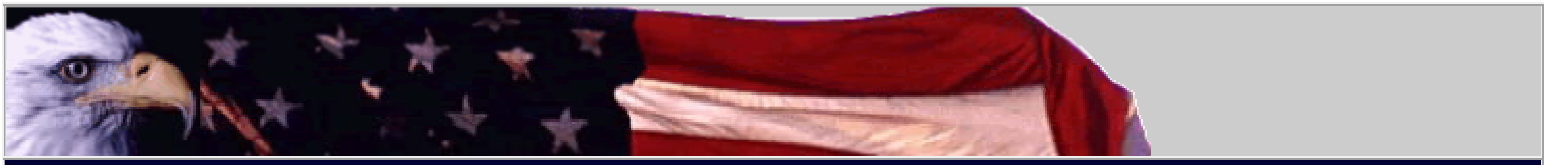

Monmouth Junction Elementary School, NJ

ENERGY AUDIT – FINAL REPORT
CEG PROJECT NO. 9C08134

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I. EXECUTIVE SUMMARY

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

Monmouth Junction Elementary School
630 Ridge Road
Monmouth Junction, NJ 08852

Municipal Contact: Anthony Tonzini (Board Administrator)

This audit was performed in connection with the New Jersey Clean Energy Local Government Energy Audit Program. These energy audits are conducted to promote the office of Clean Energy's mission, 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	$ 98,017
Natural Gas	$ 47,313
Total	$ 145,330

The potential annual energy cost savings are shown below in Table 1. Be aware that the measures are not additive because of the interrelation of several of the measures. The cost of each measure for this level of auditing is ± 20% until detailed engineering, specifications, and hard proposals are obtained.

Table 1
Energy Conservation Measures (ECM's)

ENERGY CONSERVATION MEASURES (ECM's)					
ECM NO.	**DESCRIPTION**	**NET INSTALLATION COST[A]**	**ANNUAL SAVINGS[B]**	**SIMPLE PAYBACK (Yrs)**	**SIMPLE LIFETIME ROI**
ECM #1	VARIABLE SPEED PUMPS	$13,942	$568	24.5	-18.5%
ECM #2	INSTALL LIGHTING CONTROLS	$990	$359	2.8	443.9%
RENEWABLE ENERGY MEASURES (REM's)					
ECM NO.	**DESCRIPTION**	**NET INSTALLATION COST**	**ANNUAL SAVINGS**	**SIMPLE PAYBACK (Yrs)**	**SIMPLE LIFETIME ROI**
REM #1	162 KW PV SOLAR PANELS	$1,457,280	$125,331	11.6	-36.7%

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

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

Table 2
Estimated Energy Savings

ENERGY CONSERVATION MEASURES (ECM's)				
ECM NO.	DESCRIPTION	ANNUAL UTILITY REDUCTION		
		ELECTRIC DEMAND (KW)	ELECTRIC CONSUMPTION (KWH)	NATURAL GAS (THERMS)
ECM #1	VARIABLE SPEED PUMPS		3,782	
ECM #2	INSTALL LIGHTING CONTROLS		2,458	
RENEWABLE ENERGY MEASURES (REM's)				
ECM NO.	DESCRIPTION	ANNUAL UTILITY REDUCTION		
		ELECTRIC DEMAND (KW)	ELECTRIC CONSUMPTION (KWH)	NATURAL GAS (THERMS)
REM #1	162 KW PV SOLAR PANELS	162	252,684	

Recommendations:

Concord Engineering Group recommends the implementation of all ECM's that provide a calculated simple payback at or under seven (7) years. The potential energy and cost savings from these ECM's are economically justifiable. The following Energy Conservation Measures are recommended for the Monmouth Junction Elementary School:

- **ECM #2:** Install Lighting Controls

II. INTRODUCTION

This comprehensive energy audit covers the Monmouth Junction Elementary School located at 630 Ridge Road, Monmouth Junction, NJ. Based on our survey and the documentation available, it was determined that the building area is approximately 48,000 SF.

The first task was to collect and review one year's worth of utility energy data for electricity and natural gas. This information was used to analyze operational characteristics, calculate energy benchmarks for comparison to industry averages, estimate savings potential, and establish a baseline to monitor the effectiveness of implemented measures. A computer spreadsheet was used to enter, sum, and calculate benchmarks and to graph utility information (see Appendix A).

The Energy Use Intensity (EUI) is expressed in British Thermal Units/square foot/year ($BTU/ft^2/yr$) and can be 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 annual consumption of all fuels to BTU's then dividing by the area (gross square footage) of the building. EUI is a good indicator of the relative potential for energy savings. A comparatively low EUI indicates less potential for large energy savings. Blueprints (where available) were obtained from the school district and were utilized to calculate/verify the gross area of the facility.

After gathering the utility data and calculating the EUI, the next step in the audit process is obtaining Architectural and Engineering drawings (where available). By reviewing the Architectural and Engineering drawings, questions regarding the building envelope, lighting systems/controls, HVAC equipment and controls are noted. These questions are then compared to the energy usage profiles developed during the utility data gathering step. Furthermore, 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. After this information is gathered the next step in the process is the site visit.

The site visit was spent inspecting the actual systems and answering specific questions from the preliminary review. The building manager provided occupancy schedules, O & M practices, the building energy management program, and other information that has an impact on energy consumption.

The post-site work includes evaluation of the information gathered during the site visit, researching possible conservation opportunities, organizing the audit into a comprehensive report, and making recommendations on mechanical, lighting and building envelope improvements.

III. METHOD OF ANALYSIS

CEG completed the preliminary audit tasks noted in Section II preparing for the site survey. The site survey is a critical input in deciphering where energy opportunities exist within a facility. The auditor walks the entire site to inventory the building envelope (roof, windows, etc.), the heating, ventilation, and air conditioning equipment (HVAC), the lighting equipment, other facility-specific equipment, and to gain an understanding of how each facility is used.

The collected data is then processed using energy engineering calculations, Microsoft Excel spread sheets and Trane Trace 700™ building simulation software that calculate the anticipated energy usage for the proposed energy conservation measures (ECM's). The actual energy usage is entered directly from the utility bills provided by the Owner. The anticipated energy usage is compared to the actual usage to determine energy savings for the proposed ECM's.

It is pertinent to note, that the savings noted in this report are not duplicative. The savings for each recommendation may actually be higher if the individual recommendations were installed instead of the entire project. For example, the lighting module calculates the change in wattage and multiplies it by the new operating hours instead of the existing operating hours (if there was a change in the hours at all). The lighting controls module calculates the change in hours and multiplies it by the new system wattage instead of the existing wattage. Therefore, if you chose to install the recommended lighting system but not the lighting controls, the savings achieved with the new lighting system would actually be higher because there would have been no reduction in the hours of use.

The same principal follows for heating, cooling, and temperature recommendations – even with fuel switching. If there are recommendations to change the temperature settings to reduce fuel use, then the savings for the heating/cooling equipment recommendations are reduced, as well.

Our thermal module calculates the savings for temperature reductions utilizing automated engineering calculations within Microsoft Excel™ spreadsheets and Trane Trace 700™ building simulation software. The savings are calculated in "output" values – meaning energy, not fuel savings. To show fuel savings we multiply the energy values times the fuel conversion factor (these factors are different for electricity, natural gas, fuel oil, etc.) and also take into account the heating/cooling equipment efficiency. The temperature recommendation savings are lower when the heating/cooling equipment is more efficient or is using a cheaper fuel.

Thermal recommendations (insulation, windows, etc.) are evaluated by taking the difference in the thermal load due to reduced heat transfer. Again, the "thermal load" is the thermal load after the other recommendations have been accounted for.

Lastly, installation costs, refer to Appendix B, are then applied to each recommendation and simple paybacks are calculated. Costs are derived from Means Cost Data, other industry publications, and local contractors and suppliers. The NJ SmartStart Building® program incentives (refer to Appendix C) are calculated for the appropriate ECM's and subtracted from the installed cost prior to calculation of the simple payback. In addition, where applicable, maintenance cost savings are estimated and applied to the net savings. Simple return on

investment is calculated using the standard formula of the difference of gains minus investments, divided by the investments. Included within the gains are the annual energy savings, utility incentives and maintenance savings as a total sum. The calculation is completed assuming the project is 100% direct purchased by the Owner with an energy cost escalation of 2.4% for natural gas and 2.2% for electricity.

IV. HISTORIC ENERGY CONSUMPTION/COST

A. Energy Usage / Tariffs

Electric

Table 3 and Figure 1 represent the electrical usage for the surveyed facility from June-07 to May-08. PSE&G Electric Utility provides electricity to the facility. This electric rate has a component for consumption that is measured in kilowatt-hours (kWh). It is calculated by multiplying the wattage of the equipment times the hours that it operates. For example, a 1,000 Watt lamp operating for 5 hours would measure 5,000 Watt-hours. Since one kilowatt is equal to 1,000 Watts, the measured consumption would be 5 kWh. 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 most current rate structure available.

Natural Gas

Table 4 and Figure 2 show the natural gas energy usage from June-07 to May-08. Below is the average unit cost for the utilities at this facility. PSE&G Gas Utility supplies the natural gas and delivers the fuel to the burner at the facility. Below is the average unit cost for the utilities at this facility.

Description	Average
Electricity	14.6¢ / kWh (4.3¢ / kBtu)
*Natural Gas	$1.76 / therm (1.76¢ / kBtu)

*Note: The Natural Gas cost per Therm includes customer service charges.

Table 3
Electricity Billing Data

Monmouth Junction Elementary

Provider	Month	Start Date	End Date	Account	Utility Type	Billing Days	Peak Demand	Units	Off Peak Usage	Units	On Peak Usage	Units	Total Consumption	Units	Total $
PSE&G Co (14101)	Jun-07	5/30/2007	6/28/2007	6280687228E	Electric	29	148	kw	22400	kwh	40600	kwh	63000	kwh	$ 11,220.51
PSE&G Co (14101)	Jul-07	6/28/2007	7/30/2007	6280687228E	Electric	32	148	kw	24000	kwh	32800	kwh	56800	kwh	$ 9,867.89
PSE&G Co (14101)	Aug-07	7/30/2007	9/4/2007	6280687228E	Electric	36	148	kw	24400	kwh	40600	kwh	65000	kwh	$ 11,504.60
PSE&G Co (14101)	Sep-07	9/4/2007	10/2/2007	6280687228E	Electric	28	148	kw	19800	kwh	35600	kwh	55400	kwh	$ 10,169.80
PSE&G Co (14101)	Oct-07	10/2/2007	10/30/2007	6280687228E	Electric	28	148	kw	20600	kwh	33200	kwh	53800	kwh	$ 7,045.17
PSE&G Co (14101)	Nov-07	10/30/2007	12/4/2007	6280687228E	Electric	35	148	kw	28000	kwh	33400	kwh	61400	kwh	$ 7,537.39
PSE&G Co (14101)	Dec-07	12/4/2007	1/3/2008	6280687228E	Electric	30	162	kw	23400	kwh	27800	kwh	51200	kwh	$ 6,446.24
PSE&G Co (14101)	Jan-08	1/3/2008	2/5/2008	6280687228E	Electric	33	162	kw	27200	kwh	32200	kwh	59400	kwh	$ 7,420.78
PSE&G Co (14101)	Feb-08	2/5/2008	2/29/2008	6280687228E	Electric	24	162	kw	18600	kwh	24400	kwh	43000	kwh	$ 5,633.52
PSE&G Co (14101)	Mar-08	2/29/2008	4/8/2008	6280687228E	Electric	39	162	kw	31800	kwh	36000	kwh	67800	kwh	$ 8,643.86
PSE&G Co (14101)	Apr-08	4/8/2008	5/2/2008	6280687228E	Electric	24	162	kw	16800	kwh	26000	kwh	42800	kwh	$ 5,511.33
PSE&G Co (14101)	May-08	5/2/2008	6/2/2008	6280687228E	Electric	31	162	kw	22400	kwh	30400	kwh	52800	kwh	$ 7,016.62
						Max Peak:	162	kw			**12 Month Total:**		672,400	kwh	$ 98,017.71
														Avg. Cost per kwh:	$ 0.146
														Avg. Cost per kBtu:	$ 0.043

