ENERGY AUDIT – FINAL REPORT

RUTHERFORD BOARD OF EDUCATION
PIERREPONT SCHOOL
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RUTHERFORD, NJ 07070
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CEG PROJECT NO. 9C09074

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I. EXECUTIVE SUMMARY

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

Rutherford Board of Education
Pierrepont School
70 E. Pierrepont Avenue
Rutherford, NJ 07070

Municipal Contact Person: *Robert R. Brown*

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:

Electricity	$ 51,314
Natural Gas	$ 68,655
Total	$ 119,969

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
Financial Summary Table

ENERGY CONSERVATION MEASURES (ECM's)					
ECM NO.	**DESCRIPTION**	**NET INSTALLATION COST[A]**	**ANNUAL SAVINGS[B]**	**SIMPLE PAYBACK (Yrs)**	**SIMPLE LIFETIME ROI**
ECM #1	Install Thermostatic Steam Radiator Valves	$62,000	$8,000	7.8	45.2%
ECM #2	Replace Existing Cleaver Brooks 1973 Steam Boiler	$159,979	$16,848	9.5	100.8%
ECM #3	Convert Pneumatic Controls to DDC	$297,800	$14,997	19.9	-39.6%
ECM #4	Lighting Upgrades	$3,270	$484	6.8	122.2%

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 Summary Table

ENERGY CONSERVATION MEASURES (ECM's)				
ECM NO.	**DESCRIPTION**	**ANNUAL UTILITY REDUCTION**		
		ELECTRIC DEMAND (KW)	**ELECTRIC CONSUMPTION (KWH)**	**NATURAL GAS (THERMS)**
ECM #1	Install Thermostatic Steam Radiator Valves	0.0	0.0	4095.0
ECM #2	Replace Existing Cleaver Brooks 1973 Steam Boiler	0.0	0.0	7648.0
ECM #3	Convert Pneumatic Controls to DDC	0.0	76904.0	3570.0
ECM #4	Lighting Upgrades	0.0	3105.0	0.0

Concord Engineering Group (CEG) strongly recommends the implementation of all ECM's that provide a calculated simple payback at or under ten (10) years. The potential energy and cost savings from these ECM's are too great to pass upon. The following Energy Conservation Measures are recommended for the Pierrepont School:

- **ECM #1:** Install Thermostatic Radiator Valves
- **ECM #2:** Install New 150 BHP High Efficiency Steam Boiler
- **ECM #4:** Lighting Upgrades

II. INTRODUCTION

This comprehensive energy audit covers the 72,450 square foot Pierrepont School facility that includes boiler room, maintenance shops/office, classrooms, a cafetorium/multi-purpose room, music rooms, gymnasium, library/media center, kitchen pantry, art room, administrative offices, locker rooms, faculty lounge, etc. In addition, there are three (3) temporary, portable, self-contained learning units.

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

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

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

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

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

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

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

III. METHOD OF ANALYSIS

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

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

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

Cost savings are calculated based on the actual historical energy costs for the facility. Installation costs include labor and equipment to estimate the full up-front investment required to implement a change. Costs are derived from Means Cost Data, industry publications, and local contractors and equipment suppliers. The NJ Smart Start Building® program incentives savings (where applicable) are included for the appropriate ECM's and subtracted from the installed cost. Maintenance savings are calculated where applicable and added to the energy savings for each ECM. The life-time for each ECM is estimated based on the typical life of the equipment being replaced or altered. The costs and savings are applied and a simple payback, simple lifetime savings, and simple return on investment are calculated. See below for calculation methods:

ECM Calculation Equations:

$$Simple\ Payback = \left(\frac{Net\ Cost}{Yearly\ Savings} \right)$$

$$Simple\ Lifetime\ Savings = \left(Yearly\ Savings \times ECM\ Lifetime \right)$$

$$Simple\ Lifetime\ ROI = \frac{(Simple\ Lifetime\ Savings - Net\ Cost)}{Net\ Cost}$$

$$Lifetime\ Ma\,\mathrm{int}\,enance\ Savings = \left(Yearly\ Ma\,\mathrm{int}\,enance\ Savings \times ECM\ Lifetime \right)$$

$$Internal\ Rate\ of\ \mathrm{Re}\,turn = \sum_{n=0}^{N} \left(\frac{Cash\ Flow\ of\ Period}{(1 + IRR)^n} \right)$$

$$Net\ \mathrm{Pr}\,esent\ Value = \sum_{n=0}^{N} \left(\frac{Cash\ Flow\ of\ Period}{(1 + DR)^n} \right)$$

Net Present Value calculations based on Interest Rate of 3%.

IV. HISTORIC ENERGY CONSUMPTION/COST

A. Energy Usage / Tariffs

Table 3 and Figure 1 represent the electrical usage for the surveyed facility from January-08 to December-08. The School District was able to gather the information for the above-reference period for our review and analysis. During 2008, Public Service Electric & Gas (PSE&G) provided electricity to the facility under their General Lighting and Power Service (GLPS) rate. 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.

Table 4 and Figure 2 show the natural gas energy usage for the surveyed facility from January, 08 to December, 08. Hess Corporation supplies the natural gas from the wellhead to the PSE&G™ pipelines. PSE&G™ charges a rate per therm for delivery of the natural gas via their pipelines to the burners.

Based on the utility data provide by the Owner, the average cost for utilities at this facility is as follows:

Description	Average
Electricity	15.6¢ / kWh
Natural Gas	$1.68 Therm

Table 3
Electricity Billing Data

ELECTRIC USAGE SUMMARY

Utility Provider: PSE&G
Rate: General Lighting and Power (GLP)
Meter No: 728012635, 1345634
Customer ID No: -
Third Party Utility -
TPS Meter / Acct No: 21 102 491 10

MONTH OF USE	CONSUMPTION KWH	DEMAND	TOTAL BILL
Jan-08	32,360	103.0	$4,079
Feb-08	33,770	109.0	$3,843
Mar-08	32,444	103.0	$4,203
Apr-08	32,280	100.0	$4,081
May-08	20,618	98.0	$2,579
Jun-08	24,500	111.0	$4,425
Jul-08	23,836	120.0	$5,230
Aug-08	24,316	80.0	$4,927
Sep-08	19,216	102.0	$4,517
Oct-08	27,988	122.0	$4,226
Nov-08	25,314	101.0	$4,166
Dec-08	32,322	99.0	$5,037
Totals	**328,964**	**122.0 Max**	**$51,313**

