Indian Fields @ Dayton 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:

Indian Fields @ Dayton Elementary School
310 Georges Road
Dayton, NJ 08810

Facility Contact Person: Tony Ferraro (on-site)
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	$ 18,398
Natural Gas	$ 54,739
Total	$ 73,137

The potential annual energy cost savings are shown below in Table 1. The costs are inclusive of incentive dollars. The cost of each measure for this level of auditing is ± 20% until detailed engineering, specifications, and hard proposals are obtained. Refer to Section VII for a more detailed evaluation of the ECM's.

Table 1
Energy Conservation Measures (ECM's)

ECM #	Description	Total Project Cost, $	Annual Savings	Simple Payback (Years)
ECM #1	HIGH EFFICIENCY STEAM BOILERS	$289,300	$9,686	29.9
ECM #2	VARIABLE REFRIGERANT FLOW HVAC SYSTEM - AIR COOLED	$193,500	$4,356	44.4
ECM #3	VARIABLE REFRIGERANT FLOW HVAC SYSTEM - GROUND LOOP	$315,900	$4,668	67.7
ECM #4	LIGHTING RETROFIT	$23,691	$2,261	10.5
ECM #5	50 KW PV SOLAR	$390,400	$22,596	17.3

The estimated demand and consumption 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

		Annual Utility Reduction		
ECM #	Description	Demand Reduction (KW)	Consumption Reduction (KWH)	Consumption Reduction (Therms)
ECM #1	HIGH EFFICIENCY STEAM BOILERS	0	5,600	4,641
ECM #2	VARIABLE REFRIGERANT FLOW HVAC SYSTEM - AIR COOLED	9	14,244	1,146
ECM #3	VARIABLE REFRIGERANT FLOW HVAC SYSTEM - GROUND LOOP	13	15,976	1,146
ECM #4	LIGHTING RETROFIT	5	12,560	0
ECM #5	50 KW PV SOLAR	50	76,795	0

Concord Engineering recommends the implementation of all ECM's that provide a simple payback of seven to ten (7 to 10) years or less.

The following Energy Conservation Measures are recommended for Indian Fields @ Dayton Elementary School:

> ECM # 4 Lighting Retrofit

II. INTRODUCTION

The Indian Fields @ Dayton Elementary School is included in this energy audit. Based on our survey and the documentation available, it was determined that the building area is approximately 23,000 SF.

The first task was to collect and review two years 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.

The Energy Use Index (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 obtained from the District were used to calculate the gross area of the building.

Obtaining Architectural and Mechanical drawings, a building profile was created that included age, occupancy, description, and existing conditions of Architectural and Mechanical Systems. The profile noted the major energy – consuming equipment or systems and components that are inherently inefficient. Also, by reviewing the mechanical drawings and equipment schedules, questions regarding the lighting systems/controls, HVAC zone controls, or setback operations were noted.

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 included 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 and building envelope improvements.

III. METHOD OF ANALYSIS

The first step in the energy analysis is the site survey. The auditor walks the entire site to determine building size and 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 engineering calculations, Microsoft Excel spread sheets and Trane Trace 700™ building simulation software that calculate the anticipated energy usage. The actual energy usage is entered directly from the utility bills. The anticipated energy usage is compared to the actual usage. If necessary, corrections are made to the site-collected data until the anticipated energy usage matches the actual usage. This process develops an end-use baseline for all of the fuels used at the facility. This baseline is used to calculate the energy savings for the measures that are recommended in this report.

The savings 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 <u>new</u> operating hours <u>instead of the existing</u> 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 <u>new</u> system wattage <u>instead of the existing</u> 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 Trane Trace 700™ building simulation software. The savings are calculated in "output" values – meaning <u>energy</u>, not <u>fuel</u> 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 <u>after</u> the other recommendations have been accounted for.

Lastly, installation costs 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 New Jersey SmartStart$_{tm}$ 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.

IV. HISTORIC ENERGY CONSUMPTION/COST

A. Energy Usage / Tariffs

Table 3 and Figure 1 represent the electrical usage for the surveyed facility from June 2007 to May 2008. The existing Facility is currently served electric under the Public Service Electric and Gas Company (PSEG) Large Power and Lighting (LPL) Tariff. 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 June 2007 to May 2008. Woodruff Energy supplies the natural gas and PSE&G delivers the fuel to the burner. Below is the average unit cost for the utilities at this facility.

Description	Average
Electricity	18¢/kWh
Natural Gas	$1.92 / Therm

Table 3
Electricity Billing Data

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 (14105)	Jun-07	6/1/2007	7/3/2007	6291845911E	Electric	32	34	kw	n/a	kwh	n/a	kwh	11100	kwh	$ 2,427.12
PSE&G Co (14105)	Jul-07	7/3/2007	8/1/2007	6291845911E	Electric	29	34	kw	n/a	kwh	n/a	kwh	4800	kwh	$ 1,315.15
PSE&G Co (14105)	Aug-07	8/1/2007	8/30/2007	6291845911E	Electric	29	34	kw	n/a	kwh	n/a	kwh	7360	kwh	$ 1,860.59
PSE&G Co (14105)	Sep-07	8/30/2007	10/1/2007	6291845911E	Electric	32	34	kw	n/a	kwh	n/a	kwh	11560	kwh	$ 2,478.19
PSE&G Co (14105)	Oct-07	10/1/2007	10/30/2007	6291845911E	Electric	29	34	kw	n/a	kwh	n/a	kwh	9760	kwh	$ 1,484.68
PSE&G Co (14105)	Nov-07	10/30/2007	11/30/2007	6291845911E	Electric	31	34	kw	n/a	kwh	n/a	kwh	8400	kwh	$ 1,264.61
PSE&G Co (14105)	Dec-07	11/30/2007	1/2/2008	6291845911E	Electric	33	38	kw	n/a	kwh	n/a	kwh	7760	kwh	$ 1,191.46
PSE&G Co (14105)	Jan-08	1/2/2008	2/1/2008	6291845911E	Electric	30	38	kw	n/a	kwh	n/a	kwh	8300	kwh	$ 1,271.00
PSE&G Co (14105)	Feb-08	2/1/2008	3/3/2008	6291845911E	Electric	31	38	kw	n/a	kwh	n/a	kwh	8120	kwh	$ 1,261.00
PSE&G Co (14105)	Mar-08	3/3/2008	4/2/2008	6291845911E	Electric	30	38	kw	n/a	kwh	n/a	kwh	7520	kwh	$ 1,177.76
PSE&G Co (14105)	Apr-08	4/2/2008	5/1/2008	6291845911E	Electric	29	38	kw	n/a	kwh	n/a	kwh	8280	kwh	$ 1,252.69
PSE&G Co (14105)	May-08	5/1/2008	6/2/2008	6291845911E	Electric	32	38	kw	n/a	kwh	n/a	kwh	8900	kwh	$ 1,414.02
						Max Peak:	38	kw				**12 Month Total:**	101860	kwh	$ 18,398.27
												Avg. Cost per kwh:	$ 0.18		

Figure 1
Electricity Usage Profile

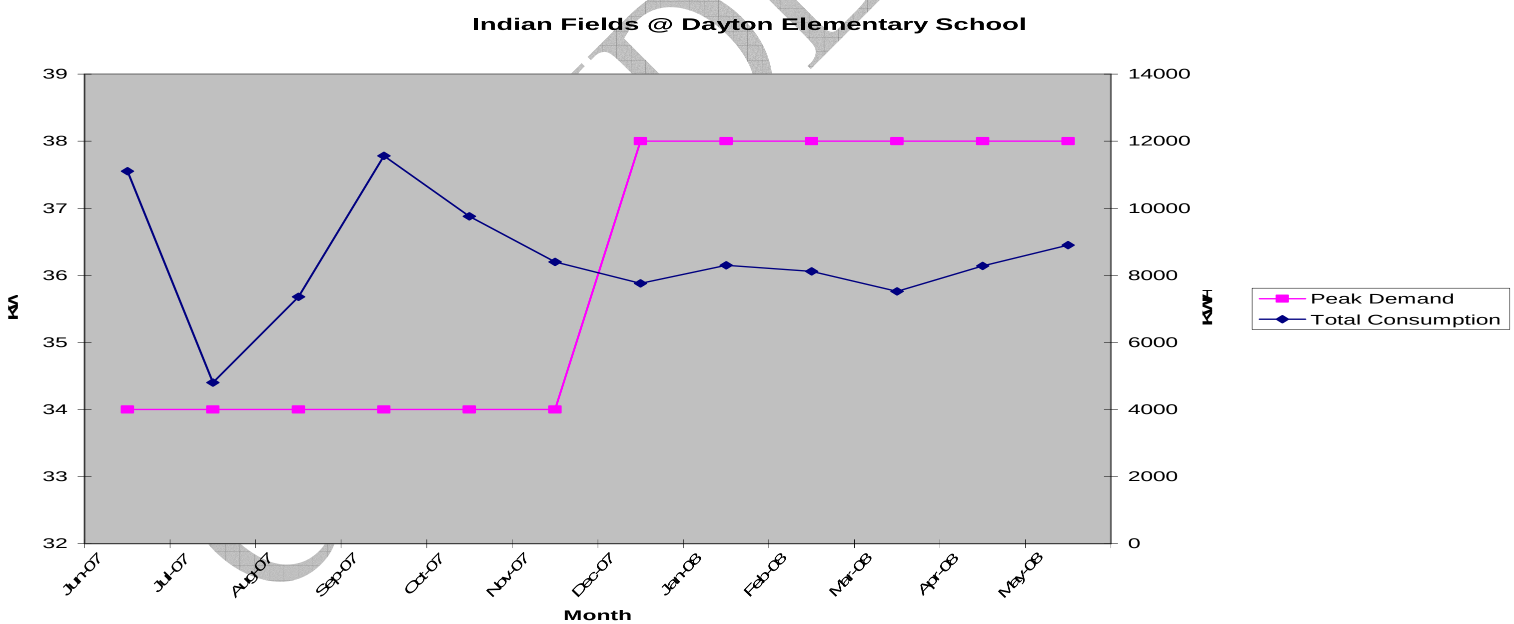
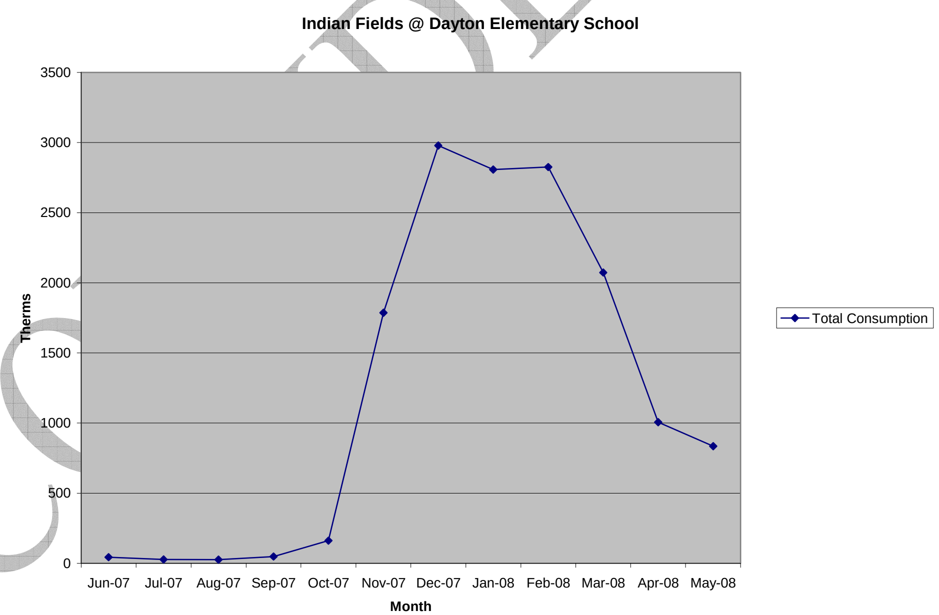


