MILLBURN TOWNSHIP PUBLIC SCHOOLS

MILLBURN HIGH SCHOOL

462 Millburn Ave., Millburn, NJ 07041

LOCAL GOVERNMENT ENERGY AUDIT PROGRAM
FOR
NEW JERSEY
BOARD OF PUBLIC UTILITIES

May 2014

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CHA PROJECT NO. 28330

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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 building 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 staff and spot measurements taken in the field.

List of Common Energy Audit Abbreviations

- A/C – Air Conditioning
- AHS – Air Handling Unit
- BMS – Building Management System
- Btu – British thermal unit
- CDW – Condenser Water
- CFM – Cubic feet per minute
- CHW – Chilled Water
- DCV – Demand Control Ventilation
- DDC – Direct Digital Control
- DHW – Domestic Hot Water
- DX – Direct Expansion
- EER – Energy Efficiency Ratio
- EF – Exhaust Fan
- EUI – Energy Use Intensity
- Gal – Gallon
- GPD – Gallons per day
- GPF – Gallons Per Flush
- GPH – Gallons per hour
- GPM – Gallons per minute
- GPS – Gallons per second
- HHW – Heating Hot Water
- HID – High Intensity Discharge
- HP – Horsepower
- HRU – Heat Recovery Unit
- HVAC – Heating, Ventilation, Air Conditioning
- HX – Heat Exchanger
- kbtu/mbtu – One thousand (1,000) Btu
- kW – Kilowatt (1,000 watts)
- kWh – Kilowatt-hours
- LED – Light Emitting Diode
- mbh – Thousand Btu per hour
- mmbtu – One million (1,000,000) Btu
- OCC – Occupancy Sensor
- PSI – Pounds per square inch
- RTU – Rooftop Unit
- SBC – System Benefits Charge
- SF – Square foot
- UH – Unit Heater
- V – Volts
- VAV – Variable Air Volume
- VSD – Variable Speed Drive
- W – Watt

1.0 EXECUTIVE SUMMARY

This report summarizes the energy audit performed by CHA for Millburn Township Public Schools, in connection with the New Jersey Board of Public Utilities (NJBPU) Local Government Energy Audit (LGEA) Program. The purpose of this report is to identify energy savings opportunities associated with major energy consumers and inefficient practices. Low-cost and no-cost are also identified during the study. This report details the results of the energy audit conducted for the building listed below:

Building Name	Address	Square Feet	Construction Date
Millburn High School	462 Millburn Ave., NJ 07041	201,858	1955

The potential total annual energy and cost savings for the energy conservation measures (ECM) identified in the survey are shown below:

Building Name	Electric Savings (kWh)	NG Savings (therms)	Total Savings ($)	Payback (years)
Millburn High School	411,778	17,994	66,362	9.9

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

Each measure recommended by CHA typically has a simple payback period of 15 years or less to be consistent with the requirements of the Energy Savings Improvement Plan (ESIP) which has a maximum payback period of 15 years. Occasionally, we will recommend an ECM that has a longer payback period, based on the need to replace that piece(s) of equipment due to its age, such as a boiler for example.

The following table provides a detailed summary of each ECM for the building surveyed, including costs, savings, SmartStart incentives and payback.

Summary of Energy Conservation Measures

ECM #	Energy Conservation Measure	Est. Costs ($)	Est. Savings ($/year)	Payback w/o Incentive	Potential Incentive ($)*	Payback w/ Incentive	Recommended
1	Door Sweeps and Seals	2,305	298	7.7	0	7.7	Y
6	Smart Window A/C Controller	1,200	338	3.6	0	3.6	Y
9	Install VFDs on AHUs	19,047	2,466	7.7	0	7.7	Y
10	Replace Rooftop Units	152,000	706	67.7	0	67.7	Y
12	Retro-Commission Temperature Controls	69,967	21,280	3.3	0	3.3	Y
14	Kitchen Hood Controller	30,787	5,917	5.2	0	5.2	Y
15	Walk-In Cooler/Freezer Controls	20,625	172	120.1	0	120.1	Y
17	Install Vending Misers	840	881	1.0	0	1.0	Y
L1**	Lighting Replacements	454,693	31,345	14.5	10,000	14.2	N
L2**	Lighting Controls	10,287	6,937	1.5	1,590	1.3	N
L3	Lighting Replacements w/ Controls	464,980	34,304	13.6	11,590	13.2	Y
	Total	**657,550**	**66,362**	**9.9**	**11,590**	**9.7**	
	Total (Recommended)	**657,550**	**66,362**	**9.9**	**11,590**	**9.7**	

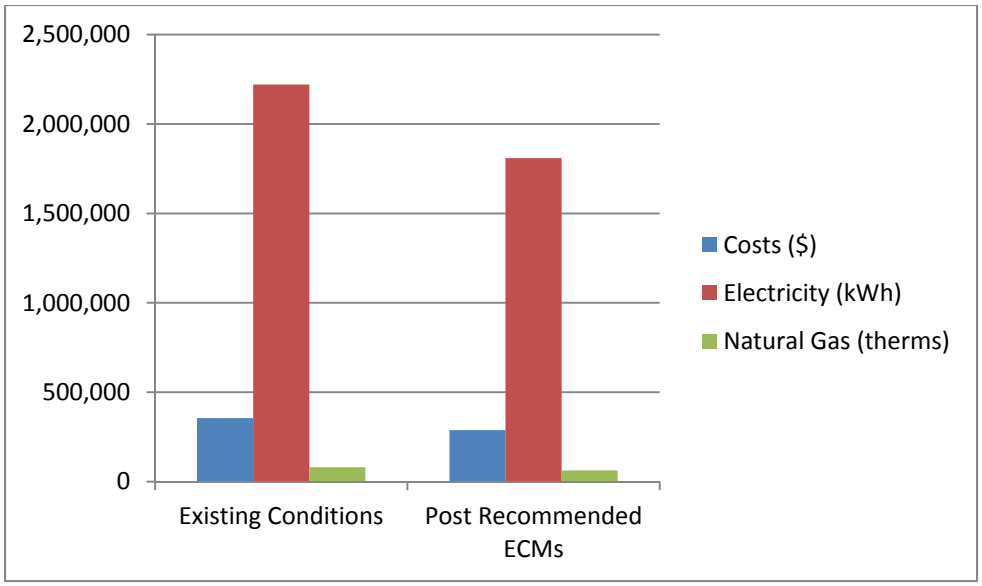
* Incentive shown is per the New Jersey SmartStart Program.
** These ECMs are not included in the Total, as they are alternate measures not recommended.

The following alternative energy measures are also recommended for further study:

- Photovoltaic (PV) Rooftop Solar Power Generation – 270 kW System

If Millburn Township Public Schools implements the recommended ECMs, energy savings would be as follows:

	Existing Conditions	**Post Recommended ECMs**	**Percent Savings**
Costs ($)	354,927	288,565	19%
Electricity (kWh)	2,220,800	1,809,022	19%
Natural Gas (therms)	80,896	62,902	22%
Site EUI (kbtu/SF/Yr)	77.6	61.7	


2,500,000
2,000,000
1,500,000
1,000,000
500,000
0
Existing Conditions
Post Recommended ECMs
Costs ($)
Electricity (kWh)
Natural Gas (therms)

2.0 BUILDING INFORMATION AND EXISTING CONDITIONS

The following is a summary of building information related to HVAC, plumbing, building envelope, lighting, kitchen equipment and domestic hot water systems as observed during CHAs site visit. See appendix B for detailed information on mechanical equipment, including capacities, model numbers and age.

Building Name: Millburn High School
Address: 462 Millburn Ave., Millburn, NJ 07041
Gross Floor Area: 201,858 sq.ft.
Number of Floors: 3 and basement
Year Built: 1955
Additions: 1996, 2002, & 2009

Description of Spaces: Classrooms, offices, cafeteria, auditorium, stage, gymnasiums, computer lab, media center, storage rooms, toilet rooms and mechanical rooms.
Description of Occupancy: The school serves 1,600 students from 9th to 12th grade. There are 180 school faculty and staff members.
Number of Computers: The school has approximately 240 desktop and laptop computers.
Building Usage: Hours of operation are 7:35 AM to 2:35 PM Monday through Friday, with various after-school activities. Custodial staff are on site in two shifts, from 6:00 AM to 3:00 PM, and 2:30 PM to 11:00 PM, 10 months per year.

Construction Materials: Structural steel framing with concrete masonry unit exterior walls, insulation unknown but assumed to vary with age: greater insulation thicknesses assumed for more recent construction. Interior walls mostly sheetrock and painted concrete. Interior and exterior walls are in fair to good condition.

Façade: Concrete masonry units and brick
Roof: The building has several wings which have flat roofs, and are covered with adhered membrane or stone ballast. Roofing over the auditorium and the old gym are pitched and covered with an adhered membrane. Insulation in attic spaces is unknown but assumed to vary with age: higher insulation thicknesses are typically found in more recent construction. Roof color varies from is light gray to dark gray.

Windows:. Double hung double pane windows with aluminum frames. Windows are in good condition and no ECMs associated with window replacement were evaluated.
Exterior Doors: Most exterior doors are steel jacketed without windows. Main entrance doors are steel framed storefront style. Some of the sweeps and seals are in poor condition, and these should be replaced. An ECM has been included to address this issue.

Heating Ventilation & Air Conditioning (HVAC) Systems

Heating: Two (2) natural gas fired hot water H.B. Smith cast iron sectional boilers, installed in 2003, provide heat for most of the school. Each of these boilers is rated for 2,850 MBH. Two (2) B&G base mounted pumps (DTWP-1 and DTWP-2) circulate the heating water around the building. These pumps are powered by 15.0 HP Baldor motors which have a NEMA nominal efficiency of 87.5% and operate in a lead/lag manner. Both pumps are controlled by Danfoss VFDs. The building utilizes a two-pipe hydronic piping system that circulates hot water in the winter months, and chilled water in the summer months. Change-over between the two systems is typically April 15 in the spring, and October 15 in the fall, with final decision on timing made by the school principal. Terminal units include unit ventilators, floor mounted fan coils, cabinet heaters, air handling units, unit heaters, and finned radiation.

Additional heat is provided into the newer 2009 sections of the school by two (2) Patterson Kelly Mach Series hot water boilers manufactured in 2008, with a capacity of approximately 1.8 million BTUHs each. Two base mounted Taco pumps, operating in a lead-lag manner, circulate the hot water around the building.

The D classroom wing is a 3 story wing supplied by three (3) Carrier packaged energy recovery rooftop units that provide gas fired heat and DX air conditioning for classrooms on each floor; these units also provide general building pressure relief. The C wing is similarly served by three (3) packaged McQuay energy recovery rooftop units of indeterminate age. The old gymnasium is served by two 1.5 HP air handling units located in a mechanical equipment room. The new gymnasium is served by two (2) packaged Trane energy recovery heating-only RTUs, with some external ductwork lacking insulation.

The Paul W. Rossey Library is essentially a separate building within the courtyard of the school, and is heated by a gas fired Weil McLain hot water firetube boiler. This boiler has an output of 408 MBH and an efficiency of 79%. Heating hot water is pumped to a 1987 Carrier air handling unit and a 1988 Carrier air handling unit, by a fractional HP B&G inline circulator pump. The Carrier AHUs have 3.0 HP supply fans and deliver heated and conditioned air via a ducted distribution system to the interior of the library.

Cooling: Much of the high school is cooled by a 250 ton Trane helical rotary chiller installed outside on a concrete pad by the loading dock at the west end of the school. The chiller is only utilized during the summer months, and a single base mounted 5.0 HP B&G pump located in the Boiler Rm supplies serves it. Chilled water pumped from the chiller is routed into the main two-pipe hydronic piping system at a 3-way valve, and from there pumps DTWP-1 and DTWP-2

circulate the chilled water around the building. The chiller is not available in the winter but is filled with propylene glycol and then drained.

Due to the fact that most of the school is heated and cooled utilizing a two-pipe hydronic system, some terminal units are valved off during the summer months. For example, chilled water running through perimeter finned tube radiation has caused condensation issues, while not providing much cooling. Shutting off the isolation valves to these types of units has helped to minimize these problems.

The Paul W. Rossey Library is cooled by two (2) Carrier air handling units [1987&1988] outfitted with DX cooling coils. This air is delivered to the interior of the space by a ducted distribution system. A couple offices within the library have wall-mounted Friedrich split AC units with DX condensing units installed outside.

Many areas of the school are cooled by individual Trane DX rooftop and air handling units, which vary in tonnage from 3 tons to 15 tons. See chart below for a listing of areas served.

Several classrooms in the Industrial Arts wing are cooled by fractional tonnage air conditioning units installed in windows. These are left in place year-round and are not covered in the winter-time. Since these are not automatically controlled, these window ACs may be inadvertently left on while the building is un-occupied. An ECM addressing this issue is evaluated.

Ventilation: Ventilation is provided by a combination of rooftop units, air handling units, and classroom unit ventilators. These units are equipped with outside air dampers which automatically modulate and vary the percentage of outside air entering the space, based on indoor and outdoor air temperatures. See table below for a listing of some rooftop and air handling units:

AHU-1	**Cafeteria**
AHU-2	**Gymnasium**
AHU-3	**Gymnasium**
AHU-S01	**Auditorium**
RTU-1	**Weight Room**
RTU-2	**Computer Rm 215**
RTU-3	**Computer Rm 142**
RTU-4	**Music Room**
HV-1	**Boys Locker Rm**
HV-2	**Girls Locker Rm**
Unit Ventilators	**Classrooms**

See Appendix B for more detailed equipment data

In general, the building mechanical ventilation systems are adequate and no associated ECMs are included.

Exhaust: Exhaust fans are used to ventilate toilet rooms and the kitchen. A 12'x4' kitchen range hood and associated ductwork connects to a roof mounted centrifugal upblast exhaust fan. Classroom laboratories are exhausted with propeller tube axial fans. Centrifugal exhaust fans, installed on the roof, provide exhaust for toilet rooms. . In general building exhaust is adequate and no associated ECMs are included.

Controls Systems

Boiler operation is manual control; with at least one boiler running all day and all night during the colder months. Boiler switching is also performed manually; as well as boiler temperature. The high school's newest HVAC equipment such as ERU, air handling units, and the newer unit ventilators are controlled by a centralized DDC Siemens controls system. But even here, control is limited to only a few points, such as temperature setpoints—over-ride on operations such as damper and valve positions are not available. Older equipment such as the boilers, pumps, and other terminal units are manually controlled. Access to the DDC system is not available on-site, but is limited to one or two individuals who control setpoints on individual pieces of equipment from a head end at the Education Center or from a remote laptop. An ECM for retro-commissioning of the controls systems is included that will address the cost and savings for these issues.

Domestic Hot Water Systems

The High School has several different domestic hot water heaters. In the Boiler Room there is a 2007 Rheem gas fired DHW unit with 90 gallons capacity and 533.3 gallons per hour recovery. A 2008 Rheem gas fired DHW heater located in a mechanical room has 119 gallons capacity and 184 gallons per hour recovery. The Paul W. Rossey Library contains an electric State Industries water heater, and this has 30 gallons storage capacity. Two electric heating elements provide recovery for this unit: a 4500 watt upper element, and a 3500 watt lower element. In all cases domestic hot water is pumped around the school/building to restrooms and sinks by fractional horsepower circulator pumps. No domestic hot water related ECMs are included.

Kitchen Equipment

The kitchen contains one 12'x4' (approximate size) range exhaust hood, which is ducted and exhausted to an exterior rooftop exhaust fan. An ECM for the installation of a kitchen hood controller is evaluated. There is one True double-door type reach-in freezer, one Beverage Air triple-door type reach-in cooler, and another double door Traulsen reach in cooler. One Bally walk-in cooler is also in the kitchen, which utilizes a Heatcraft evaporator system to maintain its 40°F temperature. An ECM which evaluates walk-in cooler controls is included. For the most part the cooking equipment (such as the bread ovens) are manufactured by both Metro and Blodgett, and are natural gas fired. Dishes are washed by a Hobart automatic dishwasher.

Plumbing Systems

The building contains low flow lavatories (2.2 GPM or less), and toilets and urinals are also of the low flush volume variety (1.6 GPF for toilets and 1.0 GPF for urinals). Newer fixtures utilize electronic sensors to monitor water flow; older fixtures are spring loaded to perform the same task. Water usage is primarily toilet rooms, the kitchen, and lavatories; and all fixtures appear to be in good condition. No ECMs for plumbing fixtures were considered.

Plug Load

This school has computers, copiers, smart boards, residential appliances (microwave, refrigerator), printers and portable electric heaters (personal) which contribute to the plug load in the building. An ECM for the installation of vending misers is evaluated.

Lighting Systems

Most of the lighting within this school is primarily 4' T8 linear fluorescent fixtures with electronic ballasts, and in most cases the number of lamps per fixture is two, three, or four. However a

significant percentage of lighting (~15%) is still T12, particularly in: the older industrial arts wing, and some corridors. Compact fluorescents round out the remaining interior lights. Exterior lighting consists of both 38 watt PAR floodlights, and 150W metal halide wallpack lamps. Lights in all of the newest areas are operated by occupancy sensors, in the rest of the school lights are controlled by manual switches. Three lighting ECMs have been included which include adding occupancy sensors to the existing lighting, replacement of the T-8 lighting with LED lighting and a third ECM that evaluates the effect of occupancy sensors used with the LED lighting upgrades.

3.0 UTILITIES

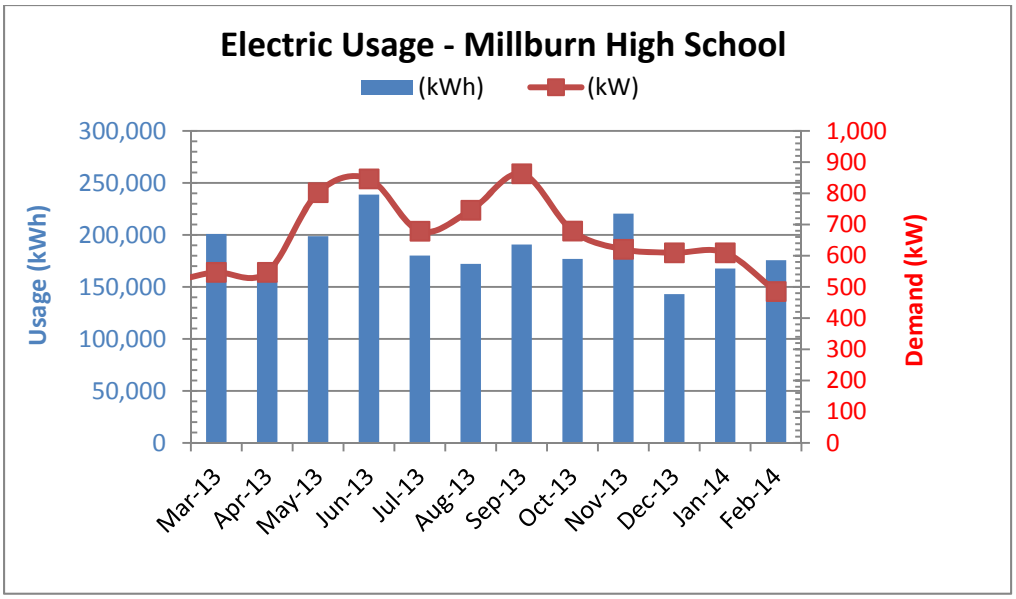
Utilities used by the building are delivered and supplied by the following utility companies:

	Electric	Natural Gas
Deliverer	New Jersey Power & Light	PSEG
Supplier	New Jersey Power & Light	Compass

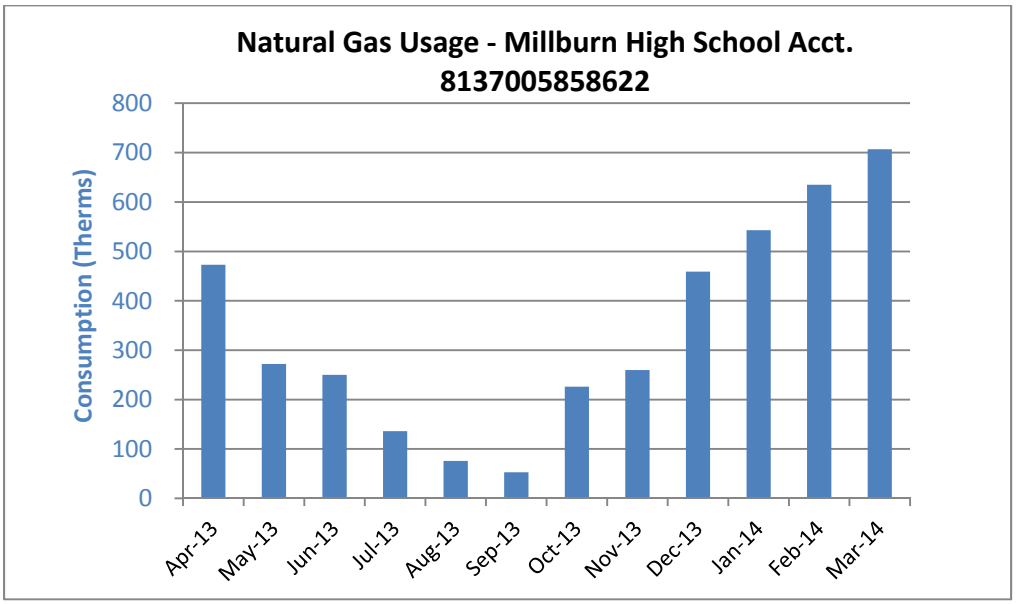
For the 12-month period ending in March 2014, the utilities usages and costs for the building were as follows:

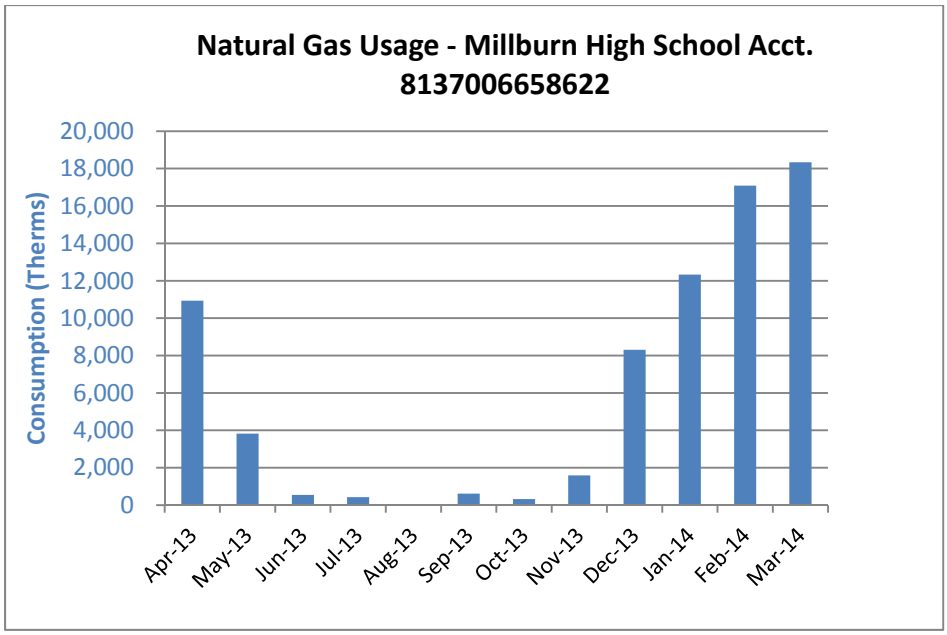
Electric		
Annual Consumption	2,220,800	kWh
Annual Cost	$266,271	$
Blended Unit Rate	$0.120	$/kWh
Supply Rate	$0.095	$/kWh
Demand Rate	$6.78	$/kW
Peak Demand	862.7	kW
Natural Gas		
Annual Consumption	103,096	Therms
Annual Cost	$88,656	$
Unit Rate	$0.856	$/therm
Water		
Annual Usage	2,308,000	Gallons/yr
Annual Cost	20,466	$
Rate	0.009	$/gallon

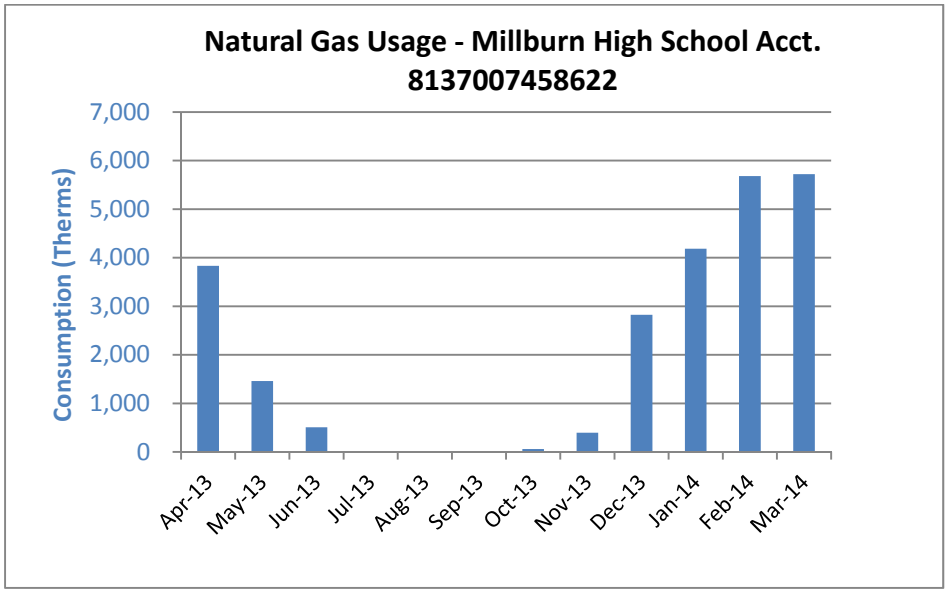
Blended Rate: Average rate charged determined by the annual cost / annual usage
Supply Rate: Actual rate charged for electricity usage in kWh (based on most recent electric bill)
Demand Rate: Rate charged for actual electrical demand in kW (based on most recent electric bill)



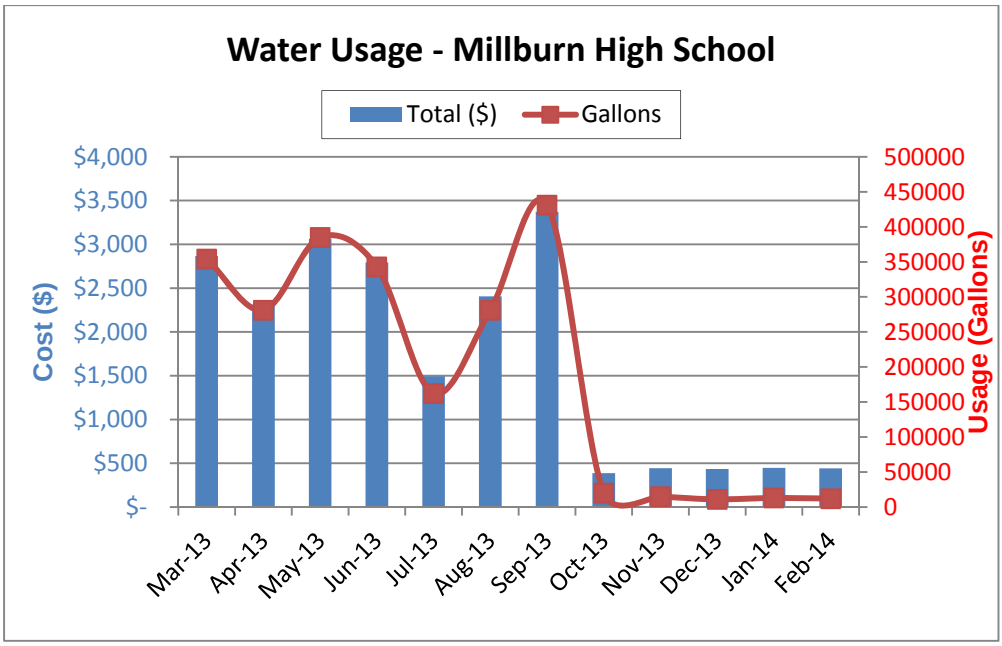
It can be seen from the chart above that electricity usage at the High School tends to peak in the late spring and early fall, which are times of maximum cooling at highest building occupancies.







Natural gas usage (shown above for three accounts) is greatest during the winter heating months and is least during the cooling months. This type of load profile is typical when natural gas is used primarily for heating from boilers and RTUs and is used only minimally by the domestic hot water heater.



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. The supply portion is open to competition, and customers can shop around for the best price for their energy suppliers. The electric and natural gas distribution utilities will still deliver the gas/ electric supplies through their wires and pipes – and respond to emergencies, should they arise – regardless of where those supplies are purchased. Purchasing the energy supplies from a company other than your electric or gas utility is purely an economic decision; it has no impact on the reliability or safety of the service.

Comparison of Utility Rates to NJ State Average Rates*			
Utility	Units	School Average Rate	NJ Average Rate
Electricity	$/kWh	$0.12	$0.12
Natural Gas	$/Therm	$0.86	$0.95
Fuel Oil	$/Gal		$3.62

* Per U.S. Energy Information Administration (2013 data – Electricity and Natural Gas, 2012 data – Fuel Oil)

This school on average pays about the same rate for their electricity and a lower rate for natural gas than the average commercial building in New Jersey. It is not recommended that this school shop for a third party utility supplier for both electric and natural gas.

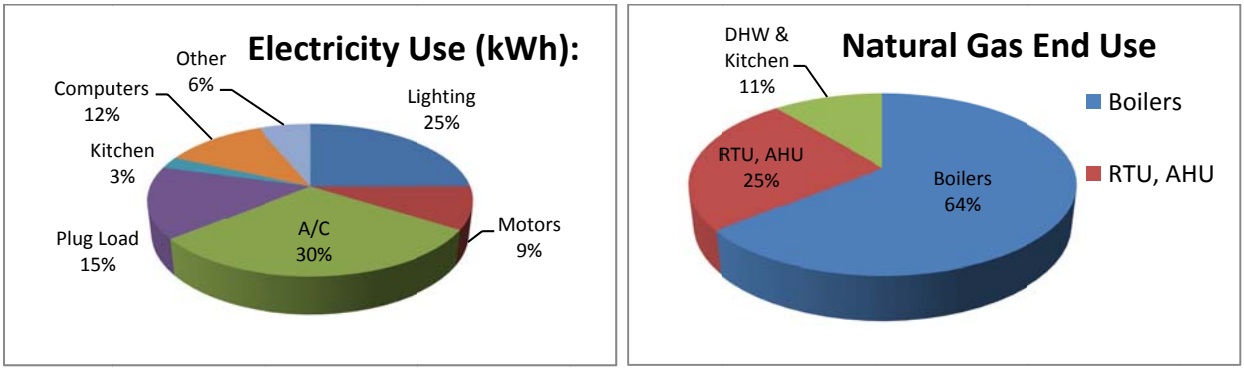
Additional information on selecting a third party energy supplier is available here:

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.

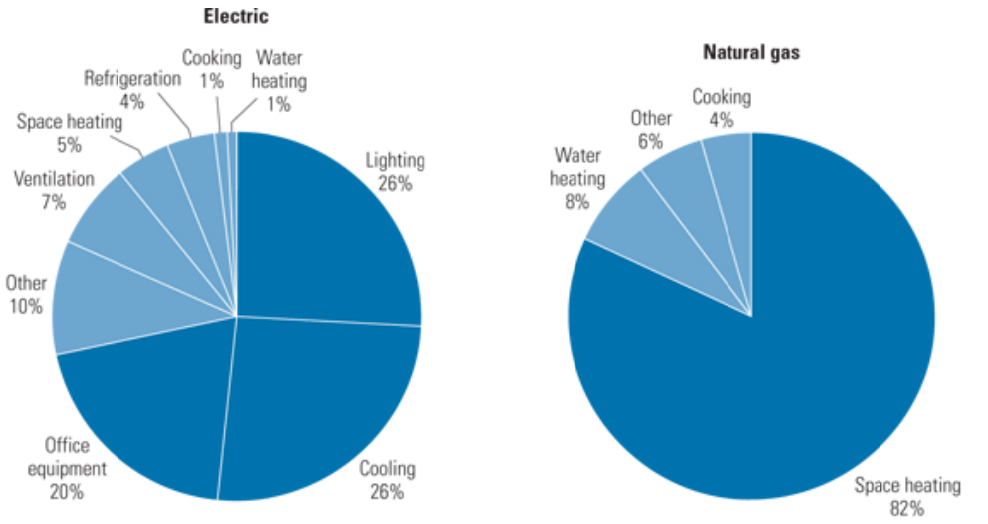
The charts below represent estimated utility end-use utility profiles for the building. The values used within the charts were estimated from a review of the utility analysis and the energy savings calculations.

Site End-Use Utility Profile



Most of the electricity consumed by educational facilities is used to for lighting, cooling, and plug loads such as computers and copiers; most of the natural gas is used for space heating. Each school's energy profile is different, and the following charts represent typical utility profiles for K-12 schools per U.S. Department of Energy.

Typical End-Use Utility Profile for Educational Facilities



Courtesy: E SOURCE; from Commercial Building Energy Consumption Survey, 1999 data

4.0 Benchmarking

The EPA Portfolio Manager benchmarking tool 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 an Energy Star label, the energy benchmark rating must be at least 75. As energy use decreases from implementation of the proposed measures, the Energy Star rating will increase.

The site EUI is the amount of heat and electricity consumed by a building as reflected in utility bills. Site energy may be delivered to a facility in the form of primary energy, which is raw fuel burned to create heat or electricity, such as natural gas or oil; or as secondary energy, which is the product created from a raw fuel such as electricity or district steam. To provide an equitable comparison for different buildings with varying proportions of primary and secondary energy consumption, Portfolio Manager uses the convention of source EUIs. The source energy also accounts for losses incurred in production, storage, transmission, and delivery of energy to the site, which provide an equivalent measure for various types of buildings with differing energy sources. The results of the benchmarking are contained in the table below.

Building	Site EUI kBtu/ft^2/yr	Source EUI Btu/ft^2/yr	Energy Star Rating (1-100)
High School	76.3	158.6	43

The building has a below average Energy Star Rating Score (50 being the median score). It is likely that a combination of factors contribute to this low score—older inefficient air handling units and RTUs; sections of the school pre-dominantly lit by T12s; and control components in need of retro-commissioning. By implementing the measures discussed in this report, it is expected that the EUI can be further reduced and the Energy Star Rating increased.

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

[redacted]

5.0 ENERGY CONSERVATION MEASURES

The following types of energy savings opportunities are identified in this section of the report:

- Energy conservation measures (ECMs) are energy savings recommendations that typically require a financial investment. For these areas of opportunity, CHA prepared detailed calculations, as summarized in this section and in Appendix C. In general, additional savings may exist from reductions in maintenance activities associated with new equipment or better controls; however for conservatism, maintenance savings are not accounted for in this report; instead the only savings which are reported are those derived directly from reductions in energy which can be tracked by the utility bills.

- Operational and Maintenance measures (O&M) consist of low- or no-cost operational opportunities, which if implemented would have positive impacts on overall building operation, comfort levels, and/or energy usage. There are no estimated savings, costs or paybacks associated with the O&M measures included as part of this study.

Energy savings were quantified in the form of:

- electrical usage (kWh=Kilowatt-hour),
- electrical demand (kW=kilowatts),
- natural gas (therms=100,000 Btu),
- propane gas (gallons=91,650 Btu),
- fuel oil (gallons =138,700 Btu), and
- water (kgal=1,000 gallons).

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

Another financial indicator of the performance of a particular ECM is the Return on Investment or ROI, which represents the benefit (annual savings over the life of a project) of an investment divided by the cost of the investment. The result is expressed as a percentage or ratio.

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

5.1 ECM-1 Replace Door Sweeps and Seals

It was noted during the site visit that the seals and sweeps were showing wear on many of the exterior doors, and daylight was visible between the door and frame.

The seals around exterior doors fail over time. This leads to infiltration of unconditioned outside air or exfiltration of conditioned air resulting in increased heating energy usage. This measure calls for the replacement of all exterior door seals. Replacement of these seals will result in a reduction of the buildings heating and cooling loads, therefore providing natural gas and electricity savings. The linear footage of gap and wind speed is used to estimate the infiltration rate, which is then multiplied by the BIN weather data and the equipment efficiencies to determine the annual energy savings.