AVERAGE DEMAND **104.0 KW average**

AVERAGE RATE **$0.156** **$/kWh**

Figure 1
Electricity Usage Profile

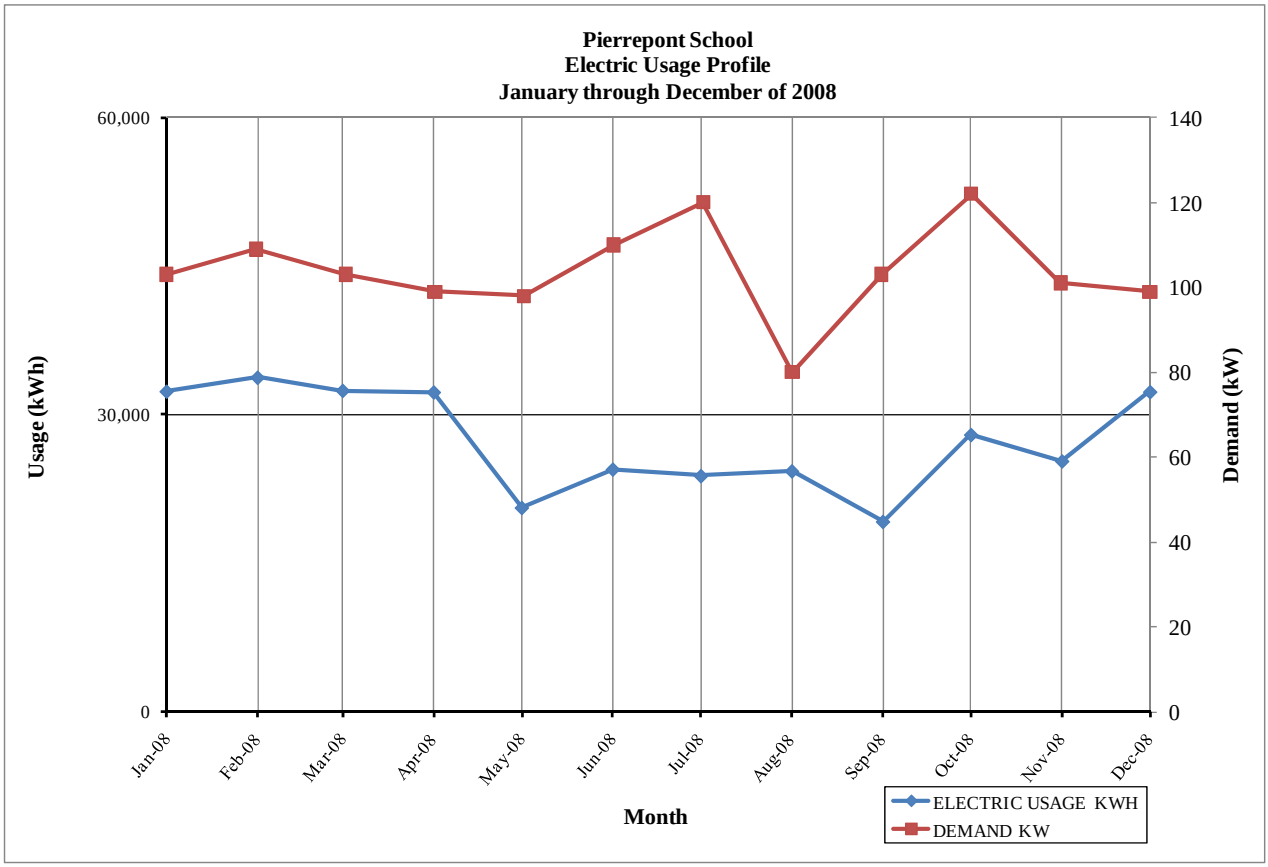
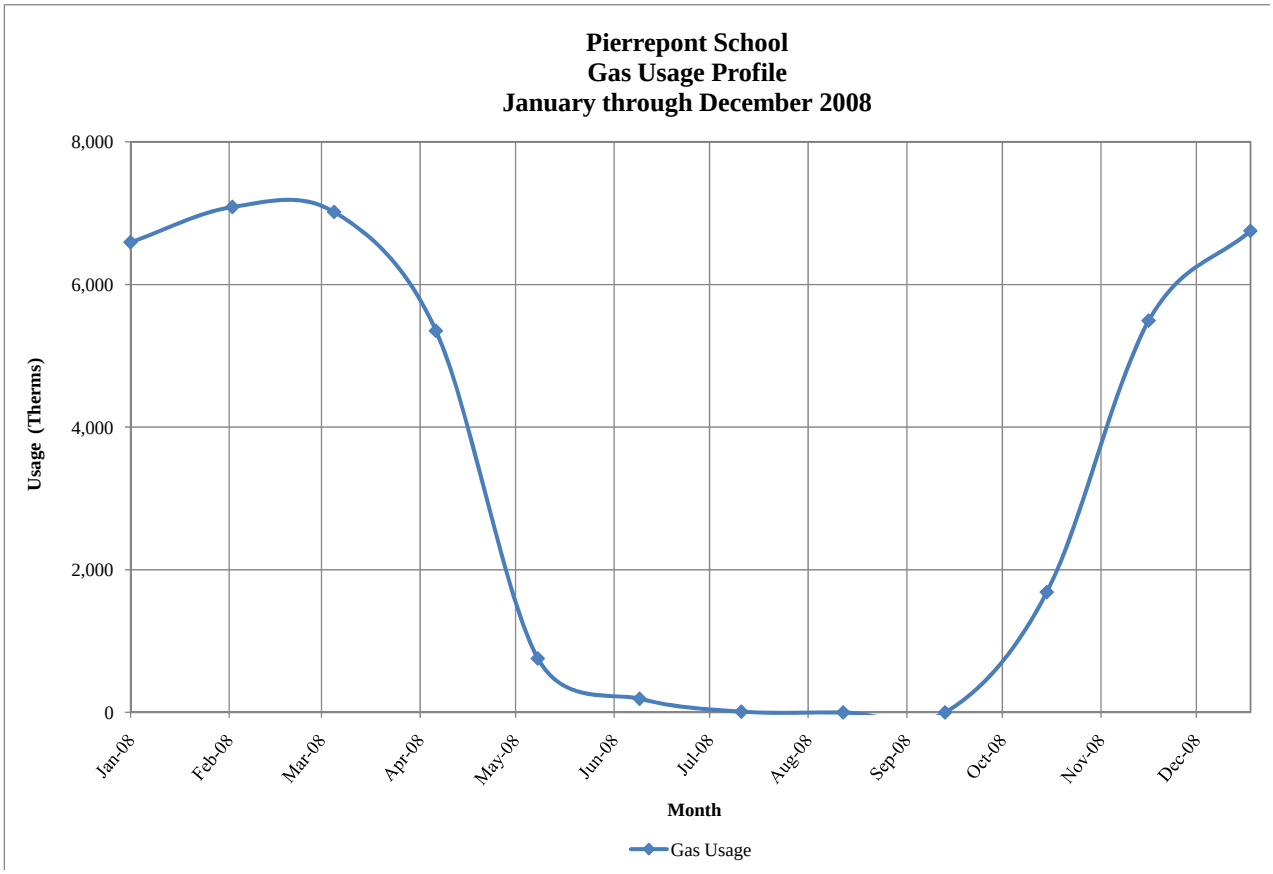


Table 4
Natural Gas Billing Data

NATURAL GAS USAGE SUMMARY		
Utility Provider:	PSE&G	
Rate:	GSGH	
Meter No:	2303806	
Point of Delivery ID:	-	
Third Party Utility Provider:	-	
TPS Meter No:	-	
MONTH OF USE	**CONSUMPTION (THERMS)**	**TOTAL BILL**
Jan-08	6,593.97	$11,778.00
Feb-08	7,088.57	$12,559.00
Mar-08	7,017.80	$12,149.00
Apr-08	5,351.07	$8,151.00
May-08	756.83	$1,246.00
Jun-08	191.69	$387.00
Jul-08	10.66	$110.00
Aug-08	0.00	$92.00
Sep-08	0.00	$92.00
Oct-08	1,687.47	$3,281.00
Nov-08	5,494.93	$8,520.00
Dec-08	6,754.00	$10,291.00
TOTALS	**40,946.99**	**$68,656.00**
AVERAGE RATE:	**$1.677**	**$/THERM**

Figure 2
Natural Gas Usage Profile



B. Energy Use Index (EUI)

Energy Use Index (EUI) is a measure of a building's annual energy utilization per square foot of building. This calculation is completed by converting all utility usage consumed by a building for one year, to British Thermal Units (BTU) and dividing this number by the building square footage. EUI is a good measure of a building's energy use and is utilized regularly for comparison of energy performance for similar building types. The Oak Ridge National Laboratory (ORNL) Buildings Technology Center under a contract with the U.S. Department of Energy maintains a Benchmarking Building Energy Performance Program. The ORNL website determines how a building's energy use compares with similar facilities throughout the U.S. and in a specific region or state.

Source use differs from site usage when comparing a building's energy consumption with the national average. Site energy use is the energy consumed by the building at the building site only. Source energy use includes the site energy use as well as all of the losses to create and distribute the energy to the building. Source energy represents the total amount of raw fuel that is required to operate the building. It incorporates all transmission, delivery, and production losses, which allows for a complete assessment of energy efficiency in a building. The type of utility purchased has a substantial impact on the source energy use of a building. The EPA has determined that source energy is the most comparable unit for evaluation purposes and overall global impact. Both the site and source EUI ratings for the building are provided to understand and compare the differences in energy use.

The site and source EUI for this facility is calculated as follows:

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

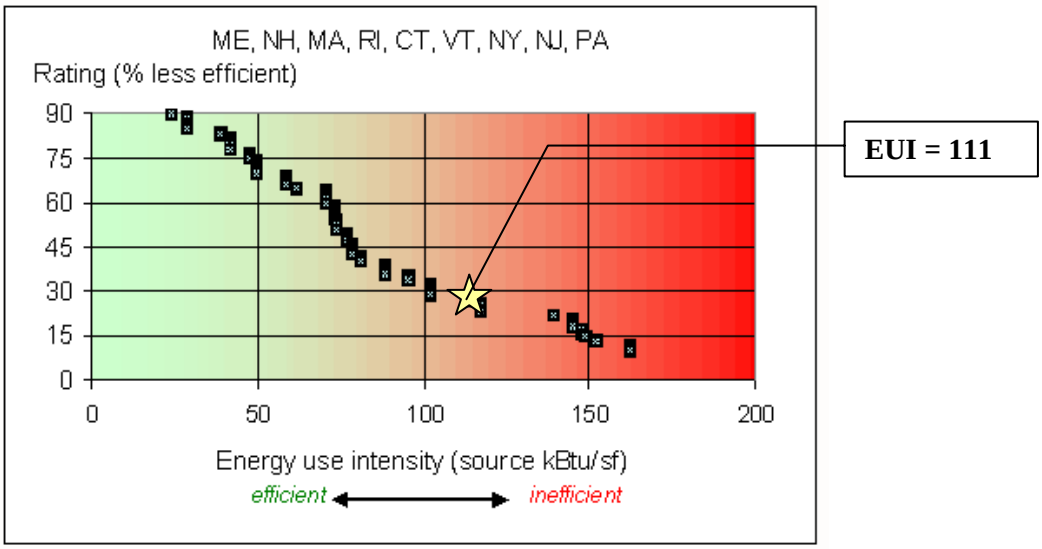
$$Building\ \ Source\ EUI = \frac{(Electric\ Usage\ in\ kBtu\ \ X\ \ SS\ \ Ratio + Gas\ Usage\ in\ kBtu\ \ X\ \ SS\ \ Ratio)}{Building\ \ Square\ \ Footage}$$

Table 5
Facility Energy Use Index (EUI) Calculation

ENERGY USE INTENSITY CALCULATION						
ENERGY TYPE	BUILDING USE			SITE ENERGY	SITE-SOURCE RATIO	SOURCE ENERGY
	kWh	Therms	Gallons	kBtu		kBtu
ELECTRIC	328964.0			1,123,083	3.340	3,751,098
NATURAL GAS		40947.0		4,094,699	1.047	4,287,149
FUEL OIL			0.0	0	1.010	0
PROPANE			0.0	0	1.010	0
TOTAL				5,217,782		8,038,247
*Site - Source Ratio data is provided by the Energy Star Performance Rating Methodology for Incorporating Source Energy Use document issued Dec 2007.						
BUILDING AREA		72,450	SQUARE FEET			
BUILDING SITE EUI		*72.02*	kBtu/SF/YR			
BUILDING SOURCE EUI		*110.95*	kBtu/SF/YR			

Figure 3 below depicts a national EUI grading for the source use of *Schools*.

