LOCAL GOVERNMENT ENERGY AUDIT PROGRAM: ENERGY AUDIT REPORT

PREPARED FOR:

BURLINGTON TOWNSHIP BOARD OF EDUCATION

BURLINGTON TOWNSHIP HIGH SCHOOL - HOPKINS BUILDING

700 Jacksonville Road
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 Board of Education
Burlington Township High School - Hopkins Building
700 Jacksonville Road
Burlington, NJ 08016

Board of Education 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	$ 104,907
Natural Gas	$ 40,548
Total	$ 145,455

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	$8,340	$2,922	2.9	425.5%
ECM #2	Lighting Occupancy Sensors / Daylight Sensors	$11,495	$2,922	3.9	281.3%
ECM #3	Replace CRT Monitors	$7,700	$1,388	5.5	170.5%
ECM #4	Demand Controlled Ventilation	$37,000	$2,824	13.1	14.5%
ECM #5	Replace Air Cooled Condensing Units	$115,260	$5,564	20.7	-27.6%
ECM #6	Window Replacement	$210,000	$5,483	38.3	-60.8%
ECM #7	Water Conservation	$38,500	$1,476	26.1	-42.5%
RENEWABLE ENERGY MEASURES (REM's)					
ECM NO.	**DESCRIPTION**	**NET INSTALLATION COST**	**ANNUAL SAVINGS**	**SIMPLE PAYBACK (Yrs)**	**SIMPLE LIFETIME ROI**
REM #1	319.24 KW Solar PV System	$2,873,160	$201,913	14.2	75.7%

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	6.3	18,375	0
ECM #2	Lighting Occupancy Sensors / Daylight Sensors	0	18,378	0
ECM #3	Replace CRT Monitors	0	8,732	0
ECM #4	Demand Controlled Ventilation	0.0	9,600	1,055
ECM #5	Replace Air Cooled Condensing Units	5.8	34,996	0
ECM #6	Window Replacement	2.9	8,053	3,417
ECM #7	Water Conservation	0.0	0	301
RENEWABLE ENERGY MEASURES (REM's)				
ECM NO.	DESCRIPTION	ANNUAL UTILITY REDUCTION		
		ELECTRIC DEMAND (KW)	ELECTRIC CONSUMPTION (KWH)	NATURAL GAS (THERMS)
REM #1	319.24 KW Solar PV System	255.4	396,687	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 and Interior Spaces
- **ECM #2:** Lighting Occupancy Sensors / Daylight Sensors
- **ECM #3:** Replace CRT Monitors

ECM #1: Lighting Upgrade – Gymnasium and Interior Spaces

The gymnasium utilizes 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 a small number of interior spaces with inefficient lighting fixtures with incandescent lamps. This ECM also includes replacement of the incandescent lamps in miscellaneous spaces with compact fluorescent lamps. This ECM has a simple payback of 2.9 years making it strongly recommended for the 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 3.9 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 5.5 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.

Renewable Energy Measures

Renewable Energy Measures (REMs) were also reviewed for implementation at the Burlington Township High School – Hopkins Building. CEG utilized a parking lot canopy mounted solar array to house a substantial PV system. The recommended 319 kW PV system will produce approximately 396,687 kWh of electricity annually and will reduce the schools electrical consumption from the grid by 60%. The system's calculated simple payback of 14.3 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 Burlington Township High School Hopkins 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 Hopkins Building, the School District will need to coordinate Direct Install efforts with the Township's Local Government.

Conclusion

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

II. INTRODUCTION

The comprehensive energy audit covers the 85,000 square foot Hopkins Building, which includes the following spaces: classrooms, cafeteria, gymnasium, faculty offices, administration offices, kitchen and library.

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:

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

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

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

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

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

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

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. The facilities receive electric distribution service through Public Service Electric & Gas (PSE&G) on rate schedule Basic General Service - LPLS rate structure. The school has contracted South Jersey Energy, a Third Party Supplier (TPS), to provide electric commodity supply (generation) service. 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. South Jersey Gas (SJG) provides natural gas to the facility under the Firm Transportation 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 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	15.9¢ / kWh
Natural Gas	$1.23 / Therm

Table 3
Electricity Billing Data

ELECTRIC USAGE SUMMARY

Utility Provider: PSE&G
Rate: LPLS
Meter No: 778008319
Account No. 42 010 038 09
Third Party Utility South Jersey Energy
TPS Meter / Acct No:

MONTH OF USE	CONSUMPTION	DEMAND	TOTAL BILL
Mar-09	65,600	180.0	$9,766
Apr-09	53,600	268.0	$2,438
May-09	60,000	232.0	$16,288
Jun-09	53,200	252.0	$9,964
Jul-09	42,000	176.0	$7,657
Aug-09	47,200	196.0	$8,658
Sep-09	61,200	264.0	$9,128
Oct-09	58,800	236.0	$8,719
Nov-09	54,000	188.0	$7,945
Dec-09	50,400	160.0	$7,412
Jan-10	54,400	184.0	$8,106
Feb-10	59,600	196.0	$8,825
Totals	**660,000**	**268.0 Max**	**$104,907**

AVERAGE DEMAND 211.0 KW average

AVERAGE RATE $0.159 $/kWh

Figure 1
Electricity Usage Profile

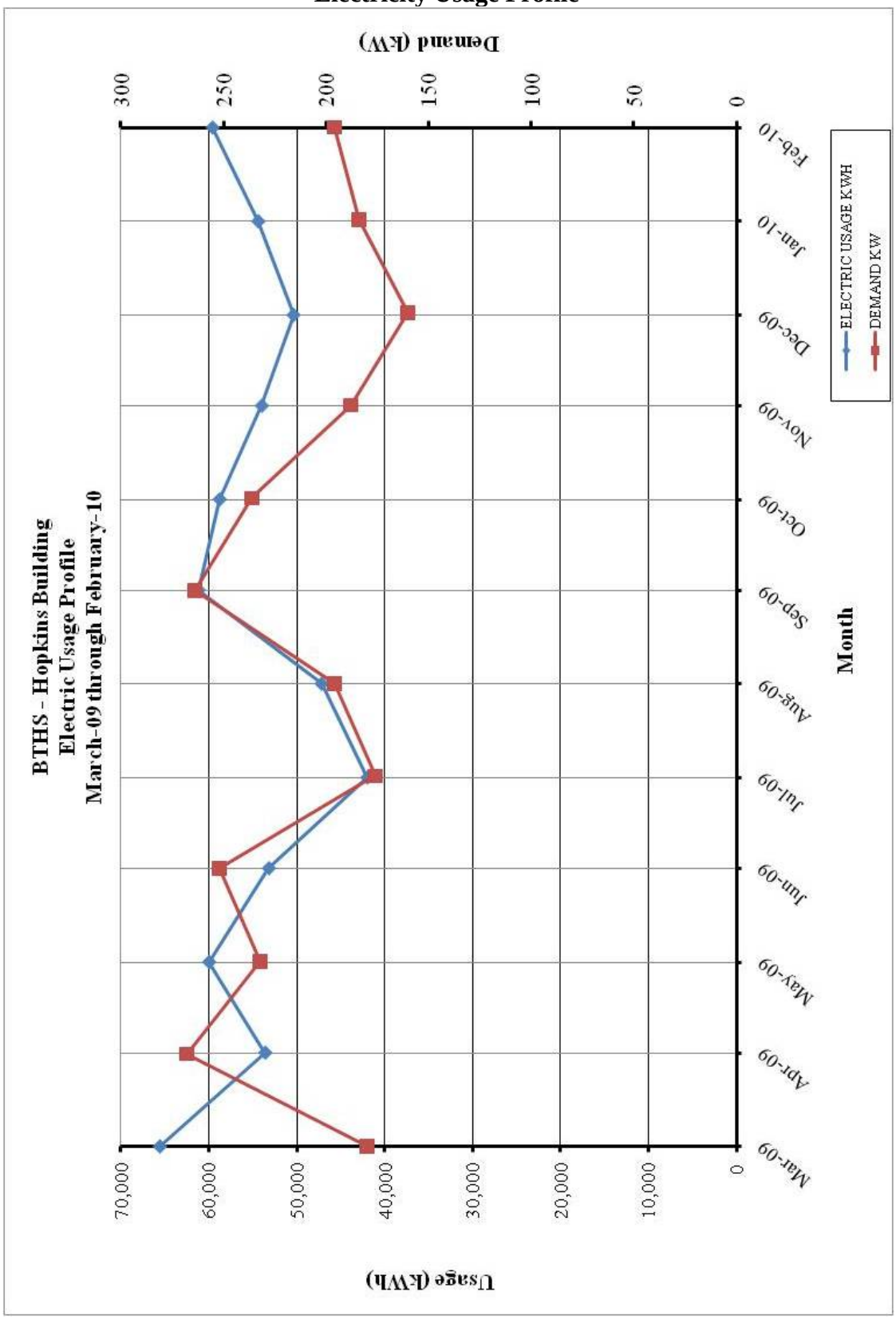


Table 4
Natural Gas Billing Data

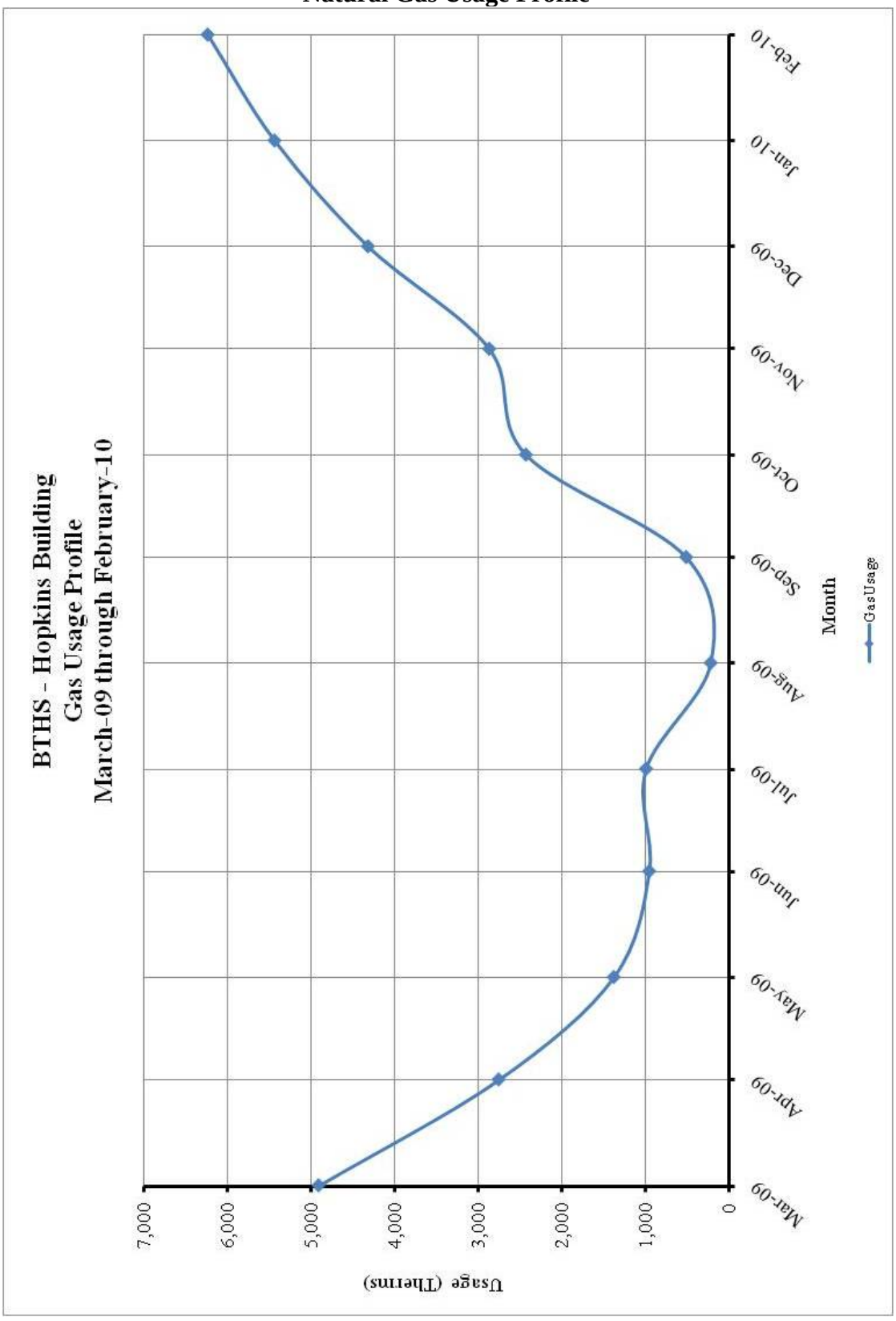
NATURAL GAS USAGE SUMMARY

Utility Provider: South Jersey Gas
Rate: Firm Transportation
Meter No: 413690
Account No. 2 20 31 0290 0 6
Third Party Utility Provider:
TPS Meter No:

