ROXBURY TOWNSHIP BOARD OF EDUCATION
NIXON ELEMENTARY SCHOOL
ENERGY ASSESSMENT

for

NEW JERSEY
BOARD OF PUBLIC UTILITIES

CHA PROJECT NO. 24454

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REPORT DISCLAIMER

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

A thorough walkthrough of the school 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 school staff and spot measurements taken in the field.

1.0 EXECUTIVE SUMMARY

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

Building Name	Address	Square Feet	Construction Date
Nixon Elementary School	275 Mt. Arlington Blvd. Landing, N.J. 07850	50,890	Original: 1969 Addition: 2006

The Energy Conservation Measures (ECMs) identified in this report will allow for a more efficient use of energy and if pursued have the opportunity to qualify for the New Jersey SmartStart Buildings Program. Potential annual savings of $21,700 for the recommended ECMs may be realized with a combined payback of 3.6 years. A summary of the costs, savings, and paybacks for the recommended ECMs follows:

Summary of Energy Conservation Measures

Energy Conservation Measure		Approx. Costs ($)	Approx. Savings ($/year)	Payback (Years) w/o Incentive	Potential Incentive ($)*	Payback (Years) w/ Incentive	Recommended For Implementation
ECM-1	Install Condensing Boilers	78,000	2,000	>20	1,800	>20	
ECM-2	Replace Electric DHW Heaters with a Condensing DHW	34,000	9,200	3.7	6,000	3.0	X
ECM-3	Install Demand Control Ventilation	27,000	4,800	5.6	200	5.6	X
ECM-4	Replace Kitchen Booster Heater with Natural Gas	10,000	2,200	4.5	5,100	2.2	X
ECM-5	Install a Network Computer Power Management System	2,000	900	2.2	0	2.2	X
ECM-6	Replace Existing Windows With Higher Thermal Efficiency	213,000	1,100	>20	0	>20	
ECM-7	Replace Existing Roof	741,000	1,400	>20	0	>20	
ECM-8	Lighting Replacement / Upgrades	6,000	4,600	1.3	700	1.2	X
ECM-9	Install Lighting Controls (Occupancy Sensors)	17,000	5,000	3.4	2,900	2.8	
ECM-10	Lighting Replacements with Lighting Controls (Occupancy Sensors)	23,000	9,100	2.5	3,600	2.1	
ECM-11	Install Low Flow Fixtures	49,000	400	>20	0	>20	

2.0 INTRODUCTION AND BACKGROUND

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

The Nixon Elementary School is a pre-k through fourth grade school located in Succasunna, NJ. It is a 50,890 square foot, single story steel framed block structure with brick veneer. The building was constructed with single pane aluminum framed windows and a flat, rubber membrane type roof. Windows in the new addition are double pane thermally insulated windows. The building was constructed in 1969 with some classrooms and a gymnasium added in 2006. Occupancy includes approximately 300 students and 56 employees, totaling 356 people. The building is assumed fully occupied from 8:00 am to 3:30 pm during the weekdays, with some maintenance and cleaning personnel operating later.

3.0 EXISTING CONDITIONS

3.1 Building - General

Built in 1969 with one addition in 2006, the Nixon Elementary School is a 50,890 square foot, single-story school with office space, classrooms, cafeteria and gymnasium. The building can be assumed to be fully occupied until 3:30 pm during the week. Custodial staff is typically in the building after hours during the week. The hours of operation are:

- Monday through Friday 8:00 am to 3:30 pm
- Saturday & Sunday, open as needed

The building is constructed of steel frame with block walls and brick veneer. The interior walls are painted block walls. The building is typical square shaped with main hallways and classrooms on either side. There is a courtyard in the center of the building. The building has exposed walls in all directions, and appeared to be in good condition at the time of the site visit. The windows include single pane aluminum frame windows in the original construction and double pane thermally sealed windows in the 2006 addition.

3.2 Utility Usage

Utilities include electricity, natural gas, and potable water. Electricity is delivered by Jersey Central Power & Light and supplied by Direct Energy. Electricity supply bills were not obtained and therefore the electricity rate is skewed. Natural gas supplied by Hess and delivered by New Jersey Natural Gas. Water is paid for through New Jersey American Water.

The building has one electric meter serving the site. From May 2011 through April 2012, the utility usage for the school was as follows:

Actual Cost & Site Usage by Utility

Electric		
Annual Usage	407,400	kWh/yr
Annual Cost	93,652	$
Blended Rate	0.230	$/kWh
Supply Rate	0.208	$/kWh
Demand Rate	6.17	$/kW
Peak Demand	141	kW
Min. Demand	100	kW
Avg. Demand	122	kW
Natural Gas		
Annual Usage	16,862	therms/yr
Annual Cost	20,706	$
Rate	1.23	$/Therm

Electrical usage was generally higher in the summer months when air conditioning equipment was operational. Natural gas consumption was highest in winter months for heating. See Appendix A for a detailed utility analysis.

Under New Jersey's energy deregulation law, the supply portion of the electric (or natural gas) bill is separated from the delivery portion. With the supply portion open to competition, customers can shop around for the best price on their energy supplies. Their electric and natural gas distribution utilities will still deliver those supplies through their wires and pipes – and respond to emergencies, should they arise – regardless of where those supplies are purchased. Purchasing your 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 your 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.

3.3 HVAC Systems

More details on the mechanical equipment can be found within Appendix B.

Heat is provided by one Buderus 1,438 MBH boiler which was installed in 2012. It is located in the main boiler room within the school. This unit has a rated efficiency of 83%. There is a second Aerco condensing natural gas hot water boiler located in the main boiler room but it was not connected during the site visit. The boiler(s) provide heating hot water to the school's cabinet unit heaters, fin tube radiation and unit heaters. Cooling is provided by direct expansion (DX) units on the roof that were installed in 2006. . Classrooms that were added in 2006 have heat provided by Airedale split system heat pumps. There is a total of 25 tons of cooling within the school.

Typically each classroom is served by a unit ventilator, which consists of heating/cooling coils, a circulation fan, outdoor air and return air dampers and temperature controls. During our audit we found that the unit ventilators are turned off due to comfort and/ or noise issues. When the units are "off", the dampers are closed and no outdoor air is being introduced through the unit, therefore the heating load on the unit is much diminished. Replacing the existing unit ventilators with new units would require that the outside air quantity be provided to each classroom to meet the present code requirements which would result in an increase in energy use verses the current units. Although modern controls can help reduce the amount of energy used, ultimately the new unit ventilators will consume more energy than the present units.

Heating hot water is distributed throughout the building with two hot water pumps. The pumps operate in lead/lag fashion.

The restrooms, classrooms and corridors are ventilated using roof mounted exhaust fans.

3.4 Lighting/Electrical Systems

Since building construction in 1969, the school has re-ballasted and re-lamped some of their fixtures. A mixture of T8 lamps compact fluorescent twin biaxial bulbs and compact fluorescent spiral bulbs are utilized. Older style incandescent bulbs are also used in select areas. The gymnasium uses 400 W metal

halide lighting. The primary source of control for the lights is switches manually turned off at the end of the day.

3.5 Plumbing Systems

3.6.1 Domestic Hot Water System

Domestic hot water is provided by an 80 kW 500 gallon Hubbell electric water heater.

3.6.2 Plumbing Fixtures

The building's lavatories, water closets, and urinals in the original construction are older high-flow 3.5 GPM plumbing fixtures.

ENERGY CONSERVATION MEASURES

3.6 ECM-1 Install Condensing Boilers

The building is heated with hot water supplied by one Buderus 1,438 MBH hot water boiler. The boiler is non-condensing with an efficiency of 83%.

Due to the low efficiency of the existing boiler and piping system, an evaluation was performed for adding a high efficiency condensing boiler to provide the heating hot water for the building during the heating months.

Natural gas usage for the facility is split between the kitchen and HHW system. The summertime usage was annualized to estimate the kitchen gas usage. The remaining gas was estimated to be consumed by the boiler. The boiler fuel consumption was calculated from the natural gas used annually for the entire year per utility bills and boiler efficiency. This was then compared to the efficiency of a new condensing boiler at the improved operating efficiency. The difference in fuel usage was the savings.

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

ECM-1 HVAC Condensing Boilers Addition

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
78,000	0	0	1,600	2,000	0	2,000	(0.4)	1,800	>20	>20

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

Expected Life: 25 years

Lifetime Savings: 0 kWh 40,000 therms $50,000

This measure is not recommended.

3.7 ECM-2 Replace Electric Water Heater with Natural Gas Fired Water Heater

The Domestic Hot Water heater is an 80 kW Electric tank type heater. The capacity is 500 gallons. This water heater uses a substantial amount of electricity to heat water that is not used. Based on the estimated usage of the areas served this unit could be replaced with a much smaller unit, perhaps even an instantaneous tankless unit. For the purpose of this report, a 140 gallon tank size was used. Converting to lower cost natural gas will result in fuel savings. This ECM assesses replacing the electric powered DHW heater that serves school with a high efficiency condensing gas water heater. To implement this ECM, piping and electrical wiring will need to be modified as well as new venting installed. The electrical power currently supplied to these units could be used to power other equipment.

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

ECM-2 Replace Electric Domestic Hot Water Heaters with Natural Gas

Budgetary Cost	Annual Utility Savings					Estimated Maintenance Savings	Total Savings	ROI	Potential Incentive*	Payback (without Incentive)	Payback (with Incentive)
	Electricity		Natural Gas	Water	Total						
$	kW	kWh	Therms	KGals	$	$	$		$	Years	Years
34,000	80	20,400	(800)	0	9,200	0	9,200	4.4	6,000	3.7	3.0

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

Expected Life: 20 years

Lifetime Savings: 408,000 kWh -16,000 therms 184,000

This measure is recommended.

3.8 ECM-3 Install Demand Control Ventilation in the Gymnasium and Cafeteria

Packaged rooftop units serve the gymnasium (RTU-1 and RTU-2) and cafeteria (RTU-4). It is assumed the units provide a minimum design outdoor air volume of 30%. Reducing outside air during occupied time periods will reduce heating and cooling energy used. This can be accomplished using carbon dioxide sensor to monitor air quality. The quantity of ventilation will be based on maintaining an acceptable carbon dioxide (CO_2) level in the space as an indicator of indoor air quality. A limit of 1000 PPM of CO_2 is recommended in ASHRAE Standard 62-2010, Ventilation for Acceptable Indoor Air Quality. Sensors will be installed to measure the building air CO_2 concentration, and the control sequence of operation programmed into the BAS. During unoccupied periods the outside air dampers should be closed.

Equipment supply and outside airflows were obtained from existing design drawings where possible, or from vendors per serial/model numbers found in the field. For the analysis, estimated savings for demand control ventilation are based on reducing the outdoor air from the design conditions to 15%. The energy savings are the differences in thermal energy and motor horse power electricity usage.

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

ECM-3 HVAC Demand Control Ventilation

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
27,000	6,800	0	2,600	4,800	0	4,800	1.7	200	5.6	5.6

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

Expected Life: 15 years

Lifetime Savings: 102,000 kWh 39,000 therms $72,000

This measure is recommended.

3.9 ECM-4 Replace Electric Dishwasher Booster Heater

The facility uses a Hobart 20 kW electric hot water booster heater four hours per day for 180 days per year for drying dishes. Utilizing natural gas for the heater was assessed.

The calculation uses electrical consumption and annual electrical cost as the baseline, which was converted to natural gas for the proposed case. 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-4 Replace Electric Dishwasher Booster Heater

Budgetary Cost	Annual Utility Savings					Estimated Maintenance Savings	Total Savings	ROI	Potential Incentive*	Payback (without Incentive)	Payback (with Incentive)
	Electricity		Natural Gas	Water	Total						
$	kW	kWh	Therms	Kgals	$	$	$		$	Years	Years
7,000	100	10,100	-400	0	2,200	0	2,200	19.4	5,100	4.5	2.2

* 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: 151,500 kWh -6,000 therms $33,000

This measure is recommended.

3.10 ECM-5 Network Controller Software

Personal computers can consume large amounts of electricity unnecessarily if left on for long periods of time when not in use, even in sleep mode. This measure assessed implementation of proprietary network manager software that monitors the usage and shuts off all computers and monitors that are inactive. This software does not effect on daily network operation and does not compromise security firewalls.

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

ECM-5 Network Controller Software

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	3,900	0	-10	900	0	900	1.6	0	2.2	2.2

* There are currently no incentives available for this measure

Expected Life: 5 years

Lifetime Savings: 19,500 kWh -100 therms $4,500

This measure is recommended.

3.11 ECM-6 Replace Single Pane Windows with Thermal Efficient Windows

The school has 2,128 square feet of window area in the original construction. These windows are constructed with aluminum frames and single pane glazing. Due to age, construction type, and condition, the windows incur excess air infiltration and provide average thermal resistance to heat transfer. An assessment considered installing aluminum frame with triple pane glazing with internal blinds to decrease energy losses.

The calculation uses bin hours to estimate the occupied and unoccupied bin hours. This is converted to existing energy for the occupied and unoccupied cases using the existing window U-factor and the heating and cooling temperature. The two are summed together to create the annual utility usage for the baseline. The same steps are done to calculate the proposed utility usage. The difference in heating losses through the windows resulted in annual heating and cooling savings.

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

ECM-6 **Replace Existing Windows With Higher Thermal Efficiency**

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
213,000	800	0	800	1,100	0	1,100	(0.8)	0	>20	>20

Expected Life: 30 years

Lifetime Savings: 24,000 kWh 24,000 therms $ 33,000

This measure is not recommended.

3.12 ECM-7 Roof Replacement

The roof is constructed of metal roof decking, insulation, and a rubber mat system. The roof has surpassed its useful life and should be replaced. This ECM addresses replacing the roof to minimize heating and cooling energy losses.

To calculate the savings, the heat losses through the roof assembly of the school was found using an estimation of the existing roof's R-value of 13.0 and bin weather data for nearby Newark, NJ. The values were totaled to determine the existing annual energy losses. Heating and cooling energy loss values were then determined with a thermal resistance which included the replacement roof R-value of 18.0. The annual energy savings of replacing the roof is detailed in the summary table below.

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

ECM-7 Roof Replacement

Budgetary Cost	Annual Utility Savings					Estimated Maintenance Savings	Total Savings	ROI	Potential Incentive*	Payback (without Incentive)	Payback (with Incentive)
	Electricity		Natural Gas	Water	Total						
$	kW	kWh	Therms	KGals	$	$	$		$	Years	Years
65,000	0	400	1,100	0	1,400	0	1,400	(0.3)	0	>20	>20

* There is no incentive available through the New Jersey Smart Start or Direct Install Programs for this ECM. See section 5.0 for other incentive opportunities.

Expected Life: 30 years

Lifetime Savings: 12,000 kWh 33,000 therms $42,000

This measure is not recommended.

3.13 ECM-8 Lighting Replacements / Upgrades

Modern fluorescent lamps convert electrical power into useful light more efficiently than an incandescent lamp or metal halides. A comprehensive fixture survey was conducted of the entire building. Each switch and circuit was identified, and the number of fixtures, locations, and existing wattage established (Appendix C). There is an opportunity to reduce consumption by upgrading the existing metal halide fixtures to T-5 fixtures and incandescent to more efficient fluorescent fixtures. Supporting calculations, including assumptions for lighting hours and annual energy usage for each fixture, are provided in Appendix C.

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

ECM-8 Lighting Replacement

Budgetary Cost	Annual Utility Savings				Estimated Maintenance Savings	Total Savings	ROI	Incentive *	Payback (without incentive)	Payback (with incentive)
	Electric	Electric	Nat Gas	Total						
$	kWh	kW	Therms	$	$	$		$	Years	Years
6,000	18,900	10	0	4,600	0	4,600	9.9	700	1.3	1.2

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

Expected Life: 15 years

Lifetime Savings: 283,500 kWh 0 therms $69,000

This measure is recommended.

3.14 ECM-9 Install Occupancy Sensors

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

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

ECM-9 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
17,000	21,800	0	0	5,000	0	5,000	3.4	2,900	3.4	2.8

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

Expected Life: 15 years

Lifetime Savings: 327,000 kWh 0 therms $75,000

This measure is not recommended in lieu of ECM-8.

3.15 ECM-10 Lighting Replacements with Occupancy Sensors

Due to interactive effects, the energy and cost savings for occupancy sensors and lighting upgrades are not cumulative. This measure is a combination of ECM-7 and ECM-8 to reflect actual expected energy and demand reduction.

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

ECM-10 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
23,000	40,700	10	0	9,100	0	9,100	4.8	3,600	2.5	2.1

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

Expected Life: 15 years

Lifetime Savings: 610,500 kWh 0 therms $136,500

This measure is not recommended in lieu of ECM-8.

3.16 ECM-11 Install Low Flow Fixtures

The existing toilet room fixtures consume more water than modern plumbing fixtures. It was determined that the current toilets and urinals with an average water use of 1.6 gal/flush for toilets and 1.6 gal/flush for urinals and 2.2 gallons per minute for faucets. Based on the number of occupants, it was estimated that each toilet and faucet is utilized approximately three times per day.The water savings associated from replacing these fixtures with low-flow fixtures was calculated by taking the difference of the annual water usage for the proposed and base case. The basis of this calculation is the number of times each fixture is used, gallons per use, and number of fixtures. Replacing the existing fixtures in the restrooms with 1.28 gals/flush toilets and 0.5 gal/flush urinals and 0.5 gallon per minute faucets.

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

ECM-11 **Install Low Flow Fixtures**

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
49,000	0	0	0	400		400	0.0	0	>20	>20

Expected Life: 15 years

Lifetime Savings: 0 kWh 0 therms $ 6,000

4.0 PROJECT INCENTIVES

4.1 Incentives Overview

4.1.1 New Jersey Pay For Performance Program

The school 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 School annual energy cost

The standard incentive pays $0.10 per square foot, up to a maximum of $50,000, not to exceed 50% of school 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.

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

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

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

The table below shows the summary of incentives available through the Pay for Performance program for this building. The total ECM savings did not meet the minimum 15% annual savings required to obtain incentives # 2 and #3, hence they are zero. Detailed calculations can be found in Appendix D.

	Incentives $		
	Elec	Gas	Total
Incentive #1	$0	$0	$5,089
Incentive #2	$0	$0	$0
Incentive #3	$0	$0	$0
Total All Incentives	**$0**	**$0**	**$5,089**

The current ECM's does not meet the minimum savings of 15% and therefore the building will not be eligible for incentives #2 and #3. See Appendix D for additional details.

4.1.2 New Jersey Smart Start Program

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

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

4.1.3 Direct Install Program

The Direct Install Program targets small and medium sized facilities where the peak electrical demand does not exceed 150 kW in any of the previous 12 months. Buildings must be located in New Jersey and served by one of the state's public, regulated electric or natural gas utility companies.

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

The program pays 70% of each project cost up to $75,000 per electrical utility account; total funding for each year is capped at $250,000 per customer. Installations must be completed by a Direct Install participating contractor, a list of which can be found on the New Jersey Clean Energy Website at

http://www.njcleanenergy.com. Contractors will coordinate with the applicant to arrange installation of recommended measures identified in a previous energy assessment, such as this document.

The school is potentially eligible to receive funding from the Direct Install Program. The total implementation cost for all ECMs potentially eligible for Direct Install funding is $108,300, and includes replacing the existing boiler with a condensing hot water boiler, domestic water heater with a natural gas unit, demand control ventilation, booster heater replacement; lighting replacements, upgrades and controls in select areas. The program normally has a potential to pay 70% of the initial costs, leaving 30% to be paid out of pocket. Direct Install funding has the potential to significantly reduce the payback period of Energy Conservation Measures.

4.1.4 Energy Savings Improvement Plans (ESIP)

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

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

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

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

5.0 ALTERNATIVE ENERGY SCREENING EVALUATION

5.1 Solar

5.1.1 Photovoltaic Rooftop Solar Power Generation

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

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

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

Installation of (PV) arrays in the state New Jersey will allow the owner to participate in the New Jersey solar renewable energy certificates program (SREC). This is a program that has been set up to allow entities with large amounts of environmentally unfriendly emissions to purchase credits from zero emission (PV) solar-producers. One SREC credit is equivalent to 1000 kilowatt hours of PV electrical production; these credits can be traded for period of 15 years from the date of installation. The average SREC value per credit is estimated to be about $65/ SREC per year based on current market data, and this number was utilized in the cash flow for this report.

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

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

Photovoltaic (PV) Solar Power Generation - Screening Assessment

Budgetary Cost	Annual Utility Savings				Estimated Maintenance Savings	Total Savings	Federal Tax Credit	New Jersey Renewable ** SREC	Payback (without incentive)	Payback (with incentive)
$	kW	kWh	therms	$	$	$	$	$	Years	Years
$520,000	**130**	**162,400**	**0**	**$37,300**	**0**	**$37,300**	**$0**	**$10,600**	**13.9**	**10.9**

* No federal tax credit currently available.
** Solar Renewable Energy Certificate Program (SREC) for 2012 is $65/1000kwh

This measure is not recommended due to the long expected payback.

5.1.2 Solar Thermal Hot Water Plant

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 gas-fired water heaters and, therefore, this measure would offer natural gas utility savings.

6.0 EPA PORTFOLIO MANAGER

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

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

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

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

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

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

Energy Intensity	Nixon Elementary School	National Average
EPA Score	72	50
Site (kBtu/sf/year)	61	63
Source (kBtu/sf/year)	126	115

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

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

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

For the School to qualify for the Energy Star label the EPA score is required to be above 75. There are several energy conservation measures recommended in this report, that if implemented will further reduce the energy use intensity and increase the EPA score of the Elementary School. This building is not eligible for Energy Star certification at this time.

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

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

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

7.0 CONCLUSIONS & RECOMMENDATIONS

The energy audit conducted by CHA at the Nixon Elementary School identified potential ECMs for lighting and control replacement, HVAC replacement, DHW replacement, demand controlled ventilation. Potential annual savings of $21,700 may be realized for the recommended ECMs, with a summary of the costs, savings, and paybacks as follows:

ECM-2 Replace Electric DHW Heaters with a Condensing DHW

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
34,000	20,400	80	-800	9,200	0	9,200	4.4	6,000	3.7	3.0

Expected Life: 20 years
Lifetime Savings: 408,000 kWh -16,000 therms $ 184,000

ECM-3 Install Demand Control Ventilation

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
27,000	6,800	0	2,600	4,800	0	4,800	1.7	200	5.6	5.6

Expected Life: 15 years
Lifetime Savings: 102,000 kWh 39,000 therms $ 72,000

ECM-4 Replace Kitchen Booster Heater with Natural Gas

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	10,100	100	-400	2,200	0	2,200	12.9	5,100	4.5	2.2

Expected Life: 15 years
Lifetime Savings: 151,500 kWh -6,000 therms $ 33,000

ECM-5 Install a Network Computer Power Management System

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	3,900	0	-10	900	0	900	1.6	0	2.2	2.2

Expected Life: 5 years
Lifetime Savings: 19,500 kWh -100 therms $ 4,500

ECM-8 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
6,000	18,900	10	0	4,600	0	4,600	9.9	700	1.3	1.2

Expected Life: 15 years

Lifetime Savings: 283,500 kWh 0 therms $ 69,000

APPENDIX A

Utility Usage Analysis

Roxbury Township BOE
42 Hillside Ave.
Succasunna, NJ 07876

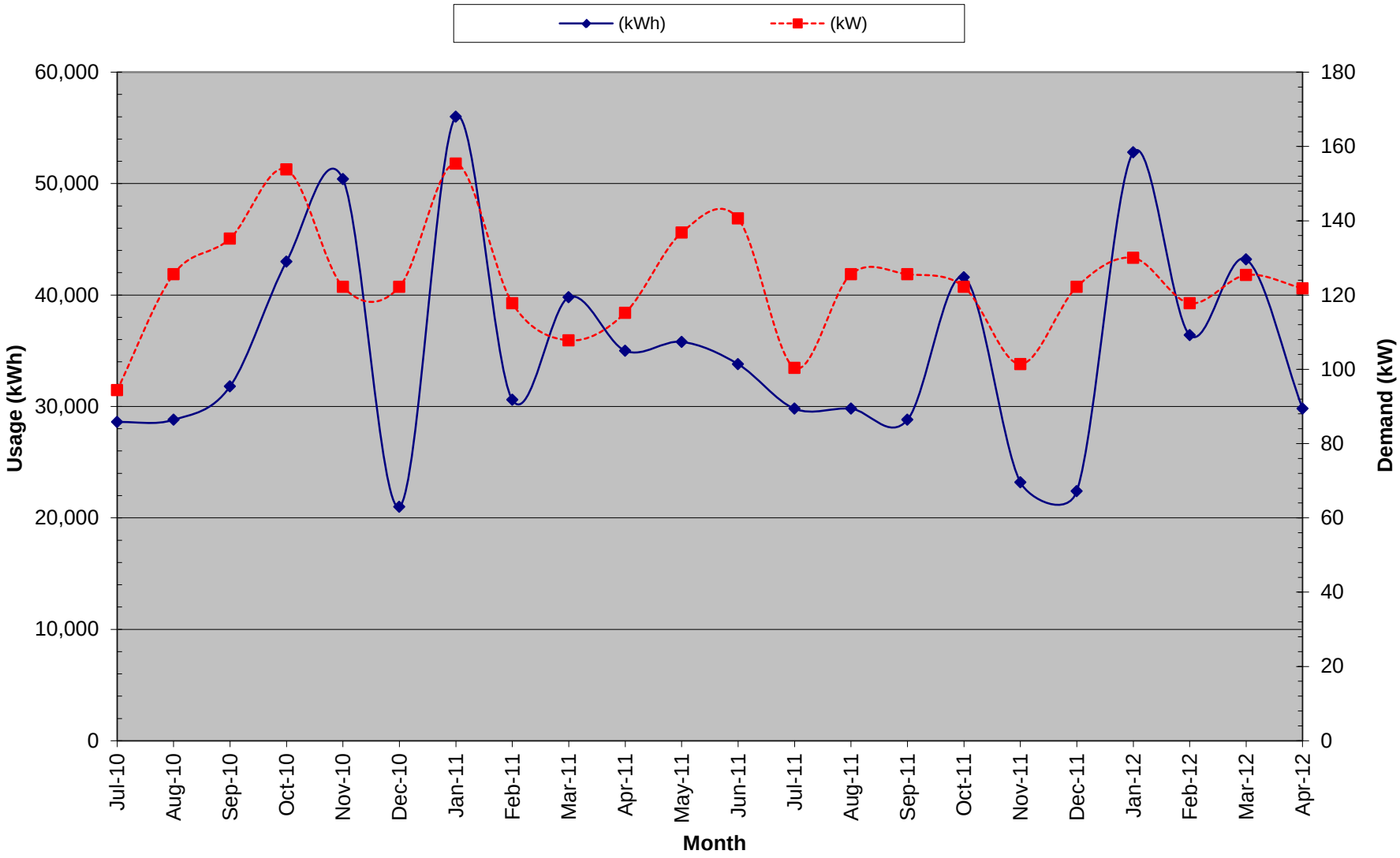
Electric Service
Delivery - JCP&L
Supplier -

For Service at: **Nixon Elementary School**
Account No.: **100000-5522-97**
Meter No.: **40721187**

			Charges			Unit Costs		
Month	Consumption (kWh)	Demand (kW)	Total ($)	Delivery ($)	Supply ($)	Blended Rate ($/kWh)	Consumption ($/kWh)	Demand ($/kW)
July-10	28,600	94.40	$ 7,190.11			$ 0.251	$ 0.251	$ -
August-10	28,800	125.60	$ 7,452.31			$ 0.259	$ 0.259	$ -
September-10	31,800	135.20	$ 8,140.74			$ 0.256	$ 0.256	$ -
October-10	43,000	153.80	$ 10,820.36			$ 0.252	$ 0.252	$ -
November-10	50,400	122.20	$ 12,311.77			$ 0.244	$ 0.244	$ -
December-10	21,000	122.20	$ 5,592.29			$ 0.266	$ 0.266	$ -
January-11	56,000	155.40	$ 13,806.48			$ 0.247	$ 0.247	$ -
February-11	30,600	117.80	$ 7,720.22			$ 0.252	$ 0.252	$ -
March-11	39,800	107.80	$ 9,454.65			$ 0.238	$ 0.238	$ -
April-11	35,000	115.20	$ 7,997.94			$ 0.229	$ 0.229	$ -
May-11	35,800	136.80	$ 8,367.63			$ 0.234	$ 0.213	$ 5.53
June-11	33,800	140.60	$ 7,979.46			$ 0.236	$ 0.209	$ 6.45
July-11	29,800	100.40	$ 6,871.00			$ 0.231	$ 0.210	$ 6.25
August-11	29,800	125.60	$ 7,045.88			$ 0.236	$ 0.210	$ 6.39
September-11	28,800	125.60	$ 6,706.08			$ 0.233	$ 0.207	$ 5.95
October-11	41,600	122.20	$ 9,411.93			$ 0.226	$ 0.209	$ 5.94
November-11	23,200	101.40	$ 5,475.61			$ 0.236	$ 0.200	$ 8.15
December-11	22,400	122.20	$ 5,441.25			$ 0.243	$ 0.211	$ 5.94
January-12	52,800	130.00	$ 11,768.43			$ 0.223	$ 0.208	$ 5.97
February-12	36,400	117.80	$ 8,260.09	$ 4,906.56	$ 3,353.53	$ 0.227	$ 0.135	$ 5.92
March-12	43,200	125.40	$ 9,524.36	$ 5,544.34	$ 3,980.02	$ 0.220	$ 0.128	$ 5.95
April-12	29,800	121.80	$ 6,800.37	$ 4,054.90	$ 2,745.47	$ 0.228	$ 0.136	$ 6.01
Total (12-months)	**407,400**	**140.60**	**$93,652.09**	**$14,505.80**	**$10,079.02**	**$ 0.230**	**$ 0.208**	**$ 6.17**

Averaged value (no data provided)

