HOLMDEL TOWNSHIP BOARD OF EDUCATION
VILLAGE SCHOOL
ENERGY ASSESMENT

FOR
NEW JERSEY
BOARD OF PUBLIC UTILITIES

FEBRUARY, 2013

Prepared by:

6 Campus Drive
Parsippany, NJ 07054
(973) 538-2120

CHA PROJECT NO. 24988

TABLE OF CONTENTS

1.0 EXECUTIVE SUMMARY 1
2.0 INTRODUCTION AND BACKGROUND 3
3.0 UTILITY 4
4.0 EXISTING CONDITIONS 6
4.1 Building Envelope 6
4.2 HVAC Systems 6
4.3 Control Systems 8
4.4 Domestic Hot Water System 8
4.5 Kitchen Equipment 8
4.6 Plumbing Systems 8
4.7 Lighting/Electrical Systems 9
5.0 ENERGY CONSERVATION MEASURES 10
5.1.1 ECM-1 Replace Single Glazing Windows in Atrium Area 10
5.1.2 ECM-2 Remove Slant Fin Boilers and Tie in Classrooms to Main Boiler Loop 11
5.1.3 ECM-3 Replace the Existing Art Room Air Conditioning Unit 11
5.1.4 ECM-4 Replace the Existing Computer Room AC Unit 12
5.1.5 ECM-5 Install Premium Efficiency Motors and VFD on the HHW Pumps 13
5.1.6 ECM-6 Install Demand Control Ventilation (DCV) Controls for APR and Old Gym 14
5.1.7 ECM-7 Install Kitchen Hood / VFD Controller 15
5.1.8 ECM-8 Replace Air Pump Motors with Premium Efficiency Motors 15
5.1.9 ECM-L1 Interior Lighting Replacement / Upgrades 16
5.1.10 ECM-L2 Install Lighting Controls 17
5.1.11 ECM-L3 Upgrade the lights and Install Lighting Controls 17
5.1.12 ECM-L4 Exterior Lighting Replacement / Upgrades 18
6.0 PROJECT INCENTIVES 19
6.1 Incentives Overview 19
6.1.1 New Jersey Smart Start Program 19
6.1.2 Direct Install Program 19
6.1.3 New Jersey Pay For Performance Program (P4P) 20

6.1.4 Energy Savings Improvement Plan (ESIP) 21
7.0 ALTERNATIVE ENERGY SCREENING EVALUATION 23
7.1 Solar 23
7.1.1 Photovoltaic Rooftop Solar Power Generation 23
7.1.2 Solar Thermal Hot Water Generation 23
7.2 Combined Heat and Power Generation (CHP) 23
7.3 Demand Response Curtailment 24
8.0 EPA PORTFOLIO MANAGER 25
9.0 CONCLUSIONS & RECOMMENDATIONS 26

APPENDICES

A Utility Usage Analysis
i. List of Third Party Energy Suppliers
B Equipment Inventory
C ECM Calculations and Cost Estimates
D New Jersey BPU Incentive Programs
i. Smart Start
ii. Direct Install
iii. Pay For Performance Incentive Program (P4P)
iv. Energy Savings Improvement Plan (ESIP)
E EPA Portfolio Manager

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

This energy audit is performed by CHA in connection with the New Jersey Board of Public Utilities' Local Government Energy Audit Program for the Village School. The purpose of this report is to convey the findings of the energy audit to identify energy savings potential associated with major energy consumers and inefficient practices. This report details the results of the energy audit conducted for:

Building Name	Address	Square Feet	Construction Date
Village School	67 McCampbell Road Holmdel NJ 07733	131,000	1964 with additions in 1973,1989, 2003

The potential annual energy and cost savings for each energy conservation measure (ECM) is shown below in Table 1. Each individual measure's annual savings are dependent on that measure alone, there are no interactive effects calculated. There are three options shown for Lighting ECM savings; only one option can be chosen. Incentives shown (if any) are based only on the SmartStart Incentive Program. Other NJBPU or local utility incentives may also be available/ applicable and are discussed in Section 5.0.

Each measure recommended by CHA typically has a simple payback period of 15 years or less to be consistent with the requirements of the Energy Savings Improvement Plan (ESIP) which has a maximum payback period of 15 years. Occasionally, we will recommend an ECM that has a longer payback period, based on the need to replace that piece(s) of equipment, such as a boiler for example. If the recommended measures are implemented a total potential annual savings of $25,600 may be realized with an average simple payback period of 5.6 years.

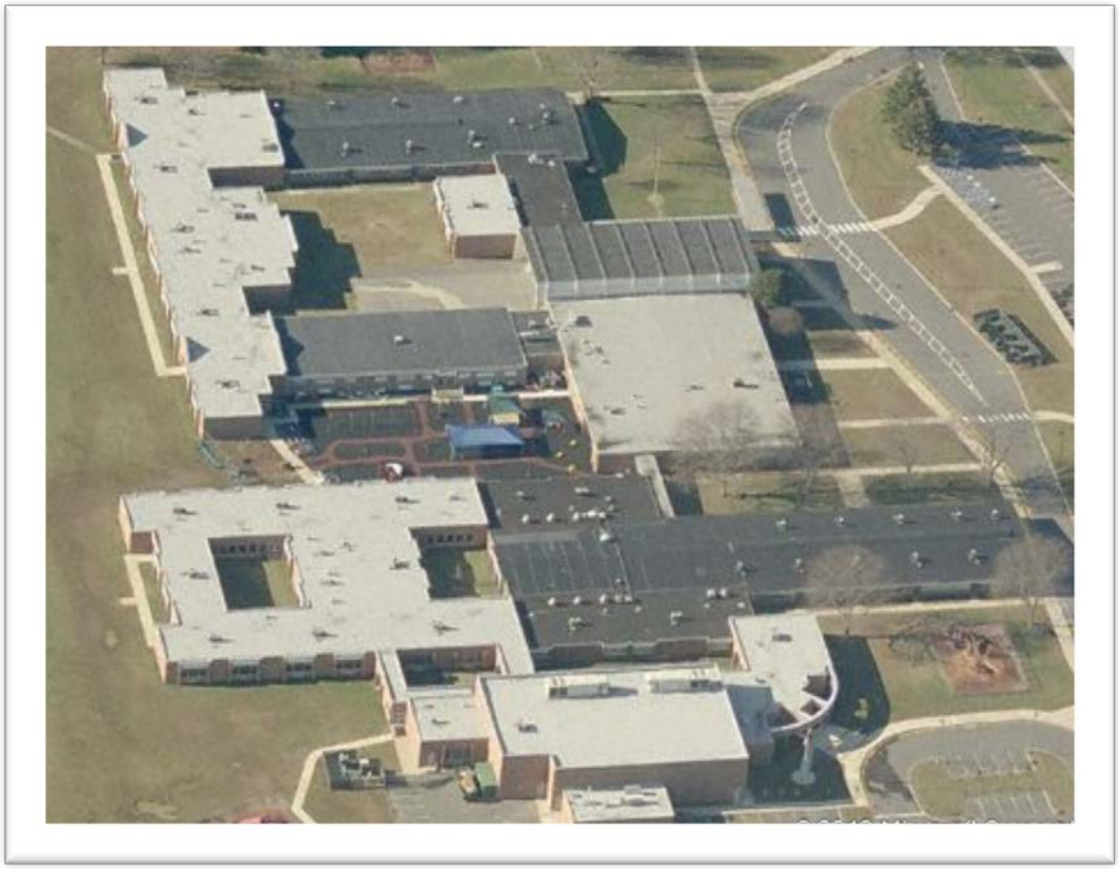
Table 1: Summary of Energy Conservation Measures

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**
ECM-1	Window Replacement in Atrium	98,300	1,700	>20	0	>20	X
ECM-2	Remove Slant Fin Boilers and Tie in Classrooms to Main Boiler Loop	10,000	1,400	>20	1,400	>20	X
ECM-3	Replace Art Room AC Unit	10,000	100	>20	292	>20	X
ECM-4	Replace Computer Room AC Unit	11,400	100	>20	365	>20	X
ECM-5	Install VFDs and Premium Motors on two HW Pumps (15HP each)	29,100	4,200	6.9	1,880	6.5	X
ECM-6	DCV Controls for Multi-purpose room and Old Gym	19,600	6,100	3.3	0	3.3	X
ECM-7	Install Kitchen Hood Controller	39,000	100	>20	163	>20	
ECM-8	Replace Air Pump Motors with Premium Efficiency Motors	1,500	200	10.0	80	9.5	X
ECM-L1	Lighting Replacement / Upgrades	42,700	2,300	18.7	7,700	15.3	
ECM-L2	Install Lighting Controls (Occupancy Sensors)	16,400	7,800	2.1	2,560	1.7	
ECM-L3	Lighting Replacements with Lighting Controls (Occupancy Sensors)	59,100	7,900	7.5	10,260	6.2	X
ECM-L4	Exterior Lighting Replacements with LED lighting	62,100	7,200	8.6	9,600	7.3	X

2.0 INTRODUCTION AND BACKGROUND

The Village School building is a 131,000 square foot school consisting of one floor. The building was constructed in 1964 with additions made in 1973, 1989, and 2003. The school serves from pre-K to 3rd grade and includes classrooms, offices, two gymnasiums, one all purpose room (APR), two libraries, a computer room, and a kitchen. The school hours of operation are from 8:55 AM – 3:30 PM Monday through Friday and the office hours are from 8:00 AM – 4:00 PM Monday through Friday. The building is occupied approximately 8 hours per day Monday through Friday; totaling around 40 hours per week. The school has approximately 839 students and 125 school members. The school has approximately 195 desktop computers and 82 notebook computers.

Figure 1: Village School



3.0 UTILITY

Utilities include electricity and natural gas. Electricity is delivered Jersey Central Power & Light (JCP&L) and is currently supplied by South Jersey Energy. Natural gas is delivered by New Jersey Natural Gas and supplied by Hess. The school district is charged for water which is provided by New Jersey American Water Co., Inc and has its own sewer water treatment plant to clean the sewer water.

For the 12-month period ending in July 2012, the utilities usage for the building was as follows:

Table 2: Actual Cost & Site Utility Usage

Electric		
Annual Usage	736,000	kWh/yr
Annual Cost	109,998	$
Blended Rate	0.149	$/kWh
Consumption Rate	0.111	$/kWh
Demand Rate	6.04	$/kW
Peak Demand	570.9	kW
Min. Demand	272.0	kW
Avg. Demand	391.9	kW
Natural Gas		
Annual Usage	33,140	Therms/yr
Annual Cost	47,850	$
Rate	1.444	$/Therm

According to the utility bills provided by Holmdel School, it was noted that the electrical delivery cost was higher than normal delivery cost and the summer month electric usage is lower than winter electric usage. Natural gas consumption was highest in winter months for heating and the unit cost of the natural gas was higher than normal natural gas cost in current market. The total billed utility usage in Village School seems to be lower than normal utility usage for schools. See Appendix A for a detailed utility analysis.

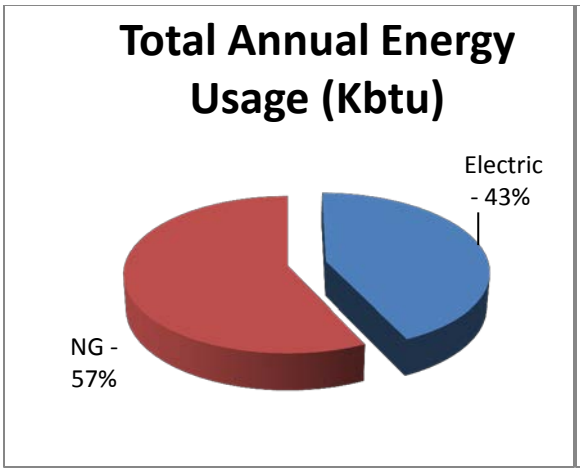


Figure 2: Annual Site Energy Usage

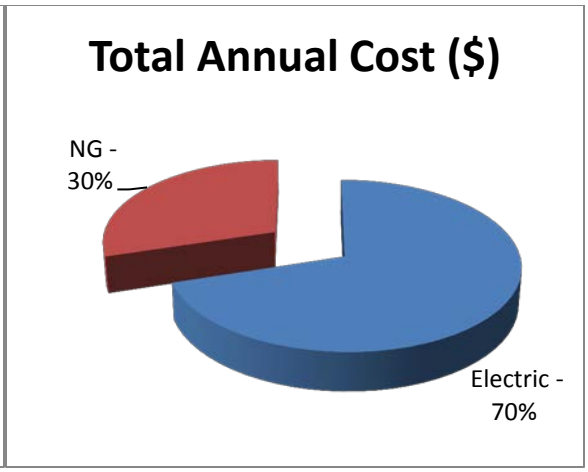


Figure 3: Annual Energy Cost

Under New Jersey's energy deregulation law, the supply portion of the electric (or natural gas) bill is separated from the delivery portion. The supply portion is open to competition, and customers can shop around for the best price for their energy suppliers. The electric and natural gas distribution utilities will still deliver the gas/ electric supplies through their wires and pipes – and respond to emergencies, should they arise – regardless of where those supplies are purchased. Purchasing the energy supplies from a company other than your electric or gas utility is purely an economic decision; it has no impact on the reliability or safety of the service. Additional information on selecting a third party energy supplier is available here:

http://www.state.nj.us/bpu/commercial/shopping.html.

See Appendix A for a list of third-party energy suppliers licensed by the Board of Public Utilities to sell within the building's service area.

4.0 EXISTING CONDITIONS

4.1 Building Envelope

The original building is constructed of concrete masonry units with red brick veneer; the interior walls are painted block walls. There is currently no insulation in the walls of the original school. The additions are built in a similar fashion with insulation added in the walls. Typically, these walls cannot be insulated without adding on to the interior resulting in a decrease of room area. It was decided that this measure was not practical.

The windows of Village School vary with age. Windows throughout the 1964, 1973, and 1989 portions of the school are operable aluminum framed single glazed windows. The windows are in fair condition except for the windows in the old gym Atrium area. In the old gym Atrium area, the south side wall consists of forty four 33" by 80" rectangle single glazing windows and two large triangle windows which consist of four smaller rectangular windows and two triangle windows. According to school staff, significant amount of heat was lost in this area due to these poor insulated large windows. The 2003 additions have double glazing windows, which are in good condition. During the site visit it was noted that the doors were installed at the same time as the 2003 windows. They are in good condition as well. Windows were considered in areas that weren't already upgraded and infiltration was high. The school district specifically asked these areas in these specific schools to be assessed due to the nature of infiltration and age of windows.

The building has a flat roof which is comprised of structural steel, insulation layer and waterproof membrane. During the site visit it was noted that the roof was in good condition. The roof has been undergoing construction to install the fixed solar panels.

4.2 HVAC Systems

4.2.a Heating Systems

Village School uses hot water boilers to produce heating hot water (HHW) for the building heating. Two HHW systems are currently used in the school. The old HHW system was installed in 1989 and serves the modular wing including classrooms from Room 37 to Room42. The HHW in this section is provided by three Slant/Fin Canavan boilers (Model: GG-300-EC). Each boiler has a rated energy input of 300MBH and output of 240MBH, which result in a nameplate efficiency of 80%. The horsepower and efficiency of the HHW pumps for these boilers were not available due to the inaccessibility to the motor nameplates during the site visit. The newer HHW system which was installed in 2002 supplies HHW to the fan coils for the remained of the building. The hot water in this system is provided by three AERCO Benchmark-2.0 condensing boilers. These boilers have a rated energy input of 2,000 MBH. These boilers have a published average efficiency of 94%. The HHW is circulated by two Taco pumps operating in a lead and lag fashion. Each Taco pump is driven by a 15 HP motor (Model FE3010E2JIE4LOA) with rated efficiency of 87.5%. Besides the HHW systems, the gymnasium, stage, computer labs, libraries, and general offices are heated by indirect gas-fired furnaces which are contained in the packaged RTUs. RTU-1 and 2 are DES CHAMPS units (Model: PV-MZP-8707) and they serve the new gymnasium area. Each of these two units is equipped with one 500 MBH 80% gas fired furnace. RTU-3

and RTU-4 are Carrier units (model 48HJD008-541NB) that serve the Computer Room (Room 21) and K-1 Library (Room 29) respectively. Each of these two units is equipped with a 125 MBH gas fired furnace with 80% heating efficiency. RTU-5 and RTU-8 are also Carrier units (model: 48HJD005-551NB). These two units serve general office area and new gymnasium stage area respectively. The heating capacity and efficiency of these two units are 59 MBH heating input and 80%. RTU-7 which also serves kitchen area is a heating only unit. The rated heating capacity and efficiency are 125MBH and 80% respectively.

Specifics on mechanical equipment can be found within the equipment inventory located in Appendix B.

4.2.b Cooling Systems

The cooling of the school is provided by individual split air conditioner (AC) units or RTUs. Each classroom in Village School has its own split AC unit with the condenser located on the roof. A total of seventy AC units are used in the school and the capacities of these AC units vary from 0.75 ton to 4 ton. These AC units are made by Trane, Lennox, EMI or Airedale. The detail of these 70 split AC units is listed in Appendix B Equipment Inventory. The gymnasium, stage, computer labs, libraries, and general offices are cooled by packaged RTUs which include DX cooling unit and indirect gas-fired furnaces. The capacities of the DX units vary from 4 ton to 35 ton. During the site visit, it was found that the two AC units serving the Art Room and Computer Room are aged and the nameplate on these units had faded away. In discussions with the maintenance staff, it was stated that these two units are in poor operating condition and are unable to meet the cooling load due to the addition of the computers and added internal heat gain.

Specifics on mechanical equipment can be found within the equipment inventory located in Appendix B.

4.2.c Ventilation Systems

RTU-1 and RTU-2 utilize 100% outdoor air as supply air for ventilation and are equipped with heat exchangers to recover energy from the exhaust air to pre-condition the outdoor ventilation air. RTU-3, 4 and 7 have 20% minimum outdoor air ventilation rate and are equipped with economizer to use 100% outdoor air during shoulder seasons. RTU-5 has a 31% minimum outdoor air ventilation rate and is equipped with economizer too. RTU-6 is a kitchen hood ventilation unit and use 100% outdoor air for ventilation. RTU-8 has 21% minimum outdoor air ventilation rate and is equipped with economizer.

Specifics on mechanical equipment can be found within the equipment inventory located in Appendix B.

4.2.d Exhaust Systems

There are 15 exhaust fans in the school to service the restrooms, classrooms, and the kitchen. The fan motor capacities vary from 1/6 HP to 1/2 HP.

Specifics on mechanical equipment can be found within the equipment inventory located in Appendix B.

4.3 Control Systems

An Automated Logic Direct Digital control system is utilized to control the most part of the Village School except a small portion that is still pneumatically controlled. Most of the thermostats in the school were upgraded to electric thermostats and connected to DDC system except five units that are still controlled by pneumatic control units. The compressed air for these five pneumatic control units is provided by a Quincy (model QT5SQCB) 2HP air compressor. According to school staff, the Automated Logic central control system has a heating set point of 70 ^{o}F and cooling set point of 75 ^{o}F with 3 degree fluctuation. The HVAC units typically only run during class hours and are turned off during the non-class hours. It was found that carbon dioxide ($CO_{2)}$ sensors were installed in the new gymnasium to reduce the ventilation cost during the site visit. However, no CO_2 sensors were identified in the old gymnasium and old all-purpose room (APR). The amount of the fresh air of the two Heating and Ventilating (HV) units in these two rooms were not available due to the lack of the nameplate data and mechanical schedule data. Based on the discussion with school staff, these two units are original to the building and it is believed that they bring a constant amount of the outdoor air into room regardless of the occupancy in the room.

4.4 Domestic Hot Water System

A total of nine domestic hot water heaters are utilized in Village School. Eight of them are electric heaters and one is gas fired heater. Two 4.5kW 80 gallon electric heaters (A.O Smith mode number: PEN-80-903 and EES-80-903) are used to provide domestic hot water for administration section and office area; three 18 kW 119 gallon electric heaters (A.O Smith mode number: DRE-120-907) and one 4.5 kW 80 gallon electric heater (A.O Smith mode number: PEC-009-14) serve the classrooms and restrooms; one 45 kW 119 gallon electric heater (A.O Smith mode number: ORE-120-917) provides domestic hot water for the kitchen; one 4.5 kW 50 gallon electric heater (Vanguard mode number: 6E717) serves the APR area; and one 50 MBH 50 gallon gas fired heater (A.O Smith mode number: BT65930A) serves the rest of the restrooms.

Specifics on mechanical equipment can be found within the equipment inventory located in Appendix B.

4.5 Kitchen Equipment

The kitchen has a kitchen exhaust hood system (RTU-6). The hood is equipped with a 1.5 HP fan that exhausts 2,750 CFM. The hood is interlocked with a makeup air unit (MUA) that supplies 2,310 CFM by using a 1 HP fan to make up the kitchen hood exhaust. The stoves in the kitchen are gas fired.

4.6 Plumbing Systems

The plumbing fixtures varied in age with the age of the additions. The faucets are Chicago metered faucets have full shut off capability. The new toilets and urinals in the

section that was built in 2003 appear to be low flow toilets. The school has been proactive in reducing their water usage over the years.

4.7 Lighting/Electrical Systems

The majority of the interior lighting in Village School is a combination of fixtures utilizing T-8 bulbs and metal halides. Both of them have electronic ballasts. Some small areas have compact fluorescent and incandescent bulbs. Most of the T-8 fixtures are two-lamp fixtures. The T-8 fixtures in the section built in and after 2003 are a mixture of 3-lamp troffer fixtures and 1-lamp troffer fixtures. The gymnasium is equipped with 400 Watt metal halides. The vast majority of the interior lighting is controlled manually by switches.

The exterior lights consist of 95 watt high pressure sodium fixtures, 250 watt high pressure sodium fixtures, and some 400 watt metal halides fixtures. Parking lot lighting consists of pole mounted high pressure sodium light fixtures which are on a timer.

5.0 ENERGY CONSERVATION MEASURES

Energy conservation measures (ECM's) are energy savings recommendations that typically require a financial investment. Energy savings can be in the form of electrical demand (KW=kilowatts), electrical usage (Kwh=Kilowatt-hour), natural gas (Therms=100,000 BTU), and water (KGAL=1000 gallons).

The recommendations are influenced by the time period that it takes to "break even "referred to as Simple Payback. Simple Payback is calculated by dividing the cost of implementing the ECM by the energy cost savings (in dollars) of that ECM.

Two other financial analysis included in this report are Internal Rate of Return (IRR) and Net Present Value (NPV). Internal Rate of Return is the discount rate at which the present value of a project costs equals the present value of the project savings. Net Present Value is the difference between present value of an investment's future net cash flows and the initial investment. If the NPV equals "0", the project would equate to investing the same amount of dollars at the desired rate. NPV is sometimes referred to as Net Present Worth. These values are provided in the summary in appendix C.

5.1.1 ECM-1 Replace Single Glazing Windows in Atrium Area

Therefore, this measure looks at replacing these old single glazed windows with double glazed windows having better seals.

Energy savings of this measure were calculated by estimating the reduction in the heat transfer loss and the infiltration rate through the windows. The U value of the windows will be reduced from 1.20 Btuh/SF/^{o}F to 0.55 Btuh/SF/^{o}F and the infiltration factor is reduced from 0.30 CFM/LF to 0.10CFM/LF after upgrading the windows to double glazed windows with better seals according to the architectural information provided by school staff; therefore, the energy loss during heating season is reduced from 1,592 therms to 686 therms. This window replacement project results in a total of 906 therms gas energy savings. The Atrium area is not cooled during summer season; therefore, no cooling savings are associated with this project.

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

ECM-1 Replace Single Glazing Windows in Atrium Area

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
98,000	0	0	1,200	1,700	0	1,700	(0.6)	0	>20	>20

* Does not qualify for an Incentive per the New Jersey SmartStart Program. See section 5.0 for other incentive opportunities.

Expected Life: 25 years

Lifetime Savings: 0 kWh 30,000 therms $42,500

This measure is not recommended.

5.1.2 ECM-2 Remove Slant Fin Boilers and Tie in Classrooms to Main Boiler Loop

Two HHW systems are currently used in the school. The school has three Aerco boilers that have the capacity to do the whole building heating load, according to a study conducted by the maintenance director. Classrooms 37-42 are served by newer Slant/Fin Canavan boilers (Model: GG-300-EC) that were installed in 1997. The hot water main piping branch runs by the classrooms which will allow the Aerco boilers to serve this classroom addition as well. This ECM assesses disconnecting the Slant/Fin Boilers and interconnecting the hot water piping of the two systems so the Aerco boilers will provide hot water for the school. Further engineering study would be needed to properly size and design the system.

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

ECM-2 Remove Slant Fin Boilers and Tie in Classrooms to Main Boiler Loop

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
12,300	0	0	1000	1,400	0	1,400	1.3	0	8.6	8.6

* Incentive shown is per the New Jersey SmartStart program. See section 5.0 for other incentive opportunities.

Expected Life: 20 years

Lifetime Savings: 0 kWh 20,000 therms $ 28,000

This measure is recommended.

5.1.3 ECM-3 Replace the Existing Art Room Air Conditioning Unit

The existing AC unit serving the Art Room is original to the building and the nameplate on this AC unit has faded away due to the age. Therefore, the capacity and the efficiency of this unit were not available for analysis. It is believed that the efficiency of this unit has dropped over the years based on the discussion with the school staff. This measure looks at replacing the existing Art Room AC unit with a high efficiency AC unit.

The measure would result in electric energy savings by replacing the low efficiency AC unit with higher EER AC unit. The savings calculations were based upon comparing the energy consumption of the existing unit and the proposed AC unit to supply the same amount of cooling to the room. The cooling capacity of this AC unit is estimated based on the empirical cooling data of 45 BTH/sq. ft (from HVAC Rule of Thumb) and the total Art Room square foot (32’ by 34’). Cooling energy needed in the building was calculated by using AC capacity, room temperature set point, EER, and Newark NJ BIN data.

The installation of this project requires a 48 MBH split AC unit installation, refrigerant piping connection, electric wiring and control system connection. The price information of

the new split AC unit is based on Trane unit pricing information. Further study is required to determine the system load and sized the system more accurately.

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

ECM-3 Replace the Existing Art Room AC Unit

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
10,000	300	0	0	100	0	100	(0.9)	300	>20	>20

* Incentive shown is per the New Jersey SmartStart program. See section 5.0 for other incentive opportunities.

Expected Life: 15 years

Lifetime Savings: 4,500 kWh 0 therms $ 1,500

This measure is recommended, due to age of the equipment. A more detailed energy audit should be performed to determine actual costs and savings.

5.1.4 ECM-4 Replace the Existing Computer Room AC Unit

The existing AC unit serving the Computer Room is also original to the building and the nameplate on this AC unit has faded away due to the age. This unit is in the similar conditions as the unit serving the Art Room. The efficiency of this unit has dropped over the years and it based on the discussion with the school staff. This measure looks at replacing the existing Art Room AC unit with a high efficiency AC unit.

The measure would result in electric energy savings by replacing the low efficiency AC unit with higher EER AC unit. The savings calculations were based upon comparing the energy consumption of the existing unit and the proposed AC unit to supply the same amount of cooling to the room. The cooling capacity of this AC unit is estimated by multiplying the empirical cooling data of 45 BTH/sq. ft (from HVAC Rule of Thumb) with the total Art Room square foot (32' by 34') plus the estimated cooling load of 27 computers in the room. Cooling energy needed in the building was calculated by using AC capacity, room temperature set point, EER, and Newark NJ BIN data.

The installation of this project requires a 60 MBH split AC unit installation, refrigerant piping connection, electric wiring and control system connection. The price information of the new split AC unit is based on Trane unit pricing information. Further study is required to determine the system load and sized the system more accurately.

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

ECM-4 Replace the Existing Computer Room AC Unit

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
11,000	400	0	0	100	0	100	(0.9)	400	>20	>20

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

Expected Life: 15 years

Lifetime Savings: 6,000 kWh 0 therms $1, 500

This measure is recommended, due to age of the equipment. A more detailed energy audit should be performed to determine actual costs and savings.

5.1.5 ECM-5 Install Premium Efficiency Motors and VFD on the HHW Pumps

The HHW in the new HHW system is currently circulated by two 15 HP pumps that run at constant speed. Replacing them with premium efficiency Inverter duty motors and installing of VFDs will save energy when full power operation is not required. As the heating load is reduced and the two-way valves on the HHW coils close, the VFD will ramp down to maintain required pressure and the energy consumption on the HHW pump motors will be reduced.

The total savings of this measure are from motor efficiency improvement and motor speed reduction when the HHW system is partially loaded. Savings from replacing the motors with premium efficiency motors were calculated first by using the efficiency of each motor to get the actual electric demand drawn by the motor and then multiplying them with load percentage and run hours. Savings from the VFD installation are from the energy reduction during partial loads. The load percentage of the pumps is calculated by estimating the percentage of two-way valves open in each temperature bin. Therefore, partial energy savings in each bin could be calculated as the difference between the energy drawn by the full-load old motors and the energy drawn by the VFD motors.

Implementation of this measure will require installation of VFDs, two new inverter duty premium efficiency motors, and appropriate controls equipment. In addition, some small piping modifications and control programming will be needed to allow the system to operate with variable flow.
The implementation cost and savings related to this ECM are presented in Appendix C and summarized below:

ECM-5 Install Premium Efficiency Motors and VFD on the HHW Pumps

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
29,000	28,200	0	0	4,200	0	4,200	1.2	1,900	6.9	6.5

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

Expected Life: 15 years

Lifetime Savings: 423,000 kWh 0 therms $ 63,000

This measure is recommended.

5.1.6 ECM-6 Install Demand Control Ventilation (DCV) Controls for APR and Old Gym

Existing operation of the HV units in Village School utilizes a fixed damper position, so that the required amount of outdoor air is always introduced into the space to meet ventilation code, whenever the unit is operating. The percentage of outdoor air is generally calculated based on maximum occupancy of the space, which results in more outside air being heated than necessary for typical space occupancy. This measure evaluates implementing demand control ventilation (DCV), which consists of installing Carbon Dioxide ($CO_{2)}$ sensors in several spaces to control the ventilation upon based on air quality thresh holds. The sensors will monitor CO_2 levels in key spaces, when this level is sufficiently low, damper positions will change to allow less outside air to be introduced into the HV units, and more return air circulated throughout the space. This will decrease the amount of heating needed for the outside air, resulting in energy savings.

The saving calculation for this measure quantified the heating load of each heating and ventilating unit, based on the amount of outdoor air introduced into the space. Scheduled outdoor air values were used, along with estimated averaged temperature differential between indoor air and outdoor air to determine existing energy usage on HV units. The proposed case assumed an average 20% HV units run hour reduction based on site observation and speaking with facility staff. This results in an annual heating reduction of 1,000 therms.

The cost of implementing this measure includes installing CO_2 sensors, dampers, damper actuators, electric wiring, and the labor cost on doing programming on these new devices.

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

ECM-6 Install DCV Controls for APR and Old Gym

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
20,000	0	0	4,200	6,100	0	6,100	3.7	0	3.3	3.3

* Does not qualify for an Incentive per the New Jersey SmartStart Program. See section 5.0 for other incentive opportunities.

Expected Life: 15 years

Lifetime Savings: 0 kWh 63,000 therms $91,500

This measure is recommended.

5.1.7 ECM-7 Install Kitchen Hood / VFD Controller

The kitchen contains a kitchen hood with one 1.5 HP motors for exhaust fan and 1 HP make up air unit that run continuously when the kitchen is operational. Installing a control system was evaluated. Upon activation, the hood lights turn on and the fans reach a preset minimum speed of between 10 and 50 percent. When the cooking applications are turned on, the fan speed increases based on exhaust air temperature. During actual cooking, the speed increases to 100 percent until smoke and heat are removed. The control will also send a signal to the kitchen hood make-up air fan to modulate the speed on the make-up air fan drive based on exhaust air quantity.

Energy saving is calculated from reduction of exhaust and makeup fan speed.