MONTH OF USE	CONSUMPTION (THERMS)	TOTAL BILL
Mar-09	4,909.25	$6,174.49
Apr-09	2,754.39	$3,514.90
May-09	1,376.17	$1,816.05
Jun-09	951.71	$1,226.68
Jul-09	989.12	$966.36
Aug-09	214.55	$234.85
Sep-09	508.69	$519.34
Oct-09	2,428.08	$3,404.96
Nov-09	2,866.46	$3,889.57
Dec-09	4,317.68	$5,392.50
Jan-10	5,436.80	$6,443.28
Feb-10	6,236.68	$7,081.84
TOTALS	**32,989.59**	**$40,664.82**

AVERAGE RATE: **$1.23** **$/THERM**

Figure 2
Natural Gas Usage Profile



B. Energy Use Index (EUI)

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

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

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

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

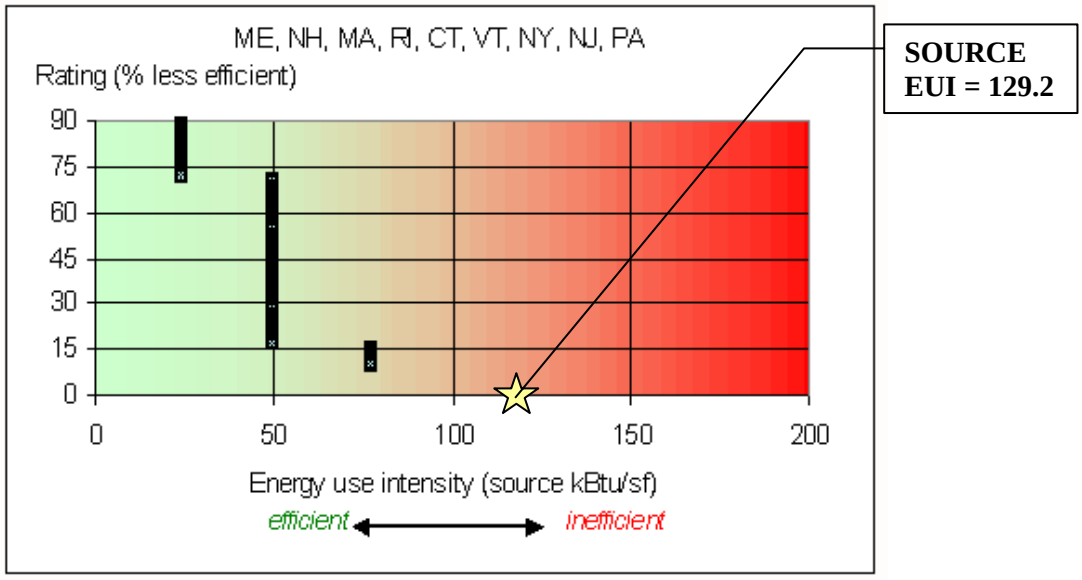
$$Building\ \ Source\ EUI = \frac{(Electric\ Usage\ in\ kBtu\ \ X\ \ SS\ \ Ratio + Gas\ Usage\ in\ kBtu\ \ X\ \ SS\ \ Ratio)}{Building\ \ Square\ \ Footage}$$

Table 5
Facility Energy Use Index (EUI) Calculation

ENERGY USE INTENSITY CALCULATION						
ENERGY TYPE	BUILDING USE			SITE ENERGY	SITE-SOURCE RATIO	SOURCE ENERGY
	kWh	Therms	Gallons	kBtu		kBtu
ELECTRIC	660,000			2,253,240	3.340	7,525,822
NATURAL GAS		32,990		3,298,959	1.047	3,454,010
FUEL OIL			0	0	1.010	0
PROPANE			0	0	1.010	0
TOTAL				5,552,199		10,979,831
*Site - Source Ratio data is provided by the Energy Star Performance Rating Methodology for Incorporating Source Energy Use document issued Dec 2007.						
BUILDING AREA		85,000	SQUARE FEET			
BUILDING SITE EUI		*65.3*	kBtu/SF/YR			
BUILDING SOURCE EUI		*129.2*	kBtu/SF/YR			

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

Figure 3
Source Energy Use Intensity Distributions: High School Buildings



C. EPA Energy Benchmarking System

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

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

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

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

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 Hopkins High School	52	50

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

V. FACILITY DESCRIPTION

The 85,000 SF Hopkins Building at the Burlington Township High School is a one story facility comprised of classrooms, cafeteria, gymnasium, faculty offices, administration offices, kitchen and library. The building was built in 1970 with an addition to the original construction in 2008.

The total number of occupancy at the Hopkins Building is approximately 364 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 gymnasium and auditorium are used after hours for sports and other events. The facility is closed on weekends. A portion of the facility remains open year round including summer months for various social programs and activities in the building including the School Board Meetings and Church Gatherings on Sundays between 9:00 AM ad 2:00 PM. The owner keeps the building at occupied conditions to control the temperature and humidity for staff and the programs that are occurring at the facility.

Exterior walls are 4 inch face brick and concrete block construction throughout the building with insulation typical of the time period. The amount of insulation 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 single pane, ¼" clear glass with aluminum frames. The roof is flat and comprised of built-up rubber roofing covering with light colored crushed stones. The amount of insulation below the roofing is unknown.

HVAC Systems

The major source of cooling for the Hopkins Building is an air cooled rotary scroll chiller with a nominal capacity of 188 tons. The chiller has integrated part load value efficiency (IPLV) of 13.4 EER and a COP of 3.9. The chiller provides chilled water to two (2) AnnexAir rooftop air handling unit and unit ventilators. The AnnexAir air handling units, installed in 2007, make use of the chiller during the cooling season to provide sufficient conditioning to the offices, corridors, media room and some of the classrooms in the building. These air handling units are in good condition and are located on the roof of the main building containing the majority of the classrooms. Major source of heating for the building is a set of two (2) Aerco BMK 2.0 gas-fired condensing boilers, with capacity of 2,000 MBH. The boilers provide hot water for the air handling units and the unit ventilators in the heating season.

In addition to the above units, there are two (2) split air conditioning systems providing heating and cooling to the cafeteria. The remote condensing units are manufactured by Carrier with capacities at 30 tons each and Energy Efficiency Ratio (EER) of 9.5. The Carrier units are older units with standard efficiency compressors.

Exhaust System

Air is exhausted from the toilet rooms, corridors, some of the classrooms and gymnasium through the roof exhausters. Majority of the exhaust fans operate based on the facility occupancy schedule.

HVAC System Controls

The HVAC systems within the facility are controlled via a digital Building Automation System made by Tridium. The Tridium system is interfaced with the existing pneumatic system to drive some of the existing control actuators in the building. Majority of the larger equipment such as boilers, chiller, air handling units and unit ventilators are controlled through the Tridium system.

Domestic Hot Water

Domestic hot water for the restrooms and kitchen area is provided by an A.O. Smith 1,000 MBH input, gas fired domestic hot water heater coupled with a A.O Smith hot water storage tank. The domestic hot water is circulated throughout the building by two hot water re-circ pumps with fractional horsepower. The circulation pumps are controlled by aqua stats. The domestic hot water piping insulation appeared to be in good condition.

Lighting

Typical lighting throughout building is modern fluorescent tube lay-in fixtures with T-8 lamps and electronic ballasts. Storage rooms and closets lit with a mixture of fluorescent fixture and a small number of incandescent fixtures. The gymnasium is lit with low bay, 250W probe start metal halide fixtures in prismatic lenses. The building exterior is lit with high pressure sodium lamps in wall-mount fixtures.

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 gymnasium at the High School utilizes low bay fixtures with 250W metal halide lamps for its lighting. Metal halide bulbs provide a reasonably efficient option for bay lighting however there are a few common drawbacks. 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.

The lighting throughout the interior spaces in the Burlington Township High School – Hopkins Building is provided with modern fixtures with T8 lamps and electronic ballasts. There are only a small number of interior spaces with inefficient lighting fixtures with incandescent lamps.

This ECM includes replacement of each of the existing gymnasium low bay 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.

Gymnasium Hours of Operation: 3,000 Hours/Yr

This ECM also includes replacement of the incandescent lamps in miscellaneous spaces with compact fluorescent lamps. The energy usage of an incandescent compared to a compact fluorescent is approximately 3 to 4 times greater. In addition to the energy savings, compact fluorescent fixtures burn-hours are 8 to 15 times longer than incandescent fixtures ranging from 6,000 to 15,000 burn-hours compared to incandescent fixtures ranging from 750 to 1000 burn-hours.

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:

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 (250-399W) with new T-5 or T-8 fixtures = $50/Fixture

$$\text{Smart Start ® Incentive} = (\#\ \text{of 250W Metal Halide Fixture Replaced} \times \$50)$$

$$\text{Smart Start ® Incentive} = (48 \times \$50) = \$2400$$

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

Energy Savings Summary:

ECM #1 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$10,740
NJ Smart Start Equipment Incentive ($):	$2,400
Net Installation Cost ($):	$8,340
Maintenance Savings ($/Yr):	$0
Energy Savings ($/Yr):	$2,922
Total Yearly Savings ($/Yr):	$2,922
Estimated ECM Lifetime (Yr):	15
Simple Payback	2.9
Simple Lifetime ROI	425.5%
Simple Lifetime Maintenance Savings	$0
Simple Lifetime Savings	$43,825
Internal Rate of Return (IRR)	35%
Net Present Value (NPV)	$26,538.93

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

Energy Savings Calculations:

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

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

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

$$\text{Smart Start® Incentive} = (\#\ \text{of wall mount} \times\ \$\ 20) + (\#\ \text{of ceiling mount} \times 35)$$
$$\text{Smart Start® Incentive} = (8 \times\ \$\ 20) + (54 \times \$35) = \$2{,}170$$

Energy Savings Summary:

ECM #2 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$13,665
NJ Smart Start Equipment Incentive ($):	$2,170
Net Installation Cost ($):	$11,495
Maintenance Savings ($/Yr):	$0
Energy Savings ($/Yr):	$2,922
Total Yearly Savings ($/Yr):	$2,922
Estimated ECM Lifetime (Yr):	15
Simple Payback	3.9
Simple Lifetime ROI	281.3%
Simple Lifetime Maintenance Savings	$0
Simple Lifetime Savings	$43,831
Internal Rate of Return (IRR)	24%
Net Present Value (NPV)	$23,388.79

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 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:	77
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	77	77	
Monitor Power Cons. (W)	75	25	
Run Time %	90%	90%	
Operating Hrs per Week	60	60	
Operating Weeks per Yr	42	42	
Elec Cost ($/kWh)	0.159	0.159	
ENERGY SAVINGS CALCULATIONS			
ECM RESULTS	**EXISTING**	**PROPOSED**	**SAVINGS**
Electric Usage (kWh)	13,098	4,366	8,732
Energy Cost ($)	$2,083	$694	$1,388
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	77	$100	$7,700
Total	77		$7,700

Energy Savings Summary:

ECM #3 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$7,700
NJ Smart Start Equipment Incentive ($):	$0
Net Installation Cost ($):	$7,700
Maintenance Savings ($/Yr):	$0
Energy Savings ($/Yr):	$1,388
Total Yearly Savings ($/Yr):	$1,388
Estimated ECM Lifetime (Yr):	15
Simple Payback	5.5
Simple Lifetime ROI	170.5%
Simple Lifetime Maintenance Savings	$0
Simple Lifetime Savings	$20,825
Internal Rate of Return (IRR)	16%
Net Present Value (NPV)	$8,874.11

ECM #4: Demand Controlled Ventilation

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

Air handling units AHU – 1 & 2 provide heating and air conditioning to the cafeteria sitting area. When operating, these units provide minimum amount of outside air to the space. The outside air volume is typically based on the maximum occupancy of the space conditioned. When a given space is not fully occupied the outside air quantity delivered to the space is greater than the amount needed for adequate ventilation.