Table 4
Natural Gas Billing Data

Provider	Month	Start Date	End Date	Account	Utility Type	Billing Days	Consumption	Units	Total $
PSE&G CO (14105)	Jun-07	6/1/2007	7/3/2007	6291845911G	Gas	32	44	therms	$ 165.86
PSE&G CO (14105)	Jul-07	7/3/2007	8/1/2007	6291845911G	Gas	29	27	therms	$ 141.35
PSE&G CO (14105)	Aug-07	8/1/2007	8/30/2007	6291845911G	Gas	29	26	therms	$ 139.86
PSE&G CO (14105)	Sep-07	8/30/2007	10/1/2007	6291845911G	Gas	32	48	therms	$ 171.76
PSE&G CO (14105)	Oct-07	10/1/2007	10/30/2007	6291845911G	Gas	29	161	therms	$ 314.06
PSE&G CO (14105)	Nov-07	10/30/2007	11/30/2007	6291845911G	Gas	31	1786	therms	$ 2,920.31
PSE&G CO (14105)	Dec-07	11/30/2007	1/2/2008	6291845911G	Gas	33	2979	therms	$ 4,497.20
PSE&G CO (14105)	Jan-08	1/2/2008	2/1/2008	6291845911G	Gas	30	2808	therms	$ 4,274.47
PSE&G CO (14105)	Feb-08	2/1/2008	3/3/2008	6291845911G	Gas	31	2825	therms	$ 4,188.45
PSE&G CO (14105)	Mar-08	3/3/2008	4/2/2008	6291845911G	Gas	30	2073	therms	$ 3,201.54
PSE&G CO (14105)	Apr-08	4/2/2008	5/1/2008	6291845911G	Gas	29	1006	therms	$ 1,368.07
PSE&G CO (14105)	May-08	5/1/2008	6/2/2008	6291845911G	Gas	32	835	therms	$ 1,155.95
*Note: This chart shows totals of 2 gas meters serving school.						**12 Month Total:**	14618	therms	$ 22,538.88
						Average Cost per therm:	$ 1.54		

Figure 2
Natural Gas Usage Profile



B. Energy Use Index (EUI)

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. Their website allows the user to determine how well the client's building energy use intensity (EUI) compares with similar facilities in the U.S. and NJ.

Elementary School EUI = (Electric Usage in kBtu/h + Gas Usage in kBtu/h) / SF

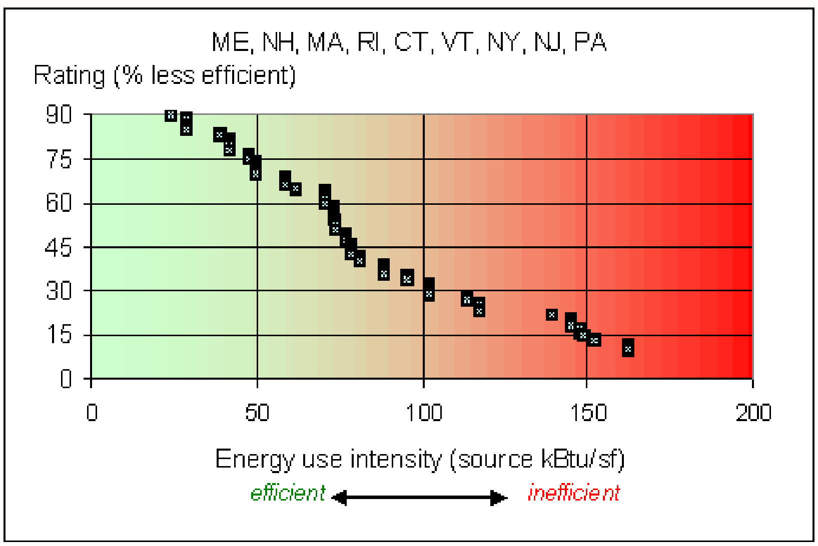
Electric = ((101,860 kWh) * (1000 W/kW) * (3.414 Btu/h / 1 W))/ (1000 Btu/h / 1 kBtu/h)
= 347,750 kbTU/h

Gas = ((14,618 therms) * (100,000 Btu/h / 1 W)) / (1000 Btu/h / 1 kBtu/h) = 1,461,800 kBtu/h

EUI = (347,750 kBTU/h + 1,461,800 kBtu/h) / (23,000 SF) = 79 kBtu/SF

School EUI = 85 kBtu/SF

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 the school district access to monitoring their yearly energy usage as it compares to facilities of similar type. The following is the user name and password for this account:

User Name:	Antcaucci
Password:	password

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
Indian Fields @ Dayton Elementary School	67	50

Specific building types are detailed on the ENERGY STAR website. Non-typical buildings are covered by an "Other" category.

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

V. FACILITY DESCRIPTION

The existing Facility is approximately 23,000 square feet and was constructed in 1928. It is occupied by approximately 260 students and 15 faculty personnel. The facility is open 7am – 6pm Monday through Friday, and closed on the weekends.

The building is a two story structure of steel, brick and block construction with slab on grade. The roof is metal deck with rigid insulation covered by rubber membrane.

Overall the facility's construction is in good condition considering the building was constructed in 1928. The walls are a minimum 14" thick and it appears that double pane replacement windows were installed throughout the building. The main entry door was replaced with a "store front" window wall system which is well sealed.

<u>HVAC System</u>

The building was originally provided with heating only. The heat source is two original Novus Boilers generating 15 psi. steam at a capacity of approximately 2200 MBH each. We're assuming the boilers are about 68% efficient. Both boilers have replacement burners which were installed in the mid 1990's. The boilers cycle on as required to maintain 15 psi. steam in the main header. The boilers operate from October to May and are offline the remaining months of the year. There were no reported problems with the boilers' operation. It should be noted that the boiler room gets extremely hot, in excess of 105ºF, during the heating season due to poor insulation around the boilers and piping. The heat radiating from the boiler room also affects the surrounding rooms and corridors. The custodian routinely receives complaints from the staff in the surrounding areas during heating season.

The classroom heating is provided by steam radiators either mounted on the ceiling or the exterior walls. The radiators and the steam piping are original and appear to operating properly. The steam supply and return piping is not insulated. In addition to radiators the second floor classrooms have unit ventilators with steam heating coils and outside air louvers to provide ventilation. The radiators do not have control valves and provide heating whenever the system is charged with steam. If additional heating is required the unit ventilator fans can be manually engaged to supplement.

The majority of the classrooms and exteriors spaces have window mounted air conditioning units. The equipment is roughly 10 years old. There were no reported problems regarding the operation of the window units.

A renovation occurred around 2004 which included a new Media Center and two new classrooms. The Media Center has a 5 ton ceiling mounted Trane air handling unit to provide cooling. The air handler has a dx cooling coil which is fed refrigerant from a 5 ton outdoor condensing unit. There were no reported problems with the Trane equipment. Heating for the Media Center is provided by a steam radiator. The new classrooms were each outfitted with a 2 ton ductless Sanyo split system for cooling. Their heating is provided by ceiling mounted steam radiators. There were no reported problems with the Sanyo equipment.

Domestic Hot Water

Domestic hot water for the school is provided by a 40 gallon Vanguard water heater with a rated capacity of 40 MBH (input). The unit has an operating efficiency of approx. 83%. There were no reported problems with the heater.

Lighting

The majority of the lighting is first generation T8 fluorescent technology. The facility also has metal halide in its gymnasiums and auditorium area. In all CEG personnel counted approximately 253 fixtures of varying types. The building lighting power density is rated at 0.84 watts per square foot. A room by room count of lighting fixtures is provided in the Appendix. (Refer to the Appendix E – 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 D for the Major Equipment List for this facility.

VII. ENERGY CONSERVATION MEASURES

Life cycle costing (LCC) is an integral part to energy auditing. The applicable costs reviewed in completing a life cycle costing analysis are as follows: utility costs, installation costs, maintenance costs, and equipment replacement costs. The NIST-BLCC 5.3™ program determines operation costs based on the energy use of the building systems (HVAC, lighting, etc.) in conjunction with the utility, installation and maintenance costs. The NIST-BLCC software is endorsed by the Federal Energy Management Program and is the approved software for all federal life cycle costing analysis. When calculating the LCC of a respective ECM, recurring costs for existing HVAC equipment replacement play a major role. The delineation of the respective costs is as follows:

<u>Utility Rates</u>

The utility rates for electric and natural gas are as noted in Section IV of this report.

<u>Installed Costs – Construction Cost Estimate</u>

The installed costs for the energy conservations measures have been completed utilizing RS Means estimating software, engineering estimates and contractor pricing.

Some initial cost can be avoided by utilizing the New Jersey SmartStart$_{tm}$ Financial Incentive program (www.njsmartbuildings.com). The program offers financial incentives on various types of building equipment. Incentives were utilized in CEG's Life Cycle Costing calculations detailed in the financial analysis.

<u>Maintenance Costs</u>

Maintenance costs are based on a variety of variables and are difficult to calculate, therefore it is an industry practice to develop these costs based on the methods established in ASHRAE Applications Handbook 2007, Chapter 36 or to estimate the numbers based on ASHRAE Research Data issued in peer-reviewed journals.

<u>Recurring Costs – Equipment Replacement Costs</u>

HVAC Equipment Replacement Costs are calculated utilizing the installation costs estimated by the cost consultant with an estimated inflation rate (approx. 2.0%) for the time of the study life that the replacement occurs. The recommended service life per ASHRAE Applications Handbook 2007, Chapter 36 has been used as the basis for the analysis software to determine equipment replacement frequency for the 20 year Life Cycle Cost Analysis. Refer to Appendix B for a listing of the recurring / replacement costs per ECM.

<u>Economic Parameters</u>

The LCC analysis was performed using a 20-year Study Life with a Cost of Capital equal to 5%. The project was not modeled as being financed because the project is privately funded. The utility costs, maintenance and replacement costs incorporate a 2.0% average long-term inflation rate calculated annually for the DOE/FEMP projects according to 10 CFR 436. Depending on any unforeseen changes in rate structure by the utility providers, this inflation rate is likely to increase.

Base Building Model

<u>Base Case reflects existing equipment, operating conditions and energy consumption.</u>

Base Building
Energy Consumption Summary

ENERGY CONSUMPTION SUMMARY

	Elect Cons. (kWh)	Gas Cons. (kBtu)	Water Cons. (1000 gals)	% of Total Building Energy	Total Building Energy (kBtu/yr)	Total Source Energy* (kBtu/yr)
Alternative 1						
Primary heating						
Primary heating		2,401,074		87.6 %	2,401,074	2,527,446
Other Htg Accessories	17,059		61	2.1 %	58,222	174,684
Heating Subtotal	**17,059**	**2,401,074**	**61**	**89.7 %**	**2,459,296**	**2,702,130**
Primary cooling						
Cooling Compressor	12,029			1.5 %	41,057	123,182
Tower/Cond Fans	1,051			0.1 %	3,588	10,764
Condenser Pump				0.0 %	0	0
Other Clg Accessories	477			0.1 %	1,628	4,883
Cooling Subtotal....	**13,558**			**1.7 %**	**46,272**	**138,829**
Auxiliary						
Supply Fans	3,110			0.4 %	10,613	31,843
Pumps	50			0.0 %	172	516
Stand-alone Base Utilities				0.0 %	0	0
Aux Subtotal....	3,160			0.4 %	10,785	32,359
Lighting						
Lighting	60,632			7.6 %	206,938	620,877
Receptacle						
Receptacles	5,629			0.7 %	19,212	57,642
Cogeneration						
Cogeneration				0.0 %	0	0
Totals						
Totals**	**100,038**	**2,401,074**	**61**	**100.0 %**	**2,742,503**	**3,551,837**

* 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.

