LOCAL GOVERNMENT ENERGY AUDIT PROGRAM: ENERGY AUDIT REPORT

PREPARED FOR: **CLINTON TOWNSHIP B.O.E.**
128 COKESBURY ROAD
LEBANON, NJ 08833
ATTN: MS. PATRICIA LEONHARDT,
BUSINESS ADMINISTRATOR

PREPARED BY: **CONCORD ENGINEERING GROUP**
520 S. BURNT MILL ROAD
VOORHEES, NJ 08043
TELEPHONE: (856) 427-0200
FACSIMILE: (856) 427-6529
WWW.CEG-INC.NET

CEG CONTACT: SAM DORIA
MANAGER, CX & ENERGY AUDITS
EMAIL: SDORIA@CEG-INC.NET

REPORT ISSUANCE: FINAL, AUGUST 4, 2011

PROJECT NO: 9C11002

TABLE OF CONTENTS

Enclosures:

Document 1 – Spruce Run Elementary School Energy Report

Document 2 – Patrick McGaheran Elementary School Energy Report

Document 3 – Round Valley Elementary School Energy Report

Document 4 – Clinton Township Middle School Energy Report

REPORT DISCLAIMER

The information contained within this report, including any attachment(s), is intended solely for use by the named addressee(s). If you are not the intended recipient, or a person designated as responsible for delivering such messages to the intended recipient, you are not authorized to disclose, copy, distribute or retain this report, in whole or in part, without written authorization from Concord Engineering Group, Inc., 520 S. Burnt Mill Road, Voorhees, NJ 08043.

This report may contain proprietary, confidential or privileged information. If you have received this report in error, please notify the sender immediately. Thank you for your anticipated cooperation.

I. EXECUTIVE SUMMARY

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

Entity: Clinton Township Board Of Education

Facilities: Spruce Run Elementary School
Patrick McGaheran Elementary School
Round Valley Elementary School
Clinton Township Middle School

Municipal Contact Person: Patricia Leonhardt, Business Administrator / Board Secretary
Facility Contact Person: Gus Tishuk, Superintendent of Buildings & Grounds

This audit is performed in connection with the New Jersey Clean Energy - Local Government Energy Audit Program for Clinton Township Board of Education. The purpose of this analysis is to provide the township insight into the energy savings potential that exists within facilities at Clinton Township School District. Energy Efficiency changes and upgrades requires support from the building occupants, operations personnel and the administrators of the township in order to maximize the savings and overall benefit. The efficiency improvement of public buildings provides a benefit for the environment and the residence of New Jersey. Through this report it has been demonstrated that there is a great potential for energy savings and infrastructure improvements at Clinton Township School District.

Fast Payback Energy Conservation Measures:

The Energy Conservation Measures (ECMs) identified within the reports represent the potential annual savings at each facility. It is recommended to consider all ECMs as part of the township's initiative to save energy, reduce emissions, and lower operating costs. Several ECMs shown within this report represent significant savings relative to the cost to implement. The ECMs shown with a simple payback of 10 years and less are considered very cost effective for a public entity such as the Clinton Township School District and should be considered a high priority for Clinton Township Board of Education. The following ECMs are highly recommended throughout the township.

- Lighting Upgrades (All Facilities)

Lighting retrofits throughout the School District buildings is a straight forward conservation measure that is prescriptive in nature and provides substantial savings for the investment. Lighting retrofits is a good example of ECMs that can be implemented with "in house" staff to reduce the installation cost and further reduce paybacks. In all the facilities the measure includes replacing existing 700 series T-8 fluorescent lamps with new higher efficiency T-8 lamps. Overall lighting upgrades represent one of the most easily implemented ECMs and are highly recommended throughout all Clinton Township facilities.

- Lighting Controls (Spruce Run, Patrick McGaheran, Round Valley)

Similar to lighting upgrades, lighting controls are very prescriptive in nature and can save considerable energy. Lighting controls do not require replacement of the fixture and typically can save more energy than lighting upgrades. For the purpose of this energy audit, each ECM is calculated as stand-alone ECMs. The maximum savings can be achieved through the implementation of both the lighting upgrades and lighting controls ECMs. Lighting controls will automatically turn off lights when spaces and rooms are not occupied. It is important to note that ECMs are calculated as stand-alone ECMs and therefore the total savings will be slightly less than the sum of both individual ECMs (Lighting Upgrade and Lighting Controls). The discrepancy between additive ECMs is within the tolerances for this level of analysis (+/- 20%). Lighting controls provide the maximum savings in spaces that have changing occupancy schedules throughout the day but these facilities for the most part have standard operating hours. Since these facilities are schools, there will also be substantial savings because all spaces are not occupied continuously. Lighting controls throughout Clinton Township, except for the Middle School which already has lighting controls, are highly recommended in addition to the lighting upgrade ECMs.

- Modify Thermostat Set Point (Clinton Township Middle School ECM#2)

The building has an existing automated temperature control system having the capability to run programmed temperature and occupancy control of the space. This allows the facility to operate on a time schedule that can automatically adjust temperature set points and switch between an occupied and unoccupied mode. It is advantageous to switch to unoccupied mode as this can adjust to more economical temperature set points and can reduce outside air volume that is required to be conditioned and can save substantial amounts of energy and money. Although these set points were modified in July 2010, this ECM modifies the existing automated temperature control scheduling and temperature set points to provide further savings. It is highly recommended to implement the set point adjustments as proposed as this will provide a sizable savings at very little cost.