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 priorities 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 municipality to access and monitoring the facility's yearly energy usage as it compares to facilities of similar type. The login page for the account can be accessed at the following web address; the username and password are also listed below:

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

User Name: rutherfordtwp
Password: lgeaceg2009

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

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

Table 6
ENERGY STAR Performance Rating

ENERGY STAR PERFORMANCE RATING		
FACILITY DESCRIPTION	**ENERGY PERFORMANCE RATING**	**NATIONAL AVERAGE**
Pierrepont School	88	50

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

V. FACILITY DESCRIPTION

The 72,450 ft^2 Pierrepont School is comprised of classrooms, a multi-purpose room, music rooms, gymnasium, cafetorium/multi-purpose room, library/media center, kitchen pantry, art rooms, administrative offices, locker rooms, etc. In addition, there are three (3) temporary, portable, self-contained learning units.

The typical hours of operation for this facility are between 7:00 am and 5:00 pm for the classrooms, and 6:30 am and 6:00 pm for the aforementioned offices. The building was originally constructed in 1906, was renovated in 1927, and has not had a major renovation since 1981. The facility is brick and stone-walled with pitched slate roofs in most of the areas. Throughout the summer vacation months the building is occupied only by the maintenance crew and occasional summer camp attendees.

Heating System

The building utilizes a 1973 Cleaver Brooks Model CP800-150 gas-fired steam boiler for heating. The 150 BHP steam boiler operates at 15 PSI, with a maximum capacity (when new) of approximately 5,175 lbs/hr steam @ 212º F with an input of 6,277 MBTUH. The boiler is 36 years old and is beyond its expected service life as outlined in Chapter 36 of the 2007 ASHRAE Applications Handbook. Due to escalating owning and maintenance costs, this steam boiler should be replaced. The domestic series CMHD boiler feed units by ITT feed condensate and make-up water to the boilers utilizing two (2) pumps. Each classroom contains a unit ventilator that is equipped with a steam fin-tube radiator to heat the room. Pneumatic controls are responsible for keeping the room at the desired temperature.

Cooling System

The faculty lounge is cooled by a Trane Model # 2YCL3042A1096AA that is located on the roof. Several classrooms and the administrative offices are cooled via a variety of window unit air conditioners.

Exhaust System

Air is exhausted from the building through a plethora of roof-top exhaust fans manufactured by Penn Barry. The fans vary in size, horsepower, and model.

Domestic Hot Water

The domestic hot water heater is a new 2005 RHEEM gas-fired hot water heater with an input of 200,000 BTUH, 80% thermal efficiency, and 76-gallon capacity storage.

Lighting

The Pierrepont School underwent a lighting retrofit in 2007. All of the 2' and 4' fixtures have been fitted with super T-8 lamps that have a 28 Watt total fixture input. A detailed lighting survey can be found in **Appendix F**.

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 energy 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 manufactures date was not shown on the equipment's nameplate. The ASHRAE service life for the equipment along with the remaining useful life is also shown in the Appendix.

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

VII. ENERGY CONSERVATION MEASURES

ECM #1: Install Thermostatic Steam Radiator Valves

Description:

The Pierrepont School has steam unit ventilators on the perimeter of the 1st and 2nd floors. Due to the equipment age, old pneumatic/manual/thermostatic control valves, and the characteristics of steam, the rooms are often overheated and the teachers are forced to use the windows to control the heat further increasing energy costs. During our site survey, we counted a total of 62 existing valves that would be excellent candidates for replacement with these new valves.

This measure would install the newest generation of thermostatic radiator valves on the steam and hot water coils which would improve control of the heating in the older sections of the school. Thermostatic controls are self-contained, non-electric and are suitable for radiators, fin-tubes, baseboards or convector units. These new thermostatic valves have the capability of setting an upper limit to prevent overheating of the spaces. The valves include a remote sensor for accurately measuring the return air temperature for better heating control.

Energy Savings Calculations:

In our experience, we have seen a 10% to 15% reduction in energy use from installation of thermostatic radiator valves. The energy cost to heat this building (not including the portable classrooms and domestic hot water heater) is estimated to be approximately $40,000 per year in natural gas costs (based on the gas usage for 2008). Therefore, the annual energy cost savings would be approximately 15% of $40,000 or $6,000.

The basis of design is the ISTEC 2000 Series Thermostatic Radiator Valve or equal which has a total installation cost (including valve, sensor, calibration, piping changes, etc.) of $1,000 per unit. 62 existing valves x $1,000/unit = $62,000.

Energy Savings Summary:

ECM #1 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$62,000
NJ Smart Start Equipment Incentive ($):	$0
Net Installation Cost ($):	$62,000
Maintenance Savings ($/Yr):	$2,000
Energy Savings ($/Yr):	$6,000
Total Yearly Savings ($/Yr):	$8,000
Estimated ECM Lifetime (Yr):	15
Simple Payback	7.8
Simple Lifetime ROI	45.2%
Simple Lifetime Maintenance Savings	$30,000
Simple Lifetime Savings	$90,000
Internal Rate of Return (IRR)	10%
Net Present Value (NPV)	$33,503.48

ECM #2: Replace Existing Cleaver Brooks 1973 Steam Boiler

Description:

Various areas of the school are heated by a 1973, Cleaver Brooks Model CP-800-150 steam boiler that is rated (when new) at 5,175 lbs/hr steam @ 212º F. This steam boiler is beyond its expected service life as outlined in Chapter 36 of the 2007 ASHRAE Applications Handbook. Due to escalating owning and maintenance costs, this steam boiler should be replaced.

Note: Owner should have a Professional Engineer verify the steam heating loads for the existing building prior to moving forward with this ECM.

This measure would install a much more efficient, 150 HP Cleaver Brooks Model CB Steam Boiler with a 10:1 turndown, DDC controller, and more efficient burner. This steam boiler is rated at 5,175 lbs/hr steam @ 212º F with an input of 6,277 MBTUH of natural gas and a BTU output capacity of 5,021 MBTUH.

Energy Savings Calculations:

It is assumed that the existing steam boiler is approximately 65% efficient due to its age and condition. This 150 BHP, steam boiler can currently only operate with a 4:1 turndown ratio.
CEG recommends that the existing steam boiler be replaced by a 150 BHP, high-efficiency steam boiler. The natural gas to steam efficiency for a 150 BHP steam boiler with digital burner controls is approximately 84% over its operating range and with the advanced controls will have a 10:1 turndown ratio for better efficiency in the shoulder months.

Existing 150 BHP Steam Boiler:

Net Rated Capacity = 5,175 lbs/hr steam @ 212ºF

Estimated Fuel-to-Steam Efficiency = 65% as calculated at 15 psig operating pressure. Currently there is no metering of steam output, condensate return, or make-up water to verify actual base conditions of operation and efficiency.

Replacement 150 BHP High-Efficiency Steam Boiler:

Net Rated Capacity = 5,175 lbs/hr steam @ 212ºF

Fuel-to-Steam Efficiency = 84% (Cleaver Brooks performance data)

Operating Data:

Existing Steam Boiler Fuel Consumption = 33,810 Therms
(Based on gas billing data for 2008 and boiler performance)

Average Cost of Natural Gas = $1.68/Therm

Energy Savings = Old Boiler Energy Input * [(New Boiler Efficiency – Old Boiler Efficiency) / New Boiler Efficiency)]

Annual Energy Savings = 33,810 Therms x $\frac{(0.84-0.65)}{(0.84)}$ = = 7,648 Therms

Energy Cost Savings = Annual Energy Savings * $/Therm = 7,648 Therms * $1.68/Therm

= $12,848 / yr.

The total installed cost of a high-efficiency 150 BHP steam boiler including demolition & removal of existing steam boiler = $165,000 (budget equipment costs obtained from Cleaver Brooks). The salvage value of the removed boiler is expected to cover the cost of rigging sections of the old boiler out through the existing old boiler room. Allowance is made for piping, new insulation, and controls.

Note: Cost does not include removal of existing boiler insulation nor any piping/valve insulation removal.

The NJ SmartStart equipment incentive is $1 per MBH of capacity = $5,021. We have assumed a maintenance savings of $4,000 per year.

Energy Savings Summary:

ECM #2 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$165,000
NJ Smart Start Equipment Incentive ($):	$5,021
Net Installation Cost ($):	$159,979
Maintenance Savings ($/Yr):	$4,000
Energy Savings ($/Yr):	$12,848
Total Yearly Savings ($/Yr):	$16,848
Estimated ECM Lifetime (Yr):	25
Simple Payback	9.5
Simple Lifetime ROI	100.8%
Simple Lifetime Maintenance Savings	$100,000
Simple Lifetime Savings	$321,200
Internal Rate of Return (IRR)	9%
Net Present Value (NPV)	$133,397.71

ECM #3: Convert Pneumatic Controls to DDC

Description:

Throughout the building there are pneumatic manual wall thermostats for various HVAC units and local pneumatic controls with adjustable settings on the heating units. These indoor temperature controls are inaccurate due to temperature drift, age, cost of maintenance of pneumatics and not having been re-calibrated. These units also do not have night time setback features. In addition, the pneumatic controllers don't have the ability to maintain the temperature at setpoint under changing load conditions.

This energy conservation measure would replace the existing pneumatic temperature control system with a Direct Digital Control System. The Direct Digital Control System will consist of multiple controllers networked over an Ethernet system that will display data at a standard PC via a web browser to allow the School District remote control and monitoring of the HVAC equipment. The advantages of a DDC system include deleting the air compressor, air dryer, and controls along with the maintenance costs of pneumatic systems. With a DDC system, it is possible to develop historical records on the operating characteristics of a building; identifying trends which can lead to better performance.

Energy Savings Calculations:

Studies have shown that the installation of a full DDC system could save an estimated 10% of the total energy costs for this facility which is approximately $119,969.

Annual Savings = 10% x $119,969 = $11,997.

Assuming one-half of the total energy savings is natural gas and the other half is electric savings, this equates to 76,904 kWh and 3,570 Therms saved. We have also assumed a maintenance savings of $3,000 per year for the pneumatic devices.