Project Name: Indian Fields @ Dayton School
Dataset Name: P:\Projects 2009\BS09-002\Trace\INDFIELD-DAYTON.TRC

TRACE® 700 v6.2 calculated at 10:57 AM on 04/14/2009
Alternative - 1 Energy Consumption Summary report page 1

ECM # 1: Replace Boilers

The existing boilers heating the school are approximately 68% efficient and have a remaining useful life of maybe 5 more years. We are suggesting replacing the boilers with new 85% efficient boilers with fully modulating capabilities. The existing boilers do not modulate. We recommend installing (2) new Miura LXL-50SG boilers with 1,674 MBH output. The total boiler output would be about 3,348 MBH.

Based on the potential savings and construction costs the simple payback for this alternative is 30 years. The table below shows a summary of the energy consumption for this alternative.

ECM No. 1
Energy Consumption Summary

ENERGY CONSUMPTION SUMMARY

	Elect Cons. (kWh)	Gas Cons. (kBtu)	Water Cons. (1000 gals)	% of Total Building Energy	Total Building Energy (kBtu/yr)	Total Source Energy* (kBtu/yr)
Alternative 2						
Primary heating						
Primary heating		1,937,001		85.5 %	1,937,001	2,038,949
Other Htg Accessories	14,095		47	2.1 %	48,106	144,332
Heating Subtotal	**14,095**	**1,937,001**	**47**	**87.6 %**	**1,985,107**	**2,183,281**
Primary cooling						
Cooling Compressor	11,233			1.7 %	38,338	115,025
Tower/Cond Fans	1,034			0.2 %	3,530	10,590
Condenser Pump				0.0 %	0	0
Other Clg Accessories	477			0.1 %	1,628	4,883
Cooling Subtotal....	**12,744**			**1.9 %**	**43,495**	**130,499**
Auxiliary						
Supply Fans	3,110			0.5 %	10,613	31,843
Pumps	50			0.0 %	172	516
Stand-alone Base Utilities				0.0 %	0	0
Aux Subtotal....	3,160			0.5 %	10,785	32,359
Lighting						
Lighting	60,632			9.1 %	206,938	620,877
Receptacle						
Receptacles	5,629			0.9 %	19,212	57,642
Cogeneration						
Cogeneration				0.0 %	0	0
Totals						
Totals**	**96,260**	**1,937,001**	**47**	**100.0 %**	**2,265,538**	**3,024,657**

* 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.

Project Name: Indian Fields @ Dayton School
Dataset Name: P:\Projects 2009\BS09-002\Trace\INDFIELD-DAYTON.TRC

TRACE® 700 v6.2 calculated at 10:57 AM on 04/14/2009
Alternative - 2 Energy Consumption Summary report page 1

ECM # 2: Variable Refrigerant Volume HVAC System – Air Cooled

The existing air conditioning system located in the classrooms is a mixture of residential style window units, ductless split systems and ducted split systems. All of the equipment is in good condition but doesn't represent a very efficient option for air conditioning.

In this alternative we are suggesting to install a Daikin variable refrigerant volume HVAC system in lieu of the existing systems. The VRV system allows for a centralized system which can heat and cool simultaneously along with full modulation. VRV is a combination of ductless indoor equipment, similar to the existing Sanyo units, being fed from exterior mounted condensing units. The condensing units have scroll compressors modulating incrementally down to 25% of the total capacity. Although we would suggest installing this type of system for the entire building, this alternative suggests cooling for the rooms that currently have cooling.

Based on the potential savings and construction costs the simple payback for this alternative is 44 years. The table below shows a summary of the energy consumption for this alternative.

ECM No. 2
Energy Consumption Summary

ENERGY CONSUMPTION SUMMARY

	Elect Cons. (kWh)	Gas Cons. (kBtu)	Water Cons. (1000 gals)	% of Total Building Energy	Total Building Energy (kBtu/yr)	Total Source Energy* (kBtu/yr)
Alternative 3						
Primary heating						
Primary heating		2,286,500		88.4 %	2,286,500	2,406,842
Other Htg Accessories	17,059		61	2.3 %	58,222	174,684
Heating Subtotal	**17,059**	**2,286,500**	**61**	**90.7 %**	**2,344,722**	**2,581,525**
Primary cooling						
Cooling Compressor	2,231			0.3 %	7,613	22,842
Tower/Cond Fans	1,515			0.2 %	5,171	15,515
Condenser Pump				0.0 %	0	0
Other Clg Accessories	148			0.0 %	504	1,513
Cooling Subtotal....	**3,894**			**0.5 %**	**13,289**	**39,870**
Auxiliary						
Supply Fans	351			0.1 %	1,199	3,598
Pumps	50			0.0 %	172	516
Stand-alone Base Utilities				0.0 %	0	0
Aux Subtotal....	402			0.1 %	1,371	4,114
Lighting						
Lighting	60,632			8.0 %	206,938	620,877
Receptacle						
Receptacles	5,629			0.7 %	19,212	57,642
Cogeneration						
Cogeneration				0.0 %	0	0
Totals						
Totals**	**87,616**	**2,286,500**	**61**	**100.0 %**	**2,585,532**	**3,304,028**

* 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.

Project Name: Indian Fields @ Dayton School
Dataset Name: P:\Projects 2009\BS09-002\Trace\INDFIELD-DAYTON.TRC

TRACE® 700 v6.2 calculated at 10:57 AM on 04/14/2009
Alternative - 3 Energy Consumption Summary report page 1

ECM # 3: Variable Refrigerant Volume HVAC System – Ground Loop Cooled

This alternative is very similar to alternative 3 except in lieu of air cooled condensing units we're suggesting a water cooled heat pump connected to a ground cooling loop. We've shown the same indoor equipment as alternative 2. The heat pump would be connected via water piping to an underground web of piping which would reject its heat. Condenser water pumps would circulate the water through the heat pump and ground loop. The ground acts a heat sink as opposed to operating air cooled equipment.

Based on the potential savings and construction costs the simple payback for this alternative is 68 years. The table below shows a summary of the energy consumption for this alternative.

ECM No. 3
Energy Consumption Summary

ENERGY CONSUMPTION SUMMARY

	Elect Cons. (kWh)	Gas Cons. (kBtu)	Water Cons. (1000 gals)	% of Total Building Energy	Total Building Energy (kBtu/yr)	Total Source Energy* (kBtu/yr)
Alternative 4						
Primary heating						
Primary heating		2,286,500		88.6 %	2,286,500	2,406,842
Other Htg Accessories	17,059		61	2.3 %	58,222	174,684
Heating Subtotal	**17,059**	**2,286,500**	**61**	**90.9 %**	**2,344,722**	**2,581,525**
Primary cooling						
Cooling Compressor	1,721			0.2 %	5,875	17,628
Tower/Cond Fans				0.0 %	0	0
Condenser Pump				0.0 %	0	0
Other Clg Accessories	148			0.0 %	504	1,513
Cooling Subtotal....	**1,869**			**0.3 %**	**6,380**	**19,141**
Auxiliary						
Supply Fans	351			0.1 %	1,199	3,598
Pumps	343			0.1 %	1,170	3,512
Stand-alone Base Utilities				0.0 %	0	0
Aux Subtotal....	694			0.1 %	2,370	7,110
Lighting						
Lighting	60,632			8.0 %	206,938	620,877
Receptacle						
Receptacles	5,629			0.7 %	19,212	57,642
Cogeneration						
Cogeneration				0.0 %	0	0
Totals						
Totals**	**85,884**	**2,286,500**	**61**	**100.0 %**	**2,579,622**	**3,286,296**

* 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.

Project Name: Indian Fields @ Dayton School
Dataset Name: P:\Projects 2009\BS09-002\Trace\INDFIELD-DAYTON.TRC

TRACE® 700 v6.2 calculated at 10:57 AM on 04/14/2009
Alternative - 4 Energy Consumption Summary report page 1

ECM # 4: Lighting Upgrade

Upgrade the Fluorescent Lighting

A simple change from old to new can provide substantial savings. A typical drop-ceiling lay in fixture with two, 4-foot lamps (32 Watt lamps) has a total wattage of about 64 Watts. By using the new 28 Watt energy saving lamps and ballasts the total wattage would be about 56 Watts. The new 28 Watt T8 energy saver lamps can fit right into the existing fixtures without any fixture modifications. The 28 Watt T8 allows you to save four watts per lamp and up to 15% in energy costs. This comes at the price of decreased lumen output. This means that the room light levels will drop about 15%.

The 28 Watt T8 should operate on the existing T8 ballast. However, if you choose to upgrade to the new high efficiency ballast, you can realize up to 6% in energy savings. They, too, can fit into the existing fixtures without any fixture modifications.

Regarding fixtures that have magnetic ballasts, energy efficient electronic ballasts reduce lighting system costs by using less power and offer the ability to use fewer ballasts to serve the lighting system. The existing ballasts add wattage to the lighting system due to their operating characteristics. Electronic ballasts subtract wattage from the lighting system due to their operating characteristics. The existing ballasts can only operate up to two lamps. One electronic ballast can operate up to four lamps, resulting in fewer ballasts required to serve the lighting system. Further ballast reductions may be possible by “tandem wiring” the ballasts. Instead of using one ballast for every fixture, it may be feasible to use one ballast for every two or more fixtures. A single ballast can operate the lamps in adjacent light fixtures.

Install Compact Fluorescent Lighting

Compact fluorescent lamps (CFL’s) were created to be replacements for the standard incandescent lamps that are common to table lamps, spot lights, hi-hats, bathroom vanity lighting, etc. The light output of the CFL has been designed to look like the incandescent lamp. The color rendering index (CRI) of the CFL is much higher than standard fluorescent lighting, and therefore provides a much “truer” light. In some instances, this is still not the desired ambiance, but in most cased the significant energy savings and the “neat incandescent” effect is welcomed.

The CFL buyer should spend some time shopping around, since the CFL is available in a myriad of shapes and sizes depending on the specific application. But for almost any application, there is a lamp that fits the need. Typical replacements are: a 13-Watt CFL for a 60-Watt incandescent lamp, an 18-Watt CFL for a 75-Watt incandescent lamp, and a 25-Watt CFL for a 100-Watt incandescent lamp.

The CFL is also available for a number of “brightness colors” that is indicated by the Kelvin rating. A 2700K CFL is the “warmest” color available and is closest in color to the incandescent lamp. Then there is a 3000K, a 3500K, and a 4100K. The 4100K would be the "brightest" or "coolest" output. It would be wise to see an example of each before making a purchase, and even to see a sample of the lamp you are buying since Kelvin ratings vary between manufacturers.

A CFL can be chosen to screw right into your existing fixtures, or a new pin-based CFL fixture could be purchased. A pin-based CFL fixture makes it impossible for someone to replace the lamp with a screw base incandescent.

Replace 250 watt metal halide fixtures

Replacement of the existing 250 watt metal halide fixtures in the gymnasium and cafeteria with T5HO fluorescent fixtures may offer energy savings. The T5HO fixtures use less power than the existing fixtures. The new fixture will need to be equipped with a wire guard for protection of the lamps. Metal Halide fixtures require a warm up time to come to full brightness; because of this, the fixtures tend to be turned on and left on all day. The T5HO fixtures will come to full brightness instantaneously allowing for the gym fixtures to be switched off when it is not in use.

Install LED Exit Signs

LED stands for light-emitting-diode. LED's are very small light sources that people most readily associate with electronic equipment. LED exit signs have been made in a variety of shapes and sizes and there are also retrofit kits that allow you to simply modify your existing exit signs to accommodate the LED technology. The benefits of LED are twofold. First, you are installing an exit sign that will last for 20-30 years without maintenance. This results in tremendous maintenance savings because the incandescent or fluorescent lamps that you are currently using need to be replaced at a rate of 1-5 times per year. Lamp costs ($2-$7 each) and labor costs ($8-$20 per lamp) add up rapidly. The second benefit of LED is that it only uses 2 Watts. In comparison, your existing sign uses 10-40 or even 60 Watts. It is highly recommended that you install samples of the products that you are interested in purchasing. This will confirm that they are compatible with you electrical system.

Simple Payback for This Measure = 0.6 Years

A detailed Investment Grade Lighting Audit can be found in Appendix E.