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

ECM-7 Install Kitchen / VFD Controller

Budgetary Cost	Annual Utility Savings				Estimated Maintenance Savings	Total Savings	ROI	Potential Incentive *	Payback (without Incentive)	Payback (with Incentive)
	Electricity		Natural Gas	Total						
$	kW	kWh	Therms	$	$	$		$	Years	Years
39,000	0	600	20	100	0	100	(1.0)	200	>20	>20

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

Expected Life: 15 years

Lifetime Savings: 9,000 kWh 300 therms $1,500

This measure is not recommended.

5.1.8 ECM-8 Replace Air Pump Motors with Premium Efficiency Motors

The waste water treatment plant uses two (2) 5 HP air pumps, two (2) 1.5 HP transport pumps, and two (2) 1 HP sludge pumps. Motors with 5 HP or above will be analyzed in this report since replacing them has more favorite the payback than small motors. The 5 HP air pump motors are constant speed with 85.5% nameplate efficiency motors. These two air pumps operate at a constant speed and lead/lag mode. By replacing them with inverter duty premium efficiency motors with an estimated efficiency of 89.7% for the 5 HP, electrical energy can be saved.

The calculation uses electrical nameplate data (HP) from the motor, efficiency and the runtime hours to estimate the annual electrical usage in kWh. The proposed annual electrical usage in kWh is calculated from converting the electrical nameplate data (HP) from the motor to kW using the efficiency multiplied by the runtime hours. The difference between the two values is the energy savings.

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

ECM-8 Replace Air Pump Motors with Premium Efficiency Motors

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
2,000	1,400	0	0	200	0	200	1.4	100	10.0	9.5

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

Expected Life: 15 years

Lifetime Savings: 21,000 kWh 0 therms $ 3,000

This measure is recommended.

5.1.9 ECM-L1 Interior Lighting Replacement / Upgrades

The gymnasium and APR lighting is proposed to be changed from metal halide fixtures to high output 6-lamp T-5 fixtures which has a longer life and consumes much less energy. Also, the incandescent light fixtures in electric closets and small restrooms are proposed to be replaced by compact fluorescent lamps (CFL).

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 15,530 kWh. These calculations are based upon 1 to 1 replacements with the fixtures. They do not take into account lumen output and square footage. A more comprehensive study may be performed to determine correct lighting levels.

Implementation of this measure includes installing high output T-5 fixtures and CFL lamps.

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

ECM-L1 Lighting Replacements / 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
43,000	15,500	8.3	0	2,300	0	2,300	0.0	7,700	18.7	15.3

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

Expected Life: 15 years

Lifetime Savings: 232,500 kWh 0 therms $34,500

This measure is not recommended in lieu of ECM-L3.

5.1.10 ECM-L2 Install Lighting Controls

Occupancy sensors are currently not installed to control the lights in the classrooms and gym. During the site visit, it was observed that the lights in the gym were left on all the time even no one was in the room and the classrooms lights were on during the lunch break. Therefore, occupancy sensors are suggested to be installed to turn off the lights when the rooms are not occupied.

To determine potential savings, a lighting survey was completed. The light fixtures that were found to be suitable applications for occupancy sensors and photocell sensors were identified and documented. Light types and counts were documented during the building survey, and entered into the lighting spreadsheet. The annual existing and proposed operational hours for each area was estimated based on discussions with facility staff and field observations. Annual savings was calculated based on the difference between existing and proposed operating conditions.

Implementation of this measure includes installing occupancy sensors in the classrooms, office rooms, storage rooms, and gyms.

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

ECM-L2 Install Lighting Controls

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
16,000	52,100	0	0	7,800	0	7,800	6.1	2,600	2.1	1.7

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

Expected Life: 15 years

Lifetime Savings: 781,000 kWh 0 therms $117,000

This measure is not recommended in lieu of ECM-L3.

5.1.11 ECM-L3 Upgrade the lights and Install Lighting Controls

This measure is a combination of ECM-L1 and ECM-L2. It looks at replacing the gym lights with high output T-5 fixtures, replacing incandescent lights with CFL lights and installing occupancy sensors for classrooms, offices, storage rooms, and gym.

The energy savings and implementation cost for this measure are also a combination of ECM-L1 and ECM-L2.

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

ECM-L3 Upgrade the lights and Install Lighting Controls

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
59,000	66,200	8.3	0	7,900	0	7,900	1.7	10,300	7.5	6.2

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

Expected Life: 15 years

Lifetime Savings: 993,000 kWh 0 therms $118,500

This measure is recommended.

5.1.12 ECM-L4 Exterior Lighting Replacement / Upgrades

Parking lot lighting consists of thirty pole mounted 250W high pressure sodium light fixtures. Fifty 70W high pressure sodium lights and sixteen 400W metal halide wall pack lights are used as the exterior lights. These exterior lighting is proposed to be changed from high pressure sodium and metal halide fixtures to LED which has a longer life and consumes much less energy.

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 54,797 kWh. These calculations are based upon 1 to 1 replacements with the fixtures. They do not take into account lumen output and square footage. A more comprehensive study may be performed to determine correct lighting levels.

Implementation of this measure includes installing LED fixtures.

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

ECM-L4 Lighting Replacements / 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
62,000	54,800	20.0	0	7,200	0	7,200	1.2	9,600	8.6	7.3

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

Expected Life: 15 years

Lifetime Savings: 822,000 kWh 0 therms $108,000

This measure is recommended.

6.0 PROJECT INCENTIVES

6.1 Incentives Overview

6.1.1 New Jersey Smart Start Program

For this energy audit, The New Jersey Smart Start Incentives are used in the energy savings calculations, where applicable. This program is intended for medium and large energy users and provides incentives for:

- Electric Chillers
- Gas Chillers
- Gas Heating
- Unitary HVAC
- Ground Source Heat Pumps
- Variable frequency Drives/ motors
- Refrigeration
- Prescriptive and performance lighting and lighting controls

The equipment is procured using a typical bid- build method, installed and paid for and then the incentives are reimbursed to the school.

If the School District wishes to and is eligible to participate in the Energy Savings Improvement Plan (ESIP) program and/or the Pay for Performance Incentive Program (P4P), It cannot participate in either the Smart Start or Direct Install Programs. Refer to appendix D for more information on the Smart Start program.

6.1.2 Direct Install Program

The Direct Install Program applies to smaller facilities that have a peak electrical demand of 150 kW or less 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 utility companies.

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, refrigeration, and other equipment upgrades with higher efficiency alternatives. If a building is eligible for this funding, the Direct Install Program can reduce the implementation cost of energy conservation projects.

The Direct install program has specific HVAC equipment and lighting requirements and are generally applicable only to smaller package HVAC units, small boilers and lighting retrofits.

The program pays a maximum amount of $75,000 per building, and up to $250,000 per customer per year. Installations must be completed by an approved Direct Install participating contractor, a list of which can be found on the New Jersey Clean Energy Website. Contractors will coordinate with the applicant to arrange installation of

recommended measures identified in a previous energy assessment, such as this energy audit. The incentive is reimbursed to the school upon successful replacement and payment of the equipment.

This school is not eligible to receive funding from the Direct Install Program because the electrical demand is more than the maximum peak electrical demand of 150 kW in the last 12 month period.

Refer to appendix D for more information on this program.

6.1.3 New Jersey Pay For Performance Program (P4P)

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.

Electric

- 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

Combining incentives #2 and #3 will provide a total of $0.18/ kWh and $1.8/therm not to exceed 50% of total project cost. Additional incentives for #2 and #3 are increased by $0.005/kWh and $0.05/therm for each percentage increase above the 15% minimum target to 20%, calculated with the EPA Portfolio Manager benchmarking tool, not to exceed 50% of total project cost.

Total P4P incentives are summarized below:

	Incentives $		
	Electric	**Gas**	**Total**
Incentive #1	$0	$0	$13,100
Incentive #2	$16,406	$7,001	$23,408
Incentive #3	$16,406	$7,001	$23,408
Total	**$32,813**	**$14,002**	**$59,915**

For the purpose of demonstrating the eligibility of the ECM's to meet the minimum savings requirement of 15% for the Pay for Performance Program, all ECM's (both recommended and not recommend) have been included in the incentive calculations. Based on this, the Village School building would be eligible for incentives#1, #2 and #3.

Refer to appendix D for more information on this program.

6.1.4 Energy Savings Improvement Plan (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. 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. Refer to appendix D for more information on this program.

7.0 ALTERNATIVE ENERGY SCREENING EVALUATION

7.1 Solar

7.1.1 Photovoltaic Rooftop Solar Power Generation

The school has entered into a power purchase agreement with Hudson Energy for installation of rooftop photovoltaic (PV) solar panels for power generation. The agreement is Hudson Energy will furnish and maintain the solar panels and the school will purchase the power generated from the panels. The goal is to have 50% of the power consumption come from the power generated from the solar panels. The size of the system implemented is 462 kW.

7.1.2 Solar Thermal Hot Water Generation

Active solar thermal systems use solar collectors to gather the sun's energy to heat water, another fluid, or air. An absorber in the collector converts the sun's energy into heat. The heat is then transferred by circulating water, antifreeze, or sometimes air to another location for immediate use or storage for later utilization. Applications for active solar thermal energy include providing hot water, heating swimming pools, space heating, and preheating air in residential and commercial buildings.

A standard solar hot water system is typically composed of solar collectors, heat storage vessel, piping, circulators, and controls. Systems are typically integrated to work alongside a conventional heating system that provides heat when solar resources are not sufficient. The solar collectors are usually placed on the roof of the building, oriented south, and tilted around the site's latitude, to maximize the amount of radiation collected on a yearly basis.

Several options exist for using active solar thermal systems for space heating. The most common method involves using glazed collectors to heat a liquid held in a storage tank (similar to an active solar hot water system). The most practical system would transfer the heat from the panels to thermal storage tanks and transfer solar produced thermal energy to use for domestic hot water production. DHW is presently produced by electric and gas-fired water heaters and, therefore, this measure would offer electric and natural gas utility savings.

It is a school and classes are not held in the summer months, the effectiveness of the solar thermal hot water would not maximize and therefore this measure is not recommended.

7.2 Combined Heat and Power Generation (CHP)

Combined heat and power, cogeneration, is self-production of electricity on-site with beneficial recovery of the heat byproduct from the electrical generator. Common CHP equipment includes reciprocating engine-driven, micro turbines, steam turbines, and fuel cells. Typical CHP customers include industrial, commercial, institutional, educational institutions, and multifamily residential facilities. CHP systems that are commercially viable at the present time are sized approximately 50 kW and above, with numerous

options in blocks grouped around 300 kW, 800 kW, 1,200 kW and larger. Typically, CHP systems are used to produce a portion of the electricity needed by a facility some or all of the time, with the balance of electric needs satisfied by purchase from the grid.

Any proposed CHP project will need to consider many factors, such as existing system load, use of thermal energy produced, system size, natural gas fuel availability, and proposed plant location. The facility has sufficient need for electrical generation and the ability to use most of the thermal byproduct during the winter, thermal usage during the summer months is low. Thermal energy produced by the CHP plant in the warmer months will be wasted. An absorption chiller could be installed to utilize the heat to produce chilled water; however, there is no chilled water distribution system in the building. The most viable selection for a CHP plant at this location would be a reciprocating engine natural gas-fired unit. Purchasing this system and performing modifications to the existing HVAC and electrical systems would greatly outweigh the savings over the life of the equipment.

This measure is not recommended due to a lack of usable rejection heat and limited summertime occupancy.

7.3 Demand Response Curtailment

Presently, Electricity is delivered by Jersey Central Power & Lights (JCP&L), which receives the electricity from regional power grid RFC East. PJM Interconnection is the regional transmission organization (RTO) that coordinates the movement of wholesale electricity in all or parts of 13 states and the District of Columbia including the State of New Jersey.

Utility Curtailment is an agreement with the utility provider's regional transmission organization and an approved Curtailment Service Provider (CSP) to shed electrical load by either turning major equipment off or energizing all or part of a facility utilizing an emergency generator; therefore, reducing the electrical demand on the utility grid. This program is to benefit the utility company during high demand periods and utility provider offers incentives to the CSP to participate in this program. Enrolling in the program will require program participants to drop electrical load or turn on emergency generators during high electrical demand conditions or during emergencies. Part of the program also will require that program participants reduce their required load or run emergency generators with notice to test the system.

A pre-approved CSP will require a minimum of 100 kW of load reduction to participate in any curtailment program. From July 2011 through July 2012 the facility had a peak electricity demand of 570.9 kW and a minimum of 272.0 kW. The monthly average over the observed 12 month period was 391.9 kW.

This measure is recommended. A load shedding sequence can be established using existing controls system.

8.0 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 measures, 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. To provide an equitable comparison for different buildings with varying proportions of primary and secondary energy consumption, Portfolio Manager uses the convention of source EUIs. The source energy also accounts for losses incurred in production, storage, transmission, and delivery of energy to the site, which provide an equivalent measure for various types of buildings with differing energy sources. The results of the Portfolio Manager benchmarking tool are contained in the table below.

Building	Site EUI kBtu/ft^2/yr	Source EUI Btu/ft^2/yr	Energy Star Rating (1-100)
Village School	45	91	90

The Village School has an above average Energy Star rating of 90 (median score being 50%). By implementing the measures discussed in this report, it is expected that the EUI can be reduced and the Energy Star score increased.

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/).

[redacted]

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

9.0 CONCLUSIONS & RECOMMENDATIONS

The LGEA energy audit conducted by CHA at Village School identified potential annual savings of $25,600 may be realized for the recommended ECMs, with a summary of the costs, savings, and paybacks as 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**
ECM-1	Window Replacement in Atrium	98,300	1,700	>20	0	>20	X
ECM-2	Remove Slant Fin Boilers and Tie in Classrooms to Main Boiler Loop	10,000	1,400	>20	1,400	>20	X
ECM-3	Replace Art Room AC Unit	10,000	100	>20	292	>20	X
ECM-4	Replace Computer Room AC Unit	11,400	100	>20	365	>20	X
ECM-5	Install VFDs and Premium Motors on two HW Pumps (15HP each)	29,100	4,200	6.9	1,880	6.5	X
ECM-6	DCV Controls for Multi-purpose room and Old Gym	19,600	6,100	3.3	0	3.3	X
ECM-7	Replace Air Pump Motors with Premium Efficiency Motors	1,500	200	10.0	80	9.5	X
ECM-L3	Lighting Replacements with Lighting Controls (Occupancy Sensors)	59,100	7,900	7.5	10,260	6.2	X
ECM-L4	Exterior Lighting Replacements with LED lighting	62,100	7,200	8.6	9,600	7.3	X

APPENDIX A

Utility Usage Analysis

Holmdel Township BOE
Village School

Annual Utilities

12-month Summary

Electric		
Annual Usage	736,000	kWh/yr
Annual Cost	109,998	$
Blended Rate	0.149	$/kWh
Consumption Rate	0.111	$/kWh
Demand Rate	6.04	$/kW
Peak Demand	570.9	kW
Min. Demand	272.0	kW
Avg. Demand	391.9	kW
Natural Gas		
Annual Usage	33,140	Therms/yr
Annual Cost	47,850	$
Rate	1.444	$/Therm

Holmdel Township BOE
Village School

Utility Bills: Account Numbers

Account Number	School Building	Location	Type	Notes
E-100009804921	Village School		Electricity	
G-16-2364-3400-21	Village School		Natural Gas	

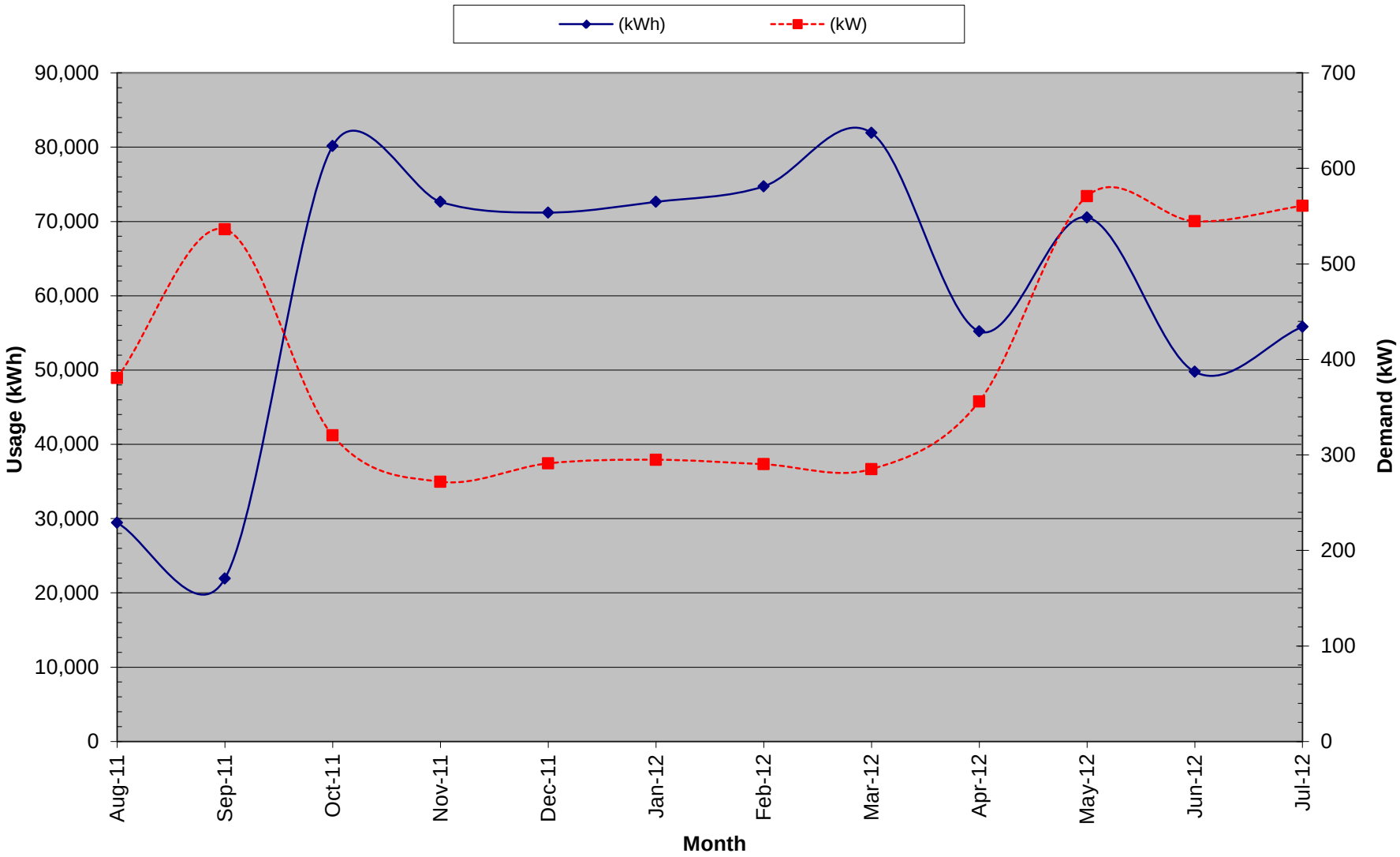
Holmdel Township BOE
Village School

For Service at: **Village School**
Account No.: **E-100009804921** **Delivery -**
Meter No.: **Supplier -**
Electric Service

			Provider Charges			Usage (kWh) vs. Demand (kW) Charges		Unit Costs		
Month	**Consumption (kWh)**	**Demand (kW)**	**Delivery ($)**	**Supplier ($)**	**Total ($)**	**Consumption ($)**	**Demand ($)**	**Blended Rate ($/kWh)**	**Consumption ($/kWh)**	**Demand ($/kW)**
July-11	60,800	504.00	10,485.84		10,485.84	10,485.84		0.17	0.17	0.00
August-11	29,440	380.50	6,025.37		6,025.37	3,454.10	2,571.27	0.20	0.12	6.76
September-11	21,920	536.30	5,989.87		5,989.87	2,584.71	3,405.16	0.27	0.12	6.35
October-11	80,160	320.40	11,291.73		11,291.73	9,283.44	2,008.29	0.14	0.12	6.27
November-11	72,640	272.00	10,150.65		10,150.65	8,491.33	1,659.32	0.14	0.12	6.10
December-11	71,200	291.20	10,105.02		10,105.02	8,285.66	1,819.36	0.14	0.12	6.25
January-12	72,640	295.00	10,244.35		10,244.35	8,444.72	1,799.63	0.14	0.12	6.10
February-12	74,720	290.30	10,454.64		10,454.64	8,641.10	1,813.54	0.14	0.12	6.25
March-12	81,920	285.20	10,815.57		10,815.57	9,035.03	1,780.54	0.13	0.11	6.24
April-12	55,200	356.00	8,347.05		8,347.05	6,175.29	2,171.76	0.15	0.11	6.10
May-12	70,560	570.90	9,966.58		9,966.58	6,073.93	3,892.65	0.14	0.09	6.82
June-12	49,760	544.60	8,013.79		8,013.79	4,303.67	3,710.12	0.16	0.09	6.81
July-12	55,840	560.90	8,593.55		8,593.55	6,821.11	1,772.44	0.15	0.12	3.16
Total (All)	**796,800**	**570.90**	**$120,484.01**	**$0.00**	**$120,484.01**	**$92,079.92**	**$28,404.09**	**$0.15**	**$0.12**	**$6.04**
Total (last 12-months)	**736,000**	**570.90**	**$109,998.17**	**$0.00**	**$109,998.17**	**$81,594.08**	**$28,404.09**	**$0.15**	**$0.11**	**$6.04**
Notes	1	2	3	4	5	6	7	8	9	10

1.) Number of kWh of electric energy used per month
2.) Number of kW of power measured
3.) Electric charges from Delivery provider
4.) Electric charges from Supply provider
5.) Total charges (Delivery + Supplier)
6.) Charges based on the number of kWh of electric energy used
7.) Charges based on the number of kW of power measured
8.) Total Charges ($) / Consumption (kWh)
9.) Consumption Charges ($) / Consumption (kWh)
10.) Demand Charges ($) / Demand (kW)

Electric Usage Village School

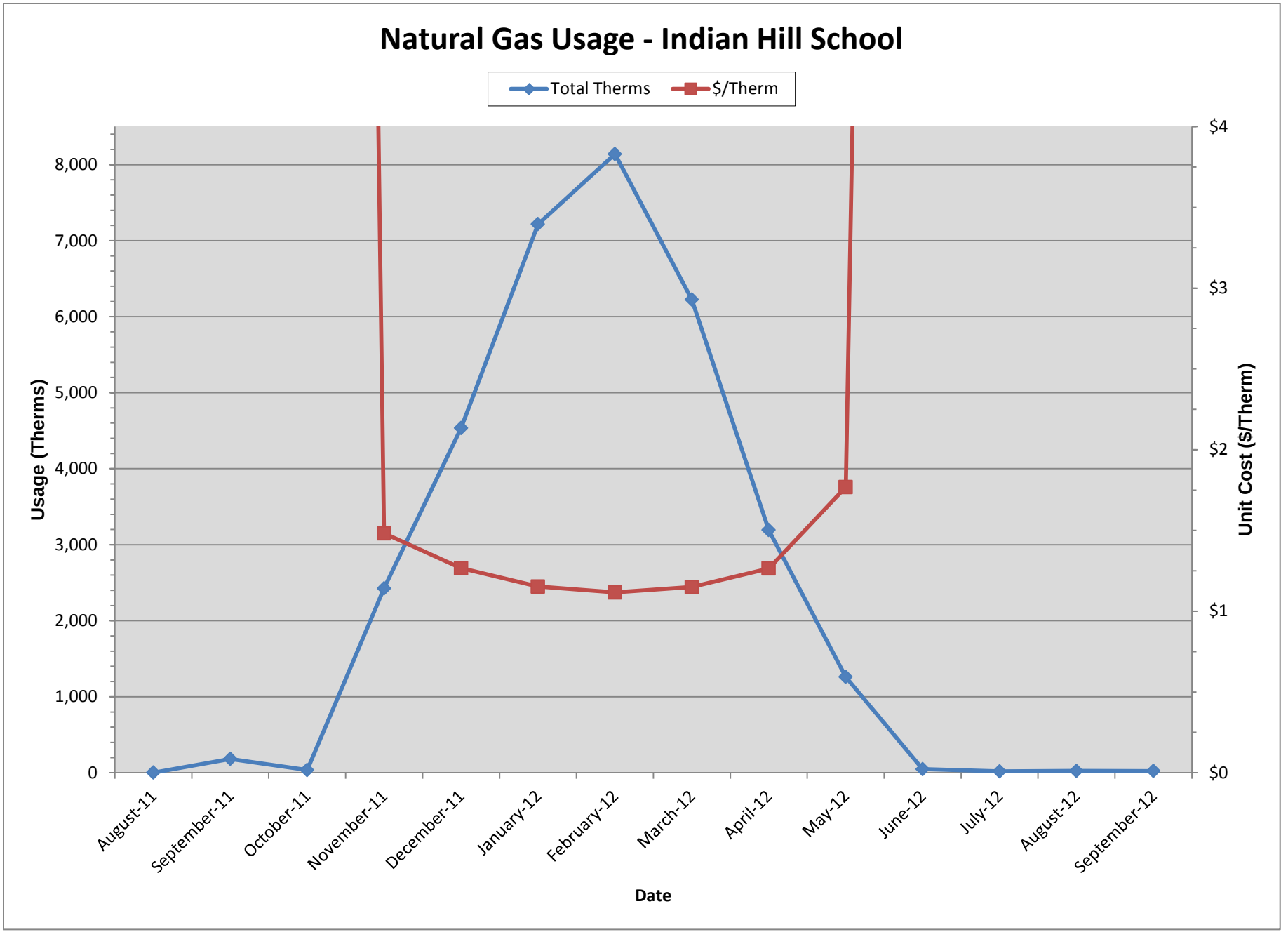


Utility Data -Village School
Electric - Main Graph

Holmdel Township BOE
Village School

For Service at: **Village School**
Account No.: **G-16-2364-3400-21**
Natural Gas Service
Delivery -
Supplier -

Month	Total Therms	Delivery ($)	Supply ($)	Total ($)	$/Therm
August-11	2.0	$ 1,261.65		$ 1,261.65	$ 630.83
September-11	181.1	$ 1,338.49	$ 99.01	$ 1,437.50	$ 7.94
October-11	36.2	$ 1,276.38	$ 18.42	$ 1,294.80	$ 35.82
November-11	2425.2	$ 2,338.20	$ 1,256.91	$ 3,595.11	$ 1.48
December-11	4533.3	$ 3,272.05	$ 2,471.29	$ 5,743.34	$ 1.27
January-12	7216.8	$ 4,452.63	$ 3,867.84	$ 8,320.47	$ 1.15
February-12	8139.4	$ 4,843.58	$ 4,246.48	$ 9,090.06	$ 1.12
March-12	6224.9	$ 4,000.81	$ 3,156.12	$ 7,156.93	$ 1.15
April-12	3192.9	$ 2,666.16	$ 1,371.19	$ 4,037.35	$ 1.26
May-12	1259.7	$ 1,815.16	$ 412.46	$ 2,227.62	$ 1.77
June-12	47.2	$ 1,281.39	$ 14.99	$ 1,296.38	$ 27.49
July-12	18.3	$ 1,268.69		$ 1,268.69	$ 69.29
August-12	23.8	$ 2,539.81		$ 2,539.81	$ 106.85
September-12	22.7	$ 1,279.49		$ 1,279.49	$ 56.29
Total (all)	**33,323.39**	**$ 33,634.49**	**$ 16,914.71**	**$ 50,549.20**	**$ 1.52**
Total (last 12 months)	**33,140.27**	**$ 31,034.35**	**$ 16,815.70**	**$ 47,850.05**	**$ 1.44**


Natural Gas Usage - Indian Hill School
Total Therms
$/Therm
Usage (Therms)
Unit Cost ($/Therm)
8,000
7,000
6,000
5,000
4,000
3,000
2,000
1,000
0
$4
$3
$2
$1
$0
August-11
September-11
October-11
November-11
December-11
January-12
February-12
March-12
April-12
May-12
June-12
July-12
August-12
September-12
Date

APPENDIX B

Equipment Inventory

CHA Project#24988

Description	QTY	Manufacturer Name	Model No.	Serial No.	Equipment Type / Utility	Capacity/Size /Efficiency	Location	Areas/Equipment Served	Date Installed	Remaining Useful Life (years)
DHW Heaters:										0
DHW Heater	1	A.O.Smith	PEN 80 913	MD89-0017543-913	DHW Heating/Electric	4.5kW 80gallon	Adminstration Office Custodian Room	Adminstration Section	2002	14
DHW Heater	1	A.O.Smith	ORE 120 917	MA0400003981	DHW Heating/Electric	45kW 119gallon	Kitchen Cusdodian Room	Kitchen	2002	14
DHW Heater	1	A.O.Smith	EES 80 913	MC960041043-913	DHW Heating/Electric	4.5kW 80gallon	Electrical Closet	Office Area	2002	14
DHW Heater	1	A.O.Smith	DRE 120 917	MM030007752	DHW Heating/Electric	18kW 119gallon	Classroom Custodian Room 1	Classrooms and Rest Rooms	2002	14
DHW Heater	1	A.O.Smith	DRE 120 917	MM030007751	DHW Heating/Electric	18kW 119gallon	Classroom Custodian Room 2	Classrooms and Rest Rooms	2002	14
DHW Heater	1	A.O.Smith	DRE 120 917	MM030002857	DHW Heating/Electric	18kW 119gallon	Classroom Custodian Room 3	Classrooms and Rest Rooms	2002	14
DHW Heater	1	A.O.Smith	PEC 00914	MF89-0024335-319	DHW Heating/Electric		Electrical Closet	Rest Rooms	2002	14
DHW Heater	1	Vanguard	6E717	VFDD0492B02455	DHW Heating/Electric	4.5kW 50gallon	APR Closet	All Purpose Room	2002	14
DHW Heater	1	A.O.Smith	BT65930A	MC93-0264736-930A	DHW Heating/Gas	50MBH 50gallon	Custodian Room	Rest Rooms	2002	14
RTUs, HV units, and Split Units:										0
13	1	Lennox	HS29-036-10Y-OPT	5804C 58106	Condenser and DX Cooling	3 ton	Condenser on Roof	Classroom 13	2002	4
14	1	Lennox	HS29-036-10Y-OPT	5804C 58105	Condenser and DX Cooling	3 ton	Condenser on Roof	Classroom 14	2002	4
15	1	Lennox	HS29-042-11Y-OPT	5804C 20518	Condenser and DX Cooling	3.5 ton	Condenser on Roof	Classroom 15	2002	4
16	1	Lennox	HS29-012-11Y-OPT	5802C 20516	Condenser and DX Cooling	1 ton	Condenser on Roof	Classroom 16	2002	4
17	1	Lennox	HS29-042-11Y-OPT	5804B 73552	Condenser and DX Cooling	3.5 ton	Condenser on Roof	Classroom 17	2002	4
18	1	Lennox	HS29-012-11Y-OPT	5804C 20517	Condenser and DX Cooling	1 ton	Condenser on Roof	Classroom 18	2002	4
19	1	Lennox	HS29-042-11Y-OPT	5804B 73558	Condenser and DX Cooling	3.5 ton	Condenser on Roof	Classroom 19	2002	4
20	1	Lennox	HS29-012-11Y-OPT	5804B 73554	Condenser and DX Cooling	1 ton	Condenser on Roof	Classroom 20	2002	0
RTU-3 (Comp Lab)	1	Carrier	48HJD008-541NB	4303G40587	DX Cooling and NG Heating	7.5 ton Cooling and 125MBH heating/ EER 11 cooling Eff. 80% Heating Eff.	Roof	21-Computer Lab	2002	4
21	1	Fujitsu	AOU30RKXQ	HNN002500	DX Cooling and NG Heating	30.6MBH Cooling and 32MBH Heating	Roof	21- Computer Lab	2002	4
22	1	Lennox	HS29-042-9Y-OPT	5802C 66576	Condenser and DX Cooling	3.5 ton	Condenser on Roof	Classroom 22	2002	4
23	1	Lennox	HS29-036-9Y-OPT	5802K 70379	Condenser and DX Cooling	3 ton	Condenser on Roof	Classroom 23	2002	4

