LOCAL GOVERNMENT ENERGY AUDIT PROGRAM: ENERGY AUDIT REPORT

PREPARED FOR: **HARRISON TOWNSHIP BOE**
PLEASANT VALLEY
ELEMENTARY SCHOOL
401 CEDAR ROAD
MULLICA HILL, NJ 08062
ATTN: MR. Robert E. Scharlé
SCHOOL BUSINESS ADMINISTRATOR

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I. EXECUTIVE SUMMARY

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

Harrison Township Board of Education
Pleasant Valley Elementary School
401 Cedar Road
Mullica Hill, NJ 08062

School Contact Person: Robert E. Scharlé
Facility Contact Person: Richard Brown

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	$ 191,506
Natural Gas	$ 66,847
Total	$ 258,353

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

Table 1
Financial Summary Table

ENERGY CONSERVATION MEASURES (ECM's)					
ECM NO.	**DESCRIPTION**	**NET INSTALLATION COST[A]**	**ANNUAL SAVINGS[B]**	**SIMPLE PAYBACK (Yrs)**	**SIMPLE LIFETIME ROI**
ECM #1	Demand Control Ventilation on Large Air Handling Units	$49,655	$1,956	25.4	-40.9%
ECM #2	Condensing Boiler Installation	$60,080	$1,890	31.8	-5.6%
ECM #3	Condensing Domestic Hot Water Heater	$79,396	$1,942	40.9	-63.3%
ECM #4	Chiller & Pump VFD	$100,374	$19,147	5.2	243.4%
ECM #5	Reprogram Unoccupied Mode	$246,123	$47,242	5.2	187.9%
RENEWABLE ENERGY MEASURES (REM's)					
ECM NO.	**DESCRIPTION**	**NET INSTALLATION COST**	**ANNUAL SAVINGS**	**SIMPLE PAYBACK (Yrs)**	**SIMPLE LIFETIME ROI**
REM #1	Solar PV 244.95 KW System	$2,204,550	$142,657	15.5	61.8%

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	Demand Control Ventilation on Large Air Handling Units	0.0	23,159.0	9,354.0
ECM #2	Condensing Boiler Installation	0.0	0.0	945.0
ECM #3	Condensing Domestic Hot Water Heater	0.0	0.0	1,270.0
ECM #4	Chiller & Pump VFD	57.1	142,891.0	0.0
ECM #5	Reprogram Unoccupied Mode	24.8	127,412.0	19,718.2
RENEWABLE ENERGY MEASURES (REM's)				
ECM NO.	**DESCRIPTION**	**ANNUAL UTILITY REDUCTION**		
		ELECTRIC DEMAND (KW)	**ELECTRIC CONSUMPTION (KWH)**	**NATURAL GAS (THERMS)**
REM #1	Solar PV 244.95 KW System	245.0	294,746.0	-
Notes:	A. Demand Savings for Renewable Energy Measures fluctuate with the seasons and are estimated based on the demand the Photovoltaic System will produce.			

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 #4: Chiller & Pump VFD**
- **ECM #5: Reprogram Unoccupied Mode**

ECM #4 – Chiller & Pump VFD:
The installation of a variable frequency drive (VFD) on the existing centrifugal chiller with inlet guide vanes will significantly improve compressor part load performance and efficiency. The current loading at peak demand is considered a part load condition for the chiller and should realize a substantial savings with the implementation of a VFD on this chiller. The existing motors for the chilled water and hot water constant volume pumping distribution systems utilize standard efficiency motors. These motors must be retrofitted with NEMA Premium Efficiency motors rated for use with a VFD when installing a VFD. The addition of the VFD increases the power consumption by a small amount. However, the VFD allows the system to operate at a lower system power consumption. The incremental savings multiplied over extended operating hours for the chiller, chilled water pumps and the hot water pumps allow the savings to pay for the installation in approximately 5.2 years.

ECM #5 – Reprogram Unoccupied Mode:
The current HVAC systems within the Pleasant Valley Elementary School does not control unoccupied mode properly. The air handling, unit ventilating, fan coil unit and exhaust fans run continuously. Outside air dampers and exhaust fan dampers are not closed. During unoccupied hours, outside air for ventilation is not required. The only fans required to operate are the combustion air supply fan at each boiler room. A great deal of energy can be conserved if the unit supply fans are turned off, outside air dampers are closed and exhaust fans are turned off during unoccupied mode. The implementation of this project will allow the savings to pay for the in approximately 5.2 years.

REM #1 – Solar Photovoltaic System:

Solar photovoltaic systems have progressed over the years to become a realistic approach for many facilities. With the incentives and energy credits available today, solar PV system installation costs have dropped to provide paybacks less than 16 years such as this facility. Power Purchase Agreements (PPAs) provide another opportunity for facilities with limited funding to invest in a clean renewable source of energy. Based on the calculated estimate for the maximum roof area available for solar panels (17,375 SF), this facility could generate approximately 20.7% of their current electric use annually. The BOE should consider this approach for considerable renewable energy improvements.

Additional Recommendations:

In addition to the ECMs, there are maintenance and operational measures that can provide significant energy savings and provide immediate benefit. The ECMs listed above represent

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

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

2. Maintain all weather stripping on entrance doors.

3. Clean all light fixtures to maximize light output.

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

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

6. Turn off computer monitors and set computers to sleep when not being used. Computer monitors and computers are becoming one of the largest energy consumers in buildings today. Set computers to sleep when not being used and automatically turn off the computer monitors. Do not set computer monitors to "screen saver" mode which saves the screen life, not energy.

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

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

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

Overall, the Pleasant Valley Elementary School appears to be operating at a low efficiency level compared to other schools in the region. With the implementation of the above recommended

measures the Harrison Township BOE will realize further energy savings at the Pleasant Valley Elementary School.

II. INTRODUCTION

The comprehensive energy audit covers the 87,901 square foot Pleasant Valley Elementary School Building, which includes the following spaces: classrooms, gym, restrooms, office, library, Art, Music, Cafetorium, Kitchen, storage and mechanical room.

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 are based on an Interest Rate of 3%.

IV. HISTORIC ENERGY CONSUMPTION/COST

A. Energy Usage / Tariffs

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

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

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

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

Description	Average
Electricity	13.4¢ / kWh
Natural Gas	$1.53 / Therm

Table 3
Electricity Billing Data

ELECTRIC USAGE SUMMARY

Utility Provider: Atlantic City Electric
Rate: Annual General Service
Meter No: 58503496
Customer ID No: 0438 5769 9961
Third Party Utility S.J. Energy Co.
TPS Meter / Acct No:

MONTH OF USE	CONSUMPTION	DEMAND	TOTAL BILL
Oct-08	120,481	344.6	$16,269
Nov-08	91,353	240.2	$12,357
Dec-08	99,833	233.0	$13,605
Jan-09	93,486	245.0	$12,822
Feb-09	98,619	237.8	$13,407
Mar-09	103,265	247.2	$14,005
Apr-09	100,187	415.2	$13,638
May-09	143,992	355.7	$18,280
Jun-09	155,929	383.5	$20,827
Jul-09	130,763	287.8	$17,480
Aug-09	135,009	343.0	$18,121
Sep-09	152,705	386.9	$20,695
Totals	**1,425,622**	**415.2 Max**	**$191,506**

AVERAGE DEMAND **310.0 KW average**
AVERAGE RATE **$0.134 $/kWh**

Figure 1
Electricity Usage Profile

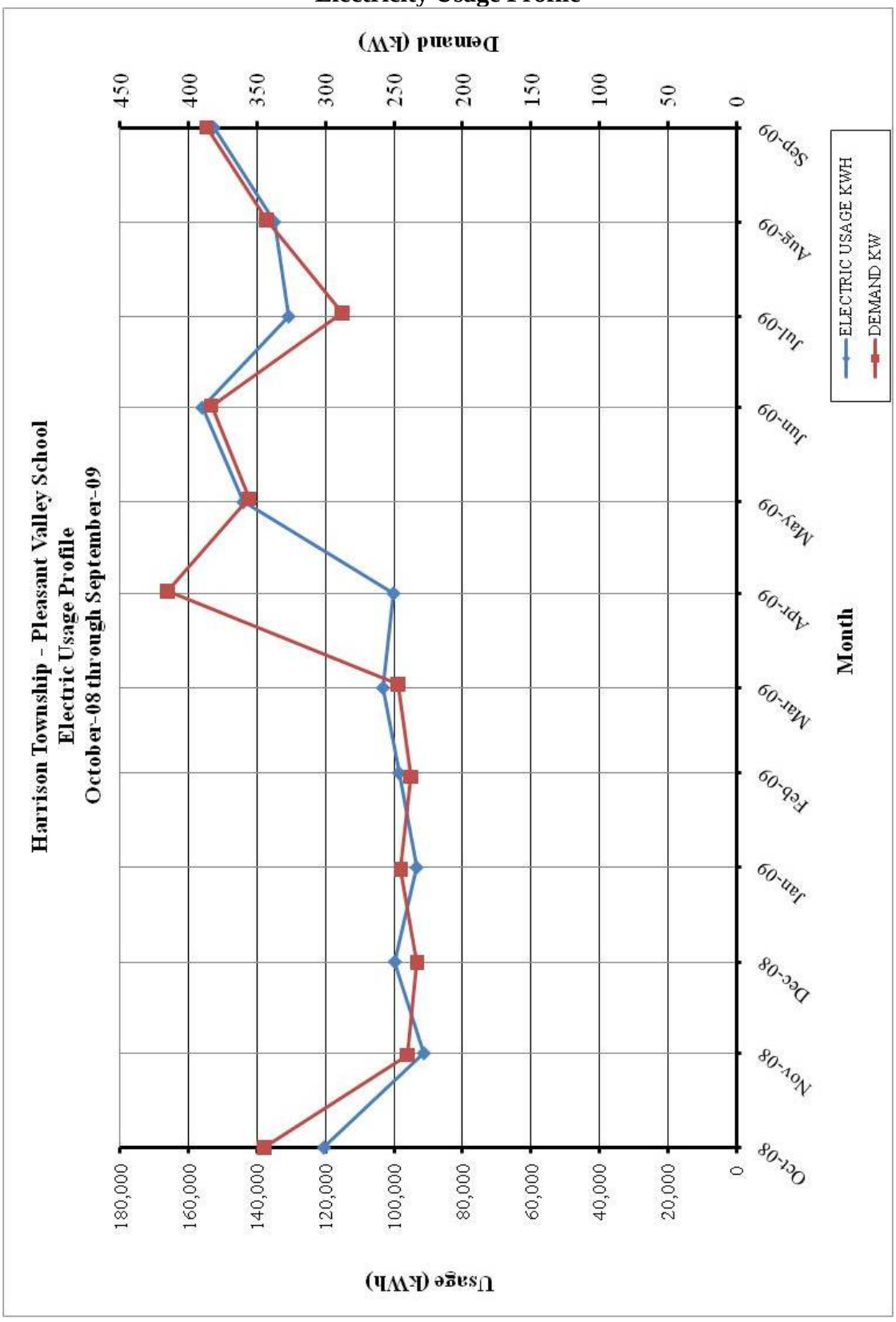
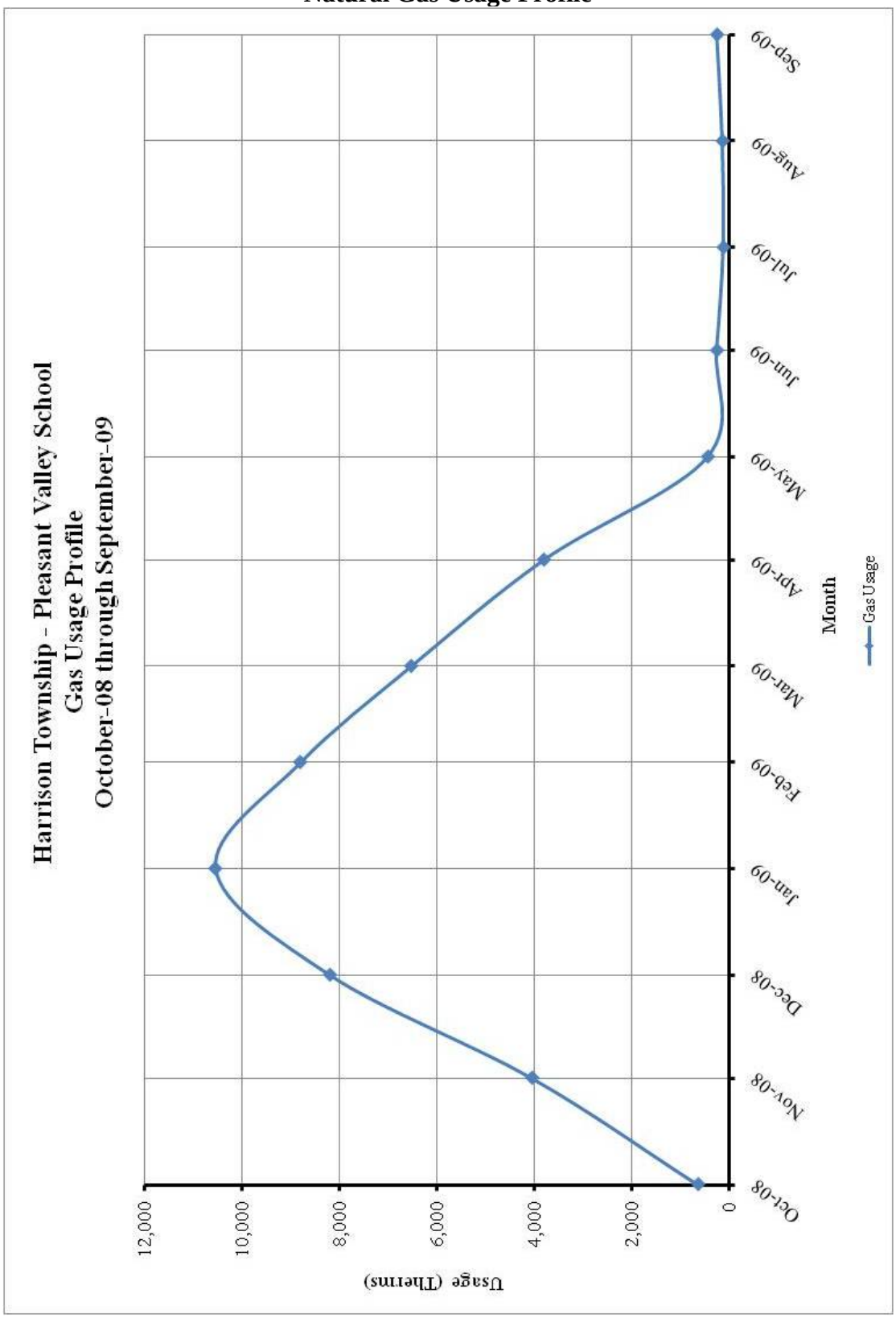


Table 4
Natural Gas Billing Data

NATURAL GAS USAGE SUMMARY		
Utility Provider:	South Jersey Gas	
Rate:	BGSS	
Meter No:	405867	
Point of Delivery ID:	21533309106	
Third Party Utility Provider:	Pepco	
TPS Meter No:	21533309106	
MONTH OF USE	**CONSUMPTION (THERMS)**	**TOTAL BILL**
Oct-08	642.32	$1,032.01
Nov-08	4,045.44	$5,819.37
Dec-08	8,184.40	$12,463.05
Jan-09	10,535.70	$14,172.48
Feb-09	8,795.64	$15,460.20
Mar-09	6,522.24	$7,137.83
Apr-09	3,804.39	$9,059.04
May-09	444.45	$572.94
Jun-09	258.75	$285.78
Jul-09	123.84	$357.60
Aug-09	143.50	$211.81
Sep-09	256.00	$274.55
TOTALS	**43,756.67**	**$66,846.66**
AVERAGE RATE:	**$1.53**	**$/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:

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

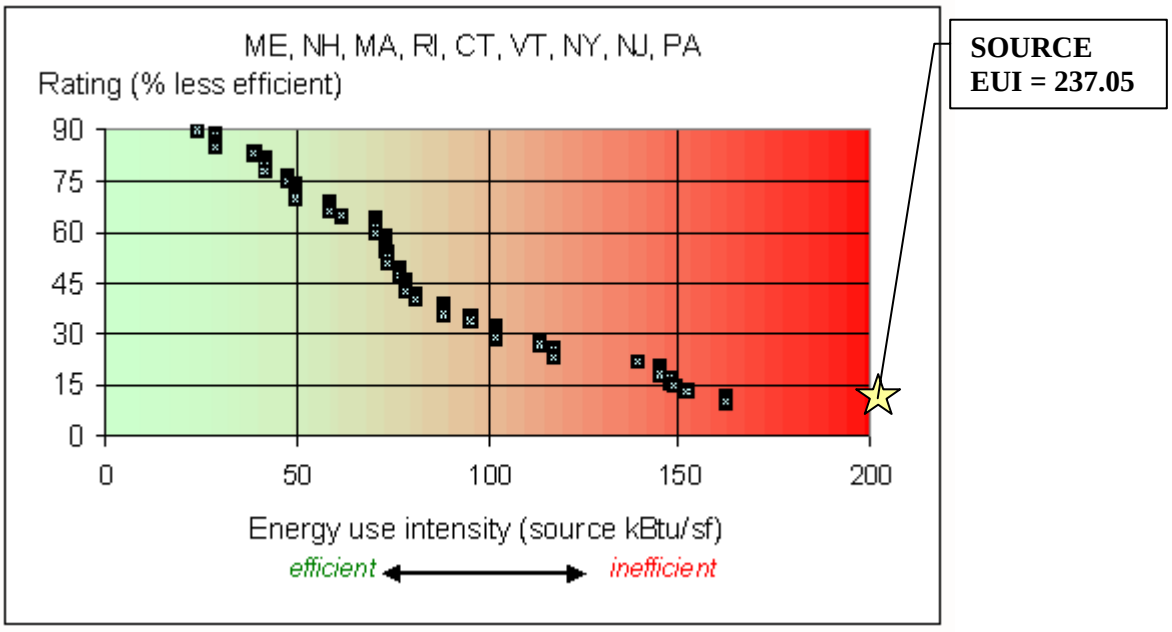
$$Building\ Source\ EUI = \frac{(Electric\ Usage\ in\ kBtu\ X\ SS\ Ratio + Gas\ Usage\ in\ kBtu\ X\ SS\ Ratio)}{Building\ Square\ Footage}$$

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	1,425,622.0	-	-	4,867,074	3.340	16,256,026
NATURAL GAS	-	43,756.7	-	4,375,667	1.047	4,581,323
TOTAL				9,242,741		20,837,349
*Site - Source Ratio data is provided by the Energy Star Performance Rating Methodology for Incorporating Source Energy Use document issued Dec 2007.						
BUILDING AREA		87,901	SQUARE FEET			
BUILDING SITE EUI		*105.15*	kBtu/SF/YR			
BUILDING SOURCE EUI		*237.05*	kBtu/SF/YR			

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

Figure 3
Source Energy Use Intensity Distributions: Elementary School Buildings



C. EPA Energy Benchmarking System

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

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

In accordance with the Local Government Energy Audit Program, CEG has created an ENERGY STAR account for the school district 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: harrisontwpboe
Password: lgeaceg2009

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

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**
Harrison Twp. BOE Pleasant Valley E.S.	13	50

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

V. FACILITY DESCRIPTION

The 87,901 square foot Pleasant Valley Elementary School Building is a one story facility comprised of classrooms, gym, restrooms, office, library, Art, Music, Cafetorium, Kitchen, storage and a second floor mechanical room. The typical hours of operation for this facility are between 7:00 am and 7:00 pm. Students attend from 7:50 am to 2:25 pm Monday through Friday. Exterior walls are block with brick construction with 1-1/2" rigid insulation typical of the time period. Some of the exterior wall is EFIS with 2" insulation. 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, low-E (#2 surface) tempered with aluminum frames. Blinds are utilized through the facility per occupant comfort. The blinds are valuable because they help to reduce heat loss in the winter and reduce solar heat in the summer. The majority of the roof is asphalt shingle on 30# roof felt on 5/8" exterior grade plywood sheathing on 4" vented rigid insulation on metal roof deck on metal roof trusses. A small portion of the roof is constructed of an EPDM roof. The building was built in 2000 with class room additions in 2004. The 2004 addition is similar in construction.

