ENERGY AUDIT – FINAL REPORT

LAKEVIEW ELEMENTARY SCHOOL

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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
Lakeview Elementary School
44 Cooper 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	$ 117,997
Natural Gas	$ 101,756
Total	$ 219,753

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	$52,236	$5,436	9.6	10.4%
2	Lighting Controls	$6,490	$3,003	2.2	46.3%
3	HVAC System Controls	$328,028	$10,889	30.1	3.3%
4	Boiler Replacement	$69,326	$9,686	7.2	14.0%
5	Solar PV – Direct Purchase	$2,156,940	$192,236	11.2	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	16.6	31,523	-
2	Lighting Controls	-	18,311	-
3	HVAC System Controls	-	5,552	5,939
4	Boiler Replacement	-	-	5,766
5	Solar PV – Direct Purchase	239.7	374,000	-

*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:** Boiler Replacement

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

1. Chemically clean the condenser and evaporator coils periodically to optimize efficiency. Poorly maintained heat transfer surfaces can reduce efficiency 5-10%. 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.
8. A concern for the facility is the high energy usage per square foot. This building is the least energy efficient of the three buildings. A major contributor could be the ceiling plenum ventilation system. Investigate and confirm that all ceiling plenum ventilation hoods are operating correctly and most importantly, opening only when needed in the heating season could result in significant heating savings.

Overall the energy use for this facility is higher than both Valleyview MS and Riverview ES per square foot. One contributor for increased energy use is the AC systems throughout the building. Even thought the original building was designed without a cooling system, the additions have included central air conditioning for the majority of the office space, and common areas throughout the building such as the library, computer room, etc. The building's higher percentage of cooled areas, accounts for a large portion of the additional energy usage.

The other major contributor for increased energy use is the large envelope exposed area and entrance / exits throughout the building. Lakeview elementary school's heat consumption is 75% greater than Valleyview's heat consumption with the similar if not more efficient heating system. Valleyview middle school's construction is multi story and with approximately half as many entrance doors as compared to Lakeview. The large perimeter, single story construction with multiple entrances at Lakeview has more roof and wall area exposed to ambient conditions, as well as higher potential for infiltration all resulting in more energy use per square foot of floor space.

II. INTRODUCTION

The comprehensive energy audit covers the 82,007 square foot Lakeview Elementary 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 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	16.4¢ / kWh
Natural Gas	$1.68 / Therm

Table 3
Electricity Billing Data

Utility Provider: JCP&L, General Service Secondary 3 Phase (Meter # G16649701)			
MONTH OF USE	**CONSUMPTION KWH**	**DEMAND**	**TOTAL BILL**
Jun-08	55,200	185.8	$10,050
Jul-08	47,840	130.1	$8,563
Aug-08	47,520	133.8	$8,537
Sep-08	62,880	202.6	$9,884
Oct-08	62,880	199.8	$9,859
Nov-08	62,240	186.1	$9,720
Dec-08	60,960	161.3	$9,779
Jan-09	89,920	200.0	$14,349
Feb-09	69,760	180.2	$11,279
Mar-09	36,640	202.6	$6,490
Apr-09	61,920	188.3	$9,650
May-09	62,720	186.1	$9,837
Totals	**720,480**	**202.6 Max**	**$117,997**
AVERAGE DEMAND 179.7 KW average			
AVERAGE RATE $0.164 $/kWh			

Figure 1
Electricity Usage Profile

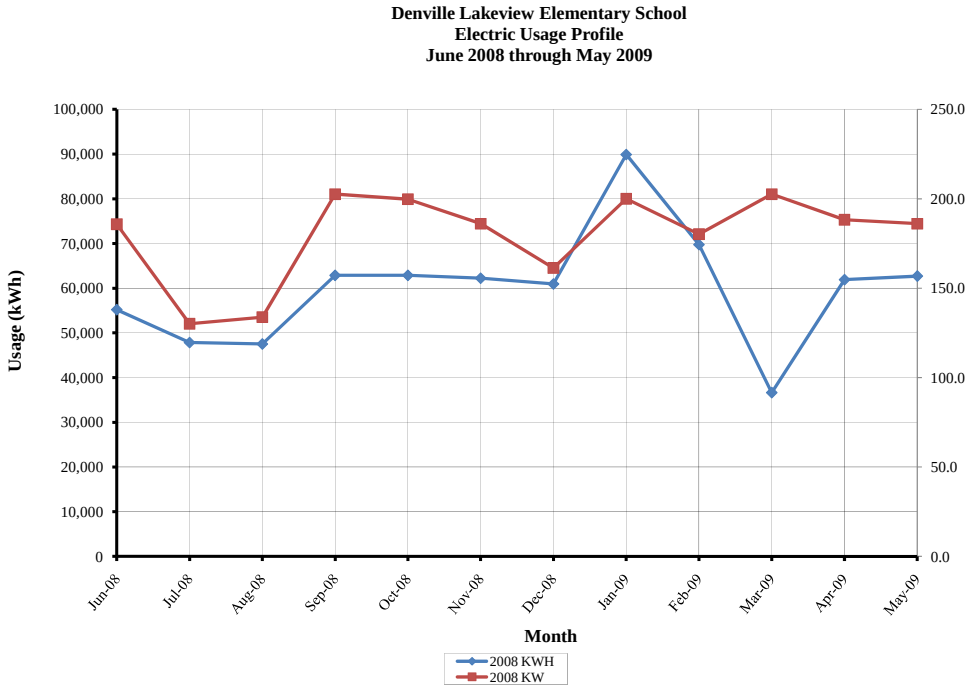
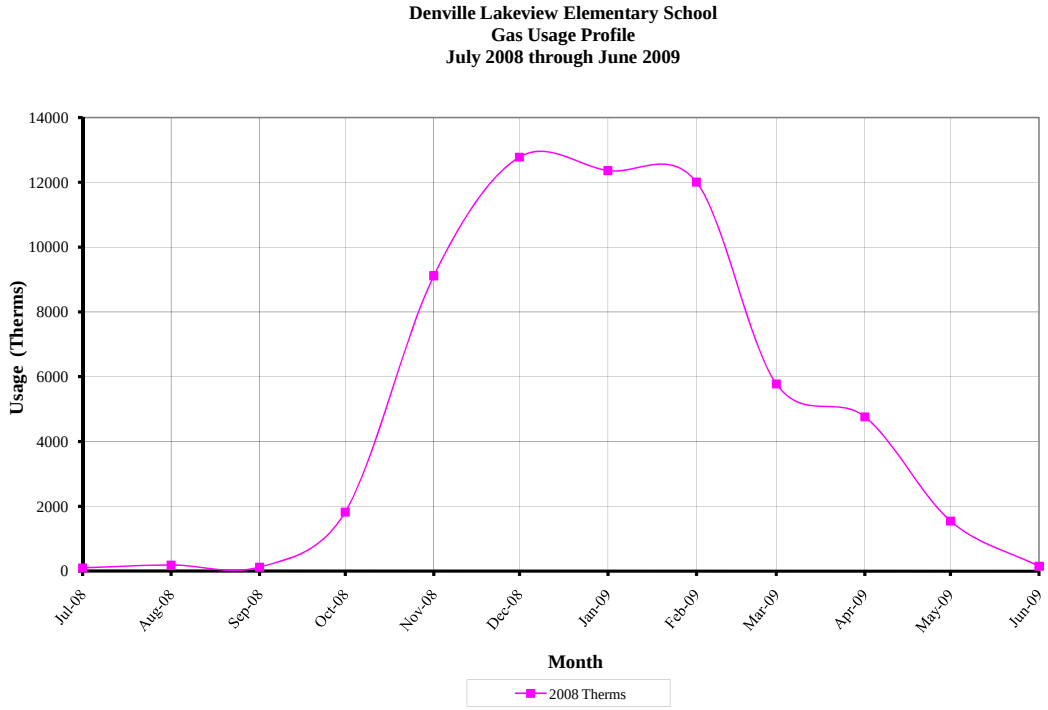


Table 4
Natural Gas Billing Data

Utility Provider: NJN, Rate - GSL, (Meter # 00546216)		
MONTH OF USE	**CONSUMPTION (THERMS)**	**TOTAL BILL**
Jul-08	99.35	$1,260
Aug-08	188.43	$1,447
Sep-08	121.74	$1,265
Oct-08	1,820.86	$3,372
Nov-08	9,114.96	$14,484
Dec-08	12,778.68	$20,154
Jan-09	12,363.79	$19,542
Feb-09	12,009.62	$18,938
Mar-09	5,777.45	$9,199
Apr-09	4,763.16	$7,893
May-09	1,545.61	$3,346
Jun-09	146.53	$858
TOTALS	**60730.18**	**$101,756**
AVERAGE RATE:	**$1.68**	**$/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:

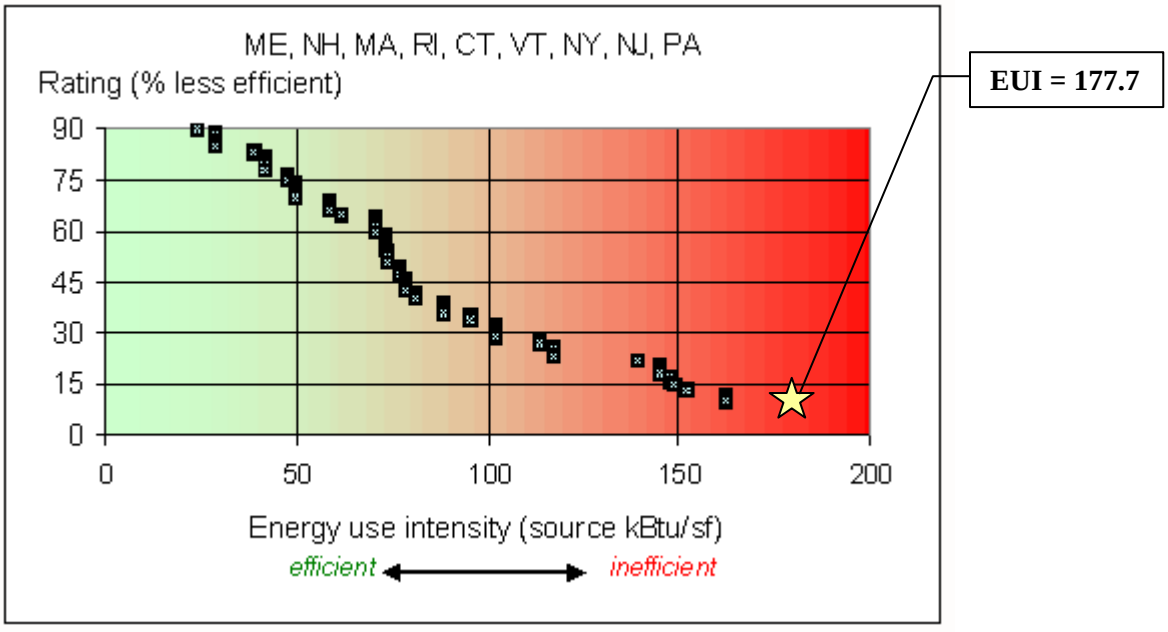
$$Building\ Site\ EUI = \frac{(Electric\ Usage\ in\ kBtu + Gas\ Usage\ in\ kBtu)}{Building\ Square\ Footage}$$

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

Table 5
Denville Lakeview Elementary School EUI Calculations

ENERGY TYPE	BUILDING USE			SITE ENERGY	SITE-SOURCE	SOURCE ENERGY
	kWh	Therms	Gallons	kBtu	RATIO	kBtu
ELECTRIC	720,480			2,459,719	3.340	8,215,461
NATURAL GAS		60,730.18		6,073,018	1.047	6,358,450
FUEL OIL			0.00	0	1.010	0
PROPANE			0.00	0	1.010	0
TOTAL				8,532,737		14,573,910
*Site - Source Ratio data is provided by the Energy Star Performance Rating Methodology for Incorporating Source Energy Use document issued Dec 2007.						
BUILDING AREA		82,007		SQUARE FEET		
BUILDING SITE EUI		104.05		kBtu/SF/YR		
BUILDING SOURCE EUI		**177.72**		**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 is 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 Lakeview ES	19	50

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

V. FACILITY DESCRIPTION

The 82,007 SF elementary School is a single story facility comprised of classrooms, offices, cafeteria, all purpose room, kitchen, gymnasium, library, and other support spaces. The original building was built in 1964. B-wing was added to the building in 1966, which includes additional classrooms, and outdoor courtyard space. C-Wing was added to the building in 2001 which includes additional classrooms, new gymnasium, library/media center, and computer room. The typical school hours are between 8:15 am and 3:30 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 flat rubber roofing system. 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 entrances / exits throughout the building are extensive due to the additions. The entrance to the main office and front hallway along with all other entrances except for one do not have vestibules.

HVAC Heating System

The original building is heated by two H.B. Smith industrial hot water boilers. The boilers have been converted to gas. The boilers were built in 1963. The boilers require additional maintenance due to its age. The heating water loop for the original building is circulated with two 5.0 HP and one 1½ HP base mounted pumps with redundancy. The pumps are manually turned on in the heating season. The C-wing addition includes two Smith Cast Iron boilers installed at the time of the C-wing addition which are 8 yrs old. The boiler water in the addition are circulated by two ¾ HP primary inline boiler pumps and two 7.5 HP secondary base mounted pumps. (operating and standby.) 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 in the original building and electronic controls for the C-wing addition. The baseboards and hot water coil water flow is regulated by 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. Some control valves are corroded and in poor condition. The electronic controls are in good condition.

HVAC Cooling System

The building does not have a central cooling plant, however many spaces have dedicated packaged rooftop equipment. A few spaces are air conditioned by either window air conditioners or split systems. The majority of offices as well as the library, computer room, front office, and faculty rooms are conditioned with packaged rooftop units. Window air conditioners are installed for classrooms and support spaces, as needed. 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). Approximately 70%-90% of the school has some form of air conditioning.

The original building was not designed with a cooling system and include general ventilation for the above ceiling space of wings A and B. Smaller more modern exhaust fans are in place for C-wing. The intent of the ventilation system is to provide hot air relief through stack effect or mechanical exhaust of the ceiling plenum. Common practice would include back draft dampers or motor operated dampers which would close the relief hoods and turn off the exhaust fans in unoccupied periods and in the heating season. The hoods / exhaust fans in A and B wing appear old and in poor condition.

Exhaust System

Air is exhausted from the toilet rooms through the roof exhausters. The toilet room exhaust fans are operated manually by maintenance personnel and typically run 24/7. Some roof exhaust fans do not appear to be operational, however in repairable condition.

Domestic Hot Water

Domestic hot water for lavatories, office lounge, locker room showers, and kitchen facilities is provided by two hot water heaters. Both the original building and C-wing addition hot water heaters are gas fired and independent of the boiler systems to avoid use of the boilers in the non heating season. The original building domestic hot water system is made up of a 69 gallon A.O. Smith hot water heater and the C-wing addition domestic hot water system is made up of a 140 gallon A.O. Smith hot water heater. The domestic hot water is circulated throughout the building by hot water re-circ pumps. The original building circulation pump has no controls and runs 24/7. The C-wing addition hot water re-circ pump is controlled by an aqua stat. The domestic hot water piping insulation appeared to be in good condition.

Lighting

Typical lighting throughout the original building is fluorescent tube lay-in fixtures with T-12 lamps and magnetic ballasts. The C-wing addition lighting consists of modern T-8 lay-in fixtures with electronic 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. The gym is lit with high ceiling high pressure sodium fixtures. All interior lighting is manually controlled by the building occupants by wall switches.