<u>*Install Lighting Controls to Reduce the Lighting Use*</u>

In some areas the lighting is left on unnecessarily. Many times this is due to the idea that it is better to keep the lights on rather than to continuously switch them on and off. The on/off dilemma was studied and it was found that the best option is to turn the lights off whenever possible. Although this does reduce the lamp life, the energy savings far outweigh the lamp replacement costs. The cutoff for when to turn the lights off is around two minutes. If the lights can be off for only a two minute interval, then it pays to shut them off.

Lighting controls come in many forms. Sometimes an additional switch is all it would take. Another type is the time-clock which allows the user to set an on/off schedule. Time-clocks can be a dial clock with on/off indicators on it, or a time-clock can be a small box the size of a thermostat where the user programs the on/off schedule in a digital format like setting the alarm on a wristwatch. Occupancy sensors detect motion and will switch the lights on when the room is occupied. They can either be mounted in place of the current wall switch, or they can be mounted on the ceiling to cover large areas. Lastly, photocells are a lighting control that sense light levels and will turn the lights off when there is adequate daylight. These are mostly used outside, but they are becoming much more popular in energy-efficient office designs as well under the “daylight harvesting” name.

Lutron offers a system where the retrofitted ballasts are addressable, like a fire alarm system. Each ballast in this system can be controlled independently. This allows for more switching options and dimming capability. The system would require all of the ballasts and switches to be replaced. The system is expandable, so you could start with a single classroom and slowly add more and more classrooms to the system. Furthermore, this system can be expanded to include utilizes daylight sensors and/or occupancy sensors. All of these measures (dimming, occupancy sensors and daylight harvesting) are energy saving strategies brought together in one efficient system. They even offer a software package that would allow you to track the savings and each classroom could see how much energy they are saving.

To determine an estimated savings for lighting controls, we used ASHAE 90.1-2004 (NJ Energy Code). Appendix G states that occupancy sensors have a 10% power adjustment factor for daytime occupancies for buildings over 5,000 SF. CEG recommends the installation of dual technology occupancy sensors in all classrooms, private offices, conference rooms, restrooms, lunch rooms, storage rooms, lounges, file rooms, etc.

From Appendix C of this report, we calculated the lighting power density (Watts/ft^2) of the existing school to be 19,271 Watts / 23,000 SF = 0.84 Watts/SF. Ten percent of this value is the resultant energy savings due to installation of occupancy sensors:

10% x 19,271 watts x 2470 hrs/yr.

= 4,760 kWh x $0.18/kWh

Savings = $857 / yr

Installation cost per dual-technology sensor is $75/unit. Total number of rooms to be retrofitted is 38. Total cost to install sensors is $7,410.

Simple Payback = 8.6 Years.

VIII. RENEWABLE/DISTRIBUTED ENERGY MEASURES (ECM # 5)

In recent years renewable energy has leaped into mainstream society affecting global 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 underneath the Board of Public Utilities and instituted a Renewable Energy Incentive Program to provide additional funding to private and public entities for installing qualified 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 Indian Fields @ Dayton Elementary, and concluded that there is a potential for solar energy generation.

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

CEG has reviewed the existing roof area of the building being audited for the purposes of determining a potential for a roof mounted photovoltaic system. A roof area of 10,800 S.F. can be utilized for a PV system on the Elementary School. 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 49 kilowatts could be installed. A system of this size has an estimated kilowatt hour production of 76,795 KWh annually, reducing the overall utility bill by almost 64%. 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 90% of the total project cost financed at a 5% interest rate over 20 years. Direct purchase involves the local government paying 100% of the total cost upfront. Both of these calculations include 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	Life Cycle Payback	IRR
Self-Finance	13.5 Years	34 %
Direct Purchase	9.3 Years	10 %

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. Refer to Section IV, Figures 1 and 2 included within this report to reference the respective electricity and natural gas usage load profile for June 2007 through May 2008.

Electricity:

Section IV, Figure 1 demonstrates an atypical cooling profile, (April –October), typically with a complimenting heating load. But in the data provided June is the second highest month of consumption (which can be typical being it is a summer month) and July (typically one of the year's peak months) shows the lowest annual consumption. September 2007 is the month with the highest consumption. These tumultuous peaks require further investigation as does the kW demand.

Natural Gas:

Section IV, Figure 2 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.

Tariff Analysis:

Electricity:

South Brunswick – Indian Fields @ Dayton receives electrical service through Public Service Electric and Gas Company (PSE&G) on a LPL (Large Power and Lighting Service) rate. This utility tariff is for delivery service for general purposes at secondary distribution voltages where the customer's measured peak demand exceeds 150 kilowatts in any month and also at primary distribution charges. The rate schedule has a Delivery Charge, Societal Benefits Charge, Non-utility Generation Charge, Securitization Charge, System Control Charge, Customer Account Services Charge, Standby Fee, Base Rate Distribution Adjustment Charge, Solar Pilot Recovery Charge and RGGI Charge. The customer can elect to have the Commodity Charge serviced through the utility or by a Third Party Supplier (TPS).

The Dayton School has additional meters and electric service. There is a BPL utility rate and a GLP utility rate. BPL is The Body Politic Lighting Service. This service is for luminaries, poles and appurtenances and area lighting to do a body politic served from Company owned lighting facilities. Customers may either purchase electric supply from a Third Party Supplier (TPS) or from PSE&G's Basic Generation Service default service as detailed in the rate schedule. Charges include: A Monthly Charge Unit, Delivery Charge, Societal Benefits Charge, Non-utility Generation Charge, Securitization Transition Charge, System Control Charge, Base-Rate Distribution Kilowatt-hour Adjustment, Solar Pilot Recovery Charge, RGGI Recovery Charge, Lighting Pole Charges and Commodity Charges. Commodity Charges can be purchased from a TPS. The Dayton School is paying $.0764 per kWh.

The Dayton School is also serviced by utility rate GLP (General Lighting and Power Service). This utility rate is for Delivery service for general purposes at secondary distribution voltages. Customers may either purchase electric supply from a Third Party Supplier of from PSE&G's, Basic Generation Service default service as detailed in the rate schedule. This rate includes the same basic charges as rate BPL. The Dayton School is paying $0.12 per kWh.

<u>Natural Gas:</u>

South Brunswick – Indian Fields @ Dayton receives natural gas service through Public Service Electric and Gas Company (PSE&G) on a LVG (Large Volume Service) rate class, when not receiving commodity by a Third Party Supplier. 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.

The Dayton Schools also receives natural gas service from PSE&G on a utility rate GSGH. CEG received an example bill for The Dayton School for the period of December 27, 2008 – January 23, 2009 to review current usage and TPS charges. In reviewing this bill, an imbalance charge has been applied to the natural gas account (and to the LVG Account). These 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, The Dayton School 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 25%-50% above market price.

Additionally, the MRESC charges $.0325 per dekatherm 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.

Recommendations:

CEG recommends a global approach that will be consistent with all facilities within the South Brunswick School District. CEG's primary observation is seen in the electricity costs. South Brunswick's "weighted average price" per kWh (kilowatt hour) for all buildings is $.1614/kWh (kWh is the common unit of electric measure). The average price per dekatherm 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 savings of over $500,000 per year (Note: Savings were calculated using South Brunswick High School's Average Annual Consumption of 8,520,053 kWh and a variance of $.06/kWh 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 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.

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 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. Repair/replace piping and ductwork insulation in the attic spaces.

E. Reduce lighting in specified areas where the foot-candle levels are above 70 in private offices and above 30 in corridor, lobbies, etc. During the site survey, many areas were measured at over 100 foot-candles.

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

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

H. Efficient parking lot lighting fixtures can reduce the energy use on the site without compromising safety or illumination. "Hockey puck" fixtures which use 175-Watt metal halide lamps use 70% less electricity than "cobra head" fixtures using 250-watt high pressure sodium lamps.

I. Clean all fixtures to maximize light output.

J. Feel for air drafts around electrical outlets. Inexpensive pads are available, as are plugs for unused sockets.

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

In addition to the recommendations above CEG would also like to suggest Retro-Commissioning. Retro-Commissioning is a means to verify your current equipment is operating at their designed capacity, airflow, etc. Commissioning agents would use an independent balancing company to perform air and water balancing on the existing systems.

APPENDIX

Electric Cost Summary

Indian Fields @ Dayton Elementary

PSE & G

Acct.No:6291845911E

Month	Jun-07	Jul-07	Aug-07	Sep-07	Oct-07	Nov-07	Dec-07	Jan-08	Feb-08	Mar-08	Apr-08	May-08	Total
Last Meter Read Date	6/1/2007	7/3/2007	8/1/2007	8/30/2007	10/1/2007	10/30/2007	11/30/2007	1/2/2008	2/1/2008	3/3/2008	4/2/2008	5/1/2008	6/1/2007
Current Meter Read Date	7/3/2007	8/1/2007	8/30/2007	10/1/2007	10/30/2007	11/30/2007	1/2/2008	2/1/2008	3/3/2008	4/2/2008	5/1/2008	6/2/2008	6/2/2008
Billing Days	32	29	29	32	29	31	33	30	31	30	29	32	367
KWH	11,100	4,800	7,360	11,560	9,760	8,400	7,760	8,300	8,120	7,520	8,280	8,900	101,860
KW	43	43	43	43	43	43	36	36	36	36	36	36	43
Monthly Load Factor	34%	16%	25%	35%	33%	26%	27%	32%	30%	29%	33%	32%	29%
Electric Delivery, $	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Delivery $/kwh	$0.000	$0.000	$0.000	$0.000	$0.000	$0.000	$0.000	$0.000	$0.000	$0.000	$0.000	$0.000	$0
Electric Supply, $	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Supply $/kwh	$0.000	$0.000	$0.000	$0.000	$0.000	$0.000	$0.000	$0.000	$0.000	$0.000	$0.000	$0.000	$0
Total Cost, $	$2,427	$1,315	$1,861	$2,478	$1,485	$1,265	$1,191	$1,271	$1,261	$1,178	$1,253	$1,414	$18,398
$/KWH	$0.2187	$0.2740	$0.2528	$0.2144	$0.1521	$0.1505	$0.1535	$0.1531	$0.1553	$0.1566	$0.1513	$0.1589	$0.1806

Natural Gas Cost Summary

Indian Fields @ Dayton
Elementary
PSE & G
Acct. No.6291845911G

Month	Jun-07	Jul-07	Aug-07	Sep-07	Oct-07	Nov-07	Dec-07	Jan-08	Feb-08	Mar-08	Apr-08	May-08	Total
Billing Days	32	29	29	32	29	31	33	30	31	30	29	32	367
Last Meter Read Date	6/1/2007	7/3/2007	8/1/2007	8/30/2007	10/1/2007	10/30/2007	11/30/2007	1/2/2008	2/1/2008	3/3/2008	4/2/2008	5/1/2008	6/1/2007
Current Meter Read Date	7/3/2007	8/1/2007	8/30/2007	10/1/2007	10/30/2007	11/30/2007	1/2/2008	2/1/2008	3/3/2008	4/2/2008	5/1/2008	6/2/2008	6/2/2008
Gas Used per 100 cu ft	0	0	0	0	0	0	0	0	0	0	0	0	0
BTU Factor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Therms (Burner Tip)	44	27	26	48	161	1,786	2,979	2,808	2,825	2,073	1,006	835	14,618
Total Distribution Cost	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Cost per Therm	$0.000	$0.000	$0.000	$0.000	$0.000	$0.000	$0.000	$0.000	$0.000	$0.000	$0.000	$0.000	$0.000
Total Commodity Cost	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Cost per Therm	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Total Cost	$166	$141	$140	$172	$314	$2,920	$4,497	$4,274	$4,188	$3,202	$1,368	$1,156	$22,538
Cost per Therm	$3.77	$5.22	$5.38	$3.58	$1.95	$1.63	$1.51	$1.52	$1.48	$1.54	$1.36	$1.38	$1.54