HVAC Systems

The building is heated by two (2) De Dietrich model GTE516A boilers in a primary/spare configuration. The boilers each have 3,998 MBH natural gas input, are 83.7% efficient. They are ten (10) years old, are in good condition and have twenty-five (25) years of ASHRAE expected useful service life remaining. Each boiler has a Power Flame model C3-G-25 natural gas burner. The burners are ten (10) years old, are in good condition and have eleven (11) years of ASHRAE expected useful service life remaining. The heating hot water is circulated throughout the building by two (2) PACO model LF-3012 3"x4"x12" constant volume pumps in a primary/spare configuration. The 25 hp pumps are rated at 364 GPM (450 future GPM) at 138 feet of head. The pumps are (10) years old, are in good condition and have ten (10) years of ASHRAE expected useful service life remaining.

The building is cooled by a McQuay liquid chiller model WSC063MA having 250 nominal tons cooling. It is ten (10) years old, is in good condition and has thirteen (13) years of ASHRAE expected useful service life remaining. The chilled water is circulated throughout the building by two (2) PACO model LF-4012 4"x5"x12" constant volume pumps in a primary/spare configuration. The 50 hp pumps are rated at 670 GPM (900 future GPM) at 143 feet of head. The pumps are (10) years old, are in good condition and have ten (10) years of ASHRAE expected useful service life remaining.

Chiller condenser water is cooled by an IMECO cooling tower model IMC-812-245-1-20 having one (1) cell and a 20 hp fan motor. It is ten (10) years old, is in fair condition and has ten (10) years of ASHRAE expected useful service life remaining. The condenser water is circulated between the cooling tower and chiller by two (2) PACO model LF-4012 4"x5"x12" constant volume pumps in a primary/spare configuration. The 20 hp pumps are rated at 750 GPM at 78 feet of head. The pumps are (10) years old, are in good condition and have ten (10) years of ASHRAE expected useful service life remaining.

The Administration area (AHU-1) and Music room (AHU-2 and 3) are conditioned by constant volume rooftop units made by McQuay, model RDS708B. The packaged rooftop unit includes a hot water coil, chilled water coil, supply fan, return fan and economizer with power relief. These units have hot water and chilled water freeze protection pumps. AHU-1 has 9.0 nominal tons cooling capacity and 90 MBH heating capacity. AHU-2 has 15.9 nominal tons cooling capacity and 299.1 MBH heating capacity. AHU-3 has 9.5 nominal tons cooling capacity and 112.2 MBH heating capacity. The units were specified with BACNET guide controls by Alerton Advanced Power Controls, outside air and exhaust air side discharge, 16" minimum roof curb with slope for roof pitch, pipe vestibule and three-way valve. These units are ten (10) years old, are in good to fair condition and have five (5) years of ASHRAE expected useful service life remaining. Conditioned air is distributed by these units through ductwork to ceiling diffusers. AHU-1 returns air from the conditioned space through a ceiling return plenum and then ducted to the air handling unit. AHU-2 and AHU-3 have ducted returns.

The Gym area (AHU-4 and AHU-4A) are conditioned by constant volume indoor units made by McQuay, model CAH010FDAC. The unit includes a hot water coil, chilled water coil, supply fan, return fan and economizer with power relief. These units have chilled water freeze protection pumps. There are no hot water freeze protection pumps on these units. AHU-4 and AHU-4A have each 17.3 nominal tons cooling capacity and 176.9 MBH heating capacity. The units were specified with BACNET guide controls by Alerton Advanced Power Controls, outside air and exhaust air top discharge, condensate drain pan overflow switch and three-way valve. These units are ten (10) years old, are in good to fair condition and have five (5) years of ASHRAE expected useful service life remaining. Conditioned air is distributed by these units through ductwork to diffusers. Air from the conditioned space is returned through duct work to the air handling units.

The Library area (AHU-5) is conditioned by one (1) constant volume indoor unit located in the ceiling space. The unit is made by McQuay, model CAH012FDAC. The unit includes a hot water coil, chilled water coil, supply fan, return fan and economizer with power relief. This unit has a chilled water freeze protection pump. There is no hot water freeze protection pump on this unit. AHU-5 has 10.6 nominal tons cooling capacity and 118.4 MBH heating capacity. The unit was specified with BACNET guide controls by Alerton Advanced Power Controls, outside air and exhaust air top discharge, condensate drain pan overflow switch and three-way valve. The unit is ten (10) years old, is in good to fair condition and has five (5) years of ASHRAE expected useful service life remaining. Conditioned air is distributed by this unit through ductwork to diffusers. AHU-5 returns air from the conditioned space through a ceiling return plenum and then ducted to the air handling unit.

The Cafetorium area (AHU-6) is conditioned by one (1) constant volume indoor unit located in the ceiling space. The unit is made by McQuay, model CAH017FDAC. The unit includes a hot water coil, chilled water coil, supply fan, return fan and economizer with power relief. This unit has a chilled water freeze protection pump. There is no hot water freeze protection pump on this unit. AHU-6 has 38 nominal tons cooling capacity and 441.2 MBH heating capacity. The unit was specified with BACNET guide controls by Alerton Advanced Power Controls, outside air and exhaust air top discharge, condensate drain pan overflow switch and three-way valve. The unit is ten (10) years old, is in good to fair condition and has five (5) years of ASHRAE expected

useful service life remaining. Conditioned air is distributed by this unit through ductwork to diffusers. Air from the conditioned space is returned through duct work to the air handling unit.

The Kitchen area (AHU-7) is conditioned by one (1) constant volume indoor units located in the ceiling space. The unit is made by McQuay, models CAH008FDAC. The unit includes a hot water coil, chilled water coil, supply fan, return fan and economizer with power relief. This unit has a chilled water freeze protection pump. There is no hot water freeze protection pump on this unit. AHU-7 has 4.42 nominal tons cooling capacity and 91.1 MBH heating capacity. The unit was specified with BACNET guide controls by Alerton Advanced Power Controls, outside air and exhaust air top discharge, condensate drain pan overflow switch and three-way valve. These units are ten (10) years old, are in good to fair condition and have five (5) years of ASHRAE expected useful service life remaining. Conditioned air is distributed by these units through ductwork to diffusers. Air from the conditioned space is returned through duct work to the air handling units.

The Kitchen Hood make up air is provided by (AHU-8) one (1) constant volume, 100% outside air, indoor unit located in the ceiling space. The unit is made by Ares/Mars, model HC1. The unit includes a supply fan and hot water coil with 43.5 MBH heating capacity. There is no hot water freeze protection pump on this unit. The unit was specified with BACNET guide controls by Alerton Advanced Power Controls, outside air and end discharge and three-way valve. This unit is ten (10) years old, is in good to fair condition and has five (5) years of ASHRAE expected useful service life remaining. Conditioned air is distributed by this unit through ductwork to the kitchen hood.

The Technology Operations room is conditioned by a fan coil unit and a cooling only ductless split system made by Fujitsu, model ASU18RLQ indoor and model AOU18RLQ outdoor unit. The unit runs 24/7 to cool the Pleasant Valley Elementary School servers. The unit is three (3) years old, is in good condition and has twelve (12) years of ASHRAE expected useful service life remaining.

Entrance doorways are heated by hydronic cabinet heaters with 22.8 MBH heating capacity. Various rooms throughout the school are conditioned with fan coil units ranging from 12.4 MBH to 23.9 MBH cooling capacity and 8.6 to 33.1 MBH heating capacity. Classrooms are conditioned by unit ventilators ranging from 24 to 60 MBH cooling capacity and 20 to 44 MBH heating capacity. These units have fractional horsepower fan motors. With exception to the 2004 classroom addition , the units are ten (10) years old, are in good to fair condition and have five (5) years of ASHRAE expected useful service life remaining. The units in the 2004 addition are six years old, are in good condition and have nine (9) years of ASHRAE expected useful service life remaining.

Exhaust System

Air is exhausted from classrooms, toilet rooms, mechanical room, electric room, storage rooms, sprinkler room, Art room and the Nurse's Suite through the roof exhausters. The Subsoil vent system is a non-mechanical, below slab vent for radon evacuation and is vented up through the roof. The fan motors are fractional horsepower. The fans are ten (10) years old, are in good condition and have ten (10) years of ASHRAE expected useful service life remaining.

The oven hood is served by EF-7 and the fryer hood by EF-8. Both fans have a 1-1/2 hp motor and are scheduled at 4000 cfm at 1.0 external static pressure and they are interlocked with AHU-8. The fans are ten (10) years old, are in good condition and have ten (10) years of ASHRAE expected useful service life remaining.

HVAC System Controls

The HVAC systems within the facility are monitored and controlled via an Alerton DDC system. The building is indexed to occupied mode as scheduled during the hours of occupancy. The typical occupied set points are 70°F heating, 72°F cooling. During hours of non-occupancy, the building is indexed to unoccupied mode. The typical unoccupied setback and setup set points are 55°F heating and 85°F cooling.

The boilers operate during heating season. The chiller and cooling tower operate during the cooling season. The air handling units, unit ventilating units and fan coil units run continuously during both occupied and unoccupied mode. All pumps are constant volume and run continuously during both occupied and unoccupied mode. The kitchen hood and AHU-8 are operated 5 hours a day for the 180 day school year and is manually switched on and off.

The air handling units, unit ventilating units and fan coil units provide outside air at approximately 10% of supply air flow. It is believed that the outside air is provided continuously and that the outside air dampers are not closed during unoccupied mode. Exhaust fans are not controlled and are allowed to run continuously in both occupied and unoccupied mode. The outside air pressurizes the building and exhaust relieves building pressure to provide an acceptable pressure balance during occupied mode. This currently is allowed during unoccupied mode, is not necessary and is a contributor to wasting energy. A great deal of energy can be conserved if the unit supply fans are turned off, outside air dampers are closed and exhaust fans are turned off during unoccupied mode.

The AHU units are constant air volume units with cooling, heating and economizer modes of operation. These units have motorized relief, outdoor air and mixing dampers. A remote wall mounted thermostat is in the zone served by the unit it is controlling. Units serving more than one room will only have on thermostat.

The AHU units have three-way valves that control the water flow through the heating and chilled water coils. The AHU freeze stat controls the in-line freeze pump that are scheduled as 1/3 hp Bell & Gossett model HD3 rated at 30.5 GPM at 15 feet of head. The freeze pumps are operated from a normally open solenoid valve that is powered closed. On sensing hot water coil discharge temperature of 40°F, the solenoid valve will open and the freeze protection pump is energized.

Unit ventilators and fan coils are on a four pipe system. A remote wall mounted thermostat/temperature sensor controls a normally open, two-way solenoid valve that is powered closed.

Cabinet unit heaters and convector/finned tube radiation have an integral thermostat. They are in a two pipe hot water system and are primarily controlled by a normally open, two-way valve.

Unit heaters have an integral thermostat and are in a two pipe hot water system. They have a venture flow meter and balancing valve with P/T ports for constant hot water flow.

Domestic Hot Water

Domestic hot water for the building is provided by a 200 gallon A.O. Smith model BTP 200-1500 natural gas hot water heater, input capacity of 1,500 MBH and having a 1455 GPH recovery at 100°F. The domestic hot water is circulated throughout the building by a fractional horsepower circulation pump. The circulation pump is controlled by an aqua stat. The domestic hot water piping insulation appeared to be in good condition. The water heater is ten (10) years old, is in fair condition and has two (2) years of expected useful service life remaining.

The domestic hot water for the Kitchen dish wash is provided by a 75 gallon Bradford White model D75T3003NA natural gas hot water heater, input capacity of 300 MBH and having a 290.9 GPH recovery at 100°F. The water heater is four (4) years old, is in good condition and has eight (8) years of expected useful service life remaining. This unit replaced the original 140 gallon A.O. Smith model BTP 140-720 natural gas hot water heater, input capacity of 720 MBH and having a 135 GPH recovery at 100°F. The smaller replacement heater appears to be of adequate capacity because there have been no complaints from the staff in regard to ever running out of hot water.

Lighting

Typical lighting throughout the building is fluorescent tube recessed, surface or pendent fixtures with T-8 and T-5 HO lamps and electronic ballasts. The building exterior is lit with metal halide and high pressure sodium lamps.

VI. MAJOR EQUIPMENT LIST

The equipment list contains major energy consuming equipment that through implementation of energy conservation measures could yield substantial energy savings. The list shows the major equipment in the facility and all pertinent information utilized in energy savings calculations. An approximate age was assigned to the equipment in some cases if a manufactures date was not shown on the equipment's nameplate. The ASHRAE service life for the equipment along with the remaining useful life is also shown in the Appendix.

Refer to the **Major Equipment List Appendix** for this facility.

VII. ENERGY CONSERVATION MEASURES

ECM #1: Demand Control Ventilation

Description:

The library, multi-purpose room, music room and other large areas are conditioned by large air handling units (AHUs) with outside are dampers for ventilation. The air handling units are running on a set schedule for the school's hours of operation. During the school day the outside air quantity is constant since the existing AHUs are constant volume units. The outside air quantity is set to provide enough outside air for the full occupancy of the space. Many times during the day these areas have occupancies which are less than maximum occupancy. The result of over ventilation is increased energy use and difficulty in providing humidity control.

Demand control ventilation provides control of the outside air quantity introduced into a space. The implementation of this control would reduce the outside air heated and cooled by the AHU and as a result, reduce the heating and cooling load on the central plants. Demand control ventilation regulates outside air based on the actual occupancy of the space. CO2 sensors provide accurate control of the rate of outside air needed at any given time. This control is beneficial for spaces which have been unoccupied for long periods prior to an event, or for spaces which are only occupied for short periods. The system would respond to CO2 levels rather than a set schedule.

The efficiency of a water cooled chiller is approximately 0.567 KW/Ton. The ancillary pumping energy, cooling tower and air handling unit fan energy is approximately 0.33 KW/Ton.

Energy Savings Calculations

This ECM includes installation of CO2 sensors installed in the return ductwork of each AHU serving the library, multi-purpose room, music room and other large areas. CO2 sensors would be installed directly in the space for each room.

Savings resulting from the implementation of this ECM for Demand Control Ventilation is estimated to be 10% of the total energy cost for the facility.

The cost of a full DCV system with new field devices, controllers, computer, software, programming, etc. is approximately $2.10 per SF in accordance with recent Contractor pricing for systems of this magnitude. Savings from the implementation of this ECM will be from the reduced energy consumption currently used by the HVAC system by proper control of schedule and temperatures via the DDC system.

Cost of complete DCV System = ($2.10/SF x 87,901 SF x 26.9%) = $49,655

Heating Season Heating Degree Days base 65°F = 4,930 HDD65
Average Cost of Gas = $1.53 / Therm

Cooling Season Full Load Cooling Hrs. = 1,238 hrs / yr
Average Cost of Electricity = $0.134 / kWh

Air handlers are cooling and heating certain areas of the building, therefore an adjustment factor for air handler cooled/heated area is necessary. The percentage of total area being conditioned by the air handlers is approximately 26.9%.

Note: Degree Days referenced from www.degreedays.net (using temperature data from www.wunderground.com) Weather Data for Glassboro, NJ, Station: Glassboro, Glassboro, NJ, US, Station ID: KNJGLASS5.

Energy Savings Calculations:

10% Savings on Heating Calculations

$$Est\ Heat\ Cons. = Total\ Therm\ Usage\ of\ Building - Baseline\ Domestic\ Hot\ Water\ Usage$$

$$Est\ Heat\ Cons. = 43{,}756.67\ Therms - 8{,}040.22\ Therms = 35{,}716.45\ Therms$$

$$Adjusted\ Heating\ Area\ for\ Air = Heat\ Consumptio\ n \times Area\ Adjustment\ Factor$$

$$Adjusted\ Heating\ Area\ for\ Air = 35{,}716.45\ Therms \times 26.9\% = 9{,}607.7\ Therms$$

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

$$Savings. = 9{,}607.7\ (Therms) \times 10\% \times 1.53\left(\frac{\$}{Therm}\right) = \underline{\$1{,}470}$$

10% Savings on Cooling Calculations**:**

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

$$Est\ Cool\ Cons. = \frac{122\ (Tons) \times 12{,}000\left(\frac{Btu}{Ton\ Hr}\right) \times 1{,}238\ Hrs.}{13.3\left(\frac{Btu}{Wh}\right) \times 1000\left(\frac{Wh}{kWh}\right)} = 136{,}273(kWh)$$

$$Adjusted\ Cooling\ Area\ for\ Air = Cooling\ Consumptio\ n \times Area\ Adjustment\ Factor$$

$$Adjusted\ Cooling\ Area\ for\ Air = 136{,}273 \times 26.6\% = 36{,}248.6\,kWh$$

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

$$Savings. = 36{,}248.6\,(kWh) \times 10\% \times 0.134\left(\frac{\$}{kWh}\right) = \underline{\$486}$$

Total Annual Energy Savings = $1,470 + $486= $1,956 per year

Energy Savings Summary:

ECM #1 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$49,655
NJ Smart Start Equipment Incentive ($):	$0
Net Installation Cost ($):	$49,655
Maintenance Savings ($/Yr):	$0
Energy Savings ($/Yr):	$1,956
Total Yearly Savings ($/Yr):	$1,956
Estimated ECM Lifetime (Yr):	15
Simple Payback	25.4
Simple Lifetime ROI	-40.9%
Simple Lifetime Maintenance Savings	$0
Simple Lifetime Savings	$29,340
Internal Rate of Return (IRR)	-6%
Net Present Value (NPV)	($26,304.40)

ECM #2: Condensing Boiler Installation

Description:

The existing cast iron sectional boilers are used as the sole source of hot water heating for the Pleasant Valley School's HVAC equipment. There are two (2) De Dietrich model GTE 516A boilers installed as primary/spare. The primary boiler can be replaced with a condensing boiler. With the increased efficiency of the condensing boiler, the savings becomes substantial.

New condensing boiler could substantially improve the operating efficiency of the heating system of the building. Condensing boiler's peak efficiency tops out at 99% depending on return water temperature. Due to the operating conditions of the building, the annual average operating efficiency of the proposed condensing boiler is expected to be 88%. This is a 5% increase in efficiency over the existing boiler which is estimated to operate at 83% efficiency. This ECM is based on variable supply water temperature adjusted based on outdoor temperature.