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 original building (A-wing and B-wing) of Lakeview elementary 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.

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

Hallways:
10 Hrs per day, 5 days per week, 47 weeks per year – 2350 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) = $25 per fixture; T-5 or T-8 (3-4 lamp) = $30 per fixture.

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

$$\text{Smart Start®}\ Incentive = (567 \times\ \$10) + (11 \times\ \$20) = \underline{\$5{,}890}$$

Replacement and Maintenance Savings are calculated as follows:

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

$$Savings = (38\ lamps\ \ per\ \ year) \times (\$2.00 + \$5.00) = \underline{\$266}$$

Energy Savings Summary:

ECM #1 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$58,126
NJ Smart Start Equipment Incentive ($):	($5,890)
Net Installation Cost ($):	$52,236
Maintenance Savings ($ / yr):	*$266*
Energy Savings ($ / yr):	*$5170*
Net Savings ($ / yr):	*$5,436*
Simple Payback (yrs):	*9.6*
Simple Return On Investment	*10.4%*
Estimated ECM Lifetime (Yr)	*25*
Simple Lifetime Savings ($)	*$135,900*

* 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 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 = 183,105 kWh/Yr. occupancy sensor controlled lighting

Energy Savings Calculations:

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

$$Energy\ Savings = 10\% \times 183{,}105\ (kWh) = 18{,}311\ (kWh)$$

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

$$Savings. = 18{,}311\ (kWh) \times 0.164\left(\frac{\$}{kWh}\right) = \$3{,}003$$

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

Installation Cost = $75 x 118 motion sensors = $8,850

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.

$$\text{Smart Start®}\ Incentive = (\#\ of\ \ wall\ mount\ devices \times\ \$\ 20) = (118 \times \$20) = \$2360$$

Energy Savings Summary:

ECM #2 - ENERGY SAVINGS SUMMARY*	
Installation Cost ($):	$8,850
NJ Smart Start Equipment Incentive ($):	($2,360)
Net Installation Cost ($):	*$6,490*
Maintenance Savings ($ / yr):	*$0*
Energy Savings ($ / yr):	*$3,003*
Total Energy Savings ($ / yr):	*$3,003*
Simple Payback (yrs):	*2.2*
Simple Return On Investment (%)	*46.3%*
Estimated ECM Lifetime (Yr)	*15*
Simple Lifetime Savings ($)	*$45,045*

* 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 in the original building 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 1964. The space thermostats are inaccurate due to temperature drift over time, leakage, or frozen actuators. The C-wing addition have modern electronic controls, however the system does not have a central system with logic or programming. 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 siginificant 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, and air handling units, wired back to a front end controller with computer interface. The front end device will provide communication between the devices and 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 82,007 SF) = $328,028.

Total Gas usage	= 60,730 Therms
Estimated non-Heat gas usage (kitchen & HW) (*Averaged from June & September gas usage)	= 134 Therms*
Average Cost of Gas	= $1.68/Therm
Total Cooling Capacity	= 53.5 tons
Ave Cooling Efficiency	= 9.25 EER
Cooling Season Full Load Cooling Hrs.	= 800 hrs/yr.
Average Cost of Electricity	= $0.164/kWh

Energy Savings Calculations:

Heating Savings Calculations

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

$$Heating\ Gas\ Input = 60{,}730\left(Therms\right) - \left(134\left(\frac{Therms}{Month}\right) \times 10\left(\frac{Months}{Yr}\right)\right) = 59{,}390\left(Therms\right)$$

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

$$Savings. = 59{,}390\left(Therms\right) \times 10\% \times 1.68\left(\frac{\$}{Therm}\right) = \$9{,}978$$

Cooling Savings Calculations

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

$$Est\ Cool\ Cons. = \frac{53.5\left(Tons\right) \times 12{,}000\left(\frac{Btu}{Ton\ Hr}\right) \times 800\ Hrs.}{9.25\left(\frac{Btu}{Wh}\right) \times 1000\left(\frac{Wh}{kWh}\right)} = 55{,}524\left(kWh\right)$$

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

$$Savings. = 55{,}524\,(kWh) \times 10\% \times 0.164\left(\frac{\$}{kWh}\right) = \$911$$

$$Total\ ECM\ \ Savings = \$9{,}978 + \$911 = \$10{,}889$$

Energy Savings Summary:

ECM #3 - ENERGY SAVINGS SUMMARY*	
Installation Cost ($):	$328,028
NJ Smart Start Equipment Incentive ($):	$0
Net Installation Cost ($):	$328,028
Maintenance Savings ($ / yr):	*$0*
Energy Savings ($ / yr):	*$10,889*
Total Energy Savings ($ / yr):	*$10,889*
Simple Payback (yrs):	*30.1*
Simple Return On Investment (%)	*3.3%*
Estimated ECM Lifetime (Yr)	*15*
Simple Lifetime Savings ($)	*$163,335*

ECM #4: Boiler Replacement

Description:

Lakeview elementary school is heated by two H.B. Smith industrial Gas-fired, sectional boilers. The boilers are original to the building, 43 years old. The C-wing addition is heated by two new Smith Cast Iron hot water boilers built with the addition in 2001, 8 years old. The original boiler efficiency is approximately 78% when producing hot water.

This ECM includes replacing the two original building gas fired hot water boilers with high efficiency boilers. The ECM does not include replacement of the C-wing addition boilers. The basis of this ECM is two (2) Weil – McLain sectional hot water boilers or equivalent with an efficiency of 85.6%.

Existing Heating Hot Water Boiler:

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:

Original building approximate SF = 54,671 SF
Average Cost of Natural Gas = $1.68/Therm

Energy Savings Calculations:

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

$$Heat\ Load = \frac{50\left(\frac{Btu}{Hr\ SF}\right)\times 54{,}671\,(SF)}{1000\left(\frac{Btu}{kBtu}\right)} = 2{,}734.57\left(\frac{kBtu}{Hr}\right)$$

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

$$\left(\frac{1}{Efficiency_{OLD}} - \frac{1}{Efficiency_{NEW}}\right)$$

$$EnergySavings = \frac{2{,}734.57\left(\frac{kBtu}{Hr}\right)\times 4{,}888\,(HDD)\times 24\ Hrs\times 0.6}{65\,(^{\circ}F)\times 100\left(\frac{kBtu}{Therm}\right)}\times\left(\frac{1}{73\%} - \frac{1}{85.1\%}\right)\cdots$$

$$= 5{,}766\,(Therms)$$

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

$$Savings. = 5{,}766\,(Therms)\times 1.68\left(\frac{\$}{Therm}\right) = \$9{,}686$$

Installed cost of the Weil McLain sectional boilers including removal of existing unit, all piping changes and controls is estimated to be $75,100.
Smart Start Incentive = $1.00/MBh x 5,774/installed MBh = $5,774

Energy Savings Summary:

ECM #4 - ENERGY SAVINGS SUMMARY*	
Installation Cost ($):	$75,100
NJ Smart Start Equipment Incentive ($):	($5,774)
Net Installation Cost ($):	$69,326
Maintenance Savings ($ / yr):	*$0*
Energy Savings ($ / yr):	*$9,686*
Total Energy Savings ($ / yr):	*$9,686*
Simple Payback (yrs):	*7.2*
Simple Return On Investment (%):	*14.0%*
Estimated ECM Lifetime (yr):	*35*
Simple Lifetime Savings ($):	*$339,010*

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 239.66 kilowatts could be installed. A system of this size has an estimated kilowatt hour production of 374,000 KWh annually, reducing the overall utility bill by approximately 51.9% percent. A detailed financial analysis can be found in the Renewable / Distributed Energy Measures Calculation appendix. This analysis illustrates the payback of the system over a 25 year period. The eventual degradation of the solar panels and the price of accumulated SREC's are factored into the payback.

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	11.2 Years	8.9%	12.8%
Direct Purchase	11.2 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 for the original building and two new gas fired boiler for the C-wing addition. 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 and when full delivery is not made, and when a new supplier is contracted or the customer returns to the utility. It is important when utilizing a Third Party Supplier, that an experienced regional supplier is used, otherwise, under delivery can occur, jeopardizing economics and scheduling.

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.

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. Recalibrate existing temperature sensors serving the original building HVAC control system.

F. Confirm that outside air dampers on the rooftop units are functioning properly to take advantage of free cooling for AC unit and avoid excessive outside air on AC and heating unit in unoccupied periods.

G. 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.

H. Repair or replace insulation where old and degraded on heating water piping especially in unconditioned spaces such as the original building boiler room and service garage where the boiler water pumps are located.

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

J. Confirm dampers are functioning properly in all exhaust fans and ventilation hoods throughout the building.

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

INSTALLATION COST AND REBATES

CONCORD ENGINEERING GROUP

Denville - Lakeview Elementary School

ECM 1: LIGHTING UPGRADE

	Qty	Unit Cost $	Material $	Labor $	Total $
Lighting Fixture Replacement	LS	$58,126	-	-	$58,126
Utility Incentive - NJ Smart Start (1-2) lamp fixture	567	$10.00			($5,670)
Utility Incentive - NJ Smart Start (3-4) lamp fixture	11	$20.00			($220)
Total Cost Less Incentive					$52,236

ECM 2: LIGHTING CONTROLS

	Qty	Unit Cost $	Material $	Labor $	Total $
Dual - Technology Sensor	118	$75	$1,770	$7,080	$8,850
Utility Incentive - NJ Smart Start	118	$20			($2,360)
Total Cost Less Incentive					$6,490

ECM 3: HVAC SYSTEM CONTROLS

	SF	Unit Cost $	Material $	Labor $	Total $
DDC Automation System	82007	$4	-	-	$328,028
Utility Incentive - NJ Smart Start					$0
Total Cost Less Incentive					$328,028

ECM 4: BOILER REPLACEMENT

	Qty	Unit Cost $	Material $	Labor $	Total $
2887 MBH High Eff Boiler	2	$34,100	$57,700	$10,500	$68,200
Old Boiler Demolition	2	$3,450		$6,900	$6,900
Utility Incentive - NJ Smart Start (5,774 MBH	5,774	$1			($5,774)
Total Cost Less Incentive					$69,326

ECM 6: SOLAR PV SYSTEM

	Qty	Unit Cost $	Material $	Labor $	Total $
Solar PV System	1	$2,156,940			$2,156,940
Utility Incentive - (see Renewable Energy Measures appendix for details)					-
Total Cost Less Incentive					$2,156,940

Concord Engineering Group, Inc.

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SmartStart Building Incentives

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

Electric Chillers

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

Gas Cooling

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

Desiccant Systems

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 Lakeview Elementary 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
Original Building HW	Boiler Room	A.O. Smith	Gas Fired	1	BTP-700A 920	LF940347680920	700 MBH	636	69	-	Nat Gas	Unknown	10	-
Building Addition HW	Mech Mezz	A.O. Smith	Gas Fired	1	BTP-140-199	-	199 MBH	193	140	-	Nat Gas	9	10	1

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
Nurse Office	Roof	Carrier	Packaged CV		50TJ005M511	2600G24063	DX R-22	48	10	None	-	-	-	-	208	3	9	15	6
Faculty Room	Roof	Carrier	Packaged CV		50TJ005M511	2600G24062	DX R-22	48	10	None	-	-	-	-	208	3	9	15	6
SIS	Roof	Carrier	Packaged CV		50TJ014541	2100G30360	DX R-22	150	9	None	-	-	-	-	208	3	9	15	6
Library	Roof	Carrier	Packaged CV		50TJ24570AA		DX R-22	240**	9**	None	-	-	-	-	208	3	9	15	6
Computer Lab	Roof	Carrier	Packaged CV		50TJ008521GA	2500G30413	DX R-22	84	8.9	None	-	-	-	-	208	3	9	15	6
Principal's Office	Roof	Carrier	Packaged CV		50TJ004M511	2600G24005	DX R-22	36	10	None	-	-	-	-	208	3	9	15	6
Main Office	Roof	Carrier	Packaged CV		50TJ004M511	2600G24006	DX R-22	36	10	None	-	-	-	-	208	3	9	15	6
GYM	Mech Mezz	Carrier	AHU		39TVCCTK-61039--AA	2900F16917	DX R-22	5500 cfm	-	None	-	-			208	3	9	15	6
GYM	Mech Mezz	Carrier	AHU		39TVCCTK-61039--AA	2900F16950	DX R-22	5500 cfm	-	None	-	-			208	3	9	15	6

*Equipment efficiencies listed above are based on new equipment product data.
**Estimated information due to inadequate model number

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	Old Boiler Room	H.B. Smith Co	Dual Fuel - Hot Water	2			Gas		1885 MBH	77%	Gas	43	25	(18)	Converted from oil to gas fired burner.
Heating Water Loop	Mezz Mech Room	Smith Cast Iron	Gas Fired - Hot Water	2	28A-5 Series	N2000-518	Gas	1491 MBH	1,166 MBH	78%	Gas	9	25	16	

* 5% efficiency degradation from manufacture data assumed in calculation for H.B. Smith Co. boiler

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	Loading Dock Room	Bell & Gossett	End Suction Cons Volume	2	185011	-	-	-	1750	5	208	-	Unknown	20	-
Heating Water Loop	Loading Dock Room	Bell & Gossett	End Suction Cons Volume	1		-	-	-	1750	1.5	208	-	Unknown	20	-
Primary Boiler Loop	Mezz Mech Room	Armstrong	End Suction Cons Volume	1	3X3X6	-	115 GPM	12 FT.	1749	0.75	208	-	9	20	11
Heating Water Loop	Mezz Mech Room	Armstrong	End Suction Cons Volume	2	3X2X10	-	170 GPM	75 FT.	1750	7.5	208	-	9	20	11

Split Systems

Service	Location	Manufacturer	Type	Qty.	Model #	Serial #	Cooling Type	Cooling Capacity	EER	Heating Type	Heating Capacity (Input)	Eff	Fan HP	Motor RPM	Volts	Phase	Approx. Age	ASHRAE Service Life	Remaining Life
IT closet	AHU - Costa Rm	Airedale	Ductless Split System Cooling Only	1		-	DX R-22	9 MBH	-	None	-	-	-	-	208	1	Unknown	15	-
	CU - Roof			1	SCC09DA00A0AA0A	1-99-H-1895-35							-	-	208	1	Unknown	15	-

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

OMB No. 2060-0347

STATEMENT OF ENERGY PERFORMANCE
Lakeview Elementary School

Building ID: 1810453
For 12-month Period Ending: May 31, 2009[1]
Date SEP becomes ineligible: N/A
Date SEP Generated: September 08, 2009

Facility
Lakeview Elementary School
44 Cooper 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: 1958
Gross Floor Area (ft²): 82,007

Energy Performance Rating[2] (1-100) 19

Site Energy Use Summary[3]

Electricity - Grid Purchase(kBtu)	2,458,278
Natural Gas (kBtu)[4]	6,600,905
Total Energy (kBtu)	9,059,183

Energy Intensity[5]

Site (kBtu/ft²/yr)	110
Source (kBtu/ft²/yr)	184

Emissions (based on site energy use)

