cost ($):	$93,008
Maintenance Savings ($/Yr):	$0
Energy Savings ($/Yr):	$1,707
Total Yearly Savings ($/Yr):	$1,707
Estimated ECM Lifetime (Yr):	15
Simple Payback	54.5
Simple Lifetime ROI	-72.5%
Simple Lifetime Maintenance Savings	$0
Simple Lifetime Savings	$25,599
Internal Rate of Return (IRR)	-13%
Net Present Value (NPV)	($72,635.01)

ECM #9: Window Replacement

Description:

The building envelope consists of a combination of double and single pane windows with aluminum frames throughout the building. The single pane windows are original to the building. 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 remaining single pane windows in the building with double pane windows with low emissivity glass. The proposed windows provide 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 $80 per SF of window installed. Below is a list of areas with older and inefficient windows:

WINDOW REPLACEMENT SUMMARY			
ECM INPUTS	**Designation on Floor Plan**	**NUMBER OF WINDOWS**	**SIZE**
Cafeteria	F	1	9'x6'
Corridor between B and C Wings	A	6	12'x6'
Corridor between B and C Wings	B	4	3'x6'
A6	D	8	3'x6'
Library	G	5	2'x8'
Lavatories	C	2	10'x6'
Courtyard	E	1	40'x6'
TOTAL		**27**	-

Note: For locations of window replacements please see the **Window Replacement Locations** Appendix for details.

Energy Savings Calculations:

$$\text{Infiltration}\left(\frac{\text{Ft}^3}{\text{Min.}}\right) = \text{Window Area}\left(\text{Ft}^2\right) \times \text{Estimated Infiltration per SF of Window}\left(\frac{\text{CFM}}{\text{Ft}^2}\right)$$

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

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

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

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

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

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

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

WINDOW REPLACEMENT CALCULATIONS			
ECM INPUTS	**EXISTING**	**PROPOSED**	**SAVINGS**
Description:	Existing Single Pane Windows	Double Pane Low-E Windows	-
Window (SF)	1,142	1,142	-
U-Value (BTU/HR/SF*°F)	0.8	0.45	0.35
Estimated Infiltration, CFM per SF Window	3	2	-
Total Infiltration, CFM	3426	2284	1,142
Heating System Efficiency (%)	85%	85%	-
Heating Degree Days (HDD)	4,496	4,496	-
Design Day Temp Diff (°F)	65	65	-
Heating Hrs Per Day (Hrs)	24	24	-
Full Load Cooling Hours	800	800	-
Average Cooling Efficiency, EER	9.5	9.5	-
Gas Cost ($/Therm)	1.21	1.21	-
Electric Cost ($/kWh)	0.148	0.148	-
Gas Heat Value (BTU/Therm)	100,000	100,000	-
ENERGY SAVINGS CALCULATIONS			
ECM RESULTS	**EXISTING**	**PROPOSED**	**SAVINGS**
Heat Load (BTU/Hr)	244,959	163,306	81,653
Leakage Energy (Therms)	2,870	1,914	957
Conductive Energy (Therms)	696	391	304
Total Heating Energy (Therms)	3,566	2,305	1,261
Cooling Load (Ton)	9	6	3
Cooling Demand (kW)	3.1	2.1	1.0
Total Cooling Energy (kWh)	8,655	5,770	2,885
Gas Energy Cost ($)	$4,315	$2,789	$1,526
Electric Energy Cost ($)	$1,281	$854	$427
Comments:	1. Proposed window U-value Based on ASHRAE 90.1 - 2007		

Estimated cost for replacing all the windows at the School building is $91,360.

Energy Savings Summary:

ECM #9 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$91,360
NJ Smart Start Equipment Incentive ($):	$0
Net Installation Cost ($):	$91,360
Maintenance Savings ($/Yr):	$0
Energy Savings ($/Yr):	$1,953
Total Yearly Savings ($/Yr):	$1,953
Estimated ECM Lifetime (Yr):	30
Simple Payback	46.8
Simple Lifetime ROI	-35.9%
Simple Lifetime Maintenance Savings	$0
Simple Lifetime Savings	$58,593
Internal Rate of Return (IRR)	-3%
Net Present Value (NPV)	($53,078.18)

ECM #10: Low Flow WC, Urinals and Faucets

Description:

The facility utilizes standard plumbing fixtures. The typical water closet and urinal water consumption only meet the minimum federally required standard for water efficiency. New fixtures are available that use less water than today's requirements and can add up to significant water reduction over a long period.

This ECM includes the replacement of the existing sink faucets, water closets and urinals within the bathrooms the 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, low flow flushometer style water closets that utilize 1.28 gallons per flush and ultra-low flushometer style urinals that utilize 1/8 gallons per flush. For the basis of this calculation the LEED rating system was used to estimate the occupancy usage for students within the school. This ECM does not include private bathrooms for teachers use and is based solely on the large public bathrooms used by the students. 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	-
Total Number of Students	984	984	-
% Male to Female	50%	50%	-
Estimated % Floor Area Served by Older Bathrooms	100%	100%	-
Occupied Days Per Year	240	240	-
Lavatory Uses per Day per Person	3	3	-
Sink flow time per use, sec	15	12	-
Sink Aerator Flow, GPM	1.5	0.5	-
WC Uses per Day per Person	2.0	2.0	-
Urinal Uses per Day per Person	1.0	1.0	-
Total Urinal Flushes Per Day	492	492	-
Total WC Flushes Per Day	984	984.0	-
Urinal Gallons Per Flush (GPF)	1.0	0.125	0.875
WC Gallons Per Flush (GPF)	1.6	1.28	0.32
**** Water Cost ($/1000 Gal)**	$8.00	$8.00	-
Gas Cost ($/Therm)	$1.21	$1.21	-
ENERGY SAVINGS CALCULATIONS			
ECM RESULTS	**EXISTING**	**PROPOSED**	**SAVINGS**
Water Consumption, Urinal and WC (Gal)	495,936	317,045	178,891
Water Consumption, Faucets (Gal)	265,680	70,848	194,832
Total Water Consumption, (Gal)	761,616	387,893	373,723
Water Cost ($)	$6,093	$3,103	$2,990
Gas Consumption (Therms)	1,108	295	812
Gas Cost ($/Year)	$1,341	$357	$983
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 installation of 23 water closets, 13 low flow urinals and 27 new auto flow sink faucets throughout the facility is estimated to be $60,000.

The following table locates and quantifies the fixtures that are being installed for this ECM.

Room Designations	Applicable Fixtures		
	Water Closets	Low Flow Urinals	Auto Flow Sink Faucets
"B" Wing Boys Lavatory	2	4	4
"B" Wing Girls Lavatory	4	0	4
"C" Wing Mens Lavatory (Faculty)	2	6	6
"C" Wing Womens Lavatory (Faculty)	6	0	5
"D" Wing Boys Lavatory	3	3	4
"D" Wing Girls Lavatory	6	0	4
Total	23	13	27

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

Energy Savings Summary:

ECM #10 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$60,000
NJ Smart Start Equipment Incentive ($):	$0
Net Installation Cost ($):	$60,000
Maintenance Savings ($/Yr):	$2,990
Energy Savings ($/Yr):	$983
Total Yearly Savings ($/Yr):	$3,973
Estimated ECM Lifetime (Yr):	15
Simple Payback	15.1
Simple Lifetime ROI	-0.7%
Simple Lifetime Maintenance Savings	$44,847
Simple Lifetime Savings	$59,593
Internal Rate of Return (IRR)	0%
Net Present Value (NPV)	($12,572.38)

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 energy produces clean energy and reduces a building's carbon footprint. This is accomplished via photovoltaic panels which will be 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 and the parking lots around the building being audited for the purposes of determining a potential photovoltaic system. A parking lot area of 9,900 S.F. can be utilized for a canopy mounted 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 155 kilowatts could be installed. A system of this size has an estimated kilowatt hour production of 192,627 KWh annually, reducing the overall utility bill by approximately 10.9 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 over an available parking lot space at 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 owner 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**	**INTERNAL RATE OF RETURN**
Direct Purchase	14.5 Years	5.2%

*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 High School to invest in a solar system through a Direct Purchase CEG does not recommend the High School pursue this route. It would be more advantageous for the High School 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 High School at a reduced rate compared to their existing electric rate.

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 is not adequate for purchase of a commercial wind turbine. 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. Irregularities in the load profile will indicate potential problems within the facility. Consequently based on the profile a recommendation will be made to remedy the irregularity in energy usage. 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 both a summer cooling and winter heating load profile. Historical usage is relatively steady throughout the year with an average monthly usage of 147,867kWh and an average monthly demand of 430kW. Largest consumption months were March and September.

The historical usage profile is beneficial and will allow for more competitive energy prices when shopping for alternative suppliers mainly due to the relatively steady year-long 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 PSE&G's BGS-FP default rate are recommended.

Natural Gas:

The Natural Gas Usage Profile demonstrates a very typical natural gas (heat load) profile. The summer months have little consumption. The average winter (Nov-Mar) consumption is 13,348 therms and the average summer (Apr-Oct) consumption is 1,729 therms. The largest consumption month is February at 16,206 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 similar 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:

The facilities receive electric distribution service through Public Service Electric & Gas Company (PSE&G) on rate schedule LPLS (Large Power and Light Secondary). The facility is currently contracted with a Third Party Supplier (TPS) to provide electric commodity service. For electric supply (generation) service, the client has a choice to either use PSE&G's default service rate BGS-FP or contract with a Third Party Supplier (TPS) to supply electric.

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 utility, PSE&G 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. PSE&G's delivery service rate includes the following charges: Customer Service Charge, Distribution Charge (kWh and Demand), Societal Benefits Charge (SBC), and Securitization Transition Charge.

Natural Gas:

This facility currently receives natural gas distribution service through PSE&G on rate schedule LVG (Large Volume General Service). This facility is currently receiving natural gas commodity supply from both the utility, PSE&G on Basic Gas Supply Service (BGSS) for meter number 3220959 and from Hess Energy a Third Party Supplier for meter number 2523557.

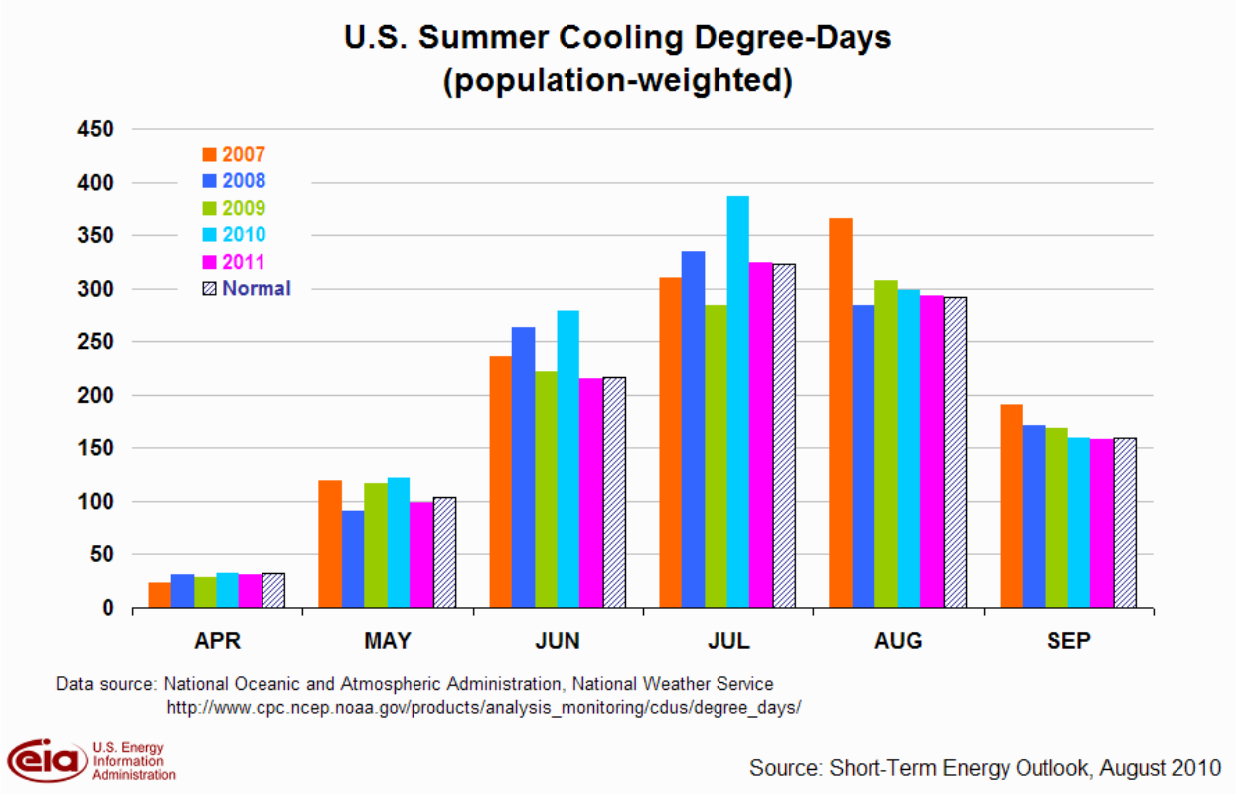
PSE&G provides basic gas supply service (BGSS) to customers who choose not to shop from a Third Party Supplier (TPS) for natural gas commodity. The option is essential to protect the reliability of service to consumers as well as protecting consumers if a third party supplier defaults or fails to provide commodity service. Please refer to the link below for a recap of natural gas BGSS charges from PSE&G for rate schedule 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 2010, 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.



Short Term Energy Outlook - US Energy Information Administration (10/13/2010):

U.S. Natural Gas Prices. *The Henry Hub spot price averaged $3.89 per MMBtu in September, $0.43 per MMBtu lower than the average spot price in August. Prices are expected to remain below $4 per MMBtu in October but rise to $4.68 per MMBtu by January as space-heating demand increases this winter. EIA has revised its projections for natural gas prices downward through 2011. Expectations are now for a price of $4.16 per MMBtu for the last quarter of 2010, $0.27 per MMBtu (6 percent) lower than last month's Outlook, based on several weeks of strong inventory builds. Price expectations for 2011 are $4.58 per MMBtu, which is $0.18 per MMBtu (4 percent) lower than last month's forecast, primarily due to a stronger domestic production forecast.*

Uncertainty over future natural gas prices is lower this year compared with last year at this time. Natural gas futures for December 2010 delivery for the 5-day period ending October 7 averaged $4.07 per MMBtu, and the average implied volatility over the same period was 39 percent. This produced lower and upper bounds for the 95-percent confidence interval of $3.09 per MMBtu and $5.37 per MMBtu, respectively. At this time last year, the natural gas December 2009 futures contract averaged $5.59 per MMBtu and implied volatility averaged 56 percent. The corresponding lower and upper limits of the 95-percent confidence interval were $3.70 per MMBtu and $8.50 per MMBtu.

U.S. Electricity Consumption. *The summer months of 2010 were warmer than normal, especially in the regions east of the Mississippi. Cooling degree-days in the east during June, July, and August ranged from 26 percent (in the South Atlantic region) to 46 percent (in New England) higher than normal. In contrast, cooling degree-days in the East as a whole were 7 percent lower than normal during 2009. The large year-over-year increase in cooling degree-days should help push up total 2010 consumption of electricity by 5 percent over last year's level. Total consumption is expected to fall slightly in 2011 as forecast temperatures return to near-normal levels*

U.S. Electricity Retail Prices. *Although the average U.S. residential retail price of electricity fell by nearly 1 percent during the first half of 2010 compared with the same period last year, prices are expected to increase by 1.5 percent year-over-year during the second half of 2010. Higher generation fuel costs this year are expected to be passed through to retail consumers during 2011, pushing up residential prices by 1.4 percent next year.*

Recommendations:

1. CEG recommends a continued aggregated approach for 3rd party commodity supply procurement strategies for both electric and natural gas supply service. Currently most Burlington Twp BOE facilities are procuring electric & natural gas supply from a TPS. However this facility is currently not procuring natural gas through a TPS for one meter. By aggregating all sites in the BOE for electricity and natural gas procurement, the BOE could continue to realize a significant reduction in energy supply costs. Energy commodities are among the most volatile of all commodities, however at this point and time, energy is extremely competitive. This facility could realize up to a 20% reduction in energy supply costs for natural gas, if it

were to aggregate usage with other schools and take advantage of these current market prices quickly, before energy increases.