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

- Demand Control Ventilation - 10% - 15%.

Energy savings achieved through "Demand Control Ventilation" average 10%-15%. Savings resulting from the implementation of this ECM for energy management controls are estimated to be 15% of the total HVAC energy cost for this system.

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

IMPLEMENTATION SUMMARY					
INPUTS	**Service**	**Min # of CO2 SENSORS**	**HVAC Unit**	**Cooling Capaity, Tons**	**Heating Capacity, MBH**
DCV-1	Cafeteria	3	AHU - 1	30	300
	Cafeteria		AHU - 2	30	300
Total				**60**	**600**

** Heating capacity of the ceiling hung AHU's estimated*

Energy Savings Calculations:

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

$$\text{EnergySavings} = \text{CoolingEnergy(kwh)} \times 15\%$$

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

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

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

$$\text{EnergySavings} = \text{HeatingEnergy(Therms)} \times 15\%$$

DEMAND CONTROLLED VENTILATION	
ECM INPUTS	**DCV**
Equipment	AHU - 1 & 2
Total Cooling Capacity, Tons	60
Efficiency (EER)	9
Annual Full Load Cooling Hours	800
Total Heating Capacity, MBh	600
Heating Efficiency (Gas)	85%
Heating Degree Days (65°F)	4496
Energy Savings	15.0%
Elec Cost ($/kWh)	$0.159
Natural Gas Cost ($/Therm)	$1.23
ENERGY SAVINGS	
ECM RESULTS	**DCV**
Cooling Energy Cnsmption, kWh	64,000
Heating Energy (Therms)	7,031
Cooling Energy Savings kWh	9,600
Heating Energy Savings (Therms)	1,055
Electric Energy Cost Savings ($)	$1,526
Total Gas Cost Savings ($)	$1,297
Total Cost Savings ($)	$2,824
COMMENTS:	HDD estimated based on Newark,NJ.

Cost and Incentives:

Estimated installed cost for demand controlled ventilation for the Cafeteria Areas is $37,000. Estimated cost includes CO2 sensors, control wiring, electrical wiring, control system equipment expansion and programming.
There are currently no Smart Start ® incentives available for a Demand Control Ventilation System.

Energy Savings Summary:

ECM #4 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$37,000
NJ Smart Start Equipment Incentive ($):	$0
Net Installation Cost ($):	$37,000
Maintenance Savings ($/Yr):	$0
Energy Savings ($/Yr):	$2,824
Total Yearly Savings ($/Yr):	$2,824
Estimated ECM Lifetime (Yr):	15
Simple Payback	13.1
Simple Lifetime ROI	14.5%
Simple Lifetime Maintenance Savings	$0
Simple Lifetime Savings	$42,354
Internal Rate of Return (IRR)	2%
Net Present Value (NPV)	($3,292.15)

ECM #5: Replace Condensing Unit

Description:

Direct expansion cooling is provided to the cafeteria air handlers by two (2) older Carrier 30 Ton split condensing units. The split system units are aged and have already reached the end of their useful service life of 15 years as outlined by ASHRAE.

Usually, energy savings derived from replacing condensing units does not have a reasonable payback term. Nevertheless, as the equipment ages, it loses efficiency due to clogged condensers, internal parts wear and deposits of oil and other contaminants on the heat exchangers. Replacing an older condensing unit avoids these issues along with some energy savings. In addition, new high-end condensing units have significantly higher full load and part load efficiencies.

This energy conservation measure includes replacement of the condensing units on the roof with new condensing units utilizing 410A refrigerant and replacement of the DX coils in the Air Handling Units AHU-1 & 2 to accommodate higher pressure refrigerant. The cost of this ECM also includes running new refrigerant lines. The basis for this ECM is TRANE air cooled condensing Unit with model number RAUJ-C30 or equivalent.

It must be noted that manufacturing of the refrigerant gas R-22 is phased out as of 2010. Although, the HVAC manufacturers continue to produce condensers and heat pumps using R22 from pre-existing R22 supplies, the availability of R22 gas will decline over the next years and R22 equipment will be more expensive to maintain.

IMPLEMENTATION SUMMARY			
ECM INPUTS	**NUMBER OF UNITS**	**COOLING CAPACITY**	**TOTAL CAPACITY**
Air Cooled Condensing Units	2	30	60
Total	2		60

Cooling Energy Savings Calculations:

Current Condensing Unit Full Load Efficiency = 9.5 EER (when new)
Proposed Efficiency = 11.2 EER

Current Condensing Unit Part Load Efficiency = 8.9 IPLV* (when new)
Proposed Load Efficiency = 16.2 IPLV

** Integrated Part Load Value*

The part load efficiency values are used in the energy savings calculation except demand savings calculations, since majority of operation hours of these units occur at part load conditions.

Annual Cooling Hours of Operation = 960 hrs/yr (4 months, 20 days/month, 12 hours/day)

$$\text{Energy Savings, kWh} = \frac{\text{Total Cooling Capacity, } \frac{\text{BTU}}{\text{RT}}}{1000\,\frac{\text{W}}{\text{kW}}} \times \left[\frac{1}{\text{IPLV}_{\text{Old}}} - \frac{1}{\text{IPLV}_{\text{New}}}\right] \times \text{Total Cooling Hours}$$

$$\text{Demand Savings, kW} = \frac{\text{Total Cooling Capacity, } \frac{\text{BTU}}{\text{RT}}}{1000\,\frac{\text{W}}{\text{kW}}} \times \left[\frac{1}{\text{EER}_{\text{Old}}} - \frac{1}{\text{EER}_{\text{New}}}\right]$$

$$\text{Utility Cost Savings} = \text{Total Electric Energy Savings, kWh} \times \text{Cost of Electricity}\,\frac{\$}{\text{kWh}}$$

Results of the energy savings calculations are summarized below:

AIR COOLED CONDENSING UNITS							
ECM INPUTS	**COOLING CAPACITY, BTU/Hr**	**ANNUAL COOLING HOURS**	**IPLV EXISTING UNITS**	**IPLV PROPOSED UNITS**	**# OF UNITS**	**ENERGY SAVINGS kWh**	**DEMAND SAVINGS kW**
Air Cooled Condensing Units	360,000	960	8.9	16.2	2	34,996	6
Total					2	34,996	6

Equipment Cost and Incentives:

Estimated installed cost of a two (2) new 30 Ton air cooled condensing units, new R410a evaporator coils, controls and piping is $120,000.

From the **New Jersey Smart Start® Program Incentives Appendix**, installation of a high efficiency split condensing units falls under the category "Electric Unitary HVAC" and warrants an incentive based on efficiency this type of equipment. The program incentives are calculated as follows:

SPLIT AC CONDENSING UNITS REBATE SUMMARY				
UNIT DESCRIPTION	**UNIT EFFICIENCY**	**REBATE $/TON**	**PROPOSED CAPACITY TONS**	**TOTAL REBATE $**
≥20 to 30 tons	≥10.5 EER	$79	60	$4,740
TOTAL			**60**	**$4,740**

Energy Savings Summary:

ECM #5 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$120,000
NJ Smart Start Equipment Incentive ($):	$4,740
Net Installation Cost ($):	$115,260
Maintenance Savings ($/Yr):	$0
Energy Savings ($/Yr):	$5,564
Total Yearly Savings ($/Yr):	$5,564
Estimated ECM Lifetime (Yr):	15
Simple Payback	20.7
Simple Lifetime ROI	-27.6%
Simple Lifetime Maintenance Savings	$0
Simple Lifetime Savings	$83,466
Internal Rate of Return (IRR)	-4%
Net Present Value (NPV)	($48,832.50)

ECM #6: Window Replacement

Description:

The building envelope consists of single pane operable windows with aluminum frames and exit doors with large single pane windows and 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 existing windows and exit door frames in the building with double pane windows and low emissivity glass. The proposed windows include reduced outside air leakage. In addition the double pane structure will significantly increase the insulation value compared to the existing single pane window structure. The basis for this ECM is Anderson Windows at $75 per SF of window installed.

Energy Savings Calculations:

$$\text{Infiltration}\left(\frac{\text{Ft}^3}{\text{Min.}}\right) = \frac{\text{Area}\left(\text{Ft}^2\right) \times \text{Ave Height}\left(\text{Ft}\right) \times \text{AirChanges Per Hour}\left(\frac{1}{\text{Hr.}}\right)}{60\left(\frac{\text{Min}}{\text{Hr.}}\right)}$$

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

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

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

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

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

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

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

WINDOW REPLACEMENT CALCULATIONS			
ECM INPUTS	**EXISTING**	**PROPOSED**	**SAVINGS**
Description:	Existing Single Pane Windows	Double Pane Low-E Windows	-
Original Bldg Area (SF)	85,000	85,000	-
Average Ceiling Height (Ft)	9	9	-
Window (SF)	2,800	2,800	-
U-Value (BTU/HR/SF*°F)	0.8	0.45	0.35
Average Leakage Rate (Air Changes per Hr)	0.75	0.5	0.3
Infiltration, CFM	9563	6375	3,188
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 ($/Therm)	1.23	1.23	-
Electric Cost ($/kWh)	0.159	0.159	-
Gas Heat Value (BTU/Therm)	100,000	100,000	-
ENERGY SAVINGS CALCULATIONS			
ECM RESULTS	**EXISTING**	**PROPOSED**	**SAVINGS**
Heat Load (BTU/Hr)	683,719	455,813	227,906
Leakage Energy (Therms)	8,012	5,341	2,671
Conductive Energy (Therms)	1,706	960	746
Total Heating Energy (Therms)	9,718	6,301	3,417
Cooling Load (Ton)	24	16	8
Cooling Demand (kW)	8.6	5.7	2.9
Total Cooling Energy (kWh)	24,158	16,105	8,053
Gas Energy Cost ($)	$11,953	$7,750	$4,203
Electric Energy Cost ($)	$3,841	$2,561	$1,280
Comments:	1. Proposed window U-value Based on ASHRAE 90.1 - 2007		

Estimated cost for replacing all the windows at the building is $210,000.

Energy Savings Summary:

ECM #6 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$210,000
NJ Smart Start Equipment Incentive ($):	$0
Net Installation Cost ($):	$210,000
Maintenance Savings ($/Yr):	$0
Energy Savings ($/Yr):	$5,483
Total Yearly Savings ($/Yr):	$5,483
Estimated ECM Lifetime (Yr):	15
Simple Payback	38.3
Simple Lifetime ROI	-60.8%
Simple Lifetime Maintenance Savings	0
Simple Lifetime Savings	$82,250
Internal Rate of Return (IRR)	-10%
Net Present Value (NPV)	($144,540.01)

ECM #7: Low Flow Faucets, WC & Urinals

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	364	364	-
% 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	182	182	-
Total WC Flushes Per Day	364	364.0	-
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)	$1.23	$1.23	-
ENERGY SAVINGS CALCULATIONS			
ECM RESULTS	**EXISTING**	**PROPOSED**	**SAVINGS**
Water Consumption, Urinal and WC (Gal)	183,456	117,281	66,175
Water Consumption, Faucets (Gal)	98,280	26,208	72,072
Total Water Consumption, (Gal)	281,736	143,489	138,247
Water Cost ($)	$2,254	$1,148	$1,106
Gas Consumption (Therms)	410	109	301
Gas Cost ($/Year)	$504	$134	$370
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 15 water closets, 10 low flow urinals and 11 new auto flow sink faucets throughout the facility is estimated to be $38,500

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

Energy Savings Summary:

ECM #7 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$38,500
NJ Smart Start Equipment Incentive ($):	$0
Net Installation Cost ($):	$38,500
Water / Maintenance Savings ($/Yr):	$1,106
Energy Savings ($/Yr):	$370
Total Yearly Savings ($/Yr):	$1,476
Estimated ECM Lifetime (Yr):	15
Simple Payback	26.1
Simple Lifetime ROI	-42.5%
Simple Lifetime Maintenance Savings	$16,590
Simple Lifetime Savings	$22,135
Internal Rate of Return (IRR)	-6%
Net Present Value (NPV)	($20,883.83)

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 Hopkins Building at the Burlington Township High School utilizing renewable technologies and concluded that there is potential for solar energy generation. The solar photovoltaic system calculation summary will be concluded as **REM#1** within this report.