Energy Audit of Holmdel Schools - Village School
CHA Project No.24988
Existing Lighting

Cost of Electricity: **$0.111** **$/kWh**
$6.04 **$/kW**

			EXISTING CONDITIONS									
	Area Description	Usage	No. of Fixtures	Standard Fixture Code	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	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
19	Hallway Area near door 24	Hallway Safety	6	1B 32 P F 2 (ELE)	F42LL	60	0.36	SW	8760	SW	3,154	
19	Hallway Area near door 24	HW	14	1B 32 P F 2 (ELE)	F42LL	60	0.84	SW	1820	SW	1,529	
35	Room 11	Offices	9	T 32 R F 3 (ELE)	F43ILL/2	90	0.81	SW	2000	OCC	1,620	
20	Room 11	Offices	8	S 32 C F 1 (ELE)	F41LL	32	0.26	SW	2000	OCC	512	
36	Room 11	Offices	1	2T 3' 17 R F 1 (ELE)	F21ILL	20	0.02	SW	2000	OCC	40	
35	Room 12	Offices	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.08	SW	2000	OCC	2,160	
20	Room 10	Offices	30	S 32 C F 1 (ELE)	F41LL	32	0.96	SW	2000	OCC	1,920	
19	Room 10	Offices	21	1B 32 P F 2 (ELE)	F42LL	60	1.26	SW	2000	OCC	2,520	
36	Room 10	Offices	13	2T 3' 17 R F 1 (ELE)	F21ILL	20	0.26	SW	2000	OCC	520	
228	Room 10	Offices	12	W60CF1	F81EL	60	0.72	SW	2000	OCC	1,440	
232	Room 10	Offices	1	R 60 C I 1	I60/1	60	0.06	SW	2000	SW	120	
19	Workroom Storage	Offices	11	1B 32 P F 2 (ELE)	F42LL	60	0.66	SW	2000	OCC	1,320	
19	Room 15	Classrooms	24	1B 32 P F 2 (ELE)	F42LL	60	1.44	SW	1400	OCC	2,016	
19	Room 16	Classrooms	24	1B 32 P F 2 (ELE)	F42LL	60	1.44	SW	1400	OCC	2,016	
19	Room 17	Classrooms	24	1B 32 P F 2 (ELE)	F42LL	60	1.44	SW	1400	OCC	2,016	
19	Room 18	Classrooms	24	1B 32 P F 2 (ELE)	F42LL	60	1.44	SW	1400	OCC	2,016	
19	Room 19	Classrooms	24	1B 32 P F 2 (ELE)	F42LL	60	1.44	SW	1400	OCC	2,016	
19	Room 20	Classrooms	24	1B 32 P F 2 (ELE)	F42LL	60	1.44	SW	1400	OCC	2,016	
35	Room 21	Classrooms	25	T 32 R F 3 (ELE)	F43ILL/2	90	2.25	SW	1400	OCC	3,150	
35	Room 21 LabA	Classrooms	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.08	SW	1400	OCC	1,512	
35	Room 22	Classrooms	15	T 32 R F 3 (ELE)	F43ILL/2	90	1.35	SW	1400	OCC	1,890	
35	Room 23	Classrooms	13	T 32 R F 3 (ELE)	F43ILL/2	90	1.17	SW	1400	OCC	1,638	
35	Room 24	Classrooms	13	T 32 R F 3 (ELE)	F43ILL/2	90	1.17	SW	1400	OCC	1,638	
35	Room 25	Classrooms	13	T 32 R F 3 (ELE)	F43ILL/2	90	1.17	SW	1400	OCC	1,638	
35	Room 26	Classrooms	13	T 32 R F 3 (ELE)	F43ILL/2	90	1.17	SW	1400	OCC	1,638	
35	Room 27	Classrooms	6	T 32 R F 3 (ELE)	F43ILL/2	90	0.54	SW	1400	OCC	756	
35	Room 28	Classrooms	13	T 32 R F 3 (ELE)	F43ILL/2	90	1.17	SW	1400	OCC	1,638	
19	Room 29 (Lib A)	Library	2	1B 32 P F 2 (ELE)	F42LL	60	0.12	SW	2000	OCC	240	
20	Room 29 (Lib A)	Library	20	S 32 C F 1 (ELE)	F41LL	32	0.64	SW	2000	OCC	1,280	
39	Room 29 (Lib A)	Library	12	2' 17 W F 2 (ELE)	F22ILL	33	0.40	SW	2000	OCC	792	
35	Room 30	Classrooms	9	T 32 R F 3 (ELE)	F43ILL/2	90	0.81	SW	1400	OCC	1,134	
35	Room 31	Classrooms	6	T 32 R F 3 (ELE)	F43ILL/2	90	0.54	SW	1400	OCC	756	
35	Room 32	Classrooms	13	T 32 R F 3 (ELE)	F43ILL/2	90	1.17	SW	1400	OCC	1,638	
35	Room 33	Classrooms	13	T 32 R F 3 (ELE)	F43ILL/2	90	1.17	SW	1400	OCC	1,638	
35	Room 34	Classrooms	17	T 32 R F 3 (ELE)	F43ILL/2	90	1.53	SW	1400	OCC	2,142	
19	Custodian Room	Custodian	2	1B 32 P F 2 (ELE)	F42LL	60	0.12	SW	780	OCC	94	
19	Electric Closet	Custodian	4	1B 32 P F 2 (ELE)	F42LL	60	0.24	SW	780	OCC	187	
35	Room 35	Classrooms	13	T 32 R F 3 (ELE)	F43ILL/2	90	1.17	SW	1400	OCC	1,638	
35	Room 36	Classrooms	13	T 32 R F 3 (ELE)	F43ILL/2	90	1.17	SW	1400	OCC	1,638	
35	Boy's Room	Restroom	1	T 32 R F 3 (ELE)	F43ILL/2	90	0.09	SW	1000	OCC	90	
35	Girl's Room	Restroom	1	T 32 R F 3 (ELE)	F43ILL/2	90	0.09	SW	1000	OCC	90	
19	Room 37	Classrooms	13	1B 32 P F 2 (ELE)	F42LL	60	0.78	SW	1400	OCC	1,092	
19	Room 38	Classrooms	13	1B 32 P F 2 (ELE)	F42LL	60	0.78	SW	1400	OCC	1,092	
19	Room 39	Classrooms	13	1B 32 P F 2 (ELE)	F42LL	60	0.78	SW	1400	OCC	1,092	
19	Room 40	Classrooms	13	1B 32 P F 2 (ELE)	F42LL	60	0.78	SW	1400	OCC	1,092	
19	Room 41	Classrooms	13	1B 32 P F 2 (ELE)	F42LL	60	0.78	SW	1400	OCC	1,092	
19	Room 42	Classrooms	13	1B 32 P F 2 (ELE)	F42LL	60	0.78	SW	1400	OCC	1,092	
19	Boiler Room B	Mechanical Room	2	1B 32 P F 2 (ELE)	F42LL	60	0.12	SW	1000	OCC	120	
9	Atrium	HW	4	High Bay MH 400	MH400/1	458	1.83	SW	1820	OCC	3,334	
9	Old Gym (Gym A)	Gymnasium	22	High Bay MH 400	MH400/1	458	10.08	SW	2000	OCC	20,152	
19	Old Gym (Gym A)	Gymnasium	10	1B 32 P F 2 (ELE)	F42LL	60	0.60	SW	2000	OCC	1,200	
133	Old Gym (Gym A)	Gymnasium	4	CF 26	CFQ26/1-L	27	0.11	SW	2000	OCC	216	
19	Boy's Room	Restroom	3	1B 32 P F 2 (ELE)	F42LL	60	0.18	SW	1000	OCC	180	
19	Girl's Room	Restroom	3	1B 32 P F 2 (ELE)	F42LL	60	0.18	SW	1000	OCC	180	
19	Custodian Room	Custodian	1	1B 32 P F 2 (ELE)	F42LL	60	0.06	SW	780	OCC	47	
19	APR Storage	Storage Areas	16	1B 32 P F 2 (ELE)	F42LL	60	0.96	SW	1000	OCC	960	
19	All Purpose Room	APR	11	1B 32 P F 2 (ELE)	F42LL	60	0.66	SW	1400	OCC	924	
9	All Purpose Room	APR	15	High Bay MH 400	MH400/1	458	6.87	SW	1400	OCC	9,618	
35	Room 43	Classrooms	10	T 32 R F 3 (ELE)	F43ILL/2	90	0.90	SW	1400	OCC	1,260	
35	Room 44	Classrooms	9	T 32 R F 3 (ELE)	F43ILL/2	90	0.81	SW	1400	OCC	1,134	
19	Room 45	Classrooms	11	1B 32 P F 2 (ELE)	F42LL	60	0.66	SW	1400	OCC	924	
19	Room 46	Classrooms	4	1B 32 P F 2 (ELE)	F42LL	60	0.24	SW	1400	OCC	336	
19	Room 46A	Classrooms	3	1B 32 P F 2 (ELE)	F42LL	60	0.18	SW	1400	OCC	252	
19	Room 47	Classrooms	6	1B 32 P F 2 (ELE)	F42LL	60	0.36	SW	1400	OCC	504	
35	Room 48	Classrooms	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.08	SW	1400	OCC	1,512	
35	Room 48B	Classrooms	6	T 32 R F 3 (ELE)	F43ILL/2	90	0.54	SW	1400	OCC	756	
19	Custodian Room	Custodian	2	1B 32 P F 2 (ELE)	F42LL	60	0.12	SW	780	OCC	94	
228	Boiler Room A	Mechanical Room	2	W60CF1	F81EL	60	0.12	SW	1000	OCC	120	
19	Room 34 A	Classrooms	4	1B 32 P F 2 (ELE)	F42LL	60	0.24	SW	1400	OCC	336	
19	Room 112A	Nurse Office	26	1B 32 P F 2 (ELE)	F42LL	60	1.56	SW	1400	OCC	2,184	
19	Boy's Room	Restroom	5	1B 32 P F 2 (ELE)	F42LL	60	0.30	SW	1000	OCC	300	

Energy Audit of Holmdel Schools - Village School
CHA Project No.24988
Existing Lighting

Cost of Electricity: **$0.111** **$/kWh**
$6.04 **$/kW**

			EXISTING CONDITIONS									
	Area Description	Usage	No. of Fixtures	Standard Fixture Code	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	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
19	Custodian Room	Custodian	1	1B 32 P F 2 (ELE)	F42LL	60	0.06	SW	780	OCC	47	
19	Girl's Room	Restroom	4	1B 32 P F 2 (ELE)	F42LL	60	0.24	SW	1000	OCC	240	
19	Room 101	Classrooms	18	1B 32 P F 2 (ELE)	F42LL	60	1.08	SW	1400	OCC	1,512	
19	Room 102	Classrooms	18	1B 32 P F 2 (ELE)	F42LL	60	1.08	SW	1400	OCC	1,512	
19	Room 103	Classrooms	18	1B 32 P F 2 (ELE)	F42LL	60	1.08	SW	1400	OCC	1,512	
19	Room 104	Classrooms	18	1B 32 P F 2 (ELE)	F42LL	60	1.08	SW	1400	OCC	1,512	
19	Room 105	Classrooms	18	1B 32 P F 2 (ELE)	F42LL	60	1.08	SW	1400	OCC	1,512	
19	Room 106	Classrooms	18	1B 32 P F 2 (ELE)	F42LL	60	1.08	SW	1400	OCC	1,512	
19	Room 107	Classrooms	18	1B 32 P F 2 (ELE)	F42LL	60	1.08	SW	1400	OCC	1,512	
19	Room 108	Classrooms	18	1B 32 P F 2 (ELE)	F42LL	60	1.08	SW	1400	OCC	1,512	
19	Room 109	Classrooms	18	1B 32 P F 2 (ELE)	F42LL	60	1.08	SW	1400	OCC	1,512	
19	Room 110	Classrooms	18	1B 32 P F 2 (ELE)	F42LL	60	1.08	SW	1400	OCC	1,512	
19	Room 111	Classrooms	22	1B 32 P F 2 (ELE)	F42LL	60	1.32	SW	1400	OCC	1,848	
19	Room 115	Classrooms	11	1B 32 P F 2 (ELE)	F42LL	60	0.66	SW	1400	OCC	924	
19	Room 116	Classrooms	18	1B 32 P F 2 (ELE)	F42LL	60	1.08	SW	1400	OCC	1,512	
19	Library B (2-3 Lib)	Library	60	1B 32 P F 2 (ELE)	F42LL	60	3.60	SW	2000	OCC	7,200	
19	Room 117	Classrooms	18	1B 32 P F 2 (ELE)	F42LL	60	1.08	SW	1400	OCC	1,512	
19	Room 118	Classrooms	5	1B 32 P F 2 (ELE)	F42LL	60	0.30	SW	1400	OCC	420	
35	Room 119	Classrooms	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.08	SW	1400	OCC	1,512	
35	Room 120	Classrooms	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.08	SW	1400	OCC	1,512	
35	Room 121	Classrooms	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.08	SW	1400	OCC	1,512	
35	Room 122	Classrooms	5	T 32 R F 3 (ELE)	F43ILL/2	90	0.45	SW	1400	OCC	630	
35	Room 123	Classrooms	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.08	SW	1400	OCC	1,512	
35	Room 124	Classrooms	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.08	SW	1400	OCC	1,512	
35	Room 125	Classrooms	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.08	SW	1400	OCC	1,512	
35	Room 126	Classrooms	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.08	SW	1400	OCC	1,512	
35	Room 127	Classrooms	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.08	SW	1400	OCC	1,512	
35	Storage	Storage Areas	2	T 32 R F 3 (ELE)	F43ILL/2	90	0.18	SW	1000	OCC	180	
35	Room 128	Classrooms	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.08	SW	1400	OCC	1,512	
35	Room 129	Classrooms	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.08	SW	1400	OCC	1,512	
35	Room 130	Classrooms	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.08	SW	1400	OCC	1,512	
35	Room 131	Classrooms	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.08	SW	1400	OCC	1,512	
35	Room 132	Classrooms	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.08	SW	1400	OCC	1,512	
35	Room 133	Classrooms	8	T 32 R F 3 (ELE)	F43ILL/2	90	0.72	SW	1400	OCC	1,008	
35	Room 134	Classrooms	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.08	SW	1400	OCC	1,512	
35	Room 135	Classrooms	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.08	SW	1400	OCC	1,512	
35	Room 136	Classrooms	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.08	SW	1400	OCC	1,512	
19	Boy's Room	Restroom	4	1B 32 P F 2 (ELE)	F42LL	60	0.24	SW	1000	OCC	240	
19	Girl's Room	Restroom	4	1B 32 P F 2 (ELE)	F42LL	60	0.24	SW	1000	OCC	240	
35	Room 137	Classrooms	18	T 32 R F 3 (ELE)	F43ILL/2	90	1.62	SW	1400	OCC	2,268	
35	Room 138	Classrooms	18	T 32 R F 3 (ELE)	F43ILL/2	90	1.62	SW	1400	OCC	2,268	
35	Room 139	Classrooms	18	T 32 R F 3 (ELE)	F43ILL/2	90	1.62	SW	1400	OCC	2,268	
35	Room 140	Classrooms	18	T 32 R F 3 (ELE)	F43ILL/2	90	1.62	SW	1400	OCC	2,268	
20	Electric Closet	Custodian	1	S 32 C F 1 (ELE)	F41LL	32	0.03	SW	780	OCC	25	
232	Electric Closet	Custodian	1	R 60 C I 1	I60/1	60	0.06	SW	780	OCC	47	
35	Main Office	Offices	24	T 32 R F 3 (ELE)	F43ILL/2	90	2.16	SW	2000	OCC	4,320	
39	Men's Room	Restroom	5	2' 17 W F 2 (ELE)	F22ILL	33	0.17	SW	1000	OCC	165	
39	Ladies' Room	Restroom	5	2' 17 W F 2 (ELE)	F22ILL	33	0.17	SW	1000	OCC	165	
9	New Gym (Gym B)	Gymnasium	36	High Bay MH 400	MH400/1	458	16.49	SW	2000	OCC	32,976	
35	Gym Office	Offices	3	T 32 R F 3 (ELE)	F43ILL/2	90	0.27	SW	2000	OCC	540	
35	Gym Storage	Storage Areas	3	T 32 R F 3 (ELE)	F43ILL/2	90	0.27	SW	1000	OCC	270	
35	Kitchen	Kitchen	13	T 32 R F 3 (ELE)	F43ILL/2	90	1.17	SW	1400	OCC	1,638	
19	Kitchen	Kitchen	2	1B 32 P F 2 (ELE)	F42LL	60	0.12	SW	1400	OCC	168	
5	Kitchen	Kitchen	3	2T 32 R F 2 (u) (ELE)	FU2LL	60	0.18	SW	1400	OCC	252	
19	Storage	Storage Areas	4	1B 32 P F 2 (ELE)	F42LL	60	0.24	SW	1000	OCC	240	
35	Storage	Storage Areas	3	T 32 R F 3 (ELE)	F43ILL/2	90	0.27	SW	1000	OCC	270	
35	Music Room	Classrooms	26	T 32 R F 3 (ELE)	F43ILL/2	90	2.34	SW	1400	OCC	3,276	
19	Electric Closet	Custodian	5	1B 32 P F 2 (ELE)	F42LL	60	0.30	SW	780	OCC	234	
19	Hallway Area	Hallway Safety	90	1B 32 P F 2 (ELE)	F42LL	60	5.40	SW	8760	SW	47,304	
19	Hallway Area	HW	100	1B 32 P F 2 (ELE)	F42LL	60	6.00	SW	1820	OCC	10,920	
39	Hallway Area	HW	10	2' 17 W F 2 (ELE)	F22ILL	33	0.33	SW	1820	OCC	601	

Energy Audit of Holmdel Schools - Village School
CHA Project No.24988
Existing Lighting

Cost of Electricity: **$0.111** **$/kWh**
$6.04 **$/kW**

			EXISTING CONDITIONS									
	Area Description	Usage	No. of Fixtures	Standard Fixture Code	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	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		1,740				150.38				278,795	

Energy Audit of Holmdel Township BOE
CHA Project No.24988
Existing Lighting

Cost of Electricity: **$0.111** **$/kWh**
$6.04 **$/kW**

			EXISTING CONDITIONS									
	Area Description	Usage	No. of Fixtures	Standard Fixture Code	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	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		96				20.56				74,838	

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	Window Replacement in Atrium	98,300	1,700	>20	0	>20	X
ECM-2	Remove Slant Fin Boilers and Tie in Classrooms to Main Boiler Loop	12,300	1,400	8.6	0	8.6	X
ECM-3	Replace Art Room AC Unit	10,000	100	>20	292	>20	X
ECM-4	Replace Computer Room AC Unit	11,400	100	>20	365	>20	X
ECM-5	Install VSDs and Premium Motors on two HW Pumps (15HP each)	29,100	4,200	6.9	1,880	6.5	X
ECM-6	DCV Controls for Multi-purpose room and Old Gym	19,600	6,100	3.3	0	3.3	X
ECM-7	Install Kitchen Hood Controller	39,000	100	>20	163	>20	
ECM-8	Replace Air Pump Motors with Premium Efficiency Motors	1,500	200	10.0	80	9.5	X
ECM-L1	Lighting Replacement / Upgrades	42,700	2,300	18.7	7,700	15.3	
ECM-L2	Install Lighting Controls (Occupancy Sensors)	16,400	7,800	2.1	2,560	1.7	
ECM-L3	Lighting Replacements with Lighting Controls (Occupancy Sensors)	59,100	7,900	7.5	10,260	6.2	X
ECM-L4	Exterior Lighting Replacements with LED lighting	62,100	7,200	8.6	9,600	7.3	X

Holmdel Township BOE - NJBPU
CHA Project #24988
Village School
ECM Summary Sheet

ECM-1 Window Replacement in Atrium

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
98,000	0	0.0	1,200	1,700	0	1,700	(0.6)	0	>20	>20

Expected Life: 25 years
Lifetime Savings: 0 kWh 30,000 therms $ 42,500

ECM-2 Remove Slant Fin Boilers and Tie in Classrooms to Main Boiler Loop

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
12,000	0	0.0	1,000	1,400	0	1,400	1.3	0	8.6	8.6

Expected Life: 20 years
Lifetime Savings: 0 kWh 20,000 therms $ 28,000

ECM-3 Replace Art Room AC Unit

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
10,000	300	0.0	0	100	0	100	(0.9)	300	>20	>20

Expected Life: 15 years
Lifetime Savings: 4,500 kWh 0 therms $ 1,500

ECM-4 Replace Computer Room AC Unit

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
11,000	400	0.0	0	100	0	100	(0.9)	400	>20	>20

Expected Life: 15 years
Lifetime Savings: 6,000 kWh 0 therms $ 1,500

ECM-5 Install VSDs and Premium Motors on two HW Pumps (15HP each)

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
29,000	28,200	0.0	0	4,200	0	4,200	1.2	1,900	6.9	6.5

Expected Life: 15 years
Lifetime Savings: 423,000 kWh 0 therms $ 63,000

ECM-6 DCV Controls for Multi-purpose room and Old Gym

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
20,000	0	0.0	4,200	6,100	0	6,100	3.7	0	3.3	3.3

Expected Life: 15 years
Lifetime Savings: 0 kWh 63,000 therms $ 91,500

ECM-7 Install Kitchen Hood Controller

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
39,000	600	0.0	20	100	0	100	(1.0)	200	>20	>20

Expected Life: 15 years

Lifetime Savings: 9,000 kWh 300 therms $ 1,500

ECM-8 Replace Air Pump Motors with Premium Efficiency Motors

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
2,000	1,400	0.0	0	200	0	200	1.4	100	10.0	9.5

Expected Life: 15 years

Lifetime Savings: 21,000 kWh 0 therms $ 3,000

ECM-L1 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
43,000	15,500	8.3	0	2,300	0	2,300	0.0	7,700	18.7	15.3

Expected Life: 15 years

Lifetime Savings: 232,500 kWh 0 therms $ 34,500

ECM-L2 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
16,000	52,100	0.0	0	7,800	0	7,800	6.1	2,600	2.1	1.7

Expected Life: 15 years

Lifetime Savings: 781,500 kWh 0 therms $ 117,000

ECM-L3 **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
59,000	66,200	8.3	0	7,900	0	7,900	1.7	10,300	7.5	6.2

Expected Life: 15 years

Lifetime Savings: 993,000 kWh 0 therms $ 118,500

ECM-L4 **Exterior Lighting Replacements with LED lighting**

Budgetary Cost	Annual Utility Savings				Estimated Maintenance Savings	Total Savings	ROI	Incentive *	Payback (without incentive)	Payback (with incentive)
	Electric	Electric	Water	Total						
$	kWh	kW	kgal/yr	$	$	$		$	Years	Years
62,000	54,800	20.0	0	7,200	0	7,200	1.2	9,600	8.6	7.3

Expected Life: 15 years

Lifetime Savings: 822,000 kWh 0 therms $ 108,000

Holmdel Township BOE - NJBPU
CHA Project #24988

Rate of Discount (used for NPV) 3.0%

Utility Costs		Yearly Usage	Building Area	Annual Utility Cost	
$ 0.149	$/kWh blended		131,000	Electric	Natural Gas
$ 0.111	$/kWh supply	736,000		$109,998	$47,850
$ 6.04	$/kW	391.94			
$ 1.44	$/Therm	33,140			
	$/kgals	545			

Village School

	Item	Savings					Cost	Simple Payback	Life Expectancy	NJ Smart Start Incentives	Direct Install Eligible (Y/N)*	Direct Install Incentives**	Max Incentives	Payback w/ Incentives***	Simple Projected Lifetime Savings					ROI	NPV	IRR
		kW	kWh	therms	Water kgal	$									kW	kWh	therms	kgal/yr	$			
ECM-1	Window Replacement in Atrium	0.0	0	1,155	0	$ 1,700	$ 98,300	57.8	25	$ -	N	$ -	$ -	57.8	0.0	0	28,884	0	$ 41,705	(0.6)	($68,698)	-5.6%
ECM-2	Remove Slant Fin Boilers and Tie in Classrooms to Main Boiler Loop	0.0	0	994	0	$ 1,400	$ 12,300	8.8	20	$ -	N	$ -	$ -	8.8	0.0	0	19,884	0	$ 28,710	1.3	$8,528	9.5%
ECM-3	Replace Art Room AC Unit	0.0	336	0	0	$ 100	$ 10,000	100.0	15	$ 292	N	$ -	$ 292	97.1	0.0	5,034	0	0	$ 752	(0.9)	($8,514)	-17.5%
ECM-4	Replace Computer Room AC Unit	0.0	420	0	0	$ 100	$ 11,400	114.0	15	$ 365	N	$ -	$ 365	110.4	0.0	6,293	0	0	$ 941	(0.9)	($9,841)	-18.5%
ECM-5	Install VSDs and Premium Motors on two HW Pumps (15HP each)	0.0	28,162	0	0	$ 4,200	$ 29,100	6.9	15	$ 1,880	N	$ -	$ 1,880	6.5	0.0	422,433	0	0	$ 63,134	1.2	$22,919	12.9%
ECM-6	DCV Controls for Multi-purpose room and Old Gym	0.0	0	4,250	0	$ 6,100	$ 19,600	3.2	15	$ -	N	$ -	$ -	3.2	0.0	0	63,750	0	$ 92,046	3.7	$53,221	30.6%
ECM-7	Install Kitchen Hood Controller	0.0	624	16	0	$ 100	$ 39,000	390.0	15	$ 163	N	$ -	$ 163	388.4	0.0	9,367	243	0	$ 1,751	(1.0)	($37,644)	-26.7%
ECM-8	Replace Air Pump Motors with Premium Efficiency Motors	0.3	1,417	0	0	$ 200	$ 1,500	7.5	15	$ 80	N	$ -	$ 80	7.1	4.9	21,260	0	0	$ 3,529	1.4	$968	11.2%
ECM-L1	Lighting Replacement / Upgrades	8.3	15,530	0.0	0	$ 2,300	$ 42,700	18.6	15	$ 7,700	N	$ -	$ 7,700	15.2	124.6	232,946	0	0	$ 43,843	0.0	($7,543)	-0.2%
ECM-L2	Install Lighting Controls (Occupancy Sensors)	0.0	52,108	0.0	0	$ 7,800	$ 16,400	2.1	15	$ 2,560	N	$ -	$ 2,560	1.8	0.0	781,619	0	0	$ 116,816	6.1	$79,276	56.3%
ECM-L3	Lighting Replacements with Lighting Controls (Occupancy Sensors)	8.3	66,191	0.0	0	$ 7,900	$ 59,100	7.5	15	$ 10,260	N	$ -	$ 10,260	6.2	124.6	992,858	0	0	$ 157,415	1.7	$45,470	13.9%
ECM-L4	Exterior Lighting Replacements with LED lighting	15.1	54,797	0.0	0	$ 7,200	$ 62,100	8.6	15	$ 9,600	N	$ -	$ 9,600	7.3	225.8	821,948	0	0	$ 139,208	1.2	$33,453	10.7%
	Total (Does Not Include ECM-L1 & ECM-L2)	**23**	**150,529**	**6,416**	**0**	**$ 30,200**	**$ 340,900**	11.3	15	$ 22,640		$ -	$ 22,640	10.5	355.2	2,279,193	112,761	0	$ 529,190	0.6	$42,265	4.8%
	Total Measures with Payback <15	**23**	**149,149**	**6,238**	**0**	**$ 26,800**	**$ 182,200**	6.8	15	$ 21,820		$ -	$ 21,820	6.0	355.2	2,258,499	83,634	0	$ 484,042	1.7	$159,557	14.5%
	% of Existing	**6%**	**20%**	**19%**	**0%**																	

Holmdel Township BOE - NJBPU
CHA Project #24988
Village School

Note: pricing is for energy calculations only -do not use for procurement

ECM-1: Window Replacement & Reduced Glazing

Existing: Single pane windows are original to the building and not properly sealed. This can lead to increased energy consumption due to infiltration/exfiltration and heat gain/loss.
Proposed: Install double pane windows and weather strips

Linear Feet of window Edge	918.1 LF	Cooling System Efficiency	1.2 kW/ton	Heating System Efficiency	88%			
Area of window glass	891.7 SF	Ex Occupied Clng Temp.	75 *F	Heating On Temp.	60 *F			
Existing Infiltration Factor	**0.30 cfm/LF**	Ex Unoccupied Clng Temp.	85 *F	Ex Occupied Htg Temp.	70 *F			
Proposed Infiltration Factor	**0.10 cfm/LF**	Cooling Occ Enthalpy Setpoint	27.5 Btu/lb	Ex Unoccupied Htg Temp.	58 *F			
Existing U Value	**1.20 Btuh/SF/°F**	Cooling Unocc Enthalpy Setpoint	27.5 Btu/lb	Electricity	$ 0.149	$/kWh		
Proposed U Value	**0.55 Btuh/SF/°F**			Natural Gas	$ 1.44	$/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	Window Infiltration & Heat Load BTUH	Window Infiltration & Heat Load BTUH	Window Infiltration & Heat Load BTUH	Window 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	50.1	0	0	0	-57,435	-46,735	-22,823	-17,919	0	0	0	0
97.5	42.5	0	0	0	-42,666	-31,966	-17,231	-12,327	0	0	0	0
92.5	39.5	3	1	2	-33,598	-22,898	-13,540	-8,636	0	0	0	0
87.5	36.6	34	8	26	-24,653	-13,953	-9,890	-4,985	0	0	0	0
82.5	34.0	131	31	100	-16,081	0	-6,363	0	0	0	0	0
77.5	31.6	500	119	381	-7,756	0	-2,920	0	0	0	0	0
72.5	29.2	620	148	472	0	0	0	0	0	0	0	0
67.5	27.0	664	158	506	0	0	0	0	0	0	0	0
62.5	24.5	854	203	651	0	0	0	0	0	0	0	0
57.5	21.4	927	221	706	17,093	684	7,370	295	0	0	48	21
52.5	18.7	600	143	457	23,930	7,521	10,317	3,243	0	0	78	34
47.5	16.2	610	145	465	30,768	14,358	13,265	6,190	0	0	127	55
42.5	14.4	611	145	466	37,605	21,195	16,213	9,138	0	0	174	75
37.5	12.6	656	156	500	44,442	28,033	19,161	12,086	0	0	238	103
32.5	10.7	1,023	244	779	51,279	34,870	22,109	15,034	0	0	451	194
27.5	8.6	734	175	559	58,117	41,707	25,057	17,982	0	0	380	164
22.5	6.8	334	80	254	64,954	48,545	28,004	20,930	0	0	199	86
17.5	5.5	252	60	192	71,791	55,382	30,952	23,877	0	0	170	73
12.5	4.1	125	30	95	78,628	62,219	33,900	26,825	0	0	94	40
7.5	2.6	47	11	36	85,466	69,056	36,848	29,773	0	0	39	17
2.5	1.0	22	5	17	92,303	75,894	39,796	32,721	0	0	20	9
-2.5	0.0	13	3	10	99,140	82,731	42,744	35,669	0	0	13	6
-7.5	-1.5	0	0	0	105,977	89,568	45,691	38,617	0	0	0	0
TOTALS		**8,760**	**2,086**	**6,674**					0	0	**2,031**	**876**

Existing Window Infiltration	**275**	**cfm**
Existing Window Heat Transfer	**1,070**	**Btuh/°F**
Proposed Window Infiltration	**92**	**cfm**
Proposed Window Heat Transfer	**490**	**Btuh/°F**

Savings	**1,155**	**Therms**	**$ 1,668**
	0	**kWh**	**$ -**
			$ 1,668

Window ID	Location	Quantity	Width (ft)	Height (ft)	Linear Feet (LF)	Area (SF)	Infiltration Rate (CFM/LF)	U Value (Btuh/SF/°F)	Infiltration (CFM)	Heat Transfer (Btuh/°F)
Atrium Area	Exterior Wall	44	2.75	6.67	828.7	806.7	0.3	1.2	248.6	968.0
Atrium Area	Exterior Wall	2	4.25	20	89.4	85.0	0.3	1.2	26.8	102.0
Total		**46**	**7**	**26.67**	**918.06**	**891.67**	**0.3**	**1.2**	**275.42**	**1070**

Multipliers	
Material:	1.10
Labor:	1.35
Equipment:	1.10

ECM-1: Window Replacements and Reduced Glazing - Cost

Description	QTY	UNIT	UNIT COSTS			SUBTOTAL COSTS			TOTAL COST	REMARKS
			MAT.	LABOR	EQUIP.	MAT.	LABOR	EQUIP.		
Windows	891.7	$ / SF	$ 45.00	$ 45.00		$ 44,138	$ 54,169	$ -	$ 98,306	
					$ -	$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	

Note: Cost Estimates are for Energy Savings Calulations only- Do not use for procurement !