- AC Equipment Upgrade (Spruce Run ECM#2)

High efficiency air conditioning equipment upgrade unit installations will typically have high installation costs. However, the savings over time can be substantial. The simple paybacks for air conditioning equipment range between 9 yrs and 40 years depending on the existing equipment efficiency, runtime, and size / installation cost. Unlike the typical capital improvement project where the energy savings alone does not justify the installation, these unit upgrades have a payback of 9.9 years. The benefit of replacing the aging equipment with new efficient equipment provides value for the Clinton Township School District and is recommended for implementation.

- Premium Motor Replacements (Patrick McGaheran E.S. ECM#3)

The simple payback for premium efficiency motor replacements ranges from 8 to 25 years depending on the horse power, existing efficiency, and run hours of the equipment. This ECM is

a one-for-one style replacement with dependable savings that is based on a simple calculation. In addition to the savings, this ECM provides new motors for three existing heat and ventilation units.

- Dishwasher & Booster Heater Upgrade (Patrick McGaheran E.S. ECM#7)

The kitchen dishwasher and electric booster hot water heater at this school are twenty-three years old, are very inefficient, have very high maintenance costs, and replacement parts are difficult to obtain. These components of the dishwasher system are long past their useful service life and should be replaced. This ECM would replace the existing dishwasher unit and electric booster heater with a modern, more efficient system that results in both hot water savings along with detergent and chemical savings.

Capital Improvement Energy Conservation Measures:

The ECMs that have much longer paybacks are considered capital improvement ECMs. These ECMs typically have high installation costs that are more difficult to justify the savings based solely on the energy savings associated with the improvement. Despite the long paybacks, these ECMs in many cases provide valuable and much needed infrastructure improvements for the facility. These ECMs include boiler controls upgrades, HVAC equipment upgrades, as well as other large equipment replacements. The savings identified for the following ECMs provides additional incentive for the Clinton Township School District's capital improvement projects:

- Some of the AC Unit Upgrades/Replacements (All Facilities)
- Boiler Control Upgrades (Spruce Run E.S.)
- Premium Efficient Motors (Patrick McGaheran E.S.)
- RTU Demand Control Ventilation (Middle School)

High efficiency AC unit installations and HVAC controls will typically have high installation costs. However, the energy and maintenance cost savings over time can be substantial. The simple paybacks for AC units range between 15 yrs and 40 years depending on the existing equipment efficiency, runtime, and size / installation cost. Similar to most capital improvement projects, the energy savings alone does not justify the installation. The benefit of replacing the aging AC systems with new equipment provides value for the Clinton Township School District that should not be overlooked.

Combined Project Approach:

Although individual projects with a simple payback of 10 years and less are considered financially self sustaining, it is important to consider how multiple projects can be combined together. When ECMs are aggregated into a single project, the lower cost ECMs provides valuable savings to offset the higher cost ECMs. Likewise when multiple facilities are aggregated together into a single entity energy efficiency project, the same benefits are seen on a larger scale.

The Energy Savings Improvement Program (ESIP) allows for financing of any combination of energy efficiency projects across multiple facilities into one large project. The term of the financing must be under 15 years and the savings provides the revenue for the financing cost. The combination of all facilities into one large energy efficiency project provides the Clinton Township School District with the opportunity to implement all ECMs identified within this report with an overall simple payback of 9.2 years. This option allows the Clinton Township School District to implement much needed infrastructure improvements such as a more efficient dishwasher system, new air conditioning equipment, new domestic hot water condensing boiler, more efficient motors, as well as high efficiency lighting and lighting controls for all facilities. The program financing allows for the implementation with no upfront cost for the Clinton Township School District. Implementation of an ESIP provides significant benefits and should be strongly considered for the Clinton Township School District. The total Entity Project Summary table below shows the savings, costs, incentive programs and paybacks for all ECMs at the Clinton Township School District.

Table 1
ESIP -Total Entity Project Summary

ENERGY SAVINGS IMPROVEMENT PROGRAM - POTENTIAL ENERGY EFFICIENCY PROJECT					
FACILITY ENERGY EFFICIENCY PROJECTS	**ANNUAL ENERGY SAVINGS ($)**	**PROJECT COST ($)**	**SMART START INCENTIVES**	**CUSTOMER COST**	**SIMPLE PAYBACK**
Spruce Run Elementary School	$10,261	$105,295	$3,940	$101,355	9.9
Patrick McGaheran Elementary School	$18,387	$179,989	$9,151	$170,838	9.3
Round Valley Elementary School	$15,209	$111,836	$15,189	$96,647	6.4
Clinton Township Middle School	$11,493	$152,078	$4,000	$148,078	12.9
Total Entity Project	**$55,350**	**$549,197**	**$32,279**	**$516,918**	**9.3**

Total School District Energy Costs:	**$684,824**
Est. Total School District Energy Savings:	**$55,350**
Overall School District Percent Reduction:	**8.1%**

Implementation of all ECMs identified within the ESIP – Entity Total Project Summary table represents a total annual savings of approximately $53,550 for the School District. The individual facility project summaries are shown within each facility energy audit report.

Other Considerations:

- Maintenance and Operational Measures

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

1. Chemically clean the condenser and evaporator coils periodically to optimize efficiency. Poorly maintained heat transfer surfaces can reduce efficiency 5-10%.
2. Maintain all weather stripping on entrance doors to limit unnecessary infiltration.
3. Clean all light fixtures to maximize light output to provide better light output and avoid the use of task lighting where otherwise not necessary.

