ENERGY AUDIT – FINAL

PITMAN BOARD OF EDUCATION
HIGH SCHOOL
225 LINDEN AVENUE
PITMAN, NJ 08071

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BUSINESS/BOARD SECRETARY

CEG PROJECT NO. 9C09067

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I. EXECUTIVE SUMMARY

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

Pitman Board of Education
Pitman High School
225 Linden Ave.
Pitman, NJ 08071

Municipal Contact Person: Thomas F. Schulte
Facility Contact Person: Tom Herms

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

The annual energy costs at this facility are as follows:

Electricity	$145,467
Natural Gas	$46,443
Total	$191,909

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

Table 1
Financial Summary Table

ENERGY CONSERVATION MEASURES (ECM's)					
ECM NO.	**DESCRIPTION**	**NET INSTALLATION COST[A]**	**ANNUAL SAVINGS[B]**	**SIMPLE PAYBACK (Yrs)**	**SIMPLE LIFETIME ROI**
ECM #1	Economizer Control w/ Demand Control Ventilation	$124,107	$35,710	3.5	331.6%
ECM #2	Electric Water Heater Replacement	$11,600	$2,010	5.8	107.9%
ECM #3	Gas Fired Water Heater Replacement	$14,247	$1,870	7.6	57.5%
ECM #4	Exit Sign Replacement	$2,025	$375	5.4	270.4%
ECM #5	Walk-In Refrigerator Controls	$3,750	$3,268	1.1	1207.2%

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

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

Table 2
Estimated Energy Savings Summary Table

ENERGY CONSERVATION MEASURES (ECM's)				
ECM NO.	**DESCRIPTION**	**ANNUAL UTILITY REDUCTION**		
		ELECTRIC DEMAND (KW)	**ELECTRIC CONSUMPTION (KWH)**	**NATURAL GAS (THERMS)**
ECM #1	Economizer Control w/ Demand Control Ventilation	0.0	180,225	6,530
ECM #2	Electric Water Heater Replacement	0.0	19,710	(673)
ECM #3	Gas Fired Water Heater Replacement	0.0	0	1,204
ECM #4	Exit Sign Replacement	0.7	2,632	0
ECM #5	Walk-In Refrigerator Controls	0.0	32,016	0

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

- **ECM #1:** Economizer Control w/ Demand Control Ventilation
- **ECM #2:** Electric Water Heater Replacement
- **ECM #3:** Gas Fired Water Heater Replacement
- **ECM #4:** Exit Sign Replacement
- **ECM #5:** Walk-In Refrigerator Controls

Renewable energy measures were not considered for Pitman High School since a solar project is already underway.

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

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

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

II. INTRODUCTION

The comprehensive energy audit covers the 103,338 SF Pitman High School is a single story facility comprised of classrooms, administration offices, cafeteria, kitchen, gymnasium and auditoriums.

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

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

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

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

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

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

III. METHOD OF ANALYSIS

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

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

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

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

ECM Calculation Equations:

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

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

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

$$Lifetime\ Ma\,\mathrm{int}\,enance\ Savings = \left(Yearly\ Ma\,\mathrm{int}\,enance\ Savings \times ECM\ Lifetime \right)$$

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

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

Net Present Value calculations based on Interest Rate of 3%.

IV. HISTORIC ENERGY CONSUMPTION/COST

A. Energy Usage / Tariffs

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

The electric usage profile represents the actual electrical usage for the facility. Atlantic City Electric provides electricity to the facility under their Annual General Service rate structure. The electric utility measures consumption in kilowatt-hours (KWH) and maximum demand in kilowatts (KW). One KWH usage is equivalent to 1000 watts running for one hour. One KW of electric demand is equivalent to 1000 watts running at any given time. The basic usage charges are shown as generation service and delivery charges along with several non-utility generation charges. Rates used in this report reflect the historical data received for the facility.

The gas usage profile shows the actual natural gas energy usage for the facility. South Jersey Gas provides natural gas to the facility under the Firm Transportation rate structure. The gas utility measures consumption in cubic feet x 100 (CCF), and converts the quantity into Therms of energy. One Therm is equivalent to 100,000 BTUs of energy.

The third party commodity provider PEPCO Energy Service, Co is responsible for providing the commodity of Natural Gas to the Board of Education. Commodity and delivery is billed separately for each respective utility service.

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

Description	Average
Electricity	14.2¢ / kWh
Natural Gas	$1.55 / Therm

Table 3
Electricity Billing Data

ELECTRIC USAGE SUMMARY			
Utility Provider:	Atlantic City Electric		
Rate:	Annual General Service (AGS)		
Meter No:	58511976		
Account No:	0114 9699 9993		
Third Party Utility	N/A		
TPS Meter / Acct No:	N/A		
MONTH OF USE	**CONSUMPTION KWH**	**DEMAND**	**TOTAL BILL**
Jan-09	85,600	312.0	$11,674
Feb-09	90,000	304.0	$12,318
Mar-09	87,600	280.0	$12,130
Apr-09	123,200	304.0	$16,586
May-09	90,800	328.0	$12,673
Jun-09	74,400	296.0	$7,970
Jul-08	58,000	212.0	$10,667
Aug-08	70,800	288.0	$11,661
Sep-08	94,800	380.0	$15,068
Oct-08	83,200	316.0	$11,313
Nov-08	77,200	280.0	$10,816
Dec-08	91,600	284.0	$12,593
Totals	**1,027,200**	**380.0 Max**	**$145,467**
	AVERAGE DEMAND	**298.7 KW average**	
	AVERAGE RATE	**$0.142 $/kWh**	

Note: The billing period for April, 2009 was measured from April 6, 2009 to May 21, 2009 this extended metering period accounts for the spike in electrical usage plotted for this month.

Figure 1
Electricity Usage Profile

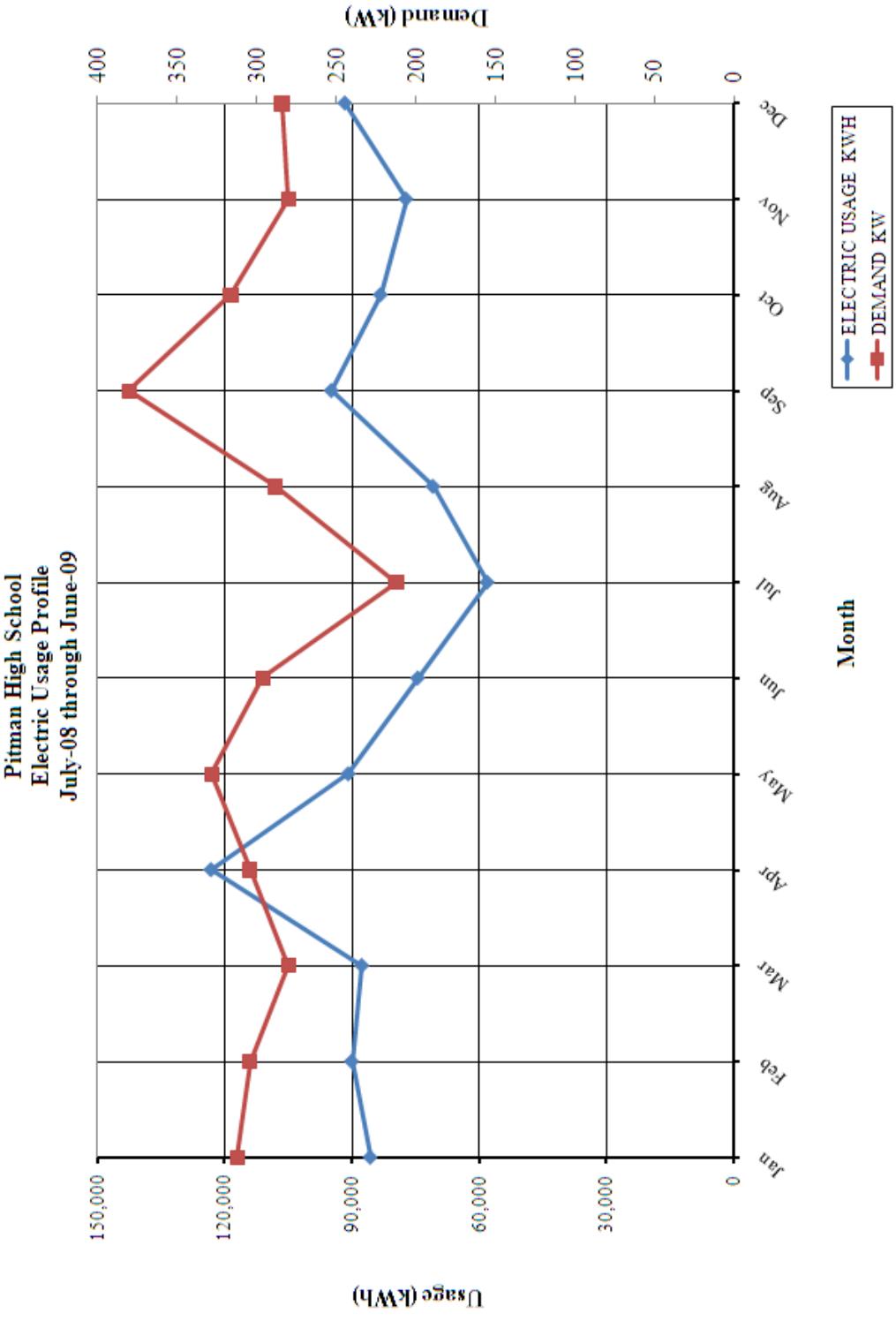
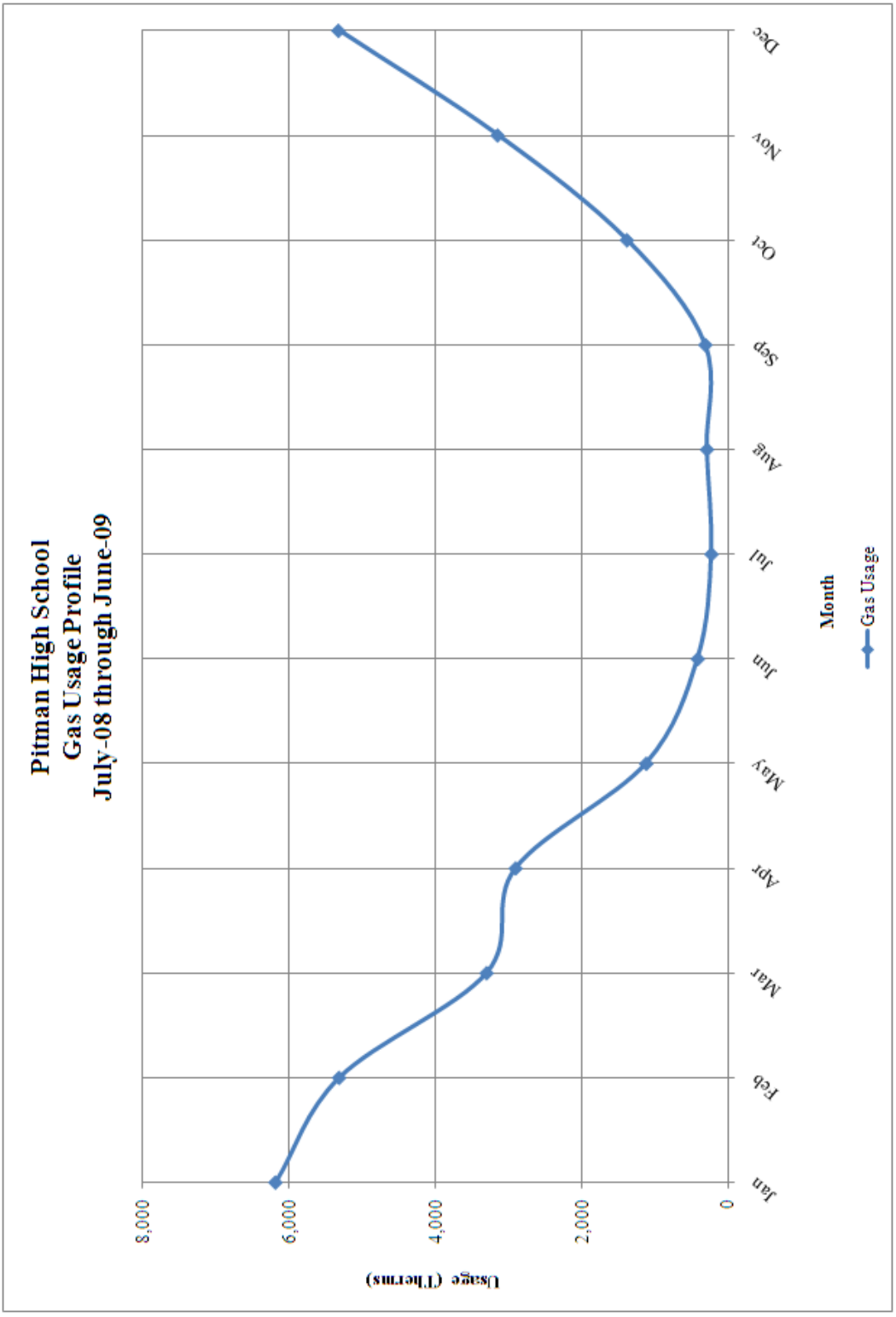


