ENERGY AUDIT – FINAL REPORT

SCHOOL DISTRICT OF THE CHATHAMS
CHATHAM HIGH SCHOOL

255 LAFAYETTE AVENUE
CHATHAM, NJ 07928
ATTN: RALPH GOODWIN
SCHOOL BUSINESS ADMINISTRATOR BOARD SECRETARY

CEG PROJECT NO. 9C09078

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I. EXECUTIVE SUMMARY

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

Chatham High School
255 Lafayette Avenue
Chatham, NJ 07928

Facility Contact Person: John Cataldo
Municipal Contact Person: Ralph Goodwin

This audit was performed in connection with the New Jersey Clean Energy Local Government Energy Audit Program. These energy audits are conducted to promote the office of Clean Energy's mission, 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	$310,997
Natural Gas	$133,194
Total	$444,191

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 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**	**SIMPLE PAYBACK (Yrs)**	**SIMPLE LIFETIME ROI**
ECM #1	Lighting Upgrade - General	$6,712	$10,498	0.6	3810.2%
ECM #2	Install Lighting Controls	$22,120	$4,699	4.7	218.6%
ECM #3	Install LED Exit Signs	$3,082	$3,471	0.9	2715.5%
ECM #4	T-5 Lighting System in Gym	$6,200	$1,022	6.1	312.1%
ECM #5	Boiler Replacement – High Efficiency Upgrade	$370,500	$6,181	59.9	-41.6%
ECM #6	Install NEMA Premium Efficient Pump Motor	$1,160	$123	9.4	112.1%
ECM #7	Indoor Air handling Unit Replacement	$72,100	$1,358	53.1	-62.3%
ECM #8	DDC System – High School	$1,014,650	$36,807	27.6	-45.6%
RENEWABLE ENERGY MEASURES (REM's)					
ECM NO.	**DESCRIPTION**	**NET INSTALLATION COST[A]**	**ANNUAL SAVINGS**	**SIMPLE PAYBACK (Yrs)**	**SIMPLE LIFETIME ROI**
REM #1	Solar Energy System	$3,055,320	$202,420	15.1	65.6%

Notes: A. Cost takes into consideration applicable NJ Smart StartTM incentives.

The estimated demand and energy savings for each ECM and REM is shown below in Table 2. The information in this table corresponds to the ECM's and REM's 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 - General	28.1	62,693.5	-
ECM #2	Install Lighting Controls	-	28,307.0	-
ECM #3	Install LED Exit Signs	1.7	15,260.0	-
ECM #4	T-5 Lighting System in Gym	2.6	5,491.0	-
ECM #5	Boiler Replacement – High Efficiency Upgrade	-	-	5,848
ECM #6	Install NEMA Premium Efficient Pump Motor	0.2	722.9	-
ECM #7	Indoor Air handling Unit Replacement	2.1	8,181.0	-
ECM #8	DDC System – High School	-	70,450.0	17,330
RENEWABLE ENERGY MEASURES (REM's)				
ECM NO.	DESCRIPTION	ANNUAL UTILITY REDUCTION		
		ELECTRIC DEMAND (KW)	ELECTRIC CONSUMPTION (KWH)	NATURAL GAS (THERMS)
REM #1	Solar Energy System	339.5	392286.0	-

Recommendation:

Concord Engineering Group (CEG) strongly recommends 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 Chatham High School:

- **ECM #1:** Lighting Upgrade
- **ECM #2:** Install Lighting Controls
- **ECM #3:** Install LED Exit Signs
- **ECM #4:** Install T-5 Lighting in Gym
- **ECM#6:** Install NEMA Premium Efficient Pump Motor

Systems that have past their useful service life should be replaced such as the systems described in ECM#5, 7 and 8. Although these ECMs will not have a payback, they are systems that should be replaced and will save a substantial amount of energy as summarized in Table 2 on page 5.

CEG recommends the owner pursue the **REM#1** PV Solar Energy System. The system can have a simple payback of 15.1 years and reduce the annual power requirement (kWh/yr) from the power grid as much as 20.9%. Two financing options are discussed in the **Renewable / Distributed Energy Measures** section of the report.

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 light fixtures to maximize light output.
4. Provide more frequent air filter changes to decrease overall system power usage and maintain better IAQ.
5. 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.

Efficient HVAC equipment replacements are difficult to justify with the energy savings alone. The replacement of HVAC equipment such as the heating and ventilation units at Chatham High School is typically initiated when the equipment stops working, surpasses the life expectancy, or maintenance requirements grow beyond the ability to continue to support it. When replacing the

equipment becomes necessary, the additional cost to install high efficiency systems becomes a great value for the investment.

Incentives provide financial motivation and much needed support for the implementation of energy conservation measures. Along with the NJ Smart Start program, the Pay for Performance Program incentives, sponsored by NJ Clean Energy Program, are suited favorably for this facility and its energy saving opportunities. It is expected through the implementation of multiple recommended ECMs, that this facility could reduce its overall energy consumption by more than 15%. The existing average operating demand above 200 KW and high energy consumption suggests the potential to qualify for the pay for performance program through the implementation of multiple ECMs. The incentive based on a 15% energy reduction for this facility would qualify for an additional $75,840 in the pay for performance program. This option is one to consider for a whole-building approach to energy reduction. CEG recommends the Owner review this option in more detail with a Pay for Performance Partner.

II. INTRODUCTION

The High School is a 253,663 square foot facility that includes classrooms, offices, media center, gymnasiums, cafeteria, auditorium, kitchen, auto shop and boiler rooms.

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.

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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 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 SmartStart 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 costs and savings are applied and a simple payback and simple return on investment (ROI) is calculated. The simple payback is based on the years that it takes for the savings to pay back the net installation cost (Net Installation divided by Net Savings.) A simple return on investment is calculated as the percentage of the net installation cost that is saved in one year (Net Savings divided by Net Installation.)

A simple life-time calculation is shown for each ECM. The life-time for each ECM is estimated based on the typical life of the equipment being replaced or altered. The energy savings is extrapolated throughout the life-time of the ECM and the total energy savings is calculated as the total life-time savings.

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.

There are two electric services for the facility. The primary service is located at the original boiler room. The secondary service is located at the boiler room in the 2001 addition. The electric usage profile represents the combined total actual electrical usage for the facility. Jersey Central Power and Light (JCP&L) provides electricity to the facility under their General Service Primary and Secondary Three-Phase rate structures. The electric utility measures consumption in kilowatt-hours (KWH) and maximum demand in kilowatts (KW). One KWH usage is equivalent to 1000 watts running for one hour. One KW of electric demand is equivalent to 1000 watts running at any given time. The basic usage charges are shown as generation service and delivery charges along with several non-utility generation charges. Rates used in this report reflect the historical data received for the facility.

The gas usage profile shows the actual natural gas energy usage for the facility. Public Service Electric and Gas (PSE&G) provides natural gas to the facility under the Basic General Supply Service- Large Volume Gas (LVG) rate structure. Hess Corporation is a third party supplier. 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 provide, the average cost for utilities at this facility is as follows:

Description	Average
Electricity	16.6¢ / kWh
Natural Gas	$1.449 / Therm

Table 3
Electricity Billing Data

Electric Usage Summary			
Utility Provider: JCP&L, General Service Secondary 3 phase			
Meter: G28742750		Customer Number: 0801577897 0000554655	
Meter: G21248931		Customer Number: 0801577897 0005941011	
MONTH OF USE	**CONSUMPTION**	**DEMAND**	**TOTAL BILL**
Aug-08	202,480	657.6	$36,431
Sep-08	147,480	753.6	$24,993
Oct-08	159,880	520.7	$25,285
Nov-08	147,160	470.4	$23,855
Dec-08	145,120	450.1	$23,978
Jan-09	169,720	469.0	$27,746
Feb-09	154,240	470.5	$25,129
Mar-09	134,880	470.4	$22,173
Apr-09	174,680	600.5	$27,745
May-09	148,440	660.7	$24,861
Jun-09	125,040	747.5	$22,293
Jul-09	163,760	520.9	$26,508
Totals	**1,872,880**	**753.6 Max**	**$310,997**
AVERAGE DEMAND	**566.0 KW average**		
AVERAGE RATE	**$0.166 $/kWh**		

Figure 1
Electricity Usage Profile

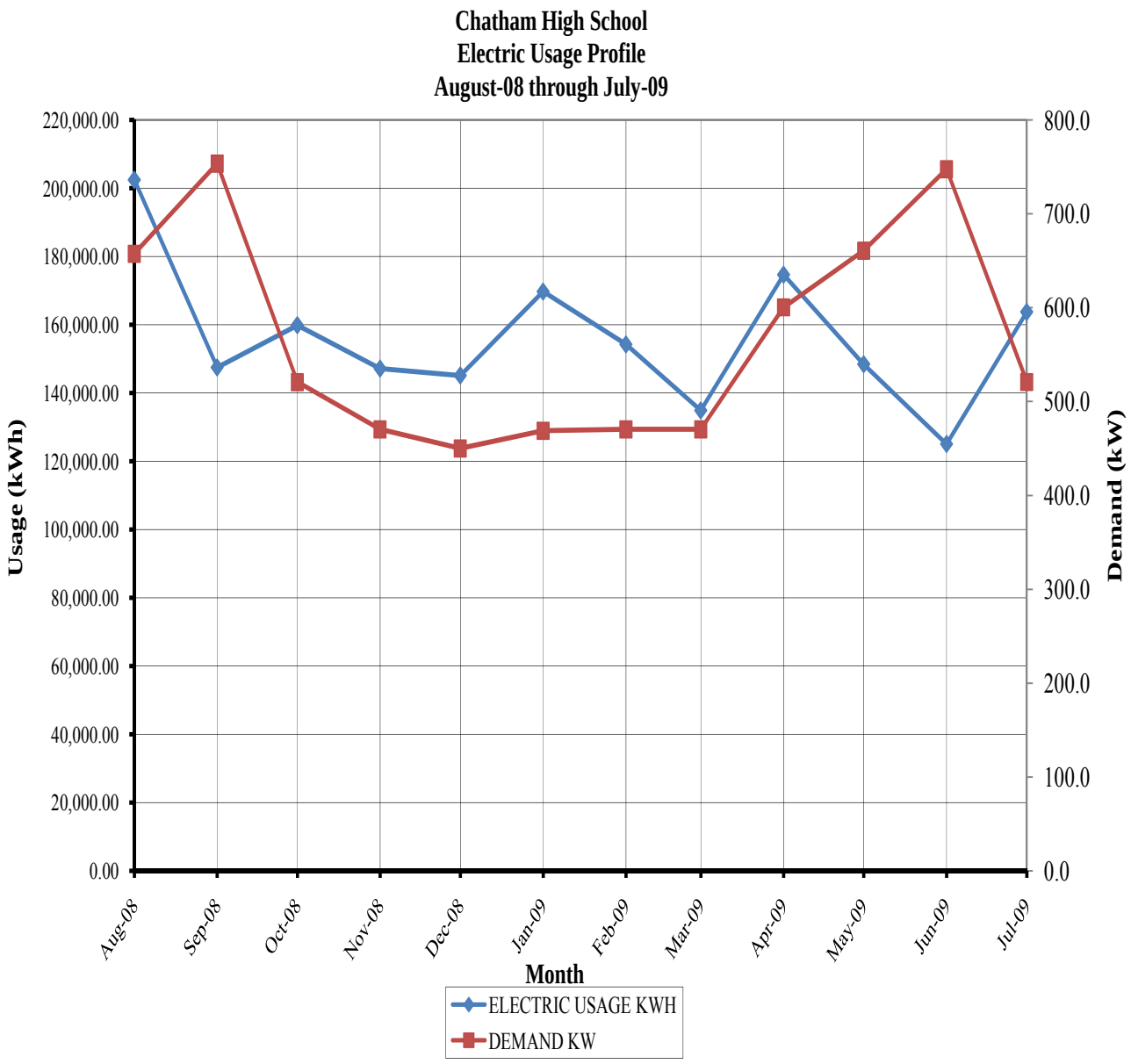
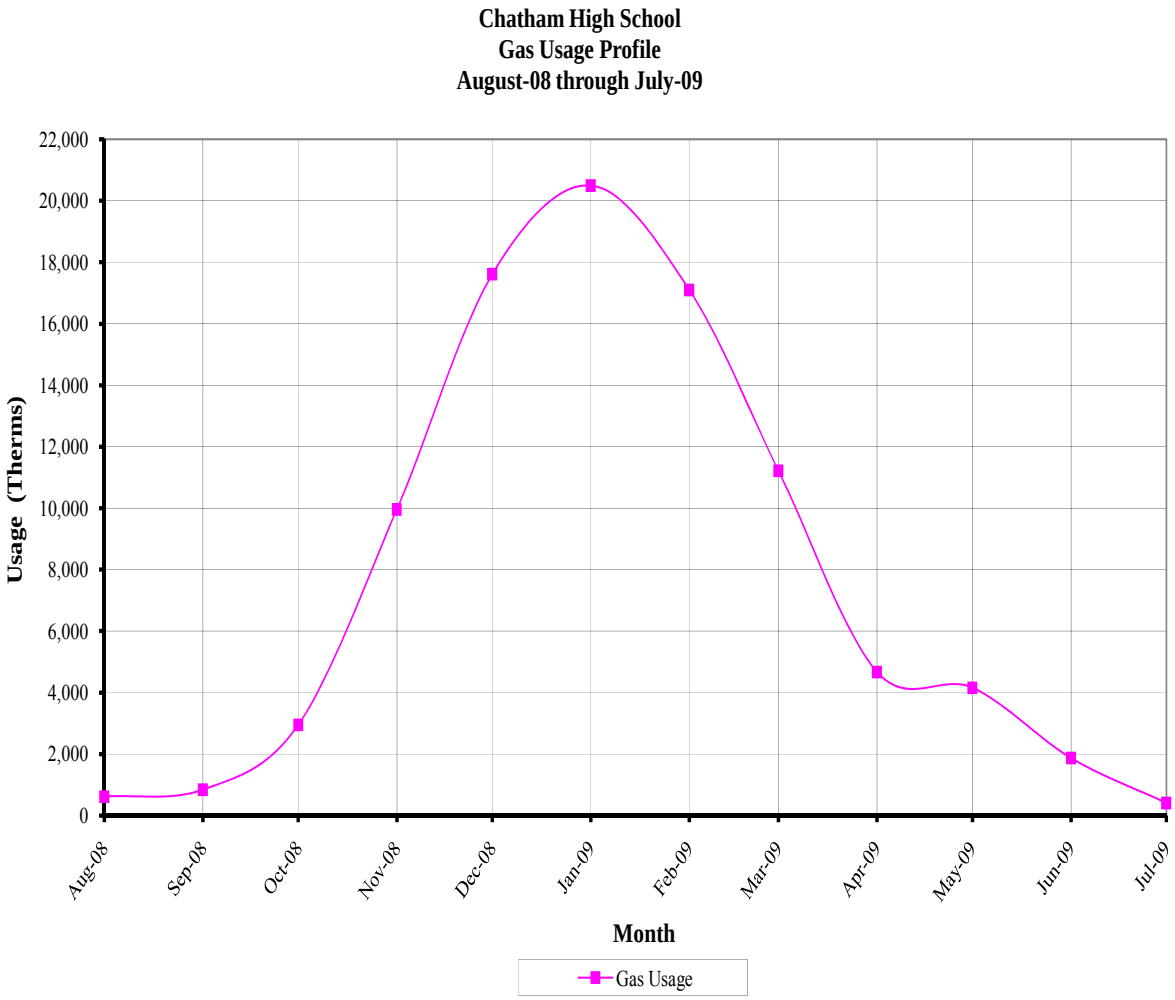


Table 4
Natural Gas Billing Data

Natural Gas Usage Summary		
Utility Provider: PSE&G Rate LVG Meter: 2917466		Combined (2209062, 2352818)
PoD ID: PG000008242842604649		PG000008242839204541
Third Party Utility Provider: HESS		
HESS Meters: 394872/404581, 394872/394901, 394872/446430		
MONTH OF USE	**CONSUMPTION (THERMS)**	**TOTAL BILL**
Aug-08	613.14	$1,031.81
Sep-08	841.01	$1,307.65
Oct-08	2,949.30	$4,966.25
Nov-08	9,963.09	$14,871.76
Dec-08	17,618.38	$26,657.66
Jan-09	20,502.47	$30,929.74
Feb-09	17,100.95	$26,244.94
Mar-09	11,221.82	$14,714.38
Apr-09	4,667.44	$6,256.02
May-09	4,157.48	$5,586.79
Jun-09	1,868.46	$391.06
Jul-09	406.69	$235.96
TOTALS	**91,910.22**	**$133,194.02**
AVERAGE RATE:	**$1.449**	**$/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. (See Table 5 for details):

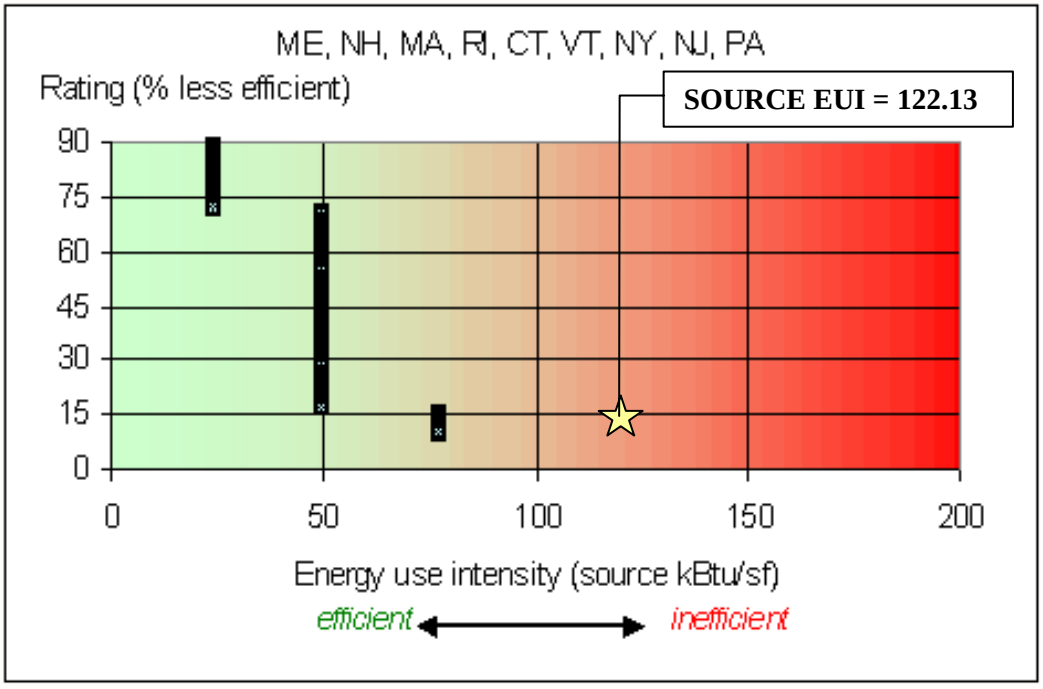
$$Building\ \ Site\ EUI = \frac{(Electric\ Usage\ in\ kBtu + Gas\ Usage\ in\ kBtu)}{Building\ \ Square\ \ Footage}$$

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

Table 5
Chatham High School EUI Calculations

ENERGY USE INTENSITY CALCULATION						
ENERGY TYPE	BUILDING USE			SITE ENERGY	SITE-SOURCE RATIO	SOURCE ENERGY
	kWh	Therms	Gallons	kBtu		kBtu
ELECTRIC	1,872,880.0			6,394,012	3.340	21,356,001
NATURAL GAS		91,910.2		9,191,022	1.047	9,623,000
FUEL OIL			0.0	0	1.010	0
PROPANE			0.0	0	1.010	0
TOTAL				15,585,035		30,979,001
*Site - Source Ratio data is provided by the Energy Star Performance Rating Methodology for Incorporating Source Energy Use document issued Dec 2007.						
BUILDING AREA		253,663	SQUARE FEET			
BUILDING SITE EUI		*61.44*	kBtu/SF/YR			
BUILDING SOURCE EUI		*122.13*	kBtu/SF/YR			

Figure 3
Source Energy Use Intensity Distributions: High Schools



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 following is the user name and password for this account:

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

[redacted]

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

Table 6
ENERGY STAR Performance Rating

FACILITY DESCRIPTION	ENERGY PERFORMANCE RATING	NATIONAL AVERAGE
Chatham High School	62	50

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

V. FACILITY DESCRIPTION

The Chatham High School is a two-story, block with brick faced building. The first floor of the facility houses the boiler rooms, kitchen, cafeteria, offices, classrooms, gymnasium, locker rooms, restrooms, library, auto shop, auditorium, band and choral rooms. The second floor areas consist of class rooms and the upper areas of the auditorium. The original building was approximately 120,440 square feet and was built in 1962. There were additions in 1973 that added approximately 60,081 square feet and an addition in 2001 added approximately 73,142 square feet bringing the building total to 253,663 square feet. The building operates for 40 hours during a typical week. There are different roof types in the building. There is cement fiber roof deck on steel joist, concrete plank with rigid insulation on steel joist, concrete on metal deck on steel joist as depicted in the 1973 addition architectural drawings. The 2001 additions have rigid insulation on steel deck on steel beams. There was a roofing project in progress during our survey. The windows in the additions are double pane with aluminum frame. The windows in the original 1962 building are single pane acrylic with aluminum frame and insulated opaque panels.

Heating System

Heat for this facility is provided by two (2) boiler plants and thirty (30) gas fired roof top air handling units. The boiler plant in the original building consists of two (2) Cleaver Brooks model CB801-150, 6280 MBH Natural Gas input each, dual fuel burner (natural gas / oil) water boilers, are 82% efficient and were manufactured in July-1961 and are in poor condition. These boilers provide heating hot water to unit heaters, unit ventilators, fin tube radiation, heat & ventilation units and AC units 2 through 6. There are two (2) 20 hp system pumps piped in parallel located in the original boiler room and operating in a lead/lag configuration. The pumps are eight years old and in good condition. AC unit 1 has been replaced by several packaged roof top units with natural gas furnaces. The packaged roof top units with natural gas heat have inputs ranging from 40,000 BTUH up to 469,000 BTUH. The packaged roof top units range from good to poor condition.

The 2001 addition added a boiler plant that serves the 2001 addition. The boiler is a Buderus model G615/13 cast iron boiler, 3753 maximum MBH natural gas input and is 82.9% efficient and is in good to fair condition. There are two (2) 5 hp in-line system pumps piped in parallel and operating in a lead/lag configuration. The pumps are eight (8) years old and are in fair condition.

Domestic Hot Water

A Lochinvar model CWN500PM, natural gas, domestic water boiler provides hot water for the facility. This unit has an input of 500,000 Btu/h and a recovery rate of 498 gallons per hour. The boiler is 5 years old and is in good condition.

Cooling System

The facility is cooled via twenty-six (26) split system air conditioning systems, eight (8) ductless split system air conditioning systems, fifteen (15) window air conditioners and thirty (30) roof top units. All cooling units are air cooled, direct expansion cooling. These units vary in sizes ranging from 0.75 nominal tons to 60 nominal tons and range from good to poor condition.

Controls System

There are Johnson Controls pneumatic controls serving the original boiler room and original school building. A 2 year old Quincy air compressor with (2) 3hp motors provides air to the controls system. There are five control zones. Zone 1 is the cafeteria, zone 2 is Gym A and Gym B, zone 3 is rooms 55-79, 136, 137 and 138, zone 4 is room 82-135, 139 and zone 5 is rooms 140-159. The system operates on a hot water reset schedule as follows: 0°F Outside air temperature (OA): 200°F Leaving Water Temperature (LWT), 15°F Outside air temperature (OA): 175°F Leaving Water Temperature (LWT), 30°F Outside air temperature (OA): 150°F Leaving Water Temperature (LWT), 45°F Outside air temperature (OA): 125°F Leaving Water Temperature (LWT), 60°F Outside air temperature (OA): 100°F Leaving Water Temperature (LWT). The system appears to be operational but is antiquated.

Exhaust System

There are many roof top centrifugal fans exhausting the bathroom, kitchen, gym and locker room areas. They are fractional horse power fan motors and range from good to poor condition. The two (2) largest exhaust fans noted are Penn Ventilator Fumex upblast centrifugal fans with 1 horsepower motors. These fans are exhausting air via the kitchen hood.

Lighting

The building is lit by varying types and sizes of light bulb types. The types used include the use of T-12 fluorescent, T-8 fluorescent, incandescent, mercury start and compact fluorescent. Most of the wattages for the fluorescent light fixtures are 32 Watts and wattage for the incandescent lamps range from 60 watts to 200 watts. There are two types of exit signs. The older units have (2) 15 watt incandescent lamps whereas the newer units use LED technology. Approximately 1/3 of the exit signs are the newer LED type.

VI. MAJOR EQUIPMENT LIST

The equipment list is considered major energy consuming equipment and through 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 - General

Description: General

The lighting in the High School is primarily made up of fluorescent fixtures with T-12 lamps and magnetic ballasts, T-8 lamps with electronic ballasts. There are a few storage rooms, original boiler room and closets with incandescent lighting and compact fluorescent fixtures.

This ECM includes replacement of the existing fixtures containing T12 lamps and magnetic ballasts with fixtures containing T8 lamps and electronic ballasts. The new energy efficient, T8 fixtures will provide adequate lighting and will save the owner on electrical costs due to the better performance of the lamp and ballasts. This ECM will also provide maintenance savings through the reduced number of lamps replaced per year. The expected lamp life of a T8 lamp is approximately 30,000 burn-hours, in comparison to the existing T12 lamps which is approximately 20,000 burn-hours. The facility will need 33% less lamps replaced per year.

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

Energy Savings Calculations:

The **Investment Grade Lighting Audit Appendix – ECM#1** outlines the proposed retrofits, costs, savings, and payback periods.

NJ Smart Start® Program Incentives are calculated as follows:

From the **Smart Start Incentive Appendix**, the replacement of a T-12 fixture to a T-5 or T-8 fixture warrants the following incentive: T-5 or T-8 (1-2 lamp) = $25 per fixture; T-5 or T-8 (3-4 lamp) = $30 per fixture.

$$\text{Smart Start®}\ \textit{Incentive} = (\#\ of\ 1-2\ lamp\ \ fixtures \times\ \$\ 25) + (\#\ of\ 3-4\ lamp\ \ fixtures \times\ \$\ 30)$$
$$\text{Smart Start®}\ \textit{Incentive} = (7 \times\ \$\ 25) = \underline{\$}175$$

Replacement and Maintenance Savings are calculated as follows:

$$Savings = (reduction\ in\ lamps\ replaced\ \ per\ \ year) \times (repacment\ \$\ per\ lamp + Labor\ \$\ per\ lamp)$$
$$Savings = (13\ lamps\ \ per\ \ year) \times (\$2.00 + \$5.00) = \$91$$

From the Smart Start Incentive appendix, there is no incentive for replacing incandescent lamps with compact fluorescent lamps. The incentive is only available if the entire light fixture is replaced. In most cases, the existing fixtures can be re-lamped by the facility's staff to obtain the energy savings without the expense of a new fixture and the involvement of an electrician to install a new fixture.

Energy Savings Summary:

ECM #1 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$6,887
NJ Smart Start Equipment Incentive ($):	$175
Net Installation Cost ($):	$6,712
Maintenance Savings ($/Yr):	$91
Energy Savings ($/Yr):	$10,407
Total Yearly Savings ($/Yr):	$10,498
Estimated ECM Lifetime (Yr):	25
Simple Payback	0.6
Simple Lifetime ROI	3810.2%
Simple Lifetime Maintenance Savings	$2,275
Simple Lifetime Savings	$262,450
Internal Rate of Return (IRR)	156%
Net Present Value (NPV)	$176,091.22

* ECM#1 Calculations DO NOT include lighting control changes implemented in ECM#2. If ECM#1 and #2 are implemented together the savings will be relatively lower than shown above.

ECM #2: Install Lighting Controls

Description:

In some areas the lighting is left on unnecessarily. There has been a belief that it is better to keep the lights on rather than to continuously switch them on and off. This on/off dilemma was studied, and it was determined that the best option is to turn the lights off whenever possible. Although this practice reduces the lamp life, the energy savings far outweigh the lamp replacement costs.

Lighting controls are available in many forms. Lighting controls can be as simplistic as an additional switch. Timeclocks are often used which allow the user to set an on/off schedule. Timeclocks range from a dial clock with on/off indicators to a small box the size of a thermostat with user programs for on/off schedule in digital format. Occupancy sensors detect motion and will switch the lights on when the room is occupied. They can either be mounted in place of the current wall switch, or they can be mounted on the ceiling to cover large areas. Lastly, photocells are a lighting control that sense light levels and will turn the lights off when there is adequate daylight. These are mostly used outside, but they are becoming much more popular in energy-efficient office designs as well.

To determine an estimated savings for lighting controls, we used ASHRAE 90.1-2004 (NJ Energy Code). Appendix G states that occupancy sensors have a 10% power adjustment factor for daytime occupancies for buildings over 5,000 SF. CEG recommends the installation of dual technology occupancy sensors in all private offices, conference rooms, restrooms, lunch rooms, storage rooms, lounges, file rooms, etc.

Energy Savings Calculations:

From **Investment Grade Lighting Audit Appendix – ECM#2** of this report, we calculated the lighting power density (Watts/ft^2) of the existing High School to be 220,840 Watts / 253,663 SF = 0.87 Watts/SF. The hallways of the building is a 24/7 facility while the majority of the building is only occupied 40 hours a week and other areas are only a few hours a day. Ten percent of this value is the resultant energy savings due to installation of occupancy sensors:

High School:

10% x 0.87 Watts/SF x 156,426 SF x 2,080 hrs/yr. x 1kW/1000W = 28,307 kWh

Savings = 28,307 kWh x $0.166Wh = $4,699 / yr

Installation cost per dual-technology sensor (Basis: Sensorswitch or equivalent) is $160/unit including material and labor. The SmartStart Buildings® incentive is $20 per control which equates to an installed cost of $140/unit. Total number of rooms to be retrofitted is 158. Total cost to install sensors is $140/ceiling unit x 158 units = $22,120.