4. Provide more frequent air filter changes to decrease overall system power usage and maintain better IAQ.

    - Renewable Energy Measures

Renewable Energy Measures (REMs) were also reviewed for implementation at the Clinton Township School District. CEG utilized a combination of roof mounted solar arrays and canopy style parking lot solar arrays to house PV systems throughout the school buildings. The total solar electric production potential for these systems is approximately 1,235,866 kWh, which would reduce the Clinton Township School District grid purchased electric energy by 38%. The system's calculated simple payback of approximately 15 years is past the standard 10 year simple payback threshold; however, with alternative funding this payback could be lessened. CEG recommends the Owner review all funding options available with the implementation of this renewable energy measure.

Overall Assessment:

Overall, the Clinton Township School District is maintained and operating fairly efficiently. There are numerous ECMs that can be implemented to further reduce energy use and save on the facility's operating costs. The total energy cost of $684,824 could be reduced by approximately 8% through the implementation of the ECMs recommended in this audit. The Clinton Township School District is in a unique position to implement energy efficiency improvements and still include large capital projects. When the total project is capable of being funded through the savings, CEG highly recommends to the Board of Education to take advantage of this opportunity.

II. INTRODUCTION

The comprehensive energy audit covers the following buildings in the Clinton Township School District:

- Spruce Run Elementary School
- Patrick McGaheran Elementary School
- Round Valley Elementary School
- Clinton Township Middle School

This audit is performed in connection with the New Jersey Clean Energy - Local Government Energy Audit Program. The energy audit is conducted to promote the mission of the office of Clean Energy, which is to use innovation and technology to solve energy and environmental problems in a way that improves the State's economy. This can be achieved through the wiser and more efficient use of energy.

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

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

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

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

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

The building site visit is performed to survey all major building components and systems. The site visit includes detailed inspection of energy consuming components. Summary of building occupancy schedules, operating and maintenance practices, and energy management programs provided by the building manager are collected along with the system and components to determine a more accurate impact on energy consumption.

III. METHOD OF ANALYSIS

This audit is consistent with an ASHRAE level 2 audit. The cost and savings for each measure is ± 20%. The evaluations are based on engineering estimations and industry standard calculation methods. More detailed analyses would require engineering simulation models, hard equipment specifications, and contractor bid pricing.

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

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

The project / Entity summary tables are based on the implementation of multiple measures. The analysis is reviewed and determined if the nature of the ECMs will cause a major conflict of the overall savings. When additive measures do not cause a major effect on the overall savings the ECMs are included. Where a major conflict is identified, the combined savings is evaluated appropriately to ensure the overall estimates are ± 20%.

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

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

ECM Calculation Equations:

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

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

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

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

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

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

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

IV. HISTORIC ENERGY CONSUMPTION/COST

A. Energy Usage

The energy usage for the facilities is tabulated and plotted in graph form as depicted within each facility report (see the individual facility energy audit reports for details). Each energy source has been identified and monthly consumption and cost noted per the information provided by the Owner. The electric and natural gas utilities are shown below in Table 2 & 3 for all facilities:

Table 2
Electric Utility Summary

ELECTRIC UTILITY USAGE PER FACILITY			
FACILITY	**ANNUAL ELECTRIC UTILITY**		
DESCRIPTION	**USAGE (KWH)**	**COST ($)**	**AVE RATE ($/KWH)**
Spruce Run Elementary School	505,120	$80,384	$0.159
Patrick McGaheran Elementary School	618,560	$95,798	$0.155
Round Valley Elementary School	710,800	$115,865	$0.163
Clinton Township Middle School	1,408,320	$229,427	$0.163
Total	**3,242,800**	**$521,474**	**$0.161**

Table 3
Natural Gas Summary

NATURAL GAS UTILTY USAGE PER FACILITY			
FACILITY	**ANNUAL NATURAL GAS UTILITY**		
DESCRIPTION	**USAGE (THERMS)**	**COST ($)**	**AVE RATE ($/THERM)**
Spruce Run Elementary School	24,610	$27,251	$1.11
Patrick McGaheran Elementary School	37,399	$42,679	$1.14
Round Valley Elementary School	48,429	$53,273	$1.10
Clinton Township Middle School	32,816	$40,148	$1.22
Total	**143,254**	**$163,350**	**$1.14**

B. Energy Use Index (EUI)

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

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

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

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

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

Table 4
Energy Use Index Summary

ENERGY USE INDEX PER FACILITY				
FACILITY	**BUILDING AREA**	**ENERGY USE INDEX**		
DESCRIPTION	**(SF)**	**SITE (KBTU/SF/YR)**	**SOURCE (KBTU/SF/YR)**	**ELECTRIC (KWH/SF/YR)**
Spruce Run Elementary School	55,445	75	150	9.1
Patrick McGaheran Elementary School	67,623	87	162	9.1
Round Valley Elementary School	107,806	67	122	6.6
Clinton Township Middle School	123,284	66	158	11.4

See the Appendix C - Statement of Energy Performance for comparason to other facilities
Highlighted areas are estimated.

C. EPA Energy Benchmarking System

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

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

In accordance with the Local Government Energy Audit Program, CEG has created an ENERGY STAR account for the municipality to access and monitoring the facility's yearly energy usage as it compares to facilities of similar type. The login page for the account can be accessed at the following web address; the username and password are also listed below:

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

User Name: clintontwpboe
Password: lgeaceg2011

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

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

Table 5
Energy Star Performance Summary

ENERGY STAR PERFORMANCE RATING PER FACILITY			
FACILITY	**ENERGY STAR PERFORMANCE RATING**		
DESCRIPTION	**SCORE**	**AVERAGE**	**POTENTIAL CERTIFICATIONS**
Spruce Run Elementary School	44	50	N/A
Patrick McGaheran Elementary School	22	50	N/A
Round Valley Elementary School	62	50	N/A
Clinton Township Middle School	38	50	N/A

See the Appendix C - Statement of Energy Performance for comparative facilities
Score: "N/A" represents facility that could not receive a rating. See Energy Star website for details.