Table 4
Natural Gas Billing Data

NATURAL GAS USAGE SUMMARY		
Utility Provider:	South Jersey Gas	
Rate:	Firm Transportation	
Meter No:	180467	
Point of Delivery ID:	N/A	
Third Party Utility Provider:	Pepco Energy Services	
TPS Meter No:	21543008805	
MONTH OF USE	**CONSUMPTION (THERMS)**	**TOTAL BILL**
Jan-09	6,184.92	$9,503.12
Feb-09	5,314.80	$8,335.97
Mar-09	3,299.20	$5,180.76
Apr-09	2,902.73	$4,583.87
May-09	1,117.80	$1,779.11
Jun-09	414.00	$658.18
Jul-08	227.04	$493.29
Aug-08	287.84	$498.02
Sep-08	310.80	$508.90
Oct-08	1,382.88	$1,999.24
Nov-08	3,149.44	$4,806.22
Dec-08	5,324.94	$8,095.93
TOTALS	**29,916.39**	**$46,442.61**
AVERAGE RATE:	**$1.55**	**$/THERM**

Figure 2
Natural Gas Usage Profile



B. Energy Use Index (EUI)

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

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

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

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

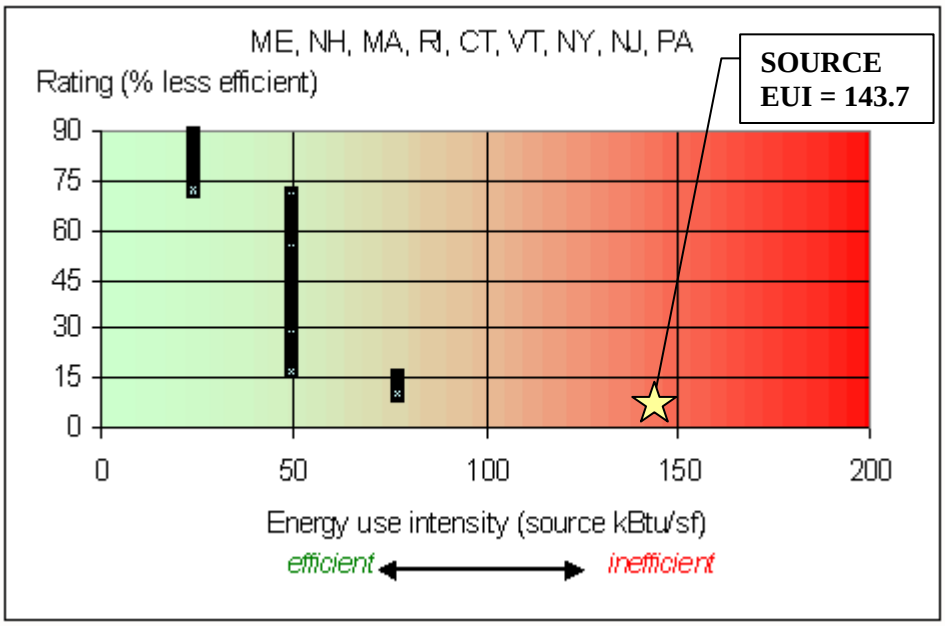
$$Building\ Source\ EUI = \frac{(Electric\ Usage\ in\ kBtu\ X\ SS\ Ratio + Gas\ Usage\ in\ kBtu\ X\ SS\ Ratio)}{Building\ Square\ Footage}$$

Table 5
Facility Energy Use Index (EUI) Calculation

ENERGY USE INTENSITY CALCULATION						
ENERGY TYPE	**BUILDING USE**			**SITE ENERGY**	**SITE-SOURCE RATIO**	**SOURCE ENERGY**
	kWh	**Therms**	**Gallons**	**kBtu**		**kBtu**
ELECTRIC	1027200.0			3,506,861	3.340	11,712,915
NATURAL GAS		29916.4		2,991,639	1.047	3,132,246
FUEL OIL			0.0	0	1.010	0
PROPANE			0.0	0	1.010	0
TOTAL				6,498,500		14,845,161
*Site - Source Ratio data is provided by the Energy Star Performance Rating Methodology for Incorporating Source Energy Use document issued Dec 2007.						
BUILDING AREA		103,338	SQUARE FEET			
BUILDING SITE EUI		*62.9*	kBtu/SF/YR			
BUILDING SOURCE EUI		*143.7*	kBtu/SF/YR			

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

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 login page for the account can be accessed at the following web address; the username and password are also listed below:

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

User Name: pitmanboe
Password: lgeaceg2009

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

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

Table 6
ENERGY STAR Performance Rating

ENERGY STAR PERFORMANCE RATING		
FACILITY DESCRIPTION	**ENERGY PERFORMANCE RATING**	**NATIONAL AVERAGE**
Pitman High School	66	50

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

V. FACILITY DESCRIPTION

The 103,338 SF High School is a single story facility comprised of classrooms, administration offices, cafeteria, kitchen, gymnasium and auditoriums. The original building was built in 1972 and the Auditorium was added to in 1989. A small, two classroom addition was added in 1999. The typical school hours are from 7:40 am to 2:45 pm. The building is also utilized after the normal hours for sporting events and after school educational programs. The building construction is CMU block with face brick. The exterior walls have minimal insulation typical of the time period. It is unknown if the CMU blocks are filled. The windows throughout the facility are in good condition and appeared to be maintained. The window type throughout the facility is double, thermopane, with vinyl cladding. The roof is a single ply flat roofing system supported by a metal deck. The amount of insulation below the roof membrane is unknown. Most doorways in the school are double doors with weather stripping that appears to be in good condition.

HVAC System

All heating and cooling is achieved through gas-fired, direct expansion rooftop equipment. The original classroom areas are heated and cooled by Nesbitt RMA series multi-zone units. All units were running at the time of the survey with the exception of rooftop unit # 6. While the overall condition was good it was noticed on all units that the economizer portion was not operating. All fresh air dampers were 98% closed limiting the amount of ventilation air to the space. It also appeared that the dampers were frozen in the position for an extended period of time. It should be noted that at the time of the survey outside temperature and humidity would have warranted the use of free cooling. The air filters and belts were in reasonable condition but it should be noted that these items should be changed more frequently. It was also noted that the self-contained control package within the unit did not appear to be operating in all aspects. This is probably due to the age and the unavailability of replacement parts for equipment of this age. The approximate age of this equipment is 38 years old which would make it a good candidate for replacement. The expected service life for roof top equipment is estimated at 15 years of service.

The auditorium area is heated and cooled by a Carrier rooftop unit. In discussing the operation of this unit with the maintenance staff, this unit is controlled by a thermostat in the space and only operates as needed. The unit is on a setback schedule and if needed an override on the Carrier programmable thermostat over-rides the setback for a period of eight hours. The unit was installed during the 1989 addition and it appears to be in good condition based on the unit's limited operation. The stage area of the auditorium is heated and cooled via a smaller Carrier unit that was also not running at the time of the survey. This unit, while appearing to be in good condition, had the outside air intake significantly blocked by the return duct below it. The re-usable outside air intake air filter was old and in need of replacement. In addition, the dampers on this unit did not appear to be functioning. The unit information was not attainable due to the ductwork being installed over the nameplate information.

All other areas within the building are heated and cooled by smaller package rooftop equipment. These units were all in comparable condition and operating at the time of the survey.

Manufacturers of the smaller capacity rooftop equipment in use were Trane, York and American Standard. Condition of the smaller package equipment was similar in nature to the larger equipment. The average age of the smaller package units located at the High School is approximately 15 years old. The gymnasium is heated by four gas-fired Reznor heating and ventilating units. No nameplate information was available. The Reznor units appeared to be from the original construction date and in good condition. It was noticed from the flue venting that these units have two heat exchangers.

Entrance ways are heated by stand alone electric cabinet unit heaters. Overall, the condition of all HVAC equipment is good and appears to be well maintained by the School District. It should be noted that it appears that all outside air dampers and economizers did not appear to be working properly. This condition should be investigated further to ensure proper fresh air is being provided to the space. Air filters within the units appeared to be maintained although more frequent replacements would be suggested. Drive belts on all units were in good condition and appeared to be properly aligned. It was noticed on several units that belt tension was lacking and should be inspected and re-tensioned more frequently.