The below recommendations presented by CEG are based on current information provided by the BOE for its utility usage, any savings presented with these recommendations are estimates only based on that information. It is recommended that further analysis and review of more recent utility data and any current 3rd party supply contracts be performed prior to performing any of the presented recommendations.

Overall, after review of the utility consumption, billing, and current commodity pricing outlook, CEG recommends that the Burlington Twp BOE Facilities utilize the advisement of 3rd party unbiased Energy Consulting Firm experienced in the aggregation of facilities and procurement of retail natural gas and electricity commodity. The Energy Consulting Firm should incorporate a rational, defensible strategy for purchasing commodity in volatile markets based upon the following:

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

2. CEG recommends that the Burlington Twp BOE consider utilizing a third party utility billing-auditing service to further analyze historical utility invoices such as water, sewer, electric and natural gas for incorrect billings and rate tariff optimization services. This service could provide refunds on potential over billings experienced by the BOE.

3. CEG recommends that the Burlington Twp BOE explore Demand Response Programs that may be available in aggregate for its facilities. Demand response is the action of end users lowering their demand for electric (reducing consumption) in order to help balance supply and demand on the electric grid and ensure stability. The greatest need for demand response typically occurs during times of peak electricity demand, between the hours of 11 am and 6 pm, when extra strain is placed on the grid from situations such as increased air conditioning use on hot days or downed power lines resulting from a storm. Significant incentives are available for clients enrolled in demand response programs. It is strongly recommended that the BOE utilize an experienced 3rd party unbiased energy consulting firm prior to initiating any demand response programs. This is recommended due to the potential conflicts with existing and/or future electric supply service agreements and transparency created by the evaluation of current programs and incentives available.

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%.

v. *Direct Install Program* – The New Jersey Clean Energy's Direct Install Program is a state funded program that targets small commercial and industrial facilities with peak demand of less than 200 kW. This turnkey program is aimed at providing owners a seamless, comprehensive process for analysis, equipment replacement and financial incentives to reduce consumption, lower utility costs and improve profitability. The program covers up to 60% of the cost for eligible upgrades including lighting, lighting controls, refrigeration, HVAC, motors, variable speed drives, natural gas and food service. Participating contractors (refer to www.njcleanenergy.com) conduct energy assessments in addition to your standard local government energy audit and install the cost-effective measures.

vi. *Energy Efficiency and Conservation Block Grants* – The EECGB rebate provides supplemental funding up to $20,000 for counties and local government entities to implement energy conservation measures. The EECGB funding is provided through the American Recovery and Reinvestment Act (ARRA). The local

government must be among the eligible local government entities listed on the NJ Clean Energy website as follows - http://njcleanenergy.com/commercial-industrial/programs/eecbg-eligible-entities. This program is limited to municipalities and counties that have not already received grants directly through the US department of Energy.

This incentive is provided in addition to the other NJ Clean Energy program funding. This program's incentive is considered the entity's capital and therefore can be applied to the LGEA program's requirements to implement the recommended energy conservation measures totaling at least 25% of the energy audit cost. Additional requirements of this program are as follows:

1. The entity must utilize additional funding through one or more of the NJ Clean Energy programs such as Smart Start, Direct Install, and Pay for Performance.

2. The EECBG funding in combination with other NJ Clean Energy programs may not exceed the total cost of the energy conservation measures being implemented.

3. Envelope measures are applicable only if recommended by the LGEA energy audit and if the energy audit was completed within the past 12 months.

4. New construction and previously installed measures are not eligible for the EECBG rebate.

5. Energy conservation measures eligible for the EECBG must fall within the list of approved energy conservation measures. The complete list of eligible measures and other program requirements are included in the "EECBG Complete Application Package." The application package is available on the NJ Clean Energy website - http://njcleanenergy.com/commercial-industrial/programs/energy-efficiency-and-conservation-block-grants.

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.

In addition to the recommendations above, implementing Retro-Commissioning would be beneficial for this facility. Retro-Commissioning is a means to verify your current equipment is operating at its designed efficiency, capacity, airflow, and overall performance. Retro-Commissioning provides valuable insight into systems or components not performing correctly or efficiently. The commissioning process defines the original system design parameters and recommends revisions to the current system operating characteristics.

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.

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

Burlington Township High School - Main Building

ECM NO.	DESCRIPTION	INSTALLATION COST				YEARLY SAVINGS			ECM LIFETIME	LIFETIME ENERGY SAVINGS	LIFETIME MAINTENANCE SAVINGS	LIFETIME ROI	SIMPLE PAYBACK	INTERNAL RATE OF RETURN (IRR)	NET PRESENT VALUE (NPV)
		MATERIAL	LABOR	REBATES, INCENTIVES	NET INSTALLATION COST	ENERGY	MAINT. / SREC	TOTAL		(Yearly Saving * ECM Lifetime)	(Yearly Maint Svaing * ECM Lifetime)	(Lifetime Savings - Net Cost) / (Net Cost)	(Net cost / Yearly Savings)	$\sum_{n=0}^{N} \frac{C_n}{(1+IRR)^n}$	$\sum_{n=0}^{N} \frac{C_n}{(1+DR)^n}$
		($)	($)	($)	($)	($/Yr)	($/Yr)	($/Yr)	(Yr)	($)	($)	(%)	(Yr)	($)	($)
ECM #1	Lighting Upgrade – Gymnasium and Interior Spaces	$13,217	$0	$3,903	$9,314	$3,898	$0	$3,898	15	$58,476	$0	527.8%	2.4	41.63%	$37,224.95
ECM #2	Lighting Occupancy & Daylight Sensors	$22,580	$0	$3,634	$18,946	$5,441	$0	$5,441	15	$81,612	$0	330.8%	3.5	28.01%	$46,006.16
ECM #3	Replace CRT Monitor	$10,800	$0	$0	$10,800	$1,813	$0	$1,813	15	$27,189	$0	151.7%	6.0	14.61%	$10,838.53
ECM #4	Install Premium Efficiency Motors	$23,452	$0	$830	$22,622	$1,147	$0	$1,147	15	$17,199	$0	-24.0%	19.7	-3.25%	($8,934.04)
ECM #5	Install Water Cooled Chiller	$250,000	$0	$3,000	$247,000	$9,934	($522)	$9,412	23	$216,479	-$12,001	-12.4%	26.2	-1.07%	($92,230.55)
ECM #6	Variable Speed Drives for Cooling Tower	$10,000	$0	$0	$10,000	$768	$0	$768	15	$11,527	$0	15.3%	13.0	1.83%	($825.89)
ECM #7	Commercial Kitchen Exhaust Hood Controls	$35,000	$0	$775	$34,225	$2,037	$0	$2,037	15	$30,555	$0	-10.7%	16.8	-1.39%	($9,907.76)
ECM #8	HVAC Unit Upgrades	$96,850	$0	$3,842	$93,008	$1,707	$0	$1,707	15	$25,599	$0	-72.5%	54.5	-13.01%	($72,635.01)
ECM #9	Window Replacement	$91,360	$0	$0	$91,360	$1,953	$0	$1,953	30	$58,593	$0	-35.9%	46.8	-2.66%	($53,078.18)
ECM #10	Low Flow WC, Urinals and Faucets	$60,000	$0	$0	$60,000	$983	$2,990	$3,973	15	$59,593	$44,847	-0.7%	15.1	-0.09%	($12,572.38)
REM RENEWABLE ENERGY AND FINANCIAL COSTS AND SAVINGS SUMMARY															
REM #1	155 kW Solar Photovoltaic System	$1,395,180	$0	$0	$1,395,180	$28,509	$67,419	$95,928	15	$1,438,924	$1,011,292	3.1%	14.5	0.39%	($249,994.83)

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, 2010:

Electric Chillers

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

Energy Efficiency must comply with ASHRAE 90.1-2004

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 - $93 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 90.1-2004

Ground Source Heat Pumps

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

Energy Efficiency must comply with ASHRAE 90.1-2004

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%

Variable Frequency Drives

Variable Air Volume	$65 - $155 per hp
Chilled-Water Pumps	$60 per hp
Compressors	$5,250 to $12,500 per drive

Natural Gas Water Heating

Gas Water Heaters ≤ 50 gallons	$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 (1-2 lamps) $30 per fixture (3-4 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	$25 per fixture
LED Exit Signs	$10 - $20 per fixture
T-5 and T-8 High Bay Fixtures	$16 - $284 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
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 90.1-2004 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%

STATEMENT OF ENERGY PERFORMANCE
Burlington Twp High School - Main

Building ID: 2475335
For 12-month Period Ending: February 28, 2010[1]
Date SEP becomes ineligible: N/A
Date SEP Generated: November 08, 2010

Facility
Burlington Twp High School - Main
610 Fountain Avenue
Burlington, NJ 08016

Facility Owner
Burlington Board of Education
700 Jacksonville Road Hopkins Building
Burlington, NJ 08016

Primary Contact for this Facility
Mary Ann Bell
700 Jacksonville Road Hopkins Building
Burlington, NJ 08016

Year Built: 1964
Gross Floor Area (ft²): 170,000

Energy Performance Rating[2] (1-100) 22

Site Energy Use Summary[3]

Electricity - Grid Purchase(kBtu)	6,054,253
Natural Gas (kBtu)[4]	7,883,951
Total Energy (kBtu)	13,938,204

Energy Intensity[5]

Site (kBtu/ft²/yr)	82
Source (kBtu/ft²/yr)	168

Emissions (based on site energy use)

Greenhouse Gas Emissions ($MtCO_2e$/year)	1,341

Electric Distribution Utility
Public Service Elec & Gas Co

National Average Comparison

National Average Site EUI	63
National Average Source EUI	129
% Difference from National Average Source EUI	29%
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[6] **for Indoor Environmental Conditions:**

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

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

Notes:
1. Application for the ENERGY STAR must be submitted to EPA within 4 months of the Period Ending date. Award of the ENERGY STAR is not final until approval is received from EPA.
2. The EPA Energy Performance Rating is based on total source energy. A rating of 75 is the minimum to be eligible for the ENERGY STAR.
3. Values represent energy consumption, annualized to a 12-month period.
4. Natural Gas values in units of volume (e.g. cubic feet) are converted to kBtu with adjustments made for elevation based on Facility zip code.
5. Values represent energy intensity, annualized to a 12-month period.
6. 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	Burlington Twp High School - Main	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	610 Fountain Avenue, Burlington, NJ 08016	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 acute care or children's hospitals) nor can they be submitted as representing only a portion of a building		☐
High School - Main (K-12 School)				
CRITERION	**VALUE AS ENTERED IN PORTFOLIO MANAGER**	**VERIFICATION QUESTIONS**	**NOTES**	☑
Gross Floor Area	170,000 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	298 (Default)	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	90 %	Is this the percentage of the total floor space within the facility that is served by mechanical cooling equipment?		☐
Percent Heated	90 %	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: Public Service Elec & Gas Co

Fuel Type: Electricity		
Meter: Electric (kWh (thousand Watt-hours)) **Space(s):** Entire Facility **Generation Method:** Grid Purchase		
Start Date	**End Date**	**Energy Use (kWh (thousand Watt-hours))**
02/01/2010	02/28/2010	158,400.00
01/01/2010	01/31/2010	151,040.00
12/01/2009	12/31/2009	152,960.00
11/01/2009	11/30/2009	154,240.00
10/01/2009	10/31/2009	143,360.00
09/01/2009	09/30/2009	161,600.00
08/01/2009	08/31/2009	116,800.00
07/01/2009	07/31/2009	137,600.00
06/01/2009	06/30/2009	137,600.00
05/01/2009	05/31/2009	137,600.00
04/01/2009	04/30/2009	137,600.00
03/01/2009	03/31/2009	185,600.00
Electric Consumption (kWh (thousand Watt-hours))		**1,774,400.00**
Electric Consumption (kBtu (thousand Btu))		**6,054,252.80**
Total Electricity (Grid Purchase) Consumption (kBtu (thousand Btu))		**6,054,252.80**
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)**
02/01/2010	02/28/2010	16,205.50
01/01/2010	01/31/2010	14,907.85
12/01/2009	12/31/2009	15,715.03
11/01/2009	11/30/2009	7,557.03
10/01/2009	10/31/2009	3,684.44
09/01/2009	09/30/2009	808.83
08/01/2009	08/31/2009	174.94
07/01/2009	07/31/2009	1,858.19
06/01/2009	06/30/2009	1,858.19
05/01/2009	05/31/2009	1,858.19

04/01/2009	04/30/2009	1,858.19
03/01/2009	03/31/2009	12,353.13
Gas Consumption (therms)		**78,839.51**
Gas Consumption (kBtu (thousand Btu))		**7,883,951.00**
Total Natural Gas Consumption (kBtu (thousand Btu))		**7,883,951.00**
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
Burlington Twp High School - Main
610 Fountain Avenue
Burlington, NJ 08016

Facility Owner
Burlington Board of Education
700 Jacksonville Road Hopkins Building
Burlington, NJ 08016

Primary Contact for this Facility
Mary Ann Bell
700 Jacksonville Road Hopkins Building
Burlington, NJ 08016

General Information

Burlington Twp High School - Main	
Gross Floor Area Excluding Parking: (ft^2)	170,000
Year Built	1964
For 12-month Evaluation Period Ending Date:	February 28, 2010

Facility Space Use Summary

High School - Main	
Space Type	K-12 School
Gross Floor Area(ft^2)	170,000
Open Weekends?	No
Number of PCs[d]	298
Number of walk-in refrigeration/freezer units	2
Presence of cooking facilities	Yes
Percent Cooled	90
Percent Heated	90
Months[o]	10
High School?	Yes
School District[o]	Burlington

Energy Performance Comparison

	Evaluation Periods		Comparisons		
Performance Metrics	**Current** (Ending Date 02/28/2010)	**Baseline** (Ending Date 02/28/2010)	**Rating of 75**	**Target**	**National Average**
Energy Performance Rating	22	22	75	N/A	50
Energy Intensity					
Site (kBtu/ft^2)	82	82	50	N/A	63
Source (kBtu/ft^2)	168	168	101	N/A	129
Energy Cost					
$/year	$ 358,532.80	$ 358,532.80	$ 216,588.97	N/A	$ 276,978.50
$/$ft^2$/year	$ 2.11	$ 2.11	$ 1.27	N/A	$ 1.63
Greenhouse Gas Emissions					
$MtCO_2e$/year	1,341	1,341	810	N/A	1,036
$kgCO_2e/ft^2$/year	8	8	5	N/A	6

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 Average column presents energy performance data your building would have if your building had an average rating of 50.

