ENERGY AUDIT – FINAL REPORT

VALLEYVIEW MIDDLE SCHOOL

320 DIAMOND SPRING ROAD
DENVILLE, NJ 07834
ATTN: JOHN SERAPIGLIA,
BUSINESS ADMINISTRATOR

CEG PROJECT NO. 9C09080

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I. EXECUTIVE SUMMARY

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

Denville Board of Education
Valleyview Middle School
320 Diamond Spring Road
Denville, NJ 07834

Municipal Contact Person: John Serapiglia
Facility Contact Person:

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	$ 112,173
Natural Gas	$ 53,239
Total	$ 165,413

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

Table 1
Energy Conservation Measures (ECM's)

ECM NO.	DESCRIPTION	COST[A]	ANNUAL SAVINGS[B]	SIMPLE PAYBACK (YEARS)	SIMPLE ROI
1	Lighting Upgrade – General	$60,037	$6,294	9.5	10.5%
2	Lighting Controls	$5,335	$2,203	2.4	41.3%
3	HVAC System Controls	$331,728	$4,967	66.8	1.5%
4	Computer Room Ductless Split System	$9,612	$1,419	6.8	14.8%
5	Boiler Replacement	$115,239	$6,662	17.3	5.8%

6	Solar PV – Direct Purchase	$726,570	$64,503	11.26	8.9%

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

The estimated demand and energy savings for each ECM is shown below in Table 2. The information in this table corresponds to the ECM's in Table 1.

Table 2
Estimated Energy Savings

ECM NO.	DESCRIPTION	ANNUAL UTILITY REDUCTION		
		ELEC. DEMAND (KW)	ELEC. CONSUMPTION (KWH)	NAT GAS (THERMS)
1	Lighting Upgrade – General	20.3	36,950	-
2	Lighting Controls	-	13,763	-
3	HVAC System Controls	-	17,320	3,043
4	Computer Room Ductless Split System	4.0	8,763	-
5	Boiler Replacement			4,326
6	Solar PV – Direct Purchase	80.7	125,583	-

*Elec. Demand Savings are calculated for cooling season only. Elec. consumption savings are totaled annually.

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 municipal building:

- **ECM #1:** Lighting Upgrade
- **ECM #2:** Lighting Controls
- **ECM #4:** Computer Room Ductless Split System

Although ECM #5 does not provide a payback less than 10 years, it is recommended to utilize a high efficiency boiler as suggested in ECM #3 (or equal) when the boiler is replaced. A boiler system replacement should be considered since the existing boiler is past its lifespan.

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%. Condenser coils at window level such as window air conditioners are particularly susceptible to dust and dirt created from landscaping and people activity.
2. Maintain all weather stripping on entrance doors. The majority of the entrance doors in the facility have significant leakage area around the doors which increases infiltration into the building.
3. Clean all light fixtures to maximize light output. Cleaned light fixtures providing full light output, may prevent added task lighting from being turned on and left on.
4. Provide more frequent air filter changes to decrease overall system power usage and maintain better IAQ.
5. Set hot water re-circ pump temperature set-point below the domestic hot water supply temperature setting. This will avoid continuous operation of the hot water re-circ pump while still providing the benefit of on demand hot water to the remote fixtures in the facility. Provide a time clock in addition to hot water re-circ aqua stat to stop hot water circulation during unoccupied periods. Keeping the hot water piping hot 24/7 is unnecessary when fixtures will not be used and adds energy consumption in the cooling season due to added cooling load in the building.
6. Set all computers and computer monitors to run in power saving (standby or sleep) mode when not in use. Added heat output from computers compounds the work that air conditioners have to do to remove the heat.
7. Repair leaking faucets in janitorial closets, bathrooms, and maintenance rooms. Although this is not associated with direct energy savings, dripping faucets will corrode and cause calcification on plumbing fixtures resulting in pre-mature replacement.

II. INTRODUCTION

The comprehensive energy audit covers the 82,932 square foot Valleyview Middle School that includes classrooms, faculty rooms, a gymnasium, cafeteria, science lab, woodshop, and administrative offices.

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

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

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

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

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

The building site visit is performed to survey all major building components and systems. The site visit includes detailed inspection of energy consuming components. Summary of building occupancy schedules, operating and maintenance practices, and energy management programs

provided by the building manager are collected along with the system and components to determine a more accurate impact on energy consumption.

III. METHOD OF ANALYSIS

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

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

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

Cost savings are calculated based on the actual historical energy costs for the facility. Installation costs include labor and equipment to estimate the full up-front investment required to implement a change. Costs are derived from Means Cost Data, industry publications, and local contractors and equipment suppliers. The NJ SmartStart Building® program incentives savings (where applicable) are included for the appropriate ECM's and subtracted from the installed cost. Maintenance savings are calculated where applicable and added to the energy savings for each ECM. The costs and savings are applied and a simple payback and simple return on investment (ROI) is calculated. The simple payback is based on the years that it takes for the savings to pay back the net installation cost (Net Installation divided by Net Savings.) A simple return on investment is calculated as the percentage of the net installation cost that is saved in one year (Net Savings divided by Net Installation.)

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

IV. HISTORIC ENERGY CONSUMPTION/COST

A. Energy Usage / Tariffs

The electric usage profile (below) represents the actual electrical usage for the facility. Jersey Central Power and Light (JCP&L) provides electricity to the facility under their General Service Secondary Three-Phase 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. New Jersey Natural Gas (NJN) provides natural gas to the facility along with a third party provider Pepco Energy Services. NJN provides natural gas under the General Supply Large (GSL) 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 provide, the average cost for utilities at this facility is as follows:

Description	Average
Electricity	16.2¢ / kWh
Natural Gas	$1.54 / Therm

Table 3
Electricity Billing Data

Utility Provider: JCP&L, General Service Secondary 3 Phase (Meter # G17995355)			
MONTH OF USE	**CONSUMPTION KWH**	**DEMAND**	**TOTAL BILL**
Jul-08	67,520	102.6	$11,523
Aug-08	33,760	101.3	$6,108
Sep-08	41,280	157.1	$7,582
Oct-08	48,320	160.5	$7,608
Nov-08	52,800	152.5	$8,200
Dec-08	65,600	173.1	$10,295
Jan-09	75,680	182.6	$12,126
Feb-09	69,600	177.6	$11,253
Mar-09	71,840	177.1	$11,415
Apr-09	57,760	168.6	$9,255
May-09	60,960	159.0	$9,332
Jun-09	46,720	160.0	$7,475
Totals	**691,840**	**182.6 Max**	**$112,173**
AVERAGE DEMAND 156.0 KW average			
AVERAGE RATE $0.162 $/kWh			

Figure 1
Electricity Usage Profile

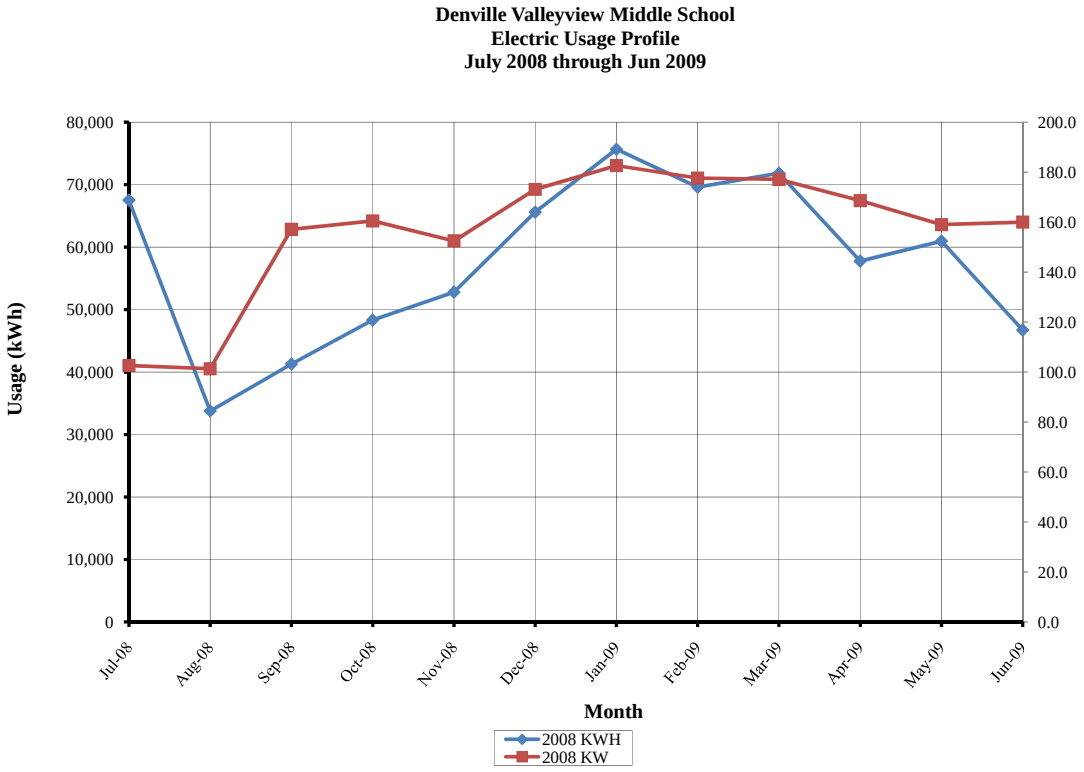
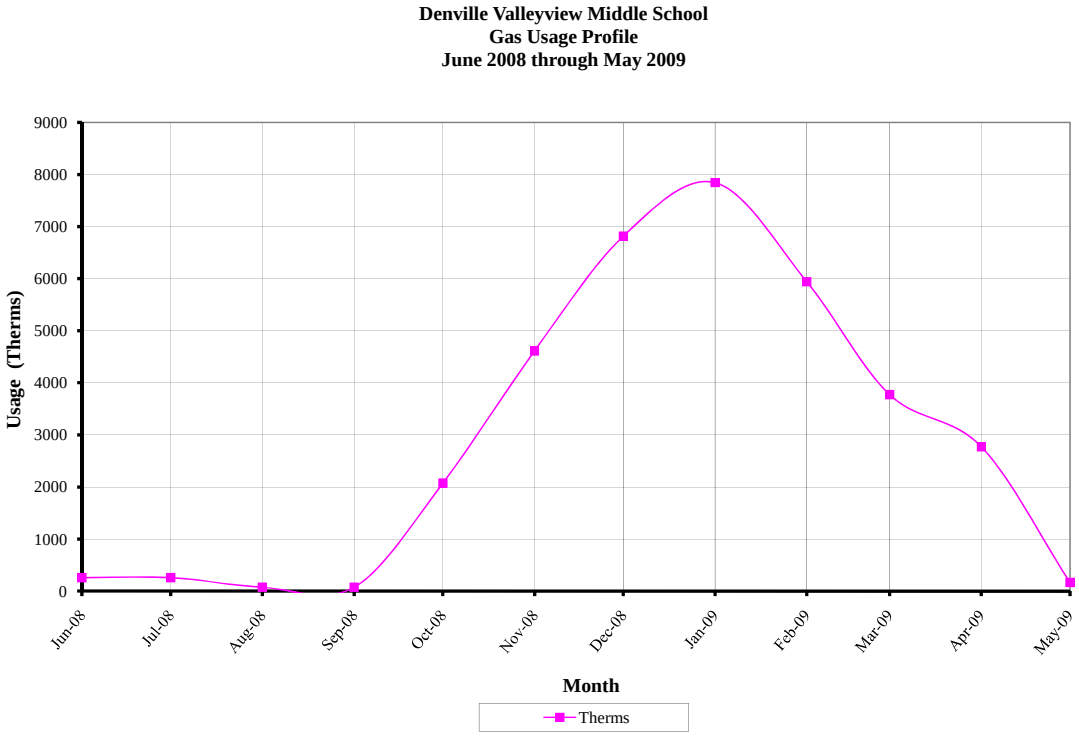


Table 4
Natural Gas Billing Data

Utility Provider: NJN, Rate - GSL, (Meter # 00746530)		
MONTH OF USE	**CONSUMPTION (THERMS)**	**TOTAL BILL**
Jun-08	259	$564.02
Jul-08	259	$564.02
Aug-08	75	$173.78
Sep-08	75	$299.36
Oct-08	2,074	$3,172.04
Nov-08	4,612	$7,053.43
Dec-08	6,816	$10,401.10
Jan-09	7,843	$11,916.56
Feb-09	5,942	$8,714.28
Mar-09	3,774	$5,691.99
Apr-09	2,773	$4,369.07
May-09	165	$319.83
TOTALS	**34666**	**$53,239.48**
AVERAGE RATE:	**$1.54**	**$/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:

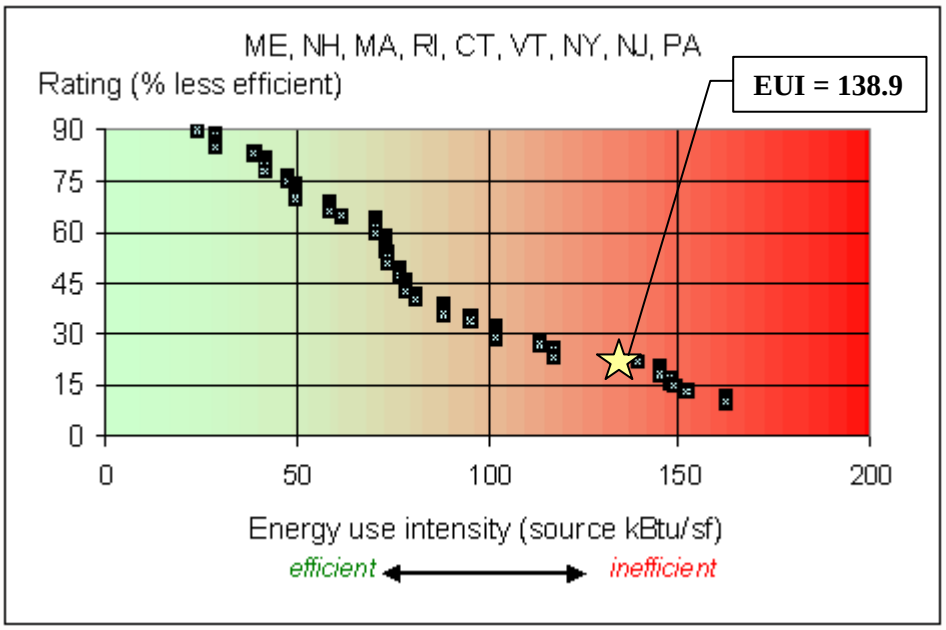
$$Building\ Site\ EUI = \frac{(Electric\ Usage\ in\ kBtu + Gas\ Usage\ in\ kBtu)}{Building\ Square\ Footage}$$

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

Table 5
Denville Valleyview Middle School EUI Calculations

ENERGY TYPE	BUILDING USE			SITE ENERGY	SITE-SOURCE	SOURCE ENERGY
	kWh	Therms	Gallons	kBtu	RATIO	kBtu
ELECTRIC	691,840			2,361,942	3.340	7,888,885
NATURAL GAS		34,665.67		3,466,567	1.047	3,629,496
FUEL OIL			0.00	0	1.010	0
PROPANE			0.00	0	1.010	0
TOTAL				5,828,509		11,518,381
*Site - Source Ratio data is provided by the Energy Star Performance Rating Methodology for Incorporating Source Energy Use document issued Dec 2007.						
BUILDING AREA		82,932		SQUARE FEET		
BUILDING SITE EUI		70.28		kBtu/SF/YR		
BUILDING SOURCE EUI		**138.89**		**kBtu/SF/YR**		

Figure 3
Source Energy Use Intensity Distributions: Schools



C. EPA Energy Benchmarking System

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

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

In accordance with the Local Government Energy Audit Program, CEG has created an ENERGY STAR account for the municipality to access and monitoring the facility's yearly energy usage as it compares to facilities of similar type. The following is the user name and password for this account:

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

User Name:	denvilleboe
Password:	lgeaceg2009
Security Question:	What is your birth city?
Security Answer:	"Denville"

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

Table 6
ENERGY STAR Performance Rating

FACILITY DESCRIPTION	ENERGY PERFORMANCE RATING	NATIONAL AVERAGE
Denville Valleyview MS	36	50

See the Statement of Energy Performance appendix for the detailed energy summary.

V. FACILITY DESCRIPTION

The 82,932 SF Middle School is a two story facility comprised of classrooms, offices, cafeteria, kitchen, gymnasium, and library on the first floor, and classrooms, offices, and science and art rooms on the ground floor. The building was built in 1963. C-wing was added to the building in 1975, which includes classrooms, science rooms, and art room. The typical school hours are between 7:40 am and 2:20 pm. The building construction is CMU block with face brick. The exterior walls have minimal insulation typical of the time period. It is unknown if the CMU blocks are filled. The windows throughout the facility are in good condition and appear to be maintained. The window type throughout the facility is double pane, clear glass with aluminum frames. Blinds are internal to the window construction and are utilized through the facility per occupant comfort. The blinds are valuable because they help to reduce solar heat gain in the summer. The roof is a single ply flat roofing system supported by a metal deck. Roof insulation is above the metal deck. The amount of insulation below the roof membrane is unknown. Most doorways into the school are double doors with weather stripping either missing or in poor condition. The main entrance to the school does not have a vestibule.

HVAC Heating System

The School is heated by two industrial hot water boilers. The boilers have been converted to gas approximately 3 years agao, but maintain the capability to run on oil. The boilers were built in 1963 with an input capacity of 7071 MBH each. The boilers require constant maintenance and cleaning of the tubes due to its age. The heating water loop is circulated with two 7.5 HP base mounted pumps (operating and standby). The pumps are manually turned on in the heating season. The heating water is circulated throughout the building to baseboards, unit ventilators, air handling units with hot water coils. The unit ventilators are operated manually and the blower typically runs 24/7. The heating equipment is controlled by a pneumatic system. The baseboards and hot water coil water flow is regulated by old pneumatic driven actuators. Some components in the pneumatic system do not respond and leak. Space temperatures are over / under heating in some areas in the heating season. Many control valves are corroded significantly with mineral deposits due to poor water treatment and leakage.