Exhaust System

Air is exhausted from the toilet rooms and common areas through typical centrifugal roof exhaust fans. These fans are manually controlled by local disconnect switches at the individual fans. The kitchen hood exhaust fan is also a typical centrifugal roof fan and controlled by a remote switch located in the kitchen area. This fan is only operated as needed. It was noted during the survey that several fans were not operating. It was not determined if they were off due to mechanical failure.

HVAC System Controls

Currently, the HVAC systems are not controlled via a central pneumatic or DDC control system. All equipment is controlled manually or by stand alone controllers integral to the equipment. A DDC control system should be reviewed for implementation at the High School.

Domestic Hot Water

Domestic hot water for the gymnasium showers, restrooms, cafeteria and custodial closets is provided by two 300,000 BTU gas-fired water heaters. The water heater for the gymnasium is currently disconnected. The shower area in both women's and men's locker rooms are not being used. The balance of the areas domestic hot water is provided from an identical unit in a storage area near the cafeteria. The existing electric water heater and storage tank was abandoned and the gas fired water heater was installed to provide hot water to the existing storage tank. The system piping was looped in order to provide uninterrupted supply of hot water. This eliminated long delays in receiving hot water in remote locations of the building. The current age of the gas-fired water heater is 27 years old and would be a potential candidate for replacement. One additional domestic electric water heater is installed in the teacher's room. This supplies hot water to the boys and girls restrooms next to the teacher's room. This water heater is an 18 kW unit and operates minimally.

Lighting

Typical lighting throughout the building is fluorescent tube fixtures with T-8 lamps and electronic ballasts. Storage rooms and closets are utilizing compact fluorescents. These areas were retrofitted approximately ten years ago. Approximately two years ago all areas that were previously retrofitted received occupancy sensors. Additionally the gymnasium was retrofitted with T-5 lamps with electronic ballasts and reflectors. Typical exterior lighting is wall-mounted high pressure sodium fixtures. Typical control of the exterior lighting is provided by mechanical timers with photocell sensors at the fixtures.

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: Economizer Controls with Demand Control Ventilation

Description:

The existing six (6) Nesbitt air handling units condition the classrooms, cafeteria and media center DX cooling and are equipped with gas fired heat exchangers. The outside air is set to a minimum damper position to provide outside air to the space whenever the supply fan is set to run (in occupied mode). Unoccupied mode the outside air dampers shut. This operation is typical for the majority of the systems throughout the building. The outside air volume is typically based on the maximum occupancy of the space conditioned. When a given space is not fully occupied the outside air quantity delivered to the space is greater than the amount needed for adequate ventilation.

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

The components included to install a demand control ventilation system include controllers, software programming, and CO_2 sensors. Each occupied zone would require a CO_2 sensor installed to monitor occupancy levels. This ECM is based on wireless sensors to minimize on installation cost. Savings from the implementation of this ECM will be achieved through reduced gas consumption from reduced heating energy as well as reduced electric consumption from reduced air conditioning energy.

It is also recommended at the time of this installation that outside air economizers are fixed or installed on all rooftop equipment serving the classrooms, media center and cafeteria. It was noted during the field survey that economizers currently located on the schools rooftop units are not operating properly. An economizer uses outside air to condition the space when outside air temperature and humidity is ideal. The cooling coils are not used in this mode of operation which intern saves energy. This approach is typically referred to as free cooling.

Energy Savings Calculations:

Energy savings calculations for the rooftop modifications have been completed utilizing Trane System Analyzer™ energy savings calculation program. A comparative analysis between the existing HVAC equipment and new HVAC equipment is utilized to calculate the estimated savings.

NJ Smart Start® Program Incentives are not currently available for this ECM.

Maintenance Savings have not been calculated at this time because information was not available to baseline the savings.

Based on the energy model results, the resultant Energy and Cost Savings are as follows:

ENERGY MODEL RESULTS						
UNIT	**ELECTRICAL**			**NATURAL GAS**		**TOTAL COST SAVINGS**
Unit Tag	**Usage Reduction (kWh)**	**Demand Reduction (kW)**	**COST SAVINGS**	**Usage Reduction (THERMS)**	**COST SAVINGS**	
Unit 1	30,375	-	$4,313	1,100	$1,705	$6,018
Unit 2	32,400	-	$4,600	1,175	$1,821	$6,421
Unit 3	30,375	-	$4,313	1,100	$1,705	$6,018
Unit 4	32,400	-	$4,600	1,175	$1,821	$6,421
Unit 5	30,375	-	$4,313	1,100	$1,705	$6,018
Unit 6	24,300	-	$3,450	880	$1,364	$4,814
Totals	**180,225**	**-**	**$25,589**	**6,530**	**$10,121**	**$35,710**

Energy Savings Summary:

ECM #1 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$124,107
NJ Smart Start Equipment Incentive ($):	$0
Net Installation Cost ($):	$124,107
Maintenance Savings ($/Yr):	$0
Energy Savings ($/Yr):	$35,710
Total Yearly Savings ($/Yr):	$35,710
Estimated ECM Lifetime (Yr):	15
Simple Payback	3.5
Simple Lifetime ROI	331.6%
Simple Lifetime Maintenance Savings	$0
Simple Lifetime Savings	$535,650
Internal Rate of Return (IRR)	28%
Net Present Value (NPV)	$302,196.66

ECM #2: Electric Water Heater Replacement

Description:

One of the existing domestic hot water heaters serving the facility is powered by an 18 kW electric heating element. This style of hot water heating, although 100% efficient (100% of Btu's from electricity transferred into heating the water), is very expensive due to the high cost of electricity.

This energy conservation measure will replace the existing Jackson electric, 66-gallon capacity domestic hot water heater with a 92% thermal efficient Gas-Fired Bradford White Ultra High Efficient domestic hot water heater with 60-gallon storage capacity or equivalent.

Existing Electric DW Heater

Rated Capacity = 18,000 Watt (61.5 MBH) input; 66 gallons storage

Proposed Natural Gas-Fired, High-Efficiency DHW Heater

Rated Capacity = 200 MBH input; 50 gallons storage

Thermal Efficiency = 92%
Radiation Losses = 0.5%
Net Efficiency = 91.5%

Operating Data for DW Heater

Estimated Daily DW Load = 50 gal/h

DW heater Operating Hrs/Day. = 3 Hrs.

DW heater Operating Hrs/Yr. = 1095 Hrs.

Energy Savings Calculations:

Annual Electrical Consumption = 1095 Hrs. x 18 kW = 19,710 kWh

Electric Heating Cost = 19,710 kWh x $0.155/kWh = $3,055/year

Gas Heating Equivalent = (19,710 kWh x 3,414 BTUh/kWh) / 100,000 BTUh/Therm
= 673 Therms

Natural Gas Heating Consumption = 673 Therms x $1.55/ Therm= $1,045/year

Yearly Savings = $3,055/year - $1,045/year = $2,010/year

Energy Savings Summary:

ECM #2 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$12,000
NJ Smart Start Equipment Incentive ($):	$400
Net Installation Cost ($):	$11,600
Maintenance Savings ($/Yr):	$0
Energy Savings ($/Yr):	$2,010
Total Yearly Savings ($/Yr):	$2,010
Estimated ECM Lifetime (Yr):	12
Simple Payback	5.8
Simple Lifetime ROI	107.9%
Simple Lifetime Maintenance Savings	$0
Simple Lifetime Savings	$24,120
Internal Rate of Return (IRR)	14%
Net Present Value (NPV)	$8,407.55

ECM #3: Gas Fired Water Heater Replacement

Description:

One of the existing domestic water heaters is an A.O. Smith model BC 300 760 with 300,000 Btu/h input natural gas heater with 82% thermal efficiency. This model is considered a hot water boiler. It works in conjunction with a hot water storage tank and pumping system to maintain adequate domestic hot water temperature throughout the school. This is a typical design seen throughout many schools in the State. Standby heat losses occur when large quantities of hot water are stored for long periods of time. The hot water boiler is responsible for maintaining the temperature in the storage tank at all times regardless if the system is calling for water. The boiler fires to overcome the standby heat losses in the storage tank, heating water that is not going to be used at that time. This style of system is inefficient and should be replaced.

This energy conservation measure will replace the existing natural gas fired hot water generator and storage tank with two (2) tankless water heaters by Noritz or equivalent. Instillation will require the removal of the hot water generator and storage tank. Two (2) wall mounted tankless water heaters and controller will be installed in place of the existing system. Sizing for these units is based on a one for one replacement with the existing system; an engineer should be consulted to determine actually system needs.

Energy Savings Calculations:

Existing Natural Gas DW Heater (1 unit)
Rated Capacity = 300 MBH input
Combustion Efficiency = 82.4%
Age & Radiation Losses = 5%
Thermal Efficiency = 77.4%
Flow Rate = 11.0 GPM

Proposed Natural Gas-Fired, Tankless DW Heater (2 Units)
Rated Capacity = 380 MBH input each; 0 gallons storage
Thermal Efficiency = 80%
Flow Rate = 13.8 GPM

DW heater Operating Hrs/Day. = 3 Hrs.

DW heater Operating Hrs/Yr. = 1,095 Hrs.

Annual Natural Gas Usage

Annual Gas Usage = GPM x 500 x ΔT x Operating Hrs

Annual Gas Usage = 11 GPM x 500 x 100°F x 1,095 Hrs = 602,250,000 Btu/Year

Annual Gas Usage = (602,250,000 Btu/Year) / 100,000 Btu/Therm = 6,025 Therms/Year

The above calculation represents the natural gas used heating only the water being used in the school. This will remain the same with the tankless heater. The following calculation represents the annual savings from not maintaining the 20°F temperature rise of the hot water generator.

Annual Gas Savings = 11 GPM x 500 x 20°F x 1,095 Hrs = 120,450,000 Btu/Year

Annual Gas Savings = (120,450,000 Btu/Year) / 100,000 Btu/Therm = 1,204 Therms/Year

Existing Natural Gas Usage = 6,025 Therms/Year + 1,204 Therms/Year = 7,229 Therms/Year

Annual Gas Savings = 1,204 Therms/Year

Annual Cost Savings = 1,204 Therms/Year x $1.55/Therm = $1,870/Year

NJ Smart Start® Program Incentives are not currently available for this ECM.

Energy Savings Summary:

ECM #3 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$14,247
NJ Smart Start Equipment Incentive ($):	$0
Net Installation Cost ($):	$14,247
Maintenance Savings ($/Yr):	$0
Energy Savings ($/Yr):	$1,870
Total Yearly Savings ($/Yr):	$1,870
Estimated ECM Lifetime (Yr):	12
Simple Payback	7.6
Simple Lifetime ROI	57.5%
Simple Lifetime Maintenance Savings	$0
Simple Lifetime Savings	$22,440
Internal Rate of Return (IRR)	8%
Net Present Value (NPV)	$4,366.99

ECM #4: Exit Sign Replacement

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 simple 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 ECM replaces all exit signs with fluorescent 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** 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**, $20/LED Exit sign (≤75kW facility connected load) and $10/LED Exit sign (≥75kW facility connected load).