Greenhouse Gas Emissions ($MtCO_2e$/year)	726

Electric Distribution Utility
Jersey Central Power & Lt Co

National Average Comparison

National Average Site EUI	82
National Average Source EUI	137
% Difference from National Average Source EUI	35%
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	Lakeview Elementary School	Is this the official building name to be displayed in the ENERGY STAR Registry of Labeled Buildings?		☐
Type	K-12 School	Is this an accurate description of the space in question?		☐
Location	44 Cooper 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		☐
Lakeview Elementary School (K-12 School)				
CRITERION	**VALUE AS ENTERED IN PORTFOLIO MANAGER**	**VERIFICATION QUESTIONS**	**NOTES**	☑
Gross Floor Area	82,007 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	161	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	80 %	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))
05/01/2009	05/31/2009	62,720.00
04/01/2009	04/30/2009	61,920.00
03/01/2009	03/31/2009	36,640.00
02/01/2009	02/28/2009	69,760.00
01/01/2009	01/31/2009	89,920.00
12/01/2008	12/31/2008	60,960.00
11/01/2008	11/30/2008	62,240.00
10/01/2008	10/31/2008	62,880.00
09/01/2008	09/30/2008	62,880.00
08/01/2008	08/31/2008	47,520.00
07/01/2008	07/31/2008	47,840.00
06/01/2008	06/30/2008	55,200.00
Electric Consumption (kWh (thousand Watt-hours))		**720,480.00**
Electric Consumption (kBtu (thousand Btu))		**2,458,277.76**
Total Electricity (Grid Purchase) Consumption (kBtu (thousand Btu))		**2,458,277.76**
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)
05/01/2009	05/31/2009	1,545.61
04/01/2009	04/30/2009	4,763.16
03/01/2009	03/31/2009	5,777.45
02/01/2009	02/28/2009	12,009.62
01/01/2009	01/31/2009	12,363.79
12/01/2008	12/31/2008	12,778.68
11/01/2008	11/30/2008	9,114.96
10/01/2008	10/31/2008	1,820.86
09/01/2008	09/30/2008	121.74
08/01/2008	08/31/2008	188.43

07/01/2008	07/31/2008	99.35
Gas Consumption (therms)		**60,583.65**
Gas Consumption (kBtu (thousand Btu))		**6,058,365.00**
Total Natural Gas Consumption (kBtu (thousand Btu))		**6,058,365.00**
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
Lakeview Elementary School
44 Cooper 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

Lakeview Elementary School	
Gross Floor Area Excluding Parking: (ft^2)	82,007
Year Built	1958
For 12-month Evaluation Period Ending Date:	May 31, 2009

Facility Space Use Summary

Lakeview Elementary School	
Space Type	K-12 School
Gross Floor Area(ft^2)	82,007
Open Weekends?	No
Number of PCs	161
Number of walk-in refrigeration/freezer units	0
Presence of cooking facilities	Yes
Percent Cooled	80
Percent Heated	100
Months[o]	10
High School?	No
School District[o]	N/A

Energy Performance Comparison

	Evaluation Periods		Comparisons		
Performance Metrics	**Current** (Ending Date 05/31/2009)	**Baseline** (Ending Date 05/31/2009)	**Rating of 75**	**Target**	**National Average**
Energy Performance Rating	19	19	75	N/A	50
Energy Intensity					
Site (kBtu/ft^2)	110	110	64	N/A	82
Source (kBtu/ft^2)	184	184	107	N/A	137
Energy Cost					
$/year	$ 151,546.75	$ 151,546.75	$ 88,044.45	N/A	$ 112,586.60
$/$ft^2$/year	$ 1.85	$ 1.85	$ 1.07	N/A	$ 1.37
Greenhouse Gas Emissions					
$MtCO_2e$/year	726	726	422	N/A	539
$kgCO_2e/ft^2$/year	9	9	5	N/A	7

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

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

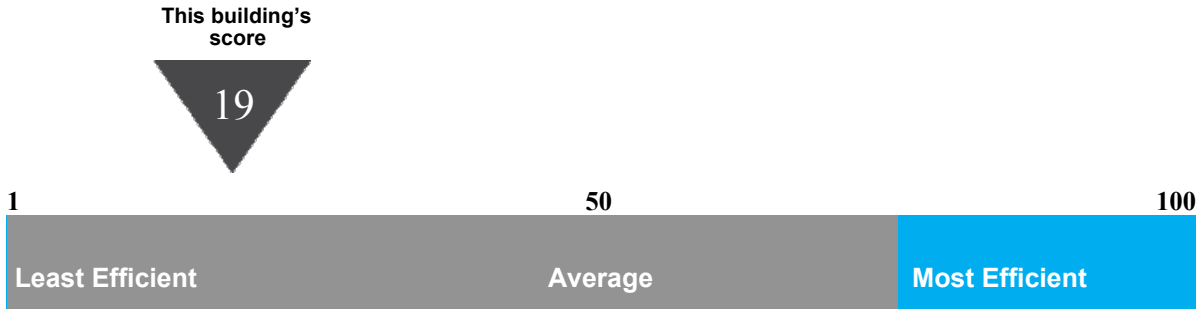
Statement of Energy Performance

2009

Lakeview Elementary School
44 Cooper Rd.
Denville, NJ 07834

Portfolio Manager Building ID: 1810453

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 184 kBtu per square foot per year.*

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

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

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

Date of certification

EPA United States Environmental Protection Agency

Date Generated: 09/08/2009

CEG Job #: 9C09080
Project: Denville Lakeview ES
Address: 44 Coopr Road
Denville, NJ 07834
Building SF: 82,007

"Denville Lakeview Elementary School"

KWH COST: $0.164

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
15	Auditorium	1880	8	0	High Pressure Sodium Lights	464	3.71	6,978.6	$1,144.48	8	0	No Change	464	3.71	6978.56	$1,144.48	$0.00	$0.00	0.00	0	$0.00	0.00
15	Stage	1880	4	0	High Pressure Sodium Lights	464	1.86	3,489.3	$572.24	4	0	No Change	464	1.86	3489.28	$572.24	$0.00	$0.00	0.00	0	$0.00	0.00
33		1880	1	0	1-Lamp Incandescents	75	0.08	141.0	$23.12	1	0	18 W CFL Lamp	18	0.02	33.84	$5.55	$5.75	$5.75	0.06	107.16	$17.57	0.33
54		1880	2	0	1 Lamp Incandescents	100	0.20	376.0	$61.66	2	0	26 W CFL Lamp	26	0.05	97.76	$16.03	$5.75	$11.50	0.15	278.24	$45.63	0.25
39	Classroom A1	1880	17	2	2-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	80	1.36	2,556.8	$419.32	17	2	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	55	0.94	1757.8	$288.28	$100.00	$1,700.00	0.43	799	$131.04	12.97
33	A1 Closet	1880	1	0	1-Lamp Incandescents	75	0.08	141.0	$23.12	1	0	18 W CFL Lamp	18	0.02	33.84	$5.55	$5.75	$5.75	0.06	107.16	$17.57	0.33
39		1880	1	2	2-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	80	0.08	150.4	$24.67	1	2	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	55	0.06	103.4	$16.96	$100.00	$100.00	0.03	47	$7.71	12.97
39	Classroom A2	1880	17	2	2-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	80	1.36	2,556.8	$419.32	17	2	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	55	0.94	1757.8	$288.28	$100.00	$1,700.00	0.43	799	$131.04	12.97
33	A2 Closet	1880	1	0	1-Lamp Incandescents	75	0.08	141.0	$23.12	1	0	18 W CFL Lamp	18	0.02	33.84	$5.55	$5.75	$5.75	0.06	107.16	$17.57	0.33
39		1880	1	2	2-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	80	0.08	150.4	$24.67	1	2	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	55	0.06	103.4	$16.96	$100.00	$100.00	0.03	47	$7.71	12.97
55	Principal's Office	1880	4	0	2-Lamp, T8, Electronic Ballast, Recessed Mounted, Parabolic	58	0.23	436.2	$71.53	4	0	No Change	58	0.23	436.16	$71.53	$0.00	$0.00	0.00	0	$0.00	0.00
56	Principal's Bathroom	1880	1	3	3-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	130	0.13	244.4	$40.08	1	3	2'X4' 3-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N 2GC8	91	0.09	171.08	$28.06	$120.00	$120.00	0.04	73.32	$12.02	9.98
57	Communication Closet	1880	1	0	3.-Lamp Incandescent	225	0.23	423.0	$69.37	1	0	(3) 18 W CFL Lamp	54	0.05	101.52	$16.65	$17.25	$17.25	0.17	321.48	$52.72	0.33
58		1880	2	2	2-Lamp, T-12, U-Lamp, Magnetic Ballast, Recessed Mounted	60	0.12	225.6	$37.00	2	2	2'x2' 2-Lamp T-8, Prism Lens Electronic Ballast, Architectural surface or Recessed static METALUX 2AC-217-UNV-EB81-U	34	0.07	127.84	$20.97	$204.00	$408.00	0.05	97.76	$16.03	25.45
39	A1 - A6 Hall	2350	13	2	2-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	80	1.04	2,444.0	$400.82	13	2	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	55	0.72	1680.25	$275.56	$100.00	$1,300.00	0.33	763.75	$125.26	10.38
55	Conference Room A	1880	6	0	2-Lamp, T8, Electronic Ballast, Recessed Mounted, Parabolic Lens	58	0.35	654.2	$107.30	6	0	No Change	58	0.35	654.24	$107.30	$0.00	$0.00	0.00	0	$0.00	0.00
39	Conference Room A Bathroom	1880	1	2	2-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	80	0.08	150.4	$24.67	1	2	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	55	0.06	103.4	$16.96	$100.00	$100.00	0.03	47	$7.71	12.97

55	Classroom A25	1880	2	0	2-Lamp, T8, Electronic Ballast, Recessed Mounted, Parabolic Lens	58	0.12	218.1	$35.77	2	0	No Change	58	0.12	218.08	$35.77	$0.00	$0.00	0.00	0	$0.00	0.00
39	Classroom A3	1880	16	2	2-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	80	1.28	2,406.4	$394.65	16	2	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	55	0.88	1654.4	$271.32	$100.00	$1,600.00	0.40	752	$123.33	12.97
39	Classroom A4	1880	16	2	2-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	80	1.28	2,406.4	$394.65	16	2	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	55	0.88	1654.4	$271.32	$100.00	$1,600.00	0.40	752	$123.33	12.97
39	Classroom A5	1880	12	2	2-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	80	0.96	1,804.8	$295.99	12	2	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	55	0.66	1240.8	$203.49	$100.00	$1,200.00	0.30	564	$92.50	12.97
39	Classroom A6	1880	12	2	2-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	80	0.96	1,804.8	$295.99	12	2	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	55	0.66	1240.8	$203.49	$100.00	$1,200.00	0.30	564	$92.50	12.97
39	Classroom A7	1880	12	2	2-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	80	0.96	1,804.8	$295.99	12	2	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	55	0.66	1240.8	$203.49	$100.00	$1,200.00	0.30	564	$92.50	12.97
39	A-hall Girls Bathroom	1880	2	2	2-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	80	0.16	300.8	$49.33	2	2	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	55	0.11	206.8	$33.92	$100.00	$200.00	0.05	94	$15.42	12.97
59	Janitor's Closet	470	1	0	2 - Lamp Incandescents	100	0.10	47.0	$7.71	1	0	(2) 18 W CFL Lamp	36	0.04	16.92	$2.77	$11.50	$11.50	0.06	30.08	$4.93	2.33
39	A-hall Boys Bathroom	1880	2	2	2-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	80	0.16	300.8	$49.33	2	2	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	55	0.11	206.8	$33.92	$100.00	$200.00	0.05	94	$15.42	12.97
39	A8-A29 Hall	2350	9	2	2-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	80	0.72	1,692.0	$277.49	9	2	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	55	0.50	1163.25	$190.77	$100.00	$900.00	0.23	528.75	$86.72	10.38
39	Classroom A8	1880	12	2	2-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	80	0.96	1,804.8	$295.99	12	2	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	55	0.66	1240.8	$203.49	$100.00	$1,200.00	0.30	564	$92.50	12.97
39	Classroom A29	1880	17	2	2-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	80	1.36	2,556.8	$419.32	17	2	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	55	0.94	1757.8	$288.28	$100.00	$1,700.00	0.43	799	$131.04	12.97
39	Classroom A29 Bathroom	1880	2	2	2-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	80	0.16	300.8	$49.33	2	2	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	55	0.11	206.8	$33.92	$100.00	$200.00	0.05	94	$15.42	12.97
39	Boilerroom Bathroom	1880	1	2	2-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	80	0.08	150.4	$24.67	1	2	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	55	0.06	103.4	$16.96	$100.00	$100.00	0.03	47	$7.71	12.97
39	Classroom A9	1880	12	2	2-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	80	0.96	1,804.8	$295.99	12	2	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	55	0.66	1240.8	$203.49	$100.00	$1,200.00	0.30	564	$92.50	12.97
39	Classroom A10	1880	12	2	2-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	80	0.96	1,804.8	$295.99	12	2	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	55	0.66	1240.8	$203.49	$100.00	$1,200.00	0.30	564	$92.50	12.97
39	Garage	470	2	2	2-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	80	0.16	75.2	$12.33	2	2	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	55	0.11	51.7	$8.48	$100.00	$200.00	0.05	23.5	$3.85	51.89
60		470	1	0	3.- Lamp Incandescent	150	0.15	70.5	$11.56	1	0	(3) 18 W CFL Lamp	54	0.05	25.38	$4.16	$17.25	$17.25	0.10	45.12	$7.40	2.33

39	Storage	470	4	2	2-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic	80	0.32	150.4	$24.67	4	2	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	55	0.22	103.4	$16.96	$100.00	$400.00	0.10	47	$7.71	51.89
61		470	2	0	1 Lamp Incandescents	50	0.10	47.0	$7.71	2	0	18 W CFL Lamp	18	0.04	16.92	$2.77	$5.75	$11.50	0.06	30.08	$4.93	2.33
39	A11	1880	12	2	2-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	80	0.96	1,804.8	$295.99	12	2	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	55	0.66	1240.8	$203.49	$100.00	$1,200.00	0.30	564	$92.50	12.97
39	A12	1880	12	2	2-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	80	0.96	1,804.8	$295.99	12	2	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	55	0.66	1240.8	$203.49	$100.00	$1,200.00	0.30	564	$92.50	12.97
62	Small Foyer	1880	6	4	4-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	130	0.78	1,466.4	$240.49	6	3	3 Lamp T-8 GE-332	47	0.28	530.16	$86.95	$29.36	$176.16	0.50	936.24	$153.54	1.15
63	Display Case	1880	1	0	1 Lamp Incandescents	40	0.04	75.2	$12.33	1	0	18 W CFL Lamp	18	0.02	33.84	$5.55	$5.75	$5.75	0.02	41.36	$6.78	0.85
39	Lunch Room	1880	50	2	2-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	80	4.00	7,520.0	$1,233.28	50	2	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	55	2.75	5170	$847.88	$100.00	$5,000.00	1.25	2350	$385.40	12.97
63	Storage	470	4	0	1 Lamp Incandescents	40	0.16	75.2	$12.33	4	0	18 W CFL Lamp	18	0.07	33.84	$5.55	$5.75	$23.00	0.09	41.36	$6.78	3.39
39	"Tolerance Hall"	2350	7	2	2-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	80	0.56	1,316.0	$215.82	7	2	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	55	0.39	904.75	$148.38	$100.00	$700.00	0.18	411.25	$67.45	10.38
36	Communication Closet	1880	4	3	3-Lamp, T12, Magnetic Ballast, Recessed Mounted, Parabolic Lens	130	0.52	977.6	$160.33	4	3	2'X4' 3-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N 2GC8	91	0.36	684.32	$112.23	$120.00	$480.00	0.16	293.28	$48.10	9.98
39	B-Hall	2350	19	2	2-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic	80	1.52	3,572.0	$585.81	19	2	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	55	1.05	2455.75	$402.74	$100.00	$1,900.00	0.48	1116.25	$183.07	10.38
39	Classroom B1	1880	15	2	2-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	80	1.20	2,256.0	$369.98	15	2	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	55	0.83	1551	$254.36	$100.00	$1,500.00	0.38	705	$115.62	12.97
39	Classroom B2	1880	15	2	2-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	80	1.20	2,256.0	$369.98	15	2	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	55	0.83	1551	$254.36	$100.00	$1,500.00	0.38	705	$115.62	12.97
39	Classroom B3	1880	15	2	2-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	80	1.20	2,256.0	$369.98	15	2	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	55	0.83	1551	$254.36	$100.00	$1,500.00	0.38	705	$115.62	12.97
39	Classroom B4	1880	15	2	2-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	80	1.20	2,256.0	$369.98	15	2	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	55	0.83	1551	$254.36	$100.00	$1,500.00	0.38	705	$115.62	12.97
39	Classroom B5	1880	15	2	2-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	80	1.20	2,256.0	$369.98	15	2	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	55	0.83	1551	$254.36	$100.00	$1,500.00	0.38	705	$115.62	12.97
39	Classroom B6	1880	15	2	2-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	80	1.20	2,256.0	$369.98	15	2	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	55	0.83	1551	$254.36	$100.00	$1,500.00	0.38	705	$115.62	12.97
39	Classroom B7	1880	15	2	2-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	80	1.20	2,256.0	$369.98	15	2	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	55	0.83	1551	$254.36	$100.00	$1,500.00	0.38	705	$115.62	12.97
39	Classroom B8	1880	15	2	2-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	80	1.20	2,256.0	$369.98	15	2	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	55	0.83	1551	$254.36	$100.00	$1,500.00	0.38	705	$115.62	12.97