HVAC Cooling System

The building does not have a central cooling system. A few spaces are air conditioned by either window air conditioners, split systems, or packaged rooftop air conditioners. Window air conditioners are installed throughout the building for perimeter offices, support spaces, and classrooms as needed such as the library, music room, life skills class, and computer room. The window AC unit are of various size, age, and capacity, however the range of efficiencies for the window AC units is 8.6 – 11.0 energy efficiency ratio (EER). The Packaged rooftop units provide conditioned air for offices without operable windows, and the two new science rooms. Approximately 50% - 75% of the school has some form of air conditioning.

Exhaust System

Air is exhausted from the toilet rooms through the roof exhausters. The toilet room exhaust fans are operated manually by maintenance personnel. Some spaces such as the nurse's toilet room are without any means of exhaust air.

Domestic Hot Water

Domestic hot water for lavatories, office lounge, locker room showers, and kitchen facilities is provided by a dedicated hot water heater system. The domestic hot water is independent of the central boiler system to avoid use of the industrial boilers in the non heating season. The domestic hot water system is made up of a 200 gallon hot water storage tank and a dedicated 315 MBH domestic water boiler. The domestic hot water is circulated throughout the building by a hot water re-circ pump. The circulation pump is controlled by an aqua stat. The domestic hot water piping insulation appeared to be in good condition.

Lighting

Typical lighting throughout building is fluorescent tube lay-in fixtures with T-12 lamps and magnetic ballasts. Storage rooms and closets lit with a mixture of incandescent lamps and compact fluorescent lamps. The parking lot is lit with light poles and high pressure sodium lamps. All interior lighting is manually controlled by the building occupants by wall switches. The gym is lit with high ceiling metal halide fixtures.

VI. MAJOR EQUIPMENT LIST

The equipment list is considered major energy consuming equipment and through replacement 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 if a manufactures date was not shown on the equipment's nameplate. The ASHRAE service life for the equipment along with the remaining useful life is also shown in the Appendix.

Refer to the Major Equipment List Appendix for this facility.

VII. ENERGY CONSERVATION MEASURES

ECM #1: Lighting Upgrade – General

Description:

The lighting in Valleyview middle school is primarily made up of fluorescent fixtures with T-12 lamps and magnetic ballasts. There are a few storage rooms and closets with incandescent lighting and compact fluorescent fixtures.

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

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

Hours of Operation:

Classrooms, Hallways, Gym, Offices, Library, etc:
8 Hrs per day, 5 days per week, 47 weeks per year – 1880 Hrs per year.

Hallways:
10 Hrs per day, 5days per week, 47 weeks per year – 2350 Hrs per year.

Storage rooms, Boiler room:
24% of normal hours (above) – 470 Hrs per year.

Outdoor Lighting:
10 Hrs per day, 7 days per week, 52 weeks per year – 3640 Hrs per year.

Energy Savings Calculations:

The Investment Grade Lighting Audit appendix outlines the proposed retrofits, costs, savings, and payback periods.

NJ Smart Start® Program Incentives are calculated as follows:

From the Smart Start Incentive appendix, the replacement of a T-12 fixture to a T-5 or T-8 fixture warrants the following incentive: T-5 or T-8 (1-2 lamp) = $10 per fixture; T-5 or T-8 (3-4 lamp) = $20 per fixture.

$$\text{Smart Start®}\ Incentive = (\#\ of\ 1-2\ lamp\ \ fixtures \times\ \$10) + (\#\ of\ 3-4\ lamp\ \ fixtures \times\ \$20)$$

$$\text{Smart Start®}\ Incentive = (630 \times\ \$10) + (27 \times\ \$20) = \underline{\$6{,}840}$$

Replacement and Maintenance Savings are calculated as follows:

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

$$Savings = (44\ lamps\ \ per\ \ year) \times (\$2.00 + \$5.00) = \underline{\$308}$$

Energy Savings Summary:

ECM #1 - ENERGY SAVINGS SUMMARY*	
Installation Cost ($):	$66,877
NJ Smart Start Equipment Incentive ($):	($6,840)
Net Installation Cost ($):	$60,037
Maintenance Savings ($ / yr):	*$308*
Energy Savings ($ / yr):	*$5,986*
Total Energy Savings ($ / yr):	*$6,294*
Simple Payback (yrs):	*9.5*
Simple Return On Investment (%):	*10.5%*
Estimated ECM Lifetime (yr):	*25*
Simple Lifetime Savings ($):	*$157,350*

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

ECM #2: Lighting Controls

Description:

In some areas the lighting is left on unnecessarily. In many cases the lights are left on because of the inconvenience to manually switch lights off when a room is left or on when a room is first occupied. This is common in storage rooms that are occupied for only short periods and only a few times per day. In some instances lights are left on due to the misconception that it is better to keep the lights on rather than to continuously switch lights on and off. Although increased switching reduces lamp life, the energy savings outweigh the lamp replacement costs. The payback timeframe for when to turn the lights off is approximately two minutes. If the lights are off for at least a two minute interval, then it pays to shut them off.

Lighting controls come in many forms. Sometimes an additional switch is adequate to provide reduced lighting levels when full light output is not needed. Occupancy sensors detect motion and will switch the lights on when the room is occupied. Occupancy sensors can either be mounted in place of a current wall switch, or on the ceiling to cover large areas. Photocell control senses light levels and turn off or reduce lights when there is adequate daylight. Photocells are mostly used outside, but are becoming more popular in energy-efficient interior lighting designs as well.

ASHRAE Standard 90.1-2004, Appendix G is a reference standard for modeling building efficiency. The standard estimates that lighting controls provide a 10% reduction in lighting power usage for daytime occupancies in buildings over 5,000 SF, and 15% reduction in buildings under 5,000 SF. This ECM includes dual technology occupancy sensors in the courthouse, each private office, open office, conference room, restrooms, lunch room, storage rooms, and file room, as well as a photocell daylight sensor controlling the 1st floor rotunda lighting.

The ECM includes replacement of standard wall switches with sensors wall switches for individual classrooms and offices. Sensors shall be manufactured by Sensorswitch, Watt Stopper or equivalent. See the "Investment Grade Lighting Audit" appendix for details.

The "Investment Grade Lighting Audit" appendix of this report includes the summary of lighting controls implemented in this ECM and outlines the proposed controls, costs, savings, and payback periods. The calculations adjust the lighting power usage by 10% for all areas that include occupancy sensor lighting controls.

Light Energy = 137,628 kWh/Yr. occupancy sensor controlled lighting

Energy Savings Calculations:

$$Energy\ Savings = 10\% \times Occuapancy\ Sensored\ Light\ Energy\ (kWh/Yr)$$

$$Energy\ Savings = 10\% \times 137{,}628\ (kWh) = 13{,}763\ (kWh)$$

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

$$Savings. = 13{,}763\ (kWh) \times 0.162\left(\frac{\$}{kWh}\right) = \$2{,}230$$

Installation cost per dual-technology sensor (Basis: Sensor switch or equivalent) is $75/unit including material and labor.

Installation Cost = $75 x 97 motion sensors = $7,275

From the NJ Smart Start appendix, the installation of a lighting control device warrants the following incentive: occupancy = $20 per fixture, daylight = $25 per fixture.

$$\text{Smart Start®}\ Incentive = (\#\ of\ \ wall\ mount\ devices \times\ \$\ 20) = (97 \times \$20) = \$1940$$

Energy Savings Summary:

ECM #2 - ENERGY SAVINGS SUMMARY*	
Installation Cost ($):	$7,275
NJ Smart Start Equipment Incentive ($):	($1,940)
Net Installation Cost ($):	$5,335
Maintenance Savings ($ / yr):	*$0*
Energy Savings ($ / yr):	*$2,203*
Total Energy Savings ($ / yr):	*$2,203*
Simple Payback (yrs):	*2.4*
Simple Return On Investment (%):	*41.3%*
Estimated ECM Lifetime (yr):	*15*
Simple Lifetime Savings ($):	*$33,045*

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

ECM #3: HVAC System Controls

Description:

The existing control system is an outdated pneumatic control system. The zone thermostats are manually set pneumatic actuators controlling local control valves within the space. The system is original to the building's heating system installed in 1963. The space thermostats are inaccurate due to temperature drift over time, leakage, or frozen actuators. The thermostats do not have programmability such as night set back, or morning warm-up features. Modern thermostats and control systems have the capability of saving significant energy as well as improve occupant comfort.

This ECM includes installing a Building Automation system through Direct Digital Controls (DDC) wired through an Ethernet backbone and front end controller. The system will include new thermostat controllers for terminal unit ventilators, baseboard zones, air handling units, and packaged AC equipment wired back to a front end controller with computer interface. The front end device will provide communication between the devices as well as the main boilers. The system will respond to the overall building's needs and operating schedules as defined by the building operator. The DDC system will provide features such as space averaging, temperature override control, night set-back, morning warm-up mode, heating water loop temperature re-set, etc.

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

- Energy Management and Control System Savings - 5%-15%.
- Commissioning - 5%-15%.
- Automatic Fault Detection and Diagnostics - 5%-15%.
- Occupancy Sensors for Lighting Control - 20%-28%.
- Photosensor-Based Lighting Control -20%-60%.
- Demand Controlled Ventilation (DCV) -10%-15%.

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

The cost of a full DDC system with new field devices, controllers, computer, software, programming, etc. is approximately $4.00 per SF. Savings from the implementation of this ECM will be primarily achieved through natural gas savings from reduced heating energy. A small portion of savings will result from the cooling system management for the central AC systems in C-wing.

Cost of complete DDC System = ($4.00/SF x 82,932 SF) = $331,728.

Total Gas usage	= 34,666 Therms
Estimated non-Heat gas usage (kitchen & HW) (*Averaged from May & June gas usage)	= 424 Therms*
Average Cost of Gas	= $1.53/Therm
Cooling Capacity (Science, Workshop, Comp)	= 17.5 tons
Cooling Season Full Load Cooling Hrs.	= 800 hrs/yr.
Average Cooling Equipment EER	= 9.7 EER
Average Cost of Electricity	= $0.162/kWh

Energy Savings Calculations:

Heating Savings Calculations

$$Heating\ Gas\ Input = Total\ Cons.\left(Therms\right) - \left(Est.\ HW\ /\ Kitchen\ Use\left(\frac{Therms}{Month}\right) \times Use\left(\frac{Months}{Yr}\right)\right)$$

$$Heating\ Gas\ Input = 34{,}666\left(Therms\right) - \left(424\left(\frac{Therms}{Month}\right) \times 10\left(\frac{Months}{Yr}\right)\right) = 30{,}426\left(Therms\right)$$

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

$$Savings. = 30{,}426\left(Therms\right) \times 10\% \times 1.54\left(\frac{\$}{Therm}\right) = \$4{,}686$$

Cooling Savings Calculations

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

$$Est\ Cool\ Cons. = \frac{17.5\left(Tons\right) \times 12{,}000\left(\frac{Btu}{Ton\ Hr}\right) \times 800\ Hrs.}{9.7\left(\frac{Btu}{Wh}\right) \times 1000\left(\frac{Wh}{kWh}\right)} = 17{,}320\left(kWh\right)$$

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

$$Savings. = 17{,}320\,(kWh) \times 10\% \times 0.162\left(\frac{\$}{kWh}\right) = \$281$$

$$Total\ ECM\ \ Savings = \$4{,}686 + \$281 = \$4{,}967$$

Energy Savings Summary:

ECM #3 - ENERGY SAVINGS SUMMARY*	
Installation Cost ($):	$331,728
NJ Smart Start Equipment Incentive ($):	-
Net Installation Cost ($):	$331,728
Maintenance Savings ($ / yr):	*$0*
Energy Savings ($ / yr):	*$4,967*
Total Energy Savings ($ / yr):	*$4,967*
Simple Payback (yrs):	*66.8*
Simple Return On Investment (%):	*1.5%*
Estimated ECM Lifetime (yr):	*15*
Simple Lifetime Savings ($):	*$74,505*

ECM #4: Computer Room Ductless Split System

Description:

The Computer Room is currently conditioned by a single zone cooling only rooftop unit. The unit's cooling efficiency was 9.1 SEER when new. Due to the age and wear, the estimated cooling efficiency is 8.2 SEER today.

This ECM includes installation of two energy efficient cooling ductless split systems. The ECM calculations are based on two 3 ton Mitsubishi Electric ductless split systems model MSY-D36NA and MUY-D36NA or equal. Cooling efficiency of 15.1 SEER

Computer Room Full Load Cooling Hrs. (6 equivalent full load hrs. per day.)	= 2184 hrs/yr.
Average Cost of Electricity	= $0.162/kWh
Total Rated Cooling Capacity	= 6 Tons
Existing System Efficiency	= 8.2 SEER
Proposed System Efficiency	= 15.1 SEER

Energy Savings Calculations:

Cooling Savings Calculation:

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

$$EnergySavings = \frac{6\,(Tons) \times 12{,}000\left(\frac{Btu}{Ton\ hr}\right)}{1000\left(\frac{Wh}{kWh}\right)} \times \left(\frac{1}{8.2\left(\frac{Btu}{W}\right)} - \frac{1}{15.1\left(\frac{Btu}{W}\right)}\right) \times 2184\ hours$$

$$= 8{,}763\ kWh$$

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

$$Demand\ Savings = \frac{8{,}763\,(kWh)}{2184\ Hrs.} = 4.01\ KW$$

$$Cooling\ Cost\ Savings = 8{,}763\,(kWh) \times 0.162\left(\frac{\$}{kWh}\right) = \$1{,}419$$

Installation cost for the two 3 ton ductless split systems is estimated at $10,050.

From the NJ Smart Start® Program appendix, the split system replacement falls under the category "Unitary AC" and warrants an incentive based on efficiency (EER) at a certain cooling tonnage. The program incentives are calculated as follows:

$$\text{Smart Start®}\ Incentive = (Cooling\ Tons \times\ \$/Ton\ Incentive)$$
$$= (6\ Tons \times \$73/Ton) = \$438$$

Energy Savings Summary:

ECM #4 - ENERGY SAVINGS SUMMARY*	
Installation Cost ($):	$10,050
NJ Smart Start Equipment Incentive ($):	($438)
Net Installation Cost ($):	$9,612
Maintenance Savings ($ / yr):	*$0*
Energy Savings ($ / yr):	*$1,419*
Total Energy Savings ($ / yr):	*$1,419*
Simple Payback (yrs):	*6.8*
Simple Return On Investment (%):	*14.8%*
Estimated ECM Lifetime (yr):	*15*
Simple Lifetime Savings ($):	*$21,285*

ECM #5: Boiler Replacement

Description:

Valleyview middle school is heated by two (2) Superior Gas-fired, sectional boilers. The boilers are original to the building, 46 years old. The input capacity for each boiler is 7,071 MBH. The original steam boiler efficiency is approximately 70%, however the boiler has been converted to hot water with approximate efficiency of 78%.

This ECM includes replacing the two gas fired hot water boilers with high efficiency boilers. The basis of this ECM is three (3) Weil – McLain sectional hot water boilers or equivalent with an efficiency of 85.6%.

Existing Heating Hot Water Boiler:

Rated Input Capacity = 7,071 MBh (Each)

Combustion Efficiency = 78%
Radiation Losses = 5%
Thermal Efficiency = 73%

Replacement Boiler:

High-Efficiency Boiler

Rated Capacity = 2,887 MBh (Each)

Combustion Efficiency = 85.6%
Radiation Losses = 0.5%
Thermal Efficiency = 85.1%

Operating Data:

Heating Season Fuel Consumption = 34,666 Therms (based on Natural. Gas billing data)
Average Cost of Natural Gas = $1.53/Therm

Energy Savings Calculations:

$$Heating\ Gas\ Input = Total\ Cons.\left(Therms\right) - \left(Est.\ HW\ /\ Kitchen\ Use\left(\frac{Therms}{Month}\right) \times Use\left(\frac{Months}{Yr}\right)\right)$$

$$Heating\ Gas\ Input = 34{,}666\left(Therms\right) - \left(424\left(\frac{Therms}{Month}\right) \times 10\left(\frac{Months}{Yr}\right)\right) = 30{,}426\left(Therms\right)$$

$$Building\ Heat\ Cons. = Heating\ Gas\ Input(Therms) \times Old\ Heating\ Efficiency(\%)$$

$$Building\ Heat\ Cons. = 30{,}426\,(Therms) \times 73\% = 22{,}211\,(Therms)$$

$$EnergySavings. = Heat\ Cons.\,(Therms) \times \left(\frac{1}{Efficiency_{OLD}} - \frac{1}{Efficiency_{NEW}} \right)$$

$$EnergySavings = 22{,}211\,(Therms) \times \left(\frac{1}{73\%} - \frac{1}{85.1\%} \right) = 4{,}326\,(Therms)$$

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

$$Savings. = 4{,}326\,(Therms) \times 1.54 \left(\frac{\$}{Therm} \right) = \$6{,}662$$

Installed cost of the Weil McLain sectional boilers including removal of existing unit, all piping changes and controls is estimated to be $123,900.
Smart Start Incentive = $1.00/MBh x 8,661/installed MBh = $8,661

Energy Savings Summary:

ECM #5 - ENERGY SAVINGS SUMMARY*	
Installation Cost ($):	$123,900
NJ Smart Start Equipment Incentive ($):	($8,661)
Net Installation Cost ($):	$115,239
Maintenance Savings ($ / yr):	*$0*
Energy Savings ($ / yr):	*$6,662*
Total Energy Savings ($ / yr):	*$6,662*
Simple Payback (yrs):	*17.3*
Simple Return On Investment (%):	*5.8%*
Estimated ECM Lifetime (yr):	*35*
Simple Lifetime Savings ($):	*$233,170*

VIII. RENEWABLE/DISTRIBUTED ENERGY MEASURES

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

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

CEG has reviewed the existing roof area of the building being audited for the purposes of determining a potential for a roof mounted photovoltaic system. A roof area of 5160 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 80.73 kilowatts could be installed. A system of this size has an estimated kilowatt hour production of 125,983 KWh annually, reducing the overall utility bill by approximately 18.2% 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.

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

PAYMENT TYPE	SIMPLE PAYBACK	SIMPLE ROI	INTERNAL RATE OF RETURN
Self-Finance	11.3 Years	8.9%	12.3%
Direct Purchase	11.3 Years	8.9%	8.0%

The resultant Internal Rate of Return indicates that if the Owner was able to "self-finance" the solar project, the project would be slightly more beneficial to the Owner. However, if the Owner was able to work out a Power Purchase Agreement with a third-party and agree upon a decent base energy rate for kilowatt hour production, the "direct purchase" option could also, prove to be a beneficial route.