CONSTRUCTION COST AND REBATES

BASE CASE - EXISTING EQUIPMENT	Qty	Unit Cost $	Material $	Labor $	Total $
Total Cost			$0	$0	**$0**
ECM # 1 - HIGH EFFICIENCY STEAM BOILERS	Qty	Unit Cost $	Material $	Labor $	Total $
50 HP Miura Boiler (85% Eff.)	2	$40,000	$80,000	$140,000	$220,000
Steam Accessories	1	$15,000	$15,000	$26,250	$41,250
Piping	1	$5,000	$5,000	$8,750	$13,750
Demo Old Boilers	1		$5,000	$8,750	$13,750
Controls	1			$4,000	$4,000
Boiler Rebate ($1/MBH)					$3,450
Total					**$289,300**
ECM # 2 - VARIABLE REFRIGERANT HVAC SYSTEM - AIR COOLED	Qty	Unit Cost $	Material $	Labor $	Total $
Daikin Variable Refrigerant System 30 Ton Total Capacity	1	$65,000	$65,000	$130,000	$195,000
Central DX Rebate ($50/Ton)					$1,500
Total					**$193,500**
ECM # 3 - VARIABLE REFRIGERANT HVAC SYSTEM - GROUND LOOP COOLED	Qty	Unit Cost $	Material $	Labor $	Total $
Daikin Variable Refrigerant System 30 Ton Total Capacity	1	$70,000	$70,000	$140,000	$210,000
Bore Field	30	$800	$24,000	$48,000	$72,000
Piping/System Pump	1	$15,000	$15,000	$30,000	$45,000
Ground Source Loop Rebate (>=16 EER) $370/ton					$11,100
Total					**$315,900**
ECM # 4 - LIGHTING RETROFIT	Qty	Unit Cost $	Material $	Labor $	Total $
Lighting Retrofit	1	$8,271	$8,271	$15,420	$23,691
Lighting Rebate					$0
Total					**$23,691**
ECM # 5 - PV SOLAR	Qty	Unit Cost $	Material $	Labor $	Total $
PV Solar	160	$1,525	$244,000	$146,400	$390,400
Total					**$390,400**

EQUIPMENT REPLACEMENT COST FOR EACH ALTERNATE

BASE CASE - EXISTING EQUIPMENT

	$	Life	Yr Incurred
Existing Steam Boilers - Cast Iron	$40,000	35	5
Existing Steam Boilers' Burners	$10,000	21	5
Existing Air Conditioning Equipment	$20,000	15	10
New High Efficiency Steam Boilers	$0	25	25
New VRV HVAC System - Air Cooled	$0	20	20
New VRV HVAC System - Ground Loop Cooled	$0	20	20

ECM # 1 - HIGH EFFICIENCY STEAM BOILERS

	$	Life	Yr Incurred
Existing Steam Boilers - Cast Iron	$0	35	5
Existing Steam Boilers' Burners	$0	21	5
Existing Air Conditioning Equipment	$20,000	15	10
New High Efficiency Steam Boilers	$80,000	25	25
New VRV HVAC System - Air Cooled	$0	20	20
New VRV HVAC System - Ground Loop Cooled	$0	20	20

ECM # 2 - VARIABLE REFRIGERANT HVAC SYSTEM - AIR COOLED

	$	Life	Yr Incurred
Existing Steam Boilers - Cast Iron	$40,000	35	5
Existing Steam Boilers' Burners	$10,000	21	5
Existing Air Conditioning Equipment	$0	15	10
New High Efficiency Steam Boilers	$0	25	25
New VRV HVAC System - Air Cooled	$65,000	20	20
New VRV HVAC System - Ground Loop Cooled	$0	20	20

ECM # 3 - VARIABLE REFRIGERANT HVAC SYSTEM - GROUND LOOP COOLED

	$	Life	Yr Incurred
Existing Steam Boilers - Cast Iron	$40,000	35	5
Existing Steam Boilers' Burners	$10,000	21	5
Existing Air Conditioning Equipment	$0	15	10
New High Efficiency Steam Boilers	$0	25	25
New VRV HVAC System - Air Cooled	$0	20	20
New VRV HVAC System - Ground Loop Cooled	$70,000	20	20

ECM # 4 - LIGHTING RETROFIT

	$	Life	Yr Incurred
Existing Steam Boilers - Cast Iron	$40,000	35	5
Existing Steam Boilers' Burners	$10,000	21	5
Existing Air Conditioning Equipment	$20,000	15	10
New High Efficiency Steam Boilers	$0	25	25
New VRV HVAC System - Air Cooled	$0	20	20
New VRV HVAC System - Ground Loop Cooled	$0	20	20

ECM # 5 - PV SOLAR

	$	Life	Yr Incurred
Existing Steam Boilers - Cast Iron	$40,000	35	5
Existing Steam Boilers' Burners	$10,000	21	5
Existing Air Conditioning Equipment	$20,000	15	10
New High Efficiency Steam Boilers	$0	25	25
New VRV HVAC System - Air Cooled	$0	20	20
New VRV HVAC System - Ground Loop Cooled	$0	20	20

Annual Maintenance Cost				
ECM	**Base**	**Additional**	**Solar PV**	**Total**
BASE CASE - EXISTING EQUIPMENT	$8,400	$0	$0	$8,400
ECM # 1 - HIGH EFFICIENCY BOILERS	$8,400	-$420	$0	$7,980
ECM # 2 - VARIABLE REFRIGERANT HVAC SYSTEM - AIR COOLED	$8,400	$0	$0	$8,400
ECM # 3 - VARIABLE REFRIGERANT HVAC SYSTEM - GROUND LOOP COOLED	$8,400	$0	$0	$8,400
ECM # 4 - LIGHTING RETROFIT	$8,400	$0	$0	$8,400
ECM # 5 - SOLAR PV SYSTEM	$8,400	$0	$0	$8,400

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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

APPENDIX D

TAG	MAKE	MODEL	TYPE	CAPACITY	EFFICIENCY	SERVES	LOCATION	REMAINING USEFUL LIFE	NOTES
-	FRIEDRICH	-	WINDOW AIR CONDITIONER	2 TONS	8.9 EER	NUMEROUS ROOMS	OFFICES & CLASSROOMS	10 YEARS	RESIDENTIAL STYLE WINDOW AIR CONDITIONER, QTY. 14
SS-1	TRANE	-	HORIZONTAL AIR HANDLER	2000 CFM	N/A	MEDIA CENTER	ABOVE CEILING - MEDIA CENTER	10 YEARS	UNIT HUNG ABOVE CEILING, WALL MOUNTED THERMOSTAT, NO HEAT
SS-1A	TRANE	2TTB060	CONDENSING UNIT	5 TONS	10 SEER	SS-1	REAR OF BUILDING OUTSIDE MEDIA CENTER	10 YEARS	UNIT MOUNTED OUTSIDE ON PAD
SS-2	SANYO	KS2422	DUCTLESS AIR CONDITIONER	800 CFM	N/A	NEW CLASSROOM - NORTHWEST CORNER	CLASSROOM - NORTHWEST CORNER	10 YEARS	DUCTLESS UNIT, WALL MOUNTED, REMOTE THERMOSTAT.
SS-2A	SANYO	C2422	CONDENSING UNIT	2 TONS	10 SEER	SS-2	LEFT SIDE - NORTHWEST FRONT	10 YEARS	UNIT MOUNTED OUTSIDE ON PAD.
SS-3	SANYO	KS2422	DUCTLESS AIR CONDITIONER	800 CFM	N/A	NEW CLASSROOM - NORTHWEST FRONT	CLASSROOM - NORTHWEST FRONT	10 YEARS	DUCTLESS UNIT, WALL MOUNTED, REMOTE THERMOSTAT.
SS-3A	SANYO	C2422	CONDENSING UNIT	2 TONS	10 SEER	SS-3	LEFT SIDE - NORTHWEST FRONT	10 YEARS	UNIT MOUNTED OUTSIDE ON PAD.
SS-4	SANYO	KS1211	DUCTLESS AIR CONDITIONER	400 CFM	N/A	ART ROOM	ART ROOM	10 YEARS	DUCTLESS UNIT, WALL MOUNTED, REMOTE THERMOSTAT.
SS-4A	SANYO	C1211	CONDENSING UNIT	1 TON	10 SEER	SS-4	FRONT RIGHT SIDE - SOUTHWEST CORNER	10 YEARS	UNIT MOUNTED OUTSIDE ON PAD.
SS-5	SANYO	KS1211	DUCTLESS AIR CONDITIONER	400 CFM	N/A	ART ROOM	ART ROOM	10 YEARS	DUCTLESS UNIT, WALL MOUNTED, REMOTE THERMOSTAT.
SS-5A	SANYO	C1211	CONDENSING UNIT	1 TON	10 SEER	SS-5	FRONT RIGHT SIDE - SOUTHWEST CORNER	10 YEARS	UNIT MOUNTED OUTSIDE ON PAD.
B-1	NOVUS	40811H	STEAM BOILER	2200 MBH INPUT	68%	STEAM RADIATORS	GROUND FLOOR BOILER ROOM	5 YEARS	VINTAGE 1928, POWER FLAME BURNER WITH 1/2 HP
B-2	NOVUS	40811H	STEAM BOILER	2200 MBH INPUT	68%	STEAM RADIATORS	GROUND FLOOR BOILER ROOM	5 YEARS	VINTAGE 1928, POWER FLAME BURNER WITH 1/2 HP
HWH-1	VANGUARD	GE714	DOMESTIC WATER HEATER & STORAGE TANK	40 GAL., 40 MBH INPUT	83%	HOT WATER	GROUND FLOOR UTILITY ROOM	5 YEARS	RESIDENTIAL STYLE HEATER

Assummed Burn Hours of 10 Hrs/Day Weekday, 5 Hours Saturday, 0 Hours Sunday for 42 Week a year, Summer Hours 4 Hours/Day Weekday, Closed Weekends, 8 Weeks a y