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

V. RENEWABLE/DISTRIBUTED ENERGY MEASURES

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

Solar Generation

Solar energy produces clean energy and reduces a building's carbon footprint. This is accomplished via photovoltaic panels which are mounted on all south and southwestern facades of the building. Flat roof, as well as sloped areas can be utilized; flat areas will have the panels turned to an optimum solar absorbing angle. (A structural survey of the roof would be necessary before the installation of PV panels is considered). Parking lots can also be utilized for the installation of a solar array. A truss system can be installed that is high enough to park vehicles under the array and no parking lot area is lost.

The state of NJ has instituted a program in which one Solar Renewable Energy Certificate (SREC) is given to the Owner for every 1000 kWh of generation. SREC's can be sold anytime on the market at their current market value. The value of the credit varies upon the current need of the power companies. The average value per credit is around $350, this value was used in our financial calculations. This equates to $0.35 per kWh generated.

CEG has reviewed the existing roof area and parking lot canopy area potential of the facilities being audited for the purposes of determining a potential for a photovoltaic system. All of the facilities have roof mounted PV designs. A parking lot canopy design was evaluated for Spruce Run, Patrick McGaheran and Round Valley Schools. The Clinton Township Middle School was evaluated to be un-suitable for either a canopy style PV system due to shading, high traffic area, or lack of space at the site and parking lots. A depiction of the area utilized at each facility is shown in **Renewable / Distributed Energy Measures Calculation Appendix**. The system sizes are shown below for each building where installation of a solar PV system is feasible. The total KWH production for all facilities combined is 3,242,800 kWh annually, reducing the overall utility bill for the school district by approximately 38% percent. A detailed financial analysis can be found in the **Renewable / Distributed Energy Measures Calculation Appendix** within each facility report. 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.

Table 6
Renewable Energy Summary

POWER PRODUCTION SUMMARY - PHOTOVOLTAIC SYSTEM PER FACILITY			
FACILITY	**PRODUCTION SUMMARY**		
DESCRIPTION	**ELECTRIC PRODUCTION (KWH)**	**TOTAL FACILITY USE (KWH)**	**% REDUCTION**
Spruce Run Elementary School	186,700	505,120	37%
Patrick McGaheran Elementary School	190,233	618,560	31%
Round Valley Elementary School	317,401	710,800	45%
Clinton Township Middle School	541,532	1,408,320	38%
Total	**1,235,866**	**3,242,800**	38%

The proposed photovoltaic array layout is designed based on the specifications for the Sun Power SPR-230 panel. This panel has a "DC" rated full load output of 230 watts, and has a total panel conversion efficiency of 18%. Although panels rated at higher wattages are available through Sun Power and other various manufacturers, in general most manufacturers who produce commercially available solar panels produce a similar panel in the 200 to 250 watt range. This provides more manufacturer options to the public entity if they wish to pursue the proposed solar recommendation without losing significant system capacity.

The array system capacity was sized based on available roof space or canopy style system area available at each existing facility. Estimated solar array generation is calculated based on the National Renewable Energy Laboratory PVWatts Version 1.0 Calculator. In order to calculate the array generation an appropriate location with solar data on file must be selected. In addition the system DC rated kilowatt (kW) capacity must be inputted, a DC to AC de-rate factor, panel tilt angle, and array azimuth angle. The DC to AC de-rate factor is based on the panel nameplate DC rating, inverter and transformer efficiencies (95%), mismatch factor (98%), diodes and connections (100%), dc and ac wiring (98%, 99%), soiling, (95%), system availability (95%), shading (if applicable), and age(new/100%). The overall DC to AC de-rate factor has been calculated at an overall rating of 81%. The PVWatts Calculator program then calculates estimated system generation based on average monthly solar irradiance and user provided inputs. The monthly energy generation and offset electric costs from the PVWatts calculator is shown in the **Renewable/Distributed Energy Measures Calculation Appendix**.

The proposed solar array for each facility is qualified by the New Jersey Board of Public Utilities Net Metering Guidelines as a Class I Renewable Energy Source. These guidelines allow onsite customer generation using renewable energy sources such as solar and wind with a capacity of 2 megawatts (MW) or less. This limits a customer system design capacity to being a net user and not a net generator of electricity on an annual basis. Although these guidelines state that if a customer does net generate (produce more electricity than they use), the customer will be credited those kilowatt-hours generated to be carried over for future usage on a month to month basis. Then, on an annual basis if the customer is a net generator the customer will then be compensated by the utility the average annual PJM Grid LMP price per kilowatt-hour for the over generation. Due to the aforementioned legislation, the customer is at limited risk if they generate more than they use at times throughout the year. With the inefficiency of today's energy storage systems, such as batteries, the added cost of storage systems is not warranted and was not considered in the proposed design.

Direct purchase involves the Clinton Township BOE paying for 100% of the total project cost upfront via one of the methods noted in the Installation Funding Options section below. Calculations include a utility inflation rate as well as the degradation of the solar panels over time. The financial summary per facility is as follows:

Table 7
Renewable Financial Summary

FINANCIAL SUMMARY - PHOTOVOLTAIC SYSTEM PER FACILITY			
FACILITY	**DIRECT PURCHASE FINANCIAL SUMMARY**		
DESCRIPTION	**INSTALLATION COST ($)**	**TOTAL SAVINGS ($)**	**INTERNAL RATE OF RETURN**
Spruce Run Elementary School	$1,463,490	$95,030	4.8%
Patrick McGaheran Elementary School	$1,511,100	$96,068	4.5%
Round Valley Elementary School	$2,529,540	$162,827	4.7%
Clinton Township Middle School	$4,220,730	$277,806	4.9%
Total	**$9,724,860**	**$631,731**	

CEG recommends Clinton Township BOE to review all options available for installation of solar PV systems at their facilities including a Power Purchase Agreement (PPA). This option utilizes providers who will own, operate, and maintain the system for a period of 15 years. During this time the PPA Provider would sell all of the electric generated by Solar Arrays to the township at a reduced rate compared to their existing electric rate.