Energy Savings Summary:

ECM #2 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$25,280
NJ Smart Start Equipment Incentive ($):	$3,160
Net Installation Cost ($):	$22,120
Maintenance Savings ($/Yr):	$0
Energy Savings ($/Yr):	$4,699
Total Yearly Savings ($/Yr):	$4,699
Estimated ECM Lifetime (Yr):	15
Simple Payback	4.7
Simple Lifetime ROI	218.6%
Simple Lifetime Maintenance Savings	$0
Simple Lifetime Savings	$70,485
Internal Rate of Return (IRR)	20%
Net Present Value (NPV)	$33,976.36

ECM #3: Install LED Exit Signs

Description:

LED is an acronym for light-emitting-diode. LED's are small light sources that are readily associated with electronic equipment. LED exit signs have been manufactured in a variety of shapes and sizes. There are also retrofit kits that allow for simply modification of existing exit signs to accommodate LED technology. The benefits of LED technology are substantial. LED exit signs will last for 20-30 years without maintenance. This results in tremendous maintenance savings considering that incandescent or fluorescent lamps need to be replaced at a rate of 1-5 times per year. Lamp costs ($2-$7 each) and labor costs ($4-$10 per lamp) add up rapidly. Additionally, LED exit lights only uses 4 Watts. In comparison, conventional exit signs use 10-40 Watts. It is recommended that samples of the products be installed to confirm that they are compatible with the existing electrical system.

This EM replaces all exit signs with incandescent lamps with new exit signs containing LED technology.

Energy Savings Calculations:

A detailed Investment Grade Lighting Audit can be found in **Investment Grade Lighting Audit Appendix – ECM#3** that outlines the proposed retrofits, costs, savings, and payback periods.

(30 watts-4 watts) x 1 kW/1000 watts x 8760 hrs/yr x 67 fixtures = 15,259.92 kWh/yr. saved

15,259.92 kWh/yr x $0.166/kWh = $2,533 / yr. saved

Maintenance savings = 67 fixtures x 2 bulbs/fixture x ($3/bulb + $4/bulb installation) = $938/yr

NJ Smart Start® Program Incentives are calculated as follows:

From the **Smart Start Incentive Appendix**, $20/LED Exit sign (≤75kW facility connected load) and $10/LED Exit sign (≥75kW facility connected load).

67 LED Exit signs x $10/ LED Exit sign = $670

Energy Savings Summary:

ECM #3 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$3,752
NJ Smart Start Equipment Incentive ($):	$670
Net Installation Cost ($):	$3,082
Maintenance Savings ($/Yr):	$938
Energy Savings ($/Yr):	$2,533
Total Yearly Savings ($/Yr):	$3,471
Estimated ECM Lifetime (Yr):	25
Simple Payback	0.9
Simple Lifetime ROI	2715.5%
Simple Lifetime Maintenance Savings	$23,450
Simple Lifetime Savings	$86,775
Internal Rate of Return (IRR)	113%
Net Present Value (NPV)	$57,359.04

ECM #4: Install T-5 Lighting System in Gym

Description:

The Gym is currently lit via twenty (24) HID, 250 W Metal Halide fixtures that are mounted approximately 20'-0" above the finished floor. The lighting system is antiquated and the space would be better served with a more efficient, fluorescent lighting system. Studies have shown that metal halide lighting systems have a steep lumen depreciation rate (rate at which light is produced from fixture) which equates to approximately a 26% to 35% reduction in lighting output at 40% of the rated lamp life. In addition, the new fluorescent system will provide a better quality of light and save the Owner many dollars on replacement of the highly expensive metal halide lamps.

CEG recommends upgrading the lighting within the Gym to an energy-efficient T-5 lighting system that includes new lighting fixtures with high efficiency, electronic ballasts and T-5 high output (HO) lamps. The T-5 HO lamps are rated for 20,000 hours versus the 10,000 hours for the 250W Metal Halide lamps so there would be a savings in replacement cost and labor. In addition to the standard lighting features of the T-5 fixtures; a day-lighting option could be selected for the outside rows of light to take advantage of the natural daylight that provides light to the room during the day via the clerestory.

This measure replaces all the HID, 250 W Metal Halide fixtures in the Gym with a well-designed T-5 lighting system. Approximately twenty (24), 3-lamp T5HO high bay fixtures with reflectors and high-efficiency, electronic ballasts will be required in order to meet the mandated 50 foot-candle average within the Gym.

Energy Savings Calculations:

A detailed Investment Grade Lighting Audit can be found in **Investment Grade Lighting Audit Appendix – ECM#4** that outlines the proposed retrofits, costs, savings, and payback periods.

NJ Smart Start® Program Incentives are calculated as follows:

From the **Smart Start Incentive Appendix**, the replacement of a 250 W HID fixture to a T-5 or T-8 fixture warrants the following incentive: \$50 per fixture.

$$\text{Smart Start®}\ Incentive = (\#\ of\ \ fixtures \times\ \$50) = (24 \times \$50) = \underline{\$1{,}200}$$

Maintenance savings are calculated based on the facility operational hours as indicated by the Owner. For the Gym, the estimated operational hours are 2,080 hours per year. Based on the lamp life comparison, there will be two (5) complete lamp replacements required for the metal halide system at the time when one (2) complete lamp replacement would be required for the fluorescent lighting system. Based on industry pricing, the lamp cost for a 250W metal halide lamp is approximately ±\$25 per lamp and a T-5 54HO fluorescent lamp is approximately ±\$5 per lamp. Therefore, the maintenance savings are calculated as follows:

$$Maintenance\ Savings = (\#\ of\ \ MH\ \ lamps \times\ \$25\ \ per\ lamp) - (\#\ of\ \ T5HO\ lamps \times \$5\ \ per\ lamp)$$

$$Maintenance\ Savings = (120\ lamps \times \$25\ per\ lamp) - (48\ lamps \times \$5\ per\ lamp) = \underline{\$2{,}760}$$
$$= \$2{,}760 / 25 \text{ years} = \$110/\text{year average maintenance savings}$$

It is pertinent to note, that installation labor was not included in the maintenance savings.

Energy Savings Summary:

ECM #4 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$7,200
NJ Smart Start Equipment Incentive ($):	$1,000
Net Installation Cost ($):	$6,200
Maintenance Savings ($/Yr):	$110
Energy Savings ($/Yr):	$912
Total Yearly Savings ($/Yr):	$1,022
Estimated ECM Lifetime (Yr):	25
Simple Payback	6.1
Simple Lifetime ROI	312.1%
Simple Lifetime Maintenance Savings	$2,750
Simple Lifetime Savings	$25,550
Internal Rate of Return (IRR)	16%
Net Present Value (NPV)	$11,596.24

ECM #5: Boiler Replacement – High Efficiency Upgrade

Description:

Heating is provided to the facility by two heating plants. The original heating plant, built in 1962 is outdated and can be more efficient. The newer heating plant, built in 2001 is adequately efficient and should remain in service.

In regards to the original plant, there are two (2) Clever Brooks model CB801-150, 6280 MBH Natural Gas input each, dual fuel burner (natural gas / oil) water boilers, which have a combustion efficiency of 82% when new. These boilers are 24 years past its ASHRAE useful service life.

This energy conservation measure will replace the gas fired boilers serving the original facility. Calculation is based on the following equipment: Aerco, Benchmark BMK-3.0LN-4 condensing boiler or equivalent. The existing units will be replaced with high energy efficient units with capacities typical of the existing units.

Energy Savings Calculations:

Existing 6280 MBh Gas Fired Boiler:

Rated Capacity = 12,560 MBh Input, 10,042 MBh Output (Natural Gas)

Combustion Efficiency = 82%
Age & Radiation Losses = 5%
Thermal Efficiency = 78%

Replacement Gas Fired Boiler:

High-Efficiency Gas Fired Boiler

Rated Capacity = 12,000 MBh Input, 11,124 MBh Output (Natural Gas)

Combustion Efficiency = 87.5%
Radiation Losses = 0.5%
Thermal Efficiency = 87%

Natural Gas Equipment List - Estimated Annual Usage per unit

Concord Engineering Group

Chatham High School

Manufacturer	Qty.	Model #	Serial #	Input (MBh)	% of Total Input	Estimated Annual Therms
Cleaver Brooks	**1**	**CB801-150**	**L-25716**	**6280**	**31.81%**	**20,617.62**
Cleaver Brooks	**1**	**CB801-150**	**L-25715**	**6280**	**31.81%**	**20,617.62**
Buderus	1	G615-13	1529.9C	3753	19.01%	12,321.32
Carrier Weathermaster	1	48HJE004-M-641HE	4201G23115	72	0.36%	236.38
Carrier Weathermaster	1	48HJD005---641HE	4001G23503	72	0.36%	236.38
Nesbitt	1	RSA35053N05CLM0BDG00DD1201	N0202008	469	2.38%	1,539.76
Carrier	7	48GX-024040301	4201G11258	40	0.20%	131.32
York - LUX Air	1	DB HB-T072AA	NCHM043966	72	0.36%	236.38
York - LUX Air	1	DD HB - T090AA	(S)NDHM055881	90	0.46%	295.48
Carrier Weathermaster Series	1	48HJD007---641HE	4001G23508	72	0.36%	236.38
Nesbitt	1	RSA25053N05GMM08DG00DD1201	N0202007	469	2.38%	1,539.76
Carrier Weathermaster Series	1	48HJF007---641HE	4001G23512	150	0.76%	492.46
Carrier	1	48HJF007---641HE	4001G23513	150	0.76%	492.46
Carrier Weathermaster Series	1	48HJF007---641HE	4001G23511	150	0.76%	492.46
Carrier Weathermaster Series	1	48HJE004-M-541HE	4201G23106	72	0.36%	236.38
Carrier	1	48HJD005-M-541HE	4201G23089	72	0.36%	236.38
Carrier	1	48HJD006---541HE	4301G22096	72	0.36%	236.38
Carrier	1	48HJE004---641HE	4001G23480	72	0.36%	236.38
Carrier	1	48GX-024040301--	4201611256	40	0.20%	131.32
Carrier	1	48HJF007---641HE	4001G23516	150	0.76%	492.46
Carrier	1	48HJF007---641HE	4001G23514	150	0.76%	492.46
Carrier	1	48HJF007---641HE	4001G23515	150	0.76%	492.46
Carrier	1	48HJD006---541HE	4301G22097	72	0.36%	236.38
Carrier	1	48HJD006---541HE	4001G23543	72	0.36%	236.38
Lochanvar	1	CWN500PM	L04H00171813	500	2.53%	1,641.53
State	1	Sandblaster SBF100199NET	G02415536	199.99	1.01%	656.58
			Total Input MBH	**19,741**	**1.00**	**64,810.85**
			Total Input Therms	197.4		
			Total Gas Consumption Therms / yr.	64810.85		

Operating Data:

Heating Season Fuel Consumption = 2 x 20,617.62 = 41,235 Therms/yr

$$\textit{Heating Energy Savings} = \textit{Fuel Consumption} \times (\textit{New Boiler Efficiency} - \textit{Old Boiler Efficiency})$$

Heating Energy Savings = 41,235 Therms x ((87% - 78%) / (87%)) = 4,266 Therms

Total Heating Cost savings

Heating Energy Cost Savings = Annual Energy Savings x $/Therm

Heating Energy Cost Savings = (4,266 Therms) x $1.449/Therm = $6,181/ yr.

Installed cost of (4) four new BMK3.0 LN 460/4, IRI 3000MBH input gas fired boilers with one (1) BMS II sequencing panel, sensor kit and installation is $391,500.

Equipment Incentives:

Heating Smart Start Equipment Incentive = ($1.75/MBh) = (12,000 MBh) x $1.75 = $21,000

Energy Savings Summary:

ECM #5 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$391,500
NJ Smart Start Equipment Incentive ($):	$21,000
Net Installation Cost ($):	$370,500
Maintenance Savings ($/Yr):	$0
Energy Savings ($/Yr):	$6,181
Total Yearly Savings ($/Yr):	$6,181
Estimated ECM Lifetime (Yr):	35
Simple Payback	59.9
Simple Lifetime ROI	-41.6%
Simple Lifetime Maintenance Savings	$0
Simple Lifetime Savings	$216,335
Internal Rate of Return (IRR)	-3%
Net Present Value (NPV)	($237,687.49)

ECM #6: Install NEMA Premium Efficient Pump Motor

Description:

Replacing the old system booster pump motor with new efficient motor is a simple change that can provide substantial savings.

Existing electric motors equal to or greater than one horsepower ranged from 78 to 93% efficient. The improved efficiency of the NEMA premium efficient motors is primarily due to better designs with use of better materials to reduce losses. Surprisingly, the electricity used to power a motor represents 95 % of its total lifetime operating cost. Because many motors operate 40-80 hours per week, even small increases in efficiency can yield substantial energy and dollar savings.

This energy conservation measure would replace all motors equal to or greater than 1 HP with NEMA Premium® Efficient Motors. NEMA Premium® is the most efficient motor designation in the marketplace today. Using MotorMaster+, Version 4, the energy & cost savings were calculated for the fan/pump motors in this facility that are greater than or equal to 1 HP.

Energy Savings Calculations:

Existing: A 2 HP system circulation pump Motor with the following characteristics:
Existing Motor Efficiency = 78%
Annual Hours of Operations = 4500 (Average)
1 HP = 0.746 Watt
Load Factor = 75%
Cost of electricity = $0.166 / kWh

Existing 2HP Motor Operating Cost =
{0.746 Watt/HP x Motor HP x Load Factor x Hours of Operation x Cost of Electricity] ÷ Motor Efficiency
= [0.746 x 2 x 0.75 x 4,500 x 0.166] ÷ 0.78 = $1072 / Year

New NEMA Premium Motor Efficiency = 88%

New NEMA Premium Efficiency Motor Operating Cost =
{0.746 x 2 x 0.75 x 4,500 x 0.166} ÷ 0.88 = $949 / Year

Savings = $1072 - $949 = $123 / Year

Installed Cost of a 2 HP NEMA Premium® Efficiency Motor = $1,280 minus the SmartStart Building® incentive of 2hp x $60/hp is $1,160.

Simple Payback = $1,160 / $123 = 9.4 Years

kWh saved = $120 / $0.166/kWh = 722.9 kWh
kW saved = 722.9 kWh / 4,500 hrs./yr. =0.16 kW

The following table outlines the motor replacement plan for this facility:

MOTOR REPLACEMENT PLAN

MOTOR HP	QTY	ENCLOSURE TYPE	NUMBER OF POLES	INSTALLED COST **	TOTAL COST	TOTAL SAVINGS	SIMPLE PAYBACK	SIMPLE RETURN ON INVESTMENT
2	1	TEFC	4-Pole	$1,280	$1,160	$123	9.4	10.6 %
				Totals:	*$3,587*	*$617*	*5.81*	*17.2 %*

**** Net Cost after the SmartStart Buildings® incentive is applied.**

Energy Savings Summary:

ECM #6 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$1,280
NJ Smart Start Equipment Incentive ($):	$120
Net Installation Cost ($):	$1,160
Maintenance Savings ($/Yr):	$0
Energy Savings ($/Yr):	$123
Total Yearly Savings ($/Yr):	$123
Estimated ECM Lifetime (Yr):	20
Simple Payback	9.4
Simple Lifetime ROI	112.1%
Simple Lifetime Maintenance Savings	0
Simple Lifetime Savings	$2,460
Internal Rate of Return (IRR)	9%
Net Present Value (NPV)	$669.93

ECM #7: Indoor Air handling Unit Replacement

Description:

Three (3) indoor air handling units with hot water heating coils have surpassed there expected service life of fifteen (15) years as outlined in Chapter 36 of the 2007 ASHRAE Applications Handbook. These units appear to be 1975 vintage, and are excellent candidates for replacement. Due to escalating owning and maintenance costs, these units should be replaced. Each of these units contains a hot water heating section and savings can we yielded from year round operation. The units range from 2320 CFM (cubic feet per minute) to 13,000 cfm capacity.

This energy conservation measure would replace air handling units with fan motors equal to or greater than 1 HP with new air handling units having NEMA Premium® Efficient Motors. NEMA Premium® is the most efficient motor designation in the marketplace today. The Trane M-series or equivalents were utilized as a basis of design. Because many units operate 40-80 hours per week, even small increases in efficiency can yield substantial energy and dollar savings.

Energy Savings Calculations:

Existing: HV-5 serving the Gym locker rooms, has a fan motor with the following characteristics:
Existing Motor Efficiency = 78%
Existing motor HP = 2 HP
Annual Hours of Operations = 4500 (Average)
1 HP = 0.746 Watt
Load Factor = 75%
Cost of electricity = $0.166 / kWh

Existing AHU Motor Operating Cost =
{0.746 Watt/HP x Motor HP x Load Factor x Hours of Operation x Cost of Electricity] ÷ Motor Efficiency
= [0.746 x 2 x 0.75 x 4,500 x 0.166] ÷ 0.78 = $1,072 / Year

New AHU with NEMA Premium Motor Efficiency = 86.5%

New AHU with NEMA Premium Efficiency Motor Operating Cost =
{0.746 x 2 x 0.75 x 4,500 x 0.166} ÷ 0.865 = $966 / Year

Savings = $1,072 - $966 = $106 / Year

Installed Cost of a 2320 CFM AHU with a 2 HP NEMA Premium® Efficiency Motor = $9,300
The SmartStart Building® incentive of 2hp x $60/hp is $120
Net installed Cost = $9,300 - $120 = $9,180.

Simple Payback = $9,180 / $106 = 87 Years

kWh saved = $106 / $0.166/kWh = 639 kWh
kW saved = 639 kWh / 4,500 hrs./yr. =0.14 kW

Existing: HV-6 serving the Gym, has a fan motor with the following characteristics:
Existing Motor Efficiency = 78%
Existing motor HP = 15 HP
Annual Hours of Operations = 4,500 (Average)
1 HP = 0.746 Watt
Load Factor = 75%
Cost of electricity = $0.166 / kWh

Existing AHU Motor Operating Cost =
{0.746 Watt/HP x Motor HP x Load Factor x Hours of Operation x Cost of Electricity] ÷ Motor Efficiency
= [0.746 x 15 x 0.75 x 4,500 x 0.166] ÷ 0.78 = $8,037 / Year

New AHU with NEMA Premium Motor Efficiency = 92.4%

New AHU with NEMA Premium Efficiency Motor Operating Cost =
{0.746 x 15 x 0.75 x 4,500 x 0.166} ÷ 0.924 = $6,785 / Year

Savings = $8,037 - $6,785 = $1,252 / Year

Installed Cost of a 13,000 CFM AHU with a 15 HP NEMA Premium® Efficiency Motor = $52,000
The SmartStart Building® incentive of 2hp x $60/hp is $900
Net installed Cost = $52,000 - $900 = $51,100.

Simple Payback = $51,100 / $1,252 = 40 Years

kWh saved = $1,252 / $0.166/kWh = 7,542 kWh
kW saved = 7,542 kWh / 4,500 hrs./yr. =1.68 kW

Existing: HV-7 serving the Auto Shop, has a fan motor with the following characteristics:
Existing Motor Efficiency = 78%
Existing motor HP = 3 HP
Annual Hours of Operations = 4500 (Average)
1 HP = 0.746 Watt
Load Factor = 75%
Cost of electricity = $0.166 / kWh

Existing AHU Motor Operating Cost =
{0.746 Watt/HP x Motor HP x Load Factor x Hours of Operation x Cost of Electricity] ÷ Motor Efficiency
= [0.746 x 3 x 0.75 x 4,500 x 0.166] ÷ 0.78 = $1,607 / Year

New AHU with NEMA Premium Motor Efficiency = 89.5%

New AHU with NEMA Premium Efficiency Motor Operating Cost =
{0.746 x 3 x 0.75 x 4,500 x 0.166} ÷ 0.895 = $1,401 / Year

Savings = $1,607 - $1,401 = $206 / Year

Installed Cost of a 3000 CFM AHU with a 3 HP NEMA Premium® Efficiency Motor = $12,000
The SmartStart Building® incentive of 3hp x $60/hp is $180
Net installed Cost = $12,000 - $180 = $11,820.

Simple Payback = $11,820 / $206 = 57 Years

kWh saved = $206 / $0.166/kWh = 1,241 kWh
kW saved = 1,241 kWh / 4,500 hrs./yr. =0.28 kW

Unit	CFM	Energy Savings	Energy Saved	Energy Demand Saved
HV-5	2,320	$106	639 kWh	0.14 kW
HV-6	13,000	$1,252	7,542 kWh	1.68 kW
HV-7	3,000	$206	1,241 kWh	0.28 kW
ECM TOTAL		$1,358	8,181 kWh	2.10 kW

Energy Savings Summary:

ECM #7 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$73,300
NJ Smart Start Equipment Incentive ($):	$1,200
Net Installation Cost ($):	$72,100
Maintenance Savings ($/Yr):	$0
Energy Savings ($/Yr):	$1,358
Total Yearly Savings ($/Yr):	$1,358
Estimated ECM Lifetime (Yr):	20
Simple Payback	53.1
Simple Lifetime ROI	-62.3%
Simple Lifetime Maintenance Savings	$0
Simple Lifetime Savings	$27,160
Internal Rate of Return (IRR)	-8%
Net Present Value (NPV)	($51,896.39)

ECM #8: DDC System – High School

Description:

The current HVAC systems within the High School are controlled via pneumatic thermostats in the original building and the 1975 addition. There is a Siemens Direct Digital Control (DDC) system serving the 2001 addition and is not a web based system. Thermostats are 2-stage for a day/night (occupied/unoccupied) function by means if a mechanical time clock. The roof top units in the 1975 addition can be monitored by a computer workstation using a Honeywell system. During initial discussions with the Owner it was noted that the hours of operation of the facility are generally 40 hours per week. Occasionally, there are additional after-hours usage during weeknights and weekends and thermostat adjustments are made by the person currently occupying the space instead on one general setpoint. This is a means for a cycling amongst different HVAC systems attempting to meet various setpoints throughout the year, independent of heating or cooling season. Therefore, a DDC system providing the Owner with full control over the HVAC equipment within the building appears to be an energy saving opportunity.

This ECM includes installing a Building Automation system with Direct Digital Controls (DDC) wired through an Ethernet backbone and front end controller within the High School only. The system will include new thermostat controllers for all indoor air-handling systems and the rooftop units, in addition to each piece of equipment being wired back to a front end controller and computer interface. With the communication between the devices and the front end computer interface, the Owner will be able to take advantage of equipment scheduling for occupied and unoccupied periods based on the actual occupancy of the facility. Due to the fact that the High School has diverse hours of occupancy, including evening and weekend hours, having supervisory control over all of the equipment makes sense. The DDC system will also aid in the response time to service / maintenance issues when the facility is not under normal maintenance supervision, i.e. after-hours.

The new DDC system has the potential to provide substantial savings by controlling the HVAC systems as a whole and provide operating schedules and features such as space averaging, night set-back, temperature override control, etc. The U.S. Department of Energy sponsored a study to analyze energy savings achieved through various types of building system controls. The referenced savings is based on the "Advanced Sensors and Controls for Building Applications: Market Assessment and Potential R&D Pathways," document posted for public use April 2005. The study has found that commercial buildings have the potential to achieve significant energy savings through the use of building controls. The average energy savings are as follows based on the referenced report:

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

Savings resulting from the implementation of this ECM for energy management controls are estimated to be 10% of the total energy cost for the facility.

The cost of a full DDC system with new field devices, controllers, computer, software, programming, etc. is approximately $4.00 per SF in accordance with recent Contractor pricing for systems of this magnitude. Savings from the implementation of this ECM will be from the reduced

energy consumption currently used by the HVAC system by proper control of schedule and temperatures via the DDC system.

Cost of complete DDC System = ($4.00/SF x 253,663 SF) = $1,014,650

Heating Season Heating Degree Days = 4,996 HDD
Average Cost of Gas = $1.449 / Therm

Cooling Season Full Load Cooling Hrs. = 1,129 hrs / yr
Average Cost of Electricity = $0.166 / kWh

Note: Degree Days and Full Load Hours referenced from ASHRAE Weather Data for Newark, NJ.

Energy Savings Calculations:

10% Savings on Heating Calculations

$$Heat\ Load = \frac{Heat\ Loss\left(\frac{Btu}{Hr\ SF}\right) \times Area\ (SF)}{1000\left(\frac{Btu}{kBtu}\right)}$$

$$Heat\ Load = \frac{50\left(\frac{Btu}{Hr\ SF}\right) \times 253{,}663\ (SF)}{1000\left(\frac{Btu}{kBtu}\right)} = 12{,}683\left(\frac{kBtu}{Hr}\right)$$

$$Est\ Heat\ Cons. = \frac{Heat\ Load\left(\frac{kBtu}{Hr}\right) \times Heat\ Deg\ Days \times 24\ Hrs \times Correction\ Factor}{Design\ Temp\ Difference\,(^{\circ}F) \times Efficiency\,(\%) \times Fuel\ Heat\ Value\left(\frac{kBtu}{Therm}\right)}$$

$$Est\ Heat\ Cons. = \frac{12{,}683\left(\frac{kBtu}{Hr}\right) \times 4{,}996\ (HDD) \times 24\ Hrs \times 0.6}{65\ (^{\circ}F) \times 81\% \times 100\left(\frac{kBtu}{Therm}\right)} = 173{,}304(Therms)$$

$$Savings. = Heat\ Cons.(Therms) \times 10\%\ Savings \times Ave\ Gas\ Cost\left(\frac{\$}{Therm}\right)$$

$$Savings. = 173{,}304\ (Therms) \times 10\% \times 1.449\left(\frac{\$}{Therm}\right) = \$25{,}112$$

10% Savings on Cooling Calculations:

$$Est\ Cool\ Cons. = \frac{Cool\ Load\ (Tons) \times 12{,}000\left(\frac{Btu}{Ton\ Hr}\right) \times Full\ Load\ Cooling\ Hrs.}{Ave\ Energy\ Efficiency\ Ratio\left(\frac{Btu}{Wh}\right) \times 1000\left(\frac{Wh}{kWh}\right)}$$

$$Est\ Cool\ Cons. = \frac{520\ (Tons) \times 12{,}000\left(\frac{Btu}{Ton\ Hr}\right) \times 1{,}129\ Hrs.}{10.0\left(\frac{Btu}{Wh}\right) \times 1000\left(\frac{Wh}{kWh}\right)} = 704{,}496(kWh)$$

$$Savings. = Cool\ Cons.(kWh) \times 10\%\ Savings \times Ave\ Elec\ Cost\left(\frac{\$}{kWh}\right)$$

$$Savings. = 704{,}496\ (kWh) \times 10\% \times 0.166\left(\frac{\$}{kWh}\right) = \underline{\$11{,}695}$$

Total Annual Energy Savings = $25,112 + $11,695 = $36,807 per year

It is pertinent to note that electric demand savings were unable to be estimated. Also, incentives for the installation of the DDC system are not currently available and maintenance savings could not be adequately calculated because information was not available to baseline the savings.

Energy Savings Summary:

ECM #8 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$1,014,650
NJ Smart Start Equipment Incentive ($):	$0
Net Installation Cost ($):	$1,014,650
Maintenance Savings ($/Yr):	$0
Energy Savings ($/Yr):	$36,807
Total Yearly Savings ($/Yr):	$36,807
Estimated ECM Lifetime (Yr):	15
Simple Payback	27.6
Simple Lifetime ROI	-45.6%
Simple Lifetime Maintenance Savings	$0
Simple Lifetime Savings	$552,105
Internal Rate of Return (IRR)	-7%
Net Present Value (NPV)	($575,250.42)

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 technologies for Chatham High School, and concluded that there is potential for solar energy generation.

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

CEG has reviewed the existing roof area of the building being audited for the purposes of determining a potential for a roof mounted photovoltaic system. A roof area of 21,700 S.F. can be utilized for a PV system. A depiction of the area utilized is shown in Renewable / Distributed Energy Measures Calculation appendix. Using this square footage it was determined that a system size of 339.48 kilowatts could be installed. A system of this size has an estimated kilowatt hour production of 392,286 KWh annually, reducing the overall utility bill by approximately 20.9% percent. A detailed financial analysis can be found in the Renewable / Distributed Energy Measures Calculation appendix. This analysis illustrates the payback of the system over a 25 year period. The eventual degradation of the solar panels and the price of accumulated SREC's are factored into the payback.

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

The array system capacity was sized on available roof space on the existing facility. Estimated solar array generation was then calculated based on the National Renewable Energy Laboratory PVWatts Version 1.0 Calculator. In order to calculate the array generation an appropriate location with solar data on file must be selected. In addition the system DC rated kilowatt (kW) capacity must be inputted, a DC to AC de-rate factor, panel tilt angle, and array azimuth angle. The DC to AC de-rate factor is based on the panel nameplate DC rating, inverter and transformer efficiencies (95%),

mismatch factor (98%), diodes and connections (100%), dc and ac wiring(98%, 99%), soiling, (95%), system availability (95%), shading (if applicable), and age(new/100%). The overall DC to AC de-rate factor has been calculated at an overall rating of 81%. The PVWatts Calculator program then calculates estimated system generation based on average monthly solar irradiance and user provided inputs. The monthly energy generation and offset electric costs from the PVWatts calculator is shown in the **Renewable/Distributed Energy Measures Calculation Appendix**.

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

CEG has reviewed financing options for the owner. Two options were studied and they are as follows: Self-financed and direct purchase without finance. Self-finance was calculated with 95% of the total project cost financed at a 7% interest rate over 25 years. Direct purchase involves the local government paying for 100% of the total project cost upfront via one of the methods noted in the Installation Funding Options section below. Both of these calculations include a utility inflation rate as well as the degradation of the solar panels over time. Based on our calculations the following are the payback periods for the respective method of payment:

FINANCIAL SUMMARY - PHOTOVOLTAIC SYSTEM			
PAYMENT TYPE	**SIMPLE PAYBACK**	**SIMPLE ROI**	**INTERNAL RATE OF RETURN**
Self-Finance	15.1 Years	65.6%	0.3%
Direct Purchase	15.1 Years	65.6%	5.0%

*The solar energy measure is shown for reference in the executive summary REM table

The resultant Internal Rate of Return indicates that if the Owner was able to "Direct Purchase" the solar project, the project would be slightly more beneficial to the Owner.

In addition to the Solar Analysis, CEG also conducted a review of the applicability of wind energy for the facility. Wind energy production is another option available through the Renewable Energy Incentive Program. Wind turbines of various types can be utilized to produce clean energy on a per building basis. Cash incentives are available per kWh of electric usage. Based on CEG's review of the applicability of wind energy for the facility, it was determined that the average wind speed is not adequate for purchase of a commercial wind turbine. Therefore, wind energy is not a viable option to implement.

IX. ENERGY PURCHASING AND PROCUREMENT STRATEGY

Load Profile:

Load Profile analysis was performed to determine the seasonal energy usage of the facility. Irregularities in the load profile will indicate potential problems within the facility. Consequently based on the profile a recommendation will be made to remedy the irregularity in energy usage. For this report, the facility's energy consumption data was gathered in table format and plotted in graph form to create the load profile. Refer to the Electric and Natural Gas Usage Profiles included within this report to reference the respective electricity and natural gas usage load profiles.