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 this facility, it was determined that the average wind speed is not adequate, and the kilowatt demand for the building is below the threshold (200 kW) for purchase of a commercial wind turbine. Therefore, wind energy is not a viable option.

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 atypical load shape. There is increased consumption in the winter period (November -March), with a continuation of April through July. The later summer-time load can be described as air-conditioning load. The air conditioning is supplied by window units, split units and packaged rooftop units. There is also an obvious drop in usage July going into August. A flatter load profile of this type, will allow for more competitive energy prices when shopping for alternative suppliers.

Natural Gas:

The Natural Gas Usage Profile demonstrates a very typical natural gas (heat load) profile. The summer months (May – September) demonstrate extremely low consumption (complimenting the winter heating load). There is an increase in winter consumption (November – March). The increased winter load is caused by heating demand. In this facility the heat is supplied by 2 large industrial natural gas fired boilers. Also adding to the natural gas demand is the presence of a natural gas fired hot water system, which is independent of the central boiler system. A base-load shaping (flat) will secure more competitive energy prices when procuring energy through an alternative energy source.

Tariff Analysis:

Electricity:

This facility receives electrical service through Jersey Central Power & Light (JCP&L) on a GSS (General Service Secondary – 3 Phase) rate. Service classification GS is available for general service purposes on secondary voltages not included under Service Classifications RS, RT, RGT or GST. This facility's rate is a single or three phase service at secondary voltages. For electric supply (generation), the customer will use the utilities Basic Generation Service (BGS) or a Third Party Supplier (TPS). This facility uses Basic Generation service from the utility. Therefore, they will pay according to the BGS default service. The Delivery Service includes the following charges: Customer Charge, Supplemental Customer Charge, Distribution Charge (kW

Demand), kWh Charge, Non-utility Generation Charge, TEFA, SBC, SCC, Standby Fee and RGGI.

Natural Gas:

This facility receives natural gas Delivery Service through New Jersey Natural Gas Company on a GSL (General Service Large) tariff rate schedule. The GSL rate is available to any Customer in the entire territory served by the Company who uses 5,000 therms or more annually and uses gas for all purposes other than residential and interruptible service. Where the customer uses the Cooling, Air Conditioning and Pool Heating Service (CAC) under Special Provision 1 applicable to customers purchasing gas supply under Rider "A", the Company will, upon application of the Customer, meter the space heating and the "CAC" separately.

This service is considered a "firm" service, where the customer may either purchase gas from Company's Rider "A", for Basic Gas Supply Service (BGSS) or from a Marketer or Broker. A "firm service" is a higher priority of delivery on the natural gas pipeline. Typically the firm users do not have the capability of being interrupted by the utility, so the utility must provide a higher level of service. Much like the telecom industry, the natural gas pipelines were deregulated and various levels of delivery service were created. The "firm service" was the most reliable, because it is last on the pecking order for interruption.

The basic charges under this tariff are for: Customer Charge, Demand Charge, Delivery Charge and if the customer elects, the BGSS Supply Charge. The customer can elect to have the Commodity Charge serviced through the utility or by a Third Party Supplier (TPS). Currently Denville is using the services of a TPS, Pepco Energy Services. Note: Should the TPS not deliver, then the customer will receive replacement service from the utility which carries an extremely high penalty cost of service, which is automatically supplied.

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

The information provided by Denville states that they are currently utilizing the service of a Third Party Supplier Pepco Energy Services. CEG believes there is room within these energy costs, for improvement (please see comments under recommendations).

Recommendations:

CEG recommends a global approach that will be consistent with all facilities within the BOE. The primary area for potential improvement is seen in the electric costs. The average price per kWh (kilowatt hour) for all buildings based on 1-year historical average price is $.1388/kWh (this is the average "price to compare" if the client intends to shop for energy). The average price per decatherm for natural gas is $ 12.11 / dth (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 extremely competitive. The BOE could see improvement in its energy costs if it were to take advantage of these current market prices quickly, before energy prices increase. Based on annual historical consumption (May 2008 through April 2009) and current electric rates, the BOE could see an improvement in its electric costs of up to 35% annually. (Note: Savings were calculated using Average Annual Consumption and a variance to a Fixed Average One-Year commodity contract). CEG recommends aggregating the entire electric load to gain the most optimal energy costs. CEG recommends advisement for alternative sourcing and supply of energy on a "managed approach".

CEG's secondary recommendation coincides with the natural gas costs. Based on the current market, Denville could improve its natural gas costs by up to 24%. Currently the BOE is utilizing the services of a Third Party Supplier, Pepco Energy Services. CEG recommends the BOE receive further advisement on these prices through an energy advisor. They should also consider procuring energy (natural gas) through an alternative supply source.

CEG also recommends scheduling a meeting with the current utility providers to review their utility charges and current tariff structures for electricity and natural gas. This meeting would provide insight regarding alternative procurement options that are currently available. Through its meeting with the Local Distribution Company (LDC), the municipality can learn more about the competitive supply process. The BOE can acquire a list of approved Third Party Suppliers from the New Jersey Board of Public Utilities website at www.nj.gov/bpu. They should also consider using a billing-auditing service to further analyze the utility invoices, manage the data and use the information for ongoing demand-side management projects. Furthermore, special attention should be given to credit mechanisms, imbalances, balancing charges and commodity charges when meeting with the utility representative. The Denville 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.

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. As stated in the executive summary these items should be considered the first form of action for this facility.

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.

F. Set hot water re-circ pump temperature set-point below hot water supply temperature setting to avoid continuous operation. Provide time clock in addition to hot water re-circ aqua stat to stop hot water circulation during unoccupied periods.

G. Set all computers to sleep or hibernate to conserve energy when not in use.

H. Repair leaking faucets in janitorial closets, bathrooms, and maintenance rooms. Although not a associated with direct energy savings, dripping faucets will corrode and cause calcification on plumbing fixtures resulting in pre-mature replacement.

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 US department of energy reports that commissioning for buildings on average save 5%-15% savings on energy usage.

INSTALLATION COST AND REBATES

CONCORD ENGINEERING GROUP

Denville - Valleyview Middle School

ECM 1: LIGHTING UPGRADE

	Qty	Unit Cost $	Material $	Labor $	Total $
Lighting Fixture Replacement	LS	$66,877	-	-	$66,877
Utility Incentive - NJ Smart Start (1-2) lamp fixture	598	$10.00			($5,980)
Utility Incentive - NJ Smart Start (3-4) lamp fixture	23	$20.00			($460)
Total Cost Less Incentive					$60,437

ECM 2: LIGHTING CONTROLS

	Qty	Unit Cost $	Material $	Labor $	Total $
Dual - Technology Sensor	97	$75	$1,455	$5,820	$7,275
Utility Incentive - NJ Smart Start	97	$20			($1,940)
Total Cost Less Incentive					$5,335

ECM 4: HVAC SYSTEM CONTROLS

	SF	Unit Cost $	Material $	Labor $	Total $
DDC Automation System	82932	$4	-	-	$331,728
Utility Incentive - NJ Smart Start					$0
Total Cost Less Incentive					$331,728

ECM 4: COMPUTER ROOM DUCTLESS SPLIT SYSTEM

	Qty	Unit Cost $	Material $	Labor $	Total $
3 Ton Ductless Split System	2	$5,025	$7,800	$880	$10,050
Utility Incentive - NJ Smart Start (6 tons total)	6	$73			($438)
Total Cost Less Incentive					$9,612

ECM 5: BOILER REPLACEMENT

	Qty	Unit Cost $	Material $	Labor $	Total $
2887 MBH High Eff Boiler	3	$34,100	$86,550	$15,750	$102,300
Old Boiler Demolition	2	$10,800		$21,600	$21,600
Utility Incentive - NJ Smart Start (11,548 MBH	8,661	$1			($8,661)
Total Cost Less Incentive					$115,239

ECM 6: SOLAR PV SYSTEM

	Qty	Unit Cost $	Material $	Labor $	Total $
Solar PV System	1	$726,570			$726,570
Utility Incentive - (see Renewable Energy Measures appendix for details)					-
Total Cost Less Incentive					$726,570

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SmartStart Building Incentives

The NJ SmartStart Buildings Program offers financial incentives on a wide variety of building system equipment. The incentives were developed to help offset the initial cost of energy-efficient equipment. The following tables show the current available incentives as of January, 2009:

Electric Chillers

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

Gas Cooling

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

Desiccant Systems

Desiccant Systems	$1.00 per cfm – gas or electric

Electric Unitary HVAC

Unitary AC and Split Systems	$73 - $93 per ton
Air-to-Air Heat Pumps	$73 - $92 per ton
Water-Source Heat Pumps	$81 per ton
Packaged Terminal AC & HP	$65 per ton
Central DX AC Systems	$40- $72 per ton
Dual Enthalpy Economizer Controls	$250

Ground Source Heat Pumps

Closed Loop & Open Loop	$370 per ton

Gas Heating

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

Variable Frequency Drives

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

Natural Gas Water Heating

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

Premium Motors

Three-Phase Motors	$45 - $700 per motor

Prescriptive Lighting

T-5 and T-8 Lamps w/Electronic Ballast in Existing Facilities	$10 - $30 per fixture, (depending on quantity)
Hard-Wired Compact Fluorescent	$25 - $30 per fixture
Metal Halide w/Pulse Start	$25 per fixture
LED Exit Signs	$10 - $20 per fixture
T-5 and T-8 High Bay Fixtures	$16 - $284 per fixture

Lighting Controls – Occupancy Sensors

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

Lighting Controls – HID or Fluorescent Hi-Bay Controls

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

Other Equipment Incentives

Performance Lighting	$1.00 per watt per SF below program incentive threshold, currently 5% more energy efficient than ASHRAE 90.1-2004 for New Construction and Complete Renovation
Custom Electric and Gas Equipment Incentives	not prescriptive

MAJOR EQUIPMENT LIST

Concord Engineering Group

"Denville Valleyview Middle School"

Domestic Hot Water Heater

Service	Location	Manufacturer	Type	Qty.	Model #	Serial #	Input	Recovery (gal/h)	Capacity (gal)	Efficiency (%)	Fuel	Approx. Age	ASHRAE Service Life	Remaining Life
Building HW	Bsmt Boiler Room	Lochinvar	Indirect Storage	1	RJA200	-	-	-	200	-	-	3	10	7
Kitchen	Kitchen closet	A.O. Smith	Electric	1	-	-	4.5 KW	-	30	100%	Elec	Unknown	10	-

Dedicated Domestic Hot Water Boiler

Service	Location	Manufacturer	Type	Qty.	Model #	Serial #	Input	Recovery (gal/h)	Capacity (gal)	Efficiency (%)	Fuel	Approx. Age	ASHRAE Service Life	Remaining Life
Dom Hot Water Heater	Bsmt Boiler Room	Lochinvar	Gas fired	1	CWN315PM	-	315 MBH	313	-	-	Nat Gas	3	10	7

AC Units

Service	Location	Manufacturer	Type	Qty.	Model #	Serial #	Cooling Type	Cooling Capacity	EER	Heating Type	Heating Capacity (Input)	COP	Fan HP	Motor RPM	Volts	Phase	Approx. Age	ASHRAE Service Life	Remaining Life
Computer Room	Roof	Carrier	Packaged CV	1	50TJ007511	Q497920782	DX R-22	72 MBH	8.9	None	-	-	2.4 BHP	-	208	3	12	15	3
POD A1A	Side of POD	Carrier	Packaged CV	1	38HDCQ48510	4196X34147	DX R-22	48 MBH	10.8	None	-	-	-	-	208	3	13	15	2
POD A1A	Side of POD	Carrier	Packaged CV	1	38HDRQ48501	2806X92428	DX R-22	48 MBH	12.5	None	-	-	-	-	208	3	3	15	12
Workshop	Roof	Carrier	Condensing Unit	1	38QRQ182331	32Q3X72740	DX R-22	18 MBH	10.8	Heat Pump	16	3.1	-	-	208	3	6	15	9
Science Room	Roof	Carrier	Packaged CV	1	Not Accessible	-	DX R-22	Est. 60 MBH	Est. 10								34	15	(19)
Science Room	Roof	Carrier	Packaged CV	1	Not Accessible	-	DX R-22	Est. 60 MBH	Est. 10								34	15	(19)

*Equipment efficiencies listed above are based on new equipment product data.

Boilers

Service	Location	Manufacturer	Type	Qty.	Model #	Serial #	Heating Type	Input Capacity	Output Capacity (Approx)	Efficiency (approx)	Fuel	Approx. Age	ASHRAE Service Life	Remaining Life	Notes
Heating Water Loop	Bsmt Boiler Room	Superior	Dual Fuel - Hot Water	2	GCR4RB150B	4396-10110	Gas	7,071 MBH	5,445 MBH	70%	Gas	46	25	(21)	Burner: Power flame burner model: C4-C0-30, Serial: 089155076

* 5% efficiency degradation from manufacture data assumed in calculation.

Boiler Pumps

Service	Location	Manufacturer	Type	Qty.	Model #	Serial #	Flow	Head	RPM	HP	Volts	Phase	Approx. Age	ASHRAE Service Life	Remaining Life
Heating Water Loop	Bsmt Boiler Room	Armstrong	End Suction Cons Volume	2	819359002	-	-	-	-	7.5	208	-	Unknown	20	-

Unit Ventilators

Location	Area Served	Manufacturer	Type	Qty	Model #	Serial #	Heating Type	Heating Capacity	RPM	HP	GPM	Phase	Approx. Age	ASHRAE Service Life	Remaining Life	
Classrooms	Classroom	Veahitt	Hot Water Coil Ventilator	1*			Hot Water	-	-	-	-	-	Unknown	20	-	

* Typically 1 unit ventilator per classroom / space.

OMB No. 2060-0347

STATEMENT OF ENERGY PERFORMANCE
Valleyview Middle School

Building ID: 1810434
For 12-month Period Ending: June 30, 2009[1]
Date SEP becomes ineligible: N/A
Date SEP Generated: September 04, 2009

Facility
Valleyview Middle School
320 Diamond Spring Rd.
Denville, NJ 07834

Facility Owner
Denville Board of Education
501 Openaki Road
Denville, NJ 07834

Primary Contact for this Facility
John Serapiglia
501 Openaki Road
Denville, NJ 07834

Year Built: 1963
Gross Floor Area (ft²): 82,932

Energy Performance Rating[2] (1-100) 36

Site Energy Use Summary[3]

Electricity - Grid Purchase(kBtu)	2,360,558
Natural Gas (kBtu)[4]	3,533,686
Total Energy (kBtu)	5,894,244

Energy Intensity[5]

Site (kBtu/ft²/yr)	71
Source (kBtu/ft²/yr)	140

Emissions (based on site energy use)

Greenhouse Gas Emissions ($MtCO_2e$/year)	547

Electric Distribution Utility
Jersey Central Power & Lt Co

National Average Comparison

National Average Site EUI	63
National Average Source EUI	124
% Difference from National Average Source EUI	13%
Building Type	K-12 School

Stamp of Certifying Professional

Based on the conditions observed at the time of my visit to this building, I certify that the information contained within this statement is accurate.

Meets Industry Standards[6] **for Indoor Environmental Conditions:**

Ventilation for Acceptable Indoor Air Quality	**N/A**
Acceptable Thermal Environmental Conditions	**N/A**
Adequate Illumination	**N/A**

Certifying Professional
Ray Johnson
520 South Burnt Mill Road
Voorhees, NJ 08043

Notes:
1. Application for the ENERGY STAR must be submitted to EPA within 4 months of the Period Ending date. Award of the ENERGY STAR is not final until approval is received from EPA.
2. The EPA Energy Performance Rating is based on total source energy. A rating of 75 is the minimum to be eligible for the ENERGY STAR.
3. Values represent energy consumption, annualized to a 12-month period.
4. Natural Gas values in units of volume (e.g. cubic feet) are converted to kBtu with adjustments made for elevation based on Facility zip code.
5. Values represent energy intensity, annualized to a 12-month period.
6. Based on Meeting ASHRAE Standard 62 for ventilation for acceptable indoor air quality, ASHRAE Standard 55 for thermal comfort, and IESNA Lighting Handbook for lighting quality.

ENERGY STAR® Data Checklist for Commercial Buildings

In order for a building to qualify for the ENERGY STAR, a Professional Engineer (PE) must validate the accuracy of the data underlying the building's energy performance rating. This checklist is designed to provide an at-a-glance summary of a property's physical and operating characteristics, as well as its total energy consumption, to assist the PE in double-checking the information that the building owner or operator has entered into Portfolio Manager.

Please complete and sign this checklist and include it with the stamped, signed Statement of Energy Performance.
NOTE: You must check each box to indicate that each value is correct, OR include a note.