Wind Generation

In addition to the Solar Analysis, CEG also conducted a review of the applicability of wind energy for the facility. Wind energy production is another option available through the Renewable Energy Incentive Program. Wind turbines of various types can be utilized to produce clean energy on a per building basis. Cash incentives are available per kWh of electric usage. Based on CEG's review of the applicability of wind energy for the facility, it was determined that the average wind speed is not adequate, and available space is very limited for purchase of a commercial wind turbine. Therefore, wind energy is not a viable option to implement.

VI. ENERGY PURCHASING AND PROCUREMENT STRATEGY

Load Profile:

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

Electricity:

Spruce Run Elementary School

The electricity usage profile demonstrates a typical cooling load profile for school facilities that have some occupancy during the summer months. Historical usage is relatively steady throughout the year with an average monthly usage of 42,093 kWh and an average monthly demand of 143kW. Largest consumption months were January, February, March and December.

McGaheran Elementary School

The electricity usage profile demonstrates a typical cooling load profile for school facilities that have some occupancy during the summer months. Historical usage is relatively steady throughout the year with an average monthly usage of 51,547 kWh and an average monthly demand of 132kW. Largest consumption months were January, February, March and June.

Round Valley Elementary School

The electricity usage profile demonstrates a typical cooling load profile for school facilities that have some occupancy during the summer months. Historical usage is relatively steady throughout the year with an average monthly usage of 59,233 kWh and an average monthly demand of 239kW. Largest consumption months were January, February, March, June and December.

Clinton Township Middle School

The electricity usage profile demonstrates a typical cooling load profile for school facilities that have occupancy during the summer months. Historical usage is relatively steady throughout the year with an average monthly usage of 117,360 kWh and an average monthly demand of 469kW. Largest consumption months were January, February, March and December.

The historical usage profiles described above are beneficial and will allow for more competitive energy prices when shopping for alternative suppliers mainly due to the relatively flat load profile and reduction of summer load. Third Party Supplier (TPS) electric commodity contracts that offer's a firm, fixed price for 100% of the facilities electric requirements and are lower than the JCP&L's BGS-FP default rate are recommended.

Natural Gas:

Spruce Run Elementary School

The natural gas usage profile demonstrates a very typical natural gas (heat load) profile. The summer months June – August have very little consumption. The average winter (Nov-Mar) consumption is 4,492 therms and the average summer (Apr-Oct) consumption is 307 therms.

McGaheran Elementary School

The natural gas usage profile demonstrates a very typical natural gas (heat load) profile. The summer months June – August have very little consumption. The average winter (Nov-Mar) consumption is 6,506 therms and the average summer (Apr-Oct) consumption is 696 therms.

Round Valley Elementary School

The natural gas usage profile demonstrates a very typical natural gas (heat load) profile. The summer months June – August have very little consumption. The average winter (Nov-Mar) consumption is 8,321 therms and the average summer (Apr-Oct) consumption is 975 therms.

Clinton Township Middle School

The natural gas usage profile demonstrates a very typical natural gas (heat load) profile. The summer months June – August have some consumption. The average winter (Nov-Mar) consumption is 7,675 therms and the average summer (Apr-Oct) consumption is 1,399 therms.

The above load profiles will yield less favorable natural gas pricing when shopping for alternative suppliers. This is because the higher winter month consumption will yield higher pricing which will not be offset by the summer month consumption. Nymex commodity pricing is generally higher in the winter months of November – March and lower in the summer months of April – October. Obtaining a flat load profile, (usage is similar each month), will yield optimum natural gas pricing when shopping for alternative suppliers. Third Party Supplier (TPS) natural gas commodity contracts that offer a product structure that includes:

1. Fixed basis rate with a market based Nymex/commodity rate that settles monthly.
2. Fixed basis rate with fixed Nymex/commodity winter rate (Nov – March) and market based Nymex/commodity rate that settles monthly for the summer months (April – October).

In addition, the product structure should state supply requirements for 100% of the facilities **metered** natural gas requirements.

Tariff Analysis:

Electricity:

The facilities studied in this report receive electrical service through JCP&L's rate tariff, General Service – Secondary (GSS), and are contracted with South Jersey Energy, a Third Party Supplier (TPS) to provide electric commodity supply service as of May 2009. For electric supply (generation) service, the client has a choice to either use JCP&L's default service rate BGS-FP or contract with a Third Party Supplier (TPS) to supply electricity commodity. The current rate per the contract reviewed is $ 0.10482/kWh which is below the current BGS-FP rate through JCP&L. The current contract is due to expire May 2012.

Each year since 2002, the four New Jersey Electric Distribution Companies (EDCs) - Public Service Gas & Electric Company (PSE&G), Atlantic City Electric Company (ACE), Jersey Central Power & Light Company (JCP&L), and Rockland Electric Company (RECO) - have procured several billion dollars of electric supply to serve their Basic Generation Service (BGS) customers through a statewide auction process held in February.

BGS refers to the service of customers who are not served by a third party supplier or competitive retailer. This service is sometimes known as Standard Offer Service, Default Service, or Provider of Last Resort Service.