Electricity:

The Electric Usage Profile demonstrates a very flat load shape throughout the year. This is a bit unusual for a school, because typically schools are closed in the summer. However the steady load profile (especially the summer) is supported by summer school, weekend activities, gymnasium, auditorium and some ongoing projects. The auditorium is in use throughout the year. There is an increase a slight peak in consumption in August as is typical with summer cooling (air conditioning) loads. The cooling in this facility is provided by (26) twenty six, split system air conditioning units, (8) eight, ductless split system air conditioning units, (15) window units and (30), thirty roof-top units. The units vary from .75 to 60 nominal ton capacity. A flatter load profile of this type, will allow for more competitive energy prices when shopping for alternative energy suppliers.

Natural Gas:

The Natural Gas Usage Profile demonstrates a very typical heating load profile. An increase in consumption is observed October through March during the standard heating season. Heating for this facility is supplied by (2) two, boiler plants and (30) thirty gas-fired roof-top air-handling units. The boilers provide hot-water throughout the facility and to AC units 2-6 (adding to the base-load load profile). The 2001 addition also added a boiler for the addition. Domestic hot-water is supplied by a natural gas fired hot water boiler. Natural gas delivery-service is provided by Public Service Electric and Gas Company (PSE&G) on an LVG rate schedule. Commodity service is supplied by the Hess Corporation, the Third Party Supplier. This consistent load profile is beneficial when looking at supply options with a Third Party Supplier.

Tariff:

Electricity:

This facility receives electrical service through Jersey Central Power & Light (JCP&L) on a GSS (General Service Secondary – 3 Phase) rate. Service classification GS is available for general service purposes on secondary voltages not included under Service Classifications RS, RT, RGT or GST. This facility's rate is a three phase service at secondary voltages. For electric supply (generation), the customer uses the service of a JCP&L. This facility uses the Delivery Service of the utility (JCP&L). The Delivery Service includes the following charges: Customer Charge,

Supplemental Customer Charge, Distribution Charge (kW Demand), kWh Charge, Non-utility Generation Charge, TEFA, SBC, SCC, Standby Fee and RGGI. The Generation Service is provided by JCP&L under BGS (Basic Generation Service). BGS Energy and Reconciliation Charges are provided in Rider BGS-FP (fixed pricing) or BGS-CIEP (Commercial Industrial Energy Pricing). BGS also has a Transmission component to its charge.

Natural Gas:

This facility receives utility service through Public Service Electric and Gas Company (PSE&G). This facility utilizes the Delivery Service from PSE&G while receiving Commodity service from a Third Party Supplier (TPS), Hess Corporation.

LVG Rate: This utility tariff is for "firm" delivery service for general purposes. This rate schedule has a Delivery Charge, Balancing Charge, Societal Benefits Charge, Realignment Adjustment Charge, Margin Adjustment Charge, RGGI Charge and Customer Account Service Charge. The customer can elect to have the Commodity Charge serviced through the utility or by a Third Party Supplier (TPS). Note: Should the TPS not deliver, the customer may receive service from PSE&G under Emergency Sales Service. Emergency Sales Service carries an extremely high penalty cost of service.

"Firm" delivery service defines the reliability of the transportation segment of the pricing. Much like the telecom industry, natural gas pipelines were un-bundled in the late 1990's and the space was divided up and marketed into reliability of service. Firm Service is said to be the most reliable and last in the pecking order for interruption. This service should not be interrupted.

Commodity Charges: Customer may choose to receive gas supply from either: A TPS or PSE&G through its Basic Gas Supply Service default service. PSE&G may also supply Emergency Sales Service in certain instances. This is at a much higher than normal rate. It should be perceived as a penalty.

This facility utilizes the services of a Third Party Supplier, The Hess Corporation. The contract is administered by The Alliance for Competitive Service (ACES). ACES is the energy aggregation program of the New Jersey School Boards Association of School Administrator's. The process was reviewed and approved by the New Jersey Department of Community Affairs.

Please see CEG recommendations below.

Recommendations:

CEG recommends a global approach that will be consistent with all facilities. Good potential savings can be seen equally in the electric costs and the natural gas costs. The average price per kWh (kilowatt hour) for the High School based on a historical 1-year weighted average fixed price from the utility JCP&L is $.1415 / kWh (this is the fixed "price to compare" when shopping for energy procurement alternatives). The fixed weighted average price per decatherm for natural gas service in the High School, provided by the Hess Corporation (TPS) is $ 12.08 / dth (dth, is the common unit of measure). The natural gas prices are also the "prices to compare".

The "price to compare" is the netted cost of the energy (including other costs), that the customer will use to compare to Third Party Supply sources when shopping for alternative suppliers. For electricity this cost would not include the utility transmission and distribution chargers. For natural gas the cost would not include the utility distribution charges and is said to be delivered to the utilities city-gate.

Energy commodities are among the most volatile of all commodities, however at this point and time, energy is extremely competitive. Chatham School District could see improvement in its energy costs if it were to take advantage of these current market prices quickly, before energy prices increase. Based on electric supply from JCP&L and utilizing the historical consumption data provided (August 2008 through July 2009) and current electric rates, the school(s) could see an improvement in its electric costs of up to 25 % annually. (Note: Savings were calculated using Average Annual Consumption and a variance to a Fixed Average One-Year commodity contract). CEG recommends aggregating the entire electric load to gain the most optimal energy costs. CEG recommends advisement for alternative sourcing and supply of energy on a "managed approach".

CEG's second recommendation coincides with the natural gas costs. Based on the current alternative market pricing supplied by the Hess Corporation (ACES Agreement), CEG feels that School District could see an improvement of up to 33 % in its natural gas costs. CEG has experience with the mechanism for schools to buy energy in New Jersey. It is through the ACES Agreement (The Alliance for Competitive Energy Services) which is an energy aggregation program. From our experience, the basis price is the reason that the overall average price per dekatherm is ($12.08/dth). Therefore the average pricing formula supplied by Hess is 25 % above today's competitive market pricing. CEG recommends the school receive further advisement on these prices through an energy advisor. They should also consider procuring energy (natural gas) through an alternative supply source.

CEG also recommends scheduling a meeting with the current utility providers to review their utility charges and current tariff structures for electricity and natural gas. This meeting would provide insight regarding alternative procurement options that are currently available. Through its meeting with the Local Distribution Company (LDC), the municipality can learn more about the competitive supply process. The county can acquire a list of approved Third Party Suppliers from the New Jersey Board of Public Utilities website at www.nj.gov/bpu. They should also consider using a billing-auditing service to further analyze the utility invoices, manage the data and use the information for ongoing demand-side management projects. Furthermore, special attention should be given to credit mechanisms, imbalances, balancing charges and commodity charges when meeting with the utility representative. The School District should ask the utility representative about alternative billing options, such as consolidated billing when utilizing the service of a Third Party Supplier. Finally, if the supplier for energy (natural gas) is changed, closely monitor balancing, particularly when the contract is close to termination. This could be performed with the aid of an "energy advisor".

X. INSTALLATION FUNDING OPTIONS

CEG has reviewed various funding options for the 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 with average demand loads above 200 KW. The facility's participation in the program is assisted by an approved program partner. An "Energy Reduction Plan" is created with the facility and approved partner to shown at least 15% reduction in the building's current energy use. Multiple energy conservation measures implemented together are applicable toward the total savings of at least 15%. No more than 50% of the total energy savings can result from lighting upgrades / changes.

Total incentive is capped at 50% of the project cost. The program savings is broken down into three benchmarks; Energy Reduction Plan, Project Implementation, and

Measurement and Verification. Each step provides additional incentives as the energy reduction project continues. The benchmark incentives are as follows:

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

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

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

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

XI. ADDITIONAL RECOMMENDATIONS

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

A. Chemically clean the condenser and evaporator coils in the window AC units periodically to optimize efficiency. Poorly maintained heat transfer surfaces can reduce efficiency 5-10%. The 3-step process includes cleaning of the coils, rinsing and a micro biocide treatment. Thoroughly cleaned coils are not as susceptible to re-fouling so they stay clean longer, reducing the cleaning cycle frequency

B. Maintain all weather stripping on windows and doors.

C. Repair/replace damaged or missing ductwork insulation in the ceiling spaces.

D. Provide more frequent air filter changes to decrease overall fan horsepower requirements and maintain better IAQ.

E. Recalibrate existing zone thermostats.

F. Clean all fixtures to maximize light output.

G. Feel for air drafts around electrical outlets. Inexpensive pads are available, as are plugs for unused sockets.

ECM COST & SAVINGS BREAKDOWN

CONCORD ENGINEERING GROUP

Chatham High School

ECM ENERGY AND FINANCIAL COSTS AND SAVINGS SUMMARY														
ECM NO.	DESCRIPTION	INSTALLATION COST				YEARLY SAVINGS			ECM LIFETIME	LIFETIME ENERGY SAVINGS	LIFETIME MAINTENANCE SAVINGS	LIFETIME ROI	SIMPLE PAYBACK	INTERNAL RATE OF RETURN (IRR)	NET PRESENT VALUE (NPV)
		MATERIAL	LABOR	REBATES, INCENTIVES	NET INSTALLATION COST	ENERGY	MAINT.	TOTAL		(Yearly Saving * ECM Lifetime)	(Yearly Maint Svaing * ECM Lifetime)	(Lifetime Savings - Net Cost) / (Net Cost)	(Net cost / Yearly Savings)	$\sum_{n=0}^{N} \frac{C_n}{(1+IRR)^n}$	$\sum_{n=0}^{N} \frac{C_n}{(1+DR)^n}$
		($)	($)	($)	($)	($/Yr)	($/Yr)	($/Yr)	(Yr)	($)	($)	(%)	(Yr)	($)	($)
ECM #1	Lighting Upgrade - General	$6,887	$0	$175	$6,712	$10,407	$91	$10,498	25	$262,450	$2,275	3810.2%	0.6	156.41%	$176,091.22
ECM #2	Install Lighting Controls	$25,280	$0	$3,160	$22,120	$4,699	$0	$4,699	15	$70,485	$0	218.6%	4.7	19.84%	$33,976.36
ECM #3	Install LED Exit Signs	$3,752	$0	$670	$3,082	$2,533	$938	$3,471	25	$86,775	$23,450	2715.5%	0.9	112.62%	$57,359.04
ECM #4	T-5 Lighting System in Gym	$7,200	$0	$1,000	$6,200	$912	$110	$1,022	25	$25,550	$2,750	312.1%	6.1	16.09%	$11,596.24
ECM #5	Boiler Replacement – High Efficiency Upgrade	$391,500	$0	$21,000	$370,500	$6,181	$0	$6,181	35	$216,335	$0	-41.6%	59.9	-2.73%	($237,687.49)
ECM #6	Install NEMA Premium Efficient Pump Motor	$1,280	$0	$120	$1,160	$123	$0	$123	20	$2,460	$0	112.1%	9.4	8.55%	$669.93
ECM #7	Indoor Air handling Unit Replacement	$73,300	$0	$1,200	$72,100	$1,358	$0	$1,358	20	$27,160	$0	-62.3%	53.1	-7.91%	($51,896.39)
ECM #8	DDC System – High School	$1,014,650	$0	$0	$1,014,650	$36,807	$0	$36,807	15	$552,105	$0	-45.6%	27.6	-6.79%	($575,250.42)
REM RENEWABLE ENERGY AND FINANCIAL COSTS AND SAVINGS SUMMARY															
REM #1	Solar Energy System	$3,055,320	$0	$0	$3,055,320	$202,420	$0	$202,420	25	$5,060,500	$0	65.6%	15.1	4.33%	$469,449.36

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* .

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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 January, 2009:

Electric Chillers

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

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

Ground Source Heat Pumps

Closed Loop & Open Loop	$370 per ton

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

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

Premium Motors

Three-Phase Motors	$45 - $700 per motor

Prescriptive Lighting

T-5 and T-8 Lamps w/Electronic Ballast in Existing Facilities	$10 - $30 per fixture, (depending on quantity)
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

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

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

MAJOR EQUIPMENT LIST

Concord Engineering Group

Chatham High School

Boiler

Location	Area Served	Manufacturer	Qty.	Model #	Serial #	Input (MBh)	Output (MBh)	Efficiency (%)	Fuel	Approx. Age	ASHRAE Service Life	Remaining Life	Notes
Orig Boiler Room		Cleaver Brooks	1	CB801-150	L-25716	6280	5150	82	Natural Gas	7/16/1961	24	(-24)	
Orig Boiler Room		Cleaver Brooks	1	CB801-150	L-25715	6280	5150	82	Natural Gas	7/13/1961	24	(-24)	
New Boiler Rm	2001 Addition	Buderus	1	G615-13	1529.9C	3753	3112	82.9	Natural Gas	1/8/2001	25	17	83.9% Comb. Eff.

Boiler - Burner

Location	Area Served	Manufacturer	Qty.	Model #	Serial #	Input (MBh)	Efficiency (%)	Fuel	Approx. Age	ASHRAE Service Life	Remaining Life	Notes
Orig Boiler Room			1		H923213			Natural Gas	47	21	(-26)	Nat Gas/Oil burner (no oil), 7.5hp burner
Orig Boiler Room			1		H923212			Natural Gas	47	21	(-26)	Nat Gas/Oil burner (no oil), 7.5hp burner
New Boiler Rm	2001 Addition	Industrial Combustion	1	HG-42-S-2	40972-1	3890	80	Natural Gas	8	21	13	Natural Gas, 1.5 hp blower

Boiler - Pumps

Location	Area Served	Manufacturer	Qty.	Model #	Serial #	HP	RPM	GPM	Ft. Hd	Frame Size	Volts	Phase	Approx. Age	ASHRAE Service Life	Remaining Life	Notes
Orig Boiler Room	Boiler Pump		1	185011	1533208	20	1750				200/400		8	20	12	91% NEMA Eff.
Orig Boiler Room	Boiler Pump		1	185011		20	1750				230/460		3	20	17	
Orig Boiler Room	HX Pump	Bell & Gosset	1	HD3 AB	102228	1/3	1725				115/230	1	34	10	(-24)	Server MoHawk heat exchanger M/N F1059
New Boiler Rm	2001 Addition	Armstrong	2	3x3x10	452686 and452686	5	1800	110	65				8	10	2	
New Boiler Rm	2001 Addition		1			fractional							8	10	2	In-line circ pump above boiler
Mechanical room	1973 Addition	Aurora Pump	1	1 1/2x3A, 344 BF	74-14881	2		75	50	145T			34	20	(-14)	Motor replaced: Dayton m/n 3KW97G NEMA 84% Eff.
Mechanical room	1973 Addition		1	5K184BC206	98-07592	5							11	20	9	3A4A-8F, 1.5x2x7A
Gym Storage	HV-6 1973 Gym	Bell & Gosset	1					50	15				8	10	2	

Domestic Hot Water Heater

Location	Area Served	Manufacturer	Qty	Model #	Serial #	Input (MBh)	Recovery (gal/h)	Capacity (gal)	Efficiency (%)	Fuel	Approx. Age	ASHRAE Service Life	Remaining Life	Notes
Orig. Boiler Room		Lochanvar	1	CWN500PM	L04H00171813	500	498	(2) TANKS - SEE BELOW	82	Natural Gas	5	25	20	Copper-Fin
	DOMESTIC BOILER	Lochanvar	2	RJS120	AM5644324 / AM5644344	-	-	(2) x 119 Gal. = 238 Gallon			5	15	10	
New Boiler Rm	2001 Addition	State	1	Sandblaster SBF100199NET	G0241536	199.99	189.1	100		Natural Gas	8	10	2	
L-wing		American Proline	1	E62-30N-045DV	522100057	4500kW		30		Electric	2	10	8	820503

DHW - Pumps

Location	Area Served	Manufacturer	Qty.	Model #	Serial #	HP	Volts	Amps	Approx. Age	ASHRAE Service Life	Remaining Life	Notes
Orig Boiler Room	Recirc	Bell & Gosset	1	BP451	189034 M58	1/3			24	10	(-14)	
Orig Boiler Room	Recirc	Bell & Gosset	1	P06441 AB	189034 K48	1/3			25	10	(-15)	
Orig Boiler Room	DW Loop Pump	Bell & Gosset	1	PL458	1BL004 D50				4	10	6	
New Boiler Rm	2001 Addition		1	SA55JXFSN-3748		1/8			8	10	2	cat no. 110-178

Air Handling Units

Location	Area Served	Manufacturer	Qty	Model #	Serial #	Cooling Coil	Cooling Eff. (EER)	Cooling Capacity BTUH	Heating Type	Input (MBh)	Output (MBh)	Heating Eff. (%)	Fuel	Volts	Phase	Amps	Approx. Age	ASHRAE Service Life	Remaining Life	Notes
Rooftop		Carrier Weathermaster	1	48HJE004-M-641HE	4201G23115	R-22	11.8	36,200	HTX	72	58	82%	NG	460	3		8	15	7	
Rooftop		Carrier Weathermaster	1	48HJD005---641HE	4001G23503	R-22	11.7	46,000	HTX	72	58	82%	NG	460	3		8	15	7	
Rooftop	Area D	Nesbitt	1	RSA35053N05CLM0BDG00DD1201	N0202008	R-22		420,000	HTX	469	375	80%	NG	460	3		7	15	8	
Rooftop		Carrier	7	48GX-024040301	4201G11258	R-22	12	24,000	HTX	40	32.8	82%	NG	208/230	1		8	15	7	
Gym Storage (HV-5)	Locker Rooms	American Air Filter				n/a	n/a	n/a	HW	240							35	15	(-20)	200-160 F Water, 0-85 F Air, 12 GPM, 10 Ft Hd.
Gym Storage (HV-6)	1973 Gym addition	American Air Filter	1	G size 45-70	RM745907	n/a	n/a	n/a	HW		1198.925						35	15	(-20)	200-160 F Water, 0-85 F Air, 50 GPM, 10 Ft Hd.
Admin rooftop (AC-4)	Administration	Nesbitt	1	RMA100G2RC24050B01A150100BCZ1	9507-61450	R-22	8.9	280,000	HW	300			-	208	3		14	15	1	
Rooftop (AC-6)	Area D	York - LUX Air	1	DB HB-T072AA	NCHM043966	R-22		72,000						208	3		10	15	5	Rusty REV B 073-19202-207
Rooftop (AC-5)	Area D	York - LUX Air	1	DD HB - T090AA	(S)NDHM055881	R-22		90,000						208	3		10	15	5	
Rooftop	Area D	Nesbitt	1	RMA100G2RC24050B01A150100BCZ1	9507-61450		8.9	280,000	HW	300			-	200	3		14	15	1	1/6 HP GB
Rooftop	Area D	Carrier Weathermaster Series	1	48HJD007---641HE	4001G23508			72,000		50/72	41/59	82%	NG	460	3		8	15	7	
Rooftop	Area D Library	Nesbitt	1	RSA25053N05GMM08DG00DD1201	N0202007	R-22		300,000	HTX	469	375		NG	460	3		7	15	8	M.O. 200012
Rooftop	Partial 2nd Floor	Carrier Weathermaster Series	1	48HJF007---641HE	4001G23512			72,000		120/150	96/120	80%	NG	460	3		8	15	7	
Rooftop	Partial 2nd Floor	Carrier	1	48HJF007---641HE	4001G23513			72,000		120/150	96/120	80%	NG	460	3		8	15	7	
Rooftop	Partial 2nd Floor	Carrier Weathermaster Series	1	48HJF007---641HE	4001G23511			72,000		120/150	96/120	80%	NG	460	3		8	15	7	
Rooftop	Area E	Carrier Weathermaster Series	1	48HJE004-M-541HE	4201G23106		11.8	36,200		50/72	41/59	82%	NG	208	3		8	15	7	
Rooftop	Area E	Carrier	1	48HJD005-M-541HE	4201G23089		11.7	46,000		50/72	41/59	82%	NG	208	3		8	15	7	
Rooftop	Area D	Carrier	1	48HJD006---541HE	4301G22096		11.9	59,000		50/72	41/59	82%	NG				8	15	7	
Rooftop	Area D	Carrier	1	48HJE004---641HE	4001G23480		11.8	36,200		72	58	82%	NG				8	15	7	
Rooftop	Partial 2nd Floor	Carrier	1	48GX-024040301--	4201611256	R-22	12	24,000	HTX	40	32.8	82%	NG	208/230	1		8	15	7	
Rooftop	Partial 2nd Floor	Carrier	1	48HJF007---641HE	4001G23516			72,000		120/150	96/120	80%	NG	460			8	15	7	
Rooftop	Partial 2nd Floor	Carrier	1	48HJF007---641HE	4001G23514			72,000		120/150	96/120	80%	NG				8	15	7	
Rooftop	Partial 2nd Floor	Carrier	1	48GX-030040501	2801G14623	R-22		30,000						208			8	15	7	
Rooftop	Partial 2nd Floor	Carrier	1	48HJF007---641HE	4001G23515			72,000		120/150	96/120	80%	NG	460			8	15	7	
Rooftop	Area E	Carrier	1	48HJD006---541HE	4301G22097		11.9	59,000		50/72	41/59	82%	NG	208/230			8	15	7	
Rooftop	Area E	Carrier	1	48HJD006---541HE	4001G23543		11.9	59,000		50/72	41/59	82%	NG				8	15	7	
Rooftop (AC-2)	Auditorium	Air Fan	1	P1-2-60	96-35665	R-22		462,480	HTX				-				10	15	5	
Rooftop (AC-3)	Auditorium	Air Fan	1	LMP-2-60	96-65666	R-22		462,480	HTX				-				10	15	5	

AC Condensers

Location	Area Served	Manufacturer	Qty.	Model #	Serial #	Cooling Capacity	Cooling Eff. (EER)	Refrigerant	Volts	Phase	Approx. Age	ASHRAE Service Life	Remaining Life	Notes
Rooftop		Mitshubishi	1	MU09TW	2004643 T	9000			115	1	5	15	10	Indoor Unit MS09 TW
Rooftop	Partial 2nd Floor	Mitshubishi	2	PU18EK1	56U00533C	18000						15		
Rooftop	Partial 2nd Floor	Carrier	1	38AN009110	2602V22499	102000			115	1	7	15	8	
Rooftop	Area F	Sanyo	1	C0911	211163	9000			115	1		15		
Rooftop	Area F	Carrier	1	38HDC018341	2301X10585	18000					8	15	7	
Rooftop	Area D	Carrier	1	38HDC036321	2901X13520	36000					8	15	7	
Rooftop	Area F	Carrier	1	38HDC024331	1501X05053	24000			208/230		7	15	8	
Rooftop	Area D	Carrier	1	38AN012310	3602Y10763	12000					6	15	9	
Rooftop	Partial 2nd Floor	Carrier	1	38HDC018341	2901X13709	18000					7	15	8	
Rooftop	Area E	Air Fan	1	LPM-2-60	96-65666	732000			208	3	13	15	2	S/A 10 hp 28.7 FLA R/A 5 hp 15.71 FLA total amps 301 Compressor 1
Rooftop	Area E	Air Fan	1	P1-60	96-35665	732000								
Rooftop	Area D	Rheem	1	RAKA-048DAS	4972 M3301 06100	46,000	9.7		460	3	8	15	7	
Rooftop	Partial 2nd Floor	Rheem	1	RAKA-024JAZ	5882F210107054	22,800	8.9		208	1	8	15	7	
Rooftop	Partial 2nd Floor	Rheem	1	RAKA-060 CAS	4991 M2300 17825	56,500	9.7		208	3	9	15	6	
Rooftop	Partial 2nd Floor	Rheem	2	RAKA-042DAS	4982 M3701 05295	40,000	9.15		460	3	8	15	7	
Rooftop	Partial 2nd Floor	Rheem	1	RAKA-060DAS	4995 M3001 07612	56,500	9.7		460	3	8	15	7	
Rooftop	Area D	Rheem	1	RAKA-048DAS	4972 M3301 06105	46,000	9.7		460	3	8	15	7	
Rooftop	Area D	Rheem	2	RAKA-048DAS	4972 M3301 06106	46,000	9.7		460	3	8	15	7	
Rooftop	Partial 2nd Floor	Rheem	1	RAKA-060DAS	4995 M3001 07613	56,500	9.7		460	3	8	15	7	
Rooftop	Partial 2nd Floor	Rheem	1	RAKA-024SAZ	5882 M2101 06817	23,400	9.15		208/230	3	8	15	7	
Rooftop	Area D	Rheem	1	RAKA-048DAS	4972 M3301 06103	46,000	9.7		460	3	8	15	7	
Rooftop	Area D	Rheem	1	RAKA-024JAZ	5882F210107051	22,800	8.9		208/230	1	8	15	7	
Rooftop	Partial 2nd Floor	Rheem	1	RAKA-060DAS	4995 M3001 07614	56,500	9.7		460	3	8	15	7	
Rooftop	Partial 2nd Floor	Rheem	1	RAKA-060DAS	4995 M3001 07619	56,500	9.7		460	3	8	15	7	

Unit Heaters and Cabinet Unit Heaters

Location	Area Served	Manufacturer	Qty.	Model #	Serial #	Heating Type	Heating Capacity (MBH)	CFM	RPM / HP	GPM	Approx. Age	ASHRAE Service Life	Remaining Life	Notes
New Boiler Rm	2001 Addition	Airtherm	1	HA-136A	M01248241001001	HW	35.9	1100	1/25		8	20	12	

Split Systems and AC Condensers

Location	Area Served	Manufacturer	Qty.	Model #	Serial #	Cooling Capacity	Eff.	Refrigerant	Volts	Phase	Amps	Approx. Age	ASHRAE Service Life	Remaining Life	Notes
Rooftop	Area D	Mitsubishi	1	PU18EK1	2081230	18000			208/230	1			15		
Tech Office	Tech Office	Carrier	1	42KN6A3407A	7182-6442			R22	115	1	3.1		15		
Orchestra Rm		Sanyo	2	KS3632	0024451 & 0024951	36000						4	15	11	
Choral Rm		Sanyo	2	KS3632	0024251 & 0024351	36000						4	15	11	
Tech Closet		Carrier	1										15		
Library Server Room		EMI	1	BC79M553H2									15		

Air Compressor

Location	Area Served	Manufacturer	Qty.	Model #	Serial #	HP	Pressure	Capacity	Volts	Phase	FLA	Approx. Age	ASHRAE Service Life	Remaining Life	Notes
Orig Boiler Room	H&V Controls	Quincy	1	QC03012D00300	20061215-0102	(2) 3HP	86	13 cfm @80 psig				2	20	18	

Heating and Ventilation Units

Location	Area Served	Manufacturer	Qty.	Model #	Serial #	Heating Coil	Capacity (Btu/h)	Fan HP	Fan RPM	Volts	Phase	Amps	Approx. Age	ASHRAE Service Life	Remaining Life	Notes
Classroom A-132	Classroom A-132	NesbittAire	1	TXW515001L000C00-EEETWXOCS	0108-0140	HW		1/6		120	1	3		20		100 inch long, 1500 cfm, DX cooling, HW heating
	Classrooms	NesbittAire	4	TXW515001L000C00-EEETWXOCS		HW		1/6		120	1	3		20		100 inch long, 1500 cfm, DX cooling, HW heating
	Classrooms	NesbittAire	22			HW		1/6						20		
B156	Classrooms	Nesbitt	2	MCR1242LO2C00014WEEETXOBS	PN00045M 1 AND 3 OF 5	HW	24,000	1/6		208	1	13.4		20		60 inch long, 640 cfm, DX cooling, HW heating
B154	Classrooms	Nesbitt	2					1/6		208	1	13.4		20		
Corr at B151	Corridor	Nesbitt	1					1/6		208	1	13.4		20		
B158	Classrooms	Nesbitt	2	MCR1242LO2C00014WEEETXOBS	PN00045M 2 AND 3 OF 5	HW	24,000	1/6		208	1	13.4		20		60 inch long, 640 cfm, DX cooling, HW heating
B160	Classrooms	Nesbitt	2	MCR1242LO2C00014WEEETXOBS	PN00045M 9 of 15	HW	24,000	1/6		208	1	13.4		20		60 inch long, 640 cfm, DX cooling, HW heating
B162, B164, B166	Classrooms	Nesbitt	6	MCR1242LO2C00014WEEETXOBS		HW	24,000	1/6		208	1	13.4		20		60 inch long, 640 cfm, DX cooling, HW heating
M15	MUSIC	Nesbitt	1			HW	24,000	1/6		208	1	13.4		20		60 inch long, 640 cfm, DX cooling, HW heating
B159	Classrooms	Nesbitt	2			HW	24,000	1/6		208	1	13.4		20		60 inch long, 640 cfm, DX cooling, HW heating
B158	Classrooms	Nesbitt	2		PN00045M 4 of 15	HW	24,000	1/6		208	1	13.4		20		60 inch long, 640 cfm, DX cooling, HW heating
B157	Classrooms	Nesbitt	2													
C141	Classrooms	Nesbitt	1													
C143	Classrooms	Nesbitt	1													
Science Rm	Classrooms	Nesbitt	1													
C138	Classrooms	Nesbitt	1													
C136	Classrooms	Nesbitt	1		RMCA4045208	S										

Kitchen Hood

Location	Area Served	Manufacturer	Qty.	Model #	Serial #	Fan HP	Fan RPM	Volts	Phase	Amps	Approx. Age	ASHRAE Service Life	Remaining Life	Notes
Roof	Kitchen Hood	Penn Vent	2	Fumex		1		208-230/460			8	25	17	

Window AC Units

Location	Area Served	Manufacturer	Qty.	Model #	Serial #	Cooling	Heating Capacity -	Fan HP	Volts	Phase	Amps	Approx. Age	ASHRAE Service	Remaining Life	Notes
A124	Classroom	Panasonic	1	CW-XC183HU	302KA01437	17800			230/208	1	7.4		10		10.7 EER
A126	Classroom	Panasonic	1	CW-XC183HU		17800			230/208				10		
A119	Classroom	Friedrich	1	KN18L30-C	LHHZ00194	17800			230/208	1	8.1	1	10	9	10.0 EER
A119	Classroom	Friedrich	1	KN18L30-A	LFBR08408	17800			230/208	1	8.1	3	10	7	10.0 EER
A117	Classroom	Friedrich	1	KN18L30-B	LGGR05179	17800			230/208	1	8.1	2	10	8	10.0 EER
A115	Classroom	Friedrich	1	KN18L30-B	LGGR06084	17800			230/208	1	8.1	2	10	8	10.0 EER
A113	Classroom	Friedrich	1	KN18L30-B	LGCR0523KM18LB0B	17800			230/208	1	8.1	2	10	8	10.0 EER
A114	Classroom	CARRIER	2										10		
A111	Classroom	Friedrich	1	KN18L30-B	LGGR00414	17800			230/208	1	8.1	2	10	8	10.0 EER
A109	Classroom	Friedrich	1	KN18L30-B	LGDR13225	17800			230/208	1	8.1	2	10	8	10.0 EER
A107	Classroom	Friedrich	1	KN18L30-B	LGDR13236	17800			230/208	1	8.1	2	10	8	10.0 EER
A108	Classroom	Panasonic	1	CW-XC183HU	302KA00080	17800			230/208	1	7.4		10		10.7 EER
A106	Classroom	Panasonic	1	CW-XC183HU	301KAD1917	17800			230/208	1	7.4		10		10.7 EER
Health Office	Health Office	Emerson	1	Quiet Cool											