CRITERION	VALUE AS ENTERED IN PORTFOLIO MANAGER	VERIFICATION QUESTIONS	NOTES	☑
Building Name	Valleyview Middle 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	320 Diamond Spring Rd., Denville, NJ 07834	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		☐
Valleyview Middle School (K-12 School)				
CRITERION	**VALUE AS ENTERED IN PORTFOLIO MANAGER**	**VERIFICATION QUESTIONS**	**NOTES**	☑
Gross Floor Area	82,932 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	163	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	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	50 %	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: Jersey Central Power & Lt Co

Fuel Type: Electricity

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

Start Date	End Date	Energy Use (kWh (thousand Watt-hours))
06/01/2009	06/30/2009	46,720.00
05/01/2009	05/31/2009	60,960.00
04/01/2009	04/30/2009	57,760.00
03/01/2009	03/31/2009	71,840.00
02/01/2009	02/28/2009	69,600.00
01/01/2009	01/31/2009	75,680.00
12/01/2008	12/31/2008	65,600.00
11/01/2008	11/30/2008	52,800.00
10/01/2008	10/31/2008	48,320.00
09/01/2008	09/30/2008	41,280.00
08/01/2008	08/31/2008	33,760.00
07/01/2008	07/31/2008	67,520.00
Electric Consumption (kWh (thousand Watt-hours))		**691,840.00**
Electric Consumption (kBtu (thousand Btu))		**2,360,558.08**
Total Electricity (Grid Purchase) Consumption (kBtu (thousand Btu))		**2,360,558.08**
Is this the total Electricity (Grid Purchase) consumption at this building including all Electricity meters?		☐

Fuel Type: Natural Gas

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

Start Date	End Date	Energy Use (therms)
06/01/2009	06/30/2009	828.65
05/01/2009	05/30/2009	165.35
04/01/2009	04/30/2009	2,772.52
03/01/2009	03/31/2009	3,773.78
02/01/2009	02/28/2009	5,942.04
01/01/2009	01/31/2009	7,843.46
12/01/2008	12/31/2008	6,815.50
11/01/2008	11/30/2008	4,612.48
10/01/2008	10/31/2008	2,074.08
09/01/2008	09/30/2008	175.00

08/01/2008	08/31/2008	75.00
07/01/2008	07/31/2008	259.00
Gas Consumption (therms)		**35,336.86**
Gas Consumption (kBtu (thousand Btu))		**3,533,686.00**
Total Natural Gas Consumption (kBtu (thousand Btu))		**3,533,686.00**
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
Valleyview Middle School
320 Diamond Spring Rd.
Denville, NJ 07834

Facility Owner
Denville Board of Education
501 Openaki Road
Denville, NJ 07834

Primary Contact for this Facility
John Serapiglia
501 Openaki Road
Denville, NJ 07834

General Information

Valleyview Middle School	
Gross Floor Area Excluding Parking: (ft^2)	82,932
Year Built	1963
For 12-month Evaluation Period Ending Date:	June 30, 2009

Facility Space Use Summary

Valleyview Middle School	
Space Type	K-12 School
Gross Floor Area(ft^2)	82,932
Open Weekends?	No
Number of PCs	163
Number of walk-in refrigeration/freezer units	0
Presence of cooking facilities	Yes
Percent Cooled	50
Percent Heated	100
Months°	10
High School?	No
School District°	N/A

Energy Performance Comparison

	Evaluation Periods		Comparisons		
Performance Metrics	**Current** (Ending Date 06/30/2009)	**Baseline** (Ending Date 06/30/2009)	**Rating of 75**	**Target**	**National Average**
Energy Performance Rating	36	36	75	N/A	50
Energy Intensity					
Site ($kBtu/ft^2$)	71	71	49	N/A	63
Source ($kBtu/ft^2$)	140	140	97	N/A	124
Energy Cost					
$/year	$ 112,176.00	$ 112,176.00	$ 77,767.15	N/A	$ 99,438.41
$/$ft^2$/year	$ 1.35	$ 1.35	$ 0.94	N/A	$ 1.20
Greenhouse Gas Emissions					
$MtCO_2e$/year	547	547	379	N/A	485
$kgCO_2e/ft^2$/year	7	7	5	N/A	6

More than 50% of your building is defined as K-12 School. Please note that your rating accounts for all of the spaces listed. The National Average column presents energy performance data your building would have if your building had an average rating of 50.

Notes:
o - This attribute is optional.
d - A default value has been supplied by Portfolio Manager.

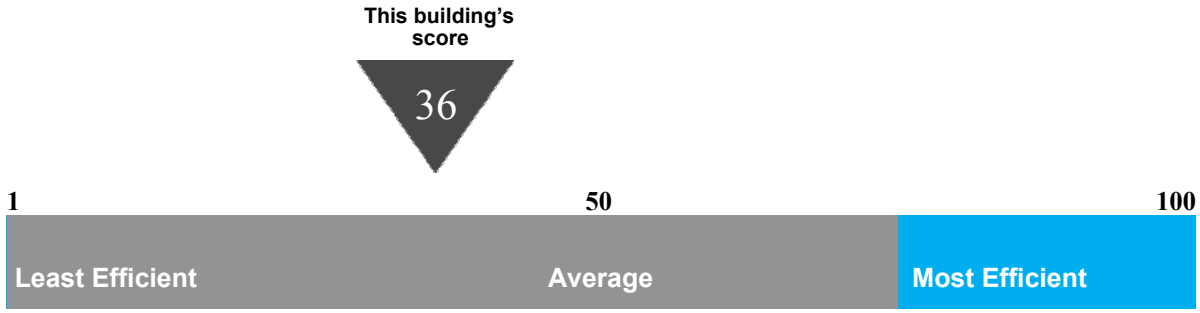
Statement of Energy Performance

2009

Valleyview Middle School
320 Diamond Spring Rd.
Denville, NJ 07834

Portfolio Manager Building ID: 1810434

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 140 kBtu per square foot per year.*

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

Buildings with a score of 75 or higher may qualify for EPA's ENERGY STAR.

I certify that the information contained within this statement is accurate and in accordance with U.S. Environmental Protection Agency's measurement standards, found at energystar.gov

Date of certification

EPA United States Environmental Protection Agency

Date Generated: 09/04/2009

CEG Job #: 9C09080
Project: Denville Valleyview MS
Address: 320 Diamond Spring Road
Denville, NJ 07834
Building SF: 82,932

"Denville Valleyview Middle School"

KWH COST: $0.162

ECM #1: Lighting Upgrade - General

EXISTING LIGHTING										PROPOSED LIGHTING									SAVINGS			
CEG Type	Fixture Location	Yearly Usage	No. Fixts	No. Lamps	Fixture Type	Fixt Watts	Total kW	kWh/Yr Fixtures	Yearly $ Cost	No. Fixts	No. Lamps	Retro-Unit Description	Watts Used	Total kW	kWh/Yr Fixtures	Yearly $ Cost	Unit Cost (INSTALLED)	Total Cost	kW Savings	kWh/Yr Savings	Yearly $ Savings	Yearly Simple Payback
1	Dellala's Back left	1880	1	2	2-Lamp, T12, Magnetic Ballast, Surface Mounted, Prismatic Lens	80	0.08	150.4	$24.36	1	2	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	55	0.06	103.4	$16.75	$100.00	$100.00	0.03	47	$7.61	13.13
1	Dellala's Front Office	1880	2	2	2-Lamp, T12, Magnetic Ballast, Surface Mounted, Prismatic Lens	80	0.16	300.8	$48.73	2	2	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	55	0.11	206.8	$33.50	$100.00	$200.00	0.05	94	$15.23	13.13
1	Nurse's Side Room	1880	2	2	2-Lamp, T12, Magnetic Ballast, Surface Mounted, Prismatic Lens	80	0.16	300.8	$48.73	2	2	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	55	0.11	206.8	$33.50	$100.00	$200.00	0.05	94	$15.23	13.13
4	Faculty Bathroom	1880	1	0	2-Lamp, Incandescent, 75 Watt Bulbs, Surface Mounted, Direct	150	0.15	282.0	$45.68	1	0	(2) 18 W CFL Lamp	36	0.04	67.68	$10.96	$11.50	$11.50	0.11	214.32	$34.72	0.33
2	Faculty Room	1880	4	4	4-Lamp, T12, Magnetic Ballast, Recessed Mount, Parabolic Lens	160	0.64	1,203.2	$194.92	4	3	2'x4' 3-Lamp 32W T-8 Parabolic Lens/Elect Ballast; Metalux M/N 2GC8	91	0.36	684.32	$110.86	$140.00	$560.00	0.28	518.88	$84.06	6.66
3		1880	1	2	2-Lamp, T12, Magnetic Ballast, Recessed Mounted, Parabolic Lens	80	0.08	150.4	$24.36	1	2	1'X4' 2-Lamp 32W T-8 Parabolic Lens/Elect Ballast; Metalux M/N GC	55	0.06	103.4	$16.75	$100.00	$100.00	0.03	47	$7.61	13.13
1		1880	1	2	2-Lamp, T12, Magnetic Ballast, Surface Mounted, Prismatic Lens	80	0.08	150.4	$24.36	1	2	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	55	0.06	103.4	$16.75	$100.00	$100.00	0.03	47	$7.61	13.13
5	Faculty Toilet	1880	1	0	2-Lamp, Compact Flourescent, Vanity Light	36	0.04	67.7	$10.96	1	0	No Change	36	0.04	67.68	$10.96	$0.00	$0.00	0.00	0	$0.00	0.00
6	Gym Foyer	1880	1	4	2 Foot, 4-Lamp, T12, Magnetic Ballast, Recessed Mount, Parabolic Lens	94	0.09	176.7	$28.63	1	3	3 Lamp T-8 GE-332	47	0.05	88.36	$14.31	$29.36	$29.36	0.05	88.36	$14.31	2.05
3		1880	1	2	2-Lamp, T12, Magnetic Ballast, Recessed Mounted, Parabolic Lens	80	0.08	150.4	$24.36	1	2	1'X4' 2-Lamp 32W T-8 Parabolic Lens/Elect Ballast; Metalux M/N GC	55	0.06	103.4	$16.75	$100.00	$100.00	0.03	47	$7.61	13.13
7	Gym	1880	17	0	1-Lamp Metal Halides	455	7.74	14,541.8	$2,355.77	17	0	No Change	455	7.74	14541.8	$2,355.77	$0.00	$0.00	0.00	0	$0.00	0.00
8	Stage	260	28	0	1-Lamp Halogens, Direct Lighting	75	2.10	546.0	$88.45	28	0	No Change	75	2.10	546	$88.45	$0.00	$0.00	0.00	0	$0.00	0.00
9		1880	6	2	2-Lamp, T12, Magnetic Ballast, Surface Mounted, No Lens	80	0.48	902.4	$146.19	6	2	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	55	0.33	620.4	$100.50	$100.00	$600.00	0.15	282	$45.68	13.13
1	Boys Lockerroom	1880	10	2	2-Lamp, T12, Magnetic Ballast, Surface Mounted, Prismatic Lens	80	0.80	1,504.0	$243.65	10	2	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	55	0.55	1034	$167.51	$100.00	$1,000.00	0.25	470	$76.14	13.13
10	Boys Locker Room Shower	1880	2	0	1-Lamp Incandescents	75	0.15	282.0	$45.68	2	0	18 W CFL Lamp	18	0.04	67.68	$10.96	$5.75	$11.50	0.11	214.32	$34.72	0.33
11	Cafeteria Storage	470	1	0	4-Lamp Incandescent	300	0.30	141.0	$22.84	1	0	(4) 18 W CFL Lamp	72	0.07	33.84	$5.48	$23.00	$23.00	0.23	107.16	$17.36	1.32

1	Copy Room	1880	3	2	2-Lamp, T12, Magnetic Ballast, Surface Mounted, Prismatic Lens	80	0.24	451.2	$73.09	3	2	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	55	0.17	310.2	$50.25	$100.00	$300.00	0.08	141	$22.84	13.13
10	A-Hall Custodial Closet	470	1	0	1-Lamp Incandescents	75	0.08	35.3	$5.71	1	0	18 W CFL Lamp	18	0.02	8.46	$1.37	$5.75	$5.75	0.06	26.79	$4.34	1.32
1	Incinerator	470	2	2	2-Lamp, T12, Magnetic Ballast, Surface Mounted, Prismatic Lens	80	0.16	75.2	$12.18	2	2	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	55	0.11	51.7	$8.38	$100.00	$200.00	0.05	23.5	$3.81	52.53
1	Boys A-hall Bathroom	1880	1	2	2-Lamp, T12, Magnetic Ballast, Surface Mounted, Prismatic Lens	80	0.08	150.4	$24.36	1	2	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	55	0.06	103.4	$16.75	$100.00	$100.00	0.03	47	$7.61	13.13
1	Girls A-hall Bathroom	1880	1	2	2-Lamp, T12, Magnetic Ballast, Surface Mounted, Prismatic Lens	80	0.08	150.4	$24.36	1	2	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	55	0.06	103.4	$16.75	$100.00	$100.00	0.03	47	$7.61	13.13
1	General Storage	470	5	2	2-Lamp, T12, Magnetic Ballast, Surface Mounted, Prismatic Lens	80	0.40	188.0	$30.46	5	2	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	55	0.28	129.25	$20.94	$100.00	$500.00	0.13	58.75	$9.52	52.53
10		470	2	0	1-Lamp Incandescents	75	0.15	70.5	$11.42	2	0	18 W CFL Lamp	18	0.04	16.92	$2.74	$5.75	$11.50	0.11	53.58	$8.68	1.32
12		470	1	0	1-Lamp Compact Flourescent	13	0.01	6.1	$0.99	1	0	No Change	13	0.01	6.11	$0.99	$0.00	$0.00	0.00	0	$0.00	0.00
12	Boiler Room	470	11	0	1-Lamp Compact Flourescent	13	0.14	67.2	$10.89	11	0	No Change	13	0.14	67.21	$10.89	$0.00	$0.00	0.00	0	$0.00	0.00
1		470	4	2	2-Lamp, T12, Magnetic Ballast, Surface Mounted, Prismatic Lens	80	0.32	150.4	$24.36	4	2	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	55	0.22	103.4	$16.75	$100.00	$400.00	0.10	47	$7.61	52.53
3	A-Hall Main Entrance	2350	6	2	2-Lamp, T12, Magnetic Ballast, Recessed Mounted, Parabolic Lens	80	0.48	1,128.0	$182.74	6	2	1'X4' 2-Lamp 32W T-8 Parabolic Lens/Elect Ballast; Metalux M/N GC	55	0.33	775.5	$125.63	$100.00	$600.00	0.15	352.5	$57.11	10.51
13	A-Hall Communications Closet	470	4	3	3-Lamp, T12, Magnetic Ballast, Recessed Mounted, Parabolic Lens	130	0.52	244.4	$39.59	4	3	2'X4' 3-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N 2GC8	91	0.36	171.08	$27.71	$120.00	$480.00	0.16	73.32	$11.88	40.41
9	A-Hall Room Storage	470	1	2	2-Lamp, T12, Magnetic Ballast, Surface Mounted, No Lens	80	0.08	37.6	$6.09	1	2	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	55	0.06	25.85	$4.19	$100.00	$100.00	0.03	11.75	$1.90	52.53
1	A-Hall Room Foyer	1880	7	2	2-Lamp, T12, Magnetic Ballast, Surface Mounted, Prismatic Lens	80	0.56	1,052.8	$170.55	7	2	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	55	0.39	723.8	$117.26	$100.00	$700.00	0.18	329	$53.30	13.13
1	Office Rooms	1880	6	2	2-Lamp, T12, Magnetic Ballast, Surface Mounted, Prismatic Lens	80	0.48	902.4	$146.19	6	2	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	55	0.33	620.4	$100.50	$100.00	$600.00	0.15	282	$45.68	13.13
13	Server Room	470	4	3	3-Lamp, T12, Magnetic Ballast, Recessed Mounted, Parabolic Lens	130	0.52	244.4	$39.59	4	3	2'X4' 3-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N 2GC8	91	0.36	171.08	$27.71	$120.00	$480.00	0.16	73.32	$11.88	40.41
1	Computer Lab	1880	12	2	2-Lamp, T12, Magnetic Ballast, Surface Mounted, Prismatic Lens	80	0.96	1,804.8	$292.38	12	2	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	55	0.66	1240.8	$201.01	$100.00	$1,200.00	0.30	564	$91.37	13.13
1	Library Storage	1880	3	2	2-Lamp, T12, Magnetic Ballast, Surface Mounted, Prismatic Lens	80	0.24	451.2	$73.09	3	2	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	55	0.17	310.2	$50.25	$100.00	$300.00	0.08	141	$22.84	13.13
1	Library Office	1880	3	2	2-Lamp, T12, Magnetic Ballast, Surface Mounted, Prismatic Lens	80	0.24	451.2	$73.09	3	2	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	55	0.17	310.2	$50.25	$100.00	$300.00	0.08	141	$22.84	13.13

1	Library Study	1880	6	2	2-Lamp, T12, Magnetic Ballast, Surface Mounted, Prismatic	80	0.48	902.4	$146.19	6	2	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	55	0.33	620.4	$100.50	$100.00	$600.00	0.15	282	$45.68	13.13
14	Classroom B-24	1880	18	2	2-Lamp, T12, Magnetic Ballast, Pendant Mounted, Prismatic Lens	80	1.44	2,707.2	$438.57	18	2	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	55	0.99	1861.2	$301.51	$100.00	$1,800.00	0.45	846	$137.05	13.13
14	Classroom B-23	1880	6	2	2-Lamp, T12, Magnetic Ballast, Pendant Mounted, Prismatic Lens	80	0.48	902.4	$146.19	6	2	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	55	0.33	620.4	$100.50	$100.00	$600.00	0.15	282	$45.68	13.13
14	Classroom B-22	1880	6	2	2-Lamp, T12, Magnetic Ballast, Pendant Mounted, Prismatic Lens	80	0.48	902.4	$146.19	6	2	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	55	0.33	620.4	$100.50	$100.00	$600.00	0.15	282	$45.68	13.13
14	Classroom B-21	1880	6	2	2-Lamp, T12, Magnetic Ballast, Pendant Mounted, Prismatic Lens	80	0.48	902.4	$146.19	6	2	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	55	0.33	620.4	$100.50	$100.00	$600.00	0.15	282	$45.68	13.13
14	Classroom B-28	1880	6	2	2-Lamp, T12, Magnetic Ballast, Pendant Mounted, Prismatic Lens	80	0.48	902.4	$146.19	6	2	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	55	0.33	620.4	$100.50	$100.00	$600.00	0.15	282	$45.68	13.13
14	Classroom B-27	1880	6	2	2-Lamp, T12, Magnetic Ballast, Pendant Mounted, Prismatic Lens	80	0.48	902.4	$146.19	6	2	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	55	0.33	620.4	$100.50	$100.00	$600.00	0.15	282	$45.68	13.13
14	Classroom B-26	1880	6	2	2-Lamp, T12, Magnetic Ballast, Pendant Mounted, Prismatic Lens	80	0.48	902.4	$146.19	6	2	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	55	0.33	620.4	$100.50	$100.00	$600.00	0.15	282	$45.68	13.13
12	B Stairwell	8760	4	0	1-Lamp Compact Flourescent	13	0.05	455.5	$73.79	4	0	No Change	13	0.05	455.52	$73.79	$0.00	$0.00	0.00	0	$0.00	0.00
14	Classroom B-11	1880	6	2	2-Lamp, T12, Magnetic Ballast, Pendant Mounted, Prismatic Lens	80	0.48	902.4	$146.19	6	2	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	55	0.33	620.4	$100.50	$100.00	$600.00	0.15	282	$45.68	13.13
14	Classroom B-18	1880	6	2	2-Lamp, T12, Magnetic Ballast, Pendant Mounted, Prismatic Lens	80	0.48	902.4	$146.19	6	2	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	55	0.33	620.4	$100.50	$100.00	$600.00	0.15	282	$45.68	13.13
14	Classroom B-12	1880	6	2	2-Lamp, T12, Magnetic Ballast, Pendant Mounted, Prismatic Lens	80	0.48	902.4	$146.19	6	2	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	55	0.33	620.4	$100.50	$100.00	$600.00	0.15	282	$45.68	13.13
14	Classroom B-17	1880	6	2	2-Lamp, T12, Magnetic Ballast, Pendant Mounted, Prismatic Lens	80	0.48	902.4	$146.19	6	2	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	55	0.33	620.4	$100.50	$100.00	$600.00	0.15	282	$45.68	13.13
14	Classroom B-13	1880	6	2	2-Lamp, T12, Magnetic Ballast, Pendant Mounted, Prismatic Lens	80	0.48	902.4	$146.19	6	2	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	55	0.33	620.4	$100.50	$100.00	$600.00	0.15	282	$45.68	13.13
14	Classroom B-16	1880	6	2	2-Lamp, T12, Magnetic Ballast, Pendant Mounted, Prismatic Lens	80	0.48	902.4	$146.19	6	2	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	55	0.33	620.4	$100.50	$100.00	$600.00	0.15	282	$45.68	13.13
14	Classroom B-14	1880	6	2	2-Lamp, T12, Magnetic Ballast, Pendant Mounted, Prismatic Lens	80	0.48	902.4	$146.19	6	2	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	55	0.33	620.4	$100.50	$100.00	$600.00	0.15	282	$45.68	13.13
14	Classroom B-15	1880	6	2	2-Lamp, T12, Magnetic Ballast, Pendant Mounted, Prismatic Lens	80	0.48	902.4	$146.19	6	2	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	55	0.33	620.4	$100.50	$100.00	$600.00	0.15	282	$45.68	13.13