Figure 1
Electricity Usage Profile

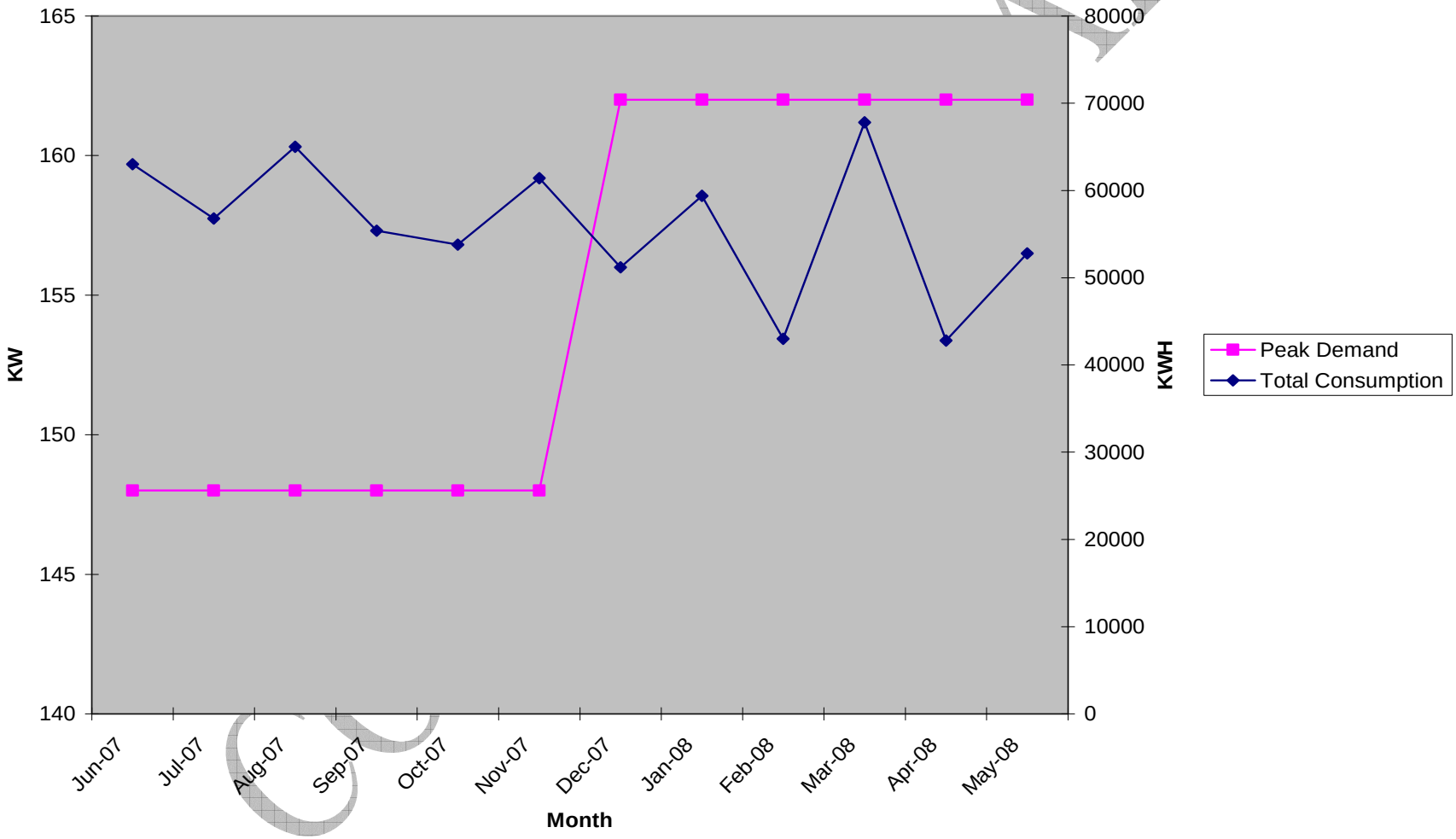


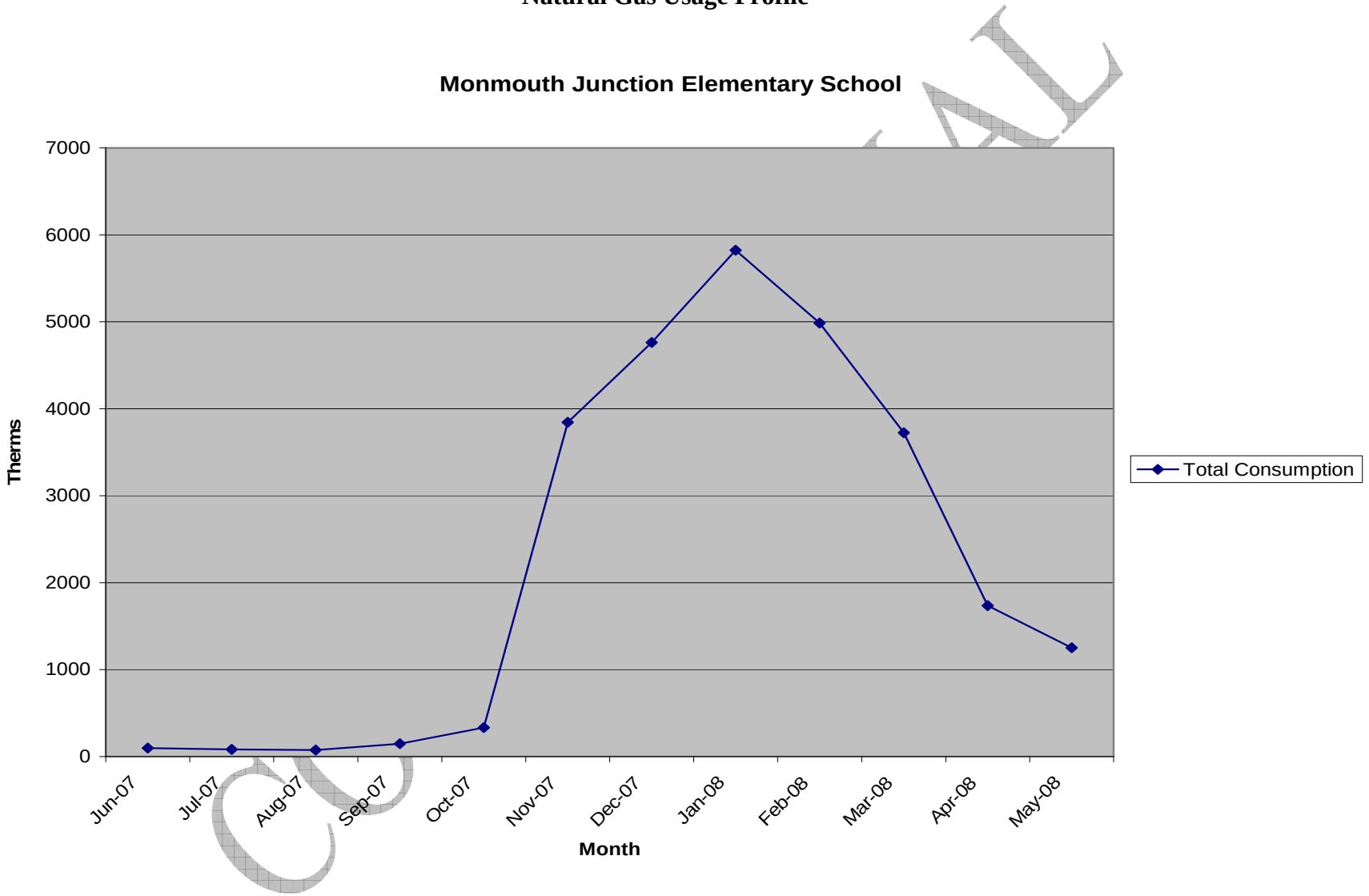
Table 4
Natural Gas Billing Data

Monmouth Junction Elementary

Provider	Month	Start Date	End Date	Account	Utility Type	Billing Days	Consumption	Units	Total $
PSE&G CO (14105)	Jun-07	5/30/2007	6/28/2007	6280687228G	Gas	29	99	therms	$ 244.17
PSE&G CO (14105)	Jul-07	6/28/2007	7/30/2007	6280687228G	Gas	32	84	therms	$ 221.03
PSE&G CO (14105)	Aug-07	7/30/2007	8/28/2007	6280687228G	Gas	29	76	therms	$ 207.87
PSE&G CO (14105)	Sep-07	8/28/2007	9/29/2007	6280687228G	Gas	32	147	therms	$ 317.09
PSE&G CO (14105)	Oct-07	9/29/2007	10/27/2007	6280687228G	Gas	28	334	therms	$ 602.78
PSE&G CO (14105)	Nov-07	10/27/2007	11/29/2007	6280687228G	Gas	33	3844	therms	$ 7,000.82
PSE&G CO (14105)	Dec-07	11/29/2007	12/28/2007	6280687228G	Gas	29	4763	therms	$ 8,471.82
PSE&G CO (14105)	Jan-08	12/28/2007	1/30/2008	6280687228G	Gas	33	5823	therms	$ 10,163.56
PSE&G CO (14105)	Feb-08	1/30/2008	2/29/2008	6280687228G	Gas	30	4987	therms	$ 8,691.83
PSE&G CO (14105)	Mar-08	2/29/2008	3/31/2008	6280687228G	Gas	31	3725	therms	$ 6,675.42
PSE&G CO (14105)	Apr-08	3/31/2008	4/29/2008	6280687228G	Gas	29	1736	therms	$ 2,722.16
PSE&G CO (14105)	May-08	4/29/2008	6/2/2008	6280687228G	Gas	34	1252	therms	$ 1,994.68
						12 Month Total:	26,870	therms	$ 47,313.23
						Average Cost per therm:	$ 1.76		

Average Cost per KBtu:	$0.0176

Figure 2
Natural Gas Usage Profile



B. Energy Use Intensity (EUI)

Energy Use Intensity (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.

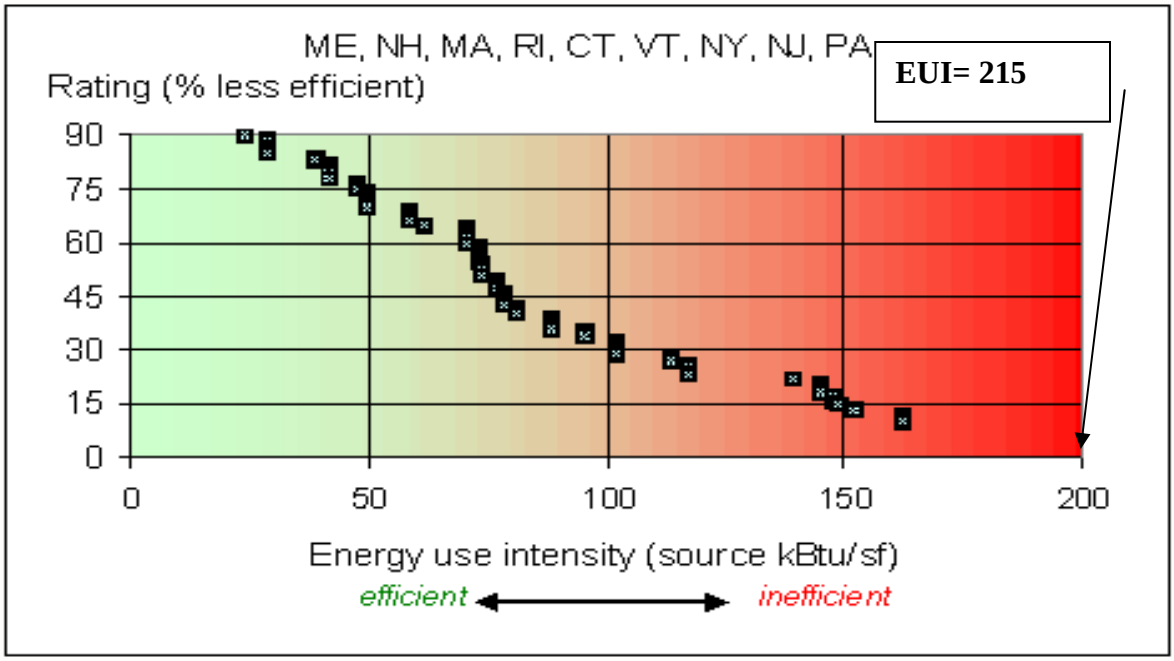
The site and source EUI for this facility is calculated as follows. (See Table 5 for details):

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

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

ENERGY TYPE	BUILDING USE			SITE ENERGY	SITE-SOURCE	SOURCE ENERGY
	kWh	Therms	Gallons	kBtu	RATIO	kBtu
ELECTRIC	672,400			2,295,574	3.340	7,667,216
NATURAL GAS		26,870.00		2,687,000	1.047	2,813,289
FUEL OIL			0.00	0	1.010	0
PROPANE			0.00	0	1.010	0
TOTAL				4,982,574		10,480,505
*Site - Source Ratio data is provided by the Energy Star Performance Rating Methodology for Incorporating Source Energy Use document issued Dec 2007.						
BUILDING AREA		48,625		SQUARE FEET		
BUILDING SITE EUI		102.47		kBtu/SF/YR		
BUILDING SOURCE EUI		**215.54**		**kBtu/SF/YR**		

Figure 3
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 you to track and assess 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 more emphasis is being placed throughout multiple arenas 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. Therefore, it is vital that local government municipalities assess their energy usage, benchmark this usage utilizing Portfolio Manager, set priorities and goals to lessen their energy usage and move forward with these priorites and goals. Saving energy will in-turn save the environment.