Electric Usage - Nixon Elementary School



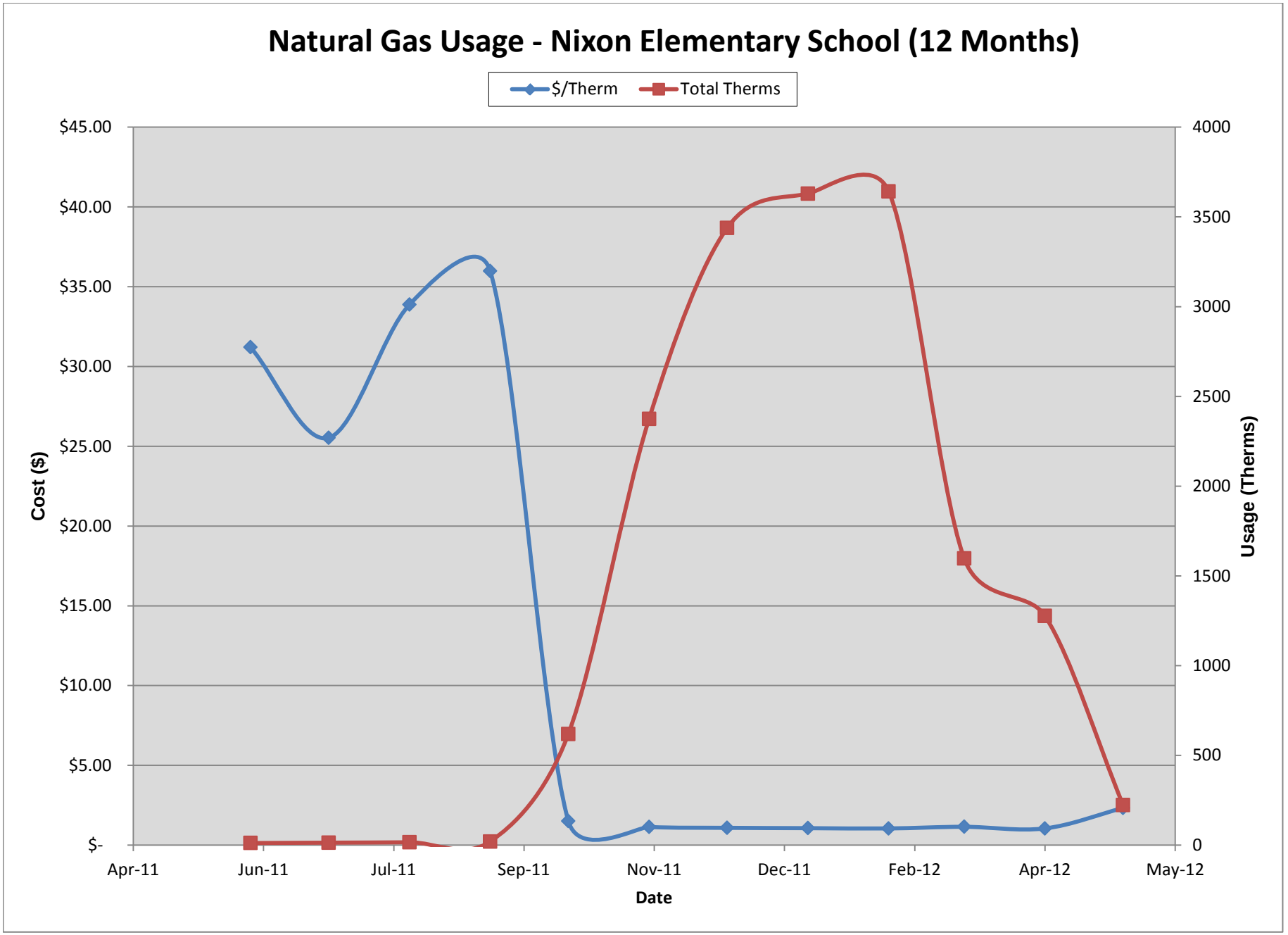
Roxbury Township BOE
42 Hillside Ave.
Succasunna, NJ 07876

Gas Service
Delivery - NJNG
Supplier -

For Service at: Nixon Elementary School
Account No.: 02-11045602-18
Meter No.: 00745440

Month	Total ($)	Delivery ($)	Supply ($)	Total Therms	$/Therm
Aug-10	$ 354.74			4.2	$ 84.46
Sep-10	$ 364.02			14.8	$ 24.60
Oct-10	$ 1,398.01			1022.8	$ 1.37
Nov-10	$ 3,091.75			2705.6	$ 1.14
Dec-10	$ 6,340.65			5782.7	$ 1.10
Jan-11	$ 6,174.51			5649.7	$ 1.09
Feb-11	$ 4,890.46			4404	$ 1.11
Mar-11	$ 4,020.54			3560.1	$ 1.13
Apr-11	$ 2,124.67			1730	$ 1.23
May-11	$ 728.81			379.1	$ 1.92
Jun-11	$ 361.97			11.6	$ 31.20
Jul-11	$ 350.43			13.73	$ 25.53
Aug-11	$ 536.87			15.85	$ 33.87
Sep-11	$ 723.30			20.1	$ 35.99
Oct-11	$ 936.60			618.8	$ 1.51
Nov-11	$ 2,704.10			2375.1	$ 1.14
Dec-11	$ 3,727.75			3438.6	$ 1.08
Jan-12	$ 3,861.29			3629.2	$ 1.06
Feb-12	$ 3,811.05			3641.8	$ 1.05
Mar-12	$ 1,835.46			1596.7	$ 1.15
Apr-12	$ 1,337.54			1277	$ 1.05
May-12	$ 519.58			223	$ 2.33
Total (12-months)	**$ 20,705.94**	**$ -**	**$ -**	**16861.48**	**$ 1.23**

Averaged Values (no data provided)


Natural Gas Usage - Nixon Elementary School (12 Months)
$/Therm
Total Therms
$45.00
$40.00
$35.00
$30.00
$25.00
$20.00
$15.00
$10.00
$5.00
$-
Cost ($)
4000
3500
3000
2500
2000
1500
1000
500
0
Usage (Therms)
Apr-11
Jun-11
Jul-11
Sep-11
Nov-11
Dec-11
Feb-12
Apr-12
May-12
Date

APPENDIX B

Equipment Inventory

New Jersey BPU Energy Audit Program
CHA #24454
Roxbury BOE
Nixon Elementary School
Original Construction Date: 1969
Renovation/Addtion Date: 2006

Description	QTY	Manufacturer Name	Model No.	Serial No.	Equipment Type / Utility	Capacity/Size/Efficiency	Location	Areas/Equipment Served	Date Installed	Remaining Useful Life (years)	Other Info.
RTU-1	1	Lenox	LGA240H2BH2G	5604B00447	AHU NG / DX	470/376 MBH / 7.5 HP/ 20 Tons Cooling	Roof	School	2006	9	
RTU-2	1	Lenox	LGA060H2BH2G	5604B00906	AHU NG / DX	1.5 HP / 5 Tons	Roof	School	2006	9	
RTU-3	1	Lenox	LGA090H2BH2G	5604B00792	AHU NG / DX	235 MBH In / 3 HP	Roof	School	2006	9	
RTU-4	1	Lenox	LGA090H2BH2G	5604B00791	AHU NG / DX	235 MBH In / 3 HP	Roof	School	2006	9	
RTU-5	1	Russell	RLH100H22-E		Condenser	1/20 HP	Roof	Kitchen	2006	14	
RTU-6	1	Healthcraft	CHT0256CF		Condenser	1/15 HP	Roof	Kitchen	2006	14	
HP-1	2	Nesbitt			Heat Pump / Electric		Office	Office	2006	9	
HP-2	6	Airedale			Heat Pump		New Classrooms	New Classrooms	2006	0	
AC	7				Window AC		School	School	2006	4	
CUV	21				Classroom Unit Ventilator		Old Classrooms	Old Classrooms	1969	-23	
DHW	1	PK	PKW-80V/8V	200725	DHW / Electric	80 kW / 500 Gal.	MER	School	1969	-18	
Compressor	1				Air Compressor / Dual Head		MER	Pneumatic Controls	1969	-23	
Dish Washer	1	Hobart	CRS-66		Dishwasher		Kitchen	None / Out of Service	1990	-7	
Oven	1	Bakers Pride			Oven / NG		Kitchen	Kitchen	1990	-7	
Range	1	Vulcan			Range / Electric	2 Burner	Kitchen	Kitchen	1990	-7	
Warmer	1				Food Warmer		Kitchen	Kitchen	1990	-7	
Refrigerator	1				Walk-In Refrigerator		Kitchen	Kitchen	1990	-7	
Boiler	1	Buderus	GE515	05086704-00-3234-0026	Boiler	1438/1200 MBH in/out 83% efficiency	Boiler Room	School	2012	25	
Boiler	1	Aerco	MLX-1060		NG Condensing Boiler	975 MBH / 1,060 MBH out/in 92% Efficiency	Boiler Room	School			
Booster Heater	1	Hobart	CRS-66	274874	Kitchen booster Heater /Electric	20 kW	Kitchen				

APPENDIX C

ECM Calculations

Summary of Energy Conservation Measures							
Energy Conservation Measure		**Approx. Costs ($)**	**Approx. Savings ($/year)**	**Payback (Years) w/o Incentive**	**Potential Incentive ($)***	**Payback (Years) w/ Incentive**	**Recommended For Implementation**
ECM-1	Install Condensiong Boilers	78,000	2,000	>20	1,800	>20	
ECM-2	Replace Electric DHW Heaters with a Condesning DHW	34,000	9,200	3.7	6,000	3.0	X
ECM-3	Install Demand Control Ventilation	27,000	4,800	5.6	200	5.6	X
ECM-4	Replace Kitchen Booster Heater with Natural Gas	10,000	2,200	4.5	5,100	2.2	X
ECM-5	Install a Network Computer Power Management System	2,000	900	2.2	0	2.2	X
ECM-6	Replace Existing Windows With Higher Thermal Efficiency	213,000	1,100	>20	0	>20	
ECM-7	Replace Existing Roof	741,000	1,400	>20	0	>20	
ECM-8	Lighting Replacement / Upgrades	6,000	4,600	1.3	700	1.2	X
ECM-9	Install Lighting Controls (Occupancy Sensors)	17,000	5,000	3.4	2,900	2.8	
ECM-10	Lighting Replacements with Lighting Controls (Occupancy Sensors)	23,000	9,100	2.5	3,600	2.1	

Roxbury Board of Education - NJBPU
CHA Project #24454
Nixon Elementary School

ECM Summary Sheet

ECM-1 Install Condensiong Boilers

Budgetary Cost	Annual Utility Savings				Estimated Maintenance Savings	Total Savings	ROI	Incentive *	Payback (without incentive)	Payback (with incentive)
	Electric	Electric	Nat Gas	Total						
$	kWh	kW	Therms	$	$	$		$	Years	Years
78,000	0	0	1,600	2,000	0	2,000	(0.4)	1,800	>20	>20

Expected Life: 25 years
Lifetime Savings: 0 kWh 40,000 therms $ 50,000

ECM-2 Replace Electric DHW Heaters with a Condesning DHW

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
34,000	20,400	80	-800	9,200	0	9,200	4.4	6,000	3.7	3.0

Expected Life: 20 years
Lifetime Savings: 408,000 kWh -16,000 therms $ 184,000

ECM-3 Install Demand Control Ventilation

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
27,000	6,800	0	2,600	4,800	0	4,800	1.7	200	5.6	5.6

Expected Life: 15 years
Lifetime Savings: 102,000 kWh 39,000 therms $ 72,000

ECM-4 Replace Kitchen Booster Heater with Natural Gas

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	10,100	100	-400	2,200	0	2,200	12.9	5,100	4.5	2.2

Expected Life: 15 years
Lifetime Savings: 151,500 kWh -6,000 therms $ 33,000

ECM-5 Install a Network Computer Power Management System

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	3,900	0	-10	900	0	900	1.6	0	2.2	2.2

Expected Life: 5 years
Lifetime Savings: 19,500 kWh -100 therms $ 4,500

ECM-6 Replace Existing Windows With Higher Thermal Efficiency

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
213,000	800	0	800	1,100	0	1,100	(0.8)	0	>20	>20

Expected Life: 30 years
Lifetime Savings: 24,000 kWh 24,000 therms $ 33,000

ECM-7 Replace Existing Roof

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
741,000	400	0	1,100	1,400	0	1,400	(0.9)	0	>20	>20

Expected Life: 30 years
Lifetime Savings: 12,000 kWh 33,000 therms $ 42,000

ECM-8 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
6,000	18,900	10	0	4,600	0	4,600	9.9	700	1.3	1.2

Expected Life: 15 years
Lifetime Savings: 283,500 kWh 0 therms $ 69,000

ECM-9 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
17,000	21,800	0	0	5,000	0	5,000	3.4	2,900	3.4	2.8

Expected Life: 15 years
Lifetime Savings: 327,000 kWh 0 therms $ 75,000

ECM-10 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
23,000	40,700	10	0	9,100	0	9,100	4.8	3,600	2.5	2.1

Expected Life: 15 years
Lifetime Savings: 610,500 kWh 0 therms $ 136,500

Roxbury Board of Education - NJBPU
CHA Project #24454

Utility Costs		Yearly Usage	MTCDE	Building Area	Annual Utility Cost	
$ 0.230	$/kWh blended		0.00042021	50,890	Electric	Natural Gas
$ 0.208	$/kWh supply	407,400	0.00042021		$ 93,652	$ 20,706
$ 6.17	$/kW	1,470	0			
$ 1.23	$/Therm	16,861	0.00533471			
	$/kgals		0			

Nixon Elementary School

	Item	Savings						Cost	Simple Payback	MTCDE	Life Expectancy	NJ Smart Start Incentives	Direct Install Eligible (Y/N)*	Direct Install Incentives**	Max Incentives	Payback w/ Incentives***	Simple Projected Lifetime Savings						ROI
		kW	kWh	therms	cooling kWh	kgal/yr	$										kW	kWh	therms	cooling	kgal/yr	$	
ECM-1	Install Condensiong Boilers	0.0	0	1,636	0	0	$ 2,000	$ 78,100	39.1	8.7	25	$ 1,750	Y	$ 54,700	$ 1,750	38.2	0.0	0	40,896	0	0	$ 50,221	(0.4)
ECM-2	Replace Electric DHW Heaters with a Condesning DHW	80.0	20,352	(767)	0	0	$ 9,200	$ 33,901	3.7	4.5	20	$ 6,000	Y	$ 23,700	$ 6,000	3.0	1,600.0	407,047	(15,345)	0	0	$ 184,166	4.4
ECM-3	Install Demand Control Ventilation	0.0	6,810	2,622	0	0	$ 4,800	$ 26,700	5.6	16.9	15	$ 225	Y	$ 18,700	$ 225	5.5	0.0	102,156	39,332	0	0	$ 71,783	1.7
ECM-4	Replace Kitchen Booster Heater with Natural Gas	100.0	10,080	-430	0	0	$ 2,200	$ 9,700	4.4	1.9	15	$ 5,100	Y	$ 6,800	$ 5,100	2.1	1,500.0	151,200	(6,451)	0	0	$ 134,566	12.9
ECM-5	Install a Network Computer Power Management System	0.0	3,850	(8)	0	0	$ 900	$ 1,700	1.9	1.6	5			$ -	$ -	1.9	0.0	19,250	(41)	0	0	$ 4,375	1.6
ECM-6	Replace Existing Windows With Higher Thermal Efficiency	0.0	0	787	767	0	$ 1,100	$ 212,800	193.5	4.5	30			$ -	$ -	193.5	0.0	0	23,603	23,021	0	$ 34,276	(0.8)
ECM-7	Replace Existing Roof	0.0	0	1,096	406	0	$ 1,400	$ 740,560	529.0	6.0	30			$ -	$ -	529.0	0.0	0	32,874	12,185	0	$ 43,170	(0.9)
ECM-8	Lighting Replacement / Upgrades	8.4	18,920	0	0	0	$ 4,600	$ 6,284	1.4	8.0	15	$ 700	Y	$ 4,400	$ 700	1.2	126.2	283,795	0	0	0	$ 68,264	9.9
ECM-9	Install Lighting Controls (Occupancy Sensors)	0.0	21,786	0	0	0	$ 5,000	$ 17,010	3.4	9.2	15	$ 2,940	Y	$ 11,900	$ 2,940	2.8	0.0	326,789	0	0	0	$ 75,121	3.4
ECM-10	Lighting Replacements with Lighting Controls (Occupancy Sensors)	8.4	40,706	0	0	0	$ 9,100	$ 23,294	2.6	17.1	15	$ 3,640	Y	$ 16,300	$ 3,640	2.2	126.2	610,584	0	0	0	$ 136,109	4.8
	Total (Does Not Include ECM-8 & ECM-9)	**188.4**	**81,798**	**4,935**	**1,174**	**0**	**$ 30,700**	**$ 1,126,755**	36.7		19.4	$ 16,715		$ 120,200	$ 16,715	36.2	3,226.2	1,290,236	114,869	35,206	0	$ 658,667	(0.4)
	Total Measures with Payback <10	**188.4**	**81,798**	**1,417**	**0**	**0**	**$ 26,200**	**$ 95,295**	3.6		14.3	$ 14,965		$ 65,500	$ 14,965	3.1	3,226.2	1,290,236	17,496	0	0	$ 531,000	4.6
	% of Existing	**13%**	**20%**	**29%**	**0%**	**#DIV/0!**																	

ECM-M3A: Boiler Replacement

Existing Fuel	Nat.Gas
Proposed Fuel	Nat.Gas

B-1

Item	Value	Units	Formula/Comments
Baseline Fuel Cost	$ 1.23	/ Therm	
Proposed Fuel Cost	$ 1.23	/ Therm	
Baseline Fuel Use	16,722	Therms	Based on historical utility data
Existing Boiler Plant Efficiency	83%		Estimated or Measured
Baseline Boiler Load	1,387,926	Mbtu/yr	Baseline Fuel Use x Existing Efficiency x 100 Mbtu/Therms
Baseline Fuel Cost	$ 20,535		
Proposed Boiler Plant Efficiency	92%		New Boiler Efficiency
Proposed Fuel Use	15,086	Therms	Baseline Boiler Load / Proposed Efficiency / 100 Mbtu/Therms
Proposed Fuel Cost	$ 18,526		

*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**	**1,636**	**$0**	**$2,009**

Multipliers	
Material:	1.00
Labor:	1.25
Equipment:	1.00

ECM-M3A: Boiler Replacement - Cost

Description	QTY	UNIT	UNIT COSTS			SUBTOTAL COSTS			TOTAL COST	REMARKS
			MAT.	LABOR	EQUIP.	MAT.	LABOR	EQUIP.		
1000 MBH NG Condensing Boiler	1	EA				$ -	$ -	$ -	$ 20,000	Vendor Quote
Flue Installation	25	LF	$ 75.0	$ 15.00		$ 1,869	$ 467	$ -	$ 2,300	
Reprogram DDC system	1	EA	$ 100.0	$ 350.00		$ 100	$ 436	$ -	$ 500	
Miscellaneous Electrical	1	LS	$ 500	$ 250		$ 499	$ 312	$ -	$ 800	
Miscellaneous HW Piping	1	LS	$ 2,000	$ 1,000		$ 1,994	$ 1,246	$ -	$ 3,200	
Boiler room/space construction	1	LS	$ 20,000	$ 10,000		$ 19,940	$ 12,460	$ -	$ 32,400	
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	

$ 59,200	Subtotal
$ 5,920.00	10% Contingency
$ 13,024.00	20% Contractor O&P
$ -	
$ 78,100	**Total**

ECM-M14B: Replace Electric DHW Heater w/ Tankless Condensing Gas-Fired DHW Heater

Summary

* Replace Electric DHW Heater w/ Instantaneous, Condensing, Gas-Fired DHW Heater

Item	Value	Units	Formula/Comments
Occupied days per week	5	days/wk	
Water supply Temperature	55	˚F	Termperature of water coming into building
Hot Water Temperature	120	˚F	
Hot Water Usage per day	374	gal/day	Calculated from usage below
Annual Hot Water Energy Demand	52,703	MBTU/yr	Energy required to heat annual quantity of hot water to setpoint
Existing Tank Size	500	Gallons	Per manufacturer nameplate
Hot Water Temperature	140	˚F	Per building personnel
Average Room Temperature	70	˚F	
Standby Losses (% by Volume)	0.5%		Based off manufacturers nameplate
Standby Losses (Heat Loss)	1.5	MBH	
Annual Standby Hot Water Load	13,286	MBTU/yr	
Total Annual Hot Water Demand (w/ standby losses)	65,989	Mbtu/yr	Building demand plus standby losses
Existing Water Heater Efficiency	95%		Per Manufacturer
Total Annual Energy Required	69,463	Mbtu/yr	
Total Annual Electric Required	**20,352**	**kWh/yr**	**Electrical Savings**
Average Annual Electric Demand	2.32	kW	
Peak Electric Demand	**80.00**	**kW**	**Per Manufacturer's Nameplate (Demand Savings)**
New Tank Size	140	Gallons	
Hot Water Temperature	140	˚F	
Average Room Temperature	70	˚F	
Standby Losses (% by Volume)	2.5%		(2.5% of stored capacity per hour, per U.S. Department of Energy)
Standby Losses (Heat Loss)	2.0	MBH	
Annual Standby Hot Water Load	17,885	MBTU/yr	
Prop Annual Hot Water Demand (w/ standby losses)	70,588	MBTU/yr	
Proposed Avg. Hot water heater efficiency	92%		Based on Navien CR180 instantaneous, condensing DHW Heater
Proposed Total Annual Energy Required	76,727	MBTU/yr	
Proposed Fuel Use	767	Therms/yr	Standby Losses and inefficient DHW heater eliminated
Elec Utility Demand Unit Cost	$6.17	$/kW	
Elec Utility Supply Unit Cost	$0.21	$/kWh	
NG Utility Unit Cost	$1.23	$/Therm	
Existing Operating Cost of DHW	$10,151	$/yr	
Proposed Operating Cost of DHW	$942	$/yr	
Annual Utility Cost Savings	**$9,208**	**$/yr**	

272,960 btuh
2,729.6 mbh

Daily Hot Water Demand

			#USES PER DAY		FULL TIME OCCUPANTS**				
FIXTURE	*BASE WATER USE GPM	DURATION OF USE (MIN)	MALE	FEMALE	MALE	FEMALE	TOTAL GAL/DAY	% HOT WATER	TOTAL HW GAL/DAY
LAVATORY (Low-Flow Lavs use 0.5 GPM)	2.5	0.25	3	3	178	178	668	50%	334
SHOWER	2.5	5	1	1	0	0	0	75%	0
KITCHEN SINK	2.5	0.5	1	1	3	3	8	75%	6
MOP SINK	2.5	2	1	1	2	2	20	75%	15
Dishwasher (gal per us	10	1	1	1	1	1	20	100%	20
						TOTAL	695		**374**

Multipliers	
Material:	1.00
Labor:	1.25
Equipment:	1.00

Description	QTY	UNIT	UNIT COSTS			SUBTOTAL COSTS			TOTAL COST	REMARKS
			MAT.	LABOR	EQUIP.	MAT.	LABOR	EQUIP.		
Gas-Fired DHW Heater Removal	1	LS		$ 50		$ -	$ 62	$ -	$ 62	
1,500 MBH High Efficiency Gas-Fired DHW Heater	2	LS	$ 10,000	$ 280		$ 19,940	$ 698	$ -	$ 20,638	
Miscellaneous Electrical	1	LS	$ 300			$ 299	$ -	$ -	$ 299	
Venting Kit	1	EA	$ 450	$ 650		$ 449	$ 810	$ -	$ 1,259	
Miscellaneous Piping and Valves	1	LS	$ 200			$ 199	$ -	$ -	$ 199	
140 Gallon DHW Tank	1	LS	$ 3,150	$ 68		$ 3,141	$ 85	$ -	$ 3,226	
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	

$ 25,683	Subtotal
$ 2,568	10% Contingency
$ 5,650	20% Contractor O&P
$ -	
$ 33,901	**Total**

TITLE: **Booster Heater Conversion (Electric to Gas)**
PROJECT: Roxbury Board of Education - NJBPU
SITE: Nixon Elementary School

DESCRIPTION: When fuel costs are less expensive than electric, converting from electric to fuel heating results in reduce cost.

GIVEN:	Electrical Energy Cost	=	$0.230	$/kWh
	Electrical Demand Cost	=	$ 6.17	$/kW
	Fuel Energy Cost	=	$1.23	$/Therm (Nat'l Gas)
	Booster Heater Capacity	=	20	Kw
	Operation (Hours/Day)	=	4.00	Hours/Day
	Operation (Days/Year)	=	180.00	Day/Year
	Operation (Hours/Year)	=	720	Hours/Year
ASSUMPTION:	Efficiency (Fuel)	=	80%	
	Efficiency (Electric)	=	100%	
	Operating Months per Year	=	10	
	Scheduled Usage	=	70%	
	Utilization Factor (Demand)	=	50%	

FORMULA: Energy Use (Kwh) = (Capacity(Kw)) x (Hours of Operation/Year) x (Scheduled Usage) / (Efficiency)
Fuel Use (Unit) = (Electrical Use(Kwh)) x (3413 btu/kw) x (Electrical Efficiency) / (Fuel Efficiency) / (Heating Value of Fuel)
Energy Demand (Kw) = (Capacity (Kw)) x (Months/Year) x (Demand Utilization Factor)
Electrical Energy Cost ($) = (Energy Cost (Kwh) x ($/Kwh)) + (Demand (Kw) x ($/Kw))
Fuel Energy Cost ($) = ((Fuel Use(Unit) x Fuel Cost($/Unit))

CALCULATION:

		Capacity		Hours/Year		Scheduled Usage		Efficiency		
Electric Usage =	(	20	)x(	720	)x(	70%	)/(	100%	) =	**10,080 Kwh**

		Electrical Use	Conversion		Efficiency (Electric)		Efficiency (Fuel)		Conversion		
Fuel Usage =	(	10,080	)x(	3,413	) x (	100%	)/(	80%	)/(	100,000	) = **430 Therm**

		Capacity		Months/Year		Utilization Factor	
Electric Demand =	(	20	)*(	10	)*(	50%	) = **100 Kw**

		Kwh		$/kwh		Kw		$/Kw		
Existing Energy Cost =	(	**10,080**	)*(	$0.230	)+(	**100**	)*(	$6.17	) =	**$ 2,934**

		Therm		$/fuel unit		
Proposed Energy Cost =	(	**430**	)*(	$1.228	) =	**$ 528**

Result

	Existing Annual Use=	**10,080**	**Kwh**	**100**	**Kw**	**$**	**2,934**
	Proposed Annual Use=			**430**	**Therm**	**$**	**528**
100%	**Annual Savings=**	**10,080**	**Kwh**	**100**	**Kw**	**$**	**2,406**
	Savings as Percent of Existing =			**(430)**	**Therm**		**82%**

COMMENTS:

Multipliers	
Material:	1.00
Labor:	1.25
Equipment:	1.00

ECM-6: Replace Electric Booster Heater with Natural Gas - Cost

Description	QTY	UNIT	UNIT COSTS			SUBTOTAL COSTS			TOTAL COST	REMARKS
			MAT.	LABOR	EQUIP.	MAT.	LABOR	EQUIP.		
Existing Heater Demolition	1	ea		$ 50	$ -	$ -	$ 62	$ -	$ 62	
Natural Gas Booster Heater	1	ea	$ 6,000	$ 150	$ -	$ 5,982	$ 187	$ -	$ 6,169	
Natural Gas Piping	1	ls	$ 200	$ -	$ -	$ 199	$ -	$ -	$ 199	
Venting	1	ls	$ 250	$ 450	$ -	$ 249	$ 561	$ -	$ 810	

$ 7,200	Subtotal
$ 1,400.00	20% Contingency
$ 1,100.00	15% Contractor O&P
$ -	0% Engineering
$ 9,700	**Total**

ECM-3: Network Controller Savings Calculations

Notes:

1. Savings are for the installation of a centralized computer management system installed on the client server that will centralize the power management functions that are native to the Windows environment.
2. Energy savings per computer are based on historical information from previous installations encompassing tens of thousands of computers.
3. It was estimated that there are 55 computers in the building

Background Data Average Consumption and Savings Figures	kWh
Average Total Consumption per PC per Year	500-700
Average Energy and Cost Waste per PC per Year	350-450
Average savings per PC	70
Average savings per IMac	50

Number of PCs	55
Number of IMac's	0
Return on Investment Analysis	
	kWh
Annual Energy Savings	3,850
Annual Cost Savings	$885

HEATING PENALTY			Comments
Total kWh		3,850	This is the total kWh reduction.
Htg. Season		55%	The percentage of the kWh reduction that occurs when heat is required.
Conducted/Convected Heat		30%	Use Standard Fluorescent fixture
Regained		70%	Percentage regained. Assumed that RTUs bring in a minimum of 30% OA
Net kWh		191	Resultant kWh from percentage reductions.
Net btu		650,432	Conversion of kWh to btu's.
Therms		(7)	Conversion of btu's to Therms
Htg. Eff.		80%	Heating system efficiency.
Net Penalty		(8.1)	Therms
$/Therm	$	1.23	Cost per Therm
Penalty	$	(10)	Final heating reduction penalty.