39	Classroom B9	1880	15	2	2-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	80	1.20	2,256.0	$369.98	15	2	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	55	0.83	1551	$254.36	$100.00	$1,500.00	0.38	705	$115.62	12.97
39	Classroom B10	1880	9	2	2-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	80	0.72	1,353.6	$221.99	9	2	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	55	0.50	930.6	$152.62	$100.00	$900.00	0.23	423	$69.37	12.97
39	Classroom B11	1880	15	2	2-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	80	1.20	2,256.0	$369.98	15	2	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	55	0.83	1551	$254.36	$100.00	$1,500.00	0.38	705	$115.62	12.97
39	Classroom B12	1880	15	2	2-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	80	1.20	2,256.0	$369.98	15	2	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	55	0.83	1551	$254.36	$100.00	$1,500.00	0.38	705	$115.62	12.97
39	Classroom B12	1880	15	2	2-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	80	1.20	2,256.0	$369.98	15	2	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	55	0.83	1551	$254.36	$100.00	$1,500.00	0.38	705	$115.62	12.97
39	Classroom B14	1880	15	2	2-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	80	1.20	2,256.0	$369.98	15	2	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	55	0.83	1551	$254.36	$100.00	$1,500.00	0.38	705	$115.62	12.97
39	Classroom B15	1880	15	2	2-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	80	1.20	2,256.0	$369.98	15	2	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	55	0.83	1551	$254.36	$100.00	$1,500.00	0.38	705	$115.62	12.97
39	Classroom B16	1880	15	2	2-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	80	1.20	2,256.0	$369.98	15	2	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	55	0.83	1551	$254.36	$100.00	$1,500.00	0.38	705	$115.62	12.97
39	Classroom B17	1880	15	2	2-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	80	1.20	2,256.0	$369.98	15	2	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	55	0.83	1551	$254.36	$100.00	$1,500.00	0.38	705	$115.62	12.97
60	Storage B13	470	1	0	3.- Lamp Incandescent	150	0.15	70.5	$11.56	1	0	(3) 18 W CFL Lamp	54	0.05	25.38	$4.16	$17.25	$17.25	0.10	45.12	$7.40	2.33
39	B-Hall Boys Bathroom	1880	3	2	2-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	80	0.24	451.2	$74.00	3	2	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	55	0.17	310.2	$50.87	$100.00	$300.00	0.08	141	$23.12	12.97
61	Custodial Closet	470	1	0	1 Lamp Incandescents	50	0.05	23.5	$3.85	1	0	18 W CFL Lamp	18	0.02	8.46	$1.39	$5.75	$5.75	0.03	15.04	$2.47	2.33
39	B-Hall Girls Bathroom	1880	3	2	2-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	80	0.24	451.2	$74.00	3	2	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	55	0.17	310.2	$50.87	$100.00	$300.00	0.08	141	$23.12	12.97
39	Hall Between A and B	2350	6	2	2-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	80	0.48	1,128.0	$184.99	6	2	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	55	0.33	775.5	$127.18	$100.00	$600.00	0.15	352.5	$57.81	10.38
49	Health Room	1880	17	0	2-Lamp, T8, U-Lamp, Electronic Ballast, Recessed Mounted, Prismatic Lens	73	1.24	2,333.1	$382.63	17	0	No Change	73	1.24	2333.08	$382.63	$0.00	$0.00	0.00	0	$0.00	0.00
64		1880	1	0	1-Lamp Compact Flourescent	17	0.02	32.0	$5.24	1	0	No Change	17	0.02	31.96	$5.24	$0.00	$0.00	0.00	0	$0.00	0.00
65	Faculty Room	1880	1	1	1 - Lamp, T-12, Magnetic Ballast, Surface Mounted	28	0.03	52.6	$8.63	1	1	2' 1-Lamp T-8 17W wall Mtd. Metalux BC117	20	0.02	37.6	$6.17	$148.00	$148.00	0.01	15.04	$2.47	60.00
66		1880	2	0	4-Lamp, T8, Electronic Ballast, Recessed Mount, Prismatic Lens	56	0.11	210.6	$34.53	2	0	No Change	56	0.11	210.56	$34.53	$0.00	$0.00	0.00	0	$0.00	0.00
55		1880	8	0	2-Lamp, T8, Electronic Ballast, Recessed Mounted, Parabolic Lens	58	0.46	872.3	$143.06	8	0	No Change	58	0.46	872.32	$143.06	$0.00	$0.00	0.00	0	$0.00	0.00

58		1880	1	2	2-Lamp, T-12, U-Lamp, Magnetic Ballast, Recessed Mounted	60	0.06	112.8	$18.50	1	2	2'x2' 2-Lamp T-8, Prism Lens Electronic Ballast, Architectural surface or Recessed static METALUX 2AC-217-UNV-EB81-U	34	0.03	63.92	$10.48	$204.00	$204.00	0.03	48.88	$8.02	25.45
65	Men's Room	1880	1	1	1 - Lamp, T-12, Magnetic Ballast, Surface Mounted	28	0.03	52.6	$8.63	1	1	2' 1-Lamp T-8 17W wall Mtd. Metalux BC117	20	0.02	37.6	$6.17	$148.00	$148.00	0.01	15.04	$2.47	60.00
7	Small Instructional Suite	1880	15	0	2-Lamp, T8, Electronic Ballast, Recessed Mounted, Prismatic Lens	58	0.87	1,635.6	$268.24	15	0	No Change	58	0.87	1635.6	$268.24	$0.00	$0.00	0.00	0	$0.00	0.00
7	Vice Principal's Office	1880	4	0	2-Lamp, T8, Electronic Ballast, Recessed Mounted, Prismatic Lens	58	0.23	436.2	$71.53	4	0	No Change	58	0.23	436.16	$71.53	$0.00	$0.00	0.00	0	$0.00	0.00
67	Break Room	1880	2	0	3-Lamp, T8, Electronic Ballast, Recessed, Prismatic Lens	82	0.16	308.3	$50.56	2	0	No Change	82	0.16	308.32	$50.56	$0.00	$0.00	0.00	0	$0.00	0.00
67	Room B29	1880	8	0	3-Lamp, T8, Electronic Ballast, Recessed, Prismatic Lens	82	0.66	1,233.3	$202.26	8	0	No Change	82	0.66	1233.28	$202.26	$0.00	$0.00	0.00	0	$0.00	0.00
7	Staff Bathroom	1880	1	0	2-Lamp, T8, Electronic Ballast, Recessed Mounted, Prismatic Lens	58	0.06	109.0	$17.88	1	0	No Change	58	0.06	109.04	$17.88	$0.00	$0.00	0.00	0	$0.00	0.00
24	Foyer	1880	2	0	1 - Lamp Compact Flourescent	18	0.04	67.7	$11.10	2	0	No Change	18	0.04	67.68	$11.10	$0.00	$0.00	0.00	0	$0.00	0.00
67	Room B32	1880	6	0	3-Lamp, T8, Electronic Ballast, Recessed, Prismatic Lens	82	0.49	925.0	$151.69	6	0	No Change	82	0.49	924.96	$151.69	$0.00	$0.00	0.00	0	$0.00	0.00
67	Room B25	1880	9	0	3-Lamp, T8, Electronic Ballast, Recessed, Prismatic Lens	82	0.74	1,387.4	$227.54	9	0	No Change	82	0.74	1387.44	$227.54	$0.00	$0.00	0.00	0	$0.00	0.00
67	Room B26	1880	6	0	3-Lamp, T8, Electronic Ballast, Recessed, Prismatic Lens	82	0.49	925.0	$151.69	6	0	No Change	82	0.49	924.96	$151.69	$0.00	$0.00	0.00	0	$0.00	0.00
67	Office	1880	2	0	3-Lamp, T8, Electronic Ballast, Recessed, Prismatic Lens	82	0.16	308.3	$50.56	2	0	No Change	82	0.16	308.32	$50.56	$0.00	$0.00	0.00	0	$0.00	0.00
67	Testing Room	1880	3	0	3-Lamp, T8, Electronic Ballast, Recessed, Prismatic Lens	82	0.25	462.5	$75.85	3	0	No Change	82	0.25	462.48	$75.85	$0.00	$0.00	0.00	0	$0.00	0.00
66	New Hall-way	2350	3	0	4-Lamp, T8, Electronic Ballast, Recessed Mount, Prismatic Lens	56	0.17	394.8	$64.75	3	0	No Change	56	0.17	394.8	$64.75	$0.00	$0.00	0.00	0	$0.00	0.00
7		2350	11	0	2-Lamp, T8, Electronic Ballast, Recessed Mounted, Prismatic Lens	58	0.64	1,499.3	$245.89	11	0	No Change	58	0.64	1499.3	$245.89	$0.00	$0.00	0.00	0	$0.00	0.00
7	C1	1880	2	0	2-Lamp, T8, Electronic Ballast, Recessed Mounted, Prismatic Lens	58	0.12	218.1	$35.77	2	0	No Change	58	0.12	218.08	$35.77	$0.00	$0.00	0.00	0	$0.00	0.00
7	C2.1	1880	2	0	2-Lamp, T8, Electronic Ballast, Recessed Mounted, Prismatic Lens	58	0.12	218.1	$35.77	2	0	No Change	58	0.12	218.08	$35.77	$0.00	$0.00	0.00	0	$0.00	0.00
13	Boys Bathroom	1880	1	0	4-Lamp, T8, Electronic Ballast, Recessed Mount, Prismatic Lens	109	0.11	204.9	$33.61	1	0	No Change	109	0.11	204.92	$33.61	$0.00	$0.00	0.00	0	$0.00	0.00
13	Girls Bathroom	1880	1	0	4-Lamp, T8, Electronic Ballast, Recessed Mount, Prismatic Lens	109	0.11	204.9	$33.61	1	0	No Change	109	0.11	204.92	$33.61	$0.00	$0.00	0.00	0	$0.00	0.00
68		1880	12	0	1 - Lamp T8, Electronic Ballast, Surface mounted	20	0.24	451.2	$74.00	12	0	No Change	20	0.24	451.2	$74.00	$0.00	$0.00	0.00	0	$0.00	0.00

55	Library	1880	52	0	2-Lamp, T8, Electronic Ballast, Recessed Mounted, Parabolic Lens	58	3.02	5,670.1	$929.89	52	0	No Change	58	3.02	5670.08	$929.89	$0.00	$0.00	0.00	0	$0.00	0.00
24		1880	5	0	1 - Lamp Compact Flourescent	18	0.09	169.2	$27.75	5	0	No Change	18	0.09	169.2	$27.75	$0.00	$0.00	0.00	0	$0.00	0.00
55	Library Office	1880	2	0	2-Lamp, T8, Electronic Ballast, Recessed Mounted, Parabolic Lens	58	0.12	218.1	$35.77	2	0	No Change	58	0.12	218.08	$35.77	$0.00	$0.00	0.00	0	$0.00	0.00
55	Work Room	1880	4	0	2-Lamp, T8, Electronic Ballast, Recessed Mounted, Parabolic Lens	58	0.23	436.2	$71.53	4	0	No Change	58	0.23	436.16	$71.53	$0.00	$0.00	0.00	0	$0.00	0.00
13	Storage	1880	2	0	4-Lamp, T8, Electronic Ballast, Recessed Mount, Prismatic Lens	109	0.22	409.8	$67.21	2	0	No Change	109	0.22	409.84	$67.21	$0.00	$0.00	0.00	0	$0.00	0.00
55	Computer Room	1880	30	0	2-Lamp, T8, Electronic Ballast, Recessed Mounted, Parabolic Lens	58	1.74	3,271.2	$536.48	30	0	No Change	58	1.74	3271.2	$536.48	$0.00	$0.00	0.00	0	$0.00	0.00
13	Trailer 1	1880	9	0	4-Lamp, T8, Electronic Ballast, Recessed Mount, Prismatic Lens	109	0.98	1,844.3	$302.46	9	0	No Change	109	0.98	1844.28	$302.46	$0.00	$0.00	0.00	0	$0.00	0.00
66		1880	2	0	4-Lamp, T8, Electronic Ballast, Recessed Mount, Prismatic Lens	56	0.11	210.6	$34.53	2	0	No Change	56	0.11	210.56	$34.53	$0.00	$0.00	0.00	0	$0.00	0.00
55		1880	3	0	2-Lamp, T8, Electronic Ballast, Recessed Mounted, Parabolic Lens	58	0.17	327.1	$53.65	3	0	No Change	58	0.17	327.12	$53.65	$0.00	$0.00	0.00	0	$0.00	0.00
13	Trailer 2	1880	9	0	4-Lamp, T8, Electronic Ballast, Recessed Mount, Prismatic Lens	109	0.98	1,844.3	$302.46	9	0	No Change	109	0.98	1844.28	$302.46	$0.00	$0.00	0.00	0	$0.00	0.00
66		1880	2	0	4-Lamp, T8, Electronic Ballast, Recessed Mount, Prismatic Lens	56	0.11	210.6	$34.53	2	0	No Change	56	0.11	210.56	$34.53	$0.00	$0.00	0.00	0	$0.00	0.00
55		1880	3	0	2-Lamp, T8, Electronic Ballast, Recessed Mounted, Parabolic Lens	58	0.17	327.1	$53.65	3	0	No Change	58	0.17	327.12	$53.65	$0.00	$0.00	0.00	0	$0.00	0.00
55	Trailer 3.A	1880	4	0	2-Lamp, T8, Electronic Ballast, Recessed Mounted, Parabolic Lens	58	0.23	436.2	$71.53	4	0	No Change	58	0.23	436.16	$71.53	$0.00	$0.00	0.00	0	$0.00	0.00
55	Trailer 3.B	1880	4	0	2-Lamp, T8, Electronic Ballast, Recessed Mounted, Parabolic Lens	58	0.23	436.2	$71.53	4	0	No Change	58	0.23	436.16	$71.53	$0.00	$0.00	0.00	0	$0.00	0.00
55	Trailer 4C	1880	5	0	2-Lamp, T8, Electronic Ballast, Recessed Mounted, Parabolic Lens	58	0.29	545.2	$89.41	5	0	No Change	58	0.29	545.2	$89.41	$0.00	$0.00	0.00	0	$0.00	0.00
7	C-Hall	2350	15	0	2-Lamp, T8, Electronic Ballast, Recessed Mounted, Prismatic Lens	58	0.87	2,044.5	$335.30	15	0	No Change	58	0.87	2044.5	$335.30	$0.00	$0.00	0.00	0	$0.00	0.00
24		2350	21	0	1 - Lamp Compact Flourescent	18	0.38	888.3	$145.68	21	0	No Change	18	0.38	888.3	$145.68	$0.00	$0.00	0.00	0	$0.00	0.00
13	Communications Closet	1880	2	0	4-Lamp, T8, Electronic Ballast, Recessed Mount, Prismatic Lens	109	0.22	409.8	$67.21	2	0	No Change	109	0.22	409.84	$67.21	$0.00	$0.00	0.00	0	$0.00	0.00
13	Classroom C21	1880	18	0	4-Lamp, T8, Electronic Ballast, Recessed Mount, Prismatic Lens	109	1.96	3,688.6	$604.92	18	0	No Change	109	1.96	3688.56	$604.92	$0.00	$0.00	0.00	0	$0.00	0.00
13	Classroom C5	1880	18	0	4-Lamp, T8, Electronic Ballast, Recessed Mount, Prismatic Lens	109	1.96	3,688.6	$604.92	18	0	No Change	109	1.96	3688.56	$604.92	$0.00	$0.00	0.00	0	$0.00	0.00