45 LED Exit signs x $10/ LED Exit sign = $450

Energy Savings Summary:

ECM #4 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$2,475
NJ Smart Start Equipment Incentive ($):	$450
Net Installation Cost ($):	$2,025
Maintenance Savings ($/Yr):	$0
Energy Savings ($/Yr):	$375
Total Yearly Savings ($/Yr):	$375
Estimated ECM Lifetime (Yr):	20
Simple Payback	5.4
Simple Lifetime ROI	270.4%
Simple Lifetime Maintenance Savings	$0
Simple Lifetime Savings	$7,500
Internal Rate of Return (IRR)	18%
Net Present Value (NPV)	$3,554.05

ECM #5: Walk-In Refrigerator Controls

Description:

The refrigerated walk-in cooler has a bank of evaporator fans that circulate the cold air over and under the food. These banks of evaporator fans (typically 1/3 HP motors) run continuously and give off heat that must be removed by the refrigeration.

This measure would install an evaporator fan controller that features two-speed operation of the evaporator fans – high speed during cooling, and low speed when not cooling manufactured by Frigitek or equivalent. The estimated energy savings assumes that the cooler is not opened for 10 hours per day.

Energy Savings Calculations:

Installing a controller on the three (3) evaporator fan motors in the two (2) walk-in cooler would save approximately 1,918 kWh/month x 12 months = 23,016 kWh/Year.

Annual Energy Cost Savings = 23,016kWh x $0.142/kWh = $3,268/Year

Refer to the **Frigitek Analysis Appendix** for a detailed energy savings calculations and list of assumptions.

NJ Smart Start® Program Incentives are not currently available for this ECM.

Energy Savings Summary:

ECM #5 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$3,750
NJ Smart Start Equipment Incentive ($):	$0
Net Installation Cost ($):	$3,750
Maintenance Savings ($/Yr):	$0
Energy Savings ($/Yr):	$3,268
Total Yearly Savings ($/Yr):	$3,268
Estimated ECM Lifetime (Yr):	15
Simple Payback	1.1
Simple Lifetime ROI	1207.2%
Simple Lifetime Maintenance Savings	$0
Simple Lifetime Savings	$49,020
Internal Rate of Return (IRR)	87%
Net Present Value (NPV)	$35,263.17

VIII. 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 typical profile of a school facility. There is an increase at the start of the school year (September) and continues to increase steadily until March and begins to decline until June and thereafter. There is one sharp peak (spike) in usage in the month of September. This can be associated to a full cooling load being utilized at the High School in addition to extra hours of use for camps and other summer educational activities. This building is equipped with rooftop units that utilize electric DX cooling to provide air-conditioning to the facility. A flatter load profile of this type will allow for more competitive energy prices when shopping for alternative suppliers.

Natural Gas:

The Natural Gas Usage Profile demonstrates a very typical natural gas (heat load) profile. The summer months (July – September) demonstrate extremely low consumption (complimenting the winter heating load). There is an increase in winter consumption (November – March). The increased winter load is caused by heating demand. In this facility the heat is supplied by natural gas fired heat exchangers located in the roof top units. These are strong contributors to the natural gas winter load profile. Also, domestic hot water is supplied by a natural gas fired hot water heaters. A base-load shaping (flat) will secure more competitive energy prices when procuring energy through an alternative energy source.

Tariff Analysis:

Electricity:

This facility receives electrical service through Atlantic City Electric (ACE) on an AGS (Annual General Service – 3 Phase) rate. Service classification AGS 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 Atlantic City Electric. This facility uses the Delivery Service of the utility (ACE). This delivery service includes the following charges: Delivery Service Charges, Distribution Demand Charges, Reactive Demand Charges, distribution Rates, Non-Utility Generation Charges, Societal Benefits Charges, Regulatory

Assets Recovery Charges, Transition Bond Charges, Market Transition Charge Tax, Transmission Demand Charge, Regional Greenhouse Gas Initiative Recovery Charge, and Infrastructure Investment Surcharge.

Natural Gas:

This facility receives natural gas delivery service from the South Jersey Gas Company (SJG) on the Firm Transportation utility rate schedule. Customer may either purchase "gas supply" from a Third Party Supplier (TPS) or from South Jersey's Gas Basic Gas Supply Service default service as detailed in the rate schedule. The Pitman BOE has elected to utilize the Third Party Supply Services of PEPCO Energy Services to provide their natural gas commodity service.

The "delivery charges" under this tariff include the following: Customer Charge, Delivery Charge, BSC Volume Charge and Commodity Charge under this rate structure. The customer can elect to have its Supply (Commodity Charge) serviced through the utility or by a Third Party Supplier (TPS). Note: Should the TPS not deliver, then the customer will receive replacement service from the utility under an emergency sales rate schedule which carries an extremely high penalty cost of service, and is automatically delivered.

"TPS Supply Charges" are the charges for supply made by a Third Party company that makes delivery of supply to the local utility (City-Gate). Once delivered to the utility then the utility delivers the supply to the end-use customer. The delivery made by the utility, are the "delivery charges". The type of service provided by the utility tariff is said to be "firm transportation". Much like the telecom wires being deregulated, so were the natural gas pipelines. Various types of services are available within the pipeline. "Firm Service" is the highest reliability. "Firm Service" would be the last to be interrupted. Since this service is "firm" the utility would tell the TPS how much natural gas to delivery each month on behalf of the end-user.

Imbalances can occur when Third Party Suppliers are used to supply natural gas and when full delivery is not made and when a new supplier is contracted or the customer returns to the utility. It is important when utilizing a Third Party Supplier, that an experienced regional supplier is used, otherwise, under delivery can occur, jeopardizing economics and scheduling.

Recommendations:

CEG recommends a global approach that will be consistent with all facilities within the BOE. Potential improvement is observed in both electric and natural gas costs. The average price per kWh (kilowatt hour) for all electricity based on a 1-year historical average price is $.111 / kWh (this is the average "price to compare" for energy supplied by Atlantic City Electric Company and for data supplied by Pitman BOE). The average price per decatherm for natural gas (as provided by PEPCO Energy Services as administered by the ACES agreement) is $10.94 / Dth (Dth, is the common unit of measure). This price is also the "price to compare".

The "price to compare" is the utility net price that would compare to an alternative suppliers offer. In electricity, this price would not include the utilities "wires" charges such as Transmission and Distribution. With regards to natural gas this would not include the utilities

"distribution" charges to the customers burner tip. The delivered product is said to be at the utilities City-Gate. From there the utility is in control of the delivery.

The BOE is able to have its electric or natural gas needs supplied via an alternative supply source TPS (Third Party Supplier). This supplier will make arrangements with producers, suppliers or hedge the product. TPS's are registered and licensed with the states Board of Public Utilities.
The Pitman BOE has gone a step further. The BOE has signed an agreement with the ACES (Alliance for Competitive Energy Services) which is an aggregator of energy for schools. The New Jersey School Board (NJSBA) is the acting lead agency, which can adopt a resolution to renew this agreement. PEPCO Energy Services has been contracted with the ACES/NJSBA agreement for natural gas service. CEG will *not* recommend a renewal of this agreement.

CEG does not recommend renewal of this agreement for contractual and economic reasons. It is our understanding that contracts cannot extend for (5) five years for schools. Additionally, CEG has observed that the BOE can see improvement in its energy costs if it were to arrange for supply from a Third Party Supplier on its own. CEG recommends the use of an "energy advisor" when making arrangements for its own "energy procurement program".

Furthermore the ACES (Alliance for Competitive Energy Services) agreement has a term through 2014. CEG is not in possession of the original ACES agreement only the resolution. CEG is aware that The Pitman BOE procures natural gas through the ACES agreement and it is possible that they also procure electricity through this agreement. If so CEG would also recommend that they not extend this agreement. If at all possible, CEG recommends terminating this agreement.

CEG does not recommend the use of the ACES agreement as it does not meet the needs of the schools. Schools, BOE and Local Governments are stricken by budgets. The ACES strategy does compliment the budget process. The budget needs to be created at the same time as the energy procurement.

Furthermore, the fixed price contract and the subsequent "blend and extend" strategy does not benefit the BOE. In order for an end-user to benefit from energy procurement: they must be able to protect the budget (through budget creation at the time of procurement), management of commodity (through active on-going involvement in the process), and by applying the "managed approach" to the procurement plan so that if prices fall the end-user can take advantage of that drop.

Energy commodities are among the most volatile of all commodities, however at this point and time, energy is extremely competitive. The BOE could see improvement in its energy costs if it were to take advantage of these current market prices quickly, before energy increases. Based on annual historical consumption of this facility and current electric rates, the BOE could see an improvement in its electric costs of up to 19% or up to $47,000 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 secondary recommendation coincides with the natural gas costs. Based on the current market, The BOE could improve its natural gas costs by up to 27% or up to $35,000 annually. CEG recommends that the BOE receive further advisement on these prices through an energy advisor. Through the use of an "energy advisor" the BOE should be able to procure natural gas on its own and create an "energy procurement program".

CEG also recommends that The BOE not renew its energy supply contract with the ACES aggregation and PEPCO Energy Solutions. The ACES agreement has demonstrated that the price is above market and the BOE has no way of adjusting the price should prices fall.

CEG further recommends that The BOE create an energy program through a "managed approach". The "managed approach" will take into account creating an "energy budget" that is in line with The BOE's budget year and risk tolerance. Risk tolerance is the appetite that The BOE has for risk. Based on the reduced state and local government budgets and the general aversion for risk, the local government is required to manage this risk.

CEG also recommends that The BOE schedule 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 BOE 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 BOE 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".

IX. INSTALLATION FUNDING OPTIONS

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

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

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

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

iv. *Pay For Performance – The New Jersey Smart Start Pay for Performance program includes incentives based on savings resulted from implemented ECMs. The program is available for all buildings 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.