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

ECM-1 Replace Window and Door Seals

Budgetary Cost	Annual Utility Savings				ROI	Potential Incentive*	Payback (without incentive)	Payback (with incentive)
	Electricity		Natural Gas	Total				
$	kW	kWh	Therms	$	%	$	Years	Years
2,305	0	0	346	298	0.9	0	7.7	7.7

* Does not qualify for Incentive from the New Jersey SmartStart Program. See section 6.0 for other incentive opportunities

This measure is recommended.

5.2 ECM-6 Smart Controller Window AC Units

Only about 5% of the building is cooled by window a/c units which can be occasionally left on by occupants when they leave the room.

This ECM evaluates the installation of programmable “smart” timers that interrupt the electrical supply to the window air conditioners when cooling is not needed due to the room being unoccupied. The timers are configurable to operate as a standalone timer or they can be wirelessly interconnected to provide remote temperature control using software.

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

ECM-6 Smart Controller Window AC Units

Budgetary Cost	Annual Utility Savings				ROI	Potential Incentive*	Payback (without incentive)	Payback (with incentive)
	Electricity		Natural Gas	Total				
$	kW	kWh	Therms	$		$	Years	Years
1,200	0	2,814	0	338	3.2	0	3.6	3.6

* Does not qualify for Incentive from the New Jersey SmartStart Program. See section 6.0 for other incentive opportunities

This measure is recommended.

5.3 ECM-9 Install VFDs and Premium Efficiency Motors on Air Handling Units

The existing 1.5 HP and 3.0 HP motors on the air handling units for the gymnasium and the Paul W. Rossey Library are not controlled by variable frequency drives (VFDs). Ideally fans are perfectly selected to match the needs of a system operating a maximum capacity. Most times 1) fans are over-sized somewhat for safety, and 2) the system is operating at less than full heating capacity. VFDs allow fans to run at slower RPMs to better meet the needs of the system and in the process, energy is saved.

To implement this ECM, the existing motors would be removed and new motors and VFDs installed in their place. Piping and wiring modifications would be needed.

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

ECM-9 Install VFDs and Premium Efficiency Motors on Air Handling Units

Budgetary Cost	Annual Utility Savings				ROI	Potential Incentive*	Payback (without incentive)	Payback (with incentive)
	Electricity		Natural Gas	Total				
$	kW	kWh	Therms	$		$	Years	Years
19,047	5.9	20,927	0	2,466	1.4	0	7.7	7.7

* Does not qualify for Incentive from the New Jersey SmartStart Program. See section 6.0 for other incentive opportunities.

This measure is recommended.

5.4 ECM-10 Replace RTUs

Several of the High School rooftop units (RTUs) contain DX cooling and natural gas heating and at 18-19 years old, are all at the end of their useful lives. It is recommended that these units be replaced with new models that will operate at a higher energy efficiency ratio (EER). This ECM assesses the replacement of each of the RTUs in question and gives the resulting energy savings.

It is assumed in the performance of this calculation that the operating hours, number of units, and capacity stays the same. Since the existing models are at the end of their useful lives and are in need of replacement, the energy savings result from the installation of high efficiency units over and above replacing the existing units with standard efficiency models.

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

ECM-10 Replace RTUs

Budgetary Cost	Annual Utility Savings				ROI	Potential Incentive*	Payback (without incentive)	Payback (with incentive)
	Electricity		Natural Gas	Total				
$	kW	kWh	Therms	$		$	Years	Years
47,800	0	5,886	0	706	(0.7)	0	67.7	67.7

* Incentive shown is per the New Jersey SmartStart Program. See section 6.0 for other incentive opportunities.

This measure is recommended.

5.5 ECM-12 Retro-Commission Temperature Controls

The High School contains HVAC equipment of varying vintage. It is likely that many of these units have components such as dampers and sensors that have not been recently checked or calibrated. Commissioning is the process of verifying that systems are designed, installed, functionally tested, and capable of being operated and maintained according to the owner's operational needs. Retro-commissioning is the same systematic process applied to existing buildings.

Both controls and components of the heating and cooling systems present saving opportunities during the retro-commissioning process. Over time, temperature sensors or thermostats may drift out of synch. Poorly calibrated sensors can increase heating and cooling loads and lead to occupant discomfort. The following procedure is recommended:

- Calibrate the indoor and outdoor building sensors. Calibration of room thermostats, duct thermostats, humidistats, and pressure and temperature sensors should be in accordance with the original design specifications. Calibrating these controls may require specialized skills or equipment and may require outside expertise.
- Inspect damper and valve controls to verify proper functioning. Check pneumatically controlled dampers for leaks in the compressed-air hoses. Dampers should also be examined for proper opening and closing. Stiff dampers can cause improper modulation of the amount of outside air being used in the supply airstream. In some cases, dampers may be wired in a single position or disconnected, violating minimum outside air requirements.
- Review building operating schedules. HVAC controls must be adjusted to heat and cool the building properly during occupied hours. Occupancy schedules can change frequently over the life of a building, and control schedules should be adjusted accordingly. When the building is unoccupied, the temperature should be set back to save heating or cooling energy; however, minimal heating and cooling may be required when the building is unoccupied. In cold climates, for example, heating may be needed to keep water pipes from freezing.

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

ECM-12 Retro-Commission Temperature Controls

Budgetary Cost	Annual Utility Savings				ROI	Potential Incentive*	Payback (without incentive)	Payback (with incentive)
	Electricity		Natural Gas	Total				
$	kW	kWh	Therms	$	%	$	Years	Years
69,967	0	99,936	10,800	21,280	3.6	0	3.3	3.3

* Does not qualify for Incentive from the New Jersey SmartStart Program. See section 6.0 for other incentive opportunities

This measure is recommended.

5.6 ECM-14 Install Kitchen Hood Controller

The kitchen contains one 12'x4' (approximate size) range exhaust hood that is ducted and exhausted via exhaust fan EF-1 located on the roof. A rooftop unit supplies the make-up air for the kitchen.

Installing a variable speed hood control system was evaluated. Upon activation of the system, the hood lights will turn on and the fans reach a preset minimum speed of 10 and 50 percent. When cooking appliances are turned on, the fan speed will increase based on temperature sensed in the exhaust duct. During cooking, an optical sensor will sense particulates entering the hood and the speed will increase to 100 percent until smoke and heat are removed.

Energy saving is calculated from reduction of exhaust fan speed and the amount of heated air diffused from other heated rooms.

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

ECM-14 Install Kitchen Hood Controller

Budgetary Cost	Annual Utility Savings				ROI	Potential Incentive*	Payback (without incentive)	Payback (with incentive)
	Electricity		Natural Gas	Total				
$	kW	kWh	Therms	$	%	$	Years	Years
30,787	0	227	6,848	5,917	1.9	0	5.2	5.2

* Does not qualify for Incentive from the New Jersey SmartStart Program. See section 6.0 for other incentive opportunities.

This measure is recommended.

5.7 ECM-15 Install Walk-in Cooler / Freezer Controls

One (1) large walk-in refrigerator keeps food at 40°F. Installing a walk-in cooler/ freezer control system was assessed. The system will monitor both dry and wet bulb temperature within the walk-in unit and allow evaporators and compressors to modulate up and down based on enthalpy set points rather than by dry bulb temperature alone. Savings is a result of reduced run time of evaporator fans, compressors and door heaters.

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

ECM-15 Install Walk-in Cooler / Freezer Controls

Budgetary Cost	Annual Utility Savings				ROI	Potential Incentive*	Payback (without incentive)	Payback (with incentive)
	Electricity		Natural Gas	Total				
$	kW	kWh	Therms	$	%	$	Years	Years
20,625	0	1,431	0	172	(0.9)	0	120.1	120.1

* Incentive shown is per the New Jersey SmartStart Program. See section 6.0 for other incentive opportunities.

This measure is recommended.

5.8 ECM-17 Install Vending Misers

The building presently has two (2) cold beverage vending machines and one snack type vending machine in the building.

Vending machines operate continuously 24 hours per day, seven (7) days a week. Installing controls such as timers or occupancy sensors allow the machines to turn on only when a customer is present or when the compressor must run to maintain the product at the desired temperature. By implementing this measure electrical energy savings could be realized.

The calculation uses electrical consumption and annual electrical cost as the baseline, vs. the reduced electrical consumption and cost 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-17 Install Vending Misers

Budgetary Cost	Annual Utility Savings				ROI	Potential Incentive*	Payback (without incentive)	Payback (with incentive)
	Electricity		Natural Gas	Total				
$	kW	kWh	Therms	$		$	Years	Years
840	0	7,343	0	881	14.7	0	1.0	1.0

* Incentive shown is per the New Jersey SmartStart Program. See section 6.0 for other incentive opportunities.

This measure is recommended.

5.9 ECM-L1 Lighting Replacement / Upgrades

Most of the lighting within this school is primarily 4' T8 linear fluorescent fixtures with electronic ballasts, and in most cases the number of lamps per fixture is two, three, or four. However a significant percentage of lighting (~15%) is still T12, particularly in: the older industrial arts wing, and some corridors. Compact fluorescents round out the remaining interior lights. Exterior lighting consists of both 38 watt PAR floodlights, and 150W metal halide wallpack lamps.

Overall energy consumption can be reduced by replacing inefficient bulbs and linear fluorescent bulbs with more efficient LED technology. To compute the annual savings for this ECM, the energy consumption of the current lighting fixtures was established and compared to the proposed fixture power requirement with the same annual hours of operation. The difference between the existing and proposed annual energy consumption was the energy savings. These calculations are based on 1 to 1 replacements of the fixtures, and do not take into account lumen output requirements for

a given space. A more comprehensive engineering study should be performed to determine correct lighting levels.

Supporting calculations, including assumptions for lighting hours and annual energy usage for each fixture, are provided in Appendix C and summarized below:

ECM-L1 Lighting Replacement / Upgrades

Budgetary Cost	Annual Utility Savings				ROI	Potential Incentive*	Payback (without incentive)	Payback (with incentive)
	Electricity		Natural Gas	Total				
$	kW	kWh	Therms	$	%	$	Years	Years
454,693	103	242,071	0	31,345	(0.2)	10,000	14.5	14.2

* Incentive shown is per the New Jersey SmartStart Program. See section 6.0 for other incentive opportunities.

This measure is not recommended in lieu of ECM L3.

5.10 ECM-L2 Install Lighting Controls (Occupancy Sensors)

Lights in all of the newest areas are operated by occupancy sensors, in the older section of the school lights are controlled by manual switches.

Review of the comprehensive lighting survey determined that lighting in the older areas could benefit from installation of occupancy sensors to turn off lights when the areas are unoccupied.

This measure recommends installing occupancy sensors for the current lighting system. Using a process similar to that utilized in Section 5.7.1, the energy savings for this measure was calculated by applying the known fixture wattages in the space to the estimated existing and proposed times of operation for each fixture.

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

ECM-L2 Install Lighting Controls (Occupancy Sensors)

Budgetary Cost	Annual Utility Savings				ROI	Potential Incentive*	Payback (without incentive)	Payback (with incentive)
	Electricity		Natural Gas	Total				
$	kW	kWh	Therms	$	%	$	Years	Years
10,287	0	73,021	0	6,937	7.5	1,590	1.5	1.3

* Incentive shown is per the New Jersey SmartStart Program. See section 6.0 for other incentive opportunities.

This measure is not recommended in lieu of ECM L3.

5.11 ECM-L3 Lighting Replacements with Controls (Occupancy Sensors)

This measure is a combination of ECM-L1 and ECM-L2; recommending replace/upgrade the current lighting fixtures to more efficient ones and installing occupancy sensors on the new lights. Interactive effects of the higher efficiency lights and occupancy sensors lead the energy and cost savings for this measure to not be cumulative or equivalent to

the sum of replacing the lighting fixtures alone and installing occupancy sensors without the lighting upgrade. The implementation cost and savings related to this ECM are presented in Appendix C and summarized below:

ECM-L3 Lighting Replacements with Controls (Occupancy Sensors)

Budgetary Cost	Annual Utility Savings				ROI	Potential Incentive*	Payback (without incentive)	Payback (with incentive)
	Electricity		Natural Gas	Total				
$	kW	kWh	Therms	$	%	$	Years	Years
464,980	103	273,215	0	34,304	(0.1)	11,590	13.6	13.2

* Incentive shown is per the New Jersey SmartStart Program. See section 6.0 for other incentive opportunities.

This measure is recommended.

5.12 Additional O&M Opportunities

This list of operations and maintenance (O&M) - type measures represent low-cost or no-cost opportunities, which if implemented will have a positive impact on the overall building operations, comfort and/or energy consumption. The recommended O&M measures for this building are as follows:

- Install Covers on Window Air Conditioners
- Clean Window AC filters before each season
- Wrap all exposed ductwork with high performance grade external insulation
- Set computers monitors to turn off and computers to sleep mode when not in use
- Look for the ENERGY STAR® label when purchasing Window AC units or Kitchen Appliances
- Disconnect unnecessary or unused small appliances and electronics when not in use to reduce phantom loads
- Train custodians to turn off lights and set HVAC temperatures to minimum levels when rooms are unoccupied
- Develop an Energy Master Plan to measure and track energy performance
- Educate students and staff about how their behavior affects energy use. Create student energy patrols to monitor and inform administration when energy is being wasted.
- During the winter, Custodians should ensure all windows are closed as part of cleaning routine

6.0 PROJECT INCENTIVES

6.1 Incentives Overview

The following sections give detailed information on available incentive programs including New Jersey Smart Start, Direct Install, New Jersey Pay for Performance (P4P) and Energy Savings Improvement Plan (ESIP). If the School District wishes to and is eligible to participate in the Energy Savings Improvement Plan (ESIP) program and/or the Pay for Performance Incentive Program (P4P), it cannot participate in either the Smart Start or Direct Install Programs. Refer to Appendix D for more information on the Smart Start program.

6.1.1 New Jersey Smart Start Program

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

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

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

Refer to Appendix D for more information on the Smart Start program.

6.1.2 Direct Install Program

The Direct Install Program applies to smaller facilities that have a peak electrical demand of 200 kW or less in any of the previous 12 months. Buildings must be located in New Jersey and served by one of the state's public, regulated electric utility companies.

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

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

The program pays a maximum amount of $75,000 per building, and up to $250,000 per customer per year. Installations must be completed by an approved Direct Install participating contractor, a list of which can be found on the New Jersey Clean Energy Website. Contractors will coordinate with the applicant to arrange installation of recommended measures identified in a previous energy assessment, such as this energy audit. The incentive is reimbursed to the owner upon successful replacement and payment of the equipment.

The building qualifies for this program because its electrical demand is less than the maximum peak electrical demand of 200 kW for the last 12 month period.

Refer to Appendix D for more information on this program.

6.1.3 New Jersey Pay For Performance Program (P4P)

The building may 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 to offset the cost of energy conservation projects for facilities that pay the Societal Benefits Charge (SBC) and whose demand (kW) in any of the preceding 12 months exceeds 100 kW. This demand minimum has been waived for buildings owned by local governments or municipalities and non-profit organizations and *is not applicable to public schools*. 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). Additionally, the overall return on investment (ROI) must exceed 10%. 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). The ERP must include a detailed energy audit of the desired ECMs, energy savings calculations (using building modeling software) and inputting of all utility bills into the EPA Portfolio Manager website.

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

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

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.

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

For the purpose of demonstrating the eligibility of the ECM's to meet the minimum savings requirement of 15% annual savings and 10% ROI for the Pay for Performance Program, all ECM's identified in this report have been included in the incentive calculations The results for the building are shown in Appendix C, along with more detailed program information in appendix D.

6.1.4 Energy Savings Improvement Plan

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" (ESO) to pay for the capital costs of energy improvements to their facilities. This can be done over a maximum term of 15 years. ESOs are not considered "new general obligation debt" of a local unit and

do not count against debt limits or require voter approval. They may be issued as refunding bonds or leases. Savings generated from the installation of energy conservation measures pay the principal of and interest on the bonds; for that reason, the debt service created by the ESOs is not paid from the debt service fund, but is paid from the general fund.

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

The ESIP approach may not be appropriate for all energy conservation and energy efficiency improvements. Local units should carefully consider all alternatives to develop an approach that best meets their needs. Refer to Appendix D for more information on this program.

6.1.5 Renewable Energy Incentive Program

The Renewable Energy Incentive Program (REIP) is part of New Jersey's efforts to reach its Energy Master Plan goals of striving to use 30 percent of electricity from renewable sources by 2020.

Incentives for sustainable bio-power projects and for energy storage projects are currently under development, with competitive solicitations for each of those technologies expected to begin in the first quarter of 2014. The wind program is currently on hold.

New solar projects are no longer eligible for REIP incentives, but can register for Solar Renewable Energy Certificates (SRECs) through the SREC Registration Program (SRP).

7.0 ALTERNATIVE ENERGY SCREENING EVALUATION

7.1 Solar

7.1.1 ECM-S1 Photovoltaic Rooftop Solar Power Generation

The building 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 amount of available roof area determines how large of a solar array can be installed on any given roof. The table below summarizes the approximate roof area available on the building and the associated solar array size that can be installed.

Available Roof Area (Ft^2)	Potential PV Array Size (kW)
34,375	270

The PVWATTS solar power generation model was utilized to calculate PV power generation; this model is provided in Appendix E.

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. An alternative compliance penalty (ACP) is paid for by the high emission producers and is set each year on a declining scale of 3% per year. 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. Payments that will be received by the PV producer (school) will change from year to year dependent upon supply and demand. There is no definitive way to calculate an exact price that will be received by the PV producer for SREC credits over the next 15 years. Renewable Energy Consultants estimates an average of $155/SREC for 2013 and this number was utilized in the cash flow for this report.

The system costs for PV installations were derived from recent solar contractor budgetary pricing in the state of New Jersey and include the total cost of the system installation (PV panels, inverters, wiring, ballast, controls). The cost of installation is currently about $4.00 per watt or $4,000 per kW of installed system, for a typical system. There are other considerations that have not been included in this pricing, such as the condition of the roof and need for structural reinforcement. Photovoltaic systems can be ground mounted if the roof is not suitable, however, this installation requires a substantial amount of open property (not wooded) and underground wiring, which adds more cost. 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 most likely need to be replaced during the useful life of the PV system.

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

Photovoltaic (PV) Rooftop Solar Power Generation – 270 kW System

Budgetary Cost	Annual Utility Savings			Total Savings	New Jersey Renewable SREC	Payback (without SREC)	Payback (with SREC)	Recommended
	Electricity		Natural Gas					
$	kW	kWh	Therms	$	$	Years	Years	Y/N
1,080,000	270.0	351,900	0	42,192	61,583	25.6	10.4	FS

Note: CHA typically recommends a more detailed evaluation be conducted for the installation of PV Solar arrays when the screening evaluations shows a payback of less than 20 years. Therefore, this ECM is recommended for further study. Before implementation is pursued, the school district should consult with a certified solar PV contractor.

7.1.1 ECM-S2 Solar Thermal Hot Water Generation

Active solar thermal systems use solar collectors to gather the sun's energy to heat a fluid. An absorber in the collector (usually black colored piping) converts the sun's energy into heat. The heat is transferred to circulating water, antifreeze, or air for immediate use or is storage for later utilization. Applications for active solar thermal energy include supplementing domestic hot water, heating swimming pools, space heating or 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 at the same angle as the site's latitude, to maximize the amount of solar radiation collected on a yearly basis.

Several options exist for using active solar thermal systems for space heating. The most common method is called a passive solar hot water system involves using glazed collectors to heat a liquid held in a storage tank (similar to an active solar hot water system described above which requires pumping). The most practical system would transfer the heat from the panels to thermal storage tanks and then use the pre-heated water for domestic hot water production. DHW is presently produced by natural gas fired water heaters and, therefore, this measure would offer natural gas utility savings. Unfortunately, the amount of domestic hot water that is currently used by this school is very small. Installing a solar domestic hot water system is not recommended due to the limited amount of domestic hot water presently consumed by the school.

This measure is not recommended.

7.2 Combined Heat and Power Plant

Combined heat and power (CHP), cogeneration, is self-production of electricity on-site with beneficial recovery of the heat byproduct from the electrical generator. Common CHP equipment includes reciprocating engine-driven, micro turbines, steam turbines,

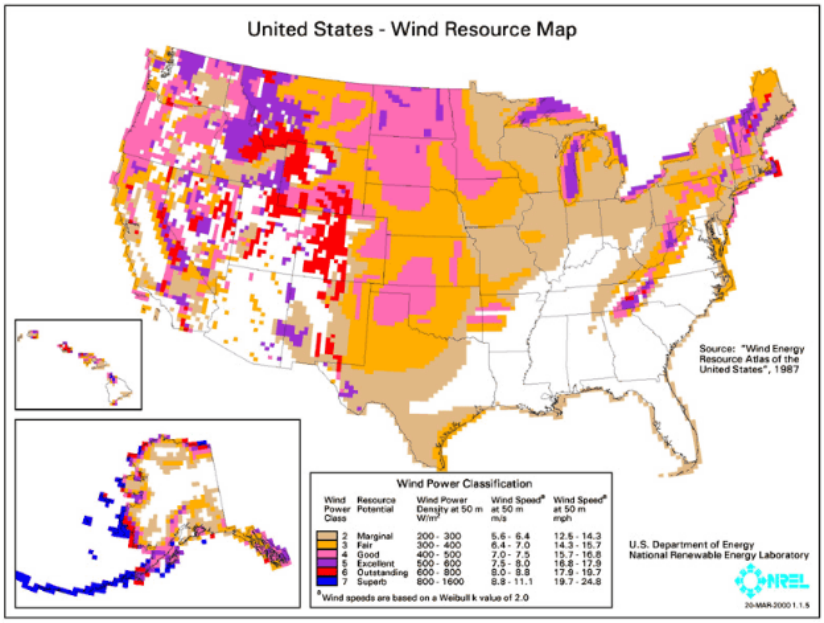
and fuel cells. Typical CHP customers include industrial, commercial, institutional, educational institutions, and multifamily residential facilities. CHP systems that are commercially viable at the present time are sized approximately 50 kW and above, with numerous options in blocks grouped around 300 kW, 800 kW, 1,200 kW and larger. Typically, CHP systems are used to produce a portion of the electricity needed by a facility some or all of the time, with the balance of electric needs satisfied by purchase from the grid.

Any proposed CHP project will need to consider many factors, such as existing system load, use of thermal energy produced, system size, natural gas fuel availability, and proposed plant location. The building has sufficient need for electrical generation and the ability to use most of the thermal byproduct during the winter; however thermal usage during the summer months does not exist. Thermal energy produced by the CHP plant in the warmer months will be wasted. An absorption chiller could be installed to utilize the heat to produce chilled water; however, there is no chilled water distribution system in the building. CHP is not recommended due to the building's limited summer thermal demand.

This measure is not recommended.

7.3 Wind Powered Turbines

Wind power is the conversion of kinetic energy from wind into mechanical power that is used to drive a generator which creates electricity by means of a wind turbine. A wind turbine consists of rotor and blades connected to a gearbox and generator that are mounted onto a tower. Newer wind turbines also use advanced technology to generate electricity at a variety of frequencies depending on the wind speed, convert it to DC and then back to AC before sending it to the grid. Wind turbines range from 50 – 750 kW for utility scale turbines down to below 50 kW for residential use. On a scale of 1 (the lowest) to 7 (the highest), Class 3 and above (wind speeds of 13 mph or greater) are generally considered "good wind resource" according to the Wind Energy Development Programmatic EIS Information Center hosted by the Bureau of Land Management. According to the map below, published by NREL, Newark, NJ is classified as Class 1 at 50m, meaning the city would not be a good candidate for wind power.



This measure is not recommended.

7.4 Demand Response Curtailment

Presently, electricity is delivered by PSE&G, which receives the electricity from regional power grid RFC. PSE&G is the regional transmission organization (RTO) that coordinates the movement of wholesale electricity in all or parts of 13 states and the District of Columbia including the State of New Jersey.

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

A pre-approved CSP will require a minimum of 100 kW of load reduction to participate in any curtailment program. From March 2013 through February 2014 the following table summarizes the electricity load profile for the building.

Building Electric Load Profile

Peak Demand kW	Min Demand kW	Avg Demand kW	Onsite Generation Y/N	Eligible? Y/N
862.7	485.4	581.3	N	N

This measure is not recommended because the building does not have adequate load to meet the required minimum load reduction.

8.0 CONCLUSIONS & RECOMMENDATIONS

The LGEA energy audit conducted by CHA for the building identified potential annual savings of $66,362/yr with an overall payback of 11.5 years, if the recommended ECMs are implemented.

The potential annual energy and cost savings are shown in the following table.

Electric Savings (kWh)	Natural Gas Savings (therms)	Total Savings ($)	Payback (years)
411,778	17,994	66,362	9.9

The following projects should be considered for implementation:

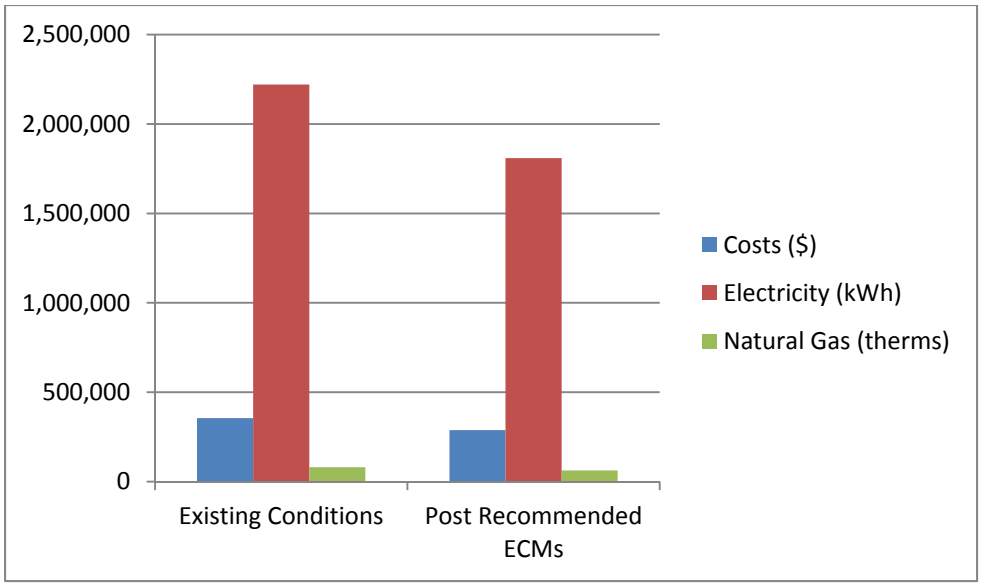
- Replace Door Sweeps and Seals
- Install Window A/C Controller
- Install Variable Frequency Drives
- Replace HVAC Rooftop Units
- Retro-Commission Temperature Controls
- Kitchen Hood Controller
- Install Walk-In Cooler / Freezer Controls
- Install Vending Misers
- Lighting Replacement / Upgrades
- Install Lighting Controls (Occupancy Sensors)
- Lighting Replacements with Controls (Occupancy Sensors)

The following alternative energy measures are recommended for further study:

- Photovoltaic (PV) Rooftop Solar Power Generation – 270 kW System

If NPS implements the recommended ECMs, energy savings would be as follows:

	Existing Conditions	Post Recommended ECMs	Percent Savings
Costs ($)	354,927	288,565	19%
Electricity (kWh)	2,220,800	1,809,022	19%
Natural Gas (therms)	80,896	62,902	22%
Site EUI (kbtu/SF/Yr)	77.6	61.7	


2,500,000
2,000,000
1,500,000
1,000,000
500,000
0
Existing Conditions
Post Recommended ECMs
Costs ($)
Electricity (kWh)
Natural Gas (therms)

APPENDIX A

Utility Usage Analysis and Alternate Utility Suppliers

Millburn Township Public Schools
462 Millburn Avenue, Millburn, NJ 07041

Annual Utilities

12-month Summary

Electric		
Annual Usage	2,220,800	kWh/yr
Annual Cost	266,271	$
Blended Rate	0.120	$/kWh
Consumption Rate	0.095	$/kWh
Demand Rate	6.78	$/kW
Peak Demand	862.7	kW
Min. Demand	485.4	kW
Avg. Demand	581.3	kW

Natural Gas				
Account Number	PG00008137005858622	PG00008137006658622	PG00008137007458622	
Annual Usage	4,090	74,333	24,673	therms/yr
Annual Cost	3,697	62952	22007	$
Rate	0.904	0.847	0.892	$/therm

Water		
Annual Usage	2,308,000	gallons/yr
Annual Cost	20,466	$
Rate	0.009	$/gallon

Millburn Township Public Schools
462 Millburn Avenue, Millburn, NJ 07041

Utility Bills: Account Numbers

Account Number	School Building	Location	Type	Notes
100 004 697 544	Millburn High School	462 Millburn Avenue, Millburn, NJ 07041	Electricity	
8137005858622	Millburn High School	462 Millburn Avenue, Millburn, NJ 07041	Natural Gas	
8137006658622	Millburn High School	462 Millburn Avenue, Millburn, NJ 07041	Natural Gas	
8137007458622	Millburn High School	462 Millburn Avenue, Millburn, NJ 07041	Natural Gas	
1018-210025955098	Millburn High School	462 Millburn Avenue, Millburn, NJ 07041	Water	

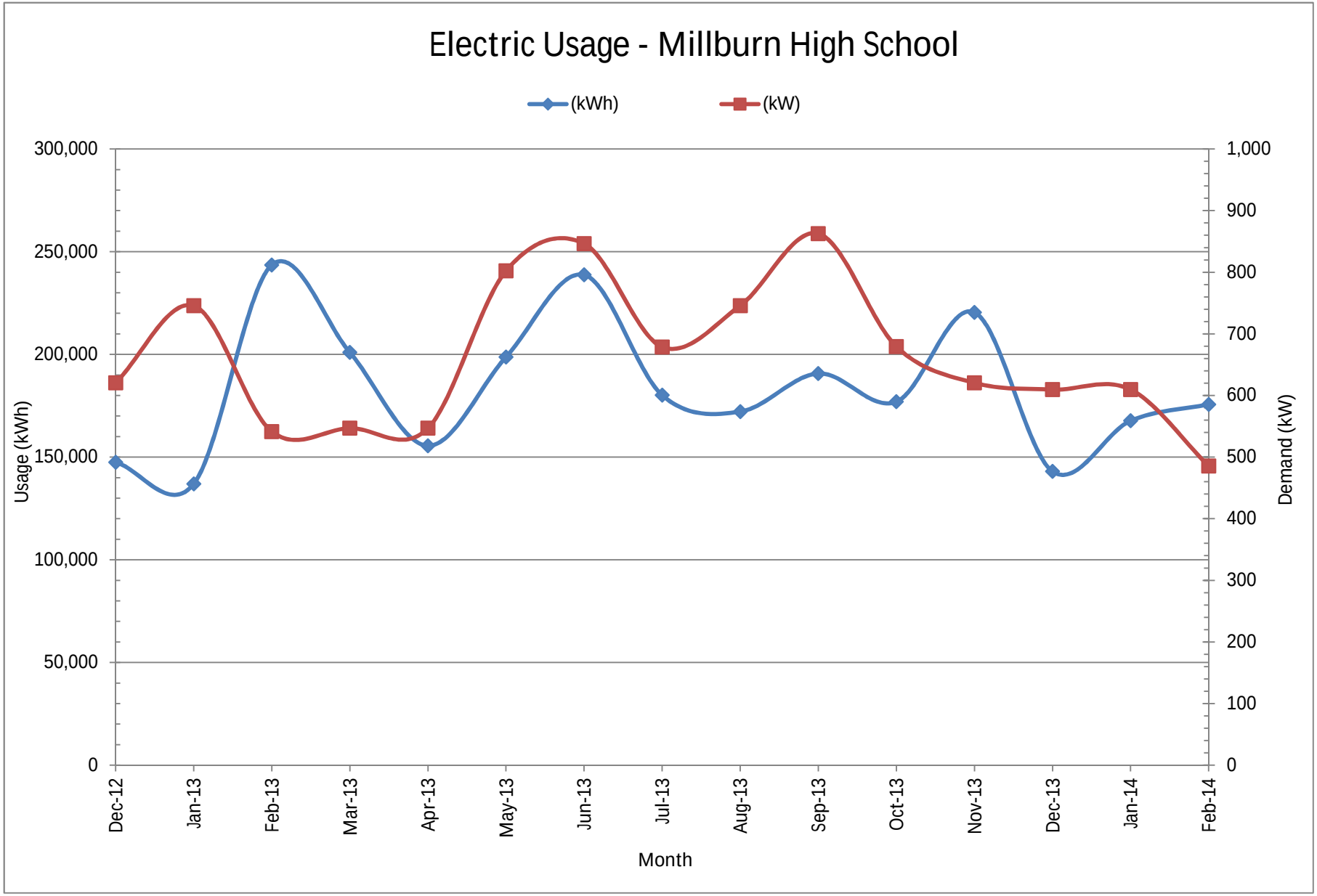
Millburn Township Public Schools
462 Millburn Avenue, Millburn, NJ 07041

For Service at: **Millburn High School**
Account No.: **100 004 697 544** **Delivery -** Jersey Central Power & Light
Meter No.: **G28133686** **Supplier -** Jersey Central Power & Light
Electric Service

			Provider Charges			Usage (kWh) vs. Demand (kW) Charges		Unit Costs		
Month	**Consumption (kWh)**	**Demand (kW)**	**Delivery ($)**	**Supplier ($)**	**Total ($)**	**Consumption ($)**	**Demand ($)**	**Blended Rate ($/kWh)**	**Consumption ($/kWh)**	**Demand ($/kW)**
December-12	147520	620.5			16519.92	12,569.98	3949.94	0.11	0.09	6.37
January-13	136960	745.6			16355.15	11,595.82	4759.33	0.12	0.08	6.38
February-13	243520	541.4			24006.11	20,567.95	3438.16	0.10	0.08	6.35
March-13	200960	546.9			23998.26	20,524.52	3473.74	0.12	0.10	6.35
April-13	155520	546.9			16632.26	13,158.52	3473.74	0.11	0.08	6.35
May-13	198720	802.2			24726.75	19,228.88	5497.87	0.12	0.10	6.85
June-13	238720	846.4			28890.22	23,085.60	5804.62	0.12	0.10	6.86
July-13	180160	678.7			22080.14	17,439.36	4640.78	0.12	0.10	6.84
August-13	172160	745.9			21775.16	16,668.01	5107.15	0.13	0.10	6.85
September-13	190720	862.7			23972.48	18,455.51	5516.97	0.13	0.10	6.40
October-13	176960	679.4			21475.26	17,144.24	4331.02	0.12	0.10	6.37
November-13	220480	620.5			25294.73	21,344.79	3949.94	0.11	0.10	6.37
December-13	143040	609.6			17703.78	12,899.27	4804.51	0.12	0.09	7.88
January-14	167680	609.6			19882.46	15,119.28	4763.18	0.12	0.09	7.81
February-14	175680	485.4			19839.33	16,763.49	3075.84	0.11	0.10	6.34
Total (All)	**2,748,800**	**862.70**	**$0.00**	**$0.00**	**$323,152.01**	**$256,565.22**	**$66,586.79**	**$0.12**	**$0.09**	**$6.70**
Total (last 12-months)	**2,220,800**	**862.70**	**$0.00**	**$0.00**	**$266,270.83**	**$211,831.47**	**$54,439.36**	**$0.12**	**$0.10**	**$6.78**
Notes	1	2	3	4	5	6	7	8	9	10