In accordance with the Local Government Energy Audit Program, CEG has created an Energy Star account for the school district in order to allow access to monitor their yearly energy usage as it compares to facilities of similar type. The login page for the account can be accessed at the following web address; the username and password are also listed below:

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

User Name:	southbrunswick
Password:	lgeaceg09002
Security Question:	What is your birth city?
Security Answer:	"South Brunswick"

Utilizing the utility bills and other information gathered during the energy audit process, CEG entered the respective data into Portfolio Manager and the following is a summary of the results:

Table 5
ENERGY STAR Performance Rating

FACILITY DESCRIPTION	ENERGY PERFORMANCE RATING	NATIONAL AVERAGE
Monmouth Junction	30	50

Specific building types are detailed on the ENERGY STAR website. Non-typical buildings are covered by an "Other" category. The "Other" category is used if your building type or a section of the building is not represented by one of the specific categories. An Energy Performance Rating cannot be calculated if more then 10% of a building is classified as "Other," or if the building is an office with less than 5,000 square feet of floor space.

The Energy Use Intensity (EUI) is also an important tool that can be used to track the energy efficiency of the building. Baselines for improvement can be set that the municipality can strive to meet. CEG recommends that the South Brunswick School District keep their Portfolio Manager account up to date to monitor the performance of the building.

The EUI calculated in the previous section and in the Energy Star Portfolio Manager is a good indicator of the energy performance of the Monmouth Junction Elementary School, in addition to the Energy Star Performance Rating.

The EUI distribution, Figure 3, is specific for Schools. The Monmouth Junction School has an EUI of 102.5 rating for this type of facility. The lower the EUI the less energy the facility uses per square foot. A low EUI indicates a more efficient building. There maybe some opportunity for improvement making the facility more energy efficient and saving more on the utility costs.

Refer to Appendix D for detailed energy benchmarking report entitled "STATEMENT OF ENERGY PERFORMANCE."

V. FACILITY DESCRIPTION

The Monmouth Junction Elementary School was originally constructed in 1950, with additions in 1974 and 2006. The single story, red brick building is 48,625 square feet, and consists of a cafeteria, media / library area, muiltipurpose / gymnasium, classrooms, mechanical / electrical rooms, faculty room and restrooms.

The typical wall envelope construction is 4 inch brick, 1 inch insulation with air space and 8, 10 and 14 inch cinder block CMU. The original building is stick-built, with roof truss, and flat rubber membrane roof construction. The newest addition of 9,200 square feet houses the cafeteria, kitchen, art and music rooms, storage and restroom facilities. The exterior wall is similar to the original building with the exception of the roof. The 2006 addition has a roof construction of steel frame trusses, metal roof deck, 4 inch base insulation, tapered rigid insulation, (2) plys of felt, fiberboard overlay, and topped with rubberized roofing membrane.

Cooling & Heating System

The original building and 1974 addition has Classroom Unit Ventilators with window air conditioners soon to be converted to DX split system with remote roof mounted condensing units. The 2006 addition is conditioned by packaged rooftop, gas fired, DX, constant volume units, except for the Media / Library Wing which is conditioned by a gas fired, DX packaged energy recovery unit with heat recovery wheel and VAV system with hot water reheat coils. The kitchen has its' own make-up-air unit which operates with the kitchen hood exhaust system. Individual zone control is achieved by hot water reheat coils in the ductwork supplied by high efficient gas fired boilers.

Domestic Hot Water

The original and new buildings are supplied with domestic hot water by two (2) gas fired domestic hot water heaters with integral storage tanks.

Lighting System

Typical lighting throughout the building uses fluorescent tube fixtures with energy efficient T-8 lamps and electronic ballasts. A limited number of fixtures use compact fluorescent lamps.

The exterior lighting uses mainly high intensity discharge wall mounted fixtures.

The existing lighting control system utilizes energy efficient occupancy sensors and "A/B" switching in most areas. Standard switching is used in remaining locations. "A/B" switching allows the occupant the ability to control approximately 50% of the lighting in an area with one switch and the remaining 50% with a separate switch if increased light levels are needed.

Occupancy sensor benefits, operation and lighting control recommendations are discussed in further detail in the Energy Conservation Measures section of this report.

School "As Built" drawings indicate that the facility has recently undergone a lighting upgrade and this was confirmed during the field survey. The light fixtures currently installed are estimated to be approximately three years old, energy efficient and are not recommended for replacement at this time.

Refer to Appendix E for a detailed Investment Grade Lighting Audit.

VI. MAJOR EQUIPMENT LIST

Following the completion of the field survey a detailed equipment list was created. The equipment within this list is considered major energy consuming equipment whose replacement could yield substantial savings. In addition, 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 manufacturers 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.

Equipment denoted by an asterisk indicates an estimate of the equipment ratings due to equipment inaccessibility, worn nameplates, lack of nameplates, etc.

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

VII. ENERGY CONSERVATION MEASURES (ECM)

ECM # 1 Install Variable Speed HW Pumps

Description:

The existing hot water pumps are constant speed. The system has a bypass valve which allows for recirculation when terminal equipments' control valves close down. We suggest installing new pumps with variable frequency drives (VFD). The existing 2-way control valves at all of the terminal equipment can remain. The new pumps would be controlled by remote pressure sensors to keep the system charged properly. The VFD's modulate the pump's speed in order to maintain the necessary system pressure as prescribed at the BMS.

The calculations for this ECM were performed using Trane Trace 700™ building simulation software and the estimated payback is approximately 24.5 years. Outputs from the simulation software are located in Appendix G. A summary of the calculations is shown below.

Energy Savings Summary:

ECM #1 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$14,050
NJ Smart Start Equipment Incentive ($):	$108
Net Installation Cost ($):	$13,942
Maintenance Savings ($/Yr):	$0
Energy Savings ($/Yr):	$568
Total Yearly Savings ($/Yr):	$568
Estimated ECM Lifetime (Yr):	20
Simple Payback	24.5
Simple Lifetime ROI	-18.5%
Simple Lifetime Maintenance Savings	$0
Simple Lifetime Savings	$11,360
Internal Rate of Return (IRR)	-2%
Net Present Value (NPV)	($5,491.59)

ECM #2 Install Lighting Controls

Description:

Install Lighting Controls to Reduce the Lighting Use

Although the majority of the building currently uses energy efficient lighting controls, 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.

CEG would recommend the replacement of standard wall switches with sensor wall switches for individual rooms, ceiling mount sensors for large office areas or restrooms, and fixture mount box sensors for some applications. Sensors shall be manufactured by Sensorswitch, Watt Stopper or equivalent.

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.

Energy Savings Calculations:

Energy Savings = *Total kilowatt Hours per year (kWh/yr) of Occupancy Sensor Controlled Area x Average Electric Cost ($/kWh) x 10% Energy Savings:*

= 24,580 kwh/yr. x $0.146/kWh x 10%

Annual Savings = $359 / yr

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

Installation Cost = $75 x 18 motion sensors = $1,350

NJ Smart Start® Program Incentives are calculated as follows:

From the NJ Smart Start appendix, the installation of a lighting control device warrants an incentive of $20 per occupancy sensor.

Smart Start Incentive = *(# of Occupancy Sensors x $20)*

Smart Start Incentive = *(18 x $20) = $360*

Energy Savings Summary:

ECM #1 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$14,050
NJ Smart Start Equipment Incentive ($):	$108
Net Installation Cost ($):	$13,942
Maintenance Savings ($/Yr):	$0
Energy Savings ($/Yr):	$568
Total Yearly Savings ($/Yr):	$568
Estimated ECM Lifetime (Yr):	20
Simple Payback	24.5
Simple Lifetime ROI	-18.5%
Simple Lifetime Maintenance Savings	$0
Simple Lifetime Savings	$11,360
Internal Rate of Return (IRR)	-2%
Net Present Value (NPV)	($5,491.59)

ECM #2 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$1,350
NJ Smart Start Equipment Incentive ($):	$360
Net Installation Cost ($):	$990
Maintenance Savings ($/Yr):	$0
Energy Savings ($/Yr):	$359
Total Yearly Savings ($/Yr):	$359
Estimated ECM Lifetime (Yr):	15
Simple Payback	2.8
Simple Lifetime ROI	443.9%
Simple Lifetime Maintenance Savings	$0
Simple Lifetime Savings	$5,385
Internal Rate of Return (IRR)	36%
Net Present Value (NPV)	$3,295.72

VIII. RENEWABLE/DISTRIBUTED ENERGY MEASURES

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

Solar energy produces clean energy and reduces a building's carbon footprint. This is accomplished via photovoltaic panels which 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). Parking lots can also be utilized for the installation of a solar array. A truss system can be installed that is high enough to park a vehicle under the array, this way no parking lot area is lost. The state of NJ has instituted a program in which one Solar Renewable Energy Certificate (SREC) is given to the Owner for every 1000 kWh of generation. SREC's can be sold anytime on the market at their current market value. The value of the credit varies upon the current need of the power companies. The average value per credit is around $350, this value was used in our financial calculations. This equates to $0.35 per kWh generated.

CEG has reviewed the 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 13,000 S.F. can be utilized for a PV system on the roof. A depiction of the area utilized is shown in Appendix F following the financial calculations. Using this square footage it was determined that a system size of 162 kilowatts could be installed to help reduce the maximum peak monthly demand. The required square footage for a system of this size is approximately 10,300 S.F. and has an estimated kilowatt hour production of 252,684 KWh annually, reducing the overall electric consumption by approximately 37.6%. A detailed financial analysis can be found in Appendix F. 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. 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	INTERNAL RATE OF RETURN
Self-Finance	11.6 Years	9.2 %
Direct Purchase	11.6 Years	7.0 %

The above information is concluded as REM # 1 showing installation costs, energy savings and other pertinent summarized information in Section I of this report.

Wind energy production is another option available through the Renewable Energy Incentive Program. Small wind turbines can be utilized to produce clean energy on a per building basis. Cash incentives are available per kWh of electric usage. CEG has reviewed the applicability of wind energy for South Brunswick and has determined it is not a viable option. Low average wind speeds for the area are not adequate for wind turbine generation. Typical wind turbines start producing energy at 8 mph wind speeds. South Brunswick averages 4 mph wind speeds making this application impractical.

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. The Electric and Natural Gas Usage Profiles included within this report to reference the respective electricity and natural gas usage load profile for June 2007 through May 2008.

Electricity:

This facility was originally constructed in 1950, with additions in 1974 and 2006. The building consists of a cafeteria, media / library area, multi-purpose / gymnasium, classrooms, mechanical / electrical rooms, faculty room and restrooms.

The Electric Usage Profile demonstrates an erratic load profile but with some consistency throughout the year. The load profile demonstrates elevated consumption annually. A peak exists in the month of March. Typically a spring and summer increase in consumption is due to the cooling (air conditioner) load. In this facility the original building has Classroom Unit Ventilators with window air conditioners. The 2006 addition is conditioned by packaged rooftop, gas fired, DX, constant volume units, except for the Media / Library Wing which is conditioned by a gas fired, DX packaged energy recovery unit with heat recovery wheel. This facility utilizes the Delivery service (GLP), and its Commodity service (BGS) from Public Service Electric and Gas Company (PSE&G). A base-load shaping is important because a flat consumption profile will yield more competitive pricing when shopping for a Third Party Supplier.

Natural Gas:

The Natural Gas Usage Profile demonstrates a typical heating load (November –March), and complimentary cooling load (April –October). Consequently there is a clear separation between summer and winter loads consistent with Wholesale Energy Pricing. Heating loads carry a much higher average cost because of the higher demand for natural gas during the winter. In this facility, heating is supplied via packaged roof-top, natural gas fired DX constant volume units, except for the Media / Library Wing, which is conditioned by a natural gas-fired, DX packaged energy recovery unit with heat recovery wheel. Individual zone control is achieved by hot-water reheat coils in the ductwork supplied by high efficient natural gas boilers. Additionally, domestic hot-water is supplied via (2) two natural gas fired hot water heaters. This facility utilizes the Delivery service (LVG) from Public Service Electric and Gas (PSE&G) while it receives its Commodity service from Woodruff Energy, the Third Party Supplier (TPS).