7	Prep Room	1880	4	0	2-Lamp, T8, Electronic Ballast, Recessed Mounted, Prismatic Lens	58	0.23	436.2	$71.53	4	0	No Change	58	0.23	436.16	$71.53	$0.00	$0.00	0.00	0	$0.00	0.00
13	Classroom C6	1880	18	0	4-Lamp, T8, Electronic Ballast, Recessed Mount, Prismatic Lens	109	1.96	3,688.6	$604.92	18	0	No Change	109	1.96	3688.56	$604.92	$0.00	$0.00	0.00	0	$0.00	0.00
13	Classroom C20	1880	8	0	4-Lamp, T8, Electronic Ballast, Recessed Mount, Prismatic Lens	109	0.87	1,639.4	$268.86	8	0	No Change	109	0.87	1639.36	$268.86	$0.00	$0.00	0.00	0	$0.00	0.00
13	Classroom C19	1880	16	0	4-Lamp, T8, Electronic Ballast, Recessed Mount, Prismatic Lens	109	1.74	3,278.7	$537.71	16	0	No Change	109	1.74	3278.72	$537.71	$0.00	$0.00	0.00	0	$0.00	0.00
13	Classroom C18	1880	16	0	4-Lamp, T8, Electronic Ballast, Recessed Mount, Prismatic Lens	109	1.74	3,278.7	$537.71	16	0	No Change	109	1.74	3278.72	$537.71	$0.00	$0.00	0.00	0	$0.00	0.00
13	Classroom C7	1880	14	0	4-Lamp, T8, Electronic Ballast, Recessed Mount, Prismatic Lens	109	1.53	2,868.9	$470.50	14	0	No Change	109	1.53	2868.88	$470.50	$0.00	$0.00	0.00	0	$0.00	0.00
13	Classroom C8	1880	14	0	4-Lamp, T8, Electronic Ballast, Recessed Mount, Prismatic Lens	109	1.53	2,868.9	$470.50	14	0	No Change	109	1.53	2868.88	$470.50	$0.00	$0.00	0.00	0	$0.00	0.00
13	Classroom C9	1880	14	0	4-Lamp, T8, Electronic Ballast, Recessed Mount, Prismatic Lens	109	1.53	2,868.9	$470.50	14	0	No Change	109	1.53	2868.88	$470.50	$0.00	$0.00	0.00	0	$0.00	0.00
13	Classroom C10	1880	14	0	4-Lamp, T8, Electronic Ballast, Recessed Mount, Prismatic Lens	109	1.53	2,868.9	$470.50	14	0	No Change	109	1.53	2868.88	$470.50	$0.00	$0.00	0.00	0	$0.00	0.00
13	Classroom C11	1880	14	0	4-Lamp, T8, Electronic Ballast, Recessed Mount, Prismatic Lens	109	1.53	2,868.9	$470.50	14	0	No Change	109	1.53	2868.88	$470.50	$0.00	$0.00	0.00	0	$0.00	0.00
13	Classroom C12	1880	14	0	4-Lamp, T8, Electronic Ballast, Recessed Mount, Prismatic Lens	109	1.53	2,868.9	$470.50	14	0	No Change	109	1.53	2868.88	$470.50	$0.00	$0.00	0.00	0	$0.00	0.00
13	Classroom C13	1880	14	0	4-Lamp, T8, Electronic Ballast, Recessed Mount, Prismatic Lens	109	1.53	2,868.9	$470.50	14	0	No Change	109	1.53	2868.88	$470.50	$0.00	$0.00	0.00	0	$0.00	0.00
13	Classroom C14	1880	14	0	4-Lamp, T8, Electronic Ballast, Recessed Mount, Prismatic Lens	109	1.53	2,868.9	$470.50	14	0	No Change	109	1.53	2868.88	$470.50	$0.00	$0.00	0.00	0	$0.00	0.00
13	Classroom C15	1880	14	0	4-Lamp, T8, Electronic Ballast, Recessed Mount, Prismatic Lens	109	1.53	2,868.9	$470.50	14	0	No Change	109	1.53	2868.88	$470.50	$0.00	$0.00	0.00	0	$0.00	0.00
13	Classroom C16	1880	14	0	4-Lamp, T8, Electronic Ballast, Recessed Mount, Prismatic Lens	109	1.53	2,868.9	$470.50	14	0	No Change	109	1.53	2868.88	$470.50	$0.00	$0.00	0.00	0	$0.00	0.00
13	Classroom C17	1880	14	0	4-Lamp, T8, Electronic Ballast, Recessed Mount, Prismatic Lens	109	1.53	2,868.9	$470.50	14	0	No Change	109	1.53	2868.88	$470.50	$0.00	$0.00	0.00	0	$0.00	0.00
13	Girls Bathroom	1880	3	0	4-Lamp, T8, Electronic Ballast, Recessed Mount, Prismatic Lens	109	0.33	614.8	$100.82	3	0	No Change	109	0.33	614.76	$100.82	$0.00	$0.00	0.00	0	$0.00	0.00
66		1880	2	0	4-Lamp, T8, Electronic Ballast, Recessed Mount, Prismatic Lens	56	0.11	210.6	$34.53	2	0	No Change	56	0.11	210.56	$34.53	$0.00	$0.00	0.00	0	$0.00	0.00
13	Boys Bathroom	1880	3	0	4-Lamp, T8, Electronic Ballast, Recessed Mount, Prismatic Lens	109	0.33	614.8	$100.82	3	0	No Change	109	0.33	614.76	$100.82	$0.00	$0.00	0.00	0	$0.00	0.00
66		1880	2	0	4-Lamp, T8, Electronic Ballast, Recessed Mount, Prismatic Lens	56	0.11	210.6	$34.53	2	0	No Change	56	0.11	210.56	$34.53	$0.00	$0.00	0.00	0	$0.00	0.00
7	Hall Between C-Wing and New Gym	2350	16	0	2-Lamp, T8, Electronic Ballast, Recessed Mounted, Prismatic Lens	58	0.93	2,180.8	$357.65	16	0	No Change	58	0.93	2180.8	$357.65	$0.00	$0.00	0.00	0	$0.00	0.00
15	Gym	1880	24	0	High Pressure Sodium Lights	464	11.14	20,935.7	$3,433.45	24	0	No Change	464	11.14	20935.68	$3,433.45	$0.00	$0.00	0.00	0	$0.00	0.00

13	Gym Office	1880	2	0	4-Lamp, T8, Electronic Ballast, Recessed Mount, Prismatic Lens	109	0.22	409.8	$67.21	2	0	No Change	109	0.22	409.84	$67.21	$0.00	$0.00	0.00	0	$0.00	0.00
7	Gym Storage	1880	7	0	2-Lamp, T8, Electronic Ballast, Recessed Mounted, Prismatic Lens	58	0.41	763.3	$125.18	7	0	No Change	58	0.41	763.28	$125.18	$0.00	$0.00	0.00	0	$0.00	0.00
7	Boys Bathroom	1880	3	0	2-Lamp, T8, Electronic Ballast, Recessed Mounted, Prismatic Lens	58	0.17	327.1	$53.65	3	0	No Change	58	0.17	327.12	$53.65	$0.00	$0.00	0.00	0	$0.00	0.00
7	Girls Bathroom	1880	3	0	2-Lamp, T8, Electronic Ballast, Recessed Mounted, Prismatic Lens	58	0.17	327.1	$53.65	3	0	No Change	58	0.17	327.12	$53.65	$0.00	$0.00	0.00	0	$0.00	0.00
7	Boiler Room	470	12	0	2-Lamp, T8, Electronic Ballast, Recessed Mounted, Prismatic Lens	58	0.70	327.1	$53.65	12	0	No Change	58	0.70	327.12	$53.65	$0.00	$0.00	0.00	0	$0.00	0.00
55	Main Office	1880	9	0	2-Lamp, T8, Electronic Ballast, Recessed Mounted, Parabolic Lens	58	0.52	981.4	$160.94	9	0	No Change	58	0.52	981.36	$160.94	$0.00	$0.00	0.00	0	$0.00	0.00
39	Lobby	1880	8	2	2-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	80	0.64	1,203.2	$197.32	8	2	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	55	0.44	827.2	$135.66	$100.00	$800.00	0.20	376	$61.66	12.97
70	Bathrooms	1880	4	0	3.- Lamp Incandescent	180	0.72	1,353.6	$221.99	4	0	(3) 18 W CFL Lamp	54	0.22	406.08	$66.60	$17.25	$69.00	0.50	947.52	$155.39	0.44
69		1880	1	0	2 - Lamp Incandescents	120	0.12	225.6	$37.00	1	0	(2) 18 W CFL Lamp	36	0.04	67.68	$11.10	$11.50	$11.50	0.08	157.92	$25.90	0.44
71	Outside	3640	24	0	High Pressure Sodium Lights, Wall Mount	300	7.20	26,208.0	$4,298.11	24	0	No Change	300	7.20	26208	$4,298.11	$0.00	$0.00	0.00	0	$0.00	0.00
24		3640	23	0	1 - Lamp Compact Flourescent	18	0.41	1,507.0	$247.14	23	0	No Change	18	0.41	1506.96	$247.14	$0.00	$0.00	0.00	0	$0.00	0.00
17		3640	4	0	1 Lamp Flood Light	90	0.36	1,310.4	$214.91	4	0	26 W CFL Lamp	26	0.10	378.56	$62.08	$5.75	$23.00	0.26	931.84	$152.82	0.15
72		3640	5	0	High Pressure Sodium Lights, Pole Mount	300	1.50	5,460.0	$895.44	5	0	No Change	300	1.50	5460	$895.44	$0.00	$0.00	0.00	0	$0.00	0.00
	Totals		1310	112			124.64	251,778	$41,291.53	1310	111			108.01	220,254	########		$58,125.66	16.63	31523	$5,169.80	11.24

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 Lakeview ES
Address: 44 Coopr Road
Denville, NJ 07834
Building SF: 82,007

"Denville Lakeview Elementary School"

KWH COST: $0.164

ECM #2: Lighting Controls

EXISTING LIGHTING										PROPOSED LIGHTING										SAVINGS			
CEG Type	Fixture Location	Yearly Usage	No. Fixts	No. Lamps	Fixture Type	Fixt Watts	Total kW	kWh/Yr Fixtures	Yearly $ Cost	No. Fixts	No. Lamps	Retro-Unit 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
15	Auditorium	1880	8	0	High Pressure Sodium Lights	464	3.71	6,979	$1,144.48	8	0	None	464	3.71	0%	6,979	$1,144.48	$0.00	$0.00	0.00	0	$0.00	0.00
15	Stage	1880	4	0	High Pressure Sodium Lights	464	1.86	3,489	$572.24	4	0	None	464	1.86	0%	3,489	$572.24	$0.00	$0.00	0.00	0	$0.00	0.00
33		1880	1	0	1-Lamp Incandescents	75	0.08	141	$23.12	1	0	None	75	0.08	0%	141	$23.12	$0.00	$0.00	0.00	0	$0.00	0.00
54		1880	2	0	1 Lamp Incandescents	100	0.20	376	$61.66	2	0	None	100	0.20	0%	376	$61.66	$0.00	$0.00	0.00	0	$0.00	0.00
39	Classroom A1	1880	17	2	2-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	80	1.36	2,557	$419.32	17	2	Dual Technology Occupancy Sensor	80	1.36	10%	2,301	$377.38	$75.00	$75.00	0.00	255.68	$41.93	1.79
33	A1 Closet	1880	1	0	1-Lamp Incandescents	75	0.08	141	$23.12	1	0	None	75	0.08	0%	141	$23.12	$0.00	$0.00	0.00	0	$0.00	0.00
39		1880	1	2	2-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	80	0.08	150	$24.67	1	2	None	80	0.08	0%	150	$24.67	$0.00	$0.00	0.00	0	$0.00	0.00
39	Classroom A2	1880	17	2	2-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	80	1.36	2,557	$419.32	17	2	Dual Technology Occupancy Sensor	80	1.36	10%	2,301	$377.38	$75.00	$75.00	0.00	255.68	$41.93	1.79
33	A2 Closet	1880	1	0	1-Lamp Incandescents	75	0.08	141	$23.12	1	0	None	75	0.08	0%	141	$23.12	$0.00	$0.00	0.00	0	$0.00	0.00
39		1880	1	2	2-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	80	0.08	150	$24.67	1	2	None	80	0.08	0%	150	$24.67	$0.00	$0.00	0.00	0	$0.00	0.00
55	Principal's Office	1880	4	0	2-Lamp, T8, Electronic Ballast, Recessed Mounted, Parabolic	58	0.23	436	$71.53	4	0	Dual Technology Occupancy Sensor	58	0.23	10%	393	$64.38	$75.00	$75.00	0.00	43.616	$7.15	10.49
56	Principal's Bathroom	1880	1	3	3-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	130	0.13	244	$40.08	1	3	None	130	0.13	0%	244	$40.08	$0.00	$0.00	0.00	0	$0.00	0.00
57	Communication Closet	1880	1	0	3.-Lamp Incandescent	225	0.23	423	$69.37	1	0	Dual Technology Occupancy Sensor	225	0.23	10%	381	$62.43	$75.00	$75.00	0.00	42.3	$6.94	10.81
58		1880	2	2	2-Lamp, T-12, U-Lamp, Magnetic Ballast, Recessed Mounted	60	0.12	226	$37.00	2	2		60	0.12	10%	203	$33.30	$75.00	$0.00	0.00	22.56	$3.70	0.00
39	A1 - A6 Hall	2350	13	2	2-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	80	1.04	2,444	$400.82	13	2	Dual Technology Occupancy Sensor	80	1.04	10%	2,200	$360.73	$225.00	$225.00	0.00	244.4	$40.08	5.61
55	Conference Room A	1880	6	0	2-Lamp, T8, Electronic Ballast, Recessed Mounted, Parabolic Lens	58	0.35	654	$107.30	6	0	Dual Technology Occupancy Sensor	58	0.35	10%	589	$96.57	$75.00	$75.00	0.00	65.424	$10.73	6.99
39	Conference Room A Bathroom	1880	1	2	2-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	80	0.08	150	$24.67	1	2	None	80	0.08	0%	150	$24.67	$0.00	$0.00	0.00	0	$0.00	0.00