15	Life Skills 2	1880	10	2	8 Foot, 2-Lamp, T12, Magnetic Ballast, Pendant Mounted, Prismatic	253	2.53	4,756.4	$770.54	10	2	8' 2-Lamp T-8 Cooper Metalux, Electronic Ballast M/N 8TDIM-232-UNV-EB81-U	118	1.18	2218.4	$359.38	$207.00	$2,070.00	1.35	2538	$411.16	5.03
14	Life Skills 1	1880	24	2	2-Lamp, T12, Magnetic Ballast, Pendant Mounted, Prismatic Lens	80	1.92	3,609.6	$584.76	24	2	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	55	1.32	2481.6	$402.02	$100.00	$2,400.00	0.60	1128	$182.74	13.13
1	C-Hall Girls	1880	2	2	2-Lamp, T12, Magnetic Ballast, Surface Mounted, Prismatic Lens	80	0.16	300.8	$48.73	2	2	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	55	0.11	206.8	$33.50	$100.00	$200.00	0.05	94	$15.23	13.13
1	C- Hall Guys	1880	2	2	2-Lamp, T12, Magnetic Ballast, Surface Mounted, Prismatic Lens	80	0.16	300.8	$48.73	2	2	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	55	0.11	206.8	$33.50	$100.00	$200.00	0.05	94	$15.23	13.13
16	Classroom C-4	1880	12	2	2-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	80	0.96	1,804.8	$292.38	12	2	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	55	0.66	1240.8	$201.01	$100.00	$1,200.00	0.30	564	$91.37	13.13
17	Men's Faculty	1880	1	0	2-Lamp, Compact Flourescent, Vanity Light	26	0.03	48.9	$7.92	1	0	No Change	26	0.03	48.88	$7.92	$0.00	$0.00	0.00	0	$0.00	0.00
17	Women's Faculty	1880	1	0	2-Lamp, Compact Flourescent, Vanity Light	26	0.03	48.9	$7.92	1	0	No Change	26	0.03	48.88	$7.92	$0.00	$0.00	0.00	0	$0.00	0.00
16	Classroom C-3	1880	12	2	2-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	80	0.96	1,804.8	$292.38	12	2	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	55	0.66	1240.8	$201.01	$100.00	$1,200.00	0.30	564	$91.37	13.13
16	Classroom C-2	1880	12	2	2-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	80	0.96	1,804.8	$292.38	12	2	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	55	0.66	1240.8	$201.01	$100.00	$1,200.00	0.30	564	$91.37	13.13
16	Classroom C-1	1880	12	2	2-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	80	0.96	1,804.8	$292.38	12	2	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	55	0.66	1240.8	$201.01	$100.00	$1,200.00	0.30	564	$91.37	13.13
16	Classroom C-6	1880	12	2	2-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	80	0.96	1,804.8	$292.38	12	2	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	55	0.66	1240.8	$201.01	$100.00	$1,200.00	0.30	564	$91.37	13.13
16	Classroom C-8	1880	12	2	2-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	80	0.96	1,804.8	$292.38	12	2	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	55	0.66	1240.8	$201.01	$100.00	$1,200.00	0.30	564	$91.37	13.13
17	Custodial Closet	470	1	0	2-Lamp, Compact Flourescent, Vanity Light	26	0.03	12.2	$1.98	1	0	No Change	26	0.03	12.22	$1.98	$0.00	$0.00	0.00	0	$0.00	0.00
4		470	1	0	2-Lamp, Incandescent, 75 Watt Bulbs, Surface Mounted, Direct	150	0.15	70.5	$11.42	1	0	(2) 18 W CFL Lamp	36	0.04	16.92	$2.74	$11.50	$11.50	0.11	53.58	$8.68	1.32
16	Art-C	1880	18	2	2-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	80	1.44	2,707.2	$438.57	18	2	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	55	0.99	1861.2	$301.51	$100.00	$1,800.00	0.45	846	$137.05	13.13
10		1880	3	0	1-Lamp Incandescents	75	0.23	423.0	$68.53	3	0	18 W CFL Lamp	18	0.05	101.52	$16.45	$5.75	$17.25	0.17	321.48	$52.08	0.33
1		1880	4	2	2-Lamp, T12, Magnetic Ballast, Surface Mounted, Prismatic Lens	80	0.32	601.6	$97.46	4	2	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	55	0.22	413.6	$67.00	$100.00	$400.00	0.10	188	$30.46	13.13
18	Classroom C-12	1880	30	0	2-Lamp, T8, Electronic Ballast, Pendant Mounted, Parabolic Lens	58	1.74	3,271.2	$529.93	30	0	No Change	58	1.74	3271.2	$529.93	$0.00	$0.00	0.00	0	$0.00	0.00

18	Classroom C-13	1880	29	0	2-Lamp, T8, Electronic Ballast, Pendant Mounted, Parabolic Lens	58	1.68	3,162.2	$512.27	29	0	No Change	58	1.68	3162.16	$512.27	$0.00	$0.00	0.00	0	$0.00	0.00
19	Classroom C-15	1880	12	0	2-Lamp, T8, Electronic Ballast, Surface Mounted, Prismatic Lens	58	0.70	1,308.5	$211.97	12	0	No Change	58	0.70	1308.48	$211.97	$0.00	$0.00	0.00	0	$0.00	0.00
20		1880	2	0	1 Lamp Incandescents	60	0.12	225.6	$36.55	2	0	18 W CFL Lamp	18	0.04	67.68	$10.96	$5.75	$11.50	0.08	157.92	$25.58	0.45
19	C-17	1880	12	0	2-Lamp, T8, Electronic Ballast, Surface Mounted, Prismatic Lens	58	0.70	1,308.5	$211.97	12	0	No Change	58	0.70	1308.48	$211.97	$0.00	$0.00	0.00	0	$0.00	0.00
20		1880	2	0	1 Lamp Incandescents	60	0.12	225.6	$36.55	2	0	18 W CFL Lamp	18	0.04	67.68	$10.96	$5.75	$11.50	0.08	157.92	$25.58	0.45
19	C-16	1880	12	0	2-Lamp, T8, Electronic Ballast, Surface Mounted, Prismatic Lens	58	0.70	1,308.5	$211.97	12	0	No Change	58	0.70	1308.48	$211.97	$0.00	$0.00	0.00	0	$0.00	0.00
20		1880	2	0	1 Lamp Incandescents	60	0.12	225.6	$36.55	2	0	18 W CFL Lamp	18	0.04	67.68	$10.96	$5.75	$11.50	0.08	157.92	$25.58	0.45
8	Outside Trailer Doors	1880	8	0	1-Lamp Halogens, Direct Lighting	75	0.60	1,128.0	$182.74	8	0	No Change	75	0.60	1128	$182.74	$0.00	$0.00	0.00	0	$0.00	0.00
9	Industrial Room	1880	38	2	2-Lamp, T12, Magnetic Ballast, Surface Mounted, No Lens	80	3.04	5,715.2	$925.86	38	2	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	55	2.09	3929.2	$636.53	$100.00	$3,800.00	0.95	1786	$289.33	13.13
21	Industrial Computer Room	1880	2	0	3-Lamp, T8, Electronic Ballast, Recessed, Parabolic Lens	82	0.16	308.3	$49.95	2	0	No Change	82	0.16	308.32	$49.95	$0.00	$0.00	0.00	0	$0.00	0.00
1	Dellala's Back Right Room	1880	1	2	2-Lamp, T12, Magnetic Ballast, Surface Mounted, Prismatic Lens	80	0.08	150.4	$24.36	1	2	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	55	0.06	103.4	$16.75	$100.00	$100.00	0.03	47	$7.61	13.13
1	Nurse's Office	1880	8	2	2-Lamp, T12, Magnetic Ballast, Surface Mounted, Prismatic Lens	80	0.64	1,203.2	$194.92	8	2	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	55	0.44	827.2	$134.01	$100.00	$800.00	0.20	376	$60.91	13.13
10	Nurse's Bathroom	1880	1	0	1-Lamp Incandescents	75	0.08	141.0	$22.84	1	0	18 W CFL Lamp	18	0.02	33.84	$5.48	$5.75	$5.75	0.06	107.16	$17.36	0.33
16	Corridor Between Gym and Admin	1880	2	2	2-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	80	0.16	300.8	$48.73	2	2	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	55	0.11	206.8	$33.50	$100.00	$200.00	0.05	94	$15.23	13.13
10	Gym Storage Room	1880	2	0	1-Lamp Incandescents	75	0.15	282.0	$45.68	2	0	18 W CFL Lamp	18	0.04	67.68	$10.96	$5.75	$11.50	0.11	214.32	$34.72	0.33
1	Girls Locker Room	1880	12	2	2-Lamp, T12, Magnetic Ballast, Surface Mounted, Prismatic Lens	80	0.96	1,804.8	$292.38	12	2	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	55	0.66	1240.8	$201.01	$100.00	$1,200.00	0.30	564	$91.37	13.13
10	Girls Locker Room Shower	1880	2	0	1-Lamp Incandescents	75	0.15	282.0	$45.68	2	0	18 W CFL Lamp	18	0.04	67.68	$10.96	$5.75	$11.50	0.11	214.32	$34.72	0.33
11	Gym Storage Room	470	2	0	4-Lamp Incandescent	300	0.60	282.0	$45.68	2	0	(4) 18 W CFL Lamp	72	0.14	67.68	$10.96	$23.00	$46.00	0.46	214.32	$34.72	1.32
16	Cafeteria	1880	30	2	2-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	80	2.40	4,512.0	$730.94	30	2	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	55	1.65	3102	$502.52	$100.00	$3,000.00	0.75	1410	$228.42	13.13
22	Kitchen	1880	3	4	4-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	160	0.48	902.4	$146.19	3	3	2'x4' 3-Lamp 32W T-8 Prismatic Lens / Elect Ballast; Metalux M/N 2GC8	91	0.27	513.24	$83.14	$140.00	$420.00	0.21	389.16	$63.04	6.66
1	Music Classroom	1880	27	2	2-Lamp, T12, Magnetic Ballast, Surface Mounted, Prismatic Lens	80	2.16	4,060.8	$657.85	27	2	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	55	1.49	2791.8	$452.27	$100.00	$2,700.00	0.68	1269	$205.58	13.13
1	Music Room Storage	470	2	2	2-Lamp, T12, Magnetic Ballast, Surface Mounted, Prismatic Lens	80	0.16	75.2	$12.18	2	2	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	55	0.11	51.7	$8.38	$100.00	$200.00	0.05	23.5	$3.81	52.53

1	Corridor Trophy Case	1880	1	2	2-Lamp, T12, Magnetic Ballast, Surface Mounted, Prismatic Lens	80	0.08	150.4	$24.36	1	2	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	55	0.06	103.4	$16.75	$100.00	$100.00	0.03	47	$7.61	13.13
23	Main Entracne Corridor	2350	8	4	2 Foot, 4-Lamp, T12, Magnetic Ballast, Recessed Mount, Prismatic Lens	94	0.75	1,767.2	$286.29	8	3	3 Lamp T-8 GE-332	47	0.38	883.6	$143.14	$29.36	$234.88	0.38	883.6	$143.14	1.64
1	Classroom A1A	1880	8	2	2-Lamp, T12, Magnetic Ballast, Surface Mounted, Prismatic Lens	80	0.64	1,203.2	$194.92	8	2	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	55	0.44	827.2	$134.01	$100.00	$800.00	0.20	376	$60.91	13.13
1	Classroom A1B	1880	8	2	2-Lamp, T12, Magnetic Ballast, Surface Mounted, Prismatic Lens	80	0.64	1,203.2	$194.92	8	2	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	55	0.44	827.2	$134.01	$100.00	$800.00	0.20	376	$60.91	13.13
1	Main Office	2350	11	2	2-Lamp, T12, Magnetic Ballast, Surface Mounted, Prismatic Lens	80	0.88	2,068.0	$335.02	11	2	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	55	0.61	1421.75	$230.32	$100.00	$1,100.00	0.28	646.25	$104.69	10.51
24	Bridge Corridor	2350	10	1	3 Foot, 1-Lamp, T12, Magnetic Ballast, Surface Mounted, Prismatic Lens	47	0.47	1,104.5	$178.93	10	0	3' - 1-Lamp 25W T-8 Prismatic Lens / Elect Ballast; Metalux M/N SNF125	23	0.23	540.5	$87.56	$119.00	$1,190.00	0.24	564	$91.37	13.02
6	Elevator Area	1880	3	4	2 Foot, 4-Lamp, T12, Magnetic Ballast, Recessed Mount, Parabolic Lens	94	0.28	530.2	$85.89	3	3	3 Lamp T-8 GE-332	47	0.14	265.08	$42.94	$29.36	$88.08	0.14	265.08	$42.94	2.05
25		1880	2	0	1-Lamp Compact Flourescent	28	0.06	105.3	$17.06	2	0	No Change	28	0.06	105.28	$17.06	$0.00	$0.00	0.00	0	$0.00	0.00
1	Library	1880	52	2	2-Lamp, T12, Magnetic Ballast, Surface Mounted, Prismatic Lens	80	4.16	7,820.8	$1,266.97	52	2	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	55	2.86	5376.8	$871.04	$100.00	$5,200.00	1.30	2444	$395.93	13.13
16		1880	2	2	2-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	80	0.16	300.8	$48.73	2	2	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	55	0.11	206.8	$33.50	$100.00	$200.00	0.05	94	$15.23	13.13
16	Corridor B21 to B28	2350	8	2	2-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	80	0.64	1,504.0	$243.65	8	2	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	55	0.44	1034	$167.51	$100.00	$800.00	0.20	470	$76.14	10.51
26	Girl's Bathroom	1880	6	0	2-Lamp, T8, U-Lamp, Electronic Ballast, Recessed Mounted, Prismatic Lens	73	0.44	823.4	$133.40	6	0	No Change	73	0.44	823.44	$133.40	$0.00	$0.00	0.00	0	$0.00	0.00
26	Co-Ed Bathroom	1880	1	0	2-Lamp, T8, U-Lamp, Electronic Ballast, Recessed Mounted, Prismatic Lens	73	0.07	137.2	$22.23	1	0	No Change	73	0.07	137.24	$22.23	$0.00	$0.00	0.00	0	$0.00	0.00
26	Boys Bathroom	1880	7	0	2-Lamp, T8, U-Lamp, Electronic Ballast, Recessed Mounted, Prismatic Lens	73	0.51	960.7	$155.63	7	0	No Change	73	0.51	960.68	$155.63	$0.00	$0.00	0.00	0	$0.00	0.00
16	Corridor	2350	12	2	2-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	80	0.96	2,256.0	$365.47	12	2	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	55	0.66	1551	$251.26	$100.00	$1,200.00	0.30	705	$114.21	10.51
12	Elevator Entrance	1880	2	0	1-Lamp Compact Flourescent	13	0.03	48.9	$7.92	2	0	No Change	13	0.03	48.88	$7.92	$0.00	$0.00	0.00	0	$0.00	0.00
1	Trophy Case	1880	1	2	2-Lamp, T12, Magnetic Ballast, Surface Mounted, Prismatic Lens	80	0.08	150.4	$24.36	1	2	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	55	0.06	103.4	$16.75	$100.00	$100.00	0.03	47	$7.61	13.13
26	Boys Bathroom	1880	7	0	2-Lamp, T8, U-Lamp, Electronic Ballast, Recessed Mounted, Prismatic Lens	73	0.51	960.7	$155.63	7	0	No Change	73	0.51	960.68	$155.63	$0.00	$0.00	0.00	0	$0.00	0.00