Tariff Analysis:

Electricity:

This facility receives electrical service through Public Service Electric and Gas Company (PSE&G). This facility receives Delivery and Commodity service through Public Service Electric and Gas Company (PSE&G) on a GLP (General Lighting and Power Service) rate schedule.

The GLP utility tariff is for Delivery service for general purposes at secondary distribution voltages. Customers may either purchase electric supply from a Third Party Supplier (TPS) or from Public Service's Basic Generation Service default service as detailed in this rate schedule. This facility is currently receiving Generation service from PSE&G's Basic Generation Service. The PSE&G Delivery service has the following charges: Service Charge, Distribution Charges, Societal Benefits Charges, Non-Utility Generation Charges, Securitization Transition Charges, System Control Charges, Customer Account Services Charges, Commercial and Industrial Energy Pricing Standby Fee (CIEP), Base Rate Distribution Kilowatt Adjustment Charge, Solar Pilot Recovery Charge and Capital Adjustment Charge.

A flat load profile will allow for a more competitive energy price when shopping for an "alternate energy source".

Natural Gas:

This facility receives natural gas Delivery service through Public Service Electric and Gas Company on an LVG (Large Volume Gas) rate class, when not receiving commodity by a Third Party Supplier. This facility receives natural gas Commodity service from a Third Party Supplier, Woodruff Energy. This utility tariff is for firm Delivery service for general purposes. This rate schedule has a Delivery Charge, Balancing Charge, Societal Benefits Charge, Realignment Adjustment Charge, Margin Adjustment Charge, RGGI Charge and Customer Account Service Charge. The customer can elect to have the Commodity Charge serviced through the utility or by a Third Party Supplier (TPS). It is pertinent to note, should the TPS not deliver, the customer may receive service from PSE&G under Emergency Sales Service. Emergency Sales Service carries an extremely high penalty cost of service.

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

From review of the information provided by the School District, South Brunswick is utilizing the services of a Third Party Supplier, Woodruff Energy for natural gas service. The contract is administered through the Middlesex Regional Educational Services Commission (MRESC) for the term, August 1, 2008 through July 31, 2010. The agreement is between the MRESC and

South Brunswick BOE and it does not define the full and final price. Based on the limited data available, it appears that South Brunswick is paying over 20% above market price.

Additionally, the MRESC charges $.0325 per deka-therm for administering this RFP. The South Brunswick BOE could realize additional savings by evaluating a new natural gas contract. It should be noted that there was not a Woodruff Energy Contract available for review, nor a complete delivered natural gas price. CEG will make recommendations below for this service.

Recommendations:

CEG recommends a global approach that will be consistent with all facilities. CEG's primary observation is seen in the electricity costs. South Brunswick's "weighted average price-to-compare" per kWh (kilowatt hour) for all buildings is $.1479/kWh (kWh is the common unit of electric measure).

The electric "price to compare" is defined as the price that would be compared to the equivalent utility price extracting the utility transmission and distribution costs (wires charges). This would be a market based price that would be supplied by a Third Party Supplier (TPS) or an alternative supplier.

The average "price-to-compare" per decatherm for natural gas is $12.50/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. South Brunswick could see significant savings if it were to take advantage of these current market prices quickly, before energy increases. Based on last year's historical consumption (June 2007 through May 2008) and current electric rates, South Brunswick would see an improvement of over $150,000 or over 20% annually. (Note: Savings were calculated using South Brunswick High School's Average Annual Consumption of 5,749,304 kWh's and a variance of approximately $.03/kWh and utilizing a fixed one-year commodity contract). South Brunswick should aggregate its 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 South Brunswick's natural gas costs and the contract with MRESC and Woodruff Energy. CEG recognized a segment of the natural gas cost is not competitive with current market prices. Based on the current market, South Brunswick is paying approximately $1.717 per unit above market in the PSEG territory and about $.58 per unit above market in the Elizabethtown Gas and New Jersey Natural Gas territories. CEG recommends further advisement on these prices. South Brunswick should also consider procuring energy (natural gas) on its own. By procuring energy through the MRESC it is paying a premium of $.0325 per unit. CEG recommends alternative sourcing strategies.

CEG has observed that there is a cost differential from Phase I. For the facilities in Phase II CEG observes improvement of up to $100,000 in natural gas costs. Since energy prices have dropped since last we analyzed the energy costs, South Brunswick could now see an improvement of up to 60% in the variance to market based pricing.

CEG recommends that South Brunswick schedule a meeting with their current utility providers to review their utility charges and current tariff structures for electricity and natural gas. This meeting would provide insight regarding alternative procurement options that might be available to South Brunswick. Through its meeting with the Local Distribution Company (LDC), South Brunswick will learn more about the competitive supply process. South Brunswick can acquire a list of approved Third Party Suppliers from the New Jersey Board of Public Utilities website at www.nj.gov/bpu. South Brunswick should also consider using a billing-auditing service to further analyze the utility invoices, manage the data and use the data to manage ongoing demand-side management projects. Furthermore, CEG recommends South Brunswick pay attention to credit mechanisms, imbalances, balancing charges and commodity charges when meeting with their utility representative. In addition, South Brunswick should also ask the utility representative about alternative billing options. Some utilities allow for consolidated billing options when utilizing the service of a Third Party Supplier.

Finally, if South Brunswick frequently changes its supplier for energy (natural gas), it needs to closely monitor balancing, particularly when the contract is close to termination.

X. INSTALLATION FUNDING OPTIONS

CEG has reviewed various funding options for the 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.

All in all, incentives provide financial motivation and much needed support for the implementation of energy conservation measures. Along with the NJ Smart Start program, the Pay for Performance Program incentives, sponsored by NJ Clean Energy Program, are applicable for this facility. The existing average operating demand above 200 KW and high energy consumption qualifies for the Pay for Performance Program. The incentive based on a 15% electrical energy reduction for this facility would qualify for an additional $14,703 in the Pay for Performance Program. If natural gas consumption could be reduced by 15% the resultant incentive would be approximately $7,097. This would equate to a total incentive equal to approximately $21,800. This option is one to consider for a whole-building approach to energy reduction. The Pay for Performance Program represents a significant commitment to energy reduction of a facility. This option should be reviewed in more detail with a Pay for Performance Program partner.

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. Use cog-belts instead of v-belts on all belt-driven fans, etc. These can reduce electrical consumption of the motor by 2-5%.

D. Reduce lighting in specified areas where the foot candle levels are above 70 in private offices and above 30 in corridor, lobbies, etc.

E. Provide more frequent air filter changes to decrease overall fan horsepower requirements and maintain better IAQ.

F. Recalibrate existing sensors serving the office spaces

G. Install a Vending Miser system to turn off the vending machines in the lunch room when not in use.

H. Clean all light fixtures to maximize light output.

I. Confirm that outside air economizers on the rooftop units that serve the Office Areas are functioning properly to take advantage of free cooling.

APPENDIX

ECM COST & SAVINGS BREAKDOWN

CONCORD ENGINEERING GROUP

Monmouth Junction Elementary School

ECM NO.	DESCRIPTION	INSTALLATION COST				YEARLY SAVINGS			ECM LIFETIME	LIFETIME ENERGY SAVINGS	LIFETIME MAINTENANCE SAVINGS	LIFETIME ROI	SIMPLE PAYBACK	INTERNAL RATE OF RETURN (IRR)	NET PRESENT VALUE (NPV)
		MATERIAL	LABOR	REBATES, INCENTIVES	NET INSTALLATION COST	ENERGY	MAINT. / SREC	TOTAL		(Yearly Saving * ECM Lifetime)	(Yearly Maint Svaing * ECM Lifetime)	(Lifetime Savings - Net Cost) / (Net Cost)	(Net cost / Yearly Savings)	$\sum_{n=0}^{N} \frac{C_n}{(1+IRR)^n}$	$\sum_{n=0}^{N} \frac{C_n}{(1+DR)^n}$
		($)	($)	($)	($)	($/Yr)	($/Yr)	($/Yr)	(Yr)	($)	($)	(%)	(Yr)	($)	($)
ECM ENERGY AND FINANCIAL COSTS AND SAVINGS SUMMARY															
ECM #1	VARIABLE SPEED PUMPS	$7,900	$6,150	$108	$13,942	$568	$0	$568	20	$11,360	$0	-18.5%	24.5	-1.88%	($5,491.59)
ECM #2	INSTALL LIGHTING CONTROLS	$990	$360	$360	$990	$359	$0	$359	15	$5,385	$0	443.9%	2.8	35.90%	$3,295.72
REM RENEWABLE ENERGY AND FINANCIAL COSTS AND SAVINGS SUMMARY															
REM #1	162 KW PV SOLAR PANELS	$1,073,600	$383,680	$0	$1,457,280	$36,892	$88,439	$125,331	25	$922,300	$2,210,975	-36.7%	11.6	7.02%	$725,127.21

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

CONSTRUCTION COST AND REBATES					
BASE CASE - EXISTING EQUIPMENT	Qty	Unit Cost $	Material $	Labor $	Total $
Total Cost			$0	$0	**$0**
ECM # 1 - VARIABLE SPEED PUMPING	Qty	Unit Cost $	Material $	Labor $	Total $
Hot Water Pump (5 HP)	2	$2,000	$4,000	$3,000	$7,000
Variable Frequency Drive > 5HP	2	$1,800	$3,600	$2,700	$6,300
Controls	2	$150	$300	$450	$750
Premium Eff Motor Rebate					$108
Total after Rebate					**$13,942**
ECM # 2 - LIGHTING CONTROLS	Qty	Unit Cost $	Material $	Labor $	Total $
Motion Sensors	18	$55	$990	$360	$1,350
Rebate					360
Total after Rebate					**$990**
REM #1 - PV SOLAR	Qty	Unit Cost $	Material $	Labor $	Total $
PV Solar	704	$1,525	$1,073,600	$383,680	$1,457,280
Total					**$1,457,280**

ANNUAL MAINTENANCE COSTS				
ECM	**Base**	**Additional**	**Solar PV**	**Total**
BASE CASE - EXISTING EQUIPMENT	$12,156	$0	$0	$12,156
ECM # 1 - VARIABLE SPEED PUMPING	$12,156	-$3,039	$0	$9,117
ECM # 2 - LIGHTING CONTROLS	$12,156	$0	$0	$12,156
REM # 1 - SOLAR PV SYSTEM	$12,156	$0	$1,500	$13,656

EQUIPMENT REPLACEMENT COST FOR EACH ALTERNATE

BASE CASE - EXISTING EQUIPMENT

	$	Life	Yr Incurred
Existing Constant Speed Pumps	$3,000	20	2
New Variable Speed Pumps	$0	20	20

ECM # 1 - VARIABLE SPEED PUMPS

	$	Life	Yr Incurred
Existing Constant Speed Pumps	$3,000	20	2
New Variable Speed Pumps	$13,942	20	20

ECM # 2 - LIGHTING CONTROLS

	$	Life	Yr Incurred
Existing Constant Speed Pumps	$3,000	20	2
New Variable Speed Pumps	$0	20	20

REM #1 - PV SOLAR

	$	Life	Yr Incurred
Existing Constant Speed Pumps	$3,000	20	2
New Variable Speed Pumps	$0	20	20

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SmartStart Building Incentives

