MAYWOOD BOARD OF EDUCATION
MEMORIAL ELEMENTARY SCHOOL
ENERGY ASSESSMENT

For

NEW JERSEY
BOARD OF PUBLIC UTILITIES

CHA PROJECT NO. 24473

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REPORT DISCLAIMER

This audit was conducted in accordance with the standards developed by the American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE) for a Level II audit. Cost and savings calculations for a given measure were estimated to within ±20%, and are based on data obtained from the owner, data obtained during site observations, professional experience, historical data, and standard engineering practice. Cost data does not include soft costs such as engineering fees, legal fees, project management fees, financing, etc.

A thorough walkthrough of the facility was performed, which included gathering nameplate information and operating parameters for all accessible equipment and lighting systems. Unless otherwise stated, model, efficiency, and capacity information included in this report were collected directly from equipment nameplates and /or from documentation provided by the owner during the site visit. Typical operation and scheduling information was obtained from interviewing facility staff and spot measurements taken in the field.

1.0 EXECUTIVE SUMMARY

The Maywood Board of Education recently engaged CHA to perform an energy audit in connection with the New Jersey Board of Public Utilities' Local Government Energy Audit Program. This report details the results of the energy audit conducted for:

Building Name	Address	Square Feet	Construction Date
Memorial Elementary School	764 Grant Avenue, Maywood, NJ	54,138	Original: 1954

The Energy Conservation Measures (ECMs) identified in this report will allow for a more efficient use of energy and if pursued have the opportunity to qualify for the New Jersey SmartStart Buildings Program. Potential annual savings of $21,700 for the recommended ECMs may be realized with a combined payback of 18.75 years. A summary of the costs, savings, and paybacks for the recommended ECMs follows:

Summary of Energy Conservation Measures							
Energy Conservation Measure		Approx. Costs ($)	Approx. Savings ($/year)	Payback (Years) w/o Incentive	Potential Incentive ($)*	Payback (Years) w/ Incentive	Recommended For Implementation
ECM-1	Install (2) New Natural Gas Hot Water Condensing Boilers	590,480	9,400	63	6,000	62	X
ECM-2	Install a New Natural Gas Condensing DHW Heater	6,625	939	7	300	7	X
ECM-3	Incorporate the Gym Unit Ventilators into the Existing EMS	5,082	958	5	0	5	X
ECM-4	Demand Control Ventilation For the Gym AHU	2,541	95	27	0	27	
ECM-5	Upgrade Attic Insulation	35,300	1,925	18	0	18	
ECM-6	Lighting Replacement / Upgrades	14,556	3,223	4.5	2,445	4	
ECM-7	Install Lighting Controls (Occupancy Sensors)	14,175	10,406	1.4	2,450	1	X
ECM-8	Lighting Replacements with Lighting Controls (Occupancy Sensors)	28,731	7,420	3.9	4,895	3	

2.0 INTRODUCTION AND BACKGROUND

New Jersey's Clean Energy Program, funded by the New Jersey Board of Public Utilities, supports energy efficiency and sustainability for Municipal and Local Government Energy Audits. Through the support of a utility trust fund, New Jersey is able to assist state and local authorities in reducing energy consumption while increasing comfort.

The Maywood Memorial Elementary School is an elementary school located in Maywood, NJ, is a 54,138 square foot, single story, block structure with exterior brick facing. The building was constructed in 1954, with a full renovation of the existing school and the addition of 9 new classrooms and gym in 2007. The majority of the school is heated with steam and the remainder is heated by hot water from steam shell and tube heat exchangers. The school does have some limited cooling systems located mostly in the administrative areas and some selected classrooms. Occupancy includes approximately 450-500 students and 50 staff members. Students are typically in the school between 7:30 am and 3:00 pm.

3.0 EXISTING CONDITIONS

3.1 Building - General

Built in the 1954 with a major renovation project to the existing school and the addition of 9 classrooms and a new gym in 2007, the Maywood Elementary School is a 54,138 square foot, single story facility.

The school has approximately 450-500 students and 50 staff. The building can be assumed to be fully occupied until 3:00 pm during the week with extended hours for the administrative offices and gymnasium year round. The hours of operation are:

- Monday through Friday 7:30 am to 3:00 pm (students)
- Extended hours for the offices and gym as needed

The original building constructed in 1954 consists of a steel frame structure with brick facing and a wooden pitched roof with petroleum based dark shingles. The insulation in the walls and roof of this section of the school are minimal with some batt insulation in the pitched roof section. The 2007 addition of the school is constructed with masonry block and red brick facing with a white flat rubber membrane roof. The windows and doors in the entire facility were upgraded in 2007 to aluminum framed, double glazed units and are in very good condition.

3.2 Utility Usage

Utilities include electricity, natural gas, and potable water. Electricity is delivered by PSE&G and supplied by SJEC. Natural gas is delivered by PSE&G and supplied by Hess. See Appendix A for a detailed utility analysis.

The school has one electric meter and one gas meter. For the 12-month period ranging from May 2011 through April 2012, the utilities usage for the building was as follows:

Actual Cost & Site Usage by Utility

Electric		
Annual Usage	313,850	kWh/yr.
Annual Cost	53,683	$
Blended Rate	0.171	$/kWh
Demand Rate	6.25	$/kW
Peak Demand	217	kW
Min. Demand	108	kW
Avg. Demand	118	kW
Natural Gas		
Annual Usage	42,379	therms/yr.
Annual Cost	42,151	$
Rate	0.99	$/Therm

3.3 HVAC Systems

The systems and equipment described below serve the school building. Specifics on the mechanical equipment can be found within the equipment inventory located in Appendix B.

3.3.1 Heating Systems

The heating plant for the school consists of two HB Mills natural gas fired steam boilers with Industrial Combustion gas/oil burners. The oil tank and all associated supply lines have been removed and the burner operates with natural gas only. Condensate recovery for the boiler is a duplex condensate receiver tank and the boiler feed water is supplied by a Triplex boiler tank.

The majority of the school is heated by steam however the heating system also consists of a steam to hot water heat exchanger for the sections of the school with hot water heat which are A-9, A-11, A-13, A-15, B-3, B-5, C-2, C-4, C-6, C-11, C-13, D-2, D-3, D-4, and D-5. There is also hot water heat in the principal, main and nurse's office. The teacher's room and limited areas of the new gym also are heated with hot water. The hot water is circulated by two 10 hp pumps with variable frequency drives that operate in a lead/ lag scheme. The majority of the classrooms have unit ventilators for heat and OA requirements with fan coil units in the administrative areas. The corridors are heated with ceiling mounted fan coil units.

There is a roof top HV unit for the new gym for outside air and heating needs.

3.3.2 Air Conditioning Systems

The cooling systems in the school are very limited as only about 25% of the school is air conditioned. The fan coil units located in the main, principal and nurses office have a DX coil and remote condensing unit. The same will apply for the teachers' lounge and the kitchen area. The classrooms numbered A-9, 11, 13 and 15 also have DX coils and remote condensers. The library has a packaged Airdale HVAC unit with several other small split systems located in computer room and office areas.

3.3.7 Exhaust Systems

The exhaust fans for the restrooms and kitchen areas are roof mounted. The restroom exhaust fans are integrated into the EMS and scheduled on/off for the occupied/ unoccupied periods. The kitchen exhaust is operated manually by the staff.

3.4 Control Systems

The school has a full Automated Logic DDC system. The facilities director has an excellent working knowledge of the system and has the energy management programs operating at their maximum capabilities. The DDC programs are constantly adjusted in the system software to maximize energy

savings. The major heating and ventilating systems are all integrated into the control system with exception of four unit ventilators located in the old gym and some small A/C systems in office areas.

The steam boilers are controlled with a Heat Timer.

3.5 Lighting/Electrical Systems

The schools lighting was upgraded in the 2007 renovation to 32 watt T-8 fixtures in the classrooms and office areas. The smaller gym is illuminated with 400 watt incandescent fixtures while the new larger gym has T-5 high bay fixtures. There are a limited number of occupancy sensors in use throughout the school.

3.6 Plumbing Systems

3.6.1 Domestic Hot Water System

The school has two separate hot water systems. The restrooms are supplied by an 85 gallon natural gas standard efficiency unit while the kitchen has an 85 gallon electric tank. The water temperature for both units was 120 degrees.

4.0 ENERGY CONSERVATION MEASURES

4.1 ECM-1 Install (2) New Natural Gas Hot Water Condensing Boilers

The existing steam boilers and heat exchangers were installed in 1986 and could be at the end of their useful equipment life. The original burner efficiency of 80% and system efficiency have degraded over time making the overall steam system efficiency poor. The existing steam boilers, heat exchangers and all steam components throughout the school could be removed and replaced with a high efficiency hot water system. The new hot water system would consist of replacing the existing boilers with high efficiency natural gas hot water condensing boilers with efficiencies of 94%and high efficiency hot water pumps. The steam piping and all steam coils in unit ventilators, cabinet unit heaters and fan coil units would have to be replaced with hot water piping and coils.

Condensing boilers has an expected life of 25 years, according to ASHRAE, and total energy savings over the life of the project are estimated at 236,321 therms and $235,139.

The implementation cost and savings related to this ECM are presented in Appendix C and summarized below:

ECM-1 Install (2) New Natural Gas Hot Water Condensing Boilers

Budgetary Cost	Annual Utility Savings				Estimated Maintenance Savings	Total Savings	ROI	Incentive *	Payback (without incentive)	Payback (with incentive)
	Electric	Electric	Nat Gas	Total						
$	kWh	kW	Therms	$	$	$		$	Years	Years
590,480	0	0	9,453	9,400	0	9,400	(0.6)	6,000	>20	>20

* Incentive shown is per the New Jersey Smart Start Program. See section 5.0 for other incentive opportunities.

This measure is recommended.

4.2 ECM-2 Install a New Natural Gas Condensing DHW Heater

The existing 50 gallon natural gas water heater consumes excess energy by keeping the water temperature of 50 gallons of water at 120 degrees at all times, combined with subpar insulation on the outside of the tank, it could use unnecessary natural gas for this process. The existing water heater could be replaced with a high efficiency natural gas on demand water heater. The on demand water heater uses technology to sense the flow of water and instantaneously heat the water to the desired temperature. The energy savings from this measure is the elimination of the 50 gallon tank of water being heated to 120 degrees even without the need for hot water.

DHW heaters have an expected life of 12 years, according to ASHRAE, and total energy savings over the life of the project are estimated at 11,319 therms and $11,262.

The implementation cost and savings related to this ECM are presented in Appendix C and summarized below:

ECM-2 Install a New Natural Gas Condensing DHW Heater

Budgetary Cost	Annual Utility Savings				Estimated Maintenance Savings	Total Savings	ROI	Incentive *	Payback (without incentive)	Payback (with incentive)
	Electric	Electric	Nat Gas	Total						
$	kWh	kW	Therms	$	$	$		$	Years	Years
6,625	0	0	943	939	0	939	0.7	300	7.1	6.7

* Incentive shown is per the New Jersey Smart Start Program. See section 5.0 for other incentive opportunities.

This measure is recommended

4.3 ECM-3 Incorporate the Gym Unit Ventilator into the Existing EMS

The four unit ventilators located in the old gym have the original pneumatic temperature controls. These types of controls are unreliable and require constant calibration to keep excess energy consumption to a minimum. The unit ventilators could be upgraded with new valves and modern DDC controls for a more accurate unit operation. The unit ventilators could then be integrated into the energy management system and utilize the energy software programs such as scheduling and night setback.

Electronic controls have an expected life of 25 years, according to ASHRAE, and total energy savings over the life of the project are estimated at 78,463 kWh and 10,895 therms and $23,959.

The implementation cost and savings related to this ECM are presented in Appendix C and summarized below:

ECM-3 Incorporate the Gym Unit Ventilators into the Existing EMS

Budgetary Cost	Annual Utility Savings				Estimated Maintenance Savings	Total Savings	ROI	Incentive *	Payback (without incentive)	Payback (with incentive)
	Electric	Electric	Nat Gas	Total						
$	kWh	kW	Therms	$	$	$		$	Years	Years
5,082	3,139	0	424	1,000	0	958	3.7	0	5.3	5.3

* Incentive shown is per the New Jersey Smart Start Program. See section 5.0 for other incentive opportunities.

This measure is recommended.

4.4 ECM-4 Demand Control Ventilation For the Gym AHU

Heating and ventilation AHU serve the new gym. The original system controls provide the full design ventilation outside air flow. Reducing outside air during occupied periods will reduce heating energy. The quantity of ventilation will be based on maintaining an acceptable carbon dioxide (CO_2) level in the space as an indicator of indoor air quality. A limit of 1000 PPM of CO_2 is recommended in ASHRAE Standard 62-1982, Ventilation for Acceptable Indoor Air Quality. Sensors will be installed to measure the building air CO_2 concentration, and the control sequence of operation programmed into the BAS. During unoccupied periods, the outside air dampers should be closed.

Equipment supply and outside airflows were obtained from existing design drawings where possible, or from vendors per serial/model numbers found in the field. For the analysis, estimated savings for demand control ventilation are based on reducing the total average volume of outside air by 20% based on observed space usage. The energy savings are the differences in utility usage.

Controls have an expected life of 25 years, according to ASHRAE, and total energy savings over the life of the project are estimated at 2381 therms and $2,369.

The implementation cost and savings related to this ECM are presented in Appendix C and summarized as follows:

ECM-4 Demand Control Ventilation For the Gym AHU

Budgetary Cost	Annual Utility Savings				Estimated Maintenance Savings	Total Savings	ROI	Incentive *	Payback (without incentive)	Payback (with incentive)
	Electric	Electric	Nat Gas	Total						
$	kWh	kW	Therms	$	$	$		$	Years	Years
2,541	0	0	95	100	0	95	(0.1)	0	>20	>20

* Incentive shown is per the New Jersey Smart Start Program. See section 5.0 for other incentive opportunities.

This measure is not recommended

4.5 ECM-5 Upgrade the Attic Insulation

The original 1954 constructed portion of the school has a pitched or partially pitched roof with a full attic. Loose fiberglass batt insulation has been installed above the ceiling tiles to insulate the ceiling of the conditioned spaces. Over the years, work on equipment and installation of network and other wiring has left much of this insulation misplaced or missing entirely. Installing 16” of insulation (R-38) above the ceiling of the conditioned spaces was assessed for this ECM. Addition of insulation will result in a reduced heating load, therefore saving natural gas usage.

Attic insulation has an expected life of 35 years, according to ASHRAE, and total energy savings over the life of the project are estimated at 67,724 therms and $67,385.

The implementation cost and savings related to this ECM are presented in Appendix C and summarized below:

ECM-5 Upgrade Attic Insulation

Budgetary Cost	Annual Utility Savings				Estimated Maintenance Savings	Total Savings	ROI	Incentive *	Payback (without incentive)	Payback (with incentive)
	Electric	Electric	Nat Gas	Total						
$	kWh	kW	Therms	$	$	$		$	Years	Years
35,300	0	0	1,935	0	0	1,925	0.9	0	18.3	18.3

* Incentive shown is per the New Jersey Smart Start Program. See section 5.0 for other incentive opportunities.

This measure is recommended.

4.6 ECM-6 Lighting Replacement

The building’s older classrooms and occupied spaces generally use linear fluorescent fixtures with T-12 bulbs; newer areas are equipped with T-8s and some T-5 bulbs. U-tube T-8s and T-12s, along with 2 foot T-8s are also used in some fixtures. Most can lights and surface mounted standard bulb fixtures use compact fluorescent lights (CFLs) to replace original incandescent bulbs.

Modern fluorescent lamps convert electrical power into useful light more efficiently than an incandescent lamp or T-12 bulbs. A comprehensive fixture survey was conducted of the entire building. Each switch and circuit was identified, and the number of fixtures, locations, and existing wattage established

(Appendix C). There is an opportunity to reduce consumption by upgrading the existing T-12 fixtures to T-8 or super T-8 fixtures.
Energy savings for this measure were calculated by applying the existing and proposed fixture wattages to estimated times of operation. The difference between energy requirements resulted in a total annual savings of 52,200 kWh with an electrical demand reduction of about 27 kW. Supporting calculations, including assumptions for lighting hours and annual energy usage for each fixture, are provided in Appendix C.

Lighting has an expected life of 15 years, according to the manufacturer, and total energy savings over the life of the project are estimated at 289,510 kWh.

The implementation cost and savings related to this ECM are presented in Appendix C and summarized below:

ECM-6 Lighting Replacement / Upgrades

Budgetary Cost	Annual Utility Savings				Estimated Maintenance Savings	Total Savings	ROI	Incentive *	Payback (without incentive)	Payback (with incentive)
	Electric	Electric	Nat Gas	Total						
$	kWh	kW	Therms	$	$	$		$	Years	Years
14,556	19,301	13	0	0	0	3,223	(1.0)	2,445	4.5	3.8

* Incentive shown is per the New Jersey Smart Start Program. See section 5.0 for other incentive opportunities
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This measure is not recommended.

4.7 ECM-7 Install Occupancy Sensors

The current elementary school lighting is controlled by manual switches. Lights are generally turned on in the morning and shut off at night. During occupied times, there are rooms that are not occupied; however, the lights remain on. Adding occupancy controls to the individual rooms will automatically control the lights based on occupancy. The occupancy sensor can be wall mounted near the switch or placed at the ceiling for larger room coverage. All occupancy sensors are equipped with a manual override feature. These sensors are generally not recommended in public toilet rooms.

Lighting controls have an expected life of 15 years, according to the manufacturer, and total energy savings over the life of the project are estimated at 934,697 kWh and $159,833.

The implementation cost and savings related to this ECM are presented in Appendix C and summarized below:

ECM-7 Install Lighting Controls (Occupancy Sensors)

Budgetary Cost	Annual Utility Savings				Estimated Maintenance Savings	Total Savings	ROI	Incentive *	Payback (without incentive)	Payback (with incentive)
	Electric	Electric	Nat Gas	Total						
$	kWh	kW	Therms	$	$	$		$	Years	Years
14,175	62,313	0	0	0	0	10,406	(0.2)	2,450	1.4	1.1

* Incentive shown is per the New Jersey Smart Start Program. See section 5.0 for other incentive opportunities.

This measure is recommended.

4.8 ECM-8 Lighting Replacements with Occupancy Sensors

The current elementary school lighting is controlled by manual switches. Lights are generally turned on Due to interactive effects, the energy and cost savings for occupancy sensors and lighting upgrades are not cumulative. This measure is a combination of ECM-7 and ECM-8 to reflect actual expected energy and demand reduction.

The combination of lighting retrofits and controls have an expected lifetime of 15 years, according to the manufacturers, and total energy savings over the life of the project are estimated at 666,483 kWh.

The implementation cost and savings related to this ECM are presented in Appendix C and summarized as follows:

ECM-8 Lighting Replacements with Lighting Controls (Occupancy Sensors)

Budgetary Cost	Annual Utility Savings				Estimated Maintenance Savings	Total Savings	ROI	Incentive *	Payback (without incentive)	Payback (with incentive)
	Electric	Electric	Nat Gas	Total						
$	kWh	kW	Therms	$	$	$		$	Years	Years
28,731	44,432	13	0	0	0	7,420	0.6	4,895	3.9	3.2

This measure is not recommended.

* Incentive shown is per the New Jersey Smart Start Program. See section 5.0 for other incentive opportunities.

5.0 PROJECT INCENTIVES

5.1 Incentives Overview

5.1.1 New Jersey Pay For Performance Program

The facility will be eligible for incentives from the New Jersey Office of Clean Energy. The most significant incentives are available from the New Jersey Pay for Performance (P4P) Program. The P4P program is designed for qualified energy conservation projects applied to facilities whose demand in any of the preceding 12 months exceeds 100 kW. This average minimum has been waived for buildings owned by local governments or municipalities and non-profit organizations, however. Facilities that meet this criterion must also achieve a minimum performance target of 15% energy reduction by using the EPA Portfolio Manager benchmarking tool before and after implementation of the measure(s). If the participant is a municipal electric company customer, and a customer of a regulated gas New Jersey Utility, only gas measures will be eligible under the Program. Available incentives are as follows:

Incentive #1: Energy Reduction Plan – This incentive is designed to offset the cost of services associated with the development of the Energy Reduction Plan (ERP).

- Incentive Amount: $0.10/SF
- Minimum incentive: $5,000
- Maximum Incentive: $50,000 or 50% of Facility annual energy cost

The standard incentive pays $0.10 per square foot, up to a maximum of $50,000, not to exceed 50% of facility annual energy cost, paid after approval of application. For building audits funded by the New Jersey Board of Public Utilities, which receive an initial 75% incentive toward performance of the energy audit, facilities are only eligible for an additional $0.05 per square foot, up to a maximum of $25,000, rather than the standard incentive noted above.

Incentive #2: Installation of Recommended Measures – This incentive is based on projected energy savings as determined in Incentive #1 (Minimum 15% savings must be achieved), and is paid upon successful installation of recommended measures.

<u>Electric</u>

- Base incentive based on 15% savings: $0.09/ per projected kWh saved.
- For each % over 15% add: $0.005 per projected kWh saved.
- Maximum incentive: $0.11/ kWh per projected kWh saved

<u>Gas</u>

- Base incentive based on 15% savings: $0.90/ per projected Therm saved.
- For each % over 15% add: $0.05 per projected Therm saved.
- Maximum incentive: $1.25 per projected Therm saved

Incentive cap: 25% of total project cost

Incentive #3: Post-Construction Benchmarking Report – This incentive is paid after acceptance of a report proving energy savings over one year utilizing the Environmental Protection Agency (EPA) Portfolio Manager benchmarking tool.

<u>Electric</u>

- Base incentive based on 15% savings: $0.09/ per projected kWh saved.
- For each % over 15% add: $0.005 per projected kWh saved.
- Maximum incentive: $0.11/ kWh per projected kWh saved

Gas

- Base incentive based on 15% savings: $0.90/ per projected Therm saved.
- For each % over 15% add: $0.05 per projected Therm saved.
- Maximum incentive: $1.25 per projected Therm saved

Incentives #2 and #3 can be combined to yield additive savings.

	Incentives $		
	Electric	**Gas**	**Total**
Incentive #1	$0	$0	$5414
Incentive #2	$0	$0	$0
Incentive #3	$0	$0	$0
Total	**$0**	**$0**	**$5414**

The applicable ECM's yield an overall savings of 5.65% which is less than the minimum required 15% saving and therefore the project is not eligible for the P4P program incentive #2 and #3. See Appendix D for calculations.

5.1.2 New Jersey Smart Start Program

For this program, specific incentives for energy conservation measures are calculated on an individual basis utilizing the 2011 New Jersey Smart Start incentive program. This program provides incentives dependent upon mechanical and electrical equipment. If applicable, incentives from this program are reflected in the ECM summaries and attached appendices.

If the complex qualifies and enters into the New Jersey Pay for Performance Program, all energy savings will be included in the total site energy reduction, and savings will be applied towards the Pay for Performance incentive. A project is not applicable for both New Jersey incentive programs.

5.1.3 Direct Install Program

The Direct Install Program targets small and medium sized facilities where the peak electrical demand does not exceed 150 kW in any of the previous 12 months. Buildings must be located in New Jersey and served by one of the state's public, regulated electric or natural gas utility companies. On a case-by-case basis, the program manager may accept a project for a customer that is within 10% of the 150 kW peak demand threshold.

Direct Install is funded through New Jersey's Clean Energy Program and is designed to provide capital for building energy upgrade projects to fast track implementation. The program will pay up to 70% of the costs for lighting, HVAC, motors, natural gas, refrigeration, and other equipment upgrades with higher efficiency alternatives. If a building is eligible for this funding, the Direct Install Program can significantly reduce the implementation cost of energy conservation projects.

The program pays 70% of each project cost up to $75,000 per electrical utility account; total funding for each year is capped at $250,000 per customer. Installations must be completed by a Direct Install participating contractor, a list of which can be found on the New Jersey Clean Energy Website at http://www.njcleanenergy.com. Contractors will coordinate with the applicant to arrange installation of recommended measures identified in a previous energy assessment, such as this document.

The Demand portion of the utilities was not provided, and therefore the eligibility for this program cannot be determined at this time.

5.1.4 Energy Savings Improvement Plans (ESIP)

The Energy Savings Improvement Program (ESIP) allows government agencies to make energy related improvements to their facilities and pay for the costs using the value of energy savings that result from the improvements. Under the recently enacted Chapter 4 of the Laws of 2009 (the law), the ESIP provides all government agencies in New Jersey with a flexible tool to improve and reduce energy usage with minimal expenditure of new financial resources.

ESIP allows local units to use “energy savings obligations” to pay for the capital costs of energy improvements to their facilities. This can be done over a maximum term of 15 years. Energy savings obligations are not considered “new general obligation debt” of a local unit and do not count against debt limits or require voter approval. They may be issued as refunding bonds or leases. Savings generated from the installation of energy conservation measures pay the principal of and interest on the bonds; for that reason, the debt service created by the ESOs is not paid from the debt service fund, but is paid from the general fund.