Solar Generation

Solar energy produces clean energy and reduces a building's carbon footprint. This is accomplished via photovoltaic panels which parking lots can also be utilized for the installation of a solar array. A truss system can be installed that is high enough to park vehicles under the array and no parking lot area is lost.

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 site area of the Hopkins Building at the Burlington Township High School for the purposes of determining a potential for a photovoltaic system. CEG believes a ground mounted parking lot canopy system is best suited for this site. An area of 20,400 S.F. can be utilized for a PV system as depicted in the **Renewable / Distributed Energy Measures Calculation Appendix**. Using this square footage it was determined that a system size of 319.24 kilowatts could be installed. A system of this size has an estimated kilowatt hour production of 396,687 KWh annually, reducing the overall utility bill by approximately 60.1% percent. A detailed financial analysis can be found in the **Renewable / Distributed Energy Measures Calculation Appendix**. This analysis illustrates the payback of the system over a 25 year period. The eventual degradation of the solar panels and the price of accumulated SREC's are factored into the payback.

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

The array system capacity was sized on available 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 school 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**	**SIMPLE ROI**	**INTERNAL RATE OF RETURN**
Direct Purchase	14.23 Years	75.7%	5.5%

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

Wind Generation

In addition to the Solar Analysis, CEG also conducted a review of the applicability of wind energy for the facility. Wind energy production is another option available through the Renewable Energy Incentive Program. Wind turbines of various types can be utilized to produce clean energy on a per building basis. Cash incentives are available per kWh of electric usage. Based on CEG's review of the applicability of wind energy for the facility, it was determined that the average wind speed is not adequate, and the space requirements are insufficient 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 55,000kWh and an average monthly demand of 211kW. Largest consumption months were February, March, May 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 4,753 therms and the average summer (Apr-Oct) consumption is 1,317 therms. The largest consumption month is February at 6,237 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) and has contracted a Third Party Supplier (TPS) to provide firm natural gas commodity service.

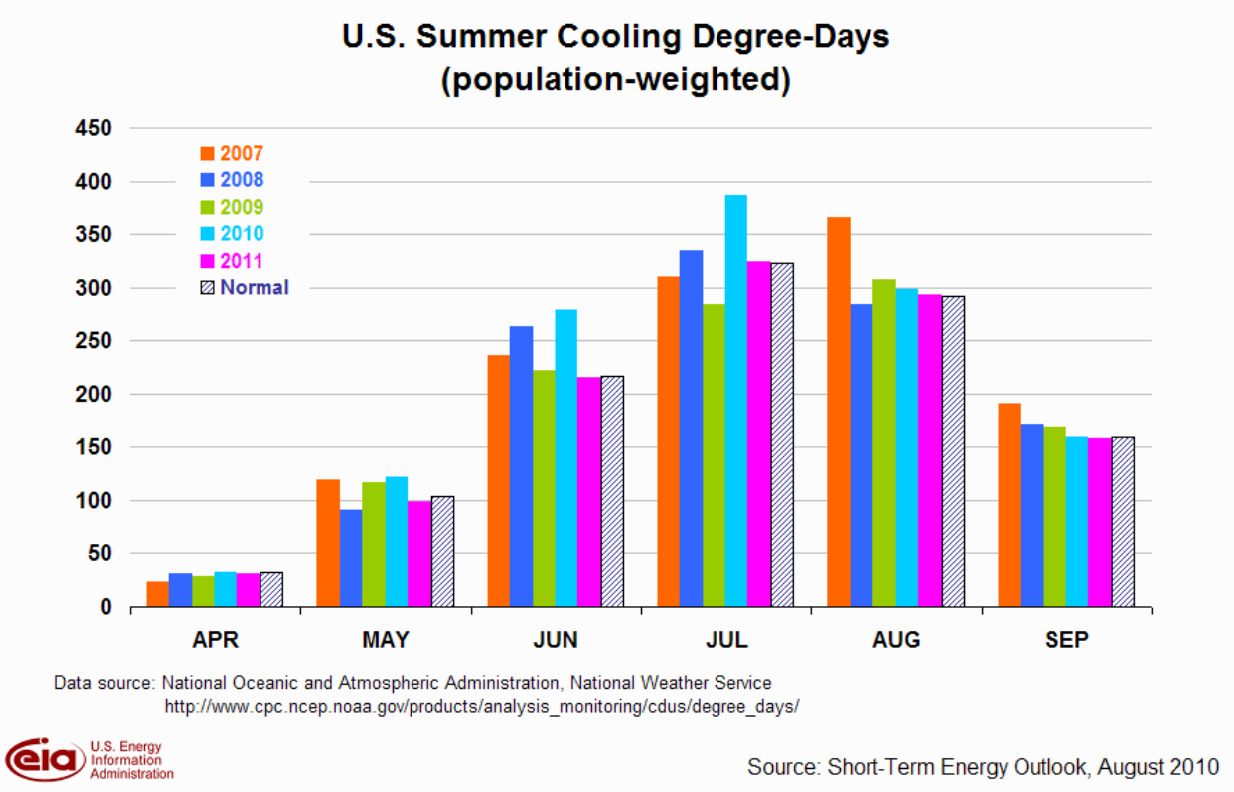
PSE&G provides basic gas supply service (BGSS) to customers who choose not to shop from a Third Party Supplier (TPS) for natural gas commodity. The option is essential to protect the reliability of service to consumers as well as protecting consumers if a third party supplier defaults or fails to provide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

   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 - Hopkins 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 / WATER	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	$10,740	$0	$2,400	$8,340	$2,922	$0	$2,922	15	$43,825	$0	425.5%	2.9	34.63%	$26,538.93
ECM #2	Lighting Occupancy Sensors / Daylight Sensors	$13,665	$0	$2,170	$11,495	$2,922	$0	$2,922	15	$43,831	$0	281.3%	3.9	24.47%	$23,388.79
ECM #3	Replace CRT Monitors	$7,700	$0	$0	$7,700	$1,388	$0	$1,388	15	$20,825	$0	170.5%	5.5	16.11%	$8,874.11
ECM #4	Demand Controlled Ventilation	$37,000	$0	$0	$37,000	$2,824	$0	$2,824	15	$42,354	$0	14.5%	13.1	1.74%	($3,292.15)
ECM #5	Replace Air Cooled Condensing Units	$120,000	$0	$4,740	$115,260	$5,564	$0	$5,564	15	$83,466	$0	-27.6%	20.7	-3.79%	($48,832.50)
ECM #6	Window Replacement	$210,000	$0	$0	$210,000	$5,483	$0	$5,483	15	$82,250	$0	-60.8%	38.3	-9.94%	($144,540.01)
ECM #7	Water Conservation	$38,500	$0	$0	$38,500	$370	$1,106	$1,476	15	$22,135	$16,590	-42.5%	26.1	-6.24%	($20,883.83)
REM RENEWABLE ENERGY AND FINANCIAL COSTS AND SAVINGS SUMMARY															
REM #1	319.24 KW Solar PV System	$2,873,160	$0	$0	$2,873,160	$63,073	$138,840	$201,913	25	$5,047,825	$3,471,000	75.7%	14.2	4.90%	$642,780.89

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%

OMB No. 2060-0347

STATEMENT OF ENERGY PERFORMANCE
Hopkins High School

Building ID: 2475176
For 12-month Period Ending: February 28, 2010[1]
Date SEP becomes ineligible: N/A
Date SEP Generated: October 04, 2010

Facility
Hopkins High School
700 Jacksonville Road
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: 1971
Gross Floor Area (ft²): 85,000

Energy Performance Rating[2] (1-100) 52

Site Energy Use Summary[3]

Electricity - Grid Purchase(kBtu)	2,251,920
Natural Gas (kBtu)[4]	3,298,958
Total Energy (kBtu)	5,550,878

Energy Intensity[5]

Site (kBtu/ft²/yr)	65
Source (kBtu/ft²/yr)	129

Emissions (based on site energy use)

Greenhouse Gas Emissions ($MtCO_2e$/year)	518

Electric Distribution Utility
Public Service Elec & Gas Co

National Average Comparison

National Average Site EUI	67
National Average Source EUI	132
% Difference from National Average Source EUI	-2%
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	Hopkins High School	Is this the official building name to be displayed in the ENERGY STAR Registry of Labeled Buildings?		☐
Type	K-12 School	Is this an accurate description of the space in question?		☐
Location	700 Jacksonville Road, 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		☐
Hopkins High School (K-12 School)				
CRITERION	**VALUE AS ENTERED IN PORTFOLIO MANAGER**	**VERIFICATION QUESTIONS**	**NOTES**	☑
Gross Floor Area	85,000 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	149 (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	59,600.00
01/01/2010	01/31/2010	54,400.00
12/01/2009	12/31/2009	50,400.00
11/01/2009	11/30/2009	54,000.00
10/01/2009	10/31/2009	58,800.00
09/01/2009	09/30/2009	61,200.00
08/01/2009	08/31/2009	47,200.00
07/01/2009	07/31/2009	42,000.00
06/01/2009	06/30/2009	53,200.00
05/01/2009	05/31/2009	60,000.00
04/01/2009	04/30/2009	53,600.00
03/01/2009	03/31/2009	65,600.00
Electric Consumption (kWh (thousand Watt-hours))		**660,000.00**
Electric Consumption (kBtu (thousand Btu))		**2,251,920.00**
Total Electricity (Grid Purchase) Consumption (kBtu (thousand Btu))		**2,251,920.00**
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	6,236.68
01/01/2010	01/31/2010	5,436.80
12/01/2009	12/31/2009	4,317.68
11/01/2009	11/30/2009	2,866.46
10/01/2009	10/31/2009	2,428.08
09/01/2009	09/30/2009	508.69
08/01/2009	08/31/2009	214.55
07/01/2009	07/31/2009	989.12
06/01/2009	06/30/2009	951.71
05/01/2009	05/31/2009	1,376.17

04/01/2009	04/30/2009	2,754.39
03/01/2009	03/31/2009	4,909.25
Gas Consumption (therms)		**32,989.58**
Gas Consumption (kBtu (thousand Btu))		**3,298,958.00**
Total Natural Gas Consumption (kBtu (thousand Btu))		**3,298,958.00**
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
Hopkins High School
700 Jacksonville Road
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

Hopkins High School	
Gross Floor Area Excluding Parking: (ft^2)	85,000
Year Built	1971
For 12-month Evaluation Period Ending Date:	February 28, 2010

Facility Space Use Summary

Hopkins High School	
Space Type	K-12 School
Gross Floor Area(ft^2)	85,000
Open Weekends?	No
Number of PCs[d]	149
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	52	52	75	N/A	50
Energy Intensity					
Site (kBtu/ft^2)	65	65	52	N/A	67
Source (kBtu/ft^2)	129	129	104	N/A	132
Energy Cost					
$/year	$ 145,453.86	$ 145,453.86	$ 116,652.66	N/A	$ 149,173.74
$/$ft^2$/year	$ 1.71	$ 1.71	$ 1.37	N/A	$ 1.75
Greenhouse Gas Emissions					
$MtCO_2e$/year	518	518	415	N/A	531
$kgCO_2e/ft^2$/year	6	6	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.