The cost of a full DDC system with new field devices, thermostats, controllers, computer, software, engineering, etc. is approximately $4 per SF based on recent project cost data and a control contractor's budget pricing. For this facility, the estimated cost of a DDC system for the oldest sections of this facility is approximately $297,800 (based on 74,450 SF).

Energy Savings Summary:

ECM #3 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$297,800
NJ Smart Start Equipment Incentive ($):	$0
Net Installation Cost ($):	$297,800
Maintenance Savings ($/Yr):	$3,000
Energy Savings ($/Yr):	$11,997
Total Yearly Savings ($/Yr):	$14,997
Estimated ECM Lifetime (Yr):	15
Simple Payback	19.9
Simple Lifetime ROI	-39.6%
Simple Lifetime Maintenance Savings	$45,000
Simple Lifetime Savings	$179,955
Internal Rate of Return (IRR)	-3%
Net Present Value (NPV)	($118,766.79)

ECM #4: Lighting Upgrades

Description:

During the energy audit, CEG took light readings in the corridors and found many corridors with lighting levels over 50 footcandles. This level of lighting is not required for corridors. Also, several closets, mechanical rooms, etc still have incandescent lamps.

Energy Savings Calculations:

This ECM would replace the existing incandescent lamps with compact fluorescent lamp (CFL) equivalents and permanently delamp and add new reflectors to the corridor fixtures.

There are three (3) 60-Watt and one 100-Watt incandescent lamps in the facility. The 60-Watt lamps would be replaced with 18-Watt CFLs and the 100-Watt lamp with a 23-Watt CFL.

Annual energy cost savings = [3 x (60-18) + (100-23)] x 400 hours x $0.156/kWh = 81.2 kWh x $0.156/kWh = $12.66

There are also forty (40) T-8 light fixtures in the corridors that can be retrofitted from 4-lamp to 2-lamp with silver reflectors and still meet the minimum lighting levels for corridors required by the Department of Education.

Annual energy cost savings = 40 x (87-45) Watts x 1,800 hrs/year x $0.156/kWh = 3,024 kWh x $0.156/kWh = $471.74.

Total energy savings for all retrofits = 81 kWh + 3,024 kWh = 3,105 kWh

Total annual cost savings = $12.66 + $471.74 = $484.40

From the **Smart Start Incentive Appendix**, the retrofit of a T-8 fixture by permanent delamping and new reflectors is $20 per fixture. There are (40) T-8 fixtures in the corridors that are candidates for this ECM. Total incentive = 40 fixtures x $20/fixture = $800

The cost of the four (4) CFL units is $70. The cost to retrofit a 2’ x4’ 4-lamp fixture to a 2-lamp fixture with a silver reflector is $100/unit. 40 fixtures x $100/unit = $4,000

Total cost for all retrofits is $4,000 + $70 = $4,070

Energy Savings Summary:

ECM #4 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$4,070
NJ Smart Start Equipment Incentive ($):	$800
Net Installation Cost ($):	$3,270
Maintenance Savings ($/Yr):	$0
Energy Savings ($/Yr):	$484
Total Yearly Savings ($/Yr):	$484
Estimated ECM Lifetime (Yr):	15
Simple Payback	6.8
Simple Lifetime ROI	122.2%
Simple Lifetime Maintenance Savings	$0
Simple Lifetime Savings	$7,266
Internal Rate of Return (IRR)	12%
Net Present Value (NPV)	$2,512.74

VIII. RENEWABLE/DISTRIBUTED ENERGY MEASURES

Globally, renewable energy has become a priority affecting international and domestic energy policy. The State of New Jersey has taken a proactive approach, and has recently adopted in its Energy Master Plan a goal of 30% renewable energy by 2020. To help reach this goal New Jersey created the Office of Clean Energy under the direction of the Board of Public Utilities and instituted a Renewable Energy Incentive Program to provide additional funding to private and public entities for installing qualified renewable technologies. A renewable energy source can greatly reduce a building's operating expenses while producing clean environmentally friendly energy. CEG has assessed the feasibility of installing renewable energy measures (REM) for the municipality utilizing renewable technologies and concluded that there is no potential for solar energy generation since the roofing is pitched with slate. This type of construction does not provide an adequate support base for the solar system and any additional support structure required would damage this expensive roofing system.

In addition to the review of the solar photovoltaic renewable energy measure, CEG also conducted a review of the applicability of wind energy for the facility. Wind energy production is another option available through the Renewable Energy Incentive Program. Wind turbines of various types can be utilized to produce clean energy on a per building basis. Cash incentives are available per kWh of electric usage. Based on CEG's review of the applicability of wind energy for the facility, it was determined that the average wind speed is not adequate, and the kilowatt demand for the building is below the threshold (200 kW) for purchase of a commercial wind turbine. Therefore, wind energy is not a viable option to implement.

Overall, based on our review of REMs for the Pierrepont School it is apparent that solar and wind measures cannot be implemented or recommended at this time.

IX. ENERGY PURCHASING AND PROCUREMENT STRATEGY

Load Profile:

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

Electricity:

This facility is comprised of classrooms, a multi-purpose room, music rooms, gymnasium, cafetorium/multi-purpose room, library/media center, kitchen, pantry, art rooms, administrative offices, locker rooms etc. There are also three temporary portable training units. The typical hours of operation are 7:00 a.m. to 5:00 p.m. for the classrooms and 6:30 a.m. to 6:00 p.m. for the offices. The building was constructed in 1906, renovated in 1927 and had a major renovation in 1981.

The Electric Usage Profile demonstrates a very flat or base-load electric load profile. The summer, (May-September) demonstrates extremely flat usage. The winter (October – April) does demonstrate a very slight elevated, but flat load profile. The summer load is elevated and this is typically due to cooling or air conditioning load. The faculty lounge is cooled by a Trane unit on the roof. There are various window units throughout the building. This facility receives its electrical Delivery service from PSE&G (Public Service Electric and Gas Company) on a GLP rate schedule and its Commodity (electric supply) from South Jersey Energy Company, a Third Party Supplier on the ACES agreement. A flatter load profile will allow for more competitive energy prices when shopping for alternative suppliers.

Natural Gas:

The Natural Gas Usage Profile demonstrates a typical natural gas (heat load) load shape. The summer (May – September) has little to no consumption profile at all. This is typical for schools as they usually do not have much activity in the summer, when closed. In contrast, the winter, (October – April) has a very steep and pronounced usage pattern. This is during the time the school is occupied and typical for a natural gas – fired heating load. Heating in this facility is provided by a Cleaver Brooks natural gas-fired steam boiler. Additionally, domestic hot water in this facility is provided by a Rheem natural gas fired hot water heater with 76-gallon capacity storage.

This facility's natural gas Delivery service is provided by PSE&G (Public Service Electric and Gas Company) on a GSGH rate schedule. The Commodity service is provided by The Hess Corporation through the ACES agreement. A base-load shaping (flat) will secure more competitive energy prices when procuring energy through an alternative energy source.

Tariff Analysis:

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

The Delivery Service is provided by PSE&G while the Commodity Service (electric supply) is provided by South Jersey Energy Company a Third Party Supplier (TPS) through the ACES (Alliance for Competitive Energy Services) Cooperative Pricing System, agreement.
The GLP Delivery Service is for general purposes at secondary distribution voltages. Customers may either purchase electric supply for a Third Party Supplier (TPS) or from PSE&G's Basic Generation Service default service as detailed in the rate schedule. Delivery Charges include: Service Charge, Distribution Charges, Societal Benefits Charge, Non-utility Generation Charge, Securitization Transition Charges. System Control Charge, Customer Account Services Charge, CIEP Standby Fee, Base-rate Adjustment Charge, Solar Pilot Recovery Charge, RGGI Recovery Charge and Capital Adjustment Charge.

The customer has the choice to procure the supply from PSE&G on its Basic Generation default supply or a Third Party Supplier (TPS). Currently this facility is provided electric supply from the TPS through the ACES agreement.

ACES is an alliance composed of the NJSBA and the NJASBO. The Rutherford BOE has stated if they want to procure alternative energy, they must through the ACES agreement. CEG will make a recommendation that is counter to this agreement. The term of the ACES agreement is the first meter read date on or after April 30, 2009 until the last meter read date, May, 2011. The ACES agreement provides for NJSBA to adopt a resolution for renewal for no more than a (5) consecutive year term. CEG will recommend against such a renewal.

Natural Gas:

This facility received its Delivery Service from PSE&G (Public Service Electric & Gas) and its Commodity supply from The Hess Corporation, (TPS). This facility receives natural gas Delivery service from PSE&G on a GSGH (General Service) rate schedule. This service is for "firm" natural gas service for general purposes, where 1), the customer does not qualify for RSG and 2) customers usage does not exceed 3,000 therms in any month. Customers may either purchase gas supply from a Third Party Supplier (TPS) of from Public Services Basic Gas Supply Service default service as detailed in the rate schedule. Delivery Charges include the following: Service Charge, Distribution Charges, Balancing Charges, Societal Benefits Charges, Realignment Adjustment Charges, Margin Adjustment Charges, RGGI Recovery Charge, Capital Adjustment Charge and Customer Account Services Charge. The customer can buy supply from a Third Party Supplier or from PSE&G under Basic Gas Supply Service. Note: Should the TPS not deliver, PSE&G may supply Emergency Sales Service. This service typically comes at a great cost to the customer and is perceived as a penalty.

A "firm" service relates to the reliability of service. When pipelines were deregulated, much like the telecom industry, the space (transportation) was re-segmented. It was segmented into different classifications. Interruptible Service and Firm Service are two of the classifications. The service is ranked on when and how the transportation is interrupted. "Firm" service, depending on class, is not typically interrupted. The "firm" customer does not typically have any alternate fuel capabilities.