$ 98,306	Subtotal
$ -	
$ -	
$ -	
$ 98,306	**Total**

ECM-2: Remove Slant Fin Boilers and Tie in Classrooms to Main Boiler Loop

Existing Fuel Nat.Gas

Proposed Fuel Nat.Gas

Item	Value	Units	Formula/Comments
Baseline Fuel Cost	$ 1.44	/ Therm	
Proposed Fuel Cost	$ 1.44	/ Therm	
Baseline Fuel Use	994	Therms	Based on historical utility data
Existing Boiler Plant Efficiency	80%		Estimated based on age of boiler and heat exchanger
Baseline Boiler Load	79,537	Mbtu/yr	Baseline Fuel Use x Existing Efficiency x 100 Mbtu/Therms
Baseline Fuel Cost	$ 1,436		

*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**	**994**	**$0**	**$1,436**

Multipliers	
Material:	1.10
Labor:	1.35
Equipment:	1.10

ECM-2: Remove Slant Fin Boilers and Tie in Classrooms to Main Boiler Loop - Cost

Description	QTY	UNIT	UNIT COSTS			SUBTOTAL COSTS			TOTAL COST	REMARKS
			MAT.	LABOR	EQUIP.	MAT.	LABOR	EQUIP.		
Piping	70	LF	$ 75.00	$ 26.00		$ 5,775	$ 2,457	$ -	$ 8,232	
Hot Water Piping Insulation	70	LF	$ 25	$ 15	$ -	$ 1,925	$ 1,418	$ -	$ 3,343	
Valves	2	EA	$ 150	$ 150		$ 330	$ 405	$ -	$ 735	
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	

Note: Cost Estimates are for Energy Savings Calulations only- Do not use for procurement !

$	12,310	Subtotal
$	-	
$	-	
$	-	
$	**12,310**	**Total**

Holmdel Township BOE - NJBPU
CHA Project #24988
Village School

EQUIPMENT	AREA/EQUIPMENT SERVED	COOLING CAPACITY* (MBH)
RTU-1A	Art Room	48
	Total Electric DX Cooling:	*48* *MBH*

* the cooling capacity is based on the book of "HVAC Rule of Tumb". The room is 32' by 34' and it is required about 45 Btu/sq ft. Therefore, 48MBH(4 ton) is needed to cool this room

ECM-3: Replace Art Room AC Unit

ECM Description Summary

By replacing older split system DX equipment with higher SEER/EER DX condensing units, significant electrical energy can be saved. Control schemes can be incorporated that were not possible with the older equiopment as well, but the equipment can also operate in same manner as existing (i.e., stand alone, or monitored/sequenced by a BAS). It is recommended this unit be replaced by more modern DX split system equipment with high efficiecny fans and compressors.

ASSUMPTIONS			Comments
Electric Cost	$0.149	/ kWh	
Average run hours per Week	50	Hours	
Space Balance Point	55	F	
Space Temperature Setpoint	75	deg F	Setpoint.
BTU/Hr Rating of existing DX equipment	48,000	Btu / Hr	Total BTU/hr of DX cooling equipment to be replaced.
Average EER	8.0		Unit is more than 20 years old, estimated
Existing Annual Electric Usage	604	kWh	

Item	Value	Units	Comments
Proposed EER	18.0		New ductless mini-splits (per manufacturer)
Proposed Annual Electric Usage	269	kWh	Unit will cycle on w/ temp of room. Possible operating time shown below

ANNUAL SAVINGS		
Annual Electrical Usage Savings	336	kWh
Annual Cost Savings	$50	
Total Project Cost	$10,000	
Simple Payback	199	years

OAT - DB Bin Temp F	Annual Hours	Cooling Hrs at Temp Above balance point	Assumed % of time of operation	Assumed hrs of Operation
102.5	0	0	100%	0
97.5	0	0	89%	0
92.5	3	1	79%	1
87.5	34	10	68%	7
82.5	131	39	58%	23
77.5	500	149	47%	70
72.5	620	0	0%	0
67.5	664	0	0%	0
62.5	854	0	0%	0
57.5	927	0	0%	0
52.5	600	0	0%	0
47.5	610	0	0%	0
42.5	611	0	0%	0
37.5	656	0	0%	0
32.5	1,023	0	0%	0
27.5	734	0	0%	0
22.5	334	0	0%	0
17.5	252	0	0%	0
12.5	125	0	0%	0
7.5	47	0	0%	0
2.5	22	0	0%	0
-2.5	13	0	0%	0
-7.5	0	0	0%	0
Total	8,760	199	51%	101

Holmdel Township BOE - NJBPU
CHA Project #24988
Village School

ECM-3: Replace Art Room AC Unit - Cost

Multipliers	
Material:	1.10
Labor:	1.35
Equipment:	1.10

Description	QTY	UNIT	UNIT COSTS			SUBTOTAL COSTS			TOTAL COST	REMARKS
			MAT.	LABOR	EQUIP.	MAT.	LABOR	EQUIP.		
AC Removal	1	EA		$ 500		$ -	$ 675	$ -	$ 675	
New Split AC Unit (4-TON UNIT)	1	EA	$ 4,000	$ 1,000		$ 4,400	$ 1,350	$ -	$ 5,750	
Miscellanous Piping	1	EA	$ 200	$ 150		$ 220	$ 203	$ -	$ 423	
Miscellanous Electric	1	EA	$ 200	$ 150		$ 220	$ 203	$ -	$ 423	
Control System	1	EA	$ 200	$ 150		$ 220	$ 203	$ -	$ 423	
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	

Note: Cost Estimates are for Energy Savings Calulations only- Do not use for procurement !

$ 7,693	Subtotal
$ 769	10% Contingency
$ 1,539	20% Contractor O&P
$ 10,000	**Total**

Holmdel Township BOE - NJBPU
CHA Project #24988
Village School

EQUIPMENT	AREA/EQUIPMENT SERVED	COOLING CAPACITY (MBH)
Computer Room AC	Computer Room	60
	Total Electric DX Cooling:	*60* *MBH*

ECM-4: Replace Computer Room AC Unit

ECM Description Summary
By replacing older split system DX equipment with higher SEER/EER DX condensing units, significant electrical energy can be saved. Control schemes can be incorporated that were not possible with the older equiopment as well, but the equipment can also operate in same manner as existing (i.e., stand alone, or monitored/sequenced by a BAS). It is recommended these units be replaced by more modern DX split system equipment with high efficiecny fans and compressors.

ASSUMPTIONS			Comments
Electric Cost	$0.149	/ kWh	
Average run hours per Week	50	Hours	
Space Balance Point	55	F	
Space Temperature Setpoint	75	deg F	Setpoint.
BTU/Hr Rating of existing DX equipment	60,000	Btu / Hr	Total BTU/hr of DX cooling equipment to be replaced.
Average EER	8.0		Units average than 11 years old, EERs were 8 when new
Existing Annual Electric Usage	755	kWh	

Item	Value	Units	Comments
Proposed EER	18.0		New Split Unit per manufacturer's data
Proposed Annual Electric Usage	336	kWh	Unit will cycle on w/ temp of room. Possible operating time shown below

ANNUAL SAVINGS		
Annual Electrical Usage Savings	420	kWh
Annual Cost Savings	$63	
Total Project Cost	$11,430	
Simple Payback	182	years

OAT - DB Bin Temp F	Annual Hours	Cooling Hrs at Temp Above balance point	Assumed % of time of operation	Assumed hrs of Operation
102.5	0	0	100%	0
97.5	0	0	89%	0
92.5	3	1	79%	1
87.5	34	10	68%	7
82.5	131	39	58%	23
77.5	500	149	47%	70
72.5	620	0	0%	0
67.5	664	0	0%	0
62.5	854	0	0%	0
57.5	927	0	0%	0
52.5	600	0	0%	0
47.5	610	0	0%	0
42.5	611	0	0%	0
37.5	656	0	0%	0
32.5	1,023	0	0%	0
27.5	734	0	0%	0
22.5	334	0	0%	0
17.5	252	0	0%	0
12.5	125	0	0%	0
7.5	47	0	0%	0
2.5	22	0	0%	0
-2.5	13	0	0%	0
-7.5	0	0	0%	0
Total	8,760	199	51%	101

Holmdel Township BOE - NJBPU
CHA Project #24988
Village School

ECM-4: Replace Computer Room AC Unit - Cost

Multipliers	
Material:	1.10
Labor:	1.35
Equipment:	1.10

Description	QTY	UNIT	UNIT COSTS			SUBTOTAL COSTS			TOTAL COST	REMARKS
			MAT.	LABOR	EQUIP.	MAT.	LABOR	EQUIP.		
Old AC Removal	1	EA		$ 500		$ -	$ 675	$ -	$ 675	
New AC (5-TON UNIT)	1	EA	$ 5,000	$ 1,000		$ 5,500	$ 1,350	$ -	$ 6,850	
Miscellanous Piping	1	EA	$ 200	$ 150		$ 220	$ 203	$ -	$ 423	
Miscellanous Electric	1	EA	$ 200	$ 150		$ 220	$ 203	$ -	$ 423	
Control System	1	EA	$ 200	$ 150		$ 220	$ 203	$ -	$ 423	
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	

Note: pricing is for energy calculations only -do not use for procurement

$ 8,793	Subtotal
$ 879	10% Contingency
$ 1,759	20% Contractor O&P
$ 11,430	**Total**

ECM-5: Install VSDs and Premium Motors on two HW Pumps (15HP each)

Variable Inputs

Blended Electric Rate	$0.15
Heating System "On" Point	55
VFD Efficiency	98.5%

ECM Description Summary

PUMP SCHEDULE							
Pump ID	Qty	HP	Total HP	Existing Motor Motor Eff.	New Motor Motor Eff.	Exist. Motor kW Note 1	New Motor kW Note 2
P-1	1	15.0	15.0	87.5%	93.0%	10.23	9.63
P-2	1	15.0	15.0	87.5%	93.0%	10.23	9.63
					Total:	20.46	19.25

SAVINGS ANALYSIS									
OAT - DB Avg Temp F	OAT - WB Avg Temp F	Annual Hours in Bin	Heating Hours Bin	Pump Load %	Existing Pump kWh Note 6	Proposed Pump kW	Speed efficiency %	Proposed Pump kWh	Proposed Savings kWh
(A) See Note 3	(B) See Note 3	(C) See Note 3	(D) =IF(A>TP,0,C)	(E) =0.5+0.5* (50-A)/(50-10)) See Note 4	(F) =D*AA	(G) =BB*E^2.5/CC See Note 5	(H)	(I) =D*G	(J) =F-H
97.5	75	0	0	0%	0	0.0	0.0%	0	0
92.5	74	3	0	0%	0	0.0	0.0%	0	0
87.5	72	34	0	0%	0	0.0	0.0%	0	0
82.5	69	131	0	0%	0	0.0	0.0%	0	0
77.5	67	500	0	0%	0	0.0	0.0%	0	0
72.5	64	620	0	0%	0	0.0	0.0%	0	0
67.5	62	664	0	0%	0	0.0	0.0%	0	0
62.5	58	854	0	0%	0	0.0	0.0%	0	0
57.5	53	927	0	0%	0	0.0	0.0%	0	0
52.5	47	600	600	53%	6,139	2.0	84.1%	1,410	4,728
47.5	43	610	610	58%	6,241	2.5	88.8%	1,744	4,497
42.5	38	611	611	64%	6,251	3.2	92.7%	2,101	4,150
37.5	34	656	656	69%	6,711	3.9	95.9%	2,688	4,024
32.5	30	1,023	1,023	75%	10,466	4.8	98.2%	4,959	5,507
27.5	25	734	734	81%	7,509	5.7	99.8%	4,188	3,321
22.5	20	334	334	86%	3,417	6.7	100.0%	2,246	1,171
17.5	16	252	252	92%	2,578	7.9	100.0%	1,981	597
12.5	11	125	125	97%	1,279	9.1	99.7%	1,142	137
7.5	6	47	47	100%	481	9.8	99.0%	464	17
2.5	2	22	22	100%	225	9.8	99.0%	217	8
-2.5	-3	13	13	100%	133	9.8	99.0%	128	5
-7.5	-8	0	0	0%	0	0.0	0.0%	0	0
		8,760	5,027		51,431			23,268	28,162

Notes:

1) Existing motor power was determined using…
2) New motor power is the same as existing motor power adjusted for the new efficiency, if a new motor is proposed.
3) Weather data from NOAA for …
4) The pump load is estimated at 100% at X deg. OAT and 50% at X deg. OAT and varies linearly in between.
5) The required VFD motor draw is based on a 2.5 power relationship to load.
6) Two pumps are running at lead and lag mode, only one pump runs at a time.

HW PUMP VFD - SAVINGS SUMMARY					
	Electric Demand	Electric Usage	Nat Gas Usage	Maint.	Total Cost
	(kW)	(kWh)	(Therms)	($)	($)
Savings	0	28,162	0	$0	$4,209

Multipliers	
Material:	1.10
Labor:	1.30
Equipment:	1.10

ECM-5: Install VSDs and Premium Motors on two HW Pumps (15HP each) - Cost

Description	QTY	UNIT	UNIT COSTS			SUBTOTAL COSTS			TOTAL COST	REMARKS
			MAT.	LABOR	EQUIP.	MAT.	LABOR	EQUIP.		
15 HP Motor VFDs	2	ea	$ 2,336	$ 772		$ 5,139	$ 2,007	$ -	$ 7,146	
Wiring and Control	2	ea	$ 1,000	$ 1,000		$ 2,200	$ 2,600	$ -	$ 4,800	
Electrical - misc.	1	ls	$ 400	$ 1,000		$ 440	$ 1,300	$ -	$ 1,740	
Pressure Sensors	1	ea	$ 1,500	$ 46		$ 1,650	$ 59	$ -	$ 1,709	
Valves and Piping	1	ea	$ 1,500	$ 1,000		$ 1,650	$ 1,300	$ -	$ 2,950	

$ 18,346	Subtotal
$ 3,669	20% Contingency
$ 3,302	15% Contractor O&P
$ 3,798	15% Engineering
$ 29,114	**Total**

Holmdel Township BOE - NJBPU
CHA Project #24988
Village School

AIR HANDLER	AREA SERVED	FAN MOTOR HP	CFM	OA CFM
HV-APR	Old Gym	1.0	4,500	4,500
HV-Old Gym	All Purpose Room	1.5	7,000	7,000
		2.5	*HP*	*11,500* *CFM*

ECM 6: DCV Controls for Multi-purpose room and Old Gym

ECM Description Summary

It is assumed the original system controls provide the full design ventilation outside air flow. Reducing outside air during occupied time periods will reduce heating and cooling energy used during the occupied period. A limit of 1000 PPM of CO2 is recommended in ASHRAE Standard 62-1982, Ventilation for Acceptable Indoor Air Quality. During unoccupied periods the outside air dampers should be closed.

Electric Cost	$ 0.15	/kWh
Natural Gas Cost	$ 1.44	/therm
Facility Ventilation Heating Load	434,700	BTU/Hour[1,2,3]
Facility Ventilation Cooling Load	0	BTU/Hour[1,2,3]
Existing Ventilation Heating Usage	17,000	Therms[2]
Existing Ventilation Cooling Usage	0	kWh[3]
Proposed Ventilation Heating Usage	12,750	Therms[7]
Proposed Ventilation Cooling Usage	0	kWh[7]
Total heating savings	4,250	**Therms**
Total cooling savings	0	**kWh**
Total cost savings	6,136	
Estimated Total Project Cost	$19,600	[8]
Simple Payback	3.2	**years**

Note: costs are used for enrgy savings calulations only. Do not use for procurment

Assumptions

1	11,500	OA AHU airflow based exsiting equipment model numbers
2	35	°F, Assumed average heating Δt (mixed air and supply)
3	10	°F, Assumed average cooling Δt (mixed air and supply)
4	80%	Heating Efficiency - %
5	1.2	Cooling Efficiency - kW/Ton
6	3,129	AHU run time per heating/cooling season bin data
7	25%	Estimated savings for DCV based on observed occupancy
8	$ 19,600	Measure Cost, see separate cost sheet

Holmdel Township BOE - NJBPU
CHA Project #24988
Village School

Multipliers	
Material:	1.10
Labor:	1.30
Equipment:	1.10

ECM 6: DCV Controls for Multi-purpose room and Old Gym - Cost

Description	QTY	UNIT	UNIT COSTS			SUBTOTAL COSTS			TOTAL COST	REMARKS
			MAT.	LABOR	EQUIP.	MAT.	LABOR	EQUIP.		
CO2 sensor	2	ea	$ 500	$ 100		$ 1,100	$ 260	$ -	$ 1,360	
Dampers and actuators	2	ea	$ 500	$ 500		$ 1,100	$ 1,300	$ -	$ 2,400	
Control system programming	2	ls	$ 500	$ 1,000		$ 1,100	$ 2,600	$ -	$ 3,700	
Electrical/wiring	2	ls	$ 1,000	$ 2,000		$ 2,200	$ 5,200	$ -	$ 7,400	

Note: Cost Estimates are for Energy Savings Calulations only- Do not use for procurement !

$ 14,860	Subtotal
$ 1,486	10% Contingency
$ 3,269	20% Contractor O&P
$ -	
$ 19,600	**Total**

ECM-7: Install Kitchen Hood Controller

Motor Operating Savings

Hours of Operation (per day)	4		A
Days/Year	190		B
Weeks/Year	38		C
Motor HP	2.5		D
Equivalent KW	1.55	KW	E
Cost of Electricity	$0.15	KWh	F
Total Time/Year	760	hrs/year	G
Total KWH/YR	1181	KWh	H

% Rated RPM I	% Run Time J	Time K J * G	Output L I * E ^ 2.5	KWH/YR M L *K
100%	9%	68	1.554	106
90%	11%	84	1.194	100
80%	14%	106	0.890	95
70%	35%	266	0.637	169
60%	18%	137	0.433	59
50%	13%	99	0.275	27
40%	0%	0	0.157	0
30%	0%	0	0.077	0
20%	0%	0	0.028	0
10%	0%	0	0.005	0
				557 N

Total Savings .= H - N 624 KWh

Reduced Electricity Savings =	**624**	**kWh**
Reduced Fuel Savings =	**16**	**therms**
Reduced Financial Savings =	**$117**	

Conditioned Make Up Air: Heating

Previous Net Exhaust Volume	440	CFM	
New Net Exhaust Volume	316	CFM	Note 1
Previous net heat load	14,494	BTU/hr	
new net heat load	10,421	BTU/hr	
Design Indoor Conditions	68	F	
Average Outdoor Air Temp (during Heating)	37.5	F	
Heating Hours	4,589	hrs/yr	
Total Therms Savings	16	Therms	

% Rated RPM I	% Run Time J	I * J
100%	9%	9.00%
90%	11%	9.90%
80%	14%	11.20%
70%	35%	24.50%
60%	18%	10.80%
50%	13%	6.50%
40%	0%	0.00%
30%	0%	0.00%
20%	0%	0.00%
10%	0%	0.00%
Avg RPM		71.90%

Cost of Fuel = $1.44 / therm

Multipliers	
Material:	1.10
Labor:	1.30
Equipment:	1.10

ECM-7: Install Kitchen Hood Controller - Cost

Description	QTY	UNIT	UNIT COSTS			SUBTOTAL COSTS			TOTAL COST	REMARKS
			MAT.	LABOR	EQUIP.	MAT.	LABOR	EQUIP.		
Me-Link Kitchen Hood Control System	1	ea	$ 15,000	$ 2,000		$ 16,500	$ 2,600	$ -	$ 19,100	
1.0 HP and 1.5 HP VFDs	1	ea	$ 1,000	$ 300		$ 1,100	$ 390	$ -	$ 1,490	
1.0 HP and 1.5HP Motors	1	ea	$ 600	$ 200		$ 660	$ 260	$ -	$ 920	
Reprogram DDC system	1	ea	$ 100	$ 1,200		$ 110	$ 1,560	$ -	$ 1,670	
Electrical - misc.	1	ls	$ 200	$ 500		$ 220	$ 650	$ -	$ 870	
Remote bulb thermostat	2	ea	$ 500	$ 200		$ 1,100	$ 520	$ -	$ 1,620	
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	

$ 25,670	Subtotal
$ 2,567	10% Contingency
$ 5,647	20% Contractor O&P
$ 5,083	15% Engineering
$ 38,967	**Total**

Demand Cost $/kW-month
$ 6.04

Energy Cost $/kWh
$ 0.15

ECM-8: Replace Air Pump Motors with Premium Efficiency Motors

Savings Analysis

								New								
			Existing	Load	Existing	Existing	New	Load	New	New	Demand	Demand	Annual	kWh	$ kWh	Total $
#	Description	Location	HP	Factor	Efficiency$_a$	kW	HP$_b$	Factor	Efficiency$_a$	kW	Savings	Savings $	Hours	Savings	Savings	Savings
1	Air Pump-1	Water Treatment Plant	5	0.8	85.50%	3.5	5	0.8	0.897	3.3	0.162	$ 12	4,380	709	$ 106	$ 118
2	Air Pump-2	Water Treatment Plant	5	0.8	85.50%	3.5	5	0.8	0.897	3.3	0.162	$ 12	4,380	709	$ 106	$ 118
		Total	**10**			**7.0**	**10**			**6.7**	**0.32**	**$ 23**		**1,417**	**$ 212**	**$ 235**

Notes

a Existing and new efficiencies should be entered if known. If not known, use provided curve fit based on "DOE Survey Installed Average" and NEMA Premium values, respectively.

b Same as existing HP unless resized to better match load

Note: Cost Estimates are for Energy Savings Calulations only- Do not use for procurement !

Multipliers	
Material:	1.10
Labor:	1.30
Equipment:	1.00

ECM-8: Replace Air Pump Motors with Premium Efficiency Motors - Cost

Description	QTY	UNIT	UNIT COSTS			SUBTOTAL COSTS			TOTAL COST	REMARKS
			MAT.	LABOR	EQUIP.	MAT.	LABOR	EQUIP.		
						$ -	$ -	$ -	$ -	
5 HP Motor	2	ea	$ 373	$ 79		$ 821	$ 205	$ -	$ 1,026	
Electrical - misc.	1	ls	$ 50	$ 50		$ 55	$ 65	$ -	$ 120	
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	

Note: Cost Estimates are for Energy Savings Calulations only- Do not use for procurement !

$ 1,146	Subtotal
$ 115	10% Contingency
$ 252	20% Contractor O&P
$ -	
$ 1,513	**Total**

New Jersey Pay For Performance Incentive Program

Note: The following calculation is based on the New Jersey Pay For Performance Incentive Program.
Building must have a minimum average electric demand of 100 kW. This minimum is waived for buildings owned by local governments 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)	131,000
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)	$109,998	$47,850
Existing Usage (from utility)	736,000	33,140
Proposed Savings	149,149	6,238
Existing Total MMBtus	5,826	
Proposed Savings MMBtus	1,133	
% Energy Reduction	**19.4%**	
Proposed Annual Savings	$26,800	

	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	$0.11	$1.12
Incentive #3	$0.09	$0.90	$0.005	$0.05	$0.11	$1.25	$0.11	$1.12

	Incentives $		
	Elec	Gas	Total
Incentive #1	$0	$0	$13,100
Incentive #2	$16,406	$7,001	$23,408
Incentive #3	$16,406	$7,001	$23,408
Total All Incentives	**$32,813**	**$14,002**	**$59,915**

Total Project Cost	$182,200

		Allowable Incentive
% Incentives #1 of Utility Cost*	8.3%	$13,100
% Incentives #2 of Project Cost**	12.8%	$23,408
% Incentives #3 of Project Cost**	12.8%	$23,408
Total Eligible Incentives***	**$59,915**	
Project Cost w/ Incentives	$122,285	

Project Payback (years)	
w/o Incentives	w/ Incentives
6.8	4.6

* 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

Energy Audit of Holmdel Schools - Village School
CHA Project No.24988
ECM-1 Lighting Replacements