26	Gils Bathroom	1880	6	0	2-Lamp, T8, U-Lamp, Electronic Ballast, Recessed Mounted, Prismatic Lens	73	0.44	823.4	$133.40	6	0	No Change	73	0.44	823.44	$133.40	$0.00	$0.00	0.00	0	$0.00	0.00
26	Co-Ed Bathroom	1880	1	0	2-Lamp, T8, U-Lamp, Electronic Ballast, Recessed Mounted, Prismatic Lens	73	0.07	137.2	$22.23	1	0	No Change	73	0.07	137.24	$22.23	$0.00	$0.00	0.00	0	$0.00	0.00
16	Corridor C1-C9	2350	7	2	2-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	80	0.56	1,316.0	$213.19	7	2	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	55	0.39	904.75	$146.57	$100.00	$700.00	0.18	411.25	$66.62	10.51
16	Corridor C Bathroom Area	1880	6	2	2-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	80	0.48	902.4	$146.19	6	2	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	55	0.33	620.4	$100.50	$100.00	$600.00	0.15	282	$45.68	13.13
16	Corridor C1-C3	1880	3	2	2-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	80	0.24	451.2	$73.09	3	2	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	55	0.17	310.2	$50.25	$100.00	$300.00	0.08	141	$22.84	13.13
16	Science C	1880	18	2	2-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	80	1.44	2,707.2	$438.57	18	2	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	55	0.99	1861.2	$301.51	$100.00	$1,800.00	0.45	846	$137.05	13.13
27		1880	1	0	2-Lamp, T12, Magnetic Ballast, Recessed Mounted, No Lens	94	0.09	176.7	$28.63	1	0	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	55	0.06	103.4	$16.75	$100.00	$100.00	0.04	73.32	$11.88	8.42
16		1880	3	2	2-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	80	0.24	451.2	$73.09	3	2	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	55	0.17	310.2	$50.25	$100.00	$300.00	0.08	141	$22.84	13.13
16	Classroom C-5	1880	12	2	2-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	80	0.96	1,804.8	$292.38	12	2	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	55	0.66	1240.8	$201.01	$100.00	$1,200.00	0.30	564	$91.37	13.13
16	Classroom C-7	1880	12	2	2-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	80	0.96	1,804.8	$292.38	12	2	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	55	0.66	1240.8	$201.01	$100.00	$1,200.00	0.30	564	$91.37	13.13
16	Classroom C-9	1880	12	2	2-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	80	0.96	1,804.8	$292.38	12	2	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	55	0.66	1240.8	$201.01	$100.00	$1,200.00	0.30	564	$91.37	13.13
16	Corridor C9 - C7	2350	3	2	2-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	80	0.24	564.0	$91.37	3	2	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	55	0.17	387.75	$62.82	$100.00	$300.00	0.08	176.25	$28.55	10.51
28	Corridor C12	2350	8	0	3-Lamp, T8, Electronic Ballast, Recessed, Prismatic Lens	82	0.66	1,541.6	$249.74	8	0	No Change	82	0.66	1541.6	$249.74	$0.00	$0.00	0.00	0	$0.00	0.00
19	Trailer C14	1880	12	0	2-Lamp, T8, Electronic Ballast, Surface Mounted, Prismatic Lens	58	0.70	1,308.5	$211.97	12	0	No Change	58	0.70	1308.48	$211.97	$0.00	$0.00	0.00	0	$0.00	0.00
19	Exterior Lighting	3640	15	0	2-Lamp, T8, Electronic Ballast, Surface Mounted, Prismatic Lens	58	0.87	3,166.8	$513.02	15	0	No Change	58	0.87	3166.8	$513.02	$0.00	$0.00	0.00	0	$0.00	0.00
28	Industrial Arts Office	1880	2	0	3-Lamp, T8, Electronic Ballast, Recessed, Prismatic Lens	82	0.16	308.3	$49.95	2	0	No Change	82	0.16	308.32	$49.95	$0.00	$0.00	0.00	0	$0.00	0.00
16	Guidance Office	1880	3	2	2-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	80	0.24	451.2	$73.09	3	2	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	55	0.17	310.2	$50.25	$100.00	$300.00	0.08	141	$22.84	13.13
29	Outside Lighting	3640	16	0	1-Lamp Metal Halide	94	1.50	5,474.6	$886.88	16	0	No Change	94	1.50	5474.56	$886.88	$0.00	$0.00	0.00	0	$0.00	0.00
30		3640	12	0	1-Lamp Compact Flourescent	20	0.24	873.6	$141.52	12	0	No Change	20	0.24	873.6	$141.52	$1.00	$12.00	0.00	0	$0.00	0.00

8	Outside Lighting	3640	3	0	1-Lamp Halogens, Direct Lighting	75	0.23	819.0	$132.68	3	0	No Change	75	0.23	819	$132.68	$0.00	$0.00	0.00	0	$0.00	0.00
31		3640	2	0	1 Lamp Incandescents	100	0.20	728.0	$117.94	2	0	26 W CFL Lamp	26	0.05	189.28	$30.66	$5.75	$11.50	0.15	538.7	$87.27	0.13
	Totals		954	179			80.83	151,812.8	$24,593.68	954	173			60.538	114863.19	########		$66,877.07	20.29	36949.6	$5,985.84	11.17

NOTES: 1. Simple Payback noted in this spreadsheet does not include Maintenance Savings and NJ Smart Start Incentives.
2. Lamp totals only include T-12 tube replacment calculations

CEG Job #: 9C09080
Project: Denville Valleyview MS
Address: 320 Diamond Spring Road
Denville, NJ 07834
Building SF: 82,932

"Denville Valleyview Middle School"

KWH COST: $0.162

ECM #2: Lighting Controls

EXISTING LIGHTING										PROPOSED LIGHTING CONTROLS											SAVINGS			
CEG Type	Fixture Location	Yearly Usage	No. Fixts	No. Lamps	Fixture Type	Fixt Watts	Total kW	kWh/Yr Fixtures	Yearly $ Cost	No. Fixts	No. Lamps	Controls Description	Watts Used	Total kW	Reduction (%)	kWh/Yr Fixtures	Yearly $ Cost	Unit Cost (INSTALLED)	Total Cost	kW Savings	kWh/Yr Savings	Yearly $ Savings	Yearly Simple Payback
1	Dellala's Back left	1880	1	2	2-Lamp, T12, Magnetic Ballast, Surface Mounted, Prismatic Lens	80	0.08	150.4	$24.36	1	2	Dual Technology Occupancy Sensor	80	0.08	10%	135.36	$21.93	$75.00	$75.00	0.00	15.04	$2.44	30.78
1	Dellala's Front Office	1880	2	2	2-Lamp, T12, Magnetic Ballast, Surface Mounted, Prismatic Lens	80	0.16	300.8	$48.73	2	2	Dual Technology Occupancy Sensor	80	0.16	10%	270.72	$43.86	$75.00	$75.00	0.00	30.08	$4.87	15.39
1	Nurse's Side Room	1880	2	2	2-Lamp, T12, Magnetic Ballast, Surface Mounted, Prismatic Lens	80	0.16	300.8	$48.73	2	2	Dual Technology Occupancy Sensor	80	0.16	10%	270.72	$43.86	$75.00	$75.00	0.00	30.08	$4.87	15.39
4	Faculty Bathroom	1880	1	0	2-Lamp, Incandescent, 75 Watt Bulbs, Surface Mounted, Direct	150	0.15	282.0	$45.68	1	0	Dual Technology Occupancy Sensor	150	0.15	10%	253.8	$41.12	$75.00	$75.00	0.00	28.2	$4.57	16.42
2	Faculty Room	1880	4	4	4-Lamp, T12, Magnetic Ballast, Recessed Mount, Parabolic Lens	160	0.64	1,203.2	$194.92	4	3	Dual Technology Occupancy Sensor	160	0.64	10%	1082.88	$175.43	$75.00	$75.00	0.00	120.32	$19.49	3.85
3		1880	1	2	2-Lamp, T12, Magnetic Ballast, Recessed Mounted, Parabolic Lens	80	0.08	150.4	$24.36	1	2		80	0.08	10%	135.36	$21.93	$0.00	$0.00	0.00	15.04	$2.44	0.00
1		1880	1	2	2-Lamp, T12, Magnetic Ballast, Surface Mounted, Prismatic Lens	80	0.08	150.4	$24.36	1	2		80	0.08	10%	135.36	$21.93	$0.00	$0.00	0.00	15.04	$2.44	0.00
5	Faculty Toilet	1880	1	0	2-Lamp, Compact Flourescent, Vanity Light	36	0.04	67.7	$10.96	1	0	None	36	0.04	0%	67.68	$10.96	$0.00	$0.00	0.00	0	$0.00	0.00
6	Gym Foyer	1880	1	4	2 Foot, 4-Lamp, T12, Magnetic Ballast, Recessed Mount, Parabolic Lens	94	0.09	176.7	$28.63	1	3	Dual Technology Occupancy Sensor	94	0.09	10%	159.048	$25.77	$75.00	$75.00	0.00	17.672	$2.86	26.20
3		1880	1	2	2-Lamp, T12, Magnetic Ballast, Recessed Mounted, Parabolic Lens	80	0.08	150.4	$24.36	1	2		80	0.08	10%	135.36	$21.93	$0.00	$0.00	0.00	15.04	$2.44	0.00
7	Gym	1880	17	0	1-Lamp Metal Halides	455	7.74	14,541.8	$2,355.77	17	0	Dual Technology Occupancy Sensor	455	7.74	10%	13087.62	$2,120.19	$75.00	$150.00	0.00	1454.18	$235.58	0.64
8	Stage	260	28	0	1-Lamp Halogens, Direct Lighting	75	2.10	546.0	$88.45	28	0	None	75	2.10	0%	546	$88.45	$0.00	$0.00	0.00	0	$0.00	0.00
9		1880	6	2	2-Lamp, T12, Magnetic Ballast, Surface Mounted, No Lens	80	0.48	902.4	$146.19	6	2	None	80	0.48	0%	902.4	$146.19	$0.00	$0.00	0.00	0	$0.00	0.00
1	Boys Lockerroom	1880	10	2	2-Lamp, T12, Magnetic Ballast, Surface Mounted, Prismatic Lens	80	0.80	1,504.0	$243.65	10	2	Dual Technology Occupancy Sensor	80	0.80	10%	1353.6	$219.28	$75.00	$75.00	0.00	150.4	$24.36	3.08
10	Boys Locker Room Shower	1880	2	0	1-Lamp Incandescents	75	0.15	282.0	$45.68	2	0	Dual Technology Occupancy Sensor	75	0.15	10%	253.8	$41.12	$75.00	$75.00	0.00	28.2	$4.57	16.42
11	Cafeteria Storage	470	1	0	4-Lamp Incandescent	300	0.30	141.0	$22.84	1	0	Dual Technology Occupancy Sensor	300	0.30	10%	126.9	$20.56	$75.00	$75.00	0.00	14.1	$2.28	32.83

1	Copy Room	1880	3	2	2-Lamp, T12, Magnetic Ballast, Surface Mounted, Prismatic Lens	80	0.24	451.2	$73.09	3	2	Dual Technology Occupancy Sensor	80	0.24	10%	406.08	$65.78	$75.00	$75.00	0.00	45.12	$7.31	10.26
10	A-Hall Custodial Closet	470	1	0	1-Lamp Incandescents	75	0.08	35.3	$5.71	1	0	None	75	0.08	0%	35.25	$5.71	$0.00	$0.00	0.00	0	$0.00	0.00
1	Incinerator	470	2	2	2-Lamp, T12, Magnetic Ballast, Surface Mounted, Prismatic Lens	80	0.16	75.2	$12.18	2	2	None	80	0.16	0%	75.2	$12.18	$0.00	$0.00	0.00	0	$0.00	0.00
1	Boys A-hall Bathroom	1880	1	2	2-Lamp, T12, Magnetic Ballast, Surface Mounted, Prismatic Lens	80	0.08	150.4	$24.36	1	2	Dual Technology Occupancy Sensor	80	0.08	10%	135.36	$21.93	$75.00	$75.00	0.00	15.04	$2.44	30.78
1	Girls A-hall Bathroom	1880	1	2	2-Lamp, T12, Magnetic Ballast, Surface Mounted, Prismatic Lens	80	0.08	150.4	$24.36	1	2	Dual Technology Occupancy Sensor	80	0.08	10%	135.36	$21.93	$75.00	$75.00	0.00	15.04	$2.44	30.78
1	General Storage	470	5	2	2-Lamp, T12, Magnetic Ballast, Surface Mounted, Prismatic Lens	80	0.40	188.0	$30.46	5	2	Dual Technology Occupancy Sensor	80	0.40	10%	169.2	$27.41	$75.00	$75.00	0.00	18.8	$3.05	24.63
10		470	2	0	1-Lamp Incandescents	75	0.15	70.5	$11.42	2	0		75	0.15	10%	63.45	$10.28	$0.00	$0.00	0.00	7.05	$1.14	0.00
12		470	1	0	1-Lamp Compact Flourescent	13	0.01	6.1	$0.99	1	0		13	0.01	10%	5.499	$0.89	$0.00	$0.00	0.00	0.611	$0.10	0.00
12	Boiler Room	470	11	0	1-Lamp Compact Flourescent	13	0.14	67.2	$10.89	11	0	None	13	0.14	0%	67.21	$10.89	$0.00	$0.00	0.00	0	$0.00	0.00
1		470	4	2	2-Lamp, T12, Magnetic Ballast, Surface Mounted, Prismatic Lens	80	0.32	150.4	$24.36	4	2	None	80	0.32	0%	150.4	$24.36	$0.00	$0.00	0.00	0	$0.00	0.00
3	A-Hall Main Entrance	2350	6	2	2-Lamp, T12, Magnetic Ballast, Recessed Mounted, Parabolic Lens	80	0.48	1,128.0	$182.74	6	2	Dual Technology Occupancy Sensor	80	0.48	10%	1015.2	$164.46	$75.00	$75.00	0.00	112.8	$18.27	4.10
13	A-Hall Communications Closet	470	4	3	3-Lamp, T12, Magnetic Ballast, Recessed Mounted, Parabolic Lens	130	0.52	244.4	$39.59	4	3	Dual Technology Occupancy Sensor	130	0.52	10%	219.96	$35.63	$75.00	$75.00	0.00	24.44	$3.96	18.94
9	A-Hall Room Storage	470	1	2	2-Lamp, T12, Magnetic Ballast, Surface Mounted, No Lens	80	0.08	37.6	$6.09	1	2	None	80	0.08	0%	37.6	$6.09	$0.00	$0.00	0.00	0	$0.00	0.00
1	A-Hall Room Foyer	1880	7	2	2-Lamp, T12, Magnetic Ballast, Surface Mounted, Prismatic Lens	80	0.56	1,052.8	$170.55	7	2	Dual Technology Occupancy Sensor	80	0.56	10%	947.52	$153.50	$75.00	$75.00	0.00	105.28	$17.06	4.40
1	Office Rooms	1880	6	2	2-Lamp, T12, Magnetic Ballast, Surface Mounted, Prismatic Lens	80	0.48	902.4	$146.19	6	2	Dual Technology Occupancy Sensor	80	0.48	10%	812.16	$131.57	$75.00	$75.00	0.00	90.24	$14.62	5.13
13	Server Room	470	4	3	3-Lamp, T12, Magnetic Ballast, Recessed Mounted, Parabolic Lens	130	0.52	244.4	$39.59	4	3	Dual Technology Occupancy Sensor	130	0.52	10%	219.96	$35.63	$75.00	$75.00	0.00	24.44	$3.96	18.94
1	Computer Lab	1880	12	2	2-Lamp, T12, Magnetic Ballast, Surface Mounted, Prismatic Lens	80	0.96	1,804.8	$292.38	12	2	Dual Technology Occupancy Sensor	80	0.96	10%	1624.32	$263.14	$75.00	$75.00	0.00	180.48	$29.24	2.57
1	Library Storage	1880	3	2	2-Lamp, T12, Magnetic Ballast, Surface Mounted, Prismatic Lens	80	0.24	451.2	$73.09	3	2	Dual Technology Occupancy Sensor	80	0.24	10%	406.08	$65.78	$75.00	$75.00	0.00	45.12	$7.31	10.26
1	Library Office	1880	3	2	2-Lamp, T12, Magnetic Ballast, Surface Mounted, Prismatic Lens	80	0.24	451.2	$73.09	3	2	Dual Technology Occupancy Sensor	80	0.24	10%	406.08	$65.78	$75.00	$75.00	0.00	45.12	$7.31	10.26