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

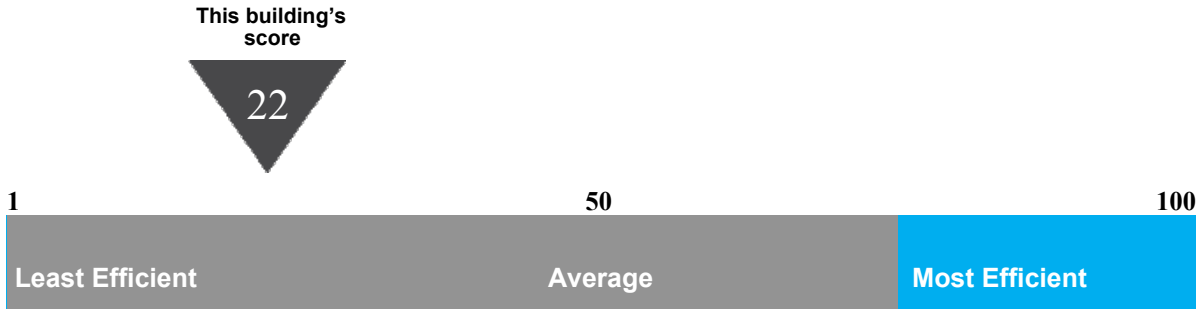
Statement of Energy Performance

2010

Burlington Twp High School - Main
610 Fountain Avenue
Burlington, NJ 08016

Portfolio Manager Building ID: 2475335

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



This building uses 168 kBtu per square foot per year.*

*Based on source energy intensity for the 12 month period ending February 2010

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

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

Date of certification

EPA United States Environmental Protection Agency

Date Generated: 11/08/2010

MAJOR EQUIPMENT LIST

Concord Engineering Group

Burlington Township Board of Education - High School - Main Building

Rooftop / AC Units

Tag	AC-1	AH-3	
Unit Type	Wall Mount Split System	Commercial Air Handling Unit	Split sytem AC
Qty	1	1	1
Location	Control Room PAC	Above Locker Room	Roof of A-Wing Corridor
Area Served	Control Room PAC	Locker Room	CAD Room
Manufacturer	Mitsubishi	McQuay	Carrier
Model #	MS09TW Indoor / MU09TW Outdoor	CAH006FDAC	38ARZ007---501--
Serial #	1001508	FBOU010900727	3306G10155
Cooling Type	DX	-	DX
Cooling Capacity (Tons)	9,500 Btu/Hr	-	6 Tons
Cooling Efficiency (SEER/EER)	13 SEER	-	12.4 EER
Heating Type	-	-	N/A
Heating Input (MBH)	-	-	N/A
Efficiency	-	-	N/A
Fuel	R410-A	-	R-22
Approx Age		9	4
ASHRAE Service Life	15	15	15
Remaining Life	15	6	11
Comments			

Rooftop / AC Units

Tag		AHU-1,2	HRV-1
Unit Type	Commercial Air Cooled Split Systems	Commercial Air Handling Unit	Air Handling Unit
Qty	1	2	1
Location	Outside	Upstairs Mechanical Room near Band Room	Upstairs Mechanical Room near Band Room
Area Served	Cafeteria Addition	Band Room	Band Room
Manufacturer	Carrier	McQuay	Semco
Model #	38AKS028---500--	CAH017FDAC	FV-3000
Serial #	5099F68911	FB0U0I0900724	21266/35406-000
Cooling Type	DX	-	-
Cooling Capacity (Tons)	25 Tons	-	-
Cooling Efficiency (SEER/EER)	9 EER	-	-
Heating Type	-	-	-
Heating Input (MBH)	-	-	-
Efficiency	-	-	-
Fuel	-	-	-
Approx Age	11	9	10
ASHRAE Service Life	15	15	15
Remaining Life	4	6	5
Comments			

Rooftop / AC Units

Tag	ACCU-A-1		
Unit Type	Split System Cooling	Split System Cooling	Split System Cooling
Qty	1	1	1
Location	Outside	Courtyard near room M5	Courtyard near room M5
Area Served	Cafeteria Addition	Nursing Suite	Main Office / Guidance
Manufacturer	Trane Odyssey	Carrier	Trane Odyssey
Model #	TTA180B400DA	38HDC024310	TTA090A300CC
Serial #	Z324XU4AH	4199X34423	952F0AH
Cooling Type	DX	DX	DX
Cooling Capacity (Tons)	15 Tons	2 Tons	7.5 Tons
Cooling Efficiency (SEER/EER)	9.5 EER	15 SEER	10.3 EER
Heating Type	N/A	N/A	N/A
Heating Input (MBH)	N/A	N/A	N/A
Efficiency	N/A	N/A	N/A
Fuel	R-22	R-22	R-22
Approx Age	9	14	12
ASHRAE Service Life	15	15	15
Remaining Life	6	1	3
Comments			

Rooftop / AC Units

Tag	HRV-D1 (HRU-D-2)	HRV-E2 (HRU-E-1)	HRV-E1 (HRU-E-2)
Unit Type	Air Handling Unit	Air Handling Unit	Air Handling Unit
Qty	2	2	2
Location	D-Wing Attic	E-Wing Attic	E-Wing Attic
Area Served	D-Wing	E-Wing	E-Wing
Manufacturer	Semco	Semco	Semco
Model #	FV-2000	FV-2000	FV-3000
Serial #	22546/38891-000	22546/38889-000	22546/38894-000
Cooling Type	-	-	-
Cooling Capacity (Tons)	2hp supply 1.5 hp exhaust	2hp supply 2 hp exhaust	2hp supply 1.5 hp exhaust
Cooling Efficiency (SEER/EER)	-	-	-
Heating Type	-	-	-
Heating Input (MBH)	-	-	-
Efficiency	-	-	-
Fuel	-	-	-
Approx Age	10	10	10
ASHRAE Service Life	15	15	15
Remaining Life	5	5	5
Comments			

Rooftop / AC Units

Tag		RTU-1	
Unit Type	Air Handling Unit		
Qty	1	1	1
Location	MER Room	PAC Roof	A Roof
Area Served		PAC Offices	AHU in A-15 Mezz
Manufacturer	Carrier	Rheem	Trane
Model #	39T6DBKCA-9-AKN-AR	RKMA-A060DL10E	TTA240B300Ca
Serial #	0200F72447	1R568ADAAF370112597	R195PRHAH
Cooling Type	-	DX	DX
Cooling Capacity (Tons)	-	5 Tons	20 Tons
Cooling Efficiency (SEER/EER)	-	-	-
Heating Type	-	Gas Fired	N/A
Heating Input (MBH)	-	100 MBH	N/A
Efficiency	-	81%	N/A
Fuel	-	Nat Gas	N/A
Approx Age	10	9	15
ASHRAE Service Life	15	15	15
Remaining Life	5	6	0
Comments			

Rooftop / AC Units

Tag	EAC-1	AH-4	
Unit Type	Room Vent	Air Handling Unit	Split System AC
Qty	1	1	1
Location	Art Room Mezz	PAC	Attic
Area Served	Art Room	PAC	Library
Manufacturer	CosaTron	Enviro-Tec	Trane
Model #	RV-4000	VV_Arr_1	TTA240B300BD
Serial #	RV01-1176	-	N2437YJAH
Cooling Type	-	DX	DX, R-22
Cooling Capacity (Tons)	-	-	20 Tons
Cooling Efficiency (SEER/EER)	-	-	9.8 EER
Heating Type	-	-	N/A
Heating Input (MBH)	-	-	N/A
Efficiency	-	-	N/A
Fuel	-	-	N/A
Approx Age	9	9	12
ASHRAE Service Life	15	15	15
Remaining Life	6	6	3
Comments			

Rooftop / AC Units

Tag			
Unit Type	Ai r Handling Unit	Ai r Handling Unit	Ai r Handling Unit
Qty	1	1	1
Location	Attic	Attic	Attic
Area Served	Woodshop	CAD Room	Main Office / Guidance
Manufacturer	McQuay	McQuay	Trane
Model #	CAH004FHAC	CAH006FHAC	TWE090A300CA
Serial #	FB0U010200540	FB0U010200528	N294N5C5H
Cooling Type	DX	DX	DX
Cooling Capacity (Tons)	-	6 Tons	7.5 Tons
Cooling Efficiency (SEER/EER)	-	-	10.3 EER
Heating Type	-	-	HW
Heating Input (MBH)	-	-	-
Efficiency	-	-	-
Fuel	-	-	-
Approx Age	9	9	12
ASHRAE Service Life	15	15	15
Remaining Life	6	6	3
Comments			

MAJOR EQUIPMENT LIST

Concord Engineering Group

Burlington Township Board of Education - High School - Main Building

Boilers

Tag	Boilers - 1-5	-	-
Unit Type	Condensing Boilers	-	-
Qty	5	-	-
Location	Boiler Room	-	-
Area Served	-	-	-
Manufacturer	Aerco	-	-
Model #	BMK 2.0	-	-
Serial #	G-00-0561	-	-
Input Capacity (MBH)	2,000 MBH	-	-
Rated Output Capacity (MBH)	1,720-1,840 MBH	-	-
Approx. Efficiency %	86%-92%	-	-
Fuel	Nat Gas	-	-
Approx Age		-	-
ASHRAE Service Life	30	-	-
Remaining Life	30	-	-
Comments		-	-

MAJOR EQUIPMENT LIST

Concord Engineering Group

Burlington Township Board of Education - High School - Main Building

Chiller

Tag	CH-1	-	-
Unit Type	Air Cooled Global Reciprocating Compressor Chiller	-	-
Qty	1	-	-
Location	Outside	-	-
Area Served	Chilled Water Loop	-	-
Manufacturer	McQuay	-	-
Model #	AGR100AS27-ER10	-	-
Serial #	STN4010900157	-	-
Refrigerant	R-22	-	-
Cooling Capacity (Tons)	100 Tons	-	-
Cooling Efficiency (IPLV)	11.1 EER	-	-
Volts / Phase / Hz	460/3/60	-	-
Fuel	-	-	-
Chilled Water GPM / ΔT	238 GPM / 10°F	-	-
Condenser Water GPM / ΔT	300 GPM / 10°F	-	-
Approx Age	10	-	-
ASHRAE Service Life	23	-	-
Remaining Life	13	-	-
Comments		-	-

MAJOR EQUIPMENT LIST

Concord Engineering Group

Burlington Township Board of Education - High School - Main Building

Cooling Tower

Tag	CT-1	-	-
Unit Type	Cooling Tower	-	-
Qty	1	-	-
Location	Mechanical Courtyard	-	-
Area Served	Chilled Water Loop	-	-
Manufacturer	Baltimore Aircoil Company (BAC)	-	-
Model #	VTL116-	-	-
Serial #	U002288401	-	-
Rated Flow GPM	348 GPM	-	-
EWT / LWT	95 / 85	-	-
Motor HP	15 HP	-	-
Electrical	-	-	-
Chilled Water GPM / ΔT	-	-	-
Condenser Water GPM / ΔT	-	-	-
Approx Age	9	-	-
ASHRAE Service Life	20	-	-
Remaining Life	11	-	-
Comments		-	-

MAJOR EQUIPMENT LIST

Concord Engineering Group

Burlington Township Board of Education - High School - Main Building

Domestic Water Heaters

Tag	HWH-1,2,3	-	-
Unit Type	Gas Fired Commercial Hot Water Heater	Electric Domestic Hot Water Heater	-
Qty	3	1	-
Location	Boiler Room		-
Area Served			-
Manufacturer	Aerco	A.O. Smith	-
Model #	KC Series	DEN 80 102	-
Serial #	-	ME01-1829135-102	-
Size (Gallons)	23 Gallons	80 Gallons	-
Input Capacity (MBH/KW)	1,000 MBH	12 KW	-
Recovery (Gal/Hr)	1,116 Gal/Hr		-
Efficiency %	93%	100%	-
Fuel	Nat Gas	Electric	-
Approx Age			-
ASHRAE Service Life	12	12	-
Remaining Life		12	-
Comments			-

MAJOR EQUIPMENT LIST

Concord Engineering Group

Burlington Township Board of Education - High School - Main Building

Pumps

Tag	LWP-1,2	DHWP-1,2	HWP-5,6
Unit Type	End Suction	In-line pump	End Suction
Qty	2	2	2
Location	Mech Room D109	Mech Room D109	Mech Room D109
Area Served	Heat Pump Loop	DHW Loop	Heat Loop
Manufacturer	Bell & Gossett	Bell & Gossett	Bell & Gossett
Model #	4E 10.875BF	-	2AC 6.500 BF
Serial #	Series 1510	-	2227893
Horse Power	20 HP	1/6 HP	1.5 HP
Flow	336 GPM @ 70 FT HD	-	80 GPM @ 40 FT HD
Motor Info	US Electric Motors	AO Smith	Marathon
Electrical Power	208-230/460/3/60	115/1/60	208-230/460/3/60
RPM	1760 RPM	1725	1800 RPM
Motor Efficiency %	89.5%	-	86%
Approx Age	10	10	10
ASHRAE Service Life	20	20	20
Remaining Life	10	10	10
Comments	Controlled thru standard motor starter. Pumps thru boiler then out system.		

Pumps

Tag	CWP-1,2		
Unit Type	End Suction		
Qty	2		
Location	Mech Room D109		
Area Served	Condenser Water		
Manufacturer	Bell & Gossett		
Model #	3BC 7.625 BF		
Serial #	2229246		
Horse Power	7.5 HP		
Flow	336 GPM @ 50FT HD		
Motor Info	US Electric Motors		
Electrical Power	208-230/460/3/60		
RPM	1800 RPM		
Motor Efficiency %	88.5%		
Approx Age	10		
ASHRAE Service Life	20		
Remaining Life	10		
Comments			

Investment Grade Lighting Audit

CEG Job #: 9C10054
Project: Burlington Township Schools — **Burlington Township High School - Main Building** — **KWH COST:** $0.148
Address: 610 Fountain Ave. Burlington, NJ, 08016
Bldg. Sq. Ft. 170,000

ECM #1: Lighting Upgrade - General

Existing Lighting										PROPOSED LIGHTING									SAVINGS			
CEG Type	Fixture Location	Yearly Usage	No. Fixts	No. Lamps	Fixture Type	Fixt Watts	Total kW	kWh/Yr Fixtures	Yearly $ Cost	No. Fixts	No. Lamps	Retro-Unit Description	Watts Used	Total kW	kWh/Yr Fixtures	Yearly $ Cost	Unit Cost (INSTALLED)	Total Cost	kW Savings	kWh/Yr Savings	Yearly $ Savings	Yearly Simple Payback
221.11	M6 Classroom	2600	21	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	1.22	3,166.8	$468.69	21	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.11	M4 Classroom	2600	18	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	1.04	2,714.4	$401.73	18	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.11	Guidance Office	2600	4	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	0.23	603.2	$89.27	4	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.11	M2 Classroom	2600	27	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	1.57	4,071.6	$602.60	27	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.11	Student Assistant Coordinator	2600	8	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	0.46	1,206.4	$178.55	8	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.11	A2 Classroom	2600	18	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	1.04	2,714.4	$401.73	18	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.11	A4 Classroom	2600	21	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt.,	58	1.22	3,166.8	$468.69	21	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.11	A1 Classroom	2600	24	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	1.39	3,619.2	$535.64	24	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.11	A3 Classroom	2600	24	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt.,	58	1.39	3,619.2	$535.64	24	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
50		2600	8	1	Round Back Track Head, 75w PAR20	75	0.60	1,560.0	$230.88	8	1	Dimmable LED PAR20, 9w	9	0.07	187.2	$27.71	$95.00	$760.00	0.53	1372.8	$203.17	3.74
211.14	A1 & A3 Storage	1200	4	1	1x4, 1 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	30	0.12	144.0	$21.31	4	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.11	A3 Locker Room & Storage	1200	4	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt.,	58	0.23	278.4	$41.20	4	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.11	A5 Classroom	2600	24	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	1.39	3,619.2	$535.64	24	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.11	A5 Kiln	2600	1	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt.,	58	0.06	150.8	$22.32	1	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.11	A6 Classroom	2600	21	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	1.22	3,166.8	$468.69	21	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.11	A8 Computer Lab.	2600	21	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt.,	58	1.22	3,166.8	$468.69	21	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
242.21	Women's Restroom	1200	3	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	104	0.31	374.4	$55.41	3	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
242.21	Men's Restroom	1200	3	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt.,	104	0.31	374.4	$55.41	3	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
613	A19 Custodian Closet	1200	1	1	"Keyless" Socket, 100w A19 Lamp	100	0.10	120.0	$17.76	1	1	(1) 26w CFL Lamp	26	0.03	31.2	$4.62	$20.00	$20.00	0.07	88.8	$13.14	1.52
221.11	Faculty Lounge	2600	13	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt.,	58	0.75	1,960.4	$290.14	13	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00