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

No data provided, most recent rate used
No data provided, interpolated value

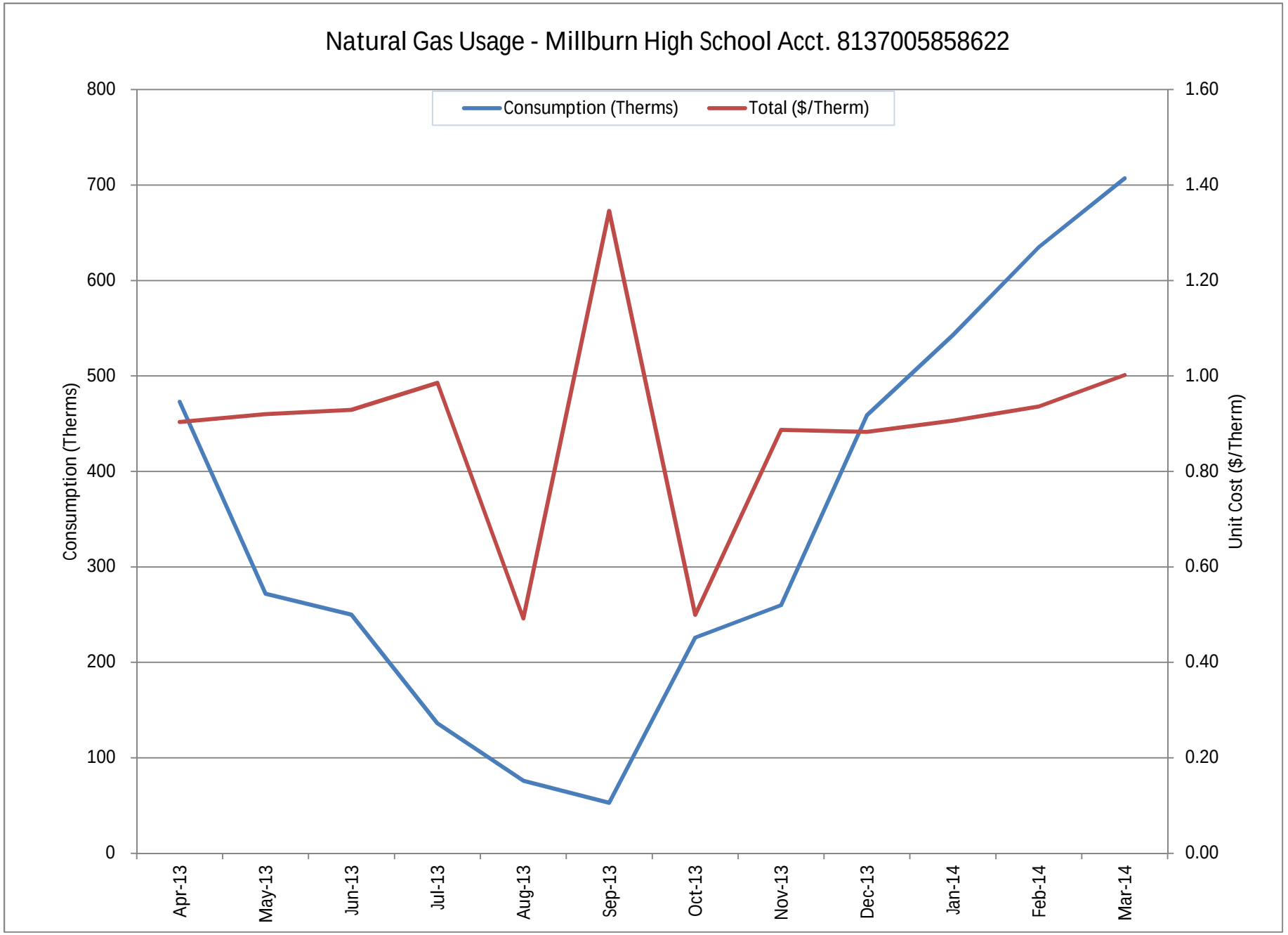


Utility Data -Millburn High School
Electric Graph

Millburn Township Public Schools
462 Millburn Avenue, Millburn, NJ 07041

For Service at: **Millburn High School**
Account No.: **PG000008137005858622**
Meter No:
Natural Gas Service **Delivery -** **PSE&G**
Supplier - **Compass**

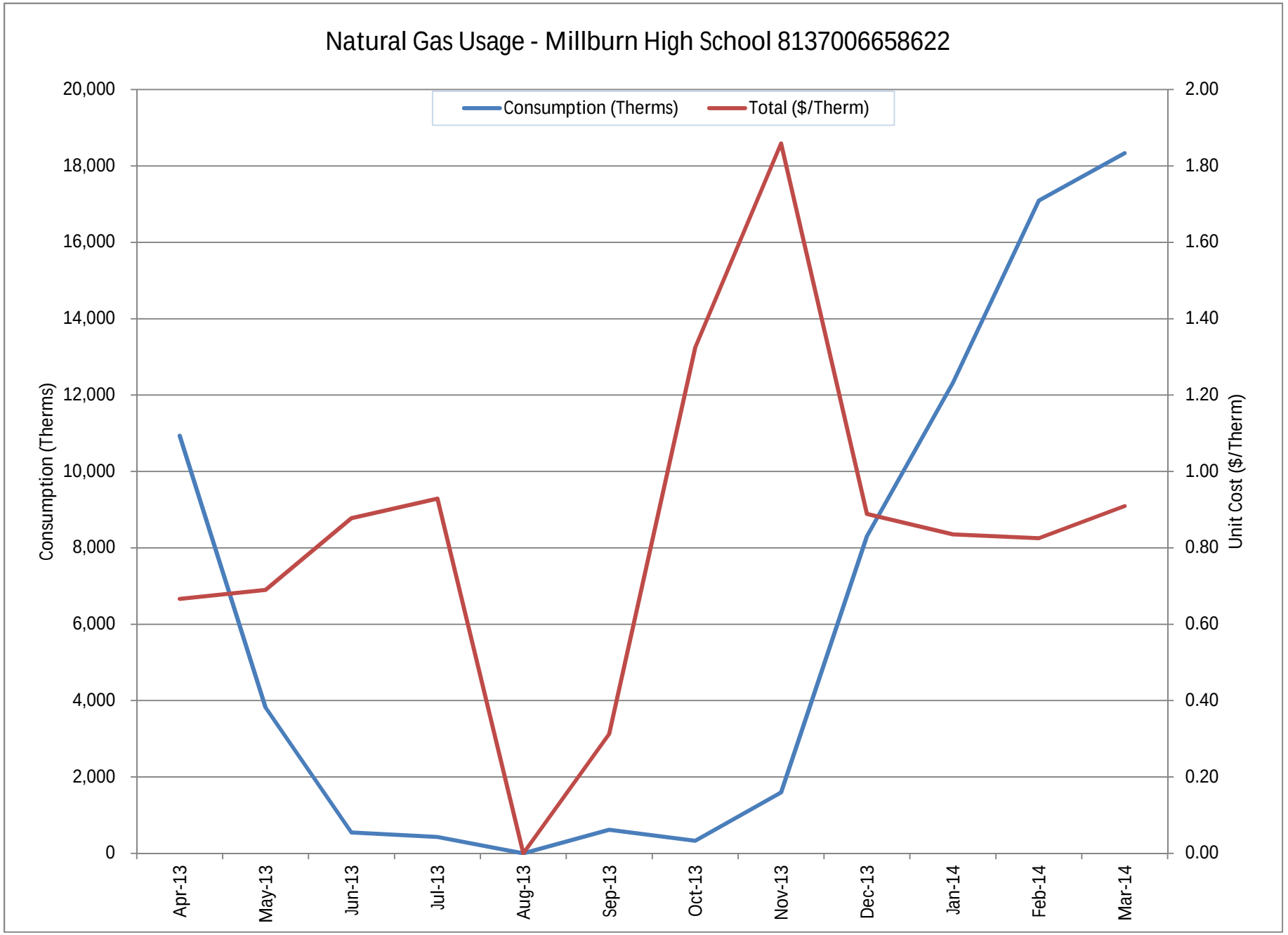
		Charges			Unit Costs		
Month	**Consumption (Therms)**	**Delivery ($)**	**Supply ($)**	**Total ($)**	**Delivery ($/Therm)**	**Supply ($/Therm)**	**Total ($/Therm)**
April-13	473	$ 171.52	$ 255.87	$ 427.39	$ 0.363	$ 0.541	$ 0.904
May-13	272	$ 103.33	$ 147.00	$ 250.33	$ 0.380	$ 0.540	$ 0.920
June-13	250	$ 96.20	$ 136.10	$ 232.30	$ 0.385	$ 0.544	$ 0.929
July-13	136	$ 57.79	$ 76.22	$ 134.01	$ 0.425	$ 0.560	$ 0.985
August-13	76	$ 37.41		$ 37.41	$ 0.492	$ -	$ 0.492
September-13	53	$ 29.46	$ 41.86	$ 71.32	$ 0.556	$ 0.790	$ 1.346
October-13	226	$ 88.76	$ 24.10	$ 112.86	$ 0.393	$ 0.107	$ 0.499
November-13	260	$ 114.83	$ 115.86	$ 230.69	$ 0.442	$ 0.446	$ 0.887
December-13	459	$ 200.86	$ 204.51	$ 405.37	$ 0.438	$ 0.446	$ 0.883
January-14	543	$ 238.71	$ 253.41	$ 492.12	$ 0.440	$ 0.467	$ 0.906
February-14	635	$ 273.62	$ 320.80	$ 594.42	$ 0.431	$ 0.505	$ 0.936
March-14	707	$ 298.76	$ 409.75	$ 708.51	$ 0.423	$ 0.580	$ 1.002
Total	**4,090**			**$ 3,696.73**			**$ 0.904**


Natural Gas Usage - Millburn High School Acct. 8137005858622
Consumption (Therms)
Total ($/Therm)
Consumption (Therms)
Unit Cost ($/Therm)
800
700
600
500
400
300
200
100
0
1.60
1.40
1.20
1.00
0.80
0.60
0.40
0.20
0.00
Apr-13
May-13
Jun-13
Jul-13
Aug-13
Sep-13
Oct-13
Nov-13
Dec-13
Jan-14
Feb-14
Mar-14

Millburn Township Public Schools
462 Millburn Avenue, Millburn, NJ 07041

For Service at: **Millburn High School**
Account No.: **PG000008137006658622**
Meter No:
Natural Gas Service **Delivery -** **PSE&G**
Supplier - **Compass**

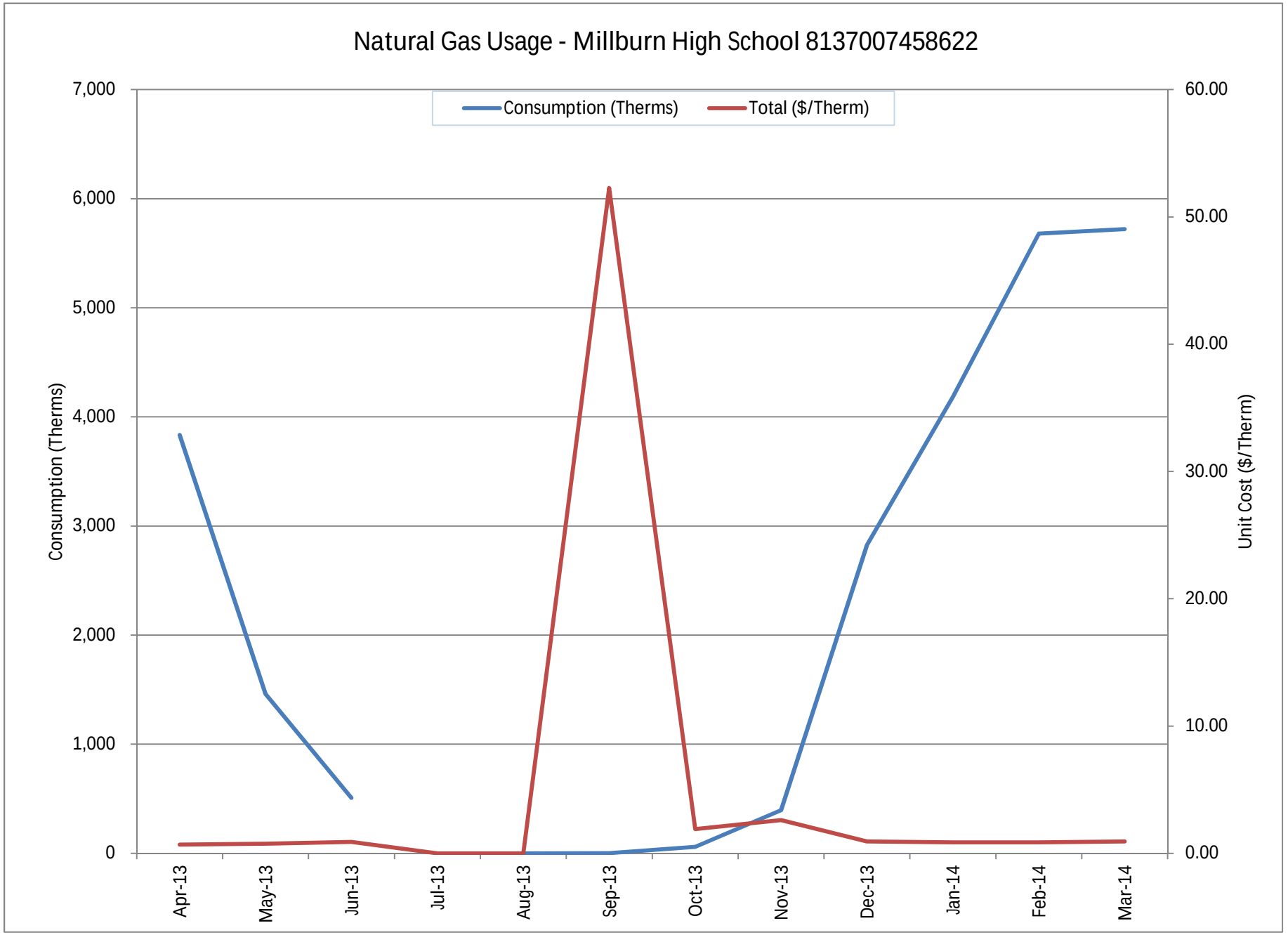
		Charges			Unit Costs		
Month	**Consumption (Therms)**	**Delivery ($)**	**Supply ($)**	**Total ($)**	**Delivery ($/Therm)**	**Supply ($/Therm)**	**Total ($/Therm)**
April-13	10,935	$ 1,302.51	$ 5,983.02	$ 7,285.53	$ 0.119	$ 0.547	$ 0.666
May-13	3,820	$ 544.87	$ 2,090.51	$ 2,635.38	$ 0.143	$ 0.547	$ 0.690
June-13	548	$ 181.42	$ 299.42	$ 480.84	$ 0.331	$ 0.546	$ 0.877
July-13	431	$ 166.17	$ 234.09	$ 400.26	$ 0.386	$ 0.543	$ 0.929
August-13	0	$ 104.24	$ -	$ 104.24	#DIV/0!	#DIV/0!	#DIV/0!
September-13	619	$ 193.25	$ -	$ 193.25	$ 0.312	$ -	$ 0.312
October-13	326	$ 151.00	$ 280.67	$ 431.67	$ 0.463	$ 0.861	$ 1.324
November-13	1,592	$ 2,250.17	$ 709.29	$ 2,959.46	$ 1.413	$ 0.446	$ 1.859
December-13	8,305	$ 3,683.70	$ 3,697.36	$ 7,381.06	$ 0.444	$ 0.445	$ 0.889
January-14	12,328	$ 4,547.14	$ 5,752.96	$ 10,300.10	$ 0.369	$ 0.467	$ 0.836
February-14	17,092	$ 5,478.05	$ 8,625.65	$ 14,103.70	$ 0.321	$ 0.505	$ 0.825
March-14	18,337	$ 6,061.63	$ 10,614.90	$ 16,676.53	$ 0.331	$ 0.579	$ 0.909
Total	**74,333**			**$ 62,952.02**			**$ 0.847**


Natural Gas Usage - Millburn High School 8137006658622
Consumption (Therms)
Total ($/Therm)
Consumption (Therms)
Unit Cost ($/Therm)
20,000
18,000
16,000
14,000
12,000
10,000
8,000
6,000
4,000
2,000
0
2.00
1.80
1.60
1.40
1.20
1.00
0.80
0.60
0.40
0.20
0.00
Apr-13
May-13
Jun-13
Jul-13
Aug-13
Sep-13
Oct-13
Nov-13
Dec-13
Jan-14
Feb-14
Mar-14

Millburn Township Public Schools
462 Millburn Avenue, Millburn, NJ 07041

For Service at: **Millburn High School**
Account No.: **PG000008137007458622**
Meter No:
Natural Gas Service **Delivery -** **PSE&G**
Supplier - **Compass**

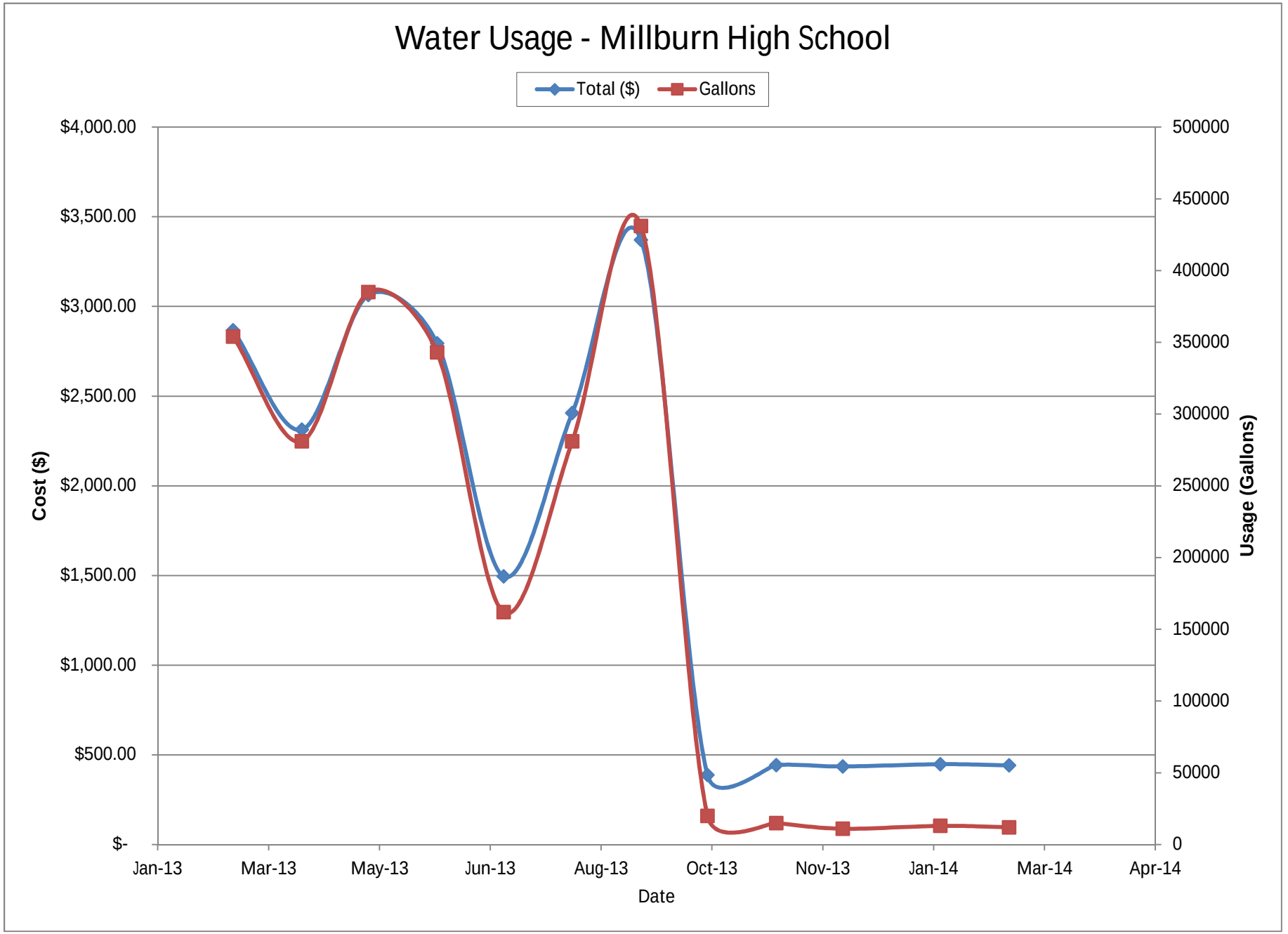
		Charges			Unit Costs		
Month	**Consumption (Therms)**	**Delivery ($)**	**Supply ($)**	**Total ($)**	**Delivery ($/Therm)**	**Supply ($/Therm)**	**Total ($/Therm)**
April-13	3,833	$ 546.21	$ 2,095.96	$ 2,642.17	$ 0.143	$ 0.547	$ 0.689
May-13	1,461	$ 293.63	$ 800.27	$ 1,093.90	$ 0.201	$ 0.548	$ 0.749
June-13	509	$ 175.93	$ 277.64	$ 453.57	$ 0.346	$ 0.545	$ 0.891
July-13			$ 21.77	$ 21.77	#DIV/0!	#DIV/0!	#DIV/0!
August-13	0	$ 104.24		$ 104.24	#DIV/0!	#DIV/0!	#DIV/0!
September-13	2	$ 104.54	$ -	$ 104.54	$ 52.270	$ -	$ 52.270
October-13	60	$ 112.94	$ 0.95	$ 113.89	$ 1.882	$ 0.016	$ 1.898
November-13	396	$ 857.47	$ 176.38	$ 1,033.85	$ 2.165	$ 0.445	$ 2.611
December-13	2,825	$ 1,397.52	$ 1,257.73	$ 2,655.25	$ 0.495	$ 0.445	$ 0.940
January-14	4,185	$ 1,689.48	$ 1,953.12	$ 3,642.60	$ 0.404	$ 0.467	$ 0.870
February-14	5,681	$ 1,980.12	$ 2,867.05	$ 4,847.17	$ 0.349	$ 0.505	$ 0.853
March-14	5,721	$ 1,982.24	$ 3,312.06	$ 5,294.30	$ 0.346	$ 0.579	$ 0.925
Total	**24,673**			**$ 22,007.25**			**$ 0.892**


Natural Gas Usage - Millburn High School 8137007458622
Consumption (Therms)
Total ($/Therm)
Consumption (Therms)
Unit Cost ($/Therm)
7,000
6,000
5,000
4,000
3,000
2,000
1,000
0
60.00
50.00
40.00
30.00
20.00
10.00
0.00
Apr-13
May-13
Jun-13
Jul-13
Aug-13
Sep-13
Oct-13
Nov-13
Dec-13
Jan-14
Feb-14
Mar-14

Millburn Township Public Schools
462 Millburn Avenue, Millburn, NJ 07041

For Service at: **Millburn High School**
Account No.: **1018-210025955098**
Meter No.: **60768167**
Water & Sewer Service **Delivery -** **New Jersey American Water**
Supplier -

Month	Total ($)	Gallons	$/Gallon
Mar-13	$ 2,867.56	354000	$ 0.008
Apr-13	$ 2,313.09	281000	$ 0.008
May-13	$ 3,063.64	385000	$ 0.008
Jun-13	$ 2,794.23	343000	$ 0.008
Jul-13	$ 1,495.11	162000	$ 0.009
Aug-13	$ 2,406.26	281000	$ 0.009
Sep-13	$ 3,371.40	431000	$ 0.008
Oct-13	$ 386.92	20000	$ 0.019
Nov-13	$ 443.13	15000	$ 0.030
Dec-13	$ 435.08	11000	$ 0.040
Jan-14	$ 447.84	13000	$ 0.034
Feb-14	$ 441.46	12000	$ 0.037
Total	**$ 20,465.72**	**2308000**	**0.009**


Water Usage - Millburn High School
Total ($)
Gallons
$4,000.00
$3,500.00
$3,000.00
$2,500.00
$2,000.00
$1,500.00
$1,000.00
$500.00
$-
Cost ($)
500000
450000
400000
350000
300000
250000
200000
150000
100000
50000
0
Usage (Gallons)
Jan-13
Mar-13
May-13
Jun-13
Aug-13
Oct-13
Nov-13
Jan-14
Mar-14
Apr-14
Date

JCP&L SERVICE TERRITORY

Last Updated: 10/24/12

***CUSTOMER CLASS - R – RESIDENTIAL C – COMMERCIAL I –INDUSTRIAL**

Supplier	Telephone & Web Site	*Customer Class
AEP Energy, Inc. 309 Fellowship Road, Fl.2 Mount Laurel, NJ 08054	(866) 258-3782 www.aepenergy.com	**C/I ACTIVE**
Alpha Gas and Electric, LLC 641 5th Street Lakewood, NJ 08701	(855) 553-6374 www.alphagasandelectric.com	**R/C ACTIVE**
Ambit Northeast, LLC 103 Carnegie Center Suite 300 Princeton, NJ 08540	(877) 30-AMBIT (877) 302-6248 www.ambitenergy.com	**R/C ACTIVE**
AP Gas & Electric, LLC 10 North Park Place, Suite 420 Morristown, NJ 07960	(855) 544-4895 www.apge.com	**R/C/I ACTIVE**
Astral Energy LLC 16 Tyson Place Bergenfield, NJ 07621	(201) 384-5552 www.astralenergyllc.com	**R/C/I ACTIVE**
BBPC, LLC d/b/a Great Eastern Energy 116 Village Blvd. Suite 200 Princeton, NJ 08540	(888) 651-4121 www.greateasternenergy.com	**C/I ACTIVE**
Champion Energy Services, LLC 72 Avenue L Newark, NJ 07105	(877) 653-5090 www.championenergyservices.com	**R/C/I ACTIVE**
Choice Energy, LLC 4257 US Highway 9, Suite 6C Freehold, NJ 07728	888-565-4490 www.4choiceenergy.com	**R/C ACTIVE**
Clearview Electric, Inc. 505 Park Drive Woodbury, NJ 08096	(888) CLR-VIEW (800) 746-4702 www.clearviewenergy.com	**R/C/I ACTIVE**
Commerce Energy, Inc. 7 Cedar Terrace Ramsey, NJ 07446	1-866-587-8674 www.commerceenergy.com	**R ACTIVE**
ConEdison Solutions Cherry Tree Corporate Center 535 State Highway Suite 180 Cherry Hill, NJ 08002	(888) 665-0955 www.conedsolutions.com	**C/I ACTIVE**
Constellation NewEnergy, Inc. 900A Lake Street, Suite 2 Ramsey, NJ 07446	(866) 237-7693 www.constellation.com	**R/C/I ACTIVE**
Constellation Energy 900A Lake Street, Suite 2 Ramsey, NJ 07446	(877) 997-9995 www.constellation.com	**R ACTIVE**
Direct Energy Business, LLC 120 Wood Avenue Suite 611 Iselin, NJ 08830	(888) 925-9115 www.directenergybusiness.com	**C/I ACTIVE**

Direct Energy Services, LLC 120 Wood Avenue Suite 611 Iselin, NJ 08830	(866) 547-2722 www.directenergy.com	**C/I ACTIVE**
Discount Energy Group, LLC 811 Church Road, Suite 149 Cherry Hill, NJ 08002	(800) 282-3331 www.discountenergygroup.com	**R/C ACTIVE**
Dominion Retail, Inc. d/b/a Dominion Energy Solutions 395 Route 70 West, Suite 125 Lakewood, NJ 08701	(866) 275-4240 www.dom.com/products	**R/C ACTIVE**
DTE Energy Supply, Inc. One Gateway Center, Suite 2600 Newark, NJ 07102	(877) 332-2450 www.dtesupply.com	**C/I ACTIVE**
Energy Plus Holdings LLC 309 Fellowship Road East Gate Center, Suite 200 Mt. Laurel, NJ 08054	(877) 866-9193 www.energypluscompany.com	**R/C ACTIVE**
Energy.me Midwest LLC 90 Washington Blvd Bedminster, NJ 07921	(855) 243-7270 www.energy.me	**R/C/I ACTIVE**
Ethical Electric Benefit Co. d/b/a Ethical Electric 100 Overlook Center, 2nd Fl. Princeton, NJ 08540	(888) 444-9452 www.ethicalelectric.com	**R/C ACTIVE**
FirstEnergy Solutions Corp. 300 Madison Avenue Morristown, NJ 07962	(800) 977-0500 www.fes.com	**C/I ACTIVE**
Gateway Energy Services Corp. 44 Whispering Pines Lane Lakewood, NJ 08701	(800) 805-8586 www.gesc.com	**R/C/I ACTIVE**
GDF SUEZ Energy Resources NA, Inc. 333 Thornall Street Sixth Floor Edison, NJ 08819	(866) 999-8374 www.gdfsuezenergyresources.com	**C/I ACTIVE**
Glacial Energy of New Jersey, Inc. 75 Route 15 Building E Lafayette, NJ 07848	(888) 452-2425 www.glacialenergy.com	**C/I ACTIVE**
Green Mountain Energy Company 211 Carnegie Center Drive Princeton, NJ 08540	(866) 767-5818 www.greenmountain.com/commercial-home	**C/I ACTIVE**
Hess Corporation 1 Hess Plaza Woodbridge, NJ 07095	(800) 437-7872 www.hess.com	**C/I ACTIVE**
HIKO Energy, LLC 655 Suffern Road Teaneck, NJ 07666	(888) 264-4908 www.hikoenergy.com	**R/C ACTIVE**
HOP Energy, LLC d/b/a Metro Energy, HOP Fleet Fueling, HOP Energy Fleet Fueling 1011 Hudson Avenue Ridgefield, NJ 07657	(877) 390-7155 www.hopenergy.com	**R/C/I ACTIVE**

IDT Energy, Inc. 550 Broad Street Newark, NJ 07102	(973) 438-4380 www.idtenergy.com	**R/C** **ACTIVE**
Independence Energy Group, LLC 211 Carnegie Center Princeton, NJ 08540	(877) 235-6708 www.chooseindependence.com	**R/C ACTIVE**
Integrys Energy Services, Inc. 99 Wood Ave, South, Suite 802 Iselin, NJ 08830	(877) 763-9977 www.integrysenergy.com	**C/I** **ACTIVE**
Liberty Power Delaware, LLC 3000 Atrium Way Suite 273 Mt. Laurel, NJ 08054	(866) 769-3799 www.libertypowercorp.com	**R/C/I** **ACTIVE**
Liberty Power Holdings, LLC 3000 Atrium Way Suite 273 Mt. Laurel, NJ 08054	(866) 769-3799 www.libertypowercorp.com	**R/C/I** **ACTIVE**
Linde Energy Services 575 Mountain Avenue Murray Hill, NJ 07974	(800) 247-2644 www.linde.com	**C/I** **ACTIVE**
Marathon Power LLC 302 Main Street Paterson, NJ 07505	(888) 779-7255 www.mecny.com	**R/C/I** **ACTIVE**
NATGASCO, Inc. 532 Freeman St. Orange, NJ 07050	(973) 678-1800 x. 251 www.supremeenergyinc.com	**R/C** **ACTIVE**
NextEra Energy Services New Jersey, LLC 651 Jernee Mill Road Sayreville, NJ 08872	(877) 528-2890 Commercial (800) 882-1276 Residential www.nexteraenergyservices.com	**R/C/I** **ACTIVE**
NJ Gas & Electric 1 Bridge Plaza fl.2 Fort Lee, NJ 07024	(866) 568-0290 www.NJGandE.com	**R/C/I** **ACTIVE**
Noble Americas Energy Solutions The Mac-Cali Building 581 Main Street, 8th Floor Woodbridge, NJ 07095	(877) 273-6772 www.noblesolutions.com	**C/I** **ACTIVE**
North American Power and Gas, LLC 222 Ridgedale Ave. Cedar Knolls, NJ 07927	(888) 313-9086 www.napower.com	**R/C/I** **ACTIVE**
Palmco Power NJ, LLC One Greentree Centre 10,000 Lincoln Drive East, Suite 201 Marlton, NJ 08053	(877) 726-5862 www.PalmcoEnergy.com	**R/C/I** **ACTIVE**
Pepco Energy Services, Inc. 112 Main St. Lebanon, NJ 08833	(800) ENERGY-9 (363-7499) www.pepco-services.com	**R/C** **ACTIVE**
Plymouth Rock Energy, LLC 338 Maitland Avenue Teaneck, NJ 07666	(855) 32-POWER (76937) www.plymouthenergy.com	**R/C/I** **ACTIVE**
PPL EnergyPlus, LLC 811 Church Road Cherry Hill, NJ 08002	(800) 281-2000 www.pplenergyplus.com	**C/I ACTIVE**

Public Power & Utility of New Jersey, LLC 39 Old Ridgebury Rd. Suite 14 Danbury, CT 06810	(888) 354-4415 www.ppandu.com	**R/C/I** **ACTIVE**
Reliant Energy 211 Carnegie Center Princeton, NJ 08540	(877) 297-3795 (877) 297-3780 www.reliant.com/pjm	**R/C/I** **ACTIVE**
ResCom Energy LLC 18C Wave Crest Ave. Winfield Park, NJ 07036	(888) 238-4041 http://rescomenergy.com	**R/C/I** **ACTIVE**
Respond Power LLC 10 Regency CT Lakewood, NJ 08701	(877) 973-7763 www.respondpower.com	**R/C/I** **ACTIVE**
South Jersey Energy Company 1 South Jersey Plaza Route 54 Folsom, NJ 08037	(800) 800-266-6020 www.southjerseyenergy.com	**C/I** **ACTIVE**
Sperian Energy Corp. 1200 Route 22 East, Suite 2000 Bridgewater, NJ 08807	(888) 682-8082	**R/C/I** **ACTIVE**
Starion Energy PA Inc. 101 Warburton Avenue Hawthorne, NJ 07506	(800) 600-3040 www.starionenergy.com	**R/C/I** **ACTIVE**
Stream Energy 309 Fellowship Road Suite 200 Mt. Laurel, NJ 08054	(877) 369-8150 www.streamenergy.net	**R** **ACTIVE**
UGI Energy Services, Inc. d/b/a GASMARK 224 Strawbridge Drive Suite 107 Moorestown, NJ 08057	(856) 273-9995 www.ugienergyservices.com	**C/I** **ACTIVE**
Verde Energy USA, Inc. 50 East Palisades Avenue Englewood, NJ 07631	(800) 388-3862 www.lowcostpower.com	**R/C/I** **ACTIVE**
Viridian Energy 2001 Route 46 Waterview Plaza Suite 310 Parsippany, NJ 07054	(866) 663-2508 www.viridian.com	**R/C/I** **ACTIVE**
Xoom Energy New Jersey, LLC 744 Broad Street Newark, NJ 07102	(888)997-8979 www.xoomenergy.com	**R/C/I** **ACTIVE**
YEP Energy 89 Headquarters Plaza North #1463 Morristown, NJ 07960	(855) 363-7736 www.yepenergyNJ.com	**R/C/I** **ACTIVE**
Your Energy Holdings, LLC One International Boulevard Suite 400 Mahwah, NJ 07495-0400	(855) 732-2493 www.thisisyourenergy.com	**R/C/I** **ACTIVE**

PSE&G GAS SERVICE TERRITORY
Last Updated: 10/24/12

***CUSTOMER CLASS** - **R – RESIDENTIAL C – COMMERCIAL I - INDUSTRIAL**

Supplier	Telephone & Web Site	*Customer Class
Ambit Northeast, LLC 103 Carnegie Center Suite 300 Princeton, NJ 08540	(877)-30-AMBIT (877) 302-6248 www.ambitenergy.com	**R/C** **ACTIVE**
Astral Energy LLC 16 Tyson Place Bergenfield, NJ 07621	888-850-1872 www.astralenergyllc.com	**R/C/I** **ACTIVE**
BBPC, LLC Great Eastern Energy 116 Village Blvd. Suite 200 Princeton, NJ 08540	888-651-4121 www.greateasternenergy.com	**C/I** **ACTIVE**
Clearview Electric Inc. **d/b/a Clearview Gas** 1744 Lexington Ave. Pennsauken, NJ 08110	800-746-4720 www.clearviewenergy.com	**R/C** **ACTIVE**
Colonial Energy, Inc. 83 Harding Road Wyckoff, NJ 07481	845-429-3229 www.colonialgroupinc.com	**C/I** **ACTIVE**
Commerce Energy, Inc. 7 Cedar Terrace Ramsey, NJ 07746	(888) 817-8572 www.commerceenergy.com	**R** **ACTIVE**
Compass Energy Services, Inc. 1085 Morris Avenue, Suite 150 Union, NJ 07083	866-867-8328 908-638-6605 www.compassenergy.net	**C/I** **ACTIVE**
ConocoPhillips Company 224 Strawbridge Drive, Suite 107 Moorestown, NJ 08057	800-646-4427 www.conocophillips.com	**C/I** **ACTIVE**
Consolidated Edison Energy, Inc. **d/b/a Con Edison Solutions** 535 State Highway 38, Suite 140 Cherry Hill, NJ 08002	888-686-1383 x2130 www.conedenergy.com	