This facility utilizes the services of a Third Party Supplier, The Hess Corporation. The contract is administered by The Alliance for Competitive Service (ACES). ACES is the energy aggregation program of the New Jersey School Boards Association of School Administrator's. The process was reviewed and approved by the New Jersey Department of Community Affairs. Term of this agreement is June 1, 2006 and expiring on or before May 31, 2009. This agreement is subject to renewal with BOE resolution. The original agreement has been extended for (1) year through May 31, 2010. CEG will not recommend extending this agreement.

Please see CEG recommendations below.

Recommendations:

CEG recommends a global approach that will be consistent with all facilities within the BOE. Potential improvement is observed in both electric and natural gas costs. The average price per kWh (kilowatt hour) for all GLP schedules is based on 1-year historical average price is $.10752 / kWh (this is the average "price to compare" for energy supplied by South Jersey Energy Company through the ACES agreement). The average price per decatherm for natural gas (as provided by The Hess Corporation as administered by the ACES agreement) is $14.058 / dth (dth, is the common unit of measure). This price is also the "price to compare".

Energy commodities are among the most volatile of all commodities, however at this point and time, energy is extremely competitive. The BOE could see improvement in its energy costs if it were to take advantage of these current market prices quickly, before energy increases. Based on annual historical consumption of this facility (September 2008 through August 2009) and current electric rates, the Pierrepont School could see an improvement in its electric costs of up to 11% or up to $5,000 annually. (Note: Savings were calculated using Average Annual Consumption and a variance to a Fixed Average One-Year commodity contract). CEG recommends aggregating the entire electric load to gain the most optimal energy costs. CEG recommends advisement for alternative sourcing and supply of energy on a "managed approach".

CEG's secondary recommendation coincides with the natural gas costs. Based on the current market, The Pierrepont School could improve its natural gas costs by up to 30% or up to $20,000 annually. CEG recommends that the BOE receive further advisement on these prices through an energy advisor. The BOE should also consider procuring energy (natural gas) through an alternative supply source.

CEG also recommends that The BOE not renew its energy supply contract with the ACES aggregation and The Hess Corporation, and the ACES agreement with South Jersey Energy and its fixed price contract. The fixed price contract methodology does not accomplish the needs of

the BOE. The BOE needs budget protection and CEG has shown that these energy prices are not competitive to the market. The ACES agreement has demonstrated that the price is much above market and the BOE has no way of adjusting the price should prices fall.

CEG further recommends that The BOE create an energy program through a "managed approach". The "managed approach" will take into account creating an "energy budget" that is in line with The BOE's budget year and risk tolerance. Risk tolerance is the appetite that The BOE has for risk. Based on the reduced state and local government budgets and the general aversion for risk, the local government is required to manage this risk.

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

X. INSTALLATION FUNDING OPTIONS

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

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

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

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

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

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

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

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

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

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

CEG recommends that the School District 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 Maintain all weather stripping on windows and doors.

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

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

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

E. Recalibrate existing temperature sensors serving the HVAC control system.

F. Install Vending Miser systems to turn off the vending machines when not in use.

G. Clean all light fixtures to maximize light output.

H. Confirm that outside air economizers on the rooftop units are functioning properly to take advantage of free cooling.

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

In addition to the recommendations above, we would also like to suggest Retro-Commissioning. Retro-Commissioning is a means to verify your current equipment is operating at its designed capacity, airflow, etc. Commissioning Agents, after defining what the original system design parameters are, would recommend revisions to the current system operating characteristics and utilize an independent testing and balancing company to perform air and water balancing on the existing systems.

ECM COST & SAVINGS BREAKDOWN

CONCORD ENGINEERING GROUP

Pierrepont School

ECM ENERGY AND FINANCIAL COSTS AND SAVINGS SUMMARY

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.	TOTAL		(Yearly Saving * ECM Lifetime)	(Yearly Maint Svaing * ECM Lifetime)	(Lifetime Savings - Net Cost) / (Net Cost)	(Net cost / Yearly Savings)	$\sum_{n=0}^{N} \frac{C_n}{(1+IRR)^n}$	$\sum_{n=0}^{N} \frac{C_n}{(1+DR)^n}$
		($)	($)	($)	($)	($/Yr)	($/Yr)	($/Yr)	(Yr)	($)	($)	(%)	(Yr)	($)	($)
ECM #1	Install Thermostatic Steam Radiator Valves	$62,000	$0	$0	$62,000	$6,000	$2,000	$8,000	15	$90,000	$30,000	45.2%	7.8	9.67%	$33,503.48
ECM #2	Replace Existing Cleaver Brooks 1973 Steam Boiler	$165,000	$0	$5,021	$159,979	$12,848	$4,000	$16,848	25	$321,200	$100,000	100.8%	9.5	9.42%	$133,397.71
ECM #3	Convert Pneumatic Controls to DDC	$297,800	$0	$0	$297,800	$11,997	$3,000	$14,997	15	$179,955	$45,000	-39.6%	19.9	-3.32%	($118,766.79)
ECM #4	Lighting Upgrades	$4,070	$0	$800	$3,270	$484	$0	$484	15	$7,266	$0	122.2%	6.8	12.17%	$2,512.74

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

Concord Engineering Group, Inc.

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

SmartStart Building Incentives

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

MAJOR EQUIPMENT LIST

Concord Engineering Group

"Pierrepont School"

Boiler

Location	Area Served	Manufacturer	Qty.	Model #	Input (MBh)	Output (MBh)	Efficiency (%)	Fuel	Approx. Age	ASHRAE Service Life	Remaining Life
Basement	School	Cleaver Brooks	1	CP800-150	6,277		84% Combustion	Natural Gas	20	30	10
		15 PSI Steam		5,175 lbs/hr			80% Thermal				

Boiler - Feedwater Pumps

Location	Area Served	Manufacturer	Qty.	Model #	HP	RPM	GPM	Ft. Hd	Approx. Age	ASHRAE Service Life	Remaining Life
Basement	Old Boiler	ITT	1	Series CMHD	3/4 HP Pumps				20	30	10
		Dual Pump									

Domestic Hot Water Heater

Location	Area Served	Manufacturer	Qty	Model #	Input (MBh)	Recovery (gal/h)	Capacity (gal)	Fuel	Approx. Age	ASHRAE Service Life	Remaining Life
Basement	Entire Facility	RHEEM	1	G76-200-1	199,900		76	Natural Gas	4	20	16
		80% Thermal Eff		Serial #	URNG0905G00101						

Air Handling Units/Packaged Rooftops

Location	Area Served	Manufacturer	Qty	Model #	S/A Fan	Condenser Fans	Cooling Capacity	Heating Capacity	Approx. Age	ASHRAE Service Life	Remaining Life
Roof	Teacher's	Trane	1	2YCL3042A1096AA					3	20	17
	Lounge										

Heating & Ventilating Units

Location	Area Served	Manufacturer	Qty.	Model #	S/A Fan	Heating Type	Heating Capacity (MBH)	CFM	Approx. Age	ASHRAE Service Life	Remaining Life
Gymnasium Ceiling	Gym	Trane	2	Model T6	2 HP	Steam 116 #/hr	112,554 BTUH	3,400	28	25	**(3 years)**

STATEMENT OF ENERGY PERFORMANCE
Pierrepont School

Building ID: 1797261
For 12-month Period Ending: December 31, 2008[1]
Date SEP becomes ineligible: N/A
Date SEP Generated: November 12, 2009

Facility
Pierrepont School
70 E. Pierrepont Avenue
Rutherford, NJ 07070

Facility Owner
Rutherford Board of Education
176 Park Avenue
Rutherford, NJ 07070

Primary Contact for this Facility
Robert Brown
176 Park Avenue
Rutherford, NJ 07070

Year Built: 1906
Gross Floor Area (ft²): 72,450

Energy Performance Rating[2] (1-100) 86

Site Energy Use Summary[3]

Electricity - Grid Purchase(kBtu)	1,122,425
Natural Gas (kBtu)[4]	4,178,010
Total Energy (kBtu)	5,300,435

Energy Intensity[5]

Site (kBtu/ft²/yr)	73
Source (kBtu/ft²/yr)	112

Emissions (based on site energy use)

Greenhouse Gas Emissions ($MtCO_2e$/year)	393

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

National Average Comparison

National Average Site EUI	111
National Average Source EUI	170
% Difference from National Average Source EUI	-34%
Building Type	K-12 School

Stamp of Certifying Professional

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

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

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

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

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

ENERGY STAR® Data Checklist for Commercial Buildings

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

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

CRITERION	VALUE AS ENTERED IN PORTFOLIO MANAGER	VERIFICATION QUESTIONS	NOTES	☑
Building Name	Pierrepont 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	70 E. Pierrepont Avenue, Rutherford, NJ 07070	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		☐
Pierrepont School (K-12 School)				
CRITERION	**VALUE AS ENTERED IN PORTFOLIO MANAGER**	**VERIFICATION QUESTIONS**	**NOTES**	☑
Gross Floor Area	72,450 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	127 (Default)	Is this the number of personal computers in the K12 School?		☐
Number of walk-in refrigeration/freezer units	1 (Default)	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 % (Default)	Is this the percentage of the total floor space within the facility that is served by mechanical cooling equipment?		☐
Percent Heated	100 % (Default)	Is this the percentage of the total floor space within the facility that is served by mechanical heating equipment?		☐
Months	10 (Optional)	Is this school in operation for at least 8 months of the year?		☐

High School?	No	Is this building a high school (teaching grades 10, 11, and/or 12)? If the building teaches to high school students at all, the user should check 'yes' to 'high school'. For example, if the school teaches to grades K-12 (elementary/middle and high school), the user should check 'yes' to 'high school'.		

