LOCAL GOVERNMENT ENERGY AUDIT PROGRAM: TRITON HIGH SCHOOL ENERGY AUDIT REPORT

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REPORT ISSUANCE: **FINAL – APRIL 04, 2011**

PROJECT NO: **9C10098**

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I. EXECUTIVE SUMMARY

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

Triton Regional High School
250 Schubert Ave
Runnemede, NJ 08078

District Contact Person: Jean Grubb, CPA, SBA
Facility Contact Person: Joe Newsham

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

The annual energy costs at this facility are as follows:

Electricity	$287,375
Natural Gas	$124,652
Total	$412,027

The potential annual energy cost savings for each energy conservation measure (ECM) and renewable energy measure (REM) are shown below in Table 1. Be aware that the ECM's and REM's are not additive because of the interrelation of some of the measures. This audit is consistent with an ASHRAE level 2 audit. The cost and savings for each measure is ± 20%. The evaluations are based on engineering estimations and industry standard calculation methods. More detailed analyses would require engineering simulation models, hard equipment specifications, and contractor bid pricing.

Table 1
Financial Summary Table

ENERGY CONSERVATION MEASURES (ECM's)					
ECM NO.	**DESCRIPTION**	**NET INSTALLATION COST[A]**	**ANNUAL SAVINGS[B]**	**SIMPLE PAYBACK (Yrs)**	**SIMPLE LIFETIME ROI**
ECM #1	Lighting Upgrade	$20,384	$10,001	2.0	635.9%
ECM #2	Computer Monitor Replacement	$14,100	$3,624	3.9	285.5%
ECM #3	Condensing Boiler Installation	$329,071	$18,412	17.9	67.9%
ECM #4	AC Unit Replacement	$40,022	$1,936	20.7	-27.4%
ECM #5	Water Conservation	$33,408	$730	45.8	-34.4%
ECM #6	Premium Efficiency Motors	$12,094	$1,863	6.5	177.3%
ECM #7	Valve Blanket Insulation	$12,000	$690	17.4	38.0%
ECM #8	Kitchen Hood Controls	$16,381	$1,216	13.5	11.3%
ECM #9	Dishwasher Replacement	$41,790	$935	44.7	-66.5%
RENEWABLE ENERGY MEASURES (REM's)					
ECM NO.	**DESCRIPTION**	**NET INSTALLATION COST**	**ANNUAL SAVINGS**	**SIMPLE PAYBACK (Yrs)**	**SIMPLE LIFETIME ROI**
REM #1	PV Solar	$6,145,830	$429,464	14.3	74.7%

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

The estimated demand and energy savings for each ECM and REM is shown below in Table 2. The descriptions in this table correspond to the ECM's and REM's listed in Table 1.

Table 2
Estimated Energy Savings Summary Table

ENERGY CONSERVATION MEASURES (ECM's)				
ECM NO.	**DESCRIPTION**	**ANNUAL UTILITY REDUCTION**		
		ELECTRIC DEMAND (KW)	**ELECTRIC CONSUMPTION (KWH)**	**NATURAL GAS (THERMS)**
ECM #1	Lighting Upgrade	26.1	65364.0	0.0
ECM #2	Computer Monitor Replacement	0.0	23688.0	0.0
ECM #3	Condensing Boiler Installation	0.0	0.0	18412.0
ECM #4	AC Unit Replacement	12.7	12651.0	0.0
ECM #5	Water Conservation	0.0	0.0	0.0
ECM #6	Premium Efficiency Motors	2.8	12177.0	0.0
ECM #7	Valve Blanket Insulation	0.0	0.0	616.0
ECM #8	Kitchen Hood Controls	0.0	2008.0	811.0
ECM #9	Dishwasher Replacement	0.0	3045.0	260.0
RENEWABLE ENERGY MEASURES (REM's)				
ECM NO.	**DESCRIPTION**	**ANNUAL UTILITY REDUCTION**		
		ELECTRIC DEMAND (KW)	**ELECTRIC CONSUMPTION (KWH)**	**NATURAL GAS (THERMS)**
REM #1	PV Solar	682.9	853807.0	0.0

Fast Payback Energy Conservation Measures:

The Energy Conservation Measures (ECMs) identified within the report represent the potential annual energy and cost savings at the facility resulting from our energy audit. It is recommended to consider all ECMs as part of the School District'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 and should be considered a high priority for the District. The following ECMs are highly recommended:

- Lighting Upgrades

Lighting retrofits throughout the School District are a straight forward conservation measure that is prescriptive in nature and provides substantial savings for the investment. Lighting retrofits are a good example of ECMs that can be implemented with "in house" staff to reduce the installation cost and further reduce paybacks. Throughout most of the school the measure includes replacing existing 700 series T-8 fluorescent lamps with new higher efficiency T-8 lamps. This upgrade also includes installation of high bay T-5 fixtures to replace the existing metal halide fixtures found in the gymnasium and auditorium. In addition it is recommended to utilize CFL lamps in lieu of all existing incandescent lamps throughout the School District. Overall lighting upgrades represent one of the most easily implemented ECMs and are highly recommended for all facilities.

- Computer Monitor Replacement

Plug loads within buildings are becoming a larger and larger portion of the total energy use in all types of facilities. Plug loads are most dominant in combination with computers and computer equipment. Modern computer monitors are flat screen LCD panels that are far more efficient than older style cathode ray-tube (CRT) monitors. Typical energy use of a flat screen monitor is approximately 1/3 of the energy used by a CRT monitor. A large portion of the computer monitors throughout the District are CRT style monitors. This represents a significant energy savings potential. It is highly recommended to replace the existing CRT monitors with flat screen monitors to take advantage of the energy savings as well as other ergonomic benefits of modern LCD monitors.

- Premium Efficiency Motors

The improved efficiency of the NEMA Premium® efficient motors in comparison to standard efficiency type is primarily due to improved designs with use of better materials to reduce losses. The existing fans and pumps at the school are configured primarily with standard efficiency motors. These standard efficiency motors run a considerable amount of time over a one year time period. Replacing the existing standard efficiency motors with NEMA Premium® efficiency models yields significant energy savings. 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 a variety of existing equipment.

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 upgrades, HVAC equipment upgrades, etc. The savings identified for the following ECMs provides additional incentive for the District's capital improvement projects.

- Condensing Boilers

Boiler replacements are one of the most significant HVAC system upgrades for a facility. The installation of condensing boilers provides a heating efficiency increase ranging from 10% to 15% over boilers of non-condensing type and an even greater savings potential over existing equipment found in the School. Even with this significant increase in efficiency the simple payback for a condensing boiler ECM is still greater than 15 years, depending on the boiler capacity and installation difficulty, due to the complexity of upgrading a major infrastructure component of the School. This ECM represents the most substantial upfront cost which creates long paybacks, but it is the most practical ECM to pursue due to the potential long term energy and maintenance savings that can be realized.

- AC Unit Upgrades

High efficiency AC unit installations will typically have high installation costs. However, the savings over time can be substantial. The simple payback for AC unit upgrades range between 25 years and 30 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 through avoided costs (i.e. maintenance, replacement, operational, refrigerant availability and disposal, etc.) that would otherwise burden the School District and should not be overlooked.

- Water Conservation

The water consumption of a typical as seen water closet and urinal in the facility only meet the minimum federally required standard for water efficiency. New fixtures are available that use less water than today's requirements and can add up to significant water reduction over a long period.

- Hot Water Valve Blanket Insulation

Hot Water piping insulation is a valuable asset to avoid the loss of heat from the boiler system. Large diameter bare steel pipe can account for significant energy loss over an entire heating system. Since the piping remains hot 24/7, bare pipe heat losses are multiplied by the entire operating hours of the heating system. Pipe & valve insulation reduces the loss compared to bare

pipe by a factor of 10 or more. Pipe insulation becomes deteriorated over time due to the repair of pipe / fitting leaks and service of components.

- Kitchen Hood Controls

Kitchen hood controls allow the exhaust air through the commercial kitchen hood to reduce with respect to the level of heat and smoke produced by the kitchen cooking equipment. This ECM provides savings on fan motors as well as energy required to heat and cool the make-up air exhausted by the hood. The savings is extremely dependent on the operating hours of the kitchen hood exhaust fan. Based on the survey and discussions with the operating staff, it was determined that the kitchen exhaust was operating for many hours beyond the needs of the cooking equipment.

- Kitchen Domestic Booster Heater

Large schools require significant hot water for cleaning and sterilization of the kitchen dishes and serving trays. Commercial kitchen dishwashing equipment requires hot water at sterilization temperatures far above the buildings typical domestic hot water supply. The dishwasher utilizes an electric booster heater with a large capacity electric input to boost the domestic hot water to the adequate temperature. Older dishwasher units consume more water when compared to equivalent capacities of today's models. Newer equipment can reduce the water consumption therefore reducing the energy required to properly clean and sterilize the kitchen dishes and serving trays.

Combined Project Approach:

Although only 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 provide 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.

Table 3
Combined Project Summary

COMBINED PROJECT APPROACH SUMMARY TABLE						
ECM NO.	**DESCRIPTION**	**ANNUAL ENERGY SAVINGS ($)**	**PROJECT COST ($)**	**SMART START INCENTIVES**	**CUSTOMER COST**	**SIMPLE PAYBACK**
ECM #1	Lighting Upgrade	$10,001	$46,654	$26,270	$20,384	2.0
ECM #2	Computer Monitor Replacement	$3,624	$14,100	$0	$14,100	3.9
ECM #3	Condensing Boiler Installation	$18,412	$340,656	$11,585	$329,071	17.9
ECM #4	AC Unit Replacement	$1,936	$41,850	$1,828	$40,022	20.7
ECM #6	Premium Efficiency Motors	$1,863	$12,604	$510	$12,094	6.5
ECM #8	Kitchen Hood Controls	$1,216	$16,381	$0	$16,381	13.5
	Design / Construction Extras (15%)		*$70,837*		*$70,837*	
	Total Project	**$37,052**	**$543,082**	**$40,193**	**$502,889**	**13.6**

Total Triton High School Energy Costs:	**$412,027**
Est. Total Triton High School Energy Savings:	**$37,052**
Overall Triton High School Percent Reduction:	**9.0%**

A funding mechanism that is available for large scale, combined projects is the E.S.I.P, P.L. 2009, c.4. 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 ECMs provides Black Horse Pike Regional School District with the opportunity to implement a large portion of the ECMs identified within Triton High School with an overall simple payback of 13.6 years. The program financing allows for the implementation with no upfront cost for Blackhorse Regional School District. Implementation of an ESIP provides significant benefits and should be strongly considered for Triton High School. The Total Entity Project Summary table below shows the savings, costs, incentive programs and paybacks for all ECMs at Triton High School. Implementation of all ECMs identified within the table represents a total annual savings of approximately $37,052 for Black Horse Pike Regional School District which is a 9% reduction in overall annual utility costs.

Other Considerations:

- Renewable Energy Measures

Renewable Energy Measures (REMs) were also reviewed for implementation at Triton High School. CEG utilized a roof and ground mounted solar array to house a substantial PV system.

The recommended 682.87 kW PV system will produce approximately 853,807 kWh of electricity annually and will reduce the schools electrical consumption from the grid by 45%. The system's calculated simple payback of 14.3 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 before deciding to not implement this renewable energy measure.

- Maintenance and Operational Measures

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

  - Chemically clean the condenser and evaporator coils periodically to optimize efficiency. Poorly maintained heat transfer surfaces can reduce efficiency 5-10%.
  - Maintain all weather stripping on entrance doors.
  - Clean all light fixtures to maximize light output.
  - Provide more frequent air filter changes to decrease overall system power usage and maintain better IAQ.

- Retro-Commissioning

Based on the review of the facility's energy bills and discussions with the School District, the energy audit team recommends Retro-Commissioning of this facility to meet the following objectives:

  - Bring existing HVAC equipment to its proper operational state including air and water distribution systems
  - Reduce energy use and energy costs
  - Improve indoor air quality
  - Verify the installation and performance of identified system upgrades
  - Address overall building energy use and demand and identify areas of highest energy use and demand
  - Identify the location of the most comfort problems or trouble spots in the building
  - Review current O&M practices

Through the implementation of a Retro-Commissioning Plan, the School District will be able to continue with their vision of reducing energy usage and operating efficient facilities.

Overall Assessment:

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 $412,027 could be reduced by approximately 9% through the implementation of the ECMs recommended in this audit. Triton High School 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 the School to take advantage of this opportunity.

II. INTRODUCTION

The comprehensive energy audit covers the 227,600 square foot Triton High School, which includes the following spaces: gymnasium, auxiliary gym, basement locker rooms, kitchen, cafeteria, library, various trade shops, science labs, administration offices, auditorium, classrooms, maintenance, computer labs, music suites, etc.

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

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

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

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

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

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

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

III. METHOD OF ANALYSIS

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

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

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

Cost savings are calculated based on the actual historical energy costs for the facility. Installation costs include labor and equipment 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 / Tariffs

The energy usage for the facility has been tabulated and plotted in graph form as depicted within this section. Each energy source has been identified and monthly consumption and cost noted per the information provided by the Owner.

The electric usage profile represents the actual electrical usage for the facility. Public Service Electric and Gas (PSE&G) provides electricity to the facility under their Large Power and Lighting Service (LPLS) rate structure. A Third Party Supplier (TPS) has not been contracted. The electric utility measures consumption in kilowatt-hours (KWH) and maximum demand in kilowatts (KW). One KWH usage is equivalent to 1000 watts running for one hour. One KW of electric demand is equivalent to 1000 watts running at any given time. The basic usage charges are shown as generation service and delivery charges along with several non-utility generation charges. Rates used in this report reflect the historical data received for the facility.

The gas usage profile shows the actual natural gas energy usage for the facility. South Jersey Gas provides natural gas to the facility under the General Service Gas-LV rate structure. The Third Party Supplier (TPS) is Hess Corporation. The gas utility measures consumption in cubic feet x 100 (CCF), and converts the quantity into Therms of energy. One Therm is equivalent to 100,000 BTUs of energy.

The overall cost for utilities is calculated by dividing the total cost by the total usage. Based on the utility history provided, the average cost for utilities at this facility is as follows:

Description	Average
Electricity	15.3¢ / kWh
Natural Gas	$1.12 / Therm

Table 4
Electricity Billing Data

ELECTRIC USAGE SUMMARY

Utility Provider: PSE&G
Rate: LPLS
Meter No: 778008336
Customer ID No: 42 002 028 08
Third Party Utility
TPS Meter / Acct No:

MONTH OF USE	CONSUMPTION KWH	DEMAND	TOTAL BILL
Jan-09	156,960	384.5	$21,459
Feb-09	165,327	382.1	$22,794
Mar-09	154,287	385.6	$22,678
Apr-09	160,882	380.0	$22,718
May-09	143,082	463.1	$20,923
Jun-09	156,689	433.8	$22,229
Jul-09	165,695	461.8	$29,802
Aug-09	139,223	259.2	$24,246
Sep-09	148,271	297.0	$25,415
Oct-09	169,762	478.5	$30,727
Nov-09	169,870	393.1	$23,581
Dec-09	147,007	393.7	$20,804
Totals	**1,877,054**	**478.5 Max**	**$287,375**

AVERAGE DEMAND **392.7 KW average**
AVERAGE RATE **$0.153** **$/kWh**

Figure 1
Electricity Usage Profile

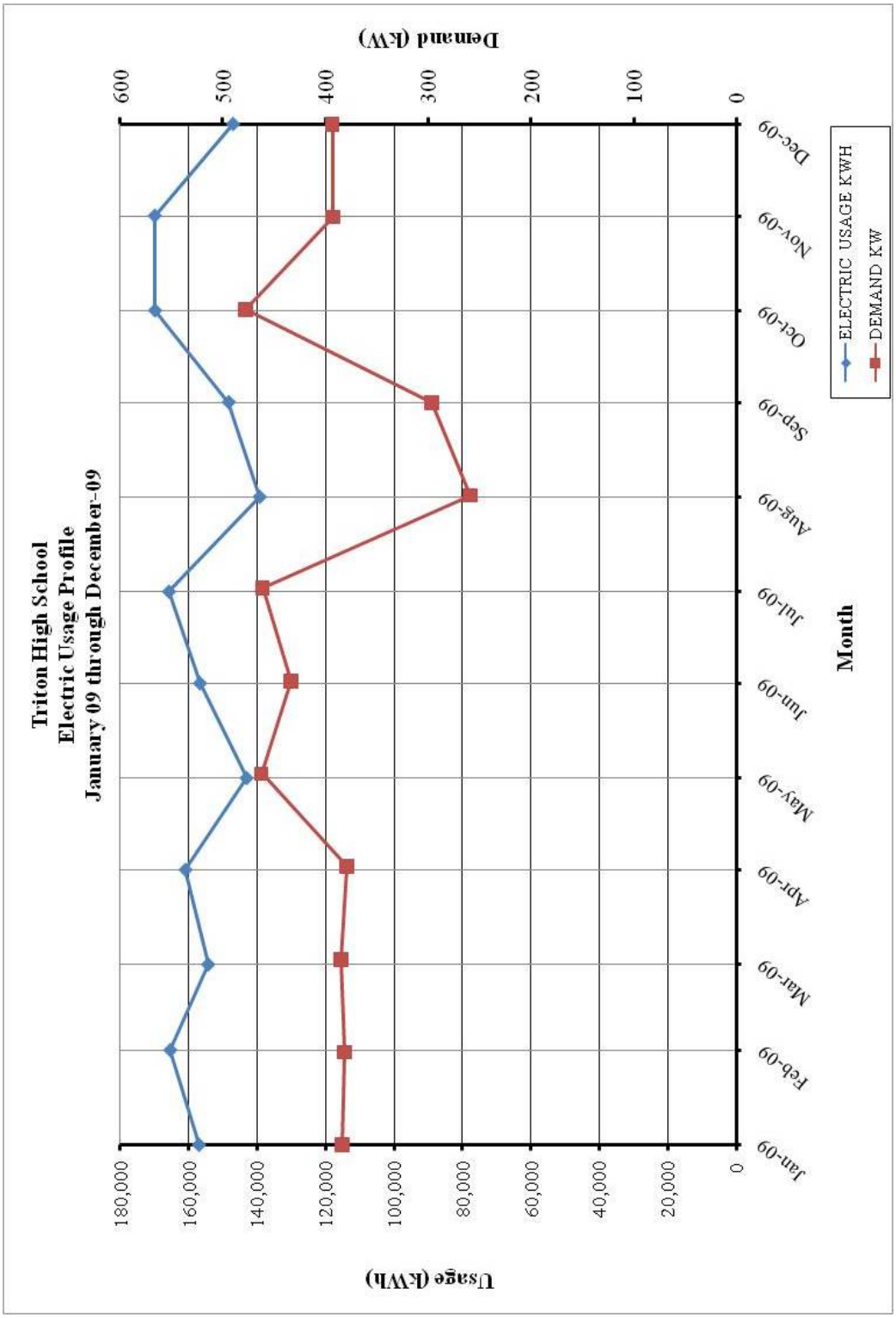
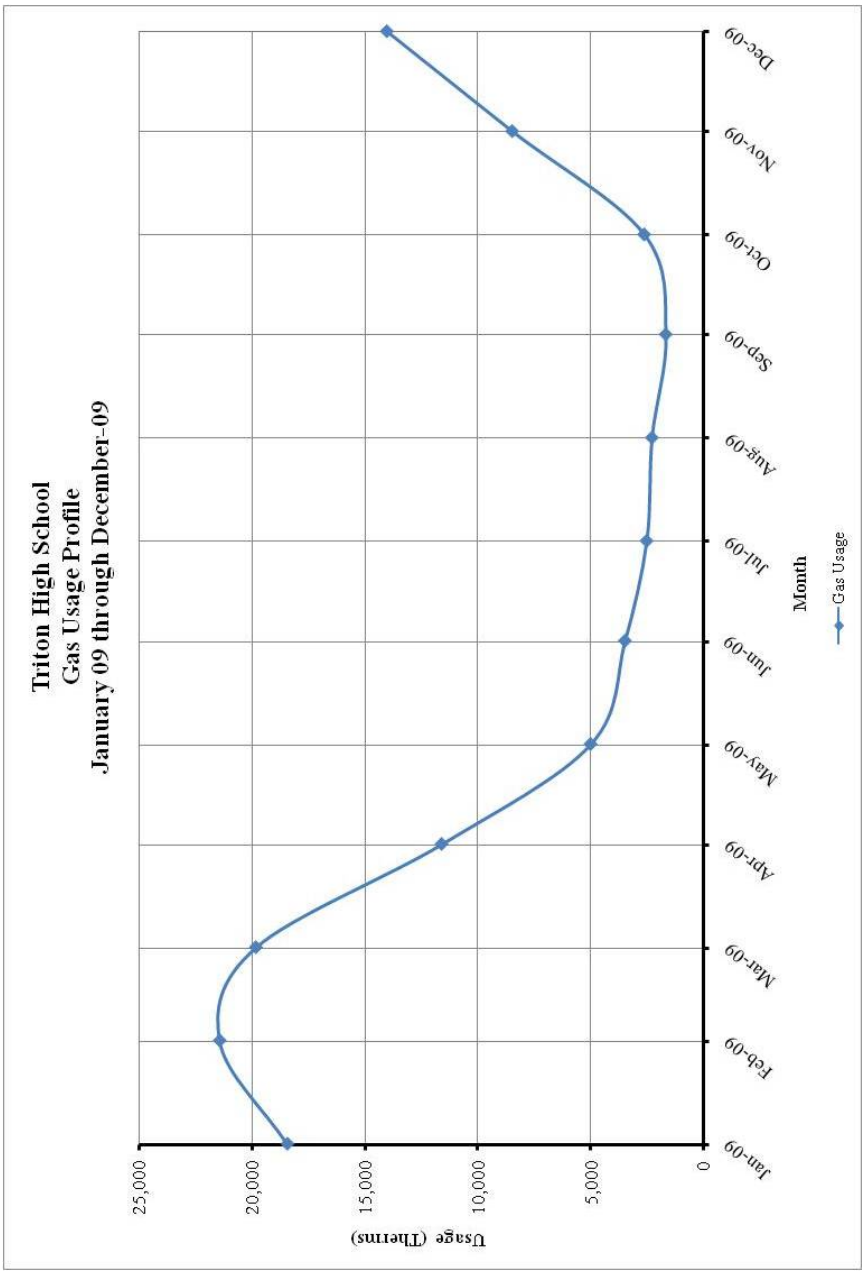


