ENERGY AUDIT – FINAL REPORT

MILLVILLE BOARD OF EDUCATION
MEMORIAL JR. HIGH SCHOOL

504 EAST BROAD STREET
MILLVILLE, NJ 08332
ATTN: TONI BASICH
ASSISTANT SCHOOL BOARD
SECRETARY/PURCHASING

CEG PROJECT NO. 9C09072

CONCORD ENGINEERING GROUP

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

CONTACT: RAYMOND JOHNSON, PRINCIPAL
EMAIL: rjohnson@ceg-inc.net

Table of Contents

REPORT DISCLAIMER

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

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

I. EXECUTIVE SUMMARY

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

Millville Board of Education
Memorial Jr. High School
504 East Broad Street
Millville, NJ 08332

Municipal Contact Person: Toni Basich
Facility Contact Person: Esteban Garcia

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	$143,644
Natural Gas	$68,101
Total	$211,745

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	General Lighting Replacment	$16,655	$6,003	2.8	440.6%
ECM #2	Gymnasium Lighting Replacement w/ Daylight Dimming	$34,800	$8,010	4.3	245.3%
ECM #3	Premium Efficient Motor Replacement	$11,602	$1,226	9.5	58.5%
ECM #4	Air Handling Unit Controls Upgrade	$84,400	$2,395	35.2	-57.4%
ECM #5	AC Upgrade	$434,838	$8,518	51.0	-70.6%
RENEWABLE ENERGY MEASURES (REM's)					
ECM NO.	**DESCRIPTION**	**NET INSTALLATION COST**	**ANNUAL SAVINGS**	**SIMPLE PAYBACK (Yrs)**	**SIMPLE LIFETIME ROI**
REM #1	Photovoltaic Panel Installation	$594,090	$44,353	13.4	12.0%

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

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

Table 2
Estimated Energy Savings Summary Table

ENERGY CONSERVATION MEASURES (ECM's)				
ECM NO.	DESCRIPTION	ANNUAL UTILITY REDUCTION		
		ELECTRIC DEMAND (KW)	ELECTRIC CONSUMPTION (KWH)	NATURAL GAS (THERMS)
ECM #1	General Lighting Replacment	8.4	31,613.0	0.0
ECM #2	Gymnasium Lighting Replacement w/ Daylight Dimming	10.6	50,062.0	0.0
ECM #3	Premium Efficient Motor Replacement	2.3	8,642.0	0.0
ECM #4	Air Handling Unit Controls Upgrade	0.0	0.0	1,799.0
ECM #5	AC Upgrade	29.6	53,240.0	0.0
RENEWABLE ENERGY MEASURES (REM's)				
ECM NO.	DESCRIPTION	ANNUAL UTILITY REDUCTION		
		ELECTRIC DEMAND (KW)	ELECTRIC CONSUMPTION (KWH)	NATURAL GAS (THERMS)
REM #1	Photovoltaic Panel Installation	0.0	86,967.0	0.0

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

- **ECM #1:** General Lighting Replacement
- **ECM #2:** Gymnasium Lighting Replacement with Day-Light Dimming
- **ECM #3:** Premium Efficient Motor Replacement

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.

All in all, incentives provide financial motivation and much needed support for the implementation of energy conservation measures. Along with the NJ Smart Start program, the Pay for Performance Program incentives, sponsored by NJ Clean Energy Program, are applicable for this facility. The existing average operating demand above 200 KW and high energy consumption qualifies for the Pay for Performance Program. The incentive based on a 15% electrical energy reduction for this facility would qualify for an additional $9,442 in the Pay for Performance Program. If natural gas consumption could be reduced by 15% the resultant incentive would be approximately $5,363. This would equate to a total incentive equal to approximately $14,805. This option is one to consider for a whole-building approach to energy reduction. The Pay for Performance Program represents a significant commitment to energy reduction of a facility. This option should be reviewed in more detail with a Pay for Performance Program partner.

II. INTRODUCTION

The comprehensive energy audit covers the 95,800 square foot Memorial Jr. High School, which includes the following spaces: classrooms, computer labs, science labs, technology labs, an auditorium, a cafeteria, a gymnasium and administration offices.

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 Basic General Service (BGS) 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 Natural Gas provides the natural gas to the facility under the Basic General Supply Service (BGSS) rate structures. 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 commodities 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	16.0¢ / kWh
Natural Gas	$1.33 / Therm

Table 3
Electricity Billing Data

ELECTRIC USAGE SUMMARY

Utility Provider: Atlantic City Electric
Rate: Annual General Service (AGS)
Meter No: 58429062 & 92858794 & 95747844 & 35592516
Customer ID No: -
Third Party Utility -
TPS Meter / Acct No: -

MONTH OF USE	CONSUMPTION KWH	DEMAND	TOTAL BILL
Jan-09	82,623	225.8	$11,134
Feb-09	88,089	284.6	$12,048
Mar-09	74,392	227.0	$10,310
Apr-09	95,253	318.7	$12,987
May-09	83,702	284.0	$24,092
Jun-08	59,829	343.2	$10,405
Jul-08	40,364	161.3	$7,295
Aug-08	45,855	383.3	$8,779
Sep-08	86,561	409.7	$13,403
Oct-08	79,750	325.5	$10,838
Nov-08	79,619	278.1	$10,971
Dec-08	83,213	228.4	$11,381
Totals	**899,250**	**409.7 Max**	**$143,644**

AVERAGE DEMAND **289.1 KW average**
AVERAGE RATE **$0.160 $/kWh**

Figure 1
Electricity Usage Profile

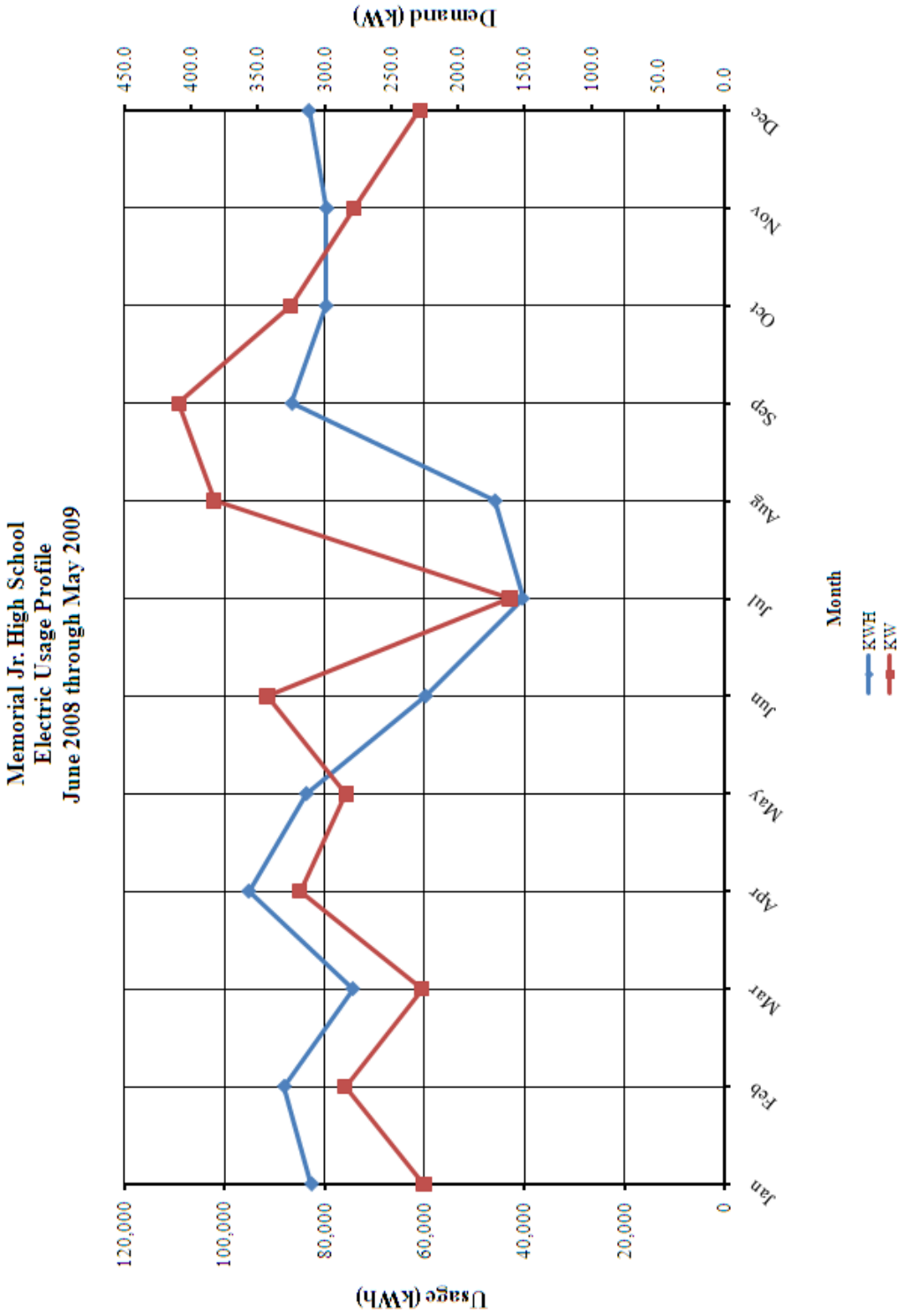
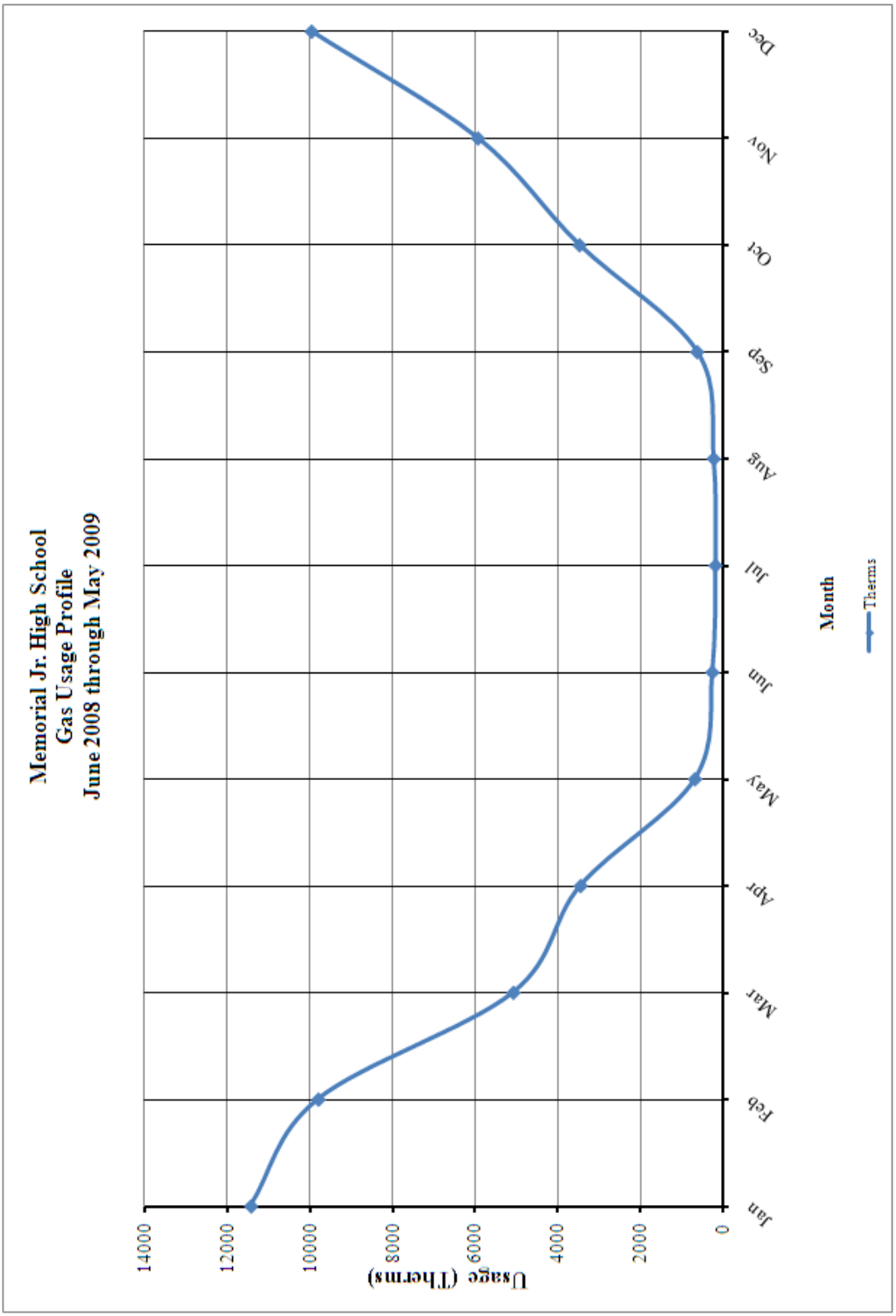