For local governments interested in pursuing an ESIP, the first step is to perform an energy audit. Pursuing a Local Government Energy Audit through New Jersey's Clean Energy Program is a valuable first step to the ESIP approach. The “Local Finance Notice” outlines how local governments can develop and implement an ESIP for their facilities (see Appendix E). The ESIP can be prepared internally if the entity has qualified staff. If not, the ESIP must be implemented by an independent contractor and not by the energy savings company producing the Energy Reduction Plan.

The ESIP approach may not be appropriate for all energy conservation and energy efficiency improvements. Local units should carefully consider all alternatives to develop an approach that best meets their needs.

6.0 ALTERNATIVE ENERGY SCREENING EVALUATION

6.1 Solar

6.1.1 Photovoltaic Rooftop Solar Power Generation

The facility was evaluated for the potential to install rooftop photovoltaic (PV) solar panels for power generation. Present technology incorporates the use of solar cell arrays that produce direct current (DC) electricity. This DC current is converted to alternating current (AC) with the use of an electrical device known as an inverter. The building’s roof has sufficient room to install a large solar cell array. All rooftop areas have been replaced, and are in good condition. It is recommended to install a permanent PV array at this time.

The PVWATTS solar power generation model was utilized to calculate PV power generation. The closest city available in the model is Newark, New Jersey and a fixed tilt array type was utilized to calculate energy production. The PVWATT solar power generation model is provided in Appendix P.

Federal tax credits are also available for renewable energy projects up to 30% of installation cost. Since the facility is a non-profit organization, federal taxes are paid and this project is eligible for this incentive.

Installation of (PV) arrays in the state New Jersey will allow the owner to participate in the New Jersey solar renewable energy certificates program (SREC). This is a program that has been set up to allow entities with large amounts of environmentally unfriendly emissions to purchase credits from zero emission (PV) solar-producers. One SREC credit is equivalent to 1000 kilowatt hours of PV electrical production; these credits can be traded for period of 15 years from the date of installation. The average SREC value per credit is estimated to be about $80/ SREC per year based on current market data, and this number was utilized in the cash flow for this report.

The existing load justifies the use of a 40 kW PV solar array. The system costs for PV installations were derived from contractor budgetary pricing in the state of New Jersey for estimates of total cost of system installation. It should be noted that the cost of installation is currently about $4.00 per watt or $4,000 per kW of installed system. Other cost considerations will also need to be considered. PV panels have an approximate 20 year life span; however, the inverter device that converts DC electricity to AC has a life span of 10 to 12 years and will need to be replaced multiple times during the useful life of the PV system.

The implementation cost and savings related to this ECM are presented in Appendix E and summarized as follows:

Photovoltaic (PV) Solar Power Generation - Screening Assessment

Budgetary Cost	Annual Utility Savings				Estimated Maintenance Savings	Total Savings	Federal Tax Credit	New Jersey Renewable ** SREC	Payback (without incentive)	Payback (with incentive)
$	kW	kWh	therms	$	$	$	$	$	Years	Years
$160,000	**40.0**	**49,024**	**0**	**$8,383**	**0**	**$8,383**	**$0**	**$3,922**	**19.1**	**13.0**

** Estimated Solar Renewable Energy Certificate Program (SREC) SREC for 15 Years= $80 /1000kwh

* No federal tax credit currently available.
** Solar Renewable Energy Certificate Program (SREC) for 2012 is $80/1000kwh

This measure is not recommended due to the long payback time. It is suggested, however, that the market for SREC credits is closely monitored. This market is fluctuating, and if the value per SREC is increased the measure could potentially show for a shorter payback in the near future.

7.0 EPA PORTFOLIO MANAGER

The EPA Portfolio Manager benchmarking tool was used to assess the building's energy performance. Portfolio Manager provides a Site and Source Energy Use Intensity (EUI), as well as an Energy Star performance rating for qualifying building types. The EUIs are provided in kBtu/ft^2/year, and the performance rating represents how energy efficient a building is on a scale of 1 to 100, with 100 being the most efficient. In order for a building to receive and Energy Star label, the energy benchmark rating must be at least 75. As energy use decreases from implementation of the proposed ECMs, the Energy Star rating will increase.

The Site EUI is the amount of heat and electricity consumed by a building as reflected in utility bills. Site energy may be delivered to a facility in the form of primary energy, which is raw fuel burned to create heat or electricity (such as natural gas or oil), or as secondary energy, which is the product created from a raw fuel (such as electricity or district steam). Site EUI is a measure of a building's annual energy utilization per square foot. Site EUI is a good measure of a building's energy use and is utilized regularly for comparison of energy performance for similar building types.

$$\textbf{\textit{Site Energy Intensity}} = \frac{(\textit{Electric Usage in kBtu + Natural Gas in kBtu})}{\textit{Building Square Footage}}$$

To provide an equitable comparison for different buildings with varying proportions of primary and secondary energy consumption, the Portfolio Manager uses the convention of Source EUIs. The source energy also accounts for all losses incurred in production, storage, transmission, and delivery of energy to the site; which provides an equivalent measure for various types of buildings with different energy sources.

$$\textbf{\textit{Source Energy Intensity}} = \frac{(\textit{Electric Usage in kBtu X Site/Source Ratio + Natural Gas in kBtu X Site/Source Ratio})}{\textit{Building Square Footage}}$$

The EPA Score, Site EUI, and Source EUI for Oradell Elementary School are as follows:

Energy Intensity	Memorial Elementary School	National Average
EPA Score	50	50
Site (kBtu/sf/year)	98	99
Source (kBtu/sf/year)	148	149

To be eligible to receive a national Energy Star score, a building must meet all three of these requirements:

1. Building designation – More than 50 percent of the building's gross floor area must be one of the spaces eligible to receive an Energy Star score. The remainder of the building must abide by specific rules for each space type.
2. Operating characteristics – To ensure the building is consistent with the peer group used for comparison, each space in your building must meet certain minimum and maximum thresholds for key operating characteristics.
3. Energy data – At least 12 full consecutive calendar months for all active meters, accounting for all energy use (regardless of fuel type) in the building.

In addition, a Licensed Professional (meaning a Professional Engineer or Registered Architect) must verify that all energy use is accounted for accurately, that the building characteristics have been properly reported (including the square footage of the building), that the building is fully functional in accordance with industry standards, and that each of the indoor environment criteria has been met.

The Maywood Elementary School is considered a higher than average energy consumer by the EPA Portfolio Manager which gives it a lower than average EPA score. For the School to qualify for the Energy Star label the EPA score is required to be above 75. There are several energy conservation measures recommended in this report, that if implemented will further reduce the energy use intensity and increase the EPA score of the Elementary School. This building does not appear to be eligible for Energy Star certification at this time.

The Portfolio Manager account can be accessed by entering the username and password shown below at the login screen of the Portfolio Manager website (https://www.energystar.gov/istar/pmpam/).

A full EPA Energy Star Portfolio Manager Report is located in Appendix F.

The user name ("*MaywoodSchool* and password ("*energystar*") for the building's EPA Portfolio Manager Account has been provided to the Maywood Board of Education.

8.0 CONCLUSIONS & RECOMMENDATIONS

The energy audit conducted by CHA at the Maywood Schools identified potential ECMs for lighting and control replacement, attic insulation, boiler replacement VSD installation, demand control ventilation,. Potential annual savings of $21,700 may be realized for the recommended ECMs, with a summary of the costs, savings, and paybacks as follows:

ECM-1 Install (2) New Natural Gas Hot Water Condensing Boilers

Budgetary Cost	Annual Utility Savings				Estimated Maintenance Savings	Total Savings	ROI	Incentive *	Payback (without incentive)	Payback (with incentive)
	Electric	Electric	Nat Gas	Total						
$	kWh	kW	Therms	$	$	$		$	Years	Years
590,480	0	0	9,453	9,400	0	9,400	(0.6)	6,000	>20	>20

ECM-2 Install a New Natural Gas Condensing DHW Heater

Budgetary Cost	Annual Utility Savings				Estimated Maintenance Savings	Total Savings	ROI	Incentive *	Payback (without incentive)	Payback (with incentive)
	Electric	Electric	Nat Gas	Total						
$	kWh	kW	Therms	$	$	$		$	Years	Years
6,625	0	0	943	939	0	939	0.7	300	7.1	6.7

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ECM-3 Incorporate the Gym Unit Ventilators into the Existing EMS

Budgetary Cost	Annual Utility Savings				Estimated Maintenance Savings	Total Savings	ROI	Incentive *	Payback (without incentive)	Payback (with incentive)
	Electric	Electric	Nat Gas	Total						
$	kWh	kW	Therms	$	$	$		$	Years	Years
5,082	3,139	0	424	1,000	0	958	3.7	0	5.3	5.3

ECM-7 Install Lighting Controls (Occupancy Sensors)

Budgetary Cost	Annual Utility Savings				Estimated Maintenance Savings	Total Savings	ROI	Incentive *	Payback (without incentive)	Payback (with incentive)
	Electric	Electric	Nat Gas	Total						
$	kWh	kW	Therms	$	$	$		$	Years	Years
14,175	62,313	0	0	0	0	10,406	(0.5)	2,450	1.4	1.1

APPENDIX A

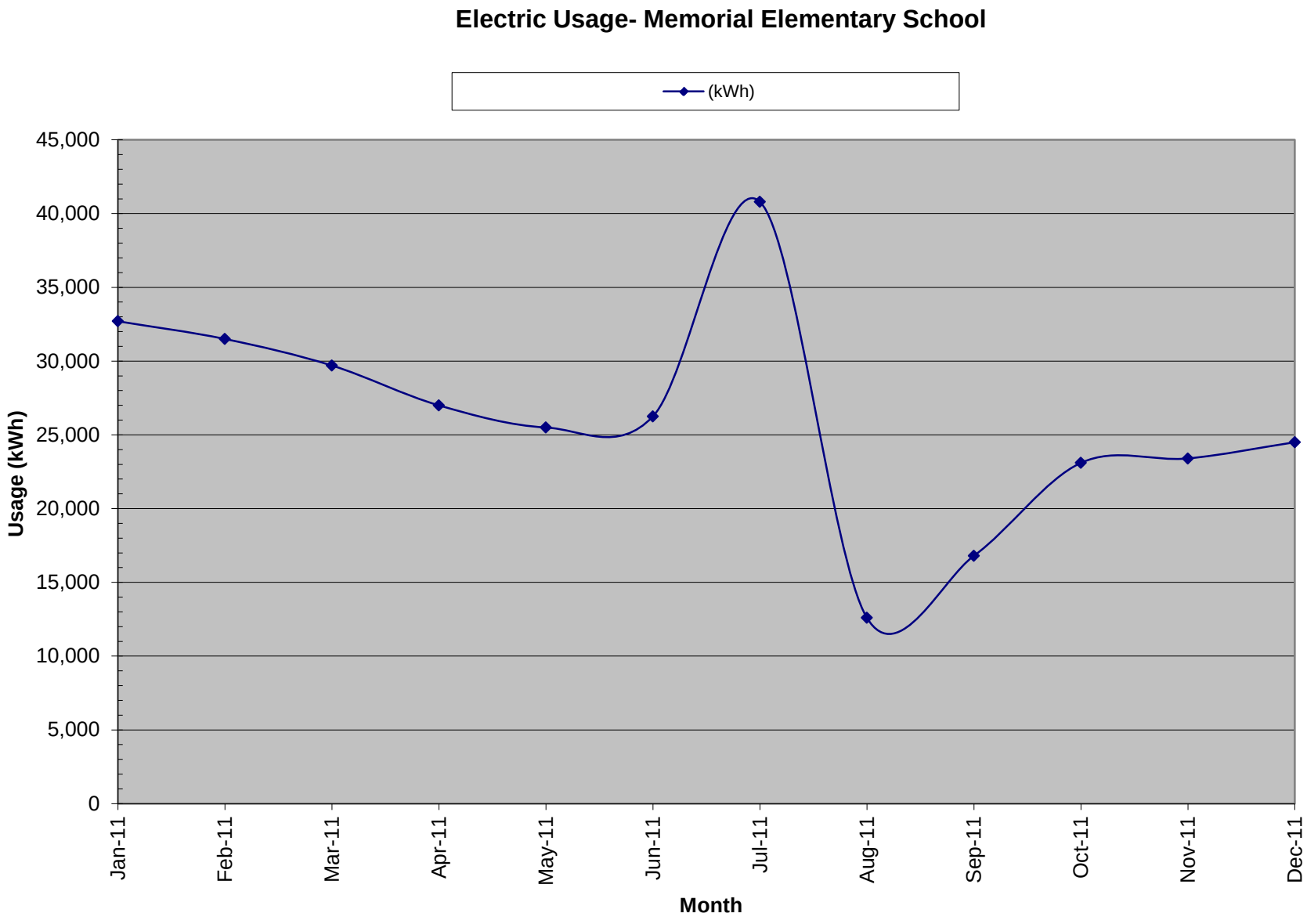
Utility Usage Analysis

Maywood Board of Education
Memorial Elementary School

Electric Service
Delivery - PSE&G
Supplier - South Jersey Energy

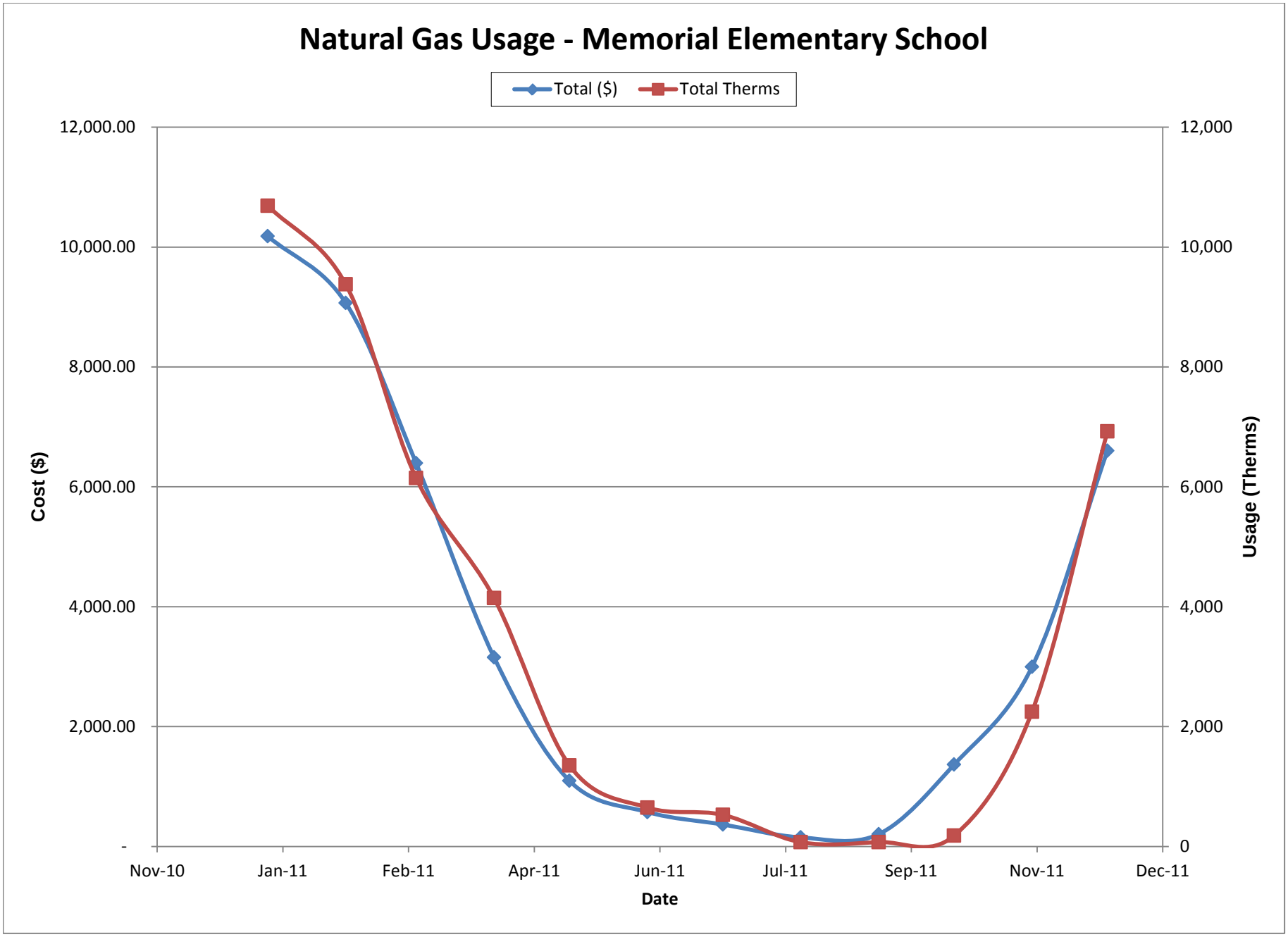
For Service at: Memorial Elementary School
Account No.: 420025001
Meter No.: 2808996

		Charges			Unit Costs
Month	Consumption (kWh)	Total ($)	Delivery ($)	Supply ($)	Blended Rate ($/kWh)
January-11	32,700	$5,058.00	$ 3,462.00	$ 1,596.00	$ 0.155
February-11	31,500	$4,891.00	$ 3,335.00	$ 1,556.00	$ 0.155
March-11	29,700	$4,606.00	$ 3,145.00	$ 1,461.00	$ 0.106
April-11	27,000	$4,307.00	$ 2,859.00	$ 1,448.00	$ 0.160
May-11	25,500	$3,785.00	$ 2,385.00	$ 1,400.00	$ 0.148
June-11	26,250	$4,751.25	$ 2,782.50	$ 1,968.75	$ 0.181
July-11	40,800	$8,165.00	$ 3,816.00	$ 4,349.00	$ 0.200
August-11	12,600	$2,280.50	$ 1,335.50	$ 945.00	$ 0.181
September-11	16,800	$3,646.00	$ 1,571.00	$ 2,075.00	$ 0.217
October-11	23,100	$4,181.10	$ 2,448.60	$ 1,732.50	$ 0.181
November-11	23,400	$3,578.00	$ 2,189.00	$ 1,389.00	$ 0.153
December-11	24,500	$4,434.50	$ 2,597.00	$ 1,837.50	$ 0.181
Total (12-months)	**313,850**	**$53,683.35**	**$31,925.60**	**$21,757.75**	**$ 0.171**



Utility Data-Memorial Elementary School
Electric Graph

Maywood Board of Education					**Gas Service**	
Memorial Elementary School					**Delivery -**	PSE&G
					Supplier -	Hess
For Service at:	Memorial Elementary School					
Account No.:	4200294702					
Meter No.:	2049795					
Month	**Total ($)**	**Delivery ($)**	**Supply ($)**	**Total Therms**	**$/Therm**	
Jan-11	10,181.00	$ 3,457.00	$ 6,724.00	10691	$ 0.95	
Feb-11	9,068.00	$ 3,195.00	$ 5,873.00	9378	$ 0.97	
Mar-11	6,395.00	$ 2,546.00	$ 3,849.00	6146	$ 1.04	
Apr-11	3,154.00	$ 560.00	$ 2,594.00	4143	$ 0.76	
May-11	1,095.00	$ 275.00	$ 820.00	1352	$ 0.81	
Jun-11	574.00	$ 190.00	$ 384.00	649	$ 0.88	
Jul-11	366.00	$ 270.00	$ 96.00	527	$ 0.69	
Aug-11	150.00	$ 109.00	$ 41.00	70	$ 2.14	
Sep-11	205.00	$ 110.00	$ 95.00	72	$ 2.85	
Oct-11	1,365.00	$ 126.00	$ 1,239.00	179	$ 7.63	
Nov-11	2,996.00	$ 1,769.00	$ 1,227.00	2248	$ 1.33	
Dec-11	6,602.00	$ 2,658.00	$ 3,944.00	6924	$ 0.95	
Total (12-months)	**$ 42,151.00**	**$ 15,265.00**	**$ 26,886.00**	**42,379**	**$ 0.99**	


Natural Gas Usage - Memorial Elementary School
Total ($)
Total Therms
12,000.00
10,000.00
8,000.00
6,000.00
4,000.00
2,000.00
-
Cost ($)
12,000
10,000
8,000
6,000
4,000
2,000
0
Usage (Therms)
Nov-10
Jan-11
Feb-11
Apr-11
Jun-11
Jul-11
Sep-11
Nov-11
Dec-11
Date

Supplier Charges:

Electricity

Month	Consumption (kWh)	South Jersey Energy (Current Supplier) ($)	PSE&G (Alternative Supplier) ($)	Difference ($)
January-11	32,700	$ 1,596.00	$ 4,087.50	$ 2,491.50
February-11	31,500	$ 1,556.00	$ 3,937.50	$ 2,381.50
March-11	29,700	$ 1,461.00	$ 3,712.50	$ 2,251.50
April-11	27,000	$ 1,448.00	$ 3,375.00	$ 1,927.00
May-11	25,500	$ 1,400.00	$ 3,187.50	$ 1,787.50
June-11	26,250	$ 1,968.75	$ 3,281.25	$ 1,312.50
July-11	40,800	$ 4,349.00	$ 5,100.00	$ 751.00
August-11	12,600	$ 945.00	$ 1,575.00	$ 630.00
September-11	16,800	$ 2,075.00	$ 2,100.00	$ 25.00
October-11	23,100	$ 1,732.50	$ 2,887.50	$ 1,155.00
November-11	23,400	$ 1,389.00	$ 2,925.00	$ 1,536.00
December-11	24,500	$ 1,837.50	$ 3,062.50	$ 1,225.00
Total (All)	**313,850**	**$ 21,757.75**	**$ 39,231.25**	**$ 17,473.50**

APPENDIX B

Equipment Inventory

New Jersey BPU Energy Audit Program
CHA # 24473
Maywood Board of Education
Memorial Elementary School
Original Construction Date: 1954
Renovation/Addtion Date: 2 2007

Description	QTY	Manufacturer Name	Model No.	Serial No.	Equipment Type / Utility	Capacity/Size/Efficiency	Output	Fuel Type	Motor HP	Eff.	Location	Areas/Equipment Served	Date Installed	Remaining Useful Life (years)	Other Info.
Boiler	1	HB Smith	450 Mills	N/A	Htg.	4200 MBH/ 82%	varies	NG		80.0%	Boiler Room	School	1986	-1	Good
Boiler	1	HB Smith	450 Mills	N/A	Htg.	4200 MBH/ 82%	varies	NG		80.0%	Boiler Room	School	1986	-1	Good
Pump HW	2	Taco	Standard	N/A	Htg.	82%	N/A	elect	10	82.0%	Boiler Room	School	2007	15	Good
DHW Heater(Kitchen)	1	A.O. Smith	XHE BTH-120-970	E07M005623	DHW Heater	85 gal.	120 MBH	NG		80.0%	Lower level	School	2007	7	
DHW Heater Restrooms	1	Ruud	G50-98	URNG0310G00336	DHW Heater	85 gal.	(2) 4500 watt	Elect		100.0%	Boiler Room	Kitchen	2007	7	
AHU- New Gym	1			N/A	HW/OA			Elect			Office	Office	2007	10	Good
Classroom Unit Ventilator	22	See below		N/A	HW/OA			HW/CW			Classrooms	Classrooms	2007	10	Good
Classroom Unit Ventilator	21	See below		N/A	Steam			HW/CW			Classrooms	Classrooms	2007	10	Good
Fan Coil Units	6			N/A	Htg.			HW			Common	Common	2007	10	Good
Air Compressor	1	Duplex	Series 4	N/A	Htg.	80 Gallon		Elect	0.75	80.0%	Boiler Room	School	2007	10	Good
Vacuum Pumps	2	MBPCO	AWVRD25402005	N/A	Htg.			Elect	2	80.0%	Boiler Room	School	1986	-11	Good
Vacuum Pumps	1	MBPCO	AWVRD25402006	N/A	Htg.			Elect	1	80.0%	Boiler Room	School	1986	-11	Good

APPENDIX C

ECM Calculations

Summary of Energy Conservation Measures							
Energy Conservation Measure		**Approx. Costs ($)**	**Approx. Savings ($/year)**	**Payback (Years) w/o Incentive**	**Potential Incentive ($)***	**Payback (Years) w/ Incentive**	**Recommended For Implementation**
ECM-1	Install (2) New Natural Gas Hot Water Condensing Boilers	590,480	9,400	63	6,000	62	X
ECM-2	Install a New Natural Gas Condensing DHW Heater	6,625	939	7	300	7	X
ECM-3	Incorporate the Gym Unit Ventilators into the Existing EMS	5,082	958	5	0	5	X
ECM-4	Demand Control Ventilation For the Gym AHU	2,541	95	27	0	27	
ECM-5	Upgrade Attic Insulation	35,300	1,925	18	0	18	
ECM-6	Lighting Replacement / Upgrades	14,556	3,223	4.5	2,445	4	
ECM-7	Install Lighting Controls (Occupancy Sensors)	14,175	10,406	1.4	2,450	1	X
ECM-8	Lighting Replacements with Lighting Controls (Occupancy Sensors)	28,731	7,420	3.9	4,895	3	