X. ADDITIONAL RECOMMENDATIONS

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

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

B. Maintain all weather stripping on windows and doors.

C. Clean all light fixtures to maximize light output.

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

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

ECM COST & SAVINGS BREAKDOWN

CONCORD ENGINEERING GROUP

Pitmand Board of Education - Pitman 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. / SREC	TOTAL		(Yearly Saving * ECM Lifetime)	(Yearly Maint Svaing * ECM Lifetime)	(Lifetime Savings - Net Cost) / (Net Cost)	(Net cost / Yearly Savings)	$\sum_{n=0}^{N} \frac{C_n}{(1+IRR)^n}$	$\sum_{n=0}^{N} \frac{C_n}{(1+DR)^n}$
		($)	($)	($)	($)	($/Yr)	($/Yr)	($/Yr)	(Yr)	($)	($)	(%)	(Yr)	($)	($)
ECM #1	Economizer Control w/ Demand Control Ventilation	$62,054	$62,054	$0	$124,107	$35,710	$0	$35,710	15	$535,650	$0	331.6%	3.5	28.07%	$302,196.66
ECM #2	Electric Water Heater Replacement	$8,000	$4,000	$400	$11,600	$2,010	$0	$2,010	12	$24,120	$0	107.9%	5.8	13.56%	$8,407.55
ECM #3	Gas Fired Water Heater Replacement	$9,498	$4,749	$0	$14,247	$1,870	$0	$1,870	12	$22,440	$0	57.5%	7.6	7.79%	$4,366.99
ECM #4	Exit Sign Replacement	$900	$1,575	$450	$2,025	$375	$0	$375	20	$7,500	$0	270.4%	5.4	17.82%	$3,554.05
ECM #5	Walk-In Refrigerator Controls	$2,500	$1,250	$0	$3,750	$3,268	$0	$3,268	15	$49,020	$0	1207.2%	1.1	87.14%	$35,263.17

Notes: 1) The variable Cn in the formulas for Internal Rate of Return and Net Present Value stands for the cash flow during each period.
2) The variable DR in the NPV equation stands for Discount Rate
3) For NPV and IRR calculations: From n=0 to N periods where N is the *lifetime of ECM* and Cn is the *cash flow during each period*.

Concord Engineering Group, Inc.

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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

STATEMENT OF ENERGY PERFORMANCE
Pitman High School

Building ID: 1940814
For 12-month Period Ending: June 30, 2009[1]
Date SEP becomes ineligible: N/A
Date SEP Generated: November 23, 2009

Facility
Pitman High School
225 Linden Ave.
Pitman, NJ 08071

Facility Owner
Pitman Board of Education
420 Hudson Avenue
Pitman, NJ 08071

Primary Contact for this Facility
Michele Roemer
420 Hudson Avenue
Pitman, NJ 08071

Year Built: 1971
Gross Floor Area (ft²): 103,338

Energy Performance Rating[2] (1-100) 66

Site Energy Use Summary[3]

Electricity - Grid Purchase(kBtu)	3,504,806
Natural Gas (kBtu)[4]	2,991,639
Total Energy (kBtu)	6,496,445

Energy Intensity[5]

Site (kBtu/ft²/yr)	63
Source (kBtu/ft²/yr)	144

Emissions (based on site energy use)

Greenhouse Gas Emissions ($MtCO_2e$/year)	693

Electric Distribution Utility
Atlantic City Electric Co

National Average Comparison

National Average Site EUI	74
National Average Source EUI	168
% Difference from National Average Source EUI	-15%
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 Rd.
Voorhees, NJ 08043

Notes:
1. Application for the ENERGY STAR must be submitted to EPA within 4 months of the Period Ending date. Award of the ENERGY STAR is not final until approval is received from EPA.
2. The EPA Energy Performance Rating is based on total source energy. A rating of 75 is the minimum to be eligible for the ENERGY STAR.
3. Values represent energy consumption, annualized to a 12-month period.
4. 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	Pitman 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	225 Linden Ave., Pitman, NJ 08071	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 (K-12 School)				
CRITERION	**VALUE AS ENTERED IN PORTFOLIO MANAGER**	**VERIFICATION QUESTIONS**	**NOTES**	☑
Gross Floor Area	103,338 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?	Yes	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	301	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	N/A(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: Atlantic City Electric Co

Fuel Type: Electricity

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

Start Date	End Date	Energy Use (kWh (thousand Watt-hours))
06/01/2009	06/30/2009	74,400.00
05/01/2009	05/31/2009	90,800.00
04/01/2009	04/30/2009	123,200.00
03/01/2009	03/31/2009	87,600.00
02/01/2009	02/28/2009	90,000.00
01/01/2009	01/31/2009	85,600.00
12/01/2008	12/31/2008	91,600.00
11/01/2008	11/30/2008	77,200.00
10/01/2008	10/31/2008	83,200.00
09/01/2008	09/30/2008	94,800.00
08/01/2008	08/31/2008	70,800.00
07/01/2008	07/31/2008	58,000.00
Electric Meter Consumption (kWh (thousand Watt-hours))		**1,027,200.00**
Electric Meter Consumption (kBtu (thousand Btu))		**3,504,806.40**
Total Electricity (Grid Purchase) Consumption (kBtu (thousand Btu))		**3,504,806.40**
Is this the total Electricity (Grid Purchase) consumption at this building including all Electricity meters?		☐

Fuel Type: Natural Gas

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

Start Date	End Date	Energy Use (therms)
06/01/2009	06/30/2009	414.00
05/01/2009	05/31/2009	1,117.80
04/01/2009	04/30/2009	2,902.73
03/01/2009	03/31/2009	3,299.20
02/01/2009	02/28/2009	5,314.80
01/01/2009	01/31/2009	6,184.92
12/01/2008	12/31/2008	5,324.94
11/01/2008	11/30/2008	3,149.44
10/01/2008	10/31/2008	1,382.88
09/01/2008	09/30/2008	310.80

08/01/2008	08/31/2008	287.84
07/01/2008	07/31/2008	227.04
Natural Gas Meter Consumption (therms)		**29,916.39**
Natural Gas Meter Consumption (kBtu (thousand Btu))		**2,991,639.00**
Total Natural Gas Consumption (kBtu (thousand Btu))		**2,991,639.00**
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
Pitman High School
225 Linden Ave.
Pitman, NJ 08071

Facility Owner
Pitman Board of Education
420 Hudson Avenue
Pitman, NJ 08071

Primary Contact for this Facility
Michele Roemer
420 Hudson Avenue
Pitman, NJ 08071

General Information

Pitman High School	
Gross Floor Area Excluding Parking: (ft^2)	103,338
Year Built	1971
For 12-month Evaluation Period Ending Date:	June 30, 2009

Facility Space Use Summary

High School	
Space Type	K-12 School
Gross Floor Area(ft^2)	103,338
Open Weekends?	Yes
Number of PCs	301
Number of walk-in refrigeration/freezer units	2
Presence of cooking facilities	Yes
Percent Cooled	100
Percent Heated	100
Months[o]	N/A
High School?	Yes
School District[o]	N/A

Energy Performance Comparison

	Evaluation Periods		Comparisons		
Performance Metrics	**Current** (Ending Date 06/30/2009)	**Baseline** (Ending Date 06/30/2009)	**Rating of 75**	**Target**	**National Average**
Energy Performance Rating	66	66	75	N/A	50
Energy Intensity					
Site ($kBtu/ft^2$)	63	63	58	N/A	74
Source ($kBtu/ft^2$)	144	144	131	N/A	168
Energy Cost					
$/year	$ 191,906.00	$ 191,906.00	$ 175,667.10	N/A	$ 224,628.00
$/$ft^2$/year	$ 1.86	$ 1.86	$ 1.70	N/A	$ 2.18
Greenhouse Gas Emissions					
$MtCO_2e$/year	693	693	634	N/A	811
$kgCO_2e/ft^2$/year	7	7	6	N/A	8

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.

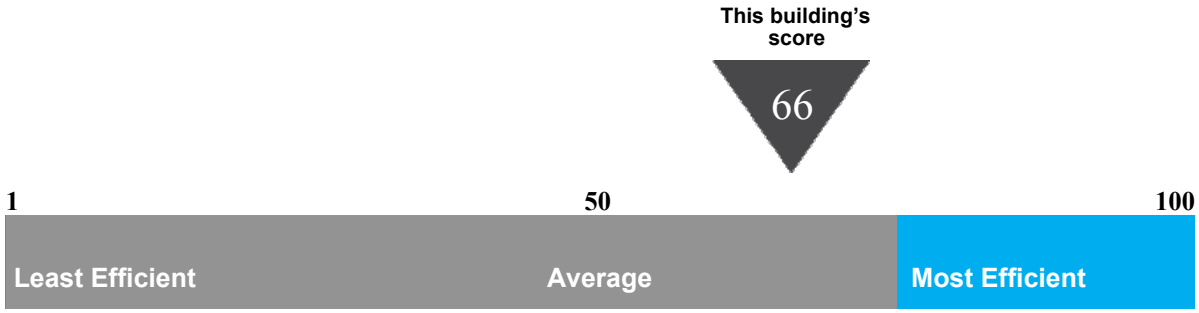
Statement of Energy Performance

2009

Pitman High School
225 Linden Ave.
Pitman, NJ 08071

Portfolio Manager Building ID: 1940814

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 144 kBtu per square foot per year.*

*Based on source energy intensity for the 12 month period ending June 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: 11/23/2009

MAJOR EQUIPMENT LIST

Concord Engineering Group

"Pitman Board of Education - High School"

Domestic Hot Water Heater

Location	Area Served	Manufacturer	Qty	Model #	Serial #	Input	Recovery (gal/h)	Capacity (gal)	Efficiency (%)	Fuel	Approx. Age	ASHRAE Service Life	Remaining Life
Teacher Work Room	Rest Rooms	Jackson	1	GRE66TH	C10256	18 kW	-	66 gallons	-	Electric	38	20	(18)
Storage Area	Entire School	AO Smith	2	BC 300 760	64400	300000 Btu/h	252	-	-	Natural Gas	27	20	(7)