Consolidated Edison Solutions, Inc. Cherry Tree Corporate Center 535 State Highway 38, Suite 140 Cherry Hill, NJ 08002	888-665-0955 www.conedsolutions.com	**C/I** **ACTIVE**
Constellation NewEnergy-Gas Division, LLC 900A Lake Street, Suite 2 Ramsey, NJ 07466	(800) 900-1982 www.constellation.com	**C/I** **ACTIVE**
Direct Energy Business, LLC 120 Wood Avenue, Suite 611 Iselin, NJ 08830	888-925-9115 www.directenergy.com	**C/I** **ACTIVE**
Direct Energy Services, LLP 120 Wood Avenue, Suite 611 Iselin, NJ 08830	866-348-4193 www.directenergy.com	**R** **ACTIVE**
Gateway Energy Services Corp. 44 Whispering Pines Lane Lakewood, NJ 08701	800-805-8586 www.gesc.com	**R/C/I** **ACTIVE**
UGI Energy Services, Inc. **d/b/a GASMARK** 224 Strawbridge Drive, Suite 107 Moorestown, NJ 08057	856-273-9995 www.ugienergyservices.com	**C/I** **ACTIVE**
Global Energy Marketing, LLC 129 Wentz Avenue Springfield, NJ 07081	800-542-0778 www.globalp.com	**C/I** **ACTIVE**
Great Eastern Energy 116 Village Blvd., Suite 200 Princeton, NJ 08540	888-651-4121 www.greateastern.com	**C/I** **ACTIVE**
Greenlight Energy 330 Hudson Street, Suite 4 Hoboken, NJ 07030	718-204-7467 www.greenlightenergy.us	**C** **ACTIVE**
Hess Energy, Inc. One Hess Plaza Woodbridge, NJ 07095	800-437-7872 www.hess.com	**C/I** **ACTIVE**
Hess Small Business Services, LLC One Hess Plaza Woodbridge, NJ 07095	888-494-4377 www.hessenergy.com	**C/I** **ACTIVE**
HIKO Energy, LLC 655 Suffern Road Teaneck, NJ 07666	(888) 264-4908 www.hikoenergy.com	**R/C** **ACTIVE**

Hudson Energy Services, LLC 7 Cedar Street Ramsey, NJ 07446	877- Hudson 9 www.hudsonenergyservices.com	**C** **ACTIVE**
IDT Energy, Inc. 550 Broad Street Newark, NJ 07102	877-887-6866 www.idtenergy.com	**R/C** **ACTIVE**
Integrys Energy Services – Natural Gas, LLC 99 Wood Avenue South Suite #802 Iselin, NJ 08830	800-536-0151 www.integrysenergy.com	**C/I** **ACTIVE**
Intelligent Energy 2050 Center Avenue, Suite 500 Fort Lee, NJ 07024	800-927-9794 www.intelligentenergy.org	**R/C/I** **ACTIVE**
Keil & Sons, Inc. **d/b/a Systrum Energy** 1 Bergen Blvd. Fairview, NJ 07022	1-877-797-8786 www.systrumenergy.com	**R/C/I** **ACTIVE**
Major Energy Services, LLC 10 Regency CT Lakewood, NJ 08701	888-625-6760 www.majorenergy.com	**R/C/I** **ACTIVE**
Marathon Power LLC 302 Main Street Paterson, NJ 07505	888-779-7255 www.mecny.com	**R/C/I** **ACTIVE**
Metromedia Energy, Inc. 6 Industrial Way Eatontown, NJ 07724	800-828-9427 www.metromediaenergy.com	**C** **ACTIVE**
Metro Energy Group, LLC 14 Washington Place Hackensack, NJ 07601	888-53-Metro www.metroenergy.com	**R/C** **ACTIVE**
MxEnergy, Inc. 900 Lake Street Ramsey, NJ 07446	800-758-4374 www.mxenergy.com	**R/C/I** **ACTIVE**
NATGASCO (Mitchell Supreme) 532 Freeman Street Orange, NJ 07050	800-840-4GAS www.natgasco.com	**C** **ACTIVE**
New Energy Services LLC 101 Neptune Avenue Deal, New Jersey 07723	800-660-3643 www.newenergyservicesllc.com	**R/C/I** **ACTIVE**

New Jersey Gas & Electric 1 Bridge Plaza, Fl. 2 Fort Lee, NJ 07024	866-568-0290 www.NJGandE.com	**R/C** **ACTIVE**
Noble Americas Energy Solutions The Mac-Cali Building 581 Main Street, 8th fl. Woodbridge, NJ 07095	877-273-6772 www.noblesolutions.com	**C/I** **ACTIVE**
North American Power & Gas, LLC d/b/a North American Power 197 Route 18 South Ste. 3000 East Brunswick, NJ 08816	(888) 313-9086 www.napower.com	**R/C/I** **ACTIVE**
Palmco Energy NJ, LLC One Greentree Centre 10,000 Lincoln Drive East, Suite 201 Marlton, NJ 08053	877-726-5862 www.PalmcoEnergy.com	**R/C/I** **ACTIVE**
Pepco Energy Services, Inc. 112 Main Street Lebanon, NJ 08833	800-363-7499 www.pepco-services.com	**C/I** **ACTIVE**
Plymouth Rock Energy, LLC 338 Maitland Avenue Teaneck, NJ 07666	855-32-POWER (76937) www.plymouthenergy.com	**R/C/I** **ACTIVE**
PPL EnergyPlus, LLC 811 Church Road - Office 105 Cherry Hill, NJ 08002	800-281-2000 www.pplenergyplus.com	**C/I** **ACTIVE**
Respond Power LLC 10 Regency CT Lakewood, NJ 08701	(877) 973-7763 www.respondpower.com	**R/C/I** **ACTIVE**
South Jersey Energy Company 1 South Jersey Plaza, Route 54 Folsom, NJ 08037	800-266-6020 www.southjerseyenergy.com	**C/I** **ACTIVE**
S.J. Energy Partners, Inc. 208 White Horse Pike, Suite 4 Barrington, NJ 08007	800-695-0666 www.sjnaturalgas.com	**R/C** **ACTIVE**
Spark Energy Gas, L.P. 2105 CityWest Blvd, Ste 100 Houston, Texas 77042	800-411-7514 www.sparkenergy.com	**R/C/I** **ACTIVE**
Sprague Energy Corp. 12 Ridge Road Chatham Township, NJ 07928	855-466-2842 www.spragueenergy.com	**C/I** **ACTIVE**

Stuyvesant Energy LLC 10 West Ivy Lane, Suite 4 Englewood, NJ 07631	800-640-6457 www.stuyfuel.com	**C** **ACTIVE**
Stream Energy New Jersey, LLC 309 Fellowship Road Suite 200 Mt. Laurel, NJ 08054	(973) 494-8097 www.streamenergy.net	**R/C** **ACTIVE**
Systrum Energy 1 Bergen Blvd. Fairview, NJ 07022	877-797-8786 www.systrumenergy.com	**R/C/I** **ACTIVE**
Woodruff Energy 73 Water Street Bridgeton, NJ 08302	800-557-1121 www.woodruffenergy.com	**R/C/I** **ACTIVE**
Woodruff Energy US LLC 73 Water Street, P.O. Box 777 Bridgeton, NJ 08302	856-455-1111 800-557-1121 www.woodruffenergy.com	**C/I** **ACTIVE**
Xoom Energy New Jersey, LLC 744 Broad Street Newark, NJ 07102	888-997-8979 www.xoomenergy.com	**R/C/I** **ACTIVE**
Your Energy Holdings, LLC One International Boulevard Suite 400 Mahwah, NJ 07495-0400	(855) 732-2493 www.thisisyourenergy.com	**R/C/I** **ACTIVE**

Back to main supplier information page

APPENDIX B

Equipment Inventory

Newark Public Schools
CHA Project# 28330
Millburn High School

Description	QTY	Manufacturer Name	Model No.	Serial No.	Equipment Type / Utility	Capacity/Size /Efficiency	Location	Areas/Equipment Served	Date Installed	Remaining Useful Life (years)
B-1	1	H.B. Smith	Cast iron sectional	310754	Hot Water Boiler	2850400 BTUH / 80% eff.	Boiler Rm	Building	2003	19
B-2	1	H.B. Smith	Cast iron sectional	310755	Hot Water Boiler	2850400 BTUH / 80% eff.	Boiler Rm	Building	2003	19
Burner-1	1	Powerflame	C3-G-25	100310754	Gas Burner	4517 MBH max	Boiler Rm	Boiler #1	2003	19
Burner-2	1	Powerflame	C3-G-25	100310755	Gas Burner	4517 MBH max	Boiler Rm	Boiler #1	2003	19
DHW-1	1	Rheem	GX90-550A	URNG0607P0048	Domestic hot water heater	90 gallons / 80% thermal eff.	Boiler Rm	Building	2007	8
DTWP-1	1	B&G	G025131-8	37F368X532	Base mtd pump	15 HP / 87.5%	Boiler Rm	Building	N/A	N/A
DTWP-2	1	B&G	G025131-8	37F368X532	Base mtd pump	15 HP / 87.5%	Boiler Rm	Building	N/A	N/A
CHWP-3	1	B&G	AV1118411TD11027	N/A	Base mtd pump	5 HP / 87.5%	Boiler Rm	Building	N/A	N/A
B-3	1	Patterson Kelly	Mach Series	M706-08-2658-A	HW Boiler	N/A	Mechanical Equip Rm	Building	2008	24
B-4	1	Patterson Kelly	Mach Series	M513-07-1721-A	HW Boiler	N/A	Mechanical Equip Rm	Building	2007	23
DHW-2	1	Rheem	HE119-160N	0608T1707N	Domestic hot water heater	119 gallons / 80% eff.	Mechanical Equip Rm	Building	2008	9
P-4, 5	2	Taco	N/A	N/A	Base mtd pump	N/A	Mechanical Equip Rm	Building	N/A	N/A
ACCU-1	1	McQuay	ALP0370827-ER10	STN80W00127	Air cooled condensing unit	N/A	Roof	C-wing	N/A	N/A
RTU	1	McQuay	RDS800CYA	FBOUO11200367	Rooftop unit	N/A	Roof	C-wing	N/A	N/A
RTU Lennox	1	Lennox	LCA060SN1G	5601L07739	Rooftop unit	N/A	Roof	C-wing	2001	7
ACCU-2	1	McQuay	ALP0370827-ER10	STN80W00153	Air cooled condensing unit	N/A	Roof	C-wing	N/A	N/A
ACCU-3	1	McQuay	ALP0373S27-ER10	STNU011200112	Air cooled condensing unit	N/A	Roof	C-wing	N/A	N/A
RTU	1	McQuay	RDS802CLA	FBOUO11200371-00	Rooftop unit	N/A	Roof	C-wing	N/A	N/A
Chiller	1	Trane	RTAC-250A	UO4CO4379	Chiller	250 tons / eff. Unknown	Exterior	Building	2004	10
RTU	1	Carrier	48SD-030040511SB	3208G21079	Rooftop unit	N/A	Roof	D-wing	2008	9
RTU	1	Carrier	48AYS025	3208U22750	Rooftop unit	N/A	Roof	D-wing	2008	9
EF-5	1	Greenheck	CBRU-1-10-30	11231031-0001	Hi-static fan	N/A	Roof	D-wing	N/A	N/A
RTU	1	Carrier	48AKS030-NT22081	3208U22772	Rooftop unit	N/A	Roof	D-wing	2008	9
RTU	1	Carrier	48AYS030-NT22080	3208U22765	Rooftop unit	N/A	Roof	D-wing	2008	9
AHU	1	Trane	CC0B08AUBK	K90C08185	Air handling unit	N/A	Mechanical Equip Rm	Old gymnasium	N/A	N/A
AHU-2	1	Trane	MMCCB025UA0A0UA	K04A10618	Air handling unit	N/A	Mechanical Equip Rm	Old gymnasium	N/A	N/A
AHU-3	1	Trane	MMCCB025UA0A0UA	K04A10623	Air handling unit	N/A	Mechanical Equip Rm	Locker Rm	N/A	N/A
DHW-3	1	State Industries	ES630DORT	E05A091623	Domestic electric hot water heater	30 gallons / 98% efficient	Mechanical Equip Rm	Library	2005	6
RTU	1	Trane	GRCA25PDMF0N6CE105C0	F04A00655	Rooftop unit	N/A	Roof	N/A	N/A	N/A
RTU	1	Trane	YCD241C3HCCA	405100223D	Rooftop unit	20 ton / 11.0 EER	Roof	N/A	2004	5
Cond. Unit	1	Trane	2TTA2036A3000AA	3314YJL3F	Condensing unit	3 tons / 8.45 EER	Roof	N/A	2003	4
RTU	1	York	D4CE060A25A	(S)NGHM104961	Rooftop unit	5 tons / 10.5 EER	Roof	N/A	1998	-1
Split cond. Unit	1	Sanyo	SAP91C	01449-43XX	Condensing unit	N/A	Roof	N/A	N/A	N/A
RTU-1	1	Trane	YHC06DA3RMA	404101217	RTU	N/A	Roof	N/A	2006	7
RTU	1	N/A	PGB090210-3	102630694	RTU	13 tons / Eff. Unknown	Roof	N/A	N/A	N/A
RTU	1	Trane	GRDA15GDBB0NICK105C0 PCV	A96F37459	RTU	N/A	Roof	N/A	1996	2
RTU	1	Trane	GRDA15GDBB0NICK105C0 PCV	A96F37458	RTU	N/A	Roof	N/A	1996	2
RTU	1	Trane	GRCA25PDMF0N6CE105C0	F04A00654	RTU	N/A	Roof	N/A	2004	10
Cond. Unit	1	Trane	2TTA2036A3000AA	3314YJ13F	Condensing unit	3 tons / 8.45 EER	Ground	N/A	2003	9
AHU	1	Carrier	09BB-012---300--	Z795312	Air handling unit	N/A	Mechanical Equip Rm	Library	1987	-7
AHU	1	Carrier	50BD-024---550--	Q897547	Air handling unit	N/A	Mechanical Equip Rm	Library	1988	-6
B-5	1	Weil McLain	H-676-W8	N/A	Hot Water Boiler	416 MBH / 80% eff.	Mechanical Equip Rm	Library	1988	-1

Energy Audit of Millburn High School
CHA Project No. 28330
Existing Lighting & Audit Input

Cost of Electricity: **$0.095** **$/kWh**
$6.78 **$/kW**

			EXISTING CONDITIONS									Retrofit Control	
	Area Description	Usage	No. of Fixtures	Standard Fixture Code	Fixture Code	Watts per Fixture	kW/Space	Exist Control	Annual Hours	Annual kWh		
Field Code	Unique description of the location - Room number/Room name: Floor number (if applicable)	Describe Usage Type using Operating Hours	No. of fixtures before the retrofit	Lighting Fixture Code	Code from Table of Standard Fixture Wattages	Value from Table of Standard Fixture Wattages	(Watts/Fixt) * (Fixt No.)	Pre-inst. control device	Estimated annual hours for the usage group	(kW/space) * (Annual Hours)	Retrofit control device	Notes
35LED	Rm 375 Fine Arts	classrooms	16	T 32 R F 3 (ELE)	F43ILL/2	90	1.44	occ	2400	3,456	C-OCC	
35LED	Rm 376	classrooms	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.08	occ	2400	2,592	C-OCC	
4LED	Stairway	stairway	2	2B 34 R F 2 (u) (MAG)	FU2EE	72	0.14	breaker	3200	461	none	
35LED	Faculty Toilet Mens	Restroom w/ OCC	1	T 32 R F 3 (ELE)	F43ILL/2	90	0.09	occ	1000	90	none	
35LED	Faculty Toilet Womens	Restroom w/ OCC	1	T 32 R F 3 (ELE)	F43ILL/2	90	0.09	occ	1000	90	none	
35LED	Corridor	Hallways	13	T 32 R F 3 (ELE)	F43ILL/2	90	1.17	breaker	2280	2,668	none	
35LED	Rm 374	classrooms	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.08	occ	2400	2,592	occ	
35LED	Rm 373	classrooms	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.08	occ	2400	2,592	occ	
35LED	Rm 372	classrooms	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.08	occ	2400	2,592	occ	
35LED	Rm 371	classrooms	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.08	occ	2400	2,592	occ	
35LED	Rm 370	classrooms	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.08	occ	2400	2,592	occ	
35LED	Corridor	Hallways	2	T 32 R F 3 (ELE)	F43ILL/2	90	0.18	breaker	2280	410	none	
121	Corridor	Hallways	2	W 34 P F 4	F44EE	144	0.29	breaker	2280	657	none	
121	corridor	Hallways	2	W 34 P F 4	F44EE	144	0.29	breaker	2280	657	none	
35LED	Boys toilet	Restroom w/ OCC	3	T 32 R F 3 (ELE)	F43ILL/2	90	0.27	occ	1000	270	none	
35LED	Girls toilet	Restroom w/ OCC	3	T 32 R F 3 (ELE)	F43ILL/2	90	0.27	occ	1000	270	none	
35LED	Custodial closet	Storage/Janitor	1	T 32 R F 3 (ELE)	F43ILL/2	90	0.09	sw	500	45	none	
35LED	Corridor	Hallways	6	T 32 R F 3 (ELE)	F43ILL/2	90	0.54	breaker	2280	1,231	none	
35LED	Rm 275	classrooms	16	T 32 R F 3 (ELE)	F43ILL/2	90	1.44	occ	2400	3,456	occ	
35LED	Rm 276	classrooms	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.08	occ	2400	2,592	occ	
4LED	Stairway	stairway	2	2B 34 R F 2 (u) (MAG)	FU2EE	72	0.14	breaker	3200	461	none	
35LED	Faculty Toilet Mens	Restroom w/ OCC	1	T 32 R F 3 (ELE)	F43ILL/2	90	0.09	occ	1000	90	none	
35LED	Faculty Toilet Womens	Restroom w/ OCC	1	T 32 R F 3 (ELE)	F43ILL/2	90	0.09	occ	1000	90	none	
35LED	Corridor	Hallways	13	T 32 R F 3 (ELE)	F43ILL/2	90	1.17	breaker	2280	2,668	none	
35LED	Rm 374	classrooms	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.08	occ	2400	2,592	occ	
35LED	Rm 373	classrooms	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.08	occ	2400	2,592	occ	
35LED	Rm 372	classrooms	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.08	occ	2400	2,592	occ	
35LED	Rm 371	classrooms	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.08	occ	2400	2,592	occ	
35LED	Rm 370	classrooms	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.08	occ	2400	2,592	occ	
35LED	Corridor	Hallways	2	T 32 R F 3 (ELE)	F43ILL/2	90	0.18	breaker	2280	410	none	
121	Corridor	Hallways	2	W 34 P F 4	F44EE	144	0.29	breaker	2280	657	none	
121	corridor	Hallways	2	W 34 P F 4	F44EE	144	0.29	breaker	2280	657	none	
35LED	Boys toilet	Restroom w/ OCC	3	T 32 R F 3 (ELE)	F43ILL/2	90	0.27	occ	1000	270	none	
35LED	Girls toilet	Restroom w/ OCC	3	T 32 R F 3 (ELE)	F43ILL/2	90	0.27	occ	1000	270	none	
35LED	Custodial closet	Storage/Janitor	1	T 32 R F 3 (ELE)	F43ILL/2	90	0.09	sw	500	45	none	
35LED	Corridor	Hallways	6	T 32 R F 3 (ELE)	F43ILL/2	90	0.54	breaker	2280	1,231	none	
6LED	classroom 140	classrooms	36	T 34 R F 4 (MAG)	F44EE	144	5.18	sw	2400	12,442	occ	
6LED	classroom 142	classrooms	24	T 34 R F 4 (MAG)	F44EE	144	3.46	sw	2400	8,294	occ	
6LED	storage	Storage/Janitor	4	T 34 R F 4 (MAG)	F44EE	144	0.58	sw	500	288	none	
35LED	classroom 141	classrooms	10	T 32 R F 3 (ELE)	F43ILL/2	90	0.90	sw	2400	2,160	occ	
35LED	classroom 143	classrooms	18	T 32 R F 3 (ELE)	F43ILL/2	90	1.62	sw	2400	3,888	occ	
41LED	Corridor	Hallways	10	1B 40 R F 2 (MAG)	F42SS	94	0.94	breaker	2280	2,143	none	
6LED	Dance Gym	classrooms	36	T 34 R F 4 (MAG)	F44EE	144	5.18	sw	2400	12,442	none	
41LED	Dance Gym	classrooms	6	1B 40 R F 2 (MAG)	F42SS	94	0.56	sw	2400	1,354	none	
40LED	Corridor	Hallways	9	T 32 R F 2 (ELE)	F42LL	60	0.54	breaker	2280	1,231	none	
18LED	Rm 137	classrooms	12	T 32 R F 4 (ELE)	F44ILL	112	1.34	breaker	2400	3,226	occ	
18LED	RM 136	classrooms	12	T 32 R F 4 (ELE)	F44ILL	112	1.34	sw	2400	3,226	occ	
18LED	Rm 135	classrooms	12	T 32 R F 4 (ELE)	F44ILL	112	1.34	sw	2400	3,226	occ	
18LED	Rm 134	classrooms	12	T 32 R F 4 (ELE)	F44ILL	112	1.34	sw	2400	3,226	occ	
18LED	Rm 133	classrooms	12	T 32 R F 4 (ELE)	F44ILL	112	1.34	sw	2400	3,226	occ	
18LED	Rm 132	classrooms	12	T 32 R F 4 (ELE)	F44ILL	112	1.34	sw	2400	3,226	occ	
18LED	Rm 131	classrooms	12	T 32 R F 4 (ELE)	F44ILL	112	1.34	sw	2400	3,226	occ	
18LED	Rm 130	classrooms	12	T 32 R F 4 (ELE)	F44ILL	112	1.34	sw	2400	3,226	occ	

Energy Audit of Millburn High School
CHA Project No. 28330
Existing Lighting & Audit Input

Cost of Electricity: **$0.095** **$/kWh**
$6.78 **$/kW**

			EXISTING CONDITIONS									Retrofit Control	
	Area Description	Usage	No. of Fixtures	Standard Fixture Code	Fixture Code	Watts per Fixture	kW/Space	Exist Control	Annual Hours	Annual kWh		
Field Code	Unique description of the location - Room number/Room name: Floor number (if applicable)	Describe Usage Type using Operating Hours	No. of fixtures before the retrofit	Lighting Fixture Code	Code from Table of Standard Fixture Wattages	Value from Table of Standard Fixture Wattages	(Watts/Fixt) * (Fixt No.)	Pre-inst. control device	Estimated annual hours for the usage group	(kW/space) * (Annual Hours)	Retrofit control device	Notes
18LED	Rm 129	classrooms	12	T 32 R F 4 (ELE)	F44ILL	112	1.34	sw	2400	3,226	occ	
18LED	Rm 232	classrooms	12	T 32 R F 4 (ELE)	F44ILL	112	1.34	sw	2400	3,226	occ	
18LED	Rm 233	classrooms	12	T 32 R F 4 (ELE)	F44ILL	112	1.34	sw	2400	3,226	occ	
18LED	Rm 234	classrooms	12	T 32 R F 4 (ELE)	F44ILL	112	1.34	sw	2400	3,226	occ	
18LED	Rm 235	classrooms	12	T 32 R F 4 (ELE)	F44ILL	112	1.34	sw	2400	3,226	occ	
18LED	Rm 236	classrooms	12	T 32 R F 4 (ELE)	F44ILL	112	1.34	sw	2400	3,226	occ	
18LED	Rm 237	classrooms	12	T 32 R F 4 (ELE)	F44ILL	112	1.34	sw	2400	3,226	occ	
18LED	Rm 238	classrooms	12	T 32 R F 4 (ELE)	F44ILL	112	1.34	sw	2400	3,226	occ	
18LED	Rm 239	classrooms	12	T 32 R F 4 (ELE)	F44ILL	112	1.34	sw	2400	3,226	occ	
18LED	Rm 240	classrooms	12	T 32 R F 4 (ELE)	F44ILL	112	1.34	sw	2400	3,226	occ	
18LED	Rm 241	classrooms	12	T 32 R F 4 (ELE)	F44ILL	112	1.34	sw	2400	3,226	occ	
18LED	Rm 242	classrooms	12	T 32 R F 4 (ELE)	F44ILL	112	1.34	sw	2400	3,226	occ	
18LED	Rm 243	classrooms	12	T 32 R F 4 (ELE)	F44ILL	112	1.34	sw	2400	3,226	occ	
18LED	Boys toilet	Restroom w/ OCC	3	T 32 R F 4 (ELE)	F44ILL	112	0.34	sw	1000	336	none	
18LED	Girls toilet	Restroom w/ OCC	3	T 32 R F 4 (ELE)	F44ILL	112	0.34	sw	1000	336	none	
18LED	Boys toilet	Restroom w/ OCC	3	T 32 R F 4 (ELE)	F44ILL	112	0.34	sw	1000	336	none	
18LED	Girls toilet	Restroom w/ OCC	3	T 32 R F 4 (ELE)	F44ILL	112	0.34	sw	1000	336	none	
41LED	Corridor	Hallways	12	1B 40 R F 2 (MAG)	F42SS	94	1.13	breaker	2280	2,572	none	
41LED	Corridor	Hallways	14	1B 40 R F 2 (MAG)	F42SS	94	1.32	breaker	2280	3,000	none	
4LED	Stairway	stairway	3	2B 34 R F 2 (u) (MAG)	FU2EE	72	0.22	breaker	3200	691	none	
4LED	Stairway	stairway	3	2B 34 R F 2 (u) (MAG)	FU2EE	72	0.22	breaker	3200	691	none	
18LED	classroom 122	classrooms	12	T 32 R F 4 (ELE)	F44ILL	112	1.34	sw	2400	3,226	occ	
18LED	classroom 123	classrooms	16	T 32 R F 4 (ELE)	F44ILL	112	1.79	sw	2400	4,301	occ	
18LED	classroom 124	classrooms	16	T 32 R F 4 (ELE)	F44ILL	112	1.79	sw	2400	4,301	occ	
18LED	classroom 125	classrooms	12	T 32 R F 4 (ELE)	F44ILL	112	1.34	sw	2400	3,226	occ	
18LED	classroom 126	classrooms	12	T 32 R F 4 (ELE)	F44ILL	112	1.34	sw	2400	3,226	occ	
18LED	Rm 226	classrooms	12	T 32 R F 4 (ELE)	F44ILL	112	1.34	sw	2400	3,226	occ	
18LED	Rm 227	classrooms	12	T 32 R F 4 (ELE)	F44ILL	112	1.34	sw	2400	3,226	occ	
18LED	Rm 228	classrooms	12	T 32 R F 4 (ELE)	F44ILL	112	1.34	sw	2400	3,226	occ	
18LED	Rm 229	classrooms	12	T 32 R F 4 (ELE)	F44ILL	112	1.34	sw	2400	3,226	occ	
18LED	Rm 230	classrooms	12	T 32 R F 4 (ELE)	F44ILL	112	1.34	sw	2400	3,226	occ	
18LED	Rm 231	classrooms	12	T 32 R F 4 (ELE)	F44ILL	112	1.34	sw	2400	3,226	occ	
9LED	New Gymnasium	Gymnasium	24	High Bay MH 200 35 Feet High	MH200/1	232	5.57	sw	2912	16,214	none	
41LED	Corridor	Hallways	15	1B 40 R F 2 (MAG)	F42SS	94	1.41	breaker	2280	3,215	none	
35LED	classroom 115	classrooms	9	T 32 R F 3 (ELE)	F43ILL/2	90	0.81	sw	2400	1,944	occ	
35LED	classroom 117	classrooms	16	T 32 R F 3 (ELE)	F43ILL/2	90	1.44	sw	2400	3,456	occ	
35LED	classroom 118	classrooms	16	T 32 R F 3 (ELE)	F43ILL/2	90	1.44	sw	2400	3,456	occ	
35LED	classroom 119	classrooms	16	T 32 R F 3 (ELE)	F43ILL/2	90	1.44	sw	2400	3,456	occ	
35LED	classroom 121	classrooms	16	T 32 R F 3 (ELE)	F43ILL/2	90	1.44	sw	2400	3,456	occ	
35LED	classroom 120	classrooms	16	T 32 R F 3 (ELE)	F43ILL/2	90	1.44	sw	2400	3,456	occ	
6LED	storage	Storage/Janitor	1	T 34 R F 4 (MAG)	F44EE	144	0.14	sw	500	72	none	
35LED	office	Offices	2	T 32 R F 3 (ELE)	F43ILL/2	90	0.18	sw	2400	432	occ	
35LED	office	Offices	3	T 32 R F 3 (ELE)	F43ILL/2	90	0.27	sw	2400	648	occ	
35LED	office	Offices	2	T 32 R F 3 (ELE)	F43ILL/2	90	0.18	sw	2400	432	occ	
35LED	Cafeteria	Cafeteria	64	T 32 R F 3 (ELE)	F43ILL/2	90	5.76	sw	1600	9,216	none	
24LED	Weight Rm	Gymnasium	24	1B 32 P F 2 (ELE)	F42LL	60	1.44	sw	2912	4,193	none	
41LED	Media Center	classrooms	48	1B 40 R F 2 (MAG)	F42SS	94	4.51	sw	2400	10,829	occ	
24LED	Boys Locker Rm	Locker	16	1B 32 P F 2 (ELE)	F42LL	60	0.96	sw	2800	2,688	occ	
24LED	Girls Locker Rm	Locker	16	1B 32 P F 2 (ELE)	F42LL	60	0.96	sw	2800	2,688	occ	
35LED	Music 101	classrooms	18	T 32 R F 3 (ELE)	F43ILL/2	90	1.62	occ	2400	3,888	none	
35LED	Music 100	classrooms	22	T 32 R F 3 (ELE)	F43ILL/2	90	1.98	occ	2400	4,752	none	
35LED	Classroom 102	classrooms	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.08	occ	2400	2,592	none	
35LED	Classroom 103	classrooms	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.08	occ	2400	2,592	none	
24LED	Corridor	Hallways	17	1B 32 P F 2 (ELE)	F42LL	60	1.02	breaker	2280	2,326	none	
24LED	classroom 208	classrooms	14	1B 32 P F 2 (ELE)	F42LL	60	0.84	sw	2400	2,016	occ	
24LED	classroom 209	classrooms	14	1B 32 P F 2 (ELE)	F42LL	60	0.84	sw	2400	2,016	occ	
24LED	classroom 210	classrooms	14	1B 32 P F 2 (ELE)	F42LL	60	0.84	sw	2400	2,016	occ	
24LED	classroom 211	classrooms	14	1B 32 P F 2 (ELE)	F42LL	60	0.84	sw	2400	2,016	occ	
24LED	classroom 207	classrooms	14	1B 32 P F 2 (ELE)	F42LL	60	0.84	sw	2400	2,016	occ	
18LED	Boys Rm	Restroom w/ OCC	4	T 32 R F 4 (ELE)	F44ILL	112	0.45	sw	1000	448	none	
18LED	Girls Rm	Restroom w/ OCC	4	T 32 R F 4 (ELE)	F44ILL	112	0.45	sw	1000	448	none	
4LED	Stairway	stairway	2	2B 34 R F 2 (u) (MAG)	FU2EE	72	0.14	breaker	3200	461	none	
18LED	Toilet rm	Restroom w/ OCC	3	T 32 R F 4 (ELE)	F44ILL	112	0.34	sw	1000	336	none	
18LED	Toilet rm	Restroom w/ OCC	3	T 32 R F 4 (ELE)	F44ILL	112	0.34	sw	1000	336	none	
262	front vestibule	Hallways	18	B CF 36 W	CFT36/1	51	0.92	breaker	2280	2,093	none	
261LED	Auditorium	Auditorium	48	PAR 38 SP	H100/1	100	4.80	sw	1820	8,736	none	
261LED	Auditorium	Auditorium	15	PAR 38 SP	H100/1	100	1.50	sw	1820	2,730	none	
1	Auditorium	Auditorium	30	SQ 13 W CF 2 (MAG)	CFQ13/2	31	0.93	sw	1820	1,693	none	
18LED	Stage	Auditorium	16	T 32 R F 4 (ELE)	F44ILL	112	1.79	sw	1820	3,261	none	
35LED	Music classroom 202	classrooms	18	T 32 R F 3 (ELE)	F43ILL/2	90	1.62	sw	2400	3,888	occ	
35LED	Music classroom 201	classrooms	20	T 32 R F 3 (ELE)	F43ILL/2	90	1.80	sw	2400	4,320	occ	

Energy Audit of Millburn High School
CHA Project No. 28330
Existing Lighting & Audit Input

Cost of Electricity: $0.095 $/kWh
$6.78 $/kW

			EXISTING CONDITIONS								Retrofit Control	
	Area Description	**Usage**	**No. of Fixtures**	**Standard Fixture Code**	**Fixture Code**	**Watts per Fixture**	**kW/Space**	**Exist Control**	**Annual Hours**	**Annual kWh**		
Field Code	**Unique description of the location - Room number/Room name: Floor number (if applicable)**	**Describe Usage Type using Operating Hours**	**No. of fixtures before the retrofit**	**Lighting Fixture Code**	**Code from Table of Standard Fixture Wattages**	**Value from Table of Standard Fixture Wattages**	**(Watts/Fixt) * (Fixt No.)**	**Pre-inst. control device**	**Estimated annual hours for the usage group**	**(kW/space) * (Annual Hours)**	**Retrofit control device**	**Notes**
18LED	Storage	Storage/Janitor	4	T 32 R F 4 (ELE)	F44ILL	112	0.45	sw	500	224	none	
35LED	Corridor	Hallways	10	T 32 R F 3 (ELE)	F43ILL/2	90	0.90	breaker	2280	2,052	none	
9LED	Old Gymnasium	Gymnasium	32	High Bay MH 200 35 Feet High	MH200/1	232	7.42	sw	2912	21,619	none	
40LED	Old Girls Locker Rm	Locker	28	T 32 R F 2 (ELE)	F42LL	60	1.68	sw	2800	4,704	none	
40LED	Old Boys Locker Rm	Locker	32	T 32 R F 2 (ELE)	F42LL	60	1.92	sw	2800	5,376	none	
40LED	New Girls Locker rm	Locker	20	T 32 R F 2 (ELE)	F42LL	60	1.20	sw	2800	3,360	none	
40LED	New Boys Locker rm	Locker	20	T 32 R F 2 (ELE)	F42LL	60	1.20	sw	2800	3,360	none	
40LED	Training Rm	Locker	8	T 32 R F 2 (ELE)	F42LL	60	0.48	sw	2800	1,344	none	
24LED	Corridor	Hallways	36	1B 32 P F 2 (ELE)	F42LL	60	2.16	breaker	2280	4,925	none	
1	Vestibules	Hallways	12	SQ 13 W CF 2 (MAG)	CFQ13/2	31	0.37	breaker	2280	848	none	
40LED	Gym storage	Storage/Janitor	4	T 32 R F 2 (ELE)	F42LL	60	0.24	sw	500	120	none	
20LED	Boys Rm	Restroom w/ OCC	6	S 32 C F 1 (ELE)	F41LL	32	0.19	sw	1000	192	none	
20LED	Girls Rm	Restroom w/ OCC	6	S 32 C F 1 (ELE)	F41LL	32	0.19	sw	1000	192	none	
35LED	Principals office	Offices	4	T 32 R F 3 (ELE)	F43ILL/2	90	0.36	sw	2400	864	none	
35LED	Asst principals office	Offices	4	T 32 R F 3 (ELE)	F43ILL/2	90	0.36	sw	2400	864	none	
35LED	Conference Rm	Conference	3	T 32 R F 3 (ELE)	F43ILL/2	90	0.27	sw	1200	324	occ	
4LED	Stairway	stairway	2	2B 34 R F 2 (u) (MAG)	FU2EE	72	0.14	breaker	3200	461	none	
24LED	Health classroom	classrooms	16	1B 32 P F 2 (ELE)	F42LL	60	0.96	sw	2400	2,304	occ	
24LED	Team Rm	Locker	14	1B 32 P F 2 (ELE)	F42LL	60	0.84	sw	2800	2,352	none	
18LED	Storage	Storage/Janitor	3	T 32 R F 4 (ELE)	F44ILL	112	0.34	sw	500	168	none	
40LED	Training Rm	Locker	4	T 32 R F 2 (ELE)	F42LL	60	0.24	sw	2800	672	none	
18LED	Storage	Storage/Janitor	3	T 32 R F 4 (ELE)	F44ILL	112	0.34	sw	500	168	none	
117	Exterior	Outdoor Lighting	12	CF 23	CFS23/1	23	0.28	breaker	4368	1,206	none	
227LED	Exterior	Outdoor Lighting	13	70 W MH Wall Pack	MH70/1	95	1.24	breaker	4368	5,394	none	
142LED	Exterior	Outdoor Lighting	3	MH 100	MH100/1	128	0.38	breaker	4368	1,677	none	
	Total		**1,896**				**180.70**			**425,079**		