The Auction Process has consisted of two auctions that are held concurrently, one for larger customers on an hourly price plan (BGS-CIEP) and one for smaller commercial and residential customers on a fixed-price plan (BGS-FP). This facility's rate structure is based on the fixed-price plan (BGS-FP).

The utility, JCP&L will continue to be responsible for maintaining the existing network of wires, pipes and poles that make up the delivery system, which will serve all consumers, regardless of whom they choose to purchase their electricity or natural gas from. JCP&L's Delivery Service rate includes the following charges: Customer Charge, Supplemental Customer Charge, Distribution Charge (kW Demand), kWh Charge, Non-utility Generation Charge, TEFA, SBC, SCC, Standby Fee and RGGI.

Natural Gas:

The facilities studied in this report currently receive natural gas distribution service through Elizabeth Town Gas (Etown) on rate schedule GDS (General Delivery Service) and have contracted Hess Energy, a Third Party Supplier (TPS) to provide natural gas commodity service. The terms and conditions of the natural gas contract include a fixed basis rate at $1.11066/dth with a market based Nymex/commodity rate settling monthly. Hess Energy currently bills the facility on Daily Contract Quantity and not actual metered usage. The current natural gas contract is due to expire May 2012.

Etown provides basic gas supply service (BGSS) to customers who choose not to shop from a Third Party Supplier (TPS) for natural gas commodity. The option is essential to protect the reliability of service to consumers as well as protecting consumers if a third party supplier defaults or fails to provide commodity service. Please refer to the link below for a recap of natural gas BGSS charges from Elizabeth Town Gas for rate schedule GDS.
http://www.elizabethtowngas.com/Universal/RatesandTariff/BGSSRateHistory.aspx

The utility, Elizabeth Town Gas is responsible for maintaining the existing network of pipes that make up the delivery system, which will serve all consumers, regardless of whom they choose to purchase their electricity or natural gas from. Elizabeth Town Gas' delivery service rate includes the following charges: Customer Service Charge, Demand Charge per DCQ, Distribution Charge and Balancing Charge for clients who have a Daily Contract Quantity under 500 therms for the months of November - March.

Electric and Natural Gas Commodities Market Overview:

Current electricity and natural gas market pricing has remained relatively stable over the last year. Commodity pricing in 2008 marked historical highs in both natural gas and electricity commodity. Commodity pricing commencing spring of 2009 continuing through 2010, has decreased dramatically over 2008 historic highs and continues to be favorable for locking in long term (2-5 year) contracts with 3rd Party Supplier's for both natural gas and electricity supply requirements.

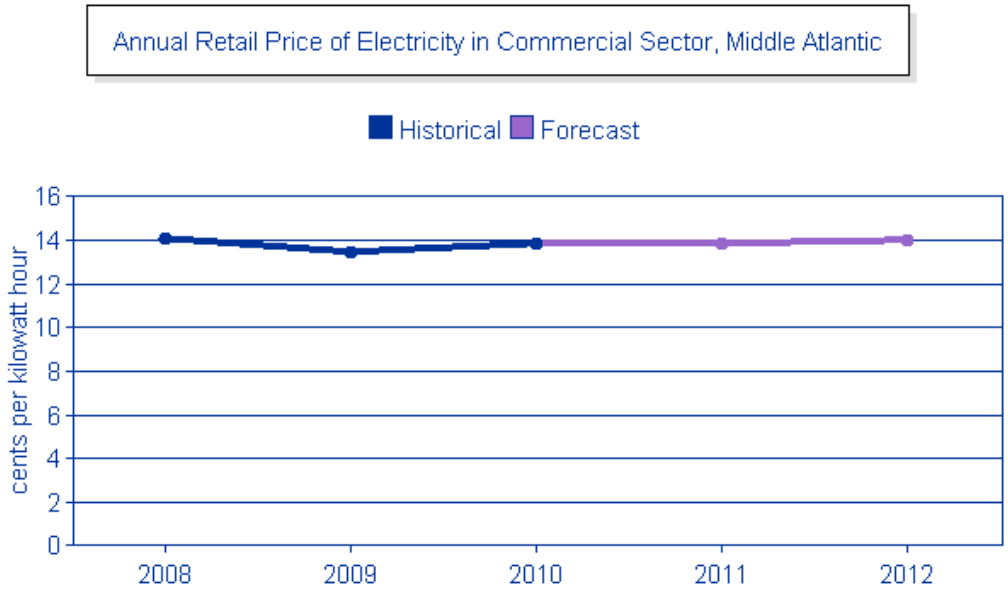
It is important to note that both natural gas and electric commodity market prices are moved by supply and demand, political conditions, market technicals and trader sentiment. This market is continuously changing Energy commodity pricing is also correlated to weather forecasts. Because weather forecasts are dependable only in the short-term, prolonged temperature extremes can really cause extreme price swings.