Table 4
Natural Gas Billing Data

NATURAL GAS USAGE SUMMARY		
Utility Provider:	South Jersey Gas	
Rate:	BGSS	
Meter No:	425388	
Point of Delivery ID:	-	
Third Party Utility Provider:	PEPCO Energy Services, Inc.	
TPS Meter No:	-	
MONTH OF USE	**CONSUMPTION (THERMS)**	**TOTAL BILL**
Jan-09	11,442.00	$12,313.67
Feb-09	9,807.00	$14,819.08
Mar-09	5,075.00	$7,771.66
Apr-09	3,446.00	$5,327.48
May-09	670.00	$1,086.92
Jun-08	250.00	$515.61
Jul-08	173.00	$388.48
Aug-08	216.00	$384.43
Sep-08	618.00	$986.45
Oct-08	3,474.00	$3,463.25
Nov-08	5,938.00	$6,567.01
Dec-08	9,974.00	$14,477.22
TOTALS	**51,083.00**	**$68,101.26**
AVERAGE RATE:	**$1.33**	**$/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:

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

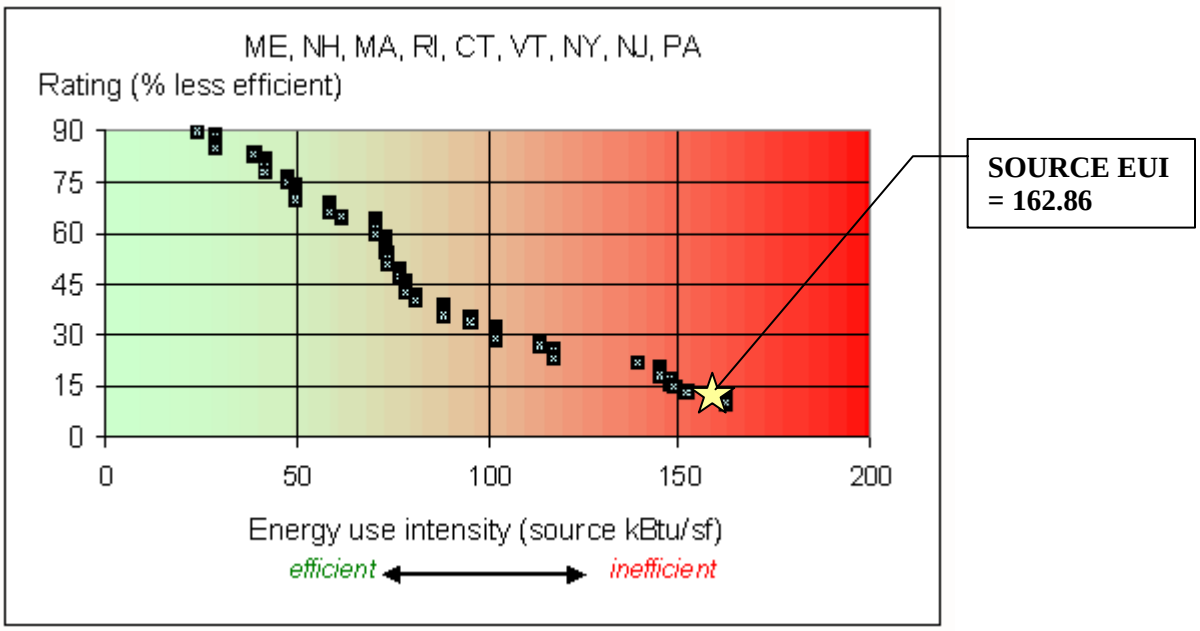
$$Building\ Source\ EUI = \frac{(Electric\ Usage\ in\ kBtu\ X\ SS\ Ratio + Gas\ Usage\ in\ kBtu\ X\ SS\ Ratio)}{Building\ Square\ Footage}$$

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	899249.5			3,070,038	3.340	10,253,926
NATURAL GAS		51083.0		5,108,300	1.047	5,348,390
FUEL OIL			0.0	0	1.010	0
PROPANE			0.0	0	1.010	0
TOTAL				8,178,338		15,602,316
*Site - Source Ratio data is provided by the Energy Star Performance Rating Methodology for Incorporating Source Energy Use document issued Dec 2007.						
BUILDING AREA		95,800	SQUARE FEET			
BUILDING SITE EUI		*85.37*	kBtu/SF/YR			
BUILDING SOURCE EUI		*162.86*	kBtu/SF/YR			

Figure 3 below depicts a national EUI grading for the source use of an Elementary School.

Figure 3
Source Energy Use Intensity Distributions: Elementary School



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: millvilleboe
Password: lgeaceg2009

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

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**
Memorial Jr. High School	46	50

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

V. FACILITY DESCRIPTION

The 95,800 SF Memorial Jr. High School is a two story facility with a basement comprised of classrooms, gymnasium, cafeteria, auditorium, kitchen, administration/faculty offices, library, music room, science labs and computer labs. The typical hours of operation for this facility are between 7:00 am and 12:00 am. Exterior walls are brick and block construction with minimum insulation typical of the time period. The total amount of insulation within the wall is unknown. The windows throughout the facility are in good condition and appear to be maintained. Typical windows throughout the facility are double pane, ¼" clear glass with aluminum frames. Blinds are utilized throughout the facility per occupant comfort. The blinds are valuable because they help to reduce heat loss in the winter and reduce solar heat gain in the summer. The roof is typical built up rubber construction with gray stone covering. The amount of insulation below the roofing is unknown. The building was built in 1923 with additions in 1937, 1958 and 1995.

HVAC Systems

The school boiler room contains two (2) identical HB Smith hot water sectional boilers. Each boiler is a 450 Mills Series 88, 17 sections, with a gross heating output of 3,490 MBH per unit. The boilers are 1988 vintage and have served twenty-one (21) years, of their estimated thirty-five (35) year service life. Outdoor air reset is utilized to modulate the boilers supply heating temperature to more efficiently heat the school. Hot water sectional boilers were the bread and butter design for decades, due to outstanding reliability and ease of operation, although inefficient according to today's standards. Hot water is distributed through the building via eight (8) end-suction pumps ranging in size from five (5) too fifteen (15) Horse Power.

Standard AAF unit ventilators (UV's) equipped with hot water coils satisfy space heating and ventilation requirements for all classroom and office areas. UV's in these areas are heating only and include no cooling capacity. Unit ventilators located in the 1995 science lab addition have DX cooling coils integrated into the unit ventilator.

Air conditioning in all classroom areas of the school is provided by window air conditioning units. With exception to a few cases all units are 2-ton Frigidaire R-22 window units with an approximate efficiency of 9.4 EER.

Large box areas including the gymnasium, locker rooms auditorium and cafeteria are serviced by heating only indoor air handling units (AHU's). Outside ventilation air is ducted into these through openings in the building's exterior. No air conditioning is provided to these spaces. A detailed list of area served and equipment capacity can be found in the **Major Equipment List Appendix**.

Entrance doorways are heated via hot water cabinet heaters.

HVAC System Controls

The HVAC systems within the facility are controlled via a Honeywell control system. Unit ventilators in this facility have electronic thermostat controls integrated into the UV, in lieu of an

external thermostat. The facilities boiler and AHU's still utilize an antiquated pneumatic control system. Integral window air conditioning controls located on individual pieces of equipment are used to control the schools air conditioning systems.

Domestic Hot Water

Domestic hot water for the facility is provided by an AO Smith natural gas fired hot water boiler, capacity of 543,800 Btu/h, located in the boiler room. This boiler is connected to two large (approximately 500 gallons each) hot water storage tanks. The hot water boiler circulates the water in the main storage tanks to maintain a constant temperature. Hot water supply is then drawn off the storage tanks. A total of three (3) 1/6 hp zone circulations pumps and one (1) 1/6 hp system circulation pump are used in the setup. The domestic hot water piping insulation appeared to be in good condition.

Lighting

Typical lighting throughout the building is fluorescent tube lay-in fixtures with T-8 lamps and electronic ballasts. Storage rooms and closets are lit with a mixture of incandescent lamps and compact fluorescent lamps. A detailed list containing all building light fixtures can be found in the **Investment Grade Lighting Audit Appendix** of this report.

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: General Lighting Replacement

Description:

New fluorescent lamps and ballasts are available as direct replacements for the existing lamps and ballasts. A simple change from the old to the new can provide substantial savings. A typical drop-ceiling lay in fixture with four, 4-foot lamps (40 Watt lamps) has a total wattage of about 188 Watts. By retrofitting with new lamps, reflector and electronic ballasts the total wattage would be reduced to 91 Watts per fixture and the space light levels and light quality would increase by about 15% and 35%, respectively.

CEG recommends a replacement of the existing fixtures containing T12 lamps and magnetic ballasts with fixtures containing T8 lamps and electronic ballasts. The new energy efficient, T8 fixtures will provide adequate lighting and will save the Owner on electrical costs due to the better performance of the electronic ballasts. In addition to functional cost savings, the fixture replacement will also provide operational cost savings. The operational cost savings will be realized through the lesser number of lamps that will be required to be replaced per year. The expected lamp life of a T8 lamp, approximately 30,000 burn-hours, in comparison to the existing T12 lamps, approximately 20,000 burn-hours, will provide the Owner with fewer lamps to replace per year. Based on the operating hours of this facility, the owner will be changing approximately 33% less lamps per year.

Compact fluorescent lamps (CFL's) were created to be direct replacements for the standard incandescent lamps which are common to table lamps, spot lights, hi-hats, bathroom vanity lighting, etc. The light output of the CFL has been designed to resemble the incandescent lamp. The color rendering index (CRI) of the CFL is much higher than standard fluorescent lighting, and therefore provides a much "truer" light. The CFL is available in a myriad of shapes and sizes depending on the specific application. Typical replacements are: a 13-Watt CFL for a 40-Watt incandescent lamp, a 15-Watt CFL for a 60-Watt incandescent lamp, an 18-Watt CFL for a 75-Watt incandescent lamp, and a 23-Watt CFL for a 100-Watt incandescent lamp.

The CFL is also available for a number of "brightness colors" that is indicated by the Kelvin rating. A 2700K CFL is the "warmest" color available and is closest in color to the incandescent lamp. CFL's are also available in 3000K, 3500K, and 4100K. The 4100K would be the "brightest" or "coolest" output. A CFL can be chosen to screw right into your existing fixtures, or hardwired into your existing fixtures.

This ECM shall replace all T12 fixtures throughout the facility with new T8 fixtures. In addition, this ECM also replaces all incandescent lamps with their compact fluorescent equivalents.

Energy Savings Calculations:

A detailed Investment Grade Lighting Audit can be found in Appendix E that outlines the proposed retrofits, costs, savings, and payback periods.

NJ Smart Start® Program Incentives are calculated as follows:

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

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

$$\text{Smart Start®}\ Incentive = (187 \times\ \$\ 25) + (8 \times\ \$\ 30) = \$4{,}915$$

Maintenance Savings are calculated as follows:

$$Maintenance\ Savings = (\#\ of\ \ lamps \times \%\ reduction \times \$\ \ per\ lamp) + Installation\ Labor$$

$$Maintenance\ Savings = (\ 406 \times 33\%\ reduction \times \$\ 2.00) + (\$5 \times 135) = \$945$$

Energy Savings Summary:

ECM #1 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$21,570
NJ Smart Start Equipment Incentive ($):	$4,915
Net Installation Cost ($):	$16,655
Maintenance Savings ($/Yr):	$945
Energy Savings ($/Yr):	$5,058
Total Yearly Savings ($/Yr):	$6,003
Estimated ECM Lifetime (Yr):	15
Simple Payback	2.8
Simple Lifetime ROI	440.6%
Simple Lifetime Maintenance Savings	$14,175
Simple Lifetime Savings	$90,045
Internal Rate of Return (IRR)	36%
Net Present Value (NPV)	$55,008.42

ECM #2: Gymnasium Lighting Replacement w/ Daylight Dimming Control

Description:

Day-light dimming systems have become more and more common as a means to provide lighting in various types of buildings. Through the use of day-lighting a space can be provided lighting via an innovative and environmentally friendly lighting system. This ECM is two part: first the existing 400 Watt metal halide high bays will be replaces with an energy efficient T5HO equivalent, these lights will then be connected to day light dimming controls.

The system works by monitoring the lumen value being delivered to the floor of the space: either from natural light of from the light fixtures. An allowable lumen set point is set for the space; this set point is the bench mark for the dimming control system. If enough natural light is coming into the space to meet the set point the light fixtures are turned off. As the lumen level starts to drop below the set point the light fixtures slowly ramp up, only providing enough light to meet the lumen set point. This allows the light fixtures to work at a reduced input wattage through the daylight hours.

CEG proposes that a day-lighting system be installed in the Gymnasium that includes the installation of new pendent mount fluorescent fixtures and day-light dimming control system.

Energy Savings Calculations:

A detailed **Day-Light Dimming Calculation Appendix** can be found in the appendix section of this report. The calculation details electrical savings and outlines the proposed fixture.