55	Classroom A25	1880	2	0	2-Lamp, T8, Electronic Ballast, Recessed Mounted, Parabolic Lens	58	0.12	218	$35.77	2	0	Dual Technology Occupancy Sensor	58	0.12	10%	196	$32.19	$75.00	$75.00	0.00	21.808	$3.58	20.97
39	Classroom A3	1880	16	2	2-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	80	1.28	2,406	$394.65	16	2	Dual Technology Occupancy Sensor	80	1.28	10%	2,166	$355.18	$75.00	$75.00	0.00	240.64	$39.46	1.90
39	Classroom A4	1880	16	2	2-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	80	1.28	2,406	$394.65	16	2	Dual Technology Occupancy Sensor	80	1.28	10%	2,166	$355.18	$75.00	$75.00	0.00	240.64	$39.46	1.90
39	Classroom A5	1880	12	2	2-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	80	0.96	1,805	$295.99	12	2	Dual Technology Occupancy Sensor	80	0.96	10%	1,624	$266.39	$75.00	$75.00	0.00	180.48	$29.60	2.53
39	Classroom A6	1880	12	2	2-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	80	0.96	1,805	$295.99	12	2	Dual Technology Occupancy Sensor	80	0.96	10%	1,624	$266.39	$75.00	$75.00	0.00	180.48	$29.60	2.53
39	Classroom A7	1880	12	2	2-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	80	0.96	1,805	$295.99	12	2	Dual Technology Occupancy Sensor	80	0.96	10%	1,624	$266.39	$75.00	$75.00	0.00	180.48	$29.60	2.53
39	A-hall Girls Bathroom	1880	2	2	2-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	80	0.16	301	$49.33	2	2	Dual Technology Occupancy Sensor	80	0.16	10%	271	$44.40	$75.00	$75.00	0.00	30.08	$4.93	15.20
59	Janitor's Closet	470	1	0	2 - Lamp Incandescents	100	0.10	47	$7.71	1	0	Dual Technology Occupancy Sensor	100	0.10		47	$7.71		$0.00	0.00	0	$0.00	0.00
39	A-hall Boys Bathroom	1880	2	2	2-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	80	0.16	301	$49.33	2	2	Dual Technology Occupancy Sensor	80	0.16	10%	271	$44.40	$75.00	$75.00	0.00	30.08	$4.93	15.20
39	A8-A29 Hall	2350	9	2	2-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	80	0.72	1,692	$277.49	9	2	Dual Technology Occupancy Sensor	80	0.72	10%	1,523	$249.74	$225.00	$225.00	0.00	169.2	$27.75	8.11
39	Classroom A8	1880	12	2	2-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	80	0.96	1,805	$295.99	12	2	Dual Technology Occupancy Sensor	80	0.96	10%	1,624	$266.39	$75.00	$75.00	0.00	180.48	$29.60	2.53
39	Classroom A29	1880	17	2	2-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	80	1.36	2,557	$419.32	17	2	Dual Technology Occupancy Sensor	80	1.36	10%	2,301	$377.38	$75.00	$75.00	0.00	255.68	$41.93	1.79
39	Classroom A29 Bathroom	1880	2	2	2-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	80	0.16	301	$49.33	2	2	Dual Technology Occupancy Sensor	80	0.16	10%	271	$44.40	$75.00	$75.00	0.00	30.08	$4.93	15.20
39	Boiler room Bathroom	1880	1	2	2-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	80	0.08	150	$24.67	1	2	None	80	0.08	0%	150	$24.67	$0.00	$0.00	0.00	0	$0.00	0.00
39	Classroom A9	1880	12	2	2-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	80	0.96	1,805	$295.99	12	2	Dual Technology Occupancy Sensor	80	0.96	10%	1,624	$266.39	$75.00	$75.00	0.00	180.48	$29.60	2.53
39	Classroom A10	1880	12	2	2-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	80	0.96	1,805	$295.99	12	2	Dual Technology Occupancy Sensor	80	0.96	10%	1,624	$266.39	$75.00	$75.00	0.00	180.48	$29.60	2.53
39	Garage	470	2	2	2-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	80	0.16	75	$12.33	2	2	None	80	0.16	0%	75	$12.33	$0.00	$0.00	0.00	0	$0.00	0.00
60		470	1	0	3.- Lamp Incandescent	150	0.15	71	$11.56	1	0	None	150	0.15	0%	71	$11.56	$0.00	$0.00	0.00	0	$0.00	0.00

39	Storage	470	4	2	2-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic	80	0.32	150	$24.67	4	2	None	80	0.32	0%	150	$24.67	$0.00	$0.00	0.00	0	$0.00	0.00
61		470	2	0	1 Lamp Incandescents	50	0.10	47	$7.71	2	0	None	50	0.10	0%	47	$7.71	$0.00	$0.00	0.00	0	$0.00	0.00
39	A11	1880	12	2	2-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	80	0.96	1,805	$295.99	12	2	Dual Technology Occupancy Sensor	80	0.96	10%	1,624	$266.39	$75.00	$75.00	0.00	180.48	$29.60	2.53
39	A12	1880	12	2	2-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	80	0.96	1,805	$295.99	12	2	Dual Technology Occupancy Sensor	80	0.96	10%	1,624	$266.39	$75.00	$75.00	0.00	180.48	$29.60	2.53
62	Small Foyer	1880	6	4	4-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	130	0.78	1,466	$240.49	6	4	Dual Technology Occupancy Sensor	130	0.78	10%	1,320	$216.44	$75.00	$75.00	0.00	146.64	$24.05	3.12
63	Display Case	1880	1	0	1 Lamp Incandescents	40	0.04	75	$12.33	1	0	None	40	0.04	0%	75	$12.33	$0.00	$0.00	0.00	0	$0.00	0.00
39	Lunch Room	1880	50	2	2-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	80	4.00	7,520	$1,233.28	50	2	Dual Technology Occupancy Sensor	80	4.00	10%	6,768	$1,109.95	$75.00	$75.00	0.00	752	$123.33	0.61
63	Storage	470	4	0	1 Lamp Incandescents	40	0.16	75	$12.33	4	0	None	40	0.16	0%	75	$12.33	$0.00	$0.00	0.00	0	$0.00	0.00
39	"Tolerance Hall"	2350	7	2	2-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	80	0.56	1,316	$215.82	7	2	Dual Technology Occupancy Sensor	80	0.56	10%	1,184	$194.24	$225.00	$225.00	0.00	131.6	$21.58	10.43
36	Communication Closet	1880	4	3	3-Lamp, T12, Magnetic Ballast, Recessed Mounted, Parabolic Lens	130	0.52	978	$160.33	4	3	Dual Technology Occupancy Sensor	130	0.52	10%	880	$144.29	$75.00	$75.00	0.00	97.76	$16.03	4.68
39	B-Hall	2350	19	2	2-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic	80	1.52	3,572	$585.81	19	2	Dual Technology Occupancy Sensor	80	1.52	10%	3,215	$527.23	$225.00	$225.00	0.00	357.2	$58.58	3.84
39	Classroom B1	1880	15	2	2-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	80	1.20	2,256	$369.98	15	2	Dual Technology Occupancy Sensor	80	1.20	10%	2,030	$332.99	$75.00	$75.00	0.00	225.6	$37.00	2.03
39	Classroom B2	1880	15	2	2-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	80	1.20	2,256	$369.98	15	2	Dual Technology Occupancy Sensor	80	1.20	10%	2,030	$332.99	$75.00	$75.00	0.00	225.6	$37.00	2.03
39	Classroom B3	1880	15	2	2-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	80	1.20	2,256	$369.98	15	2	Dual Technology Occupancy Sensor	80	1.20	10%	2,030	$332.99	$75.00	$75.00	0.00	225.6	$37.00	2.03
39	Classroom B4	1880	15	2	2-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	80	1.20	2,256	$369.98	15	2	Dual Technology Occupancy Sensor	80	1.20	10%	2,030	$332.99	$75.00	$75.00	0.00	225.6	$37.00	2.03
39	Classroom B5	1880	15	2	2-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	80	1.20	2,256	$369.98	15	2	Dual Technology Occupancy Sensor	80	1.20	10%	2,030	$332.99	$75.00	$75.00	0.00	225.6	$37.00	2.03
39	Classroom B6	1880	15	2	2-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	80	1.20	2,256	$369.98	15	2	Dual Technology Occupancy Sensor	80	1.20	10%	2,030	$332.99	$75.00	$75.00	0.00	225.6	$37.00	2.03
39	Classroom B7	1880	15	2	2-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	80	1.20	2,256	$369.98	15	2	Dual Technology Occupancy Sensor	80	1.20	10%	2,030	$332.99	$75.00	$75.00	0.00	225.6	$37.00	2.03
39	Classroom B8	1880	15	2	2-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	80	1.20	2,256	$369.98	15	2	Dual Technology Occupancy Sensor	80	1.20	10%	2,030	$332.99	$75.00	$75.00	0.00	225.6	$37.00	2.03

39	Classroom B9	1880	15	2	2-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	80	1.20	2,256	$369.98	15	2	Dual Technology Occupancy Sensor	80	1.20	10%	2,030	$332.99	$75.00	$75.00	0.00	225.6	$37.00	2.03
39	Classroom B10	1880	9	2	2-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	80	0.72	1,354	$221.99	9	2	Dual Technology Occupancy Sensor	80	0.72	10%	1,218	$199.79	$75.00	$75.00	0.00	135.36	$22.20	3.38
39	Classroom B11	1880	15	2	2-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	80	1.20	2,256	$369.98	15	2	Dual Technology Occupancy Sensor	80	1.20	10%	2,030	$332.99	$75.00	$75.00	0.00	225.6	$37.00	2.03
39	Classroom B12	1880	15	2	2-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	80	1.20	2,256	$369.98	15	2	Dual Technology Occupancy Sensor	80	1.20	10%	2,030	$332.99	$75.00	$75.00	0.00	225.6	$37.00	2.03
39	Classroom B12	1880	15	2	2-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	80	1.20	2,256	$369.98	15	2	Dual Technology Occupancy Sensor	80	1.20	10%	2,030	$332.99	$75.00	$75.00	0.00	225.6	$37.00	2.03
39	Classroom B14	1880	15	2	2-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	80	1.20	2,256	$369.98	15	2	Dual Technology Occupancy Sensor	80	1.20	10%	2,030	$332.99	$75.00	$75.00	0.00	225.6	$37.00	2.03
39	Classroom B15	1880	15	2	2-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	80	1.20	2,256	$369.98	15	2	Dual Technology Occupancy Sensor	80	1.20	10%	2,030	$332.99	$75.00	$75.00	0.00	225.6	$37.00	2.03
39	Classroom B16	1880	15	2	2-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	80	1.20	2,256	$369.98	15	2	Dual Technology Occupancy Sensor	80	1.20	10%	2,030	$332.99	$75.00	$75.00	0.00	225.6	$37.00	2.03
39	Classroom B17	1880	15	2	2-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	80	1.20	2,256	$369.98	15	2	Dual Technology Occupancy Sensor	80	1.20	10%	2,030	$332.99	$75.00	$75.00	0.00	225.6	$37.00	2.03
60	Storage B13	470	1	0	3.- Lamp Incandescent	150	0.15	71	$11.56	1	0	None	150	0.15	0%	71	$11.56	$0.00	$0.00	0.00	0	$0.00	0.00
39	B-Hall Boys Bathroom	1880	3	2	2-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	80	0.24	451	$74.00	3	2	Dual Technology Occupancy Sensor	80	0.24	10%	406	$66.60	$75.00	$75.00	0.00	45.12	$7.40	10.14
61	Custodial Closet	470	1	0	1 Lamp Incandescents	50	0.05	24	$3.85	1	0	None	50	0.05	0%	24	$3.85	$0.00	$0.00	0.00	0	$0.00	0.00
39	B-Hall Girls Bathroom	1880	3	2	2-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	80	0.24	451	$74.00	3	2	Dual Technology Occupancy Sensor	80	0.24	10%	406	$66.60	$75.00	$75.00	0.00	45.12	$7.40	10.14
39	Hall Between A and B	2350	6	2	2-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	80	0.48	1,128	$184.99	6	2	Dual Technology Occupancy Sensor	80	0.48	10%	1,015	$166.49	$150.00	$150.00	0.00	112.8	$18.50	8.11
49	Health Room	1880	17	0	2-Lamp, T8, U-Lamp, Electronic Ballast, Recessed Mounted, Prismatic Lens	73	1.24	2,333	$382.63	17	0	Dual Technology Occupancy Sensor	73	1.24	10%	2,100	$344.36	$75.00	$75.00	0.00	233.308	$38.26	1.96
64		1880	1	0	1-Lamp Compact Flourescent	17	0.02	32	$5.24	1	0		17	0.02	10%	29	$4.72	$0.00	$0.00	0.00	3.196	$0.52	0.00
65	Faculty Room	1880	1	1	1 - Lamp, T-12, Magnetic Ballast, Surface Mounted	28	0.03	53	$8.63	1	1	Dual Technology Occupancy Sensor	28	0.03	10%	47	$7.77	$0.00	$0.00	0.00	5.264	$0.86	0.00
66		1880	2	0	4-Lamp, T8, Electronic Ballast, Recessed Mount, Prismatic Lens	56	0.11	211	$34.53	2	0		56	0.11	10%	190	$31.08	$0.00	$0.00	0.00	21.056	$3.45	0.00
55		1880	8	0	2-Lamp, T8, Electronic Ballast, Recessed Mounted, Parabolic Lens	58	0.46	872	$143.06	8	0		58	0.46	10%	785	$128.75	$75.00	$75.00	0.00	87.232	$14.31	5.24