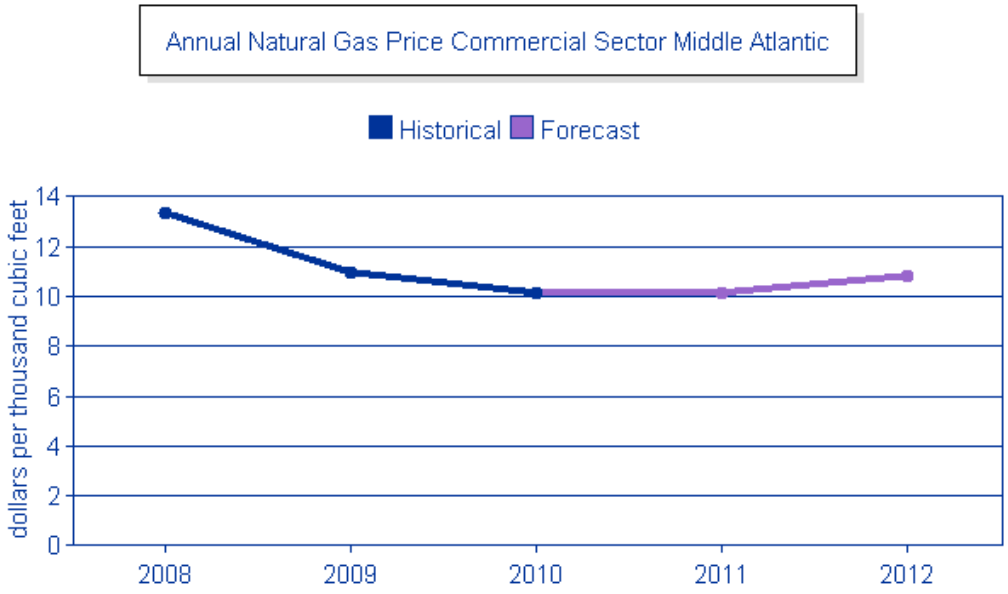
Short Term Energy Outlook - US Energy Information Administration (April 12, 2011):

U.S. Natural Gas Prices. *The Henry Hub spot price averaged $3.97 per MMBtu in March, 12 cents lower than the average price in February and 6 cents lower than the March forecast in last month's Outlook. EIA expects that the Henry Hub price will average $4.10 per MMBtu over 2011, a decline of 29 cents from 2010. However, the projected Henry Hub price rises to $4.55 per MMBtu in 2012.*

Uncertainty over future natural gas prices is slightly lower this year compared with last year at this time. Natural gas futures for June 2011 delivery (for the 5-day period ending April 7) averaged $4.29 per MMBtu, and the average implied volatility over the same period was 34 percent. The lower and upper bounds for the 95-percent confidence interval for June 2011 contracts are $3.37 per MMBtu and $5.47 per MMBtu, respectively. At this time last year, the natural gas June 2010 futures contract averaged $4.04 per MMBtu and implied volatility averaged 41 percent. The corresponding lower and upper limits of the 95-percent confidence interval were $3.00 per MMBtu and $5.50 per MMBtu.

U.S. Electricity Retail Prices. *During 2010, retail prices for electricity distributed to the residential sector averaged 11.58 cents per kilowatthour, about the same level as in 2009. EIA expects residential prices to rise by 2.3 percent in 2011, followed by little change in 2012. The effect of lower generation fuel costs should be more evident during 2011 in retail prices for electricity distributed to the industrial sector, which EIA projects will increase by only 0.9 percent during 2011 then fall slightly, by 0.2 percent next year.*





Note: Pricing includes both utility distribution and energy commodity charges.

Recommendations:

1. CEG recommends a continued aggregation approach for 3rd party commodity supply procurement strategies for both electric and natural gas supply service. Aggregating the usage of all school facilities for electricity and natural gas supply service, would allow the facilities to either continue to achieve or achieve a reduction in commodity supply costs. Energy commodities are among the most volatile of all commodities, however at this point and time, energy is extremely competitive and contract terms longer than 12 months are desirable. Contracts due to expire in the near term would continue to yield favorable pricing. It is important to aggregate usage where available and take advantage of these current market prices quickly, before energy increases.

   The below recommendations presented by CEG are based on current information provided by the school facilities for its utility usage. Any savings presented with these recommendations are estimates only based on that information. It is recommended that further analysis and review of more recent utility data and actual TPS contracts be performed prior to performing any of the presented recommendations.

   Overall, after review of the utility consumption, billing, and current commodity pricing outlook, CEG recommends that the facilities participate in the energy supply aggregation groups for both electricity and natural gas supply service for all facilities. Many aggregation groups utilize the advisement of a 3rd party unbiased Energy Consulting Firm experienced in the aggregation of and procurement of retail electricity and natural gas commodity. It is important to note that the Energy Consulting Firm should incorporate a rational, defensible strategy for purchasing commodity in volatile markets based upon the following:

   - Budgets that reflect sound market intelligence
   - An understanding of historical prices and trends
   - Awareness of seasonal opportunities (e.g. shoulder months)
   - Negotiation of fair contractual terms
   - An aggressive, market based price

2. CEG recommends that the school district consider utilizing a third party utility billing-auditing service to further analyze historical utility invoices such as water, sewer, natural gas and electric for incorrect billings and rate tariff optimization services. This service can be based on a shared savings model with no cost to the school district. The service could provide refunds on potential incorrect billings that may have been passed through by the utilities and paid by the school district.

VII. INSTALLATION FUNDING OPTIONS

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

A. Incentive Programs:

Pay For Performance

The New Jersey Smart Start Pay for Performance program includes incentives based on savings resulted from implemented ECMs. The program is available for all buildings that were audited as part of the NJ Clean Energy's Local Government Energy Audit Program. The facility's participation in the program is assisted by an approved program partner. An "Energy Reduction Plan" is created with the facility and approved partner to shown at least 15% reduction in the building's current energy use. Multiple energy conservation measures implemented together are applicable toward the total savings of at least 15%. No more than 50% of the total energy savings can result from lighting upgrades / changes.

Total incentive is capped at 50% of the project cost. The program savings is broken down into three benchmarks; Energy Reduction Plan, Project Implementation, and Measurement and Verification. Each step provides additional incentives as the energy reduction project continues. The benchmark incentives are as follows:

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

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

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

$0.70 / Therm for 15% savings, $0.80 / Therm for 17% saving, …)
Increased incentives result from verified savings above 15%.