Roof Top Units

Location	Area Served	Manufacturer	Qty	Equipment Tag	Model #	Serial #	Cooling Coil	Cooling Eff. (EER)	Cooling Capacity	Heating Type	Input (MBh)	Output (MBh)	Heating Eff. (%)	Fuel	Volts	Ph	Hz	Approx. Age	ASHRAE Service Life	Remaining Life
Roof	Auditorium	Carrier	1	-	Part # 48DJE074DA 601FH	Serial # 1891F59248	DX R-22	-	6 Ton	Natural Gas	N/A	N/A	-	-	460	3	60	18	15	(3)
Roof	-	American Standard	1	Unit 10	YCD108B4L0HB	Serial # 702101697D	DX R-22	-	-	Gas HX	250,000	203,000	81%	Nat. Gas	460	3	60	2	15	13
Roof	-	York	1	Unit 9	D4CG120N16546ECA	Serial # NMGM149312	DX R-22	9.0 EER	10 Ton	Gas HX	204,000	161,500	79%	Nat. Gas	460	3	60	11	15	4
Roof	-	Carrier	1	Unit 12	No nameplate	-	DX	-	-	Natural Gas	N/A	N/A	-	-	460	3	60	18	15	(3)
Roof	-	Carrier	1	Unit 13	Weather Maker 48 Series	-	DX	-	-	Natural Gas	N/A	N/A	-	-	460	3	60	18	15	(3)
Roof	-	Nesbitt	1	Unit 1	RMA100NG5C3015CB06A170000	Serial # 9901-72617	DX R-22	10.0 EER	30 Ton	Gas HX	500,000	375,000	75%	Nat. Gas	460	3	60	10	15	5
Roof	-	Nesbitt	1	Unit 2	RMA100NG5C3215CB0717000	Serial # 9901-72621	DX R-22	10.0 EER	32 Ton	Gas HX	500,000	375,000	75%	Nat. Gas	460	3	60	10	15	5
Roof	-	Nesbitt	1	Unit 3	RMA100NG5C3015CB06A170000	Serial # 9901-72622	DX R-22	10.0 EER	30 Ton	Gas HX	500,000	375,000	75%	Nat. Gas	460	3	60	10	15	5
Roof	-	Nesbitt	1	Unit 4	RMA100NG5C3215CB02A170000	Serial # 9901-72620	DX R-22	10.0 EER	32 Ton	Gas HX	500,000	375,000	75%	Nat. Gas	460	3	60	10	15	5
Roof	-	Nesbitt	1	Unit 5	RMA100NG5C3015CB09A170000	Serial # 9901-72618	DX R-22	10.0 EER	30 Ton	Gas HX	500,000	375,000	75%	Nat. Gas	460	3	60	10	15	5
Roof	-	Nesbitt	1	Unit 6	RMA100NG4C2410CB04A17000	Serial # 9901-72619	DX R-22	10.0 EER	24 Ton	Gas HX	400,000	300,000	75%	Nat. Gas	460	3	60	10	15	5
Roof	-	York	1	Unit 7	D2CG180N32046FDE	Serial # NNGM163451	DX	9.0 EER	15 Ton	Gas HX	400,000	320,000	80%	Nat. Gas	460	3	60	11	15	4
Roof	-	Trane	1	-	No nameplate	-	DX		-	Natural Gas	N/A	N/A	-	-	460	3	60	20	15	(5)
Roof	New Addition	York	1	-	D4CG090N13046ECA	Serial # NNGM165521	DX	9.0 EER	7.5 Ton	Gas HX	163,300	129,400	79%	Nat. Gas	460	3	60	11	15	4

Heating and Ventilation Units

Location	Area Served	Manufacturer	Qty.	Model #	Serial #	Heating Coil	Capacity (Btu/h)	Fan HP	Fan RPM	Volts	Phase	Hz	Approx. Age	ASHRAE Service Life	Remaining Life
GYM	GYM	Reznor	4	OH	-	Gas HX	229000	1/4	850	115	1	60	38	20	(18)

Investment Grade Lighting Audit

CEG Job #: 9C09067
Project: Pitman Board of Education
Address: 225 Linden Avenue
Pitman, NJ 08071
Building SF: 103,338

"Pitman Board of Education - High School"

KWH COST: $0.142

EXISTING LIGHTINC										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	Kitchen	3750	10	4	1x8 4 4' Lamps (retro) 32w T-8 Elect Ballast, Surface Mnt., Direct	112	1.12	4,200.0	$596.40	10	0	No Change Required (NCR)	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
	Kitchen Hood	3750	5	1	1 Lamp Incandescents	100	0.50	1,875.0	$266.25	5	1	18w CFL Lamp	90	0.45	1687.5	$239.63	$7.50	$37.50	0.05	187.5	$26.63	1.41
2	Cafeteria Break Room	3750	1	2	1x4 2 Lamp 32w T-8 Elect Ballast, Surface Mnt., Direct	57	0.06	213.8	$30.35	1	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
3	Cafeteria Bathhroom	3750	1	2	2 Lamp 17w T-8 Elect Ballast, Wall Mnt Vanity, Prismatic Lens	34	0.03	127.5	$18.11	1	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
2	Cafeteria Entrance	3750	1	2	1x4 2 Lamp 32w T-8 Elect Ballast, Surface Mnt., Direct	57	0.06	213.8	$30.35	1	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
4	Cafeteria Storage	400	14	1	4' Channel, 32w T-8 Elect Ballast, Surface Mnt.	36	0.50	201.6	$28.63	14	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
5	Cafeteria	3750	42	4	1x8 4 4' Lamps (retro) 32w T-8 Elect Ballast, Surface Mnt., Prismatic	112	4.70	17,640.0	$2,504.88	42	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
6	Dish Room	3750	4	2	1x4 2 Lamp 32w T-8 Elect Ballast, Surface Mnt., Prismatic	57	0.23	855.0	$121.41	4	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
6	Food Manager's Office	400	2	2	1x4 2 Lamp 32w T-8 Elect Ballast, Surface Mnt., Prismatic	57	0.11	45.6	$6.48	2	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
6	Trailer	3750	10	2	1x4 2 Lamp 32w T-8 Elect Ballast, Surface Mnt., Prismatic	57	0.57	2,137.5	$303.53	10	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
7	Corridors	3750	70	2	2x4 2 Lamp 32w T-8 Elect Ballast, Recessed, Prismatic	57	3.99	14,962.5	$2,124.68	70	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
8	C Wing Corridor	3750	5	4	2x4 4 Lamp 32w T-8 Elect Ballast, Recessed, Prismatic	112	0.56	2,100.0	$298.20	5	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
8	Classroom C2	3750	9	4	2x4 4 Lamp 32w T-8 Elect Ballast, Recessed, Prismatic	112	1.01	3,780.0	$536.76	9	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
8	Classroom C1	3750	9	4	2x4 4 Lamp 32w T-8 Elect Ballast, Recessed, Prismatic	112	1.01	3,780.0	$536.76	9	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
8	AD Office	3750	2	4	2x4 4 Lamp 32w T-8 Elect Ballast, Recessed, Prismatic	112	0.22	840.0	$119.28	2	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
9	Boy's Lockers & Bathroom	3750	30	2	1x4 2 Lamp 32w T-8 Elect Ballast, Recessed, Prismatic	57	1.71	6,412.5	$910.58	30	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
10	Boy's Shower	3750	10	1	Dwn Light, Recessed, A19 Incandescent	100	1.00	3,750.0	$532.50	10	1	18w CFL Lamp	18	0.18	675	$95.85	$5.75	$57.50	0.82	3075	$436.65	0.13
11	Office Opposite Boy's Locker Room	3750	4	2	2x4 4 Lamp 32w T-8 Elect Ballast, Surface Mnt, Prismatic	112	0.45	1,680.0	$238.56	4	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00

Investment Grade Lighting Audit

11	Clothing Lab	3750	21	2	2x4 4 Lamp 32w T-8 Elect Ballast, Surface Mnt, Prismatic	112	2.35	8,820.0	$1,252.44	21	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
9	Girl's Lockers & Bathroom	3750	29	2	1x4 2 Lamp 32w T-8 Elect Ballast, Recessed, Prismatic	57	1.65	6,198.8	$880.22	29	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
10	Girl's Shower	3750	15	1	Dwn Light, Recessed, A19 Incandescent	100	1.50	5,625.0	$798.75	15	1	18w CFL Lamp	18	0.27	1012.5	$143.78	$5.75	$86.25	1.23	4612.5	$654.98	0.13
12	Gym	3750	36	4	2x4 4 Lamp 28w T-5 Elect Ballast, Pendant Mnt.,	128	4.61	17,280.0	$2,453.76	36	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
13		3750	2	6	2x4 6 Lamp 28w T-5 Elect Ballast, Pendant Mnt.,	185	0.37	1,387.5	$197.03	2	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
4	Girl's Locker Room Storage	3750	3	1	4' Channel, 32w T-8 Elect Ballast, Surface Mnt.	36	0.11	405.0	$57.51	3	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
7	Vestibule - Main Entrance	3750	3	2	2x4 2 Lamp 32w T-8 Elect Ballast, Recessed, Prismatic	57	0.17	641.3	$91.06	3	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
6	Main Office	3750	18	2	1x4 2 Lamp 32w T-8 Elect Ballast, Surface Mnt., Prismatic	57	1.03	3,847.5	$546.35	18	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
7	Assit. Principal's Office	3750	4	2	2x4 2 Lamp 32w T-8 Elect Ballast, Recessed, Prismatic	57	0.23	855.0	$121.41	4	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
11	Work Room	3750	2	2	2x4 4 Lamp 32w T-8 Elect Ballast, Surface Mnt, Prismatic	112	0.22	840.0	$119.28	2	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
11	Principal's Office	3750	2	2	2x4 4 Lamp 32w T-8 Elect Ballast, Surface Mnt, Prismatic	112	0.22	840.0	$119.28	2	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
4	Storage	400	1	1	4' Channel, 32w T-8 Elect Ballast, Surface Mnt.	36	0.04	14.4	$2.04	1	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
11	SRO Office	3750	1	2	2x4 4 Lamp 32w T-8 Elect Ballast, Surface Mnt, Prismatic	112	0.11	420.0	$59.64	1	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
6	Computer Lab A1	3750	24	2	1x4 2 Lamp 32w T-8 Elect Ballast, Surface Mnt., Prismatic	57	1.37	5,130.0	$728.46	24	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
6	Classroom A3	3750	18	2	1x4 2 Lamp 32w T-8 Elect Ballast, Surface Mnt., Prismatic	57	1.03	3,847.5	$546.35	18	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
6	Computer Lab A5	3750	32	2	1x4 2 Lamp 32w T-8 Elect Ballast, Surface Mnt., Prismatic	57	1.82	6,840.0	$971.28	32	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
6	Computer Lab A7	3750	24	2	1x4 2 Lamp 32w T-8 Elect Ballast, Surface Mnt., Prismatic	57	1.37	5,130.0	$728.46	24	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
14	Classroom A9	3750	18	3	2x4 3 Lamp 32w T-8 Elect Ballast, Recessed, Parabolic	93	1.67	6,277.5	$891.41	18	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
6	Classroom A11	3750	18	2	1x4 2 Lamp 32w T-8 Elect Ballast, Surface Mnt., Prismatic	57	1.03	3,847.5	$546.35	18	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
6	Classroom A14	3750	18	2	1x4 2 Lamp 32w T-8 Elect Ballast, Surface Mnt., Prismatic	57	1.03	3,847.5	$546.35	18	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
6	Classroom A12	3750	18	2	1x4 2 Lamp 32w T-8 Elect Ballast, Surface Mnt., Prismatic	57	1.03	3,847.5	$546.35	18	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00