Investment Grade Lighting Audit

200	Faculty Restroom	1200	1	2	1x2, 1 Lamp, 17w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	34	0.03	40.8	$6.04	1	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
211.11	Faculty Men's Restroom	1200	1	1	1x4, 1 Lamp, 32w T8, Elect. Ballast, Surface Mnt.,	30	0.03	36.0	$5.33	1	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.11	Faculty Women's Restroom	1200	1	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	0.06	69.6	$10.30	1	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.11	Media Center Conference Room	2600	18	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt.,	58	1.04	2,714.4	$401.73	18	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.11	B5 Media Center	2600	114	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	6.61	17,191.2	$2,544.30	114	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.11	Media Center Office	2600	8	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	0.46	1,206.4	$178.55	8	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.11	B3 Classroom	2600	24	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt.,	58	1.39	3,619.2	$535.64	24	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.11	B1 Classroom	2600	28	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	1.62	4,222.4	$624.92	28	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
3	Boys' Restroom	2600	4	2	1x2, 2 Lamp, 17w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	34	0.14	353.6	$52.33	4	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
3	Girls' Restroom	2600	4	2	1x2, 2 Lamp, 17w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	34	0.14	353.6	$52.33	4	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
3	Custodian Closet	4400	1	2	1x2, 2 Lamp, 17w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	34	0.03	149.6	$22.14	1	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.21	Nurse's Office	2600	4	3	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt.,	86	0.34	894.4	$132.37	4	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
227.21		2600	2	2	2x2, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	58	0.12	301.6	$44.64	2	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
242.21	Exam Room	2600	1	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	104	0.10	270.4	$40.02	1	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
4	Nurse's Restroom	2600	1	2	1x2, 2 Lamp, 17w T8, Elect. Ballast, Wall Mnt., Prismatic Lens	34	0.03	88.4	$13.08	1	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.11	B2 Classroom	2600	18	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	1.04	2,714.4	$401.73	18	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.11	B4 Classroom	2600	27	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	1.57	4,071.6	$602.60	27	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.11	B6 Classroom	2600	27	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	1.57	4,071.6	$602.60	27	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.11	Prep. Room	2600	4	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	0.23	603.2	$89.27	4	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.21	AD Office	2600	4	3	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.34	894.4	$132.37	4	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.11	B8 Classroom	2600	30	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	1.74	4,524.0	$669.55	30	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.11	B10 Classroom	2600	33	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	1.91	4,976.4	$736.51	33	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00

Investment Grade Lighting Audit

221.11	B10 Storage	2600	2	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	0.12	301.6	$44.64	2	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
211.34	Trainer	2600	6	1	1x4, 1 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Acrylic Lens	30	0.18	468.0	$69.26	6	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
5	Athletic Trainer Office	2600	21	2	Recessed Down Light, (2) 26w PL Lamp	54	1.13	2,948.4	$436.36	21	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.12		2600	20	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	1.16	3,016.0	$446.37	20	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.42		2600	9	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Wall Mnt., Prismatic	58	0.52	1,357.2	$200.87	9	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
7	Wrestling	2600	14	1	175w MH, Indirect	210	2.94	7,644.0	$1,131.31	14	2	1x4, 2 Lamp, 54w T5HO, Surface Mnt., Prismatic	120	1.68	4368	$646.46	$175.00	$2,450.00	1.26	3276	$484.85	5.05
7	Weight Room	2600	8	1	175w MH, Indirect	210	1.47	3,822.0	$565.66	7	2	1x4, 2 Lamp, 54w T5HO, Surface Mnt., Prismatic	120	0.84	2184	$323.23	$175.00	$1,225.00	0.63	1638	$242.42	5.05
221.21	Boys' Locker Room	2600	13	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Acrylic Lens	58	0.75	1,960.4	$290.14	13	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
227.21		2600	7	2	2x2, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	58	0.41	1,055.6	$156.23	7	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
222.21	Gym Storage	1200	2	2	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	58	0.12	139.2	$20.60	2	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.21	Gym Office	2600	2	3	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.17	447.2	$66.19	2	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.14	A12 Gym	2600	80	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., No Lens	58	4.64	12,064.0	$1,785.47	80	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
222.21	Gym Storage	1200	2	2	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	58	0.12	139.2	$20.60	2	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
222.21	Gym Office	2600	2	2	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt.,	58	0.12	301.6	$44.64	2	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.21	Girls' Locker Room	2600	13	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Acrylic Lens	58	0.75	1,960.4	$290.14	13	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
227.21		2600	7	2	2x2, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	58	0.41	1,055.6	$156.23	7	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.14	Gym Storage	1200	2	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., No Lens	58	0.12	139.2	$20.60	2	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.14	Stairway	4400	3	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., No	58	0.17	765.6	$113.31	3	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.14	Mechanical Room	1200	6	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., No Lens	58	0.35	417.6	$61.80	6	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
242.21	A15 Music Room	2600	20	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	104	2.08	5,408.0	$800.38	20	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
242.21	A17 Choral Room	2600	12	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt.,	104	1.25	3,244.8	$480.23	12	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.21	Choral Office	2600	2	3	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.17	447.2	$66.19	2	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00

Investment Grade Lighting Audit

232.21	Choral Storage	2600	2	3	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt.,	86	0.17	447.2	$66.19	2	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.21	Choral Hall / Lockers	2600	4	3	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.34	894.4	$132.37	4	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.31	A11 Classroom	2600	27	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., Prismatic Lens	58	1.57	4,071.6	$602.60	27	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.31	A13 Classroom	2600	27	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., Prismatic Lens	58	1.57	4,071.6	$602.60	27	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	A9 CAD	2600	16	3	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	1.38	3,577.6	$529.48	16	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.31	A7 Wood Shop	2600	50	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Pendant Mnt.,	58	2.90	7,540.0	$1,115.92	50	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.11	Transporatation Office	2600	11	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	0.64	1,658.8	$245.50	11	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.11	Electric Room	2600	2	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	0.12	301.6	$44.64	2	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.11	Boiler room	2600	20	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	1.16	3,016.0	$446.37	20	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
766	31 Main Gym	2600	30	1	400w MH, Pulse Start, Prismatic Lens	435	13.05	33,930.0	$5,021.64	30	4	2x4 54w T5HO 4 Lamp w/Reflective Lens, Wire Cage	236	7.08	18408	$2,724.38	$240.00	$7,200.00	5.97	15522	$2,297.26	3.13
221.16	Boys' Locker Room	2600	16	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Acrylic Lens	58	0.93	2,412.8	$357.09	16	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
8	Boys' Showers	2600	10	2	1x1 Recessed Down Light, 26w Quad PL Lamp	26	0.26	676.0	$100.05	10	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
227.21	Boys' Restroom	2600	2	2	2x2, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	58	0.12	301.6	$44.64	2	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.16	Girls' Locker Room	2600	18	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Acrylic Lens	58	1.04	2,714.4	$401.73	18	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
8	Girls' Showers	2600	8	2	1x1 Recessed Down Light, 26w Quad PL Lamp	26	0.21	540.8	$80.04	8	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
227.21	Girls' Restroom	2600	3	2	2x2, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt.,	58	0.17	452.4	$66.96	3	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.11	C9 Classroom	2600	18	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	1.04	2,714.4	$401.73	18	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.11	Faculty Room	2600	9	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	0.52	1,357.2	$200.87	9	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.11	C11 Classroom	2600	18	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	1.04	2,714.4	$401.73	18	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.11	C13 Data Room	2600	21	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt.,	58	1.22	3,166.8	$468.69	21	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.31	C15 Tech Office	2600	18	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., Prismatic Lens	58	1.04	2,714.4	$401.73	18	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.11	C20 Classroom	2600	18	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	1.04	2,714.4	$401.73	18	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00

Investment Grade Lighting Audit

221.11	C18 Classroom	2600	18	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	1.04	2,714.4	$401.73	18	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.11	C16 Classroom	2600	18	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	1.04	2,714.4	$401.73	18	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.11	C14 Classroom	2600	18	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	1.04	2,714.4	$401.73	18	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
242.21	Assistant Principal's Office	2600	4	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	104	0.42	1,081.6	$160.08	4	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
3	Electric Closet	2600	1	2	1x2, 2 Lamp, 17w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	34	0.03	88.4	$13.08	1	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.11	C7 Classroom	2600	18	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	1.04	2,714.4	$401.73	18	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.11	C12 Classroom	2600	18	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	1.04	2,714.4	$401.73	18	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.31	C5 Classroom	2600	18	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., Prismatic Lens	58	1.04	2,714.4	$401.73	18	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.11	C10 Classroom	2600	18	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	1.04	2,714.4	$401.73	18	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.11	C8 Classroom	2600	18	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	1.04	2,714.4	$401.73	18	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.11	C3 Classroom	2600	18	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	1.04	2,714.4	$401.73	18	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.31	C6 Classroom	2600	18	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., Prismatic Lens	58	1.04	2,714.4	$401.73	18	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.31	C1 Classroom	2600	18	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., Prismatic Lens	58	1.04	2,714.4	$401.73	18	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
3	Boys' Restroom	2600	4	2	1x2, 2 Lamp, 17w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	34	0.14	353.6	$52.33	4	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
3	Girls' Restroom	2600	4	2	1x2, 2 Lamp, 17w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	34	0.14	353.6	$52.33	4	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.11	Mens' Faculty Restroom	1200	3	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	0.17	208.8	$30.90	3	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.11	Women's Faculty Restroom	1200	3	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	0.17	208.8	$30.90	3	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.11	C4 SGI	2600	12	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	0.70	1,809.6	$267.82	12	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.31	C2 Classroom	2600	18	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., Prismatic Lens	58	1.04	2,714.4	$401.73	18	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.31	M9 Classroom	2600	18	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., Prismatic Lens	58	1.04	2,714.4	$401.73	18	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.31	M10 Classroom	2600	21	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., Prismatic Lens	58	1.22	3,166.8	$468.69	21	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00

Investment Grade Lighting Audit

221.31	M7 Classroom	2600	18	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., Prismatic Lens	58	1.04	2,714.4	$401.73	18	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.31	M5 Classroom	2600	18	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., Prismatic Lens	58	1.04	2,714.4	$401.73	18	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.31	M8 Classroom	2600	21	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., Prismatic Lens	58	1.22	3,166.8	$468.69	21	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.21	D2 Classroom	2600	12	3	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	1.03	2,683.2	$397.11	12	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.21	D4 Classroom	2600	12	3	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	1.03	2,683.2	$397.11	12	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.21	D6 Classroom	2600	12	3	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	1.03	2,683.2	$397.11	12	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.21	D8 Classroom	2600	12	3	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	1.03	2,683.2	$397.11	12	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.21	D10 Classroom	2600	12	3	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	1.03	2,683.2	$397.11	12	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.21	Office	2600	5	3	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.43	1,118.0	$165.46	5	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.21	D12 Classroom	2600	12	3	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	1.03	2,683.2	$397.11	12	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.21	D14 Classroom	2600	15	3	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	1.29	3,354.0	$496.39	15	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.21	Prep. Room	2600	6	3	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.52	1,341.6	$198.56	6	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.21	D16 Classroom	2600	15	3	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt.,	86	1.29	3,354.0	$496.39	15	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
222.22	D18 Classroom	2600	15	2	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	58	0.87	2,262.0	$334.78	15	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
222.22	D20 Classroom	2600	15	2	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	58	0.87	2,262.0	$334.78	15	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.34	Mechanical Room	2600	9	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., No Lens	58	0.52	1,357.2	$200.87	9	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
222.21	Custodian Office	4400	4	2	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	58	0.23	1,020.8	$151.08	4	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.21	D13 Classroom	2600	15	3	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	1.29	3,354.0	$496.39	15	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.21	D11 Classroom	2600	15	3	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	1.29	3,354.0	$496.39	15	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.21	D9 Classroom	2600	15	3	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	1.29	3,354.0	$496.39	15	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.21	Prep. Room	2600	6	3	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.52	1,341.6	$198.56	6	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00

Investment Grade Lighting Audit

227.21	Women's Restroom	1200	5	2	2x2, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	58	0.29	348.0	$51.50	5	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.34	Electronics & Mezzanine	2600	20	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., No Lens	58	1.16	3,016.0	$446.37	20	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
227.21	Women's Restroom	1200	5	2	2x2, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	58	0.29	348.0	$51.50	5	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.21	D7 Classroom	2600	12	3	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt.,	86	1.03	2,683.2	$397.11	12	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.21	D5 Classroom	2600	12	3	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	1.03	2,683.2	$397.11	12	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.21	D3 Classroom	2600	12	3	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	1.03	2,683.2	$397.11	12	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.21	D1 Classroom	2600	12	3	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	1.03	2,683.2	$397.11	12	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.31	Cafeteria	2600	82	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., Prismatic Lens	58	4.76	12,365.6	$1,830.11	82	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.21		2600	34	3	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	2.92	7,602.4	$1,125.16	34	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
5		2600	14	2	Recessed Down Light, (2) 26w PL Lamp	54	0.76	1,965.6	$290.91	14	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	Kitchen	2600	36	3	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	3.10	8,049.6	$1,191.34	36	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.31	115 Stage Craft	2600	24	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., Prismatic Lens	58	1.39	3,619.2	$535.64	24	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
231.31		2600	6	2	2x2, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	58	0.35	904.8	$133.91	6	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
610	Stage	2600	7	1	Globe & Wire Gaurd, 40w A19 Lamp	40	0.28	728.0	$107.74	7	1	Energy Star Rated, Dimmable 13w CFL Lamp	13	0.09	236.6	$35.02	$20.00	$140.00	0.19	491.4	$72.73	1.93
221.41		2600	3	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Wall Mnt., Prismatic	58	0.17	452.4	$66.96	3	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.21	201 Control Room	1200	3	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Acrylic Lens	58	0.17	208.8	$30.90	3	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
1		1200	3	1	Track Head, 35w Halogen	35	0.11	126.0	$18.65	3	1	8w LED MR16	8	0.02	28.8	$4.26	$30.00	$90.00	0.08	97.2	$14.39	6.26
11	Performing Arts Center Lobby	1200	11	1	Wall Washer, 42w Quad PL Lamp	42	0.46	554.4	$82.05	11	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
30		1200	2	2	Pendant Mnt, Indirect Uplight, (2) 500w Quartz Lamp	1000	2.00	2,400.0	$355.20	2	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
31		1200	2	1	Wall Mnt, Indirect Uplight, (1) 500w Quartz Lamp	500	1.00	1,200.0	$177.60	2	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
226.21	Men's Restroom	3200	4	2	6"x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	58	0.23	742.4	$109.88	4	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00

Investment Grade Lighting Audit

227.21	Men's Restroom	3200	2	2	2x2, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	58	0.12	371.2	$54.94	2	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
226.21	Women's Restroom	3200	6	2	6"x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	58	0.35	1,113.6	$164.81	6	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
227.21		3200	3	2	2x2, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	58	0.17	556.8	$82.41	3	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.21	Office	2600	2	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Acrylic Lens	58	0.12	301.6	$44.64	2	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
699	Loading Dock	3000	6	1	50w HPS Wallpack	64	0.38	1,152.0	$170.50	6	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.14	Electric Room	1200	3	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., No Lens	58	0.17	208.8	$30.90	3	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
2	Dressing Room - Women's	400	30	30	Makeup Lights, (30) 40w A Lamp	1200	36.00	14,400.0	$2,131.20	30	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
227.21		400	2	2	2x2, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	58	0.12	46.4	$6.87	2	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
2	Dressing Room - Men's	400	30	30	Makeup Lights, (30) 40w A Lamp	1200	36.00	14,400.0	$2,131.20	30	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
227.21		400	2	2	2x2, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	58	0.12	46.4	$6.87	2	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
242.21	Guidance Office	2600	14	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	104	1.46	3,785.6	$560.27	14	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.21		2600	3	3	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt.,	86	0.26	670.8	$99.28	3	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
227.21		2600	6	2	2x2, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	58	0.35	904.8	$133.91	6	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.21	Mail Room	2600	6	3	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt.,	86	0.52	1,341.6	$198.56	6	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
222.21	Main Office	2600	12	2	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	58	0.70	1,809.6	$267.82	12	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
237.21	Main Office Hall	2600	2	3	2x2, 3 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens	92	0.18	478.4	$70.80	2	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
29	Main Entrance	4400	8	4	4x4, 8 Lamp, 32w T8, Elect. Ballast, Recessed Mnt.,	208	1.66	7,321.6	$1,083.60	8	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
29	Entrance Near C2	4400	2	4	4x4, 8 Lamp, 32w T8, Elect. Ballast, Recessed Mnt.,	208	0.42	1,830.4	$270.90	2	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
5	Corridor D	4400	17	2	Recessed Down Light, (2) 26w PL Lamp	54	0.92	4,039.2	$597.80	17	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.21		4400	23	3	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt.,	86	1.98	8,703.2	$1,288.07	23	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
226.21		4400	8	2	6"x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt.,	58	0.46	2,041.6	$302.16	8	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.21	Connecting Corridors B to C & C to D (2)	4400	20	3	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	1.72	7,568.0	$1,120.06	20	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.21	Corridor C	4400	33	3	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	2.84	12,487.2	$1,848.11	33	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00