This ECM includes installation of one (1) condensing gas fired boiler to replace the one cast iron gas fired boiler. The basis for this ECM is Aerco Benchmark Series condensing boiler; model number BMK-2.0LN-1. The boiler installation is based on a 50% replacement based on capacity of the existing boiler. This would provide a total of 150% of required capacity. The new boiler will be the primary boiler and the existing cast iron

Energy Savings Calculations:

$$Bldg\ Heat\ \mathrm{Re}quired = Existing\ Natural\ Gas\ (Therm) \times Heating\ Eff.(\%) \times Fuel\ HeatValue\left(\frac{BTU}{Therm}\right)$$

$$\mathrm{Pr}oposed\ Heating\ Gas\ Usage = \frac{Bldg\ Heat\ \mathrm{Re}quired\ (BTU)}{Heating\ Eff.(\%) \times Fuel\ Heat\ Value\left(\frac{BTU}{Therm}\right)}$$

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

Natural Gas Equipment List - Estimated Annual Usage per unit

Concord Engineering Group

Harrison Township Pleasant Valley

Manufacturer	Qty.	Model #	Serial #	Input (MBh)	% of Total Input	Estimated Annual Therms
De Dietrich	**1**	**GTE 516A**	**0142528/1**	**3,998**	**38.02%**	**16,635.52**
De Dietrich	**1**	**GTE 516A**	**0142528/2**	**3,998**	**38.02%**	**16,635.52**
A.O. Smith	1	BTP 140-720	not confirmed	720	6.85%	2,995.89
A.O. Smith	1	BTP 200-1500	SE00-84079Y3, NB84079	1,500	14.26%	6,241.44
Bradford White	1	D75T3003NA	DB8766254, NB75350	300	2.85%	1,248.29
			Total Input MBH	**10,516**	**1.00**	**43,756.67**
			Total Input Therms	105.2		
		Total Gas Consumption Therms / yr.		43756.67		

CONDENSING BOILER CALCULATIONS			
ECM INPUTS	**EXISTING**	**PROPOSED**	**SAVINGS**
ECM INPUTS	Existing Cast Iron Gas Boiler	Gas Fired Condensing Boiler	-
Gas Heat Usage For Existing Boilers (Therms)	33,271	33,271	-
Heat Usage (kBtu)	2,761,496	2,761,496	-
Efficiency (%)	83%	88%	5%
Natural Gas Cost ($/Therm)	1.53	1.53	-
ENERGY SAVINGS CALCULATIONS			
ECM RESULTS	**EXISTING**	**PROPOSED**	**SAVINGS**
Gas Consumed (Therms)	33,271	31,381	1,890
Energy Cost ($)	$50,905	$48,012	$2,892
COMMENTS:			

Installation cost Aerco Benchmark Series condensing boiler (Basis: BMK-2.0LN-1 or equivalent) is $62,080 unit including material and labor.

From the **NJ Smart Start Appendix**, the installation of a condensing boiler warrants the following incentive:

Boiler with >1500 - ≤ 4000 MBH & 84% AFUE = $1.00 per MBH

$$\text{Smart Start®}\ Incentive = (Total\ MBH \times \$1/MBH) = (1{,}350 \times \$1) = \$1{,}350$$

Energy Savings Summary:

ECM #2 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$62,080
NJ Smart Start Equipment Incentive ($):	$2,000
Net Installation Cost ($):	$60,080
Maintenance Savings ($/Yr):	$0
Energy Savings ($/Yr):	$1,890
Total Yearly Savings ($/Yr):	$1,890
Estimated ECM Lifetime (Yr):	30
Simple Payback	31.8
Simple Lifetime ROI	-5.6%
Simple Lifetime Maintenance Savings	$0
Simple Lifetime Savings	$56,712
Internal Rate of Return (IRR)	0%
Net Present Value (NPV)	($23,027.33)

ECM #3: Condensing Domestic Water Heater

Description:

The original source for domestic hot water for the building is provided by one (1) A. O. Smith model BTP 200-1500 and one (1) Bradford White model D75T3003NA natural gas fired domestic hot water heaters. The efficiency of the gas hot water heaters are approximately 80% efficient. This efficiency is standard for most tank type hot water heaters.

Condensing hot water heaters provide substantially improved efficiency over standard hot water heaters (up to 97% thermal efficiency.) The thermal efficiency gain is a result of condensing the flue gases allowing for maximum extraction of heat from the combustion process.

This ECM includes installation of four (4) new central tank type condensing hot water heaters to replace the existing two (2) standard efficiency hot water heaters. The efficiency of the proposed hot water heater represents an increase of 15% for all hot water use in the building. This ECM will replace the Bradford White heater with one (1) AO Smith model number BTH 250 condensing hot water heater and replace the AO Smith 1500 MBH unit with two (2) AO Smith model BTH 400 and one (1) model BTH 300 condensing hot water heaters.

Energy Savings Calculations:

Natural Gas Equipment List - Estimated Annual Usage per unit

Concord Engineering Group

Harrison Township Pleasant Valley

Manufacturer	Qty.	Model #	Serial #	Input (MBh)	% of Total Input	Estimated Annual Therms
De Dietrich	1	GTE 516A	0142528/1	3,998	40.81%	17,858.22
De Dietrich	1	GTE 516A	0142528/2	3,998	40.81%	17,858.22
A.O. Smith	1	BTP 200-1500	SE00-84079Y3, NB84079	1,500	15.31%	**6,700.18**
Bradford White	1	D75T3003NA	DB8766254, NB75350	300	3.06%	**1,340.04**
			Total Input MBH	9,796	1.00	43,756.67
			Total Input Therms	98.0		
		Total Gas Consumption Therms / yr.		43756.67		

Estimated People: 677 People

$$Dom.HW\ Heat\ Consumption = 6700.18 + 1340.04 = 8040.22 Therms$$

$$Dom.\ HW\ Gas\ Usage = \frac{Dom\ HW\ Heat\ Cons.(Btu)}{Heating\ Eff.(\%) \times Fuel\ Heat\ Value\left(\frac{BTU}{Therm}\right)}$$

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

ECM #3 CONDENSING DOM. HWH CALCULATIONS			
ECM INPUTS	**EXISTING**	**PROPOSED**	**SAVINGS**
ECM INPUTS	Existing Nat Gas HWHs	New Condensing HWHs	-
Total Dom. Hot Water Nat. Gas Usage per Utility Bills (Therms)	8,040	67,707	-
Dom. HWH Efficiency (%)	80%	95%	15%
Gas Heat Value (BTU/Therm)	100,000	100,000	-
Dom. HW Heat Required (MMBTUs)	643.2	643.2	-
Gas Cost ($/Therm)	1.53	1.53	-
ENERGY SAVINGS CALCULATIONS			
ECM RESULTS	**EXISTING**	**PROPOSED**	**SAVINGS**
Proposed Central Dom. HW Natural Gas Usage (Therms)	8,040	6,771	1,270
Gas Energy Cost ($)	$12,302	$10,359	$1,942
COMMENTS:			

Installation cost of the four (4) AO Smith condensing hot water heaters including material and labor is $82,096 [basis of calculation (1) BTH 250A , (1) BTH 300A, (2) BTH 400A].

From the **NJ Smart Start Appendix**, the installation of a condensing hot water heater warrants the following incentive:

>50 gallons - <300 MBH, 85% AFUE = $2.00 per MBH but not less than $50/unit

Smart Start® $Incentive = (Total\ MBH \times \$2/MBH) = (1{,}350 \times \$2) = \$2{,}700$

Energy Savings Summary:

ECM #3 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$82,096
NJ Smart Start Equipment Incentive ($):	$2,700
Net Installation Cost ($):	$79,396
Maintenance Savings ($/Yr):	$0
Energy Savings ($/Yr):	$1,942
Total Yearly Savings ($/Yr):	$1,942
Estimated ECM Lifetime (Yr):	15
Simple Payback	40.9
Simple Lifetime ROI	-63.3%
Simple Lifetime Maintenance Savings	$0
Simple Lifetime Savings	$29,130
Internal Rate of Return (IRR)	-11%
Net Present Value (NPV)	($56,212.53)

ECM #4: Install Chiller and Pump VFD's

Description:

The chiller is a constant speed centrifugal chiller with inlet guide vanes controlling compressor capacity. The chiller does not currently have a variable frequency drive (VFD). The installation of a VFD on a centrifugal compressor motor with inlet guide vanes will significantly improve compressor part load performance and efficiency despite the small power penalty due to the VFD. The reduction in energy usage is measured in kW/Ton. The current loading at peak demand is considered a part load condition for the chiller and should realize a substantial savings with the implementation of a VFD on this chiller.

The chilled water and heating hot water pumps are utilizing a constant volume pumping design. The air handling units have 3-way control valves which allow continuous flow through the piping loop throughout the building. As a result the water loop pumps must provide full power output to circulate the water through all air handling units continuously.

The 2-way control valves provide flow through the unit ventilators only when there is a call for heating or cooling, unlike the 3-way control valves that allow constant flow of the water loop. The 3-way control valves require full pumping energy continuously while the 2-way control valves allow the system to reduce flow when it is not needed. This measure includes capping off the bypass port on the 3-way control valves which effectively turns the valves into "2-way" control valves. When the unit ventilator is not calling for heating, the control valve closes reducing overall flow of the system. Variable frequency drives allow the pumps to slow down in response to a reduction in overall system flow. The reduction in operating flow allows the pumps to reduce energy consumption for all hours that the heating system is not at its peak load.

This ECM includes the installation of Variable Frequency Drives on the one (1) chiller compressor, two (2) existing 25 hp hot water pumps and two (2) existing 50 hp chilled water pumps in conjunction with piping modifications at each unit ventilator to cap off the bypass port on the 3-way control valves and any miscellaneous chiller parts, sensors, reprogramming and start up. The compressor VFD would be controlled by the chiller. The pump VFD's would be controlled by a differential pressure sensor in the water loop to measure demand for water. The furthest unit ventilators from the loop pumps would remain as 3-way control valves (constant flow) to eliminate dead heading potential. This ECM also includes replacement of the existing pump motors with inverter duty motors that meet NEMA Premium Efficiency Standard, which also helps to reduce energy consumption.

Pumping energy and cost savings calculations are based on calculation software "PumpSave v4.2," provided by ABB. The PumpSave calculation software is used to estimate the pumping energy for variable speed pump systems. The chilled water loop pump operation is estimated to be 2,160 Hrs per year since this system is used for only 3 to 4 months total. The boiler water loop pump operation is estimated to be 4,380 Hrs per year since this system is used for an approximate total of 6 months. The pump flow, head pressure, and resultant energy are calculated based on the existing pump horse power installed.

Energy Savings Calculations:

Assumptions:

Total connected Cooling Capacity	= 234.4 Tons
Estimated Cooling Load (0.75 Diversity)	= 175.8 Tons
Existing Chiller Efficiency	= 0.567 kW/Ton, 21.2 EER
Chiller Part Load Efficiency with VFD	= 0.384 kW/Ton, 31.2 EER
Average Cost of Electricity	= $0.134/kWh
Average Annual Hours @ Full Load	= 2,160 Hours

$$EER = \frac{12{,}000\left(\frac{Btu}{Ton\ hr}\right)}{1000\left(\frac{Wh}{kWh}\right)\times ChillerPower\left(\frac{kW}{Ton}\right)}$$

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

$$Cons.\,Volume\ Power(HP) = \frac{Specific\ Gravity\times Flow\ Rate\left(\frac{Gal}{\min}\right)\times Head(Ft)}{3960\times Pump\ Efficiency(\%)\times Motor\ Efficiency(\%)}$$

$$Energy\ Cons.\ (kWh) = Power(HP)\times 0.746\left(\frac{KW}{HP}\right)\times Operation(Hrs.)$$

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

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

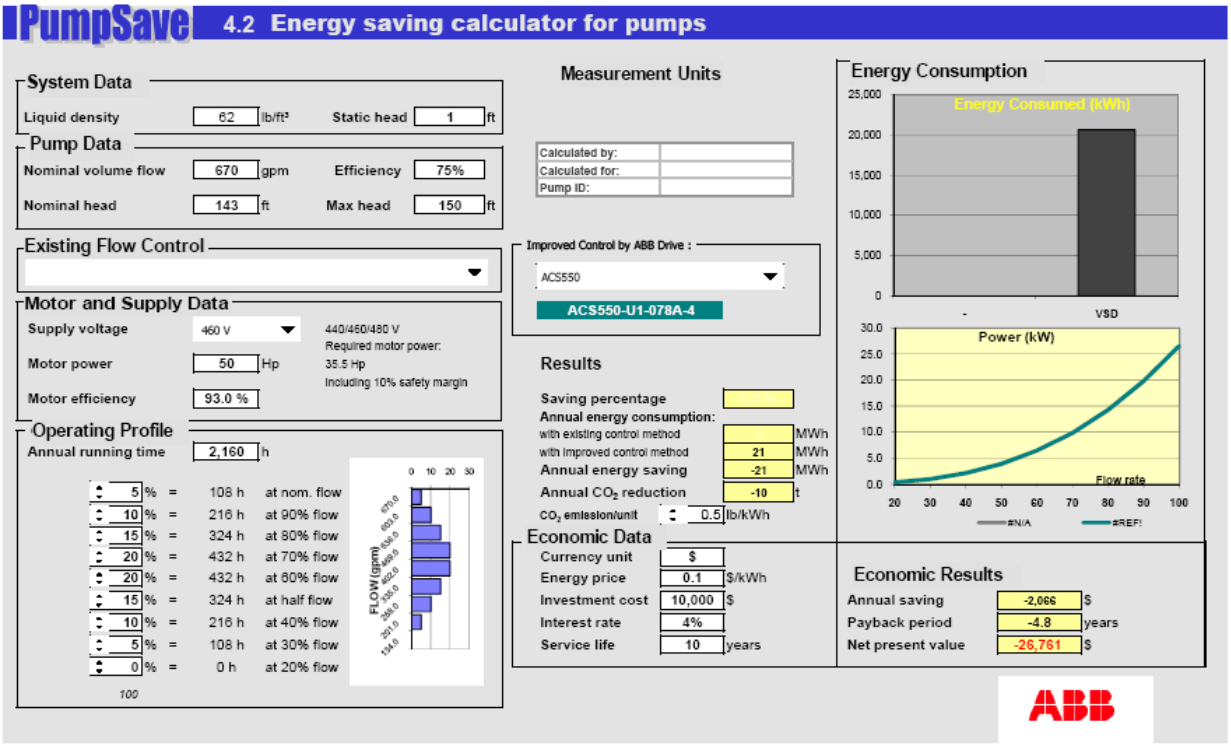
Chiller Compressor VFD Energy:

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

$$EnergySavings = \frac{175.8\,(Tons)\times 12{,}000\left(\frac{Btu}{Ton\ hr}\right)}{1000\left(\frac{Wh}{kWh}\right)}\times\left(\frac{1}{21.2\left(\frac{Btu}{W}\right)}-\frac{1}{31.25\left(\frac{Btu}{W}\right)}\right)\times 2{,}160\ hours$$

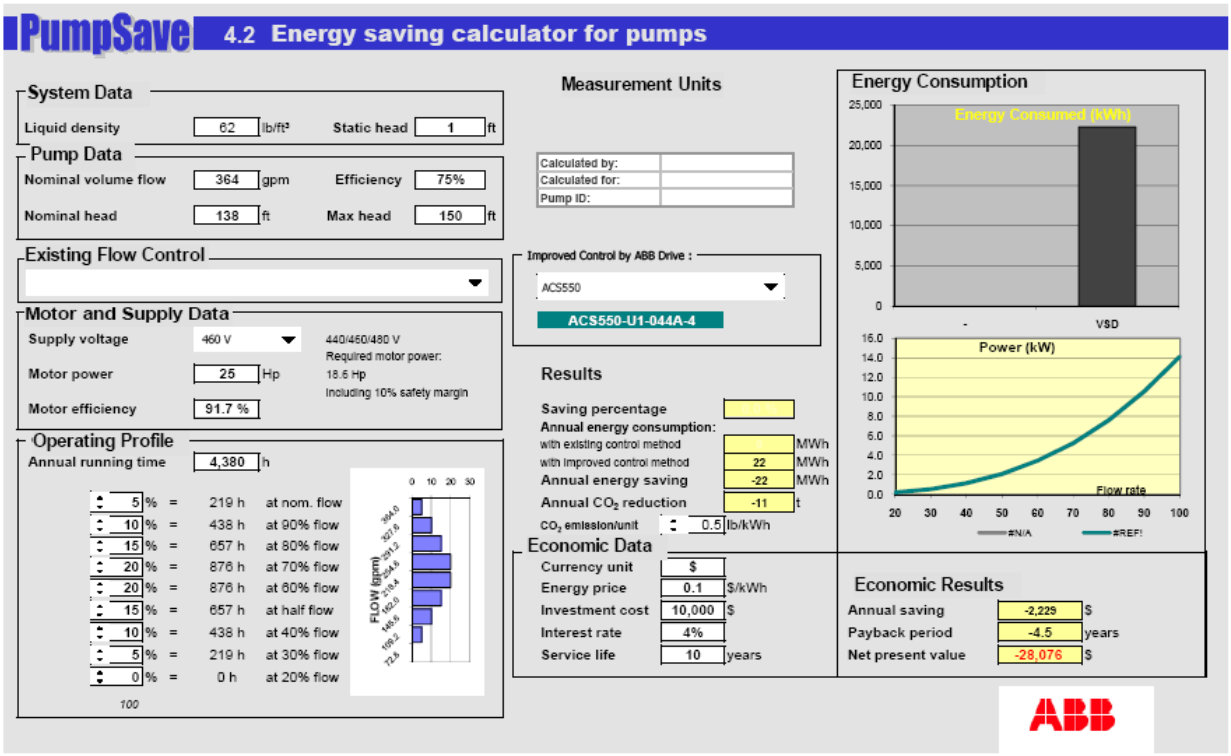
$$= \underline{69{,}125\ kWh}$$

Chilled Water VFD Pumping Energy:



CHILLED WATER PUMPS VFD CALULATION			
ECM INPUTS	**EXISTING**	**PROPOSED**	**SAVINGS**
ECM INPUTS	CV Pumps	VFD Pumps	
Flow Control	CV	VFD	
Flow (GPM)	670	670	
Head (Ft)	143	143	
Pump Efficiency (%)	75%	75%	
Motor Efficiency (%)	92%	95%	
Operating Hrs	2160	2160	
Elec Cost ($/kWh)	0.134	0.134	
ENERGY SAVINGS CALCULATIONS			
ECM RESULTS	**EXISTING**	**PROPOSED**	**SAVINGS**
Electric Energy (kWh)	56,501	21,500	35,001
Electric Energy Cost ($)	$7,571	$2,881	$4,690
COMMENTS:	VFD pump energy is based on ABB energy savings calculator for pumps, "Pump Save," version 4.2. Flow rate for VFD Pump calculation is summarized in the operating profile shown in the Pump Save output.		

Boiler Hot Water VFD Pumping Energy:



BOILER HOT WATER PUMP VFD CALULATION			
ECM INPUTS	**EXISTING**	**PROPOSED**	**SAVINGS**
ECM INPUTS	CV Pumps	VFD Pumps	
Flow Control	CV	VFD	
Flow (GPM)	364	364	
Head (Ft)	138	138	
Pump Efficiency (%)	75%	75%	
Motor Efficiency (%)	92%	94%	
Operating Hrs	4380	4380	
Elec Cost ($/kWh)	0.134	0.134	
ENERGY SAVINGS CALCULATIONS			
ECM RESULTS	**EXISTING**	**PROPOSED**	**SAVINGS**
Electric Energy (kWh)	60,265	21,500	38,765
Electric Energy Cost ($)	$8,076	$2,881	$5,195
COMMENTS:	VFD pump energy is based on ABB energy savings calculator for pumps, "Pump Save," version 4.2. Flow rate for VFD Pump calculation is summarized in the operating profile shown in the Pump Save output.		

Installation cost for four (4) VFDs, four (4) NEMA efficient motors, piping work, re-balancing, capping of 3-way valves and controls is estimated to be $51,814. The installed cost for the chiller compressor VFD and start up is $55,000. The ECM total Installation cost is $106,814.

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

$$ChillerDemand\ Savings = \frac{69{,}125\ (kWh)}{2{,}160\ Hrs.} = \underline{32.0\ kW}$$

$$PumpCHWDemand\ Savings = \frac{35{,}001\ (kWh)}{2{,}160\ Hrs.} = \underline{16.2\ kW}$$

$$PumpHWDemand\ Savings = \frac{35{,}001\ (kWh)}{4{,}380\ Hrs.} = \underline{8.85\ kW}$$

Total Annual Energy Cost Savings = (69,125 kWh+35,001 kWh+38,765 kWh) x $0.134/kWh
Total Annual Energy Cost Savings = $19,147 per year

From the **NJ Smart Start® Program Incentives Appendix**, the following incentives are warranted:

There is no incentive for installation of a VFD on an existing chiller.