ALL ESTIMATES ARE +/- 80% ACCURATE -DO NOT USE FOR PROCUREMENT

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

ECM-16: Window Replacement

Existing: Windows are not energy efficiency single paned windows
Proposed: Install energy efficient vinyl windows

Linear Feet of window Edge	2,280.0 LF	Cooling System Efficiency	1.2 kW/ton	Heating System Efficiency	80%		
Area of window glass	2,128.0 SF	Ex Occupied Clng Temp.	74 *F	Heating On Temp.	60 *F		
Existing Infiltration Factor	**0.20 cfm/LF**	Ex Unoccupied Clng Temp.	78 *F	Ex Occupied Htg Temp.	68 *F		
Proposed Infiltration Factor	**0.10 cfm/LF**	Cooling Occ Enthalpy Setpoint	27.5 Btu/lb	Ex Unoccupied Htg Temp.	60 *F		
Existing U Value	**0.60 Btuh/SF/°F**	Cooling Unocc Enthalpy Setpoint	27.5 Btu/lb	Electricity	$ 0.230	$/kWh	
Proposed U Value	**0.45 Btuh/SF/°F**			Natural Gas	$ 1.23	$/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	-82,764	-77,657	-50,479	-46,649	0	0	0	0
97.5	42.5	3	1	2	-60,785	-55,678	-37,894	-34,063	17	11	0	0
92.5	39.5	34	11	23	-48,245	-43,138	-30,028	-26,197	152	93	0	0
87.5	36.6	131	43	88	-35,910	-30,803	-22,264	-18,434	425	258	0	0
82.5	34.0	500	164	336	-24,191	-19,084	-14,809	-10,978	1038	612	0	0
77.5	31.6	620	203	417	-12,882	0	-7,558	0	261	153	0	0
72.5	29.2	664	217	447	0	0	0	0	0	0	0	0
67.5	27.0	854	280	574	0	0	0	0	0	0	0	0
62.5	24.5	927	303	624	0	0	0	0	0	0	0	0
57.5	21.4	600	196	404	18,577	4,423	12,640	3,010	0	0	68	46
52.5	18.7	610	200	410	27,424	13,270	18,660	9,029	0	0	137	93
47.5	16.2	611	200	411	36,270	22,116	24,679	15,048	0	0	204	139
42.5	14.4	656	215	441	45,117	30,962	30,698	21,067	0	0	292	199
37.5	12.6	1,023	335	688	53,963	39,809	36,717	27,086	0	0	568	387
32.5	10.7	734	240	494	62,809	48,655	42,736	33,106	0	0	489	333
27.5	8.6	334	109	225	71,656	57,502	48,756	39,125	0	0	259	177
22.5	6.8	252	83	170	80,502	66,348	54,775	45,144	0	0	224	152
17.5	5.5	125	41	84	89,349	75,194	60,794	51,163	0	0	125	85
12.5	4.1	47	15	32	98,195	84,041	66,813	57,182	0	0	52	35
7.5	2.6	22	7	15	107,041	92,887	72,832	63,202	0	0	27	18
2.5	1.0	13	4	9	115,888	101,734	78,852	69,221	0	0	17	12
0.0	0.0	0	0	0	120,311	106,157	81,861	72,230	0	0	0	0
TOTALS		**8,760**	**2,868**	**5,892**					1894	1127	**2,462**	**1,675**

Existing Window Infiltration	**456 cfm**
Existing Window Heat Transfer	**1,277 Btuh/°F**
Proposed Window Infiltration	**228 cfm**
Proposed Window Heat Transfer	**958 Btuh/°F**

Savings	**787**	**Therms**	**$**	**966**
	767	**kWh**	**$**	**176**
			$	**1,143**

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)
1	North	54	4	3.5	810.0	756.0	0.2	0.6	162.0	453.6
3	South	58	4	3.5	870.0	812.0	0.2	0.6	174.0	487.2
5	East	32	4	3.5	480.0	448.0	0.2	0.6	96.0	268.8
8	West	8	4	3.5	120.0	112.0	0.2	0.6	24.0	67.2
Total		**152**	**16**	**14**	**2,280.0**	**2,128.0**	**0.20**	**0.60**	**456.0**	**1276.8**

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

ECM-17 Roof Replacement

Existing: Ceiling can lead to increased energy consumption due to infiltration/exfiltration and heat gain/loss.
Proposed: Install EPDM roofing membrane system to reduce heat transfer.

Area of ceiling	37,028	SF	Cooling System Efficiency	1.2	kW/ton	Heating System Efficiency	80%	
Existing Infiltration Factor	**0.20**	**cfm/SF**	Ex Occupied Clng Temp.	74	*F	Heating On Point	58	*F
Proposed Infiltration Factor	**0.20**	**cfm/SF**	Ex Unoccupied Clng Temp.	78	*F	Ex Occupied Htg Temp.	68	*F
Existing U Value	**0.077**	**Btuh/SF/°F**	Cooling Occ Enthalpy Setpoint	27.5	Btu/lb	Ex Unoccupied Htg Temp.	60	*F
Proposed U Value	**0.056**	**Btuh/SF/°F**	Cooling Unocc Enthalpy Setpoint	27.5	Btu/lb	Electricity	$ 0.230	$/kWh
(Loose-Fill R-2.7/inch)						Natural Gas	$ 1.23	$/Therm

					EXISTING LOADS		PROPOSED LOADS		COOLING ENERGY		HEATING ENERGY	
					Occupied	Unoccupied	Occupied	Unoccupied				
Avg Outdoor Air Temp. Bins °F	**Avg Outdoor Air Enthalpy**	**Existing Equipment Bin Hours**	**Occupied Equipment Bin Hours**	**Unoccupied Equipment Bin Hours**	**Wall Infiltration & Heat Load BTUH**	**Wall Infiltration & Heat Load BTUH**	**Wall Infiltration & Heat Load BTUH**	**Wall Infiltration & Heat Load BTUH**	**Existing Cooling Energy kWh**	**Proposed Cooling Energy kWh**	**Existing Heating Energy Therm**	**Proposed Heating Energy Therm**
A		**B**	**C**	**D**	**E**	**F**	**G**	**H**	**I**	**J**	**K**	**L**
97.5	42.5	0	0	0	(566,813)	(555,420)	(548,220)	(539,992)	-	-	-	-
92.5	39.5	36	10	26	(452,596)	(441,203)	(437,959)	(429,731)	1,599	1,555	-	-
87.5	36.6	123	33	90	(341,711)	(330,318)	(331,030)	(322,802)	4,100	3,998	-	-
82.5	34.0	477	128	349	(240,824)	(229,431)	(234,099)	(225,871)	11,089	10,879	-	-
77.5	31.6	656	176	480	(146,602)	0	(143,833)	0	2,576	2,527	-	-
72.5	29.2	742	199	543	0	0	0	0	-	-	-	-
67.5	27.0	784	210	574	0	0	0	0	-	-	-	-
62.5	24.5	983	263	720	0	0	0	0	-	-	-	-
57.5	21.4	625	167	458	113,887	27,116	105,579	25,138	-	-	393	365
52.5	18.7	438	117	321	168,119	81,348	155,855	75,414	-	-	573	531
47.5	16.2	559	150	409	222,350	135,579	206,131	125,689	-	-	1,110	1,029
42.5	14.4	671	180	491	276,582	189,811	256,407	175,965	-	-	1,787	1,657
37.5	12.6	1,067	286	781	330,814	244,043	306,682	226,241	-	-	3,565	3,305
32.5	10.7	685	183	502	385,046	298,275	356,958	276,517	-	-	2,753	2,552
27.5	8.6	369	99	270	439,277	352,507	407,234	326,793	-	-	1,733	1,607
22.5	6.8	321	86	235	493,509	406,738	457,510	377,068	-	-	1,725	1,599
17.5	5.5	184	49	135	547,741	460,970	507,786	427,344	-	-	1,114	1,032
12.5	4.1	40	11	29	601,973	515,202	558,061	477,620	-	-	269	250
7.5	2.6	0	0	0	656,205	569,434	608,337	527,896	-	-	-	-
2.5	1.0	0	0	0	710,436	623,665	658,613	578,172	-	-	-	-
-2.5	0.0	0	0	0	764,668	677,897	708,889	628,447	-	-	-	-
-7.5	-1.5	0	0	0	818,900	732,129	759,165	678,723	-	-	-	-
-12.5	-2.8	0	0	0	873,132	786,361	809,440	728,999	-	-	-	-
TOTALS		**8,760**	**2,346**	**6,414**					19,365	18,959	**15,022**	**13,926**

Existing Ceiling Infiltration	**7,406**	**cfm**
Existing Ceiling Heat Transfer	**2,848**	**Btuh/°F**
Proposed Ceiling Infiltration	**7,406**	**cfm**
Proposed Ceiling Heat Transfer	**2,057**	**Btuh/°F**

Savings	**1,096**	**Therm**	**$ 1,346**
	406	**kWh**	**$ 93**
			$ 1,439

ECM-M8A: Install Demand Control Ventilation

Description:
Outside air can be significantly reduced for most of the time that the building is occupied.
Savings will result from the avoided heating and cooling of excessive outside air.

Method:
The outdoor air introduced into the spaces is currently constant based on design occupancy conditions.
This ECM proposes the installation of CO2 sensors in the space to allow for reduced outdoor air flows when conditions allow.
An average reduction of 50% is assumed possible with the implementation of DCV
The DCV system will automatically adjust the outdoor air damper position through the EMS to reduce outdoor air flows based on indoor CO2 levels.
This ECM has been interacted with the new boiler ECMs and accounts for the reduced operating hours of the unit via EMS scheduling.

RTU-1

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
			Existing					Proposed Demand Ventilation					Savings	
Avg. DB Bin Temp °F	OA Enthalpy Btu/lb	Occupied Bin HOURS	OA CFM	Cooling Load MBH	Heating Load MBH	Cooling kWh	Heating therms	Derated O.A. CFM	Cooling Load MBH	Heating Load MBH	Cooling kWh	Heating therms	Cooling kWh	Heating therms
102.5	49.1	-	3,863	395	0	0	-	1,931	197	0	0	-	0	-
97.5	42.5	1	3,863	280	0	25	-	1,931	140	0	13	-	13	-
92.5	39.5	11	3,863	228	0	232	-	1,931	114	0	116	-	116	-
87.5	36.6	43	3,863	177	0	697	-	1,931	89	0	348	-	348	-
82.5	34	164	3,863	132	0	1,982	-	1,931	66	0	991	-	991	-
77.5	31.6	203	3,863	90	0	1,682	-	1,931	45	0	841	-	841	-
72.5	29.2	217	3,863	49	0	970	-	1,931	24	0	485	-	485	-
67.5	27	280	3,863	10	0	267	-	1,931	5	0	134	-	134	-
62.5	24.5	303	3,863	0	0	0	-	1,931	0	0	0	-	0	-
57.5	21.4	196	3,863	0	0	0	-	1,931	0	0	0	-	0	-
52.5	18.7	200	3,863	0	65	0	161	1,931	0	32	0	81	0	81
47.5	16.2	200	3,863	0	86	0	214	1,931	0	43	0	107	0	107
42.5	14.4	215	3,863	0	106	0	286	1,931	0	53	0	143	0	143
37.5	12.6	335	3,863	0	127	0	533	1,931	0	64	0	266	0	266
32.5	10.7	240	3,863	0	148	0	445	1,931	0	74	0	222	0	222
27.5	8.6	109	3,863	0	169	0	231	1,931	0	84	0	115	0	115
22.5	6.8	83	3,863	0	190	0	196	1,931	0	95	0	98	0	98
17.5	5.5	41	3,863	0	211	0	108	1,931	0	105	0	54	0	54
12.5	4.1	15	3,863	0	232	0	45	1,931	0	116	0	22	0	22
7.5	2.6	7	3,863	0	252	0	23	1,931	0	126	0	11	0	11
2.5	1	4	3,863	0	273	0	15	1,931	0	137	0	7	0	7
-2.5	0	-	3,863	0	294	0	-	1,931	0	147	0	-	0	-
-7.5	-1.5	-	3,863	0	315	0	-	1,931	0	157	0	-	0	-
Total		**2,868**		**1,361**		**5,855**	**2,254**		**680**		**2,928**	**1,127**	**2,928**	**1,127**

	Total CFM	O.A. CFM	O.A. %	
Org. scheduled CFM	12,875	3,863	30%	
Derated CFM	12,875	1,931	15%	
SA Enthalpy	26.4	BTU/lbma		
SA Set point, Winter	68.0	°F		
SA Set point, Summer	74.0	°F		
Heating "On" Point	55.0	°F		
Cooling System Eff.	1.10	kW/Ton		(Includes ancillary equipment)
Heating System Eff.	80%			(Includes distribution losses)

RTU-2

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
			Existing					Proposed Demand Ventilation					Savings	
Avg. DB Bin Temp °F	OA Enthalpy Btu/lb	Occupied Bin HOURS	OA CFM	Cooling Load MBH	Heating Load MBH	Cooling kWh	Heating therms	Derated O.A. CFM	Cooling Load MBH	Heating Load MBH	Cooling kWh	Heating therms	Cooling kWh	Heating therms
102.5	49.1	-	1,260	129	0	0	-	630	64	0	0	-	0	-
97.5	42.5	1	1,260	91	0	8	-	630	46	0	4	-	4	-
92.5	39.5	11	1,260	74	0	76	-	630	37	0	38	-	38	-
87.5	36.6	43	1,260	58	0	227	-	630	29	0	114	-	114	-
82.5	34	164	1,260	43	0	647	-	630	22	0	323	-	323	-
77.5	31.6	203	1,260	29	0	549	-	630	15	0	274	-	274	-
72.5	29.2	217	1,260	16	0	316	-	630	8	0	158	-	158	-
67.5	27	280	1,260	3	0	87	-	630	2	0	44	-	44	-
62.5	24.5	303	1,260	0	0	0	-	630	0	0	0	-	0	-
57.5	21.4	196	1,260	0	0	0	-	630	0	0	0	-	0	-
52.5	18.7	200	1,260	0	21	0	53	630	0	11	0	26	0	26
47.5	16.2	200	1,260	0	28	0	70	630	0	14	0	35	0	35
42.5	14.4	215	1,260	0	35	0	93	630	0	17	0	47	0	47
37.5	12.6	335	1,260	0	42	0	174	630	0	21	0	87	0	87
32.5	10.7	240	1,260	0	48	0	145	630	0	24	0	73	0	73
27.5	8.6	109	1,260	0	55	0	75	630	0	28	0	38	0	38
22.5	6.8	83	1,260	0	62	0	64	630	0	31	0	32	0	32
17.5	5.5	41	1,260	0	69	0	35	630	0	34	0	18	0	18
12.5	4.1	15	1,260	0	76	0	15	630	0	38	0	7	0	7
7.5	2.6	7	1,260	0	82	0	7	630	0	41	0	4	0	4
2.5	1	4	1,260	0	89	0	5	630	0	45	0	2	0	2
-2.5	0	-	1,260	0	96	0	-	630	0	48	0	-	0	-
-7.5	-1.5	-	1,260	0	103	0	-	630	0	51	0	-	0	-
Total		**2,868**		**444**		**1,910**	**735**		**222**		**955**	**368**	**955**	**368**

	Total CFM	O.A. CFM	O.A. %	
Org. scheduled CFM	4,200	1,260	30%	
Derated CFM	4,200	630	15%	
SA Enthalpy	26.4	BTU/lbma		
SA Set point, Winter	68.0	°F		
SA Set point, Summer	74.0	°F		
Heating "On" Point	55.0	°F		
Cooling System Eff.	1.30	kW/Ton		(Includes ancillary equipment)
Heating System Eff.	79%			(Includes distribution losses)

RTU-4

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
			Existing					Proposed Demand Ventilation					Savings	
Avg. DB Bin Temp °F	OA Enthalpy Btu/lb	Occupied Bin HOURS	OA CFM	Cooling Load MBH	Heating Load MBH	Cooling kWh	Heating therms	Derated O.A. CFM	Cooling Load MBH	Heating Load MBH	Cooling kWh	Heating therms	Cooling kWh	Heating therms
102.5	49.1	-	2,400	245	0	0	-	1,200	123	0	0	-	0	-
97.5	42.5	1	3,863	280	0	25	-	1,931	140	0	13	-	13	-
92.5	39.5	11	3,863	228	0	232	-	1,931	114	0	116	-	116	-
87.5	36.6	43	3,863	177	0	697	-	1,931	89	0	348	-	348	-
82.5	34	164	3,863	132	0	1,982	-	1,931	66	0	991	-	991	-
77.5	31.6	203	3,863	90	0	1,682	-	1,931	45	0	841	-	841	-
72.5	29.2	217	3,863	49	0	970	-	1,931	24	0	485	-	485	-
67.5	27	280	3,863	10	0	267	-	1,931	5	0	134	-	134	-
62.5	24.5	303	3,863	0	0	0	-	1,931	0	0	0	-	0	-
57.5	21.4	196	3,863	0	0	0	-	1,931	0	0	0	-	0	-
52.5	18.7	200	3,863	0	65	0	161	1,931	0	32	0	81	0	81
47.5	16.2	200	3,863	0	86	0	214	1,931	0	43	0	107	0	107
42.5	14.4	215	3,863	0	106	0	286	1,931	0	53	0	143	0	143
37.5	12.6	335	3,863	0	127	0	533	1,931	0	64	0	266	0	266
32.5	10.7	240	3,863	0	148	0	445	1,931	0	74	0	222	0	222
27.5	8.6	109	3,863	0	169	0	231	1,931	0	84	0	115	0	115
22.5	6.8	83	3,863	0	190	0	196	1,931	0	95	0	98	0	98
17.5	5.5	41	3,863	0	211	0	108	1,931	0	105	0	54	0	54
12.5	4.1	15	3,863	0	232	0	45	1,931	0	116	0	22	0	22
7.5	2.6	7	3,863	0	252	0	23	1,931	0	126	0	11	0	11
2.5	1	4	3,863	0	273	0	15	1,931	0	137	0	7	0	7
-2.5	0	-	3,863	0	294	0	-	1,931	0	147	0	-	0	-
-7.5	-1.5	-	3,863	0	315	0	-	1,931	0	157	0	-	0	-
Total		**2,868**		**1,212**		**5,855**	**2,254**		**606**		**2,928**	**1,127**	**2,928**	**1,127**

	Total CFM	O.A. CFM	O.A. %	
Org. scheduled CFM	8,000	2,400	30%	
Derated CFM	8,000	1,200	15%	
SA Enthalpy	26.4	BTU/lbma		
SA Set point, Winter	68.0	°F		
SA Set point, Summer	74.0	°F		
Heating "On" Point	55.0	°F		
Cooling System Eff.	1.10	kW/Ton		(Includes ancillary equipment)
Heating System Eff.	80%			(Includes distribution losses)

DEMAND CONTROL VENTILATION SAVINGS SUMMARY

	Electric Demand	Electric Usage	Nat Gas Usage	Maint.	Total Cost
	(kW)	(kWh)	(Therms)	($)	($)
Savings		**6,810**	**2,622**	**$0**	**$4,786**

Multipliers	
Material:	1.00
Labor:	1.25
Equipment:	1.00

ECM-M8A: Install Demand Control Ventilation - Cost

Description	QTY	UNIT	UNIT COSTS			SUBTOTAL COSTS			TOTAL COST	REMARKS
			MAT.	LABOR	EQUIP.	MAT.	LABOR	EQUIP.		
CO2 sensor	3	ea	$ 400	$ 100	$ -	$ 1,196	$ 374	$ -	$ 1,600	
Replace damper actuators	3	ea	$ 100	$ 50	$ -	$ 299	$ 187	$ -	$ 500	
Control system programming	3	ls	$ 500	$ 1,000	$ -	$ 1,496	$ 3,738	$ -	$ 5,200	
electrical/wiring	3	ls	$ 1,000	$ 2,000	$ -	$ 2,991	$ 7,476	$ -	$ 10,500	

$ 17,800	Subtotal
$ 3,560	20% Contingency
$ 2,670	15% Contractor O&P
$ 2,670	15% Engineering
$ 26,700	**Total**

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
$6,284	**8.4**	**18,920**	**0**	**$2,705**	**0**	**$2,705**	**$700**	**2.3**	**2.1**

*Incentive based on New Jersey Smart Start Prescriptive Lighting Measures

ECM-2 Install Occupancy Sensors

Budgetary	Annual Utility Savings				Estimated	Total	New Jersey	Payback	Payback
Cost					Maintenance	Savings	Incentive	(without incentive)	(with incentive)
					Savings				
$	kW	kWh	therms	$	$	$	$	Years	Years
$17,010	**0.0**	**21,786**	**0**	**$2,331**	**0**	**$2,331**	**$2,940**	**7.3**	**6.0**

*Incentive based on New Jersey Smart Start Prescriptive Lighting Measures

ECM-3 Lighting Replacements with Occupancy Sensors

Budgetary	Annual Utility Savings				Estimated	Total	New Jersey	Payback	Payback
Cost					Maintenance	Savings	Incentive	(without incentive)	(with incentive)
					Savings				
$	kW	kWh	therms	$	$	$	$	Years	Years
$23,294	**8.4**	**40,706**	**0**	**$5,036**	**0**	**$5,036**	**$3,640**	**4.6**	**3.9**

*Incentive based on New Jersey Smart Start Prescriptive Lighting Measures

Energy Audit of Nixon Elementary School

CHA Project No.24454

Existing Lighting

Cost of Electricity: $0.107 $/kWh

$6.74 $/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
20	Main Office	Offices	17	S 32 C F 1 (ELE)	F41LL	32	0.54	SW	2400	C-OCC	1,306
20	Main Office	Offices	3	S 32 C F 1 (ELE)	F41LL	32	0.10	SW	2400	C-OCC	230
20	Nurse	Offices	9	S 32 C F 1 (ELE)	F41LL	32	0.29	SW	2400	C-OCC	691
20	Nurse	Offices	9	S 32 C F 1 (ELE)	F41LL	32	0.29	SW	2400	C-OCC	691
20	Nurse	Offices	3	S 32 C F 1 (ELE)	F41LL	32	0.10	SW	2400	C-OCC	230
220	Nurse Bathroom	Bath Room	1	S 17 C F 1(ELE)	F21ILL	20	0.02	SW	2000	SW	40
20	Nurse Closet	Storage Areas	1	S 32 C F 1 (ELE)	F41LL	32	0.03	SW	1000	SW	32
20	Small Gym	Gynasium	28	S 32 C F 1 (ELE)	F41LL	32	0.90	SW	2000	C-OCC	1,792
20	Small Gym	Gynasium	1	S 32 C F 1 (ELE)	F41LL	32	0.03	SW	2000	C-OCC	64
20	Small Gym Office	Offices	1	S 32 C F 1 (ELE)	F41LL	32	0.03	SW	2400	C-OCC	77
20	Small Gym Storage	Storage Areas	2	S 32 C F 1 (ELE)	F41LL	32	0.06	SW	1000	SW	64
20	Cafeteria	Cafeteria	18	S 32 C F 1 (ELE)	F41LL	32	0.58	SW	1600	C-OCC	922
20	Cafeteria	Cafeteria	18	S 32 C F 1 (ELE)	F41LL	32	0.58	SW	1600	C-OCC	922
20	Cafeteria	Cafeteria	1	S 32 C F 1 (ELE)	F41LL	32	0.03	SW	1600	C-OCC	51
20	Cafeteria Storage Large	Storage Areas	3	S 32 C F 1 (ELE)	F41LL	32	0.10	SW	1000	SW	96
20	Cafeteria Storage Small	Storage Areas	1	S 32 C F 1 (ELE)	F41LL	32	0.03	SW	1000	SW	32
20	Cafeteria Storage Small	Storage Areas	1	S 32 C F 1 (ELE)	F41LL	32	0.03	SW	1000	SW	32
20	Kitchen	Cafeteria	22	S 32 C F 1 (ELE)	F41LL	32	0.70	SW	1600	C-OCC	1,126
20	Kitchen Office	Offices	4	S 32 C F 1 (ELE)	F41LL	32	0.13	SW	2400	C-OCC	307
20	Central Boy's Bathroom	Bath Room	3	S 32 C F 1 (ELE)	F41LL	32	0.10	SW	2000	SW	192
20	Central Girl's Bathroom	Bath Room	3	S 32 C F 1 (ELE)	F41LL	32	0.10	SW	2000	SW	192
20	Central Storage	Storage Areas	4	S 32 C F 1 (ELE)	F41LL	32	0.13	SW	1000	SW	128
20	Media Center	Classrooms	29	S 32 C F 1 (ELE)	F41LL	32	0.93	SW	2400	C-OCC	2,227
15	Media Center	Classrooms	1	S 32 C F 2 (ELE)	F42LL	60	0.06	SW	2400	C-OCC	144
5	Media Center	Classrooms	3	2T 32 R F 2 (u) (ELE)	FU2LL	60	0.18	SW	2400	C-OCC	432
20	Media Center Office 1	Offices	2	S 32 C F 1 (ELE)	F41LL	32	0.06	SW	2400	C-OCC	154
20	Media Center Office 2	Offices	4	S 32 C F 1 (ELE)	F41LL	32	0.13	SW	2400	C-OCC	307
20	Media Center Storage 1	Storage Areas	1	S 32 C F 1 (ELE)	F41LL	32	0.03	SW	1000	SW	32
20	Media Center Storage 2	Storage Areas	3	S 32 C F 1 (ELE)	F41LL	32	0.10	SW	1000	SW	96
20	Custodian Room	Offices	9	S 32 C F 1 (ELE)	F41LL	32	0.29	SW	2400	C-OCC	691
20	Custodian Room	Storage Areas	5	S 32 C F 1 (ELE)	F41LL	32	0.16	SW	1000	SW	160
20	Custodian Room	Storage Areas	3	S 32 C F 1 (ELE)	F41LL	32	0.10	SW	1000	SW	96
20	Custodian Room	Storage Areas	2	S 32 C F 1 (ELE)	F41LL	32	0.06	SW	1000	SW	64
20	Custodian Room	Storage Areas	1	S 32 C F 1 (ELE)	F41LL	32	0.03	SW	1000	SW	32
20	Faculty Room	Offices	7	S 32 C F 1 (ELE)	F41LL	32	0.22	SW	2400	C-OCC	538
20	Faculty Room Men's Bathroom	Bath Room	1	S 32 C F 1 (ELE)	F41LL	32	0.03	SW	2000	SW	64
220	Faculty Room Men's Bathroom	Bath Room	1	S 17 C F 1(ELE)	F21ILL	20	0.02	SW	2000	SW	40
20	Faculty Room Women's Bathroom	Bath Room	1	S 32 C F 1 (ELE)	F41LL	32	0.03	SW	2000	SW	64
220	Faculty Room Women's Bathroom	Bath Room	1	S 17 C F 1(ELE)	F21ILL	20	0.02	SW	2000	SW	40
254	Computer Room	Classrooms	11	T 32 R F 4 (ELE)	F44LL	118	1.30	C-OCC	2400	C-OCC	3,115
254	Computer Room	Classrooms	2	T 32 R F 4 (ELE)	F44LL	118	0.24	C-OCC	2400	C-OCC	566
146	Gym	Gynasium	4	High Bay MH 400	MH400/1	458	1.83	SW	2000	C-OCC	3,664
146	Gym	Gynasium	4	High Bay MH 400	MH400/1	458	1.83	SW	2000	C-OCC	3,664
146	Gym	Gynasium	4	High Bay MH 400	MH400/1	458	1.83	SW	2000	C-OCC	3,664
146	Gym	Gynasium	4	High Bay MH 400	MH400/1	458	1.83	SW	2000	C-OCC	3,664
146	Gym	Gynasium	4	High Bay MH 400	MH400/1	458	1.83	SW	2000	C-OCC	3,664
15	Gym	Gynasium	1	S 32 C F 2 (ELE)	F42LL	60	0.06	SW	2000	C-OCC	120
210	Gym Office	Offices	4	2T 32 R F 3 (ELE) THIN TUBE	FU3ILL	89	0.36	SW	2400	C-OCC	854
15	Gym Storage 1	Storage Areas	2	S 32 C F 2 (ELE)	F42LL	60	0.12	SW	1000	SW	120
15	Gym Storage 2	Storage Areas	2	S 32 C F 2 (ELE)	F42LL	60	0.12	SW	1000	SW	120
15	Gym Area Boy's Bathroom	Bath Room	3	S 32 C F 2 (ELE)	F42LL	60	0.18	SW	2000	SW	360
20	Gym Area Boy's Bathroom	Bath Room	2	S 32 C F 1 (ELE)	F41LL	32	0.06	SW	2000	SW	128
15	Gym Area Girl's Bathroom	Bath Room	3	S 32 C F 2 (ELE)	F42LL	60	0.18	SW	2000	SW	360
20	Gym Area Girl's Bathroom	Bath Room	2	S 32 C F 1 (ELE)	F41LL	32	0.06	SW	2000	SW	128
15	Stage	Storage Areas	9	S 32 C F 2 (ELE)	F42LL	60	0.54	SW	1000	SW	540