Table 5
Natural Gas Billing Data

NATURAL GAS USAGE SUMMARY		
Utility Provider:	South Jersey Gas	
Rate:	General Service Gas - LV	
Meter No:	190786	
Point of Delivery ID:		
Third Party Utility Provider:	Hess Corporation	
TPS Meter No:		
MONTH OF USE	**CONSUMPTION (THERMS)**	**TOTAL BILL**
Jan-09	18,433.60	$22,488.26
Feb-09	21,433.80	$26,166.34
Mar-09	19,832.98	$17,859.41
Apr-09	11,607.00	$10,545.69
May-09	5,009.02	$4,808.89
Jun-09	3,488.99	$3,708.70
Jul-09	2,526.44	$2,857.60
Aug-09	2,294.14	$2,665.68
Sep-09	1,681.00	$2,050.63
Oct-09	2,634.75	$2,735.51
Nov-09	8,481.88	$7,873.43
Dec-09	14,034.98	$20,891.53
TOTALS	**111,458.58**	**$124,651.67**
AVERAGE RATE:	**$1.12**	**$/THERM**

Figure 2
Natural Gas Usage Profile



B. Energy Use Index (EUI)

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

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

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

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

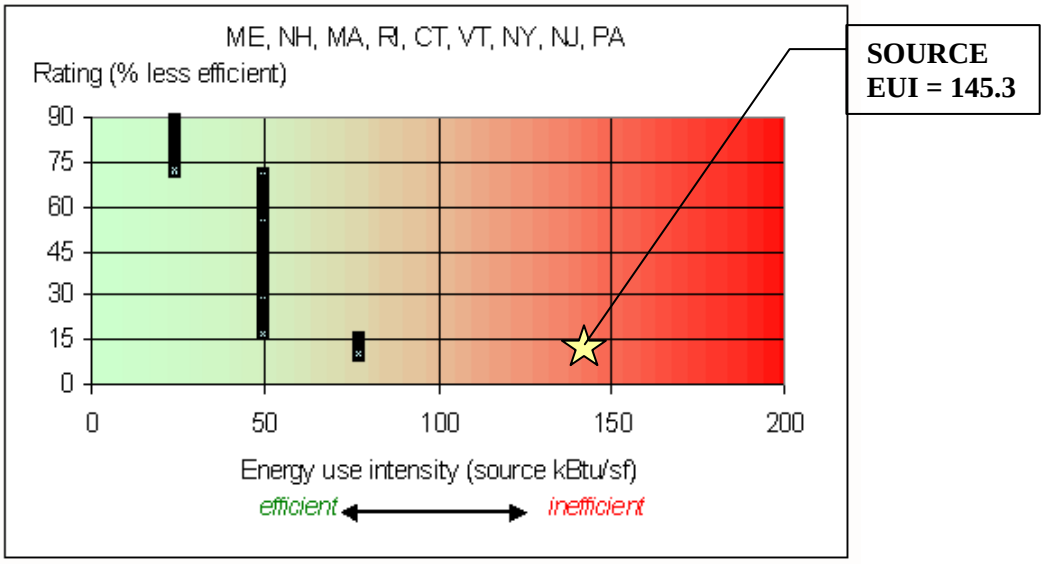
$$Building\ \ Source\ EUI = \frac{(Electric\ Usage\ in\ kBtu\ \ X\ \ SS\ \ Ratio + Gas\ Usage\ in\ kBtu\ \ X\ \ SS\ \ Ratio)}{Building\ \ Square\ \ Footage}$$

Table 6
Facility Energy Use Index (EUI) Calculation

ENERGY USE INTENSITY CALCULATION						
ENERGY TYPE	**BUILDING USE**			**SITE ENERGY**	**SITE-SOURCE RATIO**	**SOURCE ENERGY**
	kWh	**Therms**	**Gallons**	**kBtu**		**kBtu**
ELECTRIC	1,877,054.4			6,408,264	3.340	21,403,601
NATURAL GAS		111,458.6		11,145,858	1.047	11,669,713
FUEL OIL			0.0	0	1.010	0
PROPANE			0.0	0	1.010	0
TOTAL				17,554,122		33,073,314
*Site - Source Ratio data is provided by the Energy Star Performance Rating Methodology for Incorporating Source Energy Use document issued Dec 2007.						
BUILDING AREA		227,600	SQUARE FEET			
BUILDING SITE EUI		*77.13*	kBtu/SF/YR			
BUILDING SOURCE EUI		*145.31*	kBtu/SF/YR			

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

Figure 3
Source Energy Use Intensity Distributions: High Schools



C. EPA Energy Benchmarking System

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

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

In accordance with the Local Government Energy Audit Program, CEG has created an ENERGY STAR account for the municipality to access and monitoring the facility's yearly energy usage as it compares to facilities of similar type. The 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: BlackhorsepikeBOE
Password: lgeaceg2010

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

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 7
ENERGY STAR Performance Rating

ENERGY STAR PERFORMANCE RATING		
FACILITY DESCRIPTION	**ENERGY PERFORMANCE RATING**	**NATIONAL AVERAGE**
Triton High School	47	50

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

V. FACILITY DESCRIPTION

The 227,600 square foot Triton High School is a two-story facility comprised of a gymnasium, auxiliary gym, basement locker rooms, kitchen, cafeteria, faculty dining, library, various trade shops, science labs, computer technology lab, administration offices, auditorium, classrooms, maintenance, band room, choral room, etc.

The total occupancy at the Triton High School is approximately 1,692 including students, teachers and the custodial staff. The facility is open between the hours of 5:30 AM and 11:30 PM for school hours, afterschool programs and custodial services. The school is heavily used in the summer for sports, summer camps and other activities. Therefore the building is kept at occupied conditions during the summer months to control temperature and humidity for staff and programs that may be occurring at the facility.

The facility was originally constructed in 1957 and had an H Corridor Classroom Addition in 1963. Also, an auxiliary gym was added in 1988. A Library, Science Rooms and Kitchen Addition was constructed in 1993 with HVAC upgrades in 2008 and 2010. Exterior walls of the original building are brick/block construction with minimum insulation typical of the time period. The amount of insulation within the original exterior walls is unknown. The windows throughout the facility are in good condition and appear to be maintained. Typical windows throughout the facility are double pane, ¼" insulated glass with vinyl frames. Blinds are utilized throughout the facility for occupant comfort. The blinds are valuable because they help to reduce heat loss in the winter and reduce solar heat gain in the summer. The original roof is constructed of asphalt sheets over 3-inch gypsum while the newer roofing systems are EPDM and Hypalon roofing membranes.

HVAC Systems

The central heating system is located in the facility's original boiler room and consists of three (3) 1957 H. B. Smith Series 44 cast iron sectional hot water boilers each rated at 4,000 MBH input and 3,200 MBH output. The heating hot water is distributed throughout the facility via several constant volume end suction pumps feeding seven major zones in the facility and are located within the original boiler room. This system provides heating to all areas of the building except the Cafeteria, Library and Science Wing. The 1993 Library/Science Wing Addition is heated by two (2) H. B. Smith Series 28A cast iron sectional hot water boilers each rated at1,357 MBH input and 1,084 MBH output that feed three (3) in-line hot water pumps. Typical smaller terminal heating equipment throughout the facility consists of vertical unit ventilators with fin-tube radiation in classrooms; hot water unit heaters for receiving, storage, and mechanical rooms; and basic fin-tube radiation or cabinet heaters for entrances.

Cooling in the original 1957 Building and the 1963 H-Corridor Addition is provided by an assortment of split condensing units, split heat pumps, and small packaged rooftop units. The Cafeteria is cooled by three (3) 20-Ton packaged gas/electric rooftop units and the Auditorium by two (2) 30-Ton split condensing units. The 1993 Library is cooled by a 60-Ton rooftop unit, library offices/TV studio by a 10-Ton rooftop, and the faculty dining room by a 4-Ton rooftop. The auto and metal shops are cooled by an 8.5-Ton and a 5-Ton rooftop unit respectively.

Exhaust System

Air is exhausted from the building through the packaged rooftop units and centrifugal roof exhausters. Dedicated exhaust is provided for toilet rooms, specialty rooms (such as art rooms, trade shops, chemistry rooms, and biology rooms, etc.) and large assembly areas (such as the auditorium and gymnasium). The exhaust for the specialty areas is manually controlled by the maintenance staff based on temperature and occupancy comfort. The toilet rooms exhaust fans are manually controlled by bath room wall switches. It was noted that some exhaust fans do not include control dampers that close when fans are not running. The commercial kitchen includes four (4) 12 feet by 4 feet commercial exhaust hoods with make-up air and exhaust equipment on the roof. The kitchen hoods are utilized for heat and smoke exhaust over cooking ovens, steamers, and gas-fired ranges. The kitchen exhaust hoods are manually controlled by wall switches and operate approximately 8 hrs per day during the school year.

HVAC System Controls

The hot water heating systems within the original 1958 facility, the 1963 H Corridor Addition, the 1988 Auxiliary Gym Addition and the 1993 Library/Science Wing/Kitchen Additions are all controlled via a pneumatic system located in the boiler rooms. In addition, this system has summer/winter changeover, outside air temperature reset and hot water pump setpoint controls. This pneumatic system is a vintage system that is long past the service life of 20 years per ASHRAE. Throughout the building there are pneumatic manual wall thermostats for various HVAC units and local pneumatic controls with adjustable settings on the heating units that were installed in 1965. All HVAC units in the older section of the school are controlled by local or remote pneumatic thermostats. We could not determine an actual level of accuracy of the pneumatic thermostats without calibrated instrumentation but there are certainly air leakage in the sensors, field devices and air lines. The noted air leakage leads to inefficient operation of the equipment the thermostat is controlling. These indoor temperature controls are inaccurate due to temperature drift, age, cost of maintenance of pneumatics and not having been re-calibrated. In addition, pneumatic controls do not have the ability to maintain the temperature at setpoint under changing load conditions. The Auditorium, Cafeteria, Library and several Trade Shops have newer HVAC units with Direct Digital Controls (DDC) features.

Domestic Hot Water

During the heating season, domestic hot water for the kitchen, restrooms, office lounge, etc. is provided by a 5-foot diameter by 14-foot long storage tank with an internal heat exchanger feed by the heating hot water boilers via two (2) in-line circulation pumps. In the summer time, the domestic hot water is produced by an H. B. Smith 25 Mills cast iron sectional boiler rated at 858 MBH output that feeds the same heat exchanger/tank. The domestic hot water is circulated throughout the building by a hot water re-circ pump. The circulation pump is controlled by an aqua stat. The domestic hot water piping insulation appeared to be in good condition.

Lighting

Typical lighting throughout the building is 1x4 and 2x4 fixtures with T-8 lamps and electronic ballasts. Several storage rooms, mechanical rooms, practice rooms, library, stage and various closets are lit with incandescent lamps or T-12 industrial fixtures. The Main Gym is lit with 400-Watt MH fixtures and the Auxiliary Gym by 250-Watt MH lamps. Several of the exit signs use incandescent lamps and are a strong candidate for the LED lamp type exit sign fixture.

VI. MAJOR EQUIPMENT LIST

The equipment list contains major energy consuming equipment that through implementation of energy conservation measures could yield substantial energy savings. The list shows the major equipment in the facility and all pertinent information utilized in energy savings calculations. An approximate age was assigned to the equipment in some cases if a manufactures date was not shown on the equipment's nameplate. The ASHRAE service life for the equipment along with the remaining useful life is also shown in the Appendix.

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

VII. ENERGY CONSERVATION MEASURES

ECM #1: Lighting Upgrade

Description:

The majority of the lighting throughout the Triton High School is provided by lighting fixtures consisting of standard 32-Watt, T-8 lamps and electronic ballasts. There are still some spaces that have 40-Watt, T-12 lighting fixtures and incandescent lamps. The existing Gymnasium and Auxiliary Gymnasium lighting systems comprise of twenty five (25) 400-Watt Metal-Halide (MH) and twenty four (24) 250-Watt Metal-Halide (MH) fixtures which have poor lumen maintenance (approximately 30% reduction in lighting output at 40% of rated lamp life). Also, the fixture ballast can be very noisy, requiring up to 10 minutes for re-striking after shutdown, and there is a noticeable color shift as the lamp approaches the end of its life.

The facility has been upgraded with occupancy sensors that turn off lighting when not in use. A few of these sensors were noted as not working and should be repaired or replaced as necessary.

This ECM includes the replacement of all 32-Watt, T-8 and 40-Watt, T-12 lamps with 25-Watt, Super T-8 lamps throughout the entire facility. The new, energy efficient Super T-8 lamps will provide adequate lighting and will save on electrical costs due to better performance of these lamps. This ECM also includes maintenance savings through the reduced number of lamps replaced per year. The expected lamp life of a Super T-8 lamp is approximately 24,000 burn-hours, in comparison to the existing standard T-8 lamp which is approximately 20,000 burn-hours.

This ECM would also replace each of the existing Gymnasium and Auxiliary Gymnasium light fixtures with new T-5 high-bay light fixtures which would include six, 4-foot T-5 High Output (HO) lamps. The T-5 HO lamps are rated for 20,000 hours versus the 10,000 hours for the 400-Watt MH lamps so there would again be savings in replacement cost/labor. In addition, the T-5 HO lamps have better lighting quality and lumen maintenance.

Energy Savings Calculations:

The **Investment Grade Lighting Audit Appendix** outlines the hours of operation, proposed retrofits, costs, savings, and payback periods for each set of fixtures in the facility.

From the **NJ Smart Start® Program Incentives Appendix**, the following incentives are warranted:

For replacement of T-8 lamps to Super T-8 lamps is $10 per fixture.
Smart Start ® Incentive = (# of T-8 fixtures x $10 per fixture)
Smart Start ® Incentive = 2,257 fixtures x $10 per fixture = $22,570

For replacement of 400-Watt MH fixtures to a T-5 lighting system

Smart Start ® Incentive = (# of T-5 fixtures x $100 per fixture)
Smart Start ® Incentive = 25 fixtures x $100 per fixture = $2,500.

For replacement of 250-Watt MH fixtures to a T-5 lighting system
Smart Start ® Incentive = (# of T-5 fixtures x $50 per fixture)
Smart Start ® Incentive = 24 fixtures x $50 per fixture = $1,200.

Total Smart Start ® Incentive Value = $26,270.

Energy Savings Summary:

ECM #1 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$46,654
NJ Smart Start Equipment Incentive ($):	$26,270
Net Installation Cost ($):	$20,384
Maintenance Savings ($/Yr):	$0
Energy Savings ($/Yr):	$10,001
Total Yearly Savings ($/Yr):	$10,001
Estimated ECM Lifetime (Yr):	15
Simple Payback	2.0
Simple Lifetime ROI	635.9%
Simple Lifetime Maintenance Savings	$0
Simple Lifetime Savings	$150,015
Internal Rate of Return (IRR)	49%
Net Present Value (NPV)	$99,007.29

ECM #2: Computer Monitor Replacement

Description:

The computers throughout the facility utilize a mixture of CRT computer monitors and LCD computer monitors. Computers are located in the offices, computer labs, lounges, and classrooms. The CRT computer monitors are outdated and have several disadvantages such as significantly increased higher energy consumption, use large amounts of desk space, poor picture quality, distortions, flickering image, secular glare problems, high weight, and electromagnetic emissions. Many of these drawbacks are difficult to quantify except for the energy use. CRT monitors use considerably more energy than an alternative flat panel LCD monitor. Replacement of the existing CRT monitors with LCD monitors saves considerable energy as well as provides other ergonomic benefits.

Based on the site survey, it was noted that in some areas the computers were left on and allowed to run 24 / 7, while in other rooms the computers were shut down. Some of the monitors were left in screen saver mode, which is deceiving since this mode only saves the computer screen from image burn in, however it does not save on energy consumption. The average operating hours for all computers and monitors is estimated based on the site survey observations. Energy consumption of computer monitors is based on manufacture's specifications.

This ECM includes replacement of all existing CRT monitors with LCD flat panel monitors throughout the school. Installation costs were neglected for this ECM with the intention that this ECM would be installed by the school employees. The calculations are based on the following operating assumptions:

Energy Savings Calculations:

No. of CRT Monitors:	141
Weeks per Yr:	40
Hrs per Week:	84 (12 hrs per day cumulative average)

$$Electric\,Usage = \frac{\#\,of\ \ Computers \times Monitor\ \ Power\,(W) \times Operation\,(Hrs)}{1000\left(\frac{W}{KW}\right)}$$

$$Energy\ Cost = Electric\,Usage(kWh) \times Ave\ Elec\ Cost\left(\frac{\$}{kWh}\right)$$

COMPUTER MONITOR CALCULATIONS			
ECM INPUTS	**EXISTING**	**PROPOSED**	**SAVINGS**
ECM INPUTS	CRT Monitors	LCD Monitor	
# of Computers	141	141	
Monitor Power Cons. (W)	75	25	50
Operating Hrs per Week	84	84	
Operating Weeks per Yr	40	40	
Elec Cost ($/kWh)	0.153	0.153	
ENERGY SAVINGS CALCULATIONS			
ECM RESULTS	**EXISTING**	**PROPOSED**	**SAVINGS**
Electric Usage (kWh)	35,532	11,844	23,688
Energy Cost ($)	$5,436	$1,812	$3,624
COMMENTS:	CRT Monitor consumption based on Dell CRT monitor M/N: CRT-E771MM. Operating hours based on estimated average.		