NJ Smart Start® Program Incentives are applicable for this installation and are detailed in the appendix.

Energy Savings Summary:

ECM #2 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$40,800
NJ Smart Start Equipment Incentive ($):	$6,000
Net Installation Cost ($):	$34,800
Maintenance Savings ($/Yr):	$0
Energy Savings ($/Yr):	$8,010
Total Yearly Savings ($/Yr):	$8,010
Estimated ECM Lifetime (Yr):	15
Simple Payback	4.3
Simple Lifetime ROI	245.3%
Simple Lifetime Maintenance Savings	$0
Simple Lifetime Savings	$120,150
Internal Rate of Return (IRR)	22%
Net Present Value (NPV)	$60,822.86

ECM #3: Premium Efficient Motor Replacement

Description:

Replacing the hot water circulation pump motors with new NEMA premium efficient motors is a simple change that can provide substantial savings.

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

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

Energy Savings Calculations:

The following calculation was used to calculate the efficiency increase for switching to a NEMA Premium® Efficient Motor.

1 HP = 0.746 kW
Load Factor = 75%
Annual Hours of Operations = 3,696(Average)
Cost of electricity = $0.160/ kWh

$$Motor\ Savings = \frac{(0.746kW/1HP)\times(Motor\ HP)\times(Load\ Factor)\times(Hrs\ of\ Operation)}{(New\ Motor\ Efficiency - Old\ Motor\ Effieciency)}$$

NEMA Premium Efficient Motor Replacement						
Equipment Tag	**Motor HP**	**Existing Efficiency**	**NEMA Premium Efficiency**	**kW Savings**	**kWh Savings**	**Cost Savings**
P-1	5	87.5%	89.5%	0.07	264	$42
P-2	5	87.5%	89.5%	0.07	264	$42
P-3	15	87.5%	93.0%	0.57	2,097	$335
P-4	15	87.5%	93.0%	0.57	2,097	$335
P-5	5	82.5%	89.5%	0.27	980	$157
P-6	5	82.5%	89.5%	0.27	980	$157
P-7	5	82.5%	89.5%	0.27	980	$157
P-8	5	82.5%	89.5%	0.27	980	
Total Savings				**2.3**	**8,642**	**$1,226**

Smart Start® *Incentive* $= (\#\ 5\ HP\ Motors \times\ \$\ 54) = (6 \times \$\ 54) = \$324$

Smart Start® *Incentive* $= (\#\ 15\ HP\ Motors \times\ \$\ 105) = (2 \times \$\ 105) = \$210$

Total Smart Start Incentive = $324 + $210 = $534

The total cost to install six (6) 5 HP motors and two (2) 15 HP motors is $12,136.

Energy Savings Summary:

ECM #3 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$12,136
NJ Smart Start Equipment Incentive ($):	$534
Net Installation Cost ($):	$11,602
Maintenance Savings ($/Yr):	$0
Energy Savings ($/Yr):	$1,226
Total Yearly Savings ($/Yr):	$1,226
Estimated ECM Lifetime (Yr):	15
Simple Payback	9.5
Simple Lifetime ROI	58.5%
Simple Lifetime Maintenance Savings	$0
Simple Lifetime Savings	$18,390
Internal Rate of Return (IRR)	6%
Net Present Value (NPV)	$3,033.91

ECM #4: Air Handling Unit Controls Upgrade

Description:

The heating systems within the school responsible for conditioning the big box spaces, Gymnasium, Locker Rooms, Cafeteria and Auditorium are controlled by an outdated pneumatic control system. The thermostats do not utilize programmability such as night set back, or morning warm-up features. Modern thermostats and control systems have the capability of saving significant energy as well as improved occupant comfort.

This ECM recommends expanding the Building Automation System through Direct Digital Controls (DDC) to all heating equipment conditioning the spaces listed above. The front end device will provide communication between the devices as well as the main boiler plant. The system will respond to the overall classroom's needs and operating schedules as defined by the building operator. The DDC system will provide features such as space averaging, temperature override control, night set-back, morning warm-up mode, etc.

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

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

Energy savings achieved for "Energy Management and Control Systems," average 5%-15%. Savings resulting from the implementation of this ECM for energy management controls are estimated to be 10% of the total HVAC energy cost for the facility.

The cost of a full DDC system with new field devices, controllers, computer, software, programming, etc. is approximately $4.00 per SF (per recent contractor pricing.) Savings from the implementation of this ECM will be achieved through reduced fuel consumption from reduced heating energy. Classrooms total approximately 21,100 SF.

Cost of complete DDC System = ($4.00/SF x 21,100 SF) = $84,400.

Heating Assumptions:

Total Classroom Heating Capacity ($H_{L)}$	= (1,160.5 MBH)
Average Unit Efficiency	= 70% for Sectional Boilers
Average Cost of Gas	= $1.33/Therm

Energy Savings Calculations:

Heating Savings Calculations

$$Heating\ Energy\ Used = \frac{H_L \times HDD \times Hrs}{\Delta t \times Eff \times V}$$

Where:

HDD = number of Heating Degree Days as Specified Base Temperature
(Warm Air $HDD_{65^{o}F}$ = 4,604, Millville, NJ Airport)

Hrs = Hours per Day

Δt = Design temperature difference, º F (Warm Air = 70 º F)

Eff = Efficiency of Energy Utilization (Existing NG Boiler = 0.70)

V = Heating value of fuel, BTU/Therm (Natural Gas = 100,000 Btu = 1 Therm)

Estimated Energy Consumption of Blower Coils:

$$Electric\ Heating\ Energy\ Used = \frac{(1{,}160{,}500\,Btu/h) \times (4{,}604°F) \times 16.5h}{70°F \times 70\%} = 1{,}799{,}153{,}938\ Btu/Year$$

Electric Energy Used = 1,799,153,938 Btu/Year x 1Therm/100,000 Btuh = 17,990 Therm/Year

$$Savings. = Heating\ Input(Therm) \times 10\%\ Savings \times Ave\ Cost(\$/Therm)$$

$$Savings. = 17{,}990\ (Therm) \times 10\% \times \$1.33\ (\$/Therm) = \$2{,}395$$

There are currently no Smart Start® *Incentives* available for a demand control ventilation system.

Energy Savings Summary:

ECM #4 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$84,400
NJ Smart Start Equipment Incentive ($):	$0
Net Installation Cost ($):	$84,400
Maintenance Savings ($/Yr):	$0
Energy Savings ($/Yr):	$2,395
Total Yearly Savings ($/Yr):	$2,395
Estimated ECM Lifetime (Yr):	15
Simple Payback	35.2
Simple Lifetime ROI	-57.4%
Simple Lifetime Maintenance Savings	$0
Simple Lifetime Savings	$35,925
Internal Rate of Return (IRR)	-9%
Net Present Value (NPV)	($55,808.65)

ECM #5: AC Upgrade

Description:

The classrooms are conditioned by standard AAF Units ventilators and window air conditioning units. Each classroom is equipped with a hot water heating coil and a window unit with 2-Ton DX cooling capacity. The unit ventilators are 1990's vintage and have served approximately 19 years of an expected 20 year service life.

This ECM involves the replacement of the existing unit ventilators with new Trane unit ventilators equipped with hot water heating coil and DX cooling coil and remote condensing unit or equivalent. The DX cool will be attached to a remote condensing unit located on the exterior of the building, either on grade or on the roof. Utility savings will only be seen on the cooling side of the equipment, heating side capacities and efficiencies will remain the same.

Energy Savings Calculations:

Cooling Assumptions:

Total Classroom Cooling Capacity (46 Classrooms @ 2 Ton/classroom)	= 92 Tons
Average Unit Efficiency	= 9.4 EER = 10.7 SEER
New Unit Efficiency	= 15 SEER
Average Cost of Electricity	= \$0.160/kWh

Cooling Savings Calculation:

$$EnergySavings = \frac{Cooling(Tons) \times 12{,}000\left(\frac{Btu}{Ton\ hr}\right)}{1000\left(\frac{Wh}{kWh}\right)} \times \left(\frac{1}{SEER_{OLD}} - \frac{1}{SEER_{NEW}}\right) \times Cooling\ \ Hrs.$$

$$EnergySavings = \frac{92\ (Tons) \times 12{,}000\left(\frac{Btu}{Ton\ hr}\right)}{1000\left(\frac{Wh}{kWh}\right)} \times \left(\frac{1}{10.7\left(\frac{Btu}{W}\right)} - \frac{1}{15\left(\frac{Btu}{W}\right)}\right) \times 1{,}800\ hours$$

$$= \underline{53{,}240\ kWh}$$

$$Demand\ \ Savings = \frac{Energy\ \ Savings\ (kWh)}{Hrs\ of\ \ Cooling}$$

$$Demand\ Savings = \frac{53{,}240\ (kWh)}{1{,}800\ Hrs.} = \underline{29.6\ kW}$$

Total Energy Cost Savings = 53,240 kWh x $0.160/kWh = $8,518 per year

$$\text{Smart Start®}\ Incentive = (Number\ of\ Tons \times\ \$\ 92 / Ton) = (46 \times \$\ 92) = \underline{\$4{,}232}$$

Energy Savings Summary:

ECM #5 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$439,070
NJ Smart Start Equipment Incentive ($):	$4,232
Net Installation Cost ($):	$434,838
Maintenance Savings ($/Yr):	$0
Energy Savings ($/Yr):	$8,518
Total Yearly Savings ($/Yr):	$8,518
Estimated ECM Lifetime (Yr):	15
Simple Payback	51.0
Simple Lifetime ROI	-70.6%
Simple Lifetime Maintenance Savings	$0
Simple Lifetime Savings	$127,770
Internal Rate of Return (IRR)	-12%
Net Present Value (NPV)	($333,150.67)

VIII. RENEWABLE/DISTRIBUTED ENERGY MEASURES

Globally, renewable energy has become a priority affecting international and domestic energy policy. The State of New Jersey has taken a proactive approach, and has recently adopted in its Energy Master Plan a goal of 30% renewable energy by 2020. To help reach this goal New Jersey created the Office of Clean Energy under the direction of the Board of Public Utilities and instituted a Renewable Energy Incentive Program to provide additional funding to private and public entities for installing qualified renewable technologies. A renewable energy source can greatly reduce a building's operating expenses while producing clean environmentally friendly energy. CEG has assessed the feasibility of installing renewable energy technologies for the Millville Board of Education, to evaluate if there is any potential for solar or wind energy generation.

Solar energy produces clean energy and reduces a building's carbon footprint. This is accomplished via photovoltaic panels which can be mounted on all south and southwestern facades of the building. Flat roof, as well as sloped areas can be utilized; flat areas will have the panels turned to an optimum solar absorbing angle. (A structural survey of the roof would be necessary before the installation of PV panels is considered). Parking lots can also be utilized for the installation of a solar array. A truss system can be installed that is high enough to park a vehicle under the array, this way no parking lot area is lost. The state of NJ has instituted a program in which one Solar Renewable Energy Certificate (SREC) is given to the Owner for every 1000 kWh of generation. SREC's can be sold anytime on the market at their current market value. The value of the credit varies upon the current need of the power companies. The average value per credit is around $350, this value was used in our financial calculations. This equates to $0.35 per kWh generated.

CEG has reviewed the facility and believes a roof mounted system is best suited. A depiction of the proposed area layouts is shown in **Renewable / Distributed Energy Measures Calculation, Appendix**. Based on measurements of the roof it was determined that a system size of 66 kilowatts could be installed. The total system has an estimated kilowatt hour production of 86,967 KWh annually, reducing the overall electric consumption by approximately 9.7%. A detailed financial analysis can be found in **Renewable / Distributed Energy Measures Calculation, Appendix**. This analysis illustrates the payback of the system over a 25 year period. The eventual degradation of the solar panels and the price of accumulated SREC's are factored into the payback.

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

Estimated solar array generation was then calculated based on the National Renewable Energy Laboratory PVWatts Version 1.0 Calculator. In order to calculate the array generation an

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

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

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

FINANCIAL SUMMARY - PHOTOVOLTAIC SYSTEM				
PAYMENT TYPE	**SIMPLE PAYBACK**	**SIMPLE ROI**	**NET PRESENT VALUE**	**INTERNAL RATE OF RETURN**
Direct Purchase	13.39 Years	7.5%	$612,718	6.1 %

*The solar energy measure is shown for reference in the executive summary REM table as REM#1.

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

In addition to the Solar Analysis, CEG also conducted a review of the applicability of wind energy for the facility. Wind energy production is another option available through the Renewable Energy Incentive Program. Wind turbines of various types can be utilized to produce clean energy on a per building basis. Cash incentives are available per kWh of electric usage. CEG's review of the applicability of wind energy for the facility found; the low average wind speed and proximity to residential neighborhoods make facility a poor candidate for wind energy production.

IX. ENERGY PURCHASING AND PROCUREMENT STRATEGY

Load Profile:

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

Electricity:

This facility is comprised of classrooms, gymnasium, cafeteria, auditorium, kitchen, administration/faculty offices, library, music room, science labs and computer labs. The typical hours of operation for this facility are between 7:00 am and 12:00 am. The building was built in 1923 with additions in 1937, 1958 and 1995.