OMB No. 2060-0347

STATEMENT OF ENERGY PERFORMANCE
Chatham High School

Building ID: 1830578
For 12-month Period Ending: July 31, 2009[1]
Date SEP becomes ineligible: N/A
Date SEP Generated: September 24, 2009

Facility
Chatham High School
255 Lafayette Avenue
Chatham, NJ 07928

Facility Owner
School District of the Chathams
58 Meyersville Road
Chatham, NJ 07928

Primary Contact for this Facility
Ralph Goodwin
58 Meyersville Road
Chatham, NJ 07928

Year Built: 1962
Gross Floor Area (ft²): 253,663

Energy Performance Rating[2] (1-100) 62

Site Energy Use Summary[3]

Electricity - Grid Purchase(kBtu)	6,390,267
Natural Gas (kBtu)[4]	9,191,023
Total Energy (kBtu)	15,581,290

Energy Intensity[5]

Site (kBtu/ft²/yr)	61
Source (kBtu/ft²/yr)	122

Emissions (based on site energy use)

Greenhouse Gas Emissions ($MtCO_2e$/year)	1,462

Electric Distribution Utility
Jersey Central Power & Lt Co

National Average Comparison

National Average Site EUI	69
National Average Source EUI	137
% Difference from National Average Source EUI	-11%
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
Raymond Johnson
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) 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 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	Chatham 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	255 Lafayette Avenue, Chatham, NJ 07928	Is this address accurate and complete? Correct weather normalization requires an accurate zip code.		☐
Single Structure	Single Facility	Does this SEP represent a single structure? SEPs cannot be submitted for multiple-building campuses (with the exception of acute care or children's hospitals) nor can they be submitted as representing only a portion of a building		☐
High School 1973 Addition (K-12 School)				
CRITERION	**VALUE AS ENTERED IN PORTFOLIO MANAGER**	**VERIFICATION QUESTIONS**	**NOTES**	☑
Gross Floor Area	60,081 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	53	Is this the number of personal computers in the K12 School?		☐
Number of walk-in refrigeration/freezer units	0	Is this the total number of commercial walk-in type freezers and coolers? These units are typically found in storage and receiving areas.		☐
Presence of cooking facilities	No	Does this school have a dedicated space in which food is prepared and served to students? If the school has space in which food for students is only kept warm and/or served to students, or has only a galley that is used by teachers and staff then the answer is "no".		☐
Percent Cooled	100 %	Is this the percentage of the total floor space within the facility that is served by mechanical cooling equipment?		☐
Percent Heated	100 %	Is this the percentage of the total floor space within the facility that is served by mechanical heating equipment?		☐
Months	12 (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'.		☐

High School 2001 Addition (K-12 School)

CRITERION	VALUE AS ENTERED IN PORTFOLIO MANAGER	VERIFICATION QUESTIONS	NOTES	☑
Gross Floor Area	73,142 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	148	Is this the number of personal computers in the K12 School?		☐
Number of walk-in refrigeration/freezer units	0	Is this the total number of commercial walk-in type freezers and coolers? These units are typically found in storage and receiving areas.		☐
Presence of cooking facilities	No	Does this school have a dedicated space in which food is prepared and served to students? If the school has space in which food for students is only kept warm and/or served to students, or has only a galley that is used by teachers and staff then the answer is "no".		☐
Percent Cooled	100 %	Is this the percentage of the total floor space within the facility that is served by mechanical cooling equipment?		☐
Percent Heated	100 %	Is this the percentage of the total floor space within the facility that is served by mechanical heating equipment?		☐
Months	12 (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'.		☐

High School original building (K-12 School)

CRITERION	VALUE AS ENTERED IN PORTFOLIO MANAGER	VERIFICATION QUESTIONS	NOTES	☑
Gross Floor Area	120,440 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	189	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	100 %	Is this the percentage of the total floor space within the facility that is served by mechanical cooling equipment?		
Percent Heated	100 %	Is this the percentage of the total floor space within the facility that is served by mechanical heating equipment?		
Months	12 (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: Jersey Central Power & Lt Co

Fuel Type: Electricity

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

Start Date	End Date	Energy Use (kWh (thousand Watt-hours))
07/01/2009	07/31/2009	163,760.00
06/01/2009	06/30/2009	125,040.00
05/01/2009	05/31/2009	148,440.00
04/01/2009	04/30/2009	174,680.00
03/01/2009	03/31/2009	134,880.00
02/01/2009	02/28/2009	154,240.00
01/01/2009	01/31/2009	169,720.00
12/01/2008	12/31/2008	145,120.00
11/01/2008	11/30/2008	147,160.00
10/01/2008	10/31/2008	159,880.00
09/01/2008	09/30/2008	147,480.00
08/01/2008	08/31/2008	202,480.00
High School Electric Consumption (kWh (thousand Watt-hours))		**1,872,880.00**
High School Electric Consumption (kBtu (thousand Btu))		**6,390,266.56**
Total Electricity (Grid Purchase) Consumption (kBtu (thousand Btu))		**6,390,266.56**
Is this the total Electricity (Grid Purchase) consumption at this building including all Electricity meters?		☐

Fuel Type: Natural Gas

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

Start Date	End Date	Energy Use (therms)
07/01/2009	07/31/2009	406.69
06/01/2009	06/30/2009	1,868.46
05/01/2009	05/31/2009	4,157.48
04/01/2009	04/30/2009	4,667.44
03/01/2009	03/31/2009	11,221.82
02/01/2009	02/28/2009	17,100.95
01/01/2009	01/31/2009	20,502.47
12/01/2008	12/31/2008	17,618.38
11/01/2008	11/30/2008	9,963.09
10/01/2008	10/31/2008	2,949.30

09/01/2008	09/30/2008	841.01
08/01/2008	08/31/2008	613.14
Natural Gas Facility Total Consumption (therms)		**91,910.23**
Natural Gas Facility Total Consumption (kBtu (thousand Btu))		**9,191,023.00**
Total Natural Gas Consumption (kBtu (thousand Btu))		**9,191,023.00**
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 as the PE 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
Chatham High School
255 Lafayette Avenue
Chatham, NJ 07928

Facility Owner
School District of the Chathams
58 Meyersville Road
Chatham, NJ 07928

Primary Contact for this Facility
Ralph Goodwin
58 Meyersville Road
Chatham, NJ 07928

General Information

Chatham High School	
Gross Floor Area Excluding Parking: (ft²)	253,663
Year Built	1962
For 12-month Evaluation Period Ending Date:	July 31, 2009

Facility Space Use Summary

High School 1973 Addition	
Space Type	K-12 School
Gross Floor Area(ft²)	60,081
Open Weekends?	No
Number of PCs	53
Number of walk-in refrigeration/freezer units	0
Presence of cooking facilities	No
Percent Cooled	100
Percent Heated	100
Months°	12
High School?	Yes
School District°	Chatham

High School original building	
Space Type	K-12 School
Gross Floor Area(ft²)	120,440
Open Weekends?	No
Number of PCs	189
Number of walk-in refrigeration/freezer units	2
Presence of cooking facilities	Yes
Percent Cooled	100
Percent Heated	100
Months°	12
High School?	Yes
School District°	Chatham

High School 2001 Addition	
Space Type	K-12 School
Gross Floor Area(ft²)	73,142
Open Weekends?	No
Number of PCs	148
Number of walk-in refrigeration/freezer units	0
Presence of cooking facilities	No
Percent Cooled	100
Percent Heated	100
Months°	12
High School?	Yes
School District°	Chathams

Energy Performance Comparison

	Evaluation Periods		Comparisons		
Performance Metrics	**Current** (Ending Date 07/31/2009)	**Baseline** (Ending Date 07/31/2009)	**Rating of 75**	**Target**	**National Average**
Energy Performance Rating	62	62	75	N/A	50
Energy Intensity					
Site (kBtu/ft²)	61	61	54	N/A	69
Source (kBtu/ft²)	122	122	107	N/A	137
Energy Cost					
$/year	$ 444,191.02	$ 444,191.02	$ 390,682.74	N/A	$ 499,651.63

$/ft²/year	$ 1.75	$ 1.75	$ 1.54	N/A	$ 1.97
Greenhouse Gas Emissions					
$MtCO_2e$/year	1,462	1,462	1,286	N/A	1,645
$kgCO_2e/ft^2$/year	6	6	5	N/A	7

More than 50% of your building is defined as K-12 School. Please note that your rating accounts for all of the spaces listed. The National 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.

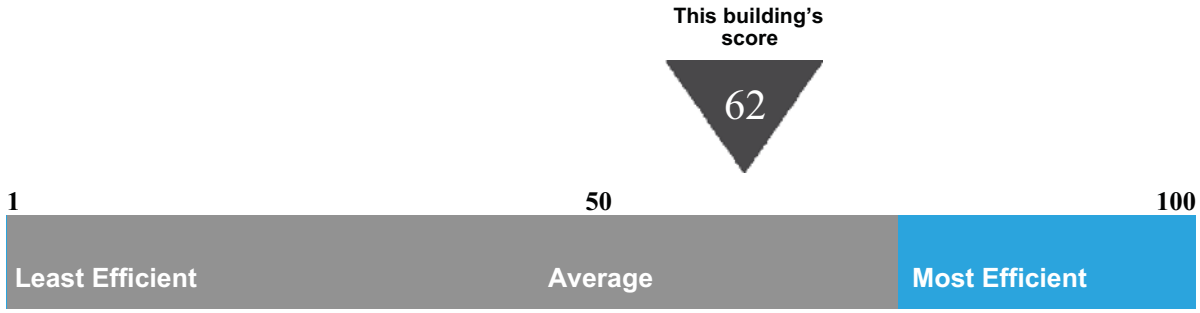
Statement of Energy Performance

2009

Chatham High School
255 Lafayette Avenue
Chatham, NJ 07928

Portfolio Manager Building ID: 1830578

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 122 kBtu per square foot per year.*

*Based on source energy intensity for the 12 month period ending July 2009

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: 09/24/2009

CEG Job #: 9C09078
Project: Chatham School District
Address: 255 Lafayette Avenue
City: Chatham
Building SF: 253,663

Chatham High School

DATE: 11/3/2009
KWH COST: $0.166

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
1	Front Hall	8760	11	4	T8 4x4 4 Lamps Electronic Ballast Recessed Mounting Prismatic Lens	109	1.20	10,503.2	$1,743.54	11	0	No Change	109	1.20	10503.24	$1,743.54	$0.00	$0.00	0.00	0	$0.00	0.00
2	Hall Behind Cafeteria	8760	7	2	T8 2x4 2 Lamps Electronic Ballast Recessed Mounting Prismatic Lens	58	0.41	3,556.6	$590.39	7	0	No Change	58	0.41	3556.56	$590.39	$0.00	$0.00	0.00	0	$0.00	0.00
3	Maintenance Hall	8760	5	2	T8 1x4 2 Lamps Electronic Ballast Surface Mounting Prismatic Lens	58	0.29	2,540.4	$421.71	5	0	No Change	58	0.29	2540.4	$421.71	$0.00	$0.00	0.00	0	$0.00	0.00
25	Maintenance Hall	8760	1	1	Incadescent Surface Mounting	100	0.10	876.0	$145.42	1	0	Eiko-30w mini sprial	30	0.03	262.8	$43.62	$6.00	$6.00	0.07	613.2	$101.79	0.06
3	Kitchen	2080	34	2	T8 1x4 2 Lamps Electronic Ballast Surface Mounting Prismatic Lens	58	1.97	4,101.8	$680.89	34	0	No Change	58	1.97	4101.76	$680.89	$0.00	$0.00	0.00	0	$0.00	0.00
3	Cafeteria Manager	2080	2	2	T8 1x4 2 Lamps Electronic Ballast Surface Mounting Prismatic Lens	58	0.12	241.3	$40.05	2	0	No Change	58	0.12	241.28	$40.05	$0.00	$0.00	0.00	0	$0.00	0.00
4	Secondary Kitchen	2080	8	3	T8 2x4 3 Lamps Electronic Ballast Recessed Mounting Prismatic Lens	82	0.66	1,364.5	$226.50	8	0	No Change	82	0.66	1364.48	$226.50	$0.00	$0.00	0.00	0	$0.00	0.00
3	Storage	2080	2	2	T8 1x4 2 Lamps Electronic Ballast Surface Mounting Prismatic Lens	58	0.12	241.3	$40.05	2	0	No Change	58	0.12	241.28	$40.05	$0.00	$0.00	0.00	0	$0.00	0.00
3	Hall Between Caf & Storage	2080	2	2	T8 1x4 2 Lamps Electronic Ballast Surface Mounting Prismatic Lens	58	0.12	241.3	$40.05	2	0	No Change	58	0.12	241.28	$40.05	$0.00	$0.00	0.00	0	$0.00	0.00
2	Cafeteria	2080	40	2	T8 2x4 2 Lamps Electronic Ballast Recessed Mounting Prismatic Lens	58	2.32	4,825.6	$801.05	40	0	No Change	58	2.32	4825.6	$801.05	$0.00	$0.00	0.00	0	$0.00	0.00
26	Cafeteria	2080	5	1	Incadescent Pendant Mounting	100	0.50	1,040.0	$172.64	5	0	Eiko-30w mini sprial	30	0.15	312	$51.79	$6.00	$30.00	0.35	728	$120.85	0.25
19	Cafeteria	2080	5	2	T8 2x2 2 U-Tube Lamps Electronic Ballast Recessed Mounting Parabolic Lens	73	0.37	759.2	$126.03	5	0	No Change	73	0.37	759.2	$126.03	$0.00	$0.00	0.00	0	$0.00	0.00
2	Bathrooms	2080	6	2	T8 2x4 2 Lamps Electronic Ballast Recessed Mounting Prismatic Lens	58	0.35	723.8	$120.16	6	0	No Change	58	0.35	723.84	$120.16	$0.00	$0.00	0.00	0	$0.00	0.00
5	Front Hall	8760	17	4	T8 2x4 4 Lamps Electronic Ballast Recessed Mounting Prismatic Lens	109	1.85	16,232.3	$2,694.56	17	0	No Change	109	1.85	16232.28	$2,694.56	$0.00	$0.00	0.00	0	$0.00	0.00
3	Hall Between Library	8760	3	2	T8 1x4 2 Lamps Electronic Ballast Surface Mounting Prismatic Lens	58	0.17	1,524.2	$253.02	3	0	No Change	58	0.17	1524.24	$253.02	$0.00	$0.00	0.00	0	$0.00	0.00
13	Conference Room	2080	10	2	T8 1x4 2 Lamps Electronic Ballast Surface Mounting Parabolic Lens	58	0.58	1,206.4	$200.26	10	0	No Change	58	0.58	1206.4	$200.26	$0.00	$0.00	0.00	0	$0.00	0.00
14	A104	2080	24	2	T8 1x4 2 Lamps Electronic Ballast Pendant Mounting Parabolic Lens	58	1.39	2,895.4	$480.63	24	0	No Change	58	1.39	2895.36	$480.63	$0.00	$0.00	0.00	0	$0.00	0.00
15	Counseling	2080	6	3	T8 2x4 3 Lamps Electronic Ballast Recessed Mounting Parabolic Lens	82	0.49	1,023.4	$169.88	6	0	No Change	82	0.49	1023.36	$169.88	$0.00	$0.00	0.00	0	$0.00	0.00
2	Counseling	2080	8	2	T8 2x4 2 Lamps Electronic Ballast Recessed Mounting Prismatic Lens	58	0.46	965.1	$160.21	8	0	No Change	58	0.46	965.12	$160.21	$0.00	$0.00	0.00	0	$0.00	0.00

18	Main Office Hall	8760	14	2	T8 4' 2 Lamps Electronic Ballast Side Wall Mount	80	1.12	9,811.2	$1,628.66	14	0	No Change	80	1.12	9811.2	$1,628.66	$0.00	$0.00	0.00	0	$0.00	0.00
20	Main Office Hall	8760	1	1	T12 8' 1 Lamp Magnetic Ballast Surface Mounting No Lens	93	0.09	814.7	$135.24	1	2	(2 in tandem) 4' - 1-Lamp 32W T-8 Industrial Strip w/ Elect Ballast; Metalux M/N SNF132	56	0.06	490.56	$81.43	$246.00	$246.00	0.04	324.12	$53.80	4.57
2	Main Office	8760	9	2	T8 2x4 2 Lamps Electronic Ballast Recessed Mounting Prismatic Lens	58	0.52	4,572.7	$759.07	9	0	No Change	58	0.52	4572.72	$759.07	$0.00	$0.00	0.00	0	$0.00	0.00
2	Assistant Prin	2080	2	2	T8 2x4 2 Lamps Electronic Ballast Recessed Mounting Prismatic Lens	58	0.12	241.3	$40.05	2	0	No Change	58	0.12	241.28	$40.05	$0.00	$0.00	0.00	0	$0.00	0.00
13	Communications	2080	1	2	T8 1x4 2 Lamps Electronic Ballast Surface Mounting Parabolic Lens	58	0.06	120.6	$20.03	1	0	No Change	58	0.06	120.64	$20.03	$0.00	$0.00	0.00	0	$0.00	0.00
4	Principal 1	2080	1	3	T8 2x4 3 Lamps Electronic Ballast Recessed Mounting Prismatic Lens	82	0.08	170.6	$28.31	1	0	No Change	82	0.08	170.56	$28.31	$0.00	$0.00	0.00	0	$0.00	0.00
2	Principal 1	2080	2	2	T8 2x4 2 Lamps Electronic Ballast Recessed Mounting Prismatic Lens	58	0.12	241.3	$40.05	2	0	No Change	58	0.12	241.28	$40.05	$0.00	$0.00	0.00	0	$0.00	0.00
2	Principal 2	2080	3	2	T8 2x4 2 Lamps Electronic Ballast Recessed Mounting Prismatic Lens	58	0.17	361.9	$60.08	3	0	No Change	58	0.17	361.92	$60.08	$0.00	$0.00	0.00	0	$0.00	0.00
6	Bathrooms	2080	2	2	T12 2x2 2 U-Tube Lamps Magnetic Ballast Recessed Mounting Prismatic Lens	70	0.14	291.2	$48.34	2	0	2'x2' 2-Lamp T-8, Prism Lens Electronic Ballast, Architectural surface or Recessed static METALUX 2AC-217-UNV-EB81-U	34	0.07	141.44	$23.48	$204.00	$408.00	0.07	149.76	$24.86	16.41
2	Security	2080	1	2	T8 2x4 2 Lamps Electronic Ballast Recessed Mounting Prismatic Lens	58	0.06	120.6	$20.03	1	0	No Change	58	0.06	120.64	$20.03	$0.00	$0.00	0.00	0	$0.00	0.00
2	Office	2080	12	2	T8 2x4 2 Lamps Electronic Ballast Recessed Mounting Prismatic Lens	58	0.70	1,447.7	$240.31	12	0	No Change	58	0.70	1447.68	$240.31	$0.00	$0.00	0.00	0	$0.00	0.00
2	Office	2080	3	2	T8 2x4 2 Lamps Electronic Ballast Recessed Mounting Prismatic Lens	58	0.17	361.9	$60.08	3	0	No Change	58	0.17	361.92	$60.08	$0.00	$0.00	0.00	0	$0.00	0.00
2	Office	2080	1	2	T8 2x4 2 Lamps Electronic Ballast Recessed Mounting Prismatic Lens	58	0.06	120.6	$20.03	1	0	No Change	58	0.06	120.64	$20.03	$0.00	$0.00	0.00	0	$0.00	0.00
13	A106	2080	18	2	T8 1x4 2 Lamps Electronic Ballast Surface Mounting Parabolic Lens	58	1.04	2,171.5	$360.47	18	0	No Change	58	1.04	2171.52	$360.47	$0.00	$0.00	0.00	0	$0.00	0.00
14	A108	2080	21	2	T8 1x4 2 Lamps Electronic Ballast Pendant Mounting Parabolic Lens	58	1.22	2,533.4	$420.55	21	0	No Change	58	1.22	2533.44	$420.55	$0.00	$0.00	0.00	0	$0.00	0.00
14	A107	2080	18	2	T8 1x4 2 Lamps Electronic Ballast Pendant Mounting Parabolic Lens	58	1.04	2,171.5	$360.47	18	0	No Change	58	1.04	2171.52	$360.47	$0.00	$0.00	0.00	0	$0.00	0.00
2	Athletic Director	2080	12	2	T8 2x4 2 Lamps Electronic Ballast Recessed Mounting Prismatic Lens	58	0.70	1,447.7	$240.31	12	0	No Change	58	0.70	1447.68	$240.31	$0.00	$0.00	0.00	0	$0.00	0.00
14	A109	2080	18	2	T8 1x4 2 Lamps Electronic Ballast Pendant Mounting Parabolic Lens	58	1.04	2,171.5	$360.47	18	0	No Change	58	1.04	2171.52	$360.47	$0.00	$0.00	0.00	0	$0.00	0.00
14	A111	2080	18	2	T8 1x4 2 Lamps Electronic Ballast Pendant Mounting Parabolic Lens	58	1.04	2,171.5	$360.47	18	0	No Change	58	1.04	2171.52	$360.47	$0.00	$0.00	0.00	0	$0.00	0.00
14	Social Studies Office	2080	14	2	T8 1x4 2 Lamps Electronic Ballast Pendant Mounting Parabolic Lens	58	0.81	1,689.0	$280.37	14	0	No Change	58	0.81	1688.96	$280.37	$0.00	$0.00	0.00	0	$0.00	0.00
7	Infront of SS Office	2080	1	2	T12 2x4 2 Lamps Magnetic Ballast Recessed Mounting Prismatic Lens	73	0.07	151.8	$25.21	1	0	2'x4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N 2GC8	61	0.06	126.88	$21.06	$120.00	$120.00	0.01	24.96	$4.14	28.96
2	A117, 118, Hall	2080	8	2	T8 2x4 2 Lamps Electronic Ballast Recessed Mounting Prismatic Lens	58	0.46	965.1	$160.21	8	0	No Change	58	0.46	965.12	$160.21	$0.00	$0.00	0.00	0	$0.00	0.00

14	A113	2080	18	2	T8 1x4 2 Lamps Electronic Ballast Pendant Mounting Parabolic Lens	58	1.04	2,171.5	$360.47	18	0	No Change	58	1.04	2171.52	$360.47	$0.00	$0.00	0.00	0	$0.00	0.00
14	A114	2080	45	2	T8 1x4 2 Lamps Electronic Ballast Pendant Mounting Parabolic Lens	58	2.61	5,428.8	$901.18	45	0	No Change	58	2.61	5428.8	$901.18	$0.00	$0.00	0.00	0	$0.00	0.00
2	A114	2080	2	2	T8 2x4 2 Lamps Electronic Ballast Recessed Mounting Prismatic Lens	58	0.12	241.3	$40.05	2	0	No Change	58	0.12	241.28	$40.05	$0.00	$0.00	0.00	0	$0.00	0.00
14	A115	2080	18	2	T8 1x4 2 Lamps Electronic Ballast Pendant Mounting Parabolic Lens	58	1.04	2,171.5	$360.47	18	0	No Change	58	1.04	2171.52	$360.47	$0.00	$0.00	0.00	0	$0.00	0.00
5	Hall to Courtyard	2080	5	4	T8 2x4 4 Lamps Electronic Ballast Recessed Mounting Prismatic Lens	109	0.55	1,133.6	$188.18	5	0	No Change	109	0.55	1133.6	$188.18	$0.00	$0.00	0.00	0	$0.00	0.00
14	A117	2080	18	2	T8 1x4 2 Lamps Electronic Ballast Pendant Mounting Parabolic Lens	58	1.04	2,171.5	$360.47	18	0	No Change	58	1.04	2171.52	$360.47	$0.00	$0.00	0.00	0	$0.00	0.00
14	A116	2080	59	2	T8 1x4 2 Lamps Electronic Ballast Pendant Mounting Parabolic Lens	58	3.42	7,117.8	$1,181.55	59	0	No Change	58	3.42	7117.76	$1,181.55	$0.00	$0.00	0.00	0	$0.00	0.00
2	A116	2080	3	2	T8 2x4 2 Lamps Electronic Ballast Recessed Mounting Prismatic Lens	58	0.17	361.9	$60.08	3	0	No Change	58	0.17	361.92	$60.08	$0.00	$0.00	0.00	0	$0.00	0.00
2	A120	2080	20	2	T8 2x4 2 Lamps Electronic Ballast Recessed Mounting Prismatic Lens	58	1.16	2,412.8	$400.52	20	0	No Change	58	1.16	2412.8	$400.52	$0.00	$0.00	0.00	0	$0.00	0.00
14	A119	2080	18	2	T8 1x4 2 Lamps Electronic Ballast Pendant Mounting Parabolic Lens	58	1.04	2,171.5	$360.47	18	0	No Change	58	1.04	2171.52	$360.47	$0.00	$0.00	0.00	0	$0.00	0.00
15	Child Study Office	2080	12	3	T8 2x4 3 Lamps Electronic Ballast Recessed Mounting Parabolic Lens	82	0.98	2,046.7	$339.76	12	0	No Change	82	0.98	2046.72	$339.76	$0.00	$0.00	0.00	0	$0.00	0.00
2	Hallway	2080	16	2	T8 2x4 2 Lamps Electronic Ballast Recessed Mounting Prismatic Lens	58	0.93	1,930.2	$320.42	16	0	No Change	58	0.93	1930.24	$320.42	$0.00	$0.00	0.00	0	$0.00	0.00
15	Server Room	2080	2	3	T8 2x4 3 Lamps Electronic Ballast Recessed Mounting Parabolic Lens	82	0.16	341.1	$56.63	2	0	No Change	82	0.16	341.12	$56.63	$0.00	$0.00	0.00	0	$0.00	0.00
13	A123	2080	12	2	T8 1x4 2 Lamps Electronic Ballast Surface Mounting Parabolic Lens	58	0.70	1,447.7	$240.31	12	0	No Change	58	0.70	1447.68	$240.31	$0.00	$0.00	0.00	0	$0.00	0.00
13	A125	2080	16	2	T8 1x4 2 Lamps Electronic Ballast Surface Mounting Parabolic Lens	58	0.93	1,930.2	$320.42	16	0	No Change	58	0.93	1930.24	$320.42	$0.00	$0.00	0.00	0	$0.00	0.00
2	Math Supervisor	2080	4	2	T8 2x4 2 Lamps Electronic Ballast Recessed Mounting Prismatic Lens	58	0.23	482.6	$80.10	4	0	No Change	58	0.23	482.56	$80.10	$0.00	$0.00	0.00	0	$0.00	0.00
11	Math Supervisor	2080	1	2	T8 1x4 2 Lamps Electronic Ballast Recessed Mounting Prismatic Lens	58	0.06	120.6	$20.03	1	0	No Change	58	0.06	120.64	$20.03	$0.00	$0.00	0.00	0	$0.00	0.00
13	A124	2080	18	2	T8 1x4 2 Lamps Electronic Ballast Surface Mounting Parabolic Lens	58	1.04	2,171.5	$360.47	18	0	No Change	58	1.04	2171.52	$360.47	$0.00	$0.00	0.00	0	$0.00	0.00
13	A127	2080	12	2	T8 1x4 2 Lamps Electronic Ballast Surface Mounting Parabolic Lens	58	0.70	1,447.7	$240.31	12	0	No Change	58	0.70	1447.68	$240.31	$0.00	$0.00	0.00	0	$0.00	0.00
13	A126	2080	18	2	T8 1x4 2 Lamps Electronic Ballast Surface Mounting Parabolic Lens	58	1.04	2,171.5	$360.47	18	0	No Change	58	1.04	2171.52	$360.47	$0.00	$0.00	0.00	0	$0.00	0.00
13	A128	2080	18	2	T8 1x4 2 Lamps Electronic Ballast Surface Mounting Parabolic Lens	58	1.04	2,171.5	$360.47	18	0	No Change	58	1.04	2171.52	$360.47	$0.00	$0.00	0.00	0	$0.00	0.00
13	A129	2080	22	2	T8 1x4 2 Lamps Electronic Ballast Surface Mounting Parabolic Lens	58	1.28	2,654.1	$440.58	22	0	No Change	58	1.28	2654.08	$440.58	$0.00	$0.00	0.00	0	$0.00	0.00
3	A131	2080	21	2	T8 1x4 2 Lamps Electronic Ballast Surface Mounting Prismatic Lens	58	1.22	2,533.4	$420.55	21	0	No Change	58	1.22	2533.44	$420.55	$0.00	$0.00	0.00	0	$0.00	0.00