Maywood Schools
CHA Project # 24473
Memorial Elementary School

ECM Summary Sheet

ECM-1 Install (2) New Natural Gas Hot Water Condensing Boilers

Budgetary Cost	Annual Utility Savings				Estimated Maintenance Savings	Total Savings	ROI	Incentive *	Payback (without incentive)	Payback (with incentive)
	Electric	Electric	Nat Gas	Total						
$	kWh	kW	Therms	$	$	$		$	Years	Years
590,480	0	0	9,453	9,400	0	9,400	(0.6)	6,000	>20	>20

ECM-2 Install a New Natural Gas Condensing DHW Heater

Budgetary Cost	Annual Utility Savings				Estimated Maintenance Savings	Total Savings	ROI	Incentive *	Payback (without incentive)	Payback (with incentive)
	Electric	Electric	Nat Gas	Total						
$	kWh	kW	Therms	$	$	$		$	Years	Years
6,625	0	0	943	939	0	939	0.7	300	7.1	6.7

ECM-3 Incorporate the Gym Unit Ventilators into the Existing EMS

Budgetary Cost	Annual Utility Savings				Estimated Maintenance Savings	Total Savings	ROI	Incentive *	Payback (without incentive)	Payback (with incentive)
	Electric	Electric	Nat Gas	Total						
$	kWh	kW	Therms	$	$	$		$	Years	Years
5,082	3,139	0	424	1,000	0	958	3.7	0	5.3	5.3

ECM-4 Demand Control Ventilation For the Gym AHU

Budgetary Cost	Annual Utility Savings				Estimated Maintenance Savings	Total Savings	ROI	Incentive *	Payback (without incentive)	Payback (with incentive)
	Electric	Electric	Nat Gas	Total						
$	kWh	kW	Therms	$	$	$		$	Years	Years
2,541	0	0	95	100	0	95	(0.1)	0	>20	>20

ECM-5 Upgrade Attic Insulation

Budgetary Cost	Annual Utility Savings				Estimated Maintenance Savings	Total Savings	ROI	Incentive *	Payback (without incentive)	Payback (with incentive)
	Electric	Electric	Nat Gas	Total						
$	kWh	kW	Therms	$	$	$		$	Years	Years
35,300	0	0	1,935	0	0	1,925	0.9	0	18.3	18.3

ECM-6 Lighting Replacement / Upgrades

Budgetary Cost	Annual Utility Savings				Estimated Maintenance Savings	Total Savings	ROI	Incentive *	Payback (without incentive)	Payback (with incentive)
	Electric	Electric	Nat Gas	Total						
$	kWh	kW	Therms	$	$	$		$	Years	Years
14,556	19,301	13	0	0	0	3,223	(1.0)	2,445	4.5	3.8

ECM-7 Install Lighting Controls (Occupancy Sensors)

Budgetary Cost	Annual Utility Savings				Estimated Maintenance Savings	Total Savings	ROI	Incentive *	Payback (without incentive)	Payback (with incentive)
	Electric	Electric	Nat Gas	Total						
$	kWh	kW	Therms	$	$	$		$	Years	Years
14,175	62,313	0	0	0	0	10,406	(0.5)	2,450	1.4	1.1

ECM-8 Lighting Replacements with Lighting Controls (Occupancy Sensors)

Budgetary Cost	Annual Utility Savings				Estimated Maintenance Savings	Total Savings	ROI	Incentive *	Payback (without incentive)	Payback (with incentive)
	Electric	Electric	Nat Gas	Total						
$	kWh	kW	Therms	$	$	$		$	Years	Years
28,731	44,432	13	0	0	0	7,420	(0.1)	4,895	3.9	3.2

Maywood Schools
CHA Project # 24473

Utility Costs		Yearly Usage	MTCDE	Building Area	Annual Utility Cost	
$ 0.171	$/kWh blended		0.00042021	54138	Electric	Natural Gas
$ -	$/kWh supply	313,850	0.00042021		44036.00	42150.00
$ -	$/kW	739	0			
$ 0.995	$/Therm	42,379	0.00533471			
$ -	$/kgals	1.000				

Memorial Elementary School

	Item	Savings						Cost	Simple Payback	MTCDE	Life Expectancy	NJ Smart Start Incentives	Direct Install Eligible (Y/N)*	Direct Install Incentives**	Max Incentives	Payback w/ Incentives***	Simple Projected Lifetime Savings						ROI
		kW	kWh	therms	cooling kWh	kgal/yr	$										kW	kWh	therms	cooling	kgal/yr	$	
ECM-1	Install (2) New Natural Gas Hot Water Condensing Boilers	0.0	0	9,453	0	0	$ 9,400	$ 590,480	62.8	50.4	25	$ 6,000		$ -	$ 6,000	62.2	0.0	0	236,321	0	0	$ 235,139	(0.6)
ECM-2	Install a New Natural Gas Condensing DHW Heater	0.0	0	943	0	0	$ 939	$ 6,625	7.1	5.0	12	$ 300		$ -	$ 300	6.7	0.0	0	11,319	0	0	$ 11,262	0.7
ECM-3	Incorporate the Gym Unit Ventilators into the Existing EMS	0.0	3,139	424	0	0	$ 958	$ 5,082	5.3	3.6	25	$ -		$ -	$ -	5.3	0.0	78,463	10,595	0	0	$ 23,959	3.7
ECM-4	Demand Control Ventilation For the Gym AHU	0.0	0	95	0	0	$ 95	$ 2,541	26.8	0.5	25	$ -		$ -	$ -	26.8	0.0	0	2,381	0	0	$ 2,369	(0.1)
ECM-5	Upgrade Attic Insulation	0.0	0	1,935	0	0	$ 1,925	$ 35,300	18.3	10.3	35	$ -		$ -	$ -	18.3	0.0	0	67,724	0	0	$ 67,385	0.9
ECM-6	Lighting Replacement / Upgrades	12.7	19,301	0	0	0	$ 3,223	$ 14,556	4.5	8.1	15	$ 2,445		$ -	$ 2,445	3.8	190.8	289,510	0	0	0	$ -	(1.0)
ECM-7	Install Lighting Controls (Occupancy Sensors)	0.0	62,313	0	0	0	$ 10,406	$ 14,175	1.4	26.2	15	$ 2,450		$ -	$ 2,450	1.1	0.0	934,697	0	0	0	$ 159,833	10.3
ECM-8	Lighting Replacements with Lighting Controls (Occupancy Sensors)	12.7	44,432	0	0	0	$ 7,420	$ 28,731	3.9	18.7	15	$ 4,895		$ -	$ 4,895	3.2	190.8	666,483	0	0	0	$ -	(1.0)
	Total (Does Not Include ECM-6 & ECM-7)	**12.7**	**47,571**	**12,850**	**0**	**0**	**$ 20,737**	**$ 668,758**	32.2			$ 11,195		$ -	$ 11,195	31.7	190.8	744,945	328,340	0	0	$ 340,115	(0.5)
	Total Measures with Payback <10	**12.7**	**47,571**	**1,367**	**0**	**0**	**$ 9,317**	**$ 40,437**	4.3			$ 5,195		$ -	$ 5,195	3.8	190.8	744,945	21,913	0	0	$ 35,221	(0.1)
	% of Existing	**2%**	**15%**	**30%**	**0%**	**0%**																	

Maywood Schools

CHA Project # 24473

ECM-1: Install (2) New Natural Gas Hot Water Condensing Boilers to replace steam boilers

Existing Fuel	Nat.Gas
Proposed Fuel	Nat.Gas

Item	Value	Units	Formula/Comments
Baseline Fuel Cost	$ 0.995	/ Therm	
Proposed Fuel Cost	$ 0.995	/ Therm	
Baseline Fuel Use	39,530	Therms	Less May-Oct
Existing Boiler Plant Efficiency	70%		Steam boiler and steam to HW exchanger
Baseline Boiler Load	2,767,100	Mbtu/yr	Baseline Fuel Use x Existing Efficiency x 100 Mbtu/Therms
Baseline Fuel Cost	$ 39,332		
Proposed Boiler Plant Efficiency	92.0%		New Boiler Efficiency-Aerco Benchmark 3000
Proposed Fuel Use	30,077	Therms	Baseline Boiler Load / Proposed Efficiency / 100 Mbtu/Therms
Proposed Fuel Cost	$ 29,927		

*Note to engineer: Link savings back to summary sheet in appropriate column.

BOILER REPLACEMENT SAVINGS SUMMARY					
	Electric Demand	**Electric Usage**	**Nat Gas Usage**	**Maint.**	**Total Cost**
	(kW)	**(kWh)**	**(Therms)**	**($)**	**($)**
Savings	**0**	**0**	**9,453**	**$0**	**$9,406**

Maywood Schools
CHA Project # 24473

ECM-1: Install (2) New Natural Gas Hot Water Condensing Boilers

Description	QTY	UNIT	UNIT COSTS			SUBTOTAL COSTS			TOTAL COST	REMARKS
			MAT.	LABOR	EQUIP.	MAT.	LABOR	EQUIP.		
3,000 MBH NG Condensing Boiler	2	EA	$45,000.00	$45,000.00		$ 90,000.00	$ 90,000.00	$ -	$180,000.00	AERCO Benchmark 3000
Boiler and Steam System Demolition	2	EA	$ -	$25,000.00		$ -	$ 50,000.00	$ -	$ 50,000.00	
Flue Installation	2	EA	$15,000.00	$15,000.00		$ 30,000.00	$ 30,000.00	$ -	$ 60,000.00	
Miscellaneous Electrical	1	LS	$ 5,000.00	$15,000.00		$ 5,000.00	$ 15,000.00	$ -	$ 20,000.00	
Miscellaneous HW Piping	1	LS	$25,000.00	$25,000.00		$ 25,000.00	$ 25,000.00	$ -	$ 50,000.00	
How Water Piping to Terminal Units	1600	LF	$ 4.00	$ 1.00		$ 6,400.00	$ 1,600.00	$ -	$ 8,000.00	
New HW Coils in Unit Ventilators	20	EA	$ 2,000.00	$ 1,500.00		$ 40,000.00	$ 30,000.00	$ -	$ 70,000.00	
New UV's for Gym	4	EA	$ 7,500.00	$ 5,000.00		$ 30,000.00	$ 20,000.00	$ -	$ 50,000.00	

Note: Pricing used for energy savings calculations only- do not use for bidding purposes

$ 488,000.00	Subtotal
$ 48,800.00	10% Contingency
$ 53,680.00	10% Contractor O&P
$ 590,480.00	**Total**

Maywood Schools
CHA Project # 24473

ECM-2: Install New Natural Gas Condensing DHW Heater

This ECM compares tank type domestic water heater and non-tank type water heater efficiencies

Item	Value	Units	Formula/Comments
Avg. Monthly Utility Demand by Water Heater	475	Therms/month	Calculated @ 4 % of historical natural gas consumption
Total Annual Utility Demand by Water Heater	570,000	MBTU/yr	1therm = 100 MBTU
Existing DHW Heater Efficiency	80%		Per manufacturer nameplate
Total Annual Hot Water Demand (w/ standby losses)	456,000	MBTU/yr	
Existing Tank Size	50	Gallons	Per manufacturer nameplate
Hot Water Piping System Capacity	10	Gallons	Estimated Per existing system (includes HWR piping)
Hot Water Temperature	120	˚F	Per building personnel
Room Temperature	70	˚F	
Standby Losses (% by Volume)	2.5%		(2.5% of stored capacity per hour, per U.S. Department of Energy)
Standby Losses (Heat Loss)	0.6	MBH	
Annual Standby Hot Water Load	5,475	MBTU/yr	
New Tank Size	5	Gallons	Based on Takagi Flash T-H2 instantaneous, condensing DHW Heater
Hot Water Piping System Capacity	10	Gallons	Estimated Per existing system (includes HWR piping)
Hot Water Temperature	120	˚F	
Room Temperature	70	˚F	
Standby Losses (% by Volume)	2.5%		(2.5% of stored capacity per hour, per U.S. Department of Energy)
Standby Losses (Heat Loss)	0.2	MBH	
Annual Standby Hot Water Load	1,369	MBTU/yr	
Total Annual Hot Water Demand	451,894	MBTU/yr	
Proposed Avg. Hot water heater efficiency	95%		Based on Takagi Flash T-H1 instantaneous, condensing DHW Heater
Proposed Fuel Use	4,757	Therms	Standby Losses and inefficient DHW heater eliminated
Utility Cost	$0.995	$/Therm	
Existing Operating Cost of DHW	$5,672	$/yr	
Proposed Operating Cost of DHW	$4,733	$/yr	

Savings Summary:

Utility	Energy Savings	Cost Savings
Therms/yr	943	$939

Maywood Schools
CHA Project # 24473

ECM-2: Install (2) New Natural Gas Condensing DHW Heater

Description	QTY	UNIT	UNIT COSTS			SUBTOTAL COSTS			TOTAL COST	REMARKS
			MAT.	LABOR	EQUIP.	MAT.	LABOR	EQUIP.		
10 GPM Tankless Water Heater	1	EA	$3,000.00	$500.00		$3,000.00	$500.00	$0.00	$3,500.00	
Flue Installation	25	LF	$10.00	$15.00		$250.00	$375.00	$0.00	$625.00	
Miscellaneous Electrical	1	LS	$200.00	$250.00		$200.00	$250.00	$0.00	$450.00	
Miscellaneous HW Piping	100	LF	$4.00	$5.00		$400.00	$500.00	$0.00	$900.00	

Note: Pricing used for energy savings calculations only- do not use for bidding purposes

$5,475.00	Subtotal
$547.50	10% Contingency
$602.25	10% Contractor O&P
$0.00	
$6,625	**Total**

Maywood Schools
CHA Project # 24473

ECM-3 Incorporate the Gym Unit Ventilators into the Existing EMS

E X I S T I N G C O N D I T I O N S		
Existing Facility Total Electric usage	313,850	kWh
Existing Facility Natural Gas Usage	42,379	Therms
Cost of Electricty	$ 0.171	$/kWh
Cost of Natural Gas	$ 0.995	$/Therm
S A V I N G S		
TOD Electric savings	3,139	kWh
TOD Natural Gas savings	424	Therms
Total Cost Savings	$ 958	

Assumptions

1 1% Approximate electric savings due to unoccupied setback
2 1% Approximate natural gas savings due to unoccupied setback

Maywood Schools
CHA Project # 24473

ECM-3 Incorporate the Gym Unit Ventilators into the Existing EMS

Description	QTY	UNIT	UNIT COSTS			SUBTOTAL COSTS			TOTAL COST	REMARKS
			MAT.	LABOR	EQUIP.	MAT.	LABOR	EQUIP.		
Valves and Actuators	4	ea	$ 125	$ 25		$ 500	$ 100	$ -	$ 600	
Room Sensor and Control Wiring	1	ea	$ 600	$ 1,000		$ 600	$ 1,000	$ -	$ 1,600	
EMS Programming	4	ea	$ 500			$ 2,000	$ -	$ -	$ 2,000	

Note: Pricing used for energy savings calculations only- do not use for bidding purposes

$ 4,200	Subtotal
$ 420	10% Contingency
$ 462	10% Contractor O&P
$ -	
$ 5,082	**Total**

Maywood Schools
CHA Project # 24473

ECM-4: Install DCV Control To Gym AHU

This ECM uses CO2 to control the OA damper position

Appendix H - ECM Calculations

Blended Electric Rate	$	0.171	per kWh
Blended Natural Gas Rate	$	0.995	per therm

Facility Ventilation Heating Load		37,800	BTU/Hour[1,2,3,4]
Facility Ventilation Cooling Load		0	BTU/Hour[1,2,3,4]
Existing Ventilation Heating Usage		476	therms°
Existing Ventilation Cooling Usage		0	kWh°
Proposed Ventilation Heating Usage		381	therms[7]
Proposed Ventilation Cooling Usage		0	kWh[7]
Proposed Ventilation Fan Savings		0	kWh[5,8]
Total heating savings		**95**	**therms**
Total cooling savings		**0**	**kWh**
Total cost savings	**$**	**95**	
Estimated Total Project Cost	**$**	**2,541**	
Simple Payback		**26.8**	**years**

Assumptions

1	800	AHU OA flow
2	35	°F, Assumed average heating Δt
3	0	°F, Assumed average cooling Δt
4	80%	Boiler Efficiency
5	1,260	AHU run time per heating season [10 hours/day, 21 days/month, 6 months/year]
6	20%	Estimated OA reduction during low occupancy periods
7	$ 2,541	estimated measure cost for installation of sensors and associated controls

Maywood Schools
CHA Project # 24473

ECM-4: **Install DCV Control To Gym AHU**

Description	QTY	UNIT	UNIT COSTS			SUBTOTAL COSTS			TOTAL COST	REMARKS
			MAT.	LABOR	EQUIP.	MAT.	LABOR	EQUIP.		
CO2 Sensor	2	EA	$ 500	$ 200	$ -	$ 1,000	$ 400	$ -	$ 1,400	
Control Wiring	100	LF	$ 1.00	$ 1.00	$ -	$ 100	$ 100	$ -	$ 200	
EMS Programming	1	EA	$ -	$ 500	$ -	$ -	$ 500	$ -	$ 500	

Note: Pricing used for energy savings calculations only- do not use for bidding purposes

$ 2,100	Subtotal
$ 210	10% Contingency
$ 231	10% Contractor O&P
$ 2,541	**Total**

Maywood Schools
CHA Project # 24473

ECM-5: **Upgrade Attic Insulation**
Add R-38 on top of existing R-19 in pitched roof area only

Area of ceiling	43,500	SF	**Cooling System Efficiency**	0	kW/ton	Heating System Efficiency	80%	
Existing Infiltration Factor	**0.00**	**cfm/SF**	**Ex Occupied Clng Temp.**	66	*F	Heating On Point	55	*F
Proposed Infiltration Factor	**0.00**	**cfm/SF**	**Ex Unoccupied Clng Temp.**	70	*F	Ex Occupied Htg Temp.	70	*F
Existing U Value	**0.053**	**Btuh/SF/°F**	**Cooling Occ Enthalpy Setpoint**	27.5	Btu/lb	Ex Unoccupied Htg Temp.	68	*F
Proposed U Value	**0.026**	**Btuh/SF/°F**	**Cooling Unocc Enthalpy Setpoint**	27.5	Btu/lb	Electricity	$ 0.171	$/kWh
						Natural Gas	$ 0.995	$/Therm

					EXISTING LOADS		PROPOSED LOADS		COOLING ENERGY		HEATING ENERGY	
					Occupied	**Unoccupied**	**Occupied**	**Unoccupied**				
Avg Outdoor Air Temp. Bins °F	**Avg Outdoor Air Enthalpy**	**Existing Equipment Bin Hours**	**Occupied Equipment Bin Hours**	**Unoccupied Equipment Bin Hours**	**Wall Infiltration & Heat Load BTUH**	**Wall Infiltration & Heat Load BTUH**	**Wall Infiltration & Heat Load BTUH**	**Wall Infiltration & Heat Load BTUH**	**Existing Cooling Energy kWh**	**Proposed Cooling Energy kWh**	**Existing Heating Energy Therms**	**Proposed Heating Energy Therms**
A		**B**	**C**	**D**	**E**	**F**	**G**	**H**	**I**	**J**	**K**	**L**
102.5		0	0	0	-83,566	-74,408	-41,783	-37,204	0	0	0	0
97.5		0	0	0	-72,118	-62,961	-36,059	-31,480	0	0	0	0
92.5		9	3	6	-60,671	-51,513	-30,336	-25,757	0	0	0	0
87.5		37	13	24	-49,224	-40,066	-24,612	-20,033	0	0	0	0
82.5		186	66	120	-37,776	-28,618	-18,888	-14,309	0	0	0	0
77.5		247	88	159	-26,329	-17,171	-13,164	-8,586	0	0	0	0
72.5		320	114	206	-14,882	-5,724	-7,441	-2,862	0	0	0	0
67.5		618	221	397	-3,434	0	-1,717	0	0	0	0	0
62.5		828	296	532	0	0	0	0	0	0	0	0
57.5		600	214	386	0	0	0	0	0	0	0	0
52.5		610	218	392	40,066	35,487	20,033	17,743	0	0	283	142
47.5		611	218	393	51,513	46,934	25,757	23,467	0	0	371	185
42.5		656	234	422	62,961	58,382	31,480	29,191	0	0	492	246
37.5		1,023	365	658	74,408	69,829	37,204	34,914	0	0	914	457
32.5		734	262	472	85,855	81,276	42,928	40,638	0	0	761	380
27.5		334	119	215	97,303	92,724	48,651	46,362	0	0	394	197
22.5		252	90	162	108,750	104,171	54,375	52,086	0	0	333	167
17.5		125	45	80	120,197	115,618	60,099	57,809	0	0	183	92
12.5		47	17	30	131,645	127,066	65,822	63,533	0	0	76	38
7.5		22	8	14	143,092	138,513	71,546	69,257	0	0	39	19
2.5		13	5	8	154,539	149,961	77,270	74,980	0	0	25	12
-2.5		0	0	0	165,987	161,408	82,993	80,704	0	0	0	0
-7.5		0	0	0	177,434	172,855	88,717	86,428	0	0	0	0
TOTALS		**7,272**	**2,597**	**4,675**					0	0	**3,870**	**1,935**

Existing Ceiling Infiltration	**0**	**cfm**
Existing Ceiling Heat Transfer	**2,289**	**Btuh/°F**
Proposed Ceiling Infiltration	**0**	**cfm**
Proposed Ceiling Heat Transfer	**1,145**	**Btuh/°F**

Savings	**1,935**	**Therms**	**$ 1,925**

Maywood Schools
CHA Project # 24473

ECM-5

Install Attic Insulation Cost

Description	QTY	UNIT	UNIT COSTS MAT.	UNIT COSTS LABOR	UNIT COSTS EQUIP.	SUBTOTAL COSTS MAT.	SUBTOTAL COSTS LABOR	SUBTOTAL COSTS EQUIP.	TOTAL COST	REMARKS
Fiberglass Blacket R-19 Insulation (6" Thick, 23" wide)	43,500	SF	$ 0.47	$ 0.20		$ 20,576	$ 8,613	$ -	$ 29,200	

$ 29,200.00	Subtotal
$ 2,900.00	10% Contingency
$ 3,200.00	10% Contractor O&P
$ -	Engineering
$ 35,300.00	**Total**

Note: Pricing used for energy savings calculations only- do not use for bidding purposes

Blanket Insulation - Fiberglass (kraft faced)

R-19 (6" thick)					
11" wide	$	0.47	$ 0.32		
15" wide	$	0.47	$ 0.24		
23" wide	$	0.47	$ 0.20		
R-38 (12" thick)					
15" wide	$	0.99	$ 0.32		
23" wide	$	0.99	$ 0.24		
Blown Insulation - Cellulose or Fiberglass					
3 1/2" thick	$	0.23	$ 0.15	$	0.06
6 1/2" thick	$	0.44	$ 0.26	$	0.10
10 7/8" thic	$	0.76	$ 0.43	$	0.17
Board Insulation					
3 lb density					
	($/sf)				
Fiberglass					
1" - R4.3	$	0.54	$ 0.32		
1 1/2" - R-6	$	1.03	$ 0.32		
2" - R-8.7	$	1.25	$ 0.36		
2 1/2" R-10	$	1.10	$ 0.41		
Polyisocyanurate					
1" R-7	$	0.61	$ 0.41		
1.5" R-10	$	0.70	$ 0.44		
2" R-14	$	0.96	$ 0.44		
3" R-21	$	2.09	$ 0.44		
Extruded Polystyrene (40 psi)					
1" R-5	$	0.52	$ 0.41		
2" R-10	$	1.09	$ 0.44		
3" R-15	$	1.47	$ 0.44		
Expanded Polystyrene					
1" R-3.8	$	0.24	$ 0.41		
2" R-7.6	$	0.65	$ 0.44		
3" R-12	$	0.83	$ 0.44		

Costs updated 1/13/09

ECM-1 Lighting Replacements

Budgetary	Annual Utility Savings				Estimated	Total	New Jersey	Payback	Payback
Cost					Maintenance	Savings	Incentive	(without incentive)	(with incentive)
					Savings				
$	kW	kWh	therms	$	$	$	$	Years	Years
$14,556	**12.7**	**19,301**	**0**	**$3,223**	**0**	**$3,223**	**$2,445**	**4.5**	**3.8**