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

Electric Chillers

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

Gas Cooling

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

Desiccant Systems

	$1.00 per cfm – gas or electric

Electric Unitary HVAC

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

Ground Source Heat Pumps

Closed Loop & Open Loop	$370 per ton

Gas Heating

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

Variable Frequency Drives

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

Natural Gas Water Heating

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

Premium Motors

Three-Phase Motors	$45 - $700 per motor

Prescriptive Lighting

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

Lighting Controls – Occupancy Sensors

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

Lighting Controls – HID or Fluorescent Hi-Bay Controls

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

Other Equipment Incentives

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

Monmouth Junction Elementary

TAG	MAKE	MODEL	TYPE	CAPACITY	EFFICIENCY	SERVES	LOCATION	REMAINING USEFUL LIFE	NOTES
RTU-1	AAON	RN-050-8-0	PACKAGED ROOFTOP-ERU	50 TONS, 540 MBH INPUT, 437 MBH OUTPUT	10 EER / 80.9 %	MEDIA WING	ROOF-NORTHEAST SIDE	11 YEARS	DX COOLING R-22, GAS HEAT, FILTER SECTION, SUPPLY & EXHAUST / RETURN FAN, AND ENERGY RECOVERY WHEEL. 208/60/3, SN#200410-ANGW00578
RTU-2	LENNOX	LGA-060H4BH4Y	PACKAGED ROOFTOP-COOLING/HEATING	5 TONS, 125 MBH INPUT, 100 MBH OUTPUT	10.5 EER / 80 %	CORR.-300 & RESTROOMS	ROOF-NORTHWEST SIDE	11 YEARS	DX COOLING R-410A, GAS HEAT, ECONOMIZER. 208/60/3,SN#5605M06076
RTU-3	LENNOX	LGA-060H4BH4Y	PACKAGED ROOFTOP-COOLING/HEATING	5 TONS, 125 MBH INPUT, 100 MBH OUTPUT	10.5 EER / 80 %	ART ROOM / ART STORAGE	ROOF-NORTHWEST SIDE	11 YEARS	DX COOLING R-410A, GAS HEAT, ECONOMIZER. 208/60/3,SN#5605M06075
RTU-4	LENNOX	LGA-060H4BH4Y	PACKAGED ROOFTOP-COOLING/HEATING	5 TONS, 125 MBH INPUT, 100 MBH OUTPUT	10.5 EER / 80 %	MUSIC ROOM / MUSIC STORAGE / PRACTICE ROOM	ROOF-NORTHWEST SIDE	11 YEARS	DX COOLING R-410A, GAS HEAT, ECONOMIZER. 208/60/3, SN#5605M06074
RTU-5	McQuay	RPS-018CSA	PACKAGED ROOFTOP-COOLING/HEATING	5000 CFM, NOM. 19.8 TONS COOLING, 400 MBH INPUT, 320 MBH OUTPUT	11 EER / 80 %	CAFETERIA / KITCHEN STORAGE / IDF STORAGE	ROOF-NORTHWEST SIDE	11 YEARS	DX COOLING R-407A, GAS HEAT, ECONOMIZER. 208/60/3, SN#FBOU060100305
RTU-6	LENNOX	LGA-060H4BH4Y	PACKAGED ROOFTOP-COOLING/HEATING	5 TONS, 125 MBH INPUT, 100 MBH OUTPUT	10.5 EER / 80 %	KITCHEN / KITCHEN STORAGE	ROOF-NORTHWEST SIDE	11 YEARS	DX COOLING R-410A, GAS HEAT, ECONOMIZER. 208/60/3, SN#5605M06074
RTU-7	McQuay	RPS-030CLA	PACKAGED ROOFTOP-COOLING/HEATING	8400 CFM, NOM. 32.1 TONS COOLING, 625 MBH INPUT, 500 MBH OUTPUT	10.3 EER / 80 %	MULTI-PURPOSE ROOM	ROOF-NORTHWEST SIDE	11 YEARS	DX COOLING R-407A, GAS HEAT, ECONOMIZER. 208/60/3, SN#FBOU060100311
MUA-1	STERLING	QVPV-300M	MUA HEAT & VENT	3600 CFM, 300 MBH INPUT, 237 MBH OUTPUT	79%	KITCHEN	ROOF ABOVE KITCHEN-NORTHWEST SIDE	10 YEARS	KITCHEN HOOD MAKE-UP-AIR HEATING & VENTILATION.
AHU	BUILT-UP	NONE	HEATING & VENTILATING	UNKNOWN	UNKNOWN	ORIGINAL 1950 SCHOOL	OLD MECHANICAL ROOM - FRONT OF SCHOOL	1 YEAR	BUILT-UP SHEET METAL AHU, 15' X 10' X 10', HW COIL, 3-WAY VALVE, ORIGINAL 1950.
UV-1	WILLIAMS	N/A	VERTICAL H & V	N/A	UNKNOWN	B-201 & B-203	CLASSROOM CORNER-WALL	0 YEARS	SURFACE WALL MOUNTED ELECTRIC HEATER
UV-2	NESBITT-AIRE	N/A	VERTICAL H & V	N/A	UNKNOWN	CLASSROOMS	CLASSROOMS	1 YEAR	FLOOR MOUNTED
B-1	PATTERSON KELLY	N2000-MFD	HOT WATER BOILER	2000 MBH INPUT, 1700 MBH OUTPUT	85%	ENTIRE BUILDING	LOWER BOILER ROOM - NORTHWEST SIDE	23 YEARS	HIGH EFFICIENCY, NON-CONDENSING, INSTALLED SEPT. 2007, B-1 & B-2, SEQUENCED FOR EQUAL OPERATING TIME.
B-2	PATTERSON KELLY	N2000-MFD	HOT WATER BOILER	2000 MBH INPUT, 1700 MBH OUTPUT	85%	ENTIRE BUILDING	LOWER BOILER ROOM - NORTHWEST SIDE	23 YEARS	HIGH EFFICIENCY, NON-CONDENSING, INSTALLED SEPT. 2007, B-1 & B-2, SEQUENCED FOR EQUAL OPERATING TIME.
DHW-1	PVI	PVI-14N125A-MX	DOMESTIC HOT WATER HEATER	140 MBH, 125 GAL., 115/60/1	82%	NEW ADDITION	HEATER ROOM IN CAFETERIA	13 YEARS	NICKEL SHIELD
DHW-2	BRADFORD WHITE	MI-50L6FBN	DOMESTIC HOT WATER HEATER	40 MBH, 48 GAL., 115/60/1	78%	OLD BUILDING	OLD MECHANICAL ROOM - FRONT OF SCHOOL	14 YEARS	WITH INTEGRAL STORAGE TANK

OMB No. 2060-0347

STATEMENT OF ENERGY PERFORMANCE
Monmouth Junction Elementary School

Building ID: 1819620
For 12-month Period Ending: April 30, 2008[1]
Date SEP becomes ineligible: N/A

Date SEP Generated: August 14, 2009

Facility
Monmouth Junction Elementary School
630 Ridge Road
Monmouth Junction, NJ 08852

Facility Owner
N/A

Primary Contact for this Facility
N/A

Year Built: 1950
Gross Floor Area (ft²): 48,625

Energy Performance Rating[2] (1-100) 30

Site Energy Use Summary[3]

Natural Gas (kBtu)[4]	2,565,973
Electricity (kBtu)	2,120,080
Total Energy (kBtu)	4,686,053

Energy Intensity[5]

Site (kBtu/ft²/yr)	104
Source (kBtu/ft²/yr)	218

Emissions (based on site energy use)

Greenhouse Gas Emissions ($MtCO_2e$/year)	459

Electric Distribution Utility
PSE&G - Public Service Elec & Gas Co

National Average Comparison

National Average Site EUI	88
National Average Source EUI	183
% Difference from National Average Source EUI	19%
Building Type	K-12 School

Stamp of Certifying Professional

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

Certifying Professional
N/A

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

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

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

ENERGY STAR® Data Checklist for Commercial Buildings

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

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

CRITERION	VALUE AS ENTERED IN PORTFOLIO MANAGER	VERIFICATION QUESTIONS	NOTES	☑
Building Name	Monmouth Junction 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	630 Ridge Road, Monmouth Junction, NJ 08852	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		☐

Monmouth Junction Elementary (K-12 School)

CRITERION	VALUE AS ENTERED IN PORTFOLIO MANAGER	VERIFICATION QUESTIONS	NOTES	☑
Gross Floor Area	48,625 Sq. Ft.	Does this square footage include all supporting functions such as kitchens and break rooms used by staff, storage areas, administrative areas, elevators, stairwells, atria, vent shafts, etc. Also note that existing atriums should only include the base floor area that it occupies. Interstitial (plenum) space between floors should not be included in the total. Finally gross floor area is not the same as leasable space. Leasable space is a subset of gross floor area.		☐
Open Weekends?	Yes	Is this building normally open at all on the weekends? This includes activities beyond the work conducted by maintenance, cleaning, and security personnel. Weekend activity could include any time when the space is used for classes, performances or other school or community activities. If the building is open on the weekend as part of the standard schedule during one or more seasons, the building should select ?yes? for open weekends. The ?yes? response should apply whether the building is open for one or both of the weekend days.		☐
Number of PCs	85 (Default)	Is this the number of personal computers in the K12 School?		☐
Number of walk-in refrigeration/freezer units	1	Is this the total number of commercial walk-in type freezers and coolers? These units are typically found in storage and receiving areas.		☐
Presence of cooking facilities	Yes	Does this school have a dedicated space in which food is prepared and served to students? If the school has space in which food for students is only kept warm and/or served to students, or has only a galley that is used by teachers and staff then the answer is "no".		☐
Percent Cooled	100 %	Is this the percentage of the total floor space within the facility that is served by mechanical cooling equipment?		☐
Percent Heated	100 %	Is this the percentage of the total floor space within the facility that is served by mechanical heating equipment?		☐

Months	12 (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: PSE&G - Public Service Elec & Gas Co

Fuel Type: Electricity		
Meter: Electricity (kWh (thousand Watt-hours)) **Space(s):** Entire Facility		
Start Date	**End Date**	**Energy Use (kWh (thousand Watt-hours))**
03/30/2008	04/29/2008	42,800.00
03/01/2008	03/29/2008	67,800.00
01/30/2008	02/29/2008	43,000.00
12/30/2007	01/29/2008	59,400.00
11/30/2007	12/29/2007	51,200.00
10/30/2007	11/29/2007	61,400.00
09/30/2007	10/29/2007	53,800.00
08/30/2007	09/29/2007	55,400.00
07/30/2007	08/29/2007	65,000.00
06/30/2007	07/29/2007	56,800.00
05/30/2007	06/29/2007	63,000.00
Electricity Consumption (kWh (thousand Watt-hours))		**619,600.00**
Electricity Consumption (kBtu)		**2,114,075.20**
Total Electricity Consumption (kBtu)		**2,114,075.20**
Is this the total Electricity 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)**
03/30/2008	04/29/2008	1,736.00
03/01/2008	03/29/2008	3,725.00
01/30/2008	02/29/2008	4,987.00
12/30/2007	01/29/2008	5,823.00
11/30/2007	12/29/2007	4,763.00
10/30/2007	11/29/2007	3,844.00
09/30/2007	10/29/2007	334.00
08/30/2007	09/29/2007	147.00
07/30/2007	08/29/2007	76.00
06/30/2007	07/29/2007	84.00

05/30/2007	06/29/2007	99.00
Gas Consumption (therms)		**25,618.00**
Gas Consumption (kBtu)		**2,561,800.00**
Total Natural Gas Consumption (kBtu)		**2,561,800.00**
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.	☐

Certifying Professional

(When applying for the ENERGY STAR, this must be the same 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
Monmouth Junction Elementary School
630 Ridge Road
Monmouth Junction, NJ 08852

Facility Owner
N/A

Primary Contact for this Facility
N/A

General Information

Monmouth Junction Elementary School	
Gross Floor Area Excluding Parking: (ft^2)	48,625
Year Built	1950
For 12-month Evaluation Period Ending Date:	April 30, 2008

Facility Space Use Summary

Monmouth Junction Elementary	
Space Type	K-12 School
Gross Floor Area(ft^2)	48,625
Open Weekends?	Yes
Number of PCs[d]	85
Number of walk-in refrigeration/freezer units	1
Presence of cooking facilities	Yes
Percent Cooled	100
Percent Heated	100
Months[o]	12
High School?	No
School District[o]	N/A

Energy Performance Comparison

	Evaluation Periods		Comparisons		
Performance Metrics	**Current** (Ending Date 04/30/2008)	**Baseline** (Ending Date 04/30/2008)	**Rating of 75**	**Target**	**National Average**
Energy Performance Rating	30	30	75	N/A	50
Energy Intensity					
Site ($kBtu/ft^2$)	104	104	69	N/A	88
Source ($kBtu/ft^2$)	218	218	143	N/A	183
Energy Cost					
$/year	$ 136,620.02	$ 136,620.02	$ 89,840.95	N/A	$ 114,892.75
$/$ft^2$/year	$ 2.81	$ 2.81	$ 1.85	N/A	$ 2.36
Greenhouse Gas Emissions					
$MtCO_2e$/year	459	459	302	N/A	386
$kgCO_2e/ft^2$/year	9	9	6	N/A	8