58		1880	1	2	2-Lamp, T-12, U-Lamp, Magnetic Ballast, Recessed Mounted	60	0.06	113	$18.50	1	2		60	0.06	10%	102	$16.65	$0.00	$0.00	0.00	11.28	$1.85	0.00
65	Men's Room	1880	1	1	1 - Lamp, T-12, Magnetic Ballast, Surface Mounted	28	0.03	53	$8.63	1	1	Dual Technology Occupancy Sensor	28	0.03	10%	47	$7.77	$75.00	$75.00	0.00	5.264	$0.86	86.88
7	Small Instructional Suite	1880	15	0	2-Lamp, T8, Electronic Ballast, Recessed Mounted, Prismatic Lens	58	0.87	1,636	$268.24	15	0	Dual Technology Occupancy Sensor	58	0.87	10%	1,472	$241.41	$75.00	$75.00	0.00	163.56	$26.82	2.80
7	Vice Principal's Office	1880	4	0	2-Lamp, T8, Electronic Ballast, Recessed Mounted, Prismatic Lens	58	0.23	436	$71.53	4	0	Dual Technology Occupancy Sensor	58	0.23	10%	393	$64.38	$75.00	$75.00	0.00	43.616	$7.15	10.49
67	Break Room	1880	2	0	3-Lamp, T8, Electronic Ballast, Recessed, Prismatic Lens	82	0.16	308	$50.56	2	0	Dual Technology Occupancy Sensor	82	0.16	10%	277	$45.51	$75.00	$75.00	0.00	30.832	$5.06	14.83
67	Room B29	1880	8	0	3-Lamp, T8, Electronic Ballast, Recessed, Prismatic Lens	82	0.66	1,233	$202.26	8	0	Dual Technology Occupancy Sensor	82	0.66	10%	1,110	$182.03	$75.00	$75.00	0.00	123.328	$20.23	3.71
7	Staff Bathroom	1880	1	0	2-Lamp, T8, Electronic Ballast, Recessed Mounted, Prismatic Lens	58	0.06	109	$17.88	1	0	None	58	0.06	0%	109	$17.88	$0.00	$0.00	0.00	0	$0.00	0.00
24	Foyer	1880	2	0	1 - Lamp Compact Flourescent	18	0.04	68	$11.10	2	0	None	18	0.04	0%	68	$11.10	$0.00	$0.00	0.00	0	$0.00	0.00
67	Room B32	1880	6	0	3-Lamp, T8, Electronic Ballast, Recessed, Prismatic Lens	82	0.49	925	$151.69	6	0	Dual Technology Occupancy Sensor	82	0.49	10%	832	$136.52	$75.00	$75.00	0.00	92.496	$15.17	4.94
67	Room B25	1880	9	0	3-Lamp, T8, Electronic Ballast, Recessed, Prismatic Lens	82	0.74	1,387	$227.54	9	0	Dual Technology Occupancy Sensor	82	0.74	10%	1,249	$204.79	$75.00	$75.00	0.00	138.744	$22.75	3.30
67	Room B26	1880	6	0	3-Lamp, T8, Electronic Ballast, Recessed, Prismatic Lens	82	0.49	925	$151.69	6	0	Dual Technology Occupancy Sensor	82	0.49	10%	832	$136.52	$75.00	$75.00	0.00	92.496	$15.17	4.94
67	Office	1880	2	0	3-Lamp, T8, Electronic Ballast, Recessed, Prismatic Lens	82	0.16	308	$50.56	2	0	Dual Technology Occupancy Sensor	82	0.16	10%	277	$45.51	$75.00	$75.00	0.00	30.832	$5.06	14.83
67	Testing Room	1880	3	0	3-Lamp, T8, Electronic Ballast, Recessed, Prismatic Lens	82	0.25	462	$75.85	3	0	Dual Technology Occupancy Sensor	82	0.25	10%	416	$68.26	$75.00	$75.00	0.00	46.248	$7.58	9.89
66	New Hall-way	2350	3	0	4-Lamp, T8, Electronic Ballast, Recessed Mount, Prismatic Lens	56	0.17	395	$64.75	3	0	Dual Technology Occupancy Sensor	56	0.17	10%	355	$58.27	$150.00	$150.00	0.00	39.48	$6.47	23.17
7		2350	11	0	2-Lamp, T8, Electronic Ballast, Recessed Mounted, Prismatic Lens	58	0.64	1,499	$245.89	11	0		58	0.64	10%	1,349	$221.30	$0.00	$0.00	0.00	149.93	$24.59	0.00
7	C1	1880	2	0	2-Lamp, T8, Electronic Ballast, Recessed Mounted, Prismatic Lens	58	0.12	218	$35.77	2	0	Dual Technology Occupancy Sensor	58	0.12	10%	196	$32.19	$75.00	$75.00	0.00	21.808	$3.58	20.97
7	C2.1	1880	2	0	2-Lamp, T8, Electronic Ballast, Recessed Mounted, Prismatic Lens	58	0.12	218	$35.77	2	0	Dual Technology Occupancy Sensor	58	0.12	10%	196	$32.19	$75.00	$75.00	0.00	21.808	$3.58	20.97
13	Boys Bathroom	1880	1	0	4-Lamp, T8, Electronic Ballast, Recessed Mount, Prismatic Lens	109	0.11	205	$33.61	1	0	Dual Technology Occupancy Sensor	109	0.11	10%	184	$30.25	$75.00	$75.00	0.00	20.492	$3.36	22.32
13	Girls Bathroom	1880	1	0	4-Lamp, T8, Electronic Ballast, Recessed Mount, Prismatic Lens	109	0.11	205	$33.61	1	0	Dual Technology Occupancy Sensor	109	0.11	10%	184	$30.25	$75.00	$75.00	0.00	20.492	$3.36	22.32
68		1880	12	0	1 - Lamp T8, Electronic Ballast, Surface mounted	20	0.24	451	$74.00	12	0		20	0.24	10%	406	$66.60	$150.00	$150.00	0.00	45.12	$7.40	20.27

55	Library	1880	52	0	2-Lamp, T8, Electronic Ballast, Recessed Mounted, Parabolic Lens	58	3.02	5,670	$929.89	52	0	Dual Technology Occupancy Sensor	58	3.02	10%	5,103	$836.90		$0.00	0.00	567.008	$92.99	0.00
24		1880	5	0	1 - Lamp Compact Flourescent	18	0.09	169	$27.75	5	0		18	0.09	10%	152	$24.97	$0.00	$0.00	0.00	16.92	$2.77	0.00
55	Library Office	1880	2	0	2-Lamp, T8, Electronic Ballast, Recessed Mounted, Parabolic Lens	58	0.12	218	$35.77	2	0	Dual Technology Occupancy Sensor	58	0.12	10%	196	$32.19	$75.00	$75.00	0.00	21.808	$3.58	20.97
55	Work Room	1880	4	0	2-Lamp, T8, Electronic Ballast, Recessed Mounted, Parabolic Lens	58	0.23	436	$71.53	4	0	Dual Technology Occupancy Sensor	58	0.23	10%	393	$64.38	$75.00	$75.00	0.00	43.616	$7.15	10.49
13	Storage	1880	2	0	4-Lamp, T8, Electronic Ballast, Recessed Mount, Prismatic Lens	109	0.22	410	$67.21	2	0	Dual Technology Occupancy Sensor	109	0.22	10%	369	$60.49	$75.00	$75.00	0.00	40.984	$6.72	11.16
55	Computer Room	1880	30	0	2-Lamp, T8, Electronic Ballast, Recessed Mounted, Parabolic Lens	58	1.74	3,271	$536.48	30	0	Dual Technology Occupancy Sensor	58	1.74	10%	2,944	$482.83	$75.00	$75.00	0.00	327.12	$53.65	1.40
13	Trailer 1	1880	9	0	4-Lamp, T8, Electronic Ballast, Recessed Mount, Prismatic Lens	109	0.98	1,844	$302.46	9	0	Dual Technology Occupancy Sensor	109	0.98	10%	1,660	$272.22	$75.00	$75.00	0.00	184.428	$30.25	2.48
66		1880	2	0	4-Lamp, T8, Electronic Ballast, Recessed Mount, Prismatic Lens	56	0.11	211	$34.53	2	0		56	0.11	10%	190	$31.08	$0.00	$0.00	0.00	21.056	$3.45	0.00
55		1880	3	0	2-Lamp, T8, Electronic Ballast, Recessed Mounted, Parabolic Lens	58	0.17	327	$53.65	3	0		58	0.17	10%	294	$48.28	$0.00	$0.00	0.00	32.712	$5.36	0.00
13	Trailer 2	1880	9	0	4-Lamp, T8, Electronic Ballast, Recessed Mount, Prismatic Lens	109	0.98	1,844	$302.46	9	0	Dual Technology Occupancy Sensor	109	0.98	10%	1,660	$272.22	$75.00	$75.00	0.00	184.428	$30.25	2.48
66		1880	2	0	4-Lamp, T8, Electronic Ballast, Recessed Mount, Prismatic Lens	56	0.11	211	$34.53	2	0		56	0.11	10%	190	$31.08	$75.00	$0.00	0.00	21.056	$3.45	0.00
55		1880	3	0	2-Lamp, T8, Electronic Ballast, Recessed Mounted, Parabolic Lens	58	0.17	327	$53.65	3	0		58	0.17	10%	294	$48.28	$75.00	$0.00	0.00	32.712	$5.36	0.00
55	Trailer 3.A	1880	4	0	2-Lamp, T8, Electronic Ballast, Recessed Mounted, Parabolic Lens	58	0.23	436	$71.53	4	0	Dual Technology Occupancy Sensor	58	0.23	10%	393	$64.38	$75.00	$75.00	0.00	43.616	$7.15	10.49
55	Trailer 3.B	1880	4	0	2-Lamp, T8, Electronic Ballast, Recessed Mounted, Parabolic Lens	58	0.23	436	$71.53	4	0	Dual Technology Occupancy Sensor	58	0.23	10%	393	$64.38	$75.00	$75.00	0.00	43.616	$7.15	10.49
55	Trailer 4C	1880	5	0	2-Lamp, T8, Electronic Ballast, Recessed Mounted, Parabolic Lens	58	0.29	545	$89.41	5	0	Dual Technology Occupancy Sensor	58	0.29	10%	491	$80.47	$75.00	$75.00	0.00	54.52	$8.94	8.39
7	C-Hall	2350	15	0	2-Lamp, T8, Electronic Ballast, Recessed Mounted, Prismatic Lens	58	0.87	2,045	$335.30	15	0	Dual Technology Occupancy Sensor	58	0.87	10%	1,840	$301.77	$225.00	$225.00	0.00	204.45	$33.53	6.71
24		2350	21	0	1 - Lamp Compact Flourescent	18	0.38	888	$145.68	21	0		18	0.38	10%	799	$131.11		$0.00	0.00	88.83	$14.57	0.00
13	Communications Closet	1880	2	0	4-Lamp, T8, Electronic Ballast, Recessed Mount, Prismatic Lens	109	0.22	410	$67.21	2	0	Dual Technology Occupancy Sensor	109	0.22	10%	369	$60.49	$75.00	$75.00	0.00	40.984	$6.72	11.16
13	Classroom C21	1880	18	0	4-Lamp, T8, Electronic Ballast, Recessed Mount, Prismatic Lens	109	1.96	3,689	$604.92	18	0	Dual Technology Occupancy Sensor	109	1.96	10%	3,320	$544.43	$75.00	$75.00	0.00	368.856	$60.49	1.24
13	Classroom C5	1880	18	0	4-Lamp, T8, Electronic Ballast, Recessed Mount, Prismatic Lens	109	1.96	3,689	$604.92	18	0	Dual Technology Occupancy Sensor	109	1.96	10%	3,320	$544.43	$75.00	$75.00	0.00	368.856	$60.49	1.24

7	Prep Room	1880	4	0	2-Lamp, T8, Electronic Ballast, Recessed Mounted, Prismatic Lens	58	0.23	436	$71.53	4	0	Dual Technology Occupancy Sensor	58	0.23	10%	393	$64.38	$75.00	$75.00	0.00	43.616	$7.15	10.49
13	Classroom C6	1880	18	0	4-Lamp, T8, Electronic Ballast, Recessed Mount, Prismatic Lens	109	1.96	3,689	$604.92	18	0	Dual Technology Occupancy Sensor	109	1.96	10%	3,320	$544.43	$75.00	$75.00	0.00	368.856	$60.49	1.24
13	Classroom C20	1880	8	0	4-Lamp, T8, Electronic Ballast, Recessed Mount, Prismatic Lens	109	0.87	1,639	$268.86	8	0	Dual Technology Occupancy Sensor	109	0.87	10%	1,475	$241.97	$75.00	$75.00	0.00	163.936	$26.89	2.79
13	Classroom C19	1880	16	0	4-Lamp, T8, Electronic Ballast, Recessed Mount, Prismatic Lens	109	1.74	3,279	$537.71	16	0	Dual Technology Occupancy Sensor	109	1.74	10%	2,951	$483.94	$75.00	$75.00	0.00	327.872	$53.77	1.39
13	Classroom C18	1880	16	0	4-Lamp, T8, Electronic Ballast, Recessed Mount, Prismatic Lens	109	1.74	3,279	$537.71	16	0	Dual Technology Occupancy Sensor	109	1.74	10%	2,951	$483.94	$75.00	$75.00	0.00	327.872	$53.77	1.39
13	Classroom C7	1880	14	0	4-Lamp, T8, Electronic Ballast, Recessed Mount, Prismatic Lens	109	1.53	2,869	$470.50	14	0	Dual Technology Occupancy Sensor	109	1.53	10%	2,582	$423.45	$75.00	$75.00	0.00	286.888	$47.05	1.59
13	Classroom C8	1880	14	0	4-Lamp, T8, Electronic Ballast, Recessed Mount, Prismatic Lens	109	1.53	2,869	$470.50	14	0	Dual Technology Occupancy Sensor	109	1.53	10%	2,582	$423.45	$75.00	$75.00	0.00	286.888	$47.05	1.59
13	Classroom C9	1880	14	0	4-Lamp, T8, Electronic Ballast, Recessed Mount, Prismatic Lens	109	1.53	2,869	$470.50	14	0	Dual Technology Occupancy Sensor	109	1.53	10%	2,582	$423.45	$75.00	$75.00	0.00	286.888	$47.05	1.59
13	Classroom C10	1880	14	0	4-Lamp, T8, Electronic Ballast, Recessed Mount, Prismatic Lens	109	1.53	2,869	$470.50	14	0	Dual Technology Occupancy Sensor	109	1.53	10%	2,582	$423.45	$75.00	$75.00	0.00	286.888	$47.05	1.59
13	Classroom C11	1880	14	0	4-Lamp, T8, Electronic Ballast, Recessed Mount, Prismatic Lens	109	1.53	2,869	$470.50	14	0	Dual Technology Occupancy Sensor	109	1.53	10%	2,582	$423.45	$75.00	$75.00	0.00	286.888	$47.05	1.59
13	Classroom C12	1880	14	0	4-Lamp, T8, Electronic Ballast, Recessed Mount, Prismatic Lens	109	1.53	2,869	$470.50	14	0	Dual Technology Occupancy Sensor	109	1.53	10%	2,582	$423.45	$75.00	$75.00	0.00	286.888	$47.05	1.59
13	Classroom C13	1880	14	0	4-Lamp, T8, Electronic Ballast, Recessed Mount, Prismatic Lens	109	1.53	2,869	$470.50	14	0	Dual Technology Occupancy Sensor	109	1.53	10%	2,582	$423.45	$75.00	$75.00	0.00	286.888	$47.05	1.59
13	Classroom C14	1880	14	0	4-Lamp, T8, Electronic Ballast, Recessed Mount, Prismatic Lens	109	1.53	2,869	$470.50	14	0	Dual Technology Occupancy Sensor	109	1.53	10%	2,582	$423.45	$75.00	$75.00	0.00	286.888	$47.05	1.59
13	Classroom C15	1880	14	0	4-Lamp, T8, Electronic Ballast, Recessed Mount, Prismatic Lens	109	1.53	2,869	$470.50	14	0	Dual Technology Occupancy Sensor	109	1.53	10%	2,582	$423.45	$75.00	$75.00	0.00	286.888	$47.05	1.59
13	Classroom C16	1880	14	0	4-Lamp, T8, Electronic Ballast, Recessed Mount, Prismatic Lens	109	1.53	2,869	$470.50	14	0	Dual Technology Occupancy Sensor	109	1.53	10%	2,582	$423.45	$75.00	$75.00	0.00	286.888	$47.05	1.59
13	Classroom C17	1880	14	0	4-Lamp, T8, Electronic Ballast, Recessed Mount, Prismatic Lens	109	1.53	2,869	$470.50	14	0	Dual Technology Occupancy Sensor	109	1.53	10%	2,582	$423.45	$75.00	$75.00	0.00	286.888	$47.05	1.59
13	Girls Bathroom	1880	3	0	4-Lamp, T8, Electronic Ballast, Recessed Mount, Prismatic Lens	109	0.33	615	$100.82	3	0	Dual Technology Occupancy Sensor	109	0.33	10%	553	$90.74	$75.00	$75.00	0.00	61.476	$10.08	7.44
66		1880	2	0	4-Lamp, T8, Electronic Ballast, Recessed Mount, Prismatic Lens	56	0.11	211	$34.53	2	0		56	0.11	10%	190	$31.08	$0.00	$0.00	0.00	21.056	$3.45	0.00
13	Boys Bathroom	1880	3	0	4-Lamp, T8, Electronic Ballast, Recessed Mount, Prismatic Lens	109	0.33	615	$100.82	3	0	Dual Technology Occupancy Sensor	109	0.33	10%	553	$90.74	$75.00	$75.00	0.00	61.476	$10.08	7.44
66		1880	2	0	4-Lamp, T8, Electronic Ballast, Recessed Mount, Prismatic Lens	56	0.11	211	$34.53	2	0		56	0.11	10%	190	$31.08	$0.00	$0.00	0.00	21.056	$3.45	0.00
7	Hall Between C-Wing and New Gym	2350	16	0	2-Lamp, T8, Electronic Ballast, Recessed Mounted, Prismatic Lens	58	0.93	2,181	$357.65	16	0	Dual Technology Occupancy Sensor	58	0.93	10%	1,963	$321.89	$150.00	$150.00	0.00	218.08	$35.77	4.19
15	Gym	1880	24	0	High Pressure Sodium Lights	464	11.14	20,936	$3,433.45	24	0	None	464	11.14	0%	20,936	$3,433.45	$0.00	$0.00	0.00	0	$0.00	0.00