*Incentive based on New Jersey Smart Start Prescriptive Lighting Measures

ECM-2 Install Occupancy Sensors

Budgetary	Annual Utility Savings				Estimated	Total	New Jersey	Payback	Payback
Cost					Maintenance	Savings	Incentive	(without incentive)	(with incentive)
					Savings				
$	kW	kWh	therms	$	$	$	$	Years	Years
$14,175	**0.0**	**62,313**	**0**	**$10,406**	**0**	**$10,406**	**$2,450**	**1.4**	**1.1**

*Incentive based on New Jersey Smart Start Prescriptive Lighting Measures

ECM-3 Lighting Replacements with Occupancy Sensors

Budgetary	Annual Utility Savings				Estimated	Total	New Jersey	Payback	Payback
Cost					Maintenance	Savings	Incentive	(without incentive)	(with incentive)
					Savings				
$	kW	kWh	therms	$	$	$	$	Years	Years
$28,731	**12.7**	**44,432**	**0**	**$7,420**	**0**	**$7,420**	**$4,895**	**3.9**	**3.2**

*Incentive based on New Jersey Smart Start Prescriptive Lighting Measures

Energy Audit of Memorial Elementary School

CHA Project No.24473

Existing Lighting

Cost of Electricity: **$0.167** **$/kWh**

$0.00 **$/kW**

			EXISTING CONDITIONS									
	Area Description	**Usage**	**No. of Fixtures**	**Standard Fixture Code**	**NYSERDA Fixture Code**	**Watts per Fixture**	**kW/Space**	**Exist Control**	**Annual Hours**	**Retrofit Control**	**Annual kWh**	
Field Code	Unique description of the location - Room number/Room name: Floor number (if applicable)	Describe Usage Type using Operating Hours	No. of fixtures before the retrofit	"Lighting Fixture Code" Example 2T 40 R F(U) = 2'x2' Troff 40 w Recess. Floor 2 lamps U shape	Code from Table of Standard Fixture Wattages	Value from Table of Standard Fixture Wattages	(Watts/Fixt) * (Fixt No.)	Pre-inst. control device	Estimated annual hours for the usage group	Retrofit control device	(kW/space) * (Annual Hours)	Notes
35	Principal Office	Offices	2	T 32 R F 3 (ELE)	F43ILL/2	90	0.18	SW	2400	C-OCC	432	
35	Nurse	Offices	2	T 32 R F 3 (ELE)	F43ILL/2	90	0.18	SW	2400	C-OCC	432	
202	Nurse	Offices	2	2T 17 R F 4 (ELE)	F22ILL	33	0.07	SW	2400	C-OCC	158	
202	Nurse Bathroom	Offices	2	2T 17 R F 4 (ELE)	F22ILL	33	0.07	SW	2400	C-OCC	158	
35	Main Office	Offices	3	T 32 R F 3 (ELE)	F43ILL/2	90	0.27	SW	2400	C-OCC	648	
202	Main office Storage	Storage Areas	1	2T 17 R F 4 (ELE)	F22ILL	33	0.03	SW	1000	C-OCC	33	
35	Teachers Room	Offices	6	T 32 R F 3 (ELE)	F43ILL/2	90	0.54	SW	2400	C-OCC	1,296	
35	Teachers Kitchen	Break/Lunch Rooms	1	T 32 R F 3 (ELE)	F43ILL/2	90	0.09	SW	3102.5	C-OCC	279	
71	Teachers Under Cabinet	Storage Areas	2	I 60	I60/1	60	0.12	SW	1000	C-OCC	120	
35	Womens Room	Bath Room	1	T 32 R F 3 (ELE)	F43ILL/2	90	0.09	SW	2000	C-OCC	180	
146	Cafetorium	Cafeteria	20	High Bay MH 400	MH400/1	458	9.16	SW	1600	C-OCC	14,656	
X1	Cafetorium	Cafeteria	3	X 1.5 W LED	ELED1.5/1	1.5	0.00	SW	1600	C-OCC	7	
35	Café.Serving Room	Cafeteria	3	T 32 R F 3 (ELE)	F43ILL/2	90	0.27	SW	1600	C-OCC	432	
5	Kitchen	Cafeteria	5	2T 32 R F 2 (u) (ELE)	FU2LL	60	0.30	SW	1600		480	
X1	Kitchen	Cafeteria	2	X 1.5 W LED	ELED1.5/1	1.5	0.00	SW	1600		5	
202	Respect Road Corridor	Hallways	12	2T 17 R F 4 (ELE)	F22ILL	33	0.40	SW	2280		903	
35	Respect Road Corridor	Hallways	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.08	SW	2280		2,462	
X1	Respect Road Corridor	Hallways	2	X 1.5 W LED	ELED1.5/1	1.5	0.00	SW	2280		7	
93	Respect Road Corridor	Hallways	2	I 75	I75/1	75	0.15	SW	2280		342	
202	Custodial Closet	Storage Areas	1	2T 17 R F 4 (ELE)	F22ILL	33	0.03	SW	1000		33	
202	Boys Room	Bath Room	3	2T 17 R F 4 (ELE)	F22ILL	33	0.10	SW	2000	C-OCC	198	
202	Rm B-1	Offices	3	2T 17 R F 4 (ELE)	F22ILL	33	0.10	SW	2400	C-OCC	238	
71	Stage	Auditorium	4	I 60	I60/1	60	0.24	SW	1000	C-OCC	240	
146	Stage	Auditorium	4	High Bay MH 400	MH400/1	458	1.83	SW	1000		1,832	
35	Rm B-2	Offices	6	T 32 R F 3 (ELE)	F43ILL/2	90	0.54	SW	2400		1,296	
250	Rm B-3 Media Sw 1	Classrooms	32	T 54 W F 4 (ELE) (T-5)	F44GHL	234	7.49	SW	2400	C-OCC	17,971	
250	Rm B-3 Media Sw 2	Classrooms	16	T 54 W F 4 (ELE) (T-5)	F44GHL	234	3.74	SW	2400	C-OCC	8,986	
X4	Rm B-3 Media Sw 3	Classrooms	7	CF26W	CF26/4-L	108	0.76	SW	2400	C-OCC	1,814	
X4	Rm B-3 Media Sw 4	Classrooms	4	CF26W	CF26/4-L	108	0.43	SW	2400	C-OCC	1,037	
X1	Rm B-3 Media Sw 5	Classrooms	2	X 1.5 W LED	ELED1.5/1	1.5	0.00	SW	2400	C-OCC	7	
35	Media Woork Rm	Classrooms	1	T 32 R F 3 (ELE)	F43ILL/2	90	0.09	SW	2400	C-OCC	216	
35	Custodial Closet Sw 1	Storage Areas	1	T 32 R F 3 (ELE)	F43ILL/2	90	0.09	SW	1000	C-OCC	90	
202	Custodial Closet Sw 2	Storage Areas	1	2T 17 R F 4 (ELE)	F22ILL	33	0.03	SW	1000	C-OCC	33	
35	Boys RR	Bath Room	3	T 32 R F 3 (ELE)	F43ILL/2	90	0.27	SW	2000	C-OCC	540	
35	Honesty St Corridor	Hallways	14	T 32 R F 3 (ELE)	F43ILL/2	90	1.26	SW	2280		2,873	
X1	Honesty St Corridor	Hallways	3	X 1.5 W LED	ELED1.5/1	1.5	0.00	SW	2280		10	
35	Rm C-1	Classrooms	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.08	SW	2400	C-OCC	2,592	
35	Rm C-3	Classrooms	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.08	SW	2400	C-OCC	2,592	
35	Rm C-5	Classrooms	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.08	SW	2400	C-OCC	2,592	
35	Rm C-2	Classrooms	13	T 32 R F 3 (ELE)	F43ILL/2	90	1.17	SW	2400	C-OCC	2,808	
202	Rm C-2	Classrooms	2	2T 17 R F 4 (ELE)	F22ILL	33	0.07	SW	2400	C-OCC	158	
7	Rm C-2 Toilet	Bath Room	1	2T 32 R F 2 (u) (ELE) Thin Tube	FU2LL	60	0.06	SW	2000	C-OCC	120	
7	Rm C-7	Classrooms	1	2T 32 R F 2 (u) (ELE) Thin Tube	FU2LL	60	0.06	SW	2400	C-OCC	144	
7	Rm C-4	Classrooms	1	2T 32 R F 2 (u) (ELE) Thin Tube	FU2LL	60	0.06	SW	2400	C-OCC	144	
7	Rm C-9	Classrooms	1	2T 32 R F 2 (u) (ELE) Thin Tube	FU2LL	60	0.06	SW	2400	C-OCC	144	
7	Rm C-6	Classrooms	1	2T 32 R F 2 (u) (ELE) Thin Tube	FU2LL	60	0.06	SW	2400	C-OCC	144	
35	Rm C-11	Classrooms	8	T 32 R F 3 (ELE)	F43ILL/2	90	0.72	SW	2400	C-OCC	1,728	
35	Rm C-13	Classrooms	8	T 32 R F 3 (ELE)	F43ILL/2	90	0.72	SW	2400	C-OCC	1,728	
35	Gym	Gymnasium	24	T 32 R F 3 (ELE)	F43ILL/2	90	2.16	SW	2912		6,290	
202	Gym Office	Offices	2	2T 17 R F 4 (ELE)	F22ILL	33	0.07	SW	2400	C-OCC	158	
35	Gym Entrance Hall	Hallways	2	T 32 R F 3 (ELE)	F43ILL/2	90	0.18	SW	2280		410	
201	Gym Entrance Hall	Hallways	2	T 32 R F 3 (ELE)	F43ILL/2	90	0.18	SW	2280		410	

Energy Audit of Memorial Elementary School

CHA Project No.24473

Existing Lighting

Cost of Electricity: **$0.167** **$/kWh**

$0.00 **$/kW**

			EXISTING CONDITIONS									
	Area Description	**Usage**	**No. of Fixtures**	**Standard Fixture Code**	**NYSERDA Fixture Code**	**Watts per Fixture**	**kW/Space**	**Exist Control**	**Annual Hours**	**Retrofit Control**	**Annual kWh**	
Field Code	Unique description of the location - Room number/Room name: Floor number (if applicable)	Describe Usage Type using Operating Hours	No. of fixtures before the retrofit	"Lighting Fixture Code" Example 2T 40 R F(U) = 2'x2' Troff 40 w Recess. Floor 2 lamps U shape	Code from Table of Standard Fixture Wattages	Value from Table of Standard Fixture Wattages	(Watts/Fixt) * (Fixt No.)	Pre-inst. control device	Estimated annual hours for the usage group	Retrofit control device	(kW/space) * (Annual Hours)	Notes
35	Rm D-3 Art	Classrooms	16	T 32 R F 3 (ELE)	F43ILL/2	90	1.44	SW	2400	C-OCC	3,456	
35	Gym Hall	Hallways	4	T 32 R F 3 (ELE)	F43ILL/2	90	0.36	SW	2280		821	
35	Custodial Closet	Storage Areas	1	T 32 R F 3 (ELE)	F43ILL/2	90	0.09	SW	1000	C-OCC	90	
35	Boys Rm 2nd Fl	Bath Room	4	T 32 R F 3 (ELE)	F43ILL/2	90	0.36	SW	2000	C-OCC	720	
35	Storage	Storage Areas	1	T 32 R F 3 (ELE)	F43ILL/2	90	0.09	SW	1000	C-OCC	90	
249	Storage	Storage Areas	4	F 48 R F 2 (ELE)	F41GL	32	0.13	SW	1000	C-OCC	128	
35	Fairness Ave Corridor	Hallways	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.08	SW	2280		2,462	
35	Rm D-2	Classrooms	9	T 32 R F 3 (ELE)	F43ILL/2	90	0.81	SW	2400	C-OCC	1,944	
7	Rm D-2	Classrooms	3	2T 32 R F 2 (u) (ELE) Thin Tube	FU2LL	60	0.18	SW	2400	C-OCC	432	
7	Rm D-2 Toilet	Bath Room	1	2T 32 R F 2 (u) (ELE) Thin Tube	FU2LL	60	0.06	SW	2000	C-OCC	120	
7	Rm D-4	Classrooms	1	2T 32 R F 2 (u) (ELE) Thin Tube	FU2LL	60	0.06	SW	2400	C-OCC	144	
7	Rm D-5	Classrooms	1	2T 32 R F 2 (u) (ELE) Thin Tube	FU2LL	60	0.06	SW	2400	C-OCC	144	
7	Rm A-9 Speech	Classrooms	4	2T 32 R F 2 (u) (ELE) Thin Tube	FU2LL	60	0.24	SW	2400	C-OCC	576	
7	Rm A-9 Closet	Storage Areas	2	2T 32 R F 2 (u) (ELE) Thin Tube	FU2LL	60	0.12	SW	1000	C-OCC	120	
7	Rm A-11 Speech	Classrooms	4	2T 32 R F 2 (u) (ELE) Thin Tube	FU2LL	60	0.24	SW	2400	C-OCC	576	
35	Rm A-13	Classrooms	3	T 32 R F 3 (ELE)	F43ILL/2	90	0.27	SW	2400	C-OCC	648	
7	Rm A-15 Sw1	Classrooms	4	2T 32 R F 2 (u) (ELE) Thin Tube	FU2LL	60	0.24	SW	2400	C-OCC	576	
7	Rm A-15 Sw2	Classrooms	4	2T 32 R F 2 (u) (ELE) Thin Tube	FU2LL	60	0.24	SW	2400	C-OCC	576	
7	A Wing Corridor	Hallways	3	2T 32 R F 2 (u) (ELE) Thin Tube	FU2LL	60	0.18	SW	2280		410	
7	A Wing Toilet	Bath Room	1	2T 32 R F 2 (u) (ELE) Thin Tube	FU2LL	60	0.06	SW	2000	C-OCC	120	
35	A Wing Corridor	Hallways	18	T 32 R F 3 (ELE)	F43ILL/2	90	1.62	SW	2280		3,694	
35	Classroom A-10	Classrooms	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.08	SW	2400	C-OCC	2,592	
35	Classroom A-8	Classrooms	6	T 32 R F 3 (ELE)	F43ILL/2	90	0.54	SW	2400	C-OCC	1,296	
35	Classroom A-8	Classrooms	6	T 32 R F 3 (ELE)	F43ILL/2	90	0.54	SW	2400	C-OCC	1,296	
35	Classroom A-7	Classrooms	9	T 32 R F 3 (ELE)	F43ILL/2	90	0.81	SW	2400	C-OCC	1,944	
35	Classroom A-6	Classrooms	8	T 32 R F 3 (ELE)	F43ILL/2	90	0.72	SW	2400	C-OCC	1,728	
35	Classroom A-5	Classrooms	8	T 32 R F 3 (ELE)	F43ILL/2	90	0.72	SW	2400	C-OCC	1,728	
35	Classroom A-4	Classrooms	8	T 32 R F 3 (ELE)	F43ILL/2	90	0.72	SW	2400	C-OCC	1,728	
35	Classroom A-3	Classrooms	8	T 32 R F 3 (ELE)	F43ILL/2	90	0.72	SW	2400	C-OCC	1,728	
35	Classroom A-2	Classrooms	8	T 32 R F 3 (ELE)	F43ILL/2	90	0.72	SW	2400	C-OCC	1,728	
35	Classroom A-1	Classrooms	8	T 32 R F 3 (ELE)	F43ILL/2	90	0.72	SW	2400	C-OCC	1,728	
7	Storage	Storage Areas	36	2T 32 R F 2 (u) (ELE) Thin Tube	FU2LL	60	2.16	SW	1000	C-OCC	2,160	
204	Corridor Next to Main Office	Hallways	1	S 96 P F 2 (MAG) 8'	F82EHE	207	0.21	SW	2280		472	
201	Boiler Room Stairwell	Hallways	1	T 32 R F 3 (ELE)	F43ILL/2	90	0.09	SW	2280		205	
35	Boiler Room	Mechanical Room	10	T 32 R F 3 (ELE)	F43ILL/2	90	0.90	SW	1000	C-OCC	900	
X1	Boiler Room	Mechanical Room	2	X 1.5 W LED	ELED1.5/1	1.5	0.00	SW	1000	C-OCC	3	
X1	Attic	Storage Areas	12	X 1.5 W LED	ELED1.5/1	1.5	0.02	SW	1000	C-OCC	18	
35	Gym Storage	Storage Areas	3	T 32 R F 3 (ELE)	F43ILL/2	90	0.27	SW	1000	C-OCC	270	
169	Gym	Gymnasium	2	SP 250 MH ROOF	MH250/1	295	0.59	SW	2912		1,718	
227	Gym	Gymnasium	1	70 W MH Wall Pack	MH70/1	95	0.10	SW	2912		277	
169	Gym	Gymnasium	3	SP 250 MH ROOF	MH250/1	295	0.89	SW	2912		2,577	
142	Gym	Gymnasium	1	MH 100	MH100/1	128	0.13	SW	2912		373	
227	Gym	Gymnasium	1	70 W MH Wall Pack	MH70/1	95	0.10	SW	2912		277	
227	Gym	Gymnasium	4	70 W MH Wall Pack	MH70/1	95	0.38	SW	2912		1,107	
227	Gym	Gymnasium	2	70 W MH Wall Pack	MH70/1	95	0.19	SW	2912		553	

Energy Audit of Memorial Elementary School

CHA Project No.24473

Existing Lighting

Cost of Electricity: **$0.167** **$/kWh**

$0.00 **$/kW**

			EXISTING CONDITIONS									
	Area Description	**Usage**	**No. of Fixtures**	**Standard Fixture Code**	**NYSERDA Fixture Code**	**Watts per Fixture**	**kW/Space**	**Exist Control**	**Annual Hours**	**Retrofit Control**	**Annual kWh**	
Field Code	Unique description of the location - Room number/Room name: Floor number (if applicable)	Describe Usage Type using Operating Hours	No. of fixtures before the retrofit	"Lighting Fixture Code" Example 2T 40 R F(U) = 2'x2' Troff 40 w Recess. Floor 2 lamps U shape	Code from Table of Standard Fixture Wattages	Value from Table of Standard Fixture Wattages	(Watts/Fixt) * (Fixt No.)	Pre-inst. control device	Estimated annual hours for the usage group	Retrofit control device	(kW/space) * (Annual Hours)	Notes
	Total		**550**				**60.05**				**128,861**	