Installation cost of new monitors is estimated based on current pricing for a 17" LCD monitor on the market today. No labor costs were included for replacing the existing monitors with the new monitors. No incentives are available for installation of computer monitors. Net cost per monitor was estimated to be $100.

Installation Costs: # Monitors X Cost per Monitor
141 Monitors X $100 per Monitor
$14,100

Energy Savings Summary:

ECM #2 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$14,100
NJ Smart Start Equipment Incentive ($):	$0
Net Installation Cost ($):	$14,100
Maintenance Savings ($/Yr):	$0
Energy Savings ($/Yr):	$3,624
Total Yearly Savings ($/Yr):	$3,624
Estimated ECM Lifetime (Yr):	15
Simple Payback	3.9
Simple Lifetime ROI	285.5%
Simple Lifetime Maintenance Savings	$0
Simple Lifetime Savings	$54,360
Internal Rate of Return (IRR)	25%
Net Present Value (NPV)	$29,163.08

ECM #3: Condensing Boiler Installation

Description:

The central heating system consists of three (3) 1957 H. B. Smith cast iron sectional hot water boilers each rated at 3,200 MBH output that serve the building's heating hot water loop. The boilers are fired by natural gas and are roughly 23 years past the ASHRAE service life for a typical cast iron boiler.

The 1993 Library/Science Wing Addition is heated by two (2) H. B. Smith Series 28A cast iron sectional hot water boilers each rated at 1,357 MBH input and 1,084 MBH output. The boiler has roughly 12 years of service life left for a typical cast iron boiler.

During the heating season, domestic hot water for the kitchen, restrooms, office lounge, etc. is provided by a 6-foot diameter by 12-foot long storage tank with an internal heat exchanger feed by the heating hot water boilers via two (2) in-line circulation pumps. In the summer time, the domestic hot water is produced by an H.B. Smith cast iron sectional boiler rated at approximately 1,064 MBH output that feeds the same heat exchanger/tank. The summer boiler has roughly 4 years of service life left for a typical cast iron boiler.

New condensing boilers could substantially improve the operating efficiency of the heating system of the building. The condensing boilers provide significantly higher efficiencies than standard boilers by significantly reducing the flue gas temperature and extracting the latent energy. Condensing boiler's peak efficiency tops out at 99% depending on return water temperature. Due to the operating conditions of the building, the annual average operating efficiency of the proposed condensing boiler is expected to be 88% for comfort heating and 95% for domestic hot water heating. The larger original plant boiler's and the existing summer domestic hot water boiler efficiencies are approximately 70% and the Library/Science Wing Addition boiler efficiency is approximately 80%, which makes the condensing boilers an 8% to 18% increase in efficiency for comfort heating and 25% increase for domestic hot water. The new boiler sets also have the ability to be controlled by a digital boiler sequencer to optimize plant efficiency which could yield further savings than what is calculated in this ECM.

This ECM includes installation of two condensing, gas-fired boilers to replace one of the existing 3,200 MBH boilers located in the original boiler room. The remaining two 3,200 MBH boilers at the original boiler room will remain as a back-up.

The existing 1,064 MBH summer domestic hot water boiler would be replaced by two condensing, gas-fired instantaneous domestic hot water boilers as a complete standalone system. The existing storage tank with exchanger would no longer be necessary and would be demolished.

This ECM would also include the installation of one condensing, gas-fired boiler to replace one of the existing 1,084 MBH boilers located in the boiler room at the Library/Science Wing

Addition. The one remaining 1,084 MBH boiler at the Library/Science Wing Addition will remain as a back-up.

The basis for this ECM is Aerco model number BMK-1.5LN boilers or equivalent for the comfort heating and Aerco model number INN-1060 or equivalent for the domestic hot water. The basis of design for this ECM is based on variable supply water temperature adjusted based on outdoor temperature. The boiler installation is based on a one-for-one replacement which takes into account the capacity of the existing boilers.

Energy Savings Calculations:

The natural gas utility bills were utilized in the calculation of the energy savings. There is one meter for all gas-fired equipment in the facility. In order to extrapolate the natural gas consumption of the equipment analyzed in this ECM, engineering assumptions where made. In order to properly evaluate this ECM, further investigation into actual consumption should be pursued at the engineering and design phase before implementation.

Equations Used:

$$Bldg\ Heat\ \mathrm{Re}quired = Existing\ Nat\ Gas\ (Therms) \times Heating\ Eff.(\%) \times Fuel\ HeatValue\left(\frac{BTU}{Therm}\right)$$

$$\mathrm{Pr}oposed\ Heating\ Gas\ Usage = \frac{Bldg\ Heat\ \mathrm{Re}quired\ (BTU)}{Heating\ Eff.(\%) \times Fuel\ Heat\ Value\left(\frac{BTU}{Therm}\right)}$$

$$Energy\ Cost = Heating\ Gas\ Usage(Therms) \times Ave\ Fuel\ Cost\left(\frac{\$}{Therm}\right)$$

CONDENSING BOILER CALCULATIONS - COMFORT HEATING ORIGINAL BOILER ROOM			
ECM INPUTS	**EXISTING**	**PROPOSED**	**SAVINGS**
ECM INPUTS			
Consumed Nat Gas (Therms)	49,432	39,321	
Boiler Efficiency (%)	70%	88%	18%
Nat Gas Heat Value (BTU/Therm)	100,000	100,000	
Equivalent Building Heat Usage (MMBTUs)	3,460	3,460	
Gas Cost ($/Therm)	1.12	1.12	
ENERGY SAVINGS CALCULATIONS			
ECM RESULTS	**EXISTING**	**PROPOSED**	**SAVINGS**
Natural Gas Usage (Therms)	49,432	39,321	10,111
Energy Cost ($)	$55,364	$44,039	$11,324
COMMENTS:			

CONDENSING BOILER CALCULATIONS - COMFORT HEATING LIBRARY/SCIENCE WING ADDITION			
ECM INPUTS	**EXISTING**	**PROPOSED**	**SAVINGS**
ECM INPUTS			
Consumed Nat Gas (Therms)	16,770	15,245	
Boiler Efficiency (%)	80%	88%	8%
Nat Gas Heat Value (BTU/Therm)	100,000	100,000	
Equivalent Building Heat Usage (MMBTUs)	1,342	1,342	
Gas Cost ($/Therm)	1.12	1.12	
ENERGY SAVINGS CALCULATIONS			
ECM RESULTS	**EXISTING**	**PROPOSED**	**SAVINGS**
Natural Gas Usage (Therms)	16,770	15,245	1,525
Energy Cost ($)	$18,782	$17,075	$1,707
COMMENTS:			

CONDENSING BOILER CALCULATIONS - DOMESTIC HOT WATER			
ECM INPUTS	**EXISTING**	**PROPOSED**	**SAVINGS**
ECM INPUTS			
Consumed Nat Gas (Therms)	25,751	18,975	
Boiler Efficiency (%)	70%	95%	25%
Nat Gas Heat Value	100,000	100,000	
Equivalent Building Heat	1,803	1,803	
Gas Cost ($/Therm)	1.12	1.12	
ENERGY SAVINGS CALCULATIONS			
ECM RESULTS	**EXISTING**	**PROPOSED**	**SAVINGS**
Natural Gas Usage (Therms)	25,751	18,975	6,777
Energy Cost ($)	$28,842	$21,252	$7,590
COMMENTS:			

Installation cost of the new condensing boilers, demolition, flue piping, boiler water piping modifications, gas piping modifications, electric, etc. is estimated to be $340,656.

From the **NJ Smart Start® Program Incentives Appendix**, the installation of new condensing boilers warrants the following incentive: $1.00 per MBH.

Gas Fired Boilers > 300 MBH – 1500 MBH
(2) Boilers at 1060 MBH each

$$Smart\ Start® \ Incentive = \left(Boiler\ MBH \times \ \$1.75\right) = 2{,}120 \times 1.75 = \$3{,}710$$

Gas Fired Boilers > 300 MBH – 1500 MBH
(3) Boilers at 1500 MBH each

$$Smart\ Start® \ Incentive = \left(Boiler\ MBH \times \ \$1.75\right) = 4{,}500 \times 1.75 = \$7{,}875$$

Total Smart Start® Incentive = $11,585

Energy Savings Summary:

ECM #3 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$340,656
NJ Smart Start Equipment Incentive ($):	$11,585
Net Installation Cost ($):	$329,071
Maintenance Savings ($/Yr):	$0
Energy Savings ($/Yr):	$18,412
Total Yearly Savings ($/Yr):	$18,412
Estimated ECM Lifetime (Yr):	30
Simple Payback	17.9
Simple Lifetime ROI	67.9%
Simple Lifetime Maintenance Savings	$0
Simple Lifetime Savings	$552,360
Internal Rate of Return (IRR)	4%
Net Present Value (NPV)	$31,812.33

ECM #4: AC Unit Replacement

Description:

Portions of the facility are cooled by direct expansion, outdoor, air-cooled condensing systems. Both packaged and split systems were discovered and analyzed. Some of the existing units have surpassed their useful life as outlined in Chapter 36 of the 2007 ASHRAE Applications Handbook. The estimated service life for a condensing unit is twenty (20) years and fifteen (15) years for a packaged rooftop unit. Other systems are within the useful life but are not as efficient as the latest available technology. Usually, energy savings derived from replacing condensing units does not justify a reasonable payback term. Nevertheless, as the equipment ages, it loses efficiency due to clogged condensers, internal parts wear and deposits of oil and other contaminants on the heat exchangers. Replacing an older condensing unit avoids these issues along with some energy savings.

This energy conservation measure includes replacement of the packaged and split system condensing units on the roof with new equipment at equal capacities with R-410a refrigerant and replacement of the DX coil in the matching air handlers as required to accommodate higher pressure refrigerant. The cost of this ECM also includes running new refrigerant lines.

It must be noted that manufacturing of the refrigerant gas R-22 is being phased out gradually. After 2010, HVAC manufacturers will continue to produce condensers and heat pumps using R-22 only from pre-existing R-22 supplies. The availability of R-22 gas will decline and R-22 equipment will be more expensive to maintain. On the other hand, converting most R-22 refrigeration systems into an alternative R-410a system requires replacement of the condensing unit, evaporator coils in the air handling unit, refrigerant pipes and fittings.

The unit's cooling efficiencies and capacities are as shown below. This ECM includes a one-to-one replacement of the older air conditioning units with newer, high efficiency systems. It is recommended to fully evaluate the capacity needed for all new systems prior to moving forward with this ECM. A summary of this ECM can be found in the table below:

IMPLEMENTATION SUMMARY						
ECM INPUTS	**SERVICE FOR**	**NUMBER OF UNITS**	**COOLING CAPACITY, BTU/HR**	**COOLING CAPACITY, TONS**	**TOTAL COOLING CAPACITY, TONS**	**REPLACEMENT BASED ON**
AC-1	Faculty Dining	1	48,000	4.0	4.0	Trane Equipment
Unmarked	Admin Offices	1	120,000	10.0	10.0	Trane Equipment
AC-2	Library Offices	1	120,000	10.0	10.0	Trane Equipment
Total		**3**			**24.0**	

The basis of design is Trane equipment with R410a refrigerant.

Energy Savings Calculations:

Cooling Energy Savings:

Seasonal energy consumption of the air conditioners during cooling mode is calculated with the equation below:

$$Energy\,Savings, kWh = Cooling\,Capacity, \frac{BTU}{Hr} \times \left(\frac{1}{SEER_{Existing}} - \frac{1}{SEER_{Proposed}} \right) \times \frac{Full\,Load\,Hours}{1000 \frac{W}{kWh}}$$

$$Demand\,Savings, kW = \frac{Energy Savings\,(kWh)}{Hours of\ Cooling}$$

$$Cooling\,Savings = Energy\,Savings, kWh \times Cost of\ Electricity \left(\frac{\$}{kWh} \right)$$

ENERGY SAVINGS CALCULATIONS							
ECM INPUTS	**COOLING CAPACITY, BTU/Hr**	**ANNUAL COOLING HOURS**	**EXISTING UNITS SEER/EER**	**PROPOSED SEER/EER**	**# OF UNITS**	**ENERGY SAVINGS kWh**	**DEMAND SAVINGS kW**
AC-1	48,000	1,000	8.3	15	1	2,583	2.6
Unmarked	120,000	1,000	8.2	12.5	1	5,034	5.0
AC-2	120,000	1,000	8.2	12.5	1	5,034	5.0
Total					3	12,651	12.7

Project Cost, Incentives and Maintenance Savings

From the **NJ Smart Start® Program Incentives Appendix**, the replacement AC units with high efficiency AC units falls under the category "Unitary HVAC Split System" and warrants an incentive based on efficiency (SEER) noted below. The program incentives are calculated as follows:

$$\text{SmartStart® Incentive} = (\text{Cooling Tons} \times \ \$/\text{Ton Incentive})$$

AC UNITS INCENTIVE SUMMARY				
UNIT DESCRIPTION	UNIT EFFICIENCY	REBATE $/TON	PROPOSED CAPACITY TONS	TOTAL REBATE $
5.4 tons or less Unitary AC and Split System	≥14 SEER	$92	4.0	$368
5.4 tons to 11.25 tons Unitary AC and Split System	≥11.5 EER	$73	20.0	$1,460

Summary of cost, savings and payback for this ECM is below.

COST & SAVINGS SUMMARY							
ECM INPUTS	INSTALLED COST	# OF UNITS	TOTAL COST	REBATES	NET COST	ENERGY SAVING	PAY BACK YEARS
AC-1	$9,600	1	$9,600	$368	$9,232	$395	23.4
Unmarked	$16,125	1	$16,125	$730	$15,395	$770	20.0
AC-2	$16,125	1	$16,125	$730	$15,395	$770	20.0
Total		3	$41,850	$1,828	$40,022	$1,936	20.7

There is no significant maintenance savings due to implementation of this ECM.

Energy Savings Summary:

ECM #4 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$41,850
NJ Smart Start Equipment Incentive ($):	$1,828
Net Installation Cost ($):	$40,022
Maintenance Savings ($/Yr):	$0
Energy Savings ($/Yr):	$1,936
Total Yearly Savings ($/Yr):	$1,936
Estimated ECM Lifetime (Yr):	15
Simple Payback	20.7
Simple Lifetime ROI	-27.4%
Simple Lifetime Maintenance Savings	$0
Simple Lifetime Savings	$29,040
Internal Rate of Return (IRR)	-4%
Net Present Value (NPV)	($16,910.16)

ECM #5: Water Conservation

Description:

The facility utilizes a mixture of old and new plumbing fixtures. Approximately half of the total fixtures have been upgraded to the low-flow style. The typical water closet and urinal water consumption only meet the minimum federally required standard for water efficiency. New fixtures are available that use less water than today's requirements and can add up to significant water reduction over a long period.

This ECM includes the replacement of the existing water closets and urinals within the facility. The proposed retrofit includes installation of low flow flushometer style water closets that utilize 1.28 gallons per flush and ultra-low flushometer style urinals that utilize 1/8 gallon per flush. For the basis of this calculation, the LEED rating system was used to estimate the occupancy usage for students within the school. This ECM does not include private bathrooms for teachers use and is based solely on the large public bathrooms used by the students. When water consumption information was not available, the GPF values were estimated for the existing fixtures. The water cost per gallon was estimated based other facilities served by the same municipality.

Energy Savings Calculations:

$$Water\ Cons = Occupancy\left(\frac{Days}{Yr}\right) \times Use\left(\frac{Flush}{Person\ per\ Day}\right) \times Fixture\left(\frac{Gal}{Flush}\right)$$

$$Water\ Cost = \frac{Water\ Cons(Gallons) \times Ave\ Cost\left(\frac{\$}{1000\ Gal}\right)}{1000(Gal)}$$

WATER CONSERVATION CALCULATIONS			
ECM INPUTS	**EXISTING**	**PROPOSED**	**SAVINGS**
ECM INPUTS	Existing Fixtures	Low Flow Fixtures	
Total Number of Students	846	846	
% Male to Female	50%	50%	
Occupied Days Per Year	180	180	
WC Uses per Day per Person	0.6	0.6	
Urinal Uses per Day per Person	0.4	0.4	
Total Urinal Flushes Per Day	169	169	
Total WC Flushes Per Day	253.8	253.8	
Urinal Gallons Per Flush (GPF)	1.0	0.125	0.875
WC Gallons Per Flush (GPF)	3.5	1.28	2.22
Water Cost ($/1000)	$5.70	$5.70	
ENERGY SAVINGS CALCULATIONS			
ECM RESULTS	**EXISTING**	**PROPOSED**	**SAVINGS**
Water Consumption (Gal)	190,350	62,283	128,067
Water Cost ($)	$1,085	$355	$730
COMMENTS:	*Savings are based on LEED Reference Guide for Green Building Design and Construction - 2009 Edition for WC and Urinal water usage.		

The cost for installation of 20 water closets and 15 low flow urinals throughout the facility is estimated to be $33,408.

Currently, there are no Smart Start rebates available for installation of low flow plumbing fixtures.

Energy Savings Summary:

ECM #5 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$33,408
NJ Smart Start Equipment Incentive ($):	$0
Net Installation Cost ($):	$33,408
Maintenance Savings ($/Yr):	$0
Energy Savings ($/Yr):	$730
Total Yearly Savings ($/Yr):	$730
Estimated ECM Lifetime (Yr):	30
Simple Payback	45.8
Simple Lifetime ROI	-34.4%
Simple Lifetime Maintenance Savings	0
Simple Lifetime Savings	$21,900
Internal Rate of Return (IRR)	-3%
Net Present Value (NPV)	($19,099.68)

ECM #6: Install NEMA Premium® Efficiency Motors

Description:

The improved efficiency of the NEMA Premium® efficient motors is primarily due to better designs with use of better materials to reduce losses. Surprisingly, the electricity used to power a motor represents 95 % of its total lifetime operating cost. Because many motors operate continuously 24 hours a day, even small increases in efficiency can yield substantial energy and dollar savings.

The electric motors driving the hot water pumps in the old boiler room and supply fans in some of the heating and ventilating equipment are candidates for replacing with premium efficiency motors. These standard efficiency motors run a considerable amount of time over a one year time period.

This energy conservation measure replaces existing electric motors over 5 HP or more with NEMA Premium® efficiency motors. NEMA Premium® is the most efficient motor designation in the marketplace today.

IMPLEMENTATION SUMMARY								
EQUIPMENT IDENTIFICATION	**FUNCTION**	**MOTOR HP**	**POLE**	**RPM**	**Frame Type**	**HOURS OF OPERATION**	**EXISTING EFFICIENCY**	**NEMA PREMIUM EFFICIENCY**
Classroom	Hot Water Pump	5	4	1,725	TEFC	4,320	82.0%	90.2%
Auxillary	Hot Water Pump	5	4	1,750	TEFC	4,320	82.0%	90.2%
H-Corridor	Hot Water Pump	5	4	1,740	TEFC	4,320	82.0%	90.2%
P-1	Hot Water Pump	5	4	1,740	TEFC	4,320	82.0%	90.2%
P-2	Hot Water Pump	5	4	1,740	TEFC	4,320	82.0%	90.2%
P-3	Hot Water Pump	5	4	1,740	TEFC	4,320	82.0%	90.2%
Locker Rooms	Supply Fan	5	4	1,750	TEFC	4,320	82.0%	90.2%
HV-1	Supply Fan	7.5	4	1,750	TEFC	4,320	88.5%	91.7%

Energy Savings Calculations:

$$Electric\ Usage, kWh = \frac{HP \times LF \times 0.746 \times Hours\ of\ Operation}{Motor\ Efficiency}$$

$where, HP = Motor\ \ Nameplate\ \ Horsepower\ \ Rating$

$LF = Load\ \ Factor \qquad Motor\ \ Efficiency = Motor\ \ Nameplate\ \ Efficiency$

$$\text{Electric Usage Savings, kWh} = \text{Electric Usage}_{\text{Existing}} - \text{Electric Usage}_{\text{Proposed}}$$

$$Electric\ Cost\ Savings = Electric\ Usage\ Savings \times Electric\ Rate\left(\frac{\$}{kWh}\right)$$

The calculations were carried out and the results are tabulated in the table below:

PREMIUM EFFICIENCY MOTOR CALCULATIONS							
EQUIPMENT IDENTIFICATION	**MOTOR HP**	**LOAD FACTOR**	**EXISTING EFFICIENCY**	**NEMA PREMIUM EFFICIENCY**	**POWER SAVINGS kW**	**ENERGY SAVINGS kWH**	**COST SAVINGS**
Classroom	5	90%	82.0%	90.2%	0.37	1,616	$247
Auxillary	5	90%	82.0%	90.2%	0.37	1,616	$247
H-Corridor	5	90%	82.0%	90.2%	0.37	1,616	$247
P-1	5	90%	82.0%	90.2%	0.37	1,616	$247
P-2	5	90%	82.0%	90.2%	0.37	1,616	$247
P-3	5	90%	82.0%	90.2%	0.37	1,616	$247
Locker Rooms	5	90%	82.0%	90.2%	0.37	1,616	$247
HV-1	7.5	90%	88.5%	91.7%	0.20	862	$132
TOTAL					**2.8**	**12,177**	**$1,863**

Project Cost, Incentives and Maintenance Savings

The Smart Start Incentives are calculated from the **NJ Smart Start® Program Incentives Appendix**. The results are listed below.