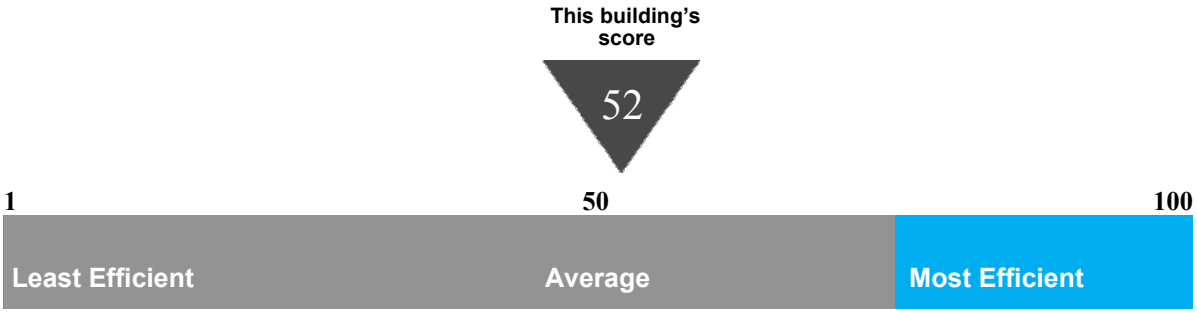
Statement of Energy Performance

2010

Hopkins High School
700 Jacksonville Road
Burlington, NJ 08016

Portfolio Manager Building ID: 2475176

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 129 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: 10/04/2010

MAJOR EQUIPMENT LIST

Concord Engineering Group

Burlington Township Schools - Hopkins High School

Rooftop / AC Units

Tag	MZ-1,2	A-1,2	-
Unit Type	Air Handling Unit	Split AC Units	-
Qty	2	2	-
Location	Roof over Block "B"	Roof	-
Area Served	Block "B"	Cafeteria Air Handlers	-
Manufacturer	AnnexAir	Carrier	-
Model #	AHU-05-C-H-MZ	38AH-034---500AA	-
Serial #	1105-02-0807	2696F15853	-
Cooling Type	Chilled Water	DX	-
Cooling Capacity (Tons)	Supply 5 HP Exhaust 3 HP	30 Tons	-
Cooling Efficiency (SEER/EER)	-	9.5 EER	-
Heating Type	Hot Water	-	-
Heating Input (MBH)	-	-	-
Efficiency	-	-	-
Fuel	-	R-22	-
Approx Age	3	15	-
ASHRAE Service Life	15	15	-
Remaining Life	12	0	-
Comments	Baldor Super E Motors	-	-

MAJOR EQUIPMENT LIST

Concord Engineering Group

Burlington Township Schools - Hopkins High School

Boilers

Tag	Boiler-1 & 2	-	-
Unit Type	Condensing Boilers	-	-
Qty	2	-	-
Location	Mechanical Room	-	-
Area Served	AHU's, UV's	-	-
Manufacturer	Aerco	-	-
Model #	BMK 2.0	-	-
Serial #	G-08-1085	-	-
Input Capacity (MBH)	2,000 MBH	-	-
Rated Output Capacity (MBH)	1,720-1,840 MBH	-	-
Approx. Efficiency %	86-95%	-	-
Fuel	Nat Gas	-	-
Approx Age	2	-	-
ASHRAE Service Life	30	-	-
Remaining Life	28	-	-
Comments	-	-	-

MAJOR EQUIPMENT LIST

Concord Engineering Group

Burlington Township Schools - Hopkins High School

Chiller

Tag		-	-
Unit Type	Air Cooled Chiller	-	-
Qty	1	-	-
Location	Roof	-	-
Area Served	-	-	-
Manufacturer	Carrier	-	-
Model #	30RBA1905-C08CH3	-	-
Serial #	3707Q84071	-	-
Refrigerant	R-410A	-	-
Cooling Capacity (Tons)	188.5 Tons	-	-
Cooling Efficiency (KW/Ton)	13.4 EER / 3.9 COP IPLV	-	-
Volts / Phase / Hz	208/230/3/60	-	-
Fuel	-	-	-
Chilled Water GPM / ΔT	450.9 GPM / 10°F	-	-
Condenser Water GPM / ΔT	450.9 GPM / 10°F	-	-
Approx Age	3	-	-
ASHRAE Service Life	23	-	-
Remaining Life	20	-	-
Comments	-	-	-

MAJOR EQUIPMENT LIST

Concord Engineering Group

Burlington Township Schools - Hopkins High School

Domestic Water Heaters

Tag	HWH-1	Storage-1	-
Unit Type	Gas Fired Domestic Hot Water	Hot Water Storage Tank	-
Qty	1	1	-
Location	Mech Room	Mech Room	-
Area Served	DHW	DHW	-
Manufacturer	AO Smith	AO Smith Custom	-
Model #	VW-1000-100	TJV120	-
Serial #	0825M000009	-	-
Size (Gallons)	120 Gallons	120 Gallons	-
Input Capacity (MBH/KW)	1,000 MBH	-	-
Recovery (Gal/Hr)	1,014 GPH	-	-
Efficiency %	85%	-	-
Fuel	Nat Gas	-	-
Approx Age	2	2	-
ASHRAE Service Life	12	12	-
Remaining Life	10	10	-
Comments	Uses 120 Gallon Storage Tank	-	-

MAJOR EQUIPMENT LIST

Concord Engineering Group

Burlington Township Schools - Hopkins High School

Pumps

Tag	CHWP-1 & 2	HWP-1,2	Dom Booster
Unit Type	Inline	End Suction	Packaged Domestic Water Booster Pumps
Qty	2	2	1
Location	Rooftop Chiller	Mech Room	Mechanical Room
Area Served	Chiller	H&V Units / Air handlers	Domestic Hot Water
Manufacturer	-	Bell & Gossett	-
Model #	-	Series 1510	-
Serial #	-	C066368	-
Horse Power	15 HP	15 HP	-
Flow	-	360 GPM @ 80 FT HD	200 GPM @ 60FT HD
Motor Info	Baldor Reliance	NEME Premium Inverter Duty	-
Electrical Power	208-230/460	208/3	-
RPM	3525 RPM	1800 RPM	-
Motor Efficiency %	92.0%	93.0%	-
Approx Age			0
ASHRAE Service Life	20	20	20
Remaining Life	20	20	
Comments	Packaged with Chiller	Have VFD's but also saw 3-way valves in system	

MAJOR EQUIPMENT LIST

Concord Engineering Group

Burlington Township Schools - Hopkins High School

Unit Ventilators

Tag	UV	UV	UV
Unit Type	Heating and Cooling	-	-
Qty	40 (Est)	-	-
Location	Classrooms	-	-
Manufacturer	Carrier	-	-
Model #	40UF5 - 5M1	-	-
Serial #	3607R13017	-	-
Flow Capacity	-	-	-
Cooling Type	Chilled Water	-	-
Cooling Capacity (Tons)	-	-	-
Estimated Cooling Efficiency (EER)	-	-	-
Heating Type	Hot Water Coil	-	-
Heating Input (MBH)	~50	-	-
Approx Age	-	-	-
Ashrae Service Life	15	-	-
Remaining Life	-	-	-
Comments	-	-	-

Investment Grade Lighting Audit

CEG Job #: 9C10054
Project: Burlington Township High School - Hopking Building
Address: 700 Jacksonville Road, Burlington, NJ 08016
Bldg. Sq. Ft. 85,000

Burlington Township High School - Hopkins Building

KWH COST: $0.159

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	H100 Classroom	2600	33	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	1.91	4,976.4	$791.25	33	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.11	H101 Classroom	2600	20	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	1.16	3,016.0	$479.54	20	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.11	H102 Classroom	2600	18	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	1.04	2,714.4	$431.59	18	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.11	Boys' Restroom	3200	3	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	0.17	556.8	$88.53	3	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.11	Girls' Restroom	3200	3	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	0.17	556.8	$88.53	3	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.11	Custodian Closet	1200	1	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	0.06	69.6	$11.07	1	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.11	H103 Classroom	2600	21	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt.,	58	1.22	3,166.8	$503.52	21	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.11	H104 Classroom	2600	27	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	1.57	4,071.6	$647.38	27	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.11	Stage	2600	12	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt.,	58	0.70	1,809.6	$287.73	12	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
242.21	Cafeteria	2600	24	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	104	2.50	6,489.6	$1,031.85	24	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
211.31	Boiler Room	4400	5	1	1x4, 1 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Acrylic Lens	30	0.15	660.0	$104.94	5	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.34	Electric Room	1200	3	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., No	58	0.17	208.8	$33.20	3	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
5	Custodian Restroom	2600	1	2	1x2, 2 Lamp, 17w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	34	0.03	88.4	$14.06	1	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.11	Kitchen	2600	15	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt.,	58	0.87	2,262.0	$359.66	15	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
617		2600	4	1	Hood Light w/Globe & Cage, 100w A19 Lamp	100	0.40	1,040.0	$165.36	4	1	(1) 26w CFL Lamp	26	0.10	270.4	$42.99	$20.00	$80.00	0.30	769.6	$122.37	0.65
221.11	Wash Area	2600	3	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt.,	58	0.17	452.4	$71.93	3	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.11	Kitchen Storage	2600	1	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	0.06	150.8	$23.98	1	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.11	Cafeteria Storage	2600	6	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt.,	58	0.35	904.8	$143.86	6	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
222.21	Corridor 100-104	4400	18	2	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	58	1.04	4,593.6	$730.38	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

222.21	Corridor 100-104	4400	5	2	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	58	0.29	1,276.0	$202.88	5	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.11	Main Office	2600	15	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt.,	58	0.87	2,262.0	$359.66	15	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.11	Office Storage	1200	2	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	0.12	139.2	$22.13	2	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.11	Lobby	4400	4	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt.,	58	0.23	1,020.8	$162.31	4	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
5	Restroom	1200	1	2	1x2, 2 Lamp, 17w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	34	0.03	40.8	$6.49	1	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.11	Office	2600	2	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt.,	58	0.12	301.6	$47.95	2	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.11	Principal's Office	2600	4	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	0.23	603.2	$95.91	4	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.11	Break Room	2600	4	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	0.23	603.2	$95.91	4	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.11	Guidance	2600	9	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	0.52	1,357.2	$215.79	9	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.11	Office	2600	1	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt.,	58	0.06	150.8	$23.98	1	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.11	Office	2600	1	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	0.06	150.8	$23.98	1	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.11	Office	2600	1	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	0.06	150.8	$23.98	1	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.11	H105 Classroom	2600	15	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	0.87	2,262.0	$359.66	15	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.11	Corridor - Main Office	4400	6	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	0.35	1,531.2	$243.46	6	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.11		4400	3	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	0.17	765.6	$121.73	3	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.11	H106 Classroom	2600	18	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	1.04	2,714.4	$431.59	18	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.14	Storage	1200	6	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., No Lens	58	0.35	417.6	$66.40	6	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.11	Nurse	2600	10	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt.,	58	0.58	1,508.0	$239.77	10	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.11	Conference Room	2600	4	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	0.23	603.2	$95.91	4	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.11	H107 Classroom	2600	15	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	0.87	2,262.0	$359.66	15	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.11	H109 Classroom	2600	6	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	0.35	904.8	$143.86	6	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.11	H111 Classroom	2600	15	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	0.87	2,262.0	$359.66	15	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.11	H113 Classroom	2600	15	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	0.87	2,262.0	$359.66	15	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	H115 Classroom	2600	15	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	0.87	2,262.0	$359.66	15	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.11	H117 Classroom	2600	6	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	0.35	904.8	$143.86	6	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.11	H119 Classroom	2600	15	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	0.87	2,262.0	$359.66	15	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.11	H121 Classroom	2600	15	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	0.87	2,262.0	$359.66	15	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.11	H123 Classroom	2600	15	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	0.87	2,262.0	$359.66	15	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.11	H125 Clasroom	2600	15	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	0.87	2,262.0	$359.66	15	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.11	H127 Classroom	2600	15	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	0.87	2,262.0	$359.66	15	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.11	H129 Classroom	2600	15	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	0.87	2,262.0	$359.66	15	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.11	H131 Classroom	2600	15	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	0.87	2,262.0	$359.66	15	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	Transportation Office	2600	9	3	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.77	2,012.4	$319.97	9	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
222.21	Corridor 121-131	4400	9	2	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	58	0.52	2,296.8	$365.19	9	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
222.21		4400	3	2	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	58	0.17	765.6	$121.73	3	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.11	H116 Classroom	2600	15	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	0.87	2,262.0	$359.66	15	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.11	H114 Classroom	2600	4	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	0.23	603.2	$95.91	4	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.11	H112 Classroom	2600	15	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	0.87	2,262.0	$359.66	15	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.11	Corridor 107-119	4400	13	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	0.75	3,317.6	$527.50	13	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.11	H110 Classroom	2600	15	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	0.87	2,262.0	$359.66	15	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.11	Library	2600	64	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	3.71	9,651.2	$1,534.54	64	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.11	Library Office	2600	2	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	0.12	301.6	$47.95	2	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
242.21	H108 Classroom	2600	8	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt.,	104	0.83	2,163.2	$343.95	8	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.11	Girls' Restroom	3200	3	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	0.17	556.8	$88.53	3	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	Boys' Restroom	3200	3	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	0.17	556.8	$88.53	3	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.11	Faculty Lounge	2600	16	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	0.93	2,412.8	$383.64	16	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.11	Women's Restroom	1200	1	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt.,	58	0.06	69.6	$11.07	1	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.11	Men's Restroom	1200	1	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	0.06	69.6	$11.07	1	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.11	H120 Storage	1200	12	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	0.70	835.2	$132.80	12	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
242.21	CST Office	2600	6	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt.,	104	0.62	1,622.4	$257.96	6	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
242.21	CST Office	2600	6	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	104	0.62	1,622.4	$257.96	6	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
242.21	CST Office	2600	2	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt.,	104	0.21	540.8	$85.99	2	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
242.21	Break Room	2600	3	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	104	0.31	811.2	$128.98	3	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
242.21	File Room	2600	2	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	104	0.21	540.8	$85.99	2	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
242.21	Board office	2600	9	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	104	0.94	2,433.6	$386.94	9	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
242.21	Board Reception Area	2600	6	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	104	0.62	1,622.4	$257.96	6	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
242.21	Board Office	2600	6	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt.,	104	0.62	1,622.4	$257.96	6	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
242.21	Conference Room	2600	12	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	104	1.25	3,244.8	$515.92	12	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
242.21	Copy / Break Room	2600	3	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	104	0.31	811.2	$128.98	3	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
242.21	File Room	2600	2	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	104	0.21	540.8	$85.99	2	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
242.21	Superintendent's Front Office	2600	8	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	104	0.83	2,163.2	$343.95	8	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
242.21	Superintendent's Office	2600	6	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	104	0.62	1,622.4	$257.96	6	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
3		2600	3	1	Table Lamp, 60w A Lamp	60	0.18	468.0	$74.41	3	1	13w CFL Lamps	1	0.00	7.8	$1.24	$20.00	$60.00	0.18	460.2	$73.17	0.82
221.11	H118 Classroom	2600	15	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	0.87	2,262.0	$359.66	15	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
222.21	Corridor Board of Education	2600	16	2	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	58	0.93	2,412.8	$383.64	16	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
222.21	Vestibule	4400	2	2	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	58	0.12	510.4	$81.15	2	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
222.21	Corridor Gym	4400	13	2	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt.,	58	0.75	3,317.6	$527.50	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