	Existing Fixtures									Proposed Fixtures											Fixtures Retrofitted			Unit Installation Cost							
Existing Lighting Fixture Type	Room Number	Room Name	Lighting Fixture Description	Lamps per Fixture	Foot Candles	Voltage	Watts	Qty of Fixtures	Total Watts	New Lighting Fixture Type	Existing/Replace	Description	Lamps per Fixture	Foot Candles	Watts	Qty of Fixtures	Total Watts	Wattage Reduction	Average Burn Hours	Ave $/kwh	Energy Savings, kWh	Energy Savings, $	Qty	Material Each	Labor Each	Total Each	Total Materials	Total Labor	Total All	Rebate Estimate	Simple Payback
		First Floor																													
B2	Boiler Rm	Boiler Room	2L-T8-1'x4'	2		120	59	4	236	B2 Retro	Relamp, Reballast	28w-T8 energey saver w/ electronic T8 High Efficiency balast	2		42	4	168	68	2470	$0.18	168	$30.23	4	22.28	60	$82.28	$89.12	$240.00	$329.12	$0.00	10.9
B2	Coal Bunker	Coal Bunker	2L-T8-1'x4'	2		120	59	4	236	B2 Retro	Relamp, Reballast	28w-T8 energey saver w/ electronic T8 High Efficiency balast	2		42	4	168	68	2470	$0.18	168	$30.23	4	22.28	60	$82.28	$89.12	$240.00	$329.12	$0.00	10.9
B2	Pump Room	Pump Room	2L-T8-1'x4'	2		120	59	1	59	B2 Retro	Relamp, Reballast	28w-T8 energey saver w/ electronic T8 High Efficiency balast	2		42	1	42	17	2470	$0.18	42	$7.56	1	22.28	60	$82.28	$22.28	$60.00	$82.28	$0.00	10.9
B3	Board Rm	Board Room	3L-T8-1'x4'	3		120	87	4	348	B3 Retro	Relamp, Reballast	28w-T8 energey saver w/ electronic T8 High Efficiency balast	3		63	4	252	96	2470	$0.18	237	$42.68	4	23.93	60	$83.93	$95.72	$240.00	$335.72	$0.00	7.9
B2	Board Rm	Board Room	2L-T8-1'x4'	2		120	59	8	472	B2 Retro	Relamp, Reballast	28w-T8 energey saver w/ electronic T8 High Efficiency balast	2		42	8	336	136	2470	$0.18	336	$60.47	8	22.28	60	$82.28	$178.24	$480.00	$658.24	$0.00	10.9
B3	Classroom	Classroom	3L-T8-1'x4'	3		120	87	4	348	B3 Retro	Relamp, Reballast	28w-T8 energey saver w/ electronic T8 High Efficiency balast	3		63	4	252	96	2470	$0.18	237	$42.68	4	23.93	60	$83.93	$95.72	$240.00	$335.72	$0.00	7.9
B2	Classroom	Classroom	2L-T8-1'x4'	2		120	59	8	472	B2 Retro	Relamp, Reballast	28w-T8 energey saver w/ electronic T8 High Efficiency balast	2		42	8	336	136	2470	$0.18	336	$60.47	8	22.28	60	$82.28	$178.24	$480.00	$658.24	$0.00	10.9
B1	Boys Rm	Boys Restroom	1L-T8-1'x4'	1		120	30	2	60	B1 Retro	Relamp, Reballast	28w-T8 energey saver w/ electronic T8 High Efficiency balast	1		22	2	44	16	2470	$0.18	40	$7.11	2	22.28	60	$82.28	$44.56	$120.00	$164.56	$0.00	23.1
B1	Girls Rm	Girls Restroom	1L-T8-1'x4'	1		120	30	2	60	B1 Retro	Relamp, Reballast	28w-T8 energey saver w/ electronic T8 High Efficiency balast	1		22	2	44	16	2470	$0.18	40	$7.11	2	22.28	60	$82.28	$44.56	$120.00	$164.56	$0.00	23.1
B3	Classroom	Classroom	3L-T8-1'x4'	3		120	87	4	348	B3 Retro	Relamp, Reballast	28w-T8 energey saver w/ electronic T8 High Efficiency balast	3		63	4	252	96	2470	$0.18	237	$42.68	4	23.93	60	$83.93	$95.72	$240.00	$335.72	$0.00	7.9
B2	Classroom	Classroom	2L-T8-1'x4'	2		120	59	8	472	B2 Retro	Relamp, Reballast	28w-T8 energey saver w/ electronic T8 High Efficiency balast	2		42	8	336	136	2470	$0.18	336	$60.47	8	22.28	60	$82.28	$178.24	$480.00	$658.24	$0.00	10.9
B2	Kitchen	Kitchen	2L-T8-1'x4'	2		120	59	6	354	B2 Retro	Relamp, Reballast	28w-T8 energey saver w/ electronic T8 High Efficiency balast	2		42	6	252	102	2470	$0.18	252	$45.35	6	22.28	60	$82.28	$133.68	$360.00	$493.68	$0.00	10.9
B1	Cafeteria	Cafeteria	1L-T8-1'x4'	1		120	30	22	660	B1 Retro	Relamp, Reballast	28w-T8 energey saver w/ electronic T8 High Efficiency balast	1		22	22	484	176	2470	$0.18	435	$78.25	22	22.28	60	$82.28	$490.16	$1,320.00	$1,810.16	$0.00	23.1
B3	Stock Rm	Stock Room	3L-T8-1'x4'	3		120	87	4	348	B3 Retro	Relamp, Reballast	28w-T8 energey saver w/ electronic T8 High Efficiency balast	3		63	4	252	96	2470	$0.18	237	$42.68	4	23.93	60	$83.93	$95.72	$240.00	$335.72	$0.00	7.9
B2	Stock Rm	Stock Room	2L-T8-1'x4'	2		120	59	6	354	B2 Retro	Relamp, Reballast	28w-T8 energey saver w/ electronic T8 High Efficiency balast	2		42	6	252	102	2470	$0.18	252	$45.35	6	22.28	60	$82.28	$133.68	$360.00	$493.68	$0.00	10.9
B2	Corridor	Corridor	2L-T8-1'x4'	2		120	59	10	590	B2 Retro	Relamp, Reballast	28w-T8 energey saver w/ electronic T8 High Efficiency balast	2		42	10	420	170	2470	$0.18	420	$75.58	10	22.28	60	$82.28	$222.80	$600.00	$822.80	$0.00	10.9
F	Auditorium	Auditorium	1MH	1		120	250	16	4000	F Retro	Replace fixture	4-54w T5HO lamps with acrylic lens and wire guard	4		216	16	3456	544	2470	$0.18	1,344	$241.86	16	180	75	$255.00	$2,880.00	$1,200.00	$4,080.00	$720.00	13.9
A1	Library	Library	3L-T8-2'x4'	3		120	87	12	1044	A1 Retro	Relamp, Reballast	28w-T8 energey saver w/ electronic T8 High Efficiency balast	3		63	12	756	288	2470	$0.18	711	$128.04	12	23.93	60	$83.93	$287.16	$720.00	$1,007.16	$0.00	7.9
																			2470	$0.18			0								
		Total First Floor						**125**	**10461**							**125**	**8102**	**2359**			**5,827**	**$1,048.81**	**125**				**$5,354.72**	**$7,740.00**	**$13,094.72**	**$720.00**	**11.8**
		Second Floor																													
B3	Classroom	Kindergarten Classroom	3L-T8-1'x4'	3		120	87	4	348	B3 Retro	Relamp, Reballast	28w-T8 energey saver w/ electronic T8 High Efficiency balast	3		63	4	252	96	2470	$0.18	237	$42.68	4	23.93	60	$83.93	$95.72	$240.00	$335.72	$0.00	7.9
B2	Classroom	Kindergarten Classroom	2L-T8-1'x4'	2		120	59	8	472	B2 Retro	Relamp, Reballast	28w-T8 energey saver w/ electronic T8 High Efficiency balast	2		42	8	336	136	2470	$0.18	336	$60.47	8	22.28	60	$82.28	$178.24	$480.00	$658.24	$0.00	10.9
B3	Classroom	Kindergarten Classroom	3L-T8-1'x4'	3		120	87	4	348	B3 Retro	Relamp, Reballast	28w-T8 energey saver w/ electronic T8 High Efficiency balast	3		63	4	252	96	2470	$0.18	237	$42.68	4	23.93	60	$83.93	$95.72	$240.00	$335.72	$0.00	7.9
B2	Classroom	Kindergarten Classroom	2L-T8-1'x4'	2		120	59	8	472	B2 Retro	Relamp, Reballast	28w-T8 energey saver w/ electronic T8 High Efficiency balast	2		42	8	336	136	2470	$0.18	336	$60.47	8	22.28	60	$82.28	$178.24	$480.00	$658.24	$0.00	10.9
B3	Classroom	Kindergarten Classroom	3L-T8-1'x4'	3		120	87	4	348	B3 Retro	Relamp, Reballast	28w-T8 energey saver w/ electronic T8 High Efficiency balast	3		63	4	252	96	2470	$0.18	237	$42.68	4	23.93	60	$83.93	$95.72	$240.00	$335.72	$0.00	7.9
B2	Classroom	Kindergarten Classroom	2L-T8-1'x4'	2		120	59	8	472	B2 Retro	Relamp, Reballast	28w-T8 energey saver w/ electronic T8 High Efficiency balast	2		42	8	336	136	2470	$0.18	336	$60.47	8	22.28	60	$82.28	$178.24	$480.00	$658.24	$0.00	10.9
A2	100	Toilet Room	2L-T8-2'x4'	2		120	59	1	59	A2 Retro	Relamp, Reballast	28w-T8 energey saver w/ electronic T8 High Efficiency balast	2		42	1	42	17	2470	$0.18	42	$7.56	1	22.28	60	$82.28	$22.28	$60.00	$82.28	$0.00	10.9
A1	Faculty Rm	Faculty Room	3L-T8-2'x4'	3		120	87	2	174	A1 Retro	Relamp, Reballast	28w-T8 energey saver w/ electronic T8 High Efficiency balast	3		63	2	126	48	2470	$0.18	119	$21.34	2	23.93	60	$83.93	$47.86	$120.00	$167.86	$0.00	7.9
A1	Resource Rm	Resource Room	3L-T8-2'x4'	3		120	87	2	174	A1 Retro	Relamp, Reballast	28w-T8 energey saver w/ electronic T8 High Efficiency balast	3		63	2	126	48	2470	$0.18	119	$21.34	2	23.93	60	$83.93	$47.86	$120.00	$167.86	$0.00	7.9
A1	Principal	Principal's Office	3L-T8-2'x4'	3		120	87	2	174	A1 Retro	Relamp, Reballast	28w-T8 energey saver w/ electronic T8 High Efficiency balast	3		63	2	126	48	2470	$0.18	119	$21.34	2	23.93	60	$83.93	$47.86	$120.00	$167.86	$0.00	7.9
A1	Main Office	Main Office	3L-T8-2'x4'	3		120	87	3	261	A1 Retro	Relamp, Reballast	28w-T8 energey saver w/ electronic T8 High Efficiency balast	3		63	3	189	72	2470	$0.18	178	$32.01	3	23.93	60	$83.93	$71.79	$180.00	$251.79	$0.00	7.9

Assumned Burn Hours of 10 Hrs/Day Weekday, 5 Hours Saturday, 0 Hours Sunday for 42 Week a year, Summer Hours 4 Hours/Day Weekday, Closed Weekends, 8 Weeks a y