Energy Audit of Memorial Elementary School

CHA Project No.24473

ECM-1 Lighting Replacements

Cost of Electricity: **$0.167 $/kWh**

$0.00 $/kW

		EXISTING CONDITIONS								RETROFIT CONDITIONS								COST & SAVINGS ANALYSIS						
	Area Description	**No. of Fixtures**	**Standard Fixture Code**	**NYSERDA Fixture Code**	**Watts per Fixture**	**kW/Space**	**Exist Control**	**Annual Hours**	**Annual kWh**	**Number of Fixtures**	**Standard Fixture Code**	**Fixture Code**	**Watts per Fixture**	**kW/Space**	**Retrofit Control**	**Annual Hours**	**Annual kWh**	**Annual kWh Saved**	**Annual kW Saved**	**Annual $ Saved**	**Retrofit Cost**	**NJ Smart Start Lighting Incentive**	**Simple Payback With Out Incentive**	**Simple Payback**
Field Code	Unique description of the location - Room number/Room name: Floor number (if applicable)	No. of fixtures before the retrofit	"Lighting Fixture Code" Example 2T 40 R F(U) = 2'x2' Troff 40 w Recess. Floor 2 lamps U shape	Code from Table of Standard Fixture Wattages	Value from Table of Standard Fixture Wattages	(Watts/Fixt) * (Fixt No.)	Pre-inst. control device	Estimated daily hours for the usage group	(kW/space) * (Annual Hours)	No. of fixtures after the retrofit	"Lighting Fixture Code" Example 2T 40 R F(U) = 2'x2' Troff 40 w Recess. Floor 2 lamps U shape	Code from Table of Standard Fixture Wattages	Value from Table of Standard Fixture Wattages	(Watts/Fixt) * (Number of Fixtures)	Retrofit control device	Estimated annual hours for the usage group	(kW/space) * (Annual Hours)	(Original Annual kWh) - (Retrofit Annual kWh)	(Original Annual kW) - (Retrofit Annual kW)	(kWh Saved) * ($/kWh)	Cost for renovations to lighting system	Prescriptive Lighting Measures	Length of time for renovations cost to be recovered	Length of time for renovations cost to be recovered
35	Principal Office	2	T 32 R F 3 (ELE)	F43ILL/2	90	0.2	SW	2400	432	2	T 32 R F 3 (ELE)	F43ILL/2	90	0.2	SW	2,400	432	-	0.0	$ -	$ -	$0		#DIV/0!
35	Nurse	2	T 32 R F 3 (ELE)	F43ILL/2	90	0.2	SW	2400	432	2	T 32 R F 3 (ELE)	F43ILL/2	90	0.2	SW	2,400	432	-	0.0	$ -	$ -	$0		
202	Nurse	2	2T 17 R F 4 (ELE)	F22ILL	33	0.1	SW	2400	158	2	2T 17 R F 4 (ELE)	F22ILL	33	0.1	SW	2,400	158	-	0.0	$ -	$ -	$0		
202	Nurse Bathroom	2	2T 17 R F 4 (ELE)	F22ILL	33	0.1	SW	2400	158	2	2T 17 R F 4 (ELE)	F22ILL	33	0.1	SW	2,400	158	-	0.0	$ -	$ -	$0		
35	Main Office	3	T 32 R F 3 (ELE)	F43ILL/2	90	0.3	SW	2400	648	3	T 32 R F 3 (ELE)	F43ILL/2	90	0.3	SW	2,400	648	-	0.0	$ -	$ -	$0		
202	Main office Storage	1	2T 17 R F 4 (ELE)	F22ILL	33	0.0	SW	1000	33	1	2T 17 R F 4 (ELE)	F22ILL	33	0.0	SW	1,000	33	-	0.0	$ -	$ -	$0		
35	Teachers Room	6	T 32 R F 3 (ELE)	F43ILL/2	90	0.5	SW	2400	1,296	6	T 32 R F 3 (ELE)	F43ILL/2	90	0.5	SW	2,400	1,296	-	0.0	$ -	$ -	$0		
35	Teachers Kitchen	1	T 32 R F 3 (ELE)	F43ILL/2	90	0.1	SW	3102.5	279	1	T 32 R F 3 (ELE)	F43ILL/2	90	0.1	SW	3,103	279	-	0.0	$ -	$ -	$0		
71	Teachers Under Cabinet	2	I 60	I60/1	60	0.1	SW	1000	120	2	CF 26	CFQ26/1-L	27	0.1	SW	1,000	54	66	0.1	$ 11.02	$ 13.50	$0	1.2	0.2
35	Womens Room	1	T 32 R F 3 (ELE)	F43ILL/2	90	0.1	SW	2000	180	1	T 32 R F 3 (ELE)	F43ILL/2	90	0.1	SW	2,000	180	-	0.0	$ -	$ -	$0		
146	Cafetorium	20	High Bay MH 400	MH400/1	458	9.2	SW	1600	14,656	20	P 54 C F 4	FC20	20	0.4	SW	1,600	640	14,016	8.8	$ 2,340.67	$ 6,000.00	$2,000	2.6	0.3
X1	Cafetorium	3	X 1.5 W LED	ELED1.5/1	1.5	0.0	SW	1600	7	3	X 1.5 W LED	ELED1.5/1	1.5	0.0	SW	1,600	7	-	0.0	$ -	$ -	$0		
35	Café.Serving Room	3	T 32 R F 3 (ELE)	F43ILL/2	90	0.3	SW	1600	432	3	T 32 R F 3 (ELE)	F43ILL/2	90	0.3	SW	1,600	432	-	0.0	$ -	$ -	$0		
5	Kitchen	5	2T 32 R F 2 (u) (ELE)	FU2LL	60	0.3	SW	1600	480	5	2T 32 R F 2 (u) (ELE)	FU2LL	60	0.3	SW	1,600	480	-	0.0	$ -	$ -	$0		
X1	Kitchen	2	X 1.5 W LED	ELED1.5/1	1.5	0.0	SW	1600	5	2	X 1.5 W LED	ELED1.5/1	1.5	0.0	SW	1,600	5	-	0.0	$ -	$ -	$0		
202	Respect Road Corridor	12	2T 17 R F 4 (ELE)	F22ILL	33	0.4	SW	2280	903	12	2T 17 R F 4 (ELE)	F22ILL	33	0.4	SW	2,280	903	-	0.0	$ -	$ -	$0		
35	Respect Road Corridor	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	SW	2280	2,462	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	SW	2,280	2,462	-	0.0	$ -	$ -	$0		
X1	Respect Road Corridor	2	X 1.5 W LED	ELED1.5/1	1.5	0.0	SW	2280	7	2	X 1.5 W LED	ELED1.5/1	1.5	0.0	SW	2,280	7	-	0.0	$ -	$ -	$0		
93	Respect Road Corridor	2	I 75	I75/1	75	0.2	SW	2280	342	2	CF 26	CFQ26/1-L	27	0.1	SW	2,280	123	219	0.1	$ 36.55	$ 10.00	$0	0.3	0.0
202	Custodial Closet	1	2T 17 R F 4 (ELE)	F22ILL	33	0.0	SW	1000	33	1	2T 17 R F 4 (ELE)	F22ILL	33	0.0	SW	1,000	33	-	0.0	$ -	$ -	$0		
202	Boys Room	3	2T 17 R F 4 (ELE)	F22ILL	33	0.1	SW	2000	198	3	2T 17 R F 4 (ELE)	F22ILL	33	0.1	SW	2,000	198	-	0.0	$ -	$ -	$0		
202	Rm B-1	3	2T 17 R F 4 (ELE)	F22ILL	33	0.1	SW	2400	238	3	2T 17 R F 4 (ELE)	F22ILL	33	0.1	SW	2,400	238	-	0.0	$ -	$ -	$0		
71	Stage	4	I 60	I60/1	60	0.2	SW	1000	240	4	CF 26	CFQ26/1-L	27	0.1	SW	1,000	108	132	0.1	$ 22.04	$ 27.00	$0	1.2	0.2
146	Stage	4	High Bay MH 400	MH400/1	458	1.8	SW	1000	1,832	4	P 54 C F 4	FC20	20	0.1	SW	1,000	80	1,752	1.8	$ 292.58	$ 1,200.00	$400	4.1	0.5
35	Rm B-2	6	T 32 R F 3 (ELE)	F43ILL/2	90	0.5	SW	2400	1,296	6	T 32 R F 3 (ELE)	F43ILL/2	90	0.5	SW	2,400	1,296	-	0.0	$ -	$ -	$0		
250	Rm B-3 Media Sw 1	32	T 54 W F 4 (ELE) (T-5)	F44GHL	234	7.5	SW	2400	17,971	32	T 54 W F 4 (ELE) (T-5)	F44GHL	234	7.5	SW	2,400	17,971	-	0.0	$ -	$ -	$0		
250	Rm B-3 Media Sw 2	16	T 54 W F 4 (ELE) (T-5)	F44GHL	234	3.7	SW	2400	8,986	16	T 54 W F 4 (ELE) (T-5)	F44GHL	234	3.7	SW	2,400	8,986	-	0.0	$ -	$ -	$0		
X4	Rm B-3 Media Sw 3	7	CF26W	CF26/4-L	108	0.8	SW	2400	1,814	7	CF26W	CF26/4-L	108	0.8	SW	2,400	1,814	-	0.0	$ -	$ -	$0		
X4	Rm B-3 Media Sw 4	4	CF26W	CF26/4-L	108	0.4	SW	2400	1,037	4	CF26W	CF26/4-L	108	0.4	SW	2,400	1,037	-	0.0	$ -	$ -	$0		
X1	Rm B-3 Media Sw 5	2	X 1.5 W LED	ELED1.5/1	1.5	0.0	SW	2400	7	2	X 1.5 W LED	ELED1.5/1	1.5	0.0	SW	2,400	7	-	0.0	$ -	$ -	$0		
35	Media Woork Rm	1	T 32 R F 3 (ELE)	F43ILL/2	90	0.1	SW	2400	216	1	T 32 R F 3 (ELE)	F43ILL/2	90	0.1	SW	2,400	216	-	0.0	$ -	$ -	$0		
35	Custodial Closet Sw 1	1	T 32 R F 3 (ELE)	F43ILL/2	90	0.1	SW	1000	90	1	T 32 R F 3 (ELE)	F43ILL/2	90	0.1	SW	1,000	90	-	0.0	$ -	$ -	$0		
202	Custodial Closet Sw 2	1	2T 17 R F 4 (ELE)	F22ILL	33	0.0	SW	1000	33	1	2T 17 R F 4 (ELE)	F22ILL	33	0.0	SW	1,000	33	-	0.0	$ -	$ -	$0		
35	Boys RR	3	T 32 R F 3 (ELE)	F43ILL/2	90	0.3	SW	2000	540	3	T 32 R F 3 (ELE)	F43ILL/2	90	0.3	SW	2,000	540	-	0.0	$ -	$ -	$0		
35	Honesty St Corridor	14	T 32 R F 3 (ELE)	F43ILL/2	90	1.3	SW	2280	2,873	14	T 32 R F 3 (ELE)	F43ILL/2	90	1.3	SW	2,280	2,873	-	0.0	$ -	$ -	$0		
X1	Honesty St Corridor	3	X 1.5 W LED	ELED1.5/1	1.5	0.0	SW	2280	10	3	X 1.5 W LED	ELED1.5/1	1.5	0.0	SW	2,280	10	-	0.0	$ -	$ -	$0		
35	Rm C-1	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	SW	2400	2,592	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	SW	2,400	2,592	-	0.0	$ -	$ -	$0		
35	Rm C-3	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	SW	2400	2,592	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	SW	2,400	2,592	-	0.0	$ -	$ -	$0		
35	Rm C-5	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	SW	2400	2,592	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	SW	2,400	2,592	-	0.0	$ -	$ -	$0		
35	Rm C-2	13	T 32 R F 3 (ELE)	F43ILL/2	90	1.2	SW	2400	2,808	13	T 32 R F 3 (ELE)	F43ILL/2	90	1.2	SW	2,400	2,808	-	0.0	$ -	$ -	$0		
202	Rm C-2	2	2T 17 R F 4 (ELE)	F22ILL	33	0.1	SW	2400	158	2	2T 17 R F 4 (ELE)	F22ILL	33	0.1	SW	2,400	158	-	0.0	$ -	$ -	$0		
7	Rm C-2 Toilet	1	2T 32 R F 2 (u) (ELE) Thin Tube	FU2LL	60	0.1	SW	2000	120	1	2T 17 R F 2 (ELE)	F22ILL	33	0.0	SW	2,000	66	54	0.0	$ 9.02	$ 101.25	$0	11.2	1.9
7	Rm C-7	1	2T 32 R F 2 (u) (ELE) Thin Tube	FU2LL	60	0.1	SW	2400	144	1	2T 17 R F 2 (ELE)	F22ILL	33	0.0	SW	2,400	79	65	0.0	$ 10.82	$ 101.25	$0	9.4	1.6
7	Rm C-4	1	2T 32 R F 2 (u) (ELE) Thin Tube	FU2LL	60	0.1	SW	2400	144	1	2T 17 R F 2 (ELE)	F22ILL	33	0.0	SW	2,400	79	65	0.0	$ 10.82	$ 101.25	$0	9.4	1.6
7	Rm C-9	1	2T 32 R F 2 (u) (ELE) Thin Tube	FU2LL	60	0.1	SW	2400	144	1	2T 17 R F 2 (ELE)	F22ILL	33	0.0	SW	2,400	79	65	0.0	$ 10.82	$ 101.25	$0	9.4	1.6
7	Rm C-6	1	2T 32 R F 2 (u) (ELE) Thin Tube	FU2LL	60	0.1	SW	2400	144	1	2T 17 R F 2 (ELE)	F22ILL	33	0.0	SW	2,400	79	65	0.0	$ 10.82	$ 101.25	$0	9.4	1.6
35	Rm C-11	8	T 32 R F 3 (ELE)	F43ILL/2	90	0.7	SW	2400	1,728	8	T 32 R F 3 (ELE)	F43ILL/2	90	0.7	SW	2,400	1,728	-	0.0	$ -	$ -	$0		
35	Rm C-13	8	T 32 R F 3 (ELE)	F43ILL/2	90	0.7	SW	2400	1,728	8	T 32 R F 3 (ELE)	F43ILL/2	90	0.7	SW	2,400	1,728	-	0.0	$ -	$ -	$0		
35	Gym	24	T 32 R F 3 (ELE)	F43ILL/2	90	2.2	SW	2912	6,290	24	T 32 R F 3 (ELE)	F43ILL/2	90	2.2	SW	2,912	6,290	-	0.0	$ -	$ -	$0		
202	Gym Office	2	2T 17 R F 4 (ELE)	F22ILL	33	0.1	SW	2400	158	2	2T 17 R F 4 (ELE)	F22ILL	33	0.1	SW	2,400	158	-	0.0	$ -	$ -	$0		
35	Gym Entrance Hall	2	T 32 R F 3 (ELE)	F43ILL/2	90	0.2	SW	2280	410	2	T 32 R F 3 (ELE)	F43ILL/2	90	0.2	SW	2,280	410	-	0.0	$ -	$ -	$0		
201	Gym Entrance Hall	2	T 32 R F 3 (ELE)	F43ILL/2	90	0.2	SW	2280	410	2	0	F43SSILL	72	0.1	SW	2,280	328	82	0.0	$ 13.71	$ 212.50	$30	15.5	2.2
35	Rm D-3 Art	16	T 32 R F 3 (ELE)	F43ILL/2	90	1.4	SW	2400	3,456	16	T 32 R F 3 (ELE)	F43ILL/2	90	1.4	SW	2,400	3,456	-	0.0	$ -	$ -	$0		
35	Gym Hall	4	T 32 R F 3 (ELE)	F43ILL/2	90	0.4	SW	2280	821	4	T 32 R F 3 (ELE)	F43ILL/2	90	0.4	SW	2,280	821	-	0.0	$ -	$ -	$0		
35	Custodial Closet	1	T 32 R F 3 (ELE)	F43ILL/2	90	0.1	SW	1000	90	1	T 32 R F 3 (ELE)	F43ILL/2	90	0.1	SW	1,000	90	-	0.0	$ -	$ -	$0		
35	Boys Rm 2nd Fl	4	T 32 R F 3 (ELE)	F43ILL/2	90	0.4	SW	2000	720	4	T 32 R F 3 (ELE)	F43ILL/2	90	0.4	SW	2,000	720	-	0.0	$ -	$ -	$0		
35	Storage	1	T 32 R F 3 (ELE)	F43ILL/2	90	0.1	SW	1000	90	1	T 32 R F 3 (ELE)	F43ILL/2	90	0.1	SW	1,000	90	-	0.0	$ -	$ -	$0		
249	Storage	4	F 48 R F 2 (ELE)	F41GL	32	0.1	SW	1000	128	4	F 48 R F 2 (ELE)	F41GL	32	0.1	SW	1,000	128	-	0.0	$ -	$ -	$0		
35	Fairness Ave Corridor	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	SW	2280	2,462	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	SW	2,280	2,462	-	0.0	$ -	$ -	$0		
35	Rm D-2	9	T 32 R F 3 (ELE)	F43ILL/2	90	0.8	SW	2400	1,944	9	T 32 R F 3 (ELE)	F43ILL/2	90	0.8	SW	2,400	1,944	-	0.0	$ -	$ -	$0		
7	Rm D-2	3	2T 32 R F 2 (u) (ELE) Thin Tube	FU2LL	60	0.2	SW	2400	432	3	2T 17 R F 2 (ELE)	F22ILL	33	0.1	SW	2,400	238	194	0.1	$ 32.46	$ 303.75	$0	9.4	1.6
7	Rm D-2 Toilet	1	2T 32 R F 2 (u) (ELE) Thin Tube	FU2LL	60	0.1	SW	2000	120	1	2T 17 R F 2 (ELE)	F22ILL	33	0.0	SW	2,000	66	54	0.0	$ 9.02	$ 101.25	$0	11.2	1.9
7	Rm D-4	1	2T 32 R F 2 (u) (ELE) Thin Tube	FU2LL	60	0.1	SW	2400	144	1	2T 17 R F 2 (ELE)	F22ILL	33	0.0	SW	2,400	79	65	0.0	$ 10.82	$ 101.25	$0	9.4	1.6
7	Rm D-5	1	2T 32 R F 2 (u) (ELE) Thin Tube	FU2LL	60	0.1	SW	2400	144	1	2T 17 R F 2 (ELE)	F22ILL	33	0.0	SW	2,400	79	65	0.0	$ 10.82	$ 101.25	$0	9.4	1.6
7	Rm A-9 Speech	4	2T 32 R F 2 (u) (ELE) Thin Tube	FU2LL	60	0.2	SW	2400	576	4	2T 17 R F 2 (ELE)	F22ILL	33	0.1	SW	2,400	317	259	0.1	$ 43.29	$ 405.00	$0	9.4	1.6
7	Rm A-9 Closet	2	2T 32 R F 2 (u) (ELE) Thin Tube	FU2LL	60	0.1	SW	1000	120	2	2T 17 R F 2 (ELE)	F22ILL	33	0.1	SW	1,000	66	54	0.1	$ 9.02	$ 202.50	$0	22.5	3.8
7	Rm A-11 Speech	4	2T 32 R F 2 (u) (ELE) Thin Tube	FU2LL	60	0.2	SW	2400	576	4	2T 17 R F 2 (ELE)	F22ILL	33	0.1	SW	2,400	317	259	0.1	$ 43.29	$ 405.00	$0	9.4	1.6
35	Rm A-13	3	T 32 R F 3 (ELE)	F43ILL/2	90	0.3	SW	2400	648	3	T 32 R F 3 (ELE)	F43ILL/2	90	0.3	SW	2,400	648	-	0.0	$ -	$ -	$0		
7	Rm A-15 Sw1	4	2T 32 R F 2 (u) (ELE) Thin Tube	FU2LL	60	0.2	SW	2400	576	4	2T 17 R F 2 (ELE)	F22ILL	33	0.1	SW	2,400	317	259	0.1	$ 43.29	$ 405.00	$0	9.4	1.6
7	Rm A-15 Sw2	4	2T 32 R F 2 (u) (ELE) Thin Tube	FU2LL	60	0.2	SW	2400	576	4	2T 17 R F 2 (ELE)	F22ILL	33	0.1	SW	2,400	317	259	0.1	$ 43.29	$ 405.00	$0	9.4	1.6
7	A Wing Corridor	3	2T 32 R F 2 (u) (ELE) Thin Tube	FU2LL	60	0.2	SW	2280	410	3	2T 17 R F 2 (ELE)	F22ILL	33	0.1	SW	2,280	226	185	0.1	$ 30.84	$ 303.75	$0	9.8	1.6
7	A Wing Toilet	1	2T 32 R F 2 (u) (ELE) Thin Tube	FU2LL	60	0.1	SW	2000	120	1	2T 17 R F 2 (ELE)	F22ILL	33	0.0	SW	2,000	66	54	0.0	$ 9.02	$ 101.25	$0	11.2	1.9
35	A Wing Corridor	18	T 32 R F 3 (ELE)	F43ILL/2	90	1.6	SW	2280	3,694	18	T 32 R F 3 (ELE)	F43ILL/2	90	1.6	SW	2,280	3,694	-	0.0	$ -	$ -	$0		
35	Classroom A-10	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	SW	2400	2,592	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	SW	2,400	2,592	-	0.0	$ -	$ -	$0		
35	Classroom A-8	6	T 32 R F 3 (ELE)	F43ILL/2	90	0.5	SW	2400	1,296	6	T 32 R F 3 (ELE)	F43ILL/2	90	0.5	SW	2,400	1,296	-	0.0	$ -	$ -	$0		
35	Classroom A-8	6	T 32 R F 3 (ELE)	F43ILL/2	90	0.5	SW	2400	1,296	6	T 32 R F 3 (ELE)	F43ILL/2	90	0.5	SW	2,400	1,296	-	0.0	$ -	$ -	$0		
35	Classroom A-7	9	T 32 R F 3 (ELE)	F43ILL/2	90	0.8	SW	2400	1,944	9	T 32 R F 3 (ELE)	F43ILL/2	90	0.8	SW	2,400	1,944	-	0.0	$ -	$ -	$0		
35	Classroom A-6	8	T 32 R F 3 (ELE)	F43ILL/2	90	0.7	SW	2400	1,728	8	T 32 R F 3 (ELE)	F43ILL/2	90	0.7	SW	2,400	1,728	-	0.0	$ -	$ -	$0		
35	Classroom A-5	8	T 32 R F 3 (ELE)	F43ILL/2	90	0.7	SW	2400	1,728	8	T 32 R F 3 (ELE)	F43ILL/2	90	0.7	SW	2,400	1,728	-	0.0	$ -	$ -	$0		
35	Classroom A-4	8	T 32 R F 3 (ELE)	F43ILL/2	90	0.7	SW	2400	1,728	8	T 32 R F 3 (ELE)	F43ILL/2	90	0.7	SW	2,400	1,728	-	0.0	$ -	$ -	$0		
35	Classroom A-3	8	T 32 R F 3 (ELE)	F43ILL/2	90	0.7	SW	2400	1,728	8	T 32 R F 3 (ELE)	F43ILL/2	90	0.7	SW	2,400	1,728	-	0.0	$ -	$ -	$0		
35	Classroom A-2	8	T 32 R F 3 (ELE)	F43ILL/2	90	0.7	SW	2400	1,728	8	T 32 R F 3 (ELE)	F43ILL/2	90	0.7	SW	2,400	1,728	-	0.0	$ -	$ -	$0		
35	Classroom A-1	8	T 32 R F 3 (ELE)	F43ILL/2	90	0.7	SW	2400	1,728	8	T 32 R F 3 (ELE)	F43ILL/2	90	0.7	SW	2,400	1,728	-	0.0	$ -	$ -	$0		
7	Storage	36	2T 32 R F 2 (u) (ELE) Thin Tube	FU2LL	60	2.2	SW	1000	2,160	36	2T 17 R F 2 (ELE)	F22ILL	33	1.2	SW	1,000	1,188	972	1.0	$ 162.32	$ 3,645.00	$0	22.5	3.8
204	Corridor Next to Main Office	1	S 96 P F 2 (MAG) 8'	F82EHE	207	0.2	SW	2280	472	1	S 96 P F 2 (MAG) 8'	F82EHE	207	0.2	SW	2,280	472	-	0.0	$ -	$ -	$0		
201	Boiler Room Stairwell	1	T 32 R F 3 (ELE)	F43ILL/2	90	0.1	SW	2280	205	1	0	F43SSILL	72	0.1	SW	2,280	164	41	0.0	$ 6.85	$ 106.25	$15	15.5	2.2
35	Boiler Room	10	T 32 R F 3 (ELE)	F43ILL/2	90	0.9	SW	1000	900	10	T 32 R F 3 (ELE)	F43ILL/2	90	0.9	SW	1,000	900	-	0.0	$ -	$ -	$0		
X1	Boiler Room	2	X 1.5 W LED	ELED1.5/1	1.5	0.0	SW	1000	3	2	X 1.5 W LED	ELED1.5/1	1.5	0.0	SW	1,000	3	-	0.0	$ -	$ -	$0		
X1	Attic	12	X 1.5 W LED	ELED1.5/1	1.5	0.0	SW	1000	18	12	X 1.5 W LED	ELED1.5/1	1.5	0.0	SW	1,000	18	-	0.0	$ -	$ -	$0		
35	Gym Storage	3	T 32 R F 3 (ELE)	F43ILL/2	90	0.3	SW	1000	270	3	T 32 R F 3 (ELE)	F43ILL/2	90	0.3	SW	1,000	270	-	0.0	$ -	$ -	$0		
169	Gym	2	SP 250 MH ROOF	MH250/1	295	0.6	SW	2912	1,718	2	SP 250 MH ROOF	MH250/1	295	0.6	SW	2,912	1,718	-	0.0	$ -	$ -	$0		

Energy Audit of Memorial Elementary School

CHA Project No.24473

ECM-1 Lighting Replacements

Cost of Electricity: **$0.167 $/kWh**

$0.00 $/kW

		EXISTING CONDITIONS								RETROFIT CONDITIONS								COST & SAVINGS ANALYSIS						
	Area Description	**No. of Fixtures**	**Standard Fixture Code**	**NYSERDA Fixture Code**	**Watts per Fixture**	**kW/Space**	**Exist Control**	**Annual Hours**	**Annual kWh**	**Number of Fixtures**	**Standard Fixture Code**	**Fixture Code**	**Watts per Fixture**	**kW/Space**	**Retrofit Control**	**Annual Hours**	**Annual kWh**	**Annual kWh Saved**	**Annual kW Saved**	**Annual $ Saved**	**Retrofit Cost**	**NJ Smart Start Lighting Incentive**	**Simple Payback With Out Incentive**	**Simple Payback**
Field Code	Unique description of the location - Room number/Room name: Floor number (if applicable)	No. of fixtures before the retrofit	"Lighting Fixture Code" Example 2T 40 R F(U) = 2'x2' Troff 40 w Recess. Floor 2 lamps U shape	Code from Table of Standard Fixture Wattages	Value from Table of Standard Fixture Wattages	(Watts/Fixt) * (Fixt No.)	Pre-inst. control device	Estimated daily hours for the usage group	(kW/space) * (Annual Hours)	No. of fixtures after the retrofit	"Lighting Fixture Code" Example 2T 40 R F(U) = 2'x2' Troff 40 w Recess. Floor 2 lamps U shape	Code from Table of Standard Fixture Wattages	Value from Table of Standard Fixture Wattages	(Watts/Fixt) * (Number of Fixtures)	Retrofit control device	Estimated annual hours for the usage group	(kW/space) * (Annual Hours)	(Original Annual kWh) - (Retrofit Annual kWh)	(Original Annual kW) - (Retrofit Annual kW)	(kWh Saved) * ($/kWh)	Cost for renovations to lighting system	Prescriptive Lighting Measures	Length of time for renovations cost to be recovered	Length of time for renovations cost to be recovered
227	Gym	1	70 W MH Wall Pack	MH70/1	95	0.1	SW	2912	277	1	70 W MH Wall Pack	MH70/1	95	0.1	SW	2,912	277	-	0.0	$ -	$ -	$0		
169	Gym	3	SP 250 MH ROOF	MH250/1	295	0.9	SW	2912	2,577	3	SP 250 MH ROOF	MH250/1	295	0.9	SW	2,912	2,577	-	0.0	$ -	$ -	$0		
142	Gym	1	MH 100	MH100/1	128	0.1	SW	2912	373	1	MH 100	MH100/1	128	0.1	SW	2,912	373	-	0.0	$ -	$ -	$0		
227	Gym	1	70 W MH Wall Pack	MH70/1	95	0.1	SW	2912	277	1	70 W MH Wall Pack	MH70/1	95	0.1	SW	2,912	277	-	0.0	$ -	$ -	$0		
227	Gym	4	70 W MH Wall Pack	MH70/1	95	0.4	SW	2912	1,107	4	70 W MH Wall Pack	MH70/1	95	0.4	SW	2,912	1,107	-	0.0	$ -	$ -	$0		
227	Gym	2	70 W MH Wall Pack	MH70/1	95	0.2	SW	2912	553	2	70 W MH Wall Pack	MH70/1	95	0.2	SW	2,912	553	-	0.0	$ -	$ -	$0		
																								#VALUE!