Installation of a chilled water pump Variable Frequency Drives:
For 20+ HP = $60 per VFD rated hp
Smart Start Savings = (# hp x $60/hp) = (100hp x $60/hp) = $6,000

Premium Efficient Motor:
50 hp TEFC, 1800 rpm, NEMA Premium Efficient 94.5% or greater = $220 / motor
Smart Start Savings = 2 motors x $220 = $440.

The ECM Net Installation cost is:
$106,814 - $6000 - $440 = $100,374.

Energy Savings Summary:

ENERGY CONSERVATION MEASURES (ECM's)					
ECM NO.	**DESCRIPTION**	**NET INSTALLATION COST[A]**	**ANNUAL SAVINGS[B]**	**SIMPLE PAYBACK (Yrs)**	**SIMPLE LIFETIME ROI**
ECM #1	Demand Control Ventilation on Large Air Handling Units	$49,655	$1,956	25.4	-40.9%
ECM #2	Condensing Boiler Installation	$60,080	$1,890	31.8	-5.6%
ECM #3	Condensing Domestic Hot Water Heater	$79,396	$1,942	40.9	-63.3%
ECM #4	Chiller & Pump VFD	$100,374	$19,147	5.2	243.4%
ECM #5	Reprogram Unoccupied Mode	$246,123	$47,242	5.2	187.9%
RENEWABLE ENERGY MEASURES (REM's)					
ECM NO.	**DESCRIPTION**	**NET INSTALLATION COST**	**ANNUAL SAVINGS**	**SIMPLE PAYBACK (Yrs)**	**SIMPLE LIFETIME ROI**
REM #1	Solar PV 244.95 KW System	$2,204,550	$142,657	15.5	61.8%

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

ECM #5: Reprogram Unoccupied Mode – Pleasant Valley Elementary School

Description:

The current HVAC systems within the Pleasant Valley Elementary School does not control unoccupied mode properly. The typical occupied set points are 70°F heating, 72°F cooling. During hours of non-occupancy, the building is indexed to unoccupied mode. The typical unoccupied setback and setup set points are 55°F heating and 85°F cooling. The following should occur when indexed to unoccupied:

1. Air handling units, unit ventilating units and fan coil units should de-energize and cycle on demand for cooling or heating.
2. All outside air dampers should close and remain closed until indexed to occupied and open only after set points have been satisfied.
3. All exhaust fans (excluding kitchen hood and boiler room combustion supply air fan) should be de-energized and associated dampers closed.

These actions are not being provided. The air handling, unit ventilating, fan coil unit and exhaust fans run continuously. Outside air dampers and exhaust fan dampers are not closed. During unoccupied hours, outside air for ventilation is not required. The only fans required to operate are the combustion air supply fan at each boiler room. All other fans can be turned off. A list of exhaust fans can be located in **APPENDIX D-2**.

The air handling units, unit ventilating units and fan coil units provide outside air at approximately 33,070 CFM as scheduled. A great deal of energy can be conserved if the unit supply fans are turned off, outside air dampers are closed and exhaust fans are turned off during unoccupied mode.

There is an Alerton Direct Digital Control (DDC) system serving the Pleasant Valley Elementary School. During initial discussions with the Owner it was noted that the hours of operation of the facility are generally 60 hours per week. Therefore, controlling the exhaust fans and turning them off during unoccupied hours will provide the Owner with an energy saving opportunity.

This ECM includes adding control points for the exhaust fans and wiring them into the DDC system. Reprogramming the DDC system's Unoccupied Mode and all necessary material and labor including programming and instructing the school maintenance staff. The installation cost is approximately $2/square foot.

Cost of DDC Reprogramming = ($2/ square foot x 1.4 overhead and profit x 87,901 square feet) = $246,123

Heating Season Heating Degree Days base 60°F = 3,969 HDD60
Average Cost of Gas = $1.53 / Therm
Average Cost of Electricity = $0.134 / kWh

Note: Degree Days referenced from www.degreedays.net (using temperature data from www.wunderground.com) Weather Data for Mullica Hill, NJ, Station: APRSWXNET Mullica Hill NJ US, Mullica Hill, NJ, US, Station ID: MC0566.

Energy Savings Calculations:

There would be an insignificant savings in the cooling season because the ambient temperature is approximately the same as the unoccupied set up temperature and is therefore assumed to be zero.

The electricity savings from turning off the fans is calculated in APPENDIX D-2 as 24.8 kW with 127,412 kWh per year saved. This equates to an annual cost savings of $17,073 for just for turning off the fans.

The heat load from infiltration due to the exhaust fans is calculated as:

$$Heat\ Load = \frac{FANcfm \times 1.085 \times (SpaceSetUp\ Temp \times W\ \text{int}\ erDesignTe\ mp)}{1000\left(\frac{Btu}{kBtu}\right)}$$

$$Heat\ Load = \frac{33{,}070 \times 1.085 \times (55 \times 10)}{1000\left(\frac{Btu}{kBtu}\right)} = \underline{1{,}614.6\ \text{kBTU/hr}}$$

The estimated unoccupied infiltration heat load due to the exhaust fans is calculated as:

$$Est\ UnoccInfiltratHeat\ Cons. = \frac{Heat\ Load\left(\frac{kBtu}{Hr}\right) \times Heat\ Deg\ Days \times 24\ Hrs \times CorrectionFactor}{DesignTemp\ Difference(^{\circ}F) \times Efficiency(\%) \times Fuel\ Heat\ Value\left(\frac{kBtu}{Therm}\right)}$$

$$Est\ UnoccInfiltratHeat\ Cons. = \frac{1{,}614.6\left(\frac{kBtu}{Hr}\right) \times 3{,}969\ (HDD) \times 24\ Hrs \times 0.75 \times (5640 hrsunocc / 8760 total)}{45\ (^{\circ}F) \times 83.7\% \times 100\left(\frac{kBtu}{Therm}\right)}$$

$$Est\ UnoccInfiltratHeat\ Cons. = \underline{19{,}718.2\text{Therms}}$$

$$Savings. = Est\ UnoccInfiltratHeat\ Cons \times Ave\ Gas\ Cost\left(\frac{\$}{Therm}\right)$$

$$Savings. = 19{,}718.2\ (Therms) \times 1.53\left(\frac{\$}{Therm}\right) = \underline{\$30{,}169}$$

Total Annual Energy Savings = $17,073 + $30,169 = $\underline{47,242}$ per year

Incentives for the installation of the exhaust fan controls are not currently available and maintenance savings could not be adequately calculated because information was not available to baseline the savings.

Energy Savings Summary:

ECM #5 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$246,123
NJ Smart Start Equipment Incentive ($):	$0
Net Installation Cost ($):	$246,123
Maintenance Savings ($/Yr):	$0
Energy Savings ($/Yr):	$47,242
Total Yearly Savings ($/Yr):	$47,242
Estimated ECM Lifetime (Yr):	15
Simple Payback	5.2
Simple Lifetime ROI	187.9%
Simple Lifetime Maintenance Savings	$0
Simple Lifetime Savings	$708,630
Internal Rate of Return (IRR)	17%
Net Present Value (NPV)	$317,848.93

VIII. RENEWABLE/DISTRIBUTED ENERGY MEASURES

Globally, renewable energy has become a priority affecting international and domestic energy policy. The State of New Jersey has taken a proactive approach, and has recently adopted in its Energy Master Plan a goal of 30% renewable energy by 2020. To help reach this goal New Jersey created the Office of Clean Energy under the direction of the Board of Public Utilities and instituted a Renewable Energy Incentive Program to provide additional funding to private and public entities for installing qualified renewable technologies. A renewable energy source can greatly reduce a building's operating expenses while producing clean environmentally friendly energy. CEG has assessed the feasibility of installing renewable energy measures (REM) for the school district utilizing renewable technologies and concluded that there is potential for solar energy generation. The solar photovoltaic system calculation summary will be concluded as **REM#1** within this report.

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

CEG has reviewed the existing roof area of the building being audited for the purposes of determining a potential for a roof mounted photovoltaic system. A roof area of 17,375 S.F. can be utilized for a PV system. A depiction of the area utilized is shown in **Renewable / Distributed Energy Measures Calculation Appendix**. Using this square footage it was determined that a system size of 244.95 kilowatts could be installed. A system of this size has an estimated kilowatt hour production of 294,746 KWh annually, reducing the overall utility bill by approximately 20.7% percent. A detailed financial analysis can be found in the **Renewable / Distributed Energy Measures Calculation Appendix**. This analysis illustrates the payback of the system over a 25 year period. The eventual degradation of the solar panels and the price of accumulated SREC's are factored into the payback.

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

The array system capacity was sized on available roof space on the existing facility. Estimated solar array generation was then calculated based on the National Renewable Energy Laboratory

PVWatts Version 1.0 Calculator. In order to calculate the array generation an appropriate location with solar data on file must be selected. In addition the system DC rated kilowatt (kW) capacity must be inputted, a DC to AC de-rate factor, panel tilt angle, and array azimuth angle. The DC to AC de-rate factor is based on the panel nameplate DC rating, inverter and transformer efficiencies (95%), mismatch factor (98%), diodes and connections (100%), dc and ac wiring(98%, 99%), soiling, (95%), system availability (95%), shading (if applicable), and age(new/100%). The overall DC to AC de-rate factor has been calculated at an overall rating of 81%. The PVWatts Calculator program then calculates estimated system generation based on average monthly solar irradiance and user provided inputs. The monthly energy generation and offset electric costs from the PVWatts calculator is shown in the **Renewable/Distributed Energy Measures Calculation Appendix**.

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

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

Table 7
Financial Summary – Photovoltaic System

FINANCIAL SUMMARY - PHOTOVOLTAIC SYSTEM			
PAYMENT TYPE	**SIMPLE PAYBACK**	**SIMPLE ROI**	**INTERNAL RATE OF RETURN**
Direct Purchase	15.45 Years	6.5%	4.6%

*The solar energy measure is shown for reference in the executive summary Renewable Energy Measure (REM) table

Given the large amount of capital required by the Pleasant Valley School to invest in a solar system through a Direct Purchase CEG does not recommend the Pleasant Valley School pursue this route. It would be more advantageous for the Pleasant Valley School to solicit Power Purchase Agreement (PPA) Providers who will own, operate, and maintain the system for a

period of 15 years. During this time the PPA Provider would sell all of the electric generated by Solar Arrays to the Pleasant Valley School at a reduced rate compared to their existing electric rate.

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

IX. ENERGY PURCHASING AND PROCUREMENT STRATEGY

Load Profile:

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

Electricity:

The Electric Usage Profile demonstrates a fairly typical load profile for a school. The profile shows a very steady baseline usage throughout the school season with an increase in electrical usage in the early and late summer. The mid summer months show a decrease in usage due to lower occupancies, however it is important to note that the usage does not drop below the baseline usage throughout the school year. The reduction in operating hours in the summer months, account for a reduction in usage and demand measured in the month of July and August. June and September shows the largest usage of the year as expected. Unlike Harrison Elementary School, this facility's usage remains low in August; however May's usage shows very high consumption where Harrison Elementary School's usage remains fairly steady in May. This increase is likely due to the fact that Pleasant Valley's HVAC system has an independent heating and cooling distribution system (4-pipe) where heating and cooling can be used simultaneously. Harrison Elementary School utilizes a 2-pipe system where heating must be shut down before cooling can be operational. This creates a clear separation between heating and cooling seasons and therefore delays the start of the cooling season at Harrison Elementary saving on cooling energy. The demand has a fairly steady profile throughout the school months mimicking the usage profile based on cooling loads throughout the building. The majority of the building has some form of air conditioning which attribute to higher energy costs compared to heated only schools. The overall load factor (L.F.) of the building is 39%. Load factor is the total usage divided by the demand times the hours. A load factor of 39% means that the equivalent full load electrical draw accounts for 39% of the total time. Load factor is a measurement of a building's unpredictability with respect to electric use. A high load factor means the building's electric use is steadier and therefore more advantageous for energy suppliers. In general terms, a higher load factor of 50% or more along with a flat load profile will allow for more competitive energy prices when shopping for alternative suppliers.

Natural Gas:

The natural gas usage profile demonstrates a very typical heat load profile. The summer months demonstrate very low consumption May through September. There is an increase in consumption November through April. Heat is provided for this facility by natural gas-fired boilers. Gas fired domestic hot water heaters also contribute to the gas consumption. A base-load shaping (flat

profile) will secure more competitive energy prices when procuring through an alternative energy source.

Tariff Analysis:

Electricity:

This facility receives electric service through Atlantic City Electric on their Annual General Service (AGS-Secondary) rate. This service classification is available for general service purposes on secondary voltages. This facility's rate is a three phase service at secondary voltages. For electric supply (generation), the customer has the option to purchase energy through the utility's Generation Charge or a Third Party Supplier (TPS). This facility utilizes the generation service provide through Atlantic City Electric (BGS), Therefore, they will pay according to the default service. The Delivery Service includes the following charges: Customer Charge, Distribution Charge (kW Demand), Reactive Demand Charge (kvar Demand, over 1/3 kW), Distribution Charge kWh, Non-utility Generation Charge, Societal benefits Charge kWh, Regulatory Assets Recovery Charge kWh, Transition Bond Charge kWh, Market Transition Charge Tax kWh, System Control Charge kWh, CIEP Standby Fee kWh, Transmission Demand Charge kW, Reliability Must Run Transmission Surcharge kWh, Transmission Enhancement Charge kWh, Basic Generation Service Charge kWh, Regional Greenhouse Gas Initiative Recovery Charge kWh, Infrastructure Investment Surcharge.

The Demand charges are based on a ratchet demand rate of 80% of the highest demand set in the months of June through September. The usage charges are based on a stepped rate structure. The demand charges are approximately equal to usage charges on a typical basis making this rate structure somewhat dependent on demand for the delivery portion of the electric charges. The steps for the usage charges are very small increments of change which result in fairly steady costs per kWh per month. It was noted that after a switch to a third party supplier in April / May of 2009, the rate paid for electricity by the BOE dropped by approximately 2%.

Natural Gas:

This facility receives natural gas service through South Jersey Gas Company on its General Service Gas rate. This is a firm delivery service (higher level of delivery) for general purposes where 1) customer does not qualify for any other rate schedule. Customers may either purchase gas supply from a Third Party (TPS) or from Public Services Basic Gas Supply Service default service as detailed in the rate schedule. This service has a much higher priority of delivery, based on the pipeline capacity. The "firm" service is the highest priority, and does not get interrupted.

This rate schedule has a Delivery Charge Mechanism which includes: Basic Gas Supply Service Charge, Capital Investment Recovery Charge, Transportation Initiation Charge, Societal Benefits Charge, Temperature Adjustment Charge, Balancing Service Charge, Economic Development Rate Charge, Conservation Incentive Program Charge, and Energy Efficiency Tracker Charge. The customer can elect to have the Supply Charge (Commodity Charge) serviced through the utility or by a Third Party Supplier (TPS). Note: If the facility should choose to utilize a third party supplier (TPS) and the TPS not deliver, the customer may receive service from South

Jersey Gas under Emergency Sales Service. Emergency Sales Service carries an extremely high penalty cost of service. Should the TPS un-deliver to the utility on behalf of the client, the utility will automatically supply this default service to the client.

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

Recommendations:

CEG recommends a global approach that will be consistent with all facilities within the BOE. Based on the latest electric utility bill, the average price per kWh (kilowatt hour) for the building based on 1-year historical average price is $.105/kWh (this is the average third party supply charges if the client intends to shop for energy). The average price per decatherm for natural gas based on 1-year historical average price is $ 10.69 / dth (this is the third party supply charges for comparison if the client intends to shop for energy, dth is the common unit of measure). Energy commodities are among the most volatile of all commodities, however at this point and time, energy is fairly competitive. The prices currently paid for electric and natural gas appear to be average or slightly low compared to the average reported prices from the Energy Information Administration website (EIA) for the past few months. The average retail price for electricity in 2008 was $.1444/kWh (this is the overall retail price). The average third party supply price for natural gas in Dec-09 through Feb-10 was $10.70/ dth (this is the commodity costs only). It is recommended that the BOE continue to utilize third party suppliers as an avenue for reducing overall energy prices and continue to shop for the most competitive prices available.

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

X. INSTALLATION FUNDING OPTIONS

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

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

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

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

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

Total incentive is capped at 50% of the project cost. The program savings is broken down into three benchmarks; Energy Reduction Plan, Project Implementation, and Measurement and Verification. Each step provides additional incentives as the energy reduction project continues. The benchmark incentives are as follows:

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

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

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

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

XI. ADDITIONAL RECOMMENDATIONS

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

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

B. Maintain all weather stripping on windows and doors.

C. Clean all light fixtures to maximize light output.

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

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

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

XII. ENERGY AUDIT ASSUMPTIONS

The assumptions utilized in this energy audit include but are not limited to following:

A. Cost Estimates noted within this report are based on industry accepted costing data such as RS Means™ Cost Data, contractor pricing and engineering estimates. All cost estimates for this level of auditing are +/- 20%. Prevailing wage rates for the specified region has been utilized to calculate installation costs. The cost estimates indicated within this audit should be utilized by the owner for prioritizing further project development post the energy audit. Project development would include investment grade auditing and detailed engineering.
B. Energy savings noted within this audit are calculated utilizing industry standard procedures and accepted engineering assumptions. For this level of auditing, energy savings are not guaranteed.
C. Information gathering for each facility is strongly based on interviews with operations personnel. Information dependent on verbal feedback is used for calculation assumptions including but not limited to the following:
    a. operating hours
    b. equipment type
    c. control strategies
    d. scheduling
D. Information contained within the major equipment list is based on the existing owner documentation where available (drawings, O&M manuals, etc.). If existing owner documentation is not available, catalog information is utilized to populate the required information.
E. Equipment incentives and energy credits are based on current pricing and status of rebate programs. Rebate availability is dependent on the individual program funding and applicability.
F. Equipment (HVAC, Plumbing, Electrical, & Lighting) noted within an ECM recommendation is strictly noted as a **basis for calculation** of energy savings. The owner should use this equipment information as a benchmark when pursuing further investment grade project development and detailed engineering for specific energy conservation measures.

Utility bill annual averages are utilized for calculation of all energy costs unless otherwise noted. Accuracy of the utility energy usage and costs are based on the information provided. Utility information including usage and costs is estimated where incomplete data is provided.

ECM COST & SAVINGS BREAKDOWN

CONCORD ENGINEERING GROUP

Harrison Township - Pleasant Valley Elementary 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	Demand Control Ventilation on Large Air Handling Units	$15,700	$33,955	$0	$49,655	$1,956	$0	$1,956	15	$29,340	$0	-40.9%	25.4	-5.96%	($26,304.40)
ECM #2	Condensing Boiler Installation	$35,800	$26,280	$2,000	$60,080	$1,890	$0	$1,890	30	$56,712	$0	-5.6%	31.8	-0.37%	($23,027.33)
ECM #3	Condensing Domestic Hot Water Heater	$60,816	$21,280	$2,700	$79,396	$1,942	$0	$1,942	15	$29,130	$0	-63.3%	40.9	-10.53%	($56,212.53)
ECM #4	Chiller & Pump VFD	$54,747	$52,067	$6,440	$100,374	$19,147	$0	$19,147	18	$344,653	$0	243.4%	5.2	18.12%	$162,969.93
ECM #5	Reprogram Unoccupied Mode	$70,321	$175,802	$0	$246,123	$47,242	$0	$47,242	15	$708,630	$0	187.9%	5.2	17.48%	$317,848.93
REM RENEWABLE ENERGY AND FINANCIAL COSTS AND SAVINGS SUMMARY															
REM #1	Solar PV 244.95 KW System	$2,204,550	$0	$0	$2,204,550	$39,496	$103,161	$142,657	25	$3,566,425	$2,579,025	61.8%	15.5	4.10%	$279,557.41

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

Concord Engineering Group, Inc.