13	Gym Office	1880	2	0	4-Lamp, T8, Electronic Ballast, Recessed Mount, Prismatic Lens	109	0.22	410	$67.21	2	0	Dual Technology Occupancy Sensor	109	0.22	10%	369	$60.49	$75.00	$75.00	0.00	40.984	$6.72	11.16
7	Gym Storage	1880	7	0	2-Lamp, T8, Electronic Ballast, Recessed Mounted, Prismatic Lens	58	0.41	763	$125.18	7	0	Dual Technology Occupancy Sensor	58	0.41	10%	687	$112.66	$75.00	$75.00	0.00	76.328	$12.52	5.99
7	Boys Bathroom	1880	3	0	2-Lamp, T8, Electronic Ballast, Recessed Mounted, Prismatic Lens	58	0.17	327	$53.65	3	0	Dual Technology Occupancy Sensor	58	0.17	10%	294	$48.28	$75.00	$75.00	0.00	32.712	$5.36	13.98
7	Girls Bathroom	1880	3	0	2-Lamp, T8, Electronic Ballast, Recessed Mounted, Prismatic Lens	58	0.17	327	$53.65	3	0	Dual Technology Occupancy Sensor	58	0.17	10%	294	$48.28	$75.00	$75.00	0.00	32.712	$5.36	13.98
7	Boiler Room	470	12	0	2-Lamp, T8, Electronic Ballast, Recessed Mounted, Prismatic Lens	58	0.70	327	$53.65	12	0	None	58	0.70	0%	327	$53.65	$0.00	$0.00	0.00	0	$0.00	0.00
55	Main Office	1880	9	0	2-Lamp, T8, Electronic Ballast, Recessed Mounted, Parabolic Lens	58	0.52	981	$160.94	9	0	Dual Technology Occupancy Sensor	58	0.52	10%	883	$144.85	$75.00	$75.00	0.00	98.136	$16.09	4.66
39	Lobby	1880	8	2	2-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	80	0.64	1,203	$197.32	8	2	Dual Technology Occupancy Sensor	80	0.64	10%	1,083	$177.59	$75.00	$75.00	0.00	120.32	$19.73	3.80
70	Bathrooms	1880	4	0	3.- Lamp Incandescent	180	0.72	1,354	$221.99	4	0	Dual Technology Occupancy Sensor	180	0.72	10%	1,218	$199.79	$75.00	$75.00	0.00	135.36	$22.20	3.38
69		1880	1	0	2 - Lamp Incandescents	120	0.12	226	$37.00	1	0		120	0.12	10%	203	$33.30	$0.00	$0.00	0.00	22.56	$3.70	0.00
71	Outside	3640	24	0	High Pressure Sodium Lights, Wall Mount	300	7.20	26,208	$4,298.11	24	0	None	300	7.20	0%	26,208	$4,298.11	$0.00	$0.00	0.00	0	$0.00	0.00
24		3640	23	0	1 - Lamp Compact Flourescent	18	0.41	1,507	$247.14	23	0	None	18	0.41	0%	1,507	$247.14	$0.00	$0.00	0.00	0	$0.00	0.00
17		3640	4	0	1 Lamp Flood Light	90	0.36	1,310	$214.91	4	0	None	90	0.36	0%	1,310	$214.91	$0.00	$0.00	0.00	0	$0.00	0.00
72		3640	5	0	High Pressure Sodium Lights, Pole Mount	300	1.50	5,460	$895.44	5	0	None	300	1.50	0%	5,460	$895.44	$0.00	$0.00	0.00	0	$0.00	0.00
	Totals		1310	112			124.64	251,778	$41,291.53	1310	112			124.64		233,467	########		$8,850.00	0.00	18311	$3,002.93	2.95

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 Lakeview Elementary School
Location: Denville, NJ
Description: Photovoltaic System 95% Financing - 25 year

Simple Payback Analysis

	Photovoltaic System 95% Financing - 25 year
Total Construction Cost	$2,156,940
Annual kWh Production	374,000
Annual Energy Cost Reduction	$61,336
Annual SREC Revenue	$130,900
First Cost Premium	**$2,156,940**
Simple Payback:	**11.22** Years

Life Cycle Cost Analysis

Analysis Period (years): 25
Financing Term (mths): 240
Average Energy Cost ($/kWh) **$0.164**
Financing Rate: 7.00%
Financing %: 95%
Maintenance Escalation Rate: 3.0%
Energy Cost Escalation Rate: 3.0%
SREC Value ($/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	$107,847	0	0	0	$0	0	0	(107,847)	0
1	$0	374,000	$61,336	$0	$130,900	$141,892	$48,747	$1,597	($106,250)
2	$0	372,130	$63,176	$0	$130,246	$138,368	$52,271	$2,783	($103,467)
3	$0	370,270	$65,071	$0	$129,594	$134,590	$56,049	$4,027	($99,441)
4	$0	368,418	$67,024	$0	$128,946	$130,538	$60,101	$5,331	($94,110)
5	$0	366,576	$69,034	$3,776	$128,302	$126,193	$64,446	$2,921	($91,189)
6	$0	364,743	$71,105	$3,757	$127,660	$121,534	$69,105	$4,370	($86,819)
7	$0	362,920	$73,238	$3,738	$127,022	$116,539	$74,100	$5,883	($80,936)
8	$0	361,105	$75,436	$3,719	$126,387	$111,182	$79,457	$7,464	($73,472)
9	$0	359,300	$77,699	$3,701	$125,755	$105,438	$85,201	$9,114	($64,358)
10	$0	357,503	$80,030	$3,682	$125,126	$99,279	$91,360	$10,834	($53,524)
11	$0	355,716	$82,431	$3,664	$124,500	$92,674	$97,965	$12,628	($40,896)
12	$0	353,937	$84,903	$3,646	$123,878	$85,593	$105,047	$14,497	($26,399)
13	$0	352,167	$87,451	$3,627	$123,259	$77,999	$112,640	$16,443	($9,957)
14	$0	350,407	$90,074	$3,609	$122,642	$69,856	$120,783	$18,468	$8,511
15	$0	348,654	$92,776	$3,591	$122,029	$61,124	$129,515	$20,575	$29,087
16	$0	346,911	$95,560	$3,573	$121,419	$51,762	$138,877	$22,766	$51,853
17	$0	345,177	$98,426	$3,555	$120,812	$41,722	$148,917	$25,044	$76,896
18	$0	343,451	$101,379	$3,538	$120,208	$30,957	$159,682	$27,410	$104,307
19	$0	341,734	$104,421	$3,520	$119,607	$19,414	$171,225	$29,868	$134,175
20	$0	340,025	$107,553	$3,502	$119,009	$7,036	$183,603	$32,420	$166,596
21	$0	338,325	$110,780	$3,485	$118,414	$5,965	$168,788	$50,956	$217,552
22	$0	336,633	$114,103	$3,467	$117,822	$4,083	$138,897	$85,478	$303,030
23	$0	334,950	$117,526	$3,450	$117,232	$0	$0	$231,309	$534,338
24	$0	333,275	$121,052	$3,433	$116,646	$0	$0	$234,266	$768,604
25	$0	331,609	$124,684	$3,416	$116,063	$0	$0	$237,331	$1,005,935
	Totals:	7,135,145	$1,648,123	$58,198	$2,497,301	$1,763,690	$2,049,093	$2,356,778	$2,470,067
				Net Present Value (NPV)				**$149,791**	
				Internal Rate of Return (IRR)				**12.8%**	

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

Simple Payback Analysis

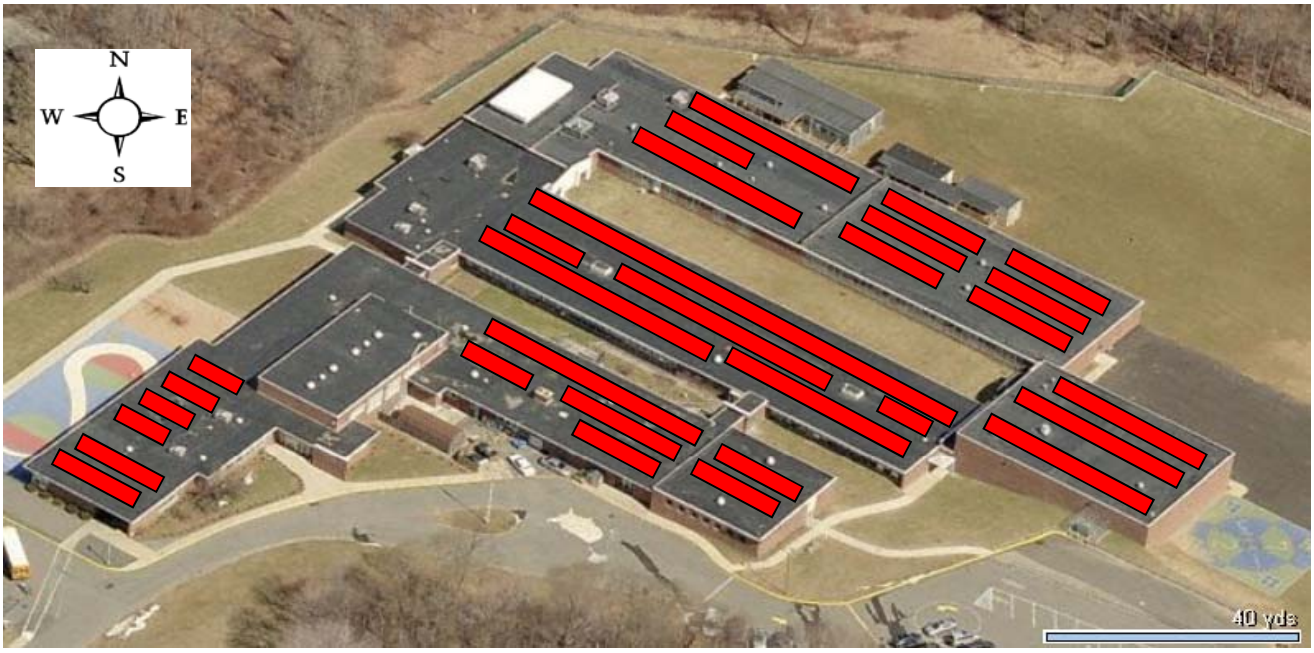
	Photovoltaic System - Direct Purchase
Total Construction Cost	$2,156,940
Annual kWh Production	374,000
Annual Energy Cost Reduction	$61,336
Annual SREC Revenue	$130,900
First Cost Premium	**$2,156,940**
Simple Payback:	**11.22** **Years**

Life Cycle Cost Analysis

Analysis Period (years):	25	Financing %:	0%
Financing Term (mths):	0	Maintenance Escalation Rate:	3.0%
Average Energy Cost ($/kWh)	**$0.164**	Energy Cost Escalation Rate:	3.0%
Financing Rate:	0.00%	SREC Value ($/kWh)	$0.350

Period	Additional Cash Outlay	Energy kWh Production	Energy Cost Savings	Additional Maint Costs	SREC Revenue	Net Cash Flow	Cumulative Cash Flow
0	$2,156,940	0	0	0	$0	(2,156,940)	0
1	$0	374,000	$61,336	$0	$130,900	$192,236	($1,964,704)
2	$0	372,130	$63,176	$0	$130,246	$193,422	($1,771,282)
3	$0	370,270	$65,071	$0	$129,594	$194,666	($1,576,616)
4	$0	368,418	$67,024	$0	$128,946	$195,970	($1,380,646)
5	$0	366,576	$69,034	$3,776	$128,302	$193,560	($1,187,086)
6	$0	364,743	$71,105	$3,757	$127,660	$195,009	($992,077)
7	$0	362,920	$73,238	$3,738	$127,022	$196,522	($795,555)
8	$0	361,105	$75,436	$3,719	$126,387	$198,103	($597,452)
9	$0	359,300	$77,699	$3,701	$125,755	$199,753	($397,699)
10	$0	357,503	$80,030	$3,682	$125,126	$201,473	($196,225)
11	$0	355,716	$82,431	$3,664	$124,500	$203,267	$7,042
12	$0	353,937	$84,903	$3,646	$123,878	$205,136	$212,178
13	$0	352,167	$87,451	$3,627	$123,259	$207,082	$419,259
14	$0	350,407	$90,074	$3,609	$122,642	$209,107	$628,367
15	$0	348,654	$92,776	$3,591	$122,029	$211,214	$839,581
16	$0	346,911	$95,560	$3,573	$121,419	$213,405	$1,052,986
17	$0	345,177	$98,426	$3,555	$120,812	$215,683	$1,268,669
18	$0	343,451	$101,379	$3,538	$120,208	$218,049	$1,486,719
19	$0	341,734	$104,421	$3,520	$119,607	$220,507	$1,707,226
20	$0	340,025	$107,553	$3,502	$119,009	$223,060	$1,930,286
21	$1	338,325	$110,780	$3,485	$118,414	$225,709	$2,155,994
22	$2	336,633	$114,103	$3,467	$117,822	$228,457	$2,384,452
23	$3	334,950	$117,526	$3,450	$117,232	$231,309	$2,615,760
24	$4	333,275	$121,052	$3,433	$116,646	$234,266	$2,850,026
25	$5	331,609	$124,684	$3,416	$116,063	$237,331	$3,087,357
Totals:		7,135,145	$1,648,123	$58,198	$2,497,301	$5,244,297	$4,087,226
				Net Present Value (NPV)		**$3,087,382**	
				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 Lakeview Elementary School	15312	Sunpower SPR230	1042	14.7	15,322	239.66	374,000	34,386	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.