Energy Audit of Nixon Elementary School

CHA Project No.24454

Existing Lighting

Cost of Electricity: **$0.107** **$/kWh**

$6.74 **$/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**	
15	Stage	Storage Areas	9	S 32 C F 2 (ELE)	F42LL	60	0.54	SW	1000	SW	540	
15	Stage Hall	Hallways	3	S 32 C F 2 (ELE)	F42LL	60	0.18	SW	2280	SW	410	
15	Gym Area Closet 1	Storage Areas	1	S 32 C F 2 (ELE)	F42LL	60	0.06	SW	1000	SW	60	
15	Gym Area Closet 2	Storage Areas	1	S 32 C F 2 (ELE)	F42LL	60	0.06	SW	1000	SW	60	
20	Room 1	Classrooms	20	S 32 C F 1 (ELE)	F41LL	32	0.64	SW	2400	C-OCC	1,536	
20	Room 1	Classrooms	10	S 32 C F 1 (ELE)	F41LL	32	0.32	SW	2400	C-OCC	768	
20	Room 1	Classrooms	3	S 32 C F 1 (ELE)	F41LL	32	0.10	SW	2400	C-OCC	230	
20	Room 1 Bathroom	Bath Room	1	S 32 C F 1 (ELE)	F41LL	32	0.03	SW	2000	SW	64	
108	Room 1/2 Vestibule	Hallways	1	I 65	I65/1	65	0.07	SW	2280	SW	148	
108	Room 1/2 Vestibule	Hallways	1	I 65	I65/1	65	0.07	SW	2280	SW	148	
220	Room 1/2 Bathroom 1	Bath Room	1	S 17 C F 1(ELE)	F21ILL	20	0.02	SW	2000	SW	40	
220	Room 1/2 Bathroom 2	Bath Room	1	S 17 C F 1(ELE)	F21ILL	20	0.02	SW	2000	SW	40	
20	Room 2	Classrooms	20	S 32 C F 1 (ELE)	F41LL	32	0.64	SW	2400	C-OCC	1,536	
20	Room 2	Classrooms	10	S 32 C F 1 (ELE)	F41LL	32	0.32	SW	2400	C-OCC	768	
20	Room 2	Classrooms	3	S 32 C F 1 (ELE)	F41LL	32	0.10	SW	2400	C-OCC	230	
20	Room 2 Bathroom	Bath Room	1	S 32 C F 1 (ELE)	F41LL	32	0.03	SW	2000	SW	64	
20	Room 3	Classrooms	11	S 32 C F 1 (ELE)	F41LL	32	0.35	SW	2400	C-OCC	845	
20	Room 3	Classrooms	6	S 32 C F 1 (ELE)	F41LL	32	0.19	SW	2400	C-OCC	461	
20	Room 3 Bathroom	Bath Room	1	S 32 C F 1 (ELE)	F41LL	32	0.03	SW	2000	SW	64	
20	Room 4	Classrooms	11	S 32 C F 1 (ELE)	F41LL	32	0.35	SW	2400	C-OCC	845	
20	Room 4	Classrooms	6	S 32 C F 1 (ELE)	F41LL	32	0.19	SW	2400	C-OCC	461	
20	Room 4 Bathroom	Bath Room	1	S 32 C F 1 (ELE)	F41LL	32	0.03	SW	2000	SW	64	
20	Room 5	Classrooms	11	S 32 C F 1 (ELE)	F41LL	32	0.35	SW	2400	C-OCC	845	
20	Room 5	Classrooms	6	S 32 C F 1 (ELE)	F41LL	32	0.19	SW	2400	C-OCC	461	
20	Room 5 Bathroom	Bath Room	1	S 32 C F 1 (ELE)	F41LL	32	0.03	SW	2000	SW	64	
20	Room 6	Classrooms	11	S 32 C F 1 (ELE)	F41LL	32	0.35	SW	2400	C-OCC	845	
20	Room 6	Classrooms	6	S 32 C F 1 (ELE)	F41LL	32	0.19	SW	2400	C-OCC	461	
20	Room 6 Bathroom	Bath Room	1	S 32 C F 1 (ELE)	F41LL	32	0.03	SW	2000	SW	64	
20	Room 7	Classrooms	11	S 32 C F 1 (ELE)	F41LL	32	0.35	SW	2400	C-OCC	845	
20	Room 7	Classrooms	6	S 32 C F 1 (ELE)	F41LL	32	0.19	SW	2400	C-OCC	461	
20	Room 7 Bathroom	Bath Room	1	S 32 C F 1 (ELE)	F41LL	32	0.03	SW	2000	SW	64	
20	Room 8	Classrooms	11	S 32 C F 1 (ELE)	F41LL	32	0.35	SW	2400	C-OCC	845	
20	Room 8	Classrooms	6	S 32 C F 1 (ELE)	F41LL	32	0.19	SW	2400	C-OCC	461	
20	Room 8 Bathroom	Bath Room	1	S 32 C F 1 (ELE)	F41LL	32	0.03	SW	2000	SW	64	
20	Room 9	Classrooms	11	S 32 C F 1 (ELE)	F41LL	32	0.35	SW	2400	C-OCC	845	
20	Room 9	Classrooms	6	S 32 C F 1 (ELE)	F41LL	32	0.19	SW	2400	C-OCC	461	
20	Room 9 Bathroom	Bath Room	1	S 32 C F 1 (ELE)	F41LL	32	0.03	SW	2000	SW	64	
20	Room 10	Classrooms	11	S 32 C F 1 (ELE)	F41LL	32	0.35	SW	2400	C-OCC	845	
20	Room 10	Classrooms	6	S 32 C F 1 (ELE)	F41LL	32	0.19	SW	2400	C-OCC	461	
20	Room 10 Bathroom	Bath Room	1	S 32 C F 1 (ELE)	F41LL	32	0.03	SW	2000	SW	64	
15	Room 11	Classrooms	12	S 32 C F 2 (ELE)	F42LL	60	0.72	SW	2400	C-OCC	1,728	
15	Room 11	Classrooms	6	S 32 C F 2 (ELE)	F42LL	60	0.36	SW	2400	C-OCC	864	
15	Room 12	Classrooms	12	S 32 C F 2 (ELE)	F42LL	60	0.72	SW	2400	C-OCC	1,728	
15	Room 12	Classrooms	6	S 32 C F 2 (ELE)	F42LL	60	0.36	SW	2400	C-OCC	864	
254	Room 13A	Classrooms	4	T 32 R F 4 (ELE)	F44LL	118	0.47	SW	2400	C-OCC	1,133	
254	Room 13B	Classrooms	4	T 32 R F 4 (ELE)	F44LL	118	0.47	SW	2400	C-OCC	1,133	
15	Room 14	Classrooms	12	S 32 C F 2 (ELE)	F42LL	60	0.72	SW	2400	C-OCC	1,728	
15	Room 14	Classrooms	6	S 32 C F 2 (ELE)	F42LL	60	0.36	SW	2400	C-OCC	864	
20	Central Office 1	Offices	3	S 32 C F 1 (ELE)	F41LL	32	0.10	SW	2400	C-OCC	230	
20	Central Office 2	Offices	2	S 32 C F 1 (ELE)	F41LL	32	0.06	SW	2400	C-OCC	154	
20	Central Office 3	Offices	3	S 32 C F 1 (ELE)	F41LL	32	0.10	SW	2400	C-OCC	230	
20	Central Office 4	Offices	2	S 32 C F 1 (ELE)	F41LL	32	0.06	SW	2400	C-OCC	154	
15	Room 15	Classrooms	12	S 32 C F 2 (ELE)	F42LL	60	0.72	SW	2400	C-OCC	1,728	
15	Room 15	Classrooms	6	S 32 C F 2 (ELE)	F42LL	60	0.36	SW	2400	C-OCC	864	
15	Room 16	Classrooms	12	S 32 C F 2 (ELE)	F42LL	60	0.72	SW	2400	C-OCC	1,728	

Energy Audit of Nixon Elementary School

CHA Project No.24454

Existing Lighting

Cost of Electricity: **$0.107** **$/kWh**

$6.74 **$/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**	
15	Room 16	Classrooms	6	S 32 C F 2 (ELE)	F42LL	60	0.36	SW	2400	C-OCC	864	
15	Room 17	Classrooms	12	S 32 C F 2 (ELE)	F42LL	60	0.72	SW	2400	C-OCC	1,728	
15	Room 17	Classrooms	6	S 32 C F 2 (ELE)	F42LL	60	0.36	SW	2400	C-OCC	864	
15	Room 18	Classrooms	12	S 32 C F 2 (ELE)	F42LL	60	0.72	SW	2400	C-OCC	1,728	
15	Room 18	Classrooms	6	S 32 C F 2 (ELE)	F42LL	60	0.36	SW	2400	C-OCC	864	
254	Room 19	Classrooms	6	T 32 R F 4 (ELE)	F44LL	118	0.71	SW	2400	C-OCC	1,699	
254	Room 19	Classrooms	1	T 32 R F 4 (ELE)	F44LL	118	0.12	SW	2400	C-OCC	283	
254	Room 20	Classrooms	5	T 32 R F 4 (ELE)	F44LL	118	0.59	SW	2400	C-OCC	1,416	
254	Room 20	Classrooms	2	T 32 R F 4 (ELE)	F44LL	118	0.24	SW	2400	C-OCC	566	
33	E. Hallway Men's Bathroom	Bath Room	1	13 W CF 1	CFQ13/1-L	15	0.02	SW	2000	SW	30	
198	E. Hallway Men's Bathroom	Bath Room	1	2T 17 R F 2 (ELE)	F22LL	31	0.03	SW	2000	SW	62	
33	E. Hallway Women's Bathroom	Bath Room	1	13 W CF 1	CFQ13/1-L	15	0.02	SW	2000	SW	30	
198	E. Hallway Women's Bathroom	Bath Room	1	2T 17 R F 2 (ELE)	F22LL	31	0.03	SW	2000	SW	62	
254	Room 22	Classrooms	7	T 32 R F 4 (ELE)	F44LL	118	0.83	SW	2400	C-OCC	1,982	
254	Room 22	Classrooms	2	T 32 R F 4 (ELE)	F44LL	118	0.24	SW	2400	C-OCC	566	
210	Room 22	Classrooms	2	2T 32 R F 3 (ELE) THIN TUBE	FU3ILL	89	0.18	SW	2400	C-OCC	427	
254	Room 23	Classrooms	8	T 32 R F 4 (ELE)	F44LL	118	0.94	SW	2400	C-OCC	2,266	
254	Room 23	Classrooms	3	T 32 R F 4 (ELE)	F44LL	118	0.35	SW	2400	C-OCC	850	
254	Room 24	Classrooms	8	T 32 R F 4 (ELE)	F44LL	118	0.94	SW	2400	C-OCC	2,266	
254	Room 24	Classrooms	3	T 32 R F 4 (ELE)	F44LL	118	0.35	SW	2400	C-OCC	850	
254	Room 25	Classrooms	8	T 32 R F 4 (ELE)	F44LL	118	0.94	SW	2400	C-OCC	2,266	
254	Room 25	Classrooms	3	T 32 R F 4 (ELE)	F44LL	118	0.35	SW	2400	C-OCC	850	
15	N. Mechanical Room	Storage Areas	5	S 32 C F 2 (ELE)	F42LL	60	0.30	SW	1000	SW	300	
33	N.E. Hallway Men's Bathroom	Bath Room	1	13 W CF 1	CFQ13/1-L	15	0.02	SW	2000	SW	30	
198	N.E. Hallway Men's Bathroom	Bath Room	1	2T 17 R F 2 (ELE)	F22LL	31	0.03	SW	2000	SW	62	
33	N.E. Hallway Women's Bathroom	Bath Room	1	13 W CF 1	CFQ13/1-L	15	0.02	SW	2000	SW	30	
198	N.E. Hallway Women's Bathroom	Bath Room	1	2T 17 R F 2 (ELE)	F22LL	31	0.03	SW	2000	SW	62	
198	Main Entrance Lobby	Hallways	8	2T 17 R F 2 (ELE)	F22LL	31	0.25	SW	2280	SW	565	
15	Gym Area Hallway	Hallways	9	S 32 C F 2 (ELE)	F42LL	60	0.54	SW	2280	SW	1,231	
15	N.E. Hallway	Hallways	10	S 32 C F 2 (ELE)	F42LL	60	0.60	SW	2280	SW	1,368	
15	W. Hallway	Hallways	8	S 32 C F 2 (ELE)	F42LL	60	0.48	SW	2280	SW	1,094	
254	W. Hallway	Hallways	1	T 32 R F 4 (ELE)	F44LL	118	0.12	SW	2280	SW	269	
15	E. Hallway	Hallways	9	S 32 C F 2 (ELE)	F42LL	60	0.54	SW	2280	SW	1,231	
15	S. Hallway	Hallways	21	S 32 C F 2 (ELE)	F42LL	60	1.26	SW	2280	SW	2,873	
254	S. Hallway	Hallways	2	T 32 R F 4 (ELE)	F44LL	118	0.24	SW	2280	SW	538	
15	S.E. Hallway	Hallways	4	S 32 C F 2 (ELE)	F42LL	60	0.24	SW	2280	SW	547	
79	Exterior	Outdoor Lighting	12	SP I 100	I100/1	100	1.20	SW	4368	SW	5,242	
68	Exterior	Outdoor Lighting	14	175 MH WALL	MH175/1	215	3.01	SW	4368	SW	13,148	
144	Exterior	Outdoor Lighting	12	HPS 150	HPS150/1	188	2.26	SW	4368	SW	9,854	
44	Exterior	Outdoor Lighting	17	DC 26 W CF 2	CFQ26/2-L	50	0.85	SW	4368	SW	3,713	
	Total		**860**				**55**				**136,536**	

Energy Audit of Nixon Elementary School

CHA Project No.24454 **Cost of Electricity:** **$0.107 $/kWh**

ECM-1 Lighting Replacements **$6.74 $/kW**

		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
20	Main Office	17	S 32 C F 1 (ELE)	F41LL	32	0.5	SW	2400	1,306	17	S 32 C F 1 (ELE)	F41LL	32	0.544	SW	2400	1305.6	0.00	0.00	$ -	$ -	$ -		
20	Main Office	3	S 32 C F 1 (ELE)	F41LL	32	0.1	SW	2400	230	3	S 32 C F 1 (ELE)	F41LL	32	0.096	SW	2400	230.4	0.00	0.00	$ -	$ -	$ -		
20	Nurse	9	S 32 C F 1 (ELE)	F41LL	32	0.3	SW	2400	691	9	S 32 C F 1 (ELE)	F41LL	32	0.288	SW	2400	691.2	0.00	0.00	$ -	$ -	$ -		
20	Nurse	9	S 32 C F 1 (ELE)	F41LL	32	0.3	SW	2400	691	9	S 32 C F 1 (ELE)	F41LL	32	0.288	SW	2400	691.2	0.00	0.00	$ -	$ -	$ -		
20	Nurse	3	S 32 C F 1 (ELE)	F41LL	32	0.1	SW	2400	230	3	S 32 C F 1 (ELE)	F41LL	32	0.096	SW	2400	230.4	0.00	0.00	$ -	$ -	$ -		
220	Nurse Bathroom	1	S 17 C F 1(ELE)	F21ILL	20	0.0	SW	2000	40	1	S 17 C F 1(ELE)	F21ILL	20	0.02	SW	2000	40	0.00	0.00	$ -	$ -	$ -		
20	Nurse Closet	1	S 32 C F 1 (ELE)	F41LL	32	0.0	SW	1000	32	1	S 32 C F 1 (ELE)	F41LL	32	0.032	SW	1000	32	0.00	0.00	$ -	$ -	$ -		
20	Small Gym	28	S 32 C F 1 (ELE)	F41LL	32	0.9	SW	2000	1,792	28	S 32 C F 1 (ELE)	F41LL	32	0.896	SW	2000	1792	0.00	0.00	$ -	$ -	$ -		
20	Small Gym	1	S 32 C F 1 (ELE)	F41LL	32	0.0	SW	2000	64	1	S 32 C F 1 (ELE)	F41LL	32	0.032	SW	2000	64	0.00	0.00	$ -	$ -	$ -		
20	Small Gym Office	1	S 32 C F 1 (ELE)	F41LL	32	0.0	SW	2400	77	1	S 32 C F 1 (ELE)	F41LL	32	0.032	SW	2400	76.8	0.00	0.00	$ -	$ -	$ -		
20	Small Gym Storage	2	S 32 C F 1 (ELE)	F41LL	32	0.1	SW	1000	64	2	S 32 C F 1 (ELE)	F41LL	32	0.064	SW	1000	64	0.00	0.00	$ -	$ -	$ -		
20	Cafeteria	18	S 32 C F 1 (ELE)	F41LL	32	0.6	SW	1600	922	18	S 32 C F 1 (ELE)	F41LL	32	0.576	SW	1600	921.6	0.00	0.00	$ -	$ -	$ -		
20	Cafeteria	18	S 32 C F 1 (ELE)	F41LL	32	0.6	SW	1600	922	18	S 32 C F 1 (ELE)	F41LL	32	0.576	SW	1600	921.6	0.00	0.00	$ -	$ -	$ -		
20	Cafeteria	1	S 32 C F 1 (ELE)	F41LL	32	0.0	SW	1600	51	1	S 32 C F 1 (ELE)	F41LL	32	0.032	SW	1600	51.2	0.00	0.00	$ -	$ -	$ -		
20	Cafeteria Storage Large	3	S 32 C F 1 (ELE)	F41LL	32	0.1	SW	1000	96	3	S 32 C F 1 (ELE)	F41LL	32	0.096	SW	1000	96	0.00	0.00	$ -	$ -	$ -		
20	Cafeteria Storage Small	1	S 32 C F 1 (ELE)	F41LL	32	0.0	SW	1000	32	1	S 32 C F 1 (ELE)	F41LL	32	0.032	SW	1000	32	0.00	0.00	$ -	$ -	$ -		
20	Cafeteria Storage Small	1	S 32 C F 1 (ELE)	F41LL	32	0.0	SW	1000	32	1	S 32 C F 1 (ELE)	F41LL	32	0.032	SW	1000	32	0.00	0.00	$ -	$ -	$ -		
20	Kitchen	22	S 32 C F 1 (ELE)	F41LL	32	0.7	SW	1600	1,126	22	S 32 C F 1 (ELE)	F41LL	32	0.704	SW	1600	1126.4	0.00	0.00	$ -	$ -	$ -		
20	Kitchen Office	4	S 32 C F 1 (ELE)	F41LL	32	0.1	SW	2400	307	4	S 32 C F 1 (ELE)	F41LL	32	0.128	SW	2400	307.2	0.00	0.00	$ -	$ -	$ -		
20	Central Boy's Bathroom	3	S 32 C F 1 (ELE)	F41LL	32	0.1	SW	2000	192	3	S 32 C F 1 (ELE)	F41LL	32	0.096	SW	2000	192	0.00	0.00	$ -	$ -	$ -		
20	Central Girl's Bathroom	3	S 32 C F 1 (ELE)	F41LL	32	0.1	SW	2000	192	3	S 32 C F 1 (ELE)	F41LL	32	0.096	SW	2000	192	0.00	0.00	$ -	$ -	$ -		
20	Central Storage	4	S 32 C F 1 (ELE)	F41LL	32	0.1	SW	1000	128	4	S 32 C F 1 (ELE)	F41LL	32	0.128	SW	1000	128	0.00	0.00	$ -	$ -	$ -		
20	Media Center	29	S 32 C F 1 (ELE)	F41LL	32	0.9	SW	2400	2,227	29	S 32 C F 1 (ELE)	F41LL	32	0.928	SW	2400	2227.2	0.00	0.00	$ -	$ -	$ -		
15	Media Center	1	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	2400	144	1	S 32 C F 2 (ELE)	F42LL	60	0.06	SW	2400	144	0.00	0.00	$ -	$ -	$ -		
5	Media Center	3	2T 32 R F 2 (u) (ELE)	FU2LL	60	0.2	SW	2400	432	3	2T 32 R F 2 (u) (ELE)	FU2LL	60	0.18	SW	2400	432	0.00	0.00	$ -	$ -	$ -		
20	Media Center Office 1	2	S 32 C F 1 (ELE)	F41LL	32	0.1	SW	2400	154	2	S 32 C F 1 (ELE)	F41LL	32	0.064	SW	2400	153.6	0.00	0.00	$ -	$ -	$ -		
20	Media Center Office 2	4	S 32 C F 1 (ELE)	F41LL	32	0.1	SW	2400	307	4	S 32 C F 1 (ELE)	F41LL	32	0.128	SW	2400	307.2	0.00	0.00	$ -	$ -	$ -		
20	Media Center Storage 1	1	S 32 C F 1 (ELE)	F41LL	32	0.0	SW	1000	32	1	S 32 C F 1 (ELE)	F41LL	32	0.032	SW	1000	32	0.00	0.00	$ -	$ -	$ -		
20	Media Center Storage 2	3	S 32 C F 1 (ELE)	F41LL	32	0.1	SW	1000	96	3	S 32 C F 1 (ELE)	F41LL	32	0.096	SW	1000	96	0.00	0.00	$ -	$ -	$ -		
20	Custodian Room	9	S 32 C F 1 (ELE)	F41LL	32	0.3	SW	2400	691	9	S 32 C F 1 (ELE)	F41LL	32	0.288	SW	2400	691.2	0.00	0.00	$ -	$ -	$ -		
20	Custodian Room	5	S 32 C F 1 (ELE)	F41LL	32	0.2	SW	1000	160	5	S 32 C F 1 (ELE)	F41LL	32	0.16	SW	1000	160	0.00	0.00	$ -	$ -	$ -		
20	Custodian Room	3	S 32 C F 1 (ELE)	F41LL	32	0.1	SW	1000	96	3	S 32 C F 1 (ELE)	F41LL	32	0.096	SW	1000	96	0.00	0.00	$ -	$ -	$ -		
20	Custodian Room	2	S 32 C F 1 (ELE)	F41LL	32	0.1	SW	1000	64	2	S 32 C F 1 (ELE)	F41LL	32	0.064	SW	1000	64	0.00	0.00	$ -	$ -	$ -		
20	Custodian Room	1	S 32 C F 1 (ELE)	F41LL	32	0.0	SW	1000	32	1	S 32 C F 1 (ELE)	F41LL	32	0.032	SW	1000	32	0.00	0.00	$ -	$ -	$ -		
20	Faculty Room	7	S 32 C F 1 (ELE)	F41LL	32	0.2	SW	2400	538	7	S 32 C F 1 (ELE)	F41LL	32	0.224	SW	2400	537.6	0.00	0.00	$ -	$ -	$ -		
20	Faculty Room Men's Bathroom	1	S 32 C F 1 (ELE)	F41LL	32	0.0	SW	2000	64	1	S 32 C F 1 (ELE)	F41LL	32	0.032	SW	2000	64	0.00	0.00	$ -	$ -	$ -		
220	Faculty Room Men's Bathroom	1	S 17 C F 1(ELE)	F21ILL	20	0.0	SW	2000	40	1	S 17 C F 1(ELE)	F21ILL	20	0.02	SW	2000	40	0.00	0.00	$ -	$ -	$ -		
20	Faculty Room Women's Bathroom	1	S 32 C F 1 (ELE)	F41LL	32	0.0	SW	2000	64	1	S 32 C F 1 (ELE)	F41LL	32	0.032	SW	2000	64	0.00	0.00	$ -	$ -	$ -		
220	Faculty Room Women's Bathroom	1	S 17 C F 1(ELE)	F21ILL	20	0.0	SW	2000	40	1	S 17 C F 1(ELE)	F21ILL	20	0.02	SW	2000	40	0.00	0.00	$ -	$ -	$ -		
254	Computer Room	11	T 32 R F 4 (ELE)	F44LL	118	1.3	C-OCC	2400	3,115	11	T 32 R F 4 (ELE)	F44LL	118	1.298	C-OCC	2400	3115.2	0.00	0.00	$ -	$ -	$ -		
254	Computer Room	2	T 32 R F 4 (ELE)	F44LL	118	0.2	C-OCC	2400	566	2	T 32 R F 4 (ELE)	F44LL	118	0.236	C-OCC	2400	566.4	0.00	0.00	$ -	$ -	$ -		
146	Gym	4	High Bay MH 400	MH400/1	458	1.8	SW	2000	3,664	4	F48T5/HO	F42LL-V	85	0.34	SW	2000	680	2984.00	1.49	$ 439.96	$ 1,200.00	$ 140.00	2.7	0.4
146	Gym	4	High Bay MH 400	MH400/1	458	1.8	SW	2000	3,664	4	F48T5/HO	F42LL-V	85	0.34	SW	2000	680	2984.00	1.49	$ 439.96	$ 1,200.00	$ 140.00	2.7	0.4
146	Gym	4	High Bay MH 400	MH400/1	458	1.8	SW	2000	3,664	4	F48T5/HO	F42LL-V	85	0.34	SW	2000	680	2984.00	1.49	$ 439.96	$ 1,200.00	$ 140.00	2.7	0.4
146	Gym	4	High Bay MH 400	MH400/1	458	1.8	SW	2000	3,664	4	F48T5/HO	F42LL-V	85	0.34	SW	2000	680	2984.00	1.49	$ 439.96	$ 1,200.00	$ 140.00	2.7	0.4
146	Gym	4	High Bay MH 400	MH400/1	458	1.8	SW	2000	3,664	4	F48T5/HO	F42LL-V	85	0.34	SW	2000	680	2984.00	1.49	$ 439.96	$ 1,200.00	$ 140.00	2.7	0.4
15	Gym	1	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	2000	120	1	S 32 C F 2 (ELE)	F42LL	60	0.06	SW	2000	120	0.00	0.00	$ -	$ -	$ -		
210	Gym Office	4	2T 32 R F 3 (ELE) THIN TUBE	FU3ILL	89	0.4	SW	2400	854	4	2T 32 R F 3 (ELE) THIN TUBE	FU3ILL	89	0.356	SW	2400	854.4	0.00	0.00	$ -	$ -	$ -		
15	Gym Storage 1	2	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	1000	120	2	S 32 C F 2 (ELE)	F42LL	60	0.12	SW	1000	120	0.00	0.00	$ -	$ -	$ -		
15	Gym Storage 2	2	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	1000	120	2	S 32 C F 2 (ELE)	F42LL	60	0.12	SW	1000	120	0.00	0.00	$ -	$ -	$ -		
15	Gym Area Boy's Bathroom	3	S 32 C F 2 (ELE)	F42LL	60	0.2	SW	2000	360	3	S 32 C F 2 (ELE)	F42LL	60	0.18	SW	2000	360	0.00	0.00	$ -	$ -	$ -		
20	Gym Area Boy's Bathroom	2	S 32 C F 1 (ELE)	F41LL	32	0.1	SW	2000	128	2	S 32 C F 1 (ELE)	F41LL	32	0.064	SW	2000	128	0.00	0.00	$ -	$ -	$ -		
15	Gym Area Girl's Bathroom	3	S 32 C F 2 (ELE)	F42LL	60	0.2	SW	2000	360	3	S 32 C F 2 (ELE)	F42LL	60	0.18	SW	2000	360	0.00	0.00	$ -	$ -	$ -		
20	Gym Area Girl's Bathroom	2	S 32 C F 1 (ELE)	F41LL	32	0.1	SW	2000	128	2	S 32 C F 1 (ELE)	F41LL	32	0.064	SW	2000	128	0.00	0.00	$ -	$ -	$ -		
15	Stage	9	S 32 C F 2 (ELE)	F42LL	60	0.5	SW	1000	540	9	S 32 C F 2 (ELE)	F42LL	60	0.54	SW	1000	540	0.00	0.00	$ -	$ -	$ -		
15	Stage	9	S 32 C F 2 (ELE)	F42LL	60	0.5	SW	1000	540	9	S 32 C F 2 (ELE)	F42LL	60	0.54	SW	1000	540	0.00	0.00	$ -	$ -	$ -		
15	Stage Hall	3	S 32 C F 2 (ELE)	F42LL	60	0.2	SW	2280	410	3	S 32 C F 2 (ELE)	F42LL	60	0.18	SW	2280	410.4	0.00	0.00	$ -	$ -	$ -		
15	Gym Area Closet 1	1	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	1000	60	1	S 32 C F 2 (ELE)	F42LL	60	0.06	SW	1000	60	0.00	0.00	$ -	$ -	$ -		
15	Gym Area Closet 2	1	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	1000	60	1	S 32 C F 2 (ELE)	F42LL	60	0.06	SW	1000	60	0.00	0.00	$ -	$ -	$ -		
20	Room 1	20	S 32 C F 1 (ELE)	F41LL	32	0.6	SW	2400	1,536	20	S 32 C F 1 (ELE)	F41LL	32	0.64	SW	2400	1536	0.00	0.00	$ -	$ -	$ -		
20	Room 1	10	S 32 C F 1 (ELE)	F41LL	32	0.3	SW	2400	768	10	S 32 C F 1 (ELE)	F41LL	32	0.32	SW	2400	768	0.00	0.00	$ -	$ -	$ -		
20	Room 1	3	S 32 C F 1 (ELE)	F41LL	32	0.1	SW	2400	230	3	S 32 C F 1 (ELE)	F41LL	32	0.096	SW	2400	230.4	0.00	0.00	$ -	$ -	$ -		
20	Room 1 Bathroom	1	S 32 C F 1 (ELE)	F41LL	32	0.0	SW	2000	64	1	S 32 C F 1 (ELE)	F41LL	32	0.032	SW	2000	64	0.00	0.00	$ -	$ -	$ -		
108	Room 1/2 Vestibule	1	I 65	I65/1	65	0.1	SW	2280	148	1	CF 26	CFQ26/1-L	27	0.027	SW	2280	61.56	86.64	0.04	$ 12.34	$ 20.25	$ -	1.6	0.2
108	Room 1/2 Vestibule	1	I 65	I65/1	65	0.1	SW	2280	148	1	CF 26	CFQ26/1-L	27	0.027	SW	2280	61.56	86.64	0.04	$ 12.34	$ 20.25	$ -	1.6	0.2
220	Room 1/2 Bathroom 1	1	S 17 C F 1(ELE)	F21ILL	20	0.0	SW	2000	40	1	S 17 C F 1(ELE)	F21ILL	20	0.02	SW	2000	40	0.00	0.00	$ -	$ -	$ -		
220	Room 1/2 Bathroom 2	1	S 17 C F 1(ELE)	F21ILL	20	0.0	SW	2000	40	1	S 17 C F 1(ELE)	F21ILL	20	0.02	SW	2000	40	0.00	0.00	$ -	$ -	$ -		
20	Room 2	20	S 32 C F 1 (ELE)	F41LL	32	0.6	SW	2400	1,536	20	S 32 C F 1 (ELE)	F41LL	32	0.64	SW	2400	1536	0.00	0.00	$ -	$ -	$ -		
20	Room 2	10	S 32 C F 1 (ELE)	F41LL	32	0.3	SW	2400	768	10	S 32 C F 1 (ELE)	F41LL	32	0.32	SW	2400	768	0.00	0.00	$ -	$ -	$ -		
20	Room 2	3	S 32 C F 1 (ELE)	F41LL	32	0.1	SW	2400	230	3	S 32 C F 1 (ELE)	F41LL	32	0.096	SW	2400	230.4	0.00	0.00	$ -	$ -	$ -		
20	Room 2 Bathroom	1	S 32 C F 1 (ELE)	F41LL	32	0.0	SW	2000	64	1	S 32 C F 1 (ELE)	F41LL	32	0.032	SW	2000	64	0.00	0.00	$ -	$ -	$ -		
20	Room 3	11	S 32 C F 1 (ELE)	F41LL	32	0.4	SW	2400	845	11	S 32 C F 1 (ELE)	F41LL	32	0.352	SW	2400	844.8	0.00	0.00	$ -	$ -	$ -		
20	Room 3	6	S 32 C F 1 (ELE)	F41LL	32	0.2	SW	2400	461	6	S 32 C F 1 (ELE)	F41LL	32	0.192	SW	2400	460.8	0.00	0.00	$ -	$ -	$ -		
20	Room 3 Bathroom	1	S 32 C F 1 (ELE)	F41LL	32	0.0	SW	2000	64	1	S 32 C F 1 (ELE)	F41LL	32	0.032	SW	2000	64	0.00	0.00	$ -	$ -	$ -		
20	Room 4	11	S 32 C F 1 (ELE)	F41LL	32	0.4	SW	2400	845	11	S 32 C F 1 (ELE)	F41LL	32	0.352	SW	2400	844.8	0.00	0.00	$ -	$ -	$ -		
20	Room 4	6	S 32 C F 1 (ELE)	F41LL	32	0.2	SW	2400	461	6	S 32 C F 1 (ELE)	F41LL	32	0.192	SW	2400	460.8	0.00	0.00	$ -	$ -	$ -		
20	Room 4 Bathroom	1	S 32 C F 1 (ELE)	F41LL	32	0.0	SW	2000	64	1	S 32 C F 1 (ELE)	F41LL	32	0.032	SW	2000	64	0.00	0.00	$ -	$ -	$ -		
20	Room 5	11	S 32 C F 1 (ELE)	F41LL	32	0.4	SW	2400	845	11	S 32 C F 1 (ELE)	F41LL	32	0.352	SW	2400	844.8	0.00	0.00	$ -	$ -	$ -		
20	Room 5	6	S 32 C F 1 (ELE)	F41LL	32	0.2	SW	2400	461	6	S 32 C F 1 (ELE)	F41LL	32	0.192	SW	2400	460.8	0.00	0.00	$ -	$ -	$ -		
20	Room 5 Bathroom	1	S 32 C F 1 (ELE)	F41LL	32	0.0	SW	2000	64	1	S 32 C F 1 (ELE)	F41LL	32	0.032	SW	2000	64	0.00	0.00	$ -	$ -	$ -		
20	Room 6	11	S 32 C F 1 (ELE)	F41LL	32	0.4	SW	2400	845	11	S 32 C F 1 (ELE)	F41LL	32	0.352	SW	2400	844.8	0.00	0.00	$ -	$ -	$ -		
20	Room 6	6	S 32 C F 1 (ELE)	F41LL	32	0.2	SW	2400	461	6	S 32 C F 1 (ELE)	F41LL	32	0.192	SW	2400	460.8	0.00	0.00	$ -	$ -	$ -		
20	Room 6 Bathroom	1	S 32 C F 1 (ELE)	F41LL	32	0.0	SW	2000	64	1	S 32 C F 1 (ELE)	F41LL	32	0.032	SW	2000	64	0.00	0.00	$ -	$ -	$ -		
20	Room 7	11	S 32 C F 1 (ELE)	F41LL	32	0.4	SW	2400	845	11	S 32 C F 1 (ELE)	F41LL	32	0.352	SW	2400	844.8	0.00	0.00	$ -	$ -	$ -		
20	Room 7	6	S 32 C F 1 (ELE)	F41LL	32	0.2	SW	2400	461	6	S 32 C F 1 (ELE)	F41LL	32	0.192	SW	2400	460.8	0.00	0.00	$ -	$ -	$ -		
20	Room 7 Bathroom	1	S 32 C F 1 (ELE)	F41LL	32	0.0	SW	2000	64	1	S 32 C F 1 (ELE)	F41LL	32	0.032	SW	2000	64	0.00	0.00	$ -	$ -	$ -		
20	Room 8	11	S 32 C F 1 (ELE)	F41LL	32	0.4	SW	2400	845	11	S 32 C F 1 (ELE)	F41LL	32	0.352	SW	2400	844.8	0.00	0.00	$ -	$ -	$ -		
20	Room 8	6	S 32 C F 1 (ELE)	F41LL	32	0.2	SW	2400	461	6	S 32 C F 1 (ELE)	F41LL	32	0.192	SW	2400	460.8	0.00	0.00	$ -	$ -	$ -		
20	Room 8 Bathroom	1	S 32 C F 1 (ELE)	F41LL	32	0.0	SW	2000	64	1	S 32 C F 1 (ELE)	F41LL	32	0.032	SW	2000	64	0.00	0.00	$ -	$ -	$ -		
20	Room 9	11	S 32 C F 1 (ELE)	F41LL	32	0.4	SW	2400	845	11	S 32 C F 1 (ELE)	F41LL	32	0.352	SW	2400	844.8	0.00	0.00	$ -	$ -	$ -		
20	Room 9	6	S 32 C F 1 (ELE)	F41LL	32	0.2	SW	2400	461	6	S 32 C F 1 (ELE)	F41LL	32	0.192	SW	2400	460.8	0.00	0.00	$ -	$ -	$ -		
20	Room 9 Bathroom	1	S 32 C F 1 (ELE)	F41LL	32	0.0	SW	2000	64	1	S 32 C F 1 (ELE)	F41LL	32	0.032	SW	2000	64	0.00	0.00	$ -	$ -	$ -		
20	Room 10	11	S 32 C F 1 (ELE)	F41LL	32	0.4	SW	2400	845	11	S 32 C F 1 (ELE)	F41LL	32	0.352	SW	2400	844.8	0.00	0.00	$ -	$ -	$ -		