The Electric Usage Profile demonstrates a fairly typical load consumption profile for a school. Schools typically close for the summer (May-August) and in this case the load profile demonstrates the drop off of electric consumption. Consumption is elevated throughout the balance of the year but fairly peaky in usage. The valley occurs in March with a peak in April. Cooling in this facility is provided by window air conditioning units. With exception to a few cases all units are 2-ton Frigidaire R-22 window units. Large box areas including the gymnasium, locker rooms auditorium and cafeteria are serviced by heating only indoor air handling units (AHU's). Outside ventilation air is ducted into these through openings in the building's exterior. No air conditioning is provided to these spaces.

This facility receives its electric delivery service via Atlantic City Electric (ACE) on an AGS and MGS rate schedule. This facility receives its electric commodity service from South Jersey Energy Company through the ACES agreement. A flat (base-load) shaping is important because it will yield more competitive pricing when shopping for alternative energy supply.

Natural Gas:

The Natural Gas Usage Profile demonstrates a very typical heating load profile, with increasing consumption in the winter months (October – March) and a dramatic drop in consumption in the summer months (May – September). Heating is the obvious reason for the winter consumption and in this facility heating is supplied via two (2) identical HB Smith hot water sectional boilers. Each boiler is a 450 Mills Series 88, 17 sections, with a gross heating output of 3,490 MBH per unit. The boilers are 1988 vintage and have served twenty-one (21) years, of their estimated thirty-five (35) year service life. Outdoor air reset is utilized to modulate the boilers supply heating temperature to more efficiently heat the school. Hot water sectional boilers were the bread and butter design for decades, due to outstanding reliability and ease of operation, although

inefficient according to today's standards. Hot water is distributed through the building via eight (8) end-suction pumps ranging in size from five (5) to fifteen (15) horse power.

Standard AAF unit ventilators (UV's) equipped with hot water coils satisfy space heating and ventilation requirements for all classroom and office areas. UV's in these areas are heating only and include no cooling capacity. Unit ventilators located in the 1995 science lab addition have DX cooling coils integrated into the unit ventilator.

Domestic hot water for the facility is provided by an AO Smith natural gas fired hot water boiler, capacity of 543,800 Btu/h, located in the boiler room. This boiler is connected to two large (approximately 500 gallons each) hot water storage tanks. The hot water boiler circulates the water in the main storage tanks to maintain a constant temperature. Hot water supply is then drawn off the storage tanks. A total of three (3) 1/6 hp zone circulations pumps and one (1) 1/6 hp system circulation pump are used in the setup.

Natural gas delivery service in this facility is provided by South Jersey Gas Company on a GSG rate schedule. The natural gas commodity service is provided by PEPCO Energy Services through the ACES agreement. A flat load profile will always allow for the most competitive price available when shopping for alternative energy supplies.

Tariff Analysis:

Electricity:

This facility receives electrical Delivery Service from Atlantic City Electric on an AGS Secondary (Annual General Service) and MGS (Monthly General Service) utility rate. The AGS rate is available at any point of The Utility's system where facilities of adequate character and capacity exist for the entire electric service requirements of any customer contracting for annual service delivered at one point and metered at or compensated to the voltage of delivery. 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.

The MGS rate is available at any point of The Utility's system where facilities of adequate character and capacity exist for the entire electric service requirements of any customer delivered at one point and metered at or compensated to the voltage of delivery. This schedule is not available to residential customers. This service includes the following charges: Delivery Service Charges, Distribution Demand Charges, Reactive Demand Charges, 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.

This facility receives electrical supply service through the ACES agreement (Alliance for Competitive Energy Services). ACES, is an alliance composed of the NJSBA and the NJASBO

and is administered by Gable Associates. CEG believes that if the BOE wants to procure alternative energy, they must through the ACES agreement. CEG will make a recommendation that is counter to this agreement. The term of the ACES agreement is the first meter read date on or after April 30, 2009 until the last meter read date, May, 2011.

The ACES agreement provides for NJSBA to adopt a resolution for renewal for no more than a (5) consecutive year term. CEG will recommend against such renewal and believes that a 5 – year term may not be allowed under local government law.

Natural Gas:

This facility is serviced by South Jersey Gas Company (SJG) on its firm delivery rate, General Service Gas (GSG) from the utility and BGSS (Basic Generation Supply Service) when not being served by a Third Party Supplier (TPS). Currently The BOE is procuring natural gas from a Third Party Supplier (TPS), PEPCO Energy Services. This Delivery Rate has the following charges: Customer Charge, Delivery Charge, BSC Volume Charge and Commodity Charge under this rate structure. The BGSS Supply rates are designed to recover SJG's cost of gas applicable to customers who purchase gas from SJG. The company earns no profit from BGSS. BGSS consists of two (2) pricing mechanisms: Residential and Commercial customers that use less than 5,000 therms annually and Commercial and Industrial customers that consume at least 5,000 therms annually.

Imbalances occur when Third Party Suppliers (TPS) are used to supply natural gas and full-delivery is not made, and when a new supplier is contracted or the customer returns to the utility. Note: It is important when utilizing a Third Party Supplier, that an experienced regional supplier is used otherwise, imbalances can occur, jeopardizing economics and scheduling. If the supplier does not deliver they can be placed on a very costly rate. A customer can automatically be put on an alternative supply rate by the utility.

A "firm account" refers to the type of interstate pipeline service that the utility has subscribed for and delivered on behalf of the customer. Much like the telecom industry, the pipeline space (capacity) has been deregulated. The pipeline capacity is broken down into reliability of service. "Firm service" is the highest level of reliability and is the last, in pecking order, for interruption.

Recommendations:

CEG recommends a global approach that will be consistent with all facilities within the scope of this project. Therefore, CEG recommends aggregating all energy loads. CEG's observations are seen in both the electric and natural gas costs. The average "price to compare" per kWh (kilowatt hour) for all buildings is $.1058/ kWh (kWh is the common unit of electric measure). The average "price to compare" per decatherm for natural gas is $10.90 /dth (dth is the common unit of measure). These Weighted Average Prices are as supplied via Third Party Suppliers (TPS) for electricity (South Jersey Energy Company) and for natural gas (PEPCO Energy services), as administered through the ACES (Alliance for Competitive Energy Services) and the lead agency, The New Jersey School Boards Association, with administration from Gable Associates.

Energy commodities are among the most volatile of all commodities, however at this point and time, energy is extremely competitive. The BOE could see significant savings if it were to take advantage of these current market prices quickly, before energy increases. Based on last year's historical consumption (January – December 2009) and current electric rates, the BOE could see an improvement of up to 15 % or up to $150,000 in its electric costs annually. (Note: Savings were calculated using an Average Annual Consumption of 9,776,921 kWh and an Average fixed one-year commodity contract). CEG recommends aggregating the entire electric load to gain the most optimal energy costs. CEG recommends that the BOE seek an energy advisor to maximize energy savings and to apply a "managed approach" to procuring energy.

CEG's secondary recommendation coincides with the BOE's natural gas costs. Based on the current market, (which is very competitive), the BOE could see a savings of over 20% or up to $90,000 annually in its natural gas expenditures. Again, CEG recommends the use of any energy advisor to review alternative energy sourcing strategies and to install a "managed approach" to energy procurement.

CEG also recommends that The BOE not renew its energy supply contract with the ACES aggregation and PEPCO Energy Services, and the ACES agreement with South Jersey Energy and its fixed price contract. The fixed priced contract does not accomplish the needs of the BOE. The BOE needs budget protection and CEG has shown that these energy prices are not competitive to the market. The ACES agreement has demonstrated that the price is much 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 a customer 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 recommends the BOE schedule a meeting with their 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), they will learn more about the competitive supply process. They can acquire a list of approved Third Party Suppliers from the New Jersey Board of Public Utilities website at www.nj.gov/bpu, and should also consider using a billing-auditing service to further analyze the utility invoices, manage the data and use the data to manage ongoing demand-side management projects. Furthermore, CEG recommends special attention given to credit mechanisms, imbalances, balancing charges and commodity charges when meeting with their utility representative. In addition, the BOE should also ask the utility representative about alternative billing options. Some utilities allow for consolidated billing options when utilizing the service of a Third Party Supplier.

Finally, if the BOE frequently changes its supplier for energy, CEG recommends it closely monitor balancing, particularly when the contract is close to termination.

X. INSTALLATION FUNDING OPTIONS

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

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

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

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

iv. *Pay For Performance – The New Jersey Smart Start Pay for Performance program includes incentives based on savings resulted from implemented ECMs. The program is available for all buildings with average demand loads above 200 KW. The facility's participation in the program is assisted by an approved program partner. An "Energy Reduction Plan" is created with the facility and approved partner to shown at least 15% reduction in the building's current energy use. Multiple energy conservation measures implemented together are applicable toward the total savings of at least 15%. No more than 50% of the total energy savings can result from lighting upgrades / changes.*

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

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

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

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

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

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

XI. ADDITIONAL RECOMMENDATIONS

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

A. Chemically clean the condenser and evaporator coils 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.

ECM COST & SAVINGS BREAKDOWN

CONCORD ENGINEERING GROUP

Millville Board of Education - Memorial Jr. High School

ECM NO.	DESCRIPTION	INSTALLATION COST				YEARLY SAVINGS			ECM LIFETIME	LIFETIME ENERGY SAVINGS	LIFETIME MAINTENANCE SAVINGS	LIFETIME ROI	SIMPLE PAYBACK	INTERNAL RATE OF RETURN (IRR)	NET PRESENT VALUE (NPV)
		MATERIAL	LABOR	REBATES, INCENTIVES	NET INSTALLATION COST	ENERGY	MAINT. / SREC	TOTAL		(Yearly Saving * ECM Lifetime)	(Yearly Maint Svaing * ECM Lifetime)	(Lifetime Savings - Net Cost) / (Net Cost)	(Net cost / Yearly Savings)	$\sum_{n=0}^{N} \frac{C_n}{(1+IRR)^n}$	$\sum_{n=0}^{N} \frac{C_n}{(1+DR)^n}$
		($)	($)	($)	($)	($/Yr)	($/Yr)	($/Yr)	(Yr)	($)	($)	(%)	(Yr)	($)	($)
ECM #1	General Lighting Replacment	$10,785	$10,785	$4,915	$16,655	$5,058	$945	$6,003	15	$90,045	$14,175	440.6%	2.8	35.67%	$55,008.42
ECM #2	Gymnasium Lighting Replacement w/ Daylight Dimming	$21,600	$19,200	$6,000	$34,800	$8,010	$0	$8,010	15	$120,150	$0	245.3%	4.3	21.83%	$60,822.86
ECM #3	Premium Efficient Motor Replacement	$6,068	$6,068	$534	$11,602	$1,226	$0	$1,226	15	$18,390	$0	58.5%	9.5	6.40%	$3,033.91
ECM #4	Air Handling Unit Controls Upgrade	$42,200	$42,200	$0	$84,400	$2,395	$0	$2,395	15	$35,925	$0	-57.4%	35.2	-9.17%	($55,808.65)
ECM #5	AC Upgrade	$278,070	$161,000	$4,232	$434,838	$8,518	$0	$8,518	15	$127,770	$0	-70.6%	51.0	-12.46%	($333,150.67)
REM RENEWABLE ENERGY AND FINANCIAL COSTS AND SAVINGS SUMMARY															
REM #1	Photovoltaic Panel Installation	$297,045	$297,045	$0	$594,090	$13,915	$30,438	$44,353	15	$665,295	$456,570	12.0%	13.4	1.45%	($64,606.77)

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

Concord Engineering Group, Inc.