	Existing Fixtures									Proposed Fixtures											Fixtures Retrofitted			Unit Installation Cost							
Existing Lighting Fixture Type	**Room Number**	**Room Name**	**Lighting Fixture Description**	**Lamps per Fixture**	**Foot Candles**	**Voltage**	**Watts**	**Qty of Fixtures**	**Total Watts**	**New Lighting Fixture Type**	**Existing/Replace**	**Description**	**Lamps per Fixture**	**Foot Candles**	**Watts**	**Qty of Fixtures**	**Total Watts**	**Wattage Reduction**	**Average Burn Hours**	**Ave $/kwh**	**Energy Savings, kWh**	**Energy Savings, $**	**Qty**	**Material Each**	**Labor Each**	**Total Each**	**Total Materials**	**Total Labor**	**Total All**	**Rebate Estimate**	**Simple Payback**
D	Nurse Rm	Nurse's Toilet	1L-A	1		120	100	1	100	D Retro	Relamp	26w Edison base CFL	1		26	1	26	74	2470	$0.18	183	$32.90	1	22.28	60	$82.28	$22.28	$60.00	$82.28	$0.00	2.5
A1	Nurse Rm	Nurse's Office	3L-T8-2'x4'	3		120	87	2	174	A1 Retro	Relamp, Reballast	28w-T8 energey saver w/ electronic T8 High Efficiency balast	3		63	2	126	48	2470	$0.18	119	$21.34	2	23.93	60	$83.93	$47.86	$120.00	$167.86	$0.00	7.9
C	Nurse Rm	Nurse's Closet	1L-A	1		120	100	1	100	C Retro	Relamp	26w Edison base CFL	1		26	1	26	74	2470	$0.18	183	$32.90	1	22.28	60	$82.28	$22.28	$60.00	$82.28	$0.00	2.5
E	Stair	Entry Stair	3L-30w- CANDELABRA	3		120	90	1	90	E Retro	Relamp	5w screw-base CFL	3		15	1	15	75	2470	$0.18	185	$33.35	1	22.28	60	$82.28	$22.28	$60.00	$82.28	$0.00	2.5
B2	Stair	Entry Stair	2L-T8-1'x4'	2		120	59	1	59	B2 Retro	Relamp, Reballast	28w-T8 energey saver w/ electronic T8 High Efficiency balast	2		42	1	42	17	2470	$0.18	42	$7.56	1	22.28	60	$82.28	$22.28	$60.00	$82.28	$0.00	10.9
D	Teacher Rm	Teacher's Restroom	1L-A	1		120	100	1	100	D Retro	Relamp	26w Edison base CFL	1		26	1	26	74	2470	$0.18	183	$32.90	1	22.28	60	$82.28	$22.28	$60.00	$82.28	$0.00	2.5
B2	Teacher Rm	Teacher's Room	2L-T8-1'x4'	2		120	59	4	236	B2 Retro	Relamp, Reballast	28w-T8 energey saver w/ electronic T8 High Efficiency balast	2		42	4	168	68	2470	$0.18	168	$30.23	4	22.28	60	$82.28	$89.12	$240.00	$329.12	$0.00	10.9
B1	Teacher Rm	Teacher's Room	1L-T8-1'x4'	1		120	30	1	30	B1 Retro	Relamp, Reballast	28w-T8 energey saver w/ electronic T8 High Efficiency balast	1		22	1	22	8	2470	$0.18	20	$3.56	1	22.28	60	$82.28	$22.28	$60.00	$82.28	$0.00	23.1
D	Restroom	Kindergarten Restroom	1L-A	1		120	100	1	100	D Retro	Relamp	26w Edison base CFL	1		26	1	26	74	2470	$0.18	183	$32.90	1	22.28	60	$82.28	$22.28	$60.00	$82.28	$0.00	2.5
B3	Classroom	Kindergarten Classroom	3L-T8-1'x4'	3		120	87	4	348	B3 Retro	Relamp, Reballast	28w-T8 energey saver w/ electronic T8 High Efficiency balast	3		63	4	252	96	2470	$0.18	237	$42.68	4	23.93	60	$83.93	$95.72	$240.00	$335.72	$0.00	7.9
B2	Classroom	Kindergarten Classroom	2L-T8-1'x4'	2		120	59	8	472	B2 Retro	Relamp, Reballast	28w-T8 energey saver w/ electronic T8 High Efficiency balast	2		42	8	336	136	2470	$0.18	336	$60.47	8	22.28	60	$82.28	$178.24	$480.00	$658.24	$0.00	10.9
B3	Classroom	Kindergarten Classroom	3L-T8-1'x4'	3		120	87	4	348	B3 Retro	Relamp, Reballast	28w-T8 energey saver w/ electronic T8 High Efficiency balast	3		63	4	252	96	2470	$0.18	237	$42.68	4	23.93	60	$83.93	$95.72	$240.00	$335.72	$0.00	7.9
B2	Classroom	Kindergarten Classroom	2L-T8-1'x4'	2		120	59	8	472	B2 Retro	Relamp, Reballast	28w-T8 energey saver w/ electronic T8 High Efficiency balast	2		42	8	336	136	2470	$0.18	336	$60.47	8	22.28	60	$82.28	$178.24	$480.00	$658.24	$0.00	10.9
B3	Classroom	Kindergarten Classroom	3L-T8-1'x4'	3		120	87	4	348	B3 Retro	Relamp, Reballast	28w-T8 energey saver w/ electronic T8 High Efficiency balast	3		63	4	252	96	2470	$0.18	237	$42.68	4	23.93	60	$83.93	$95.72	$240.00	$335.72	$0.00	7.9
B2	Classroom	Kindergarten Classroom	2L-T8-1'x4'	2		120	59	8	472	B2 Retro	Relamp, Reballast	28w-T8 energey saver w/ electronic T8 High Efficiency balast	2		42	8	336	136	2470	$0.18	336	$60.47	8	22.28	60	$82.28	$178.24	$480.00	$658.24	$0.00	10.9
B3	Classroom	Kindergarten Classroom	3L-T8-1'x4'	3		120	87	4	348	B3 Retro	Relamp, Reballast	28w-T8 energey saver w/ electronic T8 High Efficiency balast	3		63	4	252	96	2470	$0.18	237	$42.68	4	23.93	60	$83.93	$95.72	$240.00	$335.72	$0.00	7.9
B2	Classroom	Kindergarten Classroom	2L-T8-1'x4'	2		120	59	8	472	B2 Retro	Relamp, Reballast	28w-T8 energey saver w/ electronic T8 High Efficiency balast	2		42	8	336	136	2470	$0.18	336	$60.47	8	22.28	60	$82.28	$178.24	$480.00	$658.24	$0.00	10.9
A2	Restroom	Restroom	2L-T8-2'x4'	2		120	59	1	59	A2 Retro	Relamp, Reballast	28w-T8 energey saver w/ electronic T8 High Efficiency balast	2		42	1	42	17	2470	$0.18	42	$7.56	1	22.28	60	$82.28	$22.28	$60.00	$82.28	$0.00	10.9
A2	Restroom	Restroom	2L-T8-2'x4'	2		120	59	1	59	A2 Retro	Relamp, Reballast	28w-T8 energey saver w/ electronic T8 High Efficiency balast	2		42	1	42	17	2470	$0.18	42	$7.56	1	22.28	60	$82.28	$22.28	$60.00	$82.28	$0.00	10.9
A2	Corridor	Corridor	2L-T8-2'x4'	2		120	59	16	944	A2 Retro	Relamp, Reballast	28w-T8 energey saver w/ electronic T8 High Efficiency balast	2		42	16	672	272	2470	$0.18	672	$120.93	16	22.28	60	$82.28	$356.48	$960.00	$1,316.48	$0.00	10.9
B2	Stair	Stairwell	2L-T8-1'x4'	2		120	59	2	118	B2 Retro	Relamp, Reballast	28w-T8 energey saver w/ electronic T8 High Efficiency balast	2		42	2	84	34	2470	$0.18	84	$15.12	2	22.28	60	$82.28	$44.56	$120.00	$164.56	$0.00	10.9
B2	Stair	Stairwell	2L-T8-1'x4'	2		120	59	1	59	B2 Retro	Relamp, Reballast	28w-T8 energey saver w/ electronic T8 High Efficiency balast	2		42	1	42	17	2470	$0.18	42	$7.56	1	22.28	60	$82.28	$22.28	$60.00	$82.28	$0.00	10.9
																			2470	$0.18			0								
		Total Second Floor						**128**	**8810**							**128**	**6084**	**2726**			**6,733**	**$1,211.98**	**128**				**$2,916.19**	**$7,680.00**	**$10,596.19**	**$0.00**	**8.7**

Indian Fields @ Dayton Elementary School - PV Solar Financials
Self Financed 90%-20 Year Term-5.0% Interest Rate

Total Project Cost	$390,400	System Size (kW)	49	Tax Rate	0.0%
		Utility Rate ($/kWh)	$0.1800		
Net Project Cost	$390,400	Utility Rate Inflation	3.00%		
Percent Financed	**90%**	REC Value ($/kWh)	$0.350		
Capital Outlay	$39,040	Term (years)	**20**		
Financing Principal	$351,360	Rate	**5.0%**		

Year	0	1	2	3	4	5	6	7	8	9	10	11	12
Solar Generation (kWh)		76,795	76,411	76,029	75,649	75,271	74,894	74,520	74,147	73,776	73,408	73,041	72,675
Utility Rate per kWh		$0.180	$0.185	$0.191	$0.197	$0.203	$0.209	$0.215	$0.221	$0.228	$0.235	$0.242	$0.249
Federal Tax Credit		$0											
Cash effect of depreciation		$0	$0	$0	$0	$0	$0						
Avoided Utility Pmnt (from Solar Generation)		$13,823	$14,167	$14,519	$14,879	$15,249	$15,628	$16,016	$16,414	$16,822	$17,240	$17,669	$18,108
Revenue from REC Sale		$26,878	$26,744	$26,610	$26,477	$26,345	$26,213	$26,082	$25,952	$25,822	$25,693	$25,564	$25,436
Subtotal		$40,701	$40,910	$41,129	$41,357	$41,594	$41,841	$42,098	$42,366	$42,644	$42,933	$43,233	$43,544
Finance payment		($28,194)	($28,194)	($28,194)	($28,194)	($28,194)	($28,194)	($28,194)	($28,194)	($28,194)	($28,194)	($28,194)	($28,194)
Interest expense		($17,568)	($17,037)	($16,479)	($15,893)	($15,278)	($14,632)	($13,954)	($13,242)	($12,495)	($11,710)	($10,885)	($10,020)
Operations & Maintenance		$0	$0	$0	$0	$0	$374	$389	$405	$421	$438	$456	$474
Subtotal		($17,568)	($17,037)	($16,479)	($15,893)	($15,278)	($14,258)	($13,565)	($12,837)	($12,073)	($11,271)	($10,430)	($9,546)
Net Savings		$23,133	$23,874	$24,650	$25,463	$26,316	$27,583	$28,534	$29,529	$30,571	$31,662	$32,803	$33,998
Taxes on net savings (no tax on principle payment)		$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Net savings after taxes		$23,133	$23,874	$24,650	$25,463	$26,316	$27,583	$28,534	$29,529	$30,571	$31,662	$32,803	$33,998
Principal Payment		($10,626)	($11,157)	($11,715)	($12,301)	($12,916)	($13,562)	($14,240)	($14,952)	($15,699)	($16,484)	($17,309)	($18,174)
Net Cash Flow After Taxes	($39,040)	$12,507	$12,716	$12,935	$13,162	$13,400	$14,022	$14,294	$14,577	$14,871	$15,177	$15,495	$15,824
Cumulative savings before taxes		$23,133	$47,007	$71,657	$97,121	$123,436	$151,020	$179,553	$209,082	$239,653	$271,315	$304,118	$338,116

Year	13	14	15	16	17	18	19	20	21	22	23	24	25
Solar Generation (kWh)	72,312	71,950	71,591	71,233	70,876	70,522	70,170	69,819	69,470	69,122	68,777	68,433	68,091
Utility Rate per kWh	$0.257	$0.264	$0.272	$0.280	$0.289	$0.298	$0.306	$0.316	$0.325	$0.335	$0.345	$0.355	$0.366
Federal Tax Credit													
Subtotal													
Avoided Utility Pmnt (from Solar Generation)	$18,558	$19,019	$19,492	$19,976	$20,472	$20,981	$21,503	$22,037	$22,585	$23,146	$23,721	$24,310	$24,915
Revenue from REC sale	$25,309	$25,183	$25,057	$24,931	$24,807	$24,683	$24,559	$24,437	$24,314	$24,193	$24,072	$23,951	$23,832
Subtotal	$43,867	$44,202	$44,548	$44,907	$45,279	$45,664	$46,062	$46,473	$46,899	$47,339	$47,793	$48,262	$48,746
Finance payment	($28,194)	($28,194)	($28,194)	($28,194)	($28,194)	($28,194)	($28,194)	($28,194)	$0	$0	$0	$0	$0
Interest expense	($9,111)	($8,157)	($7,155)	($6,103)	($4,999)	($3,839)	($2,621)	($1,343)	$0	$0	$0	$0	$0
Operations & Maintenance	$493	$512	$533	$554	$576	$600	$624	$648	$674	$701	$729	$759	$789
Subtotal	($8,618)	($7,645)	($6,622)	($5,549)	($4,422)	($3,239)	($1,998)	($694)	$674	$701	$729	$759	$789
Net Savings	$35,249	$36,557	$37,926	$39,359	$40,857	$42,425	$44,064	$45,779	$47,573	$48,040	$48,522	$49,020	$49,535
Taxes on net savings (no tax on principle payment)	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Net savings after taxes	$35,249	$36,557	$37,926	$39,359	$40,857	$42,425	$44,064	$45,779	$47,573	$48,040	$48,522	$49,020	$49,535
Principal Payment	($19,083)	($20,037)	($21,039)	($22,091)	($23,195)	($24,355)	($25,573)	($26,851)	$0	$0	$0	$0	$0
Net Cash Flow After Taxes	$16,166	$16,520	$16,887	$17,268	$17,662	$18,069	$18,491	$18,928	$47,573	$48,040	$48,522	$49,020	$49,535
Cumulative savings before taxes	$373,365	$409,922	$447,848	$487,207	$528,064	$570,488	$614,553	$660,332	$707,905	$755,945	$804,467	$853,488	$903,023

Internal Rate of Return After Taxes	34%
NPV of After Tax Cash Flows	$135,226
NPV Discount Rate	8.00%

These Figures are estimates for discussion only.