Investment Grade Lighting Audit

232.21	Corridor M	4400	19	3	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt.,	86	1.63	7,189.6	$1,064.06	19	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.21		4400	3	3	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt.,	86	0.26	1,135.2	$168.01	3	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.21	Corridors A & B	4400	54	3	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt.,	86	4.64	20,433.6	$3,024.17	54	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
242.211		4400	26	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt.,	104	2.70	11,897.6	$1,760.84	26	3	Remove 1 Lamp - No Ballast Change Required	86	2.24	9838.4	$1,456.08	$22.00	$572.00	0.47	2059.2	$304.76	1.88
232.21	PAC Corridor	4400	23	3	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt.,	86	1.98	8,703.2	$1,288.07	23	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.21		4400	4	3	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt.,	86	0.34	1,513.6	$224.01	4	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
558	PAC	1200	20	1	Recessed Down Light, 90w PAR38 Lamp	90	1.80	2,160.0	$319.68	20	1	Energy Star Rated, Dimmable 26w CFL Lamp	26	0.52	624	$92.35	$20.00	$400.00	1.28	1536	$227.33	1.76
34		1200	18	1	Step Light, 25w A Lamp	25	0.45	540.0	$79.92	18	1	Energy Star Rated, Dimmable 13w CFL Lamp	13	0.23	280.8	$41.56	$20.00	$360.00	0.22	259.2	$38.36	9.38
33		1200	54	1	Isle Light, 9w	9	0.49	583.2	$86.31	54	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
32		1200	24	1	Wall Mnt, Indirect Uplight, (1) 900w Quartz Lamp	900	21.60	25,920.0	$3,836.16	24	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
710	Exterior	3000	22	1	100w HPS Wallpack	125	2.75	8,250.0	$1,221.00	22	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
725		3000	6	1	150w HPS Wallpack	188	1.13	3,384.0	$500.83	6	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
698		3000	6	1	70w Quartz Halogen Wallpack	70	0.42	1,260.0	$186.48	6	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
697		3000	1	1	1500w Quartz Halogen Flood Light	1500	1.50	4,500.0	$666.00	1	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
651		3000	20	2	1x1 Surface Mount, (2) 13w PL Lamp	26	0.52	1,560.0	$230.88	20	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
552		3000	18	2	1x1 Recessed Down Light, 26w Quad PL Lamp	26	0.47	1,404.0	$207.79	18	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
	Totals		2,641	469			276.84	560,359	$82,933	2,640	17			12.8	36,187	$5,356		$13,217	10.7	26,341	$3,898	3.39

CEG Job #: 9C10054
Project: Burlington Township Schools
Address: 610 Fountain Ave. Burlington, NJ, 08016
Building SF: 170,000

Burlington Township High School - Main Building

KWH COST: $0.148

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
221.11	M6 Classroom	2600	21	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	1.218	3166.8	$468.69	21	1	2 Pole Power Pack w/Dual Tech. Occupancy Sensor (Sensorswitch or equal)	58	1.10	10%	2850.12	$421.82	$225.00	$225.00	0.12	316.68	$46.87	4.80
221.11	M4 Classroom	2600	18	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	1.044	2714.4	$401.73	18	1	2 Pole Power Pack w/Dual Tech. Occupancy Sensor (Sensorswitch or equal)	58	0.94	10%	2442.96	$361.56	$225.00	$225.00	0.10	271.44	$40.17	5.60
221.11	Guidance Office	2600	4	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	0.232	603.2	$89.27	4	1	Dual Technology Occupancy Sensor - Switch Mnt.	58	0.21	10%	542.88	$80.35	$75.00	$75.00	0.02	60.32	$8.93	8.40
221.11	M2 Classroom	2600	27	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	1.566	4071.6	$602.60	27	1	2 Pole Power Pack w/Dual Tech. Occupancy Sensor (Sensorswitch or equal)	58	1.41	10%	3664.44	$542.34	$225.00	$225.00	0.16	407.16	$60.26	3.73
221.11	Student Assistant Coordinator	2600	8	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	0.464	1206.4	$178.55	8	1	Dual Technology Occupancy Sensor - Remote Mnt.	58	0.42	10%	1085.76	$160.69	$160.00	$160.00	0.05	120.64	$17.85	8.96
221.11	A2 Classroom	2600	18	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	1.044	2714.4	$401.73	18	1	2 Pole Power Pack w/Dual Tech. Occupancy Sensor (Sensorswitch or equal)	58	0.94	10%	2442.96	$361.56	$225.00	$225.00	0.10	271.44	$40.17	5.60
221.11	A4 Classroom	2600	21	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	1.218	3166.8	$468.69	21	1	2 Pole Power Pack w/Dual Tech. Occupancy Sensor (Sensorswitch or equal)	58	1.10	10%	2850.12	$421.82	$225.00	$225.00	0.12	316.68	$46.87	4.80
221.11	A1 Classroom	2600	24	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	1.392	3619.2	$535.64	24	1	2 Pole Power Pack w/Dual Tech. Occupancy Sensor (Sensorswitch or equal)	58	1.25	10%	3257.28	$482.08	$225.00	$225.00	0.14	361.92	$53.56	4.20
221.11	A3 Classroom	2600	24	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	1.392	3619.2	$535.64	24	1	2 Pole Power Pack w/Dual Tech. Occupancy Sensor (Sensorswitch or equal)	58	1.25	10%	3257.28	$482.08	$225.00	$225.00	0.14	361.92	$53.56	4.20
50		2600	8	1	Round Back Track Head, 75w PAR20	75	0.6	1560	$230.88	8	0	No Change	75	0.60	0%	1560	$230.88	$0.00	$0.00	0.00	0	$0.00	0.00
211.14	A1 & A3 Storage	1200	4	1	1x4, 1 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	30	0.12	144	$21.31	4	0	No Change	30	0.12	0%	144	$21.31	$0.00	$0.00	0.00	0	$0.00	0.00
221.11	A3 Locker Room & Storage	1200	4	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	0.232	278.4	$41.20	4	1	Dual Technology Occupancy Sensor - Switch Mnt.	58	0.21	10%	250.56	$37.08	$75.00	$75.00	0.02	27.84	$4.12	18.20
221.11	A5 Classroom	2600	24	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	1.392	3619.2	$535.64	24	1	2 Pole Power Pack w/Dual Tech. Occupancy Sensor (Sensorswitch or equal)	58	1.25	10%	3257.28	$482.08	$225.00	$225.00	0.14	361.92	$53.56	4.20
221.11	A5 Kiln	2600	1	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	0.058	150.8	$22.32	1	0	No Change	58	0.06	0%	150.8	$22.32	$0.00	$0.00	0.00	0	$0.00	0.00
221.11	A6 Classroom	2600	21	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	1.218	3166.8	$468.69	21	1	2 Pole Power Pack w/Dual Tech. Occupancy Sensor (Sensorswitch or equal)	58	1.10	10%	2850.12	$421.82	$225.00	$225.00	0.12	316.68	$46.87	4.80

221.11	A8 Computer Lab.	2600	21	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	1.218	3166.8	$468.69	21	1	2 Pole Power Pack w/Dual Tech. Occupancy Sensor (Sensorswitch or equal)	58	1.10	10%	2850.12	$421.82	$225.00	$225.00	0.12	316.68	$46.87	4.80
242.21	Women's Restroom	1200	3	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	104	0.312	374.4	$55.41	3	0	No Change	104	0.31	0%	374.4	$55.41	$0.00	$0.00	0.00	0	$0.00	0.00
242.21	Men's Restroom	1200	3	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	104	0.312	374.4	$55.41	3	0	No Change	104	0.31	0%	374.4	$55.41	$0.00	$0.00	0.00	0	$0.00	0.00
613	A19 Custodian Closet	1200	1	1	"Keyless" Socket, 100w A19 Lamp	100	0.1	120	$17.76	1	0	No Change	100	0.10	0%	120	$17.76	$0.00	$0.00	0.00	0	$0.00	0.00
221.11	Faculty Lounge	2600	13	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	0.754	1960.4	$290.14	13	1	2 Pole Power Pack w/Dual Tech. Occupancy Sensor (Sensorswitch or equal)	58	0.68	10%	1764.36	$261.13	$225.00	$225.00	0.08	196.04	$29.01	7.75
200	Faculty Restroom	1200	1	2	1x2, 1 Lamp, 17w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	34	0.034	40.8	$6.04	1	0	No Change	34	0.03	0%	40.8	$6.04	$0.00	$0.00	0.00	0	$0.00	0.00
211.11	Faculty Men's Restroom	1200	1	1	1x4, 1 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	30	0.03	36	$5.33	1	0	No Change	30	0.03	0%	36	$5.33	$0.00	$0.00	0.00	0	$0.00	0.00
221.11	Faculty Women's Restroom	1200	1	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	0.058	69.6	$10.30	1	0	No Change	58	0.06	0%	69.6	$10.30	$0.00	$0.00	0.00	0	$0.00	0.00
221.11	Media Center Conference Room	2600	18	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	1.044	2714.4	$401.73	18	1	2 Pole Power Pack w/Dual Tech. Occupancy Sensor (Sensorswitch or equal)	58	0.94	10%	2442.96	$361.56	$225.00	$225.00	0.10	271.44	$40.17	5.60
221.11	B5 Media Center	2600	114	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	6.612	17191.2	$2,544.30	114	4	2 Pole Power Pack w/Dual Tech. Occupancy Sensor (Sensorswitch or equal)	58	5.95	10%	15472.08	$2,289.87	$225.00	$900.00	0.66	1719.12	$254.43	3.54
221.11	Media Center Office	2600	8	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	0.464	1206.4	$178.55	8	1	Dual Technology Occupancy Sensor - Remote Mnt.	58	0.42	10%	1085.76	$160.69	$160.00	$160.00	0.05	120.64	$17.85	8.96
221.11	B3 Classroom	2600	24	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	1.392	3619.2	$535.64	24	1	2 Pole Power Pack w/Dual Tech. Occupancy Sensor (Sensorswitch or equal)	58	1.25	10%	3257.28	$482.08	$225.00	$225.00	0.14	361.92	$53.56	4.20
221.11	B1 Classroom	2600	28	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	1.624	4222.4	$624.92	28	1	2 Pole Power Pack w/Dual Tech. Occupancy Sensor (Sensorswitch or equal)	58	1.46	10%	3800.16	$562.42	$225.00	$225.00	0.16	422.24	$62.49	3.60
3	Boys' Restroom	2600	4	2	1x2, 2 Lamp, 17w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	34	0.136	353.6	$52.33	4	1	Daylight Sensor (Sensorswitch PP-20 & CM-PC or equal)	34	0.10	25%	265.2	$39.25	$160.00	$160.00	0.03	88.4	$13.08	12.23
3	Girls' Restroom	2600	4	2	1x2, 2 Lamp, 17w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	34	0.136	353.6	$52.33	4	1	Daylight Sensor (Sensorswitch PP-20 & CM-PC or equal)	34	0.10	25%	265.2	$39.25	$160.00	$160.00	0.03	88.4	$13.08	12.23
3	Custodian Closet	4400	1	2	1x2, 2 Lamp, 17w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	34	0.034	149.6	$22.14	1	0	No Change	34	0.03	0%	149.6	$22.14	$0.00	$0.00	0.00	0	$0.00	0.00
232.21	Nurse's Office	2600	4	3	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.344	894.4	$132.37	4	1	Dual Technology Occupancy Sensor - Switch Mnt.	86	0.31	10%	804.96	$119.13	$75.00	$75.00	0.03	89.44	$13.24	5.67
227.21		2600	2	2	2x2, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	58	0.116	301.6	$44.64	2	0	No Change	58	0.12	0%	301.6	$44.64	$0.00	$0.00	0.00	0	$0.00	0.00
242.21	Exam Room	2600	1	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	104	0.104	270.4	$40.02	1	0	No Change	104	0.10	0%	270.4	$40.02	$0.00	$0.00	0.00	0	$0.00	0.00
4	Nurse's Restroom	2600	1	2	1x2, 2 Lamp, 17w T8, Elect. Ballast, Wall Mnt., Prismatic Lens	34	0.034	88.4	$13.08	1	0	No Change	34	0.03	0%	88.4	$13.08	$0.00	$0.00	0.00	0	$0.00	0.00

221.11	B2 Classroom	2600	18	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	1.044	2714.4	$401.73	18	1	2 Pole Power Pack w/Dual Tech. Occupancy Sensor (Sensorswitch or equal)	58	0.94	10%	2442.96	$361.56	$225.00	$225.00	0.10	271.44	$40.17	5.60
221.11	B4 Classroom	2600	27	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	1.566	4071.6	$602.60	27	1	2 Pole Power Pack w/Dual Tech. Occupancy Sensor (Sensorswitch or equal)	58	1.41	10%	3664.44	$542.34	$225.00	$225.00	0.16	407.16	$60.26	3.73
221.11	B6 Classroom	2600	27	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	1.566	4071.6	$602.60	27	1	2 Pole Power Pack w/Dual Tech. Occupancy Sensor (Sensorswitch or equal)	58	1.41	10%	3664.44	$542.34	$225.00	$225.00	0.16	407.16	$60.26	3.73
221.11	Prep. Room	2600	4	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	0.232	603.2	$89.27	4	1	Dual Technology Occupancy Sensor - Switch Mnt.	58	0.21	10%	542.88	$80.35	$75.00	$75.00	0.02	60.32	$8.93	8.40
232.21	AD Office	2600	4	3	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.344	894.4	$132.37	4	1	Dual Technology Occupancy Sensor - Switch Mnt.	86	0.31	10%	804.96	$119.13	$75.00	$75.00	0.03	89.44	$13.24	5.67
221.11	B8 Classroom	2600	30	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	1.74	4524	$669.55	30	1	2 Pole Power Pack w/Dual Tech. Occupancy Sensor (Sensorswitch or equal)	58	1.57	10%	4071.6	$602.60	$225.00	$225.00	0.17	452.4	$66.96	3.36
221.11	B10 Classroom	2600	33	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	1.914	4976.4	$736.51	33	1	2 Pole Power Pack w/Dual Tech. Occupancy Sensor (Sensorswitch or equal)	58	1.72	10%	4478.76	$662.86	$225.00	$225.00	0.19	497.64	$73.65	3.05
221.11	B10 Storage	2600	2	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	0.116	301.6	$44.64	2	1	Dual Technology Occupancy Sensor - Switch Mnt.	58	0.10	10%	271.44	$40.17	$75.00	$75.00	0.01	30.16	$4.46	16.80
211.34	Trainer	2600	6	1	1x4, 1 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Acrylic Lens	30	0.18	468	$69.26	6	1	Dual Technology Occupancy Sensor - Switch Mnt.	30	0.16	10%	421.2	$62.34	$75.00	$75.00	0.02	46.8	$6.93	10.83
5	Athletic Trainer Office	2600	21	2	Recessed Down Light, (2) 26w PL Lamp	54	1.134	2948.4	$436.36	21	1	Dual Technology Occupancy Sensor & Day Light Sensor - (Sensor Switch CM-PC, PP-20, CM-PDT)	54	0.85	25%	2211.3	$327.27	$360.00	$360.00	0.28	737.1	$109.09	1.65
221.12		2600	20	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	1.16	3016	$446.37	20	0		58	0.87	25%	2262	$334.78	$0.00	$0.00	0.29	754	$111.59	1.61
221.42		2600	9	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Wall Mnt., Prismatic	58	0.522	1357.2	$200.87	9	0	No Change	58	0.52	0%	1357.2	$200.87	$0.00	$0.00	0.00	0	$0.00	0.00
7	Wrestling	2600	14	1	175w MH, Indirect	210	2.94	7644	$1,131.31	14	0	No Change	210	2.94	0%	7644	$1,131.31	$0.00	$0.00	0.00	0	$0.00	0.00
7	Weight Room	2600	8	1	175w MH, Indirect	210	1.47	3822	$565.66	7	1	Dual Technology Occupancy Sensor - Remote Mnt.	210	1.32	10%	3439.8	$509.09	$160.00	$160.00	0.15	382.2	$56.57	2.83
221.21	Boys' Locker Room	2600	13	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Acrylic Lens	58	0.754	1960.4	$290.14	13	0	No Change	58	0.75	0%	1960.4	$290.14	$0.00	$0.00	0.00	0	$0.00	0.00
227.21		2600	7	2	2x2, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	58	0.406	1055.6	$156.23	7	0	No Change	58	0.41	0%	1055.6	$156.23	$0.00	$0.00	0.00	0	$0.00	0.00
222.21	Gym Storage	1200	2	2	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	58	0.116	139.2	$20.60	2	0	No Change	58	0.12	0%	139.2	$20.60	$0.00	$0.00	0.00	0	$0.00	0.00
232.21	Gym Office	2600	2	3	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.172	447.2	$66.19	2	1	Dual Technology Occupancy Sensor - Switch Mnt.	86	0.15	10%	402.48	$59.57	$75.00	$75.00	0.02	44.72	$6.62	11.33
221.14	A12 Gym	2600	80	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., No Lens	58	4.64	12064	$1,785.47	80	3	2 Pole Power Pack w/Dual Tech. Occupancy Sensor (Sensorswitch or equal)	58	4.18	10%	10857.6	$1,606.92	$225.00	$675.00	0.46	1206.4	$178.55	3.78
222.21	Gym Storage	1200	2	2	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	58	0.116	139.2	$20.60	2	0	No Change	58	0.12	0%	139.2	$20.60	$0.00	$0.00	0.00	0	$0.00	0.00