746	Gym	3000	48	1	250w MH LoBay w/Prismatic Lens	295	14.16	42,480.0	$6,754.32	48	3	1x4 54w T5HO 3 Lamp w/Reflective Lens, Wire Cage	177	8.50	25488	$4,052.59	$220.00	$10,560	5.66	16992	$2,701.73	3.91
221.11	Girls' Locker Room & Restroom	2600	16	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	0.93	2,412.8	$383.64	16	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.11	Boys' Locker Room & Restroom	2600	16	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	0.93	2,412.8	$383.64	16	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.11	Team Room & Office	2600	34	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt.,	58	1.97	5,127.2	$815.22	34	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.11	Men's Restroom	1200	2	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	0.12	139.2	$22.13	2	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.11	Women's Restroom	1200	2	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	0.12	139.2	$22.13	2	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
242.21	BA Office	2600	20	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	104	2.08	5,408.0	$859.87	20	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
242.21	BA Office	2600	4	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	104	0.42	1,081.6	$171.97	4	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
242.21	BA Office	2600	2	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	104	0.21	540.8	$85.99	2	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
242.21	BA Kitchen	2600	4	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	104	0.42	1,081.6	$171.97	4	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
242.21	Storage	1200	2	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	104	0.21	249.6	$39.69	2	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
31	BA Restroom	1200	2	1	Recessed Down Light, 90w R40 Lamp	90	0.18	216.0	$34.34	2	1	26w CFL Lamp	26	0.05	62.4	$9.92	$20.00	$40.00	0.13	153.6	$24.42	1.64
211.14	Gym Storage	1200	4	1	1x4, 1 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	30	0.12	144.0	$22.90	4	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
712	Exterior	4400	3	1	100w HPS Recessed, 18" Square, Fresnel Lens	125	0.38	1,650.0	$262.35	3	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
725		4400	13	1	150w HPS Wallpack	188	2.44	10,753.6	$1,709.82	13	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
751		4400	2	1	250w HPS, Flood	275	0.55	2,420.0	$384.78	2	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
650		4400	2	2	Wallpack, (1) 26w PL Quad Lamp	26	0.05	228.8	$36.38	2	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
	Totals		995	238			77.75	219,391	$34,883	995	6			8.7	25,829	$4,107		$10,740	6.3	18,375	$2,922	3.68

CEG Job #: 9C10054
Project: Burlington Township High School - Hopking Building
Address: 700 Jacksonville Road, Burlington, NJ 08016
Building SF: 85,000

Burlington Township High School - Hopkins Building

KWH COST: $0.159

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	H100 Classroom	2600	33	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	1.914	4976.4	$791.25	33	1	Dual Technology Occupancy Sensor & Day Light Sensor - (Sensor Switch CM-PC, PP-20, CM-PDT)	58	1.44	25%	3732.3	$593.44	$360.00	$360.00	0.48	1244.1	$197.81	1.82
221.11	H101 Classroom	2600	20	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	1.16	3016	$479.54	20	1	Dual Technology Occupancy Sensor & Day Light Sensor - (Sensor Switch CM-PC, PP-20, CM-PDT)	58	0.87	25%	2262	$359.66	$360.00	$360.00	0.29	754	$119.89	3.00
221.11	H102 Classroom	2600	18	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	1.044	2714.4	$431.59	18	1	Dual Technology Occupancy Sensor & Day Light Sensor - (Sensor Switch CM-PC, PP-20, CM-PDT)	58	0.78	25%	2035.8	$323.69	$360.00	$360.00	0.26	678.6	$107.90	3.34
221.11	Boys' Restroom	3200	3	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	0.174	556.8	$88.53	3	1	Dual Technology Occupancy Sensor - Remote Mnt.	58	0.16	10%	501.12	$79.68	$160.00	$160.00	0.02	55.68	$8.85	18.07
221.11	Girls' Restroom	3200	3	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	0.174	556.8	$88.53	3	1	Dual Technology Occupancy Sensor - Remote Mnt.	58	0.16	10%	501.12	$79.68	$160.00	$160.00	0.02	55.68	$8.85	18.07
221.11	Custodian Closet	1200	1	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	0.058	69.6	$11.07	1	0	No Change	58	0.06	0%	69.6	$11.07	$0.00	$0.00	0.00	0	$0.00	0.00
221.11	H103 Classroom	2600	21	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	1.218	3166.8	$503.52	21	1	2 Pole Power Pack w/Dual Tech. Occupancy Sensor (Sensorswitch or equal)	58	1.10	10%	2850.12	$453.17	$225.00	$225.00	0.12	316.68	$50.35	4.47
221.11	H104 Classroom	2600	27	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	1.566	4071.6	$647.38	27	1	2 Pole Power Pack w/Dual Tech. Occupancy Sensor (Sensorswitch or equal)	58	1.41	10%	3664.44	$582.65	$225.00	$225.00	0.16	407.16	$64.74	3.48
221.11	Stage	2600	12	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	0.696	1809.6	$287.73	12	0	No Change	58	0.70	0%	1809.6	$287.73	$0.00	$0.00	0.00	0	$0.00	0.00
242.21	Cafeteria	2600	24	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	104	2.496	6489.6	$1,031.85	24	1	2 Pole Power Pack w/Dual Tech. Occupancy Sensor (Sensorswitch or equal)	104	2.25	10%	5840.64	$928.66	$225.00	$225.00	0.25	648.96	$103.18	2.18
211.31	Boiler Room	4400	5	1	1x4, 1 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Acrylic Lens	30	0.15	660	$104.94	5	0	No Change	30	0.15	0%	660	$104.94	$0.00	$0.00	0.00	0	$0.00	0.00
221.34	Electric Room	1200	3	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., No Lens	58	0.174	208.8	$33.20	3	0	No Change	58	0.17	0%	208.8	$33.20	$0.00	$0.00	0.00	0	$0.00	0.00
5	Custodian Restroom	2600	1	2	1x2, 2 Lamp, 17w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	34	0.034	88.4	$14.06	1	0	No Change	34	0.03	0%	88.4	$14.06	$0.00	$0.00	0.00	0	$0.00	0.00
221.11	Kitchen	2600	15	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	0.87	2262	$359.66	15	1	2 Pole Power Pack w/Dual Tech. Occupancy Sensor (Sensorswitch or equal)	58	0.78	10%	2035.8	$323.69	$225.00	$225.00	0.09	226.2	$35.97	6.26
617		2600	4	1	Hood Light w/Globe & Cage, 100w A19 Lamp	100	0.4	1040	$165.36	4	0	No Change	100	0.40	0%	1040	$165.36	$0.00	$0.00	0.00	0	$0.00	0.00
221.11	Wash Area	2600	3	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	0.174	452.4	$71.93	3	1	Dual Technology Occupancy Sensor - Remote Mnt.	58	0.16	10%	407.16	$64.74	$160.00	$160.00	0.02	45.24	$7.19	22.24