The following table outlines the summary of motor replacement costs and incentives:

MOTOR REPLACEMENT SUMMARY						
EQUIPMENT IDENTIFICATION	**MOTOR POWER HP**	**INSTALLED COST**	**SMART START INCENTIVE**	**NET COST**	**TOTAL SAVINGS**	**SIMPLE PAYBACK**
Classroom	5	$1,519	$60	$1,459	$247	5.9
Auxillary	5	$1,519	$60	$1,459	$247	5.9
H-Corridor	5	$1,519	$60	$1,459	$247	5.9
P-1	5	$1,519	$60	$1,459	$247	5.9
P-2	5	$1,519	$60	$1,459	$247	5.9
P-3	5	$1,519	$60	$1,459	$247	5.9
Locker Rooms	5	$1,519	$60	$1,459	$247	5.9
HV-1	7.5	$1,971	$90	$1,881	$132	14.3
Totals:		**$12,604**	**$510**	**$12,094**	**$1,863**	**6.5**

Energy Savings Summary:

ECM #6 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$12,604
NJ Smart Start Equipment Incentive ($):	$510
Net Installation Cost ($):	$12,094
Maintenance Savings ($/Yr):	$0
Energy Savings ($/Yr):	$1,863
Total Yearly Savings ($/Yr):	$1,863
Estimated ECM Lifetime (Yr):	18
Simple Payback	6.5
Simple Lifetime ROI	177.3%
Simple Lifetime Maintenance Savings	$0
Simple Lifetime Savings	$33,534
Internal Rate of Return (IRR)	14%
Net Present Value (NPV)	$13,528.79

ECM #7: Valve Blanket Insulation Installation

Description:

The boiler plant supplies heating hot water to the facility for heating season. The piping and valves remain heated at approximately 180°F continuously during this period (approximately 6 months). Un-insulated piping and valves have significant heat losses due to the exposure of the steel piping to the surrounding air. Insulated piping and valves have a heat loss which is a small fraction of the heat loss from un-insulated. It was noted that the majority of piping within the main boiler room and Library/Science Wing Addition boiler room was insulated however numerous valves throughout the system have not been insulated.

Based on the site survey approximately 30 pipe valves were not insulated. Valve blankets are designed to provide insulation value over large hydronic valves that must remain accessible. This ECM includes installation of valve blankets on all exposed boiler system valves within the boiler room.

Energy Savings Calculations:

Heat Loss for un-insulated steel piping is based on ASHRAE 2009 Fundamentals – "Insulation for Mechanical Systems"

Bare Steel Piping Heat Loss 6" pipe: 373 BTU/HR per Linear FT

$$Heat\ Loss\ \frac{BTU}{HR}\ per\ Linear\ FT = \frac{1}{R-Value} \times Pipe\ Dia\ (FT) \times 3.14 \times (Pipe\ Temp\ (^{\circ}F) - Ambient\ Temp\ (^{\circ}F))$$

$$Heat\ Loss\ \frac{BTU}{HR} = Heat\ Loss\ \frac{BTU}{HR}\ per\ Linear\ FT \times Length\ of\ Uninsulate\ d\ Pipe$$

$$Energy\ Use, Therms = \frac{Heat\ Loss\ \frac{BTU}{HR} \times Operating\ Hrs}{Heating\ System\ Eff.(\%) \times Fuel\ Heat\ Value\ \frac{BTU}{Therm}}$$

$$Heating\ Energy\ Cost\ Savings = Energy\ Use, Therms \times Cost\ of\ Nat\ Gas\left(\frac{\$}{Therm}\right)$$

VALVE BLANKET INSULATION CALCULATIONS			
ECM INPUTS	**EXISTING**	**PROPOSED**	**SAVINGS**
ECM INPUTS	Bare Pipe	Insulation Blanket	
Length of Un-Insulated Pipe Valves	30	30	
Pipe Diameter (In)	6	6	
Blanket Insulation R-value	0	6	6
Temperature Difference Pipe to Ambient (°F)	100	100	
Pipe Heat Loss - 6" Pipe (BTU/Hr per FT)	373	26	347
Heat Loss (BTU/Hr)	11,190	785	10,405
Heating System Operating Hrs	4380	4380	
Energy Loss (kBtus)	49,012	3,438	45,574
Heating System Eff (%)	74%	74%	
Fuel Heat Value (BTU/Therm)	100,000	100,000	
Nat Gas Cost ($/Therm)	1.12	1.12	
ENERGY SAVINGS CALCULATIONS			
ECM RESULTS	**EXISTING**	**PROPOSED**	**SAVINGS**
Nat Gas Usage Usage (Therms)	662	46	616
Energy Cost ($)	$742	$52	$690
COMMENTS:	Bare Pipe Heat Loss value is based on ASHRAE 2009 Fundamentals "Insulation for Mechanical Systems"		

There is no maintenance savings due to implementation of this ECM.

Energy Savings Summary:

ECM #7 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$12,000
NJ Smart Start Equipment Incentive ($):	$0
Net Installation Cost ($):	$12,000
Maintenance Savings ($/Yr):	$0
Energy Savings ($/Yr):	$690
Total Yearly Savings ($/Yr):	$690
Estimated ECM Lifetime (Yr):	24
Simple Payback	17.4
Simple Lifetime ROI	38.0%
Simple Lifetime Maintenance Savings	$0
Simple Lifetime Savings	$16,560
Internal Rate of Return (IRR)	3%
Net Present Value (NPV)	($314.48)

ECM #8: Kitchen Hood Controls

Description:

The Triton High School kitchen is equipped with two exhaust hood systems for the cooking ranges in the kitchen. The size of each range hood is 4'x20'. The kitchen exhaust fan is controlled manually by a switch on the kitchen hoods.

Standard kitchen hood controls consist of switches and relays that interlock the kitchen grease hood exhaust fan(s) with the 100% outside air unit that provides make-up air for this system. Normal occupation of kitchen hood system is limited to occupied hours. During the site inspection it was noted that the kitchen exhaust fan runs for approximately 4 hours a day. Based on the operation, there is great potential energy savings through better controls of the hood exhaust fan and make-up air unit. It should be noted that make up air is supplied via transfer air from the food line area and adjacent corridors.

This energy conservation measure involves installing a Melink Kitchen Hood Variable Air Volume Controller; variable frequency drive on the kitchen hood exhaust fan; and turn off all the kitchen hood exhaust systems when the kitchen is closed. When the cooking appliances are turned on, the hood exhaust fan speed will increase based on the hood exhaust temperature. During heavy cooking, the kitchen hood exhaust fan increases to 100% speed until the smoke/vapor is removed. Energy savings are also realized when the kitchen equipment is operating at less than full load due to minimal cooking operations. During these times the fan speed decreases, removing only the necessary amount of air, saving exhaust fan energy and make up air conditioning energy.

Energy Calculations Summary:

It is pertinent to note that the calculation assumes the exhaust fans and make-up air unit are manually turned off for approximately 8 hours per day.

ENERGY CALCULATIONS - NATURAL GAS			
ECM INPUTS	**EXISTING**	**PROPOSED**	**SAVINGS**
ECM INPUTS	CAV	VAV	
Make up Air Unit Total Heating Energy	3,121	2,309	
Boiler Efficiency (%)	70%	70%	
Heating Fuel Value	100,000	100,000	
Gas Cost ($/Therm)	$1.12	$1.12	
ENERGY SAVINGS CALCULATIONS			
ECM RESULTS	**EXISTING**	**PROPOSED**	**SAVINGS**
Heating Energy,Therms	3,121	2,309	811
Heating Energy Cost ($)	$3,495	$2,587	$909
COMMENTS:			

ENERGY CALCULATIONS - ELECTRIC			
ECM INPUTS	**EXISTING**	**PROPOSED**	**SAVINGS**
ECM INPUTS	CAV	VAV	
Supply Fan HP	3	3	
Fan Energy, Annual	3,979	1,971	
Electric Cost ($/kWh)	$0.153	$0.153	
ENERGY SAVINGS CALCULATIONS			
ECM RESULTS	**EXISTING**	**PROPOSED**	**SAVINGS**
Fan Energy Annual kWh	3,979	1,971	2,008
Electric Energy Cost ($)	$609	$302	$307
COMMENTS:			

Energy Savings Summary:

ECM #8 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$16,381
NJ Smart Start Equipment Incentive ($):	$0
Net Installation Cost ($):	$16,381
Maintenance Savings ($/Yr):	$0
Energy Savings ($/Yr):	$1,216
Total Yearly Savings ($/Yr):	$1,216
Estimated ECM Lifetime (Yr):	15
Simple Payback	13.5
Simple Lifetime ROI	11.3%
Simple Lifetime Maintenance Savings	$0
Simple Lifetime Savings	$18,240
Internal Rate of Return (IRR)	1%
Net Present Value (NPV)	($1,864.47)

ECM #9: Dishwasher Replacement

Description:

The existing dishwasher is an Insinger SP 86-3. Older dishwasher equipment becomes more inefficient over time due to erosion of water nozzles, improper adjustment, etc., and can consume a substantial amount of water while in use. In addition to the increase water consumption is the cost to heat the water to proper sterilization temperatures. Newer more efficient dishwashers are able to reduce water consumption by recycling it in different parts of the wash cycle.

This ECM will replace the existing Insinger SP 86-3 dishwasher with a newer, more energy efficient water saving dishwasher. Using the equations listed below and acquiring specifications for the existing dishwasher model, water consumption and water heating usage was calculated for the existing unit and compared to the proposed unit.

Calculations are based on the following equipment: one (1) Insinger Speeder or equivalent.

Energy Savings Calculations:

Algorithms:

$$Gallons/Yr = Operating\,Hours\,Per\,Week \times Operating\,Weeks\,Per\,Year \times FinalRinseTime\% \times Gallons/Hour$$

$$\mathrm{Pr}imaryWaterHeat = GPY \times (140-40)^{\circ}F \times 8.337\frac{BTU}{gal}$$

$$BoosterWaterHeat = GPY \times (180-140)^{\circ}F \times 8.337\frac{BTU}{gal}$$

The calculations were carried out and the results are tabulated in the below table.

WATER CONSERVATION CALCULATIONS			
ECM INPUTS	**EXISTING**	**PROPOSED**	**SAVINGS**
ECM INPUTS			
Water Consumption (GPH)	144	70	74
Booster Heater (kW)	23	18	5
Final Rinse % Time On	70%	70%	
Operating Hours per Week	15	15	
Operating Weeks per Year	40	40	
Water Cost ($/1000)	$5.70	$5.70	
Electric Cost, $/kWh	$0.153	$0.153	
Nat. Gas Cost, $/Therm	$1.12	$1.12	
ENERGY SAVINGS CALCULATIONS			
ECM RESULTS	**EXISTING**	**PROPOSED**	**SAVINGS**
Water Consumption (Gal)	60,480	29,316	31,164
Water Cost ($)	$345	$167	$178
Electric Consumption (kWh)	5909	2864	3,045
Electric Cost ($)	$904	$438	$466
Nat. Gas Consumption (Therms)	504	244	260
Nat. Gas Cost ($)	$565	$274	$291
COMMENTS:			

Installation cost of the new dishwasher, demolition, piping, electric, etc. is estimated to be $41,790.

Energy Savings Summary:

ECM #9 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$41,790
NJ Smart Start Equipment Incentive ($):	$0
Net Installation Cost ($):	$41,790
Maintenance Savings ($/Yr):	$0
Energy Savings ($/Yr):	$935
Total Yearly Savings ($/Yr):	$935
Estimated ECM Lifetime (Yr):	15
Simple Payback	44.7
Simple Lifetime ROI	-66.5%
Simple Lifetime Maintenance Savings	$0
Simple Lifetime Savings	$14,018
Internal Rate of Return (IRR)	-11%
Net Present Value (NPV)	($30,633.88)

VIII. RENEWABLE/DISTRIBUTED ENERGY MEASURES

Globally, renewable energy has become a priority affecting international and domestic energy policy. The State of New Jersey has taken a proactive approach, and has recently adopted in its Energy Master Plan a goal of 30% renewable energy by 2020. To help reach this goal New Jersey created the Office of Clean Energy under the direction of the Board of Public Utilities and instituted a Renewable Energy Incentive Program to provide additional funding to private and public entities for installing qualified renewable technologies. A renewable energy source can greatly reduce a building's operating expenses while producing clean environmentally friendly energy. CEG has assessed the feasibility of installing renewable energy measures (REM) for the municipality utilizing renewable technologies and concluded that there is potential for solar energy generation. The solar photovoltaic system calculation summary will be concluded as **REM#1** within this report.

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 lots of the facility being audited for the purposes of determining a potential for a roof and ground mounted photovoltaic system. A total roof and ground area of 48,500 S.F. can be utilized for a PV system. A depiction of the area utilized is shown in **Renewable / Distributed Energy Measures Calculation Appendix**. Using this square footage it was determined that a system size of 682.87 kilowatts could be installed. A system of this size has an estimated kilowatt hour production of 853,807 KWh annually, reducing the overall utility bill by approximately 63% percent. A detailed financial analysis can be found in the **Renewable / Distributed Energy Measures Calculation Appendix**. This analysis illustrates the payback of the system over a 25 year period. The eventual degradation of the solar panels and the price of accumulated SREC's are factored into the payback.

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 on available roof space on the existing facility. Estimated solar array generation was then 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 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 school 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. Based on our calculations the following is the payback period:

Table 7
Financial Summary – Photovoltaic System

FINANCIAL SUMMARY - PHOTOVOLTAIC SYSTEM			
PAYMENT TYPE	**SIMPLE PAYBACK**	**SIMPLE ROI**	**INTERNAL RATE OF RETURN**
Direct Purchase	14.3 Years	74.7%	5%

*The solar energy measure is shown for reference in the executive summary Renewable Energy Measure (REM) table

Given the large amount of capital required by the school to invest in a solar system through a Direct Purchase CEG does not recommend the school pursue this route. It would be more advantageous for the school to solicit Power Purchase Agreement (PPA) 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 school at a reduced rate compared to their existing electric rate.

IX. ENERGY PURCHASING AND PROCUREMENT STRATEGY

Load Profile:

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

Electricity:

The electricity usage profile demonstrates a steady year long load profile for facilities that have occupancy during the summer months. The average monthly usage for all accounts combined is 593,126 kWh.

The historical usage profile is beneficial and will allow for more competitive energy prices when shopping for alternative suppliers mainly due to the relatively flat load profile. 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 Atlantic City Electric's (AECO) BGS-FP and PSE&G's BGS-FP default rate are recommended.

Natural Gas:

The Natural Gas Usage Profile demonstrates a very typical natural gas (heat load) profile. The summer months June through August have little consumption.

This load profile 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 to include either 1) a fixed basis rate with a market based Nymex/commodity rate or 2) a fixed basis rate with fixed Nymex/commodity winter rate (Nov – March) and market based Nymex/commodity rate for the summer months (April – October) for 100% of the facilities **metered** natural gas requirements are both recommended due to current market pricing.

Tariff Analysis:

Electricity:

The facilities receive electrical service through Atlantic City Electric (AECO) on AGS-Sec (Annual General Service Secondary) and PSE&G's GPL (General Power and Light) and LPLS (Large Power and Light Service). The facilities have contracted a Third Party Supplier (TPS) to provide electric commodity service. Current Third Party Supplier Terms and Conditions are unknown. For electric supply (generation) service, the client has a choice to either use AECO's or PSE&G's default service rate BGS-FP or contract with a Third Party Supplier (TPS) to supply electric.

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's, Atlantic City Electric and PSE&G 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. AECO's delivery service rate includes the following charges: Customer Service Charge, Distribution Charge, Market Transition, Transition Bond Charge, Non Utility Generation Charge, Societal Benefits Charge (SBC), Infrastructure Investment Charge, System Control Charge, Regulatory Assets Recovery Charge, and Regional Greenhouse Gas Initiative Charge. PSE&G's delivery service rate includes the following charges: Customer Service Charge, Distribution Charge (kWh and Demand), Societal Benefits Charge (SBC), and Securitization Transition Charge.

Natural Gas:

The facilities currently receive natural gas distribution service through South Jersey Gas on rate schedules General Service Gas - Firm Transportation (GSG-FT). Hess Energy is the contracted Third Party Supplier (TPS) which provides natural gas commodity supply service. The terms and conditions of the natural gas contract with Hess Energy is not available.

South Jersey Gas 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 South Jersey Gas for rate schedule GSG.
http://www.southjerseygas.com/108/tariff/bgssrates.pdf

The utility, South Jersey Gas is 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. South Jersey Gas's delivery service rate includes the following charges: Customer Service Charge, Distribution Charge, & Societal Benefits Charge (SBC).

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 2011, 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.