APPENDIX C

ECM Calculations

Millburn Township Public Schools
CHA Project Number: 28330

Rate of Discount (used for NPV) 3.0%

Utility Costs		Yearly Usage	Metric Ton Carbon Dioxide Equivalent	Building Area	Annual Utility Cost		
$ 0.120	$/kWh blended		0.000420205	201,858	Electric	Natural Gas	Fuel Oil
$ 0.095	$/kWh supply	2,220,800	0.000420205		$ 266,271	$ 88,656	
$ 6.78	$/kW	862.7	0				
$ 0.86	$/Therm	80,896	0.00533471				
$ 8.87	$/kgals	2,308	0				
$ 0.009	$/Gal	2,308,000					

Millburn High School

Recommend? Y or N		Item	Savings kW	kWh	therms	No. 2 Oil gal	Water kgal	$	Cost	Simple Payback	Life Expectancy	Equivalent CO_2 (Metric tons)	NJ Smart Start Incentives	Direct Install Eligible (Y/N)	Payback w/ Incentives	Simple Projected Lifetime Savings kW	kWh	therms	kgal/yr	$	ROI	NPV	IRR
Y	ECM-1	Replace Door Sweeps & Seals	0.0	0	346	0	0	298	$ 2,305	7.7	15	1.8		N	7.7	0.0	0	5,197	0	$ 4,470	0.9	$1,253	9.7%
Y	ECM-6	Smart Controller Window AC Units	0.0	2,814	0	0	0	338	$ 1,200	3.6	15	1.2		N	3.6	0.0	42,203	0	0	$ 5,064	3.2	$2,831	27.4%
Y	ECM-9	Install VFDs on Air Handling Units	5.9	20,927	0	0	0	2,466	$ 19,047	7.7	15	8.8		N	7.7	88.2	313,904	0	0	$ 44,842	1.4	$10,396	9.7%
Y	ECM-10	Replace Rooftop Units	0.0	5,886	0	0	0	706	$ 47,800	67.7	20.0	2.5		N	67.7	0.0	117,716	0	0	$ 14,126	(0.7)	($37,292)	-9.6%
Y	ECM-12	Retro-Commission Temperature Controls	0.0	99,936	10,800	0	0	21,280	$ 69,967	3.3	15.0	99.6		N	3.3	0.0	1,499,040	161,994	0	$319,200	3.6	$184,073	29.8%
Y	ECM-14	Install Kitchen Hood Controller	0.0	227	6,848	0	0	5,917	$ 30,787	5.2	15.0	36.6		N	5.2	0.0	3,399	102,725	0	$ 88,752	1.9	$39,847	17.5%
Y	ECM-15	Install Walk-in Cooler / Freezer Controls	0.0	1,431	0	0	0	172	$ 20,625	120.1	15.0	0.6		N	120.1	0.0	21,467	0	0	$ 2,576	(0.9)	($18,575)	-19.1%
Y	ECM-17	Install Vending Misers	0.0	7,343	0	0	0	881	$ 840	1.0	15.0	3.1		N	1.0	0.0	110,138	0	0	$ 13,217	14.72761	$9,678	104.8%
N	ECM-L1	Lighting Replacements / Upgrades	102.6	242,071	0	0	0	31,345	$ 454,693	14.5	10.0	101.7	$ 10,000	N	14.2	1,026.0	2,420,710	0	0	$373,961	(0.2)	($177,314)	-5.9%
N	ECM-L2	Install Lighting Controls (Add Occupancy Sensors)	0.0	73,021	0	0	0	6,937	$ 10,287	1.5	10.0	30.7	$ 1,590	N	1.3	0.0	730,210	0	0	$ 87,625	7.5	$50,477	79.5%
Y	ECM-L3	Lighting Replacements with Controls (Occupancy Sensors)	102.6	273,215	0	0	0	34,304	$ 464,980	13.6	10.0	114.8	$ 11,590	N	13.2	1,026.0	2,732,150	0	0	$411,333	(0.1)	($160,770)	-4.8%
		Total (Not Including ECMs L1, L2)	**108.5**	**411,778**	**17,994**	**0**	**0**	**$ 66,362**	**$ 657,550**	**9.9**	**15.0**	**269**	**$ 11,590**		**9.7**	**1,114**	**4,840,017**	**269,917**	**-**	**$903,580**	**0.4**	**$146,263**	**6.0%**
		Recommended Measures (highlighted green above)	**108.5**	**411,778**	**17,994**	**0**	**0**	**$ 66,362**	**$ 657,550**	**9.9**	**15.0**	**269**	**$ 11,590**	**0**	**9.7**	**1,114**	**4,840,017**	**269,917**	**-**	**$903,580**	**0.4**	**$146,263**	**6.0%**
		% of Existing	**13%**	**19%**	**22%**	**0**	**0%**																

City: Newark, NJ

			Occupied Hours/Week	70	70	70	70	50
				Building	Auditorium	Gymnasium	Library	Classrooms
	Enthalpy			Operating	Occupied	Occupied	Occupied	Occupied
Temp	h (Btu/lb)	Bin Hours		Hours	Hours	Hours	Hours	Hours
102.5								
97.5	35.4	6		3	3	3	3	2
92.5	37.4	31		13	13	13	13	9
87.5	35.0	131		55	55	55	55	39
82.5	33.0	500		208	208	208	208	149
77.5	31.5	620		258	258	258	258	185
72.5	29.9	664		277	277	277	277	198
67.5	27.2	854		356	356	356	356	254
62.5	24.0	927		386	386	386	386	276
57.5	20.3	600		250	250	250	250	179
52.5	18.2	730		304	304	304	304	217
47.5	16.0	491		205	205	205	205	146
42.5	14.5	656		273	273	273	273	195
37.5	12.5	1,023		426	426	426	426	304
32.5	10.5	734		306	306	306	306	218
27.5	8.7	334		139	139	139	139	99
22.5	7.0	252		105	105	105	105	75
17.5	5.4	125		52	52	52	52	37
12.5	3.7	47		20	20	20	20	14
7.5	2.1	34		14	14	14	14	10
2.5	1.3	1		0	0	0	0	0
-2.5								
-7.5								

Multipliers	
Material:	1.027
Labor:	1.246
Equipment:	1.124

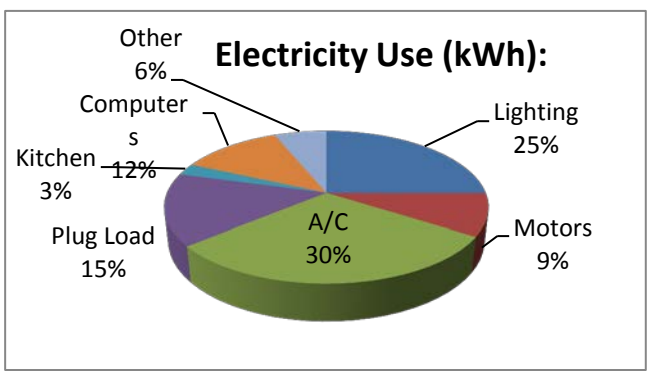
Heating System Efficiency	80%
Cooling Eff (kW/ton)	1.2

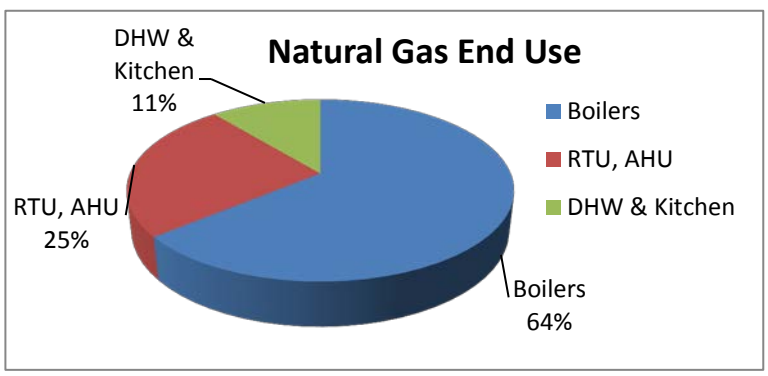
Heating		
Hours	4,427	Hrs
Weighted Avg	40	F
Avg	28	F

Cooling		
Hours	4,333	Hrs
Weighted Avg	68	F
Avg	78	F

Millburn Township Public Schools
CHA Project Number: 28330
Millburn High School

Utility End Use Analysis			
Electricity Use (kWh):		**Notes/Comments:**	
2,220,800	Total	Based on utility analysis	
555,200	Lighting	From Lighting Calculations	0.25
199,872	Motors	Estimated	0.09
666,240	A/C	Estimated	0.30
339,121	Plug Load	Estimated	0.15
55,520	Kitchen	Estimated	0.03
266,496	Computers	Estimated	0.12
138,351	Other	Remaining	0.06
Natural Gas Use (Therms):		**Notes/Comments:**	
80,896	Total	Based on utility analysis	
51,773.44	Boilers	Therms/SF x Square Feet Served	0.64
20,224	RTU, AHU	Based on utility analysis	0.25
8,899	DHW & Kitchen	Based on utility analysis	0.11





Millburn Township Public Schools
CHA Project Number: 28330
Millburn High School

ECM-1: Install Door Seals

Description: This ECM evaluates the thermal and electrical savings associate with adding door seals and sweeps to prevent infiltration of cold (hot) outdoor air.

Heating System Efficiency	80%		Ex Occupied Clng Temp.	74	*F	Ex Occupied Htg Temp.	70	*F
Cooling System Efficiency	1.20	kW/ton	Ex Unoccupied Clng Temp.	85	*F	Ex Unoccupied Htg Temp.	60	*F
Linear Feet of Door Edge	200	LF	Cooling Occ Enthalpy Setpoint	27.5	Btu/lb	Electricity	$ 0.12	$/kWh
Existing Infiltration Factor*	1.5	cfm/LF	Cooling Unocc Enthalpy Setpoint	27.5	Btu/lb	Natural Gas	$ 0.86	$/therm
Proposed Infiltration Factor*	0.45	cfm/LF						

*Infiltration Factor per Carrier Handbook of Air Conditioning System Design based on average door seal gap calculated below.

					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	Door Infiltration Load BTUH	Door Infiltration Load BTUH	Door Infiltration Load BTUH	Door Infiltration Load BTUH	Existing Cooling Energy kWh	Proposed Cooling Energy kWh	Existing Heating Energy therms	Proposed Heating Energy therms
A		B	C	D	E	F	G	H	I	J	K	L
102.5	0.0	0	0	0	37,125	37,125	11,138	11,138	0	0	0	0
97.5	35.4	6	3	4	-10,675	-10,675	-3,202	-3,202	6	2	0	0
92.5	37.4	31	13	18	-13,368	-13,368	-4,010	-4,010	41	12	0	0
87.5	35.0	131	55	76	-10,104	-10,104	-3,031	-3,031	132	40	0	0
82.5	33.0	500	208	292	-7,489	0	-2,247	0	156	47	0	0
77.5	31.5	620	258	362	-5,465	0	-1,639	0	141	42	0	0
72.5	29.9	664	277	387	0	0	0	0	0	0	0	0
67.5	27.2	854	356	498	810	0	243	0	0	0	4	1
62.5	24.0	927	386	541	2,430	0	729	0	0	0	12	4
57.5	20.3	600	250	350	4,050	810	1,215	243	0	0	16	5
52.5	18.2	730	304	426	5,670	2,430	1,701	729	0	0	34	10
47.5	16.0	491	205	286	7,290	4,050	2,187	1,215	0	0	33	10
42.5	14.5	656	273	383	8,910	5,670	2,673	1,701	0	0	58	17
37.5	12.5	1,023	426	597	10,530	7,290	3,159	2,187	0	0	110	33
32.5	10.5	734	306	428	12,150	8,910	3,645	2,673	0	0	94	28
27.5	8.7	334	139	195	13,770	10,530	4,131	3,159	0	0	50	15
22.5	7.0	252	105	147	15,390	12,150	4,617	3,645	0	0	43	13
17.5	5.4	125	52	73	17,010	13,770	5,103	4,131	0	0	24	7
12.5	3.7	47	20	27	18,630	15,390	5,589	4,617	0	0	10	3
7.5	2.1	34	14	20	20,250	17,010	6,075	5,103	0	0	8	2
2.5	1.3	1	0	1	21,870	18,630	6,561	5,589	0	0	0	0
-2.5	0.0	0	0	0	23,490	20,250	7,047	6,075	0	0	0	0
-7.5	0.0	0	0	0	25,110	21,870	7,533	6,561	0	0	0	0
TOTALS		**8,760**	**3,650**	**5,110**					**477**	**143**	**495**	**148**

Existing Door Infiltration	**300**	**cfm**	**Savings**	**346**	**therms**	**$ 298**
Existing Unoccupied Door Infiltration	**300**	**cfm**		**334**	**kWh**	**$ 40**
Proposed Door Infiltration	**90**	**cfm**				**$ 338**
Proposed Unoccupied Door Infiltration	**90**	**cfm**				

Door	Width (ft)	Height (ft)	Linear Feet (LF)	gap (in)	gap location	LF of gap	% door w/ gap	Average gap for door (in)
1a	3	7	20	0.25	bottom/seam	3	15%	0.0375
1b	3	7	20	0.25	bottom/seam	3	15%	0.0375
2a	3	7	20	0.25	all sides	15	75%	0.1875
2b	3	7	20	0.25	all sides	15	75%	0.1875
3a	3	7	20	0.125	all sides	10	50%	0.0625
3b	3	7	20	0.125	all sides	10	50%	0.0625
4a	3	7	20	0.125	all sides	10	50%	0.0625
4b	3	7	20	0.0625	all sides	10	50%	0.03125
5	3	7	20	0.25	bottom/seam	3	15%	0.0375
6	3	7	20	0.25	bottom/seam	3	15%	0.0375
Total	**30**	**70**	**200**	**0.194**		**82**	**41%**	**0.074**

Note: Doors labeled 'a', 'b', etc. are a part of the same door assembly.

Millburn Township Public Schools
CHA Project Number: 28330
Millburn High School

ECM-1: Install Door Seals - Cost

Multipliers	
Material:	1.03
Labor:	1.25
Equipment:	1.12

Description	QTY	UNIT	UNIT COSTS			SUBTOTAL COSTS			TOTAL COST	REMARKS
			MAT.	LABOR	EQUIP.	MAT.	LABOR	EQUIP.		
									$ -	
Door Weatherization Seals & Sweeps	10	EA	$ 40	$ 115	$ -	$ 411	$ 1,433	$ -	$ 1,844	RS Means 2012
						$ -	$ -	$ -	$ -	

**Cost Estimates are for Energy Savings calculations only, do not use for procurement

$ 1,844	Subtotal
$ 461	25% Contingency
$ 2,305	**Total**

Millburn Township Public Schools
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Millburn High School

EQUIPMENT		AREA/EQUIPMENT SERVED	COOLING CAPACITY (btu/h)
Window AC	6x	Classrooms & Offices	108,000

Total btu/h of all window A/C Units: *108,000* *btu/h*

ECM-6: Window A/C Controller

ECM Description : Window A/C units are currently controlled manually by the occupants and are not turned off when the room is unoccupied. This ECM evaluates implementation of a digital timer device that will automatically turn the window A/C unit off at a preset time .

ASSUMPTIONS			Comments
Electric Cost	$0.120	/ kWh	
Average run hours per Week	80	Hours	
Space Balance Point	55	F	
Space Temperature Setpoint	74	deg F	Setpoint.
BTU/Hr Rating of existing DX equipment	108,000	Btu / Hr	Total BTU/hr of Window A/C units
Average EER	10.7		
Existing Annual Electric Usage	6,191	kWh	

Item	Value	Units	Comments
Proposed Annual Electric Usage	3,377	kWh	Unit will cycle on w/ temp of room. Possible operating time shown below

ANNUAL SAVINGS		
Annual Electrical Usage Savings	2,814	kWh
Annual Cost Savings	$338	
Total Project Cost	$1,200	
Simple Payback	4	years

OAT - DB Bin Temp F	Annual Hours	**Existing Hours of Operation**	Proposed % of time of operation	**Proposed hrs of Operation**
102.5	0	0	100%	0
97.5	6	3	89%	3
92.5	31	15	79%	12
87.5	131	62	68%	43
82.5	500	238	58%	138
77.5	620	295	47%	140
72.5	664	0	0%	0
67.5	854	0	0%	0
62.5	927	0	0%	0
57.5	600	0	0%	0
52.5	730	0	0%	0
47.5	491	0	0%	0
42.5	656	0	0%	0
37.5	1,023	0	0%	0
32.5	734	0	0%	0
27.5	334	0	0%	0
22.5	252	0	0%	0
17.5	125	0	0%	0
12.5	47	0	0%	0
7.5	34	0	0%	0
2.5	1	0	0%	0
-2.5	0	0	0%	0
-7.5	0	0	0%	0
Total	8,760	**613**	55%	**335**

Millburn Township Public Schools
CHA Project Number: 28330
Millburn High School

ECM-6: Window A/C Controller - Cost

Multipliers	
Material:	1.03
Labor:	1.25
Equipment:	1.12

Description	QTY	UNIT	UNIT COSTS			SUBTOTAL COSTS			TOTAL COST	REMARKS
			MAT.	LABOR	EQUIP.	MAT.	LABOR	EQUIP.		
						0	$ -	$ -	$ -	
Window AC Controller	6	EA	$ 150	$ -	$ -	924.3	$ -	$ -	$ 924	Estimated
						$ -	$ -	$ -	$ -	

**Cost Estimates are for Energy Savings calculations only, do not use for procurement

$ 924		Subtotal
$ 231	25%	Contingency
$ 1,200		**Total**

Millburn Township Public Schools
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Millburn High School

ECM-9: Upgrade to Premium Efficiency Motors and Install Variable Speed Drives

Description: This ECM evaluates the energy (electrical) savings associated with replacing existing motors with high efficiency motors (based on ASHRAE 2010 NEMA ratings) and adding variable frequency drives to control motor speed based on actual load verses constant volume / constant flow.

Variable Inputs

Electric Rate	$0.12	**$/kWh**
Demand Rate	$0.10	**$/kW**

MOTOR SCHEDULE										Savings Factor		Existing Motor Energy		Proposed Motor Energy		Energy Savings	
Motor ID	Motor Type	Qty	HP	Total HP	Upgrade Motor	Load Factor	Existing Motor Eff.	New Motor Eff.	Annual Hours	Demand Savings Factor	Energy Savings Factor	Demand Energy (kW)	Electrical Energy (kWh)	Demand Energy (kW)	Electrical Energy (kWh)	Peak Demand Savings (kW)	Annual Energy Savings (kWh)
Gym units Return fans	FC	2	1.5	3.0	Y	0.75	84.0%	86.5%	3,560	-	0.580	2.0	7,113	-	-	2.0	7,113
Gym units Supply fans	FC	2	3.0	6.0	Y	0.75	86.5%	89.5%	3,560	-	0.580	3.9	13,814	-	-	3.9	13,814
															Total:	5.9	20,926.9
																$ 7	$ 2,511
																	$ 2,518

Savings calculation formulas are taken from NJ Protocols document for VFDs

Millburn Township Public Schools
CHA Project Number: 28330
Millburn High School

ECM-9: Upgrade to Premium Efficiency Motors and Install Variable Speed Drives

Multipliers	
Material:	1.03
Labor:	1.25
Equipment:	1.12

Description	QTY	UNIT	UNIT COSTS			SUBTOTAL COSTS			TOTAL COST	REMARKS
			MAT.	LABOR	EQUIP.	MAT.	LABOR	EQUIP.		
VFDs for AHU fan motors	2	EA	$ 1,575	$ 431		$ 3,235	$ 1,074	$ -	$ 4,309	RS Means 2012
Motor	2	EA	$ 295	$ 79		$ 606	$ 197	$ -	$ 803	RS Means 2012
Electrical - misc.	1	LS	$ 3,000	$ 1,500		$ 3,081	$ 1,869	$ -	$ 4,950	RS Means 2012
VFDs for AHU fan motors	2	EA	$ 1,575	$ 431		$ 3,235	$ 1,074	$ -	$ 4,309	RS Means 2012
Motor	2	EA	$ 326	$ 79		$ 670	$ 197	$ -	$ 866	RS Means 2012
						$ -	$ -	$ -	$ -	

$ 15,237	Subtotal
$ 3,809	25% Contingency
$ 19,047	**Total**

**Cost Estimates are for Energy Savings calculations only, do not use for procurement

Millburn Township Public Schools
CHA Project Number: 28330
Hartshorn Elementary School

EQUIPMENT	AREA SERVED	COOLING CAPACITY (MBH)
(4) RTU's	Various spaces	366
	Total Electric DX Cooling:	*366* *MBH*

ECM-10: RTU Equipment Replacment Existing RTU EER = 9.0

ECM Description Summary

By replacing older air handling equipment with newer equipment which uses more efficient fan motors and higher SEER/EER DX condensing units, significant electrical energy can be saved. The fan motors will also be replaced with premium efficiency motors. Control schemes can be incorporated that were not possible with the older equipment as well. It is recommended these units be replaced by more modern AAON units with supply fan

ASSUMPTIONS			Comments
Electric Cost	$0.121	/ kWh	
Average run hours per Week	50	Hours	
Space Balance Point	55	F	
Space Temperature Setpoint	74	deg F	Setpoint.
Existing equipment motor HP	16.0		
Existing motor efficiency	75.0%		Unit is 20+ years old; motor efficiency affected by condition and environment over time
Existing Annual Electric Useage	24,854	kWh	
Proposed BTU/Hr rating of replacment DX e	366,000	Btu / Hr	Total BTU/hr of DX cooling equipment to be added.
Proposed average EER of replacment DX e	14.4		
Proposed equipment motor HP	16.0		Premium efficiency motor with VFD.
Proposed motor efficiency	92.0%		
Proposed Annual Electric Usage	18,968	kWh	

ANNUAL SAVINGS		
Annual Electrical Usage Savings	5,886	kWh
Annual Cost Savings	$713	
Total Project Cost	$238,300	
Simple Payback	334	years

OAT - DB Bin Temp F	Annual Hours	Cooling Hrs at Temp Above balance point	Assumed % of time of operation	Assumed hrs of Operation
102.5	0	0	100%	0
97.5	3	1	100%	3
92.5	34	10	100%	10
87.5	131	39	100%	39
82.5	500	149	100%	149
77.5	620	185	100%	185
72.5	664	0	100%	0
67.5	854	0	100%	0
62.5	927	0	100%	0
57.5	600	0	100%	0
52.5	610	0	100%	0
47.5	611	0	100%	0
42.5	656	0	100%	0
37.5	1,023	0	100%	0
32.5	734	0	100%	0
27.5	334	0	100%	0
22.5	252	0	100%	0
17.5	125	0	100%	0
12.5	47	0	100%	0
7.5	13	0	100%	0
2.5	0	0	100%	0
-2.5	0	0	100%	0
-7.5	0	0	100%	0
Total	8,738	383	101%	385

Millburn Township Public Schools
CHA Project Number: 28330
Hartshorn Elementary School

ECM-10 RTU Replacement

Note: cost is over and above the cost for a standard efficiency model

Multipliers	
Material:	1.10
Labor:	1.35
Equipment:	1.10

Description	QTY	UNIT	UNIT COSTS			SUBTOTAL COSTS			TOTAL COST	REMARKS
			MAT.	LABOR	EQUIP.	MAT.	LABOR	EQUIP.		
						$ -	$ -	$ -	$ -	
DX cooling and HW heating, 7.5 tons (on average)	4	EA	$ 2,400	$ 3,500	$ 2,000	$ 10,560	$ 18,900	$ 8,800	$ 38,260	Vendor quote / Eng. Estimate
						$ -	$ -	$ -	$ -	

$ 38,260	Subtotal
$ 9,565	25% Contingency
$ 47,800	**Total**

Note : Cost estimates are for energy calculations only- do not use for procurement

Millburn Township Public Schools
CHA Project Number: 28330
Millburn High School

ECM-12: Re-Commission Building Controls System

Summary: The controls for the building are a combination of both DDC and stand-alone, with major pieces of equipment tied in to the Siemans BAS head end, but smaller pieces of equipment not connected to the BAS and thus individually controlled. Retro-commissioning should address such issues as simultaneous heating and cooling, damper operation and leakage, and equipment scheduling.

Building Information:

201,858 Sq Footage

$0.12 $/kWh Blended
$0.86 $/Therm

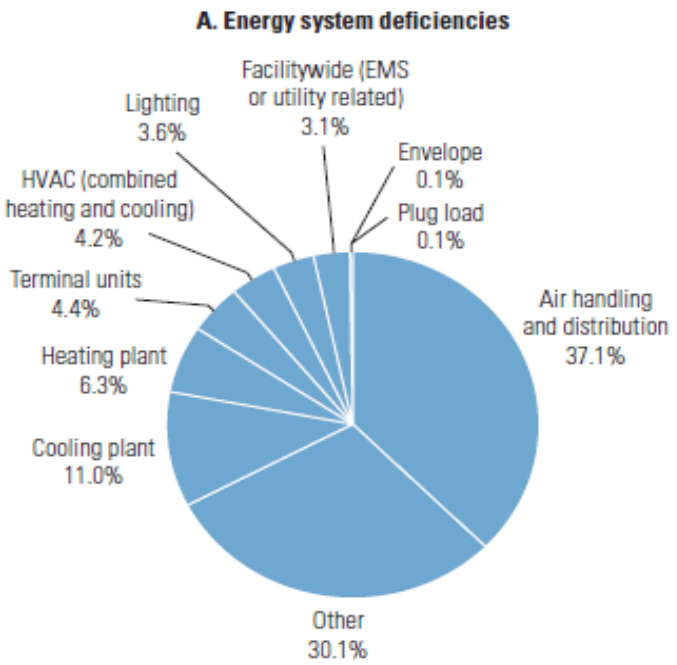
EXISTING CONDITIONS		
Existing Facility Total Electric usage	2,220,800	kWh
Existing Facility Total Gas usage	80,896	Therms
Existing Facility Cooling Electric usage	666,240	kWh[1]
Existing Facility Heating Natural Gas usage	71997.44	Therms[2]
PROPOSED CONDITIONS		
Proposed Facility Cooling Electric Savings	99,936	kWh
Proposed Facility Natural Gas Savings	10799.616	Therms
SAVINGS		
Retro-Commissioning Electric Savings	99,936	**kWh**
Retro-Commissioning Natural Gas Savings	10,800	**Therms**
Total cost savings	$ 21,279.99	

Assumptions

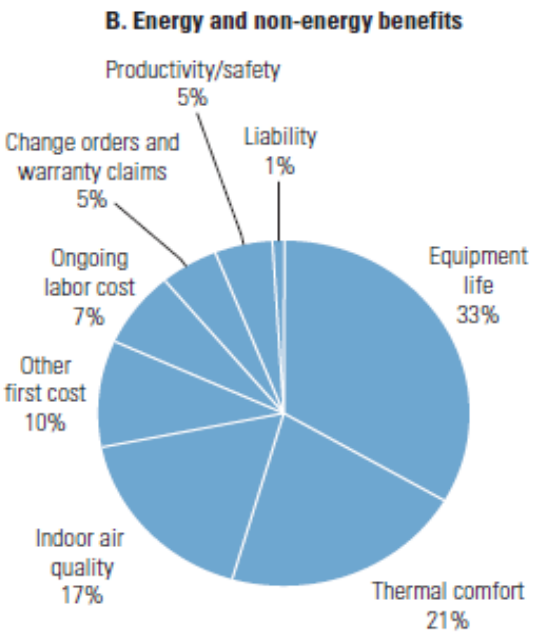
1 30% of facility total electricity dedicated to Cooling based on Building Utility Analysis
2 89% of facility total natural gas dedicated to Heating based on Building Utility Analysis
3 15% Typical Savings associated with Retro-Commissioning of controls based on EPA Energy Star Report (CH 5 - Retrocommissioning)

Figure 5.2: Retrocommissioning results

Building energy system deficiencies: A recent study of retrocommissioning revealed a wide variety of problems—those related to the overall HVAC system were the most common type (A). Energy and non-energy benefits: Retrocommissioning provided both energy and non-energy benefits—the most common of these, noted in one-third of the buildings surveyed, was the extension of equipment life (B).



Note: EMS = energy management system.



Courtesy: E SOURCE; data from Lawrence Berkeley National Laboratory, Portland Energy Conservation Inc., and Energy Systems Laboratory, Texas A&M University

Millburn Township Public Schools
CHA Project Number: 28330
Millburn High School

ECM-12: Re-Commission Building Controls System - Cost

Multipliers	
Material:	1.03
Labor:	1.25
Equipment:	1.12

Description	QTY	UNIT	UNIT COSTS			SUBTOTAL COSTS			TOTAL COST	REMARKS
			MAT.	LABOR	EQUIP.	MAT.	LABOR	EQUIP.		
									$ -	
Controls and Sensors Retro-Commissioning	201858	SF	$ 0.27	INC	INC	$ 55,973	INC	INC	$ 55,973	EPA Estimate
						$ -	$ -	$ -	$ -	

**Cost Estimates are for Energy Savings calculations only, do not use for procurement

$ 55,973	Subtotal
$ 13,993	25% Contingency
$ 69,967	**Total**

Millburn Township Public Schools
CHA Project Number: 28330
Millburn High School

ECM-14: Kitchen Hood Control

Description: This ECM evaluates the thermal and electrical energy savings associated with the implementation of a variable flow controlled exhaust hood (Fan) and make-up air unit. The Hood controller uses infrared heat sensors to detect the level of smoke produced by the cooking operations and automatically adjsustes the

Item	Value	Units	Formula/Comments	
Fuel Cost	$ 0.86	/ Therm		
Electricity Cost	$ 0.12	/kWh		
FORMULA CONSTANTS				
Conversion	0.746	HP/kW		
Constant	24	hrs/day		
Constant	1.08	(btu/hr)/CFM·F		
Conversion	3,412	btu/kWh		
ELECTRIC FAN SAVINGS				
Facility Type	School			
Quantity of Kitchen Hood Fan Motors	1			Q
Kitchen Hood Fan Motor HP	1.0	HP		HP
Motor Load Factor	0.90		NJ Protocols	LF
Efficiency of Fan Motor(s)	86.5%			FEFF
Kitchen Hood Fan Run Hours	500			RH
Fan Motor Power Reduction (From VFD)	0.584			PR
Fan Electricity Savings	227	kWh		
HEATING SAVINGS				
Kitchen is Heated?	Y			
Square Footage of Kitchen	2,500	ft^2	Estimated	SF
Code Required Ventilation Rate	0.70	CFM/ft^2	NJ Protocols	CFM/SF
Ventilation Oversize Factor	1.40		NJ Protocols	OF
Flow Reductuion (from VFD/Control)	0.310			FR
Heating Degree Day	2,783		NJ Protocols Table	HDD
Heating System Efficiency	80%		AFUE (%)	HEFF
Heating Savings	685	MMbtu		
Heating Savings	6,848	Therms		
COOLING SAVINGS				
Kitchen is Cooled?	N			
Cooling Degree Day	-		NJ Protocols Table	CDD
Cooling System Efficiency	-		COP	CEFF
Cooling Savings	-	kWh		
TOTAL SAVINGS				
Electricity Savings	227	kWh		
Fuel Savings	6,848	Therms		
Cost Savings	$ 5,917			

Savings calculation formulas are taken from NJ Protocols document for Kitchen Hood

Millburn Township Public Schools
CHA Project Number: 28330
Millburn High School

Multipliers	
Material:	1.03
Labor:	1.25
Equipment:	1.12

ECM-14: Kitchen Hood Control - Cost

Description	QTY	UNIT	UNIT COSTS			SUBTOTAL COSTS			TOTAL COST	REMARKS
			MAT.	LABOR	EQUIP.	MAT.	LABOR	EQUIP.		
Me-Link Kitchen Hood Control System	1	ea	$ 15,000	$ 2,000		$ 15,405	$ 2,492	$ -	$ 17,897	Vendor Estimation
5.0 HP VFDs (1-exhaust fan)	1	ea	$ 1,485	$ 490		$ 1,525	$ 611	$ -	$ 2,136	RS Means 2012
5.0 HP Motor	1	ea	$ 525	$ 85		$ 539	$ 106	$ -	$ 645	RS Means 2012
Reprogram DDC system	1	ea	$ 100	$ 1,200		$ 103	$ 1,495	$ -	$ 1,598	RS Means 2012
Electrical - misc.	1	ls	$ 200	$ 500		$ 205	$ 623	$ -	$ 828	RS Means 2012
Remote bulb thermostat	2	ea	$ 500	$ 200		$ 1,027	$ 498	$ -	$ 1,525	RS Means 2012
						$ -	$ -	$ -	$ -	

**Cost Estimates are for Energy Savings calculations only, do not use for procurement

$ 24,629	Subtotal
$ 6,157	25% Contingency
$ 30,787	**Total**

Millburn Township Public Schools
CHA Project Number: 28330
Millburn High School

ECM-15: Walk-in Cooler & Freezer EC Motor Retrofits

ECM Description :
For kitchens that contain walk-in coolers and freezers, CoolTrol is a controller that reduces energy consumption by controlling off of dewpoint temperature. Compressor cycling is reduced and the evaporator fans run 25% to 80% less. Door and frame heaters are also installed and controlled by store dew point temperature; this can reduce run time by up to 95% in coolers and 60% in freezers. The evaporator fan motors are also replaced with hi-efficiency fan motors saving 40% to 70% in energy. The proposed system comprises of an anti-sweat door controller, evaporator fan motor replacement and CoolTrol Cooler Control System.