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

SmartStart Building Incentives

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

OMB No. 2060-0347

STATEMENT OF ENERGY PERFORMANCE
Memorial Jr. High School

Building ID: 1874982
For 12-month Period Ending: May 31, 2009[1]
Date SEP becomes ineligible: N/A

Date SEP Generated: October 12, 2009

Facility
Memorial Jr. High School
504 E. Broad St.
Millville, NJ 08332

Facility Owner
Millville Board of Education
110 N. Third Street
Millville, NJ 08332

Primary Contact for this Facility
Toni Basich
110 N. Third Street
Millville, NJ 08332

Year Built: 1923
Gross Floor Area (ft²): 95,800

Energy Performance Rating[2] (1-100) 46

Site Energy Use Summary[3]

Electricity - Grid Purchase(kBtu)	3,068,241
Natural Gas (kBtu)[4]	5,108,300
Total Energy (kBtu)	8,176,541

Energy Intensity[5]

Site (kBtu/ft²/yr)	85
Source (kBtu/ft²/yr)	163

Emissions (based on site energy use)

Greenhouse Gas Emissions ($MtCO_2e$/year)	739

Electric Distribution Utility
Atlantic City Electric Co

National Average Comparison

National Average Site EUI	83
National Average Source EUI	158
% Difference from National Average Source EUI	3%
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 08332

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	Memorial Jr. 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	504 E. Broad St., Millville, NJ 08332	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		☐
Memorial Jr. High School (K-12 School)				
CRITERION	**VALUE AS ENTERED IN PORTFOLIO MANAGER**	**VERIFICATION QUESTIONS**	**NOTES**	☑
Gross Floor Area	95,800 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	212	Is this the number of personal computers in the K12 School?		☐
Number of walk-in refrigeration/freezer units	1	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	70 %	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: Combined Electric Meters (kWh (thousand Watt-hours))
Space(s): Entire Facility
Generation Method: Grid Purchase

Start Date	End Date	Energy Use (kWh (thousand Watt-hours))
05/01/2009	05/31/2009	83,702.00
04/01/2009	04/30/2009	95,253.00
03/01/2009	03/31/2009	74,392.00
02/01/2009	02/28/2009	88,089.00
01/01/2009	01/31/2009	82,623.00
12/01/2008	12/31/2008	83,213.00
11/01/2008	11/30/2008	79,619.00
10/01/2008	10/31/2008	79,750.00
09/01/2008	09/30/2008	86,561.00
08/01/2008	08/31/2008	45,855.00
07/01/2008	07/31/2008	40,364.00
06/01/2008	06/30/2008	59,829.00
Combined Electric Meters Consumption (kWh (thousand Watt-hours))		**899,250.00**
Combined Electric Meters Consumption (kBtu (thousand Btu))		**3,068,241.00**
Total Electricity (Grid Purchase) Consumption (kBtu (thousand Btu))		**3,068,241.00**
Is this the total Electricity (Grid Purchase) consumption at this building including all Electricity meters?		☐

Fuel Type: Natural Gas

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

Start Date	End Date	Energy Use (therms)
05/01/2009	05/31/2009	670.00
04/01/2009	04/30/2009	3,446.00
03/01/2009	03/31/2009	5,075.00
02/01/2009	02/28/2009	9,807.00
01/01/2009	01/31/2009	11,442.00
12/01/2008	12/31/2008	9,974.00
11/01/2008	11/30/2008	5,938.00
10/01/2008	10/31/2008	3,474.00
09/01/2008	09/30/2008	618.00
08/01/2008	08/31/2008	216.00

07/01/2008	07/31/2008	173.00
06/01/2008	06/30/2008	250.00
Natural Gas Consumption (therms)		**51,083.00**
Natural Gas Consumption (kBtu (thousand Btu))		**5,108,300.00**
Total Natural Gas Consumption (kBtu (thousand Btu))		**5,108,300.00**
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
Memorial Jr. High School
504 E. Broad St.
Millville, NJ 08332

Facility Owner
Millville Board of Education
110 N. Third Street
Millville, NJ 08332

Primary Contact for this Facility
Toni Basich
110 N. Third Street
Millville, NJ 08332

General Information

Memorial Jr. High School	
Gross Floor Area Excluding Parking: (ft^2)	95,800
Year Built	1923
For 12-month Evaluation Period Ending Date:	May 31, 2009

Facility Space Use Summary

Memorial Jr. High School	
Space Type	K-12 School
Gross Floor Area(ft^2)	95,800
Open Weekends?	Yes
Number of PCs	212
Number of walk-in refrigeration/freezer units	1
Presence of cooking facilities	Yes
Percent Cooled	70
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 05/31/2009)	**Baseline** (Ending Date 05/31/2009)	**Rating of 75**	**Target**	**National Average**
Energy Performance Rating	46	46	75	N/A	50
Energy Intensity					
Site ($kBtu/ft^2$)	85	85	65	N/A	83
Source ($kBtu/ft^2$)	163	163	124	N/A	158
Energy Cost					
$/year	N/A	N/A	N/A	N/A	N/A
$/$ft^2$/year	N/A	N/A	N/A	N/A	N/A
Greenhouse Gas Emissions					
$MtCO_2e$/year	739	739	561	N/A	717
$kgCO_2e/ft^2$/year	8	8	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.

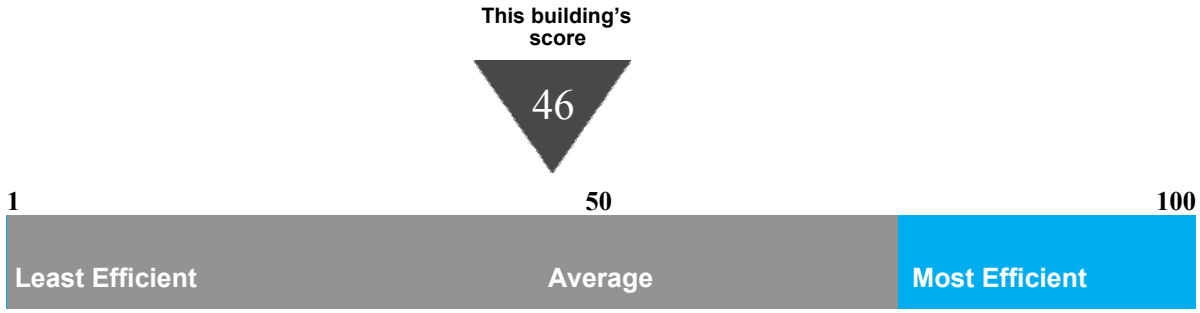
Statement of Energy Performance

2009

Memorial Jr. High School
504 E. Broad St.
Millville, NJ 08332

Portfolio Manager Building ID: 1874982

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 163 kBtu per square foot per year.*

*Based on source energy intensity for the 12 month period ending May 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: 10/12/2009

MAJOR EQUIPMENT LIST

Concord Engineering Group

"Millville B.O.E. - Memorial Jr. High School"

Boiler

Location	Area Served	Manufacturer	Qty.	Equipment Tag	Model #	Serial #	Input (MBh)	Output (MBh)	Efficiency (%)	Fuel	Approx. Age	ASHRAE Service Life	Remaining Life	Notes
Boiler Room	Entire School	HB Smith	1	B-1	450 Mills	88-1542-H	5273	3704.3	70%	Nat. Gas	22	35	13	17 Section
Boiler Room	Entire School	HB Smith	1	B-2	450 Mills	88-1544-H	5273	3704.3	70%	Nat. Gas	22	35	13	17 Section

Boiler - Burner

Location	Area Served	Manufacturer	Qty.	Equipment Tag	Model #	Serial #	Input (MBh)	Fuel	Approx. Age	ASHRAE Service Life	Remaining Life
Boiler Room	B-1	Preferred Utilities	1	-	BHE-45-3M4	29999	-	Nat. Gas	22	21	-1
Boiler Room	B-2	Preferred Utilities	1	-	BHE-45-3M4	29893	-	Nat. Gas	22	21	-1

Hot Water Pumps

Location	Area Served	Manufacturer	Qty.	Equipment Tag	Model #	Serial #	HP	RPM	GPM	Ft. Hd	Motor Eff	Frame Size	Volts	Phase	Hz	Approx. Age	ASHRAE Service Life	Remaining Life
Boiler Room	-	Aurora Pump	1	P-1	87-7287-2	-	5	1750	500	30	87.5%	184T	208-230/460	3	60	22	20	-2
Boiler Room	-	Aurora Pump	1	P-2	87-7287-2	-	5	1750	500	30	87.5%	184T	208-230/460	3	60	22	20	-2
Boiler Room	-	Aurora Pump	1	P-3	03-994903	-	15	1750	190	150	87.5%	254T	200	3	60	22	20	-2
Boiler Room	-	Aurora Pump	1	P-4	03-994903	-	15	1750	190	150	87.5%	254T	200	3	60	22	20	-2
Boiler Room	-	Aurora Pump	1	P-5	87-72891	-	5	1750	120	60	82.5%	184T	200	3	60	22	20	-2
Boiler Room	-	Aurora Pump	1	P-6	87-72891	-	5	1750	120	60	82.5%	184T	200	3	60	22	20	-2
Boiler Room	-	Aurora Pump	1	P-7	57-7290-3	-	5	1750	190	70	82.5%	184T	200	3	60	22	20	-2
Boiler Room	-	Aurora Pump	1	P-8	57-7290-3	-	5	1750	190	70	82.5%	184T	200	3	60	22	20	-2

Domestic Hot Water Boiler

Location	Area Served	Manufacturer	Qty	Equipment Tag	Model #	Serial #	Input (MBh)	Recovery (gal/h)	Capacity (gal)	Efficiency (%)	Fuel	Approx. Age	ASHRAE Service Life	Remaining Life	Notes
Boiler Room	Entire School	AO Smith	1	-	HW 670 932	0 04 03821	660	-	-	80%	Nat. Gas	5	24	19	1/6 HP Armstrong Circ Pump (x2 large

Air Handling Units

Location	Area Served	Manufacturer	Qty	Equipment Tag	Model #	Serial #	Heating Type	Input (MBh)	Output (MBh)	Volts	Phase	Amps	Approx. Age	ASHRAE Service Life	Remaining Life
Boys Locker Room	Boys Locker Room	Magic Aire	1	AH-G01	60-BHW-4-A-LM	980139955	HW	120	-	208	3	60	11	20	9
Boys Locker Room	Gym	AAF	1	AH-G02	-	-	HW	220	-	208	3	60	19	20	1
Girls Locker Room	Girls Locker Room	AAF	1	AH-G03	-	-	HW	120	-	208	3	60	19	20	1
Girls Locker Room	Gym	AAF	1	AH-G04	-	-	HW	220	-	208	3	60	19	20	1
Auditorium	Auditorium	AAF	2	-	VD-08A-LF	-	HW	148	-	208	3	60	21	20	-1
Cafeteria	Cafeteria	AAF	1	AH-C12	VD-10A-LF	-	HW	184.5	-	208	3	60	21	20	-1

AC Condensers

Location	Area Served	Manufacturer	Qty.	Equipment Tag	Model #	Serial #	Cooling Capacity	Eff.	Refrigerant	Volts	Phase	Hz	Approx. Age	ASHRAE Service Life	Remaining Life	Notes
Roof	C-204 Peer Mediation	Sanyo	1	AC-C03	C0911	12381	9,000 Btu	13 SEER	R-22	115	1	60	11	20	9	Indoor Unit M# KS0911
Roof	-	Trane	1	AC-C04	561CJ024-A	1895E13005	2 Ton	9.5 SEER	R-22	208-230	1	60	10	20	10	Manufactured in Indianapolis, IN
Roof	-	Trane	1	AC-C05	TCH036B100AA	P285PXC3H	3 Ton	11.35 EER	R-22	208-230	1	60	10	20	10	Cooling Only Roof Top Unit
Server Room	Server Room	York	1	-	M1HC024F01YA	TNAS041744	2 Ton	11.4 EER		115	1	60	5	20	15	
Grade	B-106	Trane	1	-	4TTB3048A1000AA	8344UL84F	4 Ton	13 SEER	R-410A	208-230	1	60	1	20	19	
Grade	C-100	Lennox	1	AC-C01	HS164281-1P	-	-	10.5 SEER	R-22	208-231	1	60	8	20	12	

Window AC Units

Location	Area Served	Manufacturer	Qty.	Equipment Tag	Model #	Serial #	Cooling Capacity	Eff.	Refrigerant	Volts	Phase	Hz	Approx. Age	ASHRAE Service Life	Remaining Life
Classrooms	Various	Frigidaire	61	-	FAS256R2A	-	25,000 Btu/h	9.4 EER	R-22	208-230	1	60	2	10	8

INVESTMENT GRADE LIGHTING AUDIT

CEG Job #: 9C09072
Project: Millville B.O.E.
Address: 504 E. Broad St.
Millville, NJ 08332
Building SF: 95,800

"Millville - Memorial Jr. High School"