ENERGY STAR® Data Checklist for Commercial Buildings

Energy Consumption

Power Generation Plant or Distribution Utility: PSE&G - Public Service Elec & Gas Co

Fuel Type: Electricity

Meter: Electricity (728003508) (kWh (thousand Watt-hours))
Space(s): Entire Facility
Generation Method: Grid Purchase

Start Date	End Date	Energy Use (kWh (thousand Watt-hours))
12/01/2008	12/31/2008	22,920.00
11/01/2008	11/30/2008	17,880.00
10/01/2008	10/31/2008	26,320.00
09/01/2008	09/30/2008	18,400.00
08/01/2008	08/31/2008	22,960.00
07/01/2008	07/31/2008	22,720.00
06/01/2008	06/30/2008	22,880.00
05/01/2008	05/31/2008	18,800.00
04/01/2008	04/30/2008	26,640.00
03/01/2008	03/31/2008	24,320.00
02/01/2008	02/29/2008	27,200.00
01/01/2008	01/31/2008	23,600.00
Electricity (728003508) Consumption (kWh (thousand Watt-hours))		**274,640.00**
Electricity (728003508) Consumption (kBtu (thousand Btu))		**937,071.68**

Meter: Electricity (1345634) (kWh (thousand Watt-hours))
Space(s): Entire Facility
Generation Method: Grid Purchase

Start Date	End Date	Energy Use (kWh (thousand Watt-hours))
12/01/2008	12/31/2008	9,402.00
11/01/2008	11/30/2008	7,434.00
10/01/2008	10/31/2008	1,668.00
09/01/2008	09/30/2008	816.00
08/01/2008	08/31/2008	1,356.00
07/01/2008	07/31/2008	1,116.00
06/01/2008	06/30/2008	1,620.00
05/01/2008	05/31/2008	1,818.00
04/01/2008	04/30/2008	5,640.00
03/01/2008	03/31/2008	8,124.00
02/01/2008	02/29/2008	6,570.00
01/01/2008	01/31/2008	8,760.00
Electricity (1345634) Consumption (kWh (thousand Watt-hours))		**54,324.00**

Electricity (1345634) Consumption (kBtu (thousand Btu))	**185,353.49**
Total Electricity (Grid Purchase) Consumption (kBtu (thousand Btu))	**1,122,425.17**
Is this the total Electricity (Grid Purchase) consumption at this building including all Electricity meters?	☐

Fuel Type: Natural Gas

Meter: Gas (2164239) (therms)
Space(s): Entire Facility

Start Date	End Date	Energy Use (therms)
12/01/2008	12/31/2008	88.20
11/01/2008	11/30/2008	73.20
10/01/2008	10/31/2008	75.30
09/01/2008	09/30/2008	61.90
08/01/2008	08/31/2008	55.50
07/01/2008	07/31/2008	65.70
06/01/2008	06/30/2008	76.10
05/01/2008	05/31/2008	73.00
04/01/2008	04/30/2008	68.90
03/01/2008	03/31/2008	65.70
02/01/2008	02/29/2008	61.60
01/01/2008	01/31/2008	67.90
Gas (2164239) Consumption (therms)		**833.00**
Gas (2164239) Consumption (kBtu (thousand Btu))		**83,300.00**

Meter: Gas (2344561) (therms)
Space(s): Entire Facility

Start Date	End Date	Energy Use (therms)
12/01/2008	12/31/2008	6,754.00
11/01/2008	11/30/2008	5,494.90
10/01/2008	10/31/2008	1,687.50
09/01/2008	09/30/2008	0.00
08/01/2008	08/31/2008	0.00
07/01/2008	07/31/2008	10.70
06/01/2008	06/30/2008	191.70
05/01/2008	05/31/2008	756.80
04/01/2008	04/30/2008	5,351.10
03/01/2008	03/31/2008	7,017.80
02/01/2008	02/29/2008	7,088.60
01/01/2008	01/31/2008	6,594.00
Gas (2344561) Consumption (therms)		**40,947.10**
Gas (2344561) Consumption (kBtu (thousand Btu))		**4,094,710.00**
Total Natural Gas Consumption (kBtu (thousand Btu))		**4,178,010.00**
Is this the total Natural Gas consumption at this building including all Natural Gas meters?		☐

Additional Fuels

Do the fuel consumption totals shown above represent the total energy use of this building? Please confirm there are no additional fuels (district energy, generator fuel oil) used in this facility.	☐

On-Site Solar and Wind Energy	
Do the fuel consumption totals shown above include all on-site solar and/or wind power located at your facility? Please confirm that no on-site solar or wind installations have been omitted from this list. All on-site systems must be reported.	☐

Certifying Professional

(When applying for the ENERGY STAR, the Certifying Professional must be the same as the PE that signed and stamped the SEP.)

Name: _____ Date: _____

Signature: _____

Signature is required when applying for the ENERGY STAR.

FOR YOUR RECORDS ONLY. DO NOT SUBMIT TO EPA.

Please keep this Facility Summary for your own records; do not submit it to EPA. Only the Statement of Energy Performance (SEP), Data Checklist and Letter of Agreement need to be submitted to EPA when applying for the ENERGY STAR.

Facility
Pierrepont School
70 E. Pierrepont Avenue
Rutherford, NJ 07070

Facility Owner
Rutherford Board of Education
176 Park Avenue
Rutherford, NJ 07070

Primary Contact for this Facility
Robert Brown
176 Park Avenue
Rutherford, NJ 07070

General Information

Pierrepont School	
Gross Floor Area Excluding Parking: (ft^2)	72,450
Year Built	1906
For 12-month Evaluation Period Ending Date:	December 31, 2008

Facility Space Use Summary

Pierrepont School	
Space Type	K-12 School
Gross Floor Area(ft^2)	72,450
Open Weekends?	Yes
Number of PCs[d]	127
Number of walk-in refrigeration/freezer units[d]	1
Presence of cooking facilities	Yes
Percent Cooled[d]	100
Percent Heated[d]	100
Months[o]	10
High School?	No
School District[o]	Rutherford

Energy Performance Comparison

	Evaluation Periods		Comparisons		
Performance Metrics	**Current** (Ending Date 12/31/2008)	**Baseline** (Ending Date 12/31/2008)	**Rating of 75**	**Target**	**National Average**
Energy Performance Rating	86	86	75	N/A	50
Energy Intensity					
Site (kBtu/ft^2)	73	73	87	N/A	111
Source (kBtu/ft^2)	112	112	133	N/A	170
Energy Cost					
$/year	$ 132,440.00	$ 132,440.00	$ 156,842.56	N/A	$ 200,560.79
$/$ft^2$/year	$ 1.83	$ 1.83	$ 2.17	N/A	$ 2.77
Greenhouse Gas Emissions					
$MtCO_2e$/year	393	393	465	N/A	595
$kgCO_2e/ft^2$/year	5	5	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.

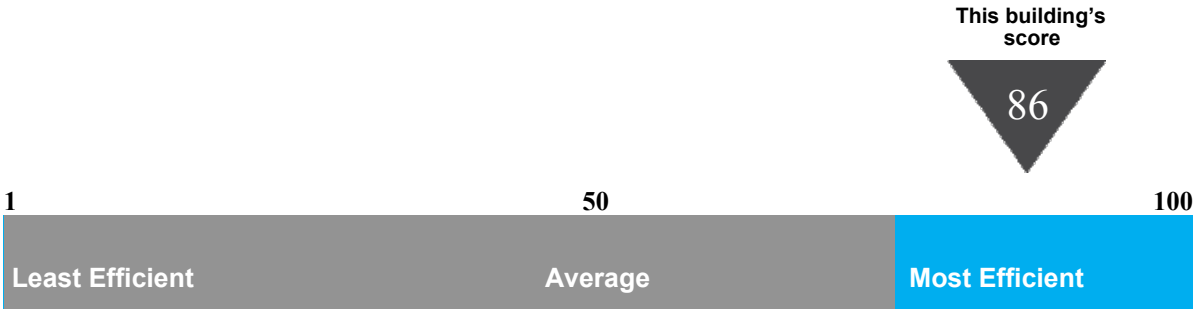
Statement of Energy Performance

2008

Pierrepont School
70 E. Pierrepont Avenue
Rutherford, NJ 07070

Portfolio Manager Building ID: 1797261

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 112 kBtu per square foot per year.*

*Based on source energy intensity for the 12 month period ending December 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: 11/12/2009

INVESTMENT GRADE LIGHTING AUDIT

CONCORD ENERGY SERVICES

CEG Job #: 9C09074
Project: Rutherford BOE
Address: 70 E. Pierrepont Ave
City: Rutherford, NJ 07070
Building SF: 72,450

"Pierrepont School"