13	A130	2080	18	2	T8 1x4 2 Lamps Electronic Ballast Surface Mounting Parabolic Lens	58	1.04	2,171.5	$360.47	18	0	No Change	58	1.04	2171.52	$360.47	$0.00	$0.00	0.00	0	$0.00	0.00
13	A132	2080	21	2	T8 1x4 2 Lamps Electronic Ballast Surface Mounting Parabolic Lens	58	1.22	2,533.4	$420.55	21	0	No Change	58	1.22	2533.44	$420.55	$0.00	$0.00	0.00	0	$0.00	0.00
13	A133	2080	18	2	T8 1x4 2 Lamps Electronic Ballast Surface Mounting Parabolic Lens	58	1.04	2,171.5	$360.47	18	0	No Change	58	1.04	2171.52	$360.47	$0.00	$0.00	0.00	0	$0.00	0.00
24	Faculty Bathroom	2080	3	1	Incadescent High Hat	100	0.30	624.0	$103.58	3	0	Eiko-30w mini sprial	30	0.09	187.2	$31.08	$6.00	$18.00	0.21	436.8	$72.51	0.25
13	A134	2080	18	2	T8 1x4 2 Lamps Electronic Ballast Surface Mounting Parabolic Lens	58	1.04	2,171.5	$360.47	18	0	No Change	58	1.04	2171.52	$360.47	$0.00	$0.00	0.00	0	$0.00	0.00
15	A134	2080	10	3	T8 2x4 3 Lamps Electronic Ballast Recessed Mounting Parabolic Lens	82	0.82	1,705.6	$283.13	10	0	No Change	82	0.82	1705.6	$283.13	$0.00	$0.00	0.00	0	$0.00	0.00
2	Hallway	8760	7	2	T8 2x4 2 Lamps Electronic Ballast Recessed Mounting Prismatic Lens	58	0.41	3,556.6	$590.39	7	0	No Change	58	0.41	3556.56	$590.39	$0.00	$0.00	0.00	0	$0.00	0.00
13	Coach Office	2080	7	2	T8 1x4 2 Lamps Electronic Ballast Surface Mounting Parabolic Lens	58	0.41	844.5	$140.18	7	0	No Change	58	0.41	844.48	$140.18	$0.00	$0.00	0.00	0	$0.00	0.00
18	Coach Office	2080	1	2	T8 4' 2 Lamps Electronic Ballast Side Wall Mount	80	0.08	166.4	$27.62	1	0	No Change	80	0.08	166.4	$27.62	$0.00	$0.00	0.00	0	$0.00	0.00
3	Coach Locker Room	2080	26	2	T8 1x4 2 Lamps Electronic Ballast Surface Mounting Prismatic Lens	58	1.51	3,136.6	$520.68	26	0	No Change	58	1.51	3136.64	$520.68	$0.00	$0.00	0.00	0	$0.00	0.00
3	Coach Locker Room	2080	1	2	T8 1x4 2 Lamps Electronic Ballast Surface Mounting Prismatic Lens	58	0.06	120.6	$20.03	1	0	No Change	58	0.06	120.64	$20.03	$0.00	$0.00	0.00	0	$0.00	0.00
23	Coach Locker Room	2080	8	4	T8 4' 4 Lamps Surface Mounting	109	0.87	1,813.8	$301.08	8	0	No Change	109	0.87	1813.76	$301.08	$0.00	$0.00	0.00	0	$0.00	0.00
3	Girls Locker Room	2080	26	2	T8 1x4 2 Lamps Electronic Ballast Surface Mounting Prismatic Lens	58	1.51	3,136.6	$520.68	26	0	No Change	58	1.51	3136.64	$520.68	$0.00	$0.00	0.00	0	$0.00	0.00
3	Locker Office	2080	6	2	T8 1x4 2 Lamps Electronic Ballast Surface Mounting Prismatic Lens	58	0.35	723.8	$120.16	6	0	No Change	58	0.35	723.84	$120.16	$0.00	$0.00	0.00	0	$0.00	0.00
3	Hall	8760	7	2	T8 1x4 2 Lamps Electronic Ballast Surface Mounting Prismatic Lens	58	0.41	3,556.6	$590.39	7	0	No Change	58	0.41	3556.56	$590.39	$0.00	$0.00	0.00	0	$0.00	0.00
24	Workout Room	2080	8	1	Incadescent High Hat	100	0.80	1,664.0	$276.22	8	0	Eiko-30w mini sprial	30	0.24	499.2	$82.87	$6.00	$48.00	0.56	1164.8	$193.36	0.25
28	Library	2080	60	1	T8 2x2 1 Lamp Electronic Ballast Recessed Mounting Direct/Indirect Lens	20	1.20	2,496.0	$414.34	60	0	No Change	20	1.20	2496	$414.34	$0.00	$0.00	0.00	0	$0.00	0.00
29	Library	2080	117	3	T8 1x4 3 Lamps Electronic Ballast Pendant Mounting Direct/Indirect Lens	82	9.59	19,955.5	$3,312.62	117	0	No Change	82	9.59	19955.52	$3,312.62	$0.00	$0.00	0.00	0	$0.00	0.00
13	Library	2080	14	2	T8 1x4 2 Lamps Electronic Ballast Surface Mounting Parabolic Lens	58	0.81	1,689.0	$280.37	14	0	No Change	58	0.81	1688.96	$280.37	$0.00	$0.00	0.00	0	$0.00	0.00
15	Library	2080	8	3	T8 2x4 3 Lamps Electronic Ballast Recessed Mounting Parabolic Lens	82	0.66	1,364.5	$226.50	8	0	No Change	82	0.66	1364.48	$226.50	$0.00	$0.00	0.00	0	$0.00	0.00
30	Server Room	2080	2	2	T8 1x4 2 Lamps Electronic Ballast Surface Mounting No lens	58	0.12	241.3	$40.05	2	0	No Change	58	0.12	241.28	$40.05	$0.00	$0.00	0.00	0	$0.00	0.00
13	Storage	2080	20	2	T8 1x4 2 Lamps Electronic Ballast Surface Mounting Parabolic Lens	58	1.16	2,412.8	$400.52	20	0	No Change	58	1.16	2412.8	$400.52	$0.00	$0.00	0.00	0	$0.00	0.00
13	L11	2080	48	2	T8 1x4 2 Lamps Electronic Ballast Surface Mounting Parabolic Lens	58	2.78	5,790.7	$961.26	48	0	No Change	58	2.78	5790.72	$961.26	$0.00	$0.00	0.00	0	$0.00	0.00
13	L10	2080	28	2	T8 1x4 2 Lamps Electronic Ballast Surface Mounting Parabolic Lens	58	1.62	3,377.9	$560.73	28	0	No Change	58	1.62	3377.92	$560.73	$0.00	$0.00	0.00	0	$0.00	0.00
13	L12	2080	33	2	T8 1x4 2 Lamps Electronic Ballast Surface Mounting Parabolic Lens	58	1.91	3,981.1	$660.87	33	0	No Change	58	1.91	3981.12	$660.87	$0.00	$0.00	0.00	0	$0.00	0.00

3	L12	2080	2	2	T8 1x4 2 Lamps Electronic Ballast Surface Mounting Prismatic Lens	58	0.12	241.3	$40.05	2	0	No Change	58	0.12	241.28	$40.05	$0.00	$0.00	0.00	0	$0.00	0.00
3	L12	2080	2	2	T8 1x4 2 Lamps Electronic Ballast Surface Mounting Prismatic Lens	58	0.12	241.3	$40.05	2	0	No Change	58	0.12	241.28	$40.05	$0.00	$0.00	0.00	0	$0.00	0.00
31	L12	2080	1	1	Incandescent Pendant	200	0.20	416.0	$69.06	1	0	65 W CFL Lamp	65	0.07	135.2	$22.44	$17.00	$17.00	0.14	280.8	$46.61	0.36
13	L14	2080	2	2	T8 1x4 2 Lamps Electronic Ballast Surface Mounting Parabolic Lens	58	0.12	241.3	$40.05	2	0	No Change	58	0.12	241.28	$40.05	$0.00	$0.00	0.00	0	$0.00	0.00
2	L14	2080	38	2	T8 2x4 2 Lamps Electronic Ballast Recessed Mounting Prismatic Lens	58	2.20	4,584.3	$761.00	38	0	No Change	58	2.20	4584.32	$761.00	$0.00	$0.00	0.00	0	$0.00	0.00
2	Electrical Panels	520	5	2	T8 2x4 2 Lamps Electronic Ballast Recessed Mounting Prismatic Lens	58	0.29	150.8	$25.03	5	0	No Change	58	0.29	150.8	$25.03	$0.00	$0.00	0.00	0	$0.00	0.00
9	L15	2080	18	1	T8 1x4 1 Lamp Electronic Ballast Surface Mounting Prismatic Lens	28	0.50	1,048.3	$174.02	18	0	No Change	28	0.50	1048.32	$174.02	$0.00	$0.00	0.00	0	$0.00	0.00
10	L15	2080	3	2	T8 1x2 2 Lamps Electronic Ballast Surface Mounting Prismatic Lens	20	0.06	124.8	$20.72	3	0	No Change	20	0.06	124.8	$20.72	$0.00	$0.00	0.00	0	$0.00	0.00
9	L13	2080	12	1	T8 1x4 1 Lamp Electronic Ballast Surface Mounting Prismatic Lens	28	0.34	698.9	$116.01	12	0	No Change	28	0.34	698.88	$116.01	$0.00	$0.00	0.00	0	$0.00	0.00
10	L13	2080	3	2	T8 1x2 2 Lamps Electronic Ballast Surface Mounting Prismatic Lens	20	0.06	124.8	$20.72	3	0	No Change	20	0.06	124.8	$20.72	$0.00	$0.00	0.00	0	$0.00	0.00
3	Boys Room	2080	2	2	T8 1x4 2 Lamps Electronic Ballast Surface Mounting Prismatic Lens	58	0.12	241.3	$40.05	2	0	No Change	58	0.12	241.28	$40.05	$0.00	$0.00	0.00	0	$0.00	0.00
24	Storage	520	1	1	Incadescent High Hat	100	0.10	52.0	$8.63	1	0	Eiko-30w mini sprial	30	0.03	15.6	$2.59	$6.00	$6.00	0.07	36.4	$6.04	0.99
3	Girls Room	2080	2	2	T8 1x4 2 Lamps Electronic Ballast Surface Mounting Prismatic Lens	58	0.12	241.3	$40.05	2	0	No Change	58	0.12	241.28	$40.05	$0.00	$0.00	0.00	0	$0.00	0.00
2	Hall	2080	6	2	T8 2x4 2 Lamps Electronic Ballast Recessed Mounting Prismatic Lens	58	0.35	723.8	$120.16	6	0	No Change	58	0.35	723.84	$120.16	$0.00	$0.00	0.00	0	$0.00	0.00
2	Elevator	8760	1	2	T8 2x4 2 Lamps Electronic Ballast Recessed Mounting Prismatic Lens	58	0.06	508.1	$84.34	1	0	No Change	58	0.06	508.08	$84.34	$0.00	$0.00	0.00	0	$0.00	0.00
24	Elevator	8760	3	1	Incadescent High Hat	100	0.30	2,628.0	$436.25	3	0	Eiko-30w mini sprial	30	0.09	788.4	$130.87	$6.00	$18.00	0.21	1839.6	$305.37	0.06
32	Elevator	8760	1	1	Compact Fluorescent High Hat 1 lamp	100	0.10	876.0	$145.42	1	0	No Change	100	0.10	876	$145.42	$0.00	$0.00	0.00	0	$0.00	0.00
15	Math Office	2080	16	3	T8 2x4 3 Lamps Electronic Ballast Recessed Mounting Parabolic Lens	82	1.31	2,729.0	$453.01	16	0	No Change	82	1.31	2728.96	$453.01	$0.00	$0.00	0.00	0	$0.00	0.00
13	Electrical Room	520	3	2	T8 1x4 2 Lamps Electronic Ballast Surface Mounting Parabolic Lens	58	0.17	90.5	$15.02	3	0	No Change	58	0.17	90.48	$15.02	$0.00	$0.00	0.00	0	$0.00	0.00
8	Stairwell	8760	3	2	T12 1x4 2 Lamps Electronic Ballast Surface Wall Mounting No Lens	94	0.28	2,470.3	$410.07	3	0	4' 2-Lamp T-8 32W wall Mtd.Metalux BC232	58	0.17	1524.24	$253.02	$170.00	$510.00	0.11	946.08	$157.05	3.25
21	Stairwell	8760	1	2	T8 1x4 2 Lamps Electronic Ballast Surface Wall Mounting	58	0.06	508.1	$84.34	1	0	No Change	58	0.06	508.08	$84.34	$0.00	$0.00	0.00	0	$0.00	0.00
2	Bathrooms	2080	4	2	T8 2x4 2 Lamps Electronic Ballast Recessed Mounting Prismatic Lens	58	0.23	482.6	$80.10	4	0	No Change	58	0.23	482.56	$80.10	$0.00	$0.00	0.00	0	$0.00	0.00
33	Bathrooms	2080	2	2	Compact Fluorescent High Hat - 2 lamp	56	0.11	233.0	$38.67	2	0	No Change	56	0.11	232.96	$38.67	$0.00	$0.00	0.00	0	$0.00	0.00
15	B160	2080	12	3	T8 2x4 3 Lamps Electronic Ballast Recessed Mounting Parabolic Lens	82	0.98	2,046.7	$339.76	12	0	No Change	82	0.98	2046.72	$339.76	$0.00	$0.00	0.00	0	$0.00	0.00
2	B162	2080	20	2	T8 2x4 2 Lamps Electronic Ballast Recessed Mounting Prismatic Lens	58	1.16	2,412.8	$400.52	20	0	No Change	58	1.16	2412.8	$400.52	$0.00	$0.00	0.00	0	$0.00	0.00
15	B163	2080	24	3	T8 2x4 3 Lamps Electronic Ballast Recessed Mounting Parabolic Lens	82	1.97	4,093.4	$679.51	24	0	No Change	82	1.97	4093.44	$679.51	$0.00	$0.00	0.00	0	$0.00	0.00

15	B161	2080	6	3	T8 2x4 3 Lamps Electronic Ballast Recessed Mounting Parabolic Lens	82	0.49	1,023.4	$169.88	6	0	No Change	82	0.49	1023.36	$169.88	$0.00	$0.00	0.00	0	$0.00	0.00
2	B164	2080	20	2	T8 2x4 2 Lamps Electronic Ballast Recessed Mounting Prismatic Lens	58	1.16	2,412.8	$400.52	20	0	No Change	58	1.16	2412.8	$400.52	$0.00	$0.00	0.00	0	$0.00	0.00
2	B166	2080	20	2	T8 2x4 2 Lamps Electronic Ballast Recessed Mounting Prismatic Lens	58	1.16	2,412.8	$400.52	20	0	No Change	58	1.16	2412.8	$400.52	$0.00	$0.00	0.00	0	$0.00	0.00
32	B166	2080	2	1	Compact Fluorescent High Hat 1 lamp	100	0.20	416.0	$69.06	2	0	No Change	100	0.20	416	$69.06	$0.00	$0.00	0.00	0	$0.00	0.00
15	B165	2080	14	3	T8 2x4 3 Lamps Electronic Ballast Recessed Mounting Parabolic Lens	82	1.15	2,387.8	$396.38	14	0	No Change	82	1.15	2387.84	$396.38	$0.00	$0.00	0.00	0	$0.00	0.00
34	B167	2080	9	1	Mercury Start 1 Lamp Magnetic Ballast	175	1.58	3,276.0	$543.82	9	1	Cylinder 9.5" Surface Cylinder 42W Triple Twin Tube Portfolio M/N C19242E	85	0.77	1591.2	$264.14	$265.00	$2,385.00	0.81	1684.8	$279.68	8.53
15	B167	2080	12	3	T8 2x4 3 Lamps Electronic Ballast Recessed Mounting Parabolic Lens	82	0.98	2,046.7	$339.76	12	0	No Change	82	0.98	2046.72	$339.76	$0.00	$0.00	0.00	0	$0.00	0.00
21	Stairwell	2080	3	2	T8 1x4 2 Lamps Electronic Ballast Surface Wall Mounting	58	0.17	361.9	$60.08	3	0	No Change	58	0.17	361.92	$60.08	$0.00	$0.00	0.00	0	$0.00	0.00
31	Auditorium	2080	102	1	Incandescent Pendant	200	20.40	42,432.0	$7,043.71	102	0	65 W CFL Lamp	65	6.63	13790.4	$2,289.21	$17.00	$1,734.00	13.77	28641.6	$4,754.51	0.36
31	Auditorium Lobby	2080	14	1	Incandescent Pendant	200	2.80	5,824.0	$966.78	14	0	65 W CFL Lamp	65	0.91	1892.8	$314.20	$17.00	$238.00	1.89	3931.2	$652.58	0.36
31	Auditorium Lobby	2080	45	1	Incandescent Pendant	200	9.00	18,720.0	$3,107.52	45	0	65 W CFL Lamp	65	2.93	6084	$1,009.94	$17.00	$765.00	6.08	12636	$2,097.58	0.36
24	Auditorium Lobby	2080	32	1	Incadescent High Hat	100	3.20	6,656.0	$1,104.90	32	0	Eiko-30w mini sprial	30	0.96	1996.8	$331.47	$6.00	$192.00	2.24	4659.2	$773.43	0.25
11	Bathrooms	2080	12	2	T8 1x4 2 Lamps Electronic Ballast Recessed Mounting Prismatic Lens	58	0.70	1,447.7	$240.31	12	0	No Change	58	0.70	1447.68	$240.31	$0.00	$0.00	0.00	0	$0.00	0.00
2	B156	2080	20	2	T8 2x4 2 Lamps Electronic Ballast Recessed Mounting Prismatic Lens	58	1.16	2,412.8	$400.52	20	0	No Change	58	1.16	2412.8	$400.52	$0.00	$0.00	0.00	0	$0.00	0.00
15	B153	2080	8	3	T8 2x4 3 Lamps Electronic Ballast Recessed Mounting Parabolic Lens	82	0.66	1,364.5	$226.50	8	0	No Change	82	0.66	1364.48	$226.50	$0.00	$0.00	0.00	0	$0.00	0.00
15	B154	2080	16	3	T8 2x4 3 Lamps Electronic Ballast Recessed Mounting Parabolic Lens	82	1.31	2,729.0	$453.01	16	0	No Change	82	1.31	2728.96	$453.01	$0.00	$0.00	0.00	0	$0.00	0.00
15	B151	2080	12	3	T8 2x4 3 Lamps Electronic Ballast Recessed Mounting Parabolic Lens	82	0.98	2,046.7	$339.76	12	0	No Change	82	0.98	2046.72	$339.76	$0.00	$0.00	0.00	0	$0.00	0.00
15	World Language	2080	8	3	T8 2x4 3 Lamps Electronic Ballast Recessed Mounting Parabolic Lens	82	0.66	1,364.5	$226.50	8	0	No Change	82	0.66	1364.48	$226.50	$0.00	$0.00	0.00	0	$0.00	0.00
15	B150	2080	15	3	T8 2x4 3 Lamps Electronic Ballast Recessed Mounting Parabolic Lens	82	1.23	2,558.4	$424.69	15	0	No Change	82	1.23	2558.4	$424.69	$0.00	$0.00	0.00	0	$0.00	0.00
19	B150	2080	1	2	T8 2x2 2 U-Tube Lamps Electronic Ballast Recessed Mounting Parabolic Lens	73	0.07	151.8	$25.21	1	0	No Change	73	0.07	151.84	$25.21	$0.00	$0.00	0.00	0	$0.00	0.00
31	Storage	2080	2	1	Incandescent Pendant	200	0.40	832.0	$138.11	2	0	65 W CFL Lamp	65	0.13	270.4	$44.89	$17.00	$34.00	0.27	561.6	$93.23	0.36
33	B Hallway	8760	10	2	Compact Fluorescent High Hat - 2 lamp	56	0.56	4,905.6	$814.33	10	0	No Change	56	0.56	4905.6	$814.33	$0.00	$0.00	0.00	0	$0.00	0.00
2	B Hallway	8760	52	2	T8 2x4 2 Lamps Electronic Ballast Recessed Mounting Prismatic Lens	58	3.02	26,420.2	$4,385.75	52	0	No Change	58	3.02	26420.16	$4,385.75	$0.00	$0.00	0.00	0	$0.00	0.00
32	B Hallway	8760	2	1	Compact Fluorescent High Hat 1 lamp	100	0.20	1,752.0	$290.83	2	0	No Change	100	0.20	1752	$290.83	$0.00	$0.00	0.00	0	$0.00	0.00
3	Projection Room	2080	3	2	T8 1x4 2 Lamps Electronic Ballast Surface Mounting Prismatic Lens	58	0.17	361.9	$60.08	3	0	No Change	58	0.17	361.92	$60.08	$0.00	$0.00	0.00	0	$0.00	0.00
24	Projection Room	2080	1	1	Incadescent High Hat	100	0.10	208.0	$34.53	1	0	Eiko-30w mini sprial	30	0.03	62.4	$10.36	$6.00	$6.00	0.07	145.6	$24.17	0.25
15	M20	2080	4	3	T8 2x4 3 Lamps Electronic Ballast Recessed Mounting Parabolic Lens	82	0.33	682.2	$113.25	4	0	No Change	82	0.33	682.24	$113.25	$0.00	$0.00	0.00	0	$0.00	0.00
15	M19	2080	4	3	T8 2x4 3 Lamps Electronic Ballast Recessed Mounting Parabolic Lens	82	0.33	682.2	$113.25	4	0	No Change	82	0.33	682.24	$113.25	$0.00	$0.00	0.00	0	$0.00	0.00

22	Band Room	2080	56	4	T8 2x2 4 Lamps Electronic Ballast Recessed Mounting Parabolic Lens	56	3.14	6,522.9	$1,082.80	56	0	No Change	56	3.14	6522.88	$1,082.80	$0.00	$0.00	0.00	0	$0.00	0.00
15	Band Office	2080	8	3	T8 2x4 3 Lamps Electronic Ballast Recessed Mounting Parabolic Lens	82	0.66	1,364.5	$226.50	8	0	No Change	82	0.66	1364.48	$226.50	$0.00	$0.00	0.00	0	$0.00	0.00
5	Band Storage	2080	8	4	T8 2x4 4 Lamps Electronic Ballast Recessed Mounting Prismatic Lens	109	0.87	1,813.8	$301.08	8	0	No Change	109	0.87	1813.76	$301.08	$0.00	$0.00	0.00	0	$0.00	0.00
15	Band Practice	2080	6	3	T8 2x4 3 Lamps Electronic Ballast Recessed Mounting Parabolic Lens	82	0.49	1,023.4	$169.88	6	0	No Change	82	0.49	1023.36	$169.88	$0.00	$0.00	0.00	0	$0.00	0.00
5	M Hall	8760	18	4	T8 2x4 4 Lamps Electronic Ballast Recessed Mounting Prismatic Lens	109	1.96	17,187.1	$2,853.06	18	0	No Change	109	1.96	17187.12	$2,853.06	$0.00	$0.00	0.00	0	$0.00	0.00
27	M Hall	8760	5	1	Incadescent High Hat	60	0.30	2,628.0	$436.25	5	0	13 W CFL Lamp	13	0.07	569.4	$94.52	$5.75	$28.75	0.24	2058.6	$341.73	0.08
33	M Hall	8760	2	2	Compact Fluorescent High Hat - 2 lamp	56	0.11	981.1	$162.87	2	0	No Change	56	0.11	981.12	$162.87	$0.00	$0.00	0.00	0	$0.00	0.00
5	Bathrooms	2080	6	4	T8 2x4 4 Lamps Electronic Ballast Recessed Mounting Prismatic Lens	109	0.65	1,360.3	$225.81	6	0	No Change	109	0.65	1360.32	$225.81	$0.00	$0.00	0.00	0	$0.00	0.00
15	M18	2080	1	3	T8 2x4 3 Lamps Electronic Ballast Recessed Mounting Parabolic Lens	82	0.08	170.6	$28.31	1	0	No Change	82	0.08	170.56	$28.31	$0.00	$0.00	0.00	0	$0.00	0.00
2	M17	2080	24	2	T8 2x4 2 Lamps Electronic Ballast Recessed Mounting Prismatic Lens	58	1.39	2,895.4	$480.63	24	0	No Change	58	1.39	2895.36	$480.63	$0.00	$0.00	0.00	0	$0.00	0.00
11	Orchastra Office Hall	8760	5	2	T8 1x4 2 Lamps Electronic Ballast Recessed Mounting Prismatic Lens	58	0.29	2,540.4	$421.71	5	0	No Change	58	0.29	2540.4	$421.71	$0.00	$0.00	0.00	0	$0.00	0.00
2	Director Office	2080	3	2	T8 2x4 2 Lamps Electronic Ballast Recessed Mounting Prismatic Lens	58	0.17	361.9	$60.08	3	0	No Change	58	0.17	361.92	$60.08	$0.00	$0.00	0.00	0	$0.00	0.00
2	Office	2080	6	2	T8 2x4 2 Lamps Electronic Ballast Recessed Mounting Prismatic Lens	58	0.35	723.8	$120.16	6	0	No Change	58	0.35	723.84	$120.16	$0.00	$0.00	0.00	0	$0.00	0.00
2	M16	2080	24	2	T8 2x4 2 Lamps Electronic Ballast Recessed Mounting Prismatic Lens	58	1.39	2,895.4	$480.63	24	0	No Change	58	1.39	2895.36	$480.63	$0.00	$0.00	0.00	0	$0.00	0.00
4	Music Tech Room	2080	24	3	T8 2x4 3 Lamps Electronic Ballast Recessed Mounting Prismatic Lens	82	1.97	4,093.4	$679.51	24	0	No Change	82	1.97	4093.44	$679.51	$0.00	$0.00	0.00	0	$0.00	0.00
11	M Wing Hall	8760	13	2	T8 1x4 2 Lamps Electronic Ballast Recessed Mounting Prismatic Lens	58	0.75	6,605.0	$1,096.44	13	0	No Change	58	0.75	6605.04	$1,096.44	$0.00	$0.00	0.00	0	$0.00	0.00
2	M Wing Hall	8760	1	2	T8 2x4 2 Lamps Electronic Ballast Recessed Mounting Prismatic Lens	58	0.06	508.1	$84.34	1	0	No Change	58	0.06	508.08	$84.34	$0.00	$0.00	0.00	0	$0.00	0.00
2	Hallway Exit B	8760	3	2	T8 2x4 2 Lamps Electronic Ballast Recessed Mounting Prismatic Lens	58	0.17	1,524.2	$253.02	3	0	No Change	58	0.17	1524.24	$253.02	$0.00	$0.00	0.00	0	$0.00	0.00
2	B159	2080	20	2	T8 2x4 2 Lamps Electronic Ballast Recessed Mounting Prismatic Lens	58	1.16	2,412.8	$400.52	20	0	No Change	58	1.16	2412.8	$400.52	$0.00	$0.00	0.00	0	$0.00	0.00
2	B158	2080	20	2	T8 2x4 2 Lamps Electronic Ballast Recessed Mounting Prismatic Lens	58	1.16	2,412.8	$400.52	20	0	No Change	58	1.16	2412.8	$400.52	$0.00	$0.00	0.00	0	$0.00	0.00
2	B157	2080	20	2	T8 2x4 2 Lamps Electronic Ballast Recessed Mounting Prismatic Lens	58	1.16	2,412.8	$400.52	20	0	No Change	58	1.16	2412.8	$400.52	$0.00	$0.00	0.00	0	$0.00	0.00
33	Hallway	8760	7	2	Compact Fluorescent High Hat - 2 lamp	56	0.39	3,433.9	$570.03	7	0	No Change	56	0.39	3433.92	$570.03	$0.00	$0.00	0.00	0	$0.00	0.00
5	Hallway	8760	15	4	T8 2x4 4 Lamps Electronic Ballast Recessed Mounting Prismatic Lens	109	1.64	14,322.6	$2,377.55	15	0	No Change	109	1.64	14322.6	$2,377.55	$0.00	$0.00	0.00	0	$0.00	0.00
5	Hallway	8760	49	4	T8 2x4 4 Lamps Electronic Ballast Recessed Mounting Prismatic Lens	109	5.34	46,787.2	$7,766.67	49	0	No Change	109	5.34	46787.16	$7,766.67	$0.00	$0.00	0.00	0	$0.00	0.00

33	Hallway	8760	4	2	Compact Fluorescent High Hat - 2 lamp	56	0.22	1,962.2	$325.73	4	0	No Change	56	0.22	1962.24	$325.73	$0.00	$0.00	0.00	0	$0.00	0.00
2	Health Office	2080	14	2	T8 2x4 2 Lamps Electronic Ballast Recessed Mounting Prismatic Lens	58	0.81	1,689.0	$280.37	14	0	No Change	58	0.81	1688.96	$280.37	$0.00	$0.00	0.00	0	$0.00	0.00
18	Health Office	2080	1	2	T8 4' 2 Lamps Electronic Ballast Side Wall Mount	80	0.08	166.4	$27.62	1	0	No Change	80	0.08	166.4	$27.62	$0.00	$0.00	0.00	0	$0.00	0.00
2	Health Office	2080	1	2	T8 2x4 2 Lamps Electronic Ballast Recessed Mounting Prismatic Lens	58	0.06	120.6	$20.03	1	0	No Change	58	0.06	120.64	$20.03	$0.00	$0.00	0.00	0	$0.00	0.00
35	Health Office	2080	1	2	T8 2 Tube 4' Indust Electronic Ballast Surface Mounting No Lens	58	0.06	120.6	$20.03	1	0	No Change	58	0.06	120.64	$20.03	$0.00	$0.00	0.00	0	$0.00	0.00
36	Health Office	2080	2	1	T8 6' 1 Lamp Electronic Ballast Surface Wall Mounted Prismatic Lens	28	0.06	116.5	$19.34	2	0	No Change	28	0.06	116.48	$19.34	$0.00	$0.00	0.00	0	$0.00	0.00
15	C137	2080	25	3	T8 2x4 3 Lamps Electronic Ballast Recessed Mounting Parabolic Lens	82	2.05	4,264.0	$707.82	25	0	No Change	82	2.05	4264	$707.82	$0.00	$0.00	0.00	0	$0.00	0.00
15	Storage	2080	6	3	T8 2x4 3 Lamps Electronic Ballast Recessed Mounting Parabolic Lens	82	0.49	1,023.4	$169.88	6	0	No Change	82	0.49	1023.36	$169.88	$0.00	$0.00	0.00	0	$0.00	0.00
15	C139	2080	25	3	T8 2x4 3 Lamps Electronic Ballast Recessed Mounting Parabolic Lens	82	2.05	4,264.0	$707.82	25	0	No Change	82	2.05	4264	$707.82	$0.00	$0.00	0.00	0	$0.00	0.00
15	C141	2080	16	3	T8 2x4 3 Lamps Electronic Ballast Recessed Mounting Parabolic Lens	82	1.31	2,729.0	$453.01	16	0	No Change	82	1.31	2728.96	$453.01	$0.00	$0.00	0.00	0	$0.00	0.00
15	C143	2080	14	3	T8 2x4 3 Lamps Electronic Ballast Recessed Mounting Parabolic Lens	82	1.15	2,387.8	$396.38	14	0	No Change	82	1.15	2387.84	$396.38	$0.00	$0.00	0.00	0	$0.00	0.00
15	Office	2080	2	3	T8 2x4 3 Lamps Electronic Ballast Recessed Mounting Parabolic Lens	82	0.16	341.1	$56.63	2	0	No Change	82	0.16	341.12	$56.63	$0.00	$0.00	0.00	0	$0.00	0.00
16	Bathrooms	2080	6	4	T8 2x4 4 Lamps Electronic Ballast Recessed Mounting Parabolic Lens	109	0.65	1,360.3	$225.81	6	0	No Change	109	0.65	1360.32	$225.81	$0.00	$0.00	0.00	0	$0.00	0.00
33	Hallway	8760	4	2	Compact Fluorescent High Hat - 2 lamp	56	0.22	1,962.2	$325.73	4	0	No Change	56	0.22	1962.24	$325.73	$0.00	$0.00	0.00	0	$0.00	0.00
15	Science Room	2080	12	3	T8 2x4 3 Lamps Electronic Ballast Recessed Mounting Parabolic Lens	82	0.98	2,046.7	$339.76	12	0	No Change	82	0.98	2046.72	$339.76	$0.00	$0.00	0.00	0	$0.00	0.00
15	C138	2080	25	3	T8 2x4 3 Lamps Electronic Ballast Recessed Mounting Parabolic Lens	82	2.05	4,264.0	$707.82	25	0	No Change	82	2.05	4264	$707.82	$0.00	$0.00	0.00	0	$0.00	0.00
15	Prep Room	2080	6	3	T8 2x4 3 Lamps Electronic Ballast Recessed Mounting Parabolic Lens	82	0.49	1,023.4	$169.88	6	0	No Change	82	0.49	1023.36	$169.88	$0.00	$0.00	0.00	0	$0.00	0.00
15	C136	2080	25	3	T8 2x4 3 Lamps Electronic Ballast Recessed Mounting Parabolic Lens	82	2.05	4,264.0	$707.82	25	0	No Change	82	2.05	4264	$707.82	$0.00	$0.00	0.00	0	$0.00	0.00
5	Bathrooms	2080	6	4	T8 2x4 4 Lamps Electronic Ballast Recessed Mounting Prismatic Lens	109	0.65	1,360.3	$225.81	6	0	No Change	109	0.65	1360.32	$225.81	$0.00	$0.00	0.00	0	$0.00	0.00
33	Bathrooms	2080	2	2	Compact Fluorescent High Hat - 2 lamp	56	0.11	233.0	$38.67	2	0	No Change	56	0.11	232.96	$38.67	$0.00	$0.00	0.00	0	$0.00	0.00
5	Electric Closet	520	5	4	T8 2x4 4 Lamps Electronic Ballast Recessed Mounting Prismatic Lens	109	0.55	283.4	$47.04	5	0	No Change	109	0.55	283.4	$47.04	$0.00	$0.00	0.00	0	$0.00	0.00
5	Storage	2080	4	4	T8 2x4 4 Lamps Electronic Ballast Recessed Mounting Prismatic Lens	109	0.44	906.9	$150.54	4	0	No Change	109	0.44	906.88	$150.54	$0.00	$0.00	0.00	0	$0.00	0.00
5	Stairwell	8760	20	4	T8 2x4 4 Lamps Electronic Ballast Recessed Mounting Prismatic Lens	109	2.18	19,096.8	$3,170.07	20	0	No Change	109	2.18	19096.8	$3,170.07	$0.00	$0.00	0.00	0	$0.00	0.00
2	Stairwell	8760	2	2	T8 2x4 2 Lamps Electronic Ballast Recessed Mounting Prismatic Lens	58	0.12	1,016.2	$168.68	2	0	No Change	58	0.12	1016.16	$168.68	$0.00	$0.00	0.00	0	$0.00	0.00