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

SmartStart Building Incentives

The NJ SmartStart Buildings Program offers financial incentives on a wide variety of building system equipment. The incentives were developed to help offset the initial cost of energy-efficient equipment. The following tables show the current available incentives as of February, 2010:

Electric Chillers

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

Energy Efficiency must comply with ASHRAE 90.1-2004

Gas Cooling

Gas Absorption Chillers	$185 - $400 per ton
Gas Engine-Driven Chillers	Calculated through custom measure path)

Desiccant Systems

$1.00 per cfm – gas or electric

Electric Unitary HVAC

Unitary AC and Split Systems	$73 - $93 per ton
Air-to-Air Heat Pumps	$73 - $92 per ton
Water-Source Heat Pumps	$81 per ton
Packaged Terminal AC & HP	$65 per ton
Central DX AC Systems	$40- $72 per ton
Dual Enthalpy Economizer Controls	$250
Occupancy Controlled Thermostat (Hospitality & Institutional Facility)	$75 per thermostat

Energy Efficiency must comply with ASHRAE 90.1-2004

Ground Source Heat Pumps

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

Energy Efficiency must comply with ASHRAE 90.1-2004

Gas Heating

Gas Fired Boilers < 300 MBH	$300 per unit
Gas Fired Boilers ≥ 300 - 1500 MBH	$1.75 per MBH
Gas Fired Boilers ≥1500 - ≤ 4000 MBH	$1.00 per MBH
Gas Fired Boilers > 4000 MBH	(Calculated through Custom Measure Path)
Gas Furnaces	$300 - $400 per unit, AFUE ≥ 92%

Variable Frequency Drives

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

Natural Gas Water Heating

Gas Water Heaters ≤ 50 gallons	$50 per unit
Gas-Fired Water Heaters > 50 gallons	$1.00 - $2.00 per MBH
Gas-Fired Booster Water Heaters	$17 - $35 per MBH
Gas Fired Tankless Water Heaters	$300 per unit

Prescriptive Lighting

Retro fit of T12 to T-5 or T-8 Lamps w/Electronic Ballast in Existing Facilities	$15 per fixture (1-4 lamps)
Replacement of T12 with new T-5 or T-8 Lamps w/Electronic Ballast in Existing Facilities	$25 per fixture (1-2 lamps) $30 per fixture (3-4 lamps)
Replacement of incandescent with screw-in PAR 38 or PAR 30 (CFL) bulb	$7 per bulb
T-8 reduced Wattage (28w/25w 4', 1-4 lamps) Lamp & ballast replacement	$10 per fixture
Hard-Wired Compact Fluorescent	$25 - $30 per fixture
Metal Halide w/Pulse Start	$25 per fixture
LED Exit Signs	$10 - $20 per fixture
T-5 and T-8 High Bay Fixtures	$16 - $284 per fixture
HID ≥ 100w Retrofit with induction lamp, power coupler and generator (must be 30% less watts/fixture than HID system)	$50 per fixture
HID ≥ 100w Replacement with new HID ≥ 100w	$70 per fixture
LED Refrigerator/Freezer case lighting replacement of fluorescent in medium and low temperature display case	$42 per 5 foot $65 per 6 foot

Lighting Controls – Occupancy Sensors

Wall Mounted	$20 per control
Remote Mounted	$35 per control
Daylight Dimmers	$25 per fixture
Occupancy Controlled hi-low Fluorescent Controls	$25 per fixture controlled

Lighting Controls – HID or Fluorescent Hi-Bay Controls

Occupancy hi-low	$75 per fixture controlled
Daylight Dimming	$75 per fixture controlled
Daylight Dimming - office	$50 per fixture controlled

Premium Motors

Three-Phase Motors	$45 - $700 per motor
Fractional HP Motors Electronic Communicated Motors (replacing shaded pole motors in refrigerator/freezer cases)	$40 per electronic communicated motor

Other Equipment Incentives

Performance Lighting	$1.00 per watt per SF below program incentive threshold, currently 5% more energy efficient than ASHRAE 90.1-2004 for New Construction and Complete Renovation
Custom Electric and Gas Equipment Incentives	not prescriptive
Custom Measures	$0.16 KWh and $1.60/Therm of 1st year savings, or a buy down to a 1 year payback on estimated savings. Minimum required savings of 75,000 KWh or 1,500 Therms and a IRR of at least 10%.
Multi Measures Bonus	15%

STATEMENT OF ENERGY PERFORMANCE
Pleasant Valley Elementary School

Building ID: 2312370
For 12-month Period Ending: September 30, 2009[1]
Date SEP becomes ineligible: N/A

Date SEP Generated: May 17, 2010

Facility
Pleasant Valley Elementary School
401 Cedar Road
Mullica Hill, NJ 08062

Facility Owner
Harrison Township School District
120 North Main Street
Mullica Hill, NJ 08062

Primary Contact for this Facility
Robert Scharlé
120 North Main Street
Mullica Hill, NJ 08062

Year Built: 2001
Gross Floor Area (ft²): 87,901

Energy Performance Rating[2] (1-100) 13

Site Energy Use Summary[3]	
Electricity - Grid Purchase(kBtu)	4,864,222
Natural Gas (kBtu)[4]	4,375,667
Total Energy (kBtu)	9,239,889

Energy Intensity[5]	
Site (kBtu/ft²/yr)	105
Source (kBtu/ft²/yr)	237

Emissions (based on site energy use)	
Greenhouse Gas Emissions ($MtCO_2e$/year)	974

Electric Distribution Utility
Pepco - Atlantic City Electric Co

National Average Comparison	
National Average Site EUI	73
National Average Source EUI	164
% Difference from National Average Source EUI	45%
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.

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

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**

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	Pleasant Valley Elementary 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	401 Cedar Road, Mullica Hill, NJ 08062	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		☐
Pleasant Valley (K-12 School)				
CRITERION	**VALUE AS ENTERED IN PORTFOLIO MANAGER**	**VERIFICATION QUESTIONS**	**NOTES**	☑
Gross Floor Area	71,533 Sq. Ft.	Does this square footage include all supporting functions such as kitchens and break rooms used by staff, storage areas, administrative areas, elevators, stairwells, atria, vent shafts, etc. Also note that existing atriums should only include the base floor area that it occupies. Interstitial (plenum) space between floors should not be included in the total. Finally gross floor area is not the same as leasable space. Leasable space is a subset of gross floor area.		☐
Open Weekends?	No	Is this building normally open at all on the weekends? This includes activities beyond the work conducted by maintenance, cleaning, and security personnel. Weekend activity could include any time when the space is used for classes, performances or other school or community activities. If the building is open on the weekend as part of the standard schedule during one or more seasons, the building should select ?yes? for open weekends. The ?yes? response should apply whether the building is open for one or both of the weekend days.		☐
Number of PCs	215	Is this the number of personal computers in the K12 School?		☐
Number of walk-in refrigeration/freezer units	2	Is this the total number of commercial walk-in type freezers and coolers? These units are typically found in storage and receiving areas.		☐
Presence of cooking facilities	Yes	Does this school have a dedicated space in which food is prepared and served to students? If the school has space in which food for students is only kept warm and/or served to students, or has only a galley that is used by teachers and staff then the answer is "no".		☐
Percent Cooled	100 %	Is this the percentage of the total floor space within the facility that is served by mechanical cooling equipment?		☐
Percent Heated	90 %	Is this the percentage of the total floor space within the facility that is served by mechanical heating equipment?		☐
Months	10(Optional)	Is this school in operation for at least 8 months of the year?		☐

High School?	No	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'.		☐

Pleasant Valley 2004 Addition (K-12 School)

CRITERION	VALUE AS ENTERED IN PORTFOLIO MANAGER	VERIFICATION QUESTIONS	NOTES	☑
Gross Floor Area	16,368 Sq. Ft.	Does this square footage include all supporting functions such as kitchens and break rooms used by staff, storage areas, administrative areas, elevators, stairwells, atria, vent shafts, etc. Also note that existing atriums should only include the base floor area that it occupies. Interstitial (plenum) space between floors should not be included in the total. Finally gross floor area is not the same as leasable space. Leasable space is a subset of gross floor area.		☐
Open Weekends?	No	Is this building normally open at all on the weekends? This includes activities beyond the work conducted by maintenance, cleaning, and security personnel. Weekend activity could include any time when the space is used for classes, performances or other school or community activities. If the building is open on the weekend as part of the standard schedule during one or more seasons, the building should select ?yes? for open weekends. The ?yes? response should apply whether the building is open for one or both of the weekend days.		☐
Number of PCs	79	Is this the number of personal computers in the K12 School?		☐
Number of walk-in refrigeration/freezer units	0	Is this the total number of commercial walk-in type freezers and coolers? These units are typically found in storage and receiving areas.		☐
Presence of cooking facilities	No	Does this school have a dedicated space in which food is prepared and served to students? If the school has space in which food for students is only kept warm and/or served to students, or has only a galley that is used by teachers and staff then the answer is "no".		☐
Percent Cooled	100 %	Is this the percentage of the total floor space within the facility that is served by mechanical cooling equipment?		☐
Percent Heated	100 %	Is this the percentage of the total floor space within the facility that is served by mechanical heating equipment?		☐
Months	10(Optional)	Is this school in operation for at least 8 months of the year?		☐
High School?	No	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: Pepco - Atlantic City Electric Co

Fuel Type: Electricity

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

Start Date	End Date	Energy Use (kWh (thousand Watt-hours))
09/01/2009	09/30/2009	152,705.00
08/01/2009	08/31/2009	135,009.00
07/01/2009	07/31/2009	130,763.00
06/01/2009	06/30/2009	155,929.00
05/01/2009	05/31/2009	143,992.00
04/01/2009	04/30/2009	100,187.00
03/01/2009	03/31/2009	103,265.00
02/01/2009	02/28/2009	98,619.00
01/01/2009	01/31/2009	93,486.00
12/01/2008	12/31/2008	99,833.00
11/01/2008	11/30/2008	91,353.00
10/01/2008	10/31/2008	120,481.00
Pleasant Valley Electric Consumption (kWh (thousand Watt-hours))		**1,425,622.00**
Pleasant Valley Electric Consumption (kBtu (thousand Btu))		**4,864,222.26**
Total Electricity (Grid Purchase) Consumption (kBtu (thousand Btu))		**4,864,222.26**
Is this the total Electricity (Grid Purchase) consumption at this building including all Electricity meters?		☐

Fuel Type: Natural Gas

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

Start Date	End Date	Energy Use (therms)
09/01/2009	09/30/2009	256.00
08/01/2009	08/31/2009	143.50
07/01/2009	07/31/2009	123.84
06/01/2009	06/30/2009	258.75
05/01/2009	05/31/2009	444.45
04/01/2009	04/30/2009	3,804.39
03/01/2009	03/31/2009	6,522.24
02/01/2009	02/28/2009	8,795.64
01/01/2009	01/31/2009	10,535.70
12/01/2008	12/31/2008	8,184.40

11/01/2008	11/30/2008	4,045.44
10/01/2008	10/31/2008	642.32
Pleasant Valley Natural Gas Consumption (therms)		**43,756.67**
Pleasant Valley Natural Gas Consumption (kBtu (thousand Btu))		**4,375,667.00**
Total Natural Gas Consumption (kBtu (thousand Btu))		**4,375,667.00**
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
Pleasant Valley Elementary School
401 Cedar Road
Mullica Hill, NJ 08062

Facility Owner
Harrison Township School District
120 North Main Street
Mullica Hill, NJ 08062

Primary Contact for this Facility
Robert Scharlé
120 North Main Street
Mullica Hill, NJ 08062

General Information

Pleasant Valley Elementary School	
Gross Floor Area Excluding Parking: (ft^2)	87,901
Year Built	2001
For 12-month Evaluation Period Ending Date:	September 30, 2009

Facility Space Use Summary

Pleasant Valley		Pleasant Valley 2004 Addition	
Space Type	K-12 School	Space Type	K-12 School
Gross Floor Area(ft^2)	71,533	Gross Floor Area(ft^2)	16,368
Open Weekends?	No	Open Weekends?	No
Number of PCs	215	Number of PCs	79
Number of walk-in refrigeration/freezer units	2	Number of walk-in refrigeration/freezer units	0
Presence of cooking facilities	Yes	Presence of cooking facilities	No
Percent Cooled	100	Percent Cooled	100
Percent Heated	90	Percent Heated	100
Months[o]	10	Months[o]	10
High School?	No	High School?	No
School District[o]	Harrison Township School District	School District[o]	Harrison Township School District

Energy Performance Comparison

	Evaluation Periods		Comparisons		
Performance Metrics	**Current** (Ending Date 09/30/2009)	**Baseline** (Ending Date 09/30/2009)	**Rating of 75**	**Target**	**National Average**
Energy Performance Rating	13	13	75	N/A	50
Energy Intensity					
Site (kBtu/ft^2)	105	105	57	N/A	73
Source (kBtu/ft^2)	237	237	128	N/A	164
Energy Cost					
$/year	$ 258,352.66	$ 258,352.66	$ 139,572.37	N/A	$ 178,477.65
$/$ft^2$/year	$ 2.94	$ 2.94	$ 1.59	N/A	$ 2.03
Greenhouse Gas Emissions					
$MtCO_2e$/year	974	974	526	N/A	673
$kgCO_2e/ft^2$/year	11	11	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.

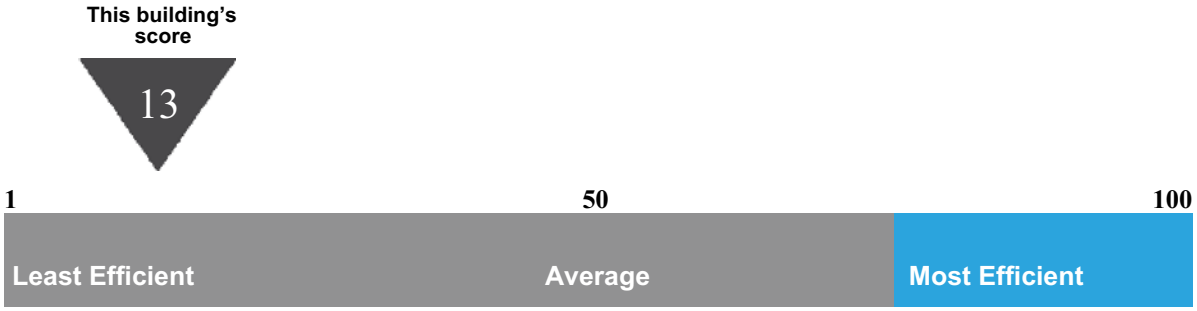
Statement of Energy Performance

2009

Pleasant Valley Elementary School
401 Cedar Road
Mullica Hill, NJ 08062

Portfolio Manager Building ID: 2312370

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 237 kBtu per square foot per year.*

*Based on source energy intensity for the 12 month period ending September 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: 05/17/2010

MAJOR EQUIPMENT LIST

Concord Engineering Group

Harrison Township - Pleasant Valley Elementary School

Liquid Chiller

Tag	Location	Area Served	Manufacturer	Qty.	Model #	Serial #	Nominal Tons	Service	EWT	LWT	GPM	Efficiency	Volt / Phase	Approx. Age	ASHRAE Service Life	Remaining Life	Notes
CH-1	Mechanical Room	HVAC system	McQuay International	1	WSC063MA / C2212CNYY2RA	STNU000500098 / NB39836	250	HVAC Cooling	55	45	600	0.567 KW/TON	480 / 3	2000	23	13	Style: E703402090, Refrigerant: 134A, Ctrl Pnl WSC063-DAAA

Boiler

Tag	Location	Area Served	Manufacturer	Qty.	Model #	Serial #	Orig. State No.	Input (MBh)	Output (MBh)	Efficiency (%)	Fuel	Approx. Age	ASHRAE Service Life	Remaining Life	Notes
B-1	Mechanical Room	HVAC system	De Dietrich	1	GTE 516A	0142528/1	2001-16592-H / NJ	3,998	3,348	83.7	Natural Gas	2000	35 Years	25 Years	SV Cap.: 9081537 BTU/Hr, MAWP: 82 PSIG, SV: 50 PSIG, Water Cap.: 193.13 Gallons
B-2	Mechanical Room	HVAC system	De Dietrich	1	GTE 516A	0142528/2	2001-16593-H / NJ	3,998	3,348	83.7	Natural Gas	2000	35 Years	25 Years	SV Cap.: 9081537 BTU/Hr, MAWP: 82 PSIG, SV: 50 PSIG, Water Cap.: 193.13 Gallons

Burner

Tag	Location	Area Served	Manufacturer	Qty.	Model #	Serial #	Input (MBh)	Efficiency (%)	Fuel	Approx. Age	ASHRAE Service Life	Remaining Life	Notes
HWH-2	Mechanical Room	Domestic Water	PowerFlame	1	CR2-G-15	10093009	2100	80	Natural Gas	2000	21	11	1/2 HP
B-1	Mechanical Room	B-1	PowerFlame	1	C3-G-25	30093797	3998	80	Natural Gas	2000	21	11	1-1/2 HP, 480/3/60, IRI
B-2	Mechanical Room	B-2	PowerFlame	1	C3-G-25	30093796	3998	80	Natural Gas	2000	21	11	1-1/2 HP, 480/3/60, IRI

Cooling Tower

Tag	Location	Area Served	Manufacturer	Qty.	Model #	Serial #	# of Cells	Flow (GPM)	Fan HP	Volts / Phase	Sump Heaters (kW)	Approx. Age	ASHRAE Service Life	Remaining Life	Notes
CT-1	ROOF ABV. Music Rm.	Chilled Water	IMECO	1	IMC-812-245-1-20	25780-1	1	750	20	480/3	12v, 20 AMP	5/12/2000	20 / 8.9	10	2 SPD MTR, SPRING VIB. ISOLATION, 250 TON CAPACITY

Pumps

Tag	Location	Area Served	Manufacturer	Qty.	Model #	Serial #	HP	RPM	GPM	Ft. Hd	Frame Size	Volts / Phase	Approx. Age	ASHRAE Service Life	Remaining Life	Notes
P-1, P-2	Mechanical Room	Cooling Water	PACO / Baldor Electric Co.	2	LF-4012, 4"x5"x12", S20631, 320831	00R4018901 A, B	20	1760	750	78	256T	230/460V / 3PH	2000	20	10	Imp. Dia. 9.3, Motor Cat. No.: M2515T, Spec.: 39D101X113H1, s/n 0000201
P-3, P-4	Mechanical Room	Chilled Water	PACO / Baldor Electric Co.	2	LF-4012, 4"x5"x12"	990830	50	1765	670 (900 Future)	143	326T	230/460V / 3PH	2000	20	10	Cat. No.: M2543T, Spec.: 40H005H951H1, s/n 0990830
P-5, P-6	Mechanical Room	Heating Water	PACO / Baldor Electric Co.	2	LF-3012, 3"x4"x12", MPE10329	73003	25	1760	364 (450 Future)	138	284T	230/460V / 3PH	2000	20	10	Imp dia 11.50, Cat. No.: M2531T, Spec.: 39L031W918H1, 91.7% motor Eff.
-	Kitchen	Domestic Water	Taco	1	1935	-	1/2	1760	35	30	-	115/60/1	2000	10	0	Replace as needed as maintenance project.