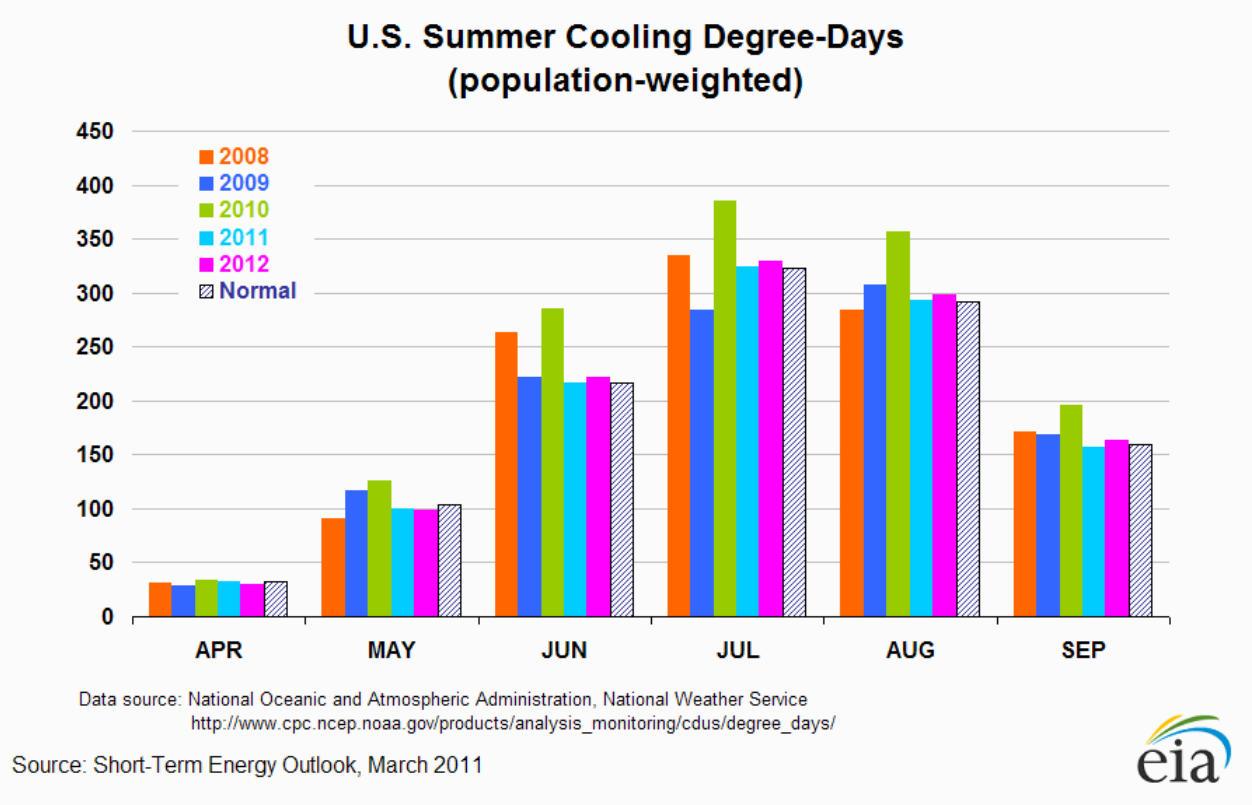
Short Term Energy Outlook - US Energy Information Administration (3/08/2011):

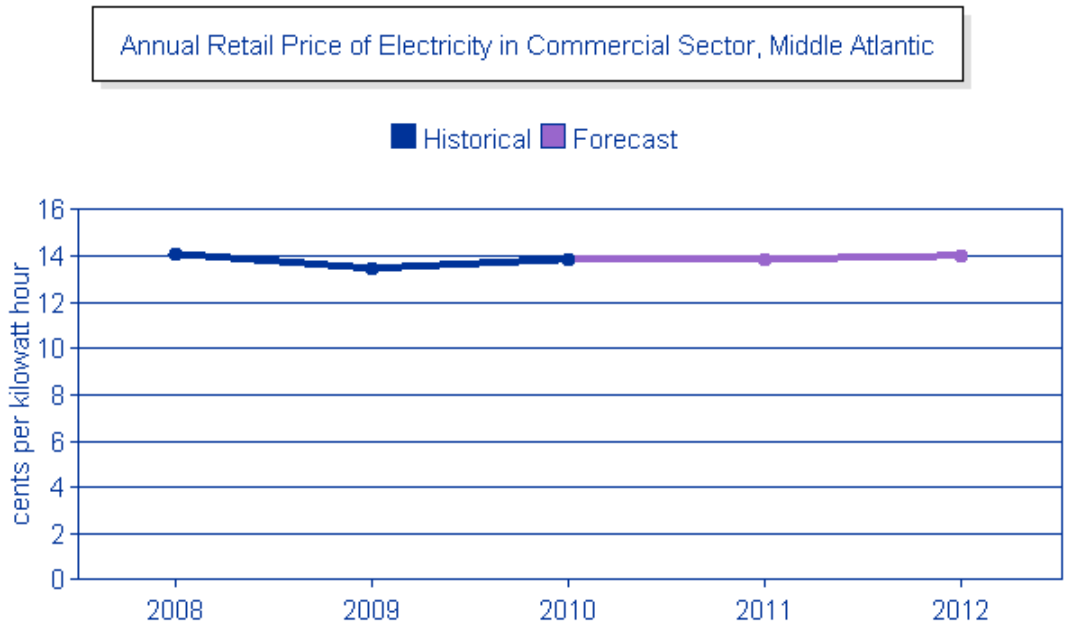
U.S. Natural Gas Prices. *The Henry Hub spot price averaged $4.09 per MMBtu in February 2011, $0.40 per MMBtu less than the average spot price in January 2011. EIA expects that the Henry Hub spot price will average $4.10 per MMBtu in 2011, a drop of $0.29 per MMBtu from the 2010 average. EIA expects the natural gas market to begin to tighten in 2012, with the Henry Hub spot price increasing to an average of $4.58 per MMBtu.*

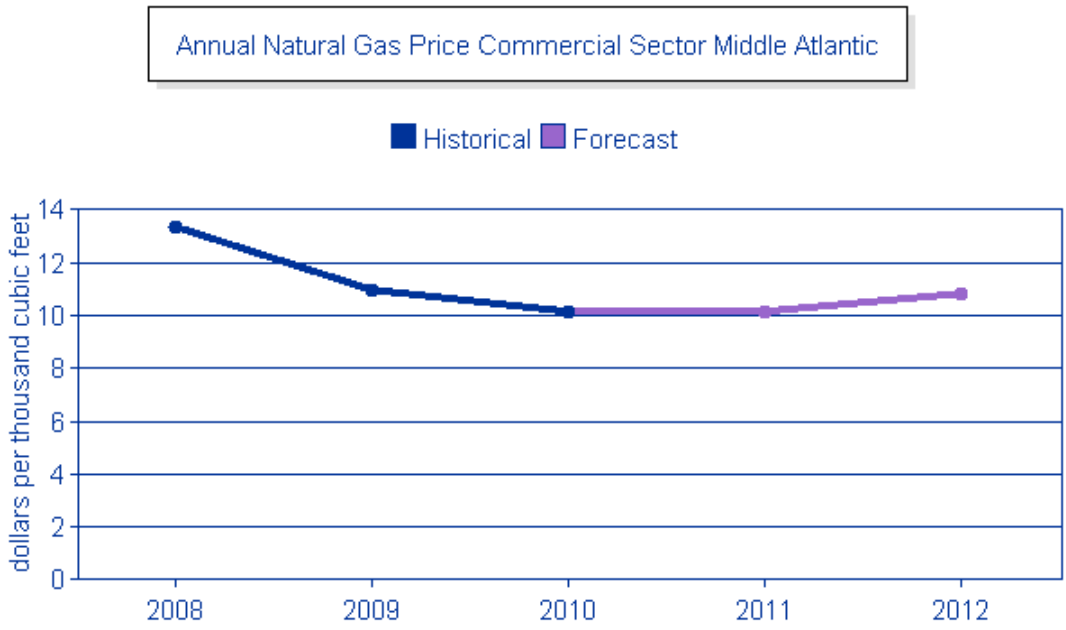
Uncertainty over future natural gas prices is slightly lower this year compared with last year at this time. Natural gas futures for May 2011 delivery (for the 5-day period ending March 3) averaged $3.98 per MMBtu, and the average implied volatility over the same period was 33 percent. This produced lower and upper bounds for the 95-percent confidence interval for May 2011 contracts of $3.09 per MMBtu and $5.11 per MMBtu, respectively. At this time last year, the natural gas May 2010 futures contract averaged $4.77 per MMBtu and implied volatility averaged 39 percent. The corresponding lower and upper limits of the 95-percent confidence interval were $3.57 per MMBtu and $6.39 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 1.0 percent in 2011, followed by an increase of 0.5 percent in*

2012. The effect of lower generation fuel costs in 2011 should be more evident in retail prices for electricity distributed to the industrial sector, which EIA projects will fall 1.6 percent during 2011 and then rise 0.2 percent next year.







Pricing includes both utility distribution and energy commodity charges.

Recommendations:

1. CEG recommends an aggregated approach for 3rd party commodity supply procurement strategies for both electric and natural gas supply service. Aggregating the usage of all 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.

X. INSTALLATION FUNDING OPTIONS

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

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

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

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

iv. *Pay For Performance* – The New Jersey Smart Start Pay for Performance program includes incentives based on savings resulted from implemented ECMs. The program is available for all buildings 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%.

v. *Energy Efficiency and Conservation Block Grants* – The EECGB rebate provides supplemental funding up to $20,000 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.

This incentive is provided in addition to the other NJ Clean Energy program funding. This program's incentive is considered the entity's capital and therefore can be applied to the LGEA program's requirements to implement the recommended energy conservation measures totaling at least 25% of the energy audit cost. Additional requirements of this program are as follows:

1. The entity must utilize additional funding through one or more of the NJ Clean Energy programs such as Smart Start, Direct Install, and Pay for Performance.

2. The EECBG funding in combination with other NJ Clean Energy programs may not exceed the total cost of the energy conservation measures being implemented.

3. Envelope measures are applicable only if recommended by the LGEA energy audit and if the energy audit was completed within the past 12 months.

4. New construction and previously installed measures are not eligible for the EECBG rebate.

5. Energy conservation measures eligible for the EECBG must fall within the list of approved energy conservation measures. The complete list of eligible measures and other program requirements are included in the "EECBG Complete Application Package." The application package is available on the NJ Clean Energy website - http://njcleanenergy.com/commercial-industrial/programs/energy-efficiency-and-conservation-block-grants.

CEG recommends the Owner review the use of the above-listed funding options in addition to utilizing their standard method of financing for facilities upgrades in order to fund the proposed energy conservation measures.

XI. ADDITIONAL RECOMMENDATIONS

The following recommendations include no cost/low cost measures, Operation & Maintenance (O&M) items, and water conservation measures with attractive paybacks. These measures are not eligible for the Smart Start Buildings incentives from the office of Clean Energy but save energy none the less.

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

B. Maintain all weather stripping on windows and doors.

C. Clean all light fixtures to maximize light output.

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

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

XII. 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.

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.

ECM COST & SAVINGS BREAKDOWN

CONCORD ENGINEERING GROUP

Triton High School

ECM NO.	DESCRIPTION	INSTALLATION COST				YEARLY SAVINGS			ECM LIFETIME	LIFETIME ENERGY SAVINGS	LIFETIME MAINTENANCE SAVINGS	LIFETIME ROI	SIMPLE PAYBACK	INTERNAL RATE OF RETURN (IRR)	NET PRESENT VALUE (NPV)
		MATERIAL	LABOR	REBATES, INCENTIVES	NET INSTALLATION COST	ENERGY	MAINT. / SREC	TOTAL		(Yearly Saving * ECM Lifetime)	(Yearly Maint Svaing * ECM Lifetime)	(Lifetime Savings - Net Cost) / (Net Cost)	(Net cost / Yearly Savings)	$\sum_{n=0}^{N} \frac{C_n}{(1+IRR)^n}$	$\sum_{n=0}^{N} \frac{C_n}{(1+DR)^n}$
		($)	($)	($)	($)	($/Yr)	($/Yr)	($/Yr)	(Yr)	($)	($)	(%)	(Yr)	($)	($)
ECM #1	Lighting Upgrade	$23,327	$23,327	$26,270	$20,384	$10,001	$0	$10,001	15	$150,015	$0	635.9%	2.0	48.94%	$99,007.29
ECM #2	Computer Monitor Replacement	$14,100	$0	$0	$14,100	$3,624	$0	$3,624	15	$54,360	$0	285.5%	3.9	24.77%	$29,163.08
ECM #3	Condensing Boiler Installation	$138,750	$201,906	$11,585	$329,071	$18,412	$0	$18,412	30	$552,360	$0	67.9%	17.9	3.73%	$31,812.33
ECM #4	AC Unit Replacement	$27,900	$13,950	$1,828	$40,022	$1,936	$0	$1,936	15	$29,040	$0	-27.4%	20.7	-3.77%	($16,910.16)
ECM #5	Water Conservation	$7,000	$26,408	$0	$33,408	$730	$0	$730	30	$21,900	$0	-34.4%	45.8	-2.53%	($19,099.68)
ECM #6	Premium Efficiency Motors	$7,759	$4,845	$510	$12,094	$1,863	$0	$1,863	18	$33,534	$0	177.3%	6.5	13.93%	$13,528.79
ECM #7	Valve Blanket Insulation	$3,000	$9,000	$0	$12,000	$690	$0	$690	24	$16,560	$0	38.0%	17.4	2.76%	($314.48)
ECM #8	Kitchen Hood Controls	$7,619	$8,762	$0	$16,381	$1,216	$0	$1,216	15	$18,240	$0	11.3%	13.5	1.37%	($1,864.47)
ECM #9	Dishwasher Replacement	$29,400	$12,390	$0	$41,790	$935	$0	$935	15	$14,018	$0	-66.5%	44.7	-11.32%	($30,633.88)
REM RENEWABLE ENERGY AND FINANCIAL COSTS AND SAVINGS SUMMARY															
REM #1	PV Solar	$6,145,830	$0	$0	$6,145,830	$130,632	$298,832	$429,464	25	$10,736,600	$7,470,800	74.7%	14.3	68.45%	$9,607,125.00

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

Concord Engineering Group, Inc.

520 BURNT MILL ROAD
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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 February, 2010:

Electric Chillers

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

Energy Efficiency must comply with ASHRAE 90.1-2004

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
Occupancy Controlled Thermostat (Hospitality & Institutional Facility)	$75 per thermostat

Energy Efficiency must comply with ASHRAE 90.1-2004

Ground Source Heat Pumps

Closed Loop & Open Loop	$450 per ton, EER ≥ 16 $600 per ton, EER ≥ 18 $750 per ton, EER ≥ 20

Energy Efficiency must comply with ASHRAE 90.1-2004

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, AFUE ≥ 92%

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
Gas Fired Tankless Water Heaters	$300 per unit

Prescriptive Lighting

Retro fit of T12 to T-5 or T-8 Lamps w/Electronic Ballast in Existing Facilities	$10 per fixture (1-4 lamps)
Replacement of T12 with new T-5 or T-8 Lamps w/Electronic Ballast in Existing Facilities	$25 per fixture (1-2 lamps) $30 per fixture (3-4 lamps)
Replacement of incandescent with screw-in PAR 38 or PAR 30 (CFL) bulb	$7 per bulb
T-8 reduced Wattage (28w/25w 4', 1-4 lamps) Lamp & ballast replacement	$10 per fixture
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
HID ≥ 100w Retrofit with induction lamp, power coupler and generator (must be 30% less watts/fixture than HID system)	$50 per fixture
HID ≥ 100w Replacement with new HID ≥ 100w	$70 per fixture
LED Refrigerator/Freezer case lighting replacement of fluorescent in medium and low temperature display case	$42 per 5 foot $65 per 6 foot

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
Daylight Dimming - office	$50 per fixture controlled

Premium Motors

Three-Phase Motors	$45 - $700 per motor
Fractional HP Motors Electronic Communicated Motors (replacing shaded pole motors in refrigerator/freezer cases)	$40 per electronic communicated motor

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
Custom Measures	$0.16 KWh and $1.60/Therm of 1st year savings, or a buy down to a 1 year payback on estimated savings. Minimum required savings of 75,000 KWh or 1,500 Therms and a IRR of at least 10%.
Multi Measures Bonus	15%

STATEMENT OF ENERGY PERFORMANCE
Triton High School

Building ID: 2596712
For 12-month Period Ending: December 31, 2009[1]
Date SEP becomes ineligible: N/A
Date SEP Generated: February 21, 2011

Facility
Triton High School
250 Schubert Avenue
Runnemede, NJ 08078

Facility Owner
Black Horse Pike Regional School District
580 Erial Road
Blackwood, NJ 08012

Primary Contact for this Facility
Jean Grubb
580 Erial Road
Blackwood, NJ 08012

Year Built: 1957
Gross Floor Area (ft²): 227,595

Energy Performance Rating[2] (1-100) 47

Site Energy Use Summary[3]

Electricity - Grid Purchase(kBtu)	6,404,512
Natural Gas (kBtu)[4]	11,145,858
Total Energy (kBtu)	17,550,370

Energy Intensity[5]

Site (kBtu/ft²/yr)	77
Source (kBtu/ft²/yr)	145

Emissions (based on site energy use)

Greenhouse Gas Emissions ($MtCO_2e$/year)	N/A

Electric Distribution Utility
N/A

National Average Comparison

National Average Site EUI	75
National Average Source EUI	142
% Difference from National Average Source EUI	2%
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
Michael Fischette
520 south burnt mill road
voorhees, NJ 08043

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

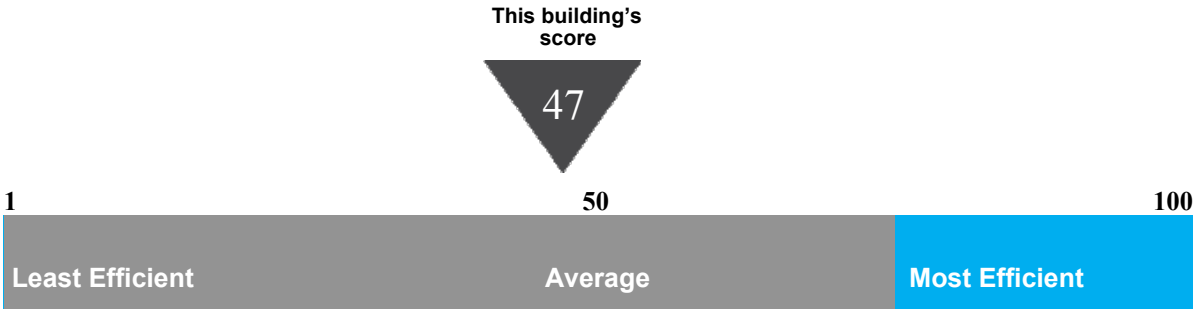
Statement of Energy Performance

2009

Triton High School
250 Schubert Avenue
Runnemede, NJ 08078

Portfolio Manager Building ID: 2596712

The energy use of this building has been measured and compared to other similar buildings using the Environmental Protection Agency's (EPA's) Energy Performance Scale of 1–100, with 1 being the least energy efficient and 100 the most energy efficient. For more information, visit energystar.gov/benchmark.