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

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

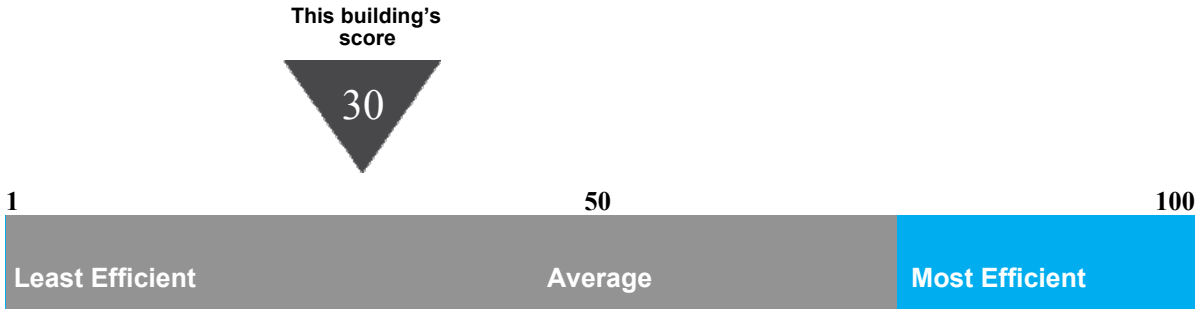
Statement of Energy Performance

2008

Monmouth Junction Elementary School
630 Ridge Road
Monmouth Junction, NJ 08852

Portfolio Manager Building ID: 1819620

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 218 kBtu per square foot per year.*

*Based on source energy intensity for the 12 month period ending April 2008

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: 08/14/2009

ECM #1: Install Lighting Controls

Appendix E

Monmouth Junction Elementary School

CEG Project #: 9C08134
Project Name : South Brunswick Schools Energy Audit
Address: 630 Ridge Road
City, State: Monmouth Junction, NJ

Date 10/28/09
kWh Cost $0.146

	Existing Lt Fixtures					Proposed Lt Fixtures			Proposed Ltg Savings				Proposed Ltg Installation Cost			Proposed Ltg Control Annual Savings				
Fixture Location	**Usage, Hrs/Yr**	**Fixt Qty**	**Lighting Fixture Description**	**Total Watts - Location**	**Annual Energy Cost**	**Fixt Qty**	**Lighting Fixture Description**	**Total Watts - Location**	**Energy Savings, Watts**	**Energy Savings, kWh/Yr**	**Savings/Yr, $**	**Simple Payback, Yrs**	**Unit Cost, Installed**	**Total Cost, Installed**	**Rebate Estimate**	**Ltg Control Description**	***Energy Savings kWh/Yr**	**Savings/ Yr $**	****Unit Cost, Total**	**Simple Payback, Yrs**
First Floor																				
Existing Classroom	1620	12	(2)32w T8 Lamps. 6" x 4' Fixture w/Elec. Ballast - 55w	660	$156.10	12	Existing to Remain	660	0	0	$0.00		$0.00	$0.00	$0.00	Dual Technology Occupancy Sensor	106.9	$15.61	$ 55.00	3.5
Existing Classroom	1620	12	(2)32w T8 Lamps. 6" x 4' Fixture w/Elec. Ballast - 55w	660	$156.10	12	Existing to Remain	660	0	0	$0.00		$0.00	$0.00	$0.00					
Nurse's Office	1450	3	(3)32w T8 Lamps. 2' x 4' Fixture w/Elec. Ballast - 87w	261	$55.25	3	Existing to Remain	261	0	0	$0.00		$0.00	$0.00	$0.00	Dual Technology Occupancy Sensor	37.8	$5.53	$ 55.00	10.0
Boys Toilet	1450	3	(3)32w T8 Lamps. 2' x 4' Fixture w/Elec. Ballast - 87w	261	$55.25	3	Existing to Remain	261	0	0	$0.00		$0.00	$0.00	$0.00					
Girls Toilet	1450	3	(3)32w T8 Lamps. 2' x 4' Fixture w/Elec. Ballast - 87w	261	$55.25	3	Existing to Remain	261	0	0	$0.00		$0.00	$0.00	$0.00	Dual Technology Occupancy Sensor	37.8	$5.53	$ 55.00	10.0
Nurse's Office Toilet	1450	1	(2) 26w CF Quad-Tube Lamps. Downlight Fixture - 52w	52	$11.01	1	Existing to Remain	52	0	0	$0.00		$0.00	$0.00	$0.00					
Existing Office	1800	8	(2)32w T8 Lamps. 6" x 4' Fixture w/Elec. Ballast - 55w	440	$115.63	8	Existing to Remain	440	0	0	$0.00		$0.00	$0.00	$0.00	Dual Technology Occupancy Sensor	79.2	$11.56	$ 55.00	4.8
Existing Copy Room	1800	1	(4)32w T8 Lamps. Recessed Fixture w/Elec. Ballast - 108w	108	$28.38	1	Existing to Remain	108	0	0	$0.00		$0.00	$0.00	$0.00					
Corridor	1800	13	(3)32w T8 Lamps. 2' x 4' Fixture w/Elec. Ballast - 87w	1131	$297.23	13	Existing to Remain	1131	0	0	$0.00		$0.00	$0.00	$0.00	Dual Technology Occupancy Sensor	203.6	$29.72	$ 55.00	1.9
Lobby	1800	4	(3)32w T8 Lamps. 2' x 4' Fixture w/Elec. Ballast - 87w	348	$91.45	4	Existing to Remain	348	0	0	$0.00		$0.00	$0.00	$0.00					
Main Office	2000	8	(2)32w T8 Lamps. 2' x 4' Fixture w/Elec. Ballast - 108w	864	$252.29	8	Existing to Remain	864	0	0	$0.00		$0.00	$0.00	$0.00	Dual Technology Occupancy Sensor	172.8	$25.23	$ 55.00	2.2
Principal's Officce	1500	2	(2)32w T8 Lamps. 2' x 4' Fixture w/Elec. Ballast - 108w	216	$47.30	2	Existing to Remain	216	0	0	$0.00		$0.00	$0.00	$0.00					
Conference Room	720	2	(2)32w T8 Lamps. 2' x 4' Fixture w/Elec. Ballast - 108w	216	$22.71	2	Existing to Remain	216	0	0	$0.00		$0.00	$0.00	$0.00					
Existing Classroom	1620	12	(3)32w T8 Lamps. 2' x 4' Fixture w/Elec. Ballast - 87w	1044	$246.93	12	Existing to Remain	1044	0	0	$0.00		$0.00	$0.00	$0.00					
Small Group Instruction	1400	3	(3)32w T8 Lamps. 2' x 4' Fixture w/Elec. Ballast - 87w	261	$53.35	3	Existing to Remain	261	0	0	$0.00		$0.00	$0.00	$0.00	Dual Technology Occupancy Sensor	36.5	$5.33	$ 55.00	10.3
Existing Classroom (8-2T/4-3T)	1620	12	(2)32w T8 Lamps. 6" x 4' Fixture w/Elec. Ballast - 55w	660	$156.10	12	Existing to Remain	660	0	0	$0.00		$0.00	$0.00	$0.00					

	Existing Lt Fixtures					Proposed Lt Fixtures			Proposed Ltg Savings				Proposed Ltg Installation Cost			Proposed Ltg Control Annual Savings				
Fixture Location	**Usage, Hrs/Yr**	**Fixt Qty**	**Lighting Fixture Description**	**Total Watts - Location**	**Annual Energy Cost**	**Fixt Qty**	**Lighting Fixture Description**	**Total Watts - Location**	**Energy Savings, Watts**	**Energy Savings, kWh/Yr**	**Savings/Yr, $**	**Simple Payback, Yrs**	**Unit Cost, Installed**	**Total Cost, Installed**	**Rebate Estimate**	**Ltg Control Description**	***Energy Savings kWh/Yr**	**Savings/ Yr $**	****Unit Cost, Total**	**Simple Payback, Yrs**
Existing Classroom (8-2T/4-3T)	1620	12	(2)32w T8 Lamps. 6" x 4' Fixture w/Elec. Ballast - 55w	660	$156.10	12	Existing to Remain	660	0	0	$0.00		$0.00	$0.00	$0.00	Dual Technology Occupancy Sensor	106.9	$15.61	$ 55.00	3.5
Existing Classroom (8-2T/4-3T)	1620	10	(2)32w T8 Lamps. 6" x 4' Fixture w/Elec. Ballast - 55w	550	$130.09	10	Existing to Remain	550	0	0	$0.00		$0.00	$0.00	$0.00					
Existing Storage Room	500	1	(4)32w T8 Lamps. Recessed Fixture w/Elec. Ballast - 108w	108	$7.88	1	Existing to Remain	108	0	0	$0.00		$0.00	$0.00	$0.00					
Existing Copy Room	1000	1	(4)32w T8 Lamps. Recessed Fixture w/Elec. Ballast - 108w	108	$15.77	1	Existing to Remain	108	0	0	$0.00		$0.00	$0.00	$0.00					
Existing Boiler Room	500	4				4														
Existing Janitor's Office	500	2	(2)32w T8 Lamps. Pendant Fixture w/Elec. Ballast - 55w	110	$8.03	2	Existing to Remain	110	0	0	$0.00		$0.00	$0.00	$0.00					
Existing Resource Center	1200	6	(4)32w T8 Lamps. Recessed Fixture w/Elec. Ballast - 108w	648	$113.53	6	Existing to Remain	648	0	0	$0.00		$0.00	$0.00	$0.00					
Existing Classroom (8-2T/4-3T)	1620	12	(2)32w T8 Lamps. 6" x 4' Fixture w/Elec. Ballast - 55w	660	$156.10	12	Existing to Remain	660	0	0	$0.00		$0.00	$0.00	$0.00	Dual Technology Occupancy Sensor	106.9	$15.61	$ 55.00	3.5
Corridor	1800	12	(3)32w T8 Lamps. 2' x 4' Fixture w/Elec. Ballast - 87w	1044	$274.36	12	Existing to Remain	1044	0	0	$0.00		$0.00	$0.00	$0.00					
Corridor	1800	17	(3)32w T8 Lamps. 2' x 4' Fixture w/Elec. Ballast - 87w	1479	$388.68	17	Existing to Remain	1479	0	0	$0.00		$0.00	$0.00	$0.00	Dual Technology Occupancy Sensor	266.2	$38.87	$ 55.00	1.4
Faculty Room	600	8	(3)32w T8 Lamps. 2' x 4' Fixture w/Elec. Ballast - 87w	696	$60.97	8	Existing to Remain	696	0	0	$0.00		$0.00	$0.00	$0.00					
Faculty Toilet Room	300	1	(2)32w T8 Lamps. 1' x 4' Fixture w/Elec. Ballast - 55w	55	$2.41	1	Existing to Remain	55	0	0	$0.00		$0.00	$0.00	$0.00					
Existing Classroom (8-2T/4-3T)	1620	12	(2)32w T8 Lamps. 6" x 4' Fixture w/Elec. Ballast - 55w	660	$156.10	12	Existing to Remain	660	0	0	$0.00		$0.00	$0.00	$0.00					
Existing Classroom (8-2T/4-3T)	1620	12	(2)32w T8 Lamps. 6" x 4' Fixture w/Elec. Ballast - 55w	660	$156.10	12	Existing to Remain	660	0	0	$0.00		$0.00	$0.00	$0.00					
Existing Classroom (8-2T/4-3T)	1620	12	(2)32w T8 Lamps. 6" x 4' Fixture w/Elec. Ballast - 55w	660	$156.10	12	Existing to Remain	660	0	0	$0.00		$0.00	$0.00	$0.00					
Existing Classroom (8-2T/4-3T)	1620	12	(2)32w T8 Lamps. 6" x 4' Fixture w/Elec. Ballast - 55w	660	$156.10	12	Existing to Remain	660	0	0	$0.00		$0.00	$0.00	$0.00					
Existing Classroom (8-2T/4-3T)	1620	12	(2)32w T8 Lamps. 6" x 4' Fixture w/Elec. Ballast - 55w	660	$156.10	12	Existing to Remain	660	0	0	$0.00		$0.00	$0.00	$0.00					
Existing Classroom (8-2T/4-3T)	1620	12	(2)32w T8 Lamps. 6" x 4' Fixture w/Elec. Ballast - 55w	660	$156.10	12	Existing to Remain	660	0	0	$0.00		$0.00	$0.00	$0.00					
Existing Boys Room	300	2	(4)32w T8 Lamps. Recessed Fixture w/Elec. Ballast - 108w	216	$9.46	2	Existing to Remain	216	0	0	$0.00		$0.00	$0.00	$0.00					
Existing Girls Room	300	2	(4)32w T8 Lamps. Recessed Fixture w/Elec. Ballast - 108w	216	$9.46	2	Existing to Remain	216	0	0	$0.00		$0.00	$0.00	$0.00					
Janitor's Closet	400	1	(2)32w T8 Lamps. 1' x 4' Fixture w/Elec. Ballast - 55w	55	$3.21	1	Existing to Remain	55	0	0	$0.00		$0.00	$0.00	$0.00					
Corridor	1800	2	(3)32w T8 Lamps. 2' x 4' Fixture w/Elec. Ballast - 87w	174	$45.73	2	Existing to Remain	174	0	0	$0.00		$0.00	$0.00	$0.00					
Storage Room	400	3	(2)32w T8 Lamps. 1' x 4' Fixture w/Elec. Ballast - 55w	165	$9.64	3	Existing to Remain	165	0	0	$0.00		$0.00	$0.00	$0.00					
Existing MP Room	1200	12				12														
Existing Classroom	1620	19	(4)32w T8 Lamps. Recessed Fixture w/Elec. Ballast - 108w	2052	$485.34	19	Existing to Remain	2052	0	0	$0.00		$0.00	$0.00	$0.00					