KWH COST: $0.160

EXISTING LIGHTINC										PROPOSED LIGHTING										SAVINGS			
Line #	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	Supply Room	3750	1	2	1' x 4', 2-Lamp, T12 34W, Magnetic Ballast, Surface Mount	80	0.08	300.0	$48.00	1	2	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	58	0.06	217.5	$34.80	$100.00	$100.00	0.02	82.5	$13.20	7.58
2	Gym	3750	48	1	1-Lamp, Metal Halide, Pendant Mount, Prismatic Lens	455	21.84	81,900.0	$13,104.00	48	4	4-Lamp T-5 HO Cooper F-Bay	229	10.99	41220	$6,595.20	$400.00	$19,200.00	10.85	40680	$6,508.80	2.95
3	Boys Locker Room	3750	2	1	Recessed Highhat Entrance, 1-Lamp, Incandescent, 60W, Recessed Mount	60	0.12	450.0	$72.00	2	1	18 W CFL Lamp	18	0.04	135	$21.60	$10.00	$20.00	0.08	315	$50.40	0.40
4	Boys Locker Room	3750	18	1	1-Lamp, Incandescent, 60W	60	1.08	4,050.0	$648.00	18	1	18 W CFL Lamp	18	0.32	1215	$194.40	$10.00	$180.00	0.76	2835	$453.60	0.40
5	Boys Shower	3750	4	1	1-Lamp, Incandescent, 60W	60	0.24	900.0	$144.00	4	1	18 W CFL Lamp	18	0.07	270	$43.20	$10.00	$40.00	0.17	630	$100.80	0.40
6	Boys Storage	3750	1	1	1-Lamp, Incandescent, 60W	60	0.06	225.0	$36.00	1	1	18 W CFL Lamp	18	0.02	67.5	$10.80	$10.00	$10.00	0.04	157.5	$25.20	0.40
7	Boys Storage	3750	1	1	1-Lamp, Incandescent, 60W	60	0.06	225.0	$36.00	1	1	18 W CFL Lamp	18	0.02	67.5	$10.80	$10.00	$10.00	0.04	157.5	$25.20	0.40
8	Boys Office	3750	2	4	2' x 4', 4-Lamp, T8 32W, Electronic Ballast, Recessed Mount, Prismatic Lens	109	0.22	817.5	$130.80	0	0	No Change Required (NCR)	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
9	Boys Office/Shower	3750	1	4	2' x 4', 4-Lamp, T8 32W, Electronic Ballast, Recessed Mount, Prismatic Lens	109	0.11	408.8	$65.40	0	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
10	Boys Bathroom	3750	2	1	1-Lamp, Incandescent, 60W	60	0.12	450.0	$72.00	2	1	18 W CFL Lamp	18	0.04	135	$21.60	$10.00	$20.00	0.08	315	$50.40	0.40
11	Boys Equipment/Storage	3750	1	1	1-Lamp, Incandescent, 60W	60	0.06	225.0	$36.00	1	1	18 W CFL Lamp	18	0.02	67.5	$10.80	$10.00	$10.00	0.04	157.5	$25.20	0.40
12	Boys Rear Storage	3750	4	1	1-Lamp, Incandescent, 60W	60	0.24	900.0	$144.00	4	1	18 W CFL Lamp	18	0.07	270	$43.20	$10.00	$40.00	0.17	630	$100.80	0.40
13	Tech. Lab.	3750	21	4	2' x 4', 4-Lamp, T8 32W, Electronic Ballast, Recessed Mount, Prismatic Lens	109	2.29	8,583.8	$1,373.40	0	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
14	Tech. Lab. Corridor	3750	2	4	2' x 4', 4-Lamp, T8 32W, Electronic Ballast, Recessed Mount, Prismatic Lens	109	0.22	817.5	$130.80	0	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
15	Tech. Lab. Storage	3750	2	2	1' x 4', 2-Lamp, T8 32W, Electronic Ballast, Surface Mount, Prismatic Lens	58	0.12	435.0	$69.60	0	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
16	Tech. Lab. 2	3750	21	4	2' x 4', 4-Lamp, T8 32W, Electronic Ballast, Recessed Mount, Prismatic Lens	109	2.29	8,583.8	$1,373.40	0	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
17	Tech. Storage	3750	2	2	1' x 4', 2-Lamp, T8 32W, Electronic Ballast, Pendant Mount, Prismatic Lens	58	0.12	435.0	$69.60	0	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00

INVESTMENT GRADE LIGHTING AUDIT

18	Corridor	3750	5	4	1' x 4', 4-Lamp, T8 32W, Electronic Ballast, Surface Mount, Prismatic Lens	109	0.55	2,043.8	$327.00	0	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
19	Woodshop	3750	6	4	1' x 4', 4-Lamp, T8 32W, Electronic Ballast, Pendant Mount, Prismatic Lens	109	0.65	2,452.5	$392.40	0	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
20	Woodshop	3750	6	2	1' x 4', 2-Lamp, T8 32W, Electronic Ballast, Pendant Mount, Prismatic Lens	58	0.35	1,305.0	$208.80	0	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
21	Woodshop Storage	3750	1	2	1' x 4', 2-Lamp, T8 32W, Electronic Ballast, Pendant Mount, Prismatic Lens	58	0.06	217.5	$34.80	0	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
22	Custodian Staff Work Room	3750	2	2	8' Indist., 2-Lamp, T12 96W, Magnetic Ballast, Pendant Mount	222	0.44	1,665.0	$266.40	4	2	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	58	0.23	870	$139.20	$100.00	$400.00	0.21	795	$127.20	3.14
23	Boiler Room	3750	15	2	8' Indist., 2-Lamp, T12 96W, Magnetic Ballast, Pendant Mount	222	3.33	12,487.5	$1,998.00	30	2	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	58	1.74	6525	$1,044.00	$100.00	$3,000.00	1.59	5962.5	$954.00	3.14
24	Pump Room	3750	4	2	8' Indist., 2-Lamp, T12 96W, Magnetic Ballast, Pendant Mount	222	0.89	3,330.0	$532.80	8	2	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	58	0.46	1740	$278.40	$100.00	$800.00	0.42	1590	$254.40	3.14
25	Pump Room	3750	2	2	8' Indist., 2-Lamp, T12 96W, Magnetic Ballast, Surface Mount	222	0.44	1,665.0	$266.40	4	2	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	58	0.23	870	$139.20	$100.00	$400.00	0.21	795	$127.20	3.14
26	Fan Room	3750	5	2	1' x 4', 2-Lamp, T8 32W, Electronic Ballast, Pendant Mount	58	0.29	1,087.5	$174.00	0	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
27	Fan Room	3750	4	2	1' x 4', 2-Lamp, T12 34W, Magnetic Ballast, Pendant Mount	80	0.32	1,200.0	$192.00	4	2	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	58	0.23	870	$139.20	$100.00	$400.00	0.09	330	$52.80	7.58
28	Auditorium	3750	52	4	2' x 4', 4-Lamp, T8 32W, Electronic Ballast, Recessed Mount, Prismatic Lens	109	5.67	21,255.0	$3,400.80	0	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
29	Auditorium Rear	3750	5	1	1-Lamp, Incandescent 60W, Recessed Mount	60	0.30	1,125.0	$180.00	5	1	18 W CFL Lamp	18	0.09	337.5	$54.00	$10.00	$50.00	0.21	787.5	$126.00	0.40
30	Cafeteria	3750	36	4	2' x 4', 4-Lamp, T8 32W, Electronic Ballast, Recessed Mount, Prismatic Lens	109	3.92	14,715.0	$2,354.40	0	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
31	Kitchen	3750	16	2	4', 2-Lamp, T8 32W, Electronic Ballast, Surface Mount, Prismatic Lens	58	0.93	3,480.0	$556.80	0	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
32	Kitchen Rear Storage	3750	2	1	1-Lamp, Incandescent 60W	60	0.12	450.0	$72.00	2	1	18 W CFL Lamp	18	0.04	135	$21.60	$10.00	$20.00	0.08	315	$50.40	0.40
33	Kitchen Rear Storage	3750	4	1	1-Lamp, Incandescent 60W	60	0.24	900.0	$144.00	4	1	18 W CFL Lamp	18	0.07	270	$43.20	$10.00	$40.00	0.17	630	$100.80	0.40
34	C Hall	3750	12	2	2' x 4', 2-Lamp, T8 32W, Electronic Ballast, Surface Mount, Prismatic Lens	58	0.70	2,610.0	$417.60	0	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00

INVESTMENT GRADE LIGHTING AUDIT

35	Lobby	3750	3	2	2' x 4', 2-Lamp, T8 32W, Electronic Ballast, Surface Mount, Prismatic Lens	58	0.17	652.5	$104.40	0	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
36	A Hall	3750	20	4	1' x 4', 4-Lamp, T8 32W, Electronic Ballast, Surface Mount, Prismatic Lens	109	2.18	8,175.0	$1,308.00	0	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
37	A-116	3750	6	4	1' x 4', 4-Lamp, T8 32W, Electronic Ballast, Surface Mount, Prismatic Lens	109	0.65	2,452.5	$392.40	0	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
38	A-115	3750	6	4	1' x 4', 4-Lamp, T8 32W, Electronic Ballast, Surface Mount, Prismatic Lens	109	0.65	2,452.5	$392.40	0	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
39	Exit F Stair	3750	2	2	1' x 4', 2-Lamp, T8 32W, Electronic Ballast, Surface Mount, Prismatic Lens	58	0.12	435.0	$69.60	0	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
40	Exit F Stair	3750	1	4	1' x 4', 4-Lamp, T8 32W, Electronic Ballast, Surface Mount, Prismatic Lens	109	0.11	408.8	$65.40	0	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
41	A114	3750	6	4	1' x 4', 4-Lamp, T8 32W, Electronic Ballast, Surface Mount, Prismatic Lens	109	0.65	2,452.5	$392.40	0	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
42	A113	3750	6	4	1' x 4', 4-Lamp, T8 32W, Electronic Ballast, Surface Mount, Prismatic Lens	109	0.65	2,452.5	$392.40	0	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
43	A112	3750	6	4	1' x 4', 4-Lamp, T8 32W, Electronic Ballast, Surface Mount, Prismatic Lens	109	0.65	2,452.5	$392.40	0	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
44	A111	3750	6	4	1' x 4', 4-Lamp, T8 32W, Electronic Ballast, Surface Mount, Prismatic Lens	109	0.65	2,452.5	$392.40	0	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
45	A110	3750	6	4	1' x 4', 4-Lamp, T8 32W, Electronic Ballast, Surface Mount, Prismatic Lens	109	0.65	2,452.5	$392.40	0	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
46	A109	3750	6	4	1' x 4', 4-Lamp, T8 32W, Electronic Ballast, Surface Mount, Prismatic Lens	109	0.65	2,452.5	$392.40	0	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
47	Stairs Exit D	3750	3	4	1' x 4', 4-Lamp, T8 32W, Electronic Ballast, Surface Mount, Prismatic Lens	109	0.33	1,226.3	$196.20	0	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
48	Boys Bathroom	3750	2	4	2' x 4', 4-Lamp, T8 32W, Electronic Ballast, Recessed Mount, Prismatic Lens	109	0.22	817.5	$130.80	0	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
49	Girls Bathroom	3750	2	4	2' x 4', 4-Lamp, T8 32W, Electronic Ballast, Recessed Mount, Prismatic Lens	109	0.22	817.5	$130.80	0	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
50	Janitor Closet	3750	2	1	1-Lamp, Incandescent 60W	60	0.12	450.0	$72.00	2	1	18 W CFL Lamp	18	0.04	135	$21.60	$10.00	$20.00	0.08	315	$50.40	0.40

INVESTMENT GRADE LIGHTING AUDIT

51	Janitor Closet	3750	1	2	2' x 2', 2-Lamp, T8 17W, Electronic Ballast, Recessed Mount, Prismatic Lens	58	0.06	217.5	$34.80	0	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
52	A108	3750	8	4	2' x 4', 4-Lamp, T8 32W, Electronic Ballast, Pendant Mount, Prismatic Lens	109	0.87	3,270.0	$523.20	0	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
53	A107	3750	8	4	2' x 4', 4-Lamp, T8 32W, Electronic Ballast, Pendant Mount, Prismatic Lens	109	0.87	3,270.0	$523.20	0	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
54	A106	3750	8	4	2' x 4', 4-Lamp, T8 32W, Electronic Ballast, Pendant Mount, Prismatic Lens	109	0.87	3,270.0	$523.20	0	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
55	A105	3750	6	4	2' x 4', 4-Lamp, T8 32W, Electronic Ballast, Pendant Mount, Prismatic Lens	109	0.65	2,452.5	$392.40	0	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
56	A104	3750	8	4	2' x 4', 4-Lamp, T8 32W, Electronic Ballast, Pendant Mount, Prismatic Lens	109	0.87	3,270.0	$523.20	0	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
57	A103	3750	3	4	2' x 4', 4-Lamp, T8 32W, Electronic Ballast, Recessed Mount, Prismatic Lens	109	0.33	1,226.3	$196.20	0	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
58	Vice Principal	3750	3	4	2' x 4', 4-Lamp, T8 32W, Electronic Ballast, Recessed Mount, Prismatic Lens	109	0.33	1,226.3	$196.20	0	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
59	A012	3750	4	4	2' x 4', 4-Lamp, T8 32W, Electronic Ballast, Pendant Mount, Prismatic Lens	109	0.44	1,635.0	$261.60	0	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
60	A101	3750	4	4	2' x 4', 4-Lamp, T8 32W, Electronic Ballast, Pendant Mount, Prismatic Lens	109	0.44	1,635.0	$261.60	0	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
61	A100	3750	8	4	2' x 4', 4-Lamp, T8 32W, Electronic Ballast, Pendant Mount, Prismatic Lens	109	0.87	3,270.0	$523.20	0	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
62	Girls Bathroom	3750	4	4	2' x 4', 4-Lamp, T8 32W, Electronic Ballast, Recessed Mount, Prismatic Lens	109	0.44	1,635.0	$261.60	0	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
63	Teachers Work Room	3750	1	4	2' x 4', 4-Lamp, T8 32W, Electronic Ballast, Recessed Mount, Prismatic Lens	109	0.11	408.8	$65.40	0	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
64	Teachers Closet	3750	1	1	1-Lamp, Incandescent 60W	60	0.06	225.0	$36.00	1	1	18 W CFL Lamp	18	0.02	67.5	$10.80	$10.00	$10.00	0.04	157.5	$25.20	0.40
65	Sec. Work Room	3750	1	4	2' x 4', 4-Lamp, T8 32W, Electronic Ballast, Recessed Mount, Prismatic Lens	109	0.11	408.8	$65.40	0	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
66	Main Office	3750	5	4	2' x 4', 4-Lamp, T8 32W, Electronic Ballast, Recessed Mount, Prismatic Lens	109	0.55	2,043.8	$327.00	0	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00