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6	Classroom A10	3750	18	2	1x4 2 Lamp 32w T-8 Elect Ballast, Surface Mnt., Prismatic	57	1.03	3,847.5	$546.35	18	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
6	Classroom A8	3750	18	2	1x4 2 Lamp 32w T-8 Elect Ballast, Surface Mnt., Prismatic	57	1.03	3,847.5	$546.35	18	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
6	Conference Room - A Wing	3750	5	2	1x4 2 Lamp 32w T-8 Elect Ballast, Surface Mnt., Prismatic	57	0.29	1,068.8	$151.76	5	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
11	Office	3750	6	2	2x4 4 Lamp 32w T-8 Elect Ballast, Surface Mnt, Prismatic	112	0.67	2,520.0	$357.84	6	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
7	Vestibule - A Wing	3750	1	2	2x4 2 Lamp 32w T-8 Elect Ballast, Recessed, Prismatic	57	0.06	213.8	$30.35	1	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
6	Nurse's Office	3750	12	2	1x4 2 Lamp 32w T-8 Elect Ballast, Surface Mnt., Prismatic	57	0.68	2,565.0	$364.23	12	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
3		3750	1	2	2 Lamp 17w T-8 Elect Ballast, Wall Mnt Vanity, Prismatic Lens	34	0.03	127.5	$18.11	1	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
6	Guidence Office	3750	10	2	1x4 2 Lamp 32w T-8 Elect Ballast, Surface Mnt., Prismatic	57	0.57	2,137.5	$303.53	10	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
11	Office - Ms Defrancesco	3750	2	2	2x4 4 Lamp 32w T-8 Elect Ballast, Surface Mnt, Prismatic	112	0.22	840.0	$119.28	2	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
11	Office - Dr Davidson	3750	2	2	2x4 4 Lamp 32w T-8 Elect Ballast, Surface Mnt, Prismatic	112	0.22	840.0	$119.28	2	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
11	Office - Mr Ricketts	3750	2	2	2x4 4 Lamp 32w T-8 Elect Ballast, Surface Mnt, Prismatic	112	0.22	840.0	$119.28	2	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
11	Office - Ms D'Arecca	3750	2	2	2x4 4 Lamp 32w T-8 Elect Ballast, Surface Mnt, Prismatic	112	0.22	840.0	$119.28	2	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
11	Records/Storage	400	1	2	2x4 4 Lamp 32w T-8 Elect Ballast, Surface Mnt, Prismatic	112	0.11	44.8	$6.36	1	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
3	Women's Faculty Bathroom	3750	1	2	2 Lamp 17w T-8 Elect Ballast, Wall Mnt Vanity, Prismatic Lens	34	0.03	127.5	$18.11	1	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
3	Men's Faculty Bathroom	3750	1	2	2 Lamp 17w T-8 Elect Ballast, Wall Mnt Vanity, Prismatic Lens	34	0.03	127.5	$18.11	1	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
6	Teacher's Work Room	3750	19	2	1x4 2 Lamp 32w T-8 Elect Ballast, Surface Mnt., Prismatic	57	1.08	4,061.3	$576.70	19	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
9	Boy's Lav - A Wing	3750	4	2	1x4 2 Lamp 32w T-8 Elect Ballast, Recessed, Prismatic	57	0.23	855.0	$121.41	4	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
9	Girl's Lav - A Wing	3750	4	2	1x4 2 Lamp 32w T-8 Elect Ballast, Recessed, Prismatic	57	0.23	855.0	$121.41	4	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
6	Classroom B2	3750	18	2	1x4 2 Lamp 32w T-8 Elect Ballast, Surface Mnt., Prismatic	57	1.03	3,847.5	$546.35	18	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
6	Classroom B4	3750	18	2	1x4 2 Lamp 32w T-8 Elect Ballast, Surface Mnt., Prismatic	57	1.03	3,847.5	$546.35	18	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
6	Classroom B6	3750	18	2	1x4 2 Lamp 32w T-8 Elect Ballast, Surface Mnt., Prismatic	57	1.03	3,847.5	$546.35	18	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00

6	Classroom B8	3750	18	2	1x4 2 Lamp 32w T-8 Elect Ballast, Surface Mnt., Prismatic	57	1.03	3,847.5	$546.35	18	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
11	IT Room	3750	2	2	2x4 4 Lamp 32w T-8 Elect Ballast, Surface Mnt, Prismatic	112	0.22	840.0	$119.28	2	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
6	Faculty Lunch Room	3750	12	2	1x4 2 Lamp 32w T-8 Elect Ballast, Surface Mnt., Prismatic	57	0.68	2,565.0	$364.23	12	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
3	Faculty Bathroom	400	2	2	2 Lamp 17w T-8 Elect Ballast, Wall Mnt Vanity, Prismatic Lens	34	0.07	27.2	$3.86	2	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
6	Classroom B10	3750	24	2	1x4 2 Lamp 32w T-8 Elect Ballast, Surface Mnt., Prismatic	57	1.37	5,130.0	$728.46	24	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
6	Classroom B12	3750	24	2	1x4 2 Lamp 32w T-8 Elect Ballast, Surface Mnt., Prismatic	57	1.37	5,130.0	$728.46	24	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
6	Classroom B14	3750	24	2	1x4 2 Lamp 32w T-8 Elect Ballast, Surface Mnt., Prismatic	57	1.37	5,130.0	$728.46	24	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
8	Science Lab B13	3750	12	4	2x4 4 Lamp 32w T-8 Elect Ballast, Recessed, Prismatic	112	1.34	5,040.0	$715.68	12	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
8	Science Lab B13 Storage	3750	3	4	2x4 4 Lamp 32w T-8 Elect Ballast, Recessed, Prismatic	112	0.34	1,260.0	$178.92	3	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
8	Classroom B11	3750	12	4	2x4 4 Lamp 32w T-8 Elect Ballast, Recessed, Prismatic	112	1.34	5,040.0	$715.68	12	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
6	Science Lab B15	3750	30	2	1x4 2 Lamp 32w T-8 Elect Ballast, Surface Mnt., Prismatic	57	1.71	6,412.5	$910.58	30	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
8	Science Lab Office B15A	3750	2	4	2x4 4 Lamp 32w T-8 Elect Ballast, Recessed, Prismatic	112	0.22	840.0	$119.28	2	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
6	Science Lab B9	3750	24	2	1x4 2 Lamp 32w T-8 Elect Ballast, Surface Mnt., Prismatic	57	1.37	5,130.0	$728.46	24	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
8	Science Lab B9 Storage	400	3	4	2x4 4 Lamp 32w T-8 Elect Ballast, Recessed, Prismatic	112	0.34	134.4	$19.08	3	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
6	Science Lab B7	3750	24	2	1x4 2 Lamp 32w T-8 Elect Ballast, Surface Mnt., Prismatic	57	1.37	5,130.0	$728.46	24	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
6	Media Center	3750	108	2	1x4 2 Lamp 32w T-8 Elect Ballast, Surface Mnt., Prismatic	57	6.16	23,085.0	$3,278.07	108	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
6	Media AV Room	3750	24	2	1x4 2 Lamp 32w T-8 Elect Ballast, Surface Mnt., Prismatic	57	1.37	5,130.0	$728.46	24	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
11	Office- Media Room	3750	3	2	2x4 4 Lamp 32w T-8 Elect Ballast, Surface Mnt, Prismatic	112	0.34	1,260.0	$178.92	3	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
6	Media Room Computer Lab	3750	6	2	1x4 2 Lamp 32w T-8 Elect Ballast, Surface Mnt., Prismatic	57	0.34	1,282.5	$182.12	6	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
6	Office - Mr Polimeni	3750	8	2	1x4 2 Lamp 32w T-8 Elect Ballast, Surface Mnt., Prismatic	57	0.46	1,710.0	$242.82	8	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
4	Gym Storage	400	6	1	4' Channel, 32w T-8 Elect Ballast, Surface Mnt.	36	0.22	86.4	$12.27	6	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00

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9	Girl's Lav. near C Wing	3750	4	2	1x4 2 Lamp 32w T-8 Elect Ballast, Recessed, Prismatic	57	0.23	855.0	$121.41	4	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
9	Boy's Lav. near C Wing	3750	3	2	1x4 2 Lamp 32w T-8 Elect Ballast, Recessed, Prismatic	57	0.17	641.3	$91.06	3	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
11	Health Room	3750	21	2	2x4 4 Lamp 32w T-8 Elect Ballast, Surface Mnt, Prismatic	112	2.35	8,820.0	$1,252.44	21	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
	Storage	400	1	1	18w CFL	20	0.02	8.0	$1.14	1	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
6	Design Art	3750	36	2	1x4 2 Lamp 32w T-8 Elect Ballast, Surface Mnt., Prismatic	57	2.05	7,695.0	$1,092.69	36	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
4	Art Storage	400	2	1	4' Channel, 32w T-8 Elect Ballast, Surface Mnt.	36	0.07	28.8	$4.09	2	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
6	Art Room	3750	39	2	1x4 2 Lamp 32w T-8 Elect Ballast, Surface Mnt., Prismatic	57	2.22	8,336.3	$1,183.75	39	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
11	ISS Room	3750	12	2	2x4 4 Lamp 32w T-8 Elect Ballast, Surface Mnt, Prismatic	112	1.34	5,040.0	$715.68	12	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
4	ISS Storage	400	6	1	4' Channel, 32w T-8 Elect Ballast, Surface Mnt.	36	0.22	86.4	$12.27	6	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
11	SGI Room	3750	18	2	2x4 4 Lamp 32w T-8 Elect Ballast, Surface Mnt, Prismatic	112	2.02	7,560.0	$1,073.52	18	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
11	Tech Drawing Office	3750	1	2	2x4 4 Lamp 32w T-8 Elect Ballast, Surface Mnt, Prismatic	112	0.11	420.0	$59.64	1	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
8	Print Shop	3750	27	4	2x4 4 Lamp 32w T-8 Elect Ballast, Recessed, Prismatic	112	3.02	11,340.0	$1,610.28	27	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
11	Dark Room	400	4	2	2x4 4 Lamp 32w T-8 Elect Ballast, Surface Mnt, Prismatic	112	0.45	179.2	$25.45	4	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
15	Print Storage	400	5	2	1x4 2 Lamp 32w T-8 Elect Ballast, Surface Mnt., Direct	57	0.29	114.0	$16.19	5	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
16	Wood Shop	3750	16	4	1x8 4 4' Lamps (retro) 32w T-8 Elect Ballast, Pendant Mnt., Prismatic	112	1.79	6,720.0	$954.24	16	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
8	Wood Shop Computer Lab	3750	12	4	2x4 4 Lamp 32w T-8 Elect Ballast, Recessed, Prismatic	112	1.34	5,040.0	$715.68	12	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
15	Mezzinine Storage	3750	12	2	1x4 2 Lamp 32w T-8 Elect Ballast, Surface Mnt., Direct	57	0.68	2,565.0	$364.23	12	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
6	Tool Room	3750	2	2	1x4 2 Lamp 32w T-8 Elect Ballast, Surface Mnt., Prismatic	57	0.11	427.5	$60.71	2	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
11	Wood Shop Office	3750	1	2	2x4 4 Lamp 32w T-8 Elect Ballast, Surface Mnt, Prismatic	112	0.11	420.0	$59.64	1	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
8	Crosswalk to Band Room/Auditorium	3750	4	4	2x4 4 Lamp 32w T-8 Elect Ballast, Recessed, Prismatic	112	0.45	1,680.0	$238.56	4	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
8	Band Room	3750	26	4	2x4 4 Lamp 32w T-8 Elect Ballast, Recessed, Prismatic	112	2.91	10,920.0	$1,550.64	26	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00