	Existing Lt Fixtures					Proposed Lt Fixtures			Proposed Ltg Savings				Proposed Ltg Installation Cost			Proposed Ltg Control Annual Savings				
Fixture Location	**Usage, Hrs/Yr**	**Fixt Qty**	**Lighting Fixture Description**	**Total Watts - Location**	**Annual Energy Cost**	**Fixt Qty**	**Lighting Fixture Description**	**Total Watts - Location**	**Energy Savings, Watts**	**Energy Savings, kWh/Yr**	**Savings/Yr, $**	**Simple Payback, Yrs**	**Unit Cost, Installed**	**Total Cost, Installed**	**Rebate Estimate**	**Ltg Control Description**	***Energy Savings kWh/Yr**	**Savings/ Yr $**	****Unit Cost, Total**	**Simple Payback, Yrs**
Existing Classroom	1620	19	(4)32w T8 Lamps. Recessed Fixture w/Elec. Ballast - 108w	2052	$485.34	19	Existing to Remain	2052	0	0	$0.00		$0.00	$0.00	$0.00	Dual Technology Occupancy Sensor	332.4	$48.53	$ 55.00	1.1
CR Toilet	200	1	(1)32w T8 Lamps. 1' x 2' Wall Mounted Fixture - 25w	25	$0.73	1	Existing to Remain	25	0	0	$0.00		$0.00	$0.00	$0.00					
CR Toilet	200	1	(1)32w T8 Lamps. 1' x 2' Wall Mounted Fixture - 25w	25	$0.73	1	Existing to Remain	25	0	0	$0.00		$0.00	$0.00	$0.00					
Storage Room	500	1	(4)32w T8 Lamps. Recessed Fixture w/Elec. Ballast - 108w	108	$7.88	1	Existing to Remain	108	0	0	$0.00		$0.00	$0.00	$0.00					
Teacher's Toilet	300	1	(1)32w T8 Lamps. 1' x 2' Wall Mounted Fixture - 25w	25	$1.10	1	Existing to Remain	25	0	0	$0.00		$0.00	$0.00	$0.00					
Girls Toilet - F-4T	300	3	(4)32w T8 Lamps. Recessed Fixture w/Elec. Ballast - 108w	324	$14.19	3	Existing to Remain	324	0	0	$0.00		$0.00	$0.00	$0.00					
Girls Toilet - P-2T	300	1	(2)T8 "U" Lamps. 2' x 2' Surface Fixture w/Elec. Ballast - 55w	55	$2.41	1	Existing to Remain	55	0	0	$0.00		$0.00	$0.00	$0.00					
Girls Toilet - F-4T	300	3	(4)32w T8 Lamps. Recessed Fixture w/Elec. Ballast - 108w	324	$14.19	3	Existing to Remain	324	0	0	$0.00		$0.00	$0.00	$0.00					
Girls Toilet - P-2T	300	1	(2)T8 "U" Lamps. 2' x 2' Surface Fixture w/Elec. Ballast - 55w	55	$2.41	1	Existing to Remain	55	0	0	$0.00		$0.00	$0.00	$0.00					
Existing Classroom	1620	20	(4)32w T8 Lamps. Recessed Fixture w/Elec. Ballast - 108w	2160	$510.88	20	Existing to Remain	2160	0	0	$0.00		$0.00	$0.00	$0.00					
Corridor	1800	12	(2)32w T8 Lamps. 2' x 4' Fixture w/Elec. Ballast - 108w	1296	$340.59	12	Existing to Remain	1296	0	0	$0.00		$0.00	$0.00	$0.00					
Small Group Instruction	1400	4	(3)32w T8 Lamps. 2' x 4' Fixture w/Elec. Ballast - 87w	348	$71.13	4	Existing to Remain	348	0	0	$0.00		$0.00	$0.00	$0.00	Dual Technology Occupancy Sensor	48.7	$7.11	$ 55.00	7.7
Kindergarten	1400	14	(3)32w T8 Lamps. 2' x 4' Fixture w/Elec. Ballast - 87w	1218	$248.96	14	Existing to Remain	1218	0	0	$0.00		$0.00	$0.00	$0.00					
Toilet Room	300	1	(2)32w T8 Lamps. 1' x 4' Fixture w/Elec. Ballast - 55w	55	$2.41	1	Existing to Remain	55	0	0	$0.00		$0.00	$0.00	$0.00					
Toilet Room	300	1	(2)32w T8 Lamps. 1' x 4' Fixture w/Elec. Ballast - 55w	55	$2.41	1	Existing to Remain	55	0	0	$0.00		$0.00	$0.00	$0.00					
Kindergarten	1400	14	(3)32w T8 Lamps. 2' x 4' Fixture w/Elec. Ballast - 87w	1218	$248.96	14	Existing to Remain	1218	0	0	$0.00		$0.00	$0.00	$0.00					
Corridor	1800	5	(2)32w T8 Lamps. 2' x 4' Fixture w/Elec. Ballast - 108w	540	$141.91	5	Existing to Remain	540	0	0	$0.00		$0.00	$0.00	$0.00					
Media Center	1700	41	(2)32w T8 Lamps. Pendant Fixture w/Elec. Ballast - 55w	2255	$559.69	41	Existing to Remain	2255	0	0	$0.00		$0.00	$0.00	$0.00	Dual Technology Occupancy Sensor	383.4	$55.97	$ 55.00	1.0
Storage Room	500	1	(2)32w T8 Lamps. 1' x 4' Fixture w/Elec. Ballast - 55w	55	$4.02	1	Existing to Remain	55	0	0	$0.00		$0.00	$0.00	$0.00					
Work Room	1200	2	(2)32w T8 Lamps. 2' x 4' Fixture w/Elec. Ballast - 108w	216	$37.84	2	Existing to Remain	216	0	0	$0.00		$0.00	$0.00	$0.00					
Office	1800	2	(3)32w T8 Lamps. 2' x 4' Fixture w/Elec. Ballast - 87w	174	$45.73	2	Existing to Remain	174	0	0	$0.00		$0.00	$0.00	$0.00					
Classroom	1620	12	(3)32w T8 Lamps. 2' x 4' Fixture w/Elec. Ballast - 87w	1044	$246.93	12	Existing to Remain	1044	0	0	$0.00		$0.00	$0.00	$0.00					
Classroom	1620	9	(3)32w T8 Lamps. 2' x 4' Fixture w/Elec. Ballast - 87w	783	$185.20	9	Existing to Remain	783	0	0	$0.00		$0.00	$0.00	$0.00					

	Existing Lt Fixtures					Proposed Lt Fixtures			Proposed Ltg Savings				Proposed Ltg Installation Cost			Proposed Ltg Control Annual Savings				
Fixture Location	**Usage, Hrs/Yr**	**Fixt Qty**	**Lighting Fixture Description**	**Total Watts - Location**	**Annual Energy Cost**	**Fixt Qty**	**Lighting Fixture Description**	**Total Watts - Location**	**Energy Savings, Watts**	**Energy Savings, kWh/Yr**	**Savings/Yr, $**	**Simple Payback, Yrs**	**Unit Cost, Installed**	**Total Cost, Installed**	**Rebate Estimate**	**Ltg Control Description**	***Energy Savings kWh/Yr**	**Savings/ Yr $**	****Unit Cost, Total**	**Simple Payback, Yrs**
Classroom	1620	9	(3)32w T8 Lamps. 2' x 4' Fixture w/Elec. Ballast - 87w	783	$185.20	9	Existing to Remain	783	0	0	$0.00		$0.00	$0.00	$0.00	Dual Technology Occupancy Sensor	126.8	$18.52	$ 55.00	3.0
Corridor	1800	3	(2) 26w CF Quad-Tube Lamps. Downlight Fixture - 52w	156	$41.00	3	Existing to Remain	156	0	0	$0.00		$0.00	$0.00	$0.00					
Corridor	1800	10	(2)32w T8 Lamps. 2' x 4' Fixture w/Elec. Ballast - 108w	1080	$283.82	10	Existing to Remain	1080	0	0	$0.00		$0.00	$0.00	$0.00					
Corridor	1800	3	(2)32w T8 Lamps. 2' x 4' Fixture w/Elec. Ballast - 108w	324	$85.15	3	Existing to Remain	324	0	0	$0.00		$0.00	$0.00	$0.00					
Vice Principal's Office	1600	2	(3)32w T8 Lamps. 2' x 4' Fixture w/Elec. Ballast - 87w	174	$40.65	2	Existing to Remain	174	0	0	$0.00		$0.00	$0.00	$0.00					
IDF Room	1400	1	(2)32w T8 Lamps. 1' x 4' Fixture w/Elec. Ballast - 55w	55	$11.24	1	Existing to Remain	55	0	0	$0.00		$0.00	$0.00	$0.00					
Classroom	1620	12	(3)32w T8 Lamps. 2' x 4' Fixture w/Elec. Ballast - 87w	1044	$246.93	12	Existing to Remain	1044	0	0	$0.00		$0.00	$0.00	$0.00	Dual Technology Occupancy Sensor	169.1	$24.69	$ 55.00	2.2
Small Group Instruction	1400	3	(3)32w T8 Lamps. 2' x 4' Fixture w/Elec. Ballast - 87w	261	$53.35	3	Existing to Remain	261	0	0	$0.00		$0.00	$0.00	$0.00					
Small Group Instruction	1400	3	(3)32w T8 Lamps. 2' x 4' Fixture w/Elec. Ballast - 87w	261	$53.35	3	Existing to Remain	261	0	0	$0.00		$0.00	$0.00	$0.00	Dual Technology Occupancy Sensor	36.5	$5.33	$ 55.00	10.3
Small Group Instruction	1400	3	(3)32w T8 Lamps. 2' x 4' Fixture w/Elec. Ballast - 87w	261	$53.35	3	Existing to Remain	261	0	0	$0.00		$0.00	$0.00	$0.00					
Kitchen	900	5	(3)32w T8 Lamps. 2' x 4' Fixture w/Elec. Ballast - 87w	435	$57.16	5	Existing to Remain	435	0	0	$0.00		$0.00	$0.00	$0.00	Dual Technology Occupancy Sensor	39.2	$5.72	$ 55.00	9.6
Storage Room	500	2	(2)32w T8 Lamps. 1' x 4' Fixture w/Elec. Ballast - 55w	110	$8.03	2	Existing to Remain	110	0	0	$0.00		$0.00	$0.00	$0.00					
Toilet Room	300	1	(2)32w T8 Lamps. 1' x 4' Fixture w/Elec. Ballast - 55w	55	$2.41	1	Existing to Remain	55	0	0	$0.00		$0.00	$0.00	$0.00					
Mechanical Room	300	1	(2)32w T8 Lamps. 1' x 4' Fixture w/Elec. Ballast - 55w	55	$2.41	1	Existing to Remain	55	0	0	$0.00		$0.00	$0.00	$0.00					
Storage Room	500	3	(2)32w T8 Lamps. 1' x 4' Fixture w/Elec. Ballast - 55w	165	$12.05	3	Existing to Remain	165	0	0	$0.00		$0.00	$0.00	$0.00					
Cafeteria	900	40	(2)32w T8 Lamps. 2' x 4' Fixture w/Elec. Ballast - 108w	4320	$567.65	40	Existing to Remain	4320	0	0	$0.00		$0.00	$0.00	$0.00					
Music Classroom	1200	16	(3)32w T8 Lamps. 2' x 4' Fixture w/Elec. Ballast - 87w	1392	$243.88	16	Existing to Remain	1392	0	0	$0.00		$0.00	$0.00	$0.00	Dual Technology Occupancy Sensor	167.0	$24.39	$ 55.00	2.3
Storage Room	500	1	(2)32w T8 Lamps. 1' x 4' Fixture w/Elec. Ballast - 55w	55	$4.02	1	Existing to Remain	55	0	0	$0.00		$0.00	$0.00	$0.00					
Practice Room	400	1	(2)32w T8 Lamps. 1' x 4' Fixture w/Elec. Ballast - 55w	55	$3.21	1	Existing to Remain	55	0	0	$0.00		$0.00	$0.00	$0.00					
Music Lobby	600	6	(2) 26w CF Quad-Tube Lamps. Downlight Fixture - 52w	312	$27.33	6	Existing to Remain	312	0	0	$0.00		$0.00	$0.00	$0.00					
First Floor Summary		**592**		**46162**	**$9,772**	**592**		**46162**	**0**	**0**	**$0**			**$0**	**$0**		**2458**	**$359**	**$990**	**2.8**

COMMENTS:

*Based on ASHRAE Standard 90.1-2004, Appendix G.