Domestic Water Heater

Tag	Location	Area Served	Manufacturer	Qty	Model #	Serial #	Input (MBh)	Recovery (gal/h) @ 100°F	Capacity (gal)	Efficiency (%)	Fuel	Approx. Age	ASHRAE Service Life	Remaining Life	Notes
HWH-2	Boiler Room	Domestic water	A.O. Smith	1	BTP 200-1500	SE00-84079Y3, NB84079	1,500	1455	200	80	Natural Gas	2000	12	2	NJ000030330H, Power Flame CR2-G-15
HWH-1	Kitchen	Dishwash	Bradford White	1	D75T3003NA	DB8766254, NB75350	300	290.9	75	80	Natural Gas	2006	12	8	SV Cap.: 2,625,000 BTU/Hr, MAWP: 150 PSIG, SV: 150 PSIG

Air Handling Units

Tag	Location	Area Served	Manufacturer	Qty	Model #	Serial #	Cooling Coil	Cooling (GPM)	Cooling Capacity (Tons)	Heating Type	Input (MBh)	HEATING (GPM)	Fuel	Volts / Phase	Approx. Age	ASHRAE Service Life	Remaining Life	Notes
AHU-1	Admin Roof	Admin Area	McQuay Internationa	1	RDS708BY	FB0U000400098 03	Chilled Water	21.4	9	HW	90	9	Electricity	460/3	10	15	5	
AHU-2	Music Room Roof	Art Room	McQuay Internationa	1	RDS708BY	FB0U000400099 03	Chilled Water	37.9	15.9	HW	299.1	30	Electricity	460/3	10	15	5	
AHU-3	Music Room Roof	Music Room	McQuay Internationa	1	RDS708BY	FB0U000400100 03	Chilled Water	22.8	9.5	HW	112.2	11.3	Electricity	460/3	10	15	5	
AHU-4	Below Roof of Gymnasium	Gymnasium	McQuay Internationa	1	CAH010FDAC	Did not confirm	Chilled Water	41.6	17.3	HW	176.9	17.9	Electricity	460/3	10	15	5	
AHU-4A	Below Roof of Gymnasium	Gymnasium	McQuay Internationa	1	CAH010FDAC	Did not confirm	Chilled Water	41.6	17.3	HW	176.9	17.9	Electricity	460/3	10	15	5	Type: Draw through, indoor, downflow/front and end. Found on PDFs M2.1 and M3.1. Never seen i
AHU-5	Below Roof of Library	Library	McQuay Internationa	1	CAH012FDAC	Did not confirm	Chilled Water	25.4	10.6	HW	118.4	11.8	Electricity	460/3	10	15	5	
AHU-6	Below Roof of Library	Library	McQuay Internationa	1	CAH017FDAC	Did not confirm	Chilled Water	92.1	38	HW	441.2	45.9	Electricity	460/3	10	15	5	Type: Draw through, indoor, downflow/front and end. Found on PDFs M2.1 and M3.1. Never seen i
AHU-7	Below Roof of Kitchen	Kitchen Area	McQuay Internationa	1	CAH008FDAC	Did not confirm	Chilled Water	10.6	4.42	HW	91.1	9.12	Electricity	460/3	10	15	5	Type: Draw through, indoor, downflow/front and end. Found on PDFs M2.1 and M3.1. Never seen i
AHU-8	Below Roof of Kitchen	Kitchen Area	Ares / Mars Air Products	1	HC1	Did not confirm	-	-	-	HW	43.5	43.5	Electricity	460/3	10	15	5	

Fans

Tag	Location	Area Served	Manufacturer	Qty.	Model #	Serial #	CFM	Fan HP	Fan RPM	Volts / Phase	Approx. Age	ASHRAE Service Life	Remaining Life	Notes
EF-7	Roof	Kitchen Hood	Greenheck	1	CUBE-180-15-G	00E06821	4000	1-1/2	1725	120/1/60	10	25	15	Interlocked with AHU-8
EF-8	Roof	Kitchen Hood	Greenheck	1	CUBE-180-15	00E06822	4000	1-1/2	1725	120/1/60	10	25	15	Interlocked with AHU-8

AC Condensers

Tag	Location	Area Served	Manufacturer	Qty.	Model #	Serial #	Cooling Capacity	Eff.	Refrigerant	Volts / Phase	Approx. Age	ASHRAE Service Life	Remaining Life	Notes
-	Outside adjacent to kitcher	Kitchen Freezer	OmniTemg	1	WA1-AC-H-2-0-2	ET00C09716, CT99G01110	2, 3	-	R404A	208/230V / 3PH	10	20	10	

Split Systems and AC Condensers

Tag	Location	Area Served	Manufacturer	Qty.	Model #	Serial #	Cooling (MBH)	EER	Refrigerant	Volts / Phase	Heating (MBH)	Approx. Age	ASHRAE Service Life	Remaining Life	Notes
-	Technollogy Operations	Technollogy Operations	Fujitsu	1	Indoor: ASU18RLQ / Outdoor: AOU18RLQ	GWA001833	18	10.4	R410A	208/230 - 1	21.6	Jun-00	15	5	

Kitchen Hood

Tag	Location	Area Served	Manufacturer	Qty.	Model #	Serial #	Fan HP	Fan RPM	Volts/Phase	Amps	Approx. Age	ASHRAE Service Life	Remaining Life	Notes
-	Kitchen	Kitchen	Ventmaster	1	CN-B-MA	-	-	-	-	-	10	30	20	Refer to AHU-8, EF-7 and EF-8

Dust Collector

Tag	Location	Area Served	Manufacturer	Qty.	Model #	Serial #	Fan HP	Fan RPM	Volts/Phase	Amps	Approx. Age	ASHRAE Service Life	Remaining Life	Notes
DC-1	On Grade Adjacent to Art Rm	Art Room	Donalson Torit	1	Cyclone 30-10-55-FF	-	10	-	480/3	-	10	20	10	

NOTE: IF AN ITEM IS LEFT BLANK, THE INFORMATION IS EITHER NOT AVAILABLE OR NOT APPLICABLE FOR THIS PIECE OF EQUIPMENT.

MAJOR EQUIPMENT LIST

Concord Engineering Group
Pleasant Valley Elementary School

ECM #5- Reprogram DDC Unoccupied Mode

Cost of Electricity	0.134	$/kWh	Winter Design Temp =	10	°F	1 Therm =	100	kBtuh
Cost of Natural Gas =	$ 1.53	$/Therm	Set back Temp =	55	°F	1 horsepower =	746	watts
Unoccupied hours	5640	hours/year	Average Boiler Efficiency	83.7	%	Pump Load Factor =	0.75	
HDD60 =	3969		Hours/year =	8760		Cooling Load Diversity =	0.75	

EXHAUST FANS & CHILLED WATER COOLING

TAG	SERVICE	Cooling Capacity (Tons)	Qty.	Total	LOCATION	Supply Fan BHP	Return Fan BHP	ELECTRIC	Watts	KWH SAVED	$ SAVED
AHU-1	Admin Area	9	1	9.00	Admin Roof	1.8	1.8	480/3	1,343.5	7,577.2	$1,015.34
AHU-2	Art Room	15.9	1	15.90	Music Room Roof	2.5	2.5	480/3	1,865.9	10,523.9	$1,410.20
AHU-3	Music Room	9.5	1	9.50	Music Room Roof	1.2	1.2	480/3	895.6	5,051.5	$676.89
AHU-4	Gymnasium	17.3	1	17.30	Below Roof of Gymnasium	3.1	3.1	480/3	2,313.8	13,049.6	$1,748.64
AHU-4a	Gymnasium	17.3	1	17.30	Below Roof of Gymnasium	3.1	3.1	480/3	2,313.8	13,049.6	$1,748.64
AHU-5	Library	10.6	1	10.60	Below Roof of Library	3.15	3.15	480/3	2,351.1	13,260.1	$1,776.85
AHU-6	Library	38	1	38.00	Below Roof of Library	6.9	6.9	480/3	5,150.0	29,045.9	$3,892.14
AHU-7	Kitchen Area	4.42	1	4.42	Below Roof of Kitchen	1.8	1.8	480/3	1,343.5	7,577.2	$1,015.34
EF-1	-	0	-	0.00	ROOF		0.78	120/1	436.4	2,461.4	$329.82
EF-2	-		-	0.00	ROOF		0.75	120/1	419.6	2,366.7	$317.14
EF-3	-		-	0.00	ROOF		0.74	120/1	414.0	2,335.1	$312.91
EF-4	-		-	0.00	ROOF		0.71	120/1	397.2	2,240.5	$300.22
EF-5	-		-	0.00	ROOF		0.21	120/1	117.5	662.7	$88.80
EF-6	-		-	0.00	ROOF		0.28	120/1	156.7	883.6	$118.40
EF-9	-		-	0.00	ROOF		0.08	480/3	44.8	252.4	$33.83
EF-10	-		-	0.00	ROOF		0.4	120/1	223.8	1,262.2	$169.14
EF-11	-		-	0.00	ROOF		0.52	120/1	290.9	1,640.9	$219.88
EF-12	-		-	0.00	ROOF		0.1	120/1	56.0	315.6	$42.28
UV-1	6	1.67	6	10.00	Ceiling		1/8	120/1	279.9	1,578.6	$211.53
UV-2	4	3.67	4	14.67	Ceiling		1/6	120/1	248.8	1,403.2	$188.03
UV-3	18	3.67	18	66.00	Ceiling		1/3	120/1	2,239.1	0.0	$0.00
UV-4	0	1.83	0	0.00	Ceiling		1/8	120/1	0.0	0.0	$0.00
FC-1	2	1.68	2	3.35	Ceiling		1/4	120/1	186.6	1,052.4	$141.02
FC-2	6	1.18	6	7.10	Ceiling		1/6	120/1	373.2	2,104.8	$282.04
FC-3	6	2.37	3	7.10	Ceiling		1/2	120/1	1,119.6	6,314.3	$846.12
FC-4	4	1.03	4	4.13	Ceiling		1/6	120/1	248.8	1,403.2	$188.03
Total Scheduled Outside Air Ventilation, CFM						33,070					
Total Connected, Tons				234.4							
Estimated Cooling Load, Tons				175.8							
Total Saved, kW									24.8		
Total Saved, kWh										127,412	
Total Saved, $											$17,073

Note: The supply air equipment is assumed to be cycled on 33% of the unoccupied hours.

Heat Load =	1614.6	kBTU/hr
Estimated Infiltration Heat Load Unoccupied =	19,718.2	Therms
Cost savings from infiltration reduction = $	30,169	
Total savings =	$47,242	

Investment Grade Lighting Audit

CEG Job #: 9C09188
Project: Pleasant Valley School
401 Cedar Road
Mullica Hill, NJ 08062
Bldg Area: 87,901

Pleasant Valley School

KWH COST: $0.134

ECM #1: Lighting Upgrade - General

EXISTING LIGHTING										PROPOSED LIGHTING									SAVINGS			
CEG Type	Fixture Location	Yearly Usage	No. Fixts	No. Lamps	Fixture Type	Fixt Watts	Total kW	kWh/Yr Fixtures	Yearly $ Cost	No. Fixts	No. Lamps	Retro-Unit Description	Watts Used	Total kW	kWh/Yr Fixtures	Yearly $ Cost	Unit Cost (INSTALLED)	Total Cost	kW Savings	kWh/Yr Savings	Yearly $ Savings	Yearly Simple Payback
226.16	Men's Restroom	2600	2	2	6"x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., White Diffuser	58	0.12	301.6	$40.41	2	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
226.16	Women's Restroom	2600	2	2	6"x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., White Diffuser	58	0.12	301.6	$40.41	2	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
226.16	Faculty Restroom	800	2	2	6"x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., White Diffuser	58	0.12	92.8	$12.44	2	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
321.37	Rm # A101 Classroom	2600	8	2	1x4, 2 Lamp, 54w T5HO, Pendant Mnt., Indirect	120	0.96	2,496.0	$334.46	8	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
321.37	Rm # A102 Classrroom	2600	12	2	1x4, 2 Lamp, 54w T5HO, Pendant Mnt., Indirect	120	1.44	3,744.0	$501.70	12	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
321.37	Rm # 103 Classroom	2600	10	2	1x4, 2 Lamp, 54w T5HO, Pendant Mnt., Indirect	120	1.20	3,120.0	$418.08	10	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
321.37	Rm # 104 Classroom	2600	10	2	1x4, 2 Lamp, 54w T5HO, Pendant Mnt., Indirect	120	1.20	3,120.0	$418.08	10	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.21	Rm # 105 Classroom	2600	9	3	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed mnt., Prismatic Lens	86	0.77	2,012.4	$269.66	9	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.21	Rm # 106 Classroom	2600	9	3	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed mnt., Prismatic Lens	86	0.77	2,012.4	$269.66	9	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.21	Rm # 107 Classroom	2600	6	3	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed mnt., Prismatic Lens	86	0.52	1,341.6	$179.77	6	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.21	Rm # 108 Classroom	2600	12	3	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed mnt., Prismatic Lens	86	1.03	2,683.2	$359.55	12	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.21	Rm # 108A Prep Room	2600	4	3	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed mnt., Prismatic Lens	86	0.34	894.4	$119.85	4	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.21	Rm # 108B Storage	2600	4	3	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed mnt., Prismatic Lens	86	0.34	894.4	$119.85	4	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
227.23	Corridor A	3600	34	2	2x2, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	58	1.97	7,099.2	$951.29	34	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.21	Rm # 109 Classroom	2600	9	3	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed mnt., Prismatic Lens	86	0.77	2,012.4	$269.66	9	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
321.37	Rm # 110 Classroom	2600	10	2	1x4, 2 Lamp, 54w T5HO, Pendant Mnt., Indirect	120	1.20	3,120.0	$418.08	10	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
321.37	Rm # 111 Classroom	2600	10	2	1x4, 2 Lamp, 54w T5HO, Pendant Mnt., Indirect	120	1.20	3,120.0	$418.08	10	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
321.37	Rm # 112 Classroom	2600	15	2	1x4, 2 Lamp, 54w T5HO, Pendant Mnt., Indirect	120	1.80	4,680.0	$627.12	15	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
321.37	Rm # 112A Prep Room	2600	2	2	1x4, 2 Lamp, 54w T5HO, Pendant Mnt., Indirect	120	0.24	624.0	$83.62	2	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
321.37	Rm # 112B Tech Closet	800	1	2	1x4, 2 Lamp, 54w T5HO, Pendant Mnt., Indirect	120	0.12	96.0	$12.86	1	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00

Investment Grade Lighting Audit

226.16	Faculty Restroom	800	1	2	6"x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., White Diffuser	58	0.06	46.4	$6.22	1	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.21	Girl's Restroom	2600	5	3	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed mnt., Prismatic Lens	86	0.43	1,118.0	$149.81	5	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.21	Boy's Restroom	2600	3	3	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed mnt., Prismatic Lens	86	0.26	670.8	$89.89	3	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
227.23	Rm # A116 Janitor's Closet	800	1	2	2x2, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	58	0.06	46.4	$6.22	1	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
321.37	Rm # A117 Classroom	2600	15	2	1x4, 2 Lamp, 54w T5HO, Pendant Mnt., Indirect	120	1.80	4,680.0	$627.12	15	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
321.37	Rm # A118 Classroom	2600	10	2	1x4, 2 Lamp, 54w T5HO, Pendant Mnt., Indirect	120	1.20	3,120.0	$418.08	10	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
321.37	Rm # A119 Classroom	2600	10	2	1x4, 2 Lamp, 54w T5HO, Pendant Mnt., Indirect	120	1.20	3,120.0	$418.08	10	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
321.37	Rm # A120 Classroom	2600	10	2	1x4, 2 Lamp, 54w T5HO, Pendant Mnt., Indirect	120	1.20	3,120.0	$418.08	10	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
321.37	Rm # A121 Classroom	2600	10	2	1x4, 2 Lamp, 54w T5HO, Pendant Mnt., Indirect	120	1.20	3,120.0	$418.08	10	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
321.37	Rm # A122 Classroom	2600	10	2	1x4, 2 Lamp, 54w T5HO, Pendant Mnt., Indirect	120	1.20	3,120.0	$418.08	10	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
321.37	Rm # A123 Classroom	2600	8	2	1x4, 2 Lamp, 54w T5HO, Pendant Mnt., Indirect	120	0.96	2,496.0	$334.46	8	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
227.23	A100 Lobby	3600	9	2	2x2, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	58	0.52	1,879.2	$251.81	9	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
227.23	Corridor "C"	3600	30	2	2x2, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	58	1.74	6,264.0	$839.38	30	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
227.23	Rm # C101 Main Office	2600	23	2	2x2, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	58	1.33	3,468.4	$464.77	23	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.21	Rm # C101J Copy Room	2600	2	3	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed mnt., Prismatic Lens	86	0.17	447.2	$59.92	2	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
227.23	Rm # C101H Principal's Office	2600	8	2	2x2, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	58	0.46	1,206.4	$161.66	8	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
227.23	Rm # C101G Guidance Office	2600	8	2	2x2, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	58	0.46	1,206.4	$161.66	8	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
226.16	Rm # C101F Faculty Restroom	800	1	2	6"x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., White Diffuser	58	0.06	46.4	$6.22	1	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
321.37	Rm # C101I Conference Room	2600	4	2	1x4, 2 Lamp, 54w T5HO, Pendant Mnt., Indirect	120	0.48	1,248.0	$167.23	4	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.21	Rm # C101 E Storage	800	2	3	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed mnt., Prismatic Lens	86	0.17	137.6	$18.44	2	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
227.23	Rm # C101 D CST Room	2600	4	2	2x2, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	58	0.23	603.2	$80.83	4	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
227.23	Rm # C101 C Guidance	2600	4	2	2x2, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	58	0.23	603.2	$80.83	4	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
227.23	Rm # C101 B Office	2600	3	2	2x2, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	58	0.17	452.4	$60.62	3	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00

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227.23	Rm # C123 C Nurse's Office	2600	9	2	2x2, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	58	0.52	1,357.2	$181.86	9	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.21		2600	4	3	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed mnt., Prismatic Lens	86	0.34	894.4	$119.85	4	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.21	Rm # C122 Storage	800	3	3	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed mnt., Prismatic Lens	86	0.26	206.4	$27.66	3	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
321.37	Rm # C103 Classroom	2600	20	2	1x4, 2 Lamp, 54w T5HO, Pendant Mnt., Indirect	120	2.40	6,240.0	$836.16	20	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.21	Rm # C103A Storage	800	2	3	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed mnt., Prismatic Lens	86	0.17	137.6	$18.44	2	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.21	Rm # C102 Faculty Room	2600	8	3	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed mnt., Prismatic Lens	86	0.69	1,788.8	$239.70	8	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
226.16	(2) Faculty Restroom	800	2	2	6"x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., White Diffuser	58	0.12	92.8	$12.44	2	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
227.23	B100 Lobby	3600	9	2	2x2, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	58	0.52	1,879.2	$251.81	9	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
321.37	Rm # B128 Team Room	2600	8	2	1x4, 2 Lamp, 54w T5HO, Pendant Mnt., Indirect	120	0.96	2,496.0	$334.46	8	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
321.37	Rm # B127 Classroom	2600	10	2	1x4, 2 Lamp, 54w T5HO, Pendant Mnt., Indirect	120	1.20	3,120.0	$418.08	10	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
321.37	Rm # B126 Classroom	2600	10	2	1x4, 2 Lamp, 54w T5HO, Pendant Mnt., Indirect	120	1.20	3,120.0	$418.08	10	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
321.37	Rm # B125 Classroom	2600	10	2	1x4, 2 Lamp, 54w T5HO, Pendant Mnt., Indirect	120	1.20	3,120.0	$418.08	10	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
321.37	Rm # B124 Classroom	2600	12	2	1x4, 2 Lamp, 54w T5HO, Pendant Mnt., Indirect	120	1.44	3,744.0	$501.70	12	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
321.37	Rm # B123 Classroom	2600	12	2	1x4, 2 Lamp, 54w T5HO, Pendant Mnt., Indirect	120	1.44	3,744.0	$501.70	12	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
321.37	Rm # B122 Classroom	2600	12	2	1x4, 2 Lamp, 54w T5HO, Pendant Mnt., Indirect	120	1.44	3,744.0	$501.70	12	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
321.37	Rm # B121 Classroom	2600	12	2	1x4, 2 Lamp, 54w T5HO, Pendant Mnt., Indirect	120	1.44	3,744.0	$501.70	12	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
227.23	Corridor B	3600	34	2	2x2, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	58	1.97	7,099.2	$951.29	34	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
321.37	Rm # B120 Classroom	2600	8	2	1x4, 2 Lamp, 54w T5HO, Pendant Mnt., Indirect	120	0.96	2,496.0	$334.46	8	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
321.37	Rm # B119 Classroom	2600	10	2	1x4, 2 Lamp, 54w T5HO, Pendant Mnt., Indirect	120	1.20	3,120.0	$418.08	10	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
321.37	Rm # B118 Classroom	2600	10	2	1x4, 2 Lamp, 54w T5HO, Pendant Mnt., Indirect	120	1.20	3,120.0	$418.08	10	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
321.37	Rm # B117 Classroom	2600	15	2	1x4, 2 Lamp, 54w T5HO, Pendant Mnt., Indirect	120	1.80	4,680.0	$627.12	15	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
227.23	Rm # B116 Janitor's Closet	800	1	2	2x2, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	58	0.06	46.4	$6.22	1	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.21	Boy's Restroom	2600	3	3	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed mnt., Prismatic Lens	86	0.26	670.8	$89.89	3	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.21	Girl's Restroom	2600	5	3	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed mnt., Prismatic Lens	86	0.43	1,118.0	$149.81	5	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.21	Rm # B112 A Prep Room	2600	2	3	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed mnt., Prismatic Lens	86	0.17	447.2	$59.92	2	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00