Indian Fields @ Dayton Elementary School - PV Solar Financials
Purchase

Total Project Cost	**$390,400**	**System Size (kW)**	**49**	Tax Rate	0.0%
		Utility Rate ($/kWh)	$0.1800		
		Utility Rate Inflation	3.00%		
		REC Value ($/kWh) year 1-25	$0.350		
Capital Outlay	$390,400				

Year	0	1	2	3	4	5	6	7	8	9	10	11	12
Solar Generation (kWh)		76,795	76,411	76,029	75,649	75,271	74,894	74,520	74,147	73,776	73,408	73,041	72,675
Utility Rate per kWh		$0.180	$0.185	$0.191	$0.197	$0.203	$0.209	$0.215	$0.221	$0.228	$0.235	$0.242	$0.249
Capital Outlay	($390,400)												
Tax Credit		$0											
Cash effect of depreciation		$0	$0	$0	$0	$0	$0						
Avoided Utility Pmnt (from Solar Generation)		$13,823	$14,167	$14,519	$14,879	$15,249	$15,628	$16,016	$16,414	$16,822	$17,240	$17,669	$18,108
Revenue from REC Sale		$26,878	$26,744	$26,610	$26,477	$26,345	$26,213	$26,082	$25,952	$25,822	$25,693	$25,564	$25,436
Subtotal		$40,701	$40,910	$41,129	$41,357	$41,594	$41,841	$42,098	$42,366	$42,644	$42,933	$43,233	$43,544
Operations & Maintenance		$0	$0	$0	$0	$0	$374	$389	$405	$421	$438	$456	$474
Subtotal		$0	$0	$0	$0	$0	$374	$389	$405	$421	$438	$456	$474
Net Savings		$40,701	$40,910	$41,129	$41,357	$41,594	$42,216	$42,488	$42,771	$43,065	$43,371	$43,689	$44,018
Taxes on net savings		$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Net Savings after taxes	($390,400)	$40,701	$40,910	$41,129	$41,357	$41,594	$42,216	$42,488	$42,771	$43,065	$43,371	$43,689	$44,018
Cumulative Savings	$0	$40,701	$81,612	$122,741	$164,097	$205,691	$247,907	$290,394	$333,165	$376,231	$419,602	$463,291	$507,309

Year	13	14	15	16	17	18	19	20	21	22	23	24	25
Solar Generation (kWh)	72,312	71,950	71,591	71,233	70,876	70,522	70,170	69,819	69,470	69,122	68,777	68,433	68,091
Utility Rate per kWh	$0.257	$0.264	$0.272	$0.280	$0.289	$0.298	$0.306	$0.316	$0.325	$0.335	$0.345	$0.355	$0.366
Avoided Utility Pmnt (from Solar Generation)	$18,558	$19,019	$19,492	$19,976	$20,472	$20,981	$21,503	$22,037	$22,585	$23,146	$23,721	$24,310	$24,915
Revenue from REC sale	$25,309	$25,183	$25,057	$24,931	$24,807	$24,683	$24,559	$24,437	$24,314	$24,193	$24,072	$23,951	$23,832
Subtotal	$43,867	$44,202	$44,548	$44,907	$45,279	$45,664	$46,062	$46,473	$46,899	$47,339	$47,793	$48,262	$48,746
Operations & Maintenance	$493	$512	$533	$554	$576	$600	$624	$648	$674	$701	$729	$759	$789
Subtotal	$493	$512	$533	$554	$576	$600	$624	$648	$674	$701	$729	$759	$789
Net Savings	$44,360	$44,714	$45,081	$45,462	$45,856	$46,263	$46,685	$47,122	$47,573	$48,040	$48,522	$49,020	$49,535
Taxes on net savings	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Net savings after taxes	$44,360	$44,714	$45,081	$45,462	$45,856	$46,263	$46,685	$47,122	$47,573	$48,040	$48,522	$49,020	$49,535
Cumulative Savings	$551,669	$596,383	$641,464	$686,926	$732,782	$779,045	$825,731	$872,853	$920,426	$968,466	$1,016,988	$1,066,009	$1,115,544

After Tax IRR	10.0%
NPV of Net Savings After Taxes	$66,201
NPV Discount Rate	8.00%

Indian Fields @ Dayton Elementary School - PV Solar Financials
Depreciation Calculations

Project Cost	$390,400
NJ BPU Grant	$0
Net Project Cost	$390,400
Federal Tax Credit	$0
Federal Depreciation Basis	$0
Federal Tax Rate	0%

Year	0	1	2	3	4	5	6	7	8	9	10	11	12
Depreciation percentage - Federal		20.00%	32.00%	19.20%	11.52%	11.52%	5.76%						
MACRS Depreciation Amount - Federal		$0	$0	$0	$0	$0	$0						
Federal Tax Credit		$0											
Cash effect of Federal depreciation		$0	$0	$0	$0	$0	$0						
Total Annual tax savings on depreciation		$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0

These figures are estimates for discussion only. Actual results and depreciation methods may vary.

Building	Roof Area (sq ft)	Panel	Qty	Panel Sq Ft	Panel Total Sq Ft	Total KW	Total Annual kWh	Panel Weight (33 lbs)	W/SQFT
Indian Fields @ Dayton Elementary	10,800	Sunpower SPR305-WHT	160	19.3	3,083	49	76,795	5,280	15.83

7466

NORTH

OMB No. 2060-0347

STATEMENT OF ENERGY PERFORMANCE
Indian Fields @ Dayton

Building ID: 1716451
For 12-month Period Ending: May 31, 2008[1]
Date SEP becomes ineligible: N/A

Date SEP Generated: June 15, 2009

Facility
Indian Fields @ Dayton
310 Georges Road
Dayton, NJ 08852

Facility Owner
N/A

Primary Contact for this Facility
N/A

Year Built: 1928
Gross Floor Area (ft²): 23,000

Energy Performance Rating[2] (1-100) 67

Site Energy Use Summary[3]	
Electricity (kBtu)	347,546
Natural Gas (kBtu)[4]	1,461,800
Total Energy (kBtu)	1,809,346

Energy Intensity[5]	
Site (kBtu/ft²/yr)	79
Source (kBtu/ft²/yr)	117

Emissions (based on site energy use)	
Greenhouse Gas Emissions (MtCO$_2$e/year)	131

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

National Average Comparison	
National Average Site EUI	92
National Average Source EUI	137
% Difference from National Average Source EUI	-15%
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
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	Indian Fields @ Dayton	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	310 Georges Road, Dayton, 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		☐

Dayton Elem School (K-12 School)

CRITERION	VALUE AS ENTERED IN PORTFOLIO MANAGER	VERIFICATION QUESTIONS	NOTES	☑
Gross Floor Area	23,000 Sq. Ft.	Does this square footage include all supporting functions such as kitchens and break rooms used by staff, storage areas, administrative areas, elevators, stairwells, atria, vent shafts, etc. Also note that existing atriums should only include the base floor area that it occupies. Interstitial (plenum) space between floors should not be included in the total. Finally gross floor area is not the same as leasable space. Leasable space is a subset of gross floor area.		☐
Open Weekends?	No	Is this building normally open at all on the weekends? This includes activities beyond the work conducted by maintenance, cleaning, and security personnel. Weekend activity could include any time when the space is used for classes, performances or other school or community activities. If the building is open on the weekend as part of the standard schedule during one or more seasons, the building should select ?yes? for open weekends. The ?yes? response should apply whether the building is open for one or both of the weekend days.		☐
Number of PCs	20	Is this the number of personal computers in the K12 School?		☐
Number of walk-in refrigeration/freezer units	0	Is this the total number of commercial walk-in type freezers and coolers? These units are typically found in storage and receiving areas.		☐
Presence of cooking facilities	Yes	Does this school have a dedicated space in which food is prepared and served to students? If the school has space in which food for students is only kept warm and/or served to students, or has only a galley that is used by teachers and staff then the answer is "no".		☐
Percent Cooled	50 %	Is this the percentage of the total floor space within the facility that is served by mechanical cooling equipment?		☐
Percent Heated	100 %	Is this the percentage of the total floor space within the facility that is served by mechanical heating equipment?		☐

Months	10 (Optional)	Is this school in operation for at least 8 months of the year?		☐
High School?	No	Is this building a high school (teaching grades 10, 11, and/or 12)? If the building teaches to high school students at all, the user should check 'yes' to 'high school'. For example, if the school teaches to grades K-12 (elementary/middle and high school), the user should check 'yes' to 'high school'.		☐

APPENDIX G
PG 3 OF 6

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: ELECTRIC METER (kWh) **Space(s):** Entire Facility		
Start Date	**End Date**	**Energy Use (kWh)**
05/01/2008	05/31/2008	8,900.00
04/01/2008	04/30/2008	8,280.00
03/01/2008	03/31/2008	7,520.00
02/01/2008	02/29/2008	8,120.00
01/01/2008	01/31/2008	8,300.00
12/01/2007	12/31/2007	7,760.00
11/01/2007	11/30/2007	8,400.00
10/01/2007	10/31/2007	9,760.00
09/01/2007	09/30/2007	11,560.00
08/01/2007	08/31/2007	7,360.00
07/01/2007	07/31/2007	4,800.00
06/01/2007	06/30/2007	11,100.00
ELECTRIC METER Consumption (kWh)		**101,860.00**
ELECTRIC METER Consumption (kBtu)		**347,546.32**
Total Electricity Consumption (kBtu)		**347,546.32**
Is this the total Electricity consumption at this building including all Electricity meters?		☐

Fuel Type: Natural Gas		
Meter: GAS METER 2 (therms) **Space(s):** Entire Facility		
Start Date	**End Date**	**Energy Use (therms)**
05/01/2008	05/31/2008	835.00
04/01/2008	04/30/2008	1,006.00
03/01/2008	03/31/2008	2,073.00
02/01/2008	02/29/2008	2,825.00
01/01/2008	01/31/2008	2,808.00
12/01/2007	12/31/2007	2,979.00
11/01/2007	11/30/2007	1,786.00
10/01/2007	10/31/2007	161.00
09/01/2007	09/30/2007	48.00

08/01/2007	08/31/2007	26.00
07/01/2007	07/31/2007	27.00
06/01/2007	06/30/2007	44.00
GAS METER 2 Consumption (therms)		**14,618.00**
GAS METER 2 Consumption (kBtu)		**1,461,800.00**
Total Natural Gas Consumption (kBtu)		**1,461,800.00**
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
Indian Fields @ Dayton
310 Georges Road
Dayton, NJ 08852

Facility Owner
N/A

Primary Contact for this Facility
N/A

General Information

Indian Fields @ Dayton	
Gross Floor Area Excluding Parking: (ft²)	23,000
Year Built	1928
For 12-month Evaluation Period Ending Date:	May 31, 2008

Facility Space Use Summary

Dayton Elem School	
Space Type	K-12 School
Gross Floor Area(ft²)	23,000
Open Weekends?	No
Number of PCs	20
Number of walk-in refrigeration/freezer units	0
Presence of cooking facilities	Yes
Percent Cooled	50
Percent Heated	100
Months°	10
High School?	No
School District°	South Brunswick

Energy Performance Comparison

	Evaluation Periods		Comparisons		
Performance Metrics	**Current** (Ending Date 05/31/2008)	**Baseline** (Ending Date 05/31/2008)	**Rating of 75**	**Target**	**National Average**
Energy Performance Rating	67	67	75	N/A	50
Energy Intensity					
Site (kBtu/ft²)	79	79	72	N/A	92
Source (kBtu/ft²)	117	117	107	N/A	137
Energy Cost					
$/year	N/A	N/A	N/A	N/A	N/A
$/ft²/year	N/A	N/A	N/A	N/A	N/A
Greenhouse Gas Emissions					
$MtCO_2e$/year	131	131	120	N/A	154
$kgCO_2e/ft^2$/year	6	6	6	N/A	7

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

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