Utility Cost

$0.12 $/kWh Blended

EXISTING CONDITIONS			
Walk-In Freezer(s)			
Existing Freezer Controls?	N		
Quantity of Walk-In Freezers	0		
Nameplate Amps of Freezer Evaporator Fan	3		AmpsEF
Nameplate Volts of Freezer Evaporator Fan	120		VoltsEF
Phase of Evaporator Fan	1		PhaseEF
Power Factor of Evaporator Fan	0.55		PFEF
Operating Hours	8,760	hrs	
Load Reduction	65%		LR
Electricity Savings (Evaporator Fan)	-	kWh	kWhEF
Electricity Savings (Evaporator Fan Reduced Heat)	-	kWh	kWhRH
Total Walk-In Freezer(s) Electricity Savings	-	kWh	
Walk-In Cooler(s)			
Existing Cooler Controls?	N		
Quantity of Walk-In Coolers	1		
Nameplate Amps of Cooler Evaporator Fan	3		
Nameplate Volts of Cooler Evaporator Fan	120		
Phase of Evaporator Fan	1		
Power Factor of Evaporator Fan	0.55		
Operating Hours	8,760	hrs	
Load Reduction	65%		
Electricity Savings (Evaporator Fan)	988	kWh	
Electricity Savings (Evaporator Fan Reduced Heat)	443	kWh	
Total Walk-In Cooler(s) Electricity Savings	1,431	kWh	
SAVINGS			
Total Electricity Savings	**1,431**	**kWh**	
Total Cost Savings	**$ 172**		
Estimated Cost	$ 20,625		
Simple Payback	120.1	**years**	

Savings calculation formulas are taken from NJ Protocols document for Walk-in Controller

**Cost Estimates are for Energy Savings calculations only, do not use for procurement

Millburn Township Public Schools
CHA Project Number: 28330
Millburn High School

ECM-15: Walk-in Cooler & Freezer EC Motor Retrofits - Cost

Multipliers	
Material:	1.03
Labor:	1.25
Equipment:	1.12

Description	QTY	UNIT	UNIT COSTS			SUBTOTAL COSTS			TOTAL COST	REMARKS
			MAT.	LABOR	EQUIP.	MAT.	LABOR	EQUIP.		
									$ -	
Turnkey Walk-In Controller & Equipment	1	EA	$ 10,000	$ 5,000	$ -	$ 10,270	$ 6,230	$ -	$ 16,500	Vendor Estimate
						$ -	$ -	$ -	$ -	

**Cost Estimates are for Energy Savings calculations only, do not use for procurement

$ 16,500	Subtotal
$ 4,125	25% Contingency
$ 20,625	**Total**

Millburn Township Public Schools
CHA Project Number: 28330
Millburn High School

ECM-XX: Install Vending Machine Controls

Description : Vending machines generally operate 24/7 regardless of the actual usage. This measure proposes installing vending machine controls to reduce the total run time of these units. Cold beverage machines will cycle on for 15 minutes every two hours in order to keep beverages at a desired temperature. The result is a reduction in total electrical energy usage.

Unit Cost: $0.120 $/kWh blended

Energy Savings Calculations:

	Existing	
Cold Beverage Vending Machine Electric usage	7,008	kWh[1,4,7]
Snack Vending Machine Electric usage	1,752	kWh[2,5,7]
Dual Vending Machine Electric Usage	-	kWh[3,6,7]
Total Vending Machine Electric Usage	8,760	kWh

	Proposed	
Cold Beverage Vending Machine Electric usage	1,103	kWh[8]
Snack Vending Machine Electric usage	315	kWh
Dual Vending Machine Electric Usage	0	kWh
Total Vending Machine Electric Usage	1,418	kWh

Vending Machine Controls Usage Savings	**7,343**	**kWh**
Total cost savings	**$ 881**	
Estimated Total Project Cost	**$ 840**	[9]
Simple Payback	**1**	**years**

Assumptions

1	2	Number of cold beverage vending machines
2	1	Number of snack vending machines
3	0	Number of dual snack/beverage vending machines
4	400	Average wattage, typical of cold beverage machines based on prior project experience
5	200	Average wattage, typical of snack machines based on prior project experience
6	300	Average wattage, typical of dual snack/beverage machines based on prior project experience
7	8760	Hours per year vending machine plugged in
8	3150	Building Occupied Hours
9	0.50	Vending Machine Traffic Factor (0.75 for High Traffic, 0.5 for Medium, 0.25 for low)

Millburn Township Public Schools
CHA Project Number: 28330
Millburn High School

ECM-XX: Install Vending Machine Controls - Cost

Multipliers	
Material:	1.03
Labor:	1.25
Equipment:	1.12

Description	QTY	UNIT	UNIT COSTS			SUBTOTAL COSTS			TOTAL COST	REMARKS
			MAT.	LABOR	EQUIP.	MAT.	LABOR	EQUIP.		
									$ -	
Vending Miser	3	EA	$ 200	$ 15	$ -	$ 616	$ 56	$ -	$ 672	Vendor Estimation
						$ -	$ -	$ -	$ -	

$ 672	Subtotal
$ 168	25% Contingency
$ 840	**Total**

**Cost Estimates are for Energy Savings calculations only, do not use for procurement

Millburn Township Public Schools
CHA Project Number: 28330
Millburn High School

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 ALL identified measures except for alternate ECMs, & except for ECM-12 (RCx), regardless of payback or IRR. P4P estimated incentives represent a best case scenario, and will likely be lower depending on which measures are included. The savings displayed here are not guaranteed to qualify for P4P incentives if IRR or payback requirements are not met.

Total Building Area (Square Feet)	201,858
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)	$266,271	$88,656
Existing Usage (from utility)	2,220,800	80,896
Proposed Savings	311,842	7,195
Existing Total MMBtus	15,669	
Proposed Savings MMBtus	1,784	
% Energy Reduction	**11.4%**	
Proposed Annual Savings	$66,362	

	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	$0
Incentive #2	$0	$0	$0
Incentive #3	$0	$0	$0
Total All Incentives	**$0**	**$0**	**$0**

Total Project Cost	$657,550

		Allowable Incentive
% Incentives #1 of Utility Cost*	0.0%	$0
% Incentives #2 of Project Cost**	0.0%	$0
% Incentives #3 of Project Cost**	0.0%	$0
Total Eligible Incentives***	**$0**	
Project Cost w/ Incentives	$657,550	

Project Payback (years)	
w/o Incentives	w/ Incentives
9.9	9.9

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

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

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

Energy Audit of Millburn High School
CHA Project No. 28330

ECM-L1 Lighting Replacements

Budgetary	Annual Utility Savings				Estimated	Total	New Jersey	Payback	Payback
Cost					Maintenance Savings	Savings	Incentive	(without incentive)	(with incentive)
$	kW	kWh	therms	$	$	$	$	Years	Years
$454,693	**102.6**	**242,071**	**0**	**$31,345**	**0**	**$31,345**	**$10,000**	**14.5**	**14.2**

*Incentive based on New Jersey Smart Start Prescriptive Lighting Measures

ECM-L2 Install Occupancy Sensors

Budgetary	Annual Utility Savings				Estimated	Total	New Jersey	Payback	Payback
Cost					Maintenance Savings	Savings	Incentive	(without incentive)	(with incentive)
$	kW	kWh	therms	$	$	$	$	Years	Years
$10,287	**0.0**	**73,021**	**0**	**$6,937**	**0**	**$6,937**	**$1,590**	**1.5**	**1.3**

*Incentive based on New Jersey Smart Start Prescriptive Lighting Measures

ECM-L3 Lighting Replacements with Occupancy Sensors

Budgetary	Annual Utility Savings				Estimated	Total	New Jersey	Payback	Payback
Cost					Maintenance Savings	Savings	Incentive	(without incentive)	(with incentive)
$	kW	kWh	therms	$	$	$	$	Years	Years
$464,980	**102.6**	**273,215**	**0**	**$34,304**	**0**	**$34,304**	**$11,590**	**13.6**	**13.2**

*Incentive based on New Jersey Smart Start Prescriptive Lighting Measures

Energy Audit of Millburn High School
CHA Project No. 28330
ECM-L1 Lighting Replacements

		EXISTING CONDITIONS								RETROFIT CONDITIONS								COST & SAVINGS ANALYSIS						
Field Code	Area Description Unique description of the location - Room number/Room name: Floor number (if applicable)	No. of Fixtures No. of fixtures before the retrofit	Standard Fixture Code "Lighting Fixture Code" Example 2T 40 R F(U) = 2'x2' Troff 40 w Recess. Floor 2 lamps U shape	Fixture Code Code from Table of Standard Fixture Wattages	Watts per Fixture Value from Table of Standard Fixture Wattages	kW/Space (Watts/Fixt) * (Fixt No.)	Exist Control Pre-inst. control device	Annual Hours Estimated daily hours for the usage group	Annual kWh (kW/space) * (Annual Hours)	Number of Fixtures No. of fixtures after the retrofit	Standard Fixture Code "Lighting Fixture Code" Example 2T 40 R F(U) = 2'x2' Troff 40 w Recess. Floor 2 lamps U shape	Fixture Code Code from Table of Standard Fixture Wattages	Watts per Fixture Value from Table of Standard Fixture Wattages	kW/Space (Watts/Fixt) * (Number of Fixtures)	Retrofit Control Retrofit control device	Annual Hours Estimated annual hours for the usage group	Annual kWh (kW/space) * (Annual Hours)	Annual kWh Saved (Original Annual kWh) - (Retrofit Annual kWh)	Annual kW Saved (Original Annual kW) - (Retrofit Annual kW)	Annual $ Saved (kWh Saved) * ($/kWh)	Retrofit Cost Cost for renovations to lighting system	NJ Smart Start Lighting Incentive Prescriptive Lighting Measures	Simple Payback With Out Incentive Length of time for renovations cost to be recovered	Simple Payback Length of time for renovations cost to be recovered
35LED	Rm 375 Fine Arts	16	T 32 R F 3 (ELE)	F43ILL/2	90	1.4	occ	2400	3,456	16	T 38 R LED	RTLED38	38	0.6	occ	2,400	1,459	1,997	0.8	$ 257.39	$ 3,780.00	$0	14.7	14.7
35LED	Rm 376	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	occ	2400	2,592	12	T 38 R LED	RTLED38	38	0.5	occ	2,400	1,094	1,498	0.6	$ 193.04	$ 2,835.00	$0	14.7	14.7
4LED	Stairway	2	2B 34 R F 2 (u) (MAG)	FU2EE	72	0.1	breaker	3200	461	2	2T XX R LED	2RTLED	25	0.1	breaker	3,200	160	301	0.1	$ 36.22	$ 405.00	$0	11.2	11.2
35LED	Faculty Toilet Mens	1	T 32 R F 3 (ELE)	F43ILL/2	90	0.1	occ	1000	90	1	T 38 R LED	RTLED38	38	0.0	occ	1,000	38	52	0.1	$ 9.17	$ 236.25	$0	25.8	25.8
35LED	Faculty Toilet Womens	1	T 32 R F 3 (ELE)	F43ILL/2	90	0.1	occ	1000	90	1	T 38 R LED	RTLED38	38	0.0	occ	1,000	38	52	0.1	$ 9.17	$ 236.25	$0	25.8	25.8
35LED	Corridor	13	T 32 R F 3 (ELE)	F43ILL/2	90	1.2	breaker	2280	2,668	13	T 38 R LED	RTLED38	38	0.5	breaker	2,280	1,126	1,541	0.7	$ 201.42	$ 3,071.25	$0	15.2	15.2
35LED	Rm 374	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	occ	2400	2,592	12	T 38 R LED	RTLED38	38	0.5	occ	2,400	1,094	1,498	0.6	$ 193.04	$ 2,835.00	$0	14.7	14.7
35LED	Rm 373	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	occ	2400	2,592	12	T 38 R LED	RTLED38	38	0.5	occ	2,400	1,094	1,498	0.6	$ 193.04	$ 2,835.00	$0	14.7	14.7
35LED	Rm 372	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	occ	2400	2,592	12	T 38 R LED	RTLED38	38	0.5	occ	2,400	1,094	1,498	0.6	$ 193.04	$ 2,835.00	$0	14.7	14.7
35LED	Rm 371	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	occ	2400	2,592	12	T 38 R LED	RTLED38	38	0.5	occ	2,400	1,094	1,498	0.6	$ 193.04	$ 2,835.00	$0	14.7	14.7
35LED	Rm 370	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	occ	2400	2,592	12	T 38 R LED	RTLED38	38	0.5	occ	2,400	1,094	1,498	0.6	$ 193.04	$ 2,835.00	$0	14.7	14.7
35LED	Corridor	2	T 32 R F 3 (ELE)	F43ILL/2	90	0.2	breaker	2280	410	2	T 38 R LED	RTLED38	38	0.1	breaker	2,280	173	237	0.1	$ 30.99	$ 472.50	$0	15.2	15.2
121	Corridor	2	W 34 P F 4	F44EE	144	0.3	breaker	2280	657	2	W 28 P F 4	F44SSILL	96	0.2	breaker	2,280	438	219	0.1	$ 28.60	$ 283.50	$0	9.9	9.9
121	corridor	2	W 34 P F 4	F44EE	144	0.3	breaker	2280	657	2	W 28 P F 4	F44SSILL	96	0.2	breaker	2,280	438	219	0.1	$ 28.60	$ 283.50	$0	9.9	9.9
35LED	Boys toilet	3	T 32 R F 3 (ELE)	F43ILL/2	90	0.3	occ	1000	270	3	T 38 R LED	RTLED38	38	0.1	occ	1,000	114	156	0.2	$ 27.51	$ 708.75	$0	25.8	25.8
35LED	Girls toilet	3	T 32 R F 3 (ELE)	F43ILL/2	90	0.3	occ	1000	270	3	T 38 R LED	RTLED38	38	0.1	occ	1,000	114	156	0.2	$ 27.51	$ 708.75	$0	25.8	25.8
35LED	Custodial closet	1	T 32 R F 3 (ELE)	F43ILL/2	90	0.1	sw	500	45	1	T 38 R LED	RTLED38	38	0.0	sw	500	19	26	0.1	$ 6.70	$ 236.25	$0	35.3	35.3
35LED	Corridor	6	T 32 R F 3 (ELE)	F43ILL/2	90	0.5	breaker	2280	1,231	6	T 38 R LED	RTLED38	38	0.2	breaker	2,280	520	711	0.3	$ 92.96	$ 1,417.50	$0	15.2	15.2
35LED	Rm 275	16	T 32 R F 3 (ELE)	F43ILL/2	90	1.4	occ	2400	3,456	16	T 38 R LED	RTLED38	38	0.6	occ	2,400	1,459	1,997	0.8	$ 257.39	$ 3,780.00	$0	14.7	14.7
35LED	Rm 276	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	occ	2400	2,592	12	T 38 R LED	RTLED38	38	0.5	occ	2,400	1,094	1,498	0.6	$ 193.04	$ 2,835.00	$0	14.7	14.7
4LED	Stairway	2	2B 34 R F 2 (u) (MAG)	FU2EE	72	0.1	breaker	3200	461	2	2T XX R LED	2RTLED	25	0.1	breaker	3,200	160	301	0.1	$ 36.22	$ 405.00	$0	11.2	11.2
35LED	Faculty Toilet Mens	1	T 32 R F 3 (ELE)	F43ILL/2	90	0.1	occ	1000	90	1	T 38 R LED	RTLED38	38	0.0	occ	1,000	38	52	0.1	$ 9.17	$ 236.25	$0	25.8	25.8
35LED	Faculty Toilet Womens	1	T 32 R F 3 (ELE)	F43ILL/2	90	0.1	occ	1000	90	1	T 38 R LED	RTLED38	38	0.0	occ	1,000	38	52	0.1	$ 9.17	$ 236.25	$0	25.8	25.8
35LED	Corridor	13	T 32 R F 3 (ELE)	F43ILL/2	90	1.2	breaker	2280	2,668	13	T 38 R LED	RTLED38	38	0.5	breaker	2,280	1,126	1,541	0.7	$ 201.42	$ 3,071.25	$0	15.2	15.2
35LED	Rm 374	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	occ	2400	2,592	12	T 38 R LED	RTLED38	38	0.5	occ	2,400	1,094	1,498	0.6	$ 193.04	$ 2,835.00	$0	14.7	14.7
35LED	Rm 273	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	occ	2400	2,592	12	T 38 R LED	RTLED38	38	0.5	occ	2,400	1,094	1,498	0.6	$ 193.04	$ 2,835.00	$0	14.7	14.7
35LED	Rm 272	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	occ	2400	2,592	12	T 38 R LED	RTLED38	38	0.5	occ	2,400	1,094	1,498	0.6	$ 193.04	$ 2,835.00	$0	14.7	14.7
35LED	Rm 271	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	occ	2400	2,592	12	T 38 R LED	RTLED38	38	0.5	occ	2,400	1,094	1,498	0.6	$ 193.04	$ 2,835.00	$0	14.7	14.7
35LED	Rm 270	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	occ	2400	2,592	12	T 38 R LED	RTLED38	38	0.5	occ	2,400	1,094	1,498	0.6	$ 193.04	$ 2,835.00	$0	14.7	14.7
35LED	Corridor	2	T 32 R F 3 (ELE)	F43ILL/2	90	0.2	breaker	2280	410	2	T 38 R LED	RTLED38	38	0.1	breaker	2,280	173	237	0.1	$ 30.99	$ 472.50	$0	15.2	15.2
121	Corridor	2	W 34 P F 4	F44EE	144	0.3	breaker	2280	657	2	W 28 P F 4	F44SSILL	96	0.2	breaker	2,280	438	219	0.1	$ 28.60	$ 283.50	$0	9.9	9.9
121	corridor	2	W 34 P F 4	F44EE	144	0.3	breaker	2280	657	2	W 28 P F 4	F44SSILL	96	0.2	breaker	2,280	438	219	0.1	$ 28.60	$ 283.50	$0	9.9	9.9
35LED	Boys toilet	3	T 32 R F 3 (ELE)	F43ILL/2	90	0.3	occ	1000	270	3	T 38 R LED	RTLED38	38	0.1	occ	1,000	114	156	0.2	$ 27.51	$ 708.75	$0	25.8	25.8
35LED	Girls toilet	3	T 32 R F 3 (ELE)	F43ILL/2	90	0.3	occ	1000	270	3	T 38 R LED	RTLED38	38	0.1	occ	1,000	114	156	0.2	$ 27.51	$ 708.75	$0	25.8	25.8
35LED	Custodial closet	1	T 32 R F 3 (ELE)	F43ILL/2	90	0.1	sw	500	45	1	T 38 R LED	RTLED38	38	0.0	sw	500	19	26	0.1	$ 6.70	$ 236.25	$0	35.3	35.3
35LED	Corridor	6	T 32 R F 3 (ELE)	F43ILL/2	90	0.5	breaker	2280	1,231	6	T 38 R LED	RTLED38	38	0.2	breaker	2,280	520	711	0.3	$ 92.96	$ 1,417.50	$0	15.2	15.2
35LED	Rm 275	16	T 32 R F 3 (ELE)	F43ILL/2	90	1.4	occ	2400	3,456	16	T 38 R LED	RTLED38	38	0.6	occ	2,400	1,459	1,997	0.8	$ 257.39	$ 3,780.00	$0	14.7	14.7
35LED	Rm 276	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	occ	2400	2,592	12	T 38 R LED	RTLED38	38	0.5	occ	2,400	1,094	1,498	0.6	$ 193.04	$ 2,835.00	$0	14.7	14.7
4LED	Stairway	2	2B 34 R F 2 (u) (MAG)	FU2EE	72	0.1	breaker	3200	461	2	2T XX R LED	2RTLED	25	0.1	breaker	3,200	160	301	0.1	$ 36.22	$ 405.00	$0	11.2	11.2
35LED	Faculty Toilet Mens	1	T 32 R F 3 (ELE)	F43ILL/2	90	0.1	occ	1000	90	1	T 38 R LED	RTLED38	38	0.0	occ	1,000	38	52	0.1	$ 9.17	$ 236.25	$0	25.8	25.8
35LED	Faculty Toilet Womens	1	T 32 R F 3 (ELE)	F43ILL/2	90	0.1	occ	1000	90	1	T 38 R LED	RTLED38	38	0.0	occ	1,000	38	52	0.1	$ 9.17	$ 236.25	$0	25.8	25.8
35LED	Corridor	13	T 32 R F 3 (ELE)	F43ILL/2	90	1.2	breaker	2280	2,668	13	T 38 R LED	RTLED38	38	0.5	breaker	2,280	1,126	1,541	0.7	$ 201.42	$ 3,071.25	$0	15.2	15.2
35LED	Rm 374	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	occ	2400	2,592	12	T 38 R LED	RTLED38	38	0.5	occ	2,400	1,094	1,498	0.6	$ 193.04	$ 2,835.00	$0	14.7	14.7
35LED	Rm 273	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	occ	2400	2,592	12	T 38 R LED	RTLED38	38	0.5	occ	2,400	1,094	1,498	0.6	$ 193.04	$ 2,835.00	$0	14.7	14.7
35LED	Rm 272	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	occ	2400	2,592	12	T 38 R LED	RTLED38	38	0.5	occ	2,400	1,094	1,498	0.6	$ 193.04	$ 2,835.00	$0	14.7	14.7
35LED	Rm 271	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	occ	2400	2,592	12	T 38 R LED	RTLED38	38	0.5	occ	2,400	1,094	1,498	0.6	$ 193.04	$ 2,835.00	$0	14.7	14.7
35LED	Rm 270	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	occ	2400	2,592	12	T 38 R LED	RTLED38	38	0.5	occ	2,400	1,094	1,498	0.6	$ 193.04	$ 2,835.00	$0	14.7	14.7
35LED	Corridor	2	T 32 R F 3 (ELE)	F43ILL/2	90	0.2	breaker	2280	410	2	T 38 R LED	RTLED38	38	0.1	breaker	2,280	173	237	0.1	$ 30.99	$ 472.50	$0	15.2	15.2
121	Corridor	2	W 34 P F 4	F44EE	144	0.3	breaker	2280	657	2	W 28 P F 4	F44SSILL	96	0.2	breaker	2,280	438	219	0.1	$ 28.60	$ 283.50	$0	9.9	9.9
121	corridor	2	W 34 P F 4	F44EE	144	0.3	breaker	2280	657	2	W 28 P F 4	F44SSILL	96	0.2	breaker	2,280	438	219	0.1	$ 28.60	$ 283.50	$0	9.9	9.9
35LED	Boys toilet	3	T 32 R F 3 (ELE)	F43ILL/2	90	0.3	occ	1000	270	3	T 38 R LED	RTLED38	38	0.1	occ	1,000	114	156	0.2	$ 27.51	$ 708.75	$0	25.8	25.8
35LED	Girls toilet	3	T 32 R F 3 (ELE)	F43ILL/2	90	0.3	occ	1000	270	3	T 38 R LED	RTLED38	38	0.1	occ	1,000	114	156	0.2	$ 27.51	$ 708.75	$0	25.8	25.8
35LED	Custodial closet	1	T 32 R F 3 (ELE)	F43ILL/2	90	0.1	sw	500	45	1	T 38 R LED	RTLED38	38	0.0	sw	500	19	26	0.1	$ 6.70	$ 236.25	$0	35.3	35.3
35LED	Corridor	6	T 32 R F 3 (ELE)	F43ILL/2	90	0.5	breaker	2280	1,231	6	T 38 R LED	RTLED38	38	0.2	breaker	2,280	520	711	0.3	$ 92.96	$ 1,417.50	$0	15.2	15.2
6LED	classroom 140	36	T 34 R F 4 (MAG)	F44EE	144	5.2	sw	2400	12,442	36	T 50 R LED	RTLED50	50	1.8	sw	2,400	4,320	8,122	3.4	$ 1,046.87	$ 8,505.00	$0	8.1	8.1
6LED	classroom 142	24	T 34 R F 4 (MAG)	F44EE	144	3.5	sw	2400	8,294	24	T 50 R LED	RTLED50	50	1.2	sw	2,400	2,880	5,414	2.3	$ 697.92	$ 5,670.00	$0	8.1	8.1
6LED	storage	4	T 34 R F 4 (MAG)	F44EE	144	0.6	sw	500	288	4	T 50 R LED	RTLED50	50	0.2	sw	500	100	188	0.4	$ 48.45	$ 945.00	$0	19.5	19.5
35LED	classroom 141	10	T 32 R F 3 (ELE)	F43ILL/2	90	0.9	sw	2400	2,160	10	T 38 R LED	RTLED38	38	0.4	sw	2,400	912	1,248	0.5	$ 160.87	$ 2,362.50	$0	14.7	14.7
35LED	classroom 143	18	T 32 R F 3 (ELE)	F43ILL/2	90	1.6	sw	2400	3,888	18	T 38 R LED	RTLED38	38	0.7	sw	2,400	1,642	2,246	0.9	$ 289.56	$ 4,252.50	$0	14.7	14.7
41LED	Corridor	10	1B 40 R F 2 (MAG)	F42SS	94	0.9	breaker	2280	2,143	10	4 ft LED Tube	200732x2	30	0.3	breaker	2,280	684	1,459	0.6	$ 190.69	$ 1,633.50	$0	8.6	8.6
6LED	Dance Gym	36	T 34 R F 4 (MAG)	F44EE	144	5.2	sw	2400	12,442	36	T 50 R LED	RTLED50	50	1.8	sw	2,400	4,320	8,122	3.4	$ 1,046.87	$ 8,505.00	$0	8.1	8.1
41LED	Dance Gym	6	1B 40 R F 2 (MAG)	F42SS	94	0.6	sw	2400	1,354	6	4 ft LED Tube	200732x2	30	0.2	sw	2,400	432	922	0.4	$ 118.79	$ 980.10	$0	8.3	8.3
40LED	Corridor	9	T 32 R F 2 (ELE)	F42LL	60	0.5	breaker	2280	1,231	9	T 38 R LED	RTLED38	38	0.3	breaker	2,280	780	451	0.2	$ 59.00	$ 2,126.25	$0	36.0	36.0
18LED	Rm 137	12	T 32 R F 4 (ELE)	F44ILL	112	1.3	breaker	2400	3,226	12	T 50 R LED	RTLED50	50	0.6	breaker	2,400	1,440	1,786	0.7	$ 230.16	$ 2,835.00	$0	12.3	12.3
18LED	RM 136	12	T 32 R F 4 (ELE)	F44ILL	112	1.3	sw	2400	3,226	12	T 50 R LED	RTLED50	50	0.6	sw	2,400	1,440	1,786	0.7	$ 230.16	$ 2,835.00	$0	12.3	12.3
18LED	Rm 135	12	T 32 R F 4 (ELE)	F44ILL	112	1.3	sw	2400	3,226	12	T 50 R LED	RTLED50	50	0.6	sw	2,400	1,440	1,786	0.7	$ 230.16	$ 2,835.00	$0	12.3	12.3
18LED	Rm 134	12	T 32 R F 4 (ELE)	F44ILL	112	1.3	sw	2400	3,226	12	T 50 R LED	RTLED50	50	0.6	sw	2,400	1,440	1,786	0.7	$ 230.16	$ 2,835.00	$0	12.3	12.3
18LED	Rm 133	12	T 32 R F 4 (ELE)	F44ILL	112	1.3	sw	2400	3,226	12	T 50 R LED	RTLED50	50	0.6	sw	2,400	1,440	1,786	0.7	$ 230.16	$ 2,835.00	$0	12.3	12.3
18LED	Rm 132	12	T 32 R F 4 (ELE)	F44ILL	112	1.3	sw	2400	3,226	12	T 50 R LED	RTLED50	50	0.6	sw	2,400	1,440	1,786	0.7	$ 230.16	$ 2,835.00	$0	12.3	12.3
18LED	Rm 131	12	T 32 R F 4 (ELE)	F44ILL	112	1.3	sw	2400	3,226	12	T 50 R LED	RTLED50	50	0.6	sw	2,400	1,440	1,786	0.7	$ 230.16	$ 2,835.00	$0	12.3	12.3
18LED	Rm 130	12	T 32 R F 4 (ELE)	F44ILL	112	1.3	sw	2400	3,226	12	T 50 R LED	RTLED50	50	0.6	sw	2,400	1,440	1,786	0.7	$ 230.16	$ 2,835.00	$0	12.3	12.3
18LED	Rm 129	12	T 32 R F 4 (ELE)	F44ILL	112	1.3	sw	2400	3,226	12	T 50 R LED	RTLED50	50	0.6	sw	2,400	1,440	1,786	0.7	$ 230.16	$ 2,835.00	$0	12.3	12.3
18LED	Rm 232	12	T 32 R F 4 (ELE)	F44ILL	112	1.3	sw	2400	3,226	12	T 50 R LED	RTLED50	50	0.6	sw	2,400	1,440	1,786	0.7	$ 230.16	$ 2,835.00	$0	12.3	12.3
18LED	Rm 233	12	T 32 R F 4 (ELE)	F44ILL	112	1.3	sw	2400	3,226	12	T 50 R LED	RTLED50	50	0.6	sw	2,400	1,440	1,786	0.7	$ 230.16	$ 2,835.00	$0	12.3	12.3
18LED	Rm 234	12	T 32 R F 4 (ELE)	F44ILL	112	1.3	sw	2400	3,226	12	T 50 R LED	RTLED50	50	0.6	sw	2,400	1,440	1,786	0.7	$ 230.16	$ 2,835.00	$0	12.3	12.3
18LED	Rm 235	12	T 32 R F 4 (ELE)	F44ILL	112	1.3	sw	2400	3,226	12	T 50 R LED	RTLED50	50	0.6	sw	2,400	1,440	1,786	0.7	$ 230.16	$ 2,835.00	$0	12.3	12.3
18LED	Rm 236	12	T 32 R F 4 (ELE)	F44ILL	112	1.3	sw	2400	3,226	12	T 50 R LED	RTLED50	50	0.6	sw	2,400	1,440	1,786	0.7	$ 230.16	$ 2,835.00	$0	12.3	12.3
18LED	Rm 237	12	T 32 R F 4 (ELE)	F44ILL	112	1.3	sw	2400	3,226	12	T 50 R LED	RTLED50	50	0.6	sw	2,400	1,440	1,786	0.7	$ 230.16	$ 2,835.00	$0	12.3	12.3
18LED	Rm 238	12	T 32 R F 4 (ELE)	F44ILL	112	1.3	sw	2400	3,226	12	T 50 R LED	RTLED50	50	0.6	sw	2,400	1,440	1,786	0.7	$ 230.16	$ 2,835.00	$0	12.3	12.3
18LED	Rm 239	12	T 32 R F 4 (ELE)	F44ILL	112	1.3	sw	2400	3,226	12	T 50 R LED	RTLED50	50	0.6	sw	2,400	1,440	1,786	0.7	$ 230.16	$ 2,835.00	$0	12.3	12.3
18LED	Rm 240	12	T 32 R F 4 (ELE)	F44ILL	112	1.3	sw	2400	3,226	12	T 50 R LED	RTLED50	50	0.6	sw	2,400	1,440	1,786	0.7	$ 230.16	$ 2,835.00	$0	12.3	12.3
18LED	Rm 241	12	T 32 R F 4 (ELE)	F44ILL	112	1.3	sw	2400	3,226	12	T 50 R LED	RTLED50	50	0.6	sw	2,400	1,440	1,786	0.7	$ 230.16	$ 2,835.00	$0	12.3	12.3
18LED	Rm 242	12	T 32 R F 4 (ELE)	F44ILL	112	1.3	sw	2400	3,226	12	T 50 R LED	RTLED50	50	0.6	sw	2,400	1,440	1,786	0.7	$ 230.16	$ 2,835.00	$0	12.3	12.3
18LED	Rm 243	12	T 32 R F 4 (ELE)	F44ILL	112	1.3	sw	2400	3,226	12	T 50 R LED	RTLED50	50	0.6	sw	2,400	1,440	1,786	0.7	$ 230.16	$ 2,835.00	$0	12.3	12.3
18LED	Boys toilet	3	T 32 R F 4 (ELE)	F44ILL	112	0.3	sw	1000	336	3	T 50 R LED	RTLED50	50	0.2	sw	1,000	150	186	0.2	$ 32.80	$ 708.75	$0	21.6	21.6
18LED	Girls toilet	3	T 32 R F 4 (ELE)	F44ILL	112	0.3	sw	1000	336	3	T 50 R LED	RTLED50	50	0.2	sw	1,000	150	186	0.2	$ 32.80	$ 708.75	$0	21.6	21.6
18LED	Boys toilet	3	T 32 R F 4 (ELE)	F44ILL	112	0.3	sw	1000	336	3	T 50 R LED	RTLED50	50	0.2	sw	1,000	150	186	0.2	$ 32.80	$ 708.75	$0	21.6	21.6
18LED	Girls toilet	3	T 32 R F 4 (ELE)	F44ILL	112	0.3	sw	1000	336	3	T 50 R LED	RTLED50	50	0.2	sw	1,000	150	186	0.2	$ 32.80	$ 708.75	$0	21.6	21.6
41LED	Corridor	12	1B 40 R F 2 (MAG)	F42SS	94	1.1	breaker	2280	2,572	12	4 ft LED Tube	200732x2	30	0.4	breaker	2,280	821	1,751	0.8	$ 228.83	$ 1,960.20	$0	8.6	8.6
41LED	Corridor	14	1B 40 R F 2 (MAG)	F42SS	94	1.3	breaker	2280	3,000	14	4 ft LED Tube	200732x2	30	0.4	breaker	2,280	958	2,043	0.9	$ 266.97	$ 2,286.90	$0	8.6	8.6
4LED	Stairway	3	2B 34 R F 2 (u) (MAG)	FU2EE	72	0.2	breaker	3200	691	3	2T XX R LED	2RTLED	25	0.1	breaker	3,200	240	451	0.1	$ 54.34	$ 607.50	$0	11.2	11.2
4LED	Stairway	3	2B 34 R F 2 (u) (MAG)	FU2EE	72	0.2	breaker	3200	691	3	2T XX R LED	2RTLED	25	0.1	breaker	3,200	240	451	0.1	$ 54.34	$ 607.50	$0	11.2	11.2
18LED	classroom 122	12	T 32 R F 4 (ELE)	F44ILL	112	1.3	sw	2400	3,226	12	T 50 R LED	RTLED50	50	0.6	sw	2,400	1,440	1,786	0.7	$ 230.16	$ 2,835.00	$0	12.3	12.3
18LED	classroom 123	16	T 32 R F 4 (ELE)	F44ILL	112	1.8	sw	2400	4,301	16	T 50 R LED	RTLED50	50	0.8	sw	2,400	1,920	2,381	1.0	$ 306.89	$ 3,780.00	$0	12.3	12.3
18LED	classroom 124	16	T 32 R F 4 (ELE)	F44ILL	112	1.8	sw	2400	4,301	16	T 50 R LED	RTLED50	50	0.8	sw	2,400	1,920	2,381	1.0	$ 306.89	$ 3,780.00	$0	12.3	12.3
18LED	classroom 125	12	T 32 R F 4 (ELE)	F44ILL	112	1.3	sw	2400	3,226	12	T 50 R LED	RTLED50	50	0.6	sw	2,400	1,440	1,786	0.7	$ 230.16	$ 2,835.00	$0	12.3	12.3
18LED	classroom 126	12	T 32 R F 4 (ELE)	F44ILL	112	1.3	sw	2400	3,226	12	T 50 R LED	RTLED50	50	0.6	sw	2,400	1,440	1,786	0.7	$ 230.16	$ 2,835.00	$0	12.3	12.3
18LED	Rm 226	12	T 32 R F 4 (ELE)	F44ILL	112	1.3	sw	2400	3,226	12	T 50 R LED	RTLED50	50	0.6	sw	2,400	1,440	1,786	0.7	$ 230.16	$ 2,835.00	$0	12.3	12.3
18LED	Rm 227	12	T 32 R F 4 (ELE)	F44ILL	112	1.3	sw	2400	3,226	12	T 50 R LED	RTLED50	50	0.6	sw	2,400	1,440	1,786	0.7	$ 230.16	$ 2,835.00	$0	12.3	12.3
18LED	Rm 228	12	T 32 R F 4 (ELE)	F44ILL	112	1.3	sw	2400	3,226	12	T 50 R LED	RTLED50	50	0.6	sw	2,400	1,440	1,786	0.7	$ 230.16	$ 2,835.00	$0	12.3	12.3
18LED	Rm 229	12	T 32 R F 4 (ELE)	F44ILL	112	1.3	sw	2400	3,226	12	T 50 R LED	RTLED50	50	0.6	sw	2,400	1,440	1,786	0.7	$ 230.16	$ 2,835.00	$0	12.3	12.3
18LED	Rm 230	12	T 32 R F 4 (ELE)	F44ILL	112	1.3	sw	2400	3,226	12	T 50 R LED	RTLED50	50	0.6	sw	2,400	1,440	1,786	0.7	$ 230.16	$ 2,835.00	$0	12.3	12.3
18LED	Rm 231	12	T 32 R F 4 (ELE)	F44ILL	112	1.3	sw	2400	3,226	12	T 50 R LED	RTLED50	50	0.6	sw	2,400	1,440	1,786	0.7	$ 230.16	$ 2,835.00	$0	12.3	12.3
9LED	New Gymnasium	24	High Bay MH 200 35 Feet High	MH200/1	232	5.6	sw	2912	16,214	24	FXLED78	FXLED78/1	78	1.9	sw	2,912	5,451	10,763	3.7	$ 1,323.17	$ 20,260.69	$3,600	15.3	12.6
41LED	Corridor	15	1B 40 R F 2 (MAG)	F42SS	94	1.4	breaker	2280	3,215	15	4 ft LED Tube	200732x2	30	0.5	breaker	2,280	1,026	2,189	1.0	$ 286.04	$ 2,450.25	$0	8.6	8.6
35LED	classroom 115	9	T 32 R F 3 (ELE)	F43ILL/2	90	0.8	sw	2400	1,944	9	T 38 R LED	RTLED38	38	0.3	sw	2,400	821	1,123	0.5	$ 144.78	$ 2,126.25	$0	14.7	14.7
35LED	classroom 117	16	T 32 R F 3 (ELE)	F43ILL/2	90	1.4	sw	2400	3,456	16	T 38 R LED	RTLED38	38	0.6	sw	2,400	1,459	1,997	0.8	$ 257.39	$ 3,780.00	$0	14.7	14.7
35LED	classroom 118	16	T 32 R F 3 (ELE)	F43ILL/2	90	1.4	sw	2400	3,456	16	T 38 R LED	RTLED38	38	0.6	sw	2,400	1,459	1,997	0.8	$ 257.39	$ 3,780.00	$0	14.7	14.7
35LED	classroom 119	16	T 32 R F 3 (ELE)	F43ILL/2	90	1.4	sw	2400	3,456	16	T 38 R LED	RTLED38	38	0.6	sw	2,400	1,459	1,997	0.8	$ 257.39	$ 3,780.00	$0	14.7	14.7
35LED	classroom 121	16	T 32 R F 3 (ELE)	F43ILL/2	90	1.4	sw	2400	3,456	16	T 38 R LED	RTLED38	38	0.6	sw	2,400	1,459	1,997	0.8	$ 257.39	$ 3,780.00	$0	14.7	14.7
35LED	classroom 120	16	T 32 R F 3 (ELE)	F43ILL/2	90	1.4	sw	2400	3,456	16	T 38 R LED	RTLED38	38	0.6	sw	2,400	1,459	1,997	0.8	$ 257.39	$ 3,780.00	$0	14.7	14.7
6LED	storage	1	T 34 R F 4 (MAG)	F44EE	144	0.1	sw	500	72	1	T 50 R LED	RTLED50	50	0.1	sw	500	25	47	0.1	$ 12.11	$ 236.25	$0	19.5	19.5
35LED	office	2	T 32 R F 3 (ELE)	F43ILL/2	90	0.2	sw	2400	432	2	T 38 R LED	RTLED38	38	0.1	sw	2,400	182	250	0.1	$ 32.17	$ 472.50	$0	14.7	14.7
35LED	office	3	T 32 R F 3 (ELE)	F43ILL/2	90	0.3	sw	2400	648	3	T 38 R LED	RTLED38	38	0.1	sw	2,400	274	374	0.2	$ 48.26	$ 708.75	$0	14.7	14.7
35LED	office	2	T 32 R F 3 (ELE)	F43ILL/2	90	0.2	sw	2400	432	2	T 38 R LED	RTLED38	38	0.1	sw	2,400	182	250	0.1	$ 32.17	$ 472.50	$0	14.7	14.7
35LED	Cafeteria	64	T 32 R F 3 (ELE)	F43ILL/2	90	5.8	sw	1600	9,216	64	T 38 R LED	RTLED38	38	2.4	sw	1,600	3,891	5,325	3.3	$ 776.62	$ 15,120.00	$0	19.5	19.5
24LED	Weight Rm	24	1B 32 P F 2 (ELE)	F42LL	60	1.4	sw	2912	4,193	24	4 ft LED Tube	200732x2	30	0.7	sw	2,912	2,097	2,097	0.7	$ 257.76	$ 3,920.40	$0	15.2	15.2
41LED	Media Center	48	1B 40 R F 2 (MAG)	F42SS	94	4.5	sw	2400	10,829	48	4 ft LED Tube	200732x2	30	1.4	sw	2,400	3,456	7,373	3.1	$ 950.35	$ 7,840.80	$0	8.3	8.3
24LED	Boys Locker Rm	16	1B 32 P F 2 (ELE)	F42LL	60	1.0	sw	2800	2,688	16	4 ft LED Tube	200732x2	30	0.5	sw	2,800	1,344	1,344	0.5	$ 166.73	$ 2,613.60	$0	15.7	15.7
24LED	Girls Locker Rm	16	1B 32 P F 2 (ELE)	F42LL	60	1.0	sw	2800	2,688	16	4 ft LED Tube	200732x2	30	0.5	sw	2,800	1,344	1,344	0.5	$ 166.73	$ 2,613.60	$0	15.7	15.7
35LED	Music 101	18	T 32 R F 3 (ELE)	F43ILL/2	90	1.6	occ	2400	3,888	18	T 38 R LED	RTLED38	38	0.7	occ	2,400	1,642	2,246	0.9	$ 289.56	$ 4,252.50	$0	14.7	14.7
35LED	Music 100	22	T 32 R F 3 (ELE)	F43ILL/2	90	2.0	occ	2400	4,752	22	T 38 R LED	RTLED38	38	0.8	occ	2,400	2,006	2,746	1.1	$ 353.91	$ 5,197.50	$0	14.7	14.7