This building uses 145 kBtu per square foot per year.*

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

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

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

Date of certification

EPA United States Environmental Protection Agency

Date Generated: 02/21/2011

MAJOR EQUIPMENT LIST

Concord Engineering Group

Triton High School

Rooftop / AC Units

Tag			
Unit Type	Split Condensing Units	Elec Cooling/Elec Heat	Cooling Only
Qty	2	1	1
Location	Auditorium Roof	General Offices Roof	Roof
Area Served	Auditorium	Admin Offices	-
Manufacturer	McQuay	Trane	Carrier
Model #	RCS030DYY	BTC120F300HG	50PG-C06-DJ60-BP
Serial #	FBOU10030 0709 & 0707	S51 183051	4308G 10041
Cooling Type	DX Coil	DX Coil	DX Coil
Cooling Capacity (Tons)	30-Tons	10-Tons	5-Tons
Cooling Efficiency (SEER/EER)	10.4 EER	8.2 EER	12.2 EER
Heating Type	Hot Water Coils	Electric Resistance Heat	N/A
Heating Input (MBH)	-	-	N/A
Efficiency	N/A	100%	N/A
Fuel	N/A	Electric	N/A
Approx Age	1	24	2
ASHRAE Service Life	20	20	20
Remaining Life	19	(4)	18
Comments			

Rooftop / AC Units

Tag	AC-1	AC-3	AC-2
Unit Type	Elec Cooling/HW Heat	Elec Cooling/HW Heat	Elec Cooling/HW Heat
Qty	1	1	1
Location	Roof	Library Roof	Library Roof
Area Served	Faculty Dining	Library	Library Offices
Manufacturer	Trane	Trane	Trane
Model #	TCD-075	SXHCC5040T67C59	BTC-130G
Serial #	N/A	J91L72620	C05F06010
Cooling Type	DX Coil	DX Coil	DX Coil
Cooling Capacity (Tons)	4-Tons	60-Tons	10-Tons
Cooling Efficiency (SEER/EER)	8.3 EER	9.0 EER	8.2 EER
Heating Type	Hot Water	Hot Water	Hot Water
Heating Input (MBH)	68	159.3	79.5
Efficiency	N/A	N/A	N/A
Fuel	N/A	N/A	N/A
Approx Age	18	18	10
ASHRAE Service Life	20	20	20
Remaining Life	2	2	10
Comments			

Rooftop / AC Units

Tag			HVAC-1 thru 3
Unit Type	Cooling Only	Cooling Only	Packaged Gas/Electric
Qty	1	1	3
Location	Auto Shop Roof	Metal Shop Roof	Cafeteria Roof
Area Served	Auto Shop	Metal Shop	Cafeteria
Manufacturer	Carrier	Trane XL16i	Trane
Model #	50PG-C09-DJ50-BP	4TTX6060E1000	YCD240B4HAJB
Serial #	5109G10020	103215141F	839100876D, 962D & 976D
Cooling Type	DX Coil	DX Coil	DX Coil
Cooling Capacity (Tons)	8.5 Tons	5-Tons	20-Tons
Cooling Efficiency (SEER/EER)	12.4 EER	12.8 EER	9.5 EER
Heating Type	N/A	N/A	Natural Gas
Heating Input (MBH)	N/A	N/A	400
Efficiency	N/A	N/A	80%
Fuel	N/A	N/A	Natural Gas
Approx Age	2	1	2
ASHRAE Service Life	20	20	20
Remaining Life	18	19	18
Comments			

MAJOR EQUIPMENT LIST

Concord Engineering Group

Triton High School

Boilers

Tag	Boiler-1 thru 3	B-1 & B-2	
Unit Type	Cast Iron Sectional	Cast Iron Sectional	
Qty	3	2	
Location	Main Boiler Room	Library Addition	
Area Served	Original School & H Wing	Library and Science Wing	
Manufacturer	H B Smith	H B Smith	
Model #	Series 44	Series 28A-5	
Serial #	N/A	N/A	
Input Capacity (MBH)	4,000	1,357	
Rated Output Capacity (MBH)	3,200	1,084	
Approx. Efficiency %	60% (Existing)	80%	
Fuel	Natural Gas	Natural Gas	
Approx Age	53	18	
ASHRAE Service Life	30	30	
Remaining Life	(23)	12	
Comments			

MAJOR EQUIPMENT LIST

Concord Engineering Group

Triton High School

Domestic Water Heater

Tag	Summer DHW Boiler	
Unit Type	Cast Iron Sectional	
Qty	1	
Location	Main Boiler Room	
Area Served	Entire Facility	
Manufacturer	H B Smith	
Model #	25 Mills	
Serial #	84-858-H	
Input Capacity (MBH)	Unknown	
Rated Output Capacity (MBH)	Unknown	
Efficiency %	Unknown	
Blower Motor	1/3 HP	
Fuel	Natural Gas	
Approx Age	26	
ASHRAE Service Life	30	
Remaining Life	4	
Comments		

MAJOR EQUIPMENT LIST

Concord Engineering Group

Triton High School

Pumps

Tag	Gym	Auditorium	Administration
Unit Type	Centrifugal Split	Centrifugal Split	Centrifugal Split
Qty	1	1	1
Location	Main Boiler Room	Main Boiler Room	Main Boiler Room
Area Served	Gym	Auditorium	Administration Offices
Manufacturer	No Tag	No Tag	No Tag
Model #	No Tag	No Tag	No Tag
Serial #	No Tag	No Tag	No Tag
Horse Power	3	3	1.5
Flow	No Tag	No Tag	No Tag
Motor Info	Baldor	Baldor	Baldor
Electrical Power	208 V/3 Phase	208 V/3 Phase	460 V / 3 Phase
RPM	1725	1725	1725
Motor Efficiency %	N/A	N/A	N/A
Approx Age	No Tag	No Tag	No Tag
ASHRAE Service Life	20	20	20
Remaining Life			
Comments			

Pumps

Tag	Classroom	Auxillary	H-Corridor Addition
Unit Type	Centrifugal Split	Centrifugal Split	Centrifugal Split
Qty	1	1	1
Location	Main Boiler Room	Main Boiler Room	Main Boiler Room
Area Served	Original Classrooms		H-Corridor/Classroom
Manufacturer	No Tag	No Tag	No Tag
Model #	No Tag	No Tag	No Tag
Serial #	No Tag	No Tag	No Tag
Horse Power	5	5.00	5
Flow	No Tag	No Tag	No Tag
Motor Info	Baldor	Warner	Baldor
Electrical Power	208 V/3 Phase	208 V/3 Phase	208 V/3 Phase
RPM	1725	1750	1740
Motor Efficiency %	N/A	N/A	N/A
Approx Age	No Tag	No Tag	No Tag
ASHRAE Service Life	20	20	20
Remaining Life			
Comments			

Pumps

Tag	Auxillary	Maintenance	Aux Gym
Unit Type	Centrifugal Split	In-Line	Centrifugal Split
Qty	1	1	1
Location	Main Boiler Room	Main Boiler Room	Main Boiler Room
Area Served		Maintenance	Aux Gym
Manufacturer	No Tag	No Tag	No Tag
Model #	No Tag	No Tag	No Tag
Serial #	No Tag	No Tag	No Tag
Horse Power	2	1/6	2
Flow	No Tag	No Tag	No Tag
Motor Info	U S Motor	B&G	Baldor
Electrical Power	208 V/3 Phase	208 V/3 Phase	208 V/ 3 Phase
RPM	1750	1750	1725
Motor Efficiency %	N/A	N/A	N/A
Approx Age	No Tag	No Tag	No Tag
ASHRAE Service Life	20	20	20
Remaining Life			
Comments			

Pumps

Tag	P-1 thru P-3	DHW Circ Pump	
Unit Type	In-Line	In-Line	
Qty	3	1	
Location	Library Addition Mech Rm	Main Boiler Room	
Area Served	Library/Classroom Addition	Entire Facility	
Manufacturer	Armstrong	Armstrong	
Model #	No Tag	No Tag	
Serial #	No Tag	No Tag	
Horse Power	5	3/4	
Flow	155GPM @ 60FT HD	No Tag	
Motor Info	Marathon Motor	No Tag	
Electrical Power	208 V/3 Phase	208 V/3 Phase	
RPM	1740	1725	
Motor Efficiency %	N/A	N/A	
Approx Age	No Tag	No Tag	
ASHRAE Service Life	20	20	
Remaining Life			
Comments			

MAJOR EQUIPMENT LIST

Concord Engineering Group

Triton High School

Air Handling Units (H & V)

Tag			**HV-1**
Location	Basement Mech Rm	Gym Ceiling	Kitchen Roof
Area Served	Locker Rooms	Gym	Kitchen
Manufacturer	Trane	Trane	Trane
Qty	1	4	1
Model #	No tag	N/A	PCC-23
Serial #	No tag	N/A	N/A
Supply Flow, CFM	6,500	4,500	9,000
Heating Type	Hot Water	Hot Water	Hot Water
Flow (GPM)	Unknown	Unknown	55.6
Output (MBh)	N/A	N/A	556.33
Supply Motor HP	5	3	7.5
Supply Motor Eff.	Unknown	Unknown	Unknown
Return Fan Motor HP	Unknown	Unknown	Unknown
R/F Motor Efficiency	Unknown	Unknown	Unknown
Approx. Age	Unknown	Unknown	18
ASHRAE Service Life	20	20	20
Remaining Life	Unknown	Unknown	2
Notes			

Investment Grade Lighting Audit

CEG Job #: 9C10098
Project: Triton High School
250 Schubert Avenue
Runnemede, NJ 08078
Bldg. Sq. Ft. 227,595

Triton High School

KWH COST: $0.153

ECM #1: Lighting Upgrade - General

EXISTING LIGHTING										PROPOSED LIGHTING								SAVINGS			
CEG Type	Fixture Location	Yearly Usage	No. Fixts	No. Lamps	Fixture Type	Fixt Watts	Total kW	kWh/Yr Fixtures	Yearly $ Cost	No. Fixts	No. Lamps	Retro-Unit Description	Watts Used	Total kW	kWh/Yr Fixtures	Yearly $ Cost	Unit Cost (INSTALLED)	Total Cost	kW Savings	kWh/Yr Savings	Yearly $ Savings	Yearly Simple Payback
242.11	E21 Shop	2600	43	4	2x4, 4 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	107	4.60	11,962.6	$1,830.28	43	4	Relamp - Sylvania Lamp FO28/841/SS/ECO	98	4.21	10956.4	$1,676.33	$28.00	$1,204.00	0.39	1006.2	$153.95	7.82
221.11	Wood Storage	2600	5	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	0.31	806.0	$123.32	5	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	56	0.28	728	$111.38	$14.00	$70.00	0.03	78	$11.93	5.87
221.14	E21 Office	2600	2	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., No Lens	58	0.12	301.6	$46.14	2	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	56	0.11	291.2	$44.55	$14.00	$28.00	0.00	10.4	$1.59	17.60
121.14		2600	2	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Surface Mnt., No Lens	78	0.16	405.6	$62.06	2	2	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	50	0.10	260	$39.78	$100.00	$200.00	0.06	145.6	$22.28	8.98
221.14	E21 Storage	1200	8	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., No Lens	58	0.46	556.8	$85.19	8	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	56	0.45	537.6	$82.25	$14.00	$112.00	0.02	19.2	$2.94	38.13
221.14	E25 Shop	2600	38	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., No Lens	58	2.20	5,730.4	$876.75	38	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	56	2.13	5532.8	$846.52	$14.00	$532.00	0.08	197.6	$30.23	17.60
231.33	E27 Tech. Room	2600	28	3	2x4, 3 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., Direct/ Indirect	86	2.41	6,260.8	$957.90	28	3	Relamp - Sylvania Lamp FO28/841/SS/ECO	82	2.30	5969.6	$913.35	$21.00	$588.00	0.11	291.2	$44.55	13.20
221.31	E27 Office	2600	2	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens	62	0.12	322.4	$49.33	2	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	56	0.11	291.2	$44.55	$14.00	$28.00	0.01	31.2	$4.77	5.87
221.31	E29 Classroom	2600	12	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens	62	0.74	1,934.4	$295.96	12	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	56	0.67	1747.2	$267.32	$14.00	$168.00	0.07	187.2	$28.64	5.87
221.31	E31 Classroom	2600	12	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens	62	0.74	1,934.4	$295.96	12	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	56	0.67	1747.2	$267.32	$14.00	$168.00	0.07	187.2	$28.64	5.87
221.31	E33 Classroom	2600	12	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens	62	0.74	1,934.4	$295.96	12	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	56	0.67	1747.2	$267.32	$14.00	$168.00	0.07	187.2	$28.64	5.87
221.31	H12 Classroom	2600	15	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens	62	0.93	2,418.0	$369.95	15	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	56	0.84	2184	$334.15	$14.00	$210.00	0.09	234	$35.80	5.87
221.31	H10 Classroom	2600	15	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens	62	0.93	2,418.0	$369.95	15	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	56	0.84	2184	$334.15	$14.00	$210.00	0.09	234	$35.80	5.87
221.31	H8 Classroom	2600	15	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens	62	0.93	2,418.0	$369.95	15	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	56	0.84	2184	$334.15	$14.00	$210.00	0.09	234	$35.80	5.87
221.31	H6 Classroom	2600	15	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens	62	0.93	2,418.0	$369.95	15	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	56	0.84	2184	$334.15	$14.00	$210.00	0.09	234	$35.80	5.87
221.31	H4 Classroom	2600	15	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens	62	0.93	2,418.0	$369.95	15	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	56	0.84	2184	$334.15	$14.00	$210.00	0.09	234	$35.80	5.87

Investment Grade Lighting Audit

221.31	H2 Classroom	2600	18	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens	62	1.12	2,901.6	$443.94	18	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	56	1.01	2620.8	$400.98	$14.00	$252.00	0.11	280.8	$42.96	5.87
221.31	B44 Classroom	2600	15	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens	62	0.93	2,418.0	$369.95	15	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	56	0.84	2184	$334.15	$14.00	$210.00	0.09	234	$35.80	5.87
221.31	B42 Classroom	2600	15	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens	62	0.93	2,418.0	$369.95	15	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	56	0.84	2184	$334.15	$14.00	$210.00	0.09	234	$35.80	5.87
221.31	B40 Classroom	2600	15	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens	62	0.93	2,418.0	$369.95	15	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	56	0.84	2184	$334.15	$14.00	$210.00	0.09	234	$35.80	5.87
221.31	B36 Office	2600	3	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens	62	0.19	483.6	$73.99	3	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	56	0.17	436.8	$66.83	$14.00	$42.00	0.02	46.8	$7.16	5.87
221.32	B34 Clasroom	2600	10	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., Parabolic Lens	58	0.58	1,508.0	$230.72	10	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	56	0.56	1456	$222.77	$14.00	$140.00	0.02	52	$7.96	17.60
221.32	B32 Classroom	2600	12	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., Parabolic Lens	58	0.70	1,809.6	$276.87	12	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	56	0.67	1747.2	$267.32	$14.00	$168.00	0.02	62.4	$9.55	17.60
221.32	B30 Classroom	2600	12	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., Parabolic Lens	58	0.70	1,809.6	$276.87	12	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	56	0.67	1747.2	$267.32	$14.00	$168.00	0.02	62.4	$9.55	17.60
221.32	B28 Classroom	2600	12	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., Parabolic Lens	58	0.70	1,809.6	$276.87	12	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	56	0.67	1747.2	$267.32	$14.00	$168.00	0.02	62.4	$9.55	17.60
242.21	B26 Classroom	2600	12	4	2x4, 4 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	107	1.28	3,338.4	$510.78	12	4	Relamp - Sylvania Lamp FO28/841/SS/ECO	98	1.18	3057.6	$467.81	$28.00	$336.00	0.11	280.8	$42.96	7.82
221.32	D4 Office	2600	2	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., Parabolic Lens	58	0.12	301.6	$46.14	2	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	56	0.11	291.2	$44.55	$14.00	$28.00	0.00	10.4	$1.59	17.60
221.32	D2 Office	2600	2	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., Parabolic Lens	58	0.12	301.6	$46.14	2	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	56	0.11	291.2	$44.55	$14.00	$28.00	0.00	10.4	$1.59	17.60
221.32	B16 Classroom	2600	12	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., Parabolic Lens	58	0.70	1,809.6	$276.87	12	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	56	0.67	1747.2	$267.32	$14.00	$168.00	0.02	62.4	$9.55	17.60
221.32	B14 Classroom	2600	12	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., Parabolic Lens	58	0.70	1,809.6	$276.87	12	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	56	0.67	1747.2	$267.32	$14.00	$168.00	0.02	62.4	$9.55	17.60
221.32	B12 Classroom	2600	12	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., Parabolic Lens	58	0.70	1,809.6	$276.87	12	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	56	0.67	1747.2	$267.32	$14.00	$168.00	0.02	62.4	$9.55	17.60
221.32	B10 Classroom	2600	15	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., Parabolic Lens	58	0.87	2,262.0	$346.09	15	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	56	0.84	2184	$334.15	$14.00	$210.00	0.03	78	$11.93	17.60
222.21	B8 Office	2600	4	2	2x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.25	644.8	$98.65	4	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.20	520	$79.56	$14.00	$56.00	0.05	124.8	$19.09	2.93
221.11	Copy Room	2600	2	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	0.12	322.4	$49.33	2	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	56	0.11	291.2	$44.55	$14.00	$28.00	0.01	31.2	$4.77	5.87
221.11	A8 Men's Restroom	2600	1	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	0.06	161.2	$24.66	1	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	56	0.06	145.6	$22.28	$14.00	$14.00	0.01	15.6	$2.39	5.87
241.11	A6 Conf. Room	2600	3	4	1x4, 4 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	104	0.31	811.2	$124.11	3	4	Relamp - Sylvania Lamp FO28/841/SS/ECO	98	0.29	764.4	$116.95	$28.00	$84.00	0.02	46.8	$7.16	11.73

Investment Grade Lighting Audit

232.22	Main Office	2600	16	3	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	1.38	3,577.6	$547.37	16	3	Relamp - Sylvania Lamp FO28/841/SS/ECO	82	1.31	3411.2	$521.91	$21.00	$336.00	0.06	166.4	$25.46	13.20
242.11	Kitchenette	2600	2	4	2x4, 4 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	107	0.21	556.4	$85.13	2	4	Relamp - Sylvania Lamp FO28/841/SS/ECO	98	0.20	509.6	$77.97	$28.00	$56.00	0.02	46.8	$7.16	7.82
222.21	A2 Principal's Office	2600	6	2	2x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.37	967.2	$147.98	6	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.30	780	$119.34	$14.00	$84.00	0.07	187.2	$28.64	2.93
222.21	A3 Guidance	2600	23	2	2x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	1.43	3,707.6	$567.26	23	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	1.15	2990	$457.47	$14.00	$322.00	0.28	717.6	$109.79	2.93
222.21	Nurse	2600	12	2	2x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.74	1,934.4	$295.96	12	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.60	1560	$238.68	$14.00	$168.00	0.14	374.4	$57.28	2.93
242.11	B5 Office	2600	3	4	2x4, 4 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	107	0.32	834.6	$127.69	3	4	Relamp - Sylvania Lamp FO28/841/SS/ECO	98	0.29	764.4	$116.95	$28.00	$84.00	0.03	70.2	$10.74	7.82
221.32	B7 Classroom	2600	21	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., Parabolic Lens	58	1.22	3,166.8	$484.52	21	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	56	1.18	3057.6	$467.81	$14.00	$294.00	0.04	109.2	$16.71	17.60
221.32	B9 Classroom	2600	14	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., Parabolic Lens	58	0.81	2,111.2	$323.01	14	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	56	0.78	2038.4	$311.88	$14.00	$196.00	0.03	72.8	$11.14	17.60
221.32	B11 Classroom	2600	12	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., Parabolic Lens	58	0.70	1,809.6	$276.87	12	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	56	0.67	1747.2	$267.32	$14.00	$168.00	0.02	62.4	$9.55	17.60
221.32	B13 Classroom	2600	12	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., Parabolic Lens	58	0.70	1,809.6	$276.87	12	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	56	0.67	1747.2	$267.32	$14.00	$168.00	0.02	62.4	$9.55	17.60
221.32	B15 Classroom	2600	12	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., Parabolic Lens	58	0.70	1,809.6	$276.87	12	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	56	0.67	1747.2	$267.32	$14.00	$168.00	0.02	62.4	$9.55	17.60
242.11	Elec. Room	1200	2	4	2x4, 4 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	107	0.21	256.8	$39.29	2	4	Relamp - Sylvania Lamp FO28/841/SS/ECO	98	0.20	235.2	$35.99	$28.00	$56.00	0.02	21.6	$3.30	16.95
221.32	D7 Office	2600	2	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., Parabolic Lens	58	0.12	301.6	$46.14	2	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	56	0.11	291.2	$44.55	$14.00	$28.00	0.00	10.4	$1.59	17.60
222.21	Women's Restroom	2600	2	2	2x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.12	322.4	$49.33	2	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.10	260	$39.78	$14.00	$28.00	0.02	62.4	$9.55	2.93
222.21	Men's Restroom	2600	2	2	2x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.12	322.4	$49.33	2	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.10	260	$39.78	$14.00	$28.00	0.02	62.4	$9.55	2.93
221.32	B25 Classroom	2600	14	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., Parabolic Lens	58	0.81	2,111.2	$323.01	14	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	56	0.78	2038.4	$311.88	$14.00	$196.00	0.03	72.8	$11.14	17.60
221.32	B29 Classroom	2600	14	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., Parabolic Lens	58	0.81	2,111.2	$323.01	14	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	56	0.78	2038.4	$311.88	$14.00	$196.00	0.03	72.8	$11.14	17.60
221.32	31 Classroom	2600	14	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., Parabolic Lens	58	0.81	2,111.2	$323.01	14	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	56	0.78	2038.4	$311.88	$14.00	$196.00	0.03	72.8	$11.14	17.60
221.32	33 Classroom	2600	18	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., Parabolic Lens	58	1.04	2,714.4	$415.30	18	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	56	1.01	2620.8	$400.98	$14.00	$252.00	0.04	93.6	$14.32	17.60
222.21	H3 Office	2600	2	2	2x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.12	322.4	$49.33	2	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.10	260	$39.78	$14.00	$28.00	0.02	62.4	$9.55	2.93