17	C205	2080	25	3	T8 2x4 3 Lamps Electronic Ballast Surface Mounting Parabolic Lens	82	2.05	4,264.0	$707.82	25	0	No Change	82	2.05	4264	$707.82	$0.00	$0.00	0.00	0	$0.00	0.00
17	Storage	2080	2	3	T8 2x4 3 Lamps Electronic Ballast Surface Mounting Parabolic Lens	82	0.16	341.1	$56.63	2	0	No Change	82	0.16	341.12	$56.63	$0.00	$0.00	0.00	0	$0.00	0.00
15	Science Office	2080	8	3	T8 2x4 3 Lamps Electronic Ballast Recessed Mounting Parabolic Lens	82	0.66	1,364.5	$226.50	8	0	No Change	82	0.66	1364.48	$226.50	$0.00	$0.00	0.00	0	$0.00	0.00
15	C203	2080	25	3	T8 2x4 3 Lamps Electronic Ballast Recessed Mounting Parabolic Lens	82	2.05	4,264.0	$707.82	25	0	No Change	82	2.05	4264	$707.82	$0.00	$0.00	0.00	0	$0.00	0.00
15	Prep Room	2080	6	3	T8 2x4 3 Lamps Electronic Ballast Recessed Mounting Parabolic Lens	82	0.49	1,023.4	$169.88	6	0	No Change	82	0.49	1023.36	$169.88	$0.00	$0.00	0.00	0	$0.00	0.00
15	Storage	2080	4	3	T8 2x4 3 Lamps Electronic Ballast Recessed Mounting Parabolic Lens	82	0.33	682.2	$113.25	4	0	No Change	82	0.33	682.24	$113.25	$0.00	$0.00	0.00	0	$0.00	0.00
15	C201	2080	25	3	T8 2x4 3 Lamps Electronic Ballast Recessed Mounting Parabolic Lens	82	2.05	4,264.0	$707.82	25	0	No Change	82	2.05	4264	$707.82	$0.00	$0.00	0.00	0	$0.00	0.00
12	Greenhouse	2080	4	6	T8 8' 6 Lamps (4') Electronic Ballast Surface Mounting Prismatic Lens Vapor Proof	167	0.67	1,389.4	$230.65	4	0	No Change	167	0.67	1389.44	$230.65	$0.00	$0.00	0.00	0	$0.00	0.00
5	Electrical Room	2080	12	4	T8 2x4 4 Lamps Electronic Ballast Recessed Mounting Prismatic Lens	109	1.31	2,720.6	$451.63	12	0	No Change	109	1.31	2720.64	$451.63	$0.00	$0.00	0.00	0	$0.00	0.00
5	C Wing Up Stairs Hall	8760	38	4	T8 2x4 4 Lamps Electronic Ballast Recessed Mounting Prismatic Lens	109	4.14	36,283.9	$6,023.13	38	0	No Change	109	4.14	36283.92	$6,023.13	$0.00	$0.00	0.00	0	$0.00	0.00
33	C Wing Up Stairs Hall	8760	6	2	Compact Fluorescent High Hat - 2 lamp	56	0.34	2,943.4	$488.60	6	0	No Change	56	0.34	2943.36	$488.60	$0.00	$0.00	0.00	0	$0.00	0.00
5	Storage	2080	3	4	T8 2x4 4 Lamps Electronic Ballast Recessed Mounting Prismatic Lens	109	0.33	680.2	$112.91	3	0	No Change	109	0.33	680.16	$112.91	$0.00	$0.00	0.00	0	$0.00	0.00
5	Bathrooms	2080	6	4	T8 2x4 4 Lamps Electronic Ballast Recessed Mounting Prismatic Lens	109	0.65	1,360.3	$225.81	6	0	No Change	109	0.65	1360.32	$225.81	$0.00	$0.00	0.00	0	$0.00	0.00
33	Bathrooms	2080	2	2	Compact Fluorescent High Hat - 2 lamp	56	0.11	233.0	$38.67	2	0	No Change	56	0.11	232.96	$38.67	$0.00	$0.00	0.00	0	$0.00	0.00
15	C200	2080	25	3	T8 2x4 3 Lamps Electronic Ballast Recessed Mounting Parabolic Lens	82	2.05	4,264.0	$707.82	25	0	No Change	82	2.05	4264	$707.82	$0.00	$0.00	0.00	0	$0.00	0.00
15	Prep Room	2080	6	3	T8 2x4 3 Lamps Electronic Ballast Recessed Mounting Parabolic Lens	82	0.49	1,023.4	$169.88	6	0	No Change	82	0.49	1023.36	$169.88	$0.00	$0.00	0.00	0	$0.00	0.00
15	Storage	2080	4	3	T8 2x4 3 Lamps Electronic Ballast Recessed Mounting Parabolic Lens	82	0.33	682.2	$113.25	4	0	No Change	82	0.33	682.24	$113.25	$0.00	$0.00	0.00	0	$0.00	0.00
15	C202	2080	25	3	T8 2x4 3 Lamps Electronic Ballast Recessed Mounting Parabolic Lens	82	2.05	4,264.0	$707.82	25	0	No Change	82	2.05	4264	$707.82	$0.00	$0.00	0.00	0	$0.00	0.00
15	C204	2080	25	3	T8 2x4 3 Lamps Electronic Ballast Recessed Mounting Parabolic Lens	82	2.05	4,264.0	$707.82	25	0	No Change	82	2.05	4264	$707.82	$0.00	$0.00	0.00	0	$0.00	0.00
15	Storage	2080	3	3	T8 2x4 3 Lamps Electronic Ballast Recessed Mounting Parabolic Lens	82	0.25	511.7	$84.94	3	0	No Change	82	0.25	511.68	$84.94	$0.00	$0.00	0.00	0	$0.00	0.00
4	Bathrooms	2080	6	3	T8 2x4 3 Lamps Electronic Ballast Recessed Mounting Prismatic Lens	82	0.49	1,023.4	$169.88	6	0	No Change	82	0.49	1023.36	$169.88	$0.00	$0.00	0.00	0	$0.00	0.00
39	Boiler Room - Original	2080	8	1	Incadescent Pendant Mounting	150	1.20	2,496.0	$414.34	8	1	40 W CFL Lamp	40	0.32	665.6	$110.49	$9.60	$76.80	0.88	1830.4	$303.85	0.25
40	Boiler Room - 2001 Addition	2080	9	2	4' - 2-Lamp 32W T-8 Industrial Strip w/ Elect Ballast and Wire guard	73	0.66	1,366.6	$226.85	9	2	No Change	73	0.66	1366.56	$226.85	$0.00	$0.00	0.00	0	$0.00	0.00
	Totals		2754	495			213.70	639,038.2	$106,080.33	2754	6			185.623	576344.6	$95,673.21		$6,886.55	28.07	62693.5	$10,407.12	0.66

NOTES: 1. Simple Payback noted in this spreadsheet does not include Maintenance Savings and NJ Smart Start Incentives.

CEG Job #: 9C09078
Project: Chatham School District
Address: 255 Lafayette Avenue
City: Chatham
Building SF: 253,663

Chatham High School

DATE: 11/3/2009
KWH COST: $0.166

ECM #2: Lighting Controls

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	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
1	Front Hall	8760	11	4	T8 4x4 4 Lamps Electronic Ballast Recessed Mounting Prismatic Lens	109	1.20	10,503.2	$1,743.54	11	0	No Change	109	1.20	0%	10503.24	$1,743.54	$0.00	$0.00	0.00	0	$0.00	0.00
2	Hall Behind Cafeteria	8760	7	2	T8 2x4 2 Lamps Electronic Ballast Recessed Mounting Prismatic Lens	58	0.41	3,556.6	$590.39	7	0	No Change	58	0.41	0%	3556.56	$590.39	$0.00	$0.00	0.00	0	$0.00	0.00
3	Maintenance Hall	8760	5	2	T8 1x4 2 Lamps Electronic Ballast Surface Mounting Prismatic Lens	58	0.29	2,540.4	$421.71	5	0	No Change	58	0.29	0%	2540.40	$421.71	$0.00	$0.00	0.00	0	$0.00	0.00
25	Maintenance Hall	8760	1	1	Incadescent Surface Mounting	100	0.10	876.0	$145.42	1	0	No Change	100	0.10	0%	876.00	$145.42	$0.00	$0.00	0.00	0	$0.00	0.00
3	Kitchen	2080	34	2	T8 1x4 2 Lamps Electronic Ballast Surface Mounting Prismatic Lens	58	1.97	4,101.8	$680.89	34	0	No Change	58	1.97	0%	4101.76	$680.89	$0.00	$0.00	0.00	0	$0.00	0.00
3	Cafeteria Manager	2080	2	2	T8 1x4 2 Lamps Electronic Ballast Surface Mounting Prismatic Lens	58	0.12	241.3	$40.05	2	0	Dual Technology Occupancy Sensor	58	0.12	10%	217.15	$36.05	$160.00	$160.00	0.00	24.128	$4.01	39.95
4	Secondary Kitchen	2080	8	3	T8 2x4 3 Lamps Electronic Ballast Recessed Mounting Prismatic Lens	82	0.66	1,364.5	$226.50	8	0	Dual Technology Occupancy Sensor	82	0.66	10%	1228.03	$203.85	$160.00	$160.00	0.00	136.448	$22.65	7.06
3	Storage	2080	2	2	T8 1x4 2 Lamps Electronic Ballast Surface Mounting Prismatic Lens	58	0.12	241.3	$40.05	2	0	Dual Technology Occupancy Sensor	58	0.12	10%	217.15	$36.05	$160.00	$160.00	0.00	24.128	$4.01	39.95
3	Hall Between Caf & Storage	2080	2	2	T8 1x4 2 Lamps Electronic Ballast Surface Mounting Prismatic Lens	58	0.12	241.3	$40.05	2	0	No Change	58	0.12	0%	241.28	$40.05	$0.00	$0.00	0.00	0	$0.00	0.00
2	Cafeteria	2080	40	2	T8 2x4 2 Lamps Electronic Ballast Recessed Mounting Prismatic Lens	58	2.32	4,825.6	$801.05	40	0	Dual Technology Occupancy Sensor	58	2.32	10%	4343.04	$720.94	$160.00	$160.00	0.00	482.56	$80.10	2.00
26	Cafeteria	2080	5	1	Incadescent Pendant Mounting	100	0.50	1,040.0	$172.64	5	0	Dual Technology Occupancy Sensor	100	0.50	10%	936.00	$155.38	$160.00	$160.00	0.00	104	$17.26	9.27
19	Cafeteria	2080	5	2	T8 2x2 2 U-Tube Lamps Electronic Ballast Recessed Mounting Parabolic Lens	73	0.37	759.2	$126.03	5	0	Dual Technology Occupancy Sensor	73	0.37	10%	683.28	$113.42	$160.00	$160.00	0.00	75.92	$12.60	12.70
2	Bathrooms	2080	6	2	T8 2x4 2 Lamps Electronic Ballast Recessed Mounting Prismatic Lens	58	0.35	723.8	$120.16	6	0	No Change	58	0.35	0%	723.84	$120.16	$0.00	$0.00	0.00	0	$0.00	0.00
5	Front Hall	8760	17	4	T8 2x4 4 Lamps Electronic Ballast Recessed Mounting Prismatic Lens	109	1.85	16,232.3	$2,694.56	17	0	No Change	109	1.85	0%	16232.28	$2,694.56	$0.00	$0.00	0.00	0	$0.00	0.00
3	Hall Between Library	8760	3	2	T8 1x4 2 Lamps Electronic Ballast Surface Mounting Prismatic Lens	58	0.17	1,524.2	$253.02	3	0	No Change	58	0.17	0%	1524.24	$253.02	$0.00	$0.00	0.00	0	$0.00	0.00
13	Conference Room	2080	10	2	T8 1x4 2 Lamps Electronic Ballast Surface Mounting Parabolic Lens	58	0.58	1,206.4	$200.26	10	0	Dual Technology Occupancy Sensor	58	0.58	10%	1085.76	$180.24	$160.00	$160.00	0.00	120.64	$20.03	7.99
14	A104	2080	24	2	T8 1x4 2 Lamps Electronic Ballast Pendant Mounting Parabolic Lens	58	1.39	2,895.4	$480.63	24	0	Dual Technology Occupancy Sensor	58	1.39	10%	2605.82	$432.57	$160.00	$160.00	0.00	289.536	$48.06	3.33
15	Counseling	2080	6	3	T8 2x4 3 Lamps Electronic Ballast Recessed Mounting Parabolic Lens	82	0.49	1,023.4	$169.88	6	0	Dual Technology Occupancy Sensor	82	0.49	10%	921.02	$152.89	$160.00	$160.00	0.00	102.336	$16.99	9.42
2	Counseling	2080	8	2	T8 2x4 2 Lamps Electronic Ballast Recessed Mounting Prismatic Lens	58	0.46	965.1	$160.21	8	0	Dual Technology Occupancy Sensor	58	0.46	10%	868.61	$144.19	$160.00	$160.00	0.00	96.512	$16.02	9.99
18	Main Office Hall	8760	14	2	T8 4' 2 Lamps Electronic Ballast Side Wall Mount	80	1.12	9,811.2	$1,628.66	14	0	No Change	80	1.12	0%	9811.20	$1,628.66	$0.00	$0.00	0.00	0	$0.00	0.00
20	Main Office Hall	8760	1	1	T12 8' 1 Lamp Magnetic Ballast Surface Mounting No Lens	93	0.09	814.7	$135.24	1	2	No Change	93	0.09	0%	814.68	$135.24	$0.00	$0.00	0.00	0	$0.00	0.00
2	Main Office	8760	9	2	T8 2x4 2 Lamps Electronic Ballast Recessed Mounting Prismatic Lens	58	0.52	4,572.7	$759.07	9	0	No Change	58	0.52	0%	4572.72	$759.07	$0.00	$0.00	0.00	0	$0.00	0.00
2	Assistant Prin	2080	2	2	T8 2x4 2 Lamps Electronic Ballast Recessed Mounting Prismatic Lens	58	0.12	241.3	$40.05	2	0	Dual Technology Occupancy Sensor	58	0.12	10%	217.15	$36.05	$160.00	$160.00	0.00	24.128	$4.01	39.95

13	Communications	2080	1	2	T8 1x4 2 Lamps Electronic Ballast Surface Mounting Parabolic Lens	58	0.06	120.6	$20.03	1	0	Dual Technology Occupancy Sensor	58	0.06	10%	108.58	$18.02	$160.00	$160.00	0.00	12.064	$2.00	79.90
4	Principal 1	2080	1	3	T8 2x4 3 Lamps Electronic Ballast Recessed Mounting Prismatic Lens	82	0.08	170.6	$28.31	1	0	Dual Technology Occupancy Sensor	82	0.08	10%	153.50	$25.48	$160.00	$160.00	0.00	17.056	$2.83	56.51
2	Principal 1	2080	2	2	T8 2x4 2 Lamps Electronic Ballast Recessed Mounting Prismatic Lens	58	0.12	241.3	$40.05	2	0	Dual Technology Occupancy Sensor	58	0.12	10%	217.15	$36.05	$160.00	$160.00	0.00	24.128	$4.01	39.95
2	Principal 2	2080	3	2	T8 2x4 2 Lamps Electronic Ballast Recessed Mounting Prismatic Lens	58	0.17	361.9	$60.08	3	0	Dual Technology Occupancy Sensor	58	0.17	10%	325.73	$54.07	$160.00	$160.00	0.00	36.192	$6.01	26.63
6	Bathrooms	2080	2	2	T12 2x2 2 U-Tube Lamps Magnetic Ballast Recessed Mounting Prismatic Lens	70	0.14	291.2	$48.34	2	0	Dual Technology Occupancy Sensor	70	0.14	10%	262.08	$43.51	$160.00	$160.00	0.00	29.12	$4.83	33.10
2	Security	2080	1	2	T8 2x4 2 Lamps Electronic Ballast Recessed Mounting Prismatic Lens	58	0.06	120.6	$20.03	1	0	Dual Technology Occupancy Sensor	58	0.06	10%	108.58	$18.02	$160.00	$160.00	0.00	12.064	$2.00	79.90
2	Office	2080	12	2	T8 2x4 2 Lamps Electronic Ballast Recessed Mounting Prismatic Lens	58	0.70	1,447.7	$240.31	12	0	Dual Technology Occupancy Sensor	58	0.70	10%	1302.91	$216.28	$160.00	$160.00	0.00	144.768	$24.03	6.66
2	Office	2080	3	2	T8 2x4 2 Lamps Electronic Ballast Recessed Mounting Prismatic Lens	58	0.17	361.9	$60.08	3	0	Dual Technology Occupancy Sensor	58	0.17	10%	325.73	$54.07	$160.00	$160.00	0.00	36.192	$6.01	26.63
2	Office	2080	1	2	T8 2x4 2 Lamps Electronic Ballast Recessed Mounting Prismatic Lens	58	0.06	120.6	$20.03	1	0	Dual Technology Occupancy Sensor	58	0.06	10%	108.58	$18.02	$160.00	$160.00	0.00	12.064	$2.00	79.90
13	A106	2080	18	2	T8 1x4 2 Lamps Electronic Ballast Surface Mounting Parabolic Lens	58	1.04	2,171.5	$360.47	18	0	Dual Technology Occupancy Sensor	58	1.04	10%	1954.37	$324.43	$160.00	$160.00	0.00	217.152	$36.05	4.44
14	A108	2080	21	2	T8 1x4 2 Lamps Electronic Ballast Pendant Mounting Parabolic Lens	58	1.22	2,533.4	$420.55	21	0	Dual Technology Occupancy Sensor	58	1.22	10%	2280.10	$378.50	$160.00	$160.00	0.00	253.344	$42.06	3.80
14	A107	2080	18	2	T8 1x4 2 Lamps Electronic Ballast Pendant Mounting Parabolic Lens	58	1.04	2,171.5	$360.47	18	0	Dual Technology Occupancy Sensor	58	1.04	10%	1954.37	$324.43	$160.00	$160.00	0.00	217.152	$36.05	4.44
2	Athletic Director	2080	12	2	T8 2x4 2 Lamps Electronic Ballast Recessed Mounting Prismatic Lens	58	0.70	1,447.7	$240.31	12	0	Dual Technology Occupancy Sensor	58	0.70	10%	1302.91	$216.28	$160.00	$160.00	0.00	144.768	$24.03	6.66
14	A109	2080	18	2	T8 1x4 2 Lamps Electronic Ballast Pendant Mounting Parabolic Lens	58	1.04	2,171.5	$360.47	18	0	Dual Technology Occupancy Sensor	58	1.04	10%	1954.37	$324.43	$160.00	$160.00	0.00	217.152	$36.05	4.44
14	A111	2080	18	2	T8 1x4 2 Lamps Electronic Ballast Pendant Mounting Parabolic Lens	58	1.04	2,171.5	$360.47	18	0	Dual Technology Occupancy Sensor	58	1.04	10%	1954.37	$324.43	$160.00	$160.00	0.00	217.152	$36.05	4.44
14	Social Studies Office	2080	14	2	T8 1x4 2 Lamps Electronic Ballast Pendant Mounting Parabolic Lens	58	0.81	1,689.0	$280.37	14	0	Dual Technology Occupancy Sensor	58	0.81	10%	1520.06	$252.33	$160.00	$160.00	0.00	168.896	$28.04	5.71
7	Infront of SS Office	2080	1	2	T12 2x4 2 Lamps Magnetic Ballast Recessed Mounting Prismatic Lens	73	0.07	151.8	$25.21	1	0	No Change	73	0.07	0%	151.84	$25.21	$0.00	$0.00	0.00	0	$0.00	0.00
2	A117, 118, Hall	8760	8	2	T8 2x4 2 Lamps Electronic Ballast Recessed Mounting Prismatic Lens	58	0.46	4,064.6	$674.73	8	0	No Change	58	0.46	0%	4064.64	$674.73	$0.00	$0.00	0.00	0	$0.00	0.00
14	A113	2080	18	2	T8 1x4 2 Lamps Electronic Ballast Pendant Mounting Parabolic Lens	58	1.04	2,171.5	$360.47	18	0	Dual Technology Occupancy Sensor	58	1.04	10%	1954.37	$324.43	$160.00	$160.00	0.00	217.152	$36.05	4.44
14	A114	2080	45	2	T8 1x4 2 Lamps Electronic Ballast Pendant Mounting Parabolic Lens	58	2.61	5,428.8	$901.18	45	0	Dual Technology Occupancy Sensor	58	2.61	10%	4885.92	$811.06	$160.00	$160.00	0.00	542.88	$90.12	1.78
2	A114	2080	2	2	T8 2x4 2 Lamps Electronic Ballast Recessed Mounting Prismatic Lens	58	0.12	241.3	$40.05	2	0	Dual Technology Occupancy Sensor	58	0.12	10%	217.15	$36.05	$160.00	$160.00	0.00	24.128	$4.01	39.95
14	A115	2080	18	2	T8 1x4 2 Lamps Electronic Ballast Pendant Mounting Parabolic Lens	58	1.04	2,171.5	$360.47	18	0	Dual Technology Occupancy Sensor	58	1.04	10%	1954.37	$324.43	$160.00	$160.00	0.00	217.152	$36.05	4.44
5	Hall to Courtyard	2080	5	4	T8 2x4 4 Lamps Electronic Ballast Recessed Mounting Prismatic Lens	109	0.55	1,133.6	$188.18	5	0	No Change	109	0.55	0%	1133.60	$188.18	$0.00	$0.00	0.00	0	$0.00	0.00
14	A117	2080	18	2	T8 1x4 2 Lamps Electronic Ballast Pendant Mounting Parabolic Lens	58	1.04	2,171.5	$360.47	18	0	Dual Technology Occupancy Sensor	58	1.04	10%	1954.37	$324.43	$160.00	$160.00	0.00	217.152	$36.05	4.44
14	A116	2080	59	2	T8 1x4 2 Lamps Electronic Ballast Pendant Mounting Parabolic Lens	58	3.42	7,117.8	$1,181.55	59	0	Dual Technology Occupancy Sensor	58	3.42	10%	6405.98	$1,063.39	$160.00	$160.00	0.00	711.776	$118.15	1.35
2	A116	2080	3	2	T8 2x4 2 Lamps Electronic Ballast Recessed Mounting Prismatic Lens	58	0.17	361.9	$60.08	3	0	Dual Technology Occupancy Sensor	58	0.17	10%	325.73	$54.07	$160.00	$160.00	0.00	36.192	$6.01	26.63
2	A120	2080	20	2	T8 2x4 2 Lamps Electronic Ballast Recessed Mounting Prismatic Lens	58	1.16	2,412.8	$400.52	20	0	Dual Technology Occupancy Sensor	58	1.16	10%	2171.52	$360.47	$160.00	$160.00	0.00	241.28	$40.05	3.99

14	A119	2080	18	2	T8 1x4 2 Lamps Electronic Ballast Pendant Mounting Parabolic Lens	58	1.04	2,171.5	$360.47	18	0	Dual Technology Occupancy Sensor	58	1.04	10%	1954.37	$324.43	$160.00	$160.00	0.00	217.152	$36.05	4.44
15	Child Study Office	2080	12	3	T8 2x4 3 Lamps Electronic Ballast Recessed Mounting Parabolic Lens	82	0.98	2,046.7	$339.76	12	0	Dual Technology Occupancy Sensor	82	0.98	10%	1842.05	$305.78	$160.00	$160.00	0.00	204.672	$33.98	4.71
2	Hallway	2080	16	2	T8 2x4 2 Lamps Electronic Ballast Recessed Mounting Prismatic Lens	58	0.93	1,930.2	$320.42	16	0	No Change	58	0.93	0%	1930.24	$320.42	$0.00	$0.00	0.00	0	$0.00	0.00
15	Server Room	2080	2	3	T8 2x4 3 Lamps Electronic Ballast Recessed Mounting Parabolic Lens	82	0.16	341.1	$56.63	2	0	Dual Technology Occupancy Sensor	82	0.16	10%	307.01	$50.96	$160.00	$160.00	0.00	34.112	$5.66	28.26
13	A123	2080	12	2	T8 1x4 2 Lamps Electronic Ballast Surface Mounting Parabolic Lens	58	0.70	1,447.7	$240.31	12	0	Dual Technology Occupancy Sensor	58	0.70	10%	1302.91	$216.28	$160.00	$160.00	0.00	144.768	$24.03	6.66
13	A125	2080	16	2	T8 1x4 2 Lamps Electronic Ballast Surface Mounting Parabolic Lens	58	0.93	1,930.2	$320.42	16	0	Dual Technology Occupancy Sensor	58	0.93	10%	1737.22	$288.38	$160.00	$160.00	0.00	193.024	$32.04	4.99
2	Math Supervisor	2080	4	2	T8 2x4 2 Lamps Electronic Ballast Recessed Mounting Prismatic Lens	58	0.23	482.6	$80.10	4	0	Dual Technology Occupancy Sensor	58	0.23	10%	434.30	$72.09	$160.00	$160.00	0.00	48.256	$8.01	19.97
11	Math Supervisor	2080	1	2	T8 1x4 2 Lamps Electronic Ballast Recessed Mounting Prismatic Lens	58	0.06	120.6	$20.03	1	0	Dual Technology Occupancy Sensor	58	0.06	10%	108.58	$18.02	$160.00	$160.00	0.00	12.064	$2.00	79.90
13	A124	2080	18	2	T8 1x4 2 Lamps Electronic Ballast Surface Mounting Parabolic Lens	58	1.04	2,171.5	$360.47	18	0	Dual Technology Occupancy Sensor	58	1.04	10%	1954.37	$324.43	$160.00	$160.00	0.00	217.152	$36.05	4.44
13	A127	2080	12	2	T8 1x4 2 Lamps Electronic Ballast Surface Mounting Parabolic Lens	58	0.70	1,447.7	$240.31	12	0	Dual Technology Occupancy Sensor	58	0.70	10%	1302.91	$216.28	$160.00	$160.00	0.00	144.768	$24.03	6.66
13	A126	2080	18	2	T8 1x4 2 Lamps Electronic Ballast Surface Mounting Parabolic Lens	58	1.04	2,171.5	$360.47	18	0	Dual Technology Occupancy Sensor	58	1.04	10%	1954.37	$324.43	$160.00	$160.00	0.00	217.152	$36.05	4.44
13	A128	2080	18	2	T8 1x4 2 Lamps Electronic Ballast Surface Mounting Parabolic Lens	58	1.04	2,171.5	$360.47	18	0	Dual Technology Occupancy Sensor	58	1.04	10%	1954.37	$324.43	$160.00	$160.00	0.00	217.152	$36.05	4.44
13	A129	2080	22	2	T8 1x4 2 Lamps Electronic Ballast Surface Mounting Parabolic Lens	58	1.28	2,654.1	$440.58	22	0	Dual Technology Occupancy Sensor	58	1.28	10%	2388.67	$396.52	$160.00	$160.00	0.00	265.408	$44.06	3.63
3	A131	2080	21	2	T8 1x4 2 Lamps Electronic Ballast Surface Mounting Prismatic Lens	58	1.22	2,533.4	$420.55	21	0	Dual Technology Occupancy Sensor	58	1.22	10%	2280.10	$378.50	$160.00	$160.00	0.00	253.344	$42.06	3.80
13	A130	2080	18	2	T8 1x4 2 Lamps Electronic Ballast Surface Mounting Parabolic Lens	58	1.04	2,171.5	$360.47	18	0	Dual Technology Occupancy Sensor	58	1.04	10%	1954.37	$324.43	$160.00	$160.00	0.00	217.152	$36.05	4.44
13	A132	2080	21	2	T8 1x4 2 Lamps Electronic Ballast Surface Mounting Parabolic Lens	58	1.22	2,533.4	$420.55	21	0	Dual Technology Occupancy Sensor	58	1.22	10%	2280.10	$378.50	$160.00	$160.00	0.00	253.344	$42.06	3.80
13	A133	2080	18	2	T8 1x4 2 Lamps Electronic Ballast Surface Mounting Parabolic Lens	58	1.04	2,171.5	$360.47	18	0	Dual Technology Occupancy Sensor	58	1.04	10%	1954.37	$324.43	$160.00	$160.00	0.00	217.152	$36.05	4.44
24	Faculty Bathroom	2080	3	1	Incadescent High Hat	100	0.30	624.0	$103.58	3	0	No Change	100	0.30	0%	624.00	$103.58	$0.00	$0.00	0.00	0	$0.00	0.00
13	A134	2080	18	2	T8 1x4 2 Lamps Electronic Ballast Surface Mounting Parabolic Lens	58	1.04	2,171.5	$360.47	18	0	Dual Technology Occupancy Sensor	58	1.04	10%	1954.37	$324.43	$160.00	$160.00	0.00	217.152	$36.05	4.44
15	A134	2080	10	3	T8 2x4 3 Lamps Electronic Ballast Recessed Mounting Parabolic Lens	82	0.82	1,705.6	$283.13	10	0	Dual Technology Occupancy Sensor	82	0.82	10%	1535.04	$254.82	$160.00	$160.00	0.00	170.56	$28.31	5.65
2	Hallway	8760	7	2	T8 2x4 2 Lamps Electronic Ballast Recessed Mounting Prismatic Lens	58	0.41	3,556.6	$590.39	7	0	No Change	58	0.41	0%	3556.56	$590.39	$0.00	$0.00	0.00	0	$0.00	0.00
24	Gym	2080	20	1	Incadescent High Hat	100	2.00	4,160.0	$690.56	20	0	Dual Technology Occupancy Sensor	100	2.00	10%	3744.00	$621.50	$160.00	$160.00	0.00	416	$69.06	2.32
13	Coach Office	2080	7	2	T8 1x4 2 Lamps Electronic Ballast Surface Mounting Parabolic Lens	58	0.41	844.5	$140.18	7	0	Dual Technology Occupancy Sensor	58	0.41	10%	760.03	$126.17	$160.00	$160.00	0.00	84.448	$14.02	11.41
18	Coach Office	2080	1	2	T8 4' 2 Lamps Electronic Ballast Side Wall Mount	80	0.08	166.4	$27.62	1	0	Dual Technology Occupancy Sensor	80	0.08	10%	149.76	$24.86	$160.00	$160.00	0.00	16.64	$2.76	57.92
3	Coach Locker Room	2080	26	2	T8 1x4 2 Lamps Electronic Ballast Surface Mounting Prismatic Lens	58	1.51	3,136.6	$520.68	26	0	Dual Technology Occupancy Sensor	58	1.51	10%	2822.98	$468.61	$160.00	$160.00	0.00	313.664	$52.07	3.07
3	Coach Locker Room	2080	1	2	T8 1x4 2 Lamps Electronic Ballast Surface Mounting Prismatic Lens	58	0.06	120.6	$20.03	1	0	Dual Technology Occupancy Sensor	58	0.06	10%	108.58	$18.02	$160.00	$160.00	0.00	12.064	$2.00	79.90
23	Coach Locker Room	2080	8	4	T8 4' 4 Lamps Surface Mounting	109	0.87	1,813.8	$301.08	8	0	Dual Technology Occupancy Sensor	109	0.87	10%	1632.38	$270.98	$160.00	$160.00	0.00	181.376	$30.11	5.31
3	Girls Locker Room	2080	26	2	T8 1x4 2 Lamps Electronic Ballast Surface Mounting Prismatic Lens	58	1.51	3,136.6	$520.68	26	0	Dual Technology Occupancy Sensor	58	1.51	10%	2822.98	$468.61	$160.00	$160.00	0.00	313.664	$52.07	3.07