**Occupancy Sensor unit cost includes a $20 NJ Smart Start incentive per unit.

Project Name: Monmouth Junction Elementary School
Location: Monmouth Junction, NJ
Description: Photovoltaic System 95% Financing - 20 year

Simple Payback Analysis

	Photovoltaic System 95% Financing - 20 year
Total Construction Cost	$1,457,280
Annual kWh Production	252,684
Annual Energy Cost Reduction	$36,892
Annual SREC Revenue	$88,439
First Cost Premium	**$1,457,280**
Simple Payback:	**11.63** Years

Life Cycle Cost Analysis

Analysis Period (years):	25	Financing %:	95%
Financing Term (mths):	240	Maintenance Escalation Rate:	3.0%
Average Energy Cost ($/kWh)	**$0.146**	Energy Cost Escalation Rate:	3.0%
Financing Rate:	7.00%	SREC Value ($/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	$72,864	0	0	0	$0	0	0	(72,864)	0
1	$0	252,684	$36,892	$0	$88,439	$95,866	$32,935	($3,469)	($76,333)
2	$0	251,420	$37,999	$0	$87,997	$93,485	$35,315	($2,805)	($79,138)
3	$0	250,163	$39,139	$0	$87,557	$90,932	$37,868	($2,105)	($81,243)
4	$0	248,912	$40,313	$0	$87,119	$88,194	$40,606	($1,368)	($82,611)
5	$0	247,668	$41,522	$2,551	$86,684	$85,259	$43,541	($3,146)	($85,757)
6	$0	246,429	$42,768	$2,538	$86,250	$82,111	$46,689	($2,321)	($88,077)
7	$0	245,197	$44,051	$2,526	$85,819	$78,736	$50,064	($1,456)	($89,533)
8	$0	243,971	$45,372	$2,513	$85,390	$75,117	$53,683	($551)	($90,084)
9	$0	242,751	$46,733	$2,500	$84,963	$71,236	$57,564	$396	($89,689)
10	$0	241,538	$48,135	$2,488	$84,538	$67,075	$61,725	$1,385	($88,303)
11	$0	240,330	$49,580	$2,475	$84,115	$62,613	$66,187	$2,419	($85,884)
12	$0	239,128	$51,067	$2,463	$83,695	$57,828	$70,972	$3,498	($82,386)
13	$0	237,933	$52,599	$2,451	$83,276	$52,698	$76,103	$4,624	($77,761)
14	$0	236,743	$54,177	$2,438	$82,860	$47,196	$81,604	$5,798	($71,963)
15	$0	235,559	$55,802	$2,426	$82,446	$41,297	$87,503	$7,021	($64,942)
16	$0	234,381	$57,476	$2,414	$82,034	$34,972	$93,829	$8,295	($56,647)
17	$0	233,210	$59,201	$2,402	$81,623	$28,189	$100,612	$9,621	($47,025)
18	$0	232,044	$60,977	$2,390	$81,215	$20,915	$107,885	$11,001	($36,024)
19	$0	230,883	$62,806	$2,378	$80,809	$13,116	$115,684	$12,437	($23,587)
20	$0	229,729	$64,690	$2,366	$80,405	$4,754	$124,047	$13,929	($9,659)
21	$0	228,580	$66,631	$2,354	$80,003	$4,030	$114,037	$26,212	$16,554
22	$0	227,437	$68,630	$2,343	$79,603	$2,758	$93,842	$49,290	$65,843
23	$0	226,300	$70,689	$2,331	$79,205	$0	$0	$147,563	$213,406
24	$0	225,169	$72,809	$2,319	$78,809	$0	$0	$149,299	$362,705
25	$0	224,043	$74,993	$2,308	$78,415	$0	$0	$151,101	$513,806
	Totals:	4,820,674	$991,297	$39,320	$1,687,236	$1,191,591	$1,384,416	$1,592,295	($234,333)
				Net Present Value (NPV)			**$40,207**		
				Internal Rate of Return (IRR)			**9.2%**		

Project Name: **Monmouth Junction Elementary School**
Location: **Monmouth Junction, NJ**
Description: **Photovoltaic System - Direct Purchase**

Simple Payback Analysis

	Photovoltaic System - Direct Purchase
Total Construction Cost	$1,457,280
Annual kWh Production	252,684
Annual Energy Cost Reduction	$36,892
Annual SREC Revenue	$88,439
First Cost Premium	**$1,457,280**
Simple Payback:	**11.63** **Years**

Life Cycle Cost Analysis

Analysis Period (years):	25	Financing %:	0%
Financing Term (mths):	0	Maintenance Escalation Rate:	3.0%
Average Energy Cost ($/kWh)	**$0.146**	Energy Cost Escalation Rate:	3.0%
Financing Rate:	0.00%	SREC Value ($/kWh)	$0.350

Period	Additional Cash Outlay	Energy kWh Production	Energy Cost Savings	Additional Maint Costs	SREC Revenue	Net Cash Flow	Cumulative Cash Flow
0	$1,457,280	0	0	0	$0	(1,457,280)	0
1	$0	252,684	$36,892	$0	$88,439	$125,331	($1,331,949)
2	$0	251,420	$37,999	$0	$87,997	$125,996	($1,205,953)
3	$0	250,163	$39,139	$0	$87,557	$126,696	($1,079,258)
4	$0	248,912	$40,313	$0	$87,119	$127,432	($951,826)
5	$0	247,668	$41,522	$2,551	$86,684	$125,655	($826,171)
6	$0	246,429	$42,768	$2,538	$86,250	$126,480	($699,691)
7	$0	245,197	$44,051	$2,526	$85,819	$127,344	($572,347)
8	$0	243,971	$45,372	$2,513	$85,390	$128,249	($444,098)
9	$0	242,751	$46,733	$2,500	$84,963	$129,196	($314,902)
10	$0	241,538	$48,135	$2,488	$84,538	$130,186	($184,716)
11	$0	240,330	$49,580	$2,475	$84,115	$131,220	($53,496)
12	$0	239,128	$51,067	$2,463	$83,695	$132,299	$78,803
13	$0	237,933	$52,599	$2,451	$83,276	$133,425	$212,227
14	$0	236,743	$54,177	$2,438	$82,860	$134,598	$346,826
15	$0	235,559	$55,802	$2,426	$82,446	$135,822	$482,647
16	$0	234,381	$57,476	$2,414	$82,034	$137,096	$619,743
17	$0	233,210	$59,201	$2,402	$81,623	$138,422	$758,165
18	$0	232,044	$60,977	$2,390	$81,215	$139,802	$897,966
19	$0	230,883	$62,806	$2,378	$80,809	$141,237	$1,039,203
20	$0	229,729	$64,690	$2,366	$80,405	$142,729	$1,181,932
21	$1	228,580	$66,631	$2,354	$80,003	$144,279	$1,326,212
22	$2	227,437	$68,630	$2,343	$79,603	$145,890	$1,472,102
23	$3	226,300	$70,689	$2,331	$79,205	$147,563	$1,619,664
24	$4	225,169	$72,809	$2,319	$78,809	$149,299	$1,768,963
25	$5	224,043	$74,993	$2,308	$78,415	$151,101	$1,920,064
	Totals:	4,820,674	$991,297	$39,320	$1,687,236	$3,377,344	$2,639,212
				Net Present Value (NPV)		**$1,920,089**	
				Internal Rate of Return (IRR)		**7.6%**	

Building	Usable Roof Area (sq ft)	Panel	Qty	Panel Sq Ft	Panel Total Sq Ft	Total KW	Total Annual kWh	Panel Weight (33 lbs)	W/SQFT
Monmouth Junction Elementary	13,000	Sunpower SPR230	704	14.7	10,352	161.92	252,684	23,232	15.64

.= Proposed PV Layout

Roof Area	13,000	80%	10,400	S.F.	704 Panels	162 Kw

Notes:

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

ENERGY CONSUMPTION SUMMARY

By CAE

	Elect Cons. (kWh)	Gas Cons. (kBtu)	% of Total Building Energy	Total Building Energy (kBtu/yr)	Total Source Energy* (kBtu/yr)
Existing System					
Primary heating					
Primary heating	37,935	2,204,337	50.2 %	2,333,808	2,708,808
Other Htg Accessories	12,176		0.9 %	41,556	124,680
Heating Subtotal	**50,111**	**2,204,337**	**51.1 %**	**2,375,364**	**2,833,489**
Primary cooling					
Cooling Compressor	83,628		6.1 %	285,422	856,351
Tower/Cond Fans	8,987		0.7 %	30,671	92,024
Condenser Pump			0.0 %	0	0
Other Clg Accessories	1,683		0.1 %	5,745	17,237
Cooling Subtotal....	**94,298**		**6.9 %**	**321,838**	**965,611**
Auxiliary					
Supply Fans	110,034		8.1 %	375,546	1,126,752
Pumps	4,731		0.4 %	16,146	48,442
Stand-alone Base Utilities	4,745		0.4 %	16,195	48,589
Aux Subtotal....	119,510		8.8 %	407,887	1,223,783
Lighting					
Lighting	298,377		21.9 %	1,018,361	3,055,388
Receptacle					
Receptacles	154,788		11.4 %	528,292	1,585,033
Cogeneration					
Cogeneration			0.0 %	0	0
Totals					
Totals**	**717,083**	**2,204,337**	**100.0 %**	**4,651,741**	**9,663,303**

* Note: Resource Utilization factors are included in the Total Source Energy value.
** Note: This report can display a maximum of 7 utilities. If additional utilities are used, they will be included in the total.

ENERGY CONSUMPTION SUMMARY

By CAE

	Elect Cons. (kWh)	Gas Cons. (kBtu)	% of Total Building Energy	Total Building Energy (kBtu/yr)	Total Source Energy* (kBtu/yr)
ECM # 1 – VFD's Pumps					
Primary heating					
Primary heating	37,935	2,204,337	50.3 %	2,333,808	2,708,808
Other Htg Accessories	12,176		0.9 %	41,556	124,680
Heating Subtotal	**50,111**	**2,204,337**	**51.2 %**	**2,375,364**	**2,833,489**
Primary cooling					
Cooling Compressor	83,628		6.2 %	285,422	856,351
Tower/Cond Fans	8,987		0.7 %	30,671	92,024
Condenser Pump			0.0 %	0	0
Other Clg Accessories	1,683		0.1 %	5,745	17,237
Cooling Subtotal....	**94,298**		**6.9 %**	**321,838**	**965,611**
Auxiliary					
Supply Fans	110,034		8.1 %	375,546	1,126,752
Pumps	949		0.1 %	3,238	9,714
Stand-alone Base Utilities	4,745		0.4 %	16,195	48,589
Aux Subtotal....	115,728		8.5 %	394,979	1,185,054
Lighting					
Lighting	298,377		22.0 %	1,018,361	3,055,388
Receptacle					
Receptacles	154,788		11.4 %	528,292	1,585,033
Cogeneration					
Cogeneration			0.0 %	0	0
Totals					
Totals**	**713,301**	**2,204,337**	**100.0 %**	**4,638,833**	**9,624,575**

* Note: Resource Utilization factors are included in the Total Source Energy value.
** Note: This report can display a maximum of 7 utilities. If additional utilities are used, they will be included in the total.