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232.21	Rm # B112 B Tech Room	2600	1	3	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed mnt., Prismatic Lens	86	0.09	223.6	$29.96	1	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
321.37	Rm # B112 Classroom	2600	15	2	1x4, 2 Lamp, 54w T5HO, Pendant Mnt., Indirect	120	1.80	4,680.0	$627.12	15	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
321.37	Rm # B111 Classroom	2600	10	2	1x4, 2 Lamp, 54w T5HO, Pendant Mnt., Indirect	120	1.20	3,120.0	$418.08	10	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
321.37	Rm # B110 Classroom	2600	10	2	1x4, 2 Lamp, 54w T5HO, Pendant Mnt., Indirect	120	1.20	3,120.0	$418.08	10	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
321.37	Rm # B109 Classroom	2600	10	2	1x4, 2 Lamp, 54w T5HO, Pendant Mnt., Indirect	120	1.20	3,120.0	$418.08	10	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
321.37	Rm # B108 Classroom	2600	18	2	1x4, 2 Lamp, 54w T5HO, Pendant Mnt., Indirect	120	2.16	5,616.0	$752.54	18	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.21	Rm # B108B Storage	800	3	3	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed mnt., Prismatic Lens	86	0.26	206.4	$27.66	3	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.21	Rm # B108A Prep Room	2600	4	3	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed mnt., Prismatic Lens	86	0.34	894.4	$119.85	4	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
321.37	Rm # B107 Classroom	2600	8	2	1x4, 2 Lamp, 54w T5HO, Pendant Mnt., Indirect	120	0.96	2,496.0	$334.46	8	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
321.37	Rm # B106 Classroom	2600	12	2	1x4, 2 Lamp, 54w T5HO, Pendant Mnt., Indirect	120	1.44	3,744.0	$501.70	12	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
321.37	Rm # B105 Classroom	2600	12	2	1x4, 2 Lamp, 54w T5HO, Pendant Mnt., Indirect	120	1.44	3,744.0	$501.70	12	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
321.37	Rm # B104 Classroom	2600	10	2	1x4, 2 Lamp, 54w T5HO, Pendant Mnt., Indirect	120	1.20	3,120.0	$418.08	10	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
321.37	Rm # B103 Classroom	2600	10	2	1x4, 2 Lamp, 54w T5HO, Pendant Mnt., Indirect	120	1.20	3,120.0	$418.08	10	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
321.37	Rm # B102 Classroom	2600	12	2	1x4, 2 Lamp, 54w T5HO, Pendant Mnt., Indirect	120	1.44	3,744.0	$501.70	12	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
321.37	Rm # B101 Classroom	2600	8	2	1x4, 2 Lamp, 54w T5HO, Pendant Mnt., Indirect	120	0.96	2,496.0	$334.46	8	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
321.37	Rm # C104 Music	2600	18	2	1x4, 2 Lamp, 54w T5HO, Pendant Mnt., Indirect	120	2.16	5,616.0	$752.54	18	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.21	Rm # C104B Storage	2600	4	3	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed mnt., Prismatic Lens	86	0.34	894.4	$119.85	4	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.21	Rm # C104A Group Rehearsal	2600	2	3	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed mnt., Prismatic Lens	86	0.17	447.2	$59.92	2	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
321.37	Rm # C105 Platform	2600	20	2	1x4, 2 Lamp, 54w T5HO, Pendant Mnt., Indirect	120	2.40	6,240.0	$836.16	20	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.21	Loadin Dock	2600	2	3	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed mnt., Prismatic Lens	86	0.17	447.2	$59.92	2	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
800	Rm # C106 Cafetorium	2600	18	8	Pendant Mnt., Globe, (8) 36w FT36DL T5 lamps	300	5.40	14,040.0	$1,881.36	18	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
321.37	Rm # C107A Serving	2600	16	2	1x4, 2 Lamp, 54w T5HO, Pendant Mnt., Indirect	120	1.92	4,992.0	$668.93	16	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
227.21	Kitchen	2600	8	2	2x2, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	58	0.46	1,206.4	$161.66	8	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.21	Kitchen Hood	2600	3	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Acrylic Lens	58	0.17	452.4	$60.62	3	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
226.16	Faculty Restroom	800	1	2	6"x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., White Diffuser	58	0.06	46.4	$6.22	1	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.21	Kitchen Locker Room	2600	2	3	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed mnt., Prismatic Lens	86	0.17	447.2	$59.92	2	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00

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232.21	Rm # C107D Dry Storage	2600	2	3	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed mnt., Prismatic Lens	86	0.17	447.2	$59.92	2	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.21	Rm # C107B Kitchen Office	2600	1	3	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed mnt., Prismatic Lens	86	0.09	223.6	$29.96	1	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.21	Rm # C106 A Janitor's Closet	800	2	3	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed mnt., Prismatic Lens	86	0.17	137.6	$18.44	2	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.21	Boy's Restroom	2600	2	3	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed mnt., Prismatic Lens	86	0.17	447.2	$59.92	2	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.11	Janitor's Closet	800	1	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	0.06	46.4	$6.22	1	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.21	Girl's Restroom	2600	2	3	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed mnt., Prismatic Lens	86	0.17	447.2	$59.92	2	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
226.16		2600	2	2	6"x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., White Diffuser	58	0.12	301.6	$40.41	2	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.21	Rm # C108A Maintenance	3600	10	3	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed mnt., Prismatic Lens	86	0.86	3,096.0	$414.86	10	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.21	Rm # C109 Gym	2600	15	3	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed mnt., Prismatic Lens	86	1.29	3,354.0	$449.44	15	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.31	Rm # C109 E Electrical Room	800	2	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., Prismatic Lens	58	0.12	92.8	$12.44	2	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.31	Rm # C109 D Storage	800	6	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., Prismatic Lens	58	0.35	278.4	$37.31	6	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.31	Rm # C109 B Storage	800	6	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., Prismatic Lens	58	0.35	278.4	$37.31	6	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.31	Rm # C109 C Sprinkler Room	800	2	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., Prismatic Lens	58	0.12	92.8	$12.44	2	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.21	Rm # C111 Gym Office	2600	4	3	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed mnt., Prismatic Lens	86	0.34	894.4	$119.85	4	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
227.21	C112 Gym Lobby	3600	12	2	2x2, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	58	0.70	2,505.6	$335.75	12	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
321.37	Rm # C115 O.T./P.T.	2600	6	2	1x4, 2 Lamp, 54w T5HO, Pendant Mnt., Indirect	120	0.72	1,872.0	$250.85	6	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
226.16	Men's Restroom	2600	1	2	6"x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., White Diffuser	58	0.06	150.8	$20.21	1	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
226.16	Women's Restroom	2600	1	2	6"x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., White Diffuser	58	0.06	150.8	$20.21	1	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.21	Rm # C116 PTA	2600	2	3	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed mnt., Prismatic Lens	86	0.17	447.2	$59.92	2	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
564	Library Entrance	3600	4	2	Recessed Down Light, (2) 42w Quad PL Lamp	88	0.35	1,267.2	$169.80	4	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
800	RM # C117 Library	2600	28	8	Pendant Mnt., Globe, (8) 36w FT36DL T5 lamps	300	8.40	21,840.0	$2,926.56	28	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
801		2600	26	4	Surface Mnt., Globe, (4) 36w FT36DL T5 lamps	150	3.90	10,140.0	$1,358.76	26	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00

Investment Grade Lighting Audit

232.21	Rm # C117 A Storage	800	4	3	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed mnt., Prismatic Lens	86	0.34	275.2	$36.88	4	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
801	Rm # C118 Library Office	2600	6	4	Surface Mnt., Globe, (4) 36w FT36DL T5 lamps	150	0.90	2,340.0	$313.56	6	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
227.21	Faculty Restroom	800	1	2	2x2, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	58	0.06	46.4	$6.22	1	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
226.16		800	1	2	6"x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., White Diffuser	58	0.06	46.4	$6.22	1	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.21	Rm # C119 Tech Ops	2600	6	3	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed mnt., Prismatic Lens	86	0.52	1,341.6	$179.77	6	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.31	Stairway	3600	3	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., Prismatic Lens	58	0.17	626.4	$83.94	3	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.31	Mechanical Room	3600	12	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., Prismatic Lens	58	0.70	2,505.6	$335.75	12	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
709	Roof	3600	2	1	100w MH Wallpack	125	0.25	900.0	$120.60	2	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
747	Exterior	3600	10	1	250w MH Wallpack	295	2.95	10,620.0	$1,423.08	10	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
713		3600	22	1	100w MH Walkway Light, Pole Mntd., 10' High	125	2.75	9,900.0	$1,326.60	22	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
712		3600	31	1	100w HPS Recessed, 18" Square, Fresnel Lens	125	3.88	13,950.0	$1,869.30	31	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
	Totals		12				3.20	11,520	$1,544	12				0.0	0	$0	$0	$0	0.0	0	$0	None

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

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

Project Name: LGEA Solar PV Project - Harrison Twp. Pleasant Valley Elementary School
Location: Mullica Hill, NJ 08062
Description: Photovoltaic System - Direct Purchase

Simple Payback Analysis

	Photovoltaic System - Direct Purchase
Total Construction Cost	$776,250
Annual kWh Production	104,088
Annual Energy Cost Reduction	$13,948
Annual SREC Revenue	$36,431
First Cost Premium	**$776,250**
Simple Payback:	**15.41** **Years**

Life Cycle Cost Analysis

Analysis Period (years):	25	Financing %:	0%
Financing Term (mths):	0	Maintenance Escalation Rate:	3.0%
Average Energy Cost ($/kWh)	**$0.134**	Energy Cost Escalation Rate:	3.0%
Financing Rate:	0.00%	SREC Value ($/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	$776,250	0	0	0	$0	(776,250)	0
1	$0	104,088	$13,948	$0	$36,431	$50,379	($725,871)
2	$0	103,568	$14,366	$0	$36,249	$50,615	($675,257)
3	$0	103,050	$14,797	$0	$36,067	$50,865	($624,392)
4	$0	102,534	$15,241	$0	$35,887	$51,128	($573,264)
5	$0	102,022	$15,698	$1,051	$35,708	$50,355	($522,909)
6	$0	101,512	$16,169	$1,046	$35,529	$50,653	($472,256)
7	$0	101,004	$16,654	$1,040	$35,351	$50,965	($421,290)
8	$0	100,499	$17,154	$1,035	$35,175	$51,294	($369,997)
9	$0	99,997	$17,669	$1,030	$34,999	$51,637	($318,359)
10	$0	99,497	$18,199	$1,025	$34,824	$51,998	($266,361)
11	$0	98,999	$18,745	$1,020	$34,650	$52,375	($213,987)
12	$0	98,504	$19,307	$1,015	$34,476	$52,769	($161,218)
13	$0	98,012	$19,886	$1,010	$34,304	$53,181	($108,037)
14	$0	97,522	$20,483	$1,004	$34,133	$53,611	($54,426)
15	$0	97,034	$21,097	$999	$33,962	$54,060	($367)
16	$0	96,549	$21,730	$994	$33,792	$54,528	$54,161
17	$0	96,066	$22,382	$989	$33,623	$55,016	$109,177
18	$0	95,586	$23,054	$985	$33,455	$55,524	$164,701
19	$0	95,108	$23,745	$980	$33,288	$56,053	$220,754
20	$0	94,632	$24,458	$975	$33,121	$56,604	$277,359
21	$1	94,159	$25,191	$970	$32,956	$57,177	$334,536
22	$2	93,688	$25,947	$965	$32,791	$57,773	$392,309
23	$3	93,220	$26,725	$960	$32,627	$58,392	$450,701
24	$4	92,754	$27,527	$955	$32,464	$59,036	$509,736
25	$5	92,290	$28,353	$951	$32,301	$59,704	$569,440
	Totals:	2,451,892	$508,526	$20,998	$858,162	$1,345,690	($2,425,116)
				Net Present Value (NPV)		**$569,465**	
				Internal Rate of Return (IRR)		**4.6%**	

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
Pleasant Valley Elementary School	6125	Sunpower SPR230	375	14.7	5,514	86.25	104,088	12,375	15.64

.= Proposed PV Layout

Harrison Twp. Pleasant Valley zone 1

Station Identification	
City:	Atlantic_City
State:	New_Jersey
Latitude:	39.45° N
Longitude:	74.57° W
Elevation:	20 m
PV System Specifications	
DC Rating:	86.2 kW
DC to AC Derate Factor:	0.810
AC Rating:	69.9 kW
Array Type:	Fixed Tilt
Array Tilt:	14.0°
Array Azimuth:	225.0°
Energy Specifications	
Cost of Electricity:	0.1 ¢/kWh

Results			
Month	Solar Radiation (kWh/m²/day)	AC Energy (kWh)	Energy Value ($)
1	2.54	5472	7.33
2	3.30	6567	8.80
3	4.27	9135	12.24
4	5.17	10477	14.04
5	5.84	11924	15.98
6	6.09	11569	15.50
7	6.03	11691	15.67
8	5.48	10739	14.39
9	4.80	9269	12.42
10	3.69	7456	9.99
11	2.60	5218	6.99
12	2.20	4571	6.13
Year	4.34	104088	139.48

Notes:

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

Project Name: LGEA Solar PV Project - Harrison Twp. Pleasant Valley Elementary School
Location: Mullica Hill, NJ 08062
Description: Photovoltaic System - Direct Purchase

Simple Payback Analysis

	Photovoltaic System - Direct Purchase
Total Construction Cost	$1,161,270
Annual kWh Production	156,267
Annual Energy Cost Reduction	$20,940
Annual SREC Revenue	$54,693
First Cost Premium	**$1,161,270**
Simple Payback:	**15.35** **Years**

Life Cycle Cost Analysis

Analysis Period (years):	25	Financing %:	0%
Financing Term (mths):	0	Maintenance Escalation Rate:	3.0%
Average Energy Cost ($/kWh)	**$0.134**	Energy Cost Escalation Rate:	3.0%
Financing Rate:	0.00%	SREC Value ($/kWh)	$0.350

Period	Additional Cash Outlay	Energy kWh Production	Energy Cost Savings	Additional Maint Costs	SREC Revenue	Net Cash Flow	Cumulative Cash Flow
0	$1,161,270	0	0	0	$0	(1,161,270)	0
1	$0	156,267	$20,940	$0	$54,693	$75,633	($1,085,637)
2	$0	155,486	$21,568	$0	$54,420	$75,988	($1,009,649)
3	$0	154,708	$22,215	$0	$54,148	$76,363	($933,286)
4	$0	153,935	$22,881	$0	$53,877	$76,759	($856,527)
5	$0	153,165	$23,568	$1,578	$53,608	$75,598	($780,929)
6	$0	152,399	$24,275	$1,570	$53,340	$76,045	($704,884)
7	$0	151,637	$25,003	$1,562	$53,073	$76,514	($628,370)
8	$0	150,879	$25,753	$1,554	$52,808	$77,007	($551,363)
9	$0	150,125	$26,526	$1,546	$52,544	$77,523	($473,840)
10	$0	149,374	$27,322	$1,539	$52,281	$78,064	($395,776)
11	$0	148,627	$28,141	$1,531	$52,019	$78,630	($317,146)
12	$0	147,884	$28,986	$1,523	$51,759	$79,222	($237,924)
13	$0	147,145	$29,855	$1,516	$51,501	$79,840	($158,084)
14	$0	146,409	$30,751	$1,508	$51,243	$80,486	($77,598)
15	$0	145,677	$31,673	$1,500	$50,987	$81,160	$3,562
16	$0	144,948	$32,623	$1,493	$50,732	$81,862	$85,424
17	$0	144,224	$33,602	$1,486	$50,478	$82,595	$168,019
18	$0	143,503	$34,610	$1,478	$50,226	$83,358	$251,377
19	$0	142,785	$35,649	$1,471	$49,975	$84,153	$335,530
20	$0	142,071	$36,718	$1,463	$49,725	$84,980	$420,509
21	$1	141,361	$37,820	$1,456	$49,476	$85,840	$506,349
22	$2	140,654	$38,954	$1,449	$49,229	$86,734	$593,083
23	$3	139,951	$40,123	$1,441	$48,983	$87,664	$680,747
24	$4	139,251	$41,326	$1,434	$48,738	$88,630	$769,377
25	$5	138,555	$42,566	$1,427	$48,494	$89,633	$859,011
	Totals:	3,681,018	$763,449	$31,524	$1,288,356	$2,020,281	($3,538,025)
				Net Present Value (NPV)		**$859,036**	
				Internal Rate of Return (IRR)		**4.6%**	

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
Pleasant Valley Elementary School	9150	Sunpower SPR230	561	14.7	8,249	129.03	156,267	18,513	15.64

.= Proposed PV Layout

PVWatts AC Energy & Cost Savings Cautions for Interpreting the Results

Harrison Twp. Pleasant Valley Zone 2

Station Identification	
City:	Atlantic_City
State:	New_Jersey
Latitude:	39.45° N
Longitude:	74.57° W
Elevation:	20 m
PV System Specifications	
DC Rating:	129.0 kW
DC to AC Derate Factor:	0.810
AC Rating:	104.5 kW
Array Type:	Fixed Tilt
Array Tilt:	14.0°
Array Azimuth:	135.0°
Energy Specifications	
Cost of Electricity:	0.1 ¢/kWh

Results			
Month	Solar Radiation (kWh/m²/day)	AC Energy (kWh)	Energy Value ($)
1	2.57	8348	11.19
2	3.30	9799	13.13
3	4.28	13743	18.42
4	5.14	15601	20.91
5	5.78	17618	23.61
6	6.09	17324	23.21
7	6.00	17417	23.34
8	5.50	16098	21.57
9	4.81	13918	18.65
10	3.76	11413	15.29
11	2.66	8047	10.78
12	2.23	6940	9.30
Year	4.35	156267	209.40

Notes:

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

Project Name: LGEA Solar PV Project - Harrison Twp. Pleasant Valley Elementary School
Location: Mullica Hill, NJ 08062
Description: Photovoltaic System - Direct Purchase

Simple Payback Analysis

	Photovoltaic System - Direct Purchase
Total Construction Cost	$267,030
Annual kWh Production	34,391
Annual Energy Cost Reduction	$4,608
Annual SREC Revenue	$12,037
First Cost Premium	**$267,030**
Simple Payback:	**16.04** **Years**