Energy Audit of Nixon Elementary School

CHA Project No.24454

ECM-1 Lighting Replacements

Cost of Electricity: **$0.107 $/kWh**

$6.74 $/kW

		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
20	Room 10	6	S 32 C F 1 (ELE)	F41LL	32	0.2	SW	2400	461	6	S 32 C F 1 (ELE)	F41LL	32	0.192	SW	2400	460.8	0.00	0.00	$ -	$ -	$ -		
20	Room 10 Bathroom	1	S 32 C F 1 (ELE)	F41LL	32	0.0	SW	2000	64	1	S 32 C F 1 (ELE)	F41LL	32	0.032	SW	2000	64	0.00	0.00	$ -	$ -	$ -		
15	Room 11	12	S 32 C F 2 (ELE)	F42LL	60	0.7	SW	2400	1,728	12	S 32 C F 2 (ELE)	F42LL	60	0.72	SW	2400	1728	0.00	0.00	$ -	$ -	$ -		
15	Room 11	6	S 32 C F 2 (ELE)	F42LL	60	0.4	SW	2400	864	6	S 32 C F 2 (ELE)	F42LL	60	0.36	SW	2400	864	0.00	0.00	$ -	$ -	$ -		
15	Room 12	12	S 32 C F 2 (ELE)	F42LL	60	0.7	SW	2400	1,728	12	S 32 C F 2 (ELE)	F42LL	60	0.72	SW	2400	1728	0.00	0.00	$ -	$ -	$ -		
15	Room 12	6	S 32 C F 2 (ELE)	F42LL	60	0.4	SW	2400	864	6	S 32 C F 2 (ELE)	F42LL	60	0.36	SW	2400	864	0.00	0.00	$ -	$ -	$ -		
254	Room 13A	4	T 32 R F 4 (ELE)	F44LL	118	0.5	SW	2400	1,133	4	T 32 R F 4 (ELE)	F44LL	118	0.472	SW	2400	1132.8	0.00	0.00	$ -	$ -	$ -		
254	Room 13B	4	T 32 R F 4 (ELE)	F44LL	118	0.5	SW	2400	1,133	4	T 32 R F 4 (ELE)	F44LL	118	0.472	SW	2400	1132.8	0.00	0.00	$ -	$ -	$ -		
15	Room 14	12	S 32 C F 2 (ELE)	F42LL	60	0.7	SW	2400	1,728	12	S 32 C F 2 (ELE)	F42LL	60	0.72	SW	2400	1728	0.00	0.00	$ -	$ -	$ -		
15	Room 14	6	S 32 C F 2 (ELE)	F42LL	60	0.4	SW	2400	864	6	S 32 C F 2 (ELE)	F42LL	60	0.36	SW	2400	864	0.00	0.00	$ -	$ -	$ -		
20	Central Office 1	3	S 32 C F 1 (ELE)	F41LL	32	0.1	SW	2400	230	3	S 32 C F 1 (ELE)	F41LL	32	0.096	SW	2400	230.4	0.00	0.00	$ -	$ -	$ -		
20	Central Office 2	2	S 32 C F 1 (ELE)	F41LL	32	0.1	SW	2400	154	2	S 32 C F 1 (ELE)	F41LL	32	0.064	SW	2400	153.6	0.00	0.00	$ -	$ -	$ -		
20	Central Office 3	3	S 32 C F 1 (ELE)	F41LL	32	0.1	SW	2400	230	3	S 32 C F 1 (ELE)	F41LL	32	0.096	SW	2400	230.4	0.00	0.00	$ -	$ -	$ -		
20	Central Office 4	2	S 32 C F 1 (ELE)	F41LL	32	0.1	SW	2400	154	2	S 32 C F 1 (ELE)	F41LL	32	0.064	SW	2400	153.6	0.00	0.00	$ -	$ -	$ -		
15	Room 15	12	S 32 C F 2 (ELE)	F42LL	60	0.7	SW	2400	1,728	12	S 32 C F 2 (ELE)	F42LL	60	0.72	SW	2400	1728	0.00	0.00	$ -	$ -	$ -		
15	Room 15	6	S 32 C F 2 (ELE)	F42LL	60	0.4	SW	2400	864	6	S 32 C F 2 (ELE)	F42LL	60	0.36	SW	2400	864	0.00	0.00	$ -	$ -	$ -		
15	Room 16	12	S 32 C F 2 (ELE)	F42LL	60	0.7	SW	2400	1,728	12	S 32 C F 2 (ELE)	F42LL	60	0.72	SW	2400	1728	0.00	0.00	$ -	$ -	$ -		
15	Room 16	6	S 32 C F 2 (ELE)	F42LL	60	0.4	SW	2400	864	6	S 32 C F 2 (ELE)	F42LL	60	0.36	SW	2400	864	0.00	0.00	$ -	$ -	$ -		
15	Room 17	12	S 32 C F 2 (ELE)	F42LL	60	0.7	SW	2400	1,728	12	S 32 C F 2 (ELE)	F42LL	60	0.72	SW	2400	1728	0.00	0.00	$ -	$ -	$ -		
15	Room 17	6	S 32 C F 2 (ELE)	F42LL	60	0.4	SW	2400	864	6	S 32 C F 2 (ELE)	F42LL	60	0.36	SW	2400	864	0.00	0.00	$ -	$ -	$ -		
15	Room 18	12	S 32 C F 2 (ELE)	F42LL	60	0.7	SW	2400	1,728	12	S 32 C F 2 (ELE)	F42LL	60	0.72	SW	2400	1728	0.00	0.00	$ -	$ -	$ -		
15	Room 18	6	S 32 C F 2 (ELE)	F42LL	60	0.4	SW	2400	864	6	S 32 C F 2 (ELE)	F42LL	60	0.36	SW	2400	864	0.00	0.00	$ -	$ -	$ -		
254	Room 19	6	T 32 R F 4 (ELE)	F44LL	118	0.7	SW	2400	1,699	6	T 32 R F 4 (ELE)	F44LL	118	0.708	SW	2400	1699.2	0.00	0.00	$ -	$ -	$ -		
254	Room 19	1	T 32 R F 4 (ELE)	F44LL	118	0.1	SW	2400	283	1	T 32 R F 4 (ELE)	F44LL	118	0.118	SW	2400	283.2	0.00	0.00	$ -	$ -	$ -		
254	Room 20	5	T 32 R F 4 (ELE)	F44LL	118	0.6	SW	2400	1,416	5	T 32 R F 4 (ELE)	F44LL	118	0.59	SW	2400	1416	0.00	0.00	$ -	$ -	$ -		
254	Room 20	2	T 32 R F 4 (ELE)	F44LL	118	0.2	SW	2400	566	2	T 32 R F 4 (ELE)	F44LL	118	0.236	SW	2400	566.4	0.00	0.00	$ -	$ -	$ -		
33	E. Hallway Men's Bathroom	1	13 W CF 1	CFQ13/1-L	15	0.0	SW	2000	30	1	13 W CF 1	CFQ13/1-L	15	0.015	SW	2000	30	0.00	0.00	$ -	$ -	$ -		
198	E. Hallway Men's Bathroom	1	2T 17 R F 2 (ELE)	F22LL	31	0.0	SW	2000	62	1	2T 17 R F 2 (ELE)	F22LL	31	0.031	SW	2000	62	0.00	0.00	$ -	$ -	$ -		
33	E. Hallway Women's Bathroom	1	13 W CF 1	CFQ13/1-L	15	0.0	SW	2000	30	1	13 W CF 1	CFQ13/1-L	15	0.015	SW	2000	30	0.00	0.00	$ -	$ -	$ -		
198	E. Hallway Women's Bathroom	1	2T 17 R F 2 (ELE)	F22LL	31	0.0	SW	2000	62	1	2T 17 R F 2 (ELE)	F22LL	31	0.031	SW	2000	62	0.00	0.00	$ -	$ -	$ -		
254	Room 22	7	T 32 R F 4 (ELE)	F44LL	118	0.8	SW	2400	1,982	7	T 32 R F 4 (ELE)	F44LL	118	0.826	SW	2400	1982.4	0.00	0.00	$ -	$ -	$ -		
254	Room 22	2	T 32 R F 4 (ELE)	F44LL	118	0.2	SW	2400	566	2	T 32 R F 4 (ELE)	F44LL	118	0.236	SW	2400	566.4	0.00	0.00	$ -	$ -	$ -		
210	Room 22	2	2T 32 R F 3 (ELE) THIN TUBE	FU3ILL	89	0.2	SW	2400	427	2	2T 32 R F 3 (ELE) THIN TUBE	FU3ILL	89	0.178	SW	2400	427.2	0.00	0.00	$ -	$ -	$ -		
254	Room 23	8	T 32 R F 4 (ELE)	F44LL	118	0.9	SW	2400	2,266	8	T 32 R F 4 (ELE)	F44LL	118	0.944	SW	2400	2265.6	0.00	0.00	$ -	$ -	$ -		
254	Room 23	3	T 32 R F 4 (ELE)	F44LL	118	0.4	SW	2400	850	3	T 32 R F 4 (ELE)	F44LL	118	0.354	SW	2400	849.6	0.00	0.00	$ -	$ -	$ -		
254	Room 24	8	T 32 R F 4 (ELE)	F44LL	118	0.9	SW	2400	2,266	8	T 32 R F 4 (ELE)	F44LL	118	0.944	SW	2400	2265.6	0.00	0.00	$ -	$ -	$ -		
254	Room 24	3	T 32 R F 4 (ELE)	F44LL	118	0.4	SW	2400	850	3	T 32 R F 4 (ELE)	F44LL	118	0.354	SW	2400	849.6	0.00	0.00	$ -	$ -	$ -		
254	Room 25	8	T 32 R F 4 (ELE)	F44LL	118	0.9	SW	2400	2,266	8	T 32 R F 4 (ELE)	F44LL	118	0.944	SW	2400	2265.6	0.00	0.00	$ -	$ -	$ -		
254	Room 25	3	T 32 R F 4 (ELE)	F44LL	118	0.4	SW	2400	850	3	T 32 R F 4 (ELE)	F44LL	118	0.354	SW	2400	849.6	0.00	0.00	$ -	$ -	$ -		
15	N. Mechanical Room	5	S 32 C F 2 (ELE)	F42LL	60	0.3	SW	1000	300	5	S 32 C F 2 (ELE)	F42LL	60	0.3	SW	1000	300	0.00	0.00	$ -	$ -	$ -		
33	N.E. Hallway Men's Bathroom	1	13 W CF 1	CFQ13/1-L	15	0.0	SW	2000	30	1	13 W CF 1	CFQ13/1-L	15	0.015	SW	2000	30	0.00	0.00	$ -	$ -	$ -		
198	N.E. Hallway Men's Bathroom	1	2T 17 R F 2 (ELE)	F22LL	31	0.0	SW	2000	62	1	2T 17 R F 2 (ELE)	F22LL	31	0.031	SW	2000	62	0.00	0.00	$ -	$ -	$ -		
33	N.E. Hallway Women's Bathroom	1	13 W CF 1	CFQ13/1-L	15	0.0	SW	2000	30	1	13 W CF 1	CFQ13/1-L	15	0.015	SW	2000	30	0.00	0.00	$ -	$ -	$ -		
198	N.E. Hallway Women's Bathroom	1	2T 17 R F 2 (ELE)	F22LL	31	0.0	SW	2000	62	1	2T 17 R F 2 (ELE)	F22LL	31	0.031	SW	2000	62	0.00	0.00	$ -	$ -	$ -		
198	Main Entrance Lobby	8	2T 17 R F 2 (ELE)	F22LL	31	0.2	SW	2280	565	8	2T 17 R F 2 (ELE)	F22LL	31	0.248	SW	2280	565.44	0.00	0.00	$ -	$ -	$ -		
15	Gym Area Hallway	9	S 32 C F 2 (ELE)	F42LL	60	0.5	SW	2280	1,231	9	S 32 C F 2 (ELE)	F42LL	60	0.54	SW	2280	1231.2	0.00	0.00	$ -	$ -	$ -		
15	N.E. Hallway	10	S 32 C F 2 (ELE)	F42LL	60	0.6	SW	2280	1,368	10	S 32 C F 2 (ELE)	F42LL	60	0.6	SW	2280	1368	0.00	0.00	$ -	$ -	$ -		
15	W. Hallway	8	S 32 C F 2 (ELE)	F42LL	60	0.5	SW	2280	1,094	8	S 32 C F 2 (ELE)	F42LL	60	0.48	SW	2280	1094.4	0.00	0.00	$ -	$ -	$ -		
254	W. Hallway	1	T 32 R F 4 (ELE)	F44LL	118	0.1	SW	2280	269	1	T 32 R F 4 (ELE)	F44LL	118	0.118	SW	2280	269.04	0.00	0.00	$ -	$ -	$ -		
15	E. Hallway	9	S 32 C F 2 (ELE)	F42LL	60	0.5	SW	2280	1,231	9	S 32 C F 2 (ELE)	F42LL	60	0.54	SW	2280	1231.2	0.00	0.00	$ -	$ -	$ -		
15	S. Hallway	21	S 32 C F 2 (ELE)	F42LL	60	1.3	SW	2280	2,873	21	S 32 C F 2 (ELE)	F42LL	60	1.26	SW	2280	2872.8	0.00	0.00	$ -	$ -	$ -		
254	S. Hallway	2	T 32 R F 4 (ELE)	F44LL	118	0.2	SW	2280	538	2	T 32 R F 4 (ELE)	F44LL	118	0.236	SW	2280	538.08	0.00	0.00	$ -	$ -	$ -		
15	S.E. Hallway	4	S 32 C F 2 (ELE)	F42LL	60	0.2	SW	2280	547	4	S 32 C F 2 (ELE)	F42LL	60	0.24	SW	2280	547.2	0.00	0.00	$ -	$ -	$ -		
79	Exterior	12	SP I 100	I100/1	100	1.2	SW	4368	5,242	12	CF 26	CFQ26/1-L	27	0.324	SW	4368	1415.232	3826.37	0.88	$ 480.27	$ 243.00	$ -	0.5	0.1
68	Exterior	14	175 MH WALL	MH175/1	215	3.0	SW	4368	13,148	14	175 MH WALL	MH175/1	215	3.01	SW	4368	13147.68	0.00	0.00	$ -	$ -	$ -		
144	Exterior	12	HPS 150	HPS150/1	188	2.3	SW	4368	9,854	12	HPS 150	HPS150/1	188	2.256	SW	4368	9854.208	0.00	0.00	$ -	$ -	$ -		
44	Exterior	17	DC 26 W CF 2	CFQ26/2-L	50	0.9	SW	4368	3,713	17	DC 26 W CF 2	CFQ26/2-L	50	0.85	SW	4368	3712.8	0.00	0.00	$ -	$ -	$ -		
	Total	**860**				**55**			**136,536**	**860**			**7,860**	**47**			**117616.8**	**18,920**	**8**	**$ 2,704.76**	**$ 6,283.50**	**$ 700.00**		
																	Demand Savings			**8.4**	**$ 680.36**			
																	kWh Savings			**18,920**	**$ 2,024.40**			
																	Total savings				**$ 2,704.76**		**2.3**	**2.1**