222.21	Gym Office	2600	2	2	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	58	0.116	301.6	$44.64	2	1	Dual Technology Occupancy Sensor - Switch Mnt.	58	0.10	10%	271.44	$40.17	$75.00	$75.00	0.01	30.16	$4.46	16.80
221.21	Girls' Locker Room	2600	13	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Acrylic Lens	58	0.754	1960.4	$290.14	13	0	No Change	58	0.75	0%	1960.4	$290.14	$0.00	$0.00	0.00	0	$0.00	0.00
227.21		2600	7	2	2x2, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	58	0.406	1055.6	$156.23	7	0	No Change	58	0.41	0%	1055.6	$156.23	$0.00	$0.00	0.00	0	$0.00	0.00
221.14	Gym Storage	1200	2	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., No Lens	58	0.116	139.2	$20.60	2	0	No Change	58	0.12	0%	139.2	$20.60	$0.00	$0.00	0.00	0	$0.00	0.00
221.14	Stairway	4400	3	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., No Lens	58	0.174	765.6	$113.31	3	0	No Change	58	0.17	0%	765.6	$113.31	$0.00	$0.00	0.00	0	$0.00	0.00
221.14	Mechanical Room	1200	6	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., No Lens	58	0.348	417.6	$61.80	6	1	Dual Technology Occupancy Sensor - Switch Mnt.	58	0.31	10%	375.84	$55.62	$75.00	$75.00	0.03	41.76	$6.18	12.13
242.21	A15 Music Room	2600	20	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	104	2.08	5408	$800.38	20	1	2 Pole Power Pack w/Dual Tech. Occupancy Sensor (Sensorswitch or equal)	104	1.87	10%	4867.2	$720.35	$225.00	$225.00	0.21	540.8	$80.04	2.81
242.21	A17 Choral Room	2600	12	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	104	1.248	3244.8	$480.23	12	1	Dual Technology Occupancy Sensor - Remote Mnt.	104	1.12	10%	2920.32	$432.21	$160.00	$160.00	0.12	324.48	$48.02	3.33
232.21	Choral Office	2600	2	3	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.172	447.2	$66.19	2	1	Dual Technology Occupancy Sensor - Switch Mnt.	86	0.15	10%	402.48	$59.57	$75.00	$75.00	0.02	44.72	$6.62	11.33
232.21	Choral Storage	2600	2	3	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.172	447.2	$66.19	2	1	Dual Technology Occupancy Sensor - Switch Mnt.	86	0.15	10%	402.48	$59.57	$75.00	$75.00	0.02	44.72	$6.62	11.33
232.21	Choral Hall / Lockers	2600	4	3	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.344	894.4	$132.37	4	1	Dual Technology Occupancy Sensor - Switch Mnt.	86	0.31	10%	804.96	$119.13	$75.00	$75.00	0.03	89.44	$13.24	5.67
221.31	A11 Classroom	2600	27	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Pendant Mnt. Prismatic Lens	58	1.566	4071.6	$602.60	27	1	2 Pole Power Pack w/Dual Tech. Occupancy Sensor (Sensorswitch or equal)	58	1.41	10%	3664.44	$542.34	$225.00	$225.00	0.16	407.16	$60.26	3.73
221.31	A13 Classroom	2600	27	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Pendant Mnt. Prismatic Lens	58	1.566	4071.6	$602.60	27	1	2 Pole Power Pack w/Dual Tech. Occupancy Sensor (Sensorswitch or equal)	58	1.41	10%	3664.44	$542.34	$225.00	$225.00	0.16	407.16	$60.26	3.73
232.22	A9 CAD	2600	16	3	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	1.376	3577.6	$529.48	16	1	Dual Technology Occupancy Sensor - Remote Mnt.	86	1.24	10%	3219.84	$476.54	$160.00	$160.00	0.14	357.76	$52.95	3.02
221.31	A7 Wood Shop	2600	50	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Pendant Mnt. Prismatic Lens	58	2.9	7540	$1,115.92	50	2	2 Pole Power Pack w/Dual Tech. Occupancy Sensor (Sensorswitch or equal)	58	2.61	10%	6786	$1,004.33	$225.00	$450.00	0.29	754	$111.59	4.03
221.11	Transporatation Office	2600	11	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	0.638	1658.8	$245.50	11	1	Dual Technology Occupancy Sensor - Remote Mnt.	58	0.57	10%	1492.92	$220.95	$160.00	$160.00	0.06	165.88	$24.55	6.52
221.11	Electric Room	2600	2	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	0.116	301.6	$44.64	2	1	Dual Technology Occupancy Sensor - Switch Mnt.	58	0.10	10%	271.44	$40.17	$75.00	$75.00	0.01	30.16	$4.46	16.80
221.11	Boiler room	2600	20	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	1.16	3016	$446.37	20	0	No Change	58	1.16	0%	3016	$446.37	$0.00	$0.00	0.00	0	$0.00	0.00
766	31 Main Gym	2600	30	1	400w MH, Pulse Start, Prismatic Lens	435	13.05	33930	$5,021.64	30	1	2 Pole Power Pack w/Dual Tech. Occupancy Sensor (Sensorswitch or equal)	435	11.75	10%	30537	$4,519.48	$225.00	$225.00	1.31	3393	$502.16	0.45
221.16	Boys' Locker Room	2600	16	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Acrylic Lens	58	0.928	2412.8	$357.09	16	1	2 Pole Power Pack w/Dual Tech. Occupancy Sensor (Sensorswitch or equal)	58	0.84	10%	2171.52	$321.38	$225.00	$225.00	0.09	241.28	$35.71	6.30

8	Boys' Showers	2600	10	2	1x1 Recessed Down Light, 26w Quad PL Lamp	26	0.26	676	$100.05	10	0	No Change	26	0.26	0%	676	$100.05	$0.00	$0.00	0.00	0	$0.00	0.00
227.21	Boys' Restroom	2600	2	2	2x2, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	58	0.116	301.6	$44.64	2	0	No Change	58	0.12	0%	301.6	$44.64	$0.00	$0.00	0.00	0	$0.00	0.00
221.16	Girls' Locker Room	2600	18	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Acrylic Lens	58	1.044	2714.4	$401.73	18	1	2 Pole Power Pack w/Dual Tech. Occupancy Sensor (Sensorswitch or equal)	58	0.94	10%	2442.96	$361.56	$225.00	$225.00	0.10	271.44	$40.17	5.60
8	Girls' Showers	2600	8	2	1x1 Recessed Down Light, 26w Quad PL Lamp	26	0.208	540.8	$80.04	8	0	No Change	26	0.21	0%	540.8	$80.04	$0.00	$0.00	0.00	0	$0.00	0.00
227.21	Girls' Restroom	2600	3	2	2x2, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	58	0.174	452.4	$66.96	3	0	No Change	58	0.17	0%	452.4	$66.96	$0.00	$0.00	0.00	0	$0.00	0.00
221.11	C9 Classroom	2600	18	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	1.044	2714.4	$401.73	18	1	2 Pole Power Pack w/Dual Tech. Occupancy Sensor (Sensorswitch or equal)	58	0.94	10%	2442.96	$361.56	$225.00	$225.00	0.10	271.44	$40.17	5.60
221.11	Faculty Room	2600	9	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	0.522	1357.2	$200.87	9	1	Dual Technology Occupancy Sensor - Remote Mnt.	58	0.47	10%	1221.48	$180.78	$160.00	$160.00	0.05	135.72	$20.09	7.97
221.11	C11 Classroom	2600	18	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	1.044	2714.4	$401.73	18	1	2 Pole Power Pack w/Dual Tech. Occupancy Sensor (Sensorswitch or equal)	58	0.94	10%	2442.96	$361.56	$225.00	$225.00	0.10	271.44	$40.17	5.60
221.11	C13 Data Room	2600	21	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	1.218	3166.8	$468.69	21	1	2 Pole Power Pack w/Dual Tech. Occupancy Sensor (Sensorswitch or equal)	58	1.10	10%	2850.12	$421.82	$225.00	$225.00	0.12	316.68	$46.87	4.80
221.31	C15 Tech Office	2600	18	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Pendant Mnt. Prismatic Lens	58	1.044	2714.4	$401.73	18	1	2 Pole Power Pack w/Dual Tech. Occupancy Sensor (Sensorswitch or equal)	58	0.94	10%	2442.96	$361.56	$225.00	$225.00	0.10	271.44	$40.17	5.60
221.11	C20 Classroom	2600	18	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	1.044	2714.4	$401.73	18	1	2 Pole Power Pack w/Dual Tech. Occupancy Sensor (Sensorswitch or equal)	58	0.94	10%	2442.96	$361.56	$225.00	$225.00	0.10	271.44	$40.17	5.60
221.11	C18 Classroom	2600	18	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	1.044	2714.4	$401.73	18	1	2 Pole Power Pack w/Dual Tech. Occupancy Sensor (Sensorswitch or equal)	58	0.94	10%	2442.96	$361.56	$225.00	$225.00	0.10	271.44	$40.17	5.60
221.11	C16 Classroom	2600	18	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	1.044	2714.4	$401.73	18	1	2 Pole Power Pack w/Dual Tech. Occupancy Sensor (Sensorswitch or equal)	58	0.94	10%	2442.96	$361.56	$225.00	$225.00	0.10	271.44	$40.17	5.60
221.11	C14 Classroom	2600	18	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	1.044	2714.4	$401.73	18	1	2 Pole Power Pack w/Dual Tech. Occupancy Sensor (Sensorswitch or equal)	58	0.94	10%	2442.96	$361.56	$225.00	$225.00	0.10	271.44	$40.17	5.60
242.21	Assistant Principal's Office	2600	4	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	104	0.416	1081.6	$160.08	4	1	Dual Technology Occupancy Sensor - Switch Mnt.	104	0.37	10%	973.44	$144.07	$75.00	$75.00	0.04	108.16	$16.01	4.69
3	Electric Closet	2600	1	2	1x2, 2 Lamp, 17w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	34	0.034	88.4	$13.08	1	0	No Change	34	0.03	0%	88.4	$13.08	$0.00	$0.00	0.00	0	$0.00	0.00
221.11	C7 Classroom	2600	18	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	1.044	2714.4	$401.73	18	1	2 Pole Power Pack w/Dual Tech. Occupancy Sensor (Sensorswitch or equal)	58	0.94	10%	2442.96	$361.56	$225.00	$225.00	0.10	271.44	$40.17	5.60

221.11	C12 Classroom	2600	18	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	1.044	2714.4	$401.73	18	1	2 Pole Power Pack w/Dual Tech. Occupancy Sensor (Sensorswitch or equal)	58	0.94	10%	2442.96	$361.56	$225.00	$225.00	0.10	271.44	$40.17	5.60
221.31	C5 Classroom	2600	18	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., Prismatic Lens	58	1.044	2714.4	$401.73	18	1	2 Pole Power Pack w/Dual Tech. Occupancy Sensor (Sensorswitch or equal)	58	0.94	10%	2442.96	$361.56	$225.00	$225.00	0.10	271.44	$40.17	5.60
221.11	C10 Classroom	2600	18	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	1.044	2714.4	$401.73	18	1	2 Pole Power Pack w/Dual Tech. Occupancy Sensor (Sensorswitch or equal)	58	0.94	10%	2442.96	$361.56	$225.00	$225.00	0.10	271.44	$40.17	5.60
221.11	C8 Classroom	2600	18	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	1.044	2714.4	$401.73	18	1	2 Pole Power Pack w/Dual Tech. Occupancy Sensor (Sensorswitch or equal)	58	0.94	10%	2442.96	$361.56	$225.00	$225.00	0.10	271.44	$40.17	5.60
221.11	C3 Classroom	2600	18	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	1.044	2714.4	$401.73	18	1	2 Pole Power Pack w/Dual Tech. Occupancy Sensor (Sensorswitch or equal)	58	0.94	10%	2442.96	$361.56	$225.00	$225.00	0.10	271.44	$40.17	5.60
221.31	C6 Classroom	2600	18	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., Prismatic Lens	58	1.044	2714.4	$401.73	18	1	2 Pole Power Pack w/Dual Tech. Occupancy Sensor (Sensorswitch or equal)	58	0.94	10%	2442.96	$361.56	$225.00	$225.00	0.10	271.44	$40.17	5.60
221.31	C1 Classroom	2600	18	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., Prismatic Lens	58	1.044	2714.4	$401.73	18	1	2 Pole Power Pack w/Dual Tech. Occupancy Sensor (Sensorswitch or equal)	58	0.94	10%	2442.96	$361.56	$225.00	$225.00	0.10	271.44	$40.17	5.60
3	Boys' Restroom	2600	4	2	1x2, 2 Lamp, 17w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	34	0.136	353.6	$52.33	4	0	No Change	34	0.14	0%	353.6	$52.33	$0.00	$0.00	0.00	0	$0.00	0.00
3	Girls' Restroom	2600	4	2	1x2, 2 Lamp, 17w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	34	0.136	353.6	$52.33	4	0	No Change	34	0.14	0%	353.6	$52.33	$0.00	$0.00	0.00	0	$0.00	0.00
221.11	Mens' Faculty Restroom	1200	3	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	0.174	208.8	$30.90	3	0	No Change	58	0.17	0%	208.8	$30.90	$0.00	$0.00	0.00	0	$0.00	0.00
221.11	Women's Faculty Restroom	1200	3	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	0.174	208.8	$30.90	3	0	No Change	58	0.17	0%	208.8	$30.90	$0.00	$0.00	0.00	0	$0.00	0.00
221.11	C4 SGI	2600	12	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	0.696	1809.6	$267.82	12	1	Dual Technology Occupancy Sensor - Remote Mnt.	58	0.63	10%	1628.64	$241.04	$160.00	$160.00	0.07	180.96	$26.78	5.97
221.31	C2 Classroom	2600	18	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., Prismatic Lens	58	1.044	2714.4	$401.73	18	1	2 Pole Power Pack w/Dual Tech. Occupancy Sensor (Sensorswitch or equal)	58	0.94	10%	2442.96	$361.56	$225.00	$225.00	0.10	271.44	$40.17	5.60
221.31	M9 Classroom	2600	18	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., Prismatic Lens	58	1.044	2714.4	$401.73	18	1	2 Pole Power Pack w/Dual Tech. Occupancy Sensor (Sensorswitch or equal)	58	0.94	10%	2442.96	$361.56	$225.00	$225.00	0.10	271.44	$40.17	5.60
221.31	M10 Classroom	2600	21	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., Prismatic Lens	58	1.218	3166.8	$468.69	21	1	2 Pole Power Pack w/Dual Tech. Occupancy Sensor (Sensorswitch or equal)	58	1.10	10%	2850.12	$421.82	$225.00	$225.00	0.12	316.68	$46.87	4.80
221.31	M7 Classroom	2600	18	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., Prismatic Lens	58	1.044	2714.4	$401.73	18	1	2 Pole Power Pack w/Dual Tech. Occupancy Sensor (Sensorswitch or equal)	58	0.94	10%	2442.96	$361.56	$225.00	$225.00	0.10	271.44	$40.17	5.60