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221.31	H5 Classroom	2600	21	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens	62	1.30	3,385.2	$517.94	21	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	56	1.18	3057.6	$467.81	$14.00	$294.00	0.13	327.6	$50.12	5.87
221.31	H1 Office/Storage	2600	2	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens	62	0.12	322.4	$49.33	2	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	56	0.11	291.2	$44.55	$14.00	$28.00	0.01	31.2	$4.77	5.87
128.14		2600	3	2	8' Channel, 2 Lamp, 75w T12, Mag. Ballast, Surface Mnt., No Lens	142	0.43	1,107.6	$169.46	3	4	(2) 8' Lamps to (4) 4' Lamps - 32w T8, Elect Ballast; retrofit	104	0.31	811.2	$124.11	$100.00	$300.00	0.11	296.4	$45.35	6.62
221.31	H7 Classroom	2600	21	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens	62	1.30	3,385.2	$517.94	21	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	56	1.18	3057.6	$467.81	$14.00	$294.00	0.13	327.6	$50.12	5.87
242.21	H9 Classroom	2600	12	4	2x4, 4 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	107	1.28	3,338.4	$510.78	12	4	Relamp - Sylvania Lamp FO28/841/SS/ECO	98	1.18	3057.6	$467.81	$28.00	$336.00	0.11	280.8	$42.96	7.82
200	Girls' Restroom	2600	2	2	1x2, 1 Lamp, 17w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	34	0.07	176.8	$27.05	2	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
200	Boys' Restroom	2600	2	2	1x2, 1 Lamp, 17w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	34	0.07	176.8	$27.05	2	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.31	E30 Classroom	2600	14	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens	62	0.87	2,256.8	$345.29	14	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	56	0.78	2038.4	$311.88	$14.00	$196.00	0.08	218.4	$33.42	5.87
221.31	E28 Classroom	2600	14	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens	62	0.87	2,256.8	$345.29	14	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	56	0.78	2038.4	$311.88	$14.00	$196.00	0.08	218.4	$33.42	5.87
221.31	Paint Storage	2600	2	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens	62	0.12	322.4	$49.33	2	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	56	0.11	291.2	$44.55	$14.00	$28.00	0.01	31.2	$4.77	5.87
221.31	E24 Classroom	2600	33	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens	62	2.05	5,319.6	$813.90	33	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	56	1.85	4804.8	$735.13	$14.00	$462.00	0.20	514.8	$78.76	5.87
221.31	E20 Classroom	2600	33	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens	62	2.05	5,319.6	$813.90	33	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	56	1.85	4804.8	$735.13	$14.00	$462.00	0.20	514.8	$78.76	5.87
200	Girls' Restroom	2600	2	2	1x2, 1 Lamp, 17w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	34	0.07	176.8	$27.05	2	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
247.211	E12 Classroom	2600	32	4	2x2, 4 Lamp, 17w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	68	2.18	5,657.6	$865.61	32	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
247.211	E6 Classroom	2600	32	4	2x2, 4 Lamp, 17w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	68	2.18	5,657.6	$865.61	32	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.11	5B - old CST Bldg. (F-5)	800	12	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	0.74	595.2	$91.07	12	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	56	0.67	537.6	$82.25	$14.00	$168.00	0.07	57.6	$8.81	19.06
247.211	CST	2600	28	4	2x2, 4 Lamp, 17w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	68	1.90	4,950.4	$757.41	28	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
247.211	Band Room	2600	33	4	2x2, 4 Lamp, 17w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	68	2.24	5,834.4	$892.66	33	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
625	Practie Rooms & Storage	1200	3	2	1x1 Recessed, (2) 100w A19 Lamp	200	0.60	720.0	$110.16	3	2	(2) 18w CFL Lamp	36	0.11	129.6	$19.83	$20.00	$60.00	0.49	590.4	$90.33	0.66
247.211	Auditorium Side Corridor	4400	18	4	2x2, 4 Lamp, 17w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	68	1.22	5,385.6	$824.00	18	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00

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625	Four Practice Rooms	1200	4	2	1x1 Recessed, (2) 100w A19 Lamp	200	0.80	960.0	$146.88	4	2	(2) 18w CFL Lamp	36	0.14	172.8	$26.44	$20.00	$80.00	0.66	787.2	$120.44	0.66
221.34	Two Practice Rooms	1200	2	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., No Lens	58	0.12	139.2	$21.30	2	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	56	0.11	134.4	$20.56	$14.00	$28.00	0.00	4.8	$0.73	38.13
247.211	Girls' Restroom	2600	1	4	2x2, 4 Lamp, 17w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	68	0.07	176.8	$27.05	1	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
247.211	Boys' Restroom	2600	1	4	2x2, 4 Lamp, 17w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	68	0.07	176.8	$27.05	1	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
613.1	Stage	1800	22	1	Industrial Fixture, 200w A19 Lamp	200	4.40	7,920.0	$1,211.76	22	1	(1) 42w CFL Lamp	42	0.92	1663.2	$254.47	$20.00	$440.00	3.48	6256.8	$957.29	0.46
131.14		1800	16	3	1x4, 3-Lamp, 34w T12, Mag. Ballast, Surface Mnt., No Lens	127	2.03	3,657.6	$559.61	16	2	2 Lamp, 32w T8, Elect. Ballast; retrofit	58	0.93	1670.4	$255.57	$100.00	$1,600.00	1.10	1987.2	$304.04	5.26
241.11	Stage Storage	1200	6	4	1x4, 4 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	104	0.62	748.8	$114.57	6	4	Relamp - Sylvania Lamp FO28/841/SS/ECO	98	0.59	705.6	$107.96	$28.00	$168.00	0.04	43.2	$6.61	25.42
612	Control Room Stairs	2600	4	1	100w A19 Lamp	100	0.40	1,040.0	$159.12	4	1	(1) 26w CFL Lamp	26	0.10	270.4	$41.37	$20.00	$80.00	0.30	769.6	$117.75	0.68
221.11	Control Room	2600	3	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	0.19	483.6	$73.99	3	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	56	0.17	436.8	$66.83	$14.00	$42.00	0.02	46.8	$7.16	5.87
558	Auditorium	2600	6	1	Recessed Down Light, 65w R30 Lamp	100	0.60	1,560.0	$238.68	6	1	Energy Star Rated, Dimmable 26w CFL Lamp	26	0.16	405.6	$62.06	$20.00	$120.00	0.44	1154.4	$176.62	0.68
221.11	Elec. Room	1200	1	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	0.06	74.4	$11.38	1	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	56	0.06	67.2	$10.28	$14.00	$14.00	0.01	7.2	$1.10	12.71
221.11	G10 Band Office	2600	4	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	0.25	644.8	$98.65	4	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	56	0.22	582.4	$89.11	$14.00	$56.00	0.02	62.4	$9.55	5.87
211.11	Band Storage	1200	6	1	1x4, 1 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	33	0.20	237.6	$36.35	6	1	Relamp - Sylvania Lamp FO28/841/SS/ECO	25	0.15	180	$27.54	$7.00	$42.00	0.05	57.6	$8.81	4.77
221.11	G4 Band	2600	8	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	0.50	1,289.6	$197.31	8	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	56	0.45	1164.8	$178.21	$14.00	$112.00	0.05	124.8	$19.09	5.87
221.11	G4 Practice & Storage Rooms	1200	4	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	0.25	297.6	$45.53	4	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	56	0.22	268.8	$41.13	$14.00	$56.00	0.02	28.8	$4.41	12.71
242.21	School Store	2600	2	4	2x4, 4 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	107	0.21	556.4	$85.13	2	4	Relamp - Sylvania Lamp FO28/841/SS/ECO	98	0.20	509.6	$77.97	$28.00	$56.00	0.02	46.8	$7.16	7.82
242.21	VP Office	2600	4	4	2x4, 4 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	107	0.43	1,112.8	$170.26	4	4	Relamp - Sylvania Lamp FO28/841/SS/ECO	98	0.39	1019.2	$155.94	$28.00	$112.00	0.04	93.6	$14.32	7.82
221.32	A23 Classroom	2600	14	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., Parabolic Lens	58	0.81	2,111.2	$323.01	14	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	56	0.78	2038.4	$311.88	$14.00	$196.00	0.03	72.8	$11.14	17.60
242.21	A25 Classroom	2600	17	4	2x4, 4 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	107	1.82	4,729.4	$723.60	17	4	Relamp - Sylvania Lamp FO28/841/SS/ECO	98	1.67	4331.6	$662.73	$28.00	$476.00	0.15	397.8	$60.86	7.82
242.21	A31 AD Office	2600	12	4	2x4, 4 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	107	1.28	3,338.4	$510.78	12	4	Relamp - Sylvania Lamp FO28/841/SS/ECO	98	1.18	3057.6	$467.81	$28.00	$336.00	0.11	280.8	$42.96	7.82

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247.211	Office	2600	4	4	2x2, 4 Lamp, 17w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	68	0.27	707.2	$108.20	4	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
770	Gym	2600	25	1	400w MH, Prismatic Lens	465	11.63	30,225.0	$4,624.43	25	6	2x4 54w T5HO 6 Lamp w/Reflecter	354	8.85	23010	$3,520.53	$240.00	$6,000.00	2.78	7215	$1,103.90	5.44
242.11	Gym Corridor	4400	4	4	2x4, 4 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	107	0.43	1,883.2	$288.13	4	4	Relamp - Sylvania Lamp FO28/841/SS/ECO	98	0.39	1724.8	$263.89	$28.00	$112.00	0.04	158.4	$24.24	4.62
247.211		4400	26	4	2x2, 4 Lamp, 17w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	68	1.77	7,779.2	$1,190.22	26	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
612	Cust. Closet	1200	1	1	100w A19 Lamp	100	0.10	120.0	$18.36	1	1	(1) 26w CFL Lamp	26	0.03	31.2	$4.77	$20.00	$20.00	0.07	88.8	$13.59	1.47
242.11	Locker Rm Stairwell (2)	4400	7	4	2x4, 4 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	107	0.75	3,295.6	$504.23	7	4	Relamp - Sylvania Lamp FO28/841/SS/ECO	98	0.69	3018.4	$461.82	$28.00	$196.00	0.06	277.2	$42.41	4.62
221.11	Girls' Locker Room	2600	22	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	1.36	3,546.4	$542.60	22	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	56	1.23	3203.2	$490.09	$14.00	$308.00	0.13	343.2	$52.51	5.87
221.11	Girls' Locker Stoage	1200	2	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	0.12	148.8	$22.77	2	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	56	0.11	134.4	$20.56	$14.00	$28.00	0.01	14.4	$2.20	12.71
221.32	Girls' Gym Office	2600	4	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., Parabolic Lens	58	0.23	603.2	$92.29	4	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	56	0.22	582.4	$89.11	$14.00	$56.00	0.01	20.8	$3.18	17.60
221.11	Storage	1200	4	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	0.25	297.6	$45.53	4	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	56	0.22	268.8	$41.13	$14.00	$56.00	0.02	28.8	$4.41	12.71
221.11	Boys' Locker Room	2600	22	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	1.36	3,546.4	$542.60	22	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	56	1.23	3203.2	$490.09	$14.00	$308.00	0.13	343.2	$52.51	5.87
221.11	Boys' Gym Office	2600	4	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	0.25	644.8	$98.65	4	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	56	0.22	582.4	$89.11	$14.00	$56.00	0.02	62.4	$9.55	5.87
746	Auxiliary Gym	2600	24	1	250w MH LoBay w/Prismatic Lens	295	7.08	18,408.0	$2,816.42	24	3	2x4 54w T5HO 3 Lamp, Prismatic Lens	177	4.25	11044.8	$1,689.85	$220.00	$5,280.00	2.83	7363.2	$1,126.57	4.69
242.21	Training Room	2600	7	4	2x4, 4 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	107	0.75	1,947.4	$297.95	7	4	Relamp - Sylvania Lamp FO28/841/SS/ECO	98	0.69	1783.6	$272.89	$28.00	$196.00	0.06	163.8	$25.06	7.82
242.11	Equipment Storage	1200	2	4	2x4, 4 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	107	0.21	256.8	$39.29	2	4	Relamp - Sylvania Lamp FO28/841/SS/ECO	98	0.20	235.2	$35.99	$28.00	$56.00	0.02	21.6	$3.30	16.95
222.21	A30	2600	16	2	2x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.99	2,579.2	$394.62	16	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.80	2080	$318.24	$14.00	$224.00	0.19	499.2	$76.38	2.93
222.21	Kitchen Break Room	2600	2	2	2x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.12	322.4	$49.33	2	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.10	260	$39.78	$14.00	$28.00	0.02	62.4	$9.55	2.93
602	Kitchen	8760	1	2	Incandescent Exit Sign	20	0.02	175.2	$26.81	1	1	LED Exit Sign	2	0.00	17.52	$2.68	$65.00	$65.00	0.02	157.68	$24.13	2.69
222.21		2600	48	2	2x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	2.98	7,737.6	$1,183.85	48	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	2.40	6240	$954.72	$14.00	$672.00	0.58	1497.6	$229.13	2.93
222.21	Cafeteria	2600	60	2	2x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	3.72	9,672.0	$1,479.82	60	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	3.00	7800	$1,193.40	$14.00	$840.00	0.72	1872	$286.42	2.93

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222.21	Teachers' Cafeteria	2600	10	2	2x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.62	1,612.0	$246.64	10	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.50	1300	$198.90	$14.00	$140.00	0.12	312	$47.74	2.93
221.11	Teachers' Lounge	2600	17	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	1.05	2,740.4	$419.28	17	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	56	0.95	2475.2	$378.71	$14.00	$238.00	0.10	265.2	$40.58	5.87
227.21	Corridor J	4400	19	2	2x2, 2 Lamp, 32w 700 series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	65	1.24	5,434.0	$831.40	19	2	Sylvania Lamp FBO30/841XP/6//SS/ECO	49	0.93	4096.4	$626.75	$24.00	$456.00	0.30	1337.6	$204.65	2.23
222.21	J3 Office	2600	4	2	2x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.25	644.8	$98.65	4	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.20	520	$79.56	$14.00	$56.00	0.05	124.8	$19.09	2.93
222.21	J1 Classroom	2600	12	2	2x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.74	1,934.4	$295.96	12	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.60	1560	$238.68	$14.00	$168.00	0.14	374.4	$57.28	2.93
222.21	J2 Resource Officer	2600	4	2	2x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.25	644.8	$98.65	4	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.20	520	$79.56	$14.00	$56.00	0.05	124.8	$19.09	2.93
222.21	J4 VP Office	2600	8	2	2x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.50	1,289.6	$197.31	8	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.40	1040	$159.12	$14.00	$112.00	0.10	249.6	$38.19	2.93
222.21	J5 Office	2600	4	2	2x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.25	644.8	$98.65	4	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.20	520	$79.56	$14.00	$56.00	0.05	124.8	$19.09	2.93
264.21	J7 Conference Room	2600	2	6	4x4, 6 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens	172	0.34	894.4	$136.84	2	6	Relamp - Sylvania Lamp FO28/841/SS/ECO	148	0.30	769.6	$117.75	$42.00	$84.00	0.05	124.8	$19.09	4.40
623		2600	6	1	Track Head, 65w BR30	65	0.39	1,014.0	$155.14	6	1	Energy Star Rated, 26w CFL Flood Lamp	26	0.16	405.6	$62.06	$20.00	$120.00	0.23	608.4	$93.09	1.29
221.41	Women's Restroom - Faculty	2600	1	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Wall Mnt., Prismatic	58	0.06	150.8	$23.07	1	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.41	Men's Restroom - Faculty	2600	1	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Wall Mnt., Prismatic	58	0.06	150.8	$23.07	1	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
227.211	Boys' Restroom	2600	6	2	2x2, 2 Lamp, 17w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	34	0.20	530.4	$81.15	6	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
227.211	Girls' Restroom	2600	6	2	2x2, 2 Lamp, 17w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	34	0.20	530.4	$81.15	6	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.11	Cust. Closet	1200	1	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	0.06	74.4	$11.38	1	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	56	0.06	67.2	$10.28	$14.00	$14.00	0.01	7.2	$1.10	12.71
242.21	S7 Classroom	2600	20	4	2x4, 4 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	107	2.14	5,564.0	$851.29	20	4	Relamp - Sylvania Lamp FO28/841/SS/ECO	98	1.96	5096	$779.69	$28.00	$560.00	0.18	468	$71.60	7.82
247.211	Corridor S	4400	25	4	2x2, 4 Lamp, 17w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	68	1.70	7,480.0	$1,144.44	25	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
242.21	S13 Classroom	2600	20	4	2x4, 4 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	107	2.14	5,564.0	$851.29	20	4	Relamp - Sylvania Lamp FO28/841/SS/ECO	98	1.96	5096	$779.69	$28.00	$560.00	0.18	468	$71.60	7.82
242.21	Prep Room	2600	4	4	2x4, 4 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	107	0.43	1,112.8	$170.26	4	4	Relamp - Sylvania Lamp FO28/841/SS/ECO	98	0.39	1019.2	$155.94	$28.00	$112.00	0.04	93.6	$14.32	7.82
242.21	S15 Office	2600	2	4	2x4, 4 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	107	0.21	556.4	$85.13	2	4	Relamp - Sylvania Lamp FO28/841/SS/ECO	98	0.20	509.6	$77.97	$28.00	$56.00	0.02	46.8	$7.16	7.82