1	Library Study	1880	6	2	2-Lamp, T12, Magnetic Ballast, Surface Mounted, Prismatic	80	0.48	902.4	$146.19	6	2	Dual Technology Occupancy Sensor	80	0.48	10%	812.16	$131.57	$75.00	$75.00	0.00	90.24	$14.62	5.13
14	Classroom B-24	1880	18	2	2-Lamp, T12, Magnetic Ballast, Pendant Mounted, Prismatic Lens	80	1.44	2,707.2	$438.57	18	2	Dual Technology Occupancy Sensor	80	1.44	10%	2436.48	$394.71	$75.00	$75.00	0.00	270.72	$43.86	1.71
14	Classroom B-23	1880	6	2	2-Lamp, T12, Magnetic Ballast, Pendant Mounted, Prismatic Lens	80	0.48	902.4	$146.19	6	2	Dual Technology Occupancy Sensor	80	0.48	10%	812.16	$131.57	$75.00	$75.00	0.00	90.24	$14.62	5.13
14	Classroom B-22	1880	6	2	2-Lamp, T12, Magnetic Ballast, Pendant Mounted, Prismatic Lens	80	0.48	902.4	$146.19	6	2	Dual Technology Occupancy Sensor	80	0.48	10%	812.16	$131.57	$75.00	$75.00	0.00	90.24	$14.62	5.13
14	Classroom B-21	1880	6	2	2-Lamp, T12, Magnetic Ballast, Pendant Mounted, Prismatic Lens	80	0.48	902.4	$146.19	6	2	Dual Technology Occupancy Sensor	80	0.48	10%	812.16	$131.57	$75.00	$75.00	0.00	90.24	$14.62	5.13
14	Classroom B-28	1880	6	2	2-Lamp, T12, Magnetic Ballast, Pendant Mounted, Prismatic Lens	80	0.48	902.4	$146.19	6	2	Dual Technology Occupancy Sensor	80	0.48	10%	812.16	$131.57	$75.00	$75.00	0.00	90.24	$14.62	5.13
14	Classroom B-27	1880	6	2	2-Lamp, T12, Magnetic Ballast, Pendant Mounted, Prismatic Lens	80	0.48	902.4	$146.19	6	2	Dual Technology Occupancy Sensor	80	0.48	10%	812.16	$131.57	$75.00	$75.00	0.00	90.24	$14.62	5.13
14	Classroom B-26	1880	6	2	2-Lamp, T12, Magnetic Ballast, Pendant Mounted, Prismatic Lens	80	0.48	902.4	$146.19	6	2	Dual Technology Occupancy Sensor	80	0.48	10%	812.16	$131.57	$75.00	$75.00	0.00	90.24	$14.62	5.13
12	B Stairwell	8760	4	0	1-Lamp Compact Flourescent	13	0.05	455.5	$73.79	4	0	Dual Technology Occupancy Sensor	13	0.05	10%	409.968	$66.41	$75.00	$75.00	0.00	45.552	$7.38	10.16
14	Classroom B-11	1880	6	2	2-Lamp, T12, Magnetic Ballast, Pendant Mounted, Prismatic Lens	80	0.48	902.4	$146.19	6	2	Dual Technology Occupancy Sensor	80	0.48	10%	812.16	$131.57	$75.00	$75.00	0.00	90.24	$14.62	5.13
14	Classroom B-18	1880	6	2	2-Lamp, T12, Magnetic Ballast, Pendant Mounted, Prismatic Lens	80	0.48	902.4	$146.19	6	2	Dual Technology Occupancy Sensor	80	0.48	10%	812.16	$131.57	$75.00	$75.00	0.00	90.24	$14.62	5.13
14	Classroom B-12	1880	6	2	2-Lamp, T12, Magnetic Ballast, Pendant Mounted, Prismatic Lens	80	0.48	902.4	$146.19	6	2	Dual Technology Occupancy Sensor	80	0.48	10%	812.16	$131.57	$75.00	$75.00	0.00	90.24	$14.62	5.13
14	Classroom B-17	1880	6	2	2-Lamp, T12, Magnetic Ballast, Pendant Mounted, Prismatic Lens	80	0.48	902.4	$146.19	6	2	Dual Technology Occupancy Sensor	80	0.48	10%	812.16	$131.57	$75.00	$75.00	0.00	90.24	$14.62	5.13
14	Classroom B-13	1880	6	2	2-Lamp, T12, Magnetic Ballast, Pendant Mounted, Prismatic Lens	80	0.48	902.4	$146.19	6	2	Dual Technology Occupancy Sensor	80	0.48	10%	812.16	$131.57	$75.00	$75.00	0.00	90.24	$14.62	5.13
14	Classroom B-16	1880	6	2	2-Lamp, T12, Magnetic Ballast, Pendant Mounted, Prismatic Lens	80	0.48	902.4	$146.19	6	2	Dual Technology Occupancy Sensor	80	0.48	10%	812.16	$131.57	$75.00	$75.00	0.00	90.24	$14.62	5.13
14	Classroom B-14	1880	6	2	2-Lamp, T12, Magnetic Ballast, Pendant Mounted, Prismatic Lens	80	0.48	902.4	$146.19	6	2	Dual Technology Occupancy Sensor	80	0.48	10%	812.16	$131.57	$75.00	$75.00	0.00	90.24	$14.62	5.13
14	Classroom B-15	1880	6	2	2-Lamp, T12, Magnetic Ballast, Pendant Mounted, Prismatic Lens	80	0.48	902.4	$146.19	6	2	Dual Technology Occupancy Sensor	80	0.48	10%	812.16	$131.57	$75.00	$75.00	0.00	90.24	$14.62	5.13

15	Life Skills 2	1880	10	2	8 Foot, 2-Lamp, T12, Magnetic Ballast, Pendant Mounted, Prismatic	253	2.53	4,756.4	$770.54	10	2	Dual Technology Occupancy Sensor	253	2.53	10%	4280.76	$693.48	$75.00	$75.00	0.00	475.64	$77.05	0.97
14	Life Skills 1	1880	24	2	2-Lamp, T12, Magnetic Ballast, Pendant Mounted, Prismatic Lens	80	1.92	3,609.6	$584.76	24	2	Dual Technology Occupancy Sensor	80	1.92	10%	3248.64	$526.28	$75.00	$75.00	0.00	360.96	$58.48	1.28
1	C-Hall Girls	1880	2	2	2-Lamp, T12, Magnetic Ballast, Surface Mounted, Prismatic Lens	80	0.16	300.8	$48.73	2	2	Dual Technology Occupancy Sensor	80	0.16	10%	270.72	$43.86	$75.00	$75.00	0.00	30.08	$4.87	15.39
1	C- Hall Guys	1880	2	2	2-Lamp, T12, Magnetic Ballast, Surface Mounted, Prismatic Lens	80	0.16	300.8	$48.73	2	2	Dual Technology Occupancy Sensor	80	0.16	10%	270.72	$43.86	$75.00	$75.00	0.00	30.08	$4.87	15.39
16	Classroom C-4	1880	12	2	2-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	80	0.96	1,804.8	$292.38	12	2	Dual Technology Occupancy Sensor	80	0.96	10%	1624.32	$263.14	$75.00	$75.00	0.00	180.48	$29.24	2.57
17	Men's Faculty	1880	1	0	2-Lamp, Compact Flourescent, Vanity Light	26	0.03	48.9	$7.92	1	0	None	26	0.03	0%	48.88	$7.92	$0.00	$0.00	0.00	0	$0.00	0.00
17	Women's Faculty	1880	1	0	2-Lamp, Compact Flourescent, Vanity Light	26	0.03	48.9	$7.92	1	0	None	26	0.03	0%	48.88	$7.92	$0.00	$0.00	0.00	0	$0.00	0.00
16	Classroom C-3	1880	12	2	2-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	80	0.96	1,804.8	$292.38	12	2	Dual Technology Occupancy Sensor	80	0.96	10%	1624.32	$263.14	$75.00	$75.00	0.00	180.48	$29.24	2.57
16	Classroom C-2	1880	12	2	2-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	80	0.96	1,804.8	$292.38	12	2	Dual Technology Occupancy Sensor	80	0.96	10%	1624.32	$263.14	$75.00	$75.00	0.00	180.48	$29.24	2.57
16	Classroom C-1	1880	12	2	2-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	80	0.96	1,804.8	$292.38	12	2	Dual Technology Occupancy Sensor	80	0.96	10%	1624.32	$263.14	$75.00	$75.00	0.00	180.48	$29.24	2.57
16	Classroom C-6	1880	12	2	2-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	80	0.96	1,804.8	$292.38	12	2	Dual Technology Occupancy Sensor	80	0.96	10%	1624.32	$263.14	$75.00	$75.00	0.00	180.48	$29.24	2.57
16	Classroom C-8	1880	12	2	2-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	80	0.96	1,804.8	$292.38	12	2	Dual Technology Occupancy Sensor	80	0.96	10%	1624.32	$263.14	$75.00	$75.00	0.00	180.48	$29.24	2.57
17	Custodial Closet	470	1	0	2-Lamp, Compact Flourescent, Vanity Light	26	0.03	12.2	$1.98	1	0	None	26	0.03	0%	12.22	$1.98	$0.00	$0.00	0.00	0	$0.00	0.00
4		470	1	0	2-Lamp, Incandescent, 75 Watt Bulbs, Surface Mounted, Direct	150	0.15	70.5	$11.42	1	0	None	150	0.15	0%	70.5	$11.42	$0.00	$0.00	0.00	0	$0.00	0.00
16	Art-C	1880	18	2	2-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	80	1.44	2,707.2	$438.57	18	2	Dual Technology Occupancy Sensor	80	1.44	10%	2436.48	$394.71	$75.00	$75.00	0.00	270.72	$43.86	1.71
10		1880	3	0	1-Lamp Incandescents	75	0.23	423.0	$68.53	3	0		75	0.23	10%	380.7	$61.67	$75.00	$0.00	0.00	42.3	$6.85	0.00
1		1880	4	2	2-Lamp, T12, Magnetic Ballast, Surface Mounted, Prismatic Lens	80	0.32	601.6	$97.46	4	2		80	0.32	10%	541.44	$87.71	$75.00	$0.00	0.00	60.16	$9.75	0.00
18	Classroom C-12	1880	30	0	2-Lamp, T8, Electronic Ballast, Pendant Mounted, Parabolic Lens	58	1.74	3,271.2	$529.93	30	0	Dual Technology Occupancy Sensor	58	1.74	10%	2944.08	$476.94	$75.00	$75.00	0.00	327.12	$52.99	1.42

18	Classroom C-13	1880	29	0	2-Lamp, T8, Electronic Ballast, Pendant Mounted, Parabolic Lens	58	1.68	3,162.2	$512.27	29	0	Dual Technology Occupancy Sensor	58	1.68	10%	2845.944	$461.04	$75.00	$75.00	0.00	316.216	$51.23	1.46
19	Classroom C-15	1880	12	0	2-Lamp, T8, Electronic Ballast, Surface Mounted, Prismatic Lens	58	0.70	1,308.5	$211.97	12	0	Dual Technology Occupancy Sensor	58	0.70	10%	1177.632	$190.78	$75.00	$75.00	0.00	130.848	$21.20	3.54
20		1880	2	0	1 Lamp Incandescents	60	0.12	225.6	$36.55	2	0		60	0.12	10%	203.04	$32.89	$0.00	$0.00	0.00	22.56	$3.65	0.00
19	C-17	1880	12	0	2-Lamp, T8, Electronic Ballast, Surface Mounted, Prismatic Lens	58	0.70	1,308.5	$211.97	12	0	Dual Technology Occupancy Sensor	58	0.70	10%	1177.632	$190.78	$75.00	$75.00	0.00	130.848	$21.20	3.54
20		1880	2	0	1 Lamp Incandescents	60	0.12	225.6	$36.55	2	0		60	0.12	10%	203.04	$32.89	$0.00	$0.00	0.00	22.56	$3.65	0.00
19	C-16	1880	12	0	2-Lamp, T8, Electronic Ballast, Surface Mounted, Prismatic Lens	58	0.70	1,308.5	$211.97	12	0	Dual Technology Occupancy Sensor	58	0.70	10%	1177.632	$190.78	$75.00	$75.00	0.00	130.848	$21.20	3.54
20		1880	2	0	1 Lamp Incandescents	60	0.12	225.6	$36.55	2	0		60	0.12	10%	203.04	$32.89	$0.00	$0.00	0.00	22.56	$3.65	0.00
8	Outside Trailer Doors	1880	8	0	1-Lamp Halogens, Direct Lighting	75	0.60	1,128.0	$182.74	8	0	Dual Technology Occupancy Sensor	75	0.60	10%	1015.2	$164.46	$75.00	$75.00	0.00	112.8	$18.27	4.10
9	Industrial Room	1880	38	2	2-Lamp, T12, Magnetic Ballast, Surface Mounted, No Lens	80	3.04	5,715.2	$925.86	38	2	Dual Technology Occupancy Sensor	80	3.04	10%	5143.68	$833.28	$75.00	$75.00	0.00	571.52	$92.59	0.81
21	Industrial Computer Room	1880	2	0	3-Lamp, T8, Electronic Ballast, Recessed, Parabolic Lens	82	0.16	308.3	$49.95	2	0	Dual Technology Occupancy Sensor	82	0.16	10%	277.488	$44.95	$75.00	$75.00	0.00	30.832	$4.99	15.02
1	Dellala's Back Right Room	1880	1	2	2-Lamp, T12, Magnetic Ballast, Surface Mounted, Prismatic Lens	80	0.08	150.4	$24.36	1	2	Dual Technology Occupancy Sensor	80	0.08	10%	135.36	$21.93	$75.00	$75.00	0.00	15.04	$2.44	30.78
1	Nurse's Office	1880	8	2	2-Lamp, T12, Magnetic Ballast, Surface Mounted, Prismatic Lens	80	0.64	1,203.2	$194.92	8	2	Dual Technology Occupancy Sensor	80	0.64	10%	1082.88	$175.43	$75.00	$75.00	0.00	120.32	$19.49	3.85
10	Nurse's Bathroom	1880	1	0	1-Lamp Incandescents	75	0.08	141.0	$22.84	1	0	Dual Technology Occupancy Sensor	75	0.08	10%	126.9	$20.56	$75.00	$75.00	0.00	14.1	$2.28	32.83
16	Corridor Between Gym and Admin	1880	2	2	2-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	80	0.16	300.8	$48.73	2	2	Dual Technology Occupancy Sensor	80	0.16	10%	270.72	$43.86	$75.00	$75.00	0.00	30.08	$4.87	15.39
10	Gym Storage Room	1880	2	0	1-Lamp Incandescents	75	0.15	282.0	$45.68	2	0	Dual Technology Occupancy Sensor	75	0.15	10%	253.8	$41.12	$75.00	$75.00	0.00	28.2	$4.57	16.42
1	Girls Locker Room	1880	12	2	2-Lamp, T12, Magnetic Ballast, Surface Mounted, Prismatic Lens	80	0.96	1,804.8	$292.38	12	2	Dual Technology Occupancy Sensor	80	0.96	10%	1624.32	$263.14	$75.00	$75.00	0.00	180.48	$29.24	2.57
10	Girls Locker Room Shower	1880	2	0	1-Lamp Incandescents	75	0.15	282.0	$45.68	2	0	Dual Technology Occupancy Sensor	75	0.15	10%	253.8	$41.12	$75.00	$75.00	0.00	28.2	$4.57	16.42
11	Gym Storage Room	470	2	0	4-Lamp Incandescent	300	0.60	282.0	$45.68	2	0	Dual Technology Occupancy Sensor	300	0.60	10%	253.8	$41.12	$75.00	$75.00	0.00	28.2	$4.57	16.42
16	Cafeteria	1880	30	2	2-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	80	2.40	4,512.0	$730.94	30	2	Dual Technology Occupancy Sensor	80	2.40	10%	4060.8	$657.85	$75.00	$75.00	0.00	451.2	$73.09	1.03
22	Kitchen	1880	3	4	4-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	160	0.48	902.4	$146.19	3	3	Dual Technology Occupancy Sensor	160	0.48	10%	812.16	$131.57	$75.00	$75.00	0.00	90.24	$14.62	5.13
1	Music Classroom	1880	27	2	2-Lamp, T12, Magnetic Ballast, Surface Mounted, Prismatic Lens	80	2.16	4,060.8	$657.85	27	2	Dual Technology Occupancy Sensor	80	2.16	10%	3654.72	$592.06	$75.00	$75.00	0.00	406.08	$65.78	1.14

1	Music Room Storage	470	2	2	2-Lamp, T12, Magnetic Ballast, Surface Mounted, Prismatic Lens	80	0.16	75.2	$12.18	2	2	None	80	0.16	0%	75.2	$12.18	$0.00	$0.00	0.00	0	$0.00	0.00
1	Corridor Trophy Case	1880	1	2	2-Lamp, T12, Magnetic Ballast, Surface Mounted, Prismatic Lens	80	0.08	150.4	$24.36	1	2	None	80	0.08	0%	150.4	$24.36	$0.00	$0.00	0.00	0	$0.00	0.00
23	Main Entracne Corridor	2350	8	4	2 Foot, 4-Lamp, T12, Magnetic Ballast, Recessed Mount, Prismatic Lens	94	0.75	1,767.2	$286.29	8	3	Dual Technology Occupancy Sensor	94	0.75	10%	1590.48	$257.66	$75.00	$75.00	0.00	176.72	$28.63	2.62
1	Classroom A1A	1880	8	2	2-Lamp, T12, Magnetic Ballast, Surface Mounted, Prismatic Lens	80	0.64	1,203.2	$194.92	8	2	Dual Technology Occupancy Sensor	80	0.64	10%	1082.88	$175.43	$75.00	$75.00	0.00	120.32	$19.49	3.85
1	Classroom A1B	1880	8	2	2-Lamp, T12, Magnetic Ballast, Surface Mounted, Prismatic Lens	80	0.64	1,203.2	$194.92	8	2	Dual Technology Occupancy Sensor	80	0.64	10%	1082.88	$175.43	$75.00	$75.00	0.00	120.32	$19.49	3.85
1	Main Office	2350	11	2	2-Lamp, T12, Magnetic Ballast, Surface Mounted, Prismatic Lens	80	0.88	2,068.0	$335.02	11	2	Dual Technology Occupancy Sensor	80	0.88	10%	1861.2	$301.51	$75.00	$75.00	0.00	206.8	$33.50	2.24
24	Bridge Corridor	2350	10	1	3 Foot, 1-Lamp, T12, Magnetic Ballast, Surface Mounted, Prismatic Lens	47	0.47	1,104.5	$178.93	10	0	Dual Technology Occupancy Sensor	47	0.47	10%	994.05	$161.04	$75.00	$75.00	0.00	110.45	$17.89	4.19
6	Elevator Area	1880	3	4	2 Foot, 4-Lamp, T12, Magnetic Ballast, Recessed Mount, Parabolic Lens	94	0.28	530.2	$85.89	3	3	None	94	0.28	0%	530.16	$85.89	$0.00	$0.00	0.00	0	$0.00	0.00
25		1880	2	0	1-Lamp Compact Flourescent	28	0.06	105.3	$17.06	2	0	None	28	0.06	0%	105.28	$17.06	$0.00	$0.00	0.00	0	$0.00	0.00
1	Library	1880	52	2	2-Lamp, T12, Magnetic Ballast, Surface Mounted, Prismatic Lens	80	4.16	7,820.8	$1,266.97	52	2	Dual Technology Occupancy Sensor	80	4.16	10%	7038.72	$1,140.27	$75.00	$150.00	0.00	782.08	$126.70	1.18
16		1880	2	2	2-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	80	0.16	300.8	$48.73	2	2		80	0.16	10%	270.72	$43.86	$0.00	$0.00	0.00	30.08	$4.87	0.00
16	Corridor B21 to B28	2350	8	2	2-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	80	0.64	1,504.0	$243.65	8	2	Dual Technology Occupancy Sensor	80	0.64	10%	1353.6	$219.28	$75.00	$75.00	0.00	150.4	$24.36	3.08
26	Girl's Bathroom	1880	6	0	2-Lamp, T8, U-Lamp, Electronic Ballast, Recessed Mounted, Prismatic Lens	73	0.44	823.4	$133.40	6	0	Dual Technology Occupancy Sensor	73	0.44	10%	741.096	$120.06	$75.00	$75.00	0.00	82.344	$13.34	5.62
26	Co-Ed Bathroom	1880	1	0	2-Lamp, T8, U-Lamp, Electronic Ballast, Recessed Mounted, Prismatic Lens	73	0.07	137.2	$22.23	1	0	Dual Technology Occupancy Sensor	73	0.07	10%	123.516	$20.01	$75.00	$75.00	0.00	13.724	$2.22	33.73
26	Boys Bathroom	1880	7	0	2-Lamp, T8, U-Lamp, Electronic Ballast, Recessed Mounted, Prismatic Lens	73	0.51	960.7	$155.63	7	0	Dual Technology Occupancy Sensor	73	0.51	10%	864.612	$140.07	$75.00	$75.00	0.00	96.068	$15.56	4.82
16	Corridor	2350	12	2	2-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	80	0.96	2,256.0	$365.47	12	2	Dual Technology Occupancy Sensor	80	0.96	10%	2030.4	$328.92	$75.00	$75.00	0.00	225.6	$36.55	2.05
12	Elevator Entrance	1880	2	0	1-Lamp Compact Flourescent	13	0.03	48.9	$7.92	2	0	None	13	0.03	0%	48.88	$7.92	$0.00	$0.00	0.00	0	$0.00	0.00
1	Trophy Case	1880	1	2	2-Lamp, T12, Magnetic Ballast, Surface Mounted, Prismatic Lens	80	0.08	150.4	$24.36	1	2	None	80	0.08	0%	150.4	$24.36	$0.00	$0.00	0.00	0	$0.00	0.00