221.31	M5 Classroom	2600	18	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., Prismatic Lens	58	1.044	2714.4	$401.73	18	1	2 Pole Power Pack w/Dual Tech. Occupancy Sensor (Sensorswitch or equal)	58	0.94	10%	2442.96	$361.56	$225.00	$225.00	0.10	271.44	$40.17	5.60
221.31	M8 Classroom	2600	21	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., Prismatic Lens	58	1.218	3166.8	$468.69	21	1	2 Pole Power Pack w/Dual Tech. Occupancy Sensor (Sensorswitch or equal)	58	1.10	10%	2850.12	$421.82	$225.00	$225.00	0.12	316.68	$46.87	4.80
232.21	D2 Classroom	2600	12	3	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	1.032	2683.2	$397.11	12	1	Dual Technology Occupancy Sensor - Remote Mnt.	86	0.93	10%	2414.88	$357.40	$160.00	$160.00	0.10	268.32	$39.71	4.03
232.21	D4 Classroom	2600	12	3	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	1.032	2683.2	$397.11	12	1	Dual Technology Occupancy Sensor - Remote Mnt.	86	0.93	10%	2414.88	$357.40	$160.00	$160.00	0.10	268.32	$39.71	4.03
232.21	D6 Classroom	2600	12	3	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	1.032	2683.2	$397.11	12	1	Dual Technology Occupancy Sensor - Remote Mnt.	86	0.93	10%	2414.88	$357.40	$160.00	$160.00	0.10	268.32	$39.71	4.03
232.21	D8 Classroom	2600	12	3	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	1.032	2683.2	$397.11	12	1	Dual Technology Occupancy Sensor - Remote Mnt.	86	0.93	10%	2414.88	$357.40	$160.00	$160.00	0.10	268.32	$39.71	4.03
232.21	D10 Classroom	2600	12	3	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	1.032	2683.2	$397.11	12	1	Dual Technology Occupancy Sensor - Remote Mnt.	86	0.93	10%	2414.88	$357.40	$1,660.00	$1,660.00	0.10	268.32	$39.71	41.80
232.21	Office	2600	5	3	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.43	1118	$165.46	5	1	Dual Technology Occupancy Sensor - Switch Mnt.	86	0.39	10%	1006.2	$148.92	$75.00	$75.00	0.04	111.8	$16.55	4.53
232.21	D12 Classroom	2600	12	3	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	1.032	2683.2	$397.11	12	1	Dual Technology Occupancy Sensor - Remote Mnt.	86	0.93	10%	2414.88	$357.40	$160.00	$160.00	0.10	268.32	$39.71	4.03
232.21	D14 Classroom	2600	15	3	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	1.29	3354	$496.39	15	1	Dual Technology Occupancy Sensor - Remote Mnt.	86	1.16	10%	3018.6	$446.75	$160.00	$160.00	0.13	335.4	$49.64	3.22
232.21	Prep. Room	2600	6	3	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.516	1341.6	$198.56	6	1	Dual Technology Occupancy Sensor - Switch Mnt.	86	0.46	10%	1207.44	$178.70	$75.00	$75.00	0.05	134.16	$19.86	3.78
232.21	D16 Classroom	2600	15	3	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	1.29	3354	$496.39	15	1	Dual Technology Occupancy Sensor - Remote Mnt.	86	1.16	10%	3018.6	$446.75	$160.00	$160.00	0.13	335.4	$49.64	3.22
222.22	D18 Classroom	2600	15	2	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	58	0.87	2262	$334.78	15	1	Dual Technology Occupancy Sensor - Remote Mnt.	58	0.78	10%	2035.8	$301.30	$160.00	$160.00	0.09	226.2	$33.48	4.78
222.22	D20 Classroom	2600	15	2	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	58	0.87	2262	$334.78	15	1	Dual Technology Occupancy Sensor - Remote Mnt.	58	0.78	10%	2035.8	$301.30	$160.00	$160.00	0.09	226.2	$33.48	4.78
221.34	Mechanical Room	2600	9	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., No Lens	58	0.522	1357.2	$200.87	9	1	Dual Technology Occupancy Sensor - Remote Mnt.	58	0.47	10%	1221.48	$180.78	$160.00	$160.00	0.05	135.72	$20.09	7.97
222.21	Custodian Office	4400	4	2	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	58	0.232	1020.8	$151.08	4	1	Dual Technology Occupancy Sensor - Switch Mnt.	58	0.21	10%	918.72	$135.97	$75.00	$75.00	0.02	102.08	$15.11	4.96
232.21	D13 Classroom	2600	15	3	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	1.29	3354	$496.39	15	1	Dual Technology Occupancy Sensor - Remote Mnt.	86	1.16	10%	3018.6	$446.75	$160.00	$160.00	0.13	335.4	$49.64	3.22
232.21	D11 Classroom	2600	15	3	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	1.29	3354	$496.39	15	1	Dual Technology Occupancy Sensor - Remote Mnt.	86	1.16	10%	3018.6	$446.75	$160.00	$160.00	0.13	335.4	$49.64	3.22
232.21	D9 Classroom	2600	15	3	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	1.29	3354	$496.39	15	1	Dual Technology Occupancy Sensor - Remote Mnt.	86	1.16	10%	3018.6	$446.75	$160.00	$160.00	0.13	335.4	$49.64	3.22
232.21	Prep. Room	2600	6	3	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.516	1341.6	$198.56	6	1	Dual Technology Occupancy Sensor - Switch Mnt.	86	0.46	10%	1207.44	$178.70	$75.00	$75.00	0.05	134.16	$19.86	3.78
227.21	Women's Restroom	1200	5	2	2x2, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	58	0.29	348	$51.50	5	0	No Change	58	0.29	0%	348	$51.50	$0.00	$0.00	0.00	0	$0.00	0.00
221.34	Electronics & Mezzanine	2600	20	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., No Lens	58	1.16	3016	$446.37	20	1	Dual Technology Occupancy Sensor - Remote Mnt.	58	1.04	10%	2714.4	$401.73	$160.00	$160.00	0.12	301.6	$44.64	3.58
227.21	Women's Restroom	1200	5	2	2x2, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	58	0.29	348	$51.50	5	0	No Change	58	0.29	0%	348	$51.50	$0.00	$0.00	0.00	0	$0.00	0.00

232.21	D7 Classroom	2600	12	3	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	1.032	2683.2	$397.11	12	1	Dual Technology Occupancy Sensor - Remote Mnt.	86	0.93	10%	2414.88	$357.40	$160.00	$160.00	0.10	268.32	$39.71	4.03
232.21	D5 Classroom	2600	12	3	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	1.032	2683.2	$397.11	12	1	Dual Technology Occupancy Sensor - Remote Mnt.	86	0.93	10%	2414.88	$357.40	$160.00	$160.00	0.10	268.32	$39.71	4.03
232.21	D3 Classroom	2600	12	3	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	1.032	2683.2	$397.11	12	1	Dual Technology Occupancy Sensor - Remote Mnt.	86	0.93	10%	2414.88	$357.40	$160.00	$160.00	0.10	268.32	$39.71	4.03
232.21	D1 Classroom	2600	12	3	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	1.032	2683.2	$397.11	12	1	Dual Technology Occupancy Sensor - Remote Mnt.	86	0.93	10%	2414.88	$357.40	$160.00	$160.00	0.10	268.32	$39.71	4.03
221.31	Cafeteria	2600	82	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., Prismatic Lens	58	4.756	12365.6	$1,830.11	82	3	2 Pole Power Pack w/Dual Tech. Occupancy Sensor (Sensorswitch or equal)	58	4.28	10%	11129.04	$1,647.10	$225.00	$675.00	0.48	1236.56	$183.01	3.69
232.21		2600	34	3	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	2.924	7602.4	$1,125.16	34	2	2 Pole Power Pack w/Dual Tech. Occupancy Sensor (Sensorswitch or equal)	86	2.63	10%	6842.16	$1,012.64	$225.00	$450.00	0.29	760.24	$112.52	4.00
5		2600	14	2	Recessed Down Light, (2) 26w PL Lamp	54	0.756	1965.6	$290.91	14	0	No Change	54	0.76	0%	1965.6	$290.91	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	Kitchen	2600	36	3	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	3.096	8049.6	$1,191.34	36	0	No Change	86	3.10	0%	8049.6	$1,191.34	$0.00	$0.00	0.00	0	$0.00	0.00
221.31	115 Stage Craft	2600	24	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., Prismatic Lens	58	1.392	3619.2	$535.64	24	1	2 Pole Power Pack w/Dual Tech. Occupancy Sensor (Sensorswitch or equal)	58	1.25	10%	3257.28	$482.08	$225.00	$225.00	0.14	361.92	$53.56	4.20
231.31		2600	6	2	2x2, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	58	0.348	904.8	$133.91	6	0	No Change	58	0.35	0%	904.8	$133.91	$0.00	$0.00	0.00	0	$0.00	0.00
610	Stage	2600	7	1	Globe & Wire Gaurd, 40w A19 Lamp	40	0.28	728	$107.74	7	0	No Change	40	0.28	0%	728	$107.74	$0.00	$0.00	0.00	0	$0.00	0.00
221.41		2600	3	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Wall Mnt., Prismatic	58	0.174	452.4	$66.96	3	0	No Change	58	0.17	0%	452.4	$66.96	$0.00	$0.00	0.00	0	$0.00	0.00
221.21	201 Control Room	1200	3	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Acrylic Lens	58	0.174	208.8	$30.90	3	0	No Change	58	0.17	0%	208.8	$30.90	$0.00	$0.00	0.00	0	$0.00	0.00
1		1200	3	1	Track Head, 35w Halogen	35	0.105	126	$18.65	3	0	No Change	35	0.11	0%	126	$18.65	$0.00	$0.00	0.00	0	$0.00	0.00
11	Performing Arts Center Lobby	1200	11	1	Wall Washer, 42w Quad PL Lamp	42	0.462	554.4	$82.05	11	0	No Change	42	0.46	0%	554.4	$82.05	$0.00	$0.00	0.00	0	$0.00	0.00
30		1200	2	2	Pendant Mnt, Indirect Uplight, (2) 500w Quartz Lamp	1000	2	2400	$355.20	2	0	No Change	1000	2.00	0%	2400	$355.20	$0.00	$0.00	0.00	0	$0.00	0.00
31		1200	2	1	Wall Mnt, Indirect Uplight, (1) 500w Quartz Lamp	500	1	1200	$177.60	2	0	No Change	500	1.00	0%	1200	$177.60	$0.00	$0.00	0.00	0	$0.00	0.00
226.21	Men's Restroom	3200	4	2	6"x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	58	0.232	742.4	$109.88	4	0	No Change	58	0.23	0%	742.4	$109.88	$0.00	$0.00	0.00	0	$0.00	0.00
227.21		3200	2	2	2x2, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	58	0.116	371.2	$54.94	2	0	No Change	58	0.12	0%	371.2	$54.94	$0.00	$0.00	0.00	0	$0.00	0.00
226.21	Women's Restroom	3200	6	2	6"x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	58	0.348	1113.6	$164.81	6	0	No Change	58	0.35	0%	1113.6	$164.81	$0.00	$0.00	0.00	0	$0.00	0.00
227.21		3200	3	2	2x2, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	58	0.174	556.8	$82.41	3	0	No Change	58	0.17	0%	556.8	$82.41	$0.00	$0.00	0.00	0	$0.00	0.00
221.21	Office	2600	2	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Acrylic Lens	58	0.116	301.6	$44.64	2	1	Dual Technology Occupancy Sensor - Switch Mnt.	58	0.10	10%	271.44	$40.17	$75.00	$75.00	0.01	30.16	$4.46	16.80
699	Loading Dock	3000	6	1	50w HPS Wallpack	64	0.384	1152	$170.50	6	0	No Change	64	0.38	0%	1152	$170.50	$0.00	$0.00	0.00	0	$0.00	0.00
221.14	Electric Room	1200	3	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., No Lens	58	0.174	208.8	$30.90	3	1	Dual Technology Occupancy Sensor - Switch Mnt.	58	0.16	10%	187.92	$27.81	$75.00	$75.00	0.02	20.88	$3.09	24.27

2	Dressing Room - Women's	400	30	30	Makeup Lights, (30) 40w A Lamp	1200	36	14400	$2,131.20	30	0	No Change	1200	36.00	0%	14400	$2,131.20	$0.00	$0.00	0.00	0	$0.00	0.00
227.21		400	2	2	2x2, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	58	0.116	46.4	$6.87	2	0	No Change	58	0.12	0%	46.4	$6.87	$0.00	$0.00	0.00	0	$0.00	0.00
2	Dressing Room - Men's	400	30	30	Makeup Lights, (30) 40w A Lamp	1200	36	14400	$2,131.20	30	0	No Change	1200	36.00	0%	14400	$2,131.20	$0.00	$0.00	0.00	0	$0.00	0.00
227.21		400	2	2	2x2, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	58	0.116	46.4	$6.87	2	0	No Change	58	0.12	0%	46.4	$6.87	$0.00	$0.00	0.00	0	$0.00	0.00
242.21	Guidance Office	2600	14	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	104	1.456	3785.6	$560.27	14	0	No Change	104	1.46	0%	3785.6	$560.27	$0.00	$0.00	0.00	0	$0.00	0.00
232.21		2600	3	3	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.258	670.8	$99.28	3	0	No Change	86	0.26	0%	670.8	$99.28	$0.00	$0.00	0.00	0	$0.00	0.00
227.21		2600	6	2	2x2, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	58	0.348	904.8	$133.91	6	0	No Change	58	0.35	0%	904.8	$133.91	$0.00	$0.00	0.00	0	$0.00	0.00
232.21	Mail Room	2600	6	3	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.516	1341.6	$198.56	6	1	Dual Technology Occupancy Sensor - Switch Mnt.	86	0.46	10%	1207.44	$178.70	$75.00	$75.00	0.05	134.16	$19.86	3.78
222.21	Main Office	2600	12	2	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	58	0.696	1809.6	$267.82	12	0	No Change	58	0.70	0%	1809.6	$267.82	$0.00	$0.00	0.00	0	$0.00	0.00
237.21	Main Office Hall	2600	2	3	2x2, 3 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens	92	0.184	478.4	$70.80	2	0	No Change	92	0.18	0%	478.4	$70.80	$0.00	$0.00	0.00	0	$0.00	0.00
29	Main Entrance	4400	8	4	4x4, 8 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., White Diffuser	208	1.664	7321.6	$1,083.60	8	0	No Change	208	1.66	0%	7321.6	$1,083.60	$0.00	$0.00	0.00	0	$0.00	0.00
29	Entrance Near C2	4400	2	4	4x4, 8 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., White Diffuser	208	0.416	1830.4	$270.90	2	0	No Change	208	0.42	0%	1830.4	$270.90	$0.00	$0.00	0.00	0	$0.00	0.00
5	Corridor D	4400	17	2	Recessed Down Light, (2) 26w PL Lamp	54	0.918	4039.2	$597.80	17	0	No Change	54	0.92	0%	4039.2	$597.80	$0.00	$0.00	0.00	0	$0.00	0.00
232.21		4400	23	3	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	1.978	8703.2	$1,288.07	23	0	No Change	86	1.98	0%	8703.2	$1,288.07	$0.00	$0.00	0.00	0	$0.00	0.00
226.21		4400	8	2	6"x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	58	0.464	2041.6	$302.16	8	0	No Change	58	0.46	0%	2041.6	$302.16	$0.00	$0.00	0.00	0	$0.00	0.00
232.21	Connecting Corridors B to C & C to D (2)	4400	20	3	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	1.72	7568	$1,120.06	20	1	Daylight Sensor (Sensorswitch PP-20 & CM-PC or equal)	86	1.29	25%	5676	$840.05	$160.00	$160.00	0.43	1892	$280.02	0.57
232.21	Corridor C	4400	33	3	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	2.838	12487.2	$1,848.11	33	0	No Change	86	2.84	0%	12487.2	$1,848.11	$0.00	$0.00	0.00	0	$0.00	0.00
232.21	Corridor M	4400	19	3	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	1.634	7189.6	$1,064.06	19	0	No Change	86	1.63	0%	7189.6	$1,064.06	$0.00	$0.00	0.00	0	$0.00	0.00
232.21		4400	3	3	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.258	1135.2	$168.01	3	1	Daylight Sensor (Sensorswitch PP-20 & CM-PC or equal)	86	0.19	25%	851.4	$126.01	$160.00	$160.00	0.06	283.8	$42.00	3.81
232.21	Corridors A & B	4400	54	3	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	4.644	20433.6	$3,024.17	54	0	No Change	86	4.64	0%	20433.6	$3,024.17	$0.00	$0.00	0.00	0	$0.00	0.00
242.211		4400	26	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	104	2.704	11897.6	$1,760.84	26	0	No Change	104	2.70	0%	11897.6	$1,760.84	$0.00	$0.00	0.00	0	$0.00	0.00
232.21	PAC Corridor	4400	23	3	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	1.978	8703.2	$1,288.07	23	0	No Change	86	1.98	0%	8703.2	$1,288.07	$0.00	$0.00	0.00	0	$0.00	0.00
232.21		4400	4	3	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.344	1513.6	$224.01	4	1	Daylight Sensor (Sensorswitch PP-20 & CM-PC or equal)	86	0.26	25%	1135.2	$168.01	$160.00	$160.00	0.09	378.4	$56.00	2.86
558	PAC	1200	20	1	Recessed Down Light, 90w PAR38 Lamp	90	1.8	2160	$319.68	20	0	No Change	90	1.80	0%	2160	$319.68	$0.00	$0.00	0.00	0	$0.00	0.00
34		1200	18	1	Step Light, 25w A Lamp	25	0.45	540	$79.92	18	0	No Change	25	0.45	0%	540	$79.92	$0.00	$0.00	0.00	0	$0.00	0.00
33		1200	54	1	Isle Light, 9w	9	0.486	583.2	$86.31	54	0	No Change	9	0.49	0%	583.2	$86.31	$0.00	$0.00	0.00	0	$0.00	0.00