		EXISTING CONDITIONS							RETROFIT CONDITIONS								COST & SAVINGS ANALYSIS						
	Area Description	No. of Fixtures	Standard Fixture Code	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
19	Hallway Area near door 24	6	1B 32 P F 2 (ELE)	F42LL	60	0.4	SW	8,760	3,154	6	1B 32 P F 2 (ELE)	F42LL	60	0.4	SW	8,760	3,154	-	0.0	$ -	$ -	$0		#DIV/0!
19	Hallway Area near door 24	14	1B 32 P F 2 (ELE)	F42LL	60	0.8	SW	1820	1,529	14	1B 32 P F 2 (ELE)	F42LL	60	0.8	SW	1,820	1,529	-	0.0	$ -	$ -	$0		#DIV/0!
35	Room 11	9	T 32 R F 3 (ELE)	F43ILL/2	90	0.8	SW	2000	1,620	9	T 32 R F 3 (ELE)	F43ILL/2	90	0.8	SW	2,000	1,620	-	0.0	$ -	$ -	$0		#DIV/0!
20	Room 11	8	S 32 C F 1 (ELE)	F41LL	32	0.3	SW	2000	512	8	S 32 C F 1 (ELE)	F41LL	32	0.3	SW	2,000	512	-	0.0	$ -	$ -	$0		#DIV/0!
36	Room 11	1	2T 3' 17 R F 1 (ELE)	F21ILL	20	0.0	SW	2000	40	1	2T 3' 17 R F 1 (ELE)	F21ILL	20	0.0	SW	2,000	40	-	0.0	$ -	$ -	$0		#DIV/0!
35	Room 12	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	SW	2000	2,160	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	SW	2,000	2,160	-	0.0	$ -	$ -	$0		#DIV/0!
20	Room 10	30	S 32 C F 1 (ELE)	F41LL	32	1.0	SW	2000	1,920	30	S 32 C F 1 (ELE)	F41LL	32	1.0	SW	2,000	1,920	-	0.0	$ -	$ -	$0		#DIV/0!
19	Room 10	21	1B 32 P F 2 (ELE)	F42LL	60	1.3	SW	2000	2,520	21	1B 32 P F 2 (ELE)	F42LL	60	1.3	SW	2,000	2,520	-	0.0	$ -	$ -	$0		#DIV/0!
36	Room 10	13	2T 3' 17 R F 1 (ELE)	F21ILL	20	0.3	SW	2000	520	13	2T 3' 17 R F 1 (ELE)	F21ILL	20	0.3	SW	2,000	520	-	0.0	$ -	$ -	$0		#DIV/0!
228	Room 10	12	W60CF1	F81EL	60	0.7	SW	2000	1,440	12	W60CF1	F81EL	60	0.7	SW	2,000	1,440	-	0.0	$ -	$ -	$0		#DIV/0!
232	Room 10	1	R 60 C I 1	I60/1	60	0.1	SW	2000	120	1	CF 26	CFQ26/1-L	27	0.0	SW	2,000	54	66	0.0	$ 9.72	$ 20.25	$0	2.1	2.1
19	Workroom Storage	11	1B 32 P F 2 (ELE)	F42LL	60	0.7	SW	2000	1,320	11	1B 32 P F 2 (ELE)	F42LL	60	0.7	SW	2,000	1,320	-	0.0	$ -	$ -	$0		#DIV/0!
19	Room 15	24	1B 32 P F 2 (ELE)	F42LL	60	1.4	SW	1400	2,016	24	1B 32 P F 2 (ELE)	F42LL	60	1.4	SW	1,400	2,016	-	0.0	$ -	$ -	$0		#DIV/0!
19	Room 16	24	1B 32 P F 2 (ELE)	F42LL	60	1.4	SW	1400	2,016	24	1B 32 P F 2 (ELE)	F42LL	60	1.4	SW	1,400	2,016	-	0.0	$ -	$ -	$0		#DIV/0!
19	Room 17	24	1B 32 P F 2 (ELE)	F42LL	60	1.4	SW	1400	2,016	24	1B 32 P F 2 (ELE)	F42LL	60	1.4	SW	1,400	2,016	-	0.0	$ -	$ -	$0		#DIV/0!
19	Room 18	24	1B 32 P F 2 (ELE)	F42LL	60	1.4	SW	1400	2,016	24	1B 32 P F 2 (ELE)	F42LL	60	1.4	SW	1,400	2,016	-	0.0	$ -	$ -	$0		#DIV/0!
19	Room 19	24	1B 32 P F 2 (ELE)	F42LL	60	1.4	SW	1400	2,016	24	1B 32 P F 2 (ELE)	F42LL	60	1.4	SW	1,400	2,016	-	0.0	$ -	$ -	$0		#DIV/0!
19	Room 20	24	1B 32 P F 2 (ELE)	F42LL	60	1.4	SW	1400	2,016	24	1B 32 P F 2 (ELE)	F42LL	60	1.4	SW	1,400	2,016	-	0.0	$ -	$ -	$0		#DIV/0!
35	Room 21	25	T 32 R F 3 (ELE)	F43ILL/2	90	2.3	SW	1400	3,150	25	T 32 R F 3 (ELE)	F43ILL/2	90	2.3	SW	1,400	3,150	-	0.0	$ -	$ -	$0		#DIV/0!
35	Room 21 LabA	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	SW	1400	1,512	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	SW	1,400	1,512	-	0.0	$ -	$ -	$0		#DIV/0!
35	Room 22	15	T 32 R F 3 (ELE)	F43ILL/2	90	1.4	SW	1400	1,890	15	T 32 R F 3 (ELE)	F43ILL/2	90	1.4	SW	1,400	1,890	-	0.0	$ -	$ -	$0		#DIV/0!
35	Room 23	13	T 32 R F 3 (ELE)	F43ILL/2	90	1.2	SW	1400	1,638	13	T 32 R F 3 (ELE)	F43ILL/2	90	1.2	SW	1,400	1,638	-	0.0	$ -	$ -	$0		#DIV/0!
35	Room 24	13	T 32 R F 3 (ELE)	F43ILL/2	90	1.2	SW	1400	1,638	13	T 32 R F 3 (ELE)	F43ILL/2	90	1.2	SW	1,400	1,638	-	0.0	$ -	$ -	$0		#DIV/0!
35	Room 25	13	T 32 R F 3 (ELE)	F43ILL/2	90	1.2	SW	1400	1,638	13	T 32 R F 3 (ELE)	F43ILL/2	90	1.2	SW	1,400	1,638	-	0.0	$ -	$ -	$0		#DIV/0!
35	Room 26	13	T 32 R F 3 (ELE)	F43ILL/2	90	1.2	SW	1400	1,638	13	T 32 R F 3 (ELE)	F43ILL/2	90	1.2	SW	1,400	1,638	-	0.0	$ -	$ -	$0		#DIV/0!
35	Room 27	6	T 32 R F 3 (ELE)	F43ILL/2	90	0.5	SW	1400	756	6	T 32 R F 3 (ELE)	F43ILL/2	90	0.5	SW	1,400	756	-	0.0	$ -	$ -	$0		#DIV/0!
35	Room 28	13	T 32 R F 3 (ELE)	F43ILL/2	90	1.2	SW	1400	1,638	13	T 32 R F 3 (ELE)	F43ILL/2	90	1.2	SW	1,400	1,638	-	0.0	$ -	$ -	$0		#DIV/0!
19	Room 29 (Lib A)	2	1B 32 P F 2 (ELE)	F42LL	60	0.1	SW	2000	240	2	1B 32 P F 2 (ELE)	F42LL	60	0.1	SW	2,000	240	-	0.0	$ -	$ -	$0		#DIV/0!
20	Room 29 (Lib A)	20	S 32 C F 1 (ELE)	F41LL	32	0.6	SW	2000	1,280	20	S 32 C F 1 (ELE)	F41LL	32	0.6	SW	2,000	1,280	-	0.0	$ -	$ -	$0		#DIV/0!
39	Room 29 (Lib A)	12	2' 17 W F 2 (ELE)	F22ILL	33	0.4	SW	2000	792	12	2' 17 W F 2 (ELE)	F22ILL	33	0.4	SW	2,000	792	-	0.0	$ -	$ -	$0		#DIV/0!
35	Room 30	9	T 32 R F 3 (ELE)	F43ILL/2	90	0.8	SW	1400	1,134	9	T 32 R F 3 (ELE)	F43ILL/2	90	0.8	SW	1,400	1,134	-	0.0	$ -	$ -	$0		#DIV/0!
35	Room 31	6	T 32 R F 3 (ELE)	F43ILL/2	90	0.5	SW	1400	756	6	T 32 R F 3 (ELE)	F43ILL/2	90	0.5	SW	1,400	756	-	0.0	$ -	$ -	$0		#DIV/0!
35	Room 32	13	T 32 R F 3 (ELE)	F43ILL/2	90	1.2	SW	1400	1,638	13	T 32 R F 3 (ELE)	F43ILL/2	90	1.2	SW	1,400	1,638	-	0.0	$ -	$ -	$0		#DIV/0!
35	Room 33	13	T 32 R F 3 (ELE)	F43ILL/2	90	1.2	SW	1400	1,638	13	T 32 R F 3 (ELE)	F43ILL/2	90	1.2	SW	1,400	1,638	-	0.0	$ -	$ -	$0		#DIV/0!
35	Room 34	17	T 32 R F 3 (ELE)	F43ILL/2	90	1.5	SW	1400	2,142	17	T 32 R F 3 (ELE)	F43ILL/2	90	1.5	SW	1,400	2,142	-	0.0	$ -	$ -	$0		#DIV/0!
19	Custodian Room	2	1B 32 P F 2 (ELE)	F42LL	60	0.1	SW	780	94	2	1B 32 P F 2 (ELE)	F42LL	60	0.1	SW	780	94	-	0.0	$ -	$ -	$0		#DIV/0!
19	Electric Closet	4	1B 32 P F 2 (ELE)	F42LL	60	0.2	SW	780	187	4	1B 32 P F 2 (ELE)	F42LL	60	0.2	SW	780	187	-	0.0	$ -	$ -	$0		#DIV/0!
35	Room 35	13	T 32 R F 3 (ELE)	F43ILL/2	90	1.2	SW	1400	1,638	13	T 32 R F 3 (ELE)	F43ILL/2	90	1.2	SW	1,400	1,638	-	0.0	$ -	$ -	$0		#DIV/0!
35	Room 36	13	T 32 R F 3 (ELE)	F43ILL/2	90	1.2	SW	1400	1,638	13	T 32 R F 3 (ELE)	F43ILL/2	90	1.2	SW	1,400	1,638	-	0.0	$ -	$ -	$0		#DIV/0!
35	Boy's Room	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		#DIV/0!
35	Girl's Room	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		#DIV/0!
19	Room 37	13	1B 32 P F 2 (ELE)	F42LL	60	0.8	SW	1400	1,092	13	1B 32 P F 2 (ELE)	F42LL	60	0.8	SW	1,400	1,092	-	0.0	$ -	$ -	$0		#DIV/0!
19	Room 38	13	1B 32 P F 2 (ELE)	F42LL	60	0.8	SW	1400	1,092	13	1B 32 P F 2 (ELE)	F42LL	60	0.8	SW	1,400	1,092	-	0.0	$ -	$ -	$0		#DIV/0!
19	Room 39	13	1B 32 P F 2 (ELE)	F42LL	60	0.8	SW	1400	1,092	13	1B 32 P F 2 (ELE)	F42LL	60	0.8	SW	1,400	1,092	-	0.0	$ -	$ -	$0		#DIV/0!
19	Room 40	13	1B 32 P F 2 (ELE)	F42LL	60	0.8	SW	1400	1,092	13	1B 32 P F 2 (ELE)	F42LL	60	0.8	SW	1,400	1,092	-	0.0	$ -	$ -	$0		#DIV/0!
19	Room 41	13	1B 32 P F 2 (ELE)	F42LL	60	0.8	SW	1400	1,092	13	1B 32 P F 2 (ELE)	F42LL	60	0.8	SW	1,400	1,092	-	0.0	$ -	$ -	$0		#DIV/0!
19	Room 42	13	1B 32 P F 2 (ELE)	F42LL	60	0.8	SW	1400	1,092	13	1B 32 P F 2 (ELE)	F42LL	60	0.8	SW	1,400	1,092	-	0.0	$ -	$ -	$0		#DIV/0!
19	Boiler Room B	2	1B 32 P F 2 (ELE)	F42LL	60	0.1	SW	1000	120	2	1B 32 P F 2 (ELE)	F42LL	60	0.1	SW	1,000	120	-	0.0	$ -	$ -	$0		#DIV/0!
9	Atrium	4	High Bay MH 400	MH400/1	458	1.8	SW	1820	3,334	4	C 54 C F 6	F46GHL	351	1.4	SW	1,820	2,555	779	0.4	$ 117.49	$ 2,214.00	$400	18.8	15.4
9	Old Gym (Gym A)	22	High Bay MH 400	MH400/1	458	10.1	SW	2000	20,152	22	C 54 C F 6	F46GHL	351	7.7	SW	2,000	15,444	4,708	2.4	$ 693.21	$ 12,177.00	$2,200	17.6	14.4
19	Old Gym (Gym A)	10	1B 32 P F 2 (ELE)	F42LL	60	0.6	SW	2000	1,200	10	1B 32 P F 2 (ELE)	F42LL	60	0.6	SW	2,000	1,200	-	0.0	$ -	$ -	$0		#DIV/0!
133	Old Gym (Gym A)	4	CF 26	CFQ26/1-L	27	0.1	SW	2000	216	4	CF 26	CFQ26/1-L	27	0.1	SW	2,000	216	-	0.0	$ -	$ -	$0		#DIV/0!
19	Boy's Room	3	1B 32 P F 2 (ELE)	F42LL	60	0.2	SW	1000	180	3	1B 32 P F 2 (ELE)	F42LL	60	0.2	SW	1,000	180	-	0.0	$ -	$ -	$0		#DIV/0!
19	Girl's Room	3	1B 32 P F 2 (ELE)	F42LL	60	0.2	SW	1000	180	3	1B 32 P F 2 (ELE)	F42LL	60	0.2	SW	1,000	180	-	0.0	$ -	$ -	$0		#DIV/0!
19	Custodian Room	1	1B 32 P F 2 (ELE)	F42LL	60	0.1	SW	780	47	1	1B 32 P F 2 (ELE)	F42LL	60	0.1	SW	780	47	-	0.0	$ -	$ -	$0		#DIV/0!
19	APR Storage	16	1B 32 P F 2 (ELE)	F42LL	60	1.0	SW	1000	960	16	1B 32 P F 2 (ELE)	F42LL	60	1.0	SW	1,000	960	-	0.0	$ -	$ -	$0		#DIV/0!
19	All Purpose Room	11	1B 32 P F 2 (ELE)	F42LL	60	0.7	SW	1400	924	11	1B 32 P F 2 (ELE)	F42LL	60	0.7	SW	1,400	924	-	0.0	$ -	$ -	$0		#DIV/0!
9	All Purpose Room	15	High Bay MH 400	MH400/1	458	6.9	SW	1400	9,618	15	C 54 C F 6	F46GHL	351	5.3	SW	1,400	7,371	2,247	1.6	$ 365.75	$ 8,302.50	$1,500	22.7	18.6
35	Room 43	10	T 32 R F 3 (ELE)	F43ILL/2	90	0.9	SW	1400	1,260	10	T 32 R F 3 (ELE)	F43ILL/2	90	0.9	SW	1,400	1,260	-	0.0	$ -	$ -	$0		#DIV/0!
35	Room 44	9	T 32 R F 3 (ELE)	F43ILL/2	90	0.8	SW	1400	1,134	9	T 32 R F 3 (ELE)	F43ILL/2	90	0.8	SW	1,400	1,134	-	0.0	$ -	$ -	$0		#DIV/0!
19	Room 45	11	1B 32 P F 2 (ELE)	F42LL	60	0.7	SW	1400	924	11	1B 32 P F 2 (ELE)	F42LL	60	0.7	SW	1,400	924	-	0.0	$ -	$ -	$0		#DIV/0!
19	Room 46	4	1B 32 P F 2 (ELE)	F42LL	60	0.2	SW	1400	336	4	1B 32 P F 2 (ELE)	F42LL	60	0.2	SW	1,400	336	-	0.0	$ -	$ -	$0		#DIV/0!
19	Room 46A	3	1B 32 P F 2 (ELE)	F42LL	60	0.2	SW	1400	252	3	1B 32 P F 2 (ELE)	F42LL	60	0.2	SW	1,400	252	-	0.0	$ -	$ -	$0		#DIV/0!
19	Room 47	6	1B 32 P F 2 (ELE)	F42LL	60	0.4	SW	1400	504	6	1B 32 P F 2 (ELE)	F42LL	60	0.4	SW	1,400	504	-	0.0	$ -	$ -	$0		#DIV/0!
35	Room 48	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	SW	1400	1,512	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	SW	1,400	1,512	-	0.0	$ -	$ -	$0		#DIV/0!
35	Room 48B	6	T 32 R F 3 (ELE)	F43ILL/2	90	0.5	SW	1400	756	6	T 32 R F 3 (ELE)	F43ILL/2	90	0.5	SW	1,400	756	-	0.0	$ -	$ -	$0		#DIV/0!
19	Custodian Room	2	1B 32 P F 2 (ELE)	F42LL	60	0.1	SW	780	94	2	1B 32 P F 2 (ELE)	F42LL	60	0.1	SW	780	94	-	0.0	$ -	$ -	$0		#DIV/0!
228	Boiler Room A	2	W60CF1	F81EL	60	0.1	SW	1000	120	2	W60CF1	F81EL	60	0.1	SW	1,000	120	-	0.0	$ -	$ -	$0		#DIV/0!
19	Room 34 A	4	1B 32 P F 2 (ELE)	F42LL	60	0.2	SW	1400	336	4	1B 32 P F 2 (ELE)	F42LL	60	0.2	SW	1,400	336	-	0.0	$ -	$ -	$0		#DIV/0!
19	Room 112A	26	1B 32 P F 2 (ELE)	F42LL	60	1.6	SW	1400	2,184	26	1B 32 P F 2 (ELE)	F42LL	60	1.6	SW	1,400	2,184	-	0.0	$ -	$ -	$0		#DIV/0!
19	Boy's Room	5	1B 32 P F 2 (ELE)	F42LL	60	0.3	SW	1000	300	5	1B 32 P F 2 (ELE)	F42LL	60	0.3	SW	1,000	300	-	0.0	$ -	$ -	$0		#DIV/0!
19	Custodian Room	1	1B 32 P F 2 (ELE)	F42LL	60	0.1	SW	780	47	1	1B 32 P F 2 (ELE)	F42LL	60	0.1	SW	780	47	-	0.0	$ -	$ -	$0		#DIV/0!
19	Girl's Room	4	1B 32 P F 2 (ELE)	F42LL	60	0.2	SW	1000	240	4	1B 32 P F 2 (ELE)	F42LL	60	0.2	SW	1,000	240	-	0.0	$ -	$ -	$0		#DIV/0!
19	Room 101	18	1B 32 P F 2 (ELE)	F42LL	60	1.1	SW	1400	1,512	18	1B 32 P F 2 (ELE)	F42LL	60	1.1	SW	1,400	1,512	-	0.0	$ -	$ -	$0		#DIV/0!
19	Room 102	18	1B 32 P F 2 (ELE)	F42LL	60	1.1	SW	1400	1,512	18	1B 32 P F 2 (ELE)	F42LL	60	1.1	SW	1,400	1,512	-	0.0	$ -	$ -	$0		#DIV/0!
19	Room 103	18	1B 32 P F 2 (ELE)	F42LL	60	1.1	SW	1400	1,512	18	1B 32 P F 2 (ELE)	F42LL	60	1.1	SW	1,400	1,512	-	0.0	$ -	$ -	$0		#DIV/0!
19	Room 104	18	1B 32 P F 2 (ELE)	F42LL	60	1.1	SW	1400	1,512	18	1B 32 P F 2 (ELE)	F42LL	60	1.1	SW	1,400	1,512	-	0.0	$ -	$ -	$0		#DIV/0!
19	Room 105	18	1B 32 P F 2 (ELE)	F42LL	60	1.1	SW	1400	1,512	18	1B 32 P F 2 (ELE)	F42LL	60	1.1	SW	1,400	1,512	-	0.0	$ -	$ -	$0		#DIV/0!
19	Room 106	18	1B 32 P F 2 (ELE)	F42LL	60	1.1	SW	1400	1,512	18	1B 32 P F 2 (ELE)	F42LL	60	1.1	SW	1,400	1,512	-	0.0	$ -	$ -	$0		#DIV/0!
19	Room 107	18	1B 32 P F 2 (ELE)	F42LL	60	1.1	SW	1400	1,512	18	1B 32 P F 2 (ELE)	F42LL	60	1.1	SW	1,400	1,512	-	0.0	$ -	$ -	$0		#DIV/0!
19	Room 108	18	1B 32 P F 2 (ELE)	F42LL	60	1.1	SW	1400	1,512	18	1B 32 P F 2 (ELE)	F42LL	60	1.1	SW	1,400	1,512	-	0.0	$ -	$ -	$0		#DIV/0!
19	Room 109	18	1B 32 P F 2 (ELE)	F42LL	60	1.1	SW	1400	1,512	18	1B 32 P F 2 (ELE)	F42LL	60	1.1	SW	1,400	1,512	-	0.0	$ -	$ -	$0		#DIV/0!
19	Room 110	18	1B 32 P F 2 (ELE)	F42LL	60	1.1	SW	1400	1,512	18	1B 32 P F 2 (ELE)	F42LL	60	1.1	SW	1,400	1,512	-	0.0	$ -	$ -	$0		#DIV/0!
19	Room 111	22	1B 32 P F 2 (ELE)	F42LL	60	1.3	SW	1400	1,848	22	1B 32 P F 2 (ELE)	F42LL	60	1.3	SW	1,400	1,848	-	0.0	$ -	$ -	$0		#DIV/0!
19	Room 115	11	1B 32 P F 2 (ELE)	F42LL	60	0.7	SW	1400	924	11	1B 32 P F 2 (ELE)	F42LL	60	0.7	SW	1,400	924	-	0.0	$ -	$ -	$0		#DIV/0!
19	Room 116	18	1B 32 P F 2 (ELE)	F42LL	60	1.1	SW	1400	1,512	18	1B 32 P F 2 (ELE)	F42LL	60	1.1	SW	1,400	1,512	-	0.0	$ -	$ -	$0		#DIV/0!
19	Library B (2-3 Lib)	60	1B 32 P F 2 (ELE)	F42LL	60	3.6	SW	2000	7,200	60	1B 32 P F 2 (ELE)	F42LL	60	3.6	SW	2,000	7,200	-	0.0	$ -	$ -	$0		#DIV/0!
19	Room 117	18	1B 32 P F 2 (ELE)	F42LL	60	1.1	SW	1400	1,512	18	1B 32 P F 2 (ELE)	F42LL	60	1.1	SW	1,400	1,512	-	0.0	$ -	$ -	$0		#DIV/0!
19	Room 118	5	1B 32 P F 2 (ELE)	F42LL	60	0.3	SW	1400	420	5	1B 32 P F 2 (ELE)	F42LL	60	0.3	SW	1,400	420	-	0.0	$ -	$ -	$0		#DIV/0!
35	Room 119	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	SW	1400	1,512	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	SW	1,400	1,512	-	0.0	$ -	$ -	$0		#DIV/0!
35	Room 120	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	SW	1400	1,512	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	SW	1,400	1,512	-	0.0	$ -	$ -	$0		#DIV/0!
35	Room 121	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	SW	1400	1,512	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	SW	1,400	1,512	-	0.0	$ -	$ -	$0		#DIV/0!
35	Room 122	5	T 32 R F 3 (ELE)	F43ILL/2	90	0.5	SW	1400	630	5	T 32 R F 3 (ELE)	F43ILL/2	90	0.5	SW	1,400	630	-	0.0	$ -	$ -	$0		#DIV/0!
35	Room 123	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	SW	1400	1,512	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	SW	1,400	1,512	-	0.0	$ -	$ -	$0		#DIV/0!
35	Room 124	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	SW	1400	1,512	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	SW	1,400	1,512	-	0.0	$ -	$ -	$0		#DIV/0!
35	Room 125	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	SW	1400	1,512	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	SW	1,400	1,512	-	0.0	$ -	$ -	$0		#DIV/0!
35	Room 126	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	SW	1400	1,512	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	SW	1,400	1,512	-	0.0	$ -	$ -	$0		#DIV/0!
35	Room 127	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	SW	1400	1,512	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	SW	1,400	1,512	-	0.0	$ -	$ -	$0		#DIV/0!
35	Storage	2	T 32 R F 3 (ELE)	F43ILL/2	90	0.2	SW	1000	180	2	T 32 R F 3 (ELE)	F43ILL/2	90	0.2	SW	1,000	180	-	0.0	$ -	$ -	$0		#DIV/0!
35	Room 128	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	SW	1400	1,512	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	SW	1,400	1,512	-	0.0	$ -	$ -	$0		#DIV/0!
35	Room 129	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	SW	1400	1,512	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	SW	1,400	1,512	-	0.0	$ -	$ -	$0		#DIV/0!
35	Room 130	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	SW	1400	1,512	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	SW	1,400	1,512	-	0.0	$ -	$ -	$0		#DIV/0!
35	Room 131	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	SW	1400	1,512	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	SW	1,400	1,512	-	0.0	$ -	$ -	$0		#DIV/0!
35	Room 132	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	SW	1400	1,512	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	SW	1,400	1,512	-	0.0	$ -	$ -	$0		#DIV/0!
35	Room 133	8	T 32 R F 3 (ELE)	F43ILL/2	90	0.7	SW	1400	1,008	8	T 32 R F 3 (ELE)	F43ILL/2	90	0.7	SW	1,400	1,008	-	0.0	$ -	$ -	$0		#DIV/0!
35	Room 134	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	SW	1400	1,512	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	SW	1,400	1,512	-	0.0	$ -	$ -	$0		#DIV/0!
35	Room 135	12	T

Energy Audit of Holmdel Schools - Village School
CHA Project No.24988
ECM-1 Lighting Replacements

		EXISTING CONDITIONS								RETROFIT CONDITIONS								COST & SAVINGS ANALYSIS						
	Area Description	No. of Fixtures	Standard Fixture Code	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	Kitchen	13	T 32 R F 3 (ELE)	F43ILL/2	90	1.2	SW	1400	1,638	13	T 32 R F 3 (ELE)	F43ILL/2	90	1.2	SW	1,400	1,638	-	0.0	$ -	$ -	$0		#DIV/0!
19	Kitchen	2	1B 32 P F 2 (ELE)	F42LL	60	0.1	SW	1400	168	2	1B 32 P F 2 (ELE)	F42LL	60	0.1	SW	1,400	168	-	0.0	$ -	$ -	$0		#DIV/0!
5	Kitchen	3	2T 32 R F 2 (u) (ELE)	FU2LL	60	0.2	SW	1400	252	3	2T 32 R F 2 (u) (ELE)	FU2LL	60	0.2	SW	1,400	252	-	0.0	$ -	$ -	$0		#DIV/0!
19	Storage	4	1B 32 P F 2 (ELE)	F42LL	60	0.2	SW	1000	240	4	1B 32 P F 2 (ELE)	F42LL	60	0.2	SW	1,000	240	-	0.0	$ -	$ -	$0		#DIV/0!
35	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		#DIV/0!
35	Music Room	26	T 32 R F 3 (ELE)	F43ILL/2	90	2.3	SW	1400	3,276	26	T 32 R F 3 (ELE)	F43ILL/2	90	2.3	SW	1,400	3,276	-	0.0	$ -	$ -	$0		#DIV/0!
19	Electric Closet	5	1B 32 P F 2 (ELE)	F42LL	60	0.3	SW	780	234	5	1B 32 P F 2 (ELE)	F42LL	60	0.3	SW	780	234	-	0.0	$ -	$ -	$0		#DIV/0!
19	Hallway Area	90	1B 32 P F 2 (ELE)	F42LL	60	5.4	SW	8760	47,304	90	1B 32 P F 2 (ELE)	F42LL	60	5.4	SW	8,760	47,304	-	0.0	$ -	$ -	$0		#DIV/0!
19	Hallway Area	100	1B 32 P F 2 (ELE)	F42LL	60	6.0	SW	1820	10,920	100	1B 32 P F 2 (ELE)	F42LL	60	6.0	SW	1,820	10,920	-	0.0	$ -	$ -	$0		#DIV/0!
39	Hallway Area	10	2' 17 W F 2 (ELE)	F22ILL	33	0.3	SW	1820	601	10	2' 17 W F 2 (ELE)	F22ILL	33	0.3	SW	1,820	601	-	0.0	$ -	$ -	$0		#DIV/0!
	Total	**1,740**				**150.4**			**278,795**	**1,740**			**10,275**	**142.1**			**263,265**	**15,530**	**8.3**	**$2,326**	**$42,660**	**$7,700**		
																	Demand Savings			**8.3**	**$602**			
																	kWh Savings			**15,530**	**$1,724**			
																	Total savings				**$2,326**		**18.3**	**15.0**