Energy Audit of Memorial Elementary School

CHA Project No.24473

Cost of Electricity: **$0.167 $/kWh**

ECM-2 Install Occupancy Sensors

$0.00 $/kW

		EXISTING CONDITIONS								RETROFIT CONDITIONS								COST & SAVINGS ANALYSIS						
	Area Description	**No. of Fixtures**	**Standard Fixture Code**	**NYSERDA Fixture Code**	**Watts per Fixture**	**kW/Space**	**Exist Control**	**Annual Hours**	**Annual kWh**	**Number of Fixtures**	**Standard Fixture Code**	**Fixture Code**	**Watts per Fixture**	**kW/Space**	**Retrofit Control**	**Annual Hours**	**Annual kWh**	**Annual kWh Saved**	**Annual kW Saved**	**Annual $ Saved**	**Retrofit Cost**	**NJ Smart Start Lighting Incentive**	**Simple Payback With Out Incentive**	**Simple Payback**
Field Code	Unique description of the location - Room number/Room name: Floor number (if applicable)	No. of fixtures before the retrofit	"Lighting Fixture Code" Example 2T 40 R F(U) = 2'x2' Troff 40 w Recess. Floor 2 lamps U shape	Code from Table of Standard Fixture Wattages	Value from Table of Standard Fixture Wattages	(Watts/Fixt) * (Fixt No.)	Pre-inst. control device	Estimated annual hours for the usage group	(kW/space) * (Annual Hours)	No. of fixtures after the retrofit	"Lighting Fixture Code" Example 2T 40 R F(U) = 2'x2' Troff 40 w Recess. Floor 2 lamps U shape	Code from Table of Standard Fixture Wattages	Value from Table of Standard Fixture Wattages	(Watts/Fixt) * (Number of Fixtures)	Retrofit control device	Estimated annual hours for the usage group	(kW/space) * (Annual Hours)	(Original Annual kWh) - (Retrofit Annual kWh)	(Original Annual kW) - (Retrofit Annual kW)	(kW Saved) * ($/kWh)	Cost for renovations to lighting system		Length of time for renovations cost to be recovered	Length of time for renovations cost to be recovered
35	Principal Office	2	T 32 R F 3 (ELE)	F43ILL/2	90	0.2	SW	2400	432.0	2	T 32 R F 3 (ELE)	F43ILL/2	90	0.2	C-OCC	1200	216.0	216.0	0.0	$36.07	$202.50	$35.00	5.6	4.6
35	Nurse	2	T 32 R F 3 (ELE)	F43ILL/2	90	0.2	SW	2400	432.0	2	T 32 R F 3 (ELE)	F43ILL/2	90	0.2	C-OCC	1200	216.0	216.0	0.0	$36.07	$202.50	$35.00	5.6	4.6
202	Nurse	2	2T 17 R F 4 (ELE)	F22ILL	33	0.1	SW	2400	158.4	2	2T 17 R F 4 (ELE)	F22ILL	33	0.1	C-OCC	1200	79.2	79.2	0.0	$13.23	$202.50	$35.00	15.3	12.7
202	Nurse Bathroom	2	2T 17 R F 4 (ELE)	F22ILL	33	0.1	SW	2400	158.4	2	2T 17 R F 4 (ELE)	F22ILL	33	0.1	C-OCC	1200	79.2	79.2	0.0	$13.23	$202.50	$35.00	15.3	12.7
35	Main Office	3	T 32 R F 3 (ELE)	F43ILL/2	90	0.3	SW	2400	648.0	3	T 32 R F 3 (ELE)	F43ILL/2	90	0.3	C-OCC	1200	324.0	324.0	0.0	$54.11	$202.50	$35.00	3.7	3.1
202	Main office Storage	1	2T 17 R F 4 (ELE)	F22ILL	33	0.0	SW	1000	33.0	1	2T 17 R F 4 (ELE)	F22ILL	33	0.0	C-OCC	250	8.3	24.8	0.0	$4.13	$202.50	$35.00	49.0	40.5
35	Teachers Room	6	T 32 R F 3 (ELE)	F43ILL/2	90	0.5	SW	2400	1,296.0	6	T 32 R F 3 (ELE)	F43ILL/2	90	0.5	C-OCC	1200	648.0	648.0	0.0	$108.22	$202.50	$35.00	1.9	1.5
35	Teachers Kitchen	1	T 32 R F 3 (ELE)	F43ILL/2	90	0.1	SW	3102.5	279.2	1	T 32 R F 3 (ELE)	F43ILL/2	90	0.1	C-OCC	1500	135.0	144.2	0.0	$24.09	$202.50	$35.00	8.4	7.0
71	Teachers Under Cabinet	2	I 60	I60/1	60	0.1	SW	1000	120.0	2	I 60	I60/1	60	0.1	C-OCC	250	30.0	90.0	0.0	$15.03	$202.50	$35.00	13.5	11.1
35	Womens Room	1	T 32 R F 3 (ELE)	F43ILL/2	90	0.1	SW	2000	180.0	1	T 32 R F 3 (ELE)	F43ILL/2	90	0.1	C-OCC	1500	135.0	45.0	0.0	$7.52	$202.50	$35.00	26.9	22.3
146	Cafetorium	20	High Bay MH 400	MH400/1	458	9.2	SW	1600	14,656.0	20	High Bay MH 400	MH400/1	458	9.2	C-OCC	1200	10,992.0	3,664.0	0.0	$611.89	$202.50	$35.00	0.3	0.3
X1	Cafetorium	3	X 1.5 W LED	ELED1.5/1	1.5	0.0	SW	1600	7.2	3	X 1.5 W LED	ELED1.5/1	1.5	0.0	C-OCC	1200	5.4	1.8	0.0	$0.30	$202.50	$35.00	673.7	557.2
35	Café.Serving Room	3	T 32 R F 3 (ELE)	F43ILL/2	90	0.3	SW	1600	432.0	3	T 32 R F 3 (ELE)	F43ILL/2	90	0.3	C-OCC	1200	324.0	108.0	0.0	$18.04	$202.50	$35.00	11.2	9.3
5	Kitchen	5	2T 32 R F 2 (u) (ELE)	FU2LL	60	0.3	SW	1600	480.0	5	2T 32 R F 2 (u) (ELE)	FU2LL	60	0.3		1600			0.0		$0.00	$0.00		
X1	Kitchen	2	X 1.5 W LED	ELED1.5/1	1.5	0.0	SW	1600	4.8	2	X 1.5 W LED	ELED1.5/1	1.5	0.0		1600			0.0		$0.00	$0.00		
202	Respect Road Corridor	12	2T 17 R F 4 (ELE)	F22ILL	33	0.4	SW	2280	902.9	12	2T 17 R F 4 (ELE)	F22ILL	33	0.4		2280			0.0		$0.00	$0.00		
35	Respect Road Corridor	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	SW	2280	2,462.4	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1		2280			0.0		$0.00	$0.00		
X1	Respect Road Corridor	2	X 1.5 W LED	ELED1.5/1	1.5	0.0	SW	2280	6.8	2	X 1.5 W LED	ELED1.5/1	1.5	0.0		2280			0.0		$0.00	$0.00		
93	Respect Road Corridor	2	I 75	I75/1	75	0.2	SW	2280	342.0	2	I 75	I75/1	75	0.2		2280			0.0		$0.00	$0.00		
202	Custodial Closet	1	2T 17 R F 4 (ELE)	F22ILL	33	0.0	SW	1000	33.0	1	2T 17 R F 4 (ELE)	F22ILL	33	0.0		1000			0.0		$0.00	$0.00		
202	Boys Room	3	2T 17 R F 4 (ELE)	F22ILL	33	0.1	SW	2000	198.0	3	2T 17 R F 4 (ELE)	F22ILL	33	0.1	C-OCC	1500	148.5	49.5	0.0	$8.27	$202.50	$35.00	24.5	20.3
202	Rm B-1	3	2T 17 R F 4 (ELE)	F22ILL	33	0.1	SW	2400	237.6	3	2T 17 R F 4 (ELE)	F22ILL	33	0.1	C-OCC	1200	118.8	118.8	0.0	$19.84	$202.50	$35.00	10.2	8.4
71	Stage	4	I 60	I60/1	60	0.2	SW	1000	240.0	4	I 60	I60/1	60	0.2	C-OCC	750	180.0	60.0	0.0	$10.02	$202.50	$35.00	20.2	16.7
146	Stage	4	High Bay MH 400	MH400/1	458	1.8	SW	1000	1,832.0	4	High Bay MH 400	MH400/1	458	1.8		1000			0.0		$0.00	$0.00		
35	Rm B-2	6	T 32 R F 3 (ELE)	F43ILL/2	90	0.5	SW	2400	1,296.0	6	T 32 R F 3 (ELE)	F43ILL/2	90	0.5		2400			0.0		$0.00	$0.00		
250	Rm B-3 Media Sw 1	32	T 54 W F 4 (ELE) (T-5)	F44GHL	234	7.5	SW	2400	17,971.2	32	T 54 W F 4 (ELE) (T-5)	F44GHL	234	7.5	C-OCC	1680	12,579.8	5,391.4	0.0	$900.36	$202.50	$35.00	0.2	0.2
250	Rm B-3 Media Sw 2	16	T 54 W F 4 (ELE) (T-5)	F44GHL	234	3.7	SW	2400	8,985.6	16	T 54 W F 4 (ELE) (T-5)	F44GHL	234	3.7	C-OCC	1680	6,289.9	2,695.7	0.0	$450.18	$202.50	$35.00	0.4	0.4
X4	Rm B-3 Media Sw 3	7	CF26W	CF26/4-L	108	0.8	SW	2400	1,814.4	7	CF26W	CF26/4-L	108	0.8	C-OCC	1680	1,270.1	544.3	0.0	$90.90	$202.50	$35.00	2.2	1.8
X4	Rm B-3 Media Sw 4	4	CF26W	CF26/4-L	108	0.4	SW	2400	1,036.8	4	CF26W	CF26/4-L	108	0.4	C-OCC	1680	725.8	311.0	0.0	$51.94	$202.50	$35.00	3.9	3.2
X1	Rm B-3 Media Sw 5	2	X 1.5 W LED	ELED1.5/1	1.5	0.0	SW	2400	7.2	2	X 1.5 W LED	ELED1.5/1	1.5	0.0	C-OCC	1680	5.0	2.2	0.0	$0.36	$202.50	$35.00	561.4	464.3
35	Media Woork Rm	1	T 32 R F 3 (ELE)	F43ILL/2	90	0.1	SW	2400	216.0	1	T 32 R F 3 (ELE)	F43ILL/2	90	0.1	C-OCC	1680	151.2	64.8	0.0	$10.82	$202.50	$35.00	18.7	15.5
35	Custodial Closet Sw 1	1	T 32 R F 3 (ELE)	F43ILL/2	90	0.1	SW	1000	90.0	1	T 32 R F 3 (ELE)	F43ILL/2	90	0.1	C-OCC	250	22.5	67.5	0.0	$11.27	$202.50	$35.00	18.0	14.9
202	Custodial Closet Sw 2	1	2T 17 R F 4 (ELE)	F22ILL	33	0.0	SW	1000	33.0	1	2T 17 R F 4 (ELE)	F22ILL	33	0.0	C-OCC	250	8.3	24.8	0.0	$4.13	$202.50	$35.00	49.0	40.5
35	Boys RR	3	T 32 R F 3 (ELE)	F43ILL/2	90	0.3	SW	2000	540.0	3	T 32 R F 3 (ELE)	F43ILL/2	90	0.3	C-OCC	1500	405.0	135.0	0.0	$22.55	$202.50	$35.00	9.0	7.4
35	Honesty St Corridor	14	T 32 R F 3 (ELE)	F43ILL/2	90	1.3	SW	2280	2,872.8	14	T 32 R F 3 (ELE)	F43ILL/2	90	1.3		2280			0.0		$0.00	$0.00		
X1	Honesty St Corridor	3	X 1.5 W LED	ELED1.5/1	1.5	0.0	SW	2280	10.3	3	X 1.5 W LED	ELED1.5/1	1.5	0.0		2280			0.0		$0.00	$0.00		
35	Rm C-1	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	SW	2400	2,592.0	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	C-OCC	1680	1,814.4	777.6	0.0	$129.86	$202.50	$35.00	1.6	1.3
35	Rm C-3	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	SW	2400	2,592.0	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	C-OCC	1680	1,814.4	777.6	0.0	$129.86	$202.50	$35.00	1.6	1.3
35	Rm C-5	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	SW	2400	2,592.0	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	C-OCC	1680	1,814.4	777.6	0.0	$129.86	$202.50	$35.00	1.6	1.3
35	Rm C-2	13	T 32 R F 3 (ELE)	F43ILL/2	90	1.2	SW	2400	2,808.0	13	T 32 R F 3 (ELE)	F43ILL/2	90	1.2	C-OCC	1680	1,965.6	842.4	0.0	$140.68	$202.50	$35.00	1.4	1.2
202	Rm C-2	2	2T 17 R F 4 (ELE)	F22ILL	33	0.1	SW	2400	158.4	2	2T 17 R F 4 (ELE)	F22ILL	33	0.1	C-OCC	1680	110.9	47.5	0.0	$7.94	$202.50	$35.00	25.5	21.1
7	Rm C-2 Toilet	1	2T 32 R F 2 (u) (ELE) Thin Tube	FU2LL	60	0.1	SW	2000	120.0	1	2T 32 R F 2 (u) (ELE) Thin Tube	FU2LL	60	0.1	C-OCC	1500	90.0	30.0	0.0	$5.01	$202.50	$35.00	40.4	33.4
7	Rm C-7	1	2T 32 R F 2 (u) (ELE) Thin Tube	FU2LL	60	0.1	SW	2400	144.0	1	2T 32 R F 2 (u) (ELE) Thin Tube	FU2LL	60	0.1	C-OCC	1680	100.8	43.2	0.0	$7.21	$202.50	$35.00	28.1	23.2
7	Rm C-4	1	2T 32 R F 2 (u) (ELE) Thin Tube	FU2LL	60	0.1	SW	2400	144.0	1	2T 32 R F 2 (u) (ELE) Thin Tube	FU2LL	60	0.1	C-OCC	1680	100.8	43.2	0.0	$7.21	$202.50	$35.00	28.1	23.2
7	Rm C-9	1	2T 32 R F 2 (u) (ELE) Thin Tube	FU2LL	60	0.1	SW	2400	144.0	1	2T 32 R F 2 (u) (ELE) Thin Tube	FU2LL	60	0.1	C-OCC	1680	100.8	43.2	0.0	$7.21	$202.50	$35.00	28.1	23.2
7	Rm C-6	1	2T 32 R F 2 (u) (ELE) Thin Tube	FU2LL	60	0.1	SW	2400	144.0	1	2T 32 R F 2 (u) (ELE) Thin Tube	FU2LL	60	0.1	C-OCC	1680	100.8	43.2	0.0	$7.21	$202.50	$35.00	28.1	23.2
35	Rm C-11	8	T 32 R F 3 (ELE)	F43ILL/2	90	0.7	SW	2400	1,728.0	8	T 32 R F 3 (ELE)	F43ILL/2	90	0.7	C-OCC	1680	1,209.6	518.4	0.0	$86.57	$202.50	$35.00	2.3	1.9
35	Rm C-13	8	T 32 R F 3 (ELE)	F43ILL/2	90	0.7	SW	2400	1,728.0	8	T 32 R F 3 (ELE)	F43ILL/2	90	0.7	C-OCC	1680	1,209.6	518.4	0.0	$86.57	$202.50	$35.00	2.3	1.9
35	Gym	24	T 32 R F 3 (ELE)	F43ILL/2	90	2.2	SW	2912	6,289.9	24	T 32 R F 3 (ELE)	F43ILL/2	90	2.2		2912			0.0		$0.00	$0.00		
202	Gym Office	2	2T 17 R F 4 (ELE)	F22ILL	33	0.1	SW	2400	158.4	2	2T 17 R F 4 (ELE)	F22ILL	33	0.1	C-OCC	1200	79.2	79.2	0.0	$13.23	$202.50	$35.00	15.3	12.7
35	Gym Entrance Hall	2	T 32 R F 3 (ELE)	F43ILL/2	90	0.2	SW	2280	410.4	2	T 32 R F 3 (ELE)	F43ILL/2	90	0.2		2280			0.0		$0.00	$0.00		
201	Gym Entrance Hall	2	T 32 R F 3 (ELE)	F43ILL/2	90	0.2	SW	2280	410.4	2	T 32 R F 3 (ELE)	F43ILL/2	90	0.2		2280			0.0		$0.00	$0.00		
35	Rm D-3 Art	16	T 32 R F 3 (ELE)	F43ILL/2	90	1.4	SW	2400	3,456.0	16	T 32 R F 3 (ELE)	F43ILL/2	90	1.4	C-OCC	1680	2,419.2	1,036.8	0.0	$173.15	$202.50	$35.00	1.2	1.0
35	Gym Hall	4	T 32 R F 3 (ELE)	F43ILL/2	90	0.4	SW	2280	820.8	4	T 32 R F 3 (ELE)	F43ILL/2	90	0.4		2280			0.0		$0.00	$0.00		
35	Custodial Closet	1	T 32 R F 3 (ELE)	F43ILL/2	90	0.1	SW	1000	90.0	1	T 32 R F 3 (ELE)	F43ILL/2	90	0.1	C-OCC	250	22.5	67.5	0.0	$11.27	$202.50	$35.00	18.0	14.9
35	Boys Rm 2nd Fl	4	T 32 R F 3 (ELE)	F43ILL/2	90	0.4	SW	2000	720.0	4	T 32 R F 3 (ELE)	F43ILL/2	90	0.4	C-OCC	1500	540.0	180.0	0.0	$30.06	$202.50	$35.00	6.7	5.6
35	Storage	1	T 32 R F 3 (ELE)	F43ILL/2	90	0.1	SW	1000	90.0	1	T 32 R F 3 (ELE)	F43ILL/2	90	0.1	C-OCC	250	22.5	67.5	0.0	$11.27	$202.50	$35.00	18.0	14.9
249	Storage	4	F 48 R F 2 (ELE)	F41GL	32	0.1	SW	1000	128.0	4	F 48 R F 2 (ELE)	F41GL	32	0.1	C-OCC	250	32.0	96.0	0.0	$16.03	$202.50	$35.00	12.6	10.4
35	Fairness Ave Corridor	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	SW	2280	2,462.4	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1		2280			0.0		$0.00	$0.00		
35	Rm D-2	9	T 32 R F 3 (ELE)	F43ILL/2	90	0.8	SW	2400	1,944.0	9	T 32 R F 3 (ELE)	F43ILL/2	90	0.8	C-OCC	1680	1,360.8	583.2	0.0	$97.39	$202.50	$35.00	2.1	1.7
7	Rm D-2	3	2T 32 R F 2 (u) (ELE) Thin Tube	FU2LL	60	0.2	SW	2400	432.0	3	2T 32 R F 2 (u) (ELE) Thin Tube	FU2LL	60	0.2	C-OCC	1680	302.4	129.6	0.0	$21.64	$202.50	$35.00	9.4	7.7
7	Rm D-2 Toilet	1	2T 32 R F 2 (u) (ELE) Thin Tube	FU2LL	60	0.1	SW	2000	120.0	1	2T 32 R F 2 (u) (ELE) Thin Tube	FU2LL	60	0.1	C-OCC	1500	90.0	30.0	0.0	$5.01	$202.50	$35.00	40.4	33.4
7	Rm D-4	1	2T 32 R F 2 (u) (ELE) Thin Tube	FU2LL	60	0.1	SW	2400	144.0	1	2T 32 R F 2 (u) (ELE) Thin Tube	FU2LL	60	0.1	C-OCC	1680	100.8	43.2	0.0	$7.21	$202.50	$35.00	28.1	23.2
7	Rm D-5	1	2T 32 R F 2 (u) (ELE) Thin Tube	FU2LL	60	0.1	SW	2400	144.0	1	2T 32 R F 2 (u) (ELE) Thin Tube	FU2LL	60	0.1	C-OCC	1680	100.8	43.2	0.0	$7.21	$202.50	$35.00	28.1	23.2
7	Rm A-9 Speech	4	2T 32 R F 2 (u) (ELE) Thin Tube	FU2LL	60	0.2	SW	2400	576.0	4	2T 32 R F 2 (u) (ELE) Thin Tube	FU2LL	60	0.2	C-OCC	1680	403.2	172.8	0.0	$28.86	$202.50	$35.00	7.0	5.8
7	Rm A-9 Closet	2	2T 32 R F 2 (u) (ELE) Thin Tube	FU2LL	60	0.1	SW	1000	120.0	2	2T 32 R F 2 (u) (ELE) Thin Tube	FU2LL	60	0.1	C-OCC	250	30.0	90.0	0.0	$15.03	$202.50	$35.00	13.5	11.1
7	Rm A-11 Speech	4	2T 32 R F 2 (u) (ELE) Thin Tube	FU2LL	60	0.2	SW	2400	576.0	4	2T 32 R F 2 (u) (ELE) Thin Tube	FU2LL	60	0.2	C-OCC	1680	403.2	172.8	0.0	$28.86	$202.50	$35.00	7.0	5.8
35	Rm A-13	3	T 32 R F 3 (ELE)	F43ILL/2	90	0.3	SW	2400	648.0	3	T 32 R F 3 (ELE)	F43ILL/2	90	0.3	C-OCC	1680	453.6	194.4	0.0	$32.46	$202.50	$35.00	6.2	5.2
7	Rm A-15 Sw1	4	2T 32 R F 2 (u) (ELE) Thin Tube	FU2LL	60	0.2	SW	2400	576.0	4	2T 32 R F 2 (u) (ELE) Thin Tube	FU2LL	60	0.2	C-OCC	1680	403.2	172.8	0.0	$28.86	$202.50	$35.00	7.0	5.8
7	Rm A-15 Sw2	4	2T 32 R F 2 (u) (ELE) Thin Tube	FU2LL	60	0.2	SW	2400	576.0	4	2T 32 R F 2 (u) (ELE) Thin Tube	FU2LL	60	0.2	C-OCC	1680	403.2	172.8	0.0	$28.86	$202.50	$35.00	7.0	5.8
7	A Wing Corridor	3	2T 32 R F 2 (u) (ELE) Thin Tube	FU2LL	60	0.2	SW	2280	410.4	3	2T 32 R F 2 (u) (ELE) Thin Tube	FU2LL	60	0.2		2280			0.0		$0.00	$0.00		
7	A Wing Toilet	1	2T 32 R F 2 (u) (ELE) Thin Tube	FU2LL	60	0.1	SW	2000	120.0	1	2T 32 R F 2 (u) (ELE) Thin Tube	FU2LL	60	0.1	C-OCC	1500	90.0	30.0	0.0	$5.01	$202.50	$35.00	40.4	33.4
35	A Wing Corridor	18	T 32 R F 3 (ELE)	F43ILL/2	90	1.6	SW	2280	3,693.6	18	T 32 R F 3 (ELE)	F43ILL/2	90	1.6		2280			0.0		$0.00	$0.00		
35	Classroom A-10	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	SW	2400	2,592.0	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	C-OCC	1680	1,814.4	777.6	0.0	$129.86	$202.50	$35.00	1.6	1.3
35	Classroom A-8	6	T 32 R F 3 (ELE)	F43ILL/2	90	0.5	SW	2400	1,296.0	6	T 32 R F 3 (ELE)	F43ILL/2	90	0.5	C-OCC	1680	907.2	388.8	0.0	$64.93	$202.50	$35.00	3.1	2.6
35	Classroom A-8	6	T 32 R F 3 (ELE)	F43ILL/2	90	0.5	SW	2400	1,296.0	6	T 32 R F 3 (ELE)	F43ILL/2	90	0.5	C-OCC	1680	907.2	388.8	0.0	$64.93	$202.50	$35.00	3.1	2.6
35	Classroom A-7	9	T 32 R F 3 (ELE)	F43ILL/2	90	0.8	SW	2400	1,944.0	9	T 32 R F 3 (ELE)	F43ILL/2	90	0.8	C-OCC	1680	1,360.8	583.2	0.0	$97.39	$202.50	$35.00	2.1	1.7
35	Classroom A-6	8	T 32 R F 3 (ELE)	F43ILL/2	90	0.7	SW	2400	1,728.0	8	T 32 R F 3 (ELE)	F43ILL/2	90	0.7	C-OCC	1680	1,209.6	518.4	0.0	$86.57	$202.50	$35.00	2.3	1.9
35	Classroom A-5	8	T 32 R F 3 (ELE)	F43ILL/2	90	0.7	SW	2400	1,728.0	8	T 32 R F 3 (ELE)	F43ILL/2	90	0.7	C-OCC	1680	1,209.6	518.4	0.0	$86.57	$202.50	$35.00	2.3	1.9
35	Classroom A-4	8	T 32 R F 3 (ELE)	F43ILL/2	90	0.7	SW	2400	1,728.0	8	T 32 R F 3 (ELE)	F43ILL/2	90	0.7	C-OCC	1680	1,209.6	518.4	0.0	$86.57	$202.50	$35.00	2.3	1.9
35	Classroom A-3	8	T 32 R F 3 (ELE)	F43ILL/2	90	0.7	SW	2400	1,728.0	8	T 32 R F 3 (ELE)	F43ILL/2	90	0.7	C-OCC	1680	1,209.6	518.4	0.0	$86.57	$202.50	$35.00	2.3	1.9
35	Classroom A-2	8	T 32 R F 3 (ELE)	F43ILL/2	90	0.7	SW	2400	1,728.0	8	T 32 R F 3 (ELE)	F43ILL/2	90	0.7	C-OCC	1680	1,209.6	518.4	0.0	$86.57	$202.50	$35.00	2.3	1.9
35	Classroom A-1	8	T 32 R F 3 (ELE)	F43ILL/2	90	0.7	SW	2400	1,728.0	8	T 32 R F 3 (ELE)	F43ILL/2	90	0.7	C-OCC	1680	1,209.6	518.4	0.0	$86.57	$202.50	$35.00	2.3	1.9
7	Storage	36	2T 32 R F 2 (u) (ELE) Thin Tube	FU2LL	60	2.2	SW	1000	2,160.0	36	2T 32 R F 2 (u) (ELE) Thin Tube	FU2LL	60	2.2	C-OCC	250	540.0	1,620.0	0.0	$270.54	$202.50	$35.00	0.7	0.6
204	Corridor Next to Main Office	1	S 96 P F 2 (MAG) 8'	F82EHE	207	0.2	SW	2280	472.0	1	S 96 P F 2 (MAG) 8'	F82EHE	207	0.2		2280			0.0		$0.00	$0.00		
201	Boiler Room Stairwell	1	T 32 R F 3 (ELE)	F43ILL/2	90	0.1	SW	2280	205.2	1	T 32 R F 3 (ELE)	F43ILL/2	90	0.1		2280			0.0		$0.00	$0.00		
35	Boiler Room	10	T 32 R F 3 (ELE)	F43ILL/2	90	0.9	SW	1000	900.0	10	T 32 R F 3 (ELE)	F43ILL/2	90	0.9	C-OCC	1000	900.0	0.0	0.0	$0.00	$202.50	$35.00		#DIV/0!
X1	Boiler Room	2	X 1.5 W LED	ELED1.5/1	1.5	0.0	SW	1000	3.0	2	X 1.5 W LED	ELED1.5/1	1.5	0.0	C-OCC	1000	3.0	0.0	0.0	$0.00	$202.50	$35.00		#DIV/0!
X1	Attic	12	X 1.5 W LED	ELED1.5/1	1.5	0.0	SW	1000	18.0	12	X 1.5 W LED	ELED1.5/1	1.5	0.0	C-OCC	250	4.5	13.5	0.0	$2.25	$202.50	$35.00	89.8	74.3