3	Locker Office	2080	6	2	T8 1x4 2 Lamps Electronic Ballast Surface Mounting Prismatic Lens	58	0.35	723.8	$120.16	6	0	Dual Technology Occupancy Sensor	58	0.35	10%	651.46	$108.14	$160.00	$160.00	0.00	72.384	$12.02	13.32
3	Hall	8760	7	2	T8 1x4 2 Lamps Electronic Ballast Surface Mounting Prismatic Lens	58	0.41	3,556.6	$590.39	7	0	Dual Technology Occupancy Sensor	58	0.41	10%	3200.90	$531.35	$160.00	$160.00	0.00	355.656	$59.04	2.71
24	Workout Room	2080	8	1	Incadescent High Hat	100	0.80	1,664.0	$276.22	8	0	Dual Technology Occupancy Sensor	100	0.80	10%	1497.60	$248.60	$160.00	$160.00	0.00	166.4	$27.62	5.79
23	Gym 2	2080	24	4	T8 4' 4 Lamps Surface Mounting	109	2.62	5,441.3	$903.25	24	0	Dual Technology Occupancy Sensor	109	2.62	10%	4897.15	$812.93	$160.00	$160.00	0.00	544.128	$90.33	1.77
24	Gym 2	2080	4	1	Incadescent High Hat	100	0.40	832.0	$138.11	4	0	Dual Technology Occupancy Sensor	100	0.40	10%	748.80	$124.30	$160.00	$160.00	0.00	83.2	$13.81	11.58
28	Library	2080	60	1	T8 2x2 1 Lamp Electronic Ballast Recessed Mounting Direct/Indirect Lens	20	1.20	2,496.0	$414.34	60	0	No Change	20	1.20	0%	2496.00	$414.34	$0.00	$0.00	0.00	0	$0.00	0.00
29	Library	2080	117	3	T8 1x4 3 Lamps Electronic Ballast Pendant Mounting Direct/Indirect Lens	82	9.59	19,955.5	$3,312.62	117	0	No Change	82	9.59	0%	19955.52	$3,312.62	$0.00	$0.00	0.00	0	$0.00	0.00
13	Library	2080	14	2	T8 1x4 2 Lamps Electronic Ballast Surface Mounting Parabolic Lens	58	0.81	1,689.0	$280.37	14	0	No Change	58	0.81	0%	1688.96	$280.37	$0.00	$0.00	0.00	0	$0.00	0.00
15	Library	2080	8	3	T8 2x4 3 Lamps Electronic Ballast Recessed Mounting Parabolic Lens	82	0.66	1,364.5	$226.50	8	0	No Change	82	0.66	0%	1364.48	$226.50	$0.00	$0.00	0.00	0	$0.00	0.00
30	Server Room	2080	2	2	T8 1x4 2 Lamps Electronic Ballast Surface Mounting No lens	58	0.12	241.3	$40.05	2	0	Dual Technology Occupancy Sensor	58	0.12	10%	217.15	$36.05	$160.00	$160.00	0.00	24.128	$4.01	39.95
13	Storage	2080	20	2	T8 1x4 2 Lamps Electronic Ballast Surface Mounting Parabolic Lens	58	1.16	2,412.8	$400.52	20	0	Dual Technology Occupancy Sensor	58	1.16	10%	2171.52	$360.47	$160.00	$160.00	0.00	241.28	$40.05	3.99
13	L11	2080	48	2	T8 1x4 2 Lamps Electronic Ballast Surface Mounting Parabolic Lens	58	2.78	5,790.7	$961.26	48	0	Dual Technology Occupancy Sensor	58	2.78	10%	5211.65	$865.13	$160.00	$160.00	0.00	579.072	$96.13	1.66
13	L10	2080	28	2	T8 1x4 2 Lamps Electronic Ballast Surface Mounting Parabolic Lens	58	1.62	3,377.9	$560.73	28	0	Dual Technology Occupancy Sensor	58	1.62	10%	3040.13	$504.66	$160.00	$160.00	0.00	337.792	$56.07	2.85
13	L12	2080	33	2	T8 1x4 2 Lamps Electronic Ballast Surface Mounting Parabolic Lens	58	1.91	3,981.1	$660.87	33	0	Dual Technology Occupancy Sensor	58	1.91	10%	3583.01	$594.78	$160.00	$160.00	0.00	398.112	$66.09	2.42
3	L12	2080	2	2	T8 1x4 2 Lamps Electronic Ballast Surface Mounting Prismatic Lens	58	0.12	241.3	$40.05	2	0	Dual Technology Occupancy Sensor	58	0.12	10%	217.15	$36.05	$160.00	$160.00	0.00	24.128	$4.01	39.95
3	L12	2080	2	2	T8 1x4 2 Lamps Electronic Ballast Surface Mounting Prismatic Lens	58	0.12	241.3	$40.05	2	0	Dual Technology Occupancy Sensor	58	0.12	10%	217.15	$36.05	$160.00	$160.00	0.00	24.128	$4.01	39.95
31	L12	2080	1	1	Incandescent Pendant	200	0.20	416.0	$69.06	1	0	Dual Technology Occupancy Sensor	200	0.20	10%	374.40	$62.15	$160.00	$160.00	0.00	41.6	$6.91	23.17
13	L14	2080	2	2	T8 1x4 2 Lamps Electronic Ballast Surface Mounting Parabolic Lens	58	0.12	241.3	$40.05	2	0	Dual Technology Occupancy Sensor	58	0.12	10%	217.15	$36.05	$160.00	$160.00	0.00	24.128	$4.01	39.95
2	L14	2080	38	2	T8 2x4 2 Lamps Electronic Ballast Recessed Mounting Prismatic Lens	58	2.20	4,584.3	$761.00	38	0	Dual Technology Occupancy Sensor	58	2.20	10%	4125.89	$684.90	$160.00	$160.00	0.00	458.432	$76.10	2.10
2	Electrical Panels	520	5	2	T8 2x4 2 Lamps Electronic Ballast Recessed Mounting Prismatic Lens	58	0.29	150.8	$25.03	5	0	No Change	58	0.29	0%	150.80	$25.03	$0.00	$0.00	0.00	0	$0.00	0.00
9	L15	2080	18	1	T8 1x4 1 Lamp Electronic Ballast Surface Mounting Prismatic Lens	28	0.50	1,048.3	$174.02	18	0	Dual Technology Occupancy Sensor	28	0.50	10%	943.49	$156.62	$160.00	$160.00	0.00	104.832	$17.40	9.19
10	L15	2080	3	2	T8 1x2 2 Lamps Electronic Ballast Surface Mounting Prismatic Lens	20	0.06	124.8	$20.72	3	0	Dual Technology Occupancy Sensor	20	0.06	10%	112.32	$18.65	$160.00	$160.00	0.00	12.48	$2.07	77.23
9	L13	2080	12	1	T8 1x4 1 Lamp Electronic Ballast Surface Mounting Prismatic Lens	28	0.34	698.9	$116.01	12	0	Dual Technology Occupancy Sensor	28	0.34	10%	628.99	$104.41	$160.00	$160.00	0.00	69.888	$11.60	13.79
10	L13	2080	3	2	T8 1x2 2 Lamps Electronic Ballast Surface Mounting Prismatic Lens	20	0.06	124.8	$20.72	3	0	Dual Technology Occupancy Sensor	20	0.06	10%	112.32	$18.65	$160.00	$160.00	0.00	12.48	$2.07	77.23
3	Boys Room	2080	2	2	T8 1x4 2 Lamps Electronic Ballast Surface Mounting Prismatic Lens	58	0.12	241.3	$40.05	2	0	Dual Technology Occupancy Sensor	58	0.12	10%	217.15	$36.05	$160.00	$160.00	0.00	24.128	$4.01	39.95
24	Storage	520	1	1	Incadescent High Hat	100	0.10	52.0	$8.63	1	0	No Change	100	0.10	0%	52.00	$8.63	$0.00	$0.00	0.00	0	$0.00	0.00
3	Girls Room	2080	2	2	T8 1x4 2 Lamps Electronic Ballast Surface Mounting Prismatic Lens	58	0.12	241.3	$40.05	2	0	Dual Technology Occupancy Sensor	58	0.12	10%	217.15	$36.05	$160.00	$160.00	0.00	24.128	$4.01	39.95
2	Hall	2080	6	2	T8 2x4 2 Lamps Electronic Ballast Recessed Mounting Prismatic Lens	58	0.35	723.8	$120.16	6	0	No Change	58	0.35	0%	723.84	$120.16	$0.00	$0.00	0.00	0	$0.00	0.00
2	Elevator	8760	1	2	T8 2x4 2 Lamps Electronic Ballast Recessed Mounting Prismatic Lens	58	0.06	508.1	$84.34	1	0	No Change	58	0.06	0%	508.08	$84.34	$0.00	$0.00	0.00	0	$0.00	0.00

24	Elevator	8760	3	1	Incadescent High Hat	100	0.30	2,628.0	$436.25	3	0	No Change	100	0.30	0%	2628.00	$436.25	$0.00	$0.00	0.00	0	$0.00	0.00
32	Elevator	8760	1	1	Compact Fluorescent High Hat 1 lamp	100	0.10	876.0	$145.42	1	0	No Change	100	0.10	0%	876.00	$145.42	$0.00	$0.00	0.00	0	$0.00	0.00
15	Math Office	2080	16	3	T8 2x4 3 Lamps Electronic Ballast Recessed Mounting Parabolic Lens	82	1.31	2,729.0	$453.01	16	0	Dual Technology Occupancy Sensor	82	1.31	10%	2456.06	$407.71	$160.00	$160.00	0.00	272.896	$45.30	3.53
13	Electrical Room	520	3	2	T8 1x4 2 Lamps Electronic Ballast Surface Mounting Parabolic Lens	58	0.17	90.5	$15.02	3	0	No Change	58	0.17	0%	90.48	$15.02	$0.00	$0.00	0.00	0	$0.00	0.00
8	Stairwell	8760	3	2	T12 1x4 2 Lamps Electronic Ballast Surface Wall Mounting No Lens	94	0.28	2,470.3	$410.07	3	0	No Change	94	0.28	0%	2470.32	$410.07	$0.00	$0.00	0.00	0	$0.00	0.00
21	Stairwell	8760	1	2	T8 1x4 2 Lamps Electronic Ballast Surface Wall	58	0.06	508.1	$84.34	1	0	No Change	58	0.06	0%	508.08	$84.34	$0.00	$0.00	0.00	0	$0.00	0.00
2	Bathrooms	2080	4	2	T8 2x4 2 Lamps Electronic Ballast Recessed Mounting Prismatic Lens	58	0.23	482.6	$80.10	4	0	Dual Technology Occupancy Sensor	58	0.23	10%	434.30	$72.09	$160.00	$160.00	0.00	48.256	$8.01	19.97
33	Bathrooms	2080	2	2	Compact Fluorescent High Hat - 2 lamp	56	0.11	233.0	$38.67	2	0	Dual Technology Occupancy Sensor	56	0.11	10%	209.66	$34.80	$160.00	$160.00	0.00	23.296	$3.87	41.37
15	B160	2080	12	3	T8 2x4 3 Lamps Electronic Ballast Recessed Mounting Parabolic Lens	82	0.98	2,046.7	$339.76	12	0	Dual Technology Occupancy Sensor	82	0.98	10%	1842.05	$305.78	$160.00	$160.00	0.00	204.672	$33.98	4.71
2	B162	2080	20	2	T8 2x4 2 Lamps Electronic Ballast Recessed Mounting Prismatic Lens	58	1.16	2,412.8	$400.52	20	0	Dual Technology Occupancy Sensor	58	1.16	10%	2171.52	$360.47	$160.00	$160.00	0.00	241.28	$40.05	3.99
15	B163	2080	24	3	T8 2x4 3 Lamps Electronic Ballast Recessed Mounting Parabolic Lens	82	1.97	4,093.4	$679.51	24	0	Dual Technology Occupancy Sensor	82	1.97	10%	3684.10	$611.56	$160.00	$160.00	0.00	409.344	$67.95	2.35
15	B161	2080	6	3	T8 2x4 3 Lamps Electronic Ballast Recessed Mounting Parabolic Lens	82	0.49	1,023.4	$169.88	6	0	Dual Technology Occupancy Sensor	82	0.49	10%	921.02	$152.89	$160.00	$160.00	0.00	102.336	$16.99	9.42
2	B164	2080	20	2	T8 2x4 2 Lamps Electronic Ballast Recessed Mounting Prismatic Lens	58	1.16	2,412.8	$400.52	20	0	Dual Technology Occupancy Sensor	58	1.16	10%	2171.52	$360.47	$160.00	$160.00	0.00	241.28	$40.05	3.99
2	B166	2080	20	2	T8 2x4 2 Lamps Electronic Ballast Recessed Mounting Prismatic Lens	58	1.16	2,412.8	$400.52	20	0	Dual Technology Occupancy Sensor	58	1.16	10%	2171.52	$360.47	$160.00	$160.00	0.00	241.28	$40.05	3.99
32	B166	2080	2	1	Compact Fluorescent High Hat 1 lamp	100	0.20	416.0	$69.06	2	0	Dual Technology Occupancy Sensor	100	0.20	10%	374.40	$62.15	$160.00	$160.00	0.00	41.6	$6.91	23.17
15	B165	2080	14	3	T8 2x4 3 Lamps Electronic Ballast Recessed Mounting Parabolic Lens	82	1.15	2,387.8	$396.38	14	0	Dual Technology Occupancy Sensor	82	1.15	10%	2149.06	$356.74	$160.00	$160.00	0.00	238.784	$39.64	4.04
34	B167	2080	9	1	Mercury Start 1 Lamp Magnetic Ballast	175	1.58	3,276.0	$543.82	9	1	Dual Technology Occupancy Sensor	175	1.58	10%	2948.40	$489.43	$160.00	$160.00	0.00	327.6	$54.38	2.94
15	B167	2080	12	3	T8 2x4 3 Lamps Electronic Ballast Recessed Mounting Parabolic Lens	82	0.98	2,046.7	$339.76	12	0	Dual Technology Occupancy Sensor	82	0.98	10%	1842.05	$305.78	$160.00	$160.00	0.00	204.672	$33.98	4.71
21	Stairwell	2080	3	2	T8 1x4 2 Lamps Electronic Ballast Surface Wall	58	0.17	361.9	$60.08	3	0	No Change	58	0.17	0%	361.92	$60.08	$0.00	$0.00	0.00	0	$0.00	0.00
31	Auditorium	2080	102	1	Incandescent Pendant	200	20.40	42,432.0	$7,043.71	102	0	No Change	200	20.40	0%	42432.00	$7,043.71	$0.00	$0.00	0.00	0	$0.00	0.00
31	Auditorium Lobby	2080	14	1	Incandescent Pendant	200	2.80	5,824.0	$966.78	14	0	No Change	200	2.80	0%	5824.00	$966.78	$0.00	$0.00	0.00	0	$0.00	0.00
31	Auditorium Lobby	2080	45	1	Incandescent Pendant	200	9.00	18,720.0	$3,107.52	45	0	No Change	200	9.00	0%	18720.00	$3,107.52	$0.00	$0.00	0.00	0	$0.00	0.00
24	Auditorium Lobby	2080	32	1	Incadescent High Hat	100	3.20	6,656.0	$1,104.90	32	0	No Change	100	3.20	0%	6656.00	$1,104.90	$0.00	$0.00	0.00	0	$0.00	0.00
11	Bathrooms	2080	12	2	T8 1x4 2 Lamps Electronic Ballast Recessed Mounting Prismatic Lens	58	0.70	1,447.7	$240.31	12	0	Dual Technology Occupancy Sensor	58	0.70	10%	1302.91	$216.28	$160.00	$160.00	0.00	144.768	$24.03	6.66
2	B156	2080	20	2	T8 2x4 2 Lamps Electronic Ballast Recessed Mounting Prismatic Lens	58	1.16	2,412.8	$400.52	20	0	Dual Technology Occupancy Sensor	58	1.16	10%	2171.52	$360.47	$160.00	$160.00	0.00	241.28	$40.05	3.99
15	B153	2080	8	3	T8 2x4 3 Lamps Electronic Ballast Recessed Mounting Parabolic Lens	82	0.66	1,364.5	$226.50	8	0	Dual Technology Occupancy Sensor	82	0.66	10%	1228.03	$203.85	$160.00	$160.00	0.00	136.448	$22.65	7.06
15	B154	2080	16	3	T8 2x4 3 Lamps Electronic Ballast Recessed Mounting Parabolic Lens	82	1.31	2,729.0	$453.01	16	0	Dual Technology Occupancy Sensor	82	1.31	10%	2456.06	$407.71	$160.00	$160.00	0.00	272.896	$45.30	3.53
15	B151	2080	12	3	T8 2x4 3 Lamps Electronic Ballast Recessed Mounting Parabolic Lens	82	0.98	2,046.7	$339.76	12	0	Dual Technology Occupancy Sensor	82	0.98	10%	1842.05	$305.78	$160.00	$160.00	0.00	204.672	$33.98	4.71
15	World Language	2080	8	3	T8 2x4 3 Lamps Electronic Ballast Recessed Mounting Parabolic Lens	82	0.66	1,364.5	$226.50	8	0	Dual Technology Occupancy Sensor	82	0.66	10%	1228.03	$203.85	$160.00	$160.00	0.00	136.448	$22.65	7.06
15	B150	2080	15	3	T8 2x4 3 Lamps Electronic Ballast Recessed Mounting Parabolic Lens	82	1.23	2,558.4	$424.69	15	0	Dual Technology Occupancy Sensor	82	1.23	10%	2302.56	$382.22	$160.00	$160.00	0.00	255.84	$42.47	3.77
19	B150	2080	1	2	T8 2x2 2 U-Tube Lamps Electronic Ballast Recessed Mounting Parabolic Lens	73	0.07	151.8	$25.21	1	0	Dual Technology Occupancy Sensor	73	0.07	10%	136.66	$22.68	$160.00	$160.00	0.00	15.184	$2.52	63.48
31	Storage	2080	2	1	Incandescent Pendant	200	0.40	832.0	$138.11	2	0	Dual Technology Occupancy Sensor	200	0.40	10%	748.80	$124.30	$160.00	$160.00	0.00	83.2	$13.81	11.58
33	B Hallway	8760	10	2	Compact Fluorescent High Hat - 2 lamp	56	0.56	4,905.6	$814.33	10	0	No Change	56	0.56	0%	4905.60	$814.33	$0.00	$0.00	0.00	0	$0.00	0.00

2	B Hallway	8760	52	2	T8 2x4 2 Lamps Electronic Ballast Recessed Mounting Prismatic Lens	58	3.02	26,420.2	$4,385.75	52	0	No Change	58	3.02	0%	26420.16	$4,385.75	$0.00	$0.00	0.00	0	$0.00	0.00
32	B Hallway	8760	2	1	Compact Fluorescent High Hat 1 lamp	100	0.20	1,752.0	$290.83	2	0	No Change	100	0.20	0%	1752.00	$290.83	$0.00	$0.00	0.00	0	$0.00	0.00
3	Projection Room	2080	3	2	T8 1x4 2 Lamps Electronic Ballast Surface Mounting Prismatic Lens	58	0.17	361.9	$60.08	3	0	No Change	58	0.17	0%	361.92	$60.08	$0.00	$0.00	0.00	0	$0.00	0.00
24	Projection Room	2080	1	1	Incadescent High Hat	100	0.10	208.0	$34.53	1	0	No Change	100	0.10	0%	208.00	$34.53	$0.00	$0.00	0.00	0	$0.00	0.00
15	M20	2080	4	3	T8 2x4 3 Lamps Electronic Ballast Recessed Mounting Parabolic Lens	82	0.33	682.2	$113.25	4	0	Dual Technology Occupancy Sensor	82	0.33	10%	614.02	$101.93	$160.00	$160.00	0.00	68.224	$11.33	14.13
15	M19	2080	4	3	T8 2x4 3 Lamps Electronic Ballast Recessed Mounting Parabolic Lens	82	0.33	682.2	$113.25	4	0	Dual Technology Occupancy Sensor	82	0.33	10%	614.02	$101.93	$160.00	$160.00	0.00	68.224	$11.33	14.13
22	Band Room	2080	56	4	T8 2x2 4 Lamps Electronic Ballast Recessed Mounting Parabolic Lens	56	3.14	6,522.9	$1,082.80	56	0	Dual Technology Occupancy Sensor	56	3.14	10%	5870.59	$974.52	$160.00	$160.00	0.00	652.288	$108.28	1.48
15	Band Office	2080	8	3	T8 2x4 3 Lamps Electronic Ballast Recessed Mounting Parabolic Lens	82	0.66	1,364.5	$226.50	8	0	Dual Technology Occupancy Sensor	82	0.66	10%	1228.03	$203.85	$160.00	$160.00	0.00	136.448	$22.65	7.06
5	Band Storage	2080	8	4	T8 2x4 4 Lamps Electronic Ballast Recessed Mounting Prismatic Lens	109	0.87	1,813.8	$301.08	8	0	Dual Technology Occupancy Sensor	109	0.87	10%	1632.38	$270.98	$160.00	$160.00	0.00	181.376	$30.11	5.31
15	Band Practice	2080	6	3	T8 2x4 3 Lamps Electronic Ballast Recessed Mounting Parabolic Lens	82	0.49	1,023.4	$169.88	6	0	Dual Technology Occupancy Sensor	82	0.49	10%	921.02	$152.89	$160.00	$160.00	0.00	102.336	$16.99	9.42
5	M Hall	8760	18	4	T8 2x4 4 Lamps Electronic Ballast Recessed Mounting Prismatic Lens	109	1.96	17,187.1	$2,853.06	18	0	No Change	109	1.96	0%	17187.12	$2,853.06	$0.00	$0.00	0.00	0	$0.00	0.00
27	M Hall	8760	5	1	Incadescent High Hat	60	0.30	2,628.0	$436.25	5	0	No Change	60	0.30	0%	2628.00	$436.25	$0.00	$0.00	0.00	0	$0.00	0.00
33	M Hall	8760	2	2	Compact Fluorescent High Hat - 2 lamp	56	0.11	981.1	$162.87	2	0	No Change	56	0.11	0%	981.12	$162.87	$0.00	$0.00	0.00	0	$0.00	0.00
5	Bathrooms	2080	6	4	T8 2x4 4 Lamps Electronic Ballast Recessed Mounting Prismatic Lens	109	0.65	1,360.3	$225.81	6	0	Dual Technology Occupancy Sensor	109	0.65	10%	1224.29	$203.23	$160.00	$160.00	0.00	136.032	$22.58	7.09
15	M18	2080	1	3	T8 2x4 3 Lamps Electronic Ballast Recessed Mounting Parabolic Lens	82	0.08	170.6	$28.31	1	0	Dual Technology Occupancy Sensor	82	0.08	10%	153.50	$25.48	$160.00	$160.00	0.00	17.056	$2.83	56.51
2	M17	2080	24	2	T8 2x4 2 Lamps Electronic Ballast Recessed Mounting Prismatic Lens	58	1.39	2,895.4	$480.63	24	0	Dual Technology Occupancy Sensor	58	1.39	10%	2605.82	$432.57	$160.00	$160.00	0.00	289.536	$48.06	3.33
11	Orchastra Office Hall	8760	5	2	T8 1x4 2 Lamps Electronic Ballast Recessed Mounting Prismatic Lens	58	0.29	2,540.4	$421.71	5	0	Dual Technology Occupancy Sensor	58	0.29	10%	2286.36	$379.54	$160.00	$160.00	0.00	254.04	$42.17	3.79
2	Director Office	2080	3	2	T8 2x4 2 Lamps Electronic Ballast Recessed Mounting Prismatic Lens	58	0.17	361.9	$60.08	3	0	Dual Technology Occupancy Sensor	58	0.17	10%	325.73	$54.07	$160.00	$160.00	0.00	36.192	$6.01	26.63
2	Office	2080	6	2	T8 2x4 2 Lamps Electronic Ballast Recessed Mounting Prismatic Lens	58	0.35	723.8	$120.16	6	0	Dual Technology Occupancy Sensor	58	0.35	10%	651.46	$108.14	$160.00	$160.00	0.00	72.384	$12.02	13.32
2	M16	2080	24	2	T8 2x4 2 Lamps Electronic Ballast Recessed Mounting Prismatic Lens	58	1.39	2,895.4	$480.63	24	0	Dual Technology Occupancy Sensor	58	1.39	10%	2605.82	$432.57	$160.00	$160.00	0.00	289.536	$48.06	3.33
4	Music Tech Room	2080	24	3	T8 2x4 3 Lamps Electronic Ballast Recessed Mounting Prismatic Lens	82	1.97	4,093.4	$679.51	24	0	Dual Technology Occupancy Sensor	82	1.97	10%	3684.10	$611.56	$160.00	$160.00	0.00	409.344	$67.95	2.35
11	M Wing Hall	8760	13	2	T8 1x4 2 Lamps Electronic Ballast Recessed Mounting Prismatic Lens	58	0.75	6,605.0	$1,096.44	13	0	No Change	58	0.75	0%	6605.04	$1,096.44	$0.00	$0.00	0.00	0	$0.00	0.00
2	M Wing Hall	8760	1	2	T8 2x4 2 Lamps Electronic Ballast Recessed Mounting Prismatic Lens	58	0.06	508.1	$84.34	1	0	No Change	58	0.06	0%	508.08	$84.34	$0.00	$0.00	0.00	0	$0.00	0.00
2	Hallway Exit B	8760	3	2	T8 2x4 2 Lamps Electronic Ballast Recessed Mounting Prismatic Lens	58	0.17	1,524.2	$253.02	3	0	No Change	58	0.17	0%	1524.24	$253.02	$0.00	$0.00	0.00	0	$0.00	0.00
2	B159	2080	20	2	T8 2x4 2 Lamps Electronic Ballast Recessed Mounting Prismatic Lens	58	1.16	2,412.8	$400.52	20	0	Dual Technology Occupancy Sensor	58	1.16	10%	2171.52	$360.47	$160.00	$160.00	0.00	241.28	$40.05	3.99
2	B158	2080	20	2	T8 2x4 2 Lamps Electronic Ballast Recessed Mounting Prismatic Lens	58	1.16	2,412.8	$400.52	20	0	Dual Technology Occupancy Sensor	58	1.16	10%	2171.52	$360.47	$160.00	$160.00	0.00	241.28	$40.05	3.99
2	B157	2080	20	2	T8 2x4 2 Lamps Electronic Ballast Recessed Mounting Prismatic Lens	58	1.16	2,412.8	$400.52	20	0	Dual Technology Occupancy Sensor	58	1.16	10%	2171.52	$360.47	$160.00	$160.00	0.00	241.28	$40.05	3.99
33	Hallway	8760	7	2	Compact Fluorescent High Hat - 2 lamp	56	0.39	3,433.9	$570.03	7	0	No Change	56	0.39	0%	3433.92	$570.03	$0.00	$0.00	0.00	0	$0.00	0.00
5	Hallway	8760	15	4	T8 2x4 4 Lamps Electronic Ballast Recessed Mounting Prismatic Lens	109	1.64	14,322.6	$2,377.55	15	0	No Change	109	1.64	0%	14322.60	$2,377.55	$0.00	$0.00	0.00	0	$0.00	0.00