Energy Audit of Nixon Elementary School

CHA Project No.24454 **Cost of Electricity:** **$0.107 $/kWh**

$6.74 $/kW

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
20	Main Office	17	S 32 C F 1 (ELE)	F41LL	32	0.5	SW	2400	1,305.6	17	S 32 C F 1 (ELE)	F41LL	32	0.5	C-OCC	1200	652.8	652.80	0.00	$ 69.85	$ 202.50	$ 35.00	2.9	2.4
20	Main Office	3	S 32 C F 1 (ELE)	F41LL	32	0.1	SW	2400	230.4	3	S 32 C F 1 (ELE)	F41LL	32	0.1	C-OCC	1200	115.2	115.20	0.00	$ 12.33	$ 202.50	$ 35.00	16.4	13.6
20	Nurse	9	S 32 C F 1 (ELE)	F41LL	32	0.3	SW	2400	691.2	9	S 32 C F 1 (ELE)	F41LL	32	0.3	C-OCC	1200	345.6	345.60	0.00	$ 36.98	$ 202.50	$ 35.00	5.5	4.5
20	Nurse	9	S 32 C F 1 (ELE)	F41LL	32	0.3	SW	2400	691.2	9	S 32 C F 1 (ELE)	F41LL	32	0.3	C-OCC	1200	345.6	345.60	0.00	$ 36.98	$ 202.50	$ 35.00	5.5	4.5
20	Nurse	3	S 32 C F 1 (ELE)	F41LL	32	0.1	SW	2400	230.4	3	S 32 C F 1 (ELE)	F41LL	32	0.1	C-OCC	1200	115.2	115.20	0.00	$ 12.33	$ 202.50	$ 35.00	16.4	13.6
220	Nurse Bathroom	1	S 17 C F 1(ELE)	F21ILL	20	0.0	SW	2000	40.0	1	S 17 C F 1(ELE)	F21ILL	20	0.0	SW	2000	40	0.00	0.00	$ -	$ -	$ -		
20	Nurse Closet	1	S 32 C F 1 (ELE)	F41LL	32	0.0	SW	1000	32.0	1	S 32 C F 1 (ELE)	F41LL	32	0.0	SW	1000	32	0.00	0.00	$ -	$ -	$ -		
20	Small Gym	28	S 32 C F 1 (ELE)	F41LL	32	0.9	SW	2000	1,792.0	28	S 32 C F 1 (ELE)	F41LL	32	0.9	C-OCC	2000	1792	0.00	0.00	$ -	$ 202.50	$ 35.00		
20	Small Gym	1	S 32 C F 1 (ELE)	F41LL	32	0.0	SW	2000	64.0	1	S 32 C F 1 (ELE)	F41LL	32	0.0	C-OCC	2000	64	0.00	0.00	$ -	$ 202.50	$ 35.00		
20	Small Gym Office	1	S 32 C F 1 (ELE)	F41LL	32	0.0	SW	2400	76.8	1	S 32 C F 1 (ELE)	F41LL	32	0.0	C-OCC	1200	38.4	38.40	0.00	$ 4.11	$ 202.50	$ 35.00	49.3	40.8
20	Small Gym Storage	2	S 32 C F 1 (ELE)	F41LL	32	0.1	SW	1000	64.0	2	S 32 C F 1 (ELE)	F41LL	32	0.1	SW	1000	64	0.00	0.00	$ -	$ -	$ -		
20	Cafeteria	18	S 32 C F 1 (ELE)	F41LL	32	0.6	SW	1600	921.6	18	S 32 C F 1 (ELE)	F41LL	32	0.6	C-OCC	1200	691.2	230.40	0.00	$ 24.65	$ 202.50	$ 35.00	8.2	6.8
20	Cafeteria	18	S 32 C F 1 (ELE)	F41LL	32	0.6	SW	1600	921.6	18	S 32 C F 1 (ELE)	F41LL	32	0.6	C-OCC	1200	691.2	230.40	0.00	$ 24.65	$ 202.50	$ 35.00	8.2	6.8
20	Cafeteria	1	S 32 C F 1 (ELE)	F41LL	32	0.0	SW	1600	51.2	1	S 32 C F 1 (ELE)	F41LL	32	0.0	C-OCC	1200	38.4	12.80	0.00	$ 1.37	$ 202.50	$ 35.00	147.9	122.3
20	Cafeteria Storage Large	3	S 32 C F 1 (ELE)	F41LL	32	0.1	SW	1000	96.0	3	S 32 C F 1 (ELE)	F41LL	32	0.1	SW	1000	96	0.00	0.00	$ -	$ -	$ -		
20	Cafeteria Storage Small	1	S 32 C F 1 (ELE)	F41LL	32	0.0	SW	1000	32.0	1	S 32 C F 1 (ELE)	F41LL	32	0.0	SW	1000	32	0.00	0.00	$ -	$ -	$ -		
20	Cafeteria Storage Small	1	S 32 C F 1 (ELE)	F41LL	32	0.0	SW	1000	32.0	1	S 32 C F 1 (ELE)	F41LL	32	0.0	SW	1000	32	0.00	0.00	$ -	$ -	$ -		
20	Kitchen	22	S 32 C F 1 (ELE)	F41LL	32	0.7	SW	1600	1,126.4	22	S 32 C F 1 (ELE)	F41LL	32	0.7	C-OCC	1200	844.8	281.60	0.00	$ 30.13	$ 202.50	$ 35.00	6.7	5.6
20	Kitchen Office	4	S 32 C F 1 (ELE)	F41LL	32	0.1	SW	2400	307.2	4	S 32 C F 1 (ELE)	F41LL	32	0.1	C-OCC	1200	153.6	153.60	0.00	$ 16.44	$ 202.50	$ 35.00	12.3	10.2
20	Central Boy's Bathroom	3	S 32 C F 1 (ELE)	F41LL	32	0.1	SW	2000	192.0	3	S 32 C F 1 (ELE)	F41LL	32	0.1	SW	2000	192	0.00	0.00	$ -	$ -	$ -		
20	Central Girl's Bathroom	3	S 32 C F 1 (ELE)	F41LL	32	0.1	SW	2000	192.0	3	S 32 C F 1 (ELE)	F41LL	32	0.1	SW	2000	192	0.00	0.00	$ -	$ -	$ -		
20	Central Storage	4	S 32 C F 1 (ELE)	F41LL	32	0.1	SW	1000	128.0	4	S 32 C F 1 (ELE)	F41LL	32	0.1	SW	1000	128	0.00	0.00	$ -	$ -	$ -		
20	Media Center	29	S 32 C F 1 (ELE)	F41LL	32	0.9	SW	2400	2,227.2	29	S 32 C F 1 (ELE)	F41LL	32	0.9	C-OCC	1680	1559.04	668.16	0.00	$ 71.49	$ 202.50	$ 35.00	2.8	2.3
15	Media Center	1	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	2400	144.0	1	S 32 C F 2 (ELE)	F42LL	60	0.1	C-OCC	1680	100.8	43.20	0.00	$ 4.62	$ 202.50	$ 35.00	43.8	36.2
5	Media Center	3	2T 32 R F 2 (u) (ELE)	FU2LL	60	0.2	SW	2400	432.0	3	2T 32 R F 2 (u) (ELE)	FU2LL	60	0.2	C-OCC	1680	302.4	129.60	0.00	$ 13.87	$ 202.50	$ 35.00	14.6	12.1
20	Media Center Office 1	2	S 32 C F 1 (ELE)	F41LL	32	0.1	SW	2400	153.6	2	S 32 C F 1 (ELE)	F41LL	32	0.1	C-OCC	1200	76.8	76.80	0.00	$ 8.22	$ 202.50	$ 35.00	24.6	20.4
20	Media Center Office 2	4	S 32 C F 1 (ELE)	F41LL	32	0.1	SW	2400	307.2	4	S 32 C F 1 (ELE)	F41LL	32	0.1	C-OCC	1200	153.6	153.60	0.00	$ 16.44	$ 202.50	$ 35.00	12.3	10.2
20	Media Center Storage 1	1	S 32 C F 1 (ELE)	F41LL	32	0.0	SW	1000	32.0	1	S 32 C F 1 (ELE)	F41LL	32	0.0	SW	1000	32	0.00	0.00	$ -	$ -	$ -		
20	Media Center Storage 2	3	S 32 C F 1 (ELE)	F41LL	32	0.1	SW	1000	96.0	3	S 32 C F 1 (ELE)	F41LL	32	0.1	SW	1000	96	0.00	0.00	$ -	$ -	$ -		
20	Custodian Room	9	S 32 C F 1 (ELE)	F41LL	32	0.3	SW	2400	691.2	9	S 32 C F 1 (ELE)	F41LL	32	0.3	C-OCC	1200	345.6	345.60	0.00	$ 36.98	$ 202.50	$ 35.00	5.5	4.5
20	Custodian Room	5	S 32 C F 1 (ELE)	F41LL	32	0.2	SW	1000	160.0	5	S 32 C F 1 (ELE)	F41LL	32	0.2	SW	1000	160	0.00	0.00	$ -	$ -	$ -		
20	Custodian Room	3	S 32 C F 1 (ELE)	F41LL	32	0.1	SW	1000	96.0	3	S 32 C F 1 (ELE)	F41LL	32	0.1	SW	1000	96	0.00	0.00	$ -	$ -	$ -		
20	Custodian Room	2	S 32 C F 1 (ELE)	F41LL	32	0.1	SW	1000	64.0	2	S 32 C F 1 (ELE)	F41LL	32	0.1	SW	1000	64	0.00	0.00	$ -	$ -	$ -		
20	Custodian Room	1	S 32 C F 1 (ELE)	F41LL	32	0.0	SW	1000	32.0	1	S 32 C F 1 (ELE)	F41LL	32	0.0	SW	1000	32	0.00	0.00	$ -	$ -	$ -		
20	Faculty Room	7	S 32 C F 1 (ELE)	F41LL	32	0.2	SW	2400	537.6	7	S 32 C F 1 (ELE)	F41LL	32	0.2	C-OCC	1200	268.8	268.80	0.00	$ 28.76	$ 202.50	$ 35.00	7.0	5.8
20	Faculty Room Men's Bathroom	1	S 32 C F 1 (ELE)	F41LL	32	0.0	SW	2000	64.0	1	S 32 C F 1 (ELE)	F41LL	32	0.0	SW	2000	64	0.00	0.00	$ -	$ -	$ -		
220	Faculty Room Men's Bathroom	1	S 17 C F 1(ELE)	F21ILL	20	0.0	SW	2000	40.0	1	S 17 C F 1(ELE)	F21ILL	20	0.0	SW	2000	40	0.00	0.00	$ -	$ -	$ -		
20	Faculty Room Women's Bathroom	1	S 32 C F 1 (ELE)	F41LL	32	0.0	SW	2000	64.0	1	S 32 C F 1 (ELE)	F41LL	32	0.0	SW	2000	64	0.00	0.00	$ -	$ -	$ -		
220	Faculty Room Women's Bathroom	1	S 17 C F 1(ELE)	F21ILL	20	0.0	SW	2000	40.0	1	S 17 C F 1(ELE)	F21ILL	20	0.0	SW	2000	40	0.00	0.00	$ -	$ -	$ -		
254	Computer Room	11	T 32 R F 4 (ELE)	F44LL	118	1.3	C-OCC	2400	3,115.2	11	T 32 R F 4 (ELE)	F44LL	118	1.3	C-OCC	1680	2180.64	934.56	0.00	$ 100.00	$ 202.50	$ 35.00	2.0	1.7
254	Computer Room	2	T 32 R F 4 (ELE)	F44LL	118	0.2	C-OCC	2400	566.4	2	T 32 R F 4 (ELE)	F44LL	118	0.2	C-OCC	1680	396.48	169.92	0.00	$ 18.18	$ 202.50	$ 35.00	11.1	9.2
146	Gym	4	High Bay MH 400	MH400/1	458	1.8	SW	2000	3,664.0	4	High Bay MH 400	MH400/1	458	1.8	C-OCC	2000	3664	0.00	0.00	$ -	$ 202.50	$ 35.00		
146	Gym	4	High Bay MH 400	MH400/1	458	1.8	SW	2000	3,664.0	4	High Bay MH 400	MH400/1	458	1.8	C-OCC	2000	3664	0.00	0.00	$ -	$ 202.50	$ 35.00		
146	Gym	4	High Bay MH 400	MH400/1	458	1.8	SW	2000	3,664.0	4	High Bay MH 400	MH400/1	458	1.8	C-OCC	2000	3664	0.00	0.00	$ -	$ 202.50	$ 35.00		
146	Gym	4	High Bay MH 400	MH400/1	458	1.8	SW	2000	3,664.0	4	High Bay MH 400	MH400/1	458	1.8	C-OCC	2000	3664	0.00	0.00	$ -	$ 202.50	$ 35.00		
146	Gym	4	High Bay MH 400	MH400/1	458	1.8	SW	2000	3,664.0	4	High Bay MH 400	MH400/1	458	1.8	C-OCC	2000	3664	0.00	0.00	$ -	$ 202.50	$ 35.00		
15	Gym	1	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	2000	120.0	1	S 32 C F 2 (ELE)	F42LL	60	0.1	C-OCC	2000	120	0.00	0.00	$ -	$ 202.50	$ 35.00		
210	Gym Office	4	2T 32 R F 3 (ELE) THIN TUBE	FU3ILL	89	0.4	SW	2400	854.4	4	2T 32 R F 3 (ELE) THIN TUBE	FU3ILL	89	0.4	C-OCC	1200	427.2	427.20	0.00	$ 45.71	$ 202.50	$ 35.00	4.4	3.7
15	Gym Storage 1	2	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	1000	120.0	2	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	1000	120	0.00	0.00	$ -	$ -	$ -		
15	Gym Storage 2	2	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	1000	120.0	2	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	1000	120	0.00	0.00	$ -	$ -	$ -		
15	Gym Area Boy's Bathroom	3	S 32 C F 2 (ELE)	F42LL	60	0.2	SW	2000	360.0	3	S 32 C F 2 (ELE)	F42LL	60	0.2	SW	2000	360	0.00	0.00	$ -	$ -	$ -		
20	Gym Area Boy's Bathroom	2	S 32 C F 1 (ELE)	F41LL	32	0.1	SW	2000	128.0	2	S 32 C F 1 (ELE)	F41LL	32	0.1	SW	2000	128	0.00	0.00	$ -	$ -	$ -		
15	Gym Area Girl's Bathroom	3	S 32 C F 2 (ELE)	F42LL	60	0.2	SW	2000	360.0	3	S 32 C F 2 (ELE)	F42LL	60	0.2	SW	2000	360	0.00	0.00	$ -	$ -	$ -		
20	Gym Area Girl's Bathroom	2	S 32 C F 1 (ELE)	F41LL	32	0.1	SW	2000	128.0	2	S 32 C F 1 (ELE)	F41LL	32	0.1	SW	2000	128	0.00	0.00	$ -	$ -	$ -		
15	Stage	9	S 32 C F 2 (ELE)	F42LL	60	0.5	SW	1000	540.0	9	S 32 C F 2 (ELE)	F42LL	60	0.5	SW	1000	540	0.00	0.00	$ -	$ -	$ -		
15	Stage	9	S 32 C F 2 (ELE)	F42LL	60	0.5	SW	1000	540.0	9	S 32 C F 2 (ELE)	F42LL	60	0.5	SW	1000	540	0.00	0.00	$ -	$ -	$ -		
15	Stage Hall	3	S 32 C F 2 (ELE)	F42LL	60	0.2	SW	2280	410.4	3	S 32 C F 2 (ELE)	F42LL	60	0.2	SW	2280	410.4	0.00	0.00	$ -	$ -	$ -		
15	Gym Area Closet 1	1	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	1000	60.0	1	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	1000	60	0.00	0.00	$ -	$ -	$ -		
15	Gym Area Closet 2	1	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	1000	60.0	1	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	1000	60	0.00	0.00	$ -	$ -	$ -		
20	Room 1	20	S 32 C F 1 (ELE)	F41LL	32	0.6	SW	2400	1,536.0	20	S 32 C F 1 (ELE)	F41LL	32	0.6	C-OCC	1680	1075.2	460.80	0.00	$ 49.31	$ 202.50	$ 35.00	4.1	3.4
20	Room 1	10	S 32 C F 1 (ELE)	F41LL	32	0.3	SW	2400	768.0	10	S 32 C F 1 (ELE)	F41LL	32	0.3	C-OCC	1680	537.6	230.40	0.00	$ 24.65	$ 202.50	$ 35.00	8.2	6.8
20	Room 1	3	S 32 C F 1 (ELE)	F41LL	32	0.1	SW	2400	230.4	3	S 32 C F 1 (ELE)	F41LL	32	0.1	C-OCC	1680	161.28	69.12	0.00	$ 7.40	$ 202.50	$ 35.00	27.4	22.6
20	Room 1 Bathroom	1	S 32 C F 1 (ELE)	F41LL	32	0.0	SW	2000	64.0	1	S 32 C F 1 (ELE)	F41LL	32	0.0	SW	2000	64	0.00	0.00	$ -	$ -	$ -		
108	Room 1/2 Vestibule	1	I 65	I65/1	65	0.1	SW	2280	148.2	1	I 65	I65/1	65	0.1	SW	2280	148.2	0.00	0.00	$ -	$ -	$ -		
108	Room 1/2 Vestibule	1	I 65	I65/1	65	0.1	SW	2280	148.2	1	I 65	I65/1	65	0.1	SW	2280	148.2	0.00	0.00	$ -	$ -	$ -		
220	Room 1/2 Bathroom 1	1	S 17 C F 1(ELE)	F21ILL	20	0.0	SW	2000	40.0	1	S 17 C F 1(ELE)	F21ILL	20	0.0	SW	2000	40	0.00	0.00	$ -	$ -	$ -		
220	Room 1/2 Bathroom 2	1	S 17 C F 1(ELE)	F21ILL	20	0.0	SW	2000	40.0	1	S 17 C F 1(ELE)	F21ILL	20	0.0	SW	2000	40	0.00	0.00	$ -	$ -	$ -		
20	Room 2	20	S 32 C F 1 (ELE)	F41LL	32	0.6	SW	2400	1,536.0	20	S 32 C F 1 (ELE)	F41LL	32	0.6	C-OCC	1680	1075.2	460.80	0.00	$ 49.31	$ 202.50	$ 35.00	4.1	3.4
20	Room 2	10	S 32 C F 1 (ELE)	F41LL	32	0.3	SW	2400	768.0	10	S 32 C F 1 (ELE)	F41LL	32	0.3	C-OCC	1680	537.6	230.40	0.00	$ 24.65	$ 202.50	$ 35.00	8.2	6.8
20	Room 2	3	S 32 C F 1 (ELE)	F41LL	32	0.1	SW	2400	230.4	3	S 32 C F 1 (ELE)	F41LL	32	0.1	C-OCC	1680	161.28	69.12	0.00	$ 7.40	$ 202.50	$ 35.00	27.4	22.6
20	Room 2 Bathroom	1	S 32 C F 1 (ELE)	F41LL	32	0.0	SW	2000	64.0	1	S 32 C F 1 (ELE)	F41LL	32	0.0	SW	2000	64	0.00	0.00	$ -	$ -	$ -		
20	Room 3	11	S 32 C F 1 (ELE)	F41LL	32	0.4	SW	2400	844.8	11	S 32 C F 1 (ELE)	F41LL	32	0.4	C-OCC	1680	591.36	253.44	0.00	$ 27.12	$ 202.50	$ 35.00	7.5	6.2
20	Room 3	6	S 32 C F 1 (ELE)	F41LL	32	0.2	SW	2400	460.8	6	S 32 C F 1 (ELE)	F41LL	32	0.2	C-OCC	1680	322.56	138.24	0.00	$ 14.79	$ 202.50	$ 35.00	13.7	11.3
20	Room 3 Bathroom	1	S 32 C F 1 (ELE)	F41LL	32	0.0	SW	2000	64.0	1	S 32 C F 1 (ELE)	F41LL	32	0.0	SW	2000	64	0.00	0.00	$ -	$ -	$ -		
20	Room 4	11	S 32 C F 1 (ELE)	F41LL	32	0.4	SW	2400	844.8	11	S 32 C F 1 (ELE)	F41LL	32	0.4	C-OCC	1680	591.36	253.44	0.00	$ 27.12	$ 202.50	$ 35.00	7.5	6.2
20	Room 4	6	S 32 C F 1 (ELE)	F41LL	32	0.2	SW	2400	460.8	6	S 32 C F 1 (ELE)	F41LL	32	0.2	C-OCC	1680	322.56	138.24	0.00	$ 14.79	$ 202.50	$ 35.00	13.7	11.3
20	Room 4 Bathroom	1	S 32 C F 1 (ELE)	F41LL	32	0.0	SW	2000	64.0	1	S 32 C F 1 (ELE)	F41LL	32	0.0	SW	2000	64	0.00	0.00	$ -	$ -	$ -		
20	Room 5	11	S 32 C F 1 (ELE)	F41LL	32	0.4	SW	2400	844.8	11	S 32 C F 1 (ELE)	F41LL	32	0.4	C-OCC	1680	591.36	253.44	0.00	$ 27.12	$ 202.50	$ 35.00	7.5	6.2
20	Room 5	6	S 32 C F 1 (ELE)	F41LL	32	0.2	SW	2400	460.8	6	S 32 C F 1 (ELE)	F41LL	32	0.2	C-OCC	1680	322.56	138.24	0.00	$ 14.79	$ 202.50	$ 35.00	13.7	11.3
20	Room 5 Bathroom	1	S 32 C F 1 (ELE)	F41LL	32	0.0	SW	2000	64.0	1	S 32 C F 1 (ELE)	F41LL	32	0.0	SW	2000	64	0.00	0.00	$ -	$ -	$ -		
20	Room 6	11	S 32 C F 1 (ELE)	F41LL	32	0.4	SW	2400	844.8	11	S 32 C F 1 (ELE)	F41LL	32	0.4	C-OCC	1680	591.36	253.44	0.00	$ 27.12	$ 202.50	$ 35.00	7.5	6.2
20	Room 6	6	S 32 C F 1 (ELE)	F41LL	32	0.2	SW	2400	460.8	6	S 32 C F 1 (ELE)	F41LL	32	0.2	C-OCC	1680	322.56	138.24	0.00	$ 14.79	$ 202.50	$ 35.00	13.7	11.3
20	Room 6 Bathroom	1	S 32 C F 1 (ELE)	F41LL	32	0.0	SW	2000	64.0	1	S 32 C F 1 (ELE)	F41LL	32	0.0	SW	2000	64	0.00	0.00	$ -	$ -	$ -		
20	Room 7	11	S 32 C F 1 (ELE)	F41LL	32	0.4	SW	2400	844.8	11	S 32 C F 1 (ELE)	F41LL	32	0.4	C-OCC	1680	591.36	253.44	0.00	$ 27.12	$ 202.50	$ 35.00	7.5	6.2
20	Room 7	6	S 32 C F 1 (ELE)	F41LL	32	0.2	SW	2400	460.8	6	S 32 C F 1 (ELE)	F41LL	32	0.2	C-OCC	1680	322.56	138.24	0.00	$ 14.79	$ 202.50	$ 35.00	13.7	11.3
20	Room 7 Bathroom	1	S 32 C F 1 (ELE)	F41LL	32	0.0	SW	2000	64.0	1	S 32 C F 1 (ELE)	F41LL	32	0.0	SW	2000	64	0.00	0.00	$ -	$ -	$ -		
20	Room 8	11	S 32 C F 1 (ELE)	F41LL	32	0.4	SW	2400	844.8	11	S 32 C F 1 (ELE)	F41LL	32	0.4	C-OCC	1680	591.36	253.44	0.00	$ 27.12	$ 202.50	$ 35.00	7.5	6.2
20	Room 8	6	S 32 C F 1 (ELE)	F41LL	32	0.2	SW	2400	460.8	6	S 32 C F 1 (ELE)	F41LL	32	0.2	C-OCC	1680	322.56	138.24	0.00	$ 14.79	$ 202.50	$ 35.00	13.7	11.3
20	Room 8 Bathroom	1	S 32 C F 1 (ELE)	F41LL	32	0.0	SW	2000	64.0	1	S 32 C F 1 (ELE)	F41LL	32	0.0	SW	2000	64	0.00	0.00	$ -	$ -	$ -		
20	Room 9	11	S 32 C F 1 (ELE)	F41LL	32	0.4	SW	2400	844.8	11	S 32 C F 1 (ELE)	F41LL	32	0.4	C-OCC	1680	591.36	253.44	0.00	$ 27.12	$ 202.50	$ 35.00	7.5	6.2
20	Room 9	6	S 32 C F 1 (ELE)	F41LL	32	0.2	SW	2400	460.8	6	S 32 C F 1 (ELE)	F41LL	32	0.2	C-OCC	1680	322.56	138.24	0.00	$ 14.79	$ 202.50	$ 35.00	13.7	11.3
20	Room 9 Bathroom	1	S 32 C F 1 (ELE)	F41LL	32	0.0	SW	2000	64.0	1	S 32 C F 1 (ELE)	F41LL	32	0.0	SW	2000	64	0.00	0.00	$ -	$ -	$ -		
20	Room 10	11	S 32 C F 1 (ELE)	F41LL	32	0.4	SW	2400	844.8	11	S 32 C F 1 (ELE)	F41LL	32	0.4	C-OCC	1680	591.36	253.44	0.00	$ 27.12	$ 202.50	$ 35.00	7.5	6.2

Energy Audit of Nixon Elementary School

CHA Project No.24454

ECM-2 Install Occupancy Sensors

Cost of Electricity: **$0.107 $/kWh**

$6.74 $/kW

		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
20	Room 10	6	S 32 C F 1 (ELE)	F41LL	32	0.2	SW	2400	460.8	6	S 32 C F 1 (ELE)	F41LL	32	0.2	C-OCC	1680	322.56	138.24	0.00	$ 14.79	$ 202.50	$ 35.00	13.7	11.3
20	Room 10 Bathroom	1	S 32 C F 1 (ELE)	F41LL	32	0.0	SW	2000	64.0	1	S 32 C F 1 (ELE)	F41LL	32	0.0	SW	2000	64	0.00	0.00	$ -	$ -	$ -		
15	Room 11	12	S 32 C F 2 (ELE)	F42LL	60	0.7	SW	2400	1,728.0	12	S 32 C F 2 (ELE)	F42LL	60	0.7	C-OCC	1680	1209.6	518.40	0.00	$ 55.47	$ 202.50	$ 35.00	3.7	3.0
15	Room 11	6	S 32 C F 2 (ELE)	F42LL	60	0.4	SW	2400	864.0	6	S 32 C F 2 (ELE)	F42LL	60	0.4	C-OCC	1680	604.8	259.20	0.00	$ 27.73	$ 202.50	$ 35.00	7.3	6.0
15	Room 12	12	S 32 C F 2 (ELE)	F42LL	60	0.7	SW	2400	1,728.0	12	S 32 C F 2 (ELE)	F42LL	60	0.7	C-OCC	1680	1209.6	518.40	0.00	$ 55.47	$ 202.50	$ 35.00	3.7	3.0
15	Room 12	6	S 32 C F 2 (ELE)	F42LL	60	0.4	SW	2400	864.0	6	S 32 C F 2 (ELE)	F42LL	60	0.4	C-OCC	1680	604.8	259.20	0.00	$ 27.73	$ 202.50	$ 35.00	7.3	6.0
254	Room 13A	4	T 32 R F 4 (ELE)	F44LL	118	0.5	SW	2400	1,132.8	4	T 32 R F 4 (ELE)	F44LL	118	0.5	C-OCC	1680	792.96	339.84	0.00	$ 36.36	$ 202.50	$ 35.00	5.6	4.6
254	Room 13B	4	T 32 R F 4 (ELE)	F44LL	118	0.5	SW	2400	1,132.8	4	T 32 R F 4 (ELE)	F44LL	118	0.5	C-OCC	1680	792.96	339.84	0.00	$ 36.36	$ 202.50	$ 35.00	5.6	4.6
15	Room 14	12	S 32 C F 2 (ELE)	F42LL	60	0.7	SW	2400	1,728.0	12	S 32 C F 2 (ELE)	F42LL	60	0.7	C-OCC	1680	1209.6	518.40	0.00	$ 55.47	$ 202.50	$ 35.00	3.7	3.0
15	Room 14	6	S 32 C F 2 (ELE)	F42LL	60	0.4	SW	2400	864.0	6	S 32 C F 2 (ELE)	F42LL	60	0.4	C-OCC	1680	604.8	259.20	0.00	$ 27.73	$ 202.50	$ 35.00	7.3	6.0
20	Central Office 1	3	S 32 C F 1 (ELE)	F41LL	32	0.1	SW	2400	230.4	3	S 32 C F 1 (ELE)	F41LL	32	0.1	C-OCC	1200	115.2	115.20	0.00	$ 12.33	$ 202.50	$ 35.00	16.4	13.6
20	Central Office 2	2	S 32 C F 1 (ELE)	F41LL	32	0.1	SW	2400	153.6	2	S 32 C F 1 (ELE)	F41LL	32	0.1	C-OCC	1200	76.8	76.80	0.00	$ 8.22	$ 202.50	$ 35.00	24.6	20.4
20	Central Office 3	3	S 32 C F 1 (ELE)	F41LL	32	0.1	SW	2400	230.4	3	S 32 C F 1 (ELE)	F41LL	32	0.1	C-OCC	1200	115.2	115.20	0.00	$ 12.33	$ 202.50	$ 35.00	16.4	13.6
20	Central Office 4	2	S 32 C F 1 (ELE)	F41LL	32	0.1	SW	2400	153.6	2	S 32 C F 1 (ELE)	F41LL	32	0.1	C-OCC	1200	76.8	76.80	0.00	$ 8.22	$ 202.50	$ 35.00	24.6	20.4
15	Room 15	12	S 32 C F 2 (ELE)	F42LL	60	0.7	SW	2400	1,728.0	12	S 32 C F 2 (ELE)	F42LL	60	0.7	C-OCC	1680	1209.6	518.40	0.00	$ 55.47	$ 202.50	$ 35.00	3.7	3.0
15	Room 15	6	S 32 C F 2 (ELE)	F42LL	60	0.4	SW	2400	864.0	6	S 32 C F 2 (ELE)	F42LL	60	0.4	C-OCC	1680	604.8	259.20	0.00	$ 27.73	$ 202.50	$ 35.00	7.3	6.0
15	Room 16	12	S 32 C F 2 (ELE)	F42LL	60	0.7	SW	2400	1,728.0	12	S 32 C F 2 (ELE)	F42LL	60	0.7	C-OCC	1680	1209.6	518.40	0.00	$ 55.47	$ 202.50	$ 35.00	3.7	3.0
15	Room 16	6	S 32 C F 2 (ELE)	F42LL	60	0.4	SW	2400	864.0	6	S 32 C F 2 (ELE)	F42LL	60	0.4	C-OCC	1680	604.8	259.20	0.00	$ 27.73	$ 202.50	$ 35.00	7.3	6.0
15	Room 17	12	S 32 C F 2 (ELE)	F42LL	60	0.7	SW	2400	1,728.0	12	S 32 C F 2 (ELE)	F42LL	60	0.7	C-OCC	1680	1209.6	518.40	0.00	$ 55.47	$ 202.50	$ 35.00	3.7	3.0
15	Room 17	6	S 32 C F 2 (ELE)	F42LL	60	0.4	SW	2400	864.0	6	S 32 C F 2 (ELE)	F42LL	60	0.4	C-OCC	1680	604.8	259.20	0.00	$ 27.73	$ 202.50	$ 35.00	7.3	6.0
15	Room 18	12	S 32 C F 2 (ELE)	F42LL	60	0.7	SW	2400	1,728.0	12	S 32 C F 2 (ELE)	F42LL	60	0.7	C-OCC	1680	1209.6	518.40	0.00	$ 55.47	$ 202.50	$ 35.00	3.7	3.0
15	Room 18	6	S 32 C F 2 (ELE)	F42LL	60	0.4	SW	2400	864.0	6	S 32 C F 2 (ELE)	F42LL	60	0.4	C-OCC	1680	604.8	259.20	0.00	$ 27.73	$ 202.50	$ 35.00	7.3	6.0
254	Room 19	6	T 32 R F 4 (ELE)	F44LL	118	0.7	SW	2400	1,699.2	6	T 32 R F 4 (ELE)	F44LL	118	0.7	C-OCC	1680	1189.44	509.76	0.00	$ 54.54	$ 202.50	$ 35.00	3.7	3.1
254	Room 19	1	T 32 R F 4 (ELE)	F44LL	118	0.1	SW	2400	283.2	1	T 32 R F 4 (ELE)	F44LL	118	0.1	C-OCC	1680	198.24	84.96	0.00	$ 9.09	$ 202.50	$ 35.00	22.3	18.4
254	Room 20	5	T 32 R F 4 (ELE)	F44LL	118	0.6	SW	2400	1,416.0	5	T 32 R F 4 (ELE)	F44LL	118	0.6	C-OCC	1680	991.2	424.80	0.00	$ 45.45	$ 202.50	$ 35.00	4.5	3.7
254	Room 20	2	T 32 R F 4 (ELE)	F44LL	118	0.2	SW	2400	566.4	2	T 32 R F 4 (ELE)	F44LL	118	0.2	C-OCC	1680	396.48	169.92	0.00	$ 18.18	$ 202.50	$ 35.00	11.1	9.2
33	E. Hallway Men's Bathroom	1	13 W CF 1	CFQ13/1-L	15	0.0	SW	2000	30.0	1	13 W CF 1	CFQ13/1-L	15	0.0	SW	2000	30	0.00	0.00	$ -	$ -	$ -		
198	E. Hallway Men's Bathroom	1	2T 17 R F 2 (ELE)	F22LL	31	0.0	SW	2000	62.0	1	2T 17 R F 2 (ELE)	F22LL	31	0.0	SW	2000	62	0.00	0.00	$ -	$ -	$ -		
33	E. Hallway Women's Bathroom	1	13 W CF 1	CFQ13/1-L	15	0.0	SW	2000	30.0	1	13 W CF 1	CFQ13/1-L	15	0.0	SW	2000	30	0.00	0.00	$ -	$ -	$ -		
198	E. Hallway Women's Bathroom	1	2T 17 R F 2 (ELE)	F22LL	31	0.0	SW	2000	62.0	1	2T 17 R F 2 (ELE)	F22LL	31	0.0	SW	2000	62	0.00	0.00	$ -	$ -	$ -		
254	Room 22	7	T 32 R F 4 (ELE)	F44LL	118	0.8	SW	2400	1,982.4	7	T 32 R F 4 (ELE)	F44LL	118	0.8	C-OCC	1680	1387.68	594.72	0.00	$ 63.64	$ 202.50	$ 35.00	3.2	2.6
254	Room 22	2	T 32 R F 4 (ELE)	F44LL	118	0.2	SW	2400	566.4	2	T 32 R F 4 (ELE)	F44LL	118	0.2	C-OCC	1680	396.48	169.92	0.00	$ 18.18	$ 202.50	$ 35.00	11.1	9.2
210	Room 22	2	2T 32 R F 3 (ELE) THIN TUBE	FU3ILL	89	0.2	SW	2400	427.2	2	2T 32 R F 3 (ELE) THIN TUBE	FU3ILL	89	0.2	C-OCC	1680	299.04	128.16	0.00	$ 13.71	$ 202.50	$ 35.00	14.8	12.2
254	Room 23	8	T 32 R F 4 (ELE)	F44LL	118	0.9	SW	2400	2,265.6	8	T 32 R F 4 (ELE)	F44LL	118	0.9	C-OCC	1680	1585.92	679.68	0.00	$ 72.73	$ 202.50	$ 35.00	2.8	2.3
254	Room 23	3	T 32 R F 4 (ELE)	F44LL	118	0.4	SW	2400	849.6	3	T 32 R F 4 (ELE)	F44LL	118	0.4	C-OCC	1680	594.72	254.88	0.00	$ 27.27	$ 202.50	$ 35.00	7.4	6.1
254	Room 24	8	T 32 R F 4 (ELE)	F44LL	118	0.9	SW	2400	2,265.6	8	T 32 R F 4 (ELE)	F44LL	118	0.9	C-OCC	1680	1585.92	679.68	0.00	$ 72.73	$ 202.50	$ 35.00	2.8	2.3
254	Room 24	3	T 32 R F 4 (ELE)	F44LL	118	0.4	SW	2400	849.6	3	T 32 R F 4 (ELE)	F44LL	118	0.4	C-OCC	1680	594.72	254.88	0.00	$ 27.27	$ 202.50	$ 35.00	7.4	6.1
254	Room 25	8	T 32 R F 4 (ELE)	F44LL	118	0.9	SW	2400	2,265.6	8	T 32 R F 4 (ELE)	F44LL	118	0.9	C-OCC	1680	1585.92	679.68	0.00	$ 72.73	$ 202.50	$ 35.00	2.8	2.3
254	Room 25	3	T 32 R F 4 (ELE)	F44LL	118	0.4	SW	2400	849.6	3	T 32 R F 4 (ELE)	F44LL	118	0.4	C-OCC	1680	594.72	254.88	0.00	$ 27.27	$ 202.50	$ 35.00	7.4	6.1
15	N. Mechanical Room	5	S 32 C F 2 (ELE)	F42LL	60	0.3	SW	1000	300.0	5	S 32 C F 2 (ELE)	F42LL	60	0.3	SW	1000	300	0.00	0.00	$ -	$ -	$ -		
33	N.E. Hallway Men's Bathroom	1	13 W CF 1	CFQ13/1-L	15	0.0	SW	2000	30.0	1	13 W CF 1	CFQ13/1-L	15	0.0	SW	2000	30	0.00	0.00	$ -	$ -	$ -		
198	N.E. Hallway Men's Bathroom	1	2T 17 R F 2 (ELE)	F22LL	31	0.0	SW	2000	62.0	1	2T 17 R F 2 (ELE)	F22LL	31	0.0	SW	2000	62	0.00	0.00	$ -	$ -	$ -		
33	N.E. Hallway Women's Bathroom	1	13 W CF 1	CFQ13/1-L	15	0.0	SW	2000	30.0	1	13 W CF 1	CFQ13/1-L	15	0.0	SW	2000	30	0.00	0.00	$ -	$ -	$ -		
198	N.E. Hallway Women's Bathroom	1	2T 17 R F 2 (ELE)	F22LL	31	0.0	SW	2000	62.0	1	2T 17 R F 2 (ELE)	F22LL	31	0.0	SW	2000	62	0.00	0.00	$ -	$ -	$ -		
198	Main Entrance Lobby	8	2T 17 R F 2 (ELE)	F22LL	31	0.2	SW	2280	565.4	8	2T 17 R F 2 (ELE)	F22LL	31	0.2	SW	2280	565.44	0.00	0.00	$ -	$ -	$ -		
15	Gym Area Hallway	9	S 32 C F 2 (ELE)	F42LL	60	0.5	SW	2280	1,231.2	9	S 32 C F 2 (ELE)	F42LL	60	0.5	SW	2280	1231.2	0.00	0.00	$ -	$ -	$ -		
15	N.E. Hallway	10	S 32 C F 2 (ELE)	F42LL	60	0.6	SW	2280	1,368.0	10	S 32 C F 2 (ELE)	F42LL	60	0.6	SW	2280	1368	0.00	0.00	$ -	$ -	$ -		
15	W. Hallway	8	S 32 C F 2 (ELE)	F42LL	60	0.5	SW	2280	1,094.4	8	S 32 C F 2 (ELE)	F42LL	60	0.5	SW	2280	1094.4	0.00	0.00	$ -	$ -	$ -		
254	W. Hallway	1	T 32 R F 4 (ELE)	F44LL	118	0.1	SW	2280	269.0	1	T 32 R F 4 (ELE)	F44LL	118	0.1	SW	2280	269.04	0.00	0.00	$ -	$ -	$ -		
15	E. Hallway	9	S 32 C F 2 (ELE)	F42LL	60	0.5	SW	2280	1,231.2	9	S 32 C F 2 (ELE)	F42LL	60	0.5	SW	2280	1231.2	0.00	0.00	$ -	$ -	$ -		
15	S. Hallway	21	S 32 C F 2 (ELE)	F42LL	60	1.3	SW	2280	2,872.8	21	S 32 C F 2 (ELE)	F42LL	60	1.3	SW	2280	2872.8	0.00	0.00	$ -	$ -	$ -		
254	S. Hallway	2	T 32 R F 4 (ELE)	F44LL	118	0.2	SW	2280	538.1	2	T 32 R F 4 (ELE)	F44LL	118	0.2	SW	2280	538.08	0.00	0.00	$ -	$ -	$ -		
15	S.E. Hallway	4	S 32 C F 2 (ELE)	F42LL	60	0.2	SW	2280	547.2	4	S 32 C F 2 (ELE)	F42LL	60	0.2	SW	2280	547.2	0.00	0.00	$ -	$ -	$ -		
79	Exterior	12	SP I 100	I100/1	100	1.2	SW	4368	5,241.6	12	SP I 100	I100/1	100	1.2	SW	4368	5241.6	0.00	0.00	$ -	$ -	$ -		
68	Exterior	14	175 MH WALL	MH175/1	215	3.0	SW	4368	13,147.7	14	175 MH WALL	MH175/1	215	3.0	SW	4368	13147.68	0.00	0.00	$ -	$ -	$ -		
144	Exterior	12	HPS 150	HPS150/1	188	2.3	SW	4368	9,854.2	12	HPS 150	HPS150/1	188	2.3	SW	4368	9854.208	0.00	0.00	$ -	$ -	$ -		
44	Exterior	17	DC 26 W CF 2	CFQ26/2-L	50	0.9	SW	4368	3,712.8	17	DC 26 W CF 2	CFQ26/2-L	50	0.9	SW	4368	3712.8	0.00	0.00	$ -	$ -	$ -		
	Total	**860**				**55**			**136,536**	**860**				**55**			**114,751**	**21,786**	**0**	**$ 2,331.09**	**$ 17,010.00**	**$ 2,940.00**		
																		Demand Savings		**0.0**	**$ -**			
																		kWh Savings		**21,786**	**$ 2,331.09**			
																		Total Savings			**$ 2,331.09**		**7.3**	**6.0**