Energy Audit of Memorial Elementary School

CHA Project No.24473

ECM-2 Install Occupancy Sensors

Cost of Electricity: **$0.167 $/kWh**

$0.00 $/kW

		EXISTING CONDITIONS								RETROFIT CONDITIONS								COST & SAVINGS ANALYSIS						
	Area Description	**No. of Fixtures**	**Standard Fixture Code**	**NYSERDA Fixture Code**	**Watts per Fixture**	**kW/Space**	**Exist Control**	**Annual Hours**	**Annual kWh**	**Number of Fixtures**	**Standard Fixture Code**	**Fixture Code**	**Watts per Fixture**	**kW/Space**	**Retrofit Control**	**Annual Hours**	**Annual kWh**	**Annual kWh Saved**	**Annual kW Saved**	**Annual $ Saved**	**Retrofit Cost**	**NJ Smart Start Lighting Incentive**	**Simple Payback With Out Incentive**	**Simple Payback**
Field Code	Unique description of the location - Room number/Room name: Floor number (if applicable)	No. of fixtures before the retrofit	"Lighting Fixture Code" Example 2T 40 R F(U) = 2'x2' Troff 40 w Recess. Floor 2 lamps U shape	Code from Table of Standard Fixture Wattages	Value from Table of Standard Fixture Wattages	(Watts/Fixt) * (Fixt No.)	Pre-inst. control device	Estimated annual hours for the usage group	(kW/space) * (Annual Hours)	No. of fixtures after the retrofit	"Lighting Fixture Code" Example 2T 40 R F(U) = 2'x2' Troff 40 w Recess. Floor 2 lamps U shape	Code from Table of Standard Fixture Wattages	Value from Table of Standard Fixture Wattages	(Watts/Fixt) * (Number of Fixtures)	Retrofit control device	Estimated annual hours for the usage group	(kW/space) * (Annual Hours)	(Original Annual kWh) - (Retrofit Annual kWh)	(Original Annual kW) - (Retrofit Annual kW)	(kW Saved) * ($/kWh)	Cost for renovations to lighting system		Length of time for renovations cost to be recovered	Length of time for renovations cost to be recovered
35	Gym Storage	3	T 32 R F 3 (ELE)	F43ILL/2	90	0.3	SW	1000	270.0	3	T 32 R F 3 (ELE)	F43ILL/2	90	0.3	C-OCC	250	67.5	202.5	0.0	$33.82	$202.50	$35.00	6.0	5.0
169	Gym	2	SP 250 MH ROOF	MH250/1	295	0.6	SW	2912	1,718.1	2	SP 250 MH ROOF	MH250/1	295	0.6		2912			0.0		$0.00	$0.00		
227	Gym	1	70 W MH Wall Pack	MH70/1	95	0.1	SW	2912	276.6	1	70 W MH Wall Pack	MH70/1	95	0.1		2912			0.0		$0.00	$0.00		
169	Gym	3	SP 250 MH ROOF	MH250/1	295	0.9	SW	2912	2,577.1	3	SP 250 MH ROOF	MH250/1	295	0.9		2912			0.0		$0.00	$0.00		
142	Gym	1	MH 100	MH100/1	128	0.1	SW	2912	372.7	1	MH 100	MH100/1	128	0.1		2912			0.0		$0.00	$0.00		
227	Gym	1	70 W MH Wall Pack	MH70/1	95	0.1	SW	2912	276.6	1	70 W MH Wall Pack	MH70/1	95	0.1		2912			0.0		$0.00	$0.00		
227	Gym	4	70 W MH Wall Pack	MH70/1	95	0.4	SW	2912	1,106.6	4	70 W MH Wall Pack	MH70/1	95	0.4		2912			0.0		$0.00	$0.00		
227	Gym	2	70 W MH Wall Pack	MH70/1	95	0.2	SW	2912	553.3	2	70 W MH Wall Pack	MH70/1	95	0.2		2912			0.0		$0.00	$0.00		
	Total	**550**				**60.0**			**128,861**	**550**				**60**			**66,548**	**30,014**	**0**	**5,012**	**$14,175**	**2,450**		
																	Demand Savings			**0.0**	**$0**			
																	kWh Savings			**62,313**	**$10,406**			
																	Total Savings				**$10,406**		**1.4**	**1.1**

Energy Audit of Memorial Elementary School

CHA Project No.24473

ECM-3 Lighting Replacements with Occupancy Sensors

Cost of Electricity: **$0.167 $/kWh**

$0.00 $/kW

		EXISTING CONDITIONS								RETROFIT CONDITIONS								COST & SAVINGS ANALYSIS						
	Area Description	**No. of Fixtures**	**Standard Fixture Code**	**NYSERDA Fixture Code**	**Watts per Fixture**	**kW/Space**	**Exist Control**	**Annual Hours**	**Annual kWh**	**Number of Fixtures**	**Standard Fixture Code**	**Fixture Code**	**Watts per Fixture**	**kW/Space**	**Retrofit Control**	**Annual Hours**	**Annual kWh**	**Annual kWh Saved**	**Annual kW Saved**	**Annual $ Saved**	**Retrofit Cost**	**NJ Smart Start Lighting Incentive**	**Simple Payback With Out Incentive**	**Simple Payback**
Field Code	Unique description of the location - Room number/Room name: Floor number (if applicable)	No. of fixtures before the retrofit	"Lighting Fixture Code" Example 2T 40 R F(U) = 2'x2' Troff 40 w Recess. Floor 2 lamps U shape	Code from Table of Standard Fixture Wattages	Value from Table of Standard Fixture Wattages	(Watts/Fixt) * (Fixt No.)	Pre-inst. control device	Estimated daily hours for the usage group	(kW/space) * (Annual Hours)	No. of fixtures after the retrofit	"Lighting Fixture Code" Example 2T 40 R F(U) = 2'x2' Troff 40 w Recess. Floor 2 lamps U shape	Code from Table of Standard Fixture Wattages	Value from Table of Standard Fixture Wattages	(Watts/Fixt) * (Number of Fixtures)	Retrofit control device	Estimated annual hours for the usage group	(kW/space) * (Annual Hours)	(Original Annual kWh) - (Retrofit Annual kWh)	(Original Annual kW) - (Retrofit Annual kW)	(kWh Saved) * ($/kWh)	Cost for renovations to lighting system	Prescriptive Lighting Measures	Length of time for renovations cost to be recovered	Length of time for renovations cost to be recovered
35	Principal Office	2	T 32 R F 3 (ELE)	F43ILL/2	90	0.2	SW	2400	432	2	T 32 R F 3 (ELE)	F43ILL/2	90	0.2	C-OCC	1,200	216	216	0.0	$ 36.07	$ 202.50	$ 35	5.6	4.6
35	Nurse	2	T 32 R F 3 (ELE)	F43ILL/2	90	0.2	SW	2400	432	2	T 32 R F 3 (ELE)	F43ILL/2	90	0.2	C-OCC	1,200	216	216	0.0	$ 36.07	$ 202.50	$ 35	5.6	4.6
202	Nurse	2	2T 17 R F 4 (ELE)	F22ILL	33	0.1	SW	2400	158	2	2T 17 R F 4 (ELE)	F22ILL	33	0.1	C-OCC	1,200	79	79	0.0	$ 13.23	$ 202.50	$ 35	15.3	12.7
202	Nurse Bathroom	2	2T 17 R F 4 (ELE)	F22ILL	33	0.1	SW	2400	158	2	2T 17 R F 4 (ELE)	F22ILL	33	0.1	C-OCC	1,200	79	79	0.0	$ 13.23	$ 202.50	$ 35	15.3	12.7
35	Main Office	3	T 32 R F 3 (ELE)	F43ILL/2	90	0.3	SW	2400	648	3	T 32 R F 3 (ELE)	F43ILL/2	90	0.3	C-OCC	1,200	324	324	0.0	$ 54.11	$ 202.50	$ 35	3.7	3.1
202	Main office Storage	1	2T 17 R F 4 (ELE)	F22ILL	33	0.0	SW	1000	33	1	2T 17 R F 4 (ELE)	F22ILL	33	0.0	C-OCC	250	8	25	0.0	$ 4.13	$ 202.50	$ 35	49.0	40.5
35	Teachers Room	6	T 32 R F 3 (ELE)	F43ILL/2	90	0.5	SW	2400	1,296	6	T 32 R F 3 (ELE)	F43ILL/2	90	0.5	C-OCC	1,200	648	648	0.0	$ 108.22	$ 202.50	$ 35	1.9	1.5
35	Teachers Kitchen	1	T 32 R F 3 (ELE)	F43ILL/2	90	0.1	SW	3102.5	279	1	T 32 R F 3 (ELE)	F43ILL/2	90	0.1	C-OCC	1,500	135	144	0.0	$ 24.09	$ 202.50	$ 35	8.4	7.0
71	Teachers Under Cabinet	2	I 60	I60/1	60	0.1	SW	1000	120	2	CF 26	CFQ26/1-L	27	0.1	C-OCC	250	14	107	0.1	$ 17.79	$ 216.00	$ 35	12.1	10.2
35	Womens Room	1	T 32 R F 3 (ELE)	F43ILL/2	90	0.1	SW	2000	180	1	T 32 R F 3 (ELE)	F43ILL/2	90	0.1	C-OCC	1,500	135	45	0.0	$ 7.52	$ 202.50	$ 35	26.9	22.3
146	Cafetorium	20	High Bay MH 400	MH400/1	458	9.2	SW	1600	14,656	20	P 54 C F 4	FC20	20	0.4	C-OCC	1,200	480	14,176	8.8	$ 2,367.39	$ 6,202.50	$ 2,035	2.6	1.8
X1	Cafetorium	3	X 1.5 W LED	ELED1.5/1	1.5	0.0	SW	1600	7	3	X 1.5 W LED	ELED1.5/1	1.5	0.0	C-OCC	1,200	5	2	0.0	$ 0.30	$ 202.50	$ 35	673.7	557.2
35	Café.Serving Room	3	T 32 R F 3 (ELE)	F43ILL/2	90	0.3	SW	1600	432	3	T 32 R F 3 (ELE)	F43ILL/2	90	0.3	C-OCC	1,200	324	108	0.0	$ 18.04	$ 202.50	$ 35	11.2	9.3
5	Kitchen	5	2T 32 R F 2 (u) (ELE)	FU2LL	60	0.3	SW	1600	480	5	2T 32 R F 2 (u) (ELE)	FU2LL	60	0.3		1,600	480	-	0.0	$ -	$ -	$ -		
X1	Kitchen	2	X 1.5 W LED	ELED1.5/1	1.5	0.0	SW	1600	5	2	X 1.5 W LED	ELED1.5/1	1.5	0.0		1,600	5	-	0.0	$ -	$ -	$ -		
202	Respect Road Corridor	12	2T 17 R F 4 (ELE)	F22ILL	33	0.4	SW	2280	903	12	2T 17 R F 4 (ELE)	F22ILL	33	0.4		2,280	903	-	0.0	$ -	$ -	$ -		
35	Respect Road Corridor	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	SW	2280	2,462	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1		2,280	2,462	-	0.0	$ -	$ -	$ -		
X1	Respect Road Corridor	2	X 1.5 W LED	ELED1.5/1	1.5	0.0	SW	2280	7	2	X 1.5 W LED	ELED1.5/1	1.5	0.0		2,280	7	-	0.0	$ -	$ -	$ -		
93	Respect Road Corridor	2	I 75	I75/1	75	0.2	SW	2280	342	2	CF 26	CFQ26/1-L	27	0.1		2,280	123	219	0.1	$ 36.55	$ 10.00	$ -	0.3	0.3
202	Custodial Closet	1	2T 17 R F 4 (ELE)	F22ILL	33	0.0	SW	1000	33	1	2T 17 R F 4 (ELE)	F22ILL	33	0.0		1,000	33	-	0.0	$ -	$ -	$ -		
202	Boys Room	3	2T 17 R F 4 (ELE)	F22ILL	33	0.1	SW	2000	198	3	2T 17 R F 4 (ELE)	F22ILL	33	0.1	C-OCC	1,500	149	50	0.0	$ 8.27	$ 202.50	$ 35	24.5	20.3
202	Rm B-1	3	2T 17 R F 4 (ELE)	F22ILL	33	0.1	SW	2400	238	3	2T 17 R F 4 (ELE)	F22ILL	33	0.1	C-OCC	1,200	119	119	0.0	$ 19.84	$ 202.50	$ 35	10.2	8.4
71	Stage	4	I 60	I60/1	60	0.2	SW	1000	240	4	CF 26	CFQ26/1-L	27	0.1	C-OCC	750	81	159	0.1	$ 26.55	$ 229.50	$ 35	8.6	7.3
146	Stage	4	High Bay MH 400	MH400/1	458	1.8	SW	1000	1,832	4	P 54 C F 4	FC20	20	0.1		1,000	80	1,752	1.8	$ 292.58	$ 1,200.00	$ 400	4.1	2.7
35	Rm B-2	6	T 32 R F 3 (ELE)	F43ILL/2	90	0.5	SW	2400	1,296	6	T 32 R F 3 (ELE)	F43ILL/2	90	0.5		2,400	1,296	-	0.0	$ -	$ -	$ -		
250	Rm B-3 Media Sw 1	32	T 54 W F 4 (ELE) (T-5)	F44GHL	234	7.5	SW	2400	17,971	32	T 54 W F 4 (ELE) (T-5)	F44GHL	234	7.5	C-OCC	1,680	12,580	5,391	0.0	$ 900.36	$ 202.50	$ 35	0.2	0.2
250	Rm B-3 Media Sw 2	16	T 54 W F 4 (ELE) (T-5)	F44GHL	234	3.7	SW	2400	8,986	16	T 54 W F 4 (ELE) (T-5)	F44GHL	234	3.7	C-OCC	1,680	6,290	2,696	0.0	$ 450.18	$ 202.50	$ 35	0.4	0.4
X4	Rm B-3 Media Sw 3	7	CF26W	CF26/4-L	108	0.8	SW	2400	1,814	7	CF26W	CF26/4-L	108	0.8	C-OCC	1,680	1,270	544	0.0	$ 90.90	$ 202.50	$ 35	2.2	1.8
X4	Rm B-3 Media Sw 4	4	CF26W	CF26/4-L	108	0.4	SW	2400	1,037	4	CF26W	CF26/4-L	108	0.4	C-OCC	1,680	726	311	0.0	$ 51.94	$ 202.50	$ 35	3.9	3.2
X1	Rm B-3 Media Sw 5	2	X 1.5 W LED	ELED1.5/1	1.5	0.0	SW	2400	7	2	X 1.5 W LED	ELED1.5/1	1.5	0.0	C-OCC	1,680	5	2	0.0	$ 0.36	$ 202.50	$ 35	561.4	464.3
35	Media Woork Rm	1	T 32 R F 3 (ELE)	F43ILL/2	90	0.1	SW	2400	216	1	T 32 R F 3 (ELE)	F43ILL/2	90	0.1	C-OCC	1,680	151	65	0.0	$ 10.82	$ 202.50	$ 35	18.7	15.5
35	Custodial Closet Sw 1	1	T 32 R F 3 (ELE)	F43ILL/2	90	0.1	SW	1000	90	1	T 32 R F 3 (ELE)	F43ILL/2	90	0.1	C-OCC	250	23	68	0.0	$ 11.27	$ 202.50	$ 35	18.0	14.9
202	Custodial Closet Sw 2	1	2T 17 R F 4 (ELE)	F22ILL	33	0.0	SW	1000	33	1	2T 17 R F 4 (ELE)	F22ILL	33	0.0	C-OCC	250	8	25	0.0	$ 4.13	$ 202.50	$ 35	49.0	40.5
35	Boys RR	3	T 32 R F 3 (ELE)	F43ILL/2	90	0.3	SW	2000	540	3	T 32 R F 3 (ELE)	F43ILL/2	90	0.3	C-OCC	1,500	405	135	0.0	$ 22.55	$ 202.50	$ 35	9.0	7.4
35	Honesty St Corridor	14	T 32 R F 3 (ELE)	F43ILL/2	90	1.3	SW	2280	2,873	14	T 32 R F 3 (ELE)	F43ILL/2	90	1.3		2,280	2,873	-	0.0	$ -	$ -	$ -		
X1	Honesty St Corridor	3	X 1.5 W LED	ELED1.5/1	1.5	0.0	SW	2280	10	3	X 1.5 W LED	ELED1.5/1	1.5	0.0		2,280	10	-	0.0	$ -	$ -	$ -		
35	Rm C-1	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	SW	2400	2,592	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	C-OCC	1,680	1,814	778	0.0	$ 129.86	$ 202.50	$ 35	1.6	1.3
35	Rm C-3	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	SW	2400	2,592	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	C-OCC	1,680	1,814	778	0.0	$ 129.86	$ 202.50	$ 35	1.6	1.3
35	Rm C-5	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	SW	2400	2,592	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	C-OCC	1,680	1,814	778	0.0	$ 129.86	$ 202.50	$ 35	1.6	1.3
35	Rm C-2	13	T 32 R F 3 (ELE)	F43ILL/2	90	1.2	SW	2400	2,808	13	T 32 R F 3 (ELE)	F43ILL/2	90	1.2	C-OCC	1,680	1,966	842	0.0	$ 140.68	$ 202.50	$ 35	1.4	1.2
202	Rm C-2	2	2T 17 R F 4 (ELE)	F22ILL	33	0.1	SW	2400	158	2	2T 17 R F 4 (ELE)	F22ILL	33	0.1	C-OCC	1,680	111	48	0.0	$ 7.94	$ 202.50	$ 35	25.5	21.1
7	Rm C-2 Toilet	1	2T 32 R F 2 (u) (ELE) Thin Tube	FU2LL	60	0.1	SW	2000	120	1	2T 17 R F 2 (ELE)	F22ILL	33	0.0	C-OCC	1,500	50	71	0.0	$ 11.77	$ 303.75	$ 35	25.8	22.8
7	Rm C-7	1	2T 32 R F 2 (u) (ELE) Thin Tube	FU2LL	60	0.1	SW	2400	144	1	2T 17 R F 2 (ELE)	F22ILL	33	0.0	C-OCC	1,680	55	89	0.0	$ 14.79	$ 303.75	$ 35	20.5	18.2
7	Rm C-4	1	2T 32 R F 2 (u) (ELE) Thin Tube	FU2LL	60	0.1	SW	2400	144	1	2T 17 R F 2 (ELE)	F22ILL	33	0.0	C-OCC	1,680	55	89	0.0	$ 14.79	$ 303.75	$ 35	20.5	18.2
7	Rm C-9	1	2T 32 R F 2 (u) (ELE) Thin Tube	FU2LL	60	0.1	SW	2400	144	1	2T 17 R F 2 (ELE)	F22ILL	33	0.0	C-OCC	1,680	55	89	0.0	$ 14.79	$ 303.75	$ 35	20.5	18.2
7	Rm C-6	1	2T 32 R F 2 (u) (ELE) Thin Tube	FU2LL	60	0.1	SW	2400	144	1	2T 17 R F 2 (ELE)	F22ILL	33	0.0	C-OCC	1,680	55	89	0.0	$ 14.79	$ 303.75	$ 35	20.5	18.2
35	Rm C-11	8	T 32 R F 3 (ELE)	F43ILL/2	90	0.7	SW	2400	1,728	8	T 32 R F 3 (ELE)	F43ILL/2	90	0.7	C-OCC	1,680	1,210	518	0.0	$ 86.57	$ 202.50	$ 35	2.3	1.9
35	Rm C-13	8	T 32 R F 3 (ELE)	F43ILL/2	90	0.7	SW	2400	1,728	8	T 32 R F 3 (ELE)	F43ILL/2	90	0.7	C-OCC	1,680	1,210	518	0.0	$ 86.57	$ 202.50	$ 35	2.3	1.9
35	Gym	24	T 32 R F 3 (ELE)	F43ILL/2	90	2.2	SW	2912	6,290	24	T 32 R F 3 (ELE)	F43ILL/2	90	2.2		2,912	6,290	-	0.0	$ -	$ -	$ -		
202	Gym Office	2	2T 17 R F 4 (ELE)	F22ILL	33	0.1	SW	2400	158	2	2T 17 R F 4 (ELE)	F22ILL	33	0.1	C-OCC	1,200	79	79	0.0	$ 13.23	$ 202.50	$ 35	15.3	12.7
35	Gym Entrance Hall	2	T 32 R F 3 (ELE)	F43ILL/2	90	0.2	SW	2280	410	2	T 32 R F 3 (ELE)	F43ILL/2	90	0.2		2,280	410	-	0.0	$ -	$ -	$ -		
201	Gym Entrance Hall	2	T 32 R F 3 (ELE)	F43ILL/2	90	0.2	SW	2280	410	2	0	F43SSILL	72	0.1		2,280	328	82	0.0	$ 13.71	$ 212.50	$ 30	15.5	13.3
35	Rm D-3 Art	16	T 32 R F 3 (ELE)	F43ILL/2	90	1.4	SW	2400	3,456	16	T 32 R F 3 (ELE)	F43ILL/2	90	1.4	C-OCC	1,680	2,419	1,037	0.0	$ 173.15	$ 202.50	$ 35	1.2	1.0
35	Gym Hall -	4	T 32 R F 3 (ELE)	F43ILL/2	90	0.4	SW	2280	821	4	T 32 R F 3 (ELE)	F43ILL/2	90	0.4		2,280	821	-	0.0	$ -	$ -	$ -		
35	Custodial Closet	1	T 32 R F 3 (ELE)	F43ILL/2	90	0.1	SW	1000	90	1	T 32 R F 3 (ELE)	F43ILL/2	90	0.1	C-OCC	250	23	68	0.0	$ 11.27	$ 202.50	$ 35	18.0	14.9
35	Boys Rm 2nd Fl	4	T 32 R F 3 (ELE)	F43ILL/2	90	0.4	SW	2000	720	4	T 32 R F 3 (ELE)	F43ILL/2	90	0.4	C-OCC	1,500	540	180	0.0	$ 30.06	$ 202.50	$ 35	6.7	5.6
35	Storage	1	T 32 R F 3 (ELE)	F43ILL/2	90	0.1	SW	1000	90	1	T 32 R F 3 (ELE)	F43ILL/2	90	0.1	C-OCC	250	23	68	0.0	$ 11.27	$ 202.50	$ 35	18.0	14.9
249	Storage	4	F 48 R F 2 (ELE)	F41GL	32	0.1	SW	1000	128	4	F 48 R F 2 (ELE)	F41GL	32	0.1	C-OCC	250	32	96	0.0	$ 16.03	$ 202.50	$ 35	12.6	10.4
35	Fairness Ave Corridor	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	SW	2280	2,462	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1		2,280	2,462	-	0.0	$ -	$ -	$ -		
35	Rm D-2	9	T 32 R F 3 (ELE)	F43ILL/2	90	0.8	SW	2400	1,944	9	T 32 R F 3 (ELE)	F43ILL/2	90	0.8	C-OCC	1,680	1,361	583	0.0	$ 97.39	$ 202.50	$ 35	2.1	1.7
7	Rm D-2	3	2T 32 R F 2 (u) (ELE) Thin Tube	FU2LL	60	0.2	SW	2400	432	3	2T 17 R F 2 (ELE)	F22ILL	33	0.1	C-OCC	1,680	166	266	0.1	$ 44.37	$ 506.25	$ 35	11.4	10.6
7	Rm D-2 Toilet	1	2T 32 R F 2 (u) (ELE) Thin Tube	FU2LL	60	0.1	SW	2000	120	1	2T 17 R F 2 (ELE)	F22ILL	33	0.0	C-OCC	1,500	50	71	0.0	$ 11.77	$ 303.75	$ 35	25.8	22.8
7	Rm D-4	1	2T 32 R F 2 (u) (ELE) Thin Tube	FU2LL	60	0.1	SW	2400	144	1	2T 17 R F 2 (ELE)	F22ILL	33	0.0	C-OCC	1,680	55	89	0.0	$ 14.79	$ 303.75	$ 35	20.5	18.2
7	Rm D-5	1	2T 32 R F 2 (u) (ELE) Thin Tube	FU2LL	60	0.1	SW	2400	144	1	2T 17 R F 2 (ELE)	F22ILL	33	0.0	C-OCC	1,680	55	89	0.0	$ 14.79	$ 303.75	$ 35	20.5	18.2
7	Rm A-9 Speech	4	2T 32 R F 2 (u) (ELE) Thin Tube	FU2LL	60	0.2	SW	2400	576	4	2T 17 R F 2 (ELE)	F22ILL	33	0.1	C-OCC	1,680	222	354	0.1	$ 59.16	$ 607.50	$ 35	10.3	9.7
7	Rm A-9 Closet	2	2T 32 R F 2 (u) (ELE) Thin Tube	FU2LL	60	0.1	SW	1000	120	2	2T 17 R F 2 (ELE)	F22ILL	33	0.1	C-OCC	250	17	104	0.1	$ 17.28	$ 405.00	$ 35	23.4	21.4
7	Rm A-11 Speech	4	2T 32 R F 2 (u) (ELE) Thin Tube	FU2LL	60	0.2	SW	2400	576	4	2T 17 R F 2 (ELE)	F22ILL	33	0.1	C-OCC	1,680	222	354	0.1	$ 59.16	$ 607.50	$ 35	10.3	9.7
35	Rm A-13	3	T 32 R F 3 (ELE)	F43ILL/2	90	0.3	SW	2400	648	3	T 32 R F 3 (ELE)	F43ILL/2	90	0.3	C-OCC	1,680	454	194	0.0	$ 32.46	$ 202.50	$ 35	6.2	5.2
7	Rm A-15 Sw1	4	2T 32 R F 2 (u) (ELE) Thin Tube	FU2LL	60	0.2	SW	2400	576	4	2T 17 R F 2 (ELE)	F22ILL	33	0.1	C-OCC	1,680	222	354	0.1	$ 59.16	$ 607.50	$ 35	10.3	9.7
7	Rm A-15 Sw2	4	2T 32 R F 2 (u) (ELE) Thin Tube	FU2LL	60	0.2	SW	2400	576	4	2T 17 R F 2 (ELE)	F22ILL	33	0.1	C-OCC	1,680	222	354	0.1	$ 59.16	$ 607.50	$ 35	10.3	9.7
7	A Wing Corridor	3	2T 32 R F 2 (u) (ELE) Thin Tube	FU2LL	60	0.2	SW	2280	410	3	2T 17 R F 2 (ELE)	F22ILL	33	0.1		2,280	226	185	0.1	$ 30.84	$ 303.75	$ -	9.8	9.8
7	A Wing Toilet	1	2T 32 R F 2 (u) (ELE) Thin Tube	FU2LL	60	0.1	SW	2000	120	1	2T 17 R F 2 (ELE)	F22ILL	33	0.0	C-OCC	1,500	50	71	0.0	$ 11.77	$ 303.75	$ 35	25.8	22.8
35	A Wing Corridor	18	T 32 R F 3 (ELE)	F43ILL/2	90	1.6	SW	2280	3,694	18	T 32 R F 3 (ELE)	F43ILL/2	90	1.6		2,280	3,694	-	0.0	$ -	$ -	$ -		
35	Classroom A-10	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	SW	2400	2,592	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	C-OCC	1,680	1,814	778	0.0	$ 129.86	$ 202.50	$ 35	1.6	1.3
35	Classroom A-8	6	T 32 R F 3 (ELE)	F43ILL/2	90	0.5	SW	2400	1,296	6	T 32 R F 3 (ELE)	F43ILL/2	90	0.5	C-OCC	1,680	907	389	0.0	$ 64.93	$ 202.50	$ 35	3.1	2.6
35	Classroom A-8	6	T 32 R F 3 (ELE)	F43ILL/2	90	0.5	SW	2400	1,296	6	T 32 R F 3 (ELE)	F43ILL/2	90	0.5	C-OCC	1,680	907	389	0.0	$ 64.93	$ 202.50	$ 35	3.1	2.6
35	Classroom A-7	9	T 32 R F 3 (ELE)	F43ILL/2	90	0.8	SW	2400	1,944	9	T 32 R F 3 (ELE)	F43ILL/2	90	0.8	C-OCC	1,680	1,361	583	0.0	$ 97.39	$ 202.50	$ 35	2.1	1.7
35	Classroom A-6	8	T 32 R F 3 (ELE)	F43ILL/2	90	0.7	SW	2400	1,728	8	T 32 R F 3 (ELE)	F43ILL/2	90	0.7	C-OCC	1,680	1,210	518	0.0	$ 86.57	$ 202.50	$ 35	2.3	1.9
35	Classroom A-5	8	T 32 R F 3 (ELE)	F43ILL/2	90	0.7	SW	2400	1,728	8	T 32 R F 3 (ELE)	F43ILL/2	90	0.7	C-OCC	1,680	1,210	518	0.0	$ 86.57	$ 202.50	$ 35	2.3	1.9
35	Classroom A-4	8	T 32 R F 3 (ELE)	F43ILL/2	90	0.7	SW	2400	1,728	8	T 32 R F 3 (ELE)	F43ILL/2	90	0.7	C-OCC	1,680	1,210	518	0.0	$ 86.57	$ 202.50	$ 35	2.3	1.9
35	Classroom A-3	8	T 32 R F 3 (ELE)	F43ILL/2	90	0.7	SW	2400	1,728	8	T 32 R F 3 (ELE)	F43ILL/2	90	0.7	C-OCC	1,680	1,210	518	0.0	$ 86.57	$ 202.50	$ 35	2.3	1.9
35	Classroom A-2	8	T 32 R F 3 (ELE)	F43ILL/2	90	0.7	SW	2400	1,728	8	T 32 R F 3 (ELE)	F43ILL/2	90	0.7	C-OCC	1,680	1,210	518	0.0	$ 86.57	$ 202.50	$ 35	2.3	1.9
35	Classroom A-1	8	T 32 R F 3 (ELE)	F43ILL/2	90	0.7	SW	2400	1,728	8	T 32 R F 3 (ELE)	F43ILL/2	90	0.7	C-OCC	1,680	1,210	518	0.0	$ 86.57	$ 202.50	$ 35	2.3	1.9
7	Storage	36	2T 32 R F 2 (u) (ELE) Thin Tube	FU2LL	60	2.2	SW	1000	2,160	36	2T 17 R F 2 (ELE)	F22ILL	33	1.2	C-OCC	250	297	1,863	1.0	$ 311.12	$ 3,847.50	$ 35	12.4	12.3
204	Corridor Next to Main Office	1	S 96 P F 2 (MAG) 8'	F82EHE	207	0.2	SW	2280	472	1	S 96 P F 2 (MAG) 8'	F82EHE	207	0.2		2,280	472	-	0.0	$ -	$ -	$ -		
201	Boiler Room Stairwell	1	T 32 R F 3 (ELE)	F43ILL/2	90	0.1	SW	2280	205	1	0	F43SSILL	72	0.1		2,280	164	41	0.0	$ 6.85	$ 106.25	$ 15	15.5	13.3
35	Boiler Room	10	T 32 R F 3 (ELE)	F43ILL/2	90	0.9	SW	1000	900	10	T 32 R F 3 (ELE)	F43ILL/2	90	0.9	C-OCC	1,000	900	-	0.0	$ -	$ 202.50	$ 35		
X1	Boiler Room	2	X 1.5 W LED	ELED1.5/1	1.5	0.0	SW	1000	3	2	X 1.5 W LED	ELED1.5/1	1.5	0.0	C-OCC	1,000	3	-	0.0	$ -	$ 202.50	$ 35		
X1	Attic	12	X 1.5 W LED	ELED1.5/1	1.5	0.0	SW	1000	18	12	X 1.5 W LED	ELED1.5/1	1.5	0.0	C-OCC	250	5	14	0.0	$ 2.25	$ 202.50	$ 35	89.8	74.3
35	Gym Storage	3	T 32 R F 3 (ELE)	F43ILL/2	90	0.3	SW	1000	270	3	T 32 R F 3 (ELE)	F43ILL/2	90	0.3	C-OCC	250	68	203	0.0	$ 33.82	$ 202.50	$ 35	6.0	5.0
169	Gym	2	SP 250 MH ROOF	MH250/1	295	0.6	SW	2912	1,718	2	SP 250 MH ROOF	MH250/1	295	0.6		2,912	1,718	-	0.0	$ -	$ -	$ -		