Energy Audit of Millburn High School
CHA Project No. 28330
ECM-L1 Lighting Replacements

		EXISTING CONDITIONS							RETROFIT CONDITIONS								COST & SAVINGS ANALYSIS						
Field Code	Area Description Unique description of the location - Room number/Room name: Floor number (if applicable)	No. of Fixtures No. of fixtures before the retrofit	Standard Fixture Code "Lighting Fixture Code" Example 2T 40 R F(U) = 2'x2' Troff 40 w Recess. Floor 2 lamps U shape	Fixture Code Code from Table of Standard Fixture Wattages	Watts per Fixture Value from Table of Standard Fixture Wattages	kW/Space (Watts/Fixt) * (Fixt No.)	Exist Control Pre-inst. control device	Annual Hours Estimated daily hours for the usage group	Annual kWh (kW/space) * (Annual Hours)	Number of Fixtures No. of fixtures after the retrofit	Standard Fixture Code "Lighting Fixture Code" Example 2T 40 R F(U) = 2'x2' Troff 40 w Recess. Floor 2 lamps U shape	Fixture Code Code from Table of Standard Fixture Wattages	Watts per Fixture Value from Table of Standard Fixture Wattages	kW/Space (Watts/Fixt) * (Number of Fixtures)	Retrofit Control Retrofit control device	Annual Hours Estimated annual hours for the usage group	Annual kWh (kW/space) * (Annual Hours)	Annual kWh Saved (Original Annual kWh) - (Retrofit Annual kWh)	Annual kW Saved (Original Annual kW) - (Retrofit Annual kW)	Annual $ Saved (kWh Saved) * ($/kWh)	Retrofit Cost Cost for renovations to lighting system	NJ Smart Start Lighting Incentive Prescriptive Lighting Measures	Simple Payback With Out Incentive Length of time for renovations cost to be recovered	Simple Payback Length of time for renovations cost to be recovered
35LED	Classroom 102	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	occ	2400	2,592	12	T 38 R LED	RTLED38	38	0.5	occ	2,400	1,094	1,498	0.6	$ 193.04	$ 2,835.00	$0	14.7	14.7
35LED	Classroom 103	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	occ	2400	2,592	12	T 38 R LED	RTLED38	38	0.5	occ	2,400	1,094	1,498	0.6	$ 193.04	$ 2,835.00	$0	14.7	14.7
24LED	Corridor	17	1B 32 P F 2 (ELE)	F42LL	60	1.0	breaker	2280	2,326	17	4 ft LED Tube	200732x2	30	0.5	breaker	2,280	1,163	1,163	0.5	$ 151.96	$ 2,776.95	$0	18.3	18.3
24LED	classroom 208	14	1B 32 P F 2 (ELE)	F42LL	60	0.8	sw	2400	2,016	14	4 ft LED Tube	200732x2	30	0.4	sw	2,400	1,008	1,008	0.4	$ 129.93	$ 2,286.90	$0	17.6	17.6
24LED	classroom 209	14	1B 32 P F 2 (ELE)	F42LL	60	0.8	sw	2400	2,016	14	4 ft LED Tube	200732x2	30	0.4	sw	2,400	1,008	1,008	0.4	$ 129.93	$ 2,286.90	$0	17.6	17.6
24LED	classroom 210	14	1B 32 P F 2 (ELE)	F42LL	60	0.8	sw	2400	2,016	14	4 ft LED Tube	200732x2	30	0.4	sw	2,400	1,008	1,008	0.4	$ 129.93	$ 2,286.90	$0	17.6	17.6
24LED	classroom 211	14	1B 32 P F 2 (ELE)	F42LL	60	0.8	sw	2400	2,016	14	4 ft LED Tube	200732x2	30	0.4	sw	2,400	1,008	1,008	0.4	$ 129.93	$ 2,286.90	$0	17.6	17.6
24LED	classroom 207	14	1B 32 P F 2 (ELE)	F42LL	60	0.8	sw	2400	2,016	14	4 ft LED Tube	200732x2	30	0.4	sw	2,400	1,008	1,008	0.4	$ 129.93	$ 2,286.90	$0	17.6	17.6
18LED	Boys Rm	4	T 32 R F 4 (ELE)	F44ILL	112	0.4	sw	1000	448	4	T 50 R LED	RTLED50	50	0.2	sw	1,000	200	248	0.2	$ 43.74	$ 945.00	$0	21.6	21.6
18LED	Girls Rm	4	T 32 R F 4 (ELE)	F44ILL	112	0.4	sw	1000	448	4	T 50 R LED	RTLED50	50	0.2	sw	1,000	200	248	0.2	$ 43.74	$ 945.00	$0	21.6	21.6
4LED	Stairway	2	2B 34 R F 2 (u) (MAG)	FU2EE	72	0.1	breaker	3200	461	2	2T XX R LED	2RTLED	25	0.1	breaker	3,200	160	301	0.1	$ 36.22	$ 405.00	$0	11.2	11.2
18LED	Toilet rm	3	T 32 R F 4 (ELE)	F44ILL	112	0.3	sw	1000	336	3	T 50 R LED	RTLED50	50	0.2	sw	1,000	150	186	0.2	$ 32.80	$ 708.75	$0	21.6	21.6
18LED	Toilet rm	3	T 32 R F 4 (ELE)	F44ILL	112	0.3	sw	1000	336	3	T 50 R LED	RTLED50	50	0.2	sw	1,000	150	186	0.2	$ 32.80	$ 708.75	$0	21.6	21.6
262	front vestibule	18	B CF 36 W	CFT36/1	51	0.9	breaker	2280	2,093	18	B CF 36 W	CFT36/1	51	0.9	breaker	2,280	2,093	-	0.0	$ -	$ -	$0		#DIV/0!
261LED	Auditorium	48	PAR 38 SP	H100/1	100	4.8	sw	1820	8,736	48	EVO35/10	EVO35/10	39	1.9	sw	1,820	3,407	5,329	2.9	$ 744.47	$ 21,060.00	$0	28.3	28.3
261LED	Auditorium	15	PAR 38 SP	H100/1	100	1.5	sw	1820	2,730	15	EVO35/10	EVO35/10	39	0.6	sw	1,820	1,065	1,665	0.9	$ 232.65	$ 6,581.25	$0	28.3	28.3
1	Auditorium	30	SQ 13 W CF 2 (MAG)	CFQ13/2	31	0.9	sw	1820	1,693	30	SQ 13 W CF 2 (MAG)	CFQ13/2	31	0.9	sw	1,820	1,693	-	0.0	$ -	$ -	$0		#DIV/0!
18LED	Stage	16	T 32 R F 4 (ELE)	F44ILL	112	1.8	sw	1820	3,261	16	T 50 R LED	RTLED50	50	0.8	sw	1,820	1,456	1,805	1.0	$ 252.23	$ 3,780.00	$0	15.0	15.0
35LED	Music classroom 202	18	T 32 R F 3 (ELE)	F43ILL/2	90	1.6	sw	2400	3,888	18	T 38 R LED	RTLED38	38	0.7	sw	2,400	1,642	2,246	0.9	$ 289.56	$ 4,252.50	$0	14.7	14.7
35LED	Music classroom 201	20	T 32 R F 3 (ELE)	F43ILL/2	90	1.8	sw	2400	4,320	20	T 38 R LED	RTLED38	38	0.8	sw	2,400	1,824	2,496	1.0	$ 321.73	$ 4,725.00	$0	14.7	14.7
18LED	Storage	4	T 32 R F 4 (ELE)	F44ILL	112	0.4	sw	500	224	4	T 50 R LED	RTLED50	50	0.2	sw	500	100	124	0.2	$ 31.96	$ 945.00	$0	29.6	29.6
35LED	Corridor	10	T 32 R F 3 (ELE)	F43ILL/2	90	0.9	breaker	2280	2,052	10	T 38 R LED	RTLED38	38	0.4	breaker	2,280	866	1,186	0.5	$ 154.94	$ 2,362.50	$0	15.2	15.2
9LED	Old Gymnasium	32	High Bay MH 200 35 Feet High	MH200/1	232	7.4	sw	2912	21,619	32	FXLED78	FXLED78/1	78	2.5	sw	2,912	7,268	14,350	4.9	$ 1,764.22	$ 27,014.26	$4,800	15.3	12.6
40LED	Old Girls Locker Rm	28	T 32 R F 2 (ELE)	F42LL	60	1.7	sw	2800	4,704	28	T 38 R LED	RTLED38	38	1.1	sw	2,800	2,979	1,725	0.6	$ 213.97	$ 6,615.00	$0	30.9	30.9
40LED	Old Boys Locker Rm	32	T 32 R F 2 (ELE)	F42LL	60	1.9	sw	2800	5,376	32	T 38 R LED	RTLED38	38	1.2	sw	2,800	3,405	1,971	0.7	$ 244.54	$ 7,560.00	$0	30.9	30.9
40LED	New Girls Locker rm	20	T 32 R F 2 (ELE)	F42LL	60	1.2	sw	2800	3,360	20	T 38 R LED	RTLED38	38	0.8	sw	2,800	2,128	1,232	0.4	$ 152.84	$ 4,725.00	$0	30.9	30.9
40LED	New Boys Locker rm	20	T 32 R F 2 (ELE)	F42LL	60	1.2	sw	2800	3,360	20	T 38 R LED	RTLED38	38	0.8	sw	2,800	2,128	1,232	0.4	$ 152.84	$ 4,725.00	$0	30.9	30.9
40LED	Training Rm	8	T 32 R F 2 (ELE)	F42LL	60	0.5	sw	2800	1,344	8	T 38 R LED	RTLED38	38	0.3	sw	2,800	851	493	0.2	$ 61.14	$ 1,890.00	$0	30.9	30.9
24LED	Corridor	36	1B 32 P F 2 (ELE)	F42LL	60	2.2	breaker	2280	4,925	36	4 ft LED Tube	200732x2	30	1.1	breaker	2,280	2,462	2,462	1.1	$ 321.80	$ 5,890.60	$0	18.3	18.3
1	Vestibules	12	SQ 13 W CF 2 (MAG)	CFQ13/2	31	0.4	breaker	2280	848	12	SQ 13 W CF 2 (MAG)	CFQ13/2	31	0.4	breaker	2,280	848	-	0.0	$ -	$ -	$0		#DIV/0!
40LED	Gym storage	4	T 32 R F 2 (ELE)	F42LL	60	0.2	sw	500	120	4	T 38 R LED	RTLED38	38	0.2	sw	500	76	44	0.1	$ 11.34	$ 945.00	$0	83.3	83.3
20LED	Boys Rm	6	S 32 C F 1 (ELE)	F41LL	32	0.2	sw	1000	192	6	4 ft LED Tube	200732x1	15	0.1	sw	1,000	90	102	0.1	$ 17.99	$ 490.05	$0	27.2	27.2
20LED	Girls Rm	6	S 32 C F 1 (ELE)	F41LL	32	0.2	sw	1000	192	6	4 ft LED Tube	200732x1	15	0.1	sw	1,000	90	102	0.1	$ 17.99	$ 490.05	$0	27.2	27.2
35LED	Principals office	4	T 32 R F 3 (ELE)	F43ILL/2	90	0.4	sw	2400	864	4	T 38 R LED	RTLED38	38	0.2	sw	2,400	365	499	0.2	$ 64.35	$ 945.00	$0	14.7	14.7
35LED	Asst principals office	4	T 32 R F 3 (ELE)	F43ILL/2	90	0.4	sw	2400	864	4	T 38 R LED	RTLED38	38	0.2	sw	2,400	365	499	0.2	$ 64.35	$ 945.00	$0	14.7	14.7
35LED	Conference Rm	3	T 32 R F 3 (ELE)	F43ILL/2	90	0.3	sw	1200	324	3	T 38 R LED	RTLED38	38	0.1	sw	1,200	137	187	0.2	$ 30.48	$ 708.75	$0	23.3	23.3
4LED	Stairway	2	2B 34 R F 2 (u) (MAG)	FU2EE	72	0.1	breaker	3200	461	2	2T XX R LED	2RTLED	25	0.1	breaker	3,200	160	301	0.1	$ 36.22	$ 405.00	$0	11.2	11.2
24LED	Health classroom	16	1B 32 P F 2 (ELE)	F42LL	60	1.0	sw	2400	2,304	16	4 ft LED Tube	200732x2	30	0.5	sw	2,400	1,152	1,152	0.5	$ 148.49	$ 2,613.60	$0	17.6	17.6
24LED	Team Rm	14	1B 32 P F 2 (ELE)	F42LL	60	0.8	sw	2800	2,352	14	4 ft LED Tube	200732x2	30	0.4	sw	2,800	1,176	1,176	0.4	$ 145.89	$ 2,286.90	$0	15.7	15.7
18LED	Storage	3	T 32 R F 4 (ELE)	F44ILL	112	0.3	sw	500	168	3	T 50 R LED	RTLED50	50	0.2	sw	500	75	93	0.2	$ 23.97	$ 708.75	$0	29.6	29.6
40LED	Trainers Rm	4	T 32 R F 2 (ELE)	F42LL	60	0.2	sw	2800	672	4	T 38 R LED	RTLED38	38	0.2	sw	2,800	426	246	0.1	$ 30.57	$ 945.00	$0	30.9	30.9
18LED	Storage	3	T 32 R F 4 (ELE)	F44ILL	112	0.3	sw	500	168	3	T 50 R LED	RTLED50	50	0.2	sw	500	75	93	0.2	$ 23.97	$ 708.75	$0	29.6	29.6
117	Exterior	12	CF 23	CFS23/1	23	0.3	breaker	4368	1,206	12	CF 23	CFS23/1	23	0.3	breaker	4,368	1,206	-	0.0	$ -	$ -	$0		#DIV/0!
227LED	Exterior	13	70 W MH Wall Pack	MH70/1	95	1.2	breaker	4368	5,394	13	FXLED18	FXLED18/1	18	0.2	breaker	4,368	1,022	4,372	1.0	$ 496.82	$ 5,501.93	$1,300	11.1	8.5
142LED	Exterior	3	MH 100	MH100/1	128	0.4	breaker	4368	1,677	3	FXLED39	FXLED39/1	39	0.1	breaker	4,368	511	1,166	0.3	$ 132.52	$ 1,668.60	$300	12.6	10.3
	Total	1,896				180.7			425,079	1,896			7,048	78.1				183,008	242,071	102.6	$31,345	$454,693	$10,000		
																		Demand Savings			102.6	$8,348			
																		kWh Savings			242,071	$22,997			
																		Total savings				$31,345		14.5	14.2

Energy Audit of Millburn High School
CHA Project No. 28330
ECM-L2 Install Occupancy Sensors

		EXISTING CONDITIONS								RETROFIT CONDITIONS								COST & SAVINGS ANALYSIS						
	Area Description	No. of Fixtures	Standard Fixture Code	Fixture Code	Watts per Fixture	kW/Space	Exist Control	Annual Hours	Annual kWh	Number of Fixtures	Standard Fixture Code	Fixture Code	Watts per Fixture	kW/Space	Retrofit Control	Annual Hours	Annual kWh	Annual kWh Saved	Annual kW Saved	Annual $ Saved	Retrofit Cost	NJ Smart Start Lighting Incentive	Simple Payback With Out Incentive	Simple Payback
Field Code	Unique description of the location - Room number/Room name: Floor number (if applicable)	No. of fixtures before the retrofit	Lighting Fixture Code	Code from Table of Standard Fixture Wattages	Value from Table of Standard Fixture Wattages	(Watts/Fixt) * (Fixt No.)	Pre-inst. control device	Estimated annual hours for the usage group	(kW/space) * (Annual Hours)	No. of fixtures after the retrofit	"Lighting Fixture Code" Example 2T 40 R F(U) = 2'x2' Troff 40 w Recess. Floor 2 lamps U shape	Code from Table of Standard Fixture Wattages	Value from Table of Standard Fixture Wattages	(Watts/Fixt) * (Number of Fixtures)	Retrofit control device	Estimated annual hours for the usage group	(kW/space) * (Annual Hours)	(Original Annual kWh) - (Retrofit Annual kWh)	(Original Annual kW) - (Retrofit Annual kW)	(kW Saved) * ($/kWh)	Cost for renovations to lighting system		Length of time for renovations cost to be recovered	Length of time for renovations cost to be recovered
35LED	Rm 375 Fine Arts	16	T 32 R F 3 (ELE)	F43ILL/2	90	1.4	occ	2400	3,456.0	16	T 32 R F 3 (ELE)	F43ILL/2	90	1.4	C-OCC	1680	2,419.2	1,036.8	0.0	$98.50	$270.00	$35.00	2.7	2.4
35LED	Rm 376	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	occ	2400	2,592.0	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	C-OCC	1680	1,814.4	777.6	0.0	$73.87	$270.00	$35.00	3.7	3.2
4LED	Stairway	2	2B 34 R F 2 (u) (MAG)	FU2EE	72	0.1	breaker	3200	460.8	2	2B 34 R F 2 (u) (MAG)	FU2EE	72	0.1	none	3200	460.8	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
35LED	Faculty Toilet Mens	1	T 32 R F 3 (ELE)	F43ILL/2	90	0.1	occ	1000	90.0	1	T 32 R F 3 (ELE)	F43ILL/2	90	0.1	none	1000	90.0	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
35LED	Faculty Toilet Womens	1	T 32 R F 3 (ELE)	F43ILL/2	90	0.1	occ	1000	90.0	1	T 32 R F 3 (ELE)	F43ILL/2	90	0.1	none	1000	90.0	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
35LED	Corridor	13	T 32 R F 3 (ELE)	F43ILL/2	90	1.2	breaker	2280	2,667.6	13	T 32 R F 3 (ELE)	F43ILL/2	90	1.2	none	2280	2,667.6	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
35LED	Rm 374	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	occ	2400	2,592.0	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	occ	1680	1,814.4	777.6	0.0	$73.87	$128.25	$20.00	1.7	1.5
35LED	Rm 373	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	occ	2400	2,592.0	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	occ	1680	1,814.4	777.6	0.0	$73.87	$128.25	$20.00	1.7	1.5
35LED	Rm 372	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	occ	2400	2,592.0	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	occ	1680	1,814.4	777.6	0.0	$73.87	$128.25	$20.00	1.7	1.5
35LED	Rm 371	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	occ	2400	2,592.0	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	occ	1680	1,814.4	777.6	0.0	$73.87	$128.25	$20.00	1.7	1.5
35LED	Rm 370	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	occ	2400	2,592.0	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	occ	1680	1,814.4	777.6	0.0	$73.87	$128.25	$20.00	1.7	1.5
35LED	Corridor	2	T 32 R F 3 (ELE)	F43ILL/2	90	0.2	breaker	2280	410.4	2	T 32 R F 3 (ELE)	F43ILL/2	90	0.2	none	2280	410.4	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
121	Corridor	2	W 34 P F 4	F44EE	144	0.3	breaker	2280	656.6	2	W 34 P F 4	F44EE	144	0.3	none	2280	656.6	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
121	corridor	2	W 34 P F 4	F44EE	144	0.3	breaker	2280	656.6	2	W 34 P F 4	F44EE	144	0.3	none	2280	656.6	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
35LED	Boys toilet	3	T 32 R F 3 (ELE)	F43ILL/2	90	0.3	occ	1000	270.0	3	T 32 R F 3 (ELE)	F43ILL/2	90	0.3	none	1000	270.0	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
35LED	Girls toilet	3	T 32 R F 3 (ELE)	F43ILL/2	90	0.3	occ	1000	270.0	3	T 32 R F 3 (ELE)	F43ILL/2	90	0.3	none	1000	270.0	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
35LED	Custodial closet	1	T 32 R F 3 (ELE)	F43ILL/2	90	0.1	sw	500	45.0	1	T 32 R F 3 (ELE)	F43ILL/2	90	0.1	none	500	45.0	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
35LED	Corridor	6	T 32 R F 3 (ELE)	F43ILL/2	90	0.5	breaker	2280	1,231.2	6	T 32 R F 3 (ELE)	F43ILL/2	90	0.5	none	2280	1,231.2	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
35LED	Rm 275	16	T 32 R F 3 (ELE)	F43ILL/2	90	1.4	occ	2400	3,456.0	16	T 32 R F 3 (ELE)	F43ILL/2	90	1.4	occ	1680	2,419.2	1,036.8	0.0	$98.50	$128.25	$20.00	1.3	1.1
35LED	Rm 276	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	occ	2400	2,592.0	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	occ	1680	1,814.4	777.6	0.0	$73.87	$128.25	$20.00	1.7	1.5
4LED	Stairway	2	2B 34 R F 2 (u) (MAG)	FU2EE	72	0.1	breaker	3200	460.8	2	2B 34 R F 2 (u) (MAG)	FU2EE	72	0.1	none	3200	460.8	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
35LED	Faculty Toilet Mens	1	T 32 R F 3 (ELE)	F43ILL/2	90	0.1	occ	1000	90.0	1	T 32 R F 3 (ELE)	F43ILL/2	90	0.1	none	1000	90.0	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
35LED	Faculty Toilet Womens	1	T 32 R F 3 (ELE)	F43ILL/2	90	0.1	occ	1000	90.0	1	T 32 R F 3 (ELE)	F43ILL/2	90	0.1	none	1000	90.0	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
35LED	Corridor	13	T 32 R F 3 (ELE)	F43ILL/2	90	1.2	breaker	2280	2,667.6	13	T 32 R F 3 (ELE)	F43ILL/2	90	1.2	none	2280	2,667.6	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
35LED	Rm 374	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	occ	2400	2,592.0	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	occ	1680	1,814.4	777.6	0.0	$73.87	$128.25	$20.00	1.7	1.5
35LED	Rm 273	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	occ	2400	2,592.0	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	occ	1680	1,814.4	777.6	0.0	$73.87	$128.25	$20.00	1.7	1.5
35LED	Rm 272	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	occ	2400	2,592.0	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	occ	1680	1,814.4	777.6	0.0	$73.87	$128.25	$20.00	1.7	1.5
35LED	Rm 271	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	occ	2400	2,592.0	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	occ	1680	1,814.4	777.6	0.0	$73.87	$128.25	$20.00	1.7	1.5
35LED	Rm 270	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	occ	2400	2,592.0	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	occ	1680	1,814.4	777.6	0.0	$73.87	$128.25	$20.00	1.7	1.5
35LED	Corridor	2	T 32 R F 3 (ELE)	F43ILL/2	90	0.2	breaker	2280	410.4	2	T 32 R F 3 (ELE)	F43ILL/2	90	0.2	none	2280	410.4	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
121	Corridor	2	W 34 P F 4	F44EE	144	0.3	breaker	2280	656.6	2	W 34 P F 4	F44EE	144	0.3	none	2280	656.6	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
121	corridor	2	W 34 P F 4	F44EE	144	0.3	breaker	2280	656.6	2	W 34 P F 4	F44EE	144	0.3	none	2280	656.6	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
35LED	Boys toilet	3	T 32 R F 3 (ELE)	F43ILL/2	90	0.3	occ	1000	270.0	3	T 32 R F 3 (ELE)	F43ILL/2	90	0.3	none	1000	270.0	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
35LED	Girls toilet	3	T 32 R F 3 (ELE)	F43ILL/2	90	0.3	occ	1000	270.0	3	T 32 R F 3 (ELE)	F43ILL/2	90	0.3	none	1000	270.0	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
35LED	Custodial closet	1	T 32 R F 3 (ELE)	F43ILL/2	90	0.1	sw	500	45.0	1	T 32 R F 3 (ELE)	F43ILL/2	90	0.1	none	500	45.0	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
35LED	Corridor	6	T 32 R F 3 (ELE)	F43ILL/2	90	0.5	breaker	2280	1,231.2	6	T 32 R F 3 (ELE)	F43ILL/2	90	0.5	none	2280	1,231.2	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
35LED	Rm 275	16	T 32 R F 3 (ELE)	F43ILL/2	90	1.4	occ	2400	3,456.0	16	T 32 R F 3 (ELE)	F43ILL/2	90	1.4	occ	1680	2,419.2	1,036.8	0.0	$98.50	$128.25	$20.00	1.3	1.1
35LED	Rm 276	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	occ	2400	2,592.0	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	occ	1680	1,814.4	777.6	0.0	$73.87	$128.25	$20.00	1.7	1.5
4LED	Stairway	2	2B 34 R F 2 (u) (MAG)	FU2EE	72	0.1	breaker	3200	460.8	2	2B 34 R F 2 (u) (MAG)	FU2EE	72	0.1	none	3200	460.8	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
35LED	Faculty Toilet Mens	1	T 32 R F 3 (ELE)	F43ILL/2	90	0.1	occ	1000	90.0	1	T 32 R F 3 (ELE)	F43ILL/2	90	0.1	none	1000	90.0	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
35LED	Faculty Toilet Womens	1	T 32 R F 3 (ELE)	F43ILL/2	90	0.1	occ	1000	90.0	1	T 32 R F 3 (ELE)	F43ILL/2	90	0.1	none	1000	90.0	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
35LED	Corridor	13	T 32 R F 3 (ELE)	F43ILL/2	90	1.2	breaker	2280	2,667.6	13	T 32 R F 3 (ELE)	F43ILL/2	90	1.2	none	2280	2,667.6	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
35LED	Rm 374	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	occ	2400	2,592.0	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	occ	1680	1,814.4	777.6	0.0	$73.87	$128.25	$20.00	1.7	1.5
35LED	Rm 273	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	occ	2400	2,592.0	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	occ	1680	1,814.4	777.6	0.0	$73.87	$128.25	$20.00	1.7	1.5
35LED	Rm 272	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	occ	2400	2,592.0	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	occ	1680	1,814.4	777.6	0.0	$73.87	$128.25	$20.00	1.7	1.5
35LED	Rm 271	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	occ	2400	2,592.0	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	occ	1680	1,814.4	777.6	0.0	$73.87	$128.25	$20.00	1.7	1.5
35LED	Rm 270	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	occ	2400	2,592.0	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	occ	1680	1,814.4	777.6	0.0	$73.87	$128.25	$20.00	1.7	1.5
35LED	Corridor	2	T 32 R F 3 (ELE)	F43ILL/2	90	0.2	breaker	2280	410.4	2	T 32 R F 3 (ELE)	F43ILL/2	90	0.2	none	2280	410.4	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
121	Corridor	2	W 34 P F 4	F44EE	144	0.3	breaker	2280	656.6	2	W 34 P F 4	F44EE	144	0.3	none	2280	656.6	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
121	corridor	2	W 34 P F 4	F44EE	144	0.3	breaker	2280	656.6	2	W 34 P F 4	F44EE	144	0.3	none	2280	656.6	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
35LED	Boys toilet	3	T 32 R F 3 (ELE)	F43ILL/2	90	0.3	occ	1000	270.0	3	T 32 R F 3 (ELE)	F43ILL/2	90	0.3	none	1000	270.0	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
35LED	Girls toilet	3	T 32 R F 3 (ELE)	F43ILL/2	90	0.3	occ	1000	270.0	3	T 32 R F 3 (ELE)	F43ILL/2	90	0.3	none	1000	270.0	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
35LED	Custodial closet	1	T 32 R F 3 (ELE)	F43ILL/2	90	0.1	sw	500	45.0	1	T 32 R F 3 (ELE)	F43ILL/2	90	0.1	none	500	45.0	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
35LED	Corridor	6	T 32 R F 3 (ELE)	F43ILL/2	90	0.5	breaker	2280	1,231.2	6	T 32 R F 3 (ELE)	F43ILL/2	90	0.5	none	2280	1,231.2	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
6LED	classroom 140	36	T 34 R F 4 (MAG)	F44EE	144	5.2	sw	2400	12,441.6	36	T 34 R F 4 (MAG)	F44EE	144	5.2	occ	1680	8,709.1	3,732.5	0.0	$354.59	$128.25	$20.00	0.4	0.3
6LED	classroom 142	24	T 34 R F 4 (MAG)	F44EE	144	3.5	sw	2400	8,294.4	24	T 34 R F 4 (MAG)	F44EE	144	3.5	occ	1680	5,806.1	2,488.3	0.0	$236.39	$128.25	$20.00	0.5	0.5
6LED	storage	4	T 34 R F 4 (MAG)	F44EE	144	0.6	sw	500	288.0	4	T 34 R F 4 (MAG)	F44EE	144	0.6	none	500	288.0	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
35LED	classroom 141	10	T 32 R F 3 (ELE)	F43ILL/2	90	0.9	sw	2400	2,160.0	10	T 32 R F 3 (ELE)	F43ILL/2	90	0.9	occ	1680	1,512.0	648.0	0.0	$61.56	$128.25	$20.00	2.1	1.8
35LED	classroom 143	18	T 32 R F 3 (ELE)	F43ILL/2	90	1.6	sw	2400	3,888.0	18	T 32 R F 3 (ELE)	F43ILL/2	90	1.6	occ	1680	2,721.6	1,166.4	0.0	$110.81	$128.25	$20.00	1.2	1.0
41LED	Corridor	10	1B 40 R F 2 (MAG)	F42SS	94	0.9	breaker	2280	2,143.2	10	1B 40 R F 2 (MAG)	F42SS	94	0.9	none	2280	2,143.2	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
6LED	Dance Gym	36	T 34 R F 4 (MAG)	F44EE	144	5.2	sw	2400	12,441.6	36	T 34 R F 4 (MAG)	F44EE	144	5.2	none	2400	12,441.6	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
41LED	Dance Gym	6	1B 40 R F 2 (MAG)	F42SS	94	0.6	sw	2400	1,353.6	6	1B 40 R F 2 (MAG)	F42SS	94	0.6	none	2400	1,353.6	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
40LED	Corridor	9	T 32 R F 2 (ELE)	F42LL	60	0.5	breaker	2280	1,231.2	9	T 32 R F 2 (ELE)	F42LL	60	0.5	none	2280	1,231.2	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
18LED	Rm 137	12	T 32 R F 4 (ELE)	F44ILL	112	1.3	breaker	2400	3,225.6	12	T 32 R F 4 (ELE)	F44ILL	112	1.3	occ	1680	2,257.9	967.7	0.0	$91.93	$128.25	$20.00	1.4	1.2
18LED	RM 136	12	T 32 R F 4 (ELE)	F44ILL	112	1.3	sw	2400	3,225.6	12	T 32 R F 4 (ELE)	F44ILL	112	1.3	occ	1680	2,257.9	967.7	0.0	$91.93	$128.25	$20.00	1.4	1.2
18LED	Rm 135	12	T 32 R F 4 (ELE)	F44ILL	112	1.3	sw	2400	3,225.6	12	T 32 R F 4 (ELE)	F44ILL	112	1.3	occ	1680	2,257.9	967.7	0.0	$91.93	$128.25	$20.00	1.4	1.2
18LED	Rm 134	12	T 32 R F 4 (ELE)	F44ILL	112	1.3	sw	2400	3,225.6	12	T 32 R F 4 (ELE)	F44ILL	112	1.3	occ	1680	2,257.9	967.7	0.0	$91.93	$128.25	$20.00	1.4	1.2
18LED	Rm 133	12	T 32 R F 4 (ELE)	F44ILL	112	1.3	sw	2400	3,225.6	12	T 32 R F 4 (ELE)	F44ILL	112	1.3	occ	1680	2,257.9	967.7	0.0	$91.93	$128.25	$20.00	1.4	1.2
18LED	Rm 132	12	T 32 R F 4 (ELE)	F44ILL	112	1.3	sw	2400	3,225.6	12	T 32 R F 4 (ELE)	F44ILL	112	1.3	occ	1680	2,257.9	967.7	0.0	$91.93	$128.25	$20.00	1.4	1.2
18LED	Rm 131	12	T 32 R F 4 (ELE)	F44ILL	112	1.3	sw	2400	3,225.6	12	T 32 R F 4 (ELE)	F44ILL	112	1.3	occ	1680	2,257.9	967.7	0.0	$91.93	$128.25	$20.00	1.4	1.2
18LED	Rm 130	12	T 32 R F 4 (ELE)	F44ILL	112	1.3	sw	2400	3,225.6	12	T 32 R F 4 (ELE)	F44ILL	112	1.3	occ	1680	2,257.9	967.7	0.0	$91.93	$128.25	$20.00	1.4	1.2
18LED	Rm 129	12	T 32 R F 4 (ELE)	F44ILL	112	1.3	sw	2400	3,225.6	12	T 32 R F 4 (ELE)	F44ILL	112	1.3	occ	1680	2,257.9	967.7	0.0	$91.93	$128.25	$20.00	1.4	1.2
18LED	Rm 232	12	T 32 R F 4 (ELE)	F44ILL	112	1.3	sw	2400	3,225.6	12	T 32 R F 4 (ELE)	F44ILL	112	1.3	occ	1680	2,257.9	967.7	0.0	$91.93	$128.25	$20.00	1.4	1.2
18LED	Rm 233	12	T 32 R F 4 (ELE)	F44ILL	112	1.3	sw	2400	3,225.6	12	T 32 R F 4 (ELE)	F44ILL	112	1.3	occ	1680	2,257.9	967.7	0.0	$91.93	$128.25	$20.00	1.4	1.2
18LED	Rm 234	12	T 32 R F 4 (ELE)	F44ILL	112	1.3	sw	2400	3,225.6	12	T 32 R F 4 (ELE)	F44ILL	112	1.3	occ	1680	2,257.9	967.7	0.0	$91.93	$128.25	$20.00	1.4	1.2
18LED	Rm 235	12	T 32 R F 4 (ELE)	F44ILL	112	1.3	sw	2400	3,225.6	12	T 32 R F 4 (ELE)	F44ILL	112	1.3	occ	1680	2,257.9	967.7	0.0	$91.93	$128.25	$20.00	1.4	1.2
18LED	Rm 236	12	T 32 R F 4 (ELE)	F44ILL	112	1.3	sw	2400	3,225.6	12	T 32 R F 4 (ELE)	F44ILL	112	1.3	occ	1680	2,257.9	967.7	0.0	$91.93	$128.25	$20.00	1.4	1.2
18LED	Rm 237	12	T 32 R F 4 (ELE)	F44ILL	112	1.3	sw	2400	3,225.6	12	T 32 R F 4 (ELE)	F44ILL	112	1.3	occ	1680	2,257.9	967.7	0.0	$91.93	$128.25	$20.00	1.4	1.2
18LED	Rm 238	12	T 32 R F 4 (ELE)	F44ILL	112	1.3	sw	2400	3,225.6	12	T 32 R F 4 (ELE)	F44ILL	112	1.3	occ	1680	2,257.9	967.7	0.0	$91.93	$128.25	$20.00	1.4	1.2
18LED	Rm 239	12	T 32 R F 4 (ELE)	F44ILL	112	1.3	sw	2400	3,225.6	12	T 32 R F 4 (ELE)	F44ILL	112	1.3	occ	1680	2,257.9	967.7	0.0	$91.93	$128.25	$20.00	1.4	1.2
18LED	Rm 240	12	T 32 R F 4 (ELE)	F44ILL	112	1.3	sw	2400	3,225.6	12	T 32 R F 4 (ELE)	F44ILL	112	1.3	occ	1680	2,257.9	967.7	0.0	$91.93	$128.25	$20.00	1.4	1.2
18LED	Rm 241	12	T 32 R F 4 (ELE)	F44ILL	112	1.3	sw	2400	3,225.6	12	T 32 R F 4 (ELE)	F44ILL	112	1.3	occ	1680	2,257.9	967.7	0.0	$91.93	$128.25	$20.00	1.4	1.2
18LED	Rm 242	12	T 32 R F 4 (ELE)	F44ILL	112	1.3	sw	2400	3,225.6	12	T 32 R F 4 (ELE)	F44ILL	112	1.3	occ	1680	2,257.9	967.7	0.0	$91.93	$128.25	$20.00	1.4	1.2
18LED	Rm 243	12	T 32 R F 4 (ELE)	F44ILL	112	1.3	sw	2400	3,225.6	12	T 32 R F 4 (ELE)	F44ILL	112	1.3	occ	1680	2,257.9	967.7	0.0	$91.93	$128.25	$20.00	1.4	1.2
18LED	Boys toilet	3	T 32 R F 4 (ELE)	F44ILL	112	0.3	sw	1000	336.0	3	T 32 R F 4 (ELE)	F44ILL	112	0.3	none	1000	336.0	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
18LED	Girls toilet	3	T 32 R F 4 (ELE)	F44ILL	112	0.3	sw	1000	336.0	3	T 32 R F 4 (ELE)	F44ILL	112	0.3	none	1000	336.0	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
18LED	Boys toilet	3	T 32 R F 4 (ELE)	F44ILL	112	0.3	sw	1000	336.0	3	T 32 R F 4 (ELE)	F44ILL	112	0.3	none	1000	336.0	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
18LED	Girls toilet	3	T 32 R F 4 (ELE)	F44ILL	112	0.3	sw	1000	336.0	3	T 32 R F 4 (ELE)	F44ILL	112	0.3	none	1000	336.0	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
41LED	Corridor	12	1B 40 R F 2 (MAG)	F42SS	94	1.1	breaker	2280	2,571.8	12	1B 40 R F 2 (MAG)	F42SS	94	1.1	none	2280	2,571.8	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
41LED	Corridor	14	1B 40 R F 2 (MAG)	F42SS	94	1.3	breaker	2280	3,000.5	14	1B 40 R F 2 (MAG)	F42SS	94	1.3	none	2280	3,000.5	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
4LED	Stairway	3	2B 34 R F 2 (u) (MAG)	FU2EE	72	0.2	breaker	3200	691.2	3	2B 34 R F 2 (u) (MAG)	FU2EE	72	0.2	none	3200	691.2	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
4LED	Stairway	3	2B 34 R F 2 (u) (MAG)	FU2EE	72	0.2	breaker	3200	691.2	3	2B 34 R F 2 (u) (MAG)	FU2EE	72	0.2	none	3200	691.2	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
18LED	classroom 122	12	T 32 R F 4 (ELE)	F44ILL	112	1.3	sw	2400	3,225.6	12	T 32 R F 4 (ELE)	F44ILL	112	1.3	occ	1680	2,257.9	967.7	0.0	$91.93	$128.25	$20.00	1.4	1.2
18LED	classroom 123	16	T 32 R F 4 (ELE)	F44ILL	112	1.8	sw	2400	4,300.8	16	T 32 R F 4 (ELE)	F44ILL	112	1.8	occ	1680	3,010.6	1,290.2	0.0	$122.57	$128.25	$20.00	1.0	0.9
18LED	classroom 124	16	T 32 R F 4 (ELE)	F44ILL	112	1.8	sw	2400	4,300.8	16	T 32 R F 4 (ELE)	F44ILL	112	1.8	occ	1680	3,010.6	1,290.2	0.0	$122.57	$128.25	$20.00	1.0	0.9
18LED	classroom 125	12	T 32 R F 4 (ELE)	F44ILL	112	1.3	sw	2400	3,225.6	12	T 32 R F 4 (ELE)	F44ILL	112	1.3	occ	1680	2,257.9	967.7	0.0	$91.93	$128.25	$20.00	1.4	1.2
18LED	classroom 126	12	T 32 R F 4 (ELE)	F44ILL	112	1.3	sw	2400	3,225.6	12	T 32 R F 4 (ELE)	F44ILL	112	1.3	occ	1680	2,257.9	967.7	0.0	$91.93	$128.25	$20.00	1.4	1.2
18LED	Rm 226	12	T 32 R F 4 (ELE)	F44ILL	112	1.3	sw	2400	3,225.6	12	T 32 R F 4 (ELE)	F44ILL	112	1.3	occ	1680	2,257.9	967.7	0.0	$91.93	$128.25	$20.00	1.4	1.2
18LED	Rm 227	12	T 32 R F 4 (ELE)	F44ILL	112	1.3	sw	2400	3,225.6	12	T 32 R F 4 (ELE)	F44ILL	112	1.3	occ	1680	2,257.9	967.7	0.0	$91.93	$128.25	$20.00	1.4	1.2
18LED	Rm 228	12	T 32 R F 4 (ELE)	F44ILL	112	1.3	sw	2400	3,225.6	12	T 32 R F 4 (ELE)	F44ILL	112	1.3	occ	1680	2,257.9	967.7	0.0	$91.93	$128.25	$20.00	1.4	1.2
18LED	Rm 229	12	T 32 R F 4 (ELE)	F44ILL	112	1.3	sw	2400	3,225.6	12	T 32 R F 4 (ELE)	F44ILL	112	1.3	occ	1680	2,257.9	967.7	0.0	$91.93	$128.25	$20.00	1.4	1.2
18LED	Rm 230	12	T 32 R F 4 (ELE)	F44ILL	112	1.3	sw	2400	3,225.6	12	T 32 R F 4 (ELE)	F44ILL	112	1.3	occ	1680	2,257.9	967.7	0.0	$91.93	$128.25	$20.00	1.4	1.2
18LED	Rm 231	12	T 32 R F 4 (ELE)	F44ILL	112	1.3	sw	2400	3,225.6	12	T 32 R F 4 (ELE)	F44ILL	112	1.3	occ	1680	2,257.9	967.7	0.0	$91.93	$128.25	$20.00	1.4	1.2
9LED	New Gymnasium	24	High Bay MH 200 35 Feet High	MH200/1	232	5.6	sw	2912	16,214.0	24	High Bay MH 200 35 Feet High	MH200/1	232	5.6	none	2912	16,214.0	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
41LED	Corridor	15	1B 40 R F 2 (MAG)	F42SS	94	1.4	breaker	2280	3,214.8	15	1B 40 R F 2 (MAG)	F42SS	94	1.4	none	2280	3,214.8	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
35LED	classroom 115	9	T 32 R F 3 (ELE)	F43ILL/2	90	0.8	sw	2400	1,944.0	9	T 32 R F 3 (ELE)	F43ILL/2	90	0.8	occ	1680	1,360.8	583.2	0.0	$55.40	$128.25	$20.00	2.3	2.0
35LED	classroom 117	16	T 32 R F 3 (ELE)	F43ILL/2	90	1.4	sw	2400	3,456.0	16	T 32 R F 3 (ELE)	F43ILL/2	90	1.4	occ	1680	2,419.2	1,036.8	0.0	$98.50	$128.25	$20.00	1.3	1.1
35LED	classroom 118	16	T 32 R F 3 (ELE)	F43ILL/2	90	1.4	sw	2400	3,456.0	16	T 32 R F 3 (ELE)	F43ILL/2	90	1.4	occ	1680	2,419.2	1,036.8	0.0	$98.50	$128.25	$20.00	1.3	1.1
35LED	classroom 119	16	T 32 R F 3 (ELE)	F43ILL/2	90	1.4	sw	2400	3,456.0	16	T 32 R F 3 (ELE)	F43ILL/2	90	1.4	occ	1680	2,419.2	1,036.8	0.0	$98.50	$128.25	$20.00	1.3	1.1
35LED	classroom 121	16	T 32 R F 3 (ELE)	F43ILL/2	90	1.4	sw	2400	3,456.0	16	T 32 R F 3 (ELE)	F43ILL/2	90	1.4	occ	1680	2,419.2	1,036.8	0.0	$98.50	$128.25	$20.00	1.3	1.1
35LED	classroom 120	16	T 32 R F 3 (ELE)	F43ILL/2	90	1.4	sw	2400	3,456.0	16	T 32 R F 3 (ELE)	F43ILL/2	90	1.4	occ	1680	2,419.2	1,036.8	0.0	$98.50	$128.25	$20.00	1.3	1.1
6LED	storage	1	T 34 R F 4 (MAG)	F44EE	144	0.1	sw	500	72.0	1	T 34 R F 4 (MAG)	F44EE	144	0.1	none	500	72.0	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
35LED	office	2	T 32 R F 3 (ELE)	F43ILL/2	90	0.2	sw	2400	432.0	2	T 32 R F 3 (ELE)	F43ILL/2	90	0.2	occ	2000	360.0	72.0	0.0	$6.84	$128.25	$20.00	18.8	15.8
35LED	office	3	T 32 R F 3 (ELE)	F43ILL/2	90	0.3	sw	2400	648.0	3	T 32 R F 3 (ELE)	F43ILL/2	90	0.3	occ	2000	540.0	108.0	0.0	$10.26	$128.25	$20.00	12.5	10.6
35LED	office	2	T 32 R F 3 (ELE)	F43ILL/2	90	0.2	sw	2400	432.0	2	T 32 R F 3 (ELE)	F43ILL/2	90	0.2	occ	2000	360.0	72.0	0.0	$6.84	$128.25	$20.00	18.8	15.8
35LED	Cafeteria	64	T 32 R F 3 (ELE)	F43ILL/2	90	5.8	sw	1600	9,216.0	64	T 32 R F 3 (ELE)	F43ILL/2	90	5.8	none	1600	9,216.0	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
24LED	Weight Rm	24	1B 32 P F 2 (ELE)	F42LL	60	1.4	sw	2912	4,193.3	24	1B 32 P F 2 (ELE)	F42LL	60	1.4	none	2912	4,193.3	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
41LED	Media Center	48	1B 40 R F 2 (MAG)	F42SS	94	4.5	sw	2400	10,828.8	48	1B 40 R F 2 (MAG)	F42SS	94	4.5	occ	1680	7,580.2	3,248.6	0.0	$308.62	$128.25	$20.00	0.4	0.4
24LED	Boys Locker Rm	16	1B 32 P F 2 (ELE)	F42LL	60	1.0	sw	2800	2,688.0	16	1B 32 P F 2 (ELE)	F42LL	60	1.0	occ	2400	2,304.0	384.0	0.0	$36.48	$128.25	$20.00	3.5	3.0
24LED	Girls Locker Rm	16	1B 32 P F 2 (ELE)	F42LL	60	1.0	sw	2800	2,688.0	16	1B 32 P F 2 (ELE)	F42LL	60	1.0	occ	2400	2,304.0	384.0	0.0	$36.48	$128.25	$20.00	3.5	3.0
35LED	Music 101	18	T 32 R F 3 (ELE)	F43ILL/2	90	1.6	occ	2400	3,888.0	18	T 32 R F 3 (ELE)	F43ILL/2	90	1.6	none	2400	3,888.0	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
35LED	Music 100	22	T 32 R F 3 (ELE)	F43ILL/2	90	2.0	occ	2400	4,752.0	22	T 32 R F 3 (ELE)	F43ILL/2	90	2.0	none	2400	4,752.0	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!