221.11	Kitchen Storage	2600	1	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	0.058	150.8	$23.98	1	0	No Change	58	0.06	0%	150.8	$23.98	$0.00	$0.00	0.00	0	$0.00	0.00
221.11	Cafeteria Storage	2600	6	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	0.348	904.8	$143.86	6	1	Dual Technology Occupancy Sensor - Switch Mnt.	58	0.31	10%	814.32	$129.48	$75.00	$75.00	0.03	90.48	$14.39	5.21
222.21	Corridor 100-104	4400	18	2	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	58	1.044	4593.6	$730.38	18	0	No Change	58	1.04	0%	4593.6	$730.38	$0.00	$0.00	0.00	0	$0.00	0.00
222.21		4400	5	2	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	58	0.29	1276	$202.88	5	1	Daylight Sensor (Sensorswitch PP-20 & CM-PC or equal)	58	0.22	25%	957	$152.16	$160.00	$160.00	0.07	319	$50.72	3.15
221.11	Main Office	2600	15	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	0.87	2262	$359.66	15	0	No Change	58	0.87	0%	2262	$359.66	$0.00	$0.00	0.00	0	$0.00	0.00
221.11	Office Storage	1200	2	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	0.116	139.2	$22.13	2	0	No Change	58	0.12	0%	139.2	$22.13	$0.00	$0.00	0.00	0	$0.00	0.00
221.11	Lobby	4400	4	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	0.232	1020.8	$162.31	4	0	No Change	58	0.23	0%	1020.8	$162.31	$0.00	$0.00	0.00	0	$0.00	0.00
5	Restroom	1200	1	2	1x2, 2 Lamp, 17w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	34	0.034	40.8	$6.49	1	0	No Change	34	0.03	0%	40.8	$6.49	$0.00	$0.00	0.00	0	$0.00	0.00
221.11	Office	2600	2	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	0.116	301.6	$47.95	2	1	Dual Technology Occupancy Sensor - Switch Mnt.	58	0.10	10%	271.44	$43.16	$75.00	$75.00	0.01	30.16	$4.80	15.64
221.11	Principal's Office	2600	4	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	0.232	603.2	$95.91	4	1	Dual Technology Occupancy Sensor - Switch Mnt.	58	0.21	10%	542.88	$86.32	$75.00	$75.00	0.02	60.32	$9.59	7.82
221.11	Break Room	2600	4	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	0.232	603.2	$95.91	4	1	Dual Technology Occupancy Sensor - Switch Mnt.	58	0.21	10%	542.88	$86.32	$75.00	$75.00	0.02	60.32	$9.59	7.82
221.11	Guidance	2600	9	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	0.522	1357.2	$215.79	9	1	Dual Technology Occupancy Sensor - Remote Mnt.	58	0.47	10%	1221.48	$194.22	$160.00	$160.00	0.05	135.72	$21.58	7.41
221.11	Office	2600	1	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	0.058	150.8	$23.98	1	0	No Change	58	0.06	0%	150.8	$23.98	$0.00	$0.00	0.00	0	$0.00	0.00
221.11	Office	2600	1	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	0.058	150.8	$23.98	1	0	No Change	58	0.06	0%	150.8	$23.98	$0.00	$0.00	0.00	0	$0.00	0.00
221.11	Office	2600	1	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	0.058	150.8	$23.98	1	0	No Change	58	0.06	0%	150.8	$23.98	$0.00	$0.00	0.00	0	$0.00	0.00
221.11	H105 Classroom	2600	15	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	0.87	2262	$359.66	15	1	2 Pole Power Pack w/Dual Tech. Occupancy Sensor (Sensorswitch or equal)	58	0.78	10%	2035.8	$323.69	$225.00	$225.00	0.09	226.2	$35.97	6.26
221.11	Corridor - Main Office	4400	6	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	0.348	1531.2	$243.46	6	0	No Change	58	0.35	0%	1531.2	$243.46	$0.00	$0.00	0.00	0	$0.00	0.00
221.11		4400	3	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	0.174	765.6	$121.73	3	1	Daylight Sensor (Sensorswitch PP-20 & CM-PC or equal)	58	0.13	25%	574.2	$91.30	$160.00	$160.00	0.04	191.4	$30.43	5.26
221.11	H106 Classroom	2600	18	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	1.044	2714.4	$431.59	18	1	2 Pole Power Pack w/Dual Tech. Occupancy Sensor (Sensorswitch or equal)	58	0.94	10%	2442.96	$388.43	$225.00	$225.00	0.10	271.44	$43.16	5.21
221.14	Storage	1200	6	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., No Lens	58	0.348	417.6	$66.40	6	1	Dual Technology Occupancy Sensor - Switch Mnt.	58	0.31	10%	375.84	$59.76	$75.00	$75.00	0.03	41.76	$6.64	11.30
221.11	Nurse	2600	10	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	0.58	1508	$239.77	10	1	Dual Technology Occupancy Sensor - Remote Mnt.	58	0.52	10%	1357.2	$215.79	$160.00	$160.00	0.06	150.8	$23.98	6.67
221.11	Conference Room	2600	4	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	0.232	603.2	$95.91	4	1	Dual Technology Occupancy Sensor - Switch Mnt.	58	0.21	10%	542.88	$86.32	$75.00	$75.00	0.02	60.32	$9.59	7.82

221.11	H107 Classroom	2600	15	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	0.87	2262	$359.66	15	1	Dual Technology Occupancy Sensor & Day Light Sensor - (Sensor Switch CM-PC, PP-20, CM-PDT)	58	0.65	25%	1696.5	$269.74	$360.00	$360.00	0.22	565.5	$89.91	4.00
221.11	H109 Classroom	2600	6	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	0.348	904.8	$143.86	6	1	Dual Technology Occupancy Sensor & Day Light Sensor - (Sensor Switch CM-PC, PP-20, CM-PDT)	58	0.26	25%	678.6	$107.90	$360.00	$360.00	0.09	226.2	$35.97	10.01
221.11	H111 Classroom	2600	15	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	0.87	2262	$359.66	15	1	Dual Technology Occupancy Sensor & Day Light Sensor - (Sensor Switch CM-PC, PP-20, CM-PDT)	58	0.65	25%	1696.5	$269.74	$360.00	$360.00	0.22	565.5	$89.91	4.00
221.11	H113 Classroom	2600	15	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	0.87	2262	$359.66	15	1	Dual Technology Occupancy Sensor & Day Light Sensor - (Sensor Switch CM-PC, PP-20, CM-PDT)	58	0.65	25%	1696.5	$269.74	$360.00	$360.00	0.22	565.5	$89.91	4.00
221.11	H115 Classroom	2600	15	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	0.87	2262	$359.66	15	1	Dual Technology Occupancy Sensor & Day Light Sensor - (Sensor Switch CM-PC, PP-20, CM-PDT)	58	0.65	25%	1696.5	$269.74	$360.00	$360.00	0.22	565.5	$89.91	4.00
221.11	H117 Classroom	2600	6	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	0.348	904.8	$143.86	6	1	Dual Technology Occupancy Sensor & Day Light Sensor - (Sensor Switch CM-PC, PP-20, CM-PDT)	58	0.26	25%	678.6	$107.90	$360.00	$360.00	0.09	226.2	$35.97	10.01
221.11	H119 Classroom	2600	15	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	0.87	2262	$359.66	15	1	Dual Technology Occupancy Sensor & Day Light Sensor - (Sensor Switch CM-PC, PP-20, CM-PDT)	58	0.65	25%	1696.5	$269.74	$360.00	$360.00	0.22	565.5	$89.91	4.00
221.11	H121 Classroom	2600	15	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	0.87	2262	$359.66	15	1	2 Pole Power Pack w/Dual Tech. Occupancy Sensor (Sensorswitch or equal)	58	0.78	10%	2035.8	$323.69	$225.00	$225.00	0.09	226.2	$35.97	6.26
221.11	H123 Classroom	2600	15	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	0.87	2262	$359.66	15	1	2 Pole Power Pack w/Dual Tech. Occupancy Sensor (Sensorswitch or equal)	58	0.78	10%	2035.8	$323.69	$225.00	$225.00	0.09	226.2	$35.97	6.26
221.11	H125 Clasroom	2600	15	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	0.87	2262	$359.66	15	1	2 Pole Power Pack w/Dual Tech. Occupancy Sensor (Sensorswitch or equal)	58	0.78	10%	2035.8	$323.69	$225.00	$225.00	0.09	226.2	$35.97	6.26
221.11	H127 Classroom	2600	15	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	0.87	2262	$359.66	15	1	2 Pole Power Pack w/Dual Tech. Occupancy Sensor (Sensorswitch or equal)	58	0.78	10%	2035.8	$323.69	$225.00	$225.00	0.09	226.2	$35.97	6.26
221.11	H129 Classroom	2600	15	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	0.87	2262	$359.66	15	1	2 Pole Power Pack w/Dual Tech. Occupancy Sensor (Sensorswitch or equal)	58	0.78	10%	2035.8	$323.69	$225.00	$225.00	0.09	226.2	$35.97	6.26
221.11	H131 Classroom	2600	15	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	0.87	2262	$359.66	15	1	2 Pole Power Pack w/Dual Tech. Occupancy Sensor (Sensorswitch or equal)	58	0.78	10%	2035.8	$323.69	$225.00	$225.00	0.09	226.2	$35.97	6.26
232.22	Transportation Office	2600	9	3	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.774	2012.4	$319.97	9	1	Dual Technology Occupancy Sensor - Remote Mnt.	86	0.70	10%	1811.16	$287.97	$160.00	$160.00	0.08	201.24	$32.00	5.00
222.21	Corridor 121-131	4400	9	2	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	58	0.522	2296.8	$365.19	9	0	No Change	58	0.52	0%	2296.8	$365.19	$0.00	$0.00	0.00	0	$0.00	0.00
222.21		4400	3	2	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	58	0.174	765.6	$121.73	3	1	Daylight Sensor (Sensorswitch PP-20 & CM-PC or equal)	58	0.13	25%	574.2	$91.30	$160.00	$160.00	0.04	191.4	$30.43	5.26

221.11	H116 Classroom	2600	15	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	0.87	2262	$359.66	15	1	2 Pole Power Pack w/Dual Tech. Occupancy Sensor (Sensorswitch or equal)	58	0.78	10%	2035.8	$323.69	$225.00	$225.00	0.09	226.2	$35.97	6.26
221.11	H114 Classroom	2600	4	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	0.232	603.2	$95.91	4	1	Dual Technology Occupancy Sensor - Switch Mnt.	58	0.21	10%	542.88	$86.32	$75.00	$75.00	0.02	60.32	$9.59	7.82
221.11	H112 Classroom	2600	15	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	0.87	2262	$359.66	15	1	2 Pole Power Pack w/Dual Tech. Occupancy Sensor (Sensorswitch or equal)	58	0.78	10%	2035.8	$323.69	$225.00	$225.00	0.09	226.2	$35.97	6.26
221.11	Corridor 107-119	4400	13	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	0.754	3317.6	$527.50	13	0	No Change	58	0.75	0%	3317.6	$527.50	$0.00	$0.00	0.00	0	$0.00	0.00
221.11	H110 Classroom	2600	15	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	0.87	2262	$359.66	15	1	2 Pole Power Pack w/Dual Tech. Occupancy Sensor (Sensorswitch or equal)	58	0.78	10%	2035.8	$323.69	$225.00	$225.00	0.09	226.2	$35.97	6.26
221.11	Library	2600	64	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	3.712	9651.2	$1,534.54	64	2	2 Pole Power Pack w/Dual Tech. Occupancy Sensor (Sensorswitch or equal)	58	3.34	10%	8686.08	$1,381.09	$225.00	$450.00	0.37	965.12	$153.45	2.93
221.11	Library Office	2600	2	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	0.116	301.6	$47.95	2	1	Dual Technology Occupancy Sensor - Switch Mnt.	58	0.10	10%	271.44	$43.16	$75.00	$75.00	0.01	30.16	$4.80	15.64
242.21	H108 Classroom	2600	8	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	104	0.832	2163.2	$343.95	8	1	Dual Technology Occupancy Sensor - Remote Mnt.	104	0.75	10%	1946.88	$309.55	$160.00	$160.00	0.08	216.32	$34.39	4.65
221.11	Girls' Restroom	3200	3	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	0.174	556.8	$88.53	3	1	Dual Technology Occupancy Sensor - Remote Mnt.	58	0.16	10%	501.12	$79.68	$160.00	$160.00	0.02	55.68	$8.85	18.07
221.11	Boys' Restroom	3200	3	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	0.174	556.8	$88.53	3	1	Dual Technology Occupancy Sensor - Remote Mnt.	58	0.16	10%	501.12	$79.68	$160.00	$160.00	0.02	55.68	$8.85	18.07
221.11	Faculty Lounge	2600	16	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	0.928	2412.8	$383.64	16	1	2 Pole Power Pack w/Dual Tech. Occupancy Sensor (Sensorswitch or equal)	58	0.84	10%	2171.52	$345.27	$225.00	$225.00	0.09	241.28	$38.36	5.86
221.11	Women's Restroom	1200	1	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	0.058	69.6	$11.07	1	0	No Change	58	0.06	0%	69.6	$11.07	$0.00	$0.00	0.00	0	$0.00	0.00
221.11	Men's Restroom	1200	1	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	0.058	69.6	$11.07	1	0	No Change	58	0.06	0%	69.6	$11.07	$0.00	$0.00	0.00	0	$0.00	0.00
221.11	H120 Storage	1200	12	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	0.696	835.2	$132.80	12	1	Dual Technology Occupancy Sensor - Remote Mnt.	58	0.63	10%	751.68	$119.52	$160.00	$160.00	0.07	83.52	$13.28	12.05
242.21	CST Office	2600	6	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	104	0.624	1622.4	$257.96	6	1	Dual Technology Occupancy Sensor - Switch Mnt.	104	0.56	10%	1460.16	$232.17	$75.00	$75.00	0.06	162.24	$25.80	2.91
242.21	CST Office	2600	6	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	104	0.624	1622.4	$257.96	6	1	Dual Technology Occupancy Sensor - Switch Mnt.	104	0.56	10%	1460.16	$232.17	$75.00	$75.00	0.06	162.24	$25.80	2.91
242.21	CST Office	2600	2	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	104	0.208	540.8	$85.99	2	1	Dual Technology Occupancy Sensor - Switch Mnt.	104	0.19	10%	486.72	$77.39	$75.00	$75.00	0.02	54.08	$8.60	8.72
242.21	Break Room	2600	3	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	104	0.312	811.2	$128.98	3	1	Dual Technology Occupancy Sensor - Switch Mnt.	104	0.28	10%	730.08	$116.08	$75.00	$75.00	0.03	81.12	$12.90	5.81
242.21	File Room	2600	2	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	104	0.208	540.8	$85.99	2	1	Dual Technology Occupancy Sensor - Switch Mnt.	104	0.19	10%	486.72	$77.39	$75.00	$75.00	0.02	54.08	$8.60	8.72
242.21	Board office	2600	9	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	104	0.936	2433.6	$386.94	9	1	Dual Technology Occupancy Sensor - Remote Mnt.	104	0.84	10%	2190.24	$348.25	$160.00	$160.00	0.09	243.36	$38.69	4.13
242.21	Board Reception Area	2600	6	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	104	0.624	1622.4	$257.96	6	1	Dual Technology Occupancy Sensor - Remote Mnt.	104	0.56	10%	1460.16	$232.17	$160.00	$160.00	0.06	162.24	$25.80	6.20