Energy Audit of Nixon Elementary School

CHA Project No.24454 **Cost of Electricity:** **$0.107 $/kWh**

ECM-3 Lighting Replacements with Occupancy Sensors **$6.74 $/kW**

		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
20	Main Office	17	S 32 C F 1 (ELE)	F41LL	32	0.5	SW	2400	1,306	17	S 32 C F 1 (ELE)	F41LL	32	0.544	C-OCC	1,200	652.8	652.80	0.00	$ 69.85	$ 202.50	$ 35.00	2.9	2.4
20	Main Office	3	S 32 C F 1 (ELE)	F41LL	32	0.1	SW	2400	230	3	S 32 C F 1 (ELE)	F41LL	32	0.096	C-OCC	1,200	115.2	115.20	0.00	$ 12.33	$ 202.50	$ 35.00	16.4	13.6
20	Nurse	9	S 32 C F 1 (ELE)	F41LL	32	0.3	SW	2400	691	9	S 32 C F 1 (ELE)	F41LL	32	0.288	C-OCC	1,200	345.6	345.60	0.00	$ 36.98	$ 202.50	$ 35.00	5.5	4.5
20	Nurse	9	S 32 C F 1 (ELE)	F41LL	32	0.3	SW	2400	691	9	S 32 C F 1 (ELE)	F41LL	32	0.288	C-OCC	1,200	345.6	345.60	0.00	$ 36.98	$ 202.50	$ 35.00	5.5	4.5
20	Nurse	3	S 32 C F 1 (ELE)	F41LL	32	0.1	SW	2400	230	3	S 32 C F 1 (ELE)	F41LL	32	0.096	C-OCC	1,200	115.2	115.20	0.00	$ 12.33	$ 202.50	$ 35.00	16.4	13.6
220	Nurse Bathroom	1	S 17 C F 1(ELE)	F21ILL	20	0.0	SW	2000	40	1	S 17 C F 1(ELE)	F21ILL	20	0.02	SW	2,000	40	0.00	0.00	$ -	$ -	$ -		
20	Nurse Closet	1	S 32 C F 1 (ELE)	F41LL	32	0.0	SW	1000	32	1	S 32 C F 1 (ELE)	F41LL	32	0.032	SW	1,000	32	0.00	0.00	$ -	$ -	$ -		
20	Small Gym	28	S 32 C F 1 (ELE)	F41LL	32	0.9	SW	2000	1,792	28	S 32 C F 1 (ELE)	F41LL	32	0.896	C-OCC	2,000	1792	0.00	0.00	$ -	$ 202.50	$ 35.00		
20	Small Gym	1	S 32 C F 1 (ELE)	F41LL	32	0.0	SW	2000	64	1	S 32 C F 1 (ELE)	F41LL	32	0.032	C-OCC	2,000	64	0.00	0.00	$ -	$ 202.50	$ 35.00		
20	Small Gym Office	1	S 32 C F 1 (ELE)	F41LL	32	0.0	SW	2400	77	1	S 32 C F 1 (ELE)	F41LL	32	0.032	C-OCC	1,200	38.4	38.40	0.00	$ 4.11	$ 202.50	$ 35.00	49.3	40.8
20	Small Gym Storage	2	S 32 C F 1 (ELE)	F41LL	32	0.1	SW	1000	64	2	S 32 C F 1 (ELE)	F41LL	32	0.064	SW	1,000	64	0.00	0.00	$ -	$ -	$ -		
20	Cafeteria	18	S 32 C F 1 (ELE)	F41LL	32	0.6	SW	1600	922	18	S 32 C F 1 (ELE)	F41LL	32	0.576	C-OCC	1,200	691.2	230.40	0.00	$ 24.65	$ 202.50	$ 35.00	8.2	6.8
20	Cafeteria	18	S 32 C F 1 (ELE)	F41LL	32	0.6	SW	1600	922	18	S 32 C F 1 (ELE)	F41LL	32	0.576	C-OCC	1,200	691.2	230.40	0.00	$ 24.65	$ 202.50	$ 35.00	8.2	6.8
20	Cafeteria	1	S 32 C F 1 (ELE)	F41LL	32	0.0	SW	1600	51	1	S 32 C F 1 (ELE)	F41LL	32	0.032	C-OCC	1,200	38.4	12.80	0.00	$ 1.37	$ 202.50	$ 35.00	147.9	122.3
20	Cafeteria Storage Large	3	S 32 C F 1 (ELE)	F41LL	32	0.1	SW	1000	96	3	S 32 C F 1 (ELE)	F41LL	32	0.096	SW	1,000	96	0.00	0.00	$ -	$ -	$ -		
20	Cafeteria Storage Small	1	S 32 C F 1 (ELE)	F41LL	32	0.0	SW	1000	32	1	S 32 C F 1 (ELE)	F41LL	32	0.032	SW	1,000	32	0.00	0.00	$ -	$ -	$ -		
20	Cafeteria Storage Small	1	S 32 C F 1 (ELE)	F41LL	32	0.0	SW	1000	32	1	S 32 C F 1 (ELE)	F41LL	32	0.032	SW	1,000	32	0.00	0.00	$ -	$ -	$ -		
20	Kitchen	22	S 32 C F 1 (ELE)	F41LL	32	0.7	SW	1600	1,126	22	S 32 C F 1 (ELE)	F41LL	32	0.704	C-OCC	1,200	844.8	281.60	0.00	$ 30.13	$ 202.50	$ 35.00	6.7	5.6
20	Kitchen Office	4	S 32 C F 1 (ELE)	F41LL	32	0.1	SW	2400	307	4	S 32 C F 1 (ELE)	F41LL	32	0.128	C-OCC	1,200	153.6	153.60	0.00	$ 16.44	$ 202.50	$ 35.00	12.3	10.2
20	Central Boy's Bathroom	3	S 32 C F 1 (ELE)	F41LL	32	0.1	SW	2000	192	3	S 32 C F 1 (ELE)	F41LL	32	0.096	SW	2,000	192	0.00	0.00	$ -	$ -	$ -		
20	Central Girl's Bathroom	3	S 32 C F 1 (ELE)	F41LL	32	0.1	SW	2000	192	3	S 32 C F 1 (ELE)	F41LL	32	0.096	SW	2,000	192	0.00	0.00	$ -	$ -	$ -		
20	Central Storage	4	S 32 C F 1 (ELE)	F41LL	32	0.1	SW	1000	128	4	S 32 C F 1 (ELE)	F41LL	32	0.128	SW	1,000	128	0.00	0.00	$ -	$ -	$ -		
20	Media Center	29	S 32 C F 1 (ELE)	F41LL	32	0.9	SW	2400	2,227	29	S 32 C F 1 (ELE)	F41LL	32	0.928	C-OCC	1,680	1559.04	668.16	0.00	$ 71.49	$ 202.50	$ 35.00	2.8	2.3
15	Media Center	1	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	2400	144	1	S 32 C F 2 (ELE)	F42LL	60	0.06	C-OCC	1,680	100.8	43.20	0.00	$ 4.62	$ 202.50	$ 35.00	43.8	36.2
5	Media Center	3	2T 32 R F 2 (u) (ELE)	FU2LL	60	0.2	SW	2400	432	3	2T 32 R F 2 (u) (ELE)	FU2LL	60	0.18	C-OCC	1,680	302.4	129.60	0.00	$ 13.87	$ 202.50	$ 35.00	14.6	12.1
20	Media Center Office 1	2	S 32 C F 1 (ELE)	F41LL	32	0.1	SW	2400	154	2	S 32 C F 1 (ELE)	F41LL	32	0.064	C-OCC	1,200	76.8	76.80	0.00	$ 8.22	$ 202.50	$ 35.00	24.6	20.4
20	Media Center Office 2	4	S 32 C F 1 (ELE)	F41LL	32	0.1	SW	2400	307	4	S 32 C F 1 (ELE)	F41LL	32	0.128	C-OCC	1,200	153.6	153.60	0.00	$ 16.44	$ 202.50	$ 35.00	12.3	10.2
20	Media Center Storage 1	1	S 32 C F 1 (ELE)	F41LL	32	0.0	SW	1000	32	1	S 32 C F 1 (ELE)	F41LL	32	0.032	SW	1,000	32	0.00	0.00	$ -	$ -	$ -		
20	Media Center Storage 2	3	S 32 C F 1 (ELE)	F41LL	32	0.1	SW	1000	96	3	S 32 C F 1 (ELE)	F41LL	32	0.096	SW	1,000	96	0.00	0.00	$ -	$ -	$ -		
20	Custodian Room	9	S 32 C F 1 (ELE)	F41LL	32	0.3	SW	2400	691	9	S 32 C F 1 (ELE)	F41LL	32	0.288	C-OCC	1,200	345.6	345.60	0.00	$ 36.98	$ 202.50	$ 35.00	5.5	4.5
20	Custodian Room	5	S 32 C F 1 (ELE)	F41LL	32	0.2	SW	1000	160	5	S 32 C F 1 (ELE)	F41LL	32	0.16	SW	1,000	160	0.00	0.00	$ -	$ -	$ -		
20	Custodian Room	3	S 32 C F 1 (ELE)	F41LL	32	0.1	SW	1000	96	3	S 32 C F 1 (ELE)	F41LL	32	0.096	SW	1,000	96	0.00	0.00	$ -	$ -	$ -		
20	Custodian Room	2	S 32 C F 1 (ELE)	F41LL	32	0.1	SW	1000	64	2	S 32 C F 1 (ELE)	F41LL	32	0.064	SW	1,000	64	0.00	0.00	$ -	$ -	$ -		
20	Custodian Room	1	S 32 C F 1 (ELE)	F41LL	32	0.0	SW	1000	32	1	S 32 C F 1 (ELE)	F41LL	32	0.032	SW	1,000	32	0.00	0.00	$ -	$ -	$ -		
20	Faculty Room	7	S 32 C F 1 (ELE)	F41LL	32	0.2	SW	2400	538	7	S 32 C F 1 (ELE)	F41LL	32	0.224	C-OCC	1,200	268.8	268.80	0.00	$ 28.76	$ 202.50	$ 35.00	7.0	5.8
20	Faculty Room Men's Bathroom	1	S 32 C F 1 (ELE)	F41LL	32	0.0	SW	2000	64	1	S 32 C F 1 (ELE)	F41LL	32	0.032	SW	2,000	64	0.00	0.00	$ -	$ -	$ -		
220	Faculty Room Men's Bathroom	1	S 17 C F 1(ELE)	F21ILL	20	0.0	SW	2000	40	1	S 17 C F 1(ELE)	F21ILL	20	0.02	SW	2,000	40	0.00	0.00	$ -	$ -	$ -		
20	Faculty Room Women's Bathroom	1	S 32 C F 1 (ELE)	F41LL	32	0.0	SW	2000	64	1	S 32 C F 1 (ELE)	F41LL	32	0.032	SW	2,000	64	0.00	0.00	$ -	$ -	$ -		
220	Faculty Room Women's Bathroom	1	S 17 C F 1(ELE)	F21ILL	20	0.0	SW	2000	40	1	S 17 C F 1(ELE)	F21ILL	20	0.02	SW	2,000	40	0.00	0.00	$ -	$ -	$ -		
254	Computer Room	11	T 32 R F 4 (ELE)	F44LL	118	1.3	C-OCC	2400	3,115	11	T 32 R F 4 (ELE)	F44LL	118	1.298	C-OCC	1,680	2180.64	934.56	0.00	$ 100.00	$ 202.50	$ 35.00	2.0	1.7
254	Computer Room	2	T 32 R F 4 (ELE)	F44LL	118	0.2	C-OCC	2400	566	2	T 32 R F 4 (ELE)	F44LL	118	0.236	C-OCC	1,680	396.48	169.92	0.00	$ 18.18	$ 202.50	$ 35.00	11.1	9.2
146	Gym	4	High Bay MH 400	MH400/1	458	1.8	SW	2000	3,664	4	F48T5/HO	F42LL-V	85	0.34	C-OCC	2,000	680	2984.00	1.49	$ 439.96	$ 1,402.50	$ 175.00	3.2	2.8
146	Gym	4	High Bay MH 400	MH400/1	458	1.8	SW	2000	3,664	4	F48T5/HO	F42LL-V	85	0.34	C-OCC	2,000	680	2984.00	1.49	$ 439.96	$ 1,402.50	$ 175.00	3.2	2.8
146	Gym	4	High Bay MH 400	MH400/1	458	1.8	SW	2000	3,664	4	F48T5/HO	F42LL-V	85	0.34	C-OCC	2,000	680	2984.00	1.49	$ 439.96	$ 1,402.50	$ 175.00	3.2	2.8
146	Gym	4	High Bay MH 400	MH400/1	458	1.8	SW	2000	3,664	4	F48T5/HO	F42LL-V	85	0.34	C-OCC	2,000	680	2984.00	1.49	$ 439.96	$ 1,402.50	$ 175.00	3.2	2.8
146	Gym	4	High Bay MH 400	MH400/1	458	1.8	SW	2000	3,664	4	F48T5/HO	F42LL-V	85	0.34	C-OCC	2,000	680	2984.00	1.49	$ 439.96	$ 1,402.50	$ 175.00	3.2	2.8
15	Gym	1	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	2000	120	1	S 32 C F 2 (ELE)	F42LL	60	0.06	C-OCC	2,000	120	0.00	0.00	$ -	$ 202.50	$ 35.00		
210	Gym Office	4	2T 32 R F 3 (ELE) THIN TUBE	FU3LL	89	0.4	SW	2400	854	4	2T 32 R F 3 (ELE) THIN TUBE	FU3ILL	89	0.356	C-OCC	1,200	427.2	427.20	0.00	$ 45.71	$ 202.50	$ 35.00	4.4	3.7
15	Gym Storage 1	2	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	1000	120	2	S 32 C F 2 (ELE)	F42LL	60	0.12	SW	1,000	120	0.00	0.00	$ -	$ -	$ -		
15	Gym Storage 2	2	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	1000	120	2	S 32 C F 2 (ELE)	F42LL	60	0.12	SW	1,000	120	0.00	0.00	$ -	$ -	$ -		
15	Gym Area Boy's Bathroom	3	S 32 C F 2 (ELE)	F42LL	60	0.2	SW	2000	360	3	S 32 C F 2 (ELE)	F42LL	60	0.18	SW	2,000	360	0.00	0.00	$ -	$ -	$ -		
20	Gym Area Boy's Bathroom	2	S 32 C F 1 (ELE)	F41LL	32	0.1	SW	2000	128	2	S 32 C F 1 (ELE)	F41LL	32	0.064	SW	2,000	128	0.00	0.00	$ -	$ -	$ -		
15	Gym Area Girl's Bathroom	3	S 32 C F 2 (ELE)	F42LL	60	0.2	SW	2000	360	3	S 32 C F 2 (ELE)	F42LL	60	0.18	SW	2,000	360	0.00	0.00	$ -	$ -	$ -		
20	Gym Area Girl's Bathroom	2	S 32 C F 1 (ELE)	F41LL	32	0.1	SW	2000	128	2	S 32 C F 1 (ELE)	F41LL	32	0.064	SW	2,000	128	0.00	0.00	$ -	$ -	$ -		
15	Stage	9	S 32 C F 2 (ELE)	F42LL	60	0.5	SW	1000	540	9	S 32 C F 2 (ELE)	F42LL	60	0.54	SW	1,000	540	0.00	0.00	$ -	$ -	$ -		
15	Stage	9	S 32 C F 2 (ELE)	F42LL	60	0.5	SW	1000	540	9	S 32 C F 2 (ELE)	F42LL	60	0.54	SW	1,000	540	0.00	0.00	$ -	$ -	$ -		
15	Stage Hall	3	S 32 C F 2 (ELE)	F42LL	60	0.2	SW	2280	410	3	S 32 C F 2 (ELE)	F42LL	60	0.18	SW	2,280	410.4	0.00	0.00	$ -	$ -	$ -		
15	Gym Area Closet 1	1	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	1000	60	1	S 32 C F 2 (ELE)	F42LL	60	0.06	SW	1,000	60	0.00	0.00	$ -	$ -	$ -		
15	Gym Area Closet 2	1	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	1000	60	1	S 32 C F 2 (ELE)	F42LL	60	0.06	SW	1,000	60	0.00	0.00	$ -	$ -	$ -		
20	Room 1	20	S 32 C F 1 (ELE)	F41LL	32	0.6	SW	2400	1,536	20	S 32 C F 1 (ELE)	F41LL	32	0.64	C-OCC	1,680	1075.2	460.80	0.00	$ 49.31	$ 202.50	$ 35.00	4.1	3.4
20	Room 1	10	S 32 C F 1 (ELE)	F41LL	32	0.3	SW	2400	768	10	S 32 C F 1 (ELE)	F41LL	32	0.32	C-OCC	1,680	537.6	230.40	0.00	$ 24.65	$ 202.50	$ 35.00	8.2	6.8
20	Room 1	3	S 32 C F 1 (ELE)	F41LL	32	0.1	SW	2400	230	3	S 32 C F 1 (ELE)	F41LL	32	0.096	C-OCC	1,680	161.28	69.12	0.00	$ 7.40	$ 202.50	$ 35.00	27.4	22.6
20	Room 1 Bathroom	1	S 32 C F 1 (ELE)	F41LL	32	0.0	SW	2000	64	1	S 32 C F 1 (ELE)	F41LL	32	0.032	SW	2,000	64	0.00	0.00	$ -	$ -	$ -		
108	Room 1/2 Vestibule	1	I 65	I65/1	65	0.1	SW	2280	148	1	CF 26	CFQ26/1-L	27	0.027	SW	2,280	61.56	86.64	0.04	$ 12.34	$ 20.25	$ -	1.6	1.6
108	Room 1/2 Vestibule	1	I 65	I65/1	65	0.1	SW	2280	148	1	CF 26	CFQ26/1-L	27	0.027	SW	2,280	61.56	86.64	0.04	$ 12.34	$ 20.25	$ -	1.6	1.6
220	Room 1/2 Bathroom 1	1	S 17 C F 1(ELE)	F21ILL	20	0.0	SW	2000	40	1	S 17 C F 1(ELE)	F21ILL	20	0.02	SW	2,000	40	0.00	0.00	$ -	$ -	$ -		
220	Room 1/2 Bathroom 2	1	S 17 C F 1(ELE)	F21ILL	20	0.0	SW	2000	40	1	S 17 C F 1(ELE)	F21ILL	20	0.02	SW	2,000	40	0.00	0.00	$ -	$ -	$ -		
20	Room 2	20	S 32 C F 1 (ELE)	F41LL	32	0.6	SW	2400	1,536	20	S 32 C F 1 (ELE)	F41LL	32	0.64	C-OCC	1,680	1075.2	460.80	0.00	$ 49.31	$ 202.50	$ 35.00	4.1	3.4
20	Room 2	10	S 32 C F 1 (ELE)	F41LL	32	0.3	SW	2400	768	10	S 32 C F 1 (ELE)	F41LL	32	0.32	C-OCC	1,680	537.6	230.40	0.00	$ 24.65	$ 202.50	$ 35.00	8.2	6.8
20	Room 2	3	S 32 C F 1 (ELE)	F41LL	32	0.1	SW	2400	230	3	S 32 C F 1 (ELE)	F41LL	32	0.096	C-OCC	1,680	161.28	69.12	0.00	$ 7.40	$ 202.50	$ 35.00	27.4	22.6
20	Room 2 Bathroom	1	S 32 C F 1 (ELE)	F41LL	32	0.0	SW	2000	64	1	S 32 C F 1 (ELE)	F41LL	32	0.032	SW	2,000	64	0.00	0.00	$ -	$ -	$ -		
20	Room 3	11	S 32 C F 1 (ELE)	F41LL	32	0.4	SW	2400	845	11	S 32 C F 1 (ELE)	F41LL	32	0.352	C-OCC	1,680	591.36	253.44	0.00	$ 27.12	$ 202.50	$ 35.00	7.5	6.2
20	Room 3	6	S 32 C F 1 (ELE)	F41LL	32	0.2	SW	2400	461	6	S 32 C F 1 (ELE)	F41LL	32	0.192	C-OCC	1,680	322.56	138.24	0.00	$ 14.79	$ 202.50	$ 35.00	13.7	11.3
20	Room 3 Bathroom	1	S 32 C F 1 (ELE)	F41LL	32	0.0	SW	2000	64	1	S 32 C F 1 (ELE)	F41LL	32	0.032	SW	2,000	64	0.00	0.00	$ -	$ -	$ -		
20	Room 4	11	S 32 C F 1 (ELE)	F41LL	32	0.4	SW	2400	845	11	S 32 C F 1 (ELE)	F41LL	32	0.352	C-OCC	1,680	591.36	253.44	0.00	$ 27.12	$ 202.50	$ 35.00	7.5	6.2
20	Room 4	6	S 32 C F 1 (ELE)	F41LL	32	0.2	SW	2400	461	6	S 32 C F 1 (ELE)	F41LL	32	0.192	C-OCC	1,680	322.56	138.24	0.00	$ 14.79	$ 202.50	$ 35.00	13.7	11.3
20	Room 4 Bathroom	1	S 32 C F 1 (ELE)	F41LL	32	0.0	SW	2000	64	1	S 32 C F 1 (ELE)	F41LL	32	0.032	SW	2,000	64	0.00	0.00	$ -	$ -	$ -		
20	Room 5	11	S 32 C F 1 (ELE)	F41LL	32	0.4	SW	2400	845	11	S 32 C F 1 (ELE)	F41LL	32	0.352	C-OCC	1,680	591.36	253.44	0.00	$ 27.12	$ 202.50	$ 35.00	7.5	6.2
20	Room 5	6	S 32 C F 1 (ELE)	F41LL	32	0.2	SW	2400	461	6	S 32 C F 1 (ELE)	F41LL	32	0.192	C-OCC	1,680	322.56	138.24	0.00	$ 14.79	$ 202.50	$ 35.00	13.7	11.3
20	Room 5 Bathroom	1	S 32 C F 1 (ELE)	F41LL	32	0.0	SW	2000	64	1	S 32 C F 1 (ELE)	F41LL	32	0.032	SW	2,000	64	0.00	0.00	$ -	$ -	$ -		
20	Room 6	11	S 32 C F 1 (ELE)	F41LL	32	0.4	SW	2400	845	11	S 32 C F 1 (ELE)	F41LL	32	0.352	C-OCC	1,680	591.36	253.44	0.00	$ 27.12	$ 202.50	$ 35.00	7.5	6.2
20	Room 6	6	S 32 C F 1 (ELE)	F41LL	32	0.2	SW	2400	461	6	S 32 C F 1 (ELE)	F41LL	32	0.192	C-OCC	1,680	322.56	138.24	0.00	$ 14.79	$ 202.50	$ 35.00	13.7	11.3
20	Room 6 Bathroom	1	S 32 C F 1 (ELE)	F41LL	32	0.0	SW	2000	64	1	S 32 C F 1 (ELE)	F41LL	32	0.032	SW	2,000	64	0.00	0.00	$ -	$ -	$ -		
20	Room 7	11	S 32 C F 1 (ELE)	F41LL	32	0.4	SW	2400	845	11	S 32 C F 1 (ELE)	F41LL	32	0.352	C-OCC	1,680	591.36	253.44	0.00	$ 27.12	$ 202.50	$ 35.00	7.5	6.2
20	Room 7	6	S 32 C F 1 (ELE)	F41LL	32	0.2	SW	2400	461	6	S 32 C F 1 (ELE)	F41LL	32	0.192	C-OCC	1,680	322.56	138.24	0.00	$ 14.79	$ 202.50	$ 35.00	13.7	11.3
20	Room 7 Bathroom	1	S 32 C F 1 (ELE)	F41LL	32	0.0	SW	2000	64	1	S 32 C F 1 (ELE)	F41LL	32	0.032	SW	2,000	64	0.00	0.00	$ -	$ -	$ -		
20	Room 8	11	S 32 C F 1 (ELE)	F41LL	32	0.4	SW	2400	845	11	S 32 C F 1 (ELE)	F41LL	32	0.352	C-OCC	1,680	591.36	253.44	0.00	$ 27.12	$ 202.50	$ 35.00	7.5	6.2
20	Room 8	6	S 32 C F 1 (ELE)	F41LL	32	0.2	SW	2400	461	6	S 32 C F 1 (ELE)	F41LL	32	0.192	C-OCC	1,680	322.56	138.24	0.00	$ 14.79	$ 202.50	$ 35.00	13.7	11.3
20	Room 8 Bathroom	1	S 32 C F 1 (ELE)	F41LL	32	0.0	SW	2000	64	1	S 32 C F 1 (ELE)	F41LL	32	0.032	SW	2,000	64	0.00	0.00	$ -	$ -	$ -		
20	Room 9	11	S 32 C F 1 (ELE)	F41LL	32	0.4	SW	2400	845	11	S 32 C F 1 (ELE)	F41LL	32	0.352	C-OCC	1,680	591.36	253.44	0.00	$ 27.12	$ 202.50	$ 35.00	7.5	6.2
20	Room 9	6	S 32 C F 1 (ELE)	F41LL	32	0.2	SW	2400	461	6	S 32 C F 1 (ELE)	F41LL	32	0.192	C-OCC	1,680	322.56	138.24	0.00	$ 14.79	$ 202.50	$ 35.00	13.7	11.3
20	Room 9 Bathroom	1	S 32 C F 1 (ELE)	F41LL	32	0.0	SW	2000	64	1	S 32 C F 1 (ELE)	F41LL	32	0.032	SW	2,000	64	0.00	0.00	$ -	$ -	$ -		
20	Room 10	11	S 32 C F 1 (ELE)	F41LL	32	0.4	SW	2400	845	11	S 32 C F 1 (ELE)	F41LL	32	0.352	C-OCC	1,680	591.36	253.44	0.00	$ 27.12	$ 202.50	$ 35.00	7.5	6.2