Energy Audit of Holmdel Schools - Village School

CHA Project No.24988

ECM-2 Install Occupancy Sensors

		EXISTING CONDITIONS							RETROFIT CONDITIONS								COST & SAVINGS ANALYSIS						
	Area Description	No. of Fixtures	Standard Fixture Code	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	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
19	Hallway Area near door 24	6	1B 32 P F 2 (ELE)	F42LL	60	0.4	SW	8760	3,153.6	6	1B 32 P F 2 (ELE)	F42LL	60	0.4	SW	8760	3,153.6	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
19	Hallway Area near door 24	14	1B 32 P F 2 (ELE)	F42LL	60	0.8	SW	1820	1,528.8	14	1B 32 P F 2 (ELE)	F42LL	60	0.8	SW	1820	1,528.8	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
35	Room 11	9	T 32 R F 3 (ELE)	F43ILL/2	90	0.8	SW	2000	1,620.0	9	T 32 R F 3 (ELE)	F43ILL/2	90	0.8	OCC	1200	972.0	648.0	0.0	$71.93	$128.25	$20.00	1.8	1.5
20	Room 11	8	S 32 C F 1 (ELE)	F41LL	32	0.3	SW	2000	512.0	8	S 32 C F 1 (ELE)	F41LL	32	0.3	OCC	1200	307.2	204.8	0.0	$22.73	$128.25	$20.00	5.6	4.8
36	Room 11	1	2T 3' 17 R F 1 (ELE)	F21ILL	20	0.0	SW	2000	40.0	1	2T 3' 17 R F 1 (ELE)	F21ILL	20	0.0	OCC	1200	24.0	16.0	0.0	$1.78	$128.25	$20.00	72.2	61.0
35	Room 12	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	SW	2000	2,160.0	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	OCC	1200	1,296.0	864.0	0.0	$95.90	$128.25	$20.00	1.3	1.1
20	Room 10	30	S 32 C F 1 (ELE)	F41LL	32	1.0	SW	2000	1,920.0	30	S 32 C F 1 (ELE)	F41LL	32	1.0	OCC	1200	1,152.0	768.0	0.0	$85.25	$128.25	$20.00	1.5	1.3
19	Room 10	21	1B 32 P F 2 (ELE)	F42LL	60	1.3	SW	2000	2,520.0	21	1B 32 P F 2 (ELE)	F42LL	60	1.3	OCC	1200	1,512.0	1,008.0	0.0	$111.89	$128.25	$20.00	1.1	1.0
36	Room 10	13	2T 3' 17 R F 1 (ELE)	F21ILL	20	0.3	SW	2000	520.0	13	2T 3' 17 R F 1 (ELE)	F21ILL	20	0.3	OCC	1200	312.0	208.0	0.0	$23.09	$128.25	$20.00	5.6	4.7
228	Room 10	12	W60CF1	F81EL	60	0.7	SW	2000	1,440.0	12	W60CF1	F81EL	60	0.7	OCC	1200	864.0	576.0	0.0	$63.94	$128.25	$20.00	2.0	1.7
232	Room 10	1	R 60 C I 1	I60/1	60	0.1	SW	2000	120.0	1	R 60 C I 1	I60/1	60	0.1	SW	1200	72.0	48.0	0.0	$5.33	$0.00	$0.00	0.0	0.0
19	Workroom Storage	11	1B 32 P F 2 (ELE)	F42LL	60	0.7	SW	2000	1,320.0	11	1B 32 P F 2 (ELE)	F42LL	60	0.7	OCC	1200	792.0	528.0	0.0	$58.61	$128.25	$20.00	2.2	1.8
19	Room 15	24	1B 32 P F 2 (ELE)	F42LL	60	1.4	SW	1400	2,016.0	24	1B 32 P F 2 (ELE)	F42LL	60	1.4	OCC	980	1,411.2	604.8	0.0	$67.13	$128.25	$20.00	1.9	1.6
19	Room 16	24	1B 32 P F 2 (ELE)	F42LL	60	1.4	SW	1400	2,016.0	24	1B 32 P F 2 (ELE)	F42LL	60	1.4	OCC	980	1,411.2	604.8	0.0	$67.13	$128.25	$20.00	1.9	1.6
19	Room 17	24	1B 32 P F 2 (ELE)	F42LL	60	1.4	SW	1400	2,016.0	24	1B 32 P F 2 (ELE)	F42LL	60	1.4	OCC	980	1,411.2	604.8	0.0	$67.13	$128.25	$20.00	1.9	1.6
19	Room 18	24	1B 32 P F 2 (ELE)	F42LL	60	1.4	SW	1400	2,016.0	24	1B 32 P F 2 (ELE)	F42LL	60	1.4	OCC	980	1,411.2	604.8	0.0	$67.13	$128.25	$20.00	1.9	1.6
19	Room 19	24	1B 32 P F 2 (ELE)	F42LL	60	1.4	SW	1400	2,016.0	24	1B 32 P F 2 (ELE)	F42LL	60	1.4	OCC	980	1,411.2	604.8	0.0	$67.13	$128.25	$20.00	1.9	1.6
19	Room 20	24	1B 32 P F 2 (ELE)	F42LL	60	1.4	SW	1400	2,016.0	24	1B 32 P F 2 (ELE)	F42LL	60	1.4	OCC	980	1,411.2	604.8	0.0	$67.13	$128.25	$20.00	1.9	1.6
35	Room 21	25	T 32 R F 3 (ELE)	F43ILL/2	90	2.3	SW	1400	3,150.0	25	T 32 R F 3 (ELE)	F43ILL/2	90	2.3	OCC	980	2,205.0	945.0	0.0	$104.90	$128.25	$20.00	1.2	1.0
35	Room 21 LabA	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	SW	1400	1,512.0	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	OCC	980	1,058.4	453.6	0.0	$50.35	$128.25	$20.00	2.5	2.1
35	Room 22	15	T 32 R F 3 (ELE)	F43ILL/2	90	1.4	SW	1400	1,890.0	15	T 32 R F 3 (ELE)	F43ILL/2	90	1.4	OCC	980	1,323.0	567.0	0.0	$62.94	$128.25	$20.00	2.0	1.7
35	Room 23	13	T 32 R F 3 (ELE)	F43ILL/2	90	1.2	SW	1400	1,638.0	13	T 32 R F 3 (ELE)	F43ILL/2	90	1.2	OCC	980	1,146.6	491.4	0.0	$54.55	$128.25	$20.00	2.4	2.0
35	Room 24	13	T 32 R F 3 (ELE)	F43ILL/2	90	1.2	SW	1400	1,638.0	13	T 32 R F 3 (ELE)	F43ILL/2	90	1.2	OCC	980	1,146.6	491.4	0.0	$54.55	$128.25	$20.00	2.4	2.0
35	Room 25	13	T 32 R F 3 (ELE)	F43ILL/2	90	1.2	SW	1400	1,638.0	13	T 32 R F 3 (ELE)	F43ILL/2	90	1.2	OCC	980	1,146.6	491.4	0.0	$54.55	$128.25	$20.00	2.4	2.0
35	Room 26	13	T 32 R F 3 (ELE)	F43ILL/2	90	1.2	SW	1400	1,638.0	13	T 32 R F 3 (ELE)	F43ILL/2	90	1.2	OCC	980	1,146.6	491.4	0.0	$54.55	$128.25	$20.00	2.4	2.0
35	Room 27	6	T 32 R F 3 (ELE)	F43ILL/2	90	0.5	SW	1400	756.0	6	T 32 R F 3 (ELE)	F43ILL/2	90	0.5	OCC	980	529.2	226.8	0.0	$25.17	$128.25	$20.00	5.1	4.3
35	Room 28	13	T 32 R F 3 (ELE)	F43ILL/2	90	1.2	SW	1400	1,638.0	13	T 32 R F 3 (ELE)	F43ILL/2	90	1.2	OCC	980	1,146.6	491.4	0.0	$54.55	$128.25	$20.00	2.4	2.0
19	Room 29 (Lib A)	2	1B 32 P F 2 (ELE)	F42LL	60	0.1	SW	2000	240.0	2	1B 32 P F 2 (ELE)	F42LL	60	0.1	OCC	1500	180.0	60.0	0.0	$6.66	$128.25	$20.00	19.3	16.3
20	Room 29 (Lib A)	20	S 32 C F 1 (ELE)	F41LL	32	0.6	SW	2000	1,280.0	20	S 32 C F 1 (ELE)	F41LL	32	0.6	OCC	1500	960.0	320.0	0.0	$35.52	$128.25	$20.00	3.6	3.0
39	Room 29 (Lib A)	12	2' 17 W F 2 (ELE)	F22ILL	33	0.4	SW	2000	792.0	12	2' 17 W F 2 (ELE)	F22ILL	33	0.4	OCC	1500	594.0	198.0	0.0	$21.98	$128.25	$20.00	5.8	4.9
35	Room 30	9	T 32 R F 3 (ELE)	F43ILL/2	90	0.8	SW	1400	1,134.0	9	T 32 R F 3 (ELE)	F43ILL/2	90	0.8	OCC	980	793.8	340.2	0.0	$37.76	$128.25	$20.00	3.4	2.9
35	Room 31	6	T 32 R F 3 (ELE)	F43ILL/2	90	0.5	SW	1400	756.0	6	T 32 R F 3 (ELE)	F43ILL/2	90	0.5	OCC	980	529.2	226.8	0.0	$25.17	$128.25	$20.00	5.1	4.3
35	Room 32	13	T 32 R F 3 (ELE)	F43ILL/2	90	1.2	SW	1400	1,638.0	13	T 32 R F 3 (ELE)	F43ILL/2	90	1.2	OCC	980	1,146.6	491.4	0.0	$54.55	$128.25	$20.00	2.4	2.0
35	Room 33	13	T 32 R F 3 (ELE)	F43ILL/2	90	1.2	SW	1400	1,638.0	13	T 32 R F 3 (ELE)	F43ILL/2	90	1.2	OCC	980	1,146.6	491.4	0.0	$54.55	$128.25	$20.00	2.4	2.0
35	Room 34	17	T 32 R F 3 (ELE)	F43ILL/2	90	1.5	SW	1400	2,142.0	17	T 32 R F 3 (ELE)	F43ILL/2	90	1.5	OCC	980	1,499.4	642.6	0.0	$71.33	$128.25	$20.00	1.8	1.5
19	Custodian Room	2	1B 32 P F 2 (ELE)	F42LL	60	0.1	SW	780	93.6	2	1B 32 P F 2 (ELE)	F42LL	60	0.1	OCC	1500	180.0	-86.4	0.0	-$9.59	$128.25	$20.00		-11.3
19	Electric Closet	4	1B 32 P F 2 (ELE)	F42LL	60	0.2	SW	780	187.2	4	1B 32 P F 2 (ELE)	F42LL	60	0.2	OCC	1500	360.0	-172.8	0.0	-$19.18	$128.25	$20.00		-5.6
35	Room 35	13	T 32 R F 3 (ELE)	F43ILL/2	90	1.2	SW	1400	1,638.0	13	T 32 R F 3 (ELE)	F43ILL/2	90	1.2	OCC	980	1,146.6	491.4	0.0	$54.55	$128.25	$20.00	2.4	2.0
35	Room 36	13	T 32 R F 3 (ELE)	F43ILL/2	90	1.2	SW	1400	1,638.0	13	T 32 R F 3 (ELE)	F43ILL/2	90	1.2	OCC	980	1,146.6	491.4	0.0	$54.55	$128.25	$20.00	2.4	2.0
35	Boy's Room	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	OCC	1000	90.0	0.0	0.0	$0.00	$128.25	$20.00		#DIV/0!
35	Girl's Room	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	OCC	1000	90.0	0.0	0.0	$0.00	$128.25	$20.00		#DIV/0!
19	Room 37	13	1B 32 P F 2 (ELE)	F42LL	60	0.8	SW	1400	1,092.0	13	1B 32 P F 2 (ELE)	F42LL	60	0.8	OCC	980	764.4	327.6	0.0	$36.36	$128.25	$20.00	3.5	3.0
19	Room 38	13	1B 32 P F 2 (ELE)	F42LL	60	0.8	SW	1400	1,092.0	13	1B 32 P F 2 (ELE)	F42LL	60	0.8	OCC	980	764.4	327.6	0.0	$36.36	$128.25	$20.00	3.5	3.0
19	Room 39	13	1B 32 P F 2 (ELE)	F42LL	60	0.8	SW	1400	1,092.0	13	1B 32 P F 2 (ELE)	F42LL	60	0.8	OCC	980	764.4	327.6	0.0	$36.36	$128.25	$20.00	3.5	3.0
19	Room 40	13	1B 32 P F 2 (ELE)	F42LL	60	0.8	SW	1400	1,092.0	13	1B 32 P F 2 (ELE)	F42LL	60	0.8	OCC	980	764.4	327.6	0.0	$36.36	$128.25	$20.00	3.5	3.0
19	Room 41	13	1B 32 P F 2 (ELE)	F42LL	60	0.8	SW	1400	1,092.0	13	1B 32 P F 2 (ELE)	F42LL	60	0.8	OCC	980	764.4	327.6	0.0	$36.36	$128.25	$20.00	3.5	3.0
19	Room 42	13	1B 32 P F 2 (ELE)	F42LL	60	0.8	SW	1400	1,092.0	13	1B 32 P F 2 (ELE)	F42LL	60	0.8	OCC	980	764.4	327.6	0.0	$36.36	$128.25	$20.00	3.5	3.0
19	Boiler Room B	2	1B 32 P F 2 (ELE)	F42LL	60	0.1	SW	1000	120.0	2	1B 32 P F 2 (ELE)	F42LL	60	0.1	OCC	1000	120.0	0.0	0.0	$0.00	$128.25	$20.00		#DIV/0!
9	Atrium	4	MH400/1	MH400/1	458	1.8	SW	1820	3,334.2	4	High Bay MH 400	MH400/1	458	1.8	OCC	1820	3,334.2	0.0	0.0	$0.00	$128.25	$20.00		#DIV/0!
9	Old Gym (Gym A)	22	High Bay MH 400	MH400/1	458	10.1	SW	2000	20,152.0	22	High Bay MH 400	MH400/1	458	10.1	OCC	2000	20,152.0	0.0	0.0	$0.00	$128.25	$20.00		#DIV/0!
19	Old Gym (Gym A)	10	1B 32 P F 2 (ELE)	F42LL	60	0.6	SW	2000	1,200.0	10	1B 32 P F 2 (ELE)	F42LL	60	0.6	OCC	2000	1,200.0	0.0	0.0	$0.00	$128.25	$20.00		#DIV/0!
133	Old Gym (Gym A)	4	CF 26	CFQ26/1-L	27	0.1	SW	2000	216.0	4	CF 26	CFQ26/1-L	27	0.1	OCC	2000	216.0	0.0	0.0	$0.00	$128.25	$20.00		#DIV/0!
19	Boy's Room	3	1B 32 P F 2 (ELE)	F42LL	60	0.2	SW	1000	180.0	3	1B 32 P F 2 (ELE)	F42LL	60	0.2	OCC	1000	180.0	60.0	0.0	$0.00	$128.25	$20.00		#DIV/0!
19	Girl's Room	3	1B 32 P F 2 (ELE)	F42LL	60	0.2	SW	1000	180.0	3	1B 32 P F 2 (ELE)	F42LL	60	0.2	OCC	1000	180.0	0.0	0.0	$0.00	$128.25	$20.00		#DIV/0!
19	Custodian Room	1	1B 32 P F 2 (ELE)	F42LL	60	0.1	SW	780	46.8	1	1B 32 P F 2 (ELE)	F42LL	60	0.1	OCC	1500	90.0	-43.2	0.0	-$4.80	$128.25	$20.00		-22.6
19	APR Storage	16	1B 32 P F 2 (ELE)	F42LL	60	1.0	SW	1000	960.0	16	1B 32 P F 2 (ELE)	F42LL	60	1.0	OCC	250	240.0	720.0	0.0	$79.92	$128.25	$20.00	1.6	1.4
19	All Purpose Room	11	1B 32 P F 2 (ELE)	F42LL	60	0.7	SW	1400	924.0	11	1B 32 P F 2 (ELE)	F42LL	60	0.7	OCC	500	330.0	594.0	0.0	$65.93	$128.25	$20.00	1.9	1.6
9	All Purpose Room	15	High Bay MH 400	MH400/1	458	6.9	SW	1400	9,618.0	15	High Bay MH 400	MH400/1	458	6.9	OCC	500	3,435.0	6,183.0	0.0	$686.31	$128.25	$20.00	0.2	0.2
35	Room 43	10	T 32 R F 3 (ELE)	F43ILL/2	90	0.9	SW	1400	1,260.0	10	T 32 R F 3 (ELE)	F43ILL/2	90	0.9	OCC	980	882.0	378.0	0.0	$41.96	$128.25	$20.00	3.1	2.6
35	Room 44	9	T 32 R F 3 (ELE)	F43ILL/2	90	0.8	SW	1400	1,134.0	9	T 32 R F 3 (ELE)	F43ILL/2	90	0.8	OCC	980	793.8	340.2	0.0	$37.76	$128.25	$20.00	3.4	2.9
19	Room 45	11	1B 32 P F 2 (ELE)	F42LL	60	0.7	SW	1400	924.0	11	1B 32 P F 2 (ELE)	F42LL	60	0.7	OCC	980	646.8	277.2	0.0	$30.77	$128.25	$20.00	4.2	3.5
19	Room 46	4	1B 32 P F 2 (ELE)	F42LL	60	0.2	SW	1400	336.0	4	1B 32 P F 2 (ELE)	F42LL	60	0.2	OCC	980	235.2	100.8	0.0	$11.19	$128.25	$20.00	11.5	9.7
19	Room 46A	3	1B 32 P F 2 (ELE)	F42LL	60	0.2	SW	1400	252.0	3	1B 32 P F 2 (ELE)	F42LL	60	0.2	OCC	980	176.4	75.6	0.0	$8.39	$128.25	$20.00	15.3	12.9
19	Room 47	6	1B 32 P F 2 (ELE)	F42LL	60	0.4	SW	1400	504.0	6	1B 32 P F 2 (ELE)	F42LL	60	0.4	OCC	980	352.8	151.2	0.0	$16.78	$128.25	$20.00	7.6	6.4
35	Room 48	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	SW	1400	1,512.0	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	OCC	980	1,058.4	453.6	0.0	$50.35	$128.25	$20.00	2.5	2.1
35	Room 48B	6	T 32 R F 3 (ELE)	F43ILL/2	90	0.5	SW	1400	756.0	6	T 32 R F 3 (ELE)	F43ILL/2	90	0.5	OCC	980	529.2	226.8	0.0	$25.17	$128.25	$20.00	5.1	4.3
19	Custodian Room	2	1B 32 P F 2 (ELE)	F42LL	60	0.1	SW	780	93.6	2	1B 32 P F 2 (ELE)	F42LL	60	0.1	OCC	1500	180.0	-86.4	0.0	-$9.59	$128.25	$20.00		-11.3
228	Boiler Room A	2	W60CF1	F81EL	60	0.1	SW	1000	120.0	2	W60CF1	F81EL	60	0.1	OCC	1000	120.0	0.0	0.0	$0.00	$128.25	$20.00		#DIV/0!
19	Room 34 A	4	1B 32 P F 2 (ELE)	F42LL	60	0.2	SW	1400	336.0	4	1B 32 P F 2 (ELE)	F42LL	60	0.2	OCC	980	235.2	100.8	0.0	$11.19	$128.25	$20.00	11.5	9.7
19	Room 112A	26	1B 32 P F 2 (ELE)	F42LL	60	1.6	SW	1400	2,184.0	26	1B 32 P F 2 (ELE)	F42LL	60	1.6	OCC	0	0.0	2,184.0	0.0	$242.42	$128.25	$20.00	0.5	0.4
19	Boy's Room	5	1B 32 P F 2 (ELE)	F42LL	60	0.3	SW	1000	300.0	5	1B 32 P F 2 (ELE)	F42LL	60	0.3	OCC	1000	300.0	0.0	0.0	$0.00	$128.25	$20.00		#DIV/0!
19	Custodian Room	1	1B 32 P F 2 (ELE)	F42LL	60	0.1	SW	780	46.8	1	1B 32 P F 2 (ELE)	F42LL	60	0.1	OCC	1500	90.0	-43.2	0.0	-$4.80	$128.25	$20.00		-22.6
19	Girl's Room	4	1B 32 P F 2 (ELE)	F42LL	60	0.2	SW	1000	240.0	4	1B 32 P F 2 (ELE)	F42LL	60	0.2	OCC	1000	240.0	0.0	0.0	$0.00	$128.25	$20.00		#DIV/0!
19	Room 101	18	1B 32 P F 2 (ELE)	F42LL	60	1.1	SW	1400	1,512.0	18	1B 32 P F 2 (ELE)	F42LL	60	1.1	OCC	980	1,058.4	453.6	0.0	$50.35	$128.25	$20.00	2.5	2.1
19	Room 102	18	1B 32 P F 2 (ELE)	F42LL	60	1.1	SW	1400	1,512.0	18	1B 32 P F 2 (ELE)	F42LL	60	1.1	OCC	980	1,058.4	453.6	0.0	$50.35	$128.25	$20.00	2.5	2.1
19	Room 103	18	1B 32 P F 2 (ELE)	F42LL	60	1.1	SW	1400	1,512.0	18	1B 32 P F 2 (ELE)	F42LL	60	1.1	OCC	980	1,058.4	453.6	0.0	$50.35	$128.25	$20.00	2.5	2.1
19	Room 104	18	1B 32 P F 2 (ELE)	F42LL	60	1.1	SW	1400	1,512.0	18	1B 32 P F 2 (ELE)	F42LL	60	1.1	OCC	980	1,058.4	453.6	0.0	$50.35	$128.25	$20.00	2.5	2.1
19	Room 105	18	1B 32 P F 2 (ELE)	F42LL	60	1.1	SW	1400	1,512.0	18	1B 32 P F 2 (ELE)	F42LL	60	1.1	OCC	980	1,058.4	453.6	0.0	$50.35	$128.25	$20.00	2.5	2.1
19	Room 106	18	1B 32 P F 2 (ELE)	F42LL	60	1.1	SW	1400	1,512.0	18	1B 32 P F 2 (ELE)	F42LL	60	1.1	OCC	980	1,058.4	453.6	0.0	$50.35	$128.25	$20.00	2.5	2.1
19	Room 107	18	1B 32 P F 2 (ELE)	F42LL	60	1.1	SW	1400	1,512.0	18	1B 32 P F 2 (ELE)	F42LL	60	1.1	OCC	980	1,058.4	453.6	0.0	$50.35	$128.25	$20.00	2.5	2.1
19	Room 108	18	1B 32 P F 2 (ELE)	F42LL	60	1.1	SW	1400	1,512.0	18	1B 32 P F 2 (ELE)	F42LL	60	1.1	OCC	980	1,058.4	453.6	0.0	$50.35	$128.25	$20.00	2.5	2.1
19	Room 109	18	1B 32 P F 2 (ELE)	F42LL	60	1.1	SW	1400	1,512.0	18	1B 32 P F 2 (ELE)	F42LL	60	1.1	OCC	980	1,058.4	453.6	0.0	$50.35	$128.25	$20.00	2.5	2.1
19	Room 110	18	1B 32 P F 2 (ELE)	F42LL	60	1.1	SW	1400	1,512.0	18	1B 32 P F 2 (ELE)	F42LL	60	1.1	OCC	980	1,058.4	453.6	0.0	$50.35	$128.25	$20.00	2.5	2.1
19	Room 111	22	1B 32 P F 2 (ELE)	F42LL	60	1.3	SW	1400	1,848.0	22	1B 32 P F 2 (ELE)	F42LL	60	1.3	OCC	980	1,293.6	554.4	0.0	$61.54	$128.25	$20.00	2.1	1.8
19	Room 115	11	1B 32 P F 2 (ELE)	F42LL	60	0.7	SW	1400	924.0	11	1B 32 P F 2 (ELE)	F42LL	60	0.7	OCC	980	646.8	277.2	0.0	$30.77	$128.25	$20.00	4.2	3.5
19	Room 116	18	1B 32 P F 2 (ELE)	F42LL	60	1.1	SW	1400	1,512.0	18	1B 32 P F 2 (ELE)	F42LL	60	1.1	OCC	980	1,058.4	453.6	0.0	$50.35	$128.25	$20.00	2.5	2.1
19	Library B (2-3 Lib)	60	1B 32 P F 2 (ELE)	F42LL	60	3.6	SW	2000	7,200.0	60	1B 32 P F 2 (ELE)	F42LL	60	3.6	OCC	1500	5,400.0	1,800.0	0.0	$199.80	$128.25	$20.00	0.6	0.5
19	Room 117	18	1B 32 P F 2 (ELE)	F42LL	60	1.1	SW	1400	1,512.0	18	1B 32 P F 2 (ELE)	F42LL	60	1.1	OCC	980	1,058.4	453.6	0.0	$50.35	$128.25	$20.00	2.5	2.1
19	Room 118	5	1B 32 P F 2 (ELE)	F42LL	60	0.3	SW	1400	420.0	5	1B 32 P F 2 (ELE)	F42LL	60	0.3	OCC	980	294.0	126.0	0.0	$13.99	$128.25	$20.00	9.2	7.7
35	Room 119	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	SW	1400	1,512.0	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	OCC	980	1,058.4	453.6	0.0	$50.35	$128.25	$20.00	2.5	2.1
35	Room 120	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	SW	1400	1,512.0	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	OCC	980	1,058.4	453.6	0.0	$50.35	$128.25	$20.00	2.5	2.1
35	Room 121	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	SW	1400	1,512.0	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	OCC	980	1,058.4	453.6	0.0	$50.35	$128.25	$20.00	2.5	2.1
35	Room 122	5	T 32 R F 3 (ELE)	F43ILL/2	90	0.5	SW	1400	630.0	5	T 32 R F 3 (ELE)	F43ILL/2	90	0.5	OCC	980	441.0	189.0	0.0	$20.98	$128.25	$20.00	6.1	5.2
35	Room 123	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	SW	1400	1,512.0	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	OCC	980	1,058.4	453.6	0.0	$50.35	$128.25	$20.00	2.5	2.1
35	Room 124	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	SW	1400	1,512.0	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	OCC	980	1,058.4	453.6	0.0	$50.35	$128.25	$20.00	2.5	2.1
35	Room 125	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	SW	1400	1,512.0	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	OCC	980	1,058.4	453.6	0.0	$50.35	$128.25	$20.00	2.5	2.1
35	Room 126	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	SW	1400	1,512.0	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.

Energy Audit of Holmdel Schools - Village School
CHA Project No.24988
ECM-2 Install Occupancy Sensors

		EXISTING CONDITIONS								RETROFIT CONDITIONS								COST & SAVINGS ANALYSIS						
	Area Description	No. of Fixtures	Standard Fixture Code	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	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	Kitchen	13	T 32 R F 3 (ELE)	F43ILL/2	90	1.2	SW	1400	1,638.0	13	T 32 R F 3 (ELE)	F43ILL/2	90	1.2	OCC	1500	1,755.0	-117.0	0.0	-$12.99	$128.25	$20.00		-8.3
19	Kitchen	2	1B 32 P F 2 (ELE)	F42LL	60	0.1	SW	1400	168.0	2	1B 32 P F 2 (ELE)	F42LL	60	0.1	OCC	1500	180.0	-12.0	0.0	-$1.33	$128.25	$20.00		-81.3
5	Kitchen	3	2T 32 R F 2 (u) (ELE)	FU2LL	60	0.2	SW	1400	252.0	3	2T 32 R F 2 (u) (ELE)	FU2LL	60	0.2	OCC	1500	270.0	-18.0	0.0	-$2.00	$128.25	$20.00		-54.2
19	Storage	4	1B 32 P F 2 (ELE)	F42LL	60	0.2	SW	1000	240.0	4	1B 32 P F 2 (ELE)	F42LL	60	0.2	OCC	250	60.0	180.0	0.0	$19.98	$128.25	$20.00	6.4	5.4
35	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	OCC	250	67.5	202.5	0.0	$22.48	$128.25	$20.00	5.7	4.8
35	Music Room	26	T 32 R F 3 (ELE)	F43ILL/2	90	2.3	SW	1400	3,276.0	26	T 32 R F 3 (ELE)	F43ILL/2	90	2.3	OCC	980	2,293.2	982.8	0.0	$109.09	$128.25	$20.00	1.2	1.0
19	Electric Closet	5	1B 32 P F 2 (ELE)	F42LL	60	0.3	SW	780	234.0	5	1B 32 P F 2 (ELE)	F42LL	60	0.3	OCC	1500	450.0	-216.0	0.0	-$23.98	$128.25	$20.00		-4.5
19	Hallway Area	90	1B 32 P F 2 (ELE)	F42LL	60	5.4	SW	8760	47,304.0	90	1B 32 P F 2 (ELE)	F42LL	60	5.4	SW	8760	47,304.0	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
19	Hallway Area	100	1B 32 P F 2 (ELE)	F42LL	60	6.0	SW	1820	10,920.0	100	1B 32 P F 2 (ELE)	F42LL	60	6.0	OCC	1820	10,920.0	0.0	0.0	$0.00	$128.25	$20.00		#DIV/0!
39	Hallway Area	10	2' 17 W F 2 (ELE)	F22ILL	33	0.3	SW	1820	600.6	10	2' 17 W F 2 (ELE)	F22ILL	33	0.3	OCC	1820	600.6	0.0	0.0	$0.00	$128.25	$20.00		#DIV/0!
															0	#N/A	#VALUE!	#VALUE!	#N/A	#VALUE!			#VALUE!	#VALUE!
															0	#N/A	#VALUE!	#VALUE!	#N/A	#VALUE!			#VALUE!	#VALUE!
															0	#N/A	#VALUE!	#VALUE!	#N/A	#VALUE!			#VALUE!	#VALUE!
															0	#N/A	#VALUE!	#VALUE!	#N/A	#VALUE!			#VALUE!	#VALUE!
															0	#N/A	#VALUE!	#VALUE!	#N/A	#VALUE!			#VALUE!	#VALUE!
															0	#N/A	#VALUE!	#VALUE!	#N/A	#VALUE!			#VALUE!	#VALUE!
															0	#N/A	#VALUE!	#VALUE!	#N/A	#VALUE!			#VALUE!	#VALUE!
															0	#N/A	#VALUE!	#VALUE!	#N/A	#VALUE!			#VALUE!	#VALUE!
															0	#N/A	#VALUE!	#VALUE!	#N/A	#VALUE!			#VALUE!	#VALUE!
															0	#N/A	#VALUE!	#VALUE!	#N/A	#VALUE!			#VALUE!	#VALUE!
															0	#N/A	#VALUE!	#VALUE!	#N/A	#VALUE!			#VALUE!	#VALUE!
															0	#N/A	#VALUE!	#VALUE!	#N/A	#VALUE!			#VALUE!	#VALUE!
															0	#N/A	#VALUE!	#VALUE!	#N/A	#VALUE!			#VALUE!	#VALUE!
															0	#N/A	#VALUE!	#VALUE!	#N/A	#VALUE!			#VALUE!	#VALUE!
															0	#N/A	#VALUE!	#VALUE!	#N/A	#VALUE!			#VALUE!	#VALUE!
															0	#N/A	#VALUE!	#VALUE!	#N/A	#VALUE!			#VALUE!	#VALUE!
															0	#N/A	#VALUE!	#VALUE!	#N/A	#VALUE!			#VALUE!	#VALUE!
															0	#N/A	#VALUE!	#VALUE!	#N/A	#VALUE!			#VALUE!	#VALUE!
															0	#N/A	#VALUE!	#VALUE!	#N/A	#VALUE!			#VALUE!	#VALUE!
															0	#N/A	#VALUE!	#VALUE!	#N/A	#VALUE!			#VALUE!	#VALUE!
	Total	**1,740**				**150.4**			**278795.0**	**1740.0**				**150.4**			**226687.0**	**52108.0**	**0.0**	**5784.0**	**16416.0**	**2560.0**		
																		Demand Savings		**0.0**	**$0**			
																		kWh Savings		**52,108**	**$5,784**			
																		Total Savings			**$5,784**		**2.8**	**2.4**