26	Boys Bathroom	1880	7	0	2-Lamp, T8, U-Lamp, Electronic Ballast, Recessed Mounted, Prismatic Lens	73	0.51	960.7	$155.63	7	0	Dual Technology Occupancy Sensor	73	0.51	10%	864.612	$140.07	$75.00	$75.00	0.00	96.068	$15.56	4.82
26	Gils Bathroom	1880	6	0	2-Lamp, T8, U-Lamp, Electronic Ballast, Recessed Mounted, Prismatic Lens	73	0.44	823.4	$133.40	6	0	Dual Technology Occupancy Sensor	73	0.44	10%	741.096	$120.06	$75.00	$75.00	0.00	82.344	$13.34	5.62
26	Co-Ed Bathroom	1880	1	0	2-Lamp, T8, U-Lamp, Electronic Ballast, Recessed Mounted, Prismatic Lens	73	0.07	137.2	$22.23	1	0	Dual Technology Occupancy Sensor	73	0.07	10%	123.516	$20.01	$75.00	$75.00	0.00	13.724	$2.22	33.73
16	Corridor C1-C9	2350	7	2	2-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	80	0.56	1,316.0	$213.19	7	2	Dual Technology Occupancy Sensor	80	0.56	10%	1184.4	$191.87	$75.00	$75.00	0.00	131.6	$21.32	3.52
16	Corridor C Bathroom Area	1880	6	2	2-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	80	0.48	902.4	$146.19	6	2	Dual Technology Occupancy Sensor	80	0.48	10%	812.16	$131.57	$75.00	$75.00	0.00	90.24	$14.62	5.13
16	Corridor C1-C3	1880	3	2	2-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	80	0.24	451.2	$73.09	3	2	Dual Technology Occupancy Sensor	80	0.24	10%	406.08	$65.78	$75.00	$75.00	0.00	45.12	$7.31	10.26
16	Science C	1880	18	2	2-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	80	1.44	2,707.2	$438.57	18	2	Dual Technology Occupancy Sensor	80	1.44	10%	2436.48	$394.71	$75.00	$75.00	0.00	270.72	$43.86	1.71
27		1880	1	0	2-Lamp, T12, Magnetic Ballast, Recessed Mounted, No Lens	94	0.09	176.7	$28.63	1	0		94	0.09	10%	159.048	$25.77	$0.00	$0.00	0.00	17.672	$2.86	0.00
16		1880	3	2	2-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	80	0.24	451.2	$73.09	3	2		80	0.24	10%	406.08	$65.78	$0.00	$0.00	0.00	45.12	$7.31	0.00
16	Classroom C-5	1880	12	2	2-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	80	0.96	1,804.8	$292.38	12	2	Dual Technology Occupancy Sensor	80	0.96	10%	1624.32	$263.14	$75.00	$75.00	0.00	180.48	$29.24	2.57
16	Classroom C-7	1880	12	2	2-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	80	0.96	1,804.8	$292.38	12	2	Dual Technology Occupancy Sensor	80	0.96	10%	1624.32	$263.14	$75.00	$75.00	0.00	180.48	$29.24	2.57
16	Classroom C-9	1880	12	2	2-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	80	0.96	1,804.8	$292.38	12	2	Dual Technology Occupancy Sensor	80	0.96	10%	1624.32	$263.14	$75.00	$75.00	0.00	180.48	$29.24	2.57
16	Corridor C9 - C7	2350	3	2	2-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	80	0.24	564.0	$91.37	3	2	Dual Technology Occupancy Sensor	80	0.24	10%	507.6	$82.23	$75.00	$75.00	0.00	56.4	$9.14	8.21
28	Corridor C12	2350	8	0	3-Lamp, T8, Electronic Ballast, Recessed, Prismatic Lens	82	0.66	1,541.6	$249.74	8	0	Dual Technology Occupancy Sensor	82	0.66	10%	1387.44	$224.77	$75.00	$75.00	0.00	154.16	$24.97	3.00
19	Trailer C14	1880	12	0	2-Lamp, T8, Electronic Ballast, Surface Mounted, Prismatic Lens	58	0.70	1,308.5	$211.97	12	0	Dual Technology Occupancy Sensor	58	0.70	10%	1177.632	$190.78	$75.00	$75.00	0.00	130.848	$21.20	3.54
19	Exterior Lighting	3640	15	0	2-Lamp, T8, Electronic Ballast, Surface Mounted, Prismatic Lens	58	0.87	3,166.8	$513.02	15	0	None	58	0.87	0%	3166.8	$513.02	$0.00	$0.00	0.00	0	$0.00	0.00
28	Industrial Arts Office	1880	2	0	3-Lamp, T8, Electronic Ballast, Recessed, Prismatic Lens	82	0.16	308.3	$49.95	2	0	Dual Technology Occupancy Sensor	82	0.16	10%	277.488	$44.95	$75.00	$75.00	0.00	30.832	$4.99	15.02

16	Guidance Office	1880	3	2	2-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	80	0.24	451.2	$73.09	3	2	Dual Technology Occupancy Sensor	80	0.24	10%	406.08	$65.78	$75.00	$75.00	0.00	45.12	$7.31	10.26
29	Outside Lighting	3640	16	0	1-Lamp Metal Halide	94	1.50	5,474.6	$886.88	16	0	None	94	1.50	0%	5474.56	$886.88	$0.00	$0.00	0.00	0	$0.00	0.00
30		3640	12	0	1-Lamp Compact Flourescent	20	0.24	873.6	$141.52	12	0	None	20	0.24	0%	873.6	$141.52	$0.00	$0.00	0.00	0	$0.00	0.00
8		3640	3	0	1-Lamp Halogens, Direct Lighting	75	0.23	819.0	$132.68	3	0	None	75	0.23	0%	819	$132.68	$0.00	$0.00	0.00	0	$0.00	0.00
31		3640	2	0	1 Lamp Incandescents	100	0.20	728.0	$117.94	2	0	None	100	0.20	0%	728	$117.94	$0.00	$0.00	0.00	0.0	$0.00	0.00
	Totals		954	179			80.83	151,812.8	$24,593.68	954	173			80.829		138049.98	########		$7,275.00	0.00	13762.8	$2,229.58	3.26

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

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

Project Name: LGEA Solar PV Project - Denville Valleyview Middle School
Location: Denville, NJ
Description: Photovoltaic System 95% Financing - 25 year

Simple Payback Analysis

	Photovoltaic System 95% Financing - 25 year
Total Construction Cost	$726,570
Annual kWh Production	125,983
Annual Energy Cost Reduction	$20,409
Annual SREC Revenue	$44,094
First Cost Premium	**$726,570**
Simple Payback:	**11.26** Years

Life Cycle Cost Analysis

Analysis Period (years): 25
Financing Term (mths): 240
Average Energy Cost ($/kWh) **$0.162**
Financing Rate: 7.00%
Financing %: 95%
Maintenance Escalation Rate: 3.0%
Energy Cost Escalation Rate: 3.0%
SREC Value ($/kWh) $0.350

Period	Additional Cash Outlay	Energy kWh Production	Energy Cost Savings	Additional Maint Costs	SREC Revenue	Interest Expense	Loan Principal	Net Cash Flow	Cumulative Cash Flow
0	$36,329	0	0	0	$0	0	0	(36,329)	0
1	$0	125,983	$20,409	$0	$44,094	$47,797	$16,421	$286	($36,042)
2	$0	125,353	$21,022	$0	$43,874	$46,610	$17,608	$678	($35,365)
3	$0	124,726	$21,652	$0	$43,654	$45,337	$18,880	$1,089	($34,276)
4	$0	124,103	$22,302	$0	$43,436	$43,972	$20,245	$1,520	($32,755)
5	$0	123,482	$22,971	$1,272	$43,219	$42,508	$21,709	$700	($32,055)
6	$0	122,865	$23,660	$1,266	$43,003	$40,939	$23,278	$1,180	($30,875)
7	$0	122,250	$24,370	$1,259	$42,788	$39,256	$24,961	$1,681	($29,194)
8	$0	121,639	$25,101	$1,253	$42,574	$37,452	$26,765	$2,204	($26,990)
9	$0	121,031	$25,854	$1,247	$42,361	$35,517	$28,700	$2,751	($24,239)
10	$0	120,426	$26,629	$1,240	$42,149	$33,442	$30,775	$3,321	($20,918)
11	$0	119,824	$27,428	$1,234	$41,938	$31,218	$33,000	$3,915	($17,003)
12	$0	119,224	$28,251	$1,228	$41,729	$28,832	$35,385	$4,534	($12,469)
13	$0	118,628	$29,099	$1,222	$41,520	$26,274	$37,943	$5,180	($7,289)
14	$0	118,035	$29,972	$1,216	$41,312	$23,531	$40,686	$5,851	($1,438)
15	$0	117,445	$30,871	$1,210	$41,106	$20,590	$43,627	$6,550	$5,112
16	$0	116,858	$31,797	$1,204	$40,900	$17,436	$46,781	$7,276	$12,388
17	$0	116,274	$32,751	$1,198	$40,696	$14,054	$50,163	$8,032	$20,420
18	$0	115,692	$33,733	$1,192	$40,492	$10,428	$53,789	$8,817	$29,236
19	$0	115,114	$34,745	$1,186	$40,290	$6,540	$57,678	$9,632	$38,869
20	$0	114,538	$35,788	$1,180	$40,088	$2,370	$61,847	$10,479	$49,348
21	$0	113,965	$36,861	$1,174	$39,888	$2,009	$56,857	$16,710	$66,057
22	$0	113,396	$37,967	$1,168	$39,688	$1,375	$46,788	$28,325	$94,382
23	$0	112,829	$39,106	$1,162	$39,490	$0	$0	$77,434	$171,816
24	$0	112,264	$40,279	$1,156	$39,293	$0	$0	$78,416	$250,232
25	$0	111,703	$41,488	$1,151	$39,096	$0	$0	$79,433	$329,665
	Totals:	2,403,489	$548,404	$19,604	$841,221	$594,103	$690,241	$793,886	$726,616
					Net Present Value (NPV)		**$47,094**		
					Internal Rate of Return (IRR)		**12.3%**		

Project Name: LGEA Solar PV Project - Denville Valleyview Middle School
Location: Denville, NJ
Description: Photovoltaic System - Direct Purchase

Simple Payback Analysis

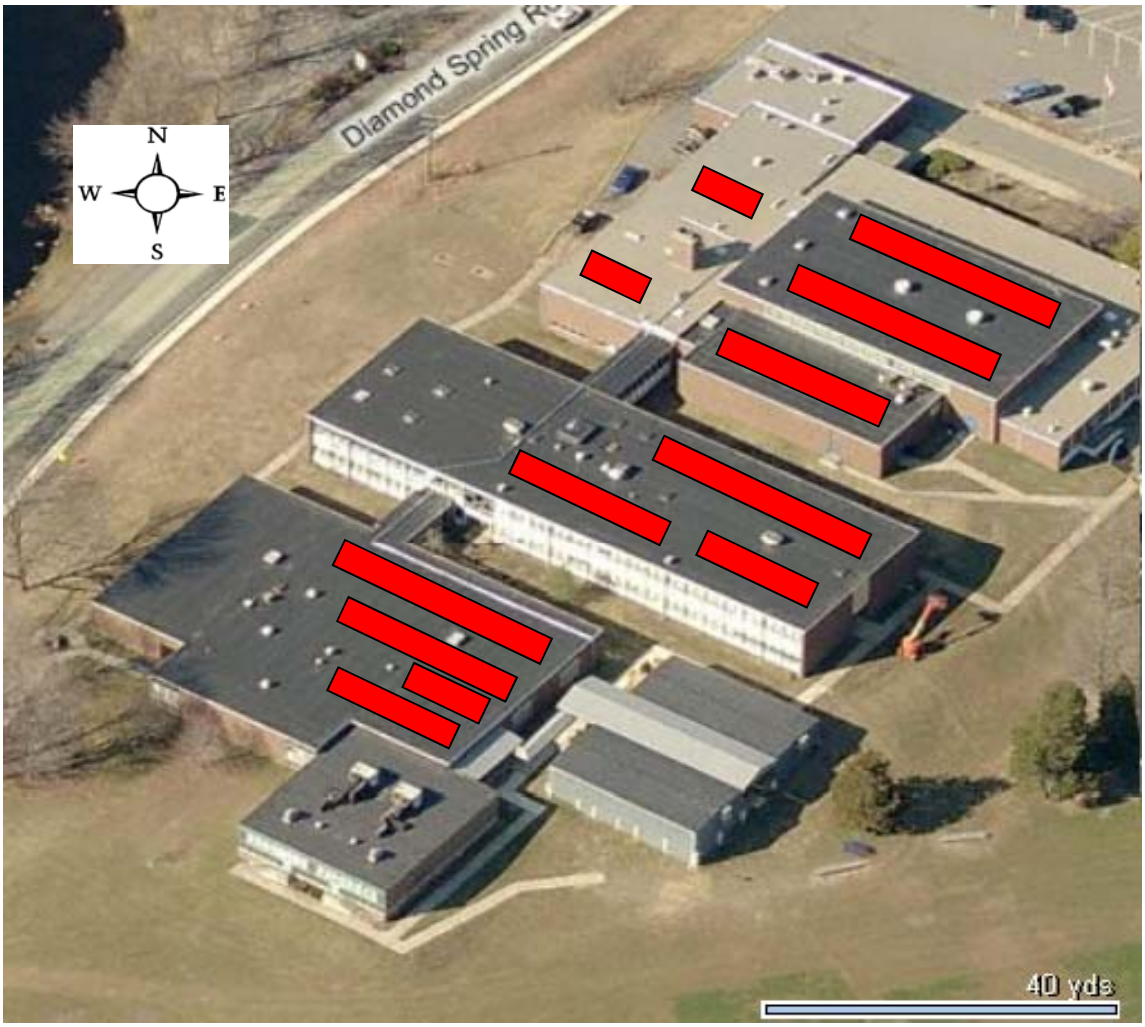
	Photovoltaic System - Direct Purchase
Total Construction Cost	$726,570
Annual kWh Production	125,983
Annual Energy Cost Reduction	$20,409
Annual SREC Revenue	$44,094
First Cost Premium	**$726,570**
Simple Payback:	**11.26** **Years**

Life Cycle Cost Analysis

Analysis Period (years):	25	Financing %:	0%
Financing Term (mths):	0	Maintenance Escalation Rate:	3.0%
Average Energy Cost ($/kWh)	**$0.162**	Energy Cost Escalation Rate:	3.0%
Financing Rate:	0.00%	SREC Value ($/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	$726,570	0	0	0	$0	(726,570)	0
1	$0	125,983	$20,409	$0	$44,094	$64,503	($662,067)
2	$0	125,353	$21,022	$0	$43,874	$64,895	($597,172)
3	$0	124,726	$21,652	$0	$43,654	$65,306	($531,865)
4	$0	124,103	$22,302	$0	$43,436	$65,738	($466,128)
5	$0	123,482	$22,971	$1,272	$43,219	$64,918	($401,210)
6	$0	122,865	$23,660	$1,266	$43,003	$65,397	($335,813)
7	$0	122,250	$24,370	$1,259	$42,788	$65,898	($269,915)
8	$0	121,639	$25,101	$1,253	$42,574	$66,422	($203,493)
9	$0	121,031	$25,854	$1,247	$42,361	$66,968	($136,526)
10	$0	120,426	$26,629	$1,240	$42,149	$67,538	($68,987)
11	$0	119,824	$27,428	$1,234	$41,938	$68,132	($855)
12	$0	119,224	$28,251	$1,228	$41,729	$68,752	$67,897
13	$0	118,628	$29,099	$1,222	$41,520	$69,397	$137,293
14	$0	118,035	$29,972	$1,216	$41,312	$70,068	$207,362
15	$0	117,445	$30,871	$1,210	$41,106	$70,767	$278,128
16	$0	116,858	$31,797	$1,204	$40,900	$71,494	$349,622
17	$0	116,274	$32,751	$1,198	$40,696	$72,249	$421,871
18	$0	115,692	$33,733	$1,192	$40,492	$73,034	$494,905
19	$0	115,114	$34,745	$1,186	$40,290	$73,849	$568,754
20	$0	114,538	$35,788	$1,180	$40,088	$74,696	$643,451
21	$1	113,965	$36,861	$1,174	$39,888	$75,575	$719,026
22	$2	113,396	$37,967	$1,168	$39,688	$76,488	$795,514
23	$3	112,829	$39,106	$1,162	$39,490	$77,434	$872,948
24	$4	112,264	$40,279	$1,156	$39,293	$78,416	$951,363
25	$5	111,703	$41,488	$1,151	$39,096	$79,433	$1,030,797
Totals:		2,403,489	$548,404	$19,604	$841,221	$1,757,367	$1,370,021
				Net Present Value (NPV)		**$1,030,822**	
				Internal Rate of Return (IRR)		**8.0%**	

Building	Roof Area (sq ft)	Panel	Qty	Panel Sq Ft	Panel Total Sq Ft	Total KW	Total Annual kWh	Panel Weight (33 lbs)	W/SQFT
Denville Valleyview Middle School	5160	Sunpower SPR230	351	14.7	5,161	80.73	125,983	11,583	15.64



.= Proposed PV Layout

Notes:
1. Estimated kWH based on 4.68 hours full output per day per 365 day year. Actual kWH will vary day to day.