Energy Audit of Nixon Elementary School

CHA Project No.24454

ECM-3 Lighting Replacements with Occupancy Sensors

Cost of Electricity: **$0.107 $/kWh**

$6.74 $/kW

		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
20	Room 10	6	S 32 C F 1 (ELE)	F41LL	32	0.2	SW	2400	461	6	S 32 C F 1 (ELE)	F41LL	32	0.192	C-OCC	1,680	322.56	138.24	0.00	$ 14.79	$ 202.50	$ 35.00	13.7	11.3
20	Room 10 Bathroom	1	S 32 C F 1 (ELE)	F41LL	32	0.0	SW	2000	64	1	S 32 C F 1 (ELE)	F41LL	32	0.032	SW	2,000	64	0.00	0.00	$ -	$ -	$ -		
15	Room 11	12	S 32 C F 2 (ELE)	F42LL	60	0.7	SW	2400	1,728	12	S 32 C F 2 (ELE)	F42LL	60	0.72	C-OCC	1,680	1209.6	518.40	0.00	$ 55.47	$ 202.50	$ 35.00	3.7	3.0
15	Room 11	6	S 32 C F 2 (ELE)	F42LL	60	0.4	SW	2400	864	6	S 32 C F 2 (ELE)	F42LL	60	0.36	C-OCC	1,680	604.8	259.20	0.00	$ 27.73	$ 202.50	$ 35.00	7.3	6.0
15	Room 12	12	S 32 C F 2 (ELE)	F42LL	60	0.7	SW	2400	1,728	12	S 32 C F 2 (ELE)	F42LL	60	0.72	C-OCC	1,680	1209.6	518.40	0.00	$ 55.47	$ 202.50	$ 35.00	3.7	3.0
15	Room 12	6	S 32 C F 2 (ELE)	F42LL	60	0.4	SW	2400	864	6	S 32 C F 2 (ELE)	F42LL	60	0.36	C-OCC	1,680	604.8	259.20	0.00	$ 27.73	$ 202.50	$ 35.00	7.3	6.0
254	Room 13A	4	T 32 R F 4 (ELE)	F44LL	118	0.5	SW	2400	1,133	4	T 32 R F 4 (ELE)	F44LL	118	0.472	C-OCC	1,680	792.96	339.84	0.00	$ 36.36	$ 202.50	$ 35.00	5.6	4.6
254	Room 13B	4	T 32 R F 4 (ELE)	F44LL	118	0.5	SW	2400	1,133	4	T 32 R F 4 (ELE)	F44LL	118	0.472	C-OCC	1,680	792.96	339.84	0.00	$ 36.36	$ 202.50	$ 35.00	5.6	4.6
15	Room 14	12	S 32 C F 2 (ELE)	F42LL	60	0.7	SW	2400	1,728	12	S 32 C F 2 (ELE)	F42LL	60	0.72	C-OCC	1,680	1209.6	518.40	0.00	$ 55.47	$ 202.50	$ 35.00	3.7	3.0
15	Room 14	6	S 32 C F 2 (ELE)	F42LL	60	0.4	SW	2400	864	6	S 32 C F 2 (ELE)	F42LL	60	0.36	C-OCC	1,680	604.8	259.20	0.00	$ 27.73	$ 202.50	$ 35.00	7.3	6.0
20	Central Office 1	3	S 32 C F 1 (ELE)	F41LL	32	0.1	SW	2400	230	3	S 32 C F 1 (ELE)	F41LL	32	0.096	C-OCC	1,200	115.2	115.20	0.00	$ 12.33	$ 202.50	$ 35.00	16.4	13.6
20	Central Office 2	2	S 32 C F 1 (ELE)	F41LL	32	0.1	SW	2400	154	2	S 32 C F 1 (ELE)	F41LL	32	0.064	C-OCC	1,200	76.8	76.80	0.00	$ 8.22	$ 202.50	$ 35.00	24.6	20.4
20	Central Office 3	3	S 32 C F 1 (ELE)	F41LL	32	0.1	SW	2400	230	3	S 32 C F 1 (ELE)	F41LL	32	0.096	C-OCC	1,200	115.2	115.20	0.00	$ 12.33	$ 202.50	$ 35.00	16.4	13.6
20	Central Office 4	2	S 32 C F 1 (ELE)	F41LL	32	0.1	SW	2400	154	2	S 32 C F 1 (ELE)	F41LL	32	0.064	C-OCC	1,200	76.8	76.80	0.00	$ 8.22	$ 202.50	$ 35.00	24.6	20.4
15	Room 15	12	S 32 C F 2 (ELE)	F42LL	60	0.7	SW	2400	1,728	12	S 32 C F 2 (ELE)	F42LL	60	0.72	C-OCC	1,680	1209.6	518.40	0.00	$ 55.47	$ 202.50	$ 35.00	3.7	3.0
15	Room 15	6	S 32 C F 2 (ELE)	F42LL	60	0.4	SW	2400	864	6	S 32 C F 2 (ELE)	F42LL	60	0.36	C-OCC	1,680	604.8	259.20	0.00	$ 27.73	$ 202.50	$ 35.00	7.3	6.0
15	Room 16	12	S 32 C F 2 (ELE)	F42LL	60	0.7	SW	2400	1,728	12	S 32 C F 2 (ELE)	F42LL	60	0.72	C-OCC	1,680	1209.6	518.40	0.00	$ 55.47	$ 202.50	$ 35.00	3.7	3.0
15	Room 16	6	S 32 C F 2 (ELE)	F42LL	60	0.4	SW	2400	864	6	S 32 C F 2 (ELE)	F42LL	60	0.36	C-OCC	1,680	604.8	259.20	0.00	$ 27.73	$ 202.50	$ 35.00	7.3	6.0
15	Room 17	12	S 32 C F 2 (ELE)	F42LL	60	0.7	SW	2400	1,728	12	S 32 C F 2 (ELE)	F42LL	60	0.72	C-OCC	1,680	1209.6	518.40	0.00	$ 55.47	$ 202.50	$ 35.00	3.7	3.0
15	Room 17	6	S 32 C F 2 (ELE)	F42LL	60	0.4	SW	2400	864	6	S 32 C F 2 (ELE)	F42LL	60	0.36	C-OCC	1,680	604.8	259.20	0.00	$ 27.73	$ 202.50	$ 35.00	7.3	6.0
15	Room 18	12	S 32 C F 2 (ELE)	F42LL	60	0.7	SW	2400	1,728	12	S 32 C F 2 (ELE)	F42LL	60	0.72	C-OCC	1,680	1209.6	518.40	0.00	$ 55.47	$ 202.50	$ 35.00	3.7	3.0
15	Room 18	6	S 32 C F 2 (ELE)	F42LL	60	0.4	SW	2400	864	6	S 32 C F 2 (ELE)	F42LL	60	0.36	C-OCC	1,680	604.8	259.20	0.00	$ 27.73	$ 202.50	$ 35.00	7.3	6.0
254	Room 19	6	T 32 R F 4 (ELE)	F44LL	118	0.7	SW	2400	1,699	6	T 32 R F 4 (ELE)	F44LL	118	0.708	C-OCC	1,680	1189.44	509.76	0.00	$ 54.54	$ 202.50	$ 35.00	3.7	3.1
254	Room 19	1	T 32 R F 4 (ELE)	F44LL	118	0.1	SW	2400	283	1	T 32 R F 4 (ELE)	F44LL	118	0.118	C-OCC	1,680	198.24	84.96	0.00	$ 9.09	$ 202.50	$ 35.00	22.3	18.4
254	Room 20	5	T 32 R F 4 (ELE)	F44LL	118	0.6	SW	2400	1,416	5	T 32 R F 4 (ELE)	F44LL	118	0.59	C-OCC	1,680	991.2	424.80	0.00	$ 45.45	$ 202.50	$ 35.00	4.5	3.7
254	Room 20	2	T 32 R F 4 (ELE)	F44LL	118	0.2	SW	2400	566	2	T 32 R F 4 (ELE)	F44LL	118	0.236	C-OCC	1,680	396.48	169.92	0.00	$ 18.18	$ 202.50	$ 35.00	11.1	9.2
33	E. Hallway Men's Bathroom	1	13 W CF 1	CFQ13/1-L	15	0.0	SW	2000	30	1	13 W CF 1	CFQ13/1-L	15	0.015	SW	2,000	30	0.00	0.00	$ -	$ -	$ -		
198	E. Hallway Men's Bathroom	1	2T 17 R F 2 (ELE)	F22LL	31	0.0	SW	2000	62	1	2T 17 R F 2 (ELE)	F22LL	31	0.031	SW	2,000	62	0.00	0.00	$ -	$ -	$ -		
33	E. Hallway Women's Bathroom	1	13 W CF 1	CFQ13/1-L	15	0.0	SW	2000	30	1	13 W CF 1	CFQ13/1-L	15	0.015	SW	2,000	30	0.00	0.00	$ -	$ -	$ -		
198	E. Hallway Women's Bathroom	1	2T 17 R F 2 (ELE)	F22LL	31	0.0	SW	2000	62	1	2T 17 R F 2 (ELE)	F22LL	31	0.031	SW	2,000	62	0.00	0.00	$ -	$ -	$ -		
254	Room 22	7	T 32 R F 4 (ELE)	F44LL	118	0.8	SW	2400	1,982	7	T 32 R F 4 (ELE)	F44LL	118	0.826	C-OCC	1,680	1387.68	594.72	0.00	$ 63.64	$ 202.50	$ 35.00	3.2	2.6
254	Room 22	2	T 32 R F 4 (ELE)	F44LL	118	0.2	SW	2400	566	2	T 32 R F 4 (ELE)	F44LL	118	0.236	C-OCC	1,680	396.48	169.92	0.00	$ 18.18	$ 202.50	$ 35.00	11.1	9.2
210	Room 22	2	2T 32 R F 3 (ELE) THIN TUBE	FU3ILL	89	0.2	SW	2400	427	2	2T 32 R F 3 (ELE) THIN TUBE	FU3ILL	89	0.178	C-OCC	1,680	299.04	128.16	0.00	$ 13.71	$ 202.50	$ 35.00	14.8	12.2
254	Room 23	8	T 32 R F 4 (ELE)	F44LL	118	0.9	SW	2400	2,266	8	T 32 R F 4 (ELE)	F44LL	118	0.944	C-OCC	1,680	1585.92	679.68	0.00	$ 72.73	$ 202.50	$ 35.00	2.8	2.3
254	Room 23	3	T 32 R F 4 (ELE)	F44LL	118	0.4	SW	2400	850	3	T 32 R F 4 (ELE)	F44LL	118	0.354	C-OCC	1,680	594.72	254.88	0.00	$ 27.27	$ 202.50	$ 35.00	7.4	6.1
254	Room 24	8	T 32 R F 4 (ELE)	F44LL	118	0.9	SW	2400	2,266	8	T 32 R F 4 (ELE)	F44LL	118	0.944	C-OCC	1,680	1585.92	679.68	0.00	$ 72.73	$ 202.50	$ 35.00	2.8	2.3
254	Room 24	3	T 32 R F 4 (ELE)	F44LL	118	0.4	SW	2400	850	3	T 32 R F 4 (ELE)	F44LL	118	0.354	C-OCC	1,680	594.72	254.88	0.00	$ 27.27	$ 202.50	$ 35.00	7.4	6.1
254	Room 25	8	T 32 R F 4 (ELE)	F44LL	118	0.9	SW	2400	2,266	8	T 32 R F 4 (ELE)	F44LL	118	0.944	C-OCC	1,680	1585.92	679.68	0.00	$ 72.73	$ 202.50	$ 35.00	2.8	2.3
254	Room 25	3	T 32 R F 4 (ELE)	F44LL	118	0.4	SW	2400	850	3	T 32 R F 4 (ELE)	F44LL	118	0.354	C-OCC	1,680	594.72	254.88	0.00	$ 27.27	$ 202.50	$ 35.00	7.4	6.1
15	N. Mechanical Room	5	S 32 C F 2 (ELE)	F42LL	60	0.3	SW	1000	300	5	S 32 C F 2 (ELE)	F42LL	60	0.3	SW	1,000	300	0.00	0.00	$ -	$ -	$ -		
33	N.E. Hallway Men's Bathroom	1	13 W CF 1	CFQ13/1-L	15	0.0	SW	2000	30	1	13 W CF 1	CFQ13/1-L	15	0.015	SW	2,000	30	0.00	0.00	$ -	$ -	$ -		
198	N.E. Hallway Men's Bathroom	1	2T 17 R F 2 (ELE)	F22LL	31	0.0	SW	2000	62	1	2T 17 R F 2 (ELE)	F22LL	31	0.031	SW	2,000	62	0.00	0.00	$ -	$ -	$ -		
33	N.E. Hallway Women's Bathroom	1	13 W CF 1	CFQ13/1-L	15	0.0	SW	2000	30	1	13 W CF 1	CFQ13/1-L	15	0.015	SW	2,000	30	0.00	0.00	$ -	$ -	$ -		
198	N.E. Hallway Women's Bathroom	1	2T 17 R F 2 (ELE)	F22LL	31	0.0	SW	2000	62	1	2T 17 R F 2 (ELE)	F22LL	31	0.031	SW	2,000	62	0.00	0.00	$ -	$ -	$ -		
198	Main Entrance Lobby	8	2T 17 R F 2 (ELE)	F22LL	31	0.2	SW	2280	565	8	2T 17 R F 2 (ELE)	F22LL	31	0.248	SW	2,280	565.44	0.00	0.00	$ -	$ -	$ -		
15	Gym Area Hallway	9	S 32 C F 2 (ELE)	F42LL	60	0.5	SW	2280	1,231	9	S 32 C F 2 (ELE)	F42LL	60	0.54	SW	2,280	1231.2	0.00	0.00	$ -	$ -	$ -		
15	N.E. Hallway	10	S 32 C F 2 (ELE)	F42LL	60	0.6	SW	2280	1,368	10	S 32 C F 2 (ELE)	F42LL	60	0.6	SW	2,280	1368	0.00	0.00	$ -	$ -	$ -		
15	W. Hallway	8	S 32 C F 2 (ELE)	F42LL	60	0.5	SW	2280	1,094	8	S 32 C F 2 (ELE)	F42LL	60	0.48	SW	2,280	1094.4	0.00	0.00	$ -	$ -	$ -		
254	W. Hallway	1	T 32 R F 4 (ELE)	F44LL	118	0.1	SW	2280	269	1	T 32 R F 4 (ELE)	F44LL	118	0.118	SW	2,280	269.04	0.00	0.00	$ -	$ -	$ -		
15	E. Hallway	9	S 32 C F 2 (ELE)	F42LL	60	0.5	SW	2280	1,231	9	S 32 C F 2 (ELE)	F42LL	60	0.54	SW	2,280	1231.2	0.00	0.00	$ -	$ -	$ -		
15	S. Hallway	21	S 32 C F 2 (ELE)	F42LL	60	1.3	SW	2280	2,873	21	S 32 C F 2 (ELE)	F42LL	60	1.26	SW	2,280	2872.8	0.00	0.00	$ -	$ -	$ -		
254	S. Hallway	2	T 32 R F 4 (ELE)	F44LL	118	0.2	SW	2280	538	2	T 32 R F 4 (ELE)	F44LL	118	0.236	SW	2,280	538.08	0.00	0.00	$ -	$ -	$ -		
15	S.E. Hallway	4	S 32 C F 2 (ELE)	F42LL	60	0.2	SW	2280	547	4	S 32 C F 2 (ELE)	F42LL	60	0.24	SW	2,280	547.2	0.00	0.00	$ -	$ -	$ -		
79	Exterior	12	SP I 100	I100/1	100	1.2	SW	4368	5,242	12	CF 26	CFQ26/1-L	27	0.324	SW	4,368	1415.232	3826.37	0.88	$ 480.27	$ 243.00	$ -	0.5	0.5
68	Exterior	14	175 MH WALL	MH175/1	215	3.0	SW	4368	13,148	14	175 MH WALL	MH175/1	215	3.01	SW	4,368	13147.68	0.00	0.00	$ -	$ -	$ -		
144	Exterior	12	HPS 150	HPS150/1	188	2.3	SW	4368	9,854	12	HPS 150	HPS150/1	188	2.256	SW	4,368	9854.208	0.00	0.00	$ -	$ -	$ -		
44	Exterior	17	DC 26 W CF 2	CFQ26/2-L	50	0.9	SW	4368	3,713	17	DC 26 W CF 2	CFQ26/2-L	50	0.85	SW	4,368	3712.8	0.00	0.00	$ -	$ -	$ -		
	Total	**860**				**55.2**			**136,536**	**860**				**46.8**			**95,831**		**8.4**	**$ 5,035.86**	**$ 23,293.50**	**$ 3,640.00**		
																		Demand Savings		**8.4**	**$ 680.36**			
																		kWh Savings		**40706**	**$ 4,355.50**			
																		Total Savings			**$ 5,035.86**		**4.6**	**3.9**

APPENDIX D

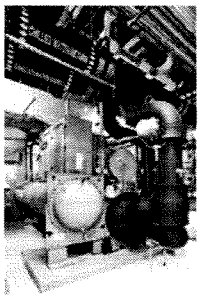
New Jersey Pay For Performance Incentive Program

Pay for Performance - Existing Buildings

Download program applications and incentive forms.

The Greater the Savings, the Greater Your Incentives

Take a comprehensive, whole-building approach to saving energy in your existing facilities and earn incentives that are directly linked to your savings. Pay for Performance relies on a network of program partners who provide technical services under direct contract to you. Acting as your energy expert, your partner will develop an energy reduction plan for each project with a whole-building technical component of a traditional energy audit, a financial plan for funding the energy efficient measures and a construction schedule for installation.



Eligibility

Existing commercial, industrial and institutional buildings with a peak demand over 100 kW for any of the preceding twelve months are eligible to participate including hotels and casinos, large office buildings, multi-family buildings, supermarkets, manufacturing facilities, schools, shopping malls and restaurants. Buildings that fall into the following five customer classes are not required to meet the 100 kW demand in order to participate in the program: hospitals, public colleges and universities, 501(c)(3) non-profits, affordable multifamily housing, and local governmental entities. Your energy reduction plan must define a comprehensive package of measures capable of reducing the existing energy consumption of your building by 15% or more.

Exceptions to the 15% threshold requirement may be made for certain industrial, manufacturing, water treatment and datacenter building types whose annual energy consumption is heavily weighted on process loads. Details are available in the high energy intensity section of the FAQ page.

ENERGY STAR Portfolio Manager

Pay for Performance takes advantage of the ENERGY STAR Program with Portfolio Manager, EPA's interactive tool that allows facility managers to track and evaluate energy and water consumption across all of their buildings. The tool provides the opportunity to load in the characteristics and energy usage of your buildings and determine an energy performance benchmark score. You can then assess energy management goals over time, identify strategic opportunities for savings, and receive EPA recognition for superior energy performance.

This rating system assesses building performance by tracking and scoring energy use in your facilities and comparing it to similar buildings. That can be a big help in locating opportunities for cost-justified energy efficiency upgrades. And, based on our findings, you may be invited to participate in the Building Performance with ENERGY STAR initiative and receive special recognition as an industry leader in energy efficiency.

Incentives

Pay for Performance incentives are awarded upon the satisfactory completion of three program milestones:

Incentive #1 - Submittal of complete energy reduction plan prepared by an approved program partner - Contingent on moving forward, incentives will be between $5,000 and $50,000 based on approximately $.10 per square foot, not to exceed 50% of the facility's annual energy expense.

Incentive #2 - Installation of recommended measures - Incentives are based on the projected level of electricity and natural gas savings resulting from the installation of comprehensive energy-efficiency measures.

Incentive #3 - Completion of Post-Construction Benchmarking Report - A completed report verifying energy reductions based on one year of post-implementation results. Incentives for electricity and natural gas savings will be paid based on actual savings, provided that the minimum performance threshold of 15% savings has been achieved.

CONTACT US

A detailed Incentive Structure document is available on the applications and forms page.

Energy Efficiency Revolving Loan Fund (EE RLF)

New Jersey-based commercial, institutional or industrial entities (including 501(c)(3) organizations) that have received an approved energy reduction plan under Pay for Performance may be eligible for supplemental financing through the EE RLF. The financing, in the form of low-interest loans, can be used to support up to 80% of total eligible project costs, not to exceed $2.5 million or 100% of total eligible project costs from all public state funding sources. Visit the NJ EDA website for details.

Steps to Participation

Click here for a step-by-step description of the program.

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.

New Jersey Pay For Performance Incentive Program

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

Total Building Area (Square Feet)	50,890
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)	$93,652	$20,706
Existing Usage (from utility)	407,400	16,861
Proposed Savings	81,798	1,417
Existing Total MMBtus	3,077	
Proposed Savings MMBtus	421	
% Energy Reduction	**13.7%**	
Proposed Annual Savings	$26,200	

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

	Incentives $		
	Elec	Gas	Total
Incentive #1	$0	$0	$5,089
Incentive #2	$0	$0	$0
Incentive #3	$0	$0	$0
Total All Incentives	**$0**	**$0**	**$5,089**

Total Project Cost	$95,295

		Allowable Incentive
% Incentives #1 of Utility Cost*	4.5%	$5,089
% Incentives #2 of Project Cost**	0.0%	$0
% Incentives #3 of Project Cost**	0.0%	$0
Total Eligible Incentives***	**$5,089**	
Project Cost w/ Incentives	$90,206	

Project Payback (years)	
w/o Incentives	w/ Incentives
3.6	3.4

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

** Maximum allowable amount of Incentive #2 is 25% of total project cost.
Maximum allowable amount of Incentive #3 is 25% of total project cost.

*** Maximum allowable amount of Incentive #1 is $50,000 if not funded by NJ BPU, and $25,000 if it is.
Maximum allowable amount of Incentive #2 & #3 is $1 million per gas account and $1 million per electric account; maximum 2 million per project

APPENDIX E

Energy Savings Improvement Plan Information

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 PLAN
  - DIRECT INSTALL
  - ENERGY BENCHMARKING
  - T-12 SCHOOLS LIGHTING INITIATIVE
  - OIL, PROPANE & MUNICIPAL ELECTRIC CUSTOMERS
  - EDA PROGRAMS
  - TEACH
  - ARRA
- TECHNOLOGIES
- TOOLS AND RESOURCES
- PROGRAM UPDATES
- CONTACT US

Home » Commercial & Industrial » Programs

Energy Savings Improvement Plan

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

- Board Order - Standby Charges for Distributed Generation Customers
- T-12 Schools Lighting Replacement Initiative - Funding Allocation Reached

Other updates posted.

APPENDIX F

Photovoltaic (PV) Rooftop Solar Power Generation

Roxbury Township Board of Education
Nixon Elementary School

Cost of Electricity	$0.230	/kWh
Electricity Usage	407,400	kWh/yr
System Unit Cost	$4,000	/kW

Photovoltaic (PV) Solar Power Generation - Screening Assessment

Budgetary Cost	Annual Utility Savings				Estimated Maintenance Savings	Total Savings	Federal Tax Credit	New Jersey Renewable ** SREC	Payback (without incentive)	Payback (with incentive)
$	kW	kWh	therms	$	$	$	$	$	Years	Years
$520,000	**130.0**	**162,366**	**0**	**$37,324**	**0**	**$37,324**	**$0**	**$10,554**	**13.9**	**10.9**

** Estimated Solar Renewable Energy Certificate Program (SREC) SREC for 15 Years= $65 /1000kwh

Area Output*
2,653 m2
28,561 ft2

Perimeter Output*
280 m
919 ft

Available Roof Space for PV:
(Area Output - 10 ft x Perimeter) x 85%
16,468 ft2

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

8	watt/ft2	
131,747	DC watts	
130	kW	Enter into PV Watts

PV Watts Inputs***

Array Tilt Angle	20	Enter into PV Watts (always 20 if flat, if pitched - enter estimated roof angle)
Array Azimuth	180	Enter into PV Watts (default)
Zip Code	07876	Enter into PV Watts
DC/AC Derate Factor	0.83	Enter info PV Watts

PV Watts Output
162,366 annual kWh calculated in PV Watts program

% Offset Calc

Usage	407,400	(from utilities)
PV Generation	162,366	(generated using PV Watts)
% offset	40%	

* http://www.freemaptools.com/area-calculator.htm
** http://www.flettexchange.com
*** http://gisatnrel.nrel.gov/PVWatts_Viewer/index.html

PVWatts * * * AC Energy & Cost Savings

Cautions for Interpreting the Results

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

Station Identification	
City:	Newark
State:	New_Jersey
Latitude:	40.70° N
Longitude:	74.17° W
Elevation:	9 m
PV System Specifications	
DC Rating:	130.0 kW
DC to AC Derate Factor:	0.830
AC Rating:	107.9 kW
Array Type:	Fixed Tilt
Array Tilt:	20.0°
Array Azimuth:	180.0°
Energy Specifications	
Cost of Electricity:	23.0 ¢/kWh

Results			
Month	Solar Radiation (kWh/m ^{2}/day)	AC Energy (kWh)	Energy Value ($)
1	2.78	9496	2184.08
2	3.54	10941	2516.43
3	4.35	14485	3331.55
4	4.95	15354	3531.42
5	5.69	17826	4099.98
6	5.86	17242	3965.66
7	5.73	17215	3959.45
8	5.47	16263	3740.49
9	4.91	14570	3351.10
10	3.99	12637	2906.51
11	2.68	8482	1950.86
12	2.35	7855	1806.65
Year	4.36	162366	37344.18

Output Hourly Performance Data * Output Results as Text

About the Hourly Performance Data Saving Text from a Browser

Run PVWATTS v.1 for another US location or an International location
Run PVWATTS v.2 (US only)

Please send questions and comments regarding PVWATTS to Webmaster

Disclaimer and copyright notice

RReDC Return to RReDC home page (*http://www.nrel.gov/rredc*)

APPENDIX G

EPA Portfolio Manager

OMB No. 2060-0347

STATEMENT OF ENERGY PERFORMANCE
Nixon Elementary School

Building ID: 3210009
For 12-month Period Ending: April 30, 2012[1]
Date SEP becomes ineligible: N/A

Date SEP Generated: August 17, 2012

Facility
Nixon Elementary School
275 Mt. Arlington Blvd
Landing, NJ 07850

Facility Owner
N/A

Primary Contact for this Facility
N/A

Year Built: 1969
Gross Floor Area (ft²): 50,890

Energy Performance Rating[2] (1-100) 72

Site Energy Use Summary[3]

Electricity - Grid Purchase(kBtu)	1,390,049
Natural Gas (kBtu)[4]	1,698,800
Total Energy (kBtu)	3,088,849

Energy Intensity[4]

Site (kBtu/ft²/yr)	61
Source (kBtu/ft²/yr)	126

Emissions (based on site energy use)

Greenhouse Gas Emissions ($MtCO_2e$/year)	287

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

National Median Comparison

National Median Site EUI	76
National Median Source EUI	157
% Difference from National Median Source EUI	-20%
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.

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	Nixon Elementary School	Is this the official building name to be displayed in the ENERGY STAR Registry of Labeled Buildings?		☐
Type	K-12 School	Is this an accurate description of the space in question?		☐
Location	275 Mt. Arlington Blvd, Landing, NJ 07850	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 (K-12 School)				
CRITERION	**VALUE AS ENTERED IN PORTFOLIO MANAGER**	**VERIFICATION QUESTIONS**	**NOTES**	☑
Gross Floor Area	50,890 Sq. Ft.	Does this square footage include all supporting functions such as kitchens and break rooms used by staff, storage areas, administrative areas, elevators, stairwells, atria, vent shafts, etc. Also note that existing atriums should only include the base floor area that it occupies. Interstitial (plenum) space between floors should not be included in the total. Finally gross floor area is not the same as leasable space. Leasable space is a subset of gross floor area.		☐
Open Weekends?	No (Default)	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	89 (Default)	Is this the number of personal computers in the K12 School?		☐
Number of walk-in refrigeration/freezer units	1 (Default)	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 (Default)	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	100 % (Default)	Is this the percentage of the total floor space within the facility that is served by mechanical cooling equipment?		☐
Percent Heated	100 % (Default)	Is this the percentage of the total floor space within the facility that is served by mechanical heating equipment?		☐
Months	N/A(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: Electricity (kWh (thousand Watt-hours))
Space(s): Entire Facility
Generation Method: Grid Purchase

Start Date	End Date	Energy Use (kWh (thousand Watt-hours))
04/01/2012	04/30/2012	29,800.00
03/01/2012	03/31/2012	43,200.00
02/01/2012	02/29/2012	36,400.00
01/01/2012	01/31/2012	52,800.00
12/01/2011	12/31/2011	22,400.00
11/01/2011	11/30/2011	23,200.00
10/01/2011	10/31/2011	41,600.00
09/01/2011	09/30/2011	28,800.00
08/01/2011	08/31/2011	29,800.00
07/01/2011	07/31/2011	29,800.00
06/01/2011	06/30/2011	33,800.00
05/01/2011	05/31/2011	35,800.00
Electricity Consumption (kWh (thousand Watt-hours))		**407,400.00**
Electricity Consumption (kBtu (thousand Btu))		**1,390,048.80**
Total Electricity (Grid Purchase) Consumption (kBtu (thousand Btu))		**1,390,048.80**
Is this the total Electricity (Grid Purchase) consumption at this building including all Electricity meters?		☐

Fuel Type: Natural Gas

Meter: Natural Gas (therms)
Space(s): Entire Facility

Start Date	End Date	Energy Use (therms)
04/01/2012	04/30/2012	1,277.00
03/01/2012	03/31/2012	1,596.70
02/01/2012	02/29/2012	3,641.80
01/01/2012	01/31/2012	3,629.20
12/01/2011	12/31/2011	3,438.60
11/01/2011	11/30/2011	2,375.10
10/01/2011	10/31/2011	618.80
08/01/2011	09/30/2011	20.10
07/01/2011	07/31/2011	0.00
06/01/2011	06/30/2011	11.60

05/01/2011	05/31/2011	379.10
Natural Gas Consumption (therms)		**16,988.00**
Natural Gas Consumption (kBtu (thousand Btu))		**1,698,800.00**
Total Natural Gas Consumption (kBtu (thousand Btu))		**1,698,800.00**
Is this the total Natural Gas consumption at this building including all Natural Gas meters?		☐

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

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
Nixon Elementary School
275 Mt. Arlington Blvd
Landing, NJ 07850

Facility Owner
N/A

Primary Contact for this Facility
N/A

General Information

Nixon Elementary School	
Gross Floor Area Excluding Parking: (ft^2)	50,890
Year Built	1969
For 12-month Evaluation Period Ending Date:	April 30, 2012

Facility Space Use Summary

School	
Space Type	K-12 School
Gross Floor Area (ft^2)	50,890
Open Weekends? [d]	No
Number of PCs [d]	89
Number of walk-in refrigeration/freezer units [d]	1
Presence of cooking facilities [d]	Yes
Percent Cooled [d]	100
Percent Heated [d]	100
Months [o]	N/A
High School?	No
School District [o]	N/A

Energy Performance Comparison

	Evaluation Periods		Comparisons		
Performance Metrics	**Current** (Ending Date 04/30/2012)	**Baseline** (Ending Date 06/30/2011)	**Rating of 75**	**Target**	**National Median**
Energy Performance Rating	72	53	75	N/A	50
Energy Intensity					
Site (kBtu/ft^2)	61	83	59	N/A	76
Source (kBtu/ft^2)	126	154	123	N/A	157
Energy Cost					
$/year	$ 114,030.39	$ 136,684.09	$ 111,231.29	N/A	$ 142,246.81
$/$ft^2$/year	$ 2.24	$ 2.69	$ 2.19	N/A	$ 2.79
Greenhouse Gas Emissions					
$MtCO_2e$/year	287	357	280	N/A	358
$kgCO_2e/ft^2$/year	6	7	6	N/A	7

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

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

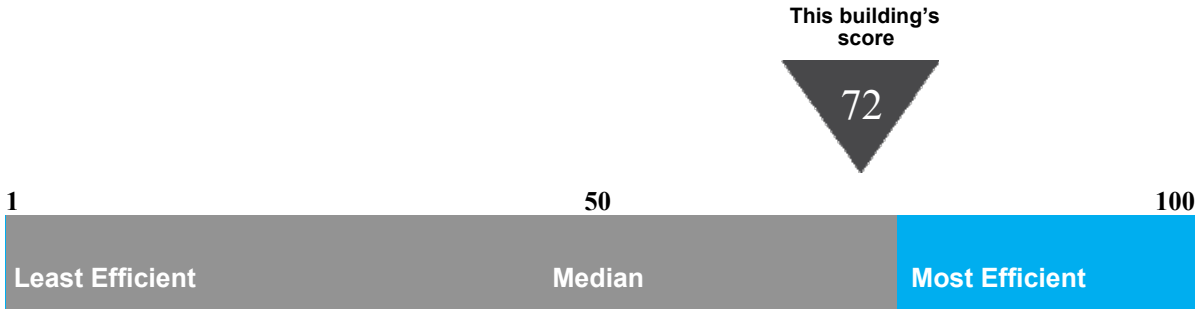
Statement of Energy Performance

2012

Nixon Elementary School
275 Mt. Arlington Blvd
Landing, NJ 07850

Portfolio Manager Building ID: 3210009

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 126 kBtu per square foot per year.*

*Based on source energy intensity for the 12 month period ending April 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: 08/17/2012