5	Hallway	8760	49	4	T8 2x4 4 Lamps Electronic Ballast Recessed Mounting Prismatic Lens	109	5.34	46,787.2	$7,766.67	49	0	No Change	109	5.34	0%	46787.16	$7,766.67	$0.00	$0.00	0.00	0	$0.00	0.00
33	Hallway	8760	4	2	Compact Fluorescent High Hat - 2 lamp	56	0.22	1,962.2	$325.73	4	0	No Change	56	0.22	0%	1962.24	$325.73	$0.00	$0.00	0.00	0	$0.00	0.00
2	Health Office	2080	14	2	T8 2x4 2 Lamps Electronic Ballast Recessed Mounting Prismatic Lens	58	0.81	1,689.0	$280.37	14	0	Dual Technology Occupancy Sensor	58	0.81	10%	1520.06	$252.33	$160.00	$160.00	0.00	168.896	$28.04	5.71
18	Health Office	2080	1	2	T8 4' 2 Lamps Electronic Ballast Side Wall Mount	80	0.08	166.4	$27.62	1	0	Dual Technology Occupancy Sensor	80	0.08	10%	149.76	$24.86	$160.00	$160.00	0.00	16.64	$2.76	57.92
2	Health Office	2080	1	2	T8 2x4 2 Lamps Electronic Ballast Recessed Mounting Prismatic Lens	58	0.06	120.6	$20.03	1	0	Dual Technology Occupancy Sensor	58	0.06	10%	108.58	$18.02	$160.00	$160.00	0.00	12.064	$2.00	79.90
35	Health Office	2080	1	2	T8 2 Tube 4' Indust Electronic Ballast Surface Mounting No Lens	58	0.06	120.6	$20.03	1	0	Dual Technology Occupancy Sensor	58	0.06	10%	108.58	$18.02	$160.00	$160.00	0.00	12.064	$2.00	79.90
36	Health Office	2080	2	1	T8 6' 1 Lamp Electronic Ballast Surface Wall Mounted Prismatic Lens	28	0.06	116.5	$19.34	2	0	Dual Technology Occupancy Sensor	28	0.06	10%	104.83	$17.40	$160.00	$160.00	0.00	11.648	$1.93	82.75
15	C137	2080	25	3	T8 2x4 3 Lamps Electronic Ballast Recessed Mounting Parabolic Lens	82	2.05	4,264.0	$707.82	25	0	Dual Technology Occupancy Sensor	82	2.05	10%	3837.60	$637.04	$160.00	$160.00	0.00	426.4	$70.78	2.26
15	Storage	2080	6	3	T8 2x4 3 Lamps Electronic Ballast Recessed Mounting Parabolic Lens	82	0.49	1,023.4	$169.88	6	0	Dual Technology Occupancy Sensor	82	0.49	10%	921.02	$152.89	$160.00	$160.00	0.00	102.336	$16.99	9.42
15	C139	2080	25	3	T8 2x4 3 Lamps Electronic Ballast Recessed Mounting Parabolic Lens	82	2.05	4,264.0	$707.82	25	0	Dual Technology Occupancy Sensor	82	2.05	10%	3837.60	$637.04	$160.00	$160.00	0.00	426.4	$70.78	2.26
15	C141	2080	16	3	T8 2x4 3 Lamps Electronic Ballast Recessed Mounting Parabolic Lens	82	1.31	2,729.0	$453.01	16	0	Dual Technology Occupancy Sensor	82	1.31	10%	2456.06	$407.71	$160.00	$160.00	0.00	272.896	$45.30	3.53
15	C143	2080	14	3	T8 2x4 3 Lamps Electronic Ballast Recessed Mounting Parabolic Lens	82	1.15	2,387.8	$396.38	14	0	Dual Technology Occupancy Sensor	82	1.15	10%	2149.06	$356.74	$160.00	$160.00	0.00	238.784	$39.64	4.04
15	Office	2080	2	3	T8 2x4 3 Lamps Electronic Ballast Recessed Mounting Parabolic Lens	82	0.16	341.1	$56.63	2	0	Dual Technology Occupancy Sensor	82	0.16	10%	307.01	$50.96	$160.00	$160.00	0.00	34.112	$5.66	28.26
16	Bathrooms	2080	6	4	T8 2x4 4 Lamps Electronic Ballast Recessed Mounting Parabolic Lens	109	0.65	1,360.3	$225.81	6	0	Dual Technology Occupancy Sensor	109	0.65	10%	1224.29	$203.23	$160.00	$160.00	0.00	136.032	$22.58	7.09
33	Hallway	8760	4	2	Compact Fluorescent High Hat - 2 lamp	56	0.22	1,962.2	$325.73	4	0	No Change	56	0.22	0%	1962.24	$325.73	$0.00	$0.00	0.00	0	$0.00	0.00
15	Science Room	2080	12	3	T8 2x4 3 Lamps Electronic Ballast Recessed Mounting Parabolic Lens	82	0.98	2,046.7	$339.76	12	0	Dual Technology Occupancy Sensor	82	0.98	10%	1842.05	$305.78	$160.00	$160.00	0.00	204.672	$33.98	4.71
15	C138	2080	25	3	T8 2x4 3 Lamps Electronic Ballast Recessed Mounting Parabolic Lens	82	2.05	4,264.0	$707.82	25	0	Dual Technology Occupancy Sensor	82	2.05	10%	3837.60	$637.04	$160.00	$160.00	0.00	426.4	$70.78	2.26
15	Prep Room	2080	6	3	T8 2x4 3 Lamps Electronic Ballast Recessed Mounting Parabolic Lens	82	0.49	1,023.4	$169.88	6	0	Dual Technology Occupancy Sensor	82	0.49	10%	921.02	$152.89	$160.00	$160.00	0.00	102.336	$16.99	9.42
15	C136	2080	25	3	T8 2x4 3 Lamps Electronic Ballast Recessed Mounting Parabolic Lens	82	2.05	4,264.0	$707.82	25	0	Dual Technology Occupancy Sensor	82	2.05	10%	3837.60	$637.04	$160.00	$160.00	0.00	426.4	$70.78	2.26
5	Bathrooms	2080	6	4	T8 2x4 4 Lamps Electronic Ballast Recessed Mounting Prismatic Lens	109	0.65	1,360.3	$225.81	6	0	Dual Technology Occupancy Sensor	109	0.65	10%	1224.29	$203.23	$160.00	$160.00	0.00	136.032	$22.58	7.09
33	Bathrooms	2080	2	2	Compact Fluorescent High Hat - 2 lamp	56	0.11	233.0	$38.67	2	0	Dual Technology Occupancy Sensor	56	0.11	10%	209.66	$34.80	$160.00	$160.00	0.00	23.296	$3.87	41.37
5	Electric Closet	520	5	4	T8 2x4 4 Lamps Electronic Ballast Recessed Mounting Prismatic Lens	109	0.55	283.4	$47.04	5	0	No Change	109	0.55	0%	283.40	$47.04	$0.00	$0.00	0.00	0	$0.00	0.00
5	Storage	2080	4	4	T8 2x4 4 Lamps Electronic Ballast Recessed Mounting Prismatic Lens	109	0.44	906.9	$150.54	4	0	Dual Technology Occupancy Sensor	109	0.44	10%	816.19	$135.49	$160.00	$160.00	0.00	90.688	$15.05	10.63
5	Stairwell	8760	20	4	T8 2x4 4 Lamps Electronic Ballast Recessed Mounting Prismatic Lens	109	2.18	19,096.8	$3,170.07	20	0	No Change	109	2.18	0%	19096.80	$3,170.07	$0.00	$0.00	0.00	0	$0.00	0.00
2	Stairwell	8760	2	2	T8 2x4 2 Lamps Electronic Ballast Recessed Mounting Prismatic Lens	58	0.12	1,016.2	$168.68	2	0	No Change	58	0.12	0%	1016.16	$168.68	$0.00	$0.00	0.00	0	$0.00	0.00
17	C205	2080	25	3	T8 2x4 3 Lamps Electronic Ballast Surface Mounting Parabolic Lens	82	2.05	4,264.0	$707.82	25	0	Dual Technology Occupancy Sensor	82	2.05	10%	3837.60	$637.04	$160.00	$160.00	0.00	426.4	$70.78	2.26
17	Storage	2080	2	3	T8 2x4 3 Lamps Electronic Ballast Surface Mounting Parabolic Lens	82	0.16	341.1	$56.63	2	0	Dual Technology Occupancy Sensor	82	0.16	10%	307.01	$50.96	$160.00	$160.00	0.00	34.112	$5.66	28.26
15	Science Office	2080	8	3	T8 2x4 3 Lamps Electronic Ballast Recessed Mounting Parabolic Lens	82	0.66	1,364.5	$226.50	8	0	Dual Technology Occupancy Sensor	82	0.66	10%	1228.03	$203.85	$160.00	$160.00	0.00	136.448	$22.65	7.06

15	C203	2080	25	3	T8 2x4 3 Lamps Electronic Ballast Recessed Mounting Parabolic Lens	82	2.05	4,264.0	$707.82	25	0	Dual Technology Occupancy Sensor	82	2.05	10%	3837.60	$637.04	$160.00	$160.00	0.00	426.4	$70.78	2.26
15	Prep Room	2080	6	3	T8 2x4 3 Lamps Electronic Ballast Recessed Mounting Parabolic Lens	82	0.49	1,023.4	$169.88	6	0	Dual Technology Occupancy Sensor	82	0.49	10%	921.02	$152.89	$160.00	$160.00	0.00	102.336	$16.99	9.42
15	Storage	2080	4	3	T8 2x4 3 Lamps Electronic Ballast Recessed Mounting Parabolic Lens	82	0.33	682.2	$113.25	4	0	Dual Technology Occupancy Sensor	82	0.33	10%	614.02	$101.93	$160.00	$160.00	0.00	68.224	$11.33	14.13
15	C201	2080	25	3	T8 2x4 3 Lamps Electronic Ballast Recessed Mounting Parabolic Lens	82	2.05	4,264.0	$707.82	25	0	Dual Technology Occupancy Sensor	82	2.05	10%	3837.60	$637.04	$160.00	$160.00	0.00	426.4	$70.78	2.26
12	Greenhouse	2080	4	6	T8 8' 6 Lamps (4') Electronic Ballast Surface Mounting Prismatic Lens Vapor Proof	167	0.67	1,389.4	$230.65	4	0	Dual Technology Occupancy Sensor	167	0.67	10%	1250.50	$207.58	$160.00	$160.00	0.00	138.944	$23.06	6.94
5	Electrical Room	2080	12	4	T8 2x4 4 Lamps Electronic Ballast Recessed Mounting Prismatic Lens	109	1.31	2,720.6	$451.63	12	0	Dual Technology Occupancy Sensor	109	1.31	10%	2448.58	$406.46	$160.00	$160.00	0.00	272.064	$45.16	3.54
5	C Wing Up Stairs Hall	8760	38	4	T8 2x4 4 Lamps Electronic Ballast Recessed Mounting Prismatic Lens	109	4.14	36,283.9	$6,023.13	38	0	No Change	109	4.14	0%	36283.92	$6,023.13	$0.00	$0.00	0.00	0	$0.00	0.00
33	C Wing Up Stairs Hall	8760	6	2	Compact Fluorescent High Hat - 2 lamp	56	0.34	2,943.4	$488.60	6	0	No Change	56	0.34	0%	2943.36	$488.60	$0.00	$0.00	0.00	0	$0.00	0.00
5	Storage	2080	3	4	T8 2x4 4 Lamps Electronic Ballast Recessed Mounting Prismatic Lens	109	0.33	680.2	$112.91	3	0	Dual Technology Occupancy Sensor	109	0.33	10%	612.14	$101.62	$160.00	$160.00	0.00	68.016	$11.29	14.17
5	Bathrooms	2080	6	4	T8 2x4 4 Lamps Electronic Ballast Recessed Mounting Prismatic Lens	109	0.65	1,360.3	$225.81	6	0	Dual Technology Occupancy Sensor	109	0.65	10%	1224.29	$203.23	$160.00	$160.00	0.00	136.032	$22.58	7.09
33	Bathrooms	2080	2	2	Compact Fluorescent High Hat - 2 lamp	56	0.11	233.0	$38.67	2	0	Dual Technology Occupancy Sensor	56	0.11	10%	209.66	$34.80	$160.00	$160.00	0.00	23.296	$3.87	41.37
15	C200	2080	25	3	T8 2x4 3 Lamps Electronic Ballast Recessed Mounting Parabolic Lens	82	2.05	4,264.0	$707.82	25	0	Dual Technology Occupancy Sensor	82	2.05	10%	3837.60	$637.04	$160.00	$160.00	0.00	426.4	$70.78	2.26
15	Prep Room	2080	6	3	T8 2x4 3 Lamps Electronic Ballast Recessed Mounting Parabolic Lens	82	0.49	1,023.4	$169.88	6	0	Dual Technology Occupancy Sensor	82	0.49	10%	921.02	$152.89	$160.00	$160.00	0.00	102.336	$16.99	9.42
15	Storage	2080	4	3	T8 2x4 3 Lamps Electronic Ballast Recessed Mounting Parabolic Lens	82	0.33	682.2	$113.25	4	0	Dual Technology Occupancy Sensor	82	0.33	10%	614.02	$101.93	$160.00	$160.00	0.00	68.224	$11.33	14.13
15	C202	2080	25	3	T8 2x4 3 Lamps Electronic Ballast Recessed Mounting Parabolic Lens	82	2.05	4,264.0	$707.82	25	0	Dual Technology Occupancy Sensor	82	2.05	10%	3837.60	$637.04	$160.00	$160.00	0.00	426.4	$70.78	2.26
15	C204	2080	25	3	T8 2x4 3 Lamps Electronic Ballast Recessed Mounting Parabolic Lens	82	2.05	4,264.0	$707.82	25	0	Dual Technology Occupancy Sensor	82	2.05	10%	3837.60	$637.04	$160.00	$160.00	0.00	426.4	$70.78	2.26
15	Storage	2080	3	3	T8 2x4 3 Lamps Electronic Ballast Recessed Mounting Parabolic Lens	82	0.25	511.7	$84.94	3	0	Dual Technology Occupancy Sensor	82	0.25	10%	460.51	$76.44	$160.00	$160.00	0.00	51.168	$8.49	18.84
4	Bathrooms	2080	6	3	T8 2x4 3 Lamps Electronic Ballast Recessed Mounting Prismatic Lens	82	0.49	1,023.4	$169.88	6	0	Dual Technology Occupancy Sensor	82	0.49	10%	921.02	$152.89	$160.00	$160.00	0.00	102.336	$16.99	9.42
39	Boiler Room - Original	2080	8	1	Incadescent Pendant Mounting	150	1.20	2,496.0	$414.34	8	1	No Change	150	1.20	0%	2496.00	$414.34	$0.00	$0.00	0.00	0	$0.00	0.00
40	Boiler Room - 2001 Addition	2080	9	2	4' - 2-Lamp 32W T-8 Industrial Strip w/ Elect Ballast and Wire guard	73	0.66	1,366.6	$226.85	9	2	No Change	73	0.66	0%	1366.56	$226.85	$0.00	$0.00	0.00	0	$0.00	0.00
37		8760	67	2	Exit Sign (2) 15 W	30	2.01	17,607.6	$2,922.86	67	0	No Change	30	2.01	0%	17607.60	$2,922.86	$0.00	$0.00	0.00	0	$0.00	0.00
38		8760	28	0	Exit Sign - LED red	4	0.11	981.1	$162.87	28	0	No Change	4	0.11	0%	981.12	$162.87	$0.00	$0.00	0.00	0	$0.00	0.00
	Totals		2897	503			220.84	671,159.7	$111,412.51	2897	6			220.84		642,852.70	$106,713.55		$25,280.00	0.00	28307.0	$4,698.96	5.38

NOTES: 1. Simple Payback noted in this spreadsheet does not include Maintenance Savings and NJ Smart Start Incentives.

CEG Job #: 9C09078
Project: Chatham School District
Address: 255 Lafayette Avenue
City: Chatham
Building SF: 253,663

Chatham High School

DATE: 11/3/2009
KWH COST: **$0.166**

ECM #3: LED Exit Signs

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
37	Throughout	8760	67	2	Exit Sign (2) 15 W incadescent	30	2.01	17,607.6	$2,922.86	67	0	Exit Sign - LED red	4	0.27	2347.68	$389.71	$56.00	$3,752.00	1.74	15259.92	$2,533.15	1.48
38	Throughout	8760	28	0	Exit Sign - LED red	4	0.11	981.1	$162.87	28	0	No Change	4	0.11	981.12	$162.87	$0.00	$0.00	0.00	0	$0.00	0.00
	Totals		95	2			2.12	18,588.7	$3,085.73	95	0			0.38	3328.8	$552.58		$3,752.00	1.74	15259.9	$2,533.15	1.48

NOTES: 1. Simple Payback noted in this spreadsheet does not include Maintenance Savings and NJ Smart Start Incentives.

CEG Job #: 9C09078
Project: Chatham School District
Address: 255 Lafayette Avenue
City: Chatham
Building SF: 253,663

Chatham High School

DATE: 11/3/2009
KWH COST: **$0.166**

ECM #4: Lighting Upgrade - Gym

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
41	Gym	2080	20	1	Metal Halide -High-Bay Fixture	292	5.84	12,147.2	$2,016.44	20	3	3-Lamp T-5 HO Cooper F-Bay	182	3.64	7571.2	$1,256.82	$300.00	$6,000.00	2.20	4576	$759.62	7.90
23	Gym 2	2080	24	4	T8 4' 4 Lamps Surface Mounting	109	2.62	5,441.3	$903.25	24	0	No Change	109	2.62	5441.28	$903.25	$0.00	$0.00	0.00	0	$0.00	0.00
41	Gym 2	2080	4	1	Metal Halide -High-Bay Fixture	292	1.17	2,429.4	$403.29	4	3	3-Lamp T-5 HO Cooper F-Bay	182	0.73	1514.24	$251.36	$300.00	$1,200.00	0.44	915.2	$151.92	7.90
	Totals		48	6			9.62	20,017.9	$3,322.97	48	6			6.984	14526.72	$2,411.44		$7,200.00	2.64	5491.2	$911.54	7.90

NOTES: 1. Simple Payback noted in this spreadsheet does not include Maintenance Savings and NJ Smart Start Incentives.

Project Name: LGEA Solar PV Project - 9C09078 Chatham High School
Location: Chatham, NJ
Description: Photovoltaic System 95% Financing - 25 year

Simple Payback Analysis

	Photovoltaic System 95% Financing - 25 year
Total Construction Cost	$3,055,320
Annual kWh Production	392,286
Annual Energy Cost Reduction	$65,119
Annual SREC Revenue	$137,300
First Cost Premium	**$3,055,320**
Simple Payback:	**15.09** Years

Life Cycle Cost Analysis

Analysis Period (years): 25
Financing Term (mths): 300
Average Energy Cost ($/kWh) **$0.166**
Financing Rate: 7.00%
Financing %: 95%
Maintenance Escalation Rate: 3.0%
Energy Cost Escalation Rate: 3.0%
SREC Value ($/kWh) $0.350

Period	Additional Cash Outlay	Energy kWh Production	Energy Cost Savings	Additional Maint Costs	SREC Revenue	Interest Expense	Loan Principal	Net Cash Flow	Cumulative Cash Flow
0	$152,766	0	0	0	$0	0	0	(152,766)	0
1	$0	392,286	$65,119	$0	$137,300	$201,772	$44,404	($43,756)	($196,522)
2	$0	390,325	$67,073	$0	$136,614	$198,562	$47,614	($42,489)	($239,011)
3	$0	388,373	$69,085	$0	$135,931	$195,120	$51,056	($41,160)	($280,171)
4	$0	386,431	$71,158	$0	$135,251	$191,429	$54,746	($39,767)	($319,938)
5	$0	384,499	$73,293	$3,960	$134,575	$187,472	$58,704	($42,269)	($362,207)
6	$0	382,576	$75,491	$3,941	$133,902	$183,228	$62,948	($40,723)	($402,931)
7	$0	380,664	$77,756	$3,921	$133,232	$178,678	$67,498	($39,108)	($442,039)
8	$0	378,760	$80,089	$3,901	$132,566	$173,798	$72,378	($37,422)	($479,461)
9	$0	376,866	$82,491	$3,882	$131,903	$168,566	$77,610	($35,663)	($515,124)
10	$0	374,982	$84,966	$3,862	$131,244	$162,955	$83,220	($33,828)	($548,952)
11	$0	373,107	$87,515	$3,843	$130,588	$156,939	$89,236	($31,916)	($580,868)
12	$0	371,242	$90,141	$3,824	$129,935	$150,489	$95,687	($29,924)	($610,793)
13	$0	369,385	$92,845	$3,805	$129,285	$143,571	$102,604	($27,851)	($638,643)
14	$0	367,539	$95,630	$3,786	$128,638	$136,154	$110,022	($25,693)	($664,336)
15	$0	365,701	$98,499	$3,767	$127,995	$128,201	$117,975	($23,448)	($687,784)
16	$0	363,872	$101,454	$3,748	$127,355	$119,672	$126,504	($21,114)	($708,899)
17	$0	362,053	$104,498	$3,729	$126,719	$110,527	$135,649	($18,689)	($727,587)
18	$0	360,243	$107,633	$3,710	$126,085	$100,721	$145,455	($16,169)	($743,756)
19	$0	358,441	$110,862	$3,692	$125,455	$90,206	$155,970	($13,552)	($757,308)
20	$0	356,649	$114,187	$3,673	$124,827	$78,931	$167,245	($10,835)	($768,142)
21	$0	354,866	$117,613	$3,655	$124,203	$71,912	$153,749	$12,500	($755,643)
22	$0	353,092	$121,141	$3,637	$123,582	$58,110	$126,521	$56,455	($699,188)
23	$0	351,326	$124,776	$3,619	$122,964	$0	$0	$244,121	($455,067)
24	$0	349,570	$128,519	$3,601	$122,349	$0	$0	$247,268	($207,799)
25	$0	347,822	$132,374	$3,583	$121,738	$0	$0	$250,530	$42,731
	Totals:	9,240,670	$2,374,208	$79,138	$3,234,234	$3,187,015	$2,146,794	$195,497	($12,749,439)
					Net Present Value (NPV)			**($310,409)**	
					Internal Rate of Return (IRR)			**0.3%**	

Project Name: **LGEA Solar PV Project - 9C09078 Chatham High School**
Location: **Chatham, NJ**
Description: **Photovoltaic System - Direct Purchase**

Simple Payback Analysis

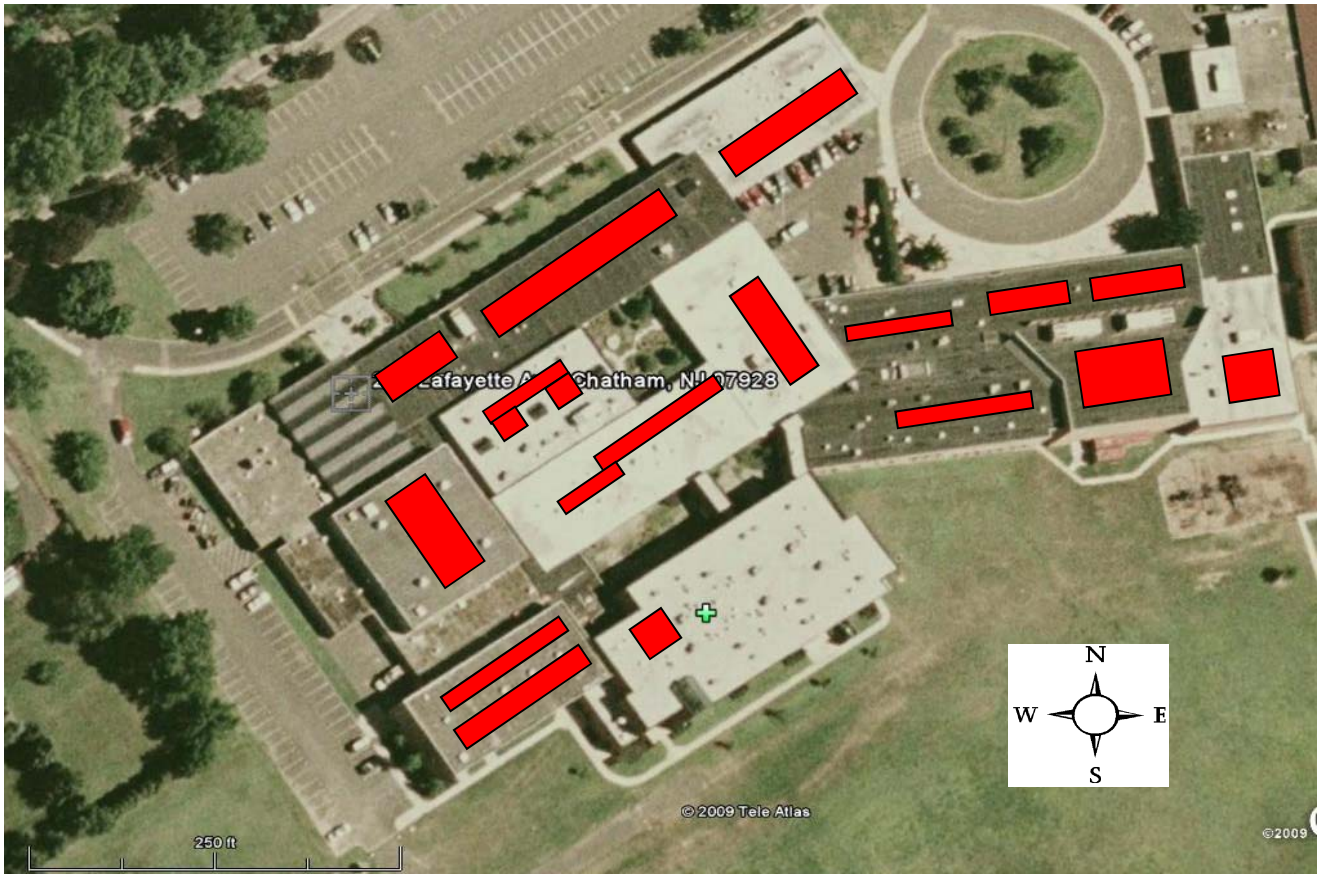
	Photovoltaic System - Direct Purchase
Total Construction Cost	$3,055,320
Annual kWh Production	392,286
Annual Energy Cost Reduction	$65,119
Annual SREC Revenue	$137,300
First Cost Premium	**$3,055,320**
Simple Payback:	**15.09** **Years**

Life Cycle Cost Analysis

Analysis Period (years):	25	Financing %:	0%
Financing Term (mths):	0	Maintenance Escalation Rate:	3.0%
Average Energy Cost ($/kWh)	**$0.166**	Energy Cost Escalation Rate:	3.0%
Financing Rate:	0.00%	SREC Value ($/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	$3,055,320	0	0	0	$0	(3,055,320)	0
1	$0	392,286	$65,119	$0	$137,300	$202,420	($2,852,900)
2	$0	390,325	$67,073	$0	$136,614	$203,687	($2,649,214)
3	$0	388,373	$69,085	$0	$135,931	$205,016	($2,444,198)
4	$0	386,431	$71,158	$0	$135,251	$206,409	($2,237,789)
5	$0	384,499	$73,293	$3,960	$134,575	$203,907	($2,033,882)
6	$0	382,576	$75,491	$3,941	$133,902	$205,453	($1,828,430)
7	$0	380,664	$77,756	$3,921	$133,232	$207,067	($1,621,362)
8	$0	378,760	$80,089	$3,901	$132,566	$208,754	($1,412,609)
9	$0	376,866	$82,491	$3,882	$131,903	$210,513	($1,202,096)
10	$0	374,982	$84,966	$3,862	$131,244	$212,348	($989,748)
11	$0	373,107	$87,515	$3,843	$130,588	$214,260	($775,489)
12	$0	371,242	$90,141	$3,824	$129,935	$216,251	($559,237)
13	$0	369,385	$92,845	$3,805	$129,285	$218,325	($340,912)
14	$0	367,539	$95,630	$3,786	$128,638	$220,483	($120,429)
15	$0	365,701	$98,499	$3,767	$127,995	$222,728	$102,298
16	$0	363,872	$101,454	$3,748	$127,355	$225,061	$327,360
17	$0	362,053	$104,498	$3,729	$126,719	$227,487	$554,847
18	$0	360,243	$107,633	$3,710	$126,085	$230,007	$784,854
19	$0	358,441	$110,862	$3,692	$125,455	$232,624	$1,017,478
20	$0	356,649	$114,187	$3,673	$124,827	$235,341	$1,252,819
21	$1	354,866	$117,613	$3,655	$124,203	$238,161	$1,490,980
22	$2	353,092	$121,141	$3,637	$123,582	$241,087	$1,732,067
23	$3	351,326	$124,776	$3,619	$122,964	$244,121	$1,976,188
24	$4	349,570	$128,519	$3,601	$122,349	$247,268	$2,223,456
25	$5	347,822	$132,374	$3,583	$121,738	$250,530	$2,473,985
	Totals:	9,240,670	$2,374,208	$79,138	$3,234,234	$5,529,305	($7,131,966)
				Net Present Value (NPV)		**$2,474,010**	
				Internal Rate of Return (IRR)		**5.0%**	

Building	Roof Area (sq ft)	Panel	Qty	Panel Sq Ft	Panel Total Sq Ft	Total KW	Total Annual kWh	Panel Weight (33 lbs)	W/SQFT
High School	21700	Sunpower SPR230	1476	14.7	21,703	339.48	392,286	48,708	15.64



.= Proposed PV Layout

Notes:

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

Click on **Calculate** if default values are acceptable, or after selecting your system specifications. Click on **Help** for information about system specifications. To use a DC to AC derate factor other than the default, click on **Derate Factor Help** for information.

Station Identification:

WBAN Number:	14734
City:	Newark
State:	New_Jersey

PV System Specifications:

DC Rating (kW): 339.48

DC to AC Derate Factor: .81 [Derate Factor Help]

Array Type: Fixed Tilt

Fixed Tilt or 1-Axis Tracking System:

Array Tilt (degrees): 10 (Default = Latitude)

Array Azimuth (degrees): 180.0 (Default = South)

Energy Data:

Cost of Electricity (cents/kWh): 0.166

[Calculate] [HELP] [Reset Form]

PVWatts * * * AC Energy & Cost Savings

Cautions for Interpreting the Results

Station Identification	
City:	Newark
State:	New_Jersey
Latitude:	40.70° N
Longitude:	74.17° W
Elevation:	9 m
PV System Specifications	
DC Rating:	339.5 kW
DC to AC Derate Factor:	0.810
AC Rating:	275.0 kW
Array Type:	Fixed Tilt
Array Tilt:	10.0°
Array Azimuth:	180.0°
Energy Specifications	
Cost of Electricity:	0.2 ¢/kWh

Results			
Month	Solar Radiation (kWh/m^2/day)	AC Energy (kWh)	Energy Value ($)
1	2.39	20368	33.81
2	3.17	24693	40.99
3	4.07	34559	57.37
4	4.83	38289	63.56
5	5.70	45554	75.62
6	5.94	44514	73.89
7	5.77	44168	73.32
8	5.38	40909	67.91
9	4.65	35197	58.43
10	3.61	28973	48.10
11	2.35	18480	30.68
12	2.01	16581	27.52
Year	4.16	392286	651.19

Output Hourly Performance Data * Output Results as Text

About the Hourly Performance Data — Saving Text from a Browser

Run PVWATTS v.1 for another US location or an International location
Run PVWATTS v.2 (US only)

Please send questions and comments regarding PVWATTS to Webmaster

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