INVESTMENT GRADE LIGHTING AUDIT

67	Principal Office	3750	2	4	2' x 4', 4-Lamp, T8 32W, Electronic Ballast, Recessed Mount, Prismatic Lens	109	0.22	817.5	$130.80	0	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
68	Main Stair to 2nd Floor	3750	4	4	2' x 4', 4-Lamp, T8 32W, Electronic Ballast, Recessed Mount, Prismatic Lens	109	0.44	1,635.0	$261.60	0	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
69	Health Office	3750	2	4	1' x 4', 4-Lamp, T8 32W, Electronic Ballast, Surface Mount, Prismatic Lens	109	0.22	817.5	$130.80	0	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
70	Health Office	3750	1	2	2' x 4', 2-Lamp, T8 32W, Electronic Ballast, Recessed Mount, Prismatic Lens	58	0.06	217.5	$34.80	0	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
71	Health Office	3750	1	2	2' x 2', 2-Lamp, T8 17W, Electronic Ballast, Recessed Mount, Prismatic Lens	58	0.06	217.5	$34.80	0	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
72	Boys Bathroom	3750	4	4	2' x 4', 4-Lamp, T8 32W, Electronic Ballast, Recessed Mount, Prismatic Lens	109	0.44	1,635.0	$261.60	0	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
73	Janitor Closet	3750	1	1	1-Lamp, Incandescent 60W	60	0.06	225.0	$36.00	1	1	18 W CFL Lamp	18	0.02	67.5	$10.80	$10.00	$10.00	0.04	157.5	$25.20	0.40
74	Faculty Bathroom	3750	1	2	2' x 4', 2-Lamp, T8 32W, Electronic Ballast, Recessed Mount, Prismatic Lens	58	0.06	217.5	$34.80	0	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
75	Faculty Bathroom	3750	2	2	2' x 2', U Tube, 2-Lamp, T8 32W, Electronic Ballast, Recessed Mount, Prismatic Lens	73	0.15	547.5	$87.60	0	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
76	C100	3750	8	2	2' x 4', 2-Lamp, T8 32W, Electronic Ballast, Recessed Mount, Prismatic Lens	58	0.46	1,740.0	$278.40	0	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
77	Faculty Dining	3750	6	2	2' x 4', 2-Lamp, T8 32W, Electronic Ballast, Recessed Mount, Prismatic Lens	58	0.35	1,305.0	$208.80	0	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
78	B Hall	3750	9	4	1' x 4', 4-Lamp, T8 32W, Electronic Ballast, Surface Mount, Prismatic Lens	109	0.98	3,678.8	$588.60	0	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
79	B Hall	3750	6	2	2' x 2', 2-Lamp, T8 17W, Electronic Ballast, Surface Mount, Prismatic Lens	34	0.20	765.0	$122.40	0	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
80	B1014 to 3	3750	7	4	1' x 4', 4-Lamp, T8 32W, Electronic Ballast, Surface Mount, Prismatic Lens	109	0.76	2,861.3	$457.80	0	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
81	B1014 Bathroom	3750	1	4	2' x 4', 4-Lamp, T8 32W, Electronic Ballast, Recessed Mount, Prismatic Lens	109	0.11	408.8	$65.40	0	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
82	B102	3750	6	4	1' x 4', 4-Lamp, T8 32W, Electronic Ballast, Surface Mount, Prismatic Lens	109	0.65	2,452.5	$392.40	0	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00

83	B104	3750	8	4	1' x 4', 4-Lamp, T8 32W, Electronic Ballast, Surface Mount, Prismatic Lens	109	0.87	3,270.0	$523.20	0	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
84	B105	3750	15	4	2' x 4', 4-Lamp, T8 32W, Electronic Ballast, Recessed Mount, Prismatic Lens	109	1.64	6,131.3	$981.00	0	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
85	B106	3750	15	4	2' x 4', 4-Lamp, T8 32W, Electronic Ballast, Recessed Mount, Prismatic Lens	109	1.64	6,131.3	$981.00	0	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
86	B106 & B108 Storage	3750	7	4	2' x 4', 4-Lamp, T8 32W, Electronic Ballast, Recessed Mount, Prismatic Lens	109	0.76	2,861.3	$457.80	0	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
87	B108	3750	15	4	2' x 4', 4-Lamp, T8 32W, Electronic Ballast, Recessed Mount, Prismatic Lens	109	1.64	6,131.3	$981.00	0	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
88	Bathroom	3750	3	2	4', 2-Lamp, T8 32W, Electronic Ballast, Surface Mount, Prismatic Lens	58	0.17	652.5	$104.40	0	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
89	Bathroom	3750	3	2	4', 2-Lamp, T8 32W, Electronic Ballast, Surface Mount, Prismatic Lens	58	0.17	652.5	$104.40	0	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
90	B107	3750	15	4	2' x 4', 4-Lamp, T8 32W, Electronic Ballast, Recessed Mount, Prismatic Lens	109	1.64	6,131.3	$981.00	0	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
91	B105 & B107	3750	7	2	4', 2-Lamp, T8 32W, Electronic Ballast, Surface Mount, Prismatic Lens	58	0.41	1,522.5	$243.60	0	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
92	D Hall	3750	14	2	2' x 2', 2-Lamp, T8 17W, Electronic Ballast, Recessed Mount, Prismatic Lens	34	0.48	1,785.0	$285.60	0	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
93	D Hall	3750	7	4	2' x 4', 4-Lamp, T8 32W, Electronic Ballast, Recessed Mount, Prismatic Lens	109	0.76	2,861.3	$457.80	0	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
94	A216	3750	6	4	1' x 4', 4-Lamp, T8 32W, Electronic Ballast, Surface Mount, Prismatic Lens	109	0.65	2,452.5	$392.40	0	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
95	A215	3750	6	4	1' x 4', 4-Lamp, T8 32W, Electronic Ballast, Surface Mount, Prismatic Lens	109	0.65	2,452.5	$392.40	0	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
96	A214	3750	6	4	1' x 4', 4-Lamp, T8 32W, Electronic Ballast, Surface Mount, Prismatic Lens	109	0.65	2,452.5	$392.40	0	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
97	A213	3750	6	4	1' x 4', 4-Lamp, T8 32W, Electronic Ballast, Surface Mount, Prismatic Lens	109	0.65	2,452.5	$392.40	0	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
98	A212	3750	6	4	1' x 4', 4-Lamp, T8 32W, Electronic Ballast, Surface Mount, Prismatic Lens	109	0.65	2,452.5	$392.40	0	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00

99	A211	3750	6	4	1' x 4', 4-Lamp, T8 32W, Electronic Ballast, Surface Mount, Prismatic Lens	109	0.65	2,452.5	$392.40	0	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
100	A210	3750	6	4	1' x 4', 4-Lamp, T8 32W, Electronic Ballast, Surface Mount, Prismatic Lens	109	0.65	2,452.5	$392.40	0	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
101	A209	3750	6	4	1' x 4', 4-Lamp, T8 32W, Electronic Ballast, Surface Mount, Prismatic Lens	109	0.65	2,452.5	$392.40	0	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
102	Boys Bathroom	3750	2	1	1-Lamp, Incandescent 60W	60	0.12	450.0	$72.00	2	1	18 W CFL Lamp	18	0.04	135	$21.60	$10.00	$20.00	0.08	315	$50.40	0.40
103	Girls Bathroom	3750	2	1	1-Lamp, Incandescent 60W	60	0.12	450.0	$72.00	2	1	18 W CFL Lamp	18	0.04	135	$21.60	$10.00	$20.00	0.08	315	$50.40	0.40
104	Server	3750	3	2	1' x 4', 2-Lamp, T8 32W, Electronic Ballast, Surface Mount, Prismatic Lens	58	0.17	652.5	$104.40	0	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
105	Faculty Lounge	3750	1	4	1' x 4', 4-Lamp, T8 32W, Electronic Ballast, Surface Mount, Prismatic Lens	109	0.11	408.8	$65.40	0	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
106	A208	3750	12	2	4', 2-Lamp, T12 34W, Magnetic Ballast, Pendant Mount, Prismatic Lens	80	0.96	3,600.0	$576.00	12	2	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	58	0.70	2610	$417.60	$100.00	$1,200.00	0.26	990	$158.40	7.58
107	A206	3750	12	2	4', 2-Lamp, T12 34W, Magnetic Ballast, Pendant Mount, Prismatic Lens	80	0.96	3,600.0	$576.00	12	2	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	58	0.70	2610	$417.60	$100.00	$1,200.00	0.26	990	$158.40	7.58
108	A204	3750	12	2	4', 2-Lamp, T12 34W, Magnetic Ballast, Pendant Mount, Prismatic Lens	80	0.96	3,600.0	$576.00	12	2	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	58	0.70	2610	$417.60	$100.00	$1,200.00	0.26	990	$158.40	7.58
109	A202	3750	8	2	4', 2-Lamp, T12 34W, Magnetic Ballast, Pendant Mount, Prismatic Lens	80	0.64	2,400.0	$384.00	8	2	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	58	0.46	1740	$278.40	$100.00	$800.00	0.18	660	$105.60	7.58
110	A203	3750	12	2	4', 2-Lamp, T12 34W, Magnetic Ballast, Pendant Mount, Prismatic Lens	80	0.96	3,600.0	$576.00	12	2	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	58	0.70	2610	$417.60	$100.00	$1,200.00	0.26	990	$158.40	7.58
111	Library	3750	24	2	4', 2-Lamp, T12 34W, Magnetic Ballast, Pendant Mount, Prismatic Lens	80	1.92	7,200.0	$1,152.00	24	2	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	58	1.39	5220	$835.20	$100.00	$2,400.00	0.53	1980	$316.80	7.58
112	Janitor Closet	3750	1	1	1-Lamp, Incandescent 60W	50	0.05	187.5	$30.00	1	1	18 W CFL Lamp	18	0.02	67.5	$10.80	$10.00	$10.00	0.03	120	$19.20	0.52
113	A201	3750	15	2	4', 2-Lamp, T12 34W, Magnetic Ballast, Pendant Mount, Prismatic Lens	80	1.20	4,500.0	$720.00	15	2	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	58	0.87	3262.5	$522.00	$100.00	$1,500.00	0.33	1237.5	$198.00	7.58
114	A201 Closet	3750	1	1	2', 1-Lamp, T8 32W, Electronic Ballast, Surface Mount	28	0.03	105.0	$16.80	0	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
115	A200	3750	12	2	4', 2-Lamp, T12 34W, Magnetic Ballast, Pendant Mount, Prismatic Lens	80	0.96	3,600.0	$576.00	12	2	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	58	0.70	2610	$417.60	$100.00	$1,200.00	0.26	990	$158.40	7.58