Life Cycle Cost Analysis

Analysis Period (years):	25	Financing %:	0%
Financing Term (mths):	0	Maintenance Escalation Rate:	3.0%
Average Energy Cost ($/kWh)	**$0.134**	Energy Cost Escalation Rate:	3.0%
Financing Rate:	0.00%	SREC Value ($/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	$267,030	0	0	0	$0	(267,030)	0
1	$0	34,391	$4,608	$0	$12,037	$16,645	($250,385)
2	$0	34,219	$4,747	$0	$11,977	$16,723	($233,661)
3	$0	34,048	$4,889	$0	$11,917	$16,806	($216,856)
4	$0	33,878	$5,036	$0	$11,857	$16,893	($199,963)
5	$0	33,708	$5,187	$347	$11,798	$16,638	($183,325)
6	$0	33,540	$5,342	$345	$11,739	$16,736	($166,589)
7	$0	33,372	$5,503	$344	$11,680	$16,839	($149,750)
8	$0	33,205	$5,668	$342	$11,622	$16,948	($132,803)
9	$0	33,039	$5,838	$340	$11,564	$17,061	($115,741)
10	$0	32,874	$6,013	$339	$11,506	$17,180	($98,561)
11	$0	32,710	$6,193	$337	$11,448	$17,305	($81,256)
12	$0	32,546	$6,379	$335	$11,391	$17,435	($63,821)
13	$0	32,383	$6,570	$334	$11,334	$17,571	($46,250)
14	$0	32,221	$6,768	$332	$11,278	$17,713	($28,537)
15	$0	32,060	$6,971	$330	$11,221	$17,862	($10,676)
16	$0	31,900	$7,180	$329	$11,165	$18,016	$7,340
17	$0	31,741	$7,395	$327	$11,109	$18,177	$25,518
18	$0	31,582	$7,617	$325	$11,054	$18,345	$43,863
19	$0	31,424	$7,845	$324	$10,998	$18,520	$62,383
20	$0	31,267	$8,081	$322	$10,943	$18,702	$81,086
21	$1	31,110	$8,323	$320	$10,889	$18,891	$99,977
22	$2	30,955	$8,573	$319	$10,834	$19,088	$119,065
23	$3	30,800	$8,830	$317	$10,780	$19,293	$138,358
24	$4	30,646	$9,095	$316	$10,726	$19,506	$157,864
25	$5	30,493	$9,368	$314	$10,673	$19,726	$177,590
	Totals:	810,113	$168,019	$6,938	$283,539	$444,620	($1,065,130)
				Net Present Value (NPV)		**$177,615**	
				Internal Rate of Return (IRR)		**4.2%**	

Building	Roof Area (sq ft)	Panel	Qty	Panel Sq Ft	Panel Total Sq Ft	Total KW_{DC}	Total Annual kWh	Panel Weight (33 lbs)	W/SQFT
Pleasant Valley Elementary School	2100	Sunpower SPR230	129	14.7	1,897	29.67	34,391	4,257	15.64

.= Proposed PV Layout

PVWatts — AC Energy & Cost Savings — Cautions for Interpreting the Results

Harrison Twp. Pleasant Valley zone 3

Station Identification	
City:	Atlantic_City
State:	New_Jersey
Latitude:	39.45° N
Longitude:	74.57° W
Elevation:	20 m
PV System Specifications	
DC Rating:	29.7 kW
DC to AC Derate Factor:	0.810
AC Rating:	24.0 kW
Array Type:	Fixed Tilt
Array Tilt:	14.0°
Array Azimuth:	247.5°
Energy Specifications	
Cost of Electricity:	0.1 ¢/kWh

Results			
Month	Solar Radiation (kWh/m²/day)	AC Energy (kWh)	Energy Value ($)
1	2.32	1687	2.26
2	3.09	2090	2.80
3	4.10	3007	4.03
4	5.05	3518	4.71
5	5.78	4061	5.44
6	6.05	3956	5.30
7	5.98	3994	5.35
8	5.37	3621	4.85
9	4.62	3064	4.11
10	3.47	2392	3.21
11	2.38	1611	2.16
12	2.00	1389	1.86
Year	4.19	34391	46.08

Notes:

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

Project Name: LGEA Solar PV Project - Harrison Twp. Pleasant Valley Elementary School
Location: Mullica Hill, NJ 08062
Description: Photovoltaic System - Direct Purchase

Simple Payback Analysis

	Photovoltaic System - Direct Purchase
Total Construction Cost	$111,780
Annual kWh Production	14,306
Annual Energy Cost Reduction	$1,917
Annual SREC Revenue	$5,007
First Cost Premium	**$111,780**
Simple Payback:	**16.14** **Years**

Life Cycle Cost Analysis

Analysis Period (years):	25	Financing %:	0%
Financing Term (mths):	0	Maintenance Escalation Rate:	3.0%
Average Energy Cost ($/kWh)	**$0.134**	Energy Cost Escalation Rate:	3.0%
Financing Rate:	0.00%	SREC Value ($/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	$111,780	0	0	0	$0	(111,780)	0
1	$0	14,306	$1,917	$0	$5,007	$6,924	($104,856)
2	$0	14,234	$1,975	$0	$4,982	$6,957	($97,899)
3	$0	14,163	$2,034	$0	$4,957	$6,991	($90,908)
4	$0	14,092	$2,095	$0	$4,932	$7,027	($83,881)
5	$0	14,022	$2,158	$144	$4,908	$6,921	($76,960)
6	$0	13,952	$2,222	$144	$4,883	$6,962	($69,999)
7	$0	13,882	$2,289	$143	$4,859	$7,005	($62,994)
8	$0	13,813	$2,358	$142	$4,834	$7,050	($55,944)
9	$0	13,744	$2,428	$142	$4,810	$7,097	($48,847)
10	$0	13,675	$2,501	$141	$4,786	$7,147	($41,700)
11	$0	13,607	$2,576	$140	$4,762	$7,198	($34,502)
12	$0	13,539	$2,654	$139	$4,738	$7,253	($27,249)
13	$0	13,471	$2,733	$139	$4,715	$7,309	($19,940)
14	$0	13,404	$2,815	$138	$4,691	$7,368	($12,572)
15	$0	13,336	$2,900	$137	$4,668	$7,430	($5,141)
16	$0	13,270	$2,987	$137	$4,644	$7,494	$2,353
17	$0	13,203	$3,076	$136	$4,621	$7,561	$9,914
18	$0	13,137	$3,169	$135	$4,598	$7,631	$17,546
19	$0	13,072	$3,264	$135	$4,575	$7,704	$25,250
20	$0	13,006	$3,361	$134	$4,552	$7,780	$33,029
21	$1	12,941	$3,462	$133	$4,529	$7,859	$40,888
22	$2	12,877	$3,566	$133	$4,507	$7,940	$48,828
23	$3	12,812	$3,673	$132	$4,484	$8,026	$56,854
24	$4	12,748	$3,783	$131	$4,462	$8,114	$64,968
25	$5	12,684	$3,897	$131	$4,440	$8,206	$73,174
	Totals:	336,991	$69,893	$2,886	$117,947	$184,954	($460,589)
				Net Present Value (NPV)		**$73,199**	
				Internal Rate of Return (IRR)		**4.2%**	

Building	Roof Area (sq ft)	Panel	Qty	Panel Sq Ft	Panel Total Sq Ft	Total KW_{DC}	Total Annual kWh	Panel Weight (33 lbs)	W/SQFT
Pleasant Valley Elementary School	875	Sunpower SPR230	54	14.7	794	12.42	14,306	1,782	15.64

.= Proposed PV Layout

PVWatts AC Energy & Cost Savings

Cautions for interpreting the Results

Harrison Twp. Pleasant Valley zone 4

Station Identification	
City:	Atlantic_City
State:	New_Jersey
Latitude:	39.45° N
Longitude:	74.57° W
Elevation:	20 m
PV System Specifications	
DC Rating:	12.4 kW
DC to AC Derate Factor:	0.810
AC Rating:	10.1 kW
Array Type:	Fixed Tilt
Array Tilt:	9.0°
Array Azimuth:	247.5°
Energy Specifications	
Cost of Electricity:	0.1 ¢/kWh

Results			
Month	Solar Radiation (kWh/m²/day)	AC Energy (kWh)	Energy Value ($)
1	2.25	675	0.90
2	3.02	855	1.15
3	4.06	1248	1.67
4	5.04	1470	1.97
5	5.79	1709	2.29
6	6.09	1675	2.24
7	6.00	1681	2.25
8	5.38	1519	2.04
9	4.59	1276	1.71
10	3.42	983	1.32
11	2.33	658	0.88
12	1.93	557	0.75
Year	4.16	14306	19.17

Notes:

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

Project Name: LGEA Solar PV Project - Harrison Twp. Pleasant Valley Elementary School
Location: Mullica Hill, NJ 08062
Description: Photovoltaic System - Direct Purchase

Simple Payback Analysis

	Photovoltaic System - Direct Purchase
Total Construction Cost	$111,780
Annual kWh Production	13,439
Annual Energy Cost Reduction	$1,801
Annual SREC Revenue	$4,704
First Cost Premium	**$111,780**
Simple Payback:	**17.19** **Years**

Life Cycle Cost Analysis

Analysis Period (years):	25	Financing %:	0%
Financing Term (mths):	0	Maintenance Escalation Rate:	3.0%
Average Energy Cost ($/kWh)	**$0.134**	Energy Cost Escalation Rate:	3.0%
Financing Rate:	0.00%	SREC Value ($/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	$111,780	0	0	0	$0	(111,780)	0
1	$0	13,439	$1,801	$0	$4,704	$6,504	($105,276)
2	$0	13,372	$1,855	$0	$4,680	$6,535	($98,741)
3	$0	13,305	$1,910	$0	$4,657	$6,567	($92,173)
4	$0	13,238	$1,968	$0	$4,633	$6,601	($85,572)
5	$0	13,172	$2,027	$136	$4,610	$6,501	($79,071)
6	$0	13,106	$2,088	$135	$4,587	$6,540	($72,531)
7	$0	13,041	$2,150	$134	$4,564	$6,580	($65,950)
8	$0	12,976	$2,215	$134	$4,541	$6,623	($59,328)
9	$0	12,911	$2,281	$133	$4,519	$6,667	($52,661)
10	$0	12,846	$2,350	$132	$4,496	$6,714	($45,947)
11	$0	12,782	$2,420	$132	$4,474	$6,762	($39,185)
12	$0	12,718	$2,493	$131	$4,451	$6,813	($32,372)
13	$0	12,654	$2,568	$130	$4,429	$6,866	($25,506)
14	$0	12,591	$2,645	$130	$4,407	$6,922	($18,584)
15	$0	12,528	$2,724	$129	$4,385	$6,980	($11,604)
16	$0	12,466	$2,806	$128	$4,363	$7,040	($4,564)
17	$0	12,403	$2,890	$128	$4,341	$7,103	$2,539
18	$0	12,341	$2,976	$127	$4,319	$7,169	$9,708
19	$0	12,280	$3,066	$126	$4,298	$7,237	$16,945
20	$0	12,218	$3,158	$126	$4,276	$7,308	$24,253
21	$1	12,157	$3,252	$125	$4,255	$7,382	$31,636
22	$2	12,096	$3,350	$125	$4,234	$7,459	$39,095
23	$3	12,036	$3,451	$124	$4,213	$7,539	$46,634
24	$4	11,976	$3,554	$123	$4,191	$7,622	$54,256
25	$5	11,916	$3,661	$123	$4,171	$7,708	$61,965
	Totals:	316,568	$65,657	$2,711	$110,799	$173,745	($602,033)
				Net Present Value (NPV)		**$61,990**	
				Internal Rate of Return (IRR)		**3.6%**	

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
Pleasant Valley Elementary School	875	Sunpower SPR230	54	14.7	794	12.42	13,439	1,782	15.64

.= Proposed PV Layout

PVWatts — AC Energy & Cost Savings — Cautions for Interpreting the Results

Harrison Twp. Pleasant Valley zone 5

Station Identification	
City:	Atlantic_City
State:	New_Jersey
Latitude:	39.45° N
Longitude:	74.57° W
Elevation:	20 m
PV System Specifications	
DC Rating:	12.4 kW
DC to AC Derate Factor:	0.810
AC Rating:	10.1 kW
Array Type:	Fixed Tilt
Array Tilt:	9.0°
Array Azimuth:	67.5°
Energy Specifications	
Cost of Electricity:	0.1 ¢/kWh

Results			
Month	Solar Radiation (kWh/m²/day)	AC Energy (kWh)	Energy Value ($)
1	1.93	560	0.75
2	2.70	743	1.00
3	3.80	1166	1.56
4	4.82	1405	1.88
5	5.62	1660	2.22
6	6.03	1666	2.23
7	5.88	1654	2.22
8	5.22	1475	1.98
9	4.33	1201	1.61
10	3.13	892	1.20
11	2.06	562	0.75
12	1.65	456	0.61
Year	3.94	13439	18.01

Notes:

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

Project Name: LGEA Solar PV Project - Harrison Twp. Pleasant Valley Elementary School
Location: Mullica Hill, NJ 08062
Description: Photovoltaic System - Direct Purchase

Simple Payback Analysis

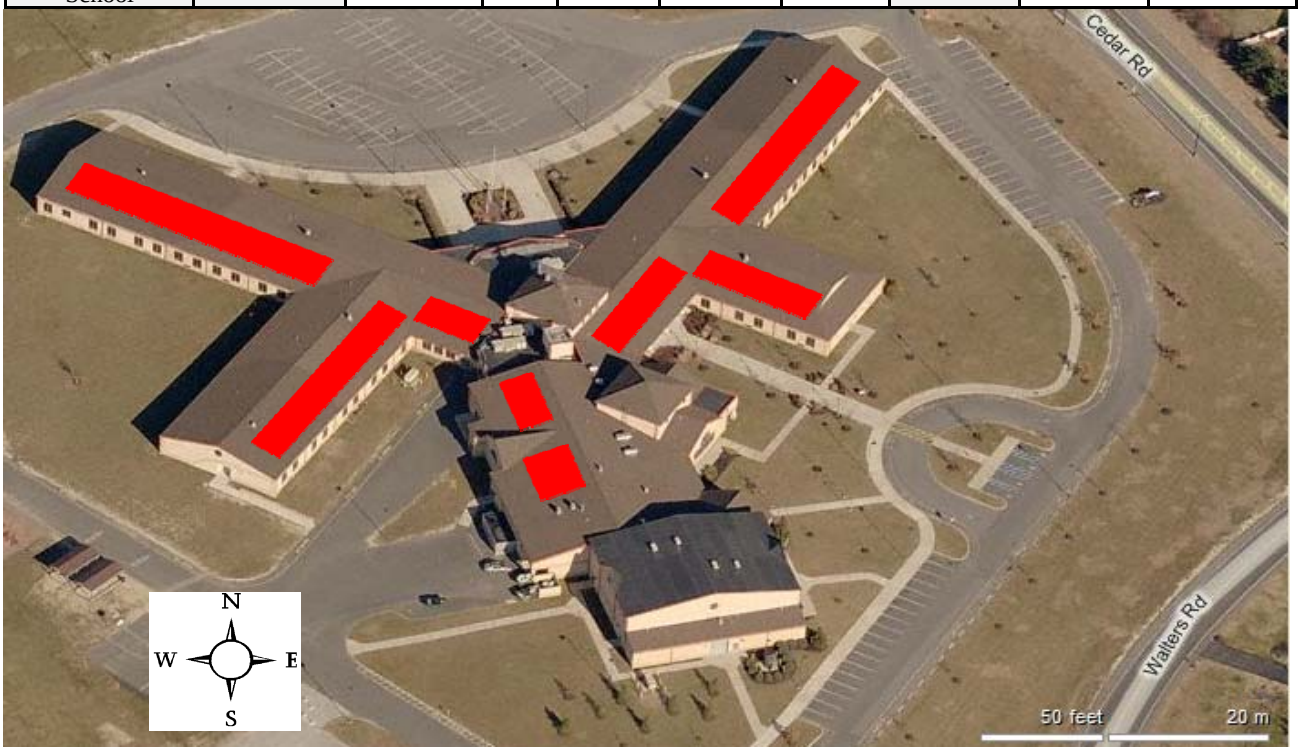
	Photovoltaic System - Direct Purchase
Total Construction Cost	$2,204,550
Annual kWh Production	294,746
Annual Energy Cost Reduction	$39,496
Annual SREC Revenue	$103,161
First Cost Premium	**$2,204,550**
Simple Payback:	**15.45** **Years**

Life Cycle Cost Analysis

Analysis Period (years):	25	Financing %:	0%
Financing Term (mths):	0	Maintenance Escalation Rate:	3.0%
Average Energy Cost ($/kWh)	**$0.134**	Energy Cost Escalation Rate:	3.0%
Financing Rate:	0.00%	SREC Value ($/kWh)	$0.350

Period	Additional Cash Outlay	Energy kWh Production	Energy Cost Savings	Additional Maint Costs	SREC Revenue	Net Cash Flow	Cumulative Cash Flow
0	$2,204,550	0	0	0	$0	(2,204,550)	0
1	$0	294,746	$39,496	$0	$103,161	$142,657	($2,061,893)
2	$0	293,272	$40,681	$0	$102,645	$143,326	($1,918,567)
3	$0	291,806	$41,901	$0	$102,132	$144,033	($1,774,533)
4	$0	290,347	$43,158	$0	$101,621	$144,780	($1,629,754)
5	$0	288,895	$44,453	$2,976	$101,113	$142,591	($1,487,163)
6	$0	287,451	$45,787	$2,961	$100,608	$143,434	($1,343,729)
7	$0	286,013	$47,160	$2,946	$100,105	$144,319	($1,199,410)
8	$0	284,583	$48,575	$2,931	$99,604	$145,248	($1,054,162)
9	$0	283,160	$50,032	$2,917	$99,106	$146,222	($907,940)
10	$0	281,745	$51,533	$2,902	$98,611	$147,242	($760,699)
11	$0	280,336	$53,079	$2,887	$98,118	$148,309	($612,389)
12	$0	278,934	$54,672	$2,873	$97,627	$149,426	($462,964)
13	$0	277,540	$56,312	$2,859	$97,139	$150,592	($312,372)
14	$0	276,152	$58,001	$2,844	$96,653	$151,810	($160,562)
15	$0	274,771	$59,741	$2,830	$96,170	$153,081	($7,481)
16	$0	273,397	$61,533	$2,816	$95,689	$154,406	$146,926
17	$0	272,030	$63,379	$2,802	$95,211	$155,788	$302,714
18	$0	270,670	$65,281	$2,788	$94,735	$157,227	$459,941
19	$0	269,317	$67,239	$2,774	$94,261	$158,726	$618,667
20	$0	267,970	$69,256	$2,760	$93,790	$160,286	$778,953
21	$1	266,630	$71,334	$2,746	$93,321	$161,908	$940,862
22	$2	265,297	$73,474	$2,733	$92,854	$163,596	$1,104,457
23	$3	263,971	$75,678	$2,719	$92,390	$165,349	$1,269,807
24	$4	262,651	$77,949	$2,705	$91,928	$167,171	$1,436,978
25	$5	261,338	$80,287	$2,692	$91,468	$169,064	$1,606,041
	Totals:	6,943,022	$1,439,994	$59,460	$2,430,058	$3,810,591	($7,028,271)
				Net Present Value (NPV)		**$1,606,066**	
				Internal Rate of Return (IRR)		**4.6%**	

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
Pleasant Valley Elementary School	17375	Sunpower SPR230	1065	14.7	15,660	244.95	294,746	35,145	15.64



.= Proposed PV Layout

Refer to Appendix F1, F2 and F3 for the PV Watts output data.

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