32		1200	24	1	Wall Mnt, Indirect Uplight, (1) 900w Quartz Lamp	900	21.6	25920	$3,836.16	24	0	No Change	900	21.60	0%	25920	$3,836.16	$0.00	$0.00	0.00	0	$0.00	0.00
710	Exterior	3000	22	1	100w HPS Wallpack	125	2.75	8250	$1,221.00	22	0	No Change	125	2.75	0%	8250	$1,221.00	$0.00	$0.00	0.00	0	$0.00	0.00
725		3000	6	1	150w HPS Wallpack	188	1.128	3384	$500.83	6	0	No Change	188	1.13	0%	3384	$500.83	$0.00	$0.00	0.00	0	$0.00	0.00
698		3000	6	1	70w Quartz Halogen Wallpack	70	0.42	1260	$186.48	6	0	No Change	70	0.42	0%	1260	$186.48	$0.00	$0.00	0.00	0	$0.00	0.00
697		3000	1	1	1500w Quartz Halogen Flood Light	1500	1.5	4500	$666.00	1	0	No Change	1500	1.50	0%	4500	$666.00	$0.00	$0.00	0.00	0	$0.00	0.00
651		3000	20	2	1x1 Surface Mount, (2) 13w PL Lamp	26	0.52	1560	$230.88	20	0	No Change	26	0.52	0%	1560	$230.88	$0.00	$0.00	0.00	0	$0.00	0.00
552		3000	18	2	1x1 Recessed Down Light, 26w Quad PL Lamp	26	0.468	1404	$207.79	18	0	No Change	26	0.47	0%	1404	$207.79	$0.00	$0.00	0.00	0	$0.00	0.00
	Totals		2,641	469			276.8	560,358.8	$82,933	2,640	117			263.1		523,596.5	$77,492.28		$22,580	13.76	36,762	$5,441	4.15

Project Name: LGEA Solar PV Project - Burlington Township High School Main Building
Location: Burlington, NJ
Description: Photovoltaic System - Direct Purchase

Simple Payback Analysis

	Photovoltaic System - Direct Purchase
Total Construction Cost	$1,395,180
Annual kWh Production	192,627
Annual Energy Cost Reduction	$28,509
Annual SREC Revenue	$67,419
First Cost Premium	**$1,395,180**
Simple Payback:	**14.54** **Years**

Life Cycle Cost Analysis

Analysis Period (years):	25	Financing %:	0%
Financing Term (mths):	0	Maintenance Escalation Rate:	3.0%
Average Energy Cost ($/kWh)	**$0.148**	Energy Cost Escalation Rate:	3.0%
Financing Rate:	0.00%	SREC Value ($/kWh)	$0.350

Period	Additional Cash Outlay	Energy kWh Production	Energy Cost Savings	Additional Maint Costs	SREC Revenue	Net Cash Flow	Cumulative Cash Flow
0	$1,395,180	0	0	0	$0	(1,395,180)	0
1	$0	192,627	$28,509	$0	$67,419	$95,928	($1,299,252)
2	$0	191,664	$29,364	$0	$67,082	$96,446	($1,202,805)
3	$0	190,706	$30,245	$0	$66,747	$96,992	($1,105,813)
4	$0	189,752	$31,152	$0	$66,413	$97,566	($1,008,248)
5	$0	188,803	$32,087	$1,945	$66,081	$96,223	($912,025)
6	$0	187,859	$33,050	$1,935	$65,751	$96,865	($815,159)
7	$0	186,920	$34,041	$1,925	$65,422	$97,538	($717,622)
8	$0	185,985	$35,062	$1,916	$65,095	$98,241	($619,380)
9	$0	185,055	$36,114	$1,906	$64,769	$98,977	($520,403)
10	$0	184,130	$37,198	$1,897	$64,446	$99,747	($420,656)
11	$0	183,209	$38,313	$1,887	$64,123	$100,550	($320,106)
12	$0	182,293	$39,463	$1,878	$63,803	$101,388	($218,719)
13	$0	181,382	$40,647	$1,868	$63,484	$102,262	($116,456)
14	$0	180,475	$41,866	$1,859	$63,166	$103,174	($13,283)
15	$0	179,573	$43,122	$1,850	$62,850	$104,123	$90,840
16	$0	178,675	$44,416	$1,840	$62,536	$105,112	$195,952
17	$0	177,781	$45,748	$1,831	$62,224	$106,141	$302,092
18	$0	176,893	$47,121	$1,822	$61,912	$107,211	$409,303
19	$0	176,008	$48,534	$1,813	$61,603	$108,324	$517,628
20	$0	175,128	$49,990	$1,804	$61,295	$109,481	$627,109
21	$1	174,252	$51,490	$1,795	$60,988	$110,684	$737,793
22	$2	173,381	$53,035	$1,786	$60,683	$111,932	$849,725
23	$3	172,514	$54,626	$1,777	$60,380	$113,229	$962,954
24	$4	171,652	$56,265	$1,768	$60,078	$114,575	$1,077,529
25	$5	170,793	$57,953	$1,759	$59,778	$115,971	$1,193,500
	Totals:	4,537,512	$1,039,410	$38,859	$1,588,129	$2,588,680	($2,325,503)
				Net Present Value (NPV)			**$1,193,525**
				Internal Rate of Return (IRR)			**5.2%**

Building	Roof Area (sq ft)	Panel	Qty	Panel Sq Ft	Panel Total Sq Ft	Total KW_{DC}	Total Annual kWh	Panel Weight (33 lbs)	W/SQFT
High School Main Building	9900	Sunpower SPR230	674	14.7	9,911	155.02	192,627	22,242	15.64

PVWatts

AC Energy & Cost Savings

Cautions for Interpreting the Results

(Type comments here to appear on printout; maximum 1 row of 80 characters.)

Station Identification	
City:	Atlantic_City
State:	New_Jersey
Latitude:	39.45° N
Longitude:	74.57° W
Elevation:	20 m
PV System Specifications	
DC Rating:	155.0 kW
DC to AC Derate Factor:	0.800
AC Rating:	124.0 kW
Array Type:	Fixed Tilt
Array Tilt:	15.0°
Array Azimuth:	180.0°
Energy Specifications	
Cost of Electricity:	0.1 ¢/kWh

Results			
Month	Solar Radiation (kWh/m²/day)	AC Energy (kWh)	Energy Value ($)
1	2.80	10933	16.18
2	3.53	12517	18.53
3	4.46	16949	25.08
4	5.28	18940	28.03
5	5.86	21346	31.59
6	6.10	20650	30.56
7	6.05	20942	30.99
8	5.60	19443	28.78
9	4.99	17046	25.23
10	3.97	14317	21.19
11	2.86	10347	15.31
12	2.43	9198	13.61
Year	4.50	192627	285.09

.= Proposed PV Layout

Notes:

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

MELINK CORPORATION

INTELLI-HOOD VARIABLE EXHAUST CONTROLLER

ENERGY SAVINGS REPORT

COMPANY: CEG

RETROFIT

ADDRESS: Burlington Township BOE
High School Main Building

Nov-02-10

APPLICATION: Main Kitchen

- MOTOR OPERATING SAVINGS:	$1,013	/YEAR
- HEATING SAVINGS:	$454	/YEAR
- COOLING SAVINGS:	$570	/YEAR
- TOTAL SAVINGS:	$2,037	/YEAR
- INSTALLED COST:	$35,000	
- PAYBACK PERIOD:	17.2	YEARS
- RATE OF RETURN - 5 YEARS:	-29.3	%
10 YEARS:	-6.5	%

The projected savings shown above are based on the above store's operating hours, HVAC system, cooking load, and geographic location.

I. MOTOR OPERATING SAVINGS

INPUT DATA:

A Operating Hours Per Day	6	HRS/DAY
B Operating Days Per Week	5	DAYS/WK
C Operating Weeks Per Year	42	WKS/YR
D Horsepower of Fan Motor(s)	11	HP
E Load Factor of Fan Motor(s)	0.9	
F Cost Per Kilowatt Hour	0.148	$/KWHR

CONSTANT EXHAUST VOLUME ANALYSIS:

G Total Time (A x B x C)	1260	HRS/YR
H Total KWHR/HP/YR (0.746/0.9 x G)	1044.4	KWHR/HP/YR

VARIABLE EXHAUST VOLUME ANALYSIS:

% Rated RPM H	% Run Time I	Time HRS/YR J=FxI	Output KW/HP K	System Effic. L	Input KW/HP M=K/L	KWHR/ HP/YR N=JxM
100	5	63	0.746	0.9	0.829	52.2
90	10	126	0.544	0.9	0.604	76.2
80	15	189	0.382	0.9	0.424	80.2
70	20	252	0.256	0.9	0.284	71.7
60	20	252	0.161	0.9	0.179	45.1
50	15	189	0.093	0.9	0.103	19.5
40	10	126	0.048	0.9	0.053	6.7
30	5	63	0.020	0.9	0.022	1.4
20	0	0	0.015	0.9	0.017	0.0
10	0	0	0.010	0.90	0.011	0.0
O Total KWH/HP/YR (Total of Column N)						353.0

CALCULATION:

SAVINGS = (H - O) x D x E x F = $1,013 /YEAR

II. CONDITIONED MAKE-UP AIR - HEATING

INPUT DATA:

A Previous Net Exhaust Volume	8400	CFM
B New Net Exhaust Volume (1)	5460	CFM
C Winter Building Temperature	70	F
D Previous Net Heat Load (2)	151982	kBTU
E New Net Heat Load (2)	98788	kBTU
F Operating Hours Per Day	6	HRS/DAY
G Operating Days Per Week	5	DAYS/WK
- Heating Fuel Type	Hot Water	
H Cost Per Fuel Unit (3)	1.21	$/UNIT
J BTU Per Fuel Unit (4)	100	kBTU/UNIT
K System Efficiency (4)	0.85	

CALCULATION:

SAVINGS = (D - E) x 0.6 x H / (J x K)

= $454 /YEAR
==========

NOTES:

(1) Determine the New Exhaust Volume by completing TABLE 1. The New Exhaust Volume equals the AVG % RPM x the Previous Exhaust Volume.

(2) Using design weather data via the Outdoor Airload Calculator and multiplied by days/year ratio.

(3) Using local energy costs.

(4) Using typical system efficiency.

TABLE 1

% Rated RPM (F)	% Run Time (I)	F x I
100	5	5
90	10	9
80	15	12
70	20	14
60	20	12
50	15	8
40	10	4
30	5	2
20	0	0
10	0	0
AVG % RPM =		65%

III. CONDITIONED MAKE-UP AIR SAVINGS - COOLING

INPUT DATA:

A Previous Net Exhaust Volume	8400	CFM
B New Net Exhaust Volume (1)	5460	CFM
C Previous Net Cooling Load (2)	201,600	kBTU
D New Net Cooling Load (2)	131040	kBTU
E AC Correction Factor (3)	1	
F Cost Per Fuel Unit (5)	0.148	$/kWH
G COP (6)	3.222971	

CALCULATION:

SAVINGS = (C - D) x 0.6 x E x F / (3.413 x G)

= $570 /YEAR
==========

NOTES:

(1) Using New Exhaust Volume from CONDITIONED MAKE-UP AIR SAVINGS - HEATING on page 2. See Note 1.

(2) Obtained from Outdoor Airload Calculator

(3) Using design weather data.

(4) The multiplier corrects for actual % outside air.

(5) Using local energy costs.

(6) Using typical system efficiency.

AFTER-TAX CASH FLOW ANALYSIS

INPUT DATA:

FIRST YEAR SAVINGS	$2,037 /YEAR
INITIAL COST PLUS INSTALLATION	$35,000
MARGINAL TAX RATE	0%
ESTIMATED ANNUAL INCREASE IN ENERGY COSTS	3%

YEAR	SAVINGS	COST	DEPREC. %	DEPREC. $	NET AFTER-TAX CASH FLOW
0		-35,000			-35,000
1	2037	-	29	10150	2037
2	2098	-	20	7000	2098
3	2161	-	13	4550	2161
4	2226	-	10	3500	2226
5	2293	-	9	3150	2293
6	2361	-	9	3150	2361
7	2432	-	9	3150	2432
8	2505	-			2505
9	2580	-			2580
10	2658	-			2658

CALCULATIONS:

NET PRESENT VALUE = 5 YEARS @ 15%	-$24,182 ;	INTERNAL RATE OF RETURN (IRR) =	-29.3 %
NET PRESENT VALUE = 10 YEARS @ 15%	-$20,578 ;	INTERNAL RATE OF RETURN (IRR) =	-6.5 %

NOTE:

Net After-tax Cash Flow is calculated as follows:
NATCF = SAVINGS - COSTS - TAX RATE(SAVINGS - COSTS - DEPRECIATION)

Net Present Value is calculated as follows:
NPV = C(0) + C(1)/(1 + r) + C(2)/(1 + r)^2 + ... + C(n)/(1 + r)^n
(where C(n) is the net cash flow for the nth year
and r is the opportunity cost of capital)

IRR is calculated by trial and error using the formula:
NPV = C(0) + C(1)/(1 + IRR) + C(2)/(1 + IRR)^2 + ... + C(n)/(1 + IRR)^n

BTHS
Main Building