242.21	Board Office	2600	6	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	104	0.624	1622.4	$257.96	6	1	Dual Technology Occupancy Sensor - Remote Mnt.	104	0.56	10%	1460.16	$232.17	$160.00	$160.00	0.06	162.24	$25.80	6.20
242.21	Conference Room	2600	12	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	104	1.248	3244.8	$515.92	12	1	2 Pole Power Pack w/Dual Tech. Occupancy Sensor (Sensorswitch or equal)	104	1.12	10%	2920.32	$464.33	$225.00	$225.00	0.12	324.48	$51.59	4.36
242.21	Copy / Break Room	2600	3	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	104	0.312	811.2	$128.98	3	1	Dual Technology Occupancy Sensor - Switch Mnt.	104	0.28	10%	730.08	$116.08	$75.00	$75.00	0.03	81.12	$12.90	5.81
242.21	File Room	2600	2	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	104	0.208	540.8	$85.99	2	1	Dual Technology Occupancy Sensor - Switch Mnt.	104	0.19	10%	486.72	$77.39	$75.00	$75.00	0.02	54.08	$8.60	8.72
242.21	Superintendent's Front Office	2600	8	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	104	0.832	2163.2	$343.95	8	1	Dual Technology Occupancy Sensor - Remote Mnt.	104	0.75	10%	1946.88	$309.55	$160.00	$160.00	0.08	216.32	$34.39	4.65
242.21	Superintendent's Office	2600	6	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	104	0.624	1622.4	$257.96	6	1	Dual Technology Occupancy Sensor - Switch Mnt.	104	0.56	10%	1460.16	$232.17	$75.00	$75.00	0.06	162.24	$25.80	2.91
3		2600	3	1	Table Lamp, 60w A Lamp	60	0.18	468	$74.41	3	0	No Change	60	0.18	0%	468	$74.41	$0.00	$0.00	0.00	0	$0.00	0.00
221.11	H118 Classroom	2600	15	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	0.87	2262	$359.66	15	1	2 Pole Power Pack w/Dual Tech. Occupancy Sensor (Sensorswitch or equal)	58	0.78	10%	2035.8	$323.69	$225.00	$225.00	0.09	226.2	$35.97	6.26
222.21	Corridor Board of Education	2600	16	2	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	58	0.928	2412.8	$383.64	16	0	No Change	58	0.93	0%	2412.8	$383.64	$0.00	$0.00	0.00	0	$0.00	0.00
222.21	Vestibule	4400	2	2	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	58	0.116	510.4	$81.15	2	1	Daylight Sensor (Sensorswitch PP-20 & CM-PC or equal)	58	0.09	25%	382.8	$60.87	$160.00	$160.00	0.03	127.6	$20.29	7.89
222.21	Corridor Gym	4400	13	2	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	58	0.754	3317.6	$527.50	13	0	No Change	58	0.75	0%	3317.6	$527.50	$0.00	$0.00	0.00	0	$0.00	0.00
746	Gym	3000	48	1	250w MH LoBay w/Prismatic Lens	295	14.16	42480	$6,754.32	48	0	No Change	295	14.16	0%	42480	$6,754.32	$0.00	$0.00	0.00	0	$0.00	0.00
221.11	Girls' Locker Room & Restroom	2600	16	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	0.928	2412.8	$383.64	16	1	2 Pole Power Pack w/Dual Tech. Occupancy Sensor (Sensorswitch or equal)	58	0.84	10%	2171.52	$345.27	$225.00	$225.00	0.09	241.28	$38.36	5.86
221.11	Boys' Locker Room & Restroom	2600	16	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	0.928	2412.8	$383.64	16	1	2 Pole Power Pack w/Dual Tech. Occupancy Sensor (Sensorswitch or equal)	58	0.84	10%	2171.52	$345.27	$225.00	$225.00	0.09	241.28	$38.36	5.86
221.11	Team Room & Office	2600	34	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	1.972	5127.2	$815.22	34	2	2 Pole Power Pack w/Dual Tech. Occupancy Sensor (Sensorswitch or equal)	58	1.77	10%	4614.48	$733.70	$225.00	$450.00	0.20	512.72	$81.52	5.52
221.11	Men's Restroom	1200	2	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	0.116	139.2	$22.13	2	0	No Change	58	0.12	0%	139.2	$22.13	$0.00	$0.00	0.00	0	$0.00	0.00
221.11	Women's Restroom	1200	2	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	0.116	139.2	$22.13	2	0	No Change	58	0.12	0%	139.2	$22.13	$0.00	$0.00	0.00	0	$0.00	0.00
242.21	BA Office	2600	20	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	104	2.08	5408	$859.87	20	1	Dual Technology Occupancy Sensor & Day Light Sensor - (Sensor Switch CM-PC, PP-20, CM-PDT)	104	1.56	25%	4056	$644.90	$360.00	$360.00	0.52	1352	$214.97	1.67
242.21	BA Office	2600	4	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	104	0.416	1081.6	$171.97	4	1	Dual Technology Occupancy Sensor - Switch Mnt.	104	0.37	10%	973.44	$154.78	$75.00	$75.00	0.04	108.16	$17.20	4.36
242.21	BA Office	2600	2	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	104	0.208	540.8	$85.99	2	1	Dual Technology Occupancy Sensor - Switch Mnt.	104	0.19	10%	486.72	$77.39	$75.00	$75.00	0.02	54.08	$8.60	8.72
242.21	BA Kitchen	2600	4	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	104	0.416	1081.6	$171.97	4	1	Dual Technology Occupancy Sensor - Switch Mnt.	104	0.37	10%	973.44	$154.78	$75.00	$75.00	0.04	108.16	$17.20	4.36

242.21	Storage	1200	2	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	104	0.208	249.6	$39.69	2	0	No Change	104	0.21	0%	249.6	$39.69	$0.00	$0.00	0.00	0	$0.00	0.00
31	BA Restroom	1200	2	1	Recessed Down Light, 90w R40 Lamp	90	0.18	216	$34.34	2	0	No Change	90	0.18	0%	216	$34.34	$0.00	$0.00	0.00	0	$0.00	0.00
211.14	Gym Storage	1200	4	1	1x4, 1 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	30	0.12	144	$22.90	4	0	No Change	30	0.12	0%	144	$22.90	$0.00	$0.00	0.00	0	$0.00	0.00
712	Exterior	4400	3	1	100w HPS Recessed, 18" Square, Fresnel Lens	125	0.375	1650	$262.35	3	0	No Change	125	0.38	0%	1650	$262.35	$0.00	$0.00	0.00	0	$0.00	0.00
725		4400	13	1	150w HPS Wallpack	188	2.444	10753.6	$1,709.82	13	0	No Change	188	2.44	0%	10753.6	$1,709.82	$0.00	$0.00	0.00	0	$0.00	0.00
751		4400	2	1	250w HPS, Flood	275	0.55	2420	$384.78	2	0	No Change	275	0.55	0%	2420	$384.78	$0.00	$0.00	0.00	0	$0.00	0.00
650		4400	2	2	Wallpack, (1) 26w PL Quad Lamp	26	0.052	228.8	$36.38	2	0	No Change	26	0.05	0%	228.8	$36.38	$0.00	$0.00	0.00	0	$0.00	0.00
	Totals		995	238			77.7	219,391.2	$34,883	995	72			70.8		201,013.2	$31,961.11		$13,665	6.98	18,378	$2,922	4.68

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

Simple Payback Analysis

	Photovoltaic System - Direct Purchase
Total Construction Cost	$2,873,160
Annual kWh Production	396,687
Annual Energy Cost Reduction	$63,073
Annual SREC Revenue	$138,840
First Cost Premium	**$2,873,160**
Simple Payback:	**14.23** **Years**

Life Cycle Cost Analysis

Analysis Period (years):	25	Financing %:	0%
Financing Term (mths):	0	Maintenance Escalation Rate:	3.0%
Average Energy Cost ($/kWh)	**$0.159**	Energy Cost Escalation Rate:	3.0%
Financing Rate:	0.00%	SREC Value ($/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	$2,873,160	0	0	0	$0	(2,873,160)	0
1	$0	396,687	$63,073	$0	$138,840	$201,914	($2,671,246)
2	$0	394,704	$64,965	$0	$138,146	$203,112	($2,468,135)
3	$0	392,730	$66,914	$0	$137,456	$204,370	($2,263,765)
4	$0	390,766	$68,922	$0	$136,768	$205,690	($2,058,075)
5	$0	388,813	$70,989	$4,005	$136,084	$203,069	($1,855,006)
6	$0	386,869	$73,119	$3,985	$135,404	$204,538	($1,650,467)
7	$0	384,934	$75,313	$3,965	$134,727	$206,075	($1,444,392)
8	$0	383,009	$77,572	$3,945	$134,053	$207,680	($1,236,712)
9	$0	381,094	$79,899	$3,925	$133,383	$209,357	($1,027,355)
10	$0	379,189	$82,296	$3,906	$132,716	$211,107	($816,248)
11	$0	377,293	$84,765	$3,886	$132,053	$212,932	($603,316)
12	$0	375,407	$87,308	$3,867	$131,392	$214,834	($388,483)
13	$0	373,530	$89,927	$3,847	$130,735	$216,815	($171,667)
14	$0	371,662	$92,625	$3,828	$130,082	$218,879	$47,211
15	$0	369,804	$95,404	$3,809	$129,431	$221,026	$268,238
16	$0	367,955	$98,266	$3,790	$128,784	$223,260	$491,498
17	$0	366,115	$101,214	$3,771	$128,140	$225,583	$717,081
18	$0	364,284	$104,250	$3,752	$127,499	$227,998	$945,079
19	$0	362,463	$107,378	$3,733	$126,862	$230,507	$1,175,585
20	$0	360,650	$110,599	$3,715	$126,228	$233,112	$1,408,698
21	$1	358,847	$113,917	$3,696	$125,597	$235,818	$1,644,515
22	$2	357,053	$117,335	$3,678	$124,969	$238,626	$1,883,141
23	$3	355,268	$120,855	$3,659	$124,344	$241,539	$2,124,680
24	$4	353,491	$124,480	$3,641	$123,722	$244,562	$2,369,242
25	$5	351,724	$128,215	$3,623	$123,103	$247,696	$2,616,937
	Totals:	9,344,340	$2,299,604	$80,025	$3,270,519	$5,490,097	($2,962,962)
				Net Present Value (NPV)		**$2,616,962**	
				Internal Rate of Return (IRR)		**5.5%**	

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
Hopkins High School	20400	Sunpower SPR230	1388	14.7	20,409	319.24	396,687	45,804	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:	319.2 kW
DC to AC Derate Factor:	0.800
AC Rating:	255.4 kW
Array Type:	Fixed Tilt
Array Tilt:	15.0°
Array Azimuth:	180.0°
Energy Specifications	
Cost of Electricity:	0.2 ¢/kWh

Results			
Month	Solar Radiation (kWh/m²/day)	AC Energy (kWh)	Energy Value ($)
1	2.80	22514	35.80
2	3.53	25777	40.99
3	4.46	34904	55.50
4	5.28	39005	62.02
5	5.86	43958	69.89
6	6.10	42525	67.61
7	6.05	43126	68.57
8	5.60	40041	63.67
9	4.99	35103	55.81
10	3.97	29483	46.88
11	2.86	21308	33.88
12	2.43	18942	30.12
Year	4.50	396687	630.73

.= Proposed PV Layout

Notes:

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