INVESTMENT GRADE LIGHTING AUDIT

116	West Faculty Lounge	3750	4	4	2' x 4', 4-Lamp, T8 32W, Electronic Ballast, Recessed Mount, Prismatic Lens	109	0.44	1,635.0	$261.60	0	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
117	Janitor Closet	3750	1	1	1-Lamp, Incandescent 60W	60	0.06	225.0	$36.00	1	1	18 W CFL Lamp	18	0.02	67.5	$10.80	$10.00	$10.00	0.04	157.5	$25.20	0.40
118	Peer Meditation	3750	2	4	2' x 4', 4-Lamp, T8 32W, Electronic Ballast, Recessed Mount, Prismatic Lens	109	0.22	817.5	$130.80	0	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
119	Girls Bathroom	3750	2	4	2' x 4', 4-Lamp, T8 32W, Electronic Ballast, Recessed Mount, Prismatic Lens	109	0.22	817.5	$130.80	0	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
120	C-202	3750	20	4	1' x 4', 4-Lamp, T8 32W, Electronic Ballast, Pendant Mount, Prismatic Lens	109	2.18	8,175.0	$1,308.00	0	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
121	Balcony Landing	3750	3	2	2' x 4', 2-Lamp, T8 32W, Electronic Ballast, Recessed Mount, Prismatic Lens	58	0.17	652.5	$104.40	0	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
122	C Hall	3750	15	2	2' x 4', 2-Lamp, T8 32W, Electronic Ballast, Recessed Mount, Prismatic Lens	58	0.87	3,262.5	$522.00	0	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
123	A Hall	3750	11	2	2' x 4', 2-Lamp, T8 32W, Electronic Ballast, Recessed Mount, Prismatic Lens	58	0.64	2,392.5	$382.80	0	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
124	A Hall	3750	12	4	1' x 4', 4-Lamp, T8 32W, Electronic Ballast, Surface Mount, Prismatic Lens	109	1.31	4,905.0	$784.80	0	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
125	B Hall	3750	4	4	2' x 4', 4-Lamp, T8 32W, Electronic Ballast, Recessed Mount, Prismatic Lens	109	0.44	1,635.0	$261.60	0	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
126	C201	3750	12	4	1' x 4', 4-Lamp, T8 32W, Electronic Ballast, Pendant Mount, Prismatic Lens	109	1.31	4,905.0	$784.80	0	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
127	Boys Bathroom	3750	2	4	2' x 4', 4-Lamp, T8 32W, Electronic Ballast, Recessed Mount, Prismatic Lens	109	0.22	817.5	$130.80	0	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
128	Janitor Closet	3750	1	1	1-Lamp, Incandescent 60W	60	0.06	225.0	$36.00	1	1	18 W CFL Lamp	18	0.02	67.5	$10.80	$10.00	$10.00	0.04	157.5	$25.20	0.40
129	B-200	3750	4	4	2' x 4', 4-Lamp, T8 32W, Electronic Ballast, Recessed Mount, Prismatic Lens	109	0.44	1,635.0	$261.60	0	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
130	B-201	3750	12	2	1' x 4', 2-Lamp, T12 34W, Magnetic Ballast, Pendant Mount, Prismatic Lens	80	0.96	3,600.0	$576.00	12	2	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	58	0.70	2610	$417.60	$100.00	$1,200.00	0.26	990	$158.40	7.58
131	B-202	3750	10	4	1' x 4', 4-Lamp, T8 32W, Electronic Ballast, Pendant Mount, Prismatic Lens	109	1.09	4,087.5	$654.00	0	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
132	B-203	3750	8	2	1' x 4', 2-Lamp, T12 34W, Magnetic Ballast, Pendant Mount, Prismatic Lens	80	0.64	2,400.0	$384.00	8	2	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	58	0.46	1740	$278.40	$100.00	$800.00	0.18	660	$105.60	7.58

INVESTMENT GRADE LIGHTING AUDIT

133	B-204	3750	6	4	1' x 4', 4-Lamp, T8 32W, Electronic Ballast, Surface Mount, Prismatic Lens	109	0.65	2,452.5	$392.40	0	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
134	B-205	3750	12	2	1' x 4', 2-Lamp, T12 34W, Magnetic Ballast, Pendant Mount, Prismatic Lens	80	0.96	3,600.0	$576.00	12	2	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	58	0.70	2610	$417.60	$100.00	$1,200.00	0.26	990	$158.40	7.58
135	Janitor Closet	3750	1	1	1-Lamp, Incandescent 60W	60	0.06	225.0	$36.00	1	1	18 W CFL Lamp	18	0.02	67.5	$10.80	$10.00	$10.00	0.04	157.5	$25.20	0.40
136	Child Study Team	3750	2	2	2' x 4', 2-Lamp, T8 32W, Electronic Ballast, Recessed Mount, Prismatic Lens	58	0.12	435.0	$69.60	0	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
137	Child Study Team	3750	1	1	1-Lamp, Incandescent 60W	60	0.06	225.0	$36.00	1	1	18 W CFL Lamp	18	0.02	67.5	$10.80	$10.00	$10.00	0.04	157.5	$25.20	0.40
138	C200	3750	18	2	1' x 4', 2-Lamp, T12 34W, Electronic Ballast, Recessed Mount, Prismatic Lens	80	1.44	5,400.0	$864.00	18	2	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	58	1.04	3915	$626.40	$100.00	$1,800.00	0.40	1485	$237.60	7.58
139	C200 Office	3750	1	4	2' x 4', 4-Lamp, T8 32W, Electronic Ballast, Recessed Mount, Prismatic Lens	109	0.11	408.8	$65.40	0	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
140	Storage	3750	2	4	1' x 4', 4-Lamp, T8 32W, Electronic Ballast, Surface Mount, Prismatic Lens	109	0.22	817.5	$130.80	0	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
141	Guidance Office	3750	2	4	1' x 4', 4-Lamp, T8 32W, Electronic Ballast, Surface Mount, Prismatic Lens	109	0.22	817.5	$130.80	0	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
142	Guidance Office	3750	10	4	1' x 4', 4-Lamp, T8 32W, Electronic Ballast, Surface Mount, Prismatic Lens	109	1.09	4,087.5	$654.00	0	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
143	School Counselor	3750	3	4	1' x 4', 4-Lamp, T8 32W, Electronic Ballast, Surface Mount, Prismatic Lens	109	0.33	1,226.3	$196.20	0	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
144	Substance Awareness	3750	4	4	1' x 4', 4-Lamp, T8 32W, Electronic Ballast, Surface Mount, Prismatic Lens	109	0.44	1,635.0	$261.60	0	0	NCR	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
145	Storage Closet	3750	1	2	1' x 4', 2-Lamp, T12 34W, Magnetic Ballast, Recessed Mount, Prismatic Lens	80	0.08	300.0	$48.00	1	2	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	58	0.06	217.5	$34.80	$100.00	$100.00	0.02	82.5	$13.20	7.58
146	Storage Closet	3750	1	2	1' x 4', 2-Lamp, T12 34W, Magnetic Ballast, Recessed Mount, Prismatic Lens	80	0.08	300.0	$48.00	1	2	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	58	0.06	217.5	$34.80	$100.00	$100.00	0.02	82.5	$13.20	7.58
	Totals		988	423			111.87	419,523.8	$67,123.80	315	65			24.198	90742.5	$14,518.80		$40,770.00	19.28	72292.5	$11,566.80	3.52

Project Name: **Millville BOE - Memorial Jr. High School**
Location: **Millville, NJ 08332**
Description: **Photovoltaic System - Direct Purchase**

Simple Payback Analysis

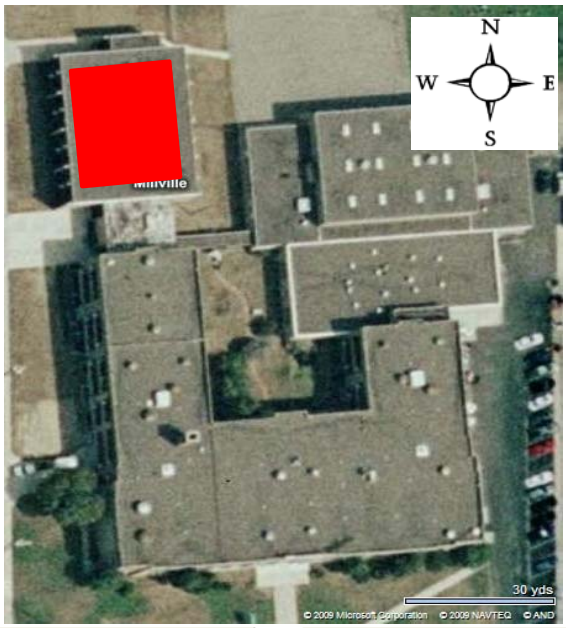
	Photovoltaic System - Direct Purchase
Total Construction Cost	$594,090
Annual kWh Production	86,967
Annual Energy Cost Reduction	$13,915
Annual SREC Revenue	$30,438
First Cost Premium	**$594,090**
Simple Payback:	**13.39** **Years**

Life Cycle Cost Analysis

Analysis Period (years):	25	Financing %:	0%
Financing Term (mths):	0	Maintenance Escalation Rate:	3.0%
Average Energy Cost ($/kWh)	**$0.160**	Energy Cost Escalation Rate:	3.0%
Financing Rate:	0.00%	SREC Value ($/kWh)	$0.350

Period	Additional Cash Outlay	Energy kWh Production	Energy Cost Savings	Additional Maint Costs	SREC Revenue	Net Cash Flow	Cumulative Cash Flow
0	$594,090	0	0	0	$0	(594,090)	0
1	$0	86,967	$13,915	$0	$30,438	$44,353	($549,737)
2	$0	86,532	$14,332	$0	$30,286	$44,618	($505,118)
3	$0	86,100	$14,762	$0	$30,135	$44,897	($460,221)
4	$0	85,669	$15,205	$0	$29,984	$45,189	($415,032)
5	$0	85,241	$15,661	$878	$29,834	$44,617	($370,415)
6	$0	84,814	$16,131	$874	$29,685	$44,942	($325,472)
7	$0	84,390	$16,615	$869	$29,537	$45,282	($280,190)
8	$0	83,968	$17,113	$865	$29,389	$45,637	($234,553)
9	$0	83,549	$17,627	$861	$29,242	$46,008	($188,545)
10	$0	83,131	$18,156	$856	$29,096	$46,395	($142,149)
11	$0	82,715	$18,700	$852	$28,950	$46,799	($95,351)
12	$0	82,302	$19,261	$848	$28,806	$47,219	($48,132)
13	$0	81,890	$19,839	$843	$28,662	$47,657	($475)
14	$0	81,481	$20,434	$839	$28,518	$48,113	$47,639
15	$0	81,073	$21,047	$835	$28,376	$48,588	$96,226
16	$0	80,668	$21,679	$831	$28,234	$49,082	$145,308
17	$0	80,265	$22,329	$827	$28,093	$49,595	$194,903
18	$0	79,863	$22,999	$823	$27,952	$50,128	$245,031
19	$0	79,464	$23,689	$818	$27,812	$50,683	$295,714
20	$0	79,067	$24,400	$814	$27,673	$51,258	$346,973
21	$1	78,671	$25,132	$810	$27,535	$51,856	$398,829
22	$2	78,278	$25,885	$806	$27,397	$52,476	$451,305
23	$3	77,887	$26,662	$802	$27,260	$53,120	$504,425
24	$4	77,497	$27,462	$798	$27,124	$53,788	$558,213
25	$5	77,110	$28,286	$794	$26,988	$54,480	$612,693
	Totals:	1,659,148	$373,894	$13,533	$580,702	$1,206,783	$941,063
				Net Present Value (NPV)		**$612,718**	
				Internal Rate of Return (IRR)		**6.1%**	

Building	Roof Area (sq ft)	Panel	Qty	Panel Sq Ft	Panel Total Sq Ft	Total KW_{DC}	Total Annual kWh	Panel Weight (33 lbs)	W/SQFT
Memorial Jr. High School	4675	Sunpower SPR230	287	14.7	4,220	66.01	86,967	9,471	15.64



Station Identification	
City:	Atlantic_City
State:	New_Jersey
Latitude:	39.45° N
Longitude:	74.57° W
Elevation:	20 m
PV System Specifications	
DC Rating:	66.0 kW
DC to AC Derate Factor:	0.810
AC Rating:	53.5 kW
Array Type:	Fixed Tilt
Array Tilt:	39.5°
Array Azimuth:	180.0°
Energy Specifications	
Cost of Electricity:	16.0 ¢/kWh

Results			
Month	Solar Radiation ($kWh/m^2/day$)	AC Energy (kWh)	Energy Value ($)
1	3.61	6222	995.52
2	4.20	6478	1036.48
3	4.78	7815	1250.40
4	5.23	8027	1284.32
5	5.44	8426	1348.16
6	5.48	7886	1261.76
7	5.55	8154	1304.64
8	5.41	8034	1285.44
9	5.23	7689	1230.24
10	4.60	7191	1150.56
11	3.59	5712	913.92
12	3.17	5333	853.28
Year	4.69	86967	13914.72

.= Proposed PV Layout

Notes:

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

Day-Light Dimming Calculation

Concord Engineering Group

Millville Board of Education - Memorial Jr. High School

Existing Fixtures

Existing Fixture	Quantity	Input Watts	Annual Operation Hrs	% Load	Annual Usage (kWh)	Demand (KW)	Operating Cost
400 Watt Metal Halide, High Bay, Pendant Mount, No Lens	48	455	3750	100%	**81900**	21.84	$11,548

Proposed Retrofit

Proposed Retrofit	Quantity	# Lamps	Input Watts	Total Input Watts	Material Cost	Labor Cost	Total Lighting Installation Cost
4-Lamp T-5 HO Cooper F-Bay	48	4	54W/lamp	229	$450	$400	**$40,800**

Daylight Dimming Utility Savings

Quantity	Input Watts	Daily Operation Hrs	% Load	Annual Operation	Annual Usage (kWh)	Demand (KW)
49	229	9	100%	227	22924.5	11.221
49	229	3	67%	227	5096.9	
49	229	4.5	33%	227	3816.9	
Total hrs of Operation		**16.5**		Total Usage	**31838.3**	

Annual Savings

kWh Savings	kW Savings
50062	**10.6**

Total Utility Savings	**$8,010**
Smart Start Incentives	
Lighting Control $25/fixture	$1,200
Lighting Fixture $100/fixture	$4,800
Total Incentive	**($6,000)**
Total Project Cost	**$34,800**
Simple Payback (years)	**4.3**