Energy Audit of Memorial Elementary School

CHA Project No.24473

ECM-3 Lighting Replacements with Occupancy Sensors

Cost of Electricity: **$0.167 $/kWh**
$0.00 $/kW

		EXISTING CONDITIONS								RETROFIT CONDITIONS								COST & SAVINGS ANALYSIS						
	Area Description	**No. of Fixtures**	**Standard Fixture Code**	**NYSERDA Fixture Code**	**Watts per Fixture**	**kW/Space**	**Exist Control**	**Annual Hours**	**Annual kWh**	**Number of Fixtures**	**Standard Fixture Code**	**Fixture Code**	**Watts per Fixture**	**kW/Space**	**Retrofit Control**	**Annual Hours**	**Annual kWh**	**Annual kWh Saved**	**Annual kW Saved**	**Annual $ Saved**	**Retrofit Cost**	**NJ Smart Start Lighting Incentive**	**Simple Payback With Out Incentive**	**Simple Payback**
Field Code	Unique description of the location - Room number/Room name: Floor number (if applicable)	No. of fixtures before the retrofit	"Lighting Fixture Code" Example 2T 40 R F(U) = 2'x2' Troff 40 w Recess. Floor 2 lamps U shape	Code from Table of Standard Fixture Wattages	Value from Table of Standard Fixture Wattages	(Watts/Fixt) * (Fixt No.)	Pre-inst. control device	Estimated daily hours for the usage group	(kW/space) * (Annual Hours)	No. of fixtures after the retrofit	"Lighting Fixture Code" Example 2T 40 R F(U) = 2'x2' Troff 40 w Recess. Floor 2 lamps U shape	Code from Table of Standard Fixture Wattages	Value from Table of Standard Fixture Wattages	(Watts/Fixt) * (Number of Fixtures)	Retrofit control device	Estimated annual hours for the usage group	(kW/space) * (Annual Hours)	(Original Annual kWh) - (Retrofit Annual kWh)	(Original Annual kW) - (Retrofit Annual kW)	(kWh Saved) * ($/kWh)	Cost for renovations to lighting system	Prescriptive Lighting Measures	Length of time for renovations cost to be recovered	Length of time for renovations cost to be recovered
227	Gym	1	70 W MH Wall Pack	MH70/1	95	0.1	SW	2912	277	1	70 W MH Wall Pack	MH70/1	95	0.1		2,912	277	-	0.0	$ -	$ -	$ -		
169	Gym	3	SP 250 MH ROOF	MH250/1	295	0.9	SW	2912	2,577	3	SP 250 MH ROOF	MH250/1	295	0.9		2,912	2,577	-	0.0	$ -	$ -	$ -		
142	Gym	1	MH 100	MH100/1	128	0.1	SW	2912	373	1	MH 100	MH100/1	128	0.1		2,912	373	-	0.0	$ -	$ -	$ -		
227	Gym	1	70 W MH Wall Pack	MH70/1	95	0.1	SW	2912	277	1	70 W MH Wall Pack	MH70/1	95	0.1		2,912	277	-	0.0	$ -	$ -	$ -		
227	Gym	4	70 W MH Wall Pack	MH70/1	95	0.4	SW	2912	1,107	4	70 W MH Wall Pack	MH70/1	95	0.4		2,912	1,107	-	0.0	$ -	$ -	$ -		
227	Gym	2	70 W MH Wall Pack	MH70/1	95	0.2	SW	2912	553	2	70 W MH Wall Pack	MH70/1	95	0.2		2,912	553	-	0.0	$ -	$ -	$ -		
																								#VALUE!

APPENDIX D

New Jersey Pay For Performance Incentive Program

New Jersey Pay For Performance Incentive Program

Note: The following calculation is based on the New Jersey Pay For Performance Incentive Program per April, 2012.
Building must have a minimum average electric demand of 100 kW. This minimum is waived for buildings owned by local governements or non-profit organizations.
Values used in this calculation are for measures with a positive return on investment (ROI) only.

Total Building Area (Square Feet)	54,138
Is this audit funded by NJ BPU (Y/N)	Yes

Board of Public Utilites (BPU)

Incentive #1		
Audit is funded by NJ BPU	$0.10	$/sqft

	Annual Utilities	
	kWh	Therms
Existing Cost (from utility)	$44,036	$42,150
Existing Usage (from utility)	313,850	42,379
Proposed Savings	47,571	1,367
Existing Total MMBtus	5,309	
Proposed Savings MMBtus	299	
% Energy Reduction	**5.6%**	
Proposed Annual Savings	$9,317	

	Min (Savings = 15%)		Increase (Savings > 15%)		Max Incentive		Achieved Incentive	
	$/kWh	$/therm	$/kWh	$/therm	$/kWh	$/therm	$/kWh	$/therm
Incentive #2	$0.09	$0.90	$0.005	$0.05	$0.11	$1.25	$0.00	$0.00
Incentive #3	$0.09	$0.90	$0.005	$0.05	$0.11	$1.25	$0.00	$0.00

	Incentives $		
	Elec	Gas	Total
Incentive #1	$0	$0	$5,414
Incentive #2	$0	$0	$0
Incentive #3	$0	$0	$0
Total All Incentives	**$0**	**$0**	**$5,414**

Total Project Cost	$40,437

		Allowable Incentive
% Incentives #1 of Utility Cost*	6.3%	$5,414
% Incentives #2 of Project Cost**	0.0%	$0
% Incentives #3 of Project Cost**	0.0%	$0
Total Eligible Incentives***	**$5,414**	
Project Cost w/ Incentives	$35,023	

Project Payback (years)	
w/o Incentives	w/ Incentives
4.3	3.8

* Maximum allowable incentive is 50% of annual utility cost if not funded by NJ BPU, and %25 if it is.

** Maximum allowable amount of Incentive #2 is 25% of total project cost.

Maximum allowable amount of Incentive #3 is 25% of total project cost.

*** Maximum allowable amount of Incentive #1 is $50,000 if not funded by NJ BPU, and $25,000 if it is.

Maximum allowable amount of Incentive #2 & #3 is $1 million per gas account and $1 million per electric account; maximum 2 million per project

APPENDIX E

Photovoltaic (PV) Rooftop Solar Power Generation

Maywood BOE
Memorial Elementary School

Cost of Electricity	$0.171	/kWh
Electricity Usage	313,850	kWh/yr
System Unit Cost	$4,000	/kW

Photovoltaic (PV) Solar Power Generation - Screening Assessment

Budgetary Cost	Annual Utility Savings				Estimated Maintenance Savings	Total Savings	Federal Tax Credit	New Jersey Renewable ** SREC	Payback (without incentive)	Payback (with incentive)
$	kW	kWh	therms	$	$	$	$	$	Years	Years
$160,000	**40.0**	**49,024**	**0**	**$8,383**	**0**	**$8,383**	**$0**	**$3,922**	**19.1**	**13.0**

** Estimated Solar Renewable Energy Certificate Program (SREC) SREC for 15 Years= $80 /1000kwh

Area Output*
984 m2
10,592 ft2

Perimeter Output*
135 m
443 ft

Available Roof Space for PV:
(Area Output - 10 ft x Perimeter) x 85%
5,238 ft2

Approximate System Size: Is the roof flat? (Yes/No) Yes

8	watt/ft2	
41,905	DC watts	
40	kW	Enter into PV Watts

PV Watts Inputs*

Array Tilt Angle	20	Enter into PV Watts (always 20 if flat, if pitched - enter estimated roof angle)
Array Azimuth	180	Enter into PV Watts (default)
Zip Code	07607	Enter into PV Watts
DC/AC Derate Factor	0.83	Enter info PV Watts

PV Watts Output
49,024 annual kWh calculated in PV Watts program

% Offset Calc

Usage	313,850	(from utilities)
PV Generation	49,024	(generated using PV Watts)
% offset	16%	

* http://www.freemaptools.com/area-calculator.htm
**http://www.flettexchange.com

APPENDIX F

EPA Portfolio Manager

OMB No. 2060-0347

STATEMENT OF ENERGY PERFORMANCE
Memorial Elementary School

Building ID: 3282036
For 12-month Period Ending: December 31, 2011[1]
Date SEP becomes ineligible: N/A

Date SEP Generated: September 14, 2012

Facility
Memorial Elementary School
764 Grant Avenue
Mywood, NJ 07607

Facility Owner
N/A

Primary Contact for this Facility
N/A

Year Built: 1954
Gross Floor Area (ft²): 54,138

Energy Performance Rating[2] (1-100) 50

Site Energy Use Summary[3]	
Electricity - Grid Purchase(kBtu)	1,070,856
Natural Gas (kBtu)[4]	4,237,900
Total Energy (kBtu)	5,308,756

Energy Intensity[4]	
Site (kBtu/ft²/yr)	98
Source (kBtu/ft²/yr)	148

Emissions (based on site energy use)	
Greenhouse Gas Emissions ($MtCO_2e$/year)	377

Electric Distribution Utility
Public Service Electric & Gas Co

National Median Comparison	
National Median Site EUI	99
National Median Source EUI	149
% Difference from National Median Source EUI	-1%
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[5] **for Indoor Environmental Conditions:**

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

Certifying Professional
N/A

Notes:
1. Application for the ENERGY STAR must be submitted to EPA within 4 months of the Period Ending date. Award of the ENERGY STAR is not final until approval is received from EPA.
2. The EPA Energy Performance Rating is based on total source energy. A rating of 75 is the minimum to be eligible for the ENERGY STAR.
3. Values represent energy consumption, annualized to a 12-month period.
4. Values represent energy intensity, annualized to a 12-month period.
5. 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.

The government estimates the average time needed to fill out this form is 6 hours (includes the time for entering energy data, Licensed Professional facility inspection, and notarizing the SEP) and welcomes suggestions for reducing this level of effort. Send comments (referencing OMB control number) to the Director, Collection Strategies Division, U.S., EPA (2822T), 1200 Pennsylvania Ave., NW, Washington, D.C. 20460.

ENERGY STAR® Data Checklist for Commercial Buildings

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

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

CRITERION	VALUE AS ENTERED IN PORTFOLIO MANAGER	VERIFICATION QUESTIONS	NOTES	☑
Building Name	Memorial Elementary School	Is this the official building name to be displayed in the ENERGY STAR Registry of Labeled Buildings?		☐
Type	K-12 School	Is this an accurate description of the space in question?		☐
Location	764 Grant Avenue, Mywood, NJ 07607	Is this address accurate and complete? Correct weather normalization requires an accurate zip code.		☐
Single Structure	Single Facility	Does this SEP represent a single structure? SEPs cannot be submitted for multiple-building campuses (with the exception of a hospital, k-12 school, hotel and senior care facility) nor can they be submitted as representing only a portion of a building.		☐
Memorial Elementary School (K-12 School)				
CRITERION	**VALUE AS ENTERED IN PORTFOLIO MANAGER**	**VERIFICATION QUESTIONS**	**NOTES**	☑
Gross Floor Area	54,138 Sq. Ft.	Does this square footage include all supporting functions such as kitchens and break rooms used by staff, storage areas, administrative areas, elevators, stairwells, atria, vent shafts, etc. Also note that existing atriums should only include the base floor area that it occupies. Interstitial (plenum) space between floors should not be included in the total. Finally gross floor area is not the same as leasable space. Leasable space is a subset of gross floor area.		☐
Open Weekends?	No	Is this building normally open at all on the weekends? This includes activities beyond the work conducted by maintenance, cleaning, and security personnel. Weekend activity could include any time when the space is used for classes, performances or other school or community activities. If the building is open on the weekend as part of the standard schedule during one or more seasons, the building should select ?yes? for open weekends. The ?yes? response should apply whether the building is open for one or both of the weekend days.		☐
Number of PCs	200	Is this the number of personal computers in the K12 School?		☐
Number of walk-in refrigeration/freezer units	1	Is this the total number of commercial walk-in type freezers and coolers? These units are typically found in storage and receiving areas.		☐
Presence of cooking facilities	Yes	Does this school have a dedicated space in which food is prepared and served to students? If the school has space in which food for students is only kept warm and/or served to students, or has only a galley that is used by teachers and staff then the answer is "no".		☐
Percent Cooled	30 %	Is this the percentage of the total floor space within the facility that is served by mechanical cooling equipment?		☐
Percent Heated	100 %	Is this the percentage of the total floor space within the facility that is served by mechanical heating equipment?		☐
Months	10(Optional)	Is this school in operation for at least 8 months of the year?		☐

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

ENERGY STAR® Data Checklist
for Commercial Buildings

Energy Consumption

Power Generation Plant or Distribution Utility: Public Service Electric & Gas Co

Fuel Type: Electricity		
Meter: Electric Meter (kWh (thousand Watt-hours)) **Space(s):** Entire Facility **Generation Method:** Grid Purchase		
Start Date	**End Date**	**Energy Use (kWh (thousand Watt-hours))**
12/01/2011	12/31/2011	24,500.00
11/01/2011	11/30/2011	23,400.00
10/01/2011	10/31/2011	23,100.00
09/01/2011	09/30/2011	16,800.00
08/01/2011	08/31/2011	12,600.00
07/01/2011	07/31/2011	40,800.00
06/01/2011	06/30/2011	26,250.00
05/01/2011	05/31/2011	25,500.00
04/01/2011	04/30/2011	27,000.00
03/01/2011	03/31/2011	29,700.00
02/01/2011	02/28/2011	31,500.00
01/01/2011	01/31/2011	32,700.00
Electric Meter Consumption (kWh (thousand Watt-hours))		**313,850.00**
Electric Meter Consumption (kBtu (thousand Btu))		**1,070,856.20**
Total Electricity (Grid Purchase) Consumption (kBtu (thousand Btu))		**1,070,856.20**
Is this the total Electricity (Grid Purchase) consumption at this building including all Electricity meters?		☐

Fuel Type: Natural Gas		
Meter: Natural Gas Meter (therms) **Space(s):** Entire Facility		
Start Date	**End Date**	**Energy Use (therms)**
12/01/2011	12/31/2011	6,924.00
11/01/2011	11/30/2011	2,248.00
10/01/2011	10/31/2011	179.00
09/01/2011	09/30/2011	72.00
08/01/2011	08/31/2011	70.00
07/01/2011	07/31/2011	527.00
06/01/2011	06/30/2011	649.00
05/01/2011	05/31/2011	1,352.00
04/01/2011	04/30/2011	4,143.00
03/01/2011	03/31/2011	6,146.00

02/01/2011	02/28/2011	9,378.00
01/01/2011	01/31/2011	10,691.00
Natural Gas Meter Consumption (therms)		**42,379.00**
Natural Gas Meter Consumption (kBtu (thousand Btu))		**4,237,900.00**
Total Natural Gas Consumption (kBtu (thousand Btu))		**4,237,900.00**
Is this the total Natural Gas consumption at this building including all Natural Gas meters?		☐

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

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

Certifying Professional

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

Name: _____ Date: _____

Signature: _____

Signature is required when applying for the ENERGY STAR.

FOR YOUR RECORDS ONLY. DO NOT SUBMIT TO EPA.

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

Facility
Memorial Elementary School
764 Grant Avenue
Mywood, NJ 07607

Facility Owner
N/A

Primary Contact for this Facility
N/A

General Information

Memorial Elementary School	
Gross Floor Area Excluding Parking: (ft^2)	54,138
Year Built	1954
For 12-month Evaluation Period Ending Date:	December 31, 2011

Facility Space Use Summary

Memorial Elementary School	
Space Type	K-12 School
Gross Floor Area (ft^2)	54,138
Open Weekends?	No
Number of PCs	200
Number of walk-in refrigeration/freezer units	1
Presence of cooking facilities	Yes
Percent Cooled	30
Percent Heated	100
Months °	10
High School?	No
School District °	N/A

Energy Performance Comparison

	Evaluation Periods		Comparisons		
Performance Metrics	**Current** (Ending Date 12/31/2011)	**Baseline** (Ending Date 12/31/2011)	**Rating of 75**	**Target**	**National Median**
Energy Performance Rating	50	50	75	N/A	50
Energy Intensity					
Site (kBtu/ft^2)	98	98	77	N/A	99
Source (kBtu/ft^2)	148	148	117	N/A	149
Energy Cost					
$/year	$ 95,834.35	$ 95,834.35	$ 75,438.03	N/A	$ 96,469.60
$/$ft^2$/year	$ 1.77	$ 1.77	$ 1.39	N/A	$ 1.78
Greenhouse Gas Emissions					
$MtCO_2e$/year	377	377	297	N/A	380
$kgCO_2e/ft^2$/year	7	7	6	N/A	7

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

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