DATE: 11/6/2009
KWH COST: $0.156

EXISTING LIGHTING											PROPOSED LIGHTING							SAVINGS			
Line No.		Fixture Location	No. eFixts	Fixture eType	Yearly Usage	Watts Used	Total kW	kWh/Yr Fixtures	Yearly $ Cost	No. rFixts	Retro-Unit rDescription	Watts Used	Total kW	kWh/Yr Fixtures	Yearly $ Cost	Unit Cost (INSTALLED)	Total Cost	kW Savings	kWh/Yr Savings	Yearly $ Savings	Yearly Payback
1		Basement Storage	4	2' x 4' 1-Lamp, T8, 28 W lamps	400	25	0.10	40	$6.24	4	No Change Required										
2		Bus Drivers	6	2' x 4' 2-Lamp, T8, 28 W lamps	800	45	0.27	216	$33.70	6	No Change Required										
3		Carpenter Shop	4	2' x 4' 2-Lamp, T8, 28 W lamps	800	45	0.18	144	$22.46	4	No Change Required										
4		Carpenter Shop	3	2' x 4' 4-Lamp, T8, 28 W lamps	800	87	0.26	208.8	$32.57	3	No Change Required										
5		Maintenance Dept	3	2' x 4' 2-Lamp, T8, 28 W lamps	800	45	0.14	108	$16.85	3	No Change Required										
6		Maintenance Dept	3	3L 13 W CFL	800	42	0.13	100.8	$15.72	3	No Change Required										
7		File Room	2	3L 13 W CFL	400	42	0.08	33.6	$5.24	2	No Change Required										
8		Office	2	2' x 4' 2-Lamp, T8, 28 W lamps	2600	45	0.09	234	$36.50	2	No Change Required										
9		SGI	6	2' x 4' 4-Lamp, T8, 28 W lamps	1800	87	0.52	939.6	$146.58	6	No Change Required										
10		Maint Workshop	4	2' x 4' 2-Lamp, T8, 28 W lamps	400	45	0.18	72	$11.23	4	No Change Required										
11		Boiler Rm	7	1' x 4' 2-Lamp, T8, 28 W INDUSTRIAL	400	45	0.32	126	$19.66	7	No Change Required										
12		Supply Rm	4	2' x 4' 2-Lamp, T8, 28 W lamps	400	45	0.18	72	$11.23	4	No Change Required										
13		Classroom 22	13	2' x 4' 4-Lamp, T8, 28 W lamps	1800	87	1.13	2035.8	$317.58	13	No Change Required										
14		Classroom 23	13	2' x 4' 4-Lamp, T8, 28 W lamps	1800	87	1.13	2035.8	$317.58	13	No Change Required										
15		Classroom 24	10	2' x 4' 4-Lamp, T8, 28 W lamps	1800	87	0.87	1566	$244.30	10	No Change Required										
16		Music Rm	16	2' x 4' 4-Lamp, T8, 28 W lamps	1800	87	1.39	2505.6	$390.87	16	No Change Required										
17		Bathroom	1	2' x 2' 4-Lamp, T8, 17 W lamps	400	70	0.07	28	$4.37	1	No Change Required										
18		Janitor Closet	1	60 Watt Ind	400	60	0.06	24	$3.74	1	18 Watt CFL										
19		Elevator Rm	1	60 Watt Ind	400	60	0.06	24	$3.74	1	18 Watt CFL										
20		Gym Storage	1	60 Watt Ind	400	60	0.06	24	$3.74	1	18 Watt CFL										
21		Gym	24	2' x 4' 4-Lamp, T5HO lamps	2600	234	5.62	14601.6	$2,277.85	24	No Change Required										
22		Gym Storage	2	2' x 4' 4-Lamp, T8, 28 W lamps	400	87	0.17	69.6	$10.86	2	No Change Required										
23		Gym Storage	2	2' x 4' 2-Lamp, T8, 28 W lamps	400	45	0.09	36	$5.62	2	No Change Required										
24		Faculty Lounge	9	2' x 4' 4-Lamp, T8, 28 W lamps	800	87	0.78	626.4	$97.72	9	No Change Required										
25		Faculty Toilet	2	2' x 4' 4-Lamp, T8, 28 W lamps	400	87	0.17	69.6	$10.86	2	No Change Required										
26		Boys Room	2	2' x 4' 4-Lamp, T8, 28 W lamps	1800	87	0.17	313.2	$48.86	2	No Change Required										
27		Girls Room	2	2' x 4' 2-Lamp, T8, 28 W lamps	1800	45	0.09	162	$25.27	2	No Change Required										
28		Corridor	3	2' x 4' 4-Lamp, T8, 28 W lamps	1800	87	0.26	469.8	$73.29	3	No Change Required										
29		Corridor	3	2' x 2' 2-Lamp, 17W lamps	1800	37	0.11	199.8	$31.17	3	No Change Required										
30		P.E. Office	11	1' x 4' 1-Lamp, T8, 28 W lamps WRAPS	1800	25	0.28	495	$77.22	11	No Change Required										

31		Gym Storage	2	2' x 4' 2-Lamp, T8, 28 W lamps	800	45	0.09	72	$11.23	2	No Change Required											
32		File Room	18	1' x 4' 2-Lamp, T8, 28 W lamps WRAPS	800	45	0.81	648	$101.09	18	No Change Required											
33		Janitor Closet	1	100 Watt Incand	400	100	0.10	40	$6.24	1	23 Watt CFL											
34		Vestibule	1	2' x 4' 2-Lamp, T8, 28 W lamps	1800	45	0.05	81	$12.64	1	No Change Required											
35		Storage	1	1' x 4' 2-Lamp, T8, 28 W lamps	400	45	0.05	18	$2.81	1	No Change Required											
36		Boys Room	1	1' x 4' 2-Lamp, T8, 28 W lamps	1800	45	0.05	81	$12.64	1	No Change Required											
37		Girls Room	1	1' x 4' 2-Lamp, T8, 28 W lamps	1800	45	0.05	81	$12.64	1	No Change Required											
38		Stairwell	2	1' x 4' 2-Lamp, T8, 28 W lamps	1800	45	0.09	162	$25.27	2	No Change Required											
39		Music Office	2	2' x 4' 4-Lamp, T8, 28 W lamps	1800	87	0.17	313.2	$48.86	2	No Change Required											
40		Stairwell	2	1' x 4' 2-Lamp, T8, 28 W lamps	1800	45	0.09	162	$25.27	2	No Change Required											
41		Stairwell	2	1' x 4' 2-Lamp, T8, 28 W lamps	1800	45	0.09	162	$25.27	2	No Change Required											
42		Stairwell	2	1' x 4' 2-Lamp, T8, 28 W lamps	1800	45	0.09	162	$25.27	2	No Change Required											
43		Library/Media Center	24	2' x 4' 4-Lamp, T8, 28 W lamps	1800	87	2.09	3758.4	$586.31	24	No Change Required											
44		Study Hall/Computers	4	2' x 4' 4-Lamp, T8, 28 W lamps	1800	87	0.35	626.4	$97.72	4	No Change Required											
45		Offices	7	2' x 4' 4-Lamp, T8, 28 W lamps WRAP	1800	45	0.32	567	$88.45	7	No Change Required											
46		Restrooms	3	3L 13 W CFL	800	42	0.13	100.8	$15.72	3	No Change Required											
47		Offieces	3	3L 13 W CFL	800	42	0.13	100.8	$15.72	3	No Change Required											
48		Stairwell	2	1' x 4' 2-Lamp, T8, 28 W lamps	1800	45	0.09	162	$25.27	2	No Change Required											
49		Room 5B	6	2' x 4' 4-Lamp, T8, 28 W lamps WRAP	1800	45	0.27	486	$75.82	6	No Change Required											
50		Room 5	9	2' x 4' 4-Lamp, T8, 28 W lamps WRAP	1800	45	0.41	729	$113.72	9	No Change Required											
51		Room 5A	8	2' x 4' 4-Lamp, T8, 28 W lamps WRAP	1800	45	0.36	648	$101.09	8	No Change Required											
52		Room 6	9	2' x 4' 4-Lamp, T8, 28 W lamps WRAP	1800	45	0.41	729	$113.72	9	No Change Required											
53		Boys Room	1	1' x 4' 2-Lamp, T8, 28 W lamps	1800	45	0.05	81	$12.64	1	No Change Required											
54		Girls Room	1	1' x 4' 2-Lamp, T8, 28 W lamps	1800	45	0.05	81	$12.64	1	No Change Required											
55		Storage	1	2' x 2' 4-Lamp, T8, 17 W lamps	400	70	0.07	28	$4.37	1	No Change Required											
56		Art Storage	2	1' x 4' 2-Lamp, T8, 28 W lamps	400	45	0.09	36	$5.62	2	No Change Required											
57		Art Room	12	2' x 4' 4-Lamp, T8, 28 W lamps	1800	87	1.04	1879.2	$293.16	12	No Change Required											
58		Classroom 2	9	2' x 4' 4-Lamp, T8, 28 W lamps	1800	87	0.78	1409.4	$219.87	9	No Change Required											
59		Classroom 1	9	2' x 4' 4-Lamp, T8, 28 W lamps	1800	87	0.78	1409.4	$219.87	9	No Change Required											
60		Classroom 9	11	2' x 4' 4-Lamp, T8, 28 W lamps	1800	87	0.96	1722.6	$268.73	11	No Change Required											
61		Fire Exit	1	60 Watt Ind	1800	60	0.06	108	$16.85	1	No Change Required											
62		Toilet	1	1' x 4' 2-Lamp, T8, 28 W lamps WRAPS	1800	45	0.05	81	$12.64	1	No Change Required											
63		Classroom 10	9	2' x 4' 4-Lamp, T8, 28 W lamps	1800	87	0.78	1409.4	$219.87	9	No Change Required											
64		Corridor	9	2' x 4' 4-Lamp, T8, 28 W lamps	1800	87	0.78	1409.4	$219.87	9	No Change Required											
65		Stairwell	2	1' x 4' 2-Lamp, T8, 28 W lamps	1800	45	0.09	162	$25.27	2	No Change Required											
66		Stairwell	2	1' x 4' 2-Lamp, T8, 28 W lamps	1800	45	0.09	162	$25.27	2	No Change Required											
67		Stage Entrance	1	3L 13 W CFL	1800	42	0.04	75.6	$11.79	1	No Change Required											
68		Stage	10	8-10W CFL Globe Fixtures	1800	80	0.80	1440	$224.64	10	No Change Required											