Energy Audit of Holmdel Schools - Village School

CHA Project No.24988

ECM-3 Lighting Replacements with Occupancy Sensors

		EXISTING CONDITIONS							RETROFIT CONDITIONS								COST & SAVINGS ANALYSIS						
	Area Description	No. of Fixtures	Standard Fixture Code	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	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	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
19	Hallway Area near door 24	6	1B 32 P F 2 (ELE)	F42LL	60	0.4	SW	8760	3,154	6	1B 32 P F 2 (ELE)	F42LL	60	0.4	SW	8,760	3,154	-	0.0	$ -	$ -	$ -		
19	Hallway Area near door 24	14	1B 32 P F 2 (ELE)	F42LL	60	0.8	SW	1820	1,529	14	1B 32 P F 2 (ELE)	F42LL	60	0.8	SW	1,820	1,529	-	0.0	$ -	$ -	$ -		
35	Room 11	9	T 32 R F 3 (ELE)	F43ILL/2	90	0.8	SW	2000	1,620	9	T 32 R F 3 (ELE)	F43ILL/2	90	0.8	OCC	1,200	972	648	0.0	$ 71.93	$ 128.25	$ 20	1.8	1.5
20	Room 11	8	S 32 C F 1 (ELE)	F41LL	32	0.3	SW	2000	512	8	S 32 C F 1 (ELE)	F41LL	32	0.3	OCC	1,200	307	205	0.0	$ 22.73	$ 128.25	$ 20	5.6	4.8
36	Room 11	1	2T 3' 17 R F 1 (ELE)	F21ILL	20	0.0	SW	2000	40	1	2T 3' 17 R F 1 (ELE)	F21ILL	20	0.0	OCC	1,200	24	16	0.0	$ 1.78	$ 128.25	$ 20	72.2	61.0
35	Room 12	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	SW	2000	2,160	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	OCC	1,200	1,296	864	0.0	$ 95.90	$ 128.25	$ 20	1.3	1.1
20	Room 10	30	S 32 C F 1 (ELE)	F41LL	32	1.0	SW	2000	1,920	30	S 32 C F 1 (ELE)	F41LL	32	1.0	OCC	1,200	1,152	768	0.0	$ 85.25	$ 128.25	$ 20	1.5	1.3
19	Room 10	21	1B 32 P F 2 (ELE)	F42LL	60	1.3	SW	2000	2,520	21	1B 32 P F 2 (ELE)	F42LL	60	1.3	OCC	1,200	1,512	1,008	0.0	$ 111.89	$ 128.25	$ 20	1.1	1.0
36	Room 10	13	2T 3' 17 R F 1 (ELE)	F21ILL	20	0.3	SW	2000	520	13	2T 3' 17 R F 1 (ELE)	F21ILL	20	0.3	OCC	1,200	312	208	0.0	$ 23.09	$ 128.25	$ 20	5.6	4.7
228	Room 10	12	W60CF1	F81EL	60	0.7	SW	2000	1,440	12	W60CF1	F81EL	60	0.7	OCC	1,200	864	576	0.0	$ 63.94	$ 128.25	$ 20	2.0	1.7
232	Room 10	1	R 60 C I 1	I60/1	60	0.1	SW	2000	120	1	CF 26	CFQ26/1-L	27	0.0	SW	1,200	32	88	0.0	$ 12.12	$ 20.25	$ -	1.7	1.7
19	Workroom Storage	11	1B 32 P F 2 (ELE)	F42LL	60	0.7	SW	2000	1,320	11	1B 32 P F 2 (ELE)	F42LL	60	0.7	OCC	1,200	792	528	0.0	$ 58.61	$ 128.25	$ 20	2.2	1.8
19	Room 15	24	1B 32 P F 2 (ELE)	F42LL	60	1.4	SW	1400	2,016	24	1B 32 P F 2 (ELE)	F42LL	60	1.4	OCC	980	1,411	605	0.0	$ 67.13	$ 128.25	$ 20	1.9	1.6
19	Room 16	24	1B 32 P F 2 (ELE)	F42LL	60	1.4	SW	1400	2,016	24	1B 32 P F 2 (ELE)	F42LL	60	1.4	OCC	980	1,411	605	0.0	$ 67.13	$ 128.25	$ 20	1.9	1.6
19	Room 17	24	1B 32 P F 2 (ELE)	F42LL	60	1.4	SW	1400	2,016	24	1B 32 P F 2 (ELE)	F42LL	60	1.4	OCC	980	1,411	605	0.0	$ 67.13	$ 128.25	$ 20	1.9	1.6
19	Room 18	24	1B 32 P F 2 (ELE)	F42LL	60	1.4	SW	1400	2,016	24	1B 32 P F 2 (ELE)	F42LL	60	1.4	OCC	980	1,411	605	0.0	$ 67.13	$ 128.25	$ 20	1.9	1.6
19	Room 19	24	1B 32 P F 2 (ELE)	F42LL	60	1.4	SW	1400	2,016	24	1B 32 P F 2 (ELE)	F42LL	60	1.4	OCC	980	1,411	605	0.0	$ 67.13	$ 128.25	$ 20	1.9	1.6
19	Room 20	24	1B 32 P F 2 (ELE)	F42LL	60	1.4	SW	1400	2,016	24	1B 32 P F 2 (ELE)	F42LL	60	1.4	OCC	980	1,411	605	0.0	$ 67.13	$ 128.25	$ 20	1.9	1.6
35	Room 21	25	T 32 R F 3 (ELE)	F43ILL/2	90	2.3	SW	1400	3,150	25	T 32 R F 3 (ELE)	F43ILL/2	90	2.3	OCC	980	2,205	945	0.0	$ 104.90	$ 128.25	$ 20	1.2	1.0
35	Room 21 Lib A	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	SW	1400	1,512	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	OCC	980	1,058	454	0.0	$ 50.35	$ 128.25	$ 20	2.5	2.1
35	Room 22	15	T 32 R F 3 (ELE)	F43ILL/2	90	1.4	SW	1400	1,890	15	T 32 R F 3 (ELE)	F43ILL/2	90	1.4	OCC	980	1,323	567	0.0	$ 62.94	$ 128.25	$ 20	2.0	1.7
35	Room 23	13	T 32 R F 3 (ELE)	F43ILL/2	90	1.2	SW	1400	1,638	13	T 32 R F 3 (ELE)	F43ILL/2	90	1.2	OCC	980	1,147	491	0.0	$ 54.55	$ 128.25	$ 20	2.4	2.0
35	Room 24	13	T 32 R F 3 (ELE)	F43ILL/2	90	1.2	SW	1400	1,638	13	T 32 R F 3 (ELE)	F43ILL/2	90	1.2	OCC	980	1,147	491	0.0	$ 54.55	$ 128.25	$ 20	2.4	2.0
35	Room 25	13	T 32 R F 3 (ELE)	F43ILL/2	90	1.2	SW	1400	1,638	13	T 32 R F 3 (ELE)	F43ILL/2	90	1.2	OCC	980	1,147	491	0.0	$ 54.55	$ 128.25	$ 20	2.4	2.0
35	Room 26	13	T 32 R F 3 (ELE)	F43ILL/2	90	1.2	SW	1400	1,638	13	T 32 R F 3 (ELE)	F43ILL/2	90	1.2	OCC	980	1,147	491	0.0	$ 54.55	$ 128.25	$ 20	2.4	2.0
35	Room 27	6	T 32 R F 3 (ELE)	F43ILL/2	90	0.5	SW	1400	756	6	T 32 R F 3 (ELE)	F43ILL/2	90	0.5	OCC	980	529	227	0.0	$ 25.17	$ 128.25	$ 20	5.1	4.3
35	Room 28	13	T 32 R F 3 (ELE)	F43ILL/2	90	1.2	SW	1400	1,638	13	T 32 R F 3 (ELE)	F43ILL/2	90	1.2	OCC	980	1,147	491	0.0	$ 54.55	$ 128.25	$ 20	2.4	2.0
19	Room 29 (Lib A)	2	1B 32 P F 2 (ELE)	F42LL	60	0.1	SW	2000	240	2	1B 32 P F 2 (ELE)	F42LL	60	0.1	OCC	1,500	180	60	0.0	$ 6.66	$ 128.25	$ 20	19.3	16.3
20	Room 29 (Lib A)	20	S 32 C F 1 (ELE)	F41LL	32	0.6	SW	2000	1,280	20	S 32 C F 1 (ELE)	F41LL	32	0.6	OCC	1,500	960	320	0.0	$ 35.52	$ 128.25	$ 20	3.6	3.0
39	Room 29 (Lib A)	12	2' 17 W F 2 (ELE)	F22ILL	33	0.4	SW	2000	792	12	2' 17 W F 2 (ELE)	F22ILL	33	0.4	OCC	1,500	594	198	0.0	$ 21.98	$ 128.25	$ 20	5.8	4.9
35	Room 30	9	T 32 R F 3 (ELE)	F43ILL/2	90	0.8	SW	1400	1,134	9	T 32 R F 3 (ELE)	F43ILL/2	90	0.8	OCC	980	794	340	0.0	$ 37.76	$ 128.25	$ 20	3.4	2.9
35	Room 31	6	T 32 R F 3 (ELE)	F43ILL/2	90	0.5	SW	1400	756	6	T 32 R F 3 (ELE)	F43ILL/2	90	0.5	OCC	980	529	227	0.0	$ 25.17	$ 128.25	$ 20	5.1	4.3
35	Room 32	13	T 32 R F 3 (ELE)	F43ILL/2	90	1.2	SW	1400	1,638	13	T 32 R F 3 (ELE)	F43ILL/2	90	1.2	OCC	980	1,147	491	0.0	$ 54.55	$ 128.25	$ 20	2.4	2.0
35	Room 33	13	T 32 R F 3 (ELE)	F43ILL/2	90	1.2	SW	1400	1,638	13	T 32 R F 3 (ELE)	F43ILL/2	90	1.2	OCC	980	1,147	491	0.0	$ 54.55	$ 128.25	$ 20	2.4	2.0
35	Room 34	17	T 32 R F 3 (ELE)	F43ILL/2	90	1.5	SW	1400	2,142	17	T 32 R F 3 (ELE)	F43ILL/2	90	1.5	OCC	980	1,499	643	0.0	$ 71.33	$ 128.25	$ 20	1.8	1.5
19	Custodian Room	2	1B 32 P F 2 (ELE)	F42LL	60	0.1	SW	780	94	2	1B 32 P F 2 (ELE)	F42LL	60	0.1	OCC	1,500	180	(86)	0.0	$ (9.59)	$ 128.25	$ 20		
19	Electric Closet	4	1B 32 P F 2 (ELE)	F42LL	60	0.2	SW	780	187	4	1B 32 P F 2 (ELE)	F42LL	60	0.2	OCC	1,500	360	(173)	0.0	$ (19.18)	$ 128.25	$ 20		
35	Room 35	13	T 32 R F 3 (ELE)	F43ILL/2	90	1.2	SW	1400	1,638	13	T 32 R F 3 (ELE)	F43ILL/2	90	1.2	OCC	980	1,147	491	0.0	$ 54.55	$ 128.25	$ 20	2.4	2.0
35	Room 36	13	T 32 R F 3 (ELE)	F43ILL/2	90	1.2	SW	1400	1,638	13	T 32 R F 3 (ELE)	F43ILL/2	90	1.2	OCC	980	1,147	491	0.0	$ 54.55	$ 128.25	$ 20	2.4	2.0
35	Boy's Room	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	OCC	1,000	90	-	0.0	$ -	$ 128.25	$ 20		
35	Girl's Room	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	OCC	1,000	90	-	0.0	$ -	$ 128.25	$ 20		
19	Room 37	13	1B 32 P F 2 (ELE)	F42LL	60	0.8	SW	1400	1,092	13	1B 32 P F 2 (ELE)	F42LL	60	0.8	OCC	980	764	328	0.0	$ 36.36	$ 128.25	$ 20	3.5	3.0
19	Room 38	13	1B 32 P F 2 (ELE)	F42LL	60	0.8	SW	1400	1,092	13	1B 32 P F 2 (ELE)	F42LL	60	0.8	OCC	980	764	328	0.0	$ 36.36	$ 128.25	$ 20	3.5	3.0
19	Room 39	13	1B 32 P F 2 (ELE)	F42LL	60	0.8	SW	1400	1,092	13	1B 32 P F 2 (ELE)	F42LL	60	0.8	OCC	980	764	328	0.0	$ 36.36	$ 128.25	$ 20	3.5	3.0
19	Room 40	13	1B 32 P F 2 (ELE)	F42LL	60	0.8	SW	1400	1,092	13	1B 32 P F 2 (ELE)	F42LL	60	0.8	OCC	980	764	328	0.0	$ 36.36	$ 128.25	$ 20	3.5	3.0
19	Room 41	13	1B 32 P F 2 (ELE)	F42LL	60	0.8	SW	1400	1,092	13	1B 32 P F 2 (ELE)	F42LL	60	0.8	OCC	980	764	328	0.0	$ 36.36	$ 128.25	$ 20	3.5	3.0
19	Room 42	13	1B 32 P F 2 (ELE)	F42LL	60	0.8	SW	1400	1,092	13	1B 32 P F 2 (ELE)	F42LL	60	0.8	OCC	980	764	328	0.0	$ 36.36	$ 128.25	$ 20	3.5	3.0
19	Boiler Room B	2	1B 32 P F 2 (ELE)	F42LL	60	0.1	SW	1000	120	2	1B 32 P F 2 (ELE)	F42LL	60	0.1	OCC	1,000	120	-	0.0	$ -	$ 128.25	$ 20		
9	Atrium	4	High Bay MH 400	MH400/1	458	1.8	SW	1820	3,334	4	C 54 C F 6	F46GHL	351	1.4	OCC	1,820	2,555	779	0.4	$ 117.49	$ 2,342.25	$ 420	19.9	16.4
9	Old Gym (Gym A)	22	High Bay MH 400	MH400/1	458	10.1	SW	2000	20,152	22	C 54 C F 6	F46GHL	351	7.7	OCC	2,000	15,444	4,708	2.4	$ 693.21	$ 12,305.25	$ 2,220	17.8	14.5
19	Old Gym (Gym A)	10	1B 32 P F 2 (ELE)	F42LL	60	0.6	SW	2000	1,200	10	1B 32 P F 2 (ELE)	F42LL	60	0.6	OCC	2,000	1,200	-	0.0	$ -	$ 128.25	$ 20		
133	Old Gym (Gym A)	4	CF 26	CFQ26/1-L	27	0.1	SW	2000	216	4	CF 26	CFQ26/1-L	27	0.1	OCC	2,000	216	-	0.0	$ -	$ 128.25	$ 20		
19	Boy's Room	3	1B 32 P F 2 (ELE)	F42LL	60	0.2	SW	1000	180	3	1B 32 P F 2 (ELE)	F42LL	60	0.2	OCC	1,000	180	-	0.0	$ -	$ 128.25	$ 20		
19	Girl's Room	3	1B 32 P F 2 (ELE)	F42LL	60	0.2	SW	1000	180	3	1B 32 P F 2 (ELE)	F42LL	60	0.2	OCC	1,000	180	-	0.0	$ -	$ 128.25	$ 20		
19	Custodian Room	1	1B 32 P F 2 (ELE)	F42LL	60	0.1	SW	780	47	1	1B 32 P F 2 (ELE)	F42LL	60	0.1	OCC	1,500	90	(43)	0.0	$ (4.80)	$ 128.25	$ 20		
19	APR Storage	16	1B 32 P F 2 (ELE)	F42LL	60	1.0	SW	1000	960	16	1B 32 P F 2 (ELE)	F42LL	60	1.0	OCC	250	240	720	0.0	$ 79.92	$ 128.25	$ 20	1.6	1.4
19	All Purpose Room	11	1B 32 P F 2 (ELE)	F42LL	60	0.7	SW	1400	924	11	1B 32 P F 2 (ELE)	F42LL	60	0.7	OCC	500	330	594	0.0	$ 65.93	$ 128.25	$ 20	1.9	1.6
9	All Purpose Room	15	High Bay MH 400	MH400/1	458	6.9	SW	1400	9,618	15	C 54 C F 6	F46GHL	351	5.3	OCC	500	2,633	6,986	1.6	$ 891.72	$ 8,430.75	$ 1,520	9.5	7.7
35	Room 43	10	T 32 R F 3 (ELE)	F43ILL/2	90	0.9	SW	1400	1,260	10	T 32 R F 3 (ELE)	F43ILL/2	90	0.9	OCC	980	882	378	0.0	$ 41.96	$ 128.25	$ 20	3.1	2.6
35	Room 44	9	T 32 R F 3 (ELE)	F43ILL/2	90	0.8	SW	1400	1,134	9	T 32 R F 3 (ELE)	F43ILL/2	90	0.8	OCC	980	794	340	0.0	$ 37.76	$ 128.25	$ 20	3.4	2.9
19	Room 45	11	1B 32 P F 2 (ELE)	F42LL	60	0.7	SW	1400	924	11	1B 32 P F 2 (ELE)	F42LL	60	0.7	OCC	980	647	277	0.0	$ 30.77	$ 128.25	$ 20	4.2	3.5
19	Room 46	4	1B 32 P F 2 (ELE)	F42LL	60	0.2	SW	1400	336	4	1B 32 P F 2 (ELE)	F42LL	60	0.2	OCC	980	235	101	0.0	$ 11.19	$ 128.25	$ 20	11.5	9.7
19	Room 46A	3	1B 32 P F 2 (ELE)	F42LL	60	0.2	SW	1400	252	3	1B 32 P F 2 (ELE)	F42LL	60	0.2	OCC	980	176	76	0.0	$ 8.39	$ 128.25	$ 20	15.3	12.9
19	Room 47	6	1B 32 P F 2 (ELE)	F42LL	60	0.4	SW	1400	504	6	1B 32 P F 2 (ELE)	F42LL	60	0.4	OCC	980	353	151	0.0	$ 16.78	$ 128.25	$ 20	7.6	6.4
35	Room 48	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	SW	1400	1,512	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	OCC	980	1,058	454	0.0	$ 50.35	$ 128.25	$ 20	2.5	2.1
35	Room 48B	6	T 32 R F 3 (ELE)	F43ILL/2	90	0.5	SW	1400	756	6	T 32 R F 3 (ELE)	F43ILL/2	90	0.5	OCC	980	529	227	0.0	$ 25.17	$ 128.25	$ 20	5.1	4.3
19	Custodian Room	2	1B 32 P F 2 (ELE)	F42LL	60	0.1	SW	780	94	2	1B 32 P F 2 (ELE)	F42LL	60	0.1	OCC	1,500	180	(86)	0.0	$ (9.59)	$ 128.25	$ 20		
228	Boiler Room A	2	W60CF1	F81EL	60	0.1	SW	1000	120	2	W60CF1	F81EL	60	0.1	OCC	1,000	120	-	0.0	$ -	$ 128.25	$ 20		
19	Room 34 A	4	1B 32 P F 2 (ELE)	F42LL	60	0.2	SW	1400	336	4	1B 32 P F 2 (ELE)	F42LL	60	0.2	OCC	980	235	101	0.0	$ 11.19	$ 128.25	$ 20	11.5	9.7
19	Room 112A	26	1B 32 P F 2 (ELE)	F42LL	60	1.6	SW	1400	2,184	26	1B 32 P F 2 (ELE)	F42LL	60	1.6	OCC	-	-	2,184	0.0	$ 242.42	$ 128.25	$ 20	0.5	0.4
19	Boy's Room	5	1B 32 P F 2 (ELE)	F42LL	60	0.3	SW	1000	300	5	1B 32 P F 2 (ELE)	F42LL	60	0.3	OCC	1,000	300	-	0.0	$ -	$ 128.25	$ 20		
19	Custodian Room	1	1B 32 P F 2 (ELE)	F42LL	60	0.1	SW	780	47	1	1B 32 P F 2 (ELE)	F42LL	60	0.1	OCC	1,500	90	(43)	0.0	$ (4.80)	$ 128.25	$ 20		
19	Girl's Room	4	1B 32 P F 2 (ELE)	F42LL	60	0.2	SW	1000	240	4	1B 32 P F 2 (ELE)	F42LL	60	0.2	OCC	1,000	240	-	0.0	$ -	$ 128.25	$ 20		
19	Room 101	18	1B 32 P F 2 (ELE)	F42LL	60	1.1	SW	1400	1,512	18	1B 32 P F 2 (ELE)	F42LL	60	1.1	OCC	980	1,058	454	0.0	$ 50.35	$ 128.25	$ 20	2.5	2.1
19	Room 102	18	1B 32 P F 2 (ELE)	F42LL	60	1.1	SW	1400	1,512	18	1B 32 P F 2 (ELE)	F42LL	60	1.1	OCC	980	1,058	454	0.0	$ 50.35	$ 128.25	$ 20	2.5	2.1
19	Room 103	18	1B 32 P F 2 (ELE)	F42LL	60	1.1	SW	1400	1,512	18	1B 32 P F 2 (ELE)	F42LL	60	1.1	OCC	980	1,058	454	0.0	$ 50.35	$ 128.25	$ 20	2.5	2.1
19	Room 104	18	1B 32 P F 2 (ELE)	F42LL	60	1.1	SW	1400	1,512	18	1B 32 P F 2 (ELE)	F42LL	60	1.1	OCC	980	1,058	454	0.0	$ 50.35	$ 128.25	$ 20	2.5	2.1
19	Room 105	18	1B 32 P F 2 (ELE)	F42LL	60	1.1	SW	1400	1,512	18	1B 32 P F 2 (ELE)	F42LL	60	1.1	OCC	980	1,058	454	0.0	$ 50.35	$ 128.25	$ 20	2.5	2.1
19	Room 106	18	1B 32 P F 2 (ELE)	F42LL	60	1.1	SW	1400	1,512	18	1B 32 P F 2 (ELE)	F42LL	60	1.1	OCC	980	1,058	454	0.0	$ 50.35	$ 128.25	$ 20	2.5	2.1
19	Room 107	18	1B 32 P F 2 (ELE)	F42LL	60	1.1	SW	1400	1,512	18	1B 32 P F 2 (ELE)	F42LL	60	1.1	OCC	980	1,058	454	0.0	$ 50.35	$ 128.25	$ 20	2.5	2.1
19	Room 108	18	1B 32 P F 2 (ELE)	F42LL	60	1.1	SW	1400	1,512	18	1B 32 P F 2 (ELE)	F42LL	60	1.1	OCC	980	1,058	454	0.0	$ 50.35	$ 128.25	$ 20	2.5	2.1
19	Room 109	18	1B 32 P F 2 (ELE)	F42LL	60	1.1	SW	1400	1,512	18	1B 32 P F 2 (ELE)	F42LL	60	1.1	OCC	980	1,058	454	0.0	$ 50.35	$ 128.25	$ 20	2.5	2.1
19	Room 110	18	1B 32 P F 2 (ELE)	F42LL	60	1.1	SW	1400	1,512	18	1B 32 P F 2 (ELE)	F42LL	60	1.1	OCC	980	1,058	454	0.0	$ 50.35	$ 128.25	$ 20	2.5	2.1
19	Room 111	22	1B 32 P F 2 (ELE)	F42LL	60	1.3	SW	1400	1,848	22	1B 32 P F 2 (ELE)	F42LL	60	1.3	OCC	980	1,294	554	0.0	$ 61.54	$ 128.25	$ 20	2.1	1.8
19	Room 115	11	1B 32 P F 2 (ELE)	F42LL	60	0.7	SW	1400	924	11	1B 32 P F 2 (ELE)	F42LL	60	0.7	OCC	980	647	277	0.0	$ 30.77	$ 128.25	$ 20	4.2	3.5
19	Room 116	18	1B 32 P F 2 (ELE)	F42LL	60	1.1	SW	1400	1,512	18	1B 32 P F 2 (ELE)	F42LL	60	1.1	OCC	980	1,058	454	0.0	$ 50.35	$ 128.25	$ 20	2.5	2.1
19	Library B (2-3 Lib)	60	1B 32 P F 2 (ELE)	F42LL	60	3.6	SW	2000	7,200	60	1B 32 P F 2 (ELE)	F42LL	60	3.6	OCC	1,500	5,400	1,800	0.0	$ 199.80	$ 128.25	$ 20	0.6	0.5
19	Room 117	18	1B 32 P F 2 (ELE)	F42LL	60	1.1	SW	1400	1,512	18	1B 32 P F 2 (ELE)	F42LL	60	1.1	OCC	980	1,058	454	0.0	$ 50.35	$ 128.25	$ 20	2.5	2.1
19	Room 118	5	1B 32 P F 2 (ELE)	F42LL	60	0.3	SW	1400	420	5	1B 32 P F 2 (ELE)	F42LL	60	0.3	OCC	980	294	126	0.0	$ 13.99	$ 128.25	$ 20	9.2	7.7
35	Room 119	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	SW	1400	1,512	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	OCC	980	1,058	454	0.0	$ 50.35	$ 128.25	$ 20	2.5	2.1
35	Room 120	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	SW	1400	1,512	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	OCC	980	1,058	454	0.0	$ 50.35	$ 128.25	$ 20	2.5	2.1
35	Room 121	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	SW	1400	1,512	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	OCC	980	1,058	454	0.0	$ 50.35	$ 128.25	$ 20	2.5	2.1
35	Room 122	5	T 32 R F 3 (ELE)	F43ILL/2	90	0.5	SW	1400	630	5	T 32 R F 3 (ELE)	F43ILL/2	90	0.5	OCC	980	441	189	0.0	$ 20.98	$ 128.25	$ 20	6.1	5.2
35	Room 123	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	SW	1400	1,512	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	OCC	980	1,058	454	0.0	$ 50.35	$ 128.25	$ 20	2.5	2.1
35	Room 124	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	SW	1400	1,512	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	OCC	980	1,058	454	0.0	$ 50.35	$ 128.25	$ 20	2.5	2.1
35	Room 125	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	SW	1400	1,512	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	OCC	980	1,058	454	0.0	$ 50.35	$ 128.25	$ 20	2.5	2.1
35	Room 126	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	SW	1400	1,512	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	OCC	980	1,058	454	0.0	$ 50.35	$ 128.25	$ 20	2.5	2.1
35	Room 127	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	SW	1400	1,512	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	OCC	980	1,058	454	0.0	$ 50.35	$ 128.25	$ 20	2.5	2.1
35	Storage	2	T 32 R F 3 (ELE)	F43ILL/2	90	0.2	SW	1000	180	2	T 32 R F 3 (ELE)	F43ILL/2	90	0.2	OCC	250	45	135	0.0	$ 14.99	$ 128.25	$ 20	8.6

Energy Audit of Holmdel Schools - Village School

CHA Project No.24988

ECM-3 Lighting Replacements with Occupancy Sensors

		EXISTING CONDITIONS								RETROFIT CONDITIONS								COST & SAVINGS ANALYSIS						
	Area Description	No. of Fixtures	Standard Fixture Code	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	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	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	Kitchen	13	T 32 R F 3 (ELE)	F43ILL/2	90	1.2	SW	1400	1,638	13	T 32 R F 3 (ELE)	F43ILL/2	90	1.2	OCC	1,500	1,755	(117)	0.0	$ (12.99)	$ 128.25	$ 20		
19	Kitchen	2	1B 32 P F 2 (ELE)	F42LL	60	0.1	SW	1400	168	2	1B 32 P F 2 (ELE)	F42LL	60	0.1	OCC	1,500	180	(12)	0.0	$ (1.33)	$ 128.25	$ 20		
5	Kitchen	3	2T 32 R F 2 (u) (ELE)	FU2LL	60	0.2	SW	1400	252	3	2T 32 R F 2 (u) (ELE)	FU2LL	60	0.2	OCC	1,500	270	(18)	0.0	$ (2.00)	$ 128.25	$ 20		
19	Storage	4	1B 32 P F 2 (ELE)	F42LL	60	0.2	SW	1000	240	4	1B 32 P F 2 (ELE)	F42LL	60	0.2	OCC	250	60	180	0.0	$ 19.98	$ 128.25	$ 20	6.4	5.4
35	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	OCC	250	68	203	0.0	$ 22.48	$ 128.25	$ 20	5.7	4.8
35	Music Room	26	T 32 R F 3 (ELE)	F43ILL/2	90	2.3	SW	1400	3,276	26	T 32 R F 3 (ELE)	F43ILL/2	90	2.3	OCC	980	2,293	983	0.0	$ 109.09	$ 128.25	$ 20	1.2	1.0
19	Electric Closet	5	1B 32 P F 2 (ELE)	F42LL	60	0.3	SW	780	234	5	1B 32 P F 2 (ELE)	F42LL	60	0.3	OCC	1,500	450	(216)	0.0	$ (23.98)	$ 128.25	$ 20		
19	Hallway Area	90	1B 32 P F 2 (ELE)	F42LL	60	5.4	SW	8760	47,304	90	1B 32 P F 2 (ELE)	F42LL	60	5.4	SW	8,760	47,304	-	0.0	$ -	$ -	$ -		
19	Hallway Area	100	1B 32 P F 2 (ELE)	F42LL	60	6.0	SW	1820	10,920	100	1B 32 P F 2 (ELE)	F42LL	60	6.0	OCC	1,820	10,920	-	0.0	$ -	$ 128.25	$ 20		
39	Hallway Area	10	2' 17 W F 2 (ELE)	F22ILL	33	0.3	SW	1820	601	10	2' 17 W F 2 (ELE)	F22ILL	33	0.3	OCC	1,820	601	-	0.0	$ -	$ 128.25	$ 20		
															0	#N/A								#VALUE!
															0	#N/A								#VALUE!
															0	#N/A								#VALUE!
															0	#N/A								#VALUE!
															0	#N/A								#VALUE!
															0	#N/A								#VALUE!
															0	#N/A								#VALUE!
															0	#N/A								#VALUE!
															0	#N/A								#VALUE!
															0	#N/A								#VALUE!
															0	#N/A								#VALUE!
															0	#N/A								#VALUE!
															0	#N/A								#VALUE!
															0	#N/A								#VALUE!
															0	#N/A								#VALUE!
															0	#N/A								#VALUE!
															0	#N/A								#VALUE!
															0	#N/A								#VALUE!
															0	#N/A								#VALUE!
															0	#N/A								#VALUE!
															0	#N/A								#VALUE!
															0	#N/A								#VALUE!
S	**Total**	**1,740**				**150.4**			**278,795**	**1,740**				**142.1**			**212,604**		**8.3**	**7,949**	**59,076**	**$10,260**		
S																		**Demand Savings**		**8.3**	**$602**			
S																		**kWh Savings**		**66,191**	**$7,347**			
S																		**Total Savings**			**$7,949**		**7.4**	**6.1**

Energy Audit of Holmdel Township BOE
CHA Project No.24988

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
$62,054	**15.1**	**54,797**	**0**	**$7,174**	**0**	**$7,174**	**$9,600**	**8.7**	**7.3**

*Incentive based on New Jersey Smart Start Prescriptive Lighting Measures

Energy Audit of Holmdel Township BOE
CHA Project No.24988
Existing Lighting

Cost of Electricity: **$0.111** **$/kWh**
$6.04 **$/kW**

			EXISTING CONDITIONS										
	Area Description	Usage	No. of Fixtures	Standard Fixture Code	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	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
226LED	Main Lot	Outdoor Lighting	50	70 High Pressure Sodium	HPS70/1	95	4.75	PCS	3640	NONE	17,290	
141	Main Lot	Outdoor Lighting	30	HPS 250	HPS250/1	295	8.85	PCS	3640	NONE	32,214	
256	Main Lot	Outdoor Lighting	16	MH 400 Wallpack	MH400/1	435	6.96	PCS	3640	NONE	25,334	
										NONE		
										NONE		

Energy Audit of Holmdel Township BOE
CHA Project No.24988
Existing Lighting

Cost of Electricity: **$0.111** **$/kWh**
$6.04 **$/kW**

			EXISTING CONDITIONS										
	Area Description	Usage	No. of Fixtures	Standard Fixture Code	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	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

Energy Audit of Holmdel Township BOE
CHA Project No.24988
ECM-1 Lighting Replacements

		EXISTING CONDITIONS								RETROFIT CONDITIONS								COST & SAVINGS ANALYSIS						
	Area Description	No. of Fixtures	Standard Fixture Code	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
226LED	Main Lot	50	70 High Pressure Sodium	HPS70/1	95	4.8	PCS	3640	17,290	50	FXLED18	FXLED18/1	18	0.9	PCS	3,640	3,276	14,014	3.9	$ 1,834.60	$ 21,161.25	$5,000	11.5	8.8
141	Main Lot	30	HPS 250	HPS250/1	295	8.9	PCS	3640	32,214	30	P21 105LA	P21 105LA/1	105	3.2	PCS	3,640	11,466	20,748	5.7	$ 2,716.16	$ 28,572.75	$3,000	10.5	9.4
256	Main Lot	16	MH 400 Wallpack	MH400/1	435	7.0	PCS	3640	25,334	16	WPLED78	WPLED78/1	91	1.5	PCS	3,640	5,300	20,035	5.5	$ 2,622.77	$ 12,320.00	$1,600	4.7	4.1

Energy Audit of Holmdel Township BOE
CHA Project No.24988
ECM-1 Lighting Replacements

		EXISTING CONDITIONS								RETROFIT CONDITIONS								COST & SAVINGS ANALYSIS						
	Area Description	No. of Fixtures	Standard Fixture Code	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
	Total	96				20.6			74,838	96			214	5.5			20,042	54,797	15.1	$7,174	$62,054	$9,600		
																	Demand Savings			15.1	$1,091			
																	kWh Savings			54,797	$6,082			
																	Total savings				$7,174		8.7	7.3

Energy Audit of Holmdel Township BOE
CHA Project No.24988
ECM-2 Install Occupancy Sensors

		EXISTING CONDITIONS								RETROFIT CONDITIONS								COST & SAVINGS ANALYSIS						
	Area Description	No. of Fixtures	Standard Fixture Code	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	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
226LED	Main Lot	50	70 High Pressure Sodium	HPS70/1	95	4.8	PCS	3640	17,290.0	50	70 High Pressure Sodium	HPS70/1	95	4.8	NONE	3640	17,290.0	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
141	Main Lot	30	HPS 250	HPS250/1	295	8.9	PCS	3640	32,214.0	30	HPS 250	HPS250/1	295	8.9	NONE	3640	32,214.0	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
256	Main Lot	16	MH 400 Wallpack	MH400/1	435	7.0	PCS	3640	25,334.4	16	MH 400 Wallpack	MH400/1	435	7.0	NONE	3640	25,334.4	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
															NONE		#VALUE!	#VALUE!		#VALUE!			#VALUE!	#VALUE!
															NONE		#VALUE!	#VALUE!		#VALUE!			#VALUE!	#VALUE!
															0	#N/A	#VALUE!	#VALUE!	#N/A

Energy Audit of Holmdel Township BOE
CHA Project No.24988
ECM-2 Install Occupancy Sensors

		EXISTING CONDITIONS								RETROFIT CONDITIONS								COST & SAVINGS ANALYSIS						
	Area Description	No. of Fixtures	Standard Fixture Code	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	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
															0	#N/A	#VALUE!	#VALUE!	#N/A	#VALUE!			#VALUE!	#VALUE!
															0	#N/A	#VALUE!	#VALUE!	#N/A	#VALUE!			#VALUE!	#VALUE!
															0	#N/A	#VALUE!	#VALUE!	#N/A	#VALUE!			#VALUE!	#VALUE!
															0	#N/A	#VALUE!	#VALUE!	#N/A	#VALUE!			#VALUE!	#VALUE!
															0	#N/A	#VALUE!	#VALUE!	#N/A	#VALUE!			#VALUE!	#VALUE!
															0	#N/A	#VALUE!	#VALUE!	#N/A	#VALUE!			#VALUE!	#VALUE!
															0	#N/A	#VALUE!	#VALUE!	#N/A	#VALUE!			#VALUE!	#VALUE!
															0	#N/A	#VALUE!	#VALUE!	#N/A	#VALUE!			#VALUE!	#VALUE!
															0	#N/A	#VALUE!	#VALUE!	#N/A	#VALUE!			#VALUE!	#VALUE!
															0	#N/A	#VALUE!	#VALUE!	#N/A	#VALUE!			#VALUE!	#VALUE!
															0	#N/A	#VALUE!	#VALUE!	#N/A	#VALUE!			#VALUE!	#VALUE!
															0	#N/A	#VALUE!	#VALUE!	#N/A	#VALUE!			#VALUE!	#VALUE!
															0	#N/A	#VALUE!	#VALUE!	#N/A	#VALUE!			#VALUE!	#VALUE!
															0	#N/A	#VALUE!	#VALUE!	#N/A	#VALUE!			#VALUE!	#VALUE!
															0	#N/A	#VALUE!	#VALUE!	#N/A	#VALUE!			#VALUE!	#VALUE!
															0	#N/A	#VALUE!	#VALUE!	#N/A	#VALUE!			#VALUE!	#VALUE!
															0	#N/A	#VALUE!	#VALUE!	#N/A	#VALUE!			#VALUE!	#VALUE!
															0	#N/A	#VALUE!	#VALUE!	#N/A	#VALUE!			#VALUE!	#VALUE!
															0	#N/A	#VALUE!	#VALUE!	#N/A	#VALUE!			#VALUE!	#VALUE!
															0	#N/A	#VALUE!	#VALUE!	#N/A	#VALUE!			#VALUE!	#VALUE!
															0	#N/A	#VALUE!	#VALUE!	#N/A	#VALUE!			#VALUE!	#VALUE!
															0	#N/A	#VALUE!	#VALUE!	#N/A	#VALUE!			#VALUE!	#VALUE!
															0	#N/A	#VALUE!	#VALUE!	#N/A	#VALUE!			#VALUE!	#VALUE!
															0	#N/A	#VALUE!	#VALUE!	#N/A	#VALUE!			#VALUE!	#VALUE!
															0	#N/A	#VALUE!	#VALUE!	#N/A	#VALUE!			#VALUE!	#VALUE!
															0	#N/A	#VALUE!	#VALUE!	#N/A	#VALUE!			#VALUE!	#VALUE!
															0	#N/A	#VALUE!	#VALUE!	#N/A	#VALUE!			#VALUE!	#VALUE!
															0	#N/A	#VALUE!	#VALUE!	#N/A	#VALUE!			#VALUE!	#VALUE!
															0	#N/A	#VALUE!	#VALUE!	#N/A	#VALUE!			#VALUE!	#VALUE!
	Total	96				20.6			74838.4	96.0				20.6			74838.4	0.0	0.0	0.0	0.0	0.0		
																	Demand Savings			0.0	$0			
																	kWh Savings			0	$0			
																	Total Savings				$0		#DIV/0!	#DIV/0!

Energy Audit of Holmdel Township BOE
CHA Project No.24988
ECM-3 Lighting Replacements with Occupancy Sensors

		EXISTING CONDITIONS							RETROFIT CONDITIONS								COST & SAVINGS ANALYSIS						
	Area Description	No. of Fixtures	Standard Fixture Code	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	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	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
226LED	Main Lot	50	70 High Pressure Sodium	HPS70/1	95	4.8	PCS	3640	17,290	50	FXLED18	FXLED18/1	18	0.9	NONE	3,640	3,276	14,014	3.9	$ 1,834.60	$ 21,161.25	$ 5,000	11.5	8.8
141	Main Lot	30	HPS 250	HPS250/1	295	8.9	PCS	3640	32,214	30	P21 105LA	P21 105LA/1	105	3.2	NONE	3,640	11,466	20,748	5.7	$ 2,716.16	$ 28,572.75	$ 3,000	10.5	9.4
256	Main Lot	16	MH 400 Wallpack	MH400/1	435	7.0	PCS	3640	25,334	16	WPLED78	WPLED78/1	91	1.5	NONE	3,640	5,300	20,035	5.5	$ 2,622.77	$ 12,320.00	$ 1,600	4.7	4.1
															NONE									#VALUE!
															NONE									#VALUE!
															0	#N/A

Energy Audit of Holmdel Township BOE
CHA Project No.24988
ECM-3 Lighting Replacements with Occupancy Sensors

		EXISTING CONDITIONS								RETROFIT CONDITIONS							COST & SAVINGS ANALYSIS						
	Area Description	No. of Fixtures	Standard Fixture Code	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	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	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
															0	#N/A								#VALUE!
															0	#N/A								#VALUE!
															0	#N/A								#VALUE!
															0	#N/A								#VALUE!
															0	#N/A								#VALUE!
															0	#N/A								#VALUE!
															0	#N/A								#VALUE!
															0	#N/A								#VALUE!
															0	#N/A								#VALUE!
															0	#N/A								#VALUE!
															0	#N/A								#VALUE!
															0	#N/A								#VALUE!
															0	#N/A								#VALUE!
															0	#N/A								#VALUE!
															0	#N/A								#VALUE!
															0	#N/A								#VALUE!
															0	#N/A								#VALUE!
															0	#N/A								#VALUE!
															0	#N/A								#VALUE!
															0	#N/A								#VALUE!
															0	#N/A								#VALUE!
															0	#N/A								#VALUE!
															0	#N/A								#VALUE!
															0	#N/A								#VALUE!
															0	#N/A								#VALUE!
															0	#N/A								#VALUE!
															0	#N/A								#VALUE!
															0	#N/A								#VALUE!
															0	#N/A								#VALUE!
															0	#N/A								#VALUE!
S	Total	96				20.6			74,838	96				5.5			20,042		15.1	7,174	62,054	$9,600		
S																	Demand Savings			15.1	$1,091			
S																	kWh Savings			54,797	$6,082			
S																	Total Savings				$7,174		8.7	7.3

APPENDIX D

New Jersey Board of Public Utilities Incentives

i. **Smart Start**

ii. **Direct Install**

iii. **Pay for Performance (P4P)**

iv. **Energy Savings Improvement Plan (ESIP)**

I. SMART START

COMMERCIAL, INDUSTRIAL AND LOCAL GOVERNMENT

PROGRAMS

NJ SMARTSTART BUILDINGS

EQUIPMENT INCENTIVES

APPLICATION FORMS

TOOLS AND RESOURCES

PAY FOR PERFORMANCE

COMBINED HEAT & POWER AND FUEL CELLS

LOCAL GOVERNMENT ENERGY AUDIT

LARGE ENERGY USERS PILOT

ENERGY SAVINGS IMPROVEMENT PROGRAM

DIRECT INSTALL

ENERGY BENCHMARKING

OIL, PROPANE & MUNICIPAL ELECTRIC CUSTOMERS

EDA PROGRAMS

T-12 SCHOOLS LIGHTING INITIATIVE

TEACH

ARRA

TECHNOLOGIES

TOOLS AND RESOURCES

PROGRAM UPDATES

CONTACT US

Home » Commercial & Industrial » Programs

NJ SmartStart Buildings

Program Overview

New Jersey SmartStart BUILDINGS®

With New Jersey SmartStart Buildings ...