Smart Start Program

Prescriptive Measures - The New Jersey Clean Energy's Smart Start prescriptive measures incentives include unit pricing incentives for installation of energy efficient equipment and controls. Proposed equipment and controls must meet the minimum efficiency requirements as well as other application requirements. The Smart Start prescriptive incentives applicable for new construction, renovations, remodeling and equipment replacements, for a wide range of equipment including:

- Electric Chillers
- Gas Cooling
- Electric Unitary HVAC
- Ground Source Heat Pumps
- Gas Heating
- Variable Frequency Drives
- Gas Water Heating
- Premium Motors
- Prescriptive Lighting
- Lighting Controls
- Technical Studies

Custom Measures - The New Jersey Clean Energy's Smart Start prescriptive measures incentives include all measures not identified in the prescriptive measures category or measures that must have savings verified through additional analysis such as energy model simulations. Custom measures are intended to include savings as a result of unique energy efficiency measures, which are typically facility specific such as waste heat recovery. Custom incentives are provided based on the amount of energy saved and minimum internal rate of return in order to be eligible.

Energy Efficiency and Conservation Block Grants

The EECGB rebate provides supplemental funding up to $50,000 for counties and local government entities to implement energy conservation measures. The EECGB funding is provided through the American Recovery and Reinvestment Act (ARRA). The local government must be among the eligible local government entities listed on the NJ Clean Energy website as follows - http://njcleanenergy.com/commercial-industrial/programs/eecbg-eligible-entities. This program is limited to municipalities and counties that have not already received grants directly through the US department of Energy.

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.

Financing Options:

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.

Power Purchase Agreement

Public Law 2008, Chapter 3 authorizes contracts of up to fifteen (15) years for energy purchase 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.

Energy Savings Improvement Program (ESIP):

Public Law 2009, Chapter 4 authorizes government entities to make energy related improvements to their facilities and pay 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. This program provides public entities to make valuable facility infrastructure improvements that are associated with energy savings. All energy savings projects are eligible as long as the financing period does not extend beyond 15 years. The financing can be utilized for all aspects of energy efficiency project implementation including, energy savings plan development, engineering, construction management, construction management, commissioning, and measurement and verification.

This program provides the much needed financing for energy efficiency projects without the burden of increased debt. The program allows for procurement of financing without voter approval or extending existing dept. The program requires evaluation to ensure a positive cash-flow through the entire 15 year financing period. The first phase of implementing an ESIP is the development of an Energy Savings Plan (ESP) to verify the energy savings, construction costs, and overall financial model.

The underlining program requirement is the limitation of the project term to 15 years. The ESIP project size is open for multiple buildings to be included within one project. In addition all applicable incentive programs can also be utilized to help reduce the overall construction cost.

The following breakdown is an estimated project scope with the potential to qualify for the ESIP. An ESP is required to verify the costs and savings as part of an ESIP project.

Table 8
ESIP -Total Entity Project Summary

ENERGY SAVINGS IMPROVEMENT PROGRAM - POTENTIAL ENERGY EFFICIENCY PROJECT					
FACILITY ENERGY EFFICIENCY PROJECTS	**ANNUAL ENERGY SAVINGS ($)**	**PROJECT COST ($)**	**SMART START INCENTIVES**	**CUSTOMER COST**	**SIMPLE PAYBACK**
Spruce Run Elementary School	$10,261	$105,295	$3,940	$101,355	9.9
Patrick McGaheran Elementary School	$18,387	$179,989	$9,151	$170,838	9.3
Round Valley Elementary School	$15,209	$111,836	$15,189	$96,647	6.4
Clinton Township Middle School	$11,493	$152,078	$4,000	$148,078	12.9
Total Entity Project	**$55,350**	**$549,197**	**$32,279**	**$516,918**	**9.3**

Total School District Energy Costs:	**$684,824**
Est. Total School District Energy Savings:	**$55,350**
Overall School District Percent Reduction:	**8.1%**

VIII. ENERGY AUDIT ASSUMPTIONS

The assumptions utilized in this energy audit include but are not limited to following:

A. Cost Estimates noted within this report are based on industry accepted costing data such as RS Means™ Cost Data, contractor pricing and engineering estimates. All cost estimates for this level of auditing are +/- 20%. Prevailing wage rates for the specified region has been utilized to calculate installation costs. The cost estimates indicated within this audit should be utilized by the owner for prioritizing further project development post the energy audit. Project development would include investment grade auditing and detailed engineering.
B. Energy savings noted within this audit are calculated utilizing industry standard procedures and accepted engineering assumptions. For this level of auditing, energy savings are not guaranteed.
C. Information gathering for each facility is strongly based on interviews with operations personnel. Information dependent on verbal feedback is used for calculation assumptions including but not limited to the following:
    a. operating hours
    b. equipment type
    c. control strategies
    d. scheduling
D. Information contained within the major equipment list is based on the existing owner documentation where available (drawings, O&M manuals, etc.). If existing owner documentation is not available, catalog information is utilized to populate the required information.
E. Equipment incentives and energy credits are based on current pricing and status of rebate programs. Rebate availability is dependent on the individual program funding and applicability.
F. Equipment (HVAC, Plumbing, Electrical, & Lighting) noted within an ECM recommendation is strictly noted as a **basis for calculation** of energy savings. The owner should use this equipment information as a benchmark when pursuing further investment grade project development and detailed engineering for specific energy conservation measures.
G. Utility bill annual averages are utilized for calculation of all energy costs unless otherwise noted. Accuracy of the utility energy usage and costs are based on the information provided. Utility information including usage and costs is estimated where incomplete data is provided.