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231.34	S14 Boiler Room	4400	4	3	2x4, 3 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., Direct/ Indirect	86	0.34	1,513.6	$231.58	4	3	Relamp - Sylvania Lamp FO28/841/SS/ECO	82	0.33	1443.2	$220.81	$21.00	$84.00	0.02	70.4	$10.77	7.80
601		8760	1	2	(2) 7w CFL Exit Sign	16	0.02	140.2	$21.44	1	1	LED Exit Sign	2	0.00	17.52	$2.68	$65.00	$65.00	0.01	122.64	$18.76	3.46
242.21	S12 Classroom	2600	18	4	2x4, 4 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	107	1.93	5,007.6	$766.16	18	4	Relamp - Sylvania Lamp FO28/841/SS/ECO	98	1.76	4586.4	$701.72	$28.00	$504.00	0.16	421.2	$64.44	7.82
242.21	S6 Prep Room	2600	4	4	2x4, 4 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	107	0.43	1,112.8	$170.26	4	4	Relamp - Sylvania Lamp FO28/841/SS/ECO	98	0.39	1019.2	$155.94	$28.00	$112.00	0.04	93.6	$14.32	7.82
242.21	S4 Classroom	2600	18	4	2x4, 4 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	107	1.93	5,007.6	$766.16	18	4	Relamp - Sylvania Lamp FO28/841/SS/ECO	98	1.76	4586.4	$701.72	$28.00	$504.00	0.16	421.2	$64.44	7.82
231.34	Elec. Closet	1200	2	3	2x4, 3 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., Direct/ Indirect	86	0.17	206.4	$31.58	2	3	Relamp - Sylvania Lamp FO28/841/SS/ECO	82	0.16	196.8	$30.11	$21.00	$42.00	0.01	9.6	$1.47	28.59
247.21	Corridor R	4400	6	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., Direct/Indirect	104	0.62	2,745.6	$420.08	6	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.21	R1 A/V	2600	9	3	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.77	2,012.4	$307.90	9	3	Relamp - Sylvania Lamp FO28/841/SS/ECO	82	0.74	1918.8	$293.58	$21.00	$189.00	0.04	93.6	$14.32	13.20
602	Library	8760	1	2	Incandescent Exit Sign	20	0.02	175.2	$26.81	1	1	LED Exit Sign	2	0.00	17.52	$2.68	$65.00	$65.00	0.02	157.68	$24.13	2.69
222.21		2600	113	2	2x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	7.01	18,215.6	$2,786.99	113	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	5.65	14690	$2,247.57	$14.00	$1,582.00	1.36	3525.6	$539.42	2.93
221.31		2600	48	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens	62	2.98	7,737.6	$1,183.85	48	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	56	2.69	6988.8	$1,069.29	$14.00	$672.00	0.29	748.8	$114.57	5.87
621		2600	10	1	Recessed Light, 100w A Lamp	100	1.00	2,600.0	$397.80	10	1	(1) 26w CFL Lamp	26	0.26	676	$103.43	$20.00	$200.00	0.74	1924	$294.37	0.68
555		2600	10	1	Recessed Down Light, 65w BR30 Lamp	65	0.65	1,690.0	$258.57	10	1	26w CFL Lamp	26	0.26	676	$103.43	$20.00	$200.00	0.39	1014	$155.14	1.29
242.21	Library Office	2600	4	4	2x4, 4 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	107	0.43	1,112.8	$170.26	4	4	Relamp - Sylvania Lamp FO28/841/SS/ECO	98	0.39	1019.2	$155.94	$28.00	$112.00	0.04	93.6	$14.32	7.82
242.21	Library Work Room	2600	7	4	2x4, 4 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	107	0.75	1,947.4	$297.95	7	4	Relamp - Sylvania Lamp FO28/841/SS/ECO	98	0.69	1783.6	$272.89	$28.00	$196.00	0.06	163.8	$25.06	7.82
232.21	R9 Classroom	2600	12	3	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	1.03	2,683.2	$410.53	12	3	Relamp - Sylvania Lamp FO28/841/SS/ECO	82	0.98	2558.4	$391.44	$21.00	$252.00	0.05	124.8	$19.09	13.20
232.21	R11 Faculty	2600	9	3	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.77	2,012.4	$307.90	9	3	Relamp - Sylvania Lamp FO28/841/SS/ECO	82	0.74	1918.8	$293.58	$21.00	$189.00	0.04	93.6	$14.32	13.20
232.22	R13 Comp.	2600	3	3	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.26	670.8	$102.63	3	3	Relamp - Sylvania Lamp FO28/841/SS/ECO	82	0.25	639.6	$97.86	$21.00	$63.00	0.01	31.2	$4.77	13.20
232.22	R15 Comp.	2600	6	3	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.52	1,341.6	$205.26	6	3	Relamp - Sylvania Lamp FO28/841/SS/ECO	82	0.49	1279.2	$195.72	$21.00	$126.00	0.02	62.4	$9.55	13.20
221.11	E11 Maintenance	2600	10	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	0.62	1,612.0	$246.64	10	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	56	0.56	1456	$222.77	$14.00	$140.00	0.06	156	$23.87	5.87

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221.11	Cust. Closet	1200	3	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	0.19	223.2	$34.15	3	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	56	0.17	201.6	$30.84	$14.00	$42.00	0.02	21.6	$3.30	12.71
242.11	E17 Maintenance Offices	2600	10	4	2x4, 4 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	107	1.07	2,782.0	$425.65	10	4	Relamp - Sylvania Lamp FO28/841/SS/ECO	98	0.98	2548	$389.84	$28.00	$280.00	0.09	234	$35.80	7.82
737	Boiler Room	4400	12	1	175w MH Down Light, Surface Mnt., Polycarb Lens	210	2.52	11,088.0	$1,696.46	12	2	1x4, 2 lamp, 54w T5HO Fixture	122	1.46	6441.6	$985.56	$200.00	$2,400.00	1.06	4646.4	$710.90	3.38
232.14	Elec. Room	2600	2	3	2x4, 3 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., Direct/ Indirect	86	0.17	447.2	$68.42	2	3	Relamp - Sylvania Lamp FO28/841/SS/ECO	82	0.16	426.4	$65.24	$21.00	$42.00	0.01	20.8	$3.18	13.20
247.211	Faculty Restroom	2600	1	4	2x2, 4 Lamp, 17w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	68	0.07	176.8	$27.05	1	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
247.211	Faculty Restroom	2600	1	4	2x2, 4 Lamp, 17w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	68	0.07	176.8	$27.05	1	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.12	C18 Office	2600	2	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	0.12	322.4	$49.33	2	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	56	0.11	291.2	$44.55	$14.00	$28.00	0.01	31.2	$4.77	5.87
221.11	C20 Offic	2600	12	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	0.74	1,934.4	$295.96	12	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	56	0.67	1747.2	$267.32	$14.00	$168.00	0.07	187.2	$28.64	5.87
247.211	C Corridor	4400	52	4	2x2, 4 Lamp, 17w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	68	3.54	15,558.4	$2,380.44	52	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.32	C22 Classroom	2600	10	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., Parabolic Lens	58	0.58	1,508.0	$230.72	10	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	56	0.56	1456	$222.77	$14.00	$140.00	0.02	52	$7.96	17.60
221.32	C24 Classroom	2600	14	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., Parabolic Lens	58	0.81	2,111.2	$323.01	14	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	56	0.78	2038.4	$311.88	$14.00	$196.00	0.03	72.8	$11.14	17.60
221.32	C26 Classroom	2600	14	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., Parabolic Lens	58	0.81	2,111.2	$323.01	14	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	56	0.78	2038.4	$311.88	$14.00	$196.00	0.03	72.8	$11.14	17.60
221.32	C28 Classroom	2600	12	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., Parabolic Lens	58	0.70	1,809.6	$276.87	12	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	56	0.67	1747.2	$267.32	$14.00	$168.00	0.02	62.4	$9.55	17.60
221.32	C30 Classroom	2600	10	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., Parabolic Lens	58	0.58	1,508.0	$230.72	10	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	56	0.56	1456	$222.77	$14.00	$140.00	0.02	52	$7.96	17.60
221.32	C32 Office	2600	3	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., Parabolic Lens	58	0.17	452.4	$69.22	3	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	56	0.17	436.8	$66.83	$14.00	$42.00	0.01	15.6	$2.39	17.60
222.21	Stairwell	4400	6	2	2x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.37	1,636.8	$250.43	6	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.30	1320	$201.96	$14.00	$84.00	0.07	316.8	$48.47	1.73
221.32	C31 Classroom	2600	25	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., Parabolic Lens	58	1.45	3,770.0	$576.81	25	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	56	1.40	3640	$556.92	$14.00	$350.00	0.05	130	$19.89	17.60
221.32	C25 Classroom	2600	14	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., Parabolic Lens	58	0.81	2,111.2	$323.01	14	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	56	0.78	2038.4	$311.88	$14.00	$196.00	0.03	72.8	$11.14	17.60
221.32	C23 Classroom	2600	12	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., Parabolic Lens	58	0.70	1,809.6	$276.87	12	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	56	0.67	1747.2	$267.32	$14.00	$168.00	0.02	62.4	$9.55	17.60
221.32	C21 Classroom	2600	12	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., Parabolic Lens	58	0.70	1,809.6	$276.87	12	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	56	0.67	1747.2	$267.32	$14.00	$168.00	0.02	62.4	$9.55	17.60

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242.21	Men's Restroom	2600	2	4	2x4, 4 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	107	0.21	556.4	$85.13	2	4	Relamp - Sylvania Lamp FO28/841/SS/ECO	98	0.20	509.6	$77.97	$28.00	$56.00	0.02	46.8	$7.16	7.82
242.21	Women's Restroom	2600	2	4	2x4, 4 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	107	0.21	556.4	$85.13	2	4	Relamp - Sylvania Lamp FO28/841/SS/ECO	98	0.20	509.6	$77.97	$28.00	$56.00	0.02	46.8	$7.16	7.82
221.32	C13 Classroom	2600	12	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., Parabolic Lens	58	0.70	1,809.6	$276.87	12	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	56	0.67	1747.2	$267.32	$14.00	$168.00	0.02	62.4	$9.55	17.60
221.32	C9 Classroom	2600	22	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., Parabolic Lens	58	1.28	3,317.6	$507.59	22	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	56	1.23	3203.2	$490.09	$14.00	$308.00	0.04	114.4	$17.50	17.60
221.32	C5 Classroom	2600	16	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., Parabolic Lens	58	0.93	2,412.8	$369.16	16	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	56	0.90	2329.6	$356.43	$14.00	$224.00	0.03	83.2	$12.73	17.60
221.32	C3 Classroom	2600	3	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., Parabolic Lens	58	0.17	452.4	$69.22	3	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	56	0.17	436.8	$66.83	$14.00	$42.00	0.01	15.6	$2.39	17.60
221.11	C1 Classroom	2600	12	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	0.74	1,934.4	$295.96	12	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	56	0.67	1747.2	$267.32	$14.00	$168.00	0.07	187.2	$28.64	5.87
242.11	Stairwell	4400	6	4	2x4, 4 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	107	0.64	2,824.8	$432.19	6	4	Relamp - Sylvania Lamp FO28/841/SS/ECO	98	0.59	2587.2	$395.84	$28.00	$168.00	0.05	237.6	$36.35	4.62
221.32	C2 Classroom	2600	12	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., Parabolic Lens	58	0.70	1,809.6	$276.87	12	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	56	0.67	1747.2	$267.32	$14.00	$168.00	0.02	62.4	$9.55	17.60
221.32	C4 Classroom	2600	12	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., Parabolic Lens	58	0.70	1,809.6	$276.87	12	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	56	0.67	1747.2	$267.32	$14.00	$168.00	0.02	62.4	$9.55	17.60
221.32	C6 Classroom	2600	12	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., Parabolic Lens	58	0.70	1,809.6	$276.87	12	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	56	0.67	1747.2	$267.32	$14.00	$168.00	0.02	62.4	$9.55	17.60
221.32	C8 Classroom	2600	12	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., Parabolic Lens	58	0.70	1,809.6	$276.87	12	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	56	0.67	1747.2	$267.32	$14.00	$168.00	0.02	62.4	$9.55	17.60
221.32	C10 Classroom	2600	12	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., Parabolic Lens	58	0.70	1,809.6	$276.87	12	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	56	0.67	1747.2	$267.32	$14.00	$168.00	0.02	62.4	$9.55	17.60
242.11	Stairwell	4400	6	4	2x4, 4 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	107	0.64	2,824.8	$432.19	6	4	Relamp - Sylvania Lamp FO28/841/SS/ECO	98	0.59	2587.2	$395.84	$28.00	$168.00	0.05	237.6	$36.35	4.62
725	Exterior	4400	32	1	150w HPS Wallpack	188	6.02	26,470.4	$4,049.97	32	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
744		4400	18	1	250w MH Flood	295	5.31	23,364.0	$3,574.69	18	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
	Totals		2,257	474			184.74	516,772	$79,066	2,257	408			128.7	337,218	$51,594		$46,654	26.1	65,364	$10,001	4.67

Project Name: LGEA Solar PV Project - Triton HS
Location: Runnemede, NJ
Description: Photovoltaic System - Direct Purchase

Simple Payback Analysis

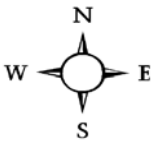
	Photovoltaic System - Direct Purchase
Total Construction Cost	$6,145,830
Annual kWh Production	853,807
Annual Energy Cost Reduction	$130,632
Annual SREC Revenue	$298,832
First Cost Premium	**$6,145,830**
Simple Payback:	**14.31** **Years**

Life Cycle Cost Analysis

Analysis Period (years):	25	Financing %:	0%
Financing Term (mths):	0	Maintenance Escalation Rate:	3.0%
Average Energy Cost ($/kWh)	**$0.153**	Energy Cost Escalation Rate:	3.0%
Financing Rate:	0.00%	SREC Value ($/kWh)	$0.350

Period	Additional Cash Outlay	Energy kWh Production	Energy Cost Savings	Additional Maint Costs	SREC Revenue	Net Cash Flow	Cumulative Cash Flow
0	$6,145,830	0	0	0	$0	(6,145,830)	0
1	$0	853,807	$130,632	$0	$298,832	$429,465	($5,716,365)
2	$0	849,538	$134,551	$0	$297,338	$431,890	($5,284,475)
3	$0	845,290	$138,588	$0	$295,852	$434,440	($4,850,036)
4	$0	841,064	$142,746	$0	$294,372	$437,118	($4,412,918)
5	$0	836,859	$147,028	$8,620	$292,900	$431,309	($3,981,609)
6	$0	832,674	$151,439	$8,577	$291,436	$434,298	($3,547,311)
7	$0	828,511	$155,982	$8,534	$289,979	$437,427	($3,109,884)
8	$0	824,368	$160,661	$8,491	$288,529	$440,699	($2,669,184)
9	$0	820,246	$165,481	$8,449	$287,086	$444,119	($2,225,065)
10	$0	816,145	$170,446	$8,406	$285,651	$447,690	($1,777,375)
11	$0	812,064	$175,559	$8,364	$284,223	$451,417	($1,325,957)
12	$0	808,004	$180,826	$8,322	$282,801	$455,305	($870,653)
13	$0	803,964	$186,251	$8,281	$281,387	$459,357	($411,295)
14	$0	799,944	$191,838	$8,239	$279,981	$463,579	$52,284
15	$0	795,945	$197,593	$8,198	$278,581	$467,976	$520,260
16	$0	791,965	$203,521	$8,157	$277,188	$472,552	$992,811
17	$0	788,005	$209,627	$8,116	$275,802	$477,312	$1,470,123
18	$0	784,065	$215,916	$8,076	$274,423	$482,262	$1,952,386
19	$0	780,145	$222,393	$8,035	$273,051	$487,408	$2,439,794
20	$0	776,244	$229,065	$7,995	$271,685	$492,755	$2,932,549
21	$1	772,363	$235,937	$7,955	$270,327	$498,308	$3,430,857
22	$2	768,501	$243,015	$7,916	$268,975	$504,075	$3,934,932
23	$3	764,658	$250,305	$7,876	$267,630	$510,060	$4,444,992
24	$4	760,835	$257,814	$7,837	$266,292	$516,270	$4,961,262
25	$5	757,031	$265,549	$7,797	$264,961	$522,712	$5,483,974
	Totals:	20,112,236	$4,762,764	$172,242	$7,039,283	$11,629,804	($7,565,902)
				Net Present Value (NPV)		**$5,483,999**	
				Internal Rate of Return (IRR)		**5.4%**	

Building	Roof Area (sq ft)	Panel	Qty	Panel Sq Ft	Panel Total Sq Ft	Total KW_{DC}	Total Annual kWh	Panel Weight (33 lbs)	W/SQFT
Triton HS	48500	Sunpower SPR230	2969	14.7	43,657	682.87	853,807	97,977	15.64



PVWatts AC Energy & Cost Savings

Cautions for Interpreting the Results

(Type comments here to appear on printout; maximum 1 row of 80 characters.)

Station Identification	
City:	Atlantic_City
State:	New_Jersey
Latitude:	39.45° N
Longitude:	74.57° W
Elevation:	20 m
PV System Specifications	
DC Rating:	682.9 kW
DC to AC Derate Factor:	0.770
AC Rating:	525.8 kW
Array Type:	Fixed Tilt
Array Tilt:	39.5°
Array Azimuth:	180.0°
Energy Specifications	
Cost of Electricity:	0.1 ¢/kWh

Results			
Month	Solar Radiation (kWh/m²/day)	AC Energy (kWh)	Energy Value ($)
1	3.61	61094	82.48
2	4.20	63627	85.90
3	4.78	76768	103.64
4	5.23	78839	106.43
5	5.44	82716	111.67
6	5.48	77358	104.43
7	5.55	79987	107.98
8	5.41	78873	106.48
9	5.23	75525	101.96
10	4.60	70616	95.33
11	3.59	56070	75.69
12	3.17	52334	70.65
Year	4.69	853807	1152.64

.= Proposed PV Layout

Notes:

1. Estimated kWH based on the National Renewable Energy Laboratory PVWatts Version 1 Calculator Program.

ENERGY CALCULATIONS - NATURAL GAS			
ECM INPUTS	**EXISTING**	**PROPOSED**	**SAVINGS**
ECM INPUTS	CAV	VAV	
Make up Air Unit Total Heating Energy	3,121	2,309	
Boiler Efficiency (%)	70%	70%	
Heating Fuel Value	100,000	100,000	
Gas Cost ($/Therm)	$1.12	$1.12	
ENERGY SAVINGS CALCULATIONS			
ECM RESULTS	**EXISTING**	**PROPOSED**	**SAVINGS**
Heating Energy,Therms	3,121	2,309	811
Heating Energy Cost ($)	$3,495	$2,587	$909
COMMENTS:			

ENERGY CALCULATIONS - ELECTRIC			
ECM INPUTS	**EXISTING**	**PROPOSED**	**SAVINGS**
ECM INPUTS	CAV	VAV	
Supply Fan HP	3	3	
Fan Energy, Annual	3,979	1,971	
Electric Cost ($/kWh)	$0.153	$0.153	
ENERGY SAVINGS CALCULATIONS			
ECM RESULTS	**EXISTING**	**PROPOSED**	**SAVINGS**
Fan Energy Annual kWh	3,979	1,971	2,008
Electric Energy Cost ($)	$609	$302	$307
COMMENTS:			

I. MOTOR OPERATING SAVINGS

INPUT DATA:

A Operating Hours Per Day	8	HRS/DAY
B Operating Days Per Week	5	DAYS/WK
C Operating Weeks Per Year	40	WKS/YR
D Horsepower of Fan Motor(s)	3	HP
E Load Factor of Fan Motor(s)	0.9	
F Cost Per Kilowatt Hour	0.153	$/KWHR

CONSTANT EXHAUST VOLUME ANALYSIS:

G Total Time (A x B x C)	1600	HRS/YR
H Total KWHR/HP/YR (0.746/0.9 x G)	1326.2	KWHR/HP/YR

VARIABLE EXHAUST VOLUME ANALYSIS:

% Rated RPM H	% Run Time I	Time HRS/YR J=FxI	Output KW/HP K	System Effic. L	Input KW/HP M=K/L	KWHR/ HP/YR N=JxM
100	20	320	0.746	0.9	0.829	265.2
90	13.3333333	213.33333	0.544	0.9	0.604	128.9
80	26.6666667	426.66667	0.382	0.9	0.424	181.1
70	0	0	0.256	0.9	0.284	0.0
60	20	320	0.161	0.9	0.179	57.2
50	13.3333333	213.33333	0.093	0.9	0.103	22.0
40	0	0	0.048	0.9	0.053	0.0
30	6.66666667	106.66667	0.020	0.9	0.022	2.4
20	0	0	0.015	0.9	0.017	0.0
10	0	0	0.010	0.90	0.011	0.0

O Total KWH/HP/YR (Total of Column N) 656.9

CALCULATION:

SAVINGS = (H - O) x D x E x F = $276 /YEAR

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II. CONDITIONED MAKE-UP AIR - HEATING

INPUT DATA:

A Previous Net Exhaust Volume	12000	CFM
B New Net Exhaust Volume (1)	8880	CFM
C Winter Building Temperature	68	F
D Previous Net Heat Load (2)	312091	kBTU
E New Net Heat Load (2)	230947	kBTU
F Operating Hours Per Day	8	HRS/DAY
G Operating Days Per Week	5	DAYS/WK
- Heating Fuel Type	Natural Gas	
H Cost Per Fuel Unit (3)	1.12	$/UNIT
J BTU Per Fuel Unit (4)	1,000	kBTU/UNIT
K System Efficiency (4)	0.7	

CALCULATION:

SAVINGS = (D - E) x 0.6 x H / (J x K)

= $78 /YEAR
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NOTES:

(1) Determine the New Exhaust Volume by completing TABLE 1. The New Exhaust Volume equals the AVG % RPM x the Previous Exhaust Volume.

(2) Using design weather data via the Outdoor Airload Calculator and multiplied by days/year ratio.

(3) Using local energy costs.

(4) Using typical system efficiency.

TABLE 1

% Rated RPM (F)	% Run Time (I)	F x I
100	20	20
90	13	12
80	27	21
70	0	0
60	20	12
50	13	7
40	0	0
30	7	2
20	0	0
10	0	0

AVG % RPM = 74%