69		Stage	1	100 Watt Incand	1800	42	0.04	75.6	$11.79	1	28 Watt CFL										
70		Multi-Purpose Rm	64	8-10W CFL Globe Fixtures	1800	80	5.12	9216	$1,437.70	64	No Change Required										
71		Women	1	3L 13 W CFL	1800	42	0.04	75.6	$11.79	1	No Change Required										
72		Men	1	3L 13 W CFL	1800	42	0.04	75.6	$11.79	1	No Change Required										
73		Lobby	1	3L 13 W CFL	1800	42	0.04	75.6	$11.79	1	No Change Required										
74		Stairs	2	1' x 4' 2-Lamp, T8, 28 W lamps	1800	45	0.09	162	$25.27	2	No Change Required										
75		Stage MER	2	1' x 4' 2-Lamp, T8, 28 W lamps	400	45	0.09	36	$5.62	2	No Change Required										
76		Principal	3	2' x 4' 4-Lamp, T8, 28 W lamps	1800	87	0.26	469.8	$73.29	3	No Change Required										
77		Vice-Principal	2	2' x 4' 4-Lamp, T8, 28 W lamps	1800	87	0.17	313.2	$48.86	2	No Change Required										
78		Main Office	6	2' x 4' 4-Lamp, T8, 28 W lamps	1800	87	0.52	939.6	$146.58	6	No Change Required										
79		Office Closet	2	2' x 4' 4-Lamp, T8, 28 W lamps	400	87	0.17	69.6	$10.86	2	No Change Required										
80		Girls Room	2	2' x 4' 4-Lamp, T8, 28 W lamps	1800	87	0.17	313.2	$48.86	2	No Change Required										
81		SGI	11	2' x 4' 4-Lamp, T8, 28 W lamps	1800	87	0.96	1722.6	$268.73	11	No Change Required										
82		Health Office	5	2' x 4' 4-Lamp, T8, 28 W lamps	1800	87	0.44	783	$122.15	5	No Change Required										
83		Classroom 14	9	2' x 4' 4-Lamp, T8, 28 W lamps	1800	87	0.78	1409.4	$219.87	9	No Change Required										
84		Classroom 14A	2	1' x 4' 2-Lamp, T8, 28 W lamps	1800	45	0.09	162	$25.27	2	No Change Required										
85		Classroom 13	9	2' x 4' 4-Lamp, T8, 28 W lamps	1800	87	0.78	1409.4	$219.87	9	No Change Required										
86		Classroom 13A	2	1' x 4' 2-Lamp, T8, 28 W lamps	1800	45	0.09	162	$25.27	2	No Change Required										
87		Stairwell	2	1' x 4' 2-Lamp, T8, 28 W lamps	1800	45	0.09	162	$25.27	2	No Change Required										
88		Janitor Closet	1	3L 13 W CFL	800	42	0.04	33.6	$5.24	1	No Change Required										
89		Toilet	1	3L 13 W CFL	1800	42	0.04	75.6	$11.79	1	No Change Required										
90		Girls Room	1	2' x 2' 2-Lamp, 17W lamps	1800	37	0.04	66.6	$10.39	1	No Change Required										
91		Corridor	7	2' x 4' 4-Lamp, T8, 28 W lamps	1800	87	0.61	1096.2	$171.01	7	No Change Required										
92		Classroom 23	9	2' x 4' 4-Lamp, T8, 28 W lamps	1800	87	0.78	1409.4	$219.87	9	No Change Required										
93		Classroom 23A	9	2' x 4' 4-Lamp, T8, 28 W lamps	1800	87	0.78	1409.4	$219.87	9	No Change Required										
94		Classroom 24	9	2' x 4' 4-Lamp, T8, 28 W lamps	1800	87	0.78	1409.4	$219.87	9	No Change Required										
95		Stairwell	2	1' x 4' 2-Lamp, T8, 28 W lamps	1800	45	0.09	162	$25.27	2	No Change Required										
96		Corridor	6	2' x 4' 4-Lamp, T8, 28 W lamps	1800	87	0.52	939.6	$146.58	6	No Change Required										
97		Classroom 23B	12	2' x 4' 4-Lamp, T8, 28 W lamps	1800	87	1.04	1879.2	$293.16	12	No Change Required										
98		Computer Rm	2	2' x 2' 2-Lamp, 17W lamps	1800	37	0.07	133.2	$20.78	2	No Change Required										
99		Computer Rm	12	2' x 4' 4-Lamp, T8, 28 W lamps	1800	87	1.04	1879.2	$293.16	12	No Change Required										
100		Classroom 22	4	2' x 4' 4-Lamp, T8, 28 W lamps	1800	87	0.35	626.4	$97.72	4	No Change Required										
101		Boys Room	2	2' x 4' 4-Lamp, T8, 28 W lamps	1800	87	0.17	313.2	$48.86	2	No Change Required										
102		Girls Room	2	2' x 2' 2-Lamp, 17W lamps	1800	37	0.07	133.2	$20.78	2	No Change Required										
103		Janitor Closet	1	3L 13 W CFL	800	42	0.04	33.6	$5.24	1	No Change Required										
104		Corridor	12	2' x 4' 4-Lamp, T8, 28 W lamps	1800	87	1.04	1879.2	$293.16	12	No Change Required										
105		Stairwell	2	1' x 4' 2-Lamp, T8, 28 W lamps	1800	45	0.09	162	$25.27	2	No Change Required										
106		Classroom 21	9	2' x 4' 4-Lamp, T8, 28 W lamps	1800	87	0.78	1409.4	$219.87	9	No Change Required										
107		Classroom 20	6	2' x 4' 4-Lamp, T8, 28 W lamps	1800	87	0.52	939.6	$146.58	6	No Change Required										

108		Classroom 25	9	2' x 4' 4-Lamp, T8, 28 W lamps	1800	87	0.78	1409.4	$219.87	9	No Change Required										
109		Classroom 26	9	2' x 4' 4-Lamp, T8, 28 W lamps	1800	87	0.78	1409.4	$219.87	9	No Change Required										
110		Classroom 27	9	2' x 4' 4-Lamp, T8, 28 W lamps	1800	87	0.78	1409.4	$219.87	9	No Change Required										
110		Classroom 28	9	2' x 4' 4-Lamp, T8, 28 W lamps	1800	87	0.78	1409.4	$219.87	9	No Change Required										
111		Stairwell	2	1' x 4' 2-Lamp, T8, 28 W lamps	1800	45	0.09	162	$25.27	2	No Change Required										
112		Classroom 29	9	2' x 4' 4-Lamp, T8, 28 W lamps	1800	87	0.78	1409.4	$219.87	9	No Change Required										
113		Classroom 30	9	2' x 4' 4-Lamp, T8, 28 W lamps	1800	87	0.78	1409.4	$219.87	9	No Change Required										
114		Classroom 31	9	2' x 4' 4-Lamp, T8, 28 W lamps	1800	87	0.78	1409.4	$219.87	9	No Change Required										
115		Book Storage	1	2' x 4' 4-Lamp, T8, 28 W lamps	400	87	0.09	34.8	$5.43	1	No Change Required										
116		Closet	1	2' x 4' 4-Lamp, T8, 28 W lamps	400	87	0.09	34.8	$5.43	1	No Change Required										
117		Corridor	10	2' x 4' 4-Lamp, T8, 28 W lamps	1800	87	0.87	1566	$244.30	10	No Change Required										
118		Storage	1	2' x 4' 4-Lamp, T8, 28 W lamps	400	87	0.09	34.8	$5.43	1	No Change Required										
119		SGI 2	2	2' x 4' 4-Lamp, T8, 28 W lamps	1800	87	0.17	313.2	$48.86	2	No Change Required										
120		Closet	1	3L 13 W CFL	400	42	0.04	16.8	$2.62	1	No Change Required										
121		Restroom	1	3L 13 W CFL	1800	42	0.04	75.6	$11.79	1	No Change Required										
122		Boys Room	2	2' x 4' 4-Lamp, T8, 28 W lamps	1800	87	0.17	313.2	$48.86	2	No Change Required										
123		Janitor Closet	1	3L 13 W CFL	800	42	0.04	33.6	$5.24	1	No Change Required										
124		Classroom 33	10	2' x 4' 4-Lamp, T8, 28 W lamps	1800	87	0.87	1566	$244.30	10	No Change Required										
125		Classroom 33	2	2' x 2' 4-Lamp, T8, 17 W lamps	1800	70	0.14	252	$39.31	2	No Change Required										
126		Classroom 34	3	2' x 4' 4-Lamp, T8, 28 W lamps	1800	87	0.26	469.8	$73.29	3	No Change Required										
127		Classroom 35	9	2' x 4' 4-Lamp, T8, 28 W lamps	1800	87	0.78	1409.4	$219.87	9	No Change Required										
128		Classroom 35	2	2' x 2' 4-Lamp, T8, 17 W lamps	1800	70	0.14	252	$39.31	2	No Change Required										
129		Classroom 36	9	2' x 4' 4-Lamp, T8, 28 W lamps	1800	87	0.78	1409.4	$219.87	9	No Change Required										
130		Classroom 36	2	2' x 2' 4-Lamp, T8, 17 W lamps	1800	70	0.14	252	$39.31	2	No Change Required										
131		Classroom 37	2	2' x 4' 4-Lamp, T8, 28 W lamps	1800	87	0.17	313.2	$48.86	2	No Change Required										
132		Classroom 38	9	2' x 4' 4-Lamp, T8, 28 W lamps	1800	87	0.78	1409.4	$219.87	9	No Change Required										
133		Classroom 38	2	2' x 2' 4-Lamp, T8, 17 W lamps	1800	70	0.14	252	$39.31	2	No Change Required										
134		Stairwell	2	1' x 4' 2-Lamp, T8, 28 W lamps	1800	45	0.09	162	$25.27	2	No Change Required										
135		Faculty RR	1	2' x 2' 4-Lamp, T8, 17 W lamps	400	70	0.07	28	$4.37	1	No Change Required										
		Totals	712				57.39	102203.8	$15,943.79	712											