... A smart start now means better performance later! Whether you're starting a commercial or industrial project from the ground up, renovating existing space, or upgrading equipment, you have unique opportunities to upgrade the energy efficiency of the project.

New Jersey SmartStart Buildings can provide a range of support — at no cost to you — to yield substantial energy savings, both now and for the future. Learn more about:

- Project Categories
- Custom Measures
- Incentives for Qualifying Equipment and Projects
- Program Terms and Conditions
- Find a Trade Ally

Please note: pre-approval is required for almost all energy efficiency incentives. This means you must submit an application form (and applicable worksheets) and receive an approval letter from the program before any equipment is installed (click here for complete Terms and Conditions.) Upon receipt of an approval letter, you may proceed to install the equipment listed on your approved application. Equipment installed prior to the date of the approval letter is not eligible for an incentive. **Any customer and/or agent who purchases equipment prior to the receipt of an incentive approval letter does so at his/her own risk.**

Getting Started

Submit your project application form as soon as you know you will be doing a construction project, or replacing/adding equipment.

Smart-Growth Eligibility: *Check to make sure your project is eligible for incentives.*

Incentives for new construction are available only for projects in areas designated for growth in the NJ State Development and Redevelopment Plan. Public school (K-12) new construction projects are exempted from this restriction and are eligible for incentives throughout the State.

Customers, or their trade allies, can determine if a location is in a designated growth area by referring to the Smart Growth Site Evaluator Tool available from the HMFA website. Contact a program representative if you are uncertain about project eligibility. The Smart Growth policies will be implemented consistent with Board Orders as described more fully in the C&I Operational Procedure Manual.

Apply for pre-approval by submitting an application for the type of equipment you have chosen to install. The application should be accompanied by a related worksheet, where applicable, and a manufacturer's specification sheet (refer to the specific program requirements on the back of the application for specs needed for your project) for the equipment you are planning to install. (Program representatives will review your application package and approve it, reject it, and/or advise you of upgrades in equipment that will save energy costs and/or increase your incentives.)

Support for Custom Energy-Efficiency Measures

Custom measures allows program participants the opportunity to receive an incentive for unique energy-efficiency measures that are not on the prescriptive equipment incentive list, but are project/facility specific.

Incentives for Qualifying Equipment and Projects

Financial incentives are available for large and small projects. These incentives offset some — or maybe even all! — of the added cost to purchase qualifying energy-efficient equipment, which provides significant long-term energy savings. Ranges of incentives are available for qualifying equipment (depending on type, size, and efficiency) in several categories.

Find out more about equipment incentives!

For specific details on equipment requirements and financial incentives, including incentives for equipment not listed here, contact a program representative. Annual financial incentives may be

Program Updates

Notice of 2013 Changes to C&I Programs

Warranty and Lease Terms for CHP/Fuel Cells Increased to 10 Years

Large Combined Heat & Power/Fuel Cell Program Update

Board Order - Standby Charges for Distributed Generation Customers

Other updates posted.

Featured Success Story

Mannington Mills:

NJ SmartStart Buildings custom measures case study presented at Globalcon Conference

Applications and Brochures

Download the latest program materials.

e-Newsletter SIGN UP TODAY!

Follow Us:

COMMERCIAL, INDUSTRIAL AND LOCAL GOVERNMENT

- PROGRAMS
  - NJ SMARTSTART BUILDINGS
    - EQUIPMENT INCENTIVES
    - APPLICATION FORMS
    - TOOLS AND RESOURCES
  - PAY FOR PERFORMANCE
  - COMBINED HEAT & POWER AND FUEL CELLS
  - LOCAL GOVERNMENT ENERGY AUDIT
  - LARGE ENERGY USERS PILOT
  - ENERGY SAVINGS IMPROVEMENT PROGRAM
  - DIRECT INSTALL
  - ENERGY BENCHMARKING
  - OIL, PROPANE & MUNICIPAL ELECTRIC CUSTOMERS
  - EDA PROGRAMS
  - T-12 SCHOOLS LIGHTING INITIATIVE
  - TEACH
  - ARRA
- TECHNOLOGIES
- TOOLS AND RESOURCES
- PROGRAM UPDATES
- CONTACT US

Home » Commercial & Industrial » Programs » NJ SmartStart Buildings

Equipment Incentives

More reasons for a smart start on your next project!

New Jersey SmartStart Buildings provides **financial incentives for qualifying equipment**. These incentives were developed to help our customers offset some of the added cost to purchase qualifying energy-efficient equipment, which provides significant long-term energy savings. A wide range of incentives are available for qualifying equipment (depending on type, size and efficiency).

Listed below are the types of qualifying equipment and ranges of incentives. For details on equipment requirements and full listings of incentives, refer to the **online application forms**.

Please note that almost all equipment incentives require pre-approval before equipment is installed. (**click for exceptions**)To start the pre-approval process, submit an Equipment Application, and appropriate Equipment Worksheets, for the type or types of equipment you are planning to install along with equipment specification sheets (refer to the specific program requirements on the back of the application for specifications needed for your project) and a current utility bill(s).

In order to be eligible to receive financial incentives under this Program, Applicants must receive electric and/or gas service from one of the regulated electric and/or gas utilities in the State of New Jersey. They are: Atlantic City Electric, Jersey Central Power & Light, Rockland Electric Company, New Jersey Natural Gas, Elizabethtown Gas, PSE&G, and South Jersey Gas.

Electric Chillers

- Water-cooled chillers ($12 - $170 per ton)
- Air-cooled chillers ($8 - $52 per ton)

Gas Cooling

- Gas absorption chillers ($185-$450 per ton)
- Gas Engine-Driven Chillers (Calculated through Custom Measure Path)

Desiccant Systems ($1.00 per cfm - gas or electric)

Electric Unitary HVAC

- Unitary AC and split systems ($73 - $92 per ton)
- Air-to-air heat pumps ($73 - $92 per ton)
- Water-source heat pumps ($81 per ton)
- Packaged terminal AC & HP ($65 per ton)
- Central DX AC Systems ($40 - $72 per ton)
- Dual Enthalpy Economizer Controls ($250)
- Occupancy Controlled Thermostats ($75 each)

Ground Source Heat Pumps

- Closed Loop ($450-750 per ton)

Gas Heating

- Gas-fired boilers < 300 MBH ($300 per unit)
- Gas-fired boilers ≥ 300 MBH - 1500 MBH ($1.75 per MBH)
- Gas-fired boilers ≥ 1500 MBH - ≤ 4000 MBH ($1.00 per MBH)
- Gas-fired boilers > 4000 MBH (Calculated through Custom Measure Path)
- Gas furnaces ($300-$400 per unit)

Variable Frequency Drives

- Variable air volume ($65 - $155 per hp)
- Chilled-water pumps ($60 per hp)
- Compressors ($5,250 to $12,500 per drive)

Natural Gas Water Heating

Program Updates

- Notice of 2013 Changes to C&I Programs
- Warranty and Lease Terms for CHP/Fuel Cells Increased to 10 Years
- Large Combined Heat & Power/Fuel Cell Program Update
- Board Order - Standby Charges for Distributed Generation Customers

Other updates posted.

Featured Success Story

Mannington Mills:

NJ SmartStart Buildings custom measures case study presented at Globalcon Conference

Applications and Brochures

Download the latest program materials.

e-Newsletter SIGN UP TODAY!

Follow Us:

II. DIRECT INSTALL

COMMERCIAL, INDUSTRIAL AND LOCAL GOVERNMENT

- PROGRAMS
  - NJ SMARTSTART BUILDINGS
  - PAY FOR PERFORMANCE
  - COMBINED HEAT & POWER AND FUEL CELLS
  - LOCAL GOVERNMENT ENERGY AUDIT
  - LARGE ENERGY USERS PILOT
  - ENERGY SAVINGS IMPROVEMENT PROGRAM
  - DIRECT INSTALL
    - PARTICIPATION STEPS
    - PARTICIPATING CONTRACTORS
    - SUSTAINABLE JERSEY
  - ENERGY BENCHMARKING
  - OIL, PROPANE & MUNICIPAL ELECTRIC CUSTOMERS
  - EDA PROGRAMS
  - T-12 SCHOOLS LIGHTING INITIATIVE
  - TEACH
  - ARRA
- TECHNOLOGIES
- TOOLS AND RESOURCES
- PROGRAM UPDATES
- CONTACT US

Home » Commercial & Industrial » Programs » Direct Install

Direct Install - Steps to Participation

New Jersey SmartStart BUILDINGS

NEW JERSEY'S CLEAN ENERGY PROGRAM DIRECT Install

SIX SIMPLE STEPS TO PARTICIPATION

CONTACT THE PARTICIPATING CONTRACTOR IN YOUR AREA

Identify the contractor assigned and trained to provide Direct Install services in the county where your project is located. Using the contact information provided, call or send an e-mail to the participating contractor to discuss your project. The contractor will schedule an energy assessment and work with you to complete the program application and participation agreement.

If you're unable to contact the participating contractor or have questions, you may contact us at 866 -NJSMART or send an e-mail to DirectInstall@NJCleanEnergy.com..

REVIEW RESULTS

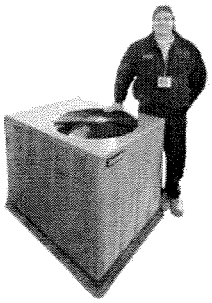
After the energy assessment, the contractor will review the results with you, including what measures qualify and your share of the project cost.

MOVE FORWARD

You will sign a scope of work document to proceed with implementation of qualifying measures.

ARRANGE INSTALLATION

You and the participating contractor will set a convenient start date for the installation.



CONFIRM INSTALLATION

Once the participating contractor completes the installation, you accept the work by signing a project completion form.

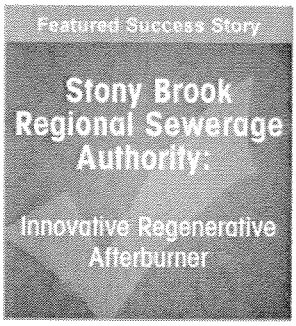
COMPLETE TRANSACTION

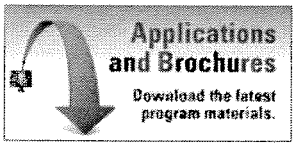
You pay the participating contractor your share of the project cost and New Jersey's Clean Energy Program pays the rest.

Program Updates

- Notice of 2013 Changes to C&I Programs
- Warranty and Lease Terms for CHP/Fuel Cells Increased to 10 Years
- Large Combined Heat & Power/Fuel Cell Program Update
- Board Order - Standby Charges for Distributed Generation Customers

Other updates posted.





Follow Us:

III. PAY FOR PERFORMANCE (P4P)

New Jersey's Clean Energy PROGRAM™
Your Power to Save
njcleanenergy.com

New Jersey SmartStart BUILDINGS®

BPU

2012 PAY FOR PERFORMANCE PROGRAM
Existing Buildings Incentive Structure

Incentive #1: Energy Reduction Plan

Incentive Amount: ..... **$0.10 per sq ft**
Minimum Incentive: **$5,000**
Maximum Incentive:: ..... **$50,000 or 50% of facility annual energy cost (whichever is less)**

This incentive is designed to offset the cost of services associated with the development of the Energy Reduction Plan (ERP) and is paid upon ERP approval. Incentive is contingent on implementation of recommended measures outlined in the ERP.

Incentive #2: Installation of Recommended Measures

Minimum Performance Target: **15%**

Electric Incentives

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 per projected kWh saved**

Gas Incentives

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**

This incentive is based on projected energy savings outlined in the ERP. Incentive is paid upon successful installation of recommended measures.

Incentive #3: Post-Construction Benchmarking Report

Minimum Performance Target: **15%**

Electric Incentives

Base Incentive based on 15% savings: ..... **$0.09 per actual kWh saved**
For each % over 15% add: ..... **$0.005 per actual kWh saved**
Maximum Incentive: ..... **$0.11 per actual kWh saved**

Gas Incentives

Base Incentive based on 15% savings: ..... **$0.90 per actual Therm saved**
For each % over 15% add: ..... **$0.05 per actual Therm saved**
Maximum Incentive: ..... **$1.25 per actual Therm saved**

Incentive Cap: ..... **25% of total project cost**

This incentive will be released upon submittal of a Post-Construction Benchmarking Report that verifies that the level of savings actually achieved by the installed measures meets or exceeds the minimum performance threshold. To validate the savings and achievement of the Energy Target, the EPA Portfolio Manager shall be used. Savings should be rounded to the nearest percent. Total value of Incentive #2 and Incentive #3 may not exceed 50% of the total project cost. Incentives will be limited to $1 million per gas and electric account per building; maximum of $2 million per project. See Participation Agreement for details.

IV. ENERGY SAVINGS IMPROVEMENT PLAN (ESIP)

COMMERCIAL, INDUSTRIAL AND LOCAL GOVERNMENT

PROGRAMS

- NJ SMARTSTART BUILDINGS
- PAY FOR PERFORMANCE
- COMBINED HEAT & POWER AND FUEL CELLS
- LOCAL GOVERNMENT ENERGY AUDIT
- LARGE ENERGY USERS PILOT
- ENERGY SAVINGS IMPROVEMENT PROGRAM
- DIRECT INSTALL
- ENERGY BENCHMARKING
- OIL, PROPANE & MUNICIPAL ELECTRIC CUSTOMERS
- EDA PROGRAMS
- T-12 SCHOOLS LIGHTING INITIATIVE
- TEACH
- ARRA

TECHNOLOGIES

TOOLS AND RESOURCES

PROGRAM UPDATES

CONTACT US

Home » Commercial & Industrial » Programs

Energy Savings Improvement Program

A new State law 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 "Energy Savings Improvement Program" (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.

This Local Finance Notice outlines how local governments can develop and implement an ESIP for their facilities. Below are two sample RFPs:

Local Government
School Districts (K-12)

The Board also adopted protocols to measure energy savings.

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. Local units considering an ESIP should carefully review the Local Finance Notice, the law, and consult with qualified professionals to determine how they should approach the task.

FIRST STEP – ENERGY AUDIT

For local governments interested in pursuing an ESIP, the first step is to perform an energy audit. As explained in the Local Finance Notice, this may be done internally if an agency has qualified staff to conduct the audit. If not, the audit must be implemented by an independent contractor and not by the energy savings company producing the Energy Reduction Plan.

Pursuing a Local Government Energy Audit through New Jersey's Clean Energy Program is a valuable first step to the ESIP approach - and it's free. **Incentives provide 100% of the cost of the audit.**

ENERGY REDUCTION PLANS

If you have an ESIP plan you would like to submit to the Board of Public Utilities, please email it to ESIP@bpu.state.nj.us. Please limit the file size to 3MB (or break it into smaller files).

Frankford Township School District
Northern Hunterdon-Voorhees Regional High School
Manalapan Township ***(180 MB** - Right Click, Save As)*

Program Updates

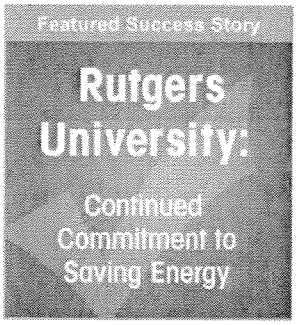
Notice of 2013 Changes to C&I Programs

Warranty and Lease Terms for CHP/Fuel Cells Increased to 10 Years

Large Combined Heat & Power/Fuel Cell Program Update

Board Order - Standby Charges for Distributed Generation Customers

Other updates posted.



Follow Us:

new jersey department of community affairs
people places progress
division of local government services

LFN 2011-17

June 16, 2011

Local Finance Notice

Chris Christie, *Governor* | Kim Guadagno, *Lt. Governor* | Lori Grifa, *Commissioner* | Thomas H. Neff, *Director*

Update on Implementing Energy Savings Improvement Programs

This Local Finance Notice provides guidance concerning Energy Savings Improvement Program (ESIP) matters that affect local units covered under the Local Public Contracts Law (LPCL, N.J.S.A. 40A:11) and the Public School Contracts Law (PSCL, N.J.S.A. 18A:18A).

The Notice covers a model ESCO (Energy Services Company) Request for Proposal document and provides information on using the "Do-It-Yourself" process for implementing an ESIP. This Notice supplements Local Finance Notice 2009-11 concerning ESIPs.

Model ESCO Request for Proposal Document

General Issues

The Division of Local Government Services and the Board of Public Utilities have completed development of a model ESCO Request for Proposal Document. It is designed to assist all organizations (contracting units) covered by the LPCL and PSCL hire an energy services company (ESCO) to develop and implement an Energy Savings Plan (ESP) as part of an Energy Savings Improvement Program as authorized under N.J.S.A. 40A:11-4.6 and 18A:18A-4.6.

Specifically, the document serves as the starting point for these government agencies to select an ESCO through the competitive contracting procedure (N.J.S.A. 40A:11-4.1 et seq. and 18A:18A-4.1 et seq.).

Notwithstanding the efforts of the State agencies to ensure that the RFP is consistent with all relevant procurement procedures, laws, and regulations, there are several issues contracting unit personnel should keep in mind:

1) Local legal advisors should review the document to ensure it is consistent with any allowable local practices and legal considerations.
2) The individual responsible for managing the project should review the entire RFP in order to be able to answer questions and ensure the document meets local needs.
3) Forms have been carefully designed to meet the need of this specific process. Care should be taken if proposed forms are removed and replaced with ones normally used by the contracting unit.

Contact Information

Director's Office
V. 609.292.6613
F. 609.292.9073

Local Government Research
V. 609.292.6110
F. 609.292.9073

Financial Regulation and Assistance
V. 609.292.4806
F. 609.984.7388

Local Finance Board
V. 609.292.0479
F. 609.633.6243

Local Management Services
V. 609.292.7842
F. 609.633.6243

Authority Regulation
V. 609.984.0132
F. 609.984.7388

Mail and Delivery
101 South Broad St.
PO Box 803
Trenton, New Jersey
08625-0803
Web: www.nj.gov/dca/lgs
E-mail: dlgs@dca.state.nj.us

Distribution
Municipal and Freeholder Clerks
Municipal and County Chief Financial Officers
Local Authority and Fire District Officials
School Business Administrators
Local Procurement Officials

The RFP also uses a formal process for potential proposers to submit questions and requests for clarifications. Appendix B is a form for the submission of these requests and is referred to throughout the text.

Contracting units are also reminded the Competitive Contracting process does not allow for negotiating proposals. While legal elements of the contract (project development agreement) may require legal determinations and modifications, the process does not allow for negotiation of price or related substantive elements and any element that would have provided less than a level playing field for proposers.

Contracting units are also cautioned that setting qualification standards that arbitrarily limit competition is inconsistent with public bidding requirements.

Office of State Comptroller Filing: Contracting units are also reminded of their obligations to meet State Comptroller requirements for public contracts. In accordance with N.J.S.A 52:15C-10, contracting units must notify OSC as early as practicable, but no later than 30 days before advertisement, of any negotiation or solicitation of a contract that may exceed $10 million. Contracting units must also provide post-award notification for any contract for an amount exceeding $2 million. Notification must be given within 20 days of the award.

Substantive Edits:

Several sections are highlighted in green. These sections should be carefully edited to meet contracting unit needs. This has important application to evaluation criteria in Section D. Once finalized, the green highlight should be removed.

Section B-16; Insurance should be reviewed by the contracting unit's Risk Management professionals to be sure the standards are appropriate to the contracting unit and the work to be done.

The following Sections also require local decisions and editing:

- A-3: # of copies of proposal and # of CDs to be submitted
- A-4: Web posting address, if desired
- A-5: If extra credit is to be provided on evaluation scoring for attending site walk through
- B-11: Delete LPCL or PSCL section as appropriate
- B-34: Use only if PSCL
- C-1: Explanation of type of audit information
- C-3(k): Include if ESCO is to provide financing option
- Use of Appendix F and Proposal Requirements #8: These forms are related to submission of Political Contribution Disclosure forms. Only PSCL agencies are required to use these forms as pursuant to Public School Fiscal Accountability Procedures (N.J.A.C. 6A23A-6.3). The forms and references to it should be removed for all LPCL users.

Under the ESIP DIY approach, there would be no conflict in a properly procured single organization conducting the audit, developing the ESP, then preparing plans and specifications. This does not apply when using the ESCO approach, where the auditor and ESCO must be independent.

Once construction plans and specifications are complete, the contracting unit would then conduct the bidding process as it would any public works construction project: manage the project as it sees fit (the firm that did the plans could also serve as construction manager), and then contract as necessary for commissioning and final third party verification. The two verification steps (the ESP and verifying implementation) must be performed by an organization independent of the ones preparing the ESP, overseeing construction and commissioning.

By following this process, the contracting unit can then apply to the Local Finance Board for the issuance of ESIP-based energy saving obligations or enter into appropriate lease financing.

The ESIP approach to energy improvement provides a range of options for contracting units to accrue energy savings while improving the environment, taking advantage of low-cost financing and state and federal incentives. DLGS and the BPU encourage comments and questions (through the ESIP web page) on this new opportunity so we can improve it as time goes on.

Approved: Thomas H. Neff, Director, Division of Local Government Services

Table of Web Links

Page	Shortcut text	Internet Address
1, 4	Local Finance Notice 2009-11	http://www.nj.gov/dca/lgs/lfns/09lfns/2009-11.doc
2	ESIP webpage	http://www.nj.gov/dca/lgs/lpcl/esip.htm
2	email comments	mailto:lpcl@dca.state.nj.us
2	to register (via email	mailto:lpcl@dca.state.nj.us
2	GovConnect Local Procurement	http://www.nj.gov/dca/surveys/ppsurvey.htm
3	State Comptroller requirements.	http://www.nj.gov/comptroller/compliance/index.html

New Jersey's Clean Energy PROGRAM
Your Power to Save
njcleanenergy.com

New Jersey SmartStart BUILDINGS

BPU

2012 PAY FOR PERFORMANCE PROGRAM
Existing Buildings Incentive Structure

Incentive #1: Energy Reduction Plan

Incentive Amount: ..... **$0.10 per sq ft**
Minimum Incentive: **$5,000**
Maximum Incentive:: ..... **$50,000 or 50% of facility annual energy cost (whichever is less)**

This incentive is designed to offset the cost of services associated with the development of the Energy Reduction Plan (ERP) and is paid upon ERP approval. Incentive is contingent on implementation of recommended measures outlined in the ERP.

Incentive #2: Installation of Recommended Measures

Minimum Performance Target: **15%**

Electric Incentives

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 per projected kWh saved**

Gas Incentives

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**

This incentive is based on projected energy savings outlined in the ERP. Incentive is paid upon successful installation of recommended measures.

Incentive #3: Post-Construction Benchmarking Report

Minimum Performance Target: **15%**

Electric Incentives

Base Incentive based on 15% savings: ..... **$0.09 per actual kWh saved**
For each % over 15% add: ..... **$0.005 per actual kWh saved**
Maximum Incentive: ..... **$0.11 per actual kWh saved**

Gas Incentives

Base Incentive based on 15% savings: ..... **$0.90 per actual Therm saved**
For each % over 15% add: ..... **$0.05 per actual Therm saved**
Maximum Incentive: ..... **$1.25 per actual Therm saved**

Incentive Cap: ..... **25% of total project cost**

This incentive will be released upon submittal of a Post-Construction Benchmarking Report that verifies that the level of savings actually achieved by the installed measures meets or exceeds the minimum performance threshold. To validate the savings and achievement of the Energy Target, the EPA Portfolio Manager shall be used. Savings should be rounded to the nearest percent. Total value of Incentive #2 and Incentive #3 may not exceed 50% of the total project cost. Incentives will be limited to $1 million per gas and electric account per building; maximum of $2 million per project. See Participation Agreement for details.

APPENDIX E

EPA Portfolio Manager

OMB No. 2060-0347

STATEMENT OF ENERGY PERFORMANCE
Village School

Building ID: 3425549
For 12-month Period Ending: July 31, 2012[1]
Date SEP becomes ineligible: N/A

Date SEP Generated: January 28, 2013

Facility
Village School
67 McCampbell Rd
Holmdel, NJ 07733

Facility Owner
N/A

Primary Contact for this Facility
N/A

Year Built: 1964
Gross Floor Area (ft²): 131,000

Energy Performance Rating[2] (1-100) 90

Site Energy Use Summary[3]

Electricity - Grid Purchase(kBtu)	2,511,232
Natural Gas (kBtu)[4]	3,327,700
Total Energy (kBtu)	5,838,932

Energy Intensity[4]

Site (kBtu/ft²/yr)	45
Source (kBtu/ft²/yr)	91

Emissions (based on site energy use)

Greenhouse Gas Emissions ($MtCO_2e$/year)	533

Electric Distribution Utility
Jersey Central Power & Light Co [FirstEnergy Corp]

National Median Comparison

National Median Site EUI	72
National Median Source EUI	147
% Difference from National Median Source EUI	-38%
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.

Certifying Professional
N/A

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**

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	Village 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	67 McCampbell Rd, Holmdel, NJ 07733	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.		☐
School Building (K-12 School)				
CRITERION	**VALUE AS ENTERED IN PORTFOLIO MANAGER**	**VERIFICATION QUESTIONS**	**NOTES**	☑
Gross Floor Area	131,000 Sq. Ft.	Does this square footage include all supporting functions such as kitchens and break rooms used by staff, storage areas, administrative areas, elevators, stairwells, atria, vent shafts, etc. Also note that existing atriums should only include the base floor area that it occupies. Interstitial (plenum) space between floors should not be included in the total. Finally gross floor area is not the same as leasable space. Leasable space is a subset of gross floor area.		☐
Open Weekends?	Yes	Is this building normally open at all on the weekends? This includes activities beyond the work conducted by maintenance, cleaning, and security personnel. Weekend activity could include any time when the space is used for classes, performances or other school or community activities. If the building is open on the weekend as part of the standard schedule during one or more seasons, the building should select ?yes? for open weekends. The ?yes? response should apply whether the building is open for one or both of the weekend days.		☐
Number of PCs	277	Is this the number of personal computers in the K12 School?		☐
Number of walk-in refrigeration/freezer units	0	Is this the total number of commercial walk-in type freezers and coolers? These units are typically found in storage and receiving areas.		☐
Presence of cooking facilities	Yes	Does this school have a dedicated space in which food is prepared and served to students? If the school has space in which food for students is only kept warm and/or served to students, or has only a galley that is used by teachers and staff then the answer is "no".		☐
Percent Cooled	80 %	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: Jersey Central Power & Light Co [FirstEnergy Corp]

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))
07/01/2012	07/31/2012	55,840.00
06/01/2012	06/30/2012	49,760.00
05/01/2012	05/31/2012	70,560.00
04/01/2012	04/30/2012	55,200.00
03/01/2012	03/31/2012	81,920.00
02/01/2012	02/29/2012	74,720.00
01/01/2012	01/31/2012	72,640.00
12/01/2011	12/31/2011	71,200.00
11/01/2011	11/30/2011	72,640.00
10/01/2011	10/31/2011	80,160.00
09/01/2011	09/30/2011	21,920.00
08/01/2011	08/31/2011	29,440.00
Electric Meter Consumption (kWh (thousand Watt-hours))		**736,000.00**
Electric Meter Consumption (kBtu (thousand Btu))		**2,511,232.00**
Total Electricity (Grid Purchase) Consumption (kBtu (thousand Btu))		**2,511,232.00**
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)
07/01/2012	07/31/2012	18.30
06/01/2012	06/30/2012	47.20
05/01/2012	05/31/2012	1,259.70
04/01/2012	04/30/2012	3,192.90
03/01/2012	03/31/2012	6,224.90
02/01/2012	02/29/2012	8,139.40
01/01/2012	01/31/2012	7,216.80
12/01/2011	12/31/2011	4,533.30
11/01/2011	11/30/2011	2,425.20
10/01/2011	10/31/2011	36.20

09/01/2011	09/30/2011	181.10
08/01/2011	08/31/2011	2.00
Natural Gas Meter Consumption (therms)		**33,277.00**
Natural Gas Meter Consumption (kBtu (thousand Btu))		**3,327,700.00**
Total Natural Gas Consumption (kBtu (thousand Btu))		**3,327,700.00**
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
Village School
67 McCampbell Rd
Holmdel, NJ 07733

Facility Owner
N/A

Primary Contact for this Facility
N/A

General Information

Village School	
Gross Floor Area Excluding Parking: (ft^2)	131,000
Year Built	1964
For 12-month Evaluation Period Ending Date:	July 31, 2012

Facility Space Use Summary

School Building	
Space Type	K-12 School
Gross Floor Area (ft^2)	131,000
Open Weekends?	Yes
Number of PCs	277
Number of walk-in refrigeration/freezer units	0
Presence of cooking facilities	Yes
Percent Cooled	80
Percent Heated	100
Months °	10
High School?	No
School District °	N/A

Energy Performance Comparison

	Evaluation Periods		Comparisons		
Performance Metrics	**Current** (Ending Date 07/31/2012)	**Baseline** (Ending Date 06/30/2012)	**Rating of 75**	**Target**	**National Median**
Energy Performance Rating	90	88	75	N/A	50
Energy Intensity					
Site ($kBtu/ft^2$)	45	47	56	N/A	72
Source ($kBtu/ft^2$)	91	93	115	N/A	147
Energy Cost					
$/year	$ 156,728.07	$ 157,351.67	$ 198,222.15	N/A	$ 253,465.54
$/$ft^2$/year	$ 1.20	$ 1.20	$ 1.52	N/A	$ 1.94
Greenhouse Gas Emissions					
$MtCO_2e$/year	533	551	674	N/A	862
$kgCO_2e/ft^2$/year	4	4	5	N/A	6

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.

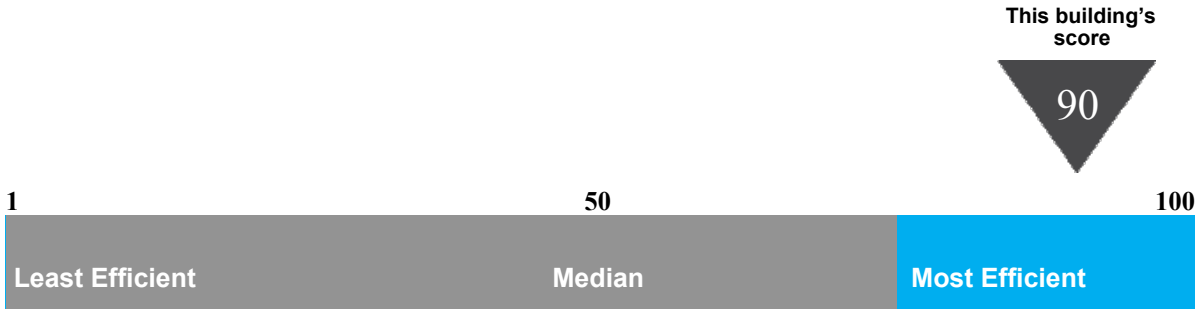
Statement of Energy Performance

2012

Village School
67 McCampbell Rd
Holmdel, NJ 07733

Portfolio Manager Building ID: 3425549

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



This building uses 91 kBtu per square foot per year.*

*Based on source energy intensity for the 12 month period ending July 2012

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

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

Date of certification

EPA United States Environmental Protection Agency

Date Generated: 01/28/2013