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7	Band Rm - Small Room #1	3750	1	2	2x4 2 Lamp 32w T-8 Elect Ballast, Recessed, Prismatic	57	0.06	213.8	$30.35	1	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
7	Band Rm - Small Room #2	3750	2	2	2x4 2 Lamp 32w T-8 Elect Ballast, Recessed, Prismatic	57	0.11	427.5	$60.71	2	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
7	Band Rm - Small Room #3	3750	2	2	2x4 2 Lamp 32w T-8 Elect Ballast, Recessed, Prismatic	57	0.11	427.5	$60.71	2	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
7	Band Rm - Small Room #4	3750	3	2	2x4 2 Lamp 32w T-8 Elect Ballast, Recessed, Prismatic	57	0.17	641.3	$91.06	3	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
7	Band Room Office	3750	4	2	2x4 2 Lamp 32w T-8 Elect Ballast, Recessed, Prismatic	57	0.23	855.0	$121.41	4	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
17	Auditorium Corridor	3750	5	2	2x2 2 Lamp 17w T-8 Elect Ballast, Recessed, Prismatic	34	0.17	637.5	$90.53	5	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
7		3750	10	2	2x4 2 Lamp 32w T-8 Elect Ballast, Recessed, Prismatic	57	0.57	2,137.5	$303.53	10	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
3	Bathroom	3750	1	2	2 Lamp 17w T-8 Elect Ballast, Wall Mnt Vanity, Prismatic Lens	34	0.03	127.5	$18.11	1	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
12	Stage	3750	10	4	2x4 4 Lamp 28w T-5 Elect Ballast, Pendant Mnt.,	128	1.28	4,800.0	$681.60	10	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
18		3750	2	1	1x4 1Lamp 32w T-8 Elect Ballast, Wall Mnt., Indirect	36	0.07	270.0	$38.34	2	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
12	Wardrobe	3750	4	4	2x4 4 Lamp 28w T-5 Elect Ballast, Pendant Mnt.,	128	0.51	1,920.0	$272.64	4	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
19	Catwalk	3750	8	1	1x4 1 Lamp 40w T-12 Magnetic Ballast, Pendant	57	0.46	1,710.0	$242.82	8	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
20	Auditorium Entrances	3750	9	1	Down Light, 150w BR40 Lamp	150	1.35	5,062.5	$718.88	9	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
21	Auditorium	3750	14	1	Wall Sconce 100w A19	100	1.40	5,250.0	$745.50	14	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
22		3750	16	1	Unknown	0	0.00	0.0	$0.00	16	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
26		3750	25	1	Unknown	0	0.00	0.0	$0.00	25	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
17	Women's Bathroom - Auditorium Lobby	3750	2	2	2x2 2 Lamp 17w T-8 Elect Ballast, Recessed, Prismatic	34	0.07	255.0	$36.21	2	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
3		3750	2	2	2 Lamp 17w T-8 Elect Ballast, Wall Mnt Vanity, Prismatic Lens	34	0.07	255.0	$36.21	2	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
17	Men's Bathroom - Auditorium Lobby	3750	2	2	2x2 2 Lamp 17w T-8 Elect Ballast, Recessed, Prismatic	34	0.07	255.0	$36.21	2	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
3		3750	2	2	2 Lamp 17w T-8 Elect Ballast, Wall Mnt Vanity, Prismatic Lens	34	0.07	255.0	$36.21	2	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
23	Auditorium Lobby	3750	31	2	12" Square Down Light, 2 Lamp 7w Bi Pin CFL	20	0.62	2,325.0	$330.15	31	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
25	Storage	400	1	1	2' Channel. 1 Lamp 25w T-5 Electronic	25	0.03	10.0	$1.42	1	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
18	Stairway to Light Booth	3750	3	1	1x4 1Lamp 32w T-8 Elect Ballast, Wall Mnt., Indirect	36	0.11	405.0	$57.51	3	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00

Investment Grade Lighting Audit

8	Light Booth Storage	400	3	4	2x4 4 Lamp 32w T-8 Elect Ballast, Recessed, Prismatic	112	0.34	134.4	$19.08	3	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
20	Light Booth Storage	400	4	1	Down Light, 150w BR40 Lamp	150	0.60	240.0	$34.08	4	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
12	Dressing Room Storage	400	4	4	2x4 4 Lamp 28w T-5 Elect Ballast, Pendant Mnt.,	128	0.51	204.8	$29.08	4	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
8	Dressing Room Storage	400	3	4	2x4 4 Lamp 32w T-8 Elect Ballast, Recessed, Prismatic	112	0.34	134.4	$19.08	3	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
24	Main Entrance Overhang	3750	6	1	12" Square Down Light, 1 Lamp 20w CFL	22	0.13	495.0	$70.29	6	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
24	Exterior Door - Maintenance	3750	2	1	12" Square Down Light, 1 Lamp 20w CFL	22	0.04	165.0	$23.43	2	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
24	Exterior Door - Cafeteria	3750	1	1	12" Square Down Light, 1 Lamp 20w CFL	22	0.02	82.5	$11.72	1	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
24	Exterior Door - Band Room	3750	1	1	12" Square Down Light, 1 Lamp 20w CFL	22	0.02	82.5	$11.72	1	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
24	Exterior Door - Auditorium	3750	3	1	12" Square Down Light, 1 Lamp 20w CFL	22	0.07	247.5	$35.15	3	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
24	Exterior Door - BWing	3750	1	1	12" Square Down Light, 1 Lamp 20w CFL	22	0.02	82.5	$11.72	1	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
24	Exterior Door - Awing	3750	3	1	12" Square Down Light, 1 Lamp 20w CFL	22	0.07	247.5	$35.15	3	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
27	Building Exterior	3750	17	1	100w HPS Flood Light	125	2.13	7,968.8	$1,131.56	17	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
28	Auduitorium Exterior	3750	8	1	Wall Pack	0	0.00	0.0	$0.00	8	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
29	Auditorium Walkway	3750	7	1	Bollard 100w HPS	125	0.88	3,281.3	$465.94	7	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
30	Auditorium Exterior Uplighting	3750	3	1	150w HPS Flood Light	188	0.56	2,115.0	$300.33	3	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
31	A Wing Exterior Door	3750	1	1	70w HPS Wall Pack	90	0.09	337.5	$47.93	1	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
32	Main Entrance Exterior Uplight	3750	1	1	400w MH Flood Light	455	0.46	1,706.3	$242.29	1	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
33	All exits	3750	45	2	Exit Sign, (2) 13w CFL	18	0.81	3,037.5	$431.33	45	1	Pegasus Lighting Item # PEZXTEU-2xWEM Exit Sign - LED	2.4	0.11	405	$57.51	$55.00	$2,475.00	0.70	2632.5	$373.82	6.62
	Totals		1594				95.99		$56,795.30	1594	4			1.01	3,780	$536.76		$2,656.25	2.80	10508	$1,492.07	1.78

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

2. Lamp totals only include T-12 tube replacment calculations

Frigitek® Single-Phase Savings Analysis			Analysis Sheet # 1 of	1	
Date -	December 3, 2009				
Customer -	Pitman High School				
Room and Evap. Description -	Kitchen Walk In Refrigerators				
Contact -				0	
Phone -				0	
Number of Evaporators on this sheet -	2		Enter one of these -		
Fan motors per Evaporator -	3		Amps/Motor -	7.20	
Fan Voltage -	120		or Total Motor Amps -	0.00	
Motor Type (S, C or E) (1) -	S		Compressor Type (2)		
Motor Power Factor (1) -	0.58		(S)ingle or (T)hree Phase -	S	
Electricity Cost per KwH (3) -	14.2	Cents	Normal Duty Cycle (4) -	40.00	%
Operation time factor (5) -	100	%	Frigitek Duty Cycle (6) -	32.00	%
Fan Motors KwH/Mo -	2,194.9	Avg	Total Fan Motor Watts (7) -	3006.7	W
Frigitek Cost, Quan., Model -	$2,498.00	2	Model	120V - 25A	
Tax Rate (%) -	0.07	Tax -	$1.75		
Install, Shipping, other costs -	$0.00				
Total Cost -	$2,499.75				
Total Frigitek KwH Savings (8) -	1918.54	/Mo Avg	23,022.49	/Yr	
Total Frigitek Dollar Savings (8) -	$272.43	/Mo Avg	$3,269.19	/Yr	
Payback Time (ROI) (9) -	9.18	Months			
Analysis Details ----------					
Before Frigitek					
Full-time High Speed Fan Cost (10) -	$311.67	/Mo Avg	$3,740.04	/Yr	
With Frigitek					
Frigitek Power Reduction Factor (11) -	80	%			
Full-Time Low Speed Cost -	$62.33	/Mo	$748.01	/Yr	
Fans KwH Saved -	1194.00	/Mo Avg	14,328.03	/Yr	
Fan High Speed Cost (12) -	$99.73	/Mo Avg	$1,196.81	/Yr	
Fan Low Speed Cost (13) -	$42.39	/Mo Avg	$508.65	/Yr	
Total Fan Cost with Frigitek -	$142.12	/Mo Avg	$1,705.46	/Yr	
Fan Dollar Savings (14) -	$169.55	/Mo Avg	$2,034.58	/Yr	
Compressor Cost Reduction					
Fan Power Reduction (15) -	1635.66	Watts	Heat Transfer Factor (16) -	9500	
Fan Heat Reduction (17) -	5581.02	BTU/Hr	Comp. Kw/Hp (18) -	1.55	
Compressor Hp use Reduction (19) -	0.5874759	Hp/Hr			
Compressor Power use Reduction (20) -	0.9105876	Kw/Hr	Cond. fan Savings (21) -	$8.50	/Mo
Compressor Power use Reduction (20) -	664.71	KwH/Mo			
Compressor Cost reduction (22) -	$102.88	/Mo Avg	$1,234.61	/Yr	
Note - Numbers in parentheses refer to Explanation Sheet.					
			Sheet version -	02/21/06	