Energy Audit of Millburn High School

CHA Project No. 28330

ECM-L2 Install Occupancy Sensors

		EXISTING CONDITIONS							RETROFIT CONDITIONS								COST & SAVINGS ANALYSIS						
	Area Description	No. of Fixtures	Standard Fixture Code	Fixture Code	Watts per Fixture	kW/Space	Exist Control	Annual Hours	Annual kWh	Number of Fixtures	Standard Fixture Code	Fixture Code	Watts per Fixture	kW/Space	Retrofit Control	Annual Hours	Annual kWh	Annual kWh Saved	Annual kW Saved	Annual $ Saved	Retrofit Cost	NJ Smart Start Lighting Incentive	Simple Payback With Out Incentive	Simple Payback
Field Code	Unique description of the location - Room number/Room name: Floor number (if applicable)	No. of fixtures before the retrofit	Lighting Fixture Code	Code from Table of Standard Fixture Wattages	Value from Table of Standard Fixture Wattages	(Watts/Fixt) * (Fixt No.)	Pre-inst. control device	Estimated annual hours for the usage group	(kW/space) * (Annual Hours)	No. of fixtures after the retrofit	"Lighting Fixture Code" Example 2T 40 R F(U) = 2'x2' Troff 40 w Recess. Floor 2 lamps U shape	Code from Table of Standard Fixture Wattages	Value from Table of Standard Fixture Wattages	(Watts/Fixt) * (Number of Fixtures)	Retrofit control device	Estimated annual hours for the usage group	(kW/space) * (Annual Hours)	(Original Annual kWh) - (Retrofit Annual kWh)	(Original Annual kW) - (Retrofit Annual kW)	($/kWh) * (kW Saved)	Cost for renovations to lighting system		Length of time for renovations cost to be recovered	Length of time for renovations cost to be recovered
35LED	Classroom 102	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	occ	2400	2,592.0	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	none	2400	2,592.0	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
35LED	Classroom 103	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	occ	2400	2,592.0	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	none	2400	2,592.0	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
24LED	Corridor	17	1B 32 P F 2 (ELE)	F42LL	60	1.0	breaker	2280	2,325.6	17	1B 32 P F 2 (ELE)	F42LL	60	1.0	none	2280	2,325.6	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
24LED	classroom 208	14	1B 32 P F 2 (ELE)	F42LL	60	0.8	sw	2400	2,016.0	14	1B 32 P F 2 (ELE)	F42LL	60	0.8	occ	1680	1,411.2	604.8	0.0	$57.46	$128.25	$20.00	2.2	1.9
24LED	classroom 209	14	1B 32 P F 2 (ELE)	F42LL	60	0.8	sw	2400	2,016.0	14	1B 32 P F 2 (ELE)	F42LL	60	0.8	occ	1680	1,411.2	604.8	0.0	$57.46	$128.25	$20.00	2.2	1.9
24LED	classroom 210	14	1B 32 P F 2 (ELE)	F42LL	60	0.8	sw	2400	2,016.0	14	1B 32 P F 2 (ELE)	F42LL	60	0.8	occ	1680	1,411.2	604.8	0.0	$57.46	$128.25	$20.00	2.2	1.9
24LED	classroom 211	14	1B 32 P F 2 (ELE)	F42LL	60	0.8	sw	2400	2,016.0	14	1B 32 P F 2 (ELE)	F42LL	60	0.8	occ	1680	1,411.2	604.8	0.0	$57.46	$128.25	$20.00	2.2	1.9
24LED	classroom 207	14	1B 32 P F 2 (ELE)	F42LL	60	0.8	sw	2400	2,016.0	14	1B 32 P F 2 (ELE)	F42LL	60	0.8	occ	1680	1,411.2	604.8	0.0	$57.46	$128.25	$20.00	2.2	1.9
18LED	Boys Rm	4	T 32 R F 4 (ELE)	F44ILL	112	0.4	sw	1000	448.0	4	T 32 R F 4 (ELE)	F44ILL	112	0.4	none	1000	448.0	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
18LED	Girls Rm	4	T 32 R F 4 (ELE)	F44ILL	112	0.4	sw	1000	448.0	4	T 32 R F 4 (ELE)	F44ILL	112	0.4	none	1000	448.0	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
4LED	Stairway	2	2B 34 R F 2 (u) (MAG)	FU2EE	72	0.1	breaker	3200	460.8	2	2B 34 R F 2 (u) (MAG)	FU2EE	72	0.1	none	3200	460.8	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
18LED	Toilet rm	3	T 32 R F 4 (ELE)	F44ILL	112	0.3	sw	1000	336.0	3	T 32 R F 4 (ELE)	F44ILL	112	0.3	none	1000	336.0	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
18LED	Toilet rm	3	T 32 R F 4 (ELE)	F44ILL	112	0.3	sw	1000	336.0	3	T 32 R F 4 (ELE)	F44ILL	112	0.3	none	1000	336.0	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
262	front vestibule	18	B CF 36 W	CFT36/1	51	0.9	breaker	2280	2,093.0	18	B CF 36 W	CFT36/1	51	0.9	none	2280	2,093.0	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
261LED	Auditorium	48	PAR 38 SP	H100/1	100	4.8	sw	1820	8,736.0	48	PAR 38 SP	H100/1	100	4.8	none	1820	8,736.0	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
261LED	Auditorium	15	PAR 38 SP	H100/1	100	1.5	sw	1820	2,730.0	15	PAR 38 SP	H100/1	100	1.5	none	1820	2,730.0	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
1	Auditorium	30	SQ 13 W CF 2 (MAG)	CFQ13/2	31	0.9	sw	1820	1,692.6	30	SQ 13 W CF 2 (MAG)	CFQ13/2	31	0.9	none	1820	1,692.6	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
18LED	Stage	16	T 32 R F 4 (ELE)	F44ILL	112	1.8	sw	1820	3,261.4	16	T 32 R F 4 (ELE)	F44ILL	112	1.8	none	1820	3,261.4	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
35LED	Music classroom 202	18	T 32 R F 3 (ELE)	F43ILL/2	90	1.6	sw	2400	3,888.0	18	T 32 R F 3 (ELE)	F43ILL/2	90	1.6	occ	1680	2,721.6	1,166.4	0.0	$110.81	$128.25	$20.00	1.2	1.0
35LED	Music classroom 201	20	T 32 R F 3 (ELE)	F43ILL/2	90	1.8	sw	2400	4,320.0	20	T 32 R F 3 (ELE)	F43ILL/2	90	1.8	occ	1680	3,024.0	1,296.0	0.0	$123.12	$128.25	$20.00	1.0	0.9
18LED	Storage	4	T 32 R F 4 (ELE)	F44ILL	112	0.4	sw	500	224.0	4	T 32 R F 4 (ELE)	F44ILL	112	0.4	none	500	224.0	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
35LED	Corridor	10	T 32 R F 3 (ELE)	F43ILL/2	90	0.9	breaker	2280	2,052.0	10	T 32 R F 3 (ELE)	F43ILL/2	90	0.9	none	2280	2,052.0	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
9LED	Old Gymnasium	32	High Bay MH 200 35 Feet High	MH200/1	232	7.4	sw	2912	21,618.7	32	High Bay MH 200 35 Feet High	MH200/1	232	7.4	none	2912	21,618.7	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
40LED	Old Girls Locker Rm	28	T 32 R F 2 (ELE)	F42LL	60	1.7	sw	2800	4,704.0	28	T 32 R F 2 (ELE)	F42LL	60	1.7	none	2800	4,704.0	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
40LED	Old Boys Locker Rm	32	T 32 R F 2 (ELE)	F42LL	60	1.9	sw	2800	5,376.0	32	T 32 R F 2 (ELE)	F42LL	60	1.9	none	2800	5,376.0	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
40LED	New Girls Locker rm	20	T 32 R F 2 (ELE)	F42LL	60	1.2	sw	2800	3,360.0	20	T 32 R F 2 (ELE)	F42LL	60	1.2	none	2800	3,360.0	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
40LED	New Boys Locker rm	20	T 32 R F 2 (ELE)	F42LL	60	1.2	sw	2800	3,360.0	20	T 32 R F 2 (ELE)	F42LL	60	1.2	none	2800	3,360.0	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
40LED	Training Rm	8	T 32 R F 2 (ELE)	F42LL	60	0.5	sw	2800	1,344.0	8	T 32 R F 2 (ELE)	F42LL	60	0.5	none	2800	1,344.0	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
24LED	Corridor	36	1B 32 P F 2 (ELE)	F42LL	60	2.2	breaker	2280	4,924.8	36	1B 32 P F 2 (ELE)	F42LL	60	2.2	none	2280	4,924.8	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
1	Vestibules	12	SQ 13 W CF 2 (MAG)	CFQ13/2	31	0.4	breaker	2280	848.2	12	SQ 13 W CF 2 (MAG)	CFQ13/2	31	0.4	none	2280	848.2	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
40LED	Gym storage	4	T 32 R F 2 (ELE)	F42LL	60	0.2	sw	500	120.0	4	T 32 R F 2 (ELE)	F42LL	60	0.2	none	500	120.0	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
20LED	Boys Rm	6	S 32 C F 1 (ELE)	F41LL	32	0.2	sw	1000	192.0	6	S 32 C F 1 (ELE)	F41LL	32	0.2	none	1000	192.0	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
20LED	Girls Rm	6	S 32 C F 1 (ELE)	F41LL	32	0.2	sw	1000	192.0	6	S 32 C F 1 (ELE)	F41LL	32	0.2	none	1000	192.0	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
35LED	Principals office	4	T 32 R F 3 (ELE)	F43ILL/2	90	0.4	sw	2400	864.0	4	T 32 R F 3 (ELE)	F43ILL/2	90	0.4	none	2400	864.0	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
35LED	Asst principals office	4	T 32 R F 3 (ELE)	F43ILL/2	90	0.4	sw	2400	864.0	4	T 32 R F 3 (ELE)	F43ILL/2	90	0.4	none	2400	864.0	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
35LED	Conference Rm	3	T 32 R F 3 (ELE)	F43ILL/2	90	0.3	sw	1200	324.0	3	T 32 R F 3 (ELE)	F43ILL/2	90	0.3	occ	1000	270.0	54.0	0.0	$5.13	$128.25	$20.00	25.0	21.1
4LED	Stairway	2	2B 34 R F 2 (u) (MAG)	FU2EE	72	0.1	breaker	3200	460.8	2	2B 34 R F 2 (u) (MAG)	FU2EE	72	0.1	none	3200	460.8	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
24LED	Health classroom	16	1B 32 P F 2 (ELE)	F42LL	60	1.0	sw	2400	2,304.0	16	1B 32 P F 2 (ELE)	F42LL	60	1.0	occ	1680	1,612.8	691.2	0.0	$65.66	$128.25	$20.00	2.0	1.6
24LED	Team Rm	14	1B 32 P F 2 (ELE)	F42LL	60	0.8	sw	2800	2,352.0	14	1B 32 P F 2 (ELE)	F42LL	60	0.8	none	2800	2,352.0	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
18LED	Storage	3	T 32 R F 4 (ELE)	F44ILL	112	0.3	sw	500	168.0	3	T 32 R F 4 (ELE)	F44ILL	112	0.3	none	500	168.0	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
40LED	Training Rm	4	T 32 R F 2 (ELE)	F42LL	60	0.2	sw	2800	672.0	4	T 32 R F 2 (ELE)	F42LL	60	0.2	none	2800	672.0	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
18LED	Storage	3	T 32 R F 4 (ELE)	F44ILL	112	0.3	sw	500	168.0	3	T 32 R F 4 (ELE)	F44ILL	112	0.3	none	500	168.0	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
117	Exterior	12	CF 23	CFS23/1	23	0.3	breaker	4368	1,205.6	12	CF 23	CFS23/1	23	0.3	none	4368	1,205.6	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
227LED	Exterior	13	70 W MH Wall Pack	MH70/1	95	1.2	breaker	4368	5,394.5	13	70 W MH Wall Pack	MH70/1	95	1.2	none	4368	5,394.5	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
142LED	Exterior	3	MH 100	MH100/1	128	0.4	breaker	4368	1,677.3	3	MH 100	MH100/1	128	0.4	none	4368	1,677.3	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
															0	#N/A	#VALUE!	#VALUE!	#N/A	#VALUE!			#VALUE!	#VALUE!
															0	#N/A	#VALUE!	#VALUE!	#N/A	#VALUE!			#VALUE!	#VALUE!
															0	#N/A	#VALUE!	#VALUE!	#N/A	#VALUE!			#VALUE!	#VALUE!
															0	#N/A	#VALUE!	#VALUE!	#N/A	#VALUE!			#VALUE!	#VALUE!
															0	#N/A	#VALUE!	#VALUE!	#N/A	#VALUE!			#VALUE!	#VALUE!
															0	#N/A	#VALUE!	#VALUE!	#N/A	#VALUE!			#VALUE!	#VALUE!
															0	#N/A	#VALUE!	#VALUE!	#N/A	#VALUE!			#VALUE!	#VALUE!
															0	#N/A	#VALUE!	#VALUE!	#N/A	#VALUE!			#VALUE!	#VALUE!
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															0	#N/A	#VALUE!	#VALUE!	#N/A	#VALUE!			#VALUE!	#VALUE!
															0	#N/A	#VALUE!	#VALUE!	#N/A	#VALUE!			#VALUE!	#VALUE!
															0	#N/A	#VALUE!	#VALUE!	#N/A	#VALUE!			#VALUE!	#VALUE!
	Total	**1,896**				**180.7**			**425078.9**	**1896.0**				**180.7**			**352058.2**	**73020.7**	**0.0**	**6937.0**	**10287.0**	**1590.0**			
																	Demand Savings			**0.0**	**$0**			
																	kWh Savings			**73,021**	**$6,937**			
																	Total Savings				**$6,937**		**1.5**	**1.3**

Energy Audit of Millburn High School
CHA Project No. 28330
ECM-L3 Lighting Replacements with Occupancy Sensors

		EXISTING CONDITIONS								RETROFIT CONDITIONS								COST & SAVINGS ANALYSIS						
	Area Description	No. of Fixtures	Standard Fixture Code	Fixture Code	Watts per Fixture	kW/Space	Exist Control	Annual Hours	Annual kWh	Number of Fixtures	Standard Fixture Code	Fixture Code	Watts per Fixture	kW/Space	Retrofit Control	Annual Hours	Annual kWh	Annual kWh Saved	Annual kW Saved	Annual $ Saved	Retrofit Cost	NJ Smart Start Lighting Incentive	Simple Payback With Out Incentive	Simple Payback
Field Code	Unique description of the location - Room number/Room name: Floor number (if applicable)	No. of fixtures before the retrofit	Lighting Fixture Code	Code from Table of Standard Fixture Wattages	Value from Table of Standard Fixture Wattages	(Watts/Fixt) * (Fixt No.)	Pre-inst. control device	Estimated daily hours for the usage group	(kW/space) * (Annual Hours)	No. of fixtures after the retrofit	Lighting Fixture Code	Code from Table of Standard Fixture Wattages	Value from Table of Standard Fixture Wattages	(Watts/Fixt) * (Number of Fixtures)	Retrofit control device	Estimated annual hours for the usage group	(kW/space) * (Annual Hours)	(Original Annual kWh) - (Retrofit Annual kWh)	(Original Annual kW) - (Retrofit Annual kW)	(kWh Saved) * ($/kWh)	Cost for renovations to lighting system	Prescriptive Lighting Measures	Length of time for renovations cost to be recovered	Length of time for renovations cost to be recovered
35LED	Rm 375 Fine Arts	16	T 32 R F 3 (ELE)	F43ILL/2	90	1.4	occ	2400	3,456	16	T 38 R LED	RTLED38	38	0.6	C-OCC	1,680	1,021	2,435	0.8	$ 298.97	$ 4,050.00	$ 35	13.5	13.4
35LED	Rm 376	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	occ	2400	2,592	12	T 38 R LED	RTLED38	38	0.5	C-OCC	1,680	766	1,826	0.6	$ 224.23	$ 3,105.00	$ 35	13.8	13.7
4LED	Stairway	2	2B 34 R F 2 (u) (MAG)	FU2EE	72	0.1	breaker	3200	461	2	2T XX R LED	2RTLED	25	0.1	none	3,200	160	301	0.1	$ 36.22	$ 405.00	$ -	11.2	11.2
35LED	Faculty Toilet Mens	1	T 32 R F 3 (ELE)	F43ILL/2	90	0.1	occ	1000	90	1	T 38 R LED	RTLED38	38	0.0	none	1,000	38	52	0.1	$ 9.17	$ 236.25	$ -	25.8	25.8
35LED	Faculty Toilet Womens	1	T 32 R F 3 (ELE)	F43ILL/2	90	0.1	occ	1000	90	1	T 38 R LED	RTLED38	38	0.0	none	1,000	38	52	0.1	$ 9.17	$ 236.25	$ -	25.8	25.8
35LED	Corridor	13	T 32 R F 3 (ELE)	F43ILL/2	90	1.2	breaker	2280	2,668	13	T 38 R LED	RTLED38	38	0.5	none	2,280	1,126	1,541	0.7	$ 201.42	$ 3,071.25	$ -	15.2	15.2
35LED	Rm 374	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	occ	2400	2,592	12	T 38 R LED	RTLED38	38	0.5	occ	1,680	766	1,826	0.6	$ 224.23	$ 2,963.25	$ 20	13.2	13.1
35LED	Rm 373	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	occ	2400	2,592	12	T 38 R LED	RTLED38	38	0.5	occ	1,680	766	1,826	0.6	$ 224.23	$ 2,963.25	$ 20	13.2	13.1
35LED	Rm 372	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	occ	2400	2,592	12	T 38 R LED	RTLED38	38	0.5	occ	1,680	766	1,826	0.6	$ 224.23	$ 2,963.25	$ 20	13.2	13.1
35LED	Rm 371	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	occ	2400	2,592	12	T 38 R LED	RTLED38	38	0.5	occ	1,680	766	1,826	0.6	$ 224.23	$ 2,963.25	$ 20	13.2	13.1
35LED	Rm 370	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	occ	2400	2,592	12	T 38 R LED	RTLED38	38	0.5	occ	1,680	766	1,826	0.6	$ 224.23	$ 2,963.25	$ 20	13.2	13.1
35LED	Corridor	2	T 32 R F 3 (ELE)	F43ILL/2	90	0.2	breaker	2280	410	2	T 38 R LED	RTLED38	38	0.1	none	2,280	173	237	0.1	$ 30.99	$ 472.50	$ -	15.2	15.2
121	Corridor	2	W 34 P F 4	F44EE	144	0.3	breaker	2280	657	2	W 28 P F 4	F44SSILL	96	0.2	none	2,280	438	219	0.1	$ 28.60	$ 283.50	$ -	9.9	9.9
121	corridor	2	W 34 P F 4	F44EE	144	0.3	breaker	2280	657	2	W 28 P F 4	F44SSILL	96	0.2	none	2,280	438	219	0.1	$ 28.60	$ 283.50	$ -	9.9	9.9
35LED	Boys toilet	3	T 32 R F 3 (ELE)	F43ILL/2	90	0.3	occ	1000	270	3	T 38 R LED	RTLED38	38	0.1	none	1,000	114	156	0.2	$ 27.51	$ 708.75	$ -	25.8	25.8
35LED	Girls toilet	3	T 32 R F 3 (ELE)	F43ILL/2	90	0.3	occ	1000	270	3	T 38 R LED	RTLED38	38	0.1	none	1,000	114	156	0.2	$ 27.51	$ 708.75	$ -	25.8	25.8
35LED	Custodial closet	1	T 32 R F 3 (ELE)	F43ILL/2	90	0.1	sw	500	45	1	T 38 R LED	RTLED38	38	0.0	none	500	19	26	0.1	$ 6.70	$ 236.25	$ -	35.3	35.3
35LED	Corridor	6	T 32 R F 3 (ELE)	F43ILL/2	90	0.5	breaker	2280	1,231	6	T 38 R LED	RTLED38	38	0.2	none	2,280	520	711	0.3	$ 92.96	$ 1,417.50	$ -	15.2	15.2
35LED	Rm 275	16	T 32 R F 3 (ELE)	F43ILL/2	90	1.4	occ	2400	3,456	16	T 38 R LED	RTLED38	38	0.6	occ	1,680	1,021	2,435	0.8	$ 298.97	$ 3,908.25	$ 20	13.1	13.0
35LED	Rm 276	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	occ	2400	2,592	12	T 38 R LED	RTLED38	38	0.5	occ	1,680	766	1,826	0.6	$ 224.23	$ 2,963.25	$ 20	13.2	13.1
4LED	Stairway	2	2B 34 R F 2 (u) (MAG)	FU2EE	72	0.1	breaker	3200	461	2	2T XX R LED	2RTLED	25	0.1	none	3,200	160	301	0.1	$ 36.22	$ 405.00	$ -	11.2	11.2
35LED	Faculty Toilet Mens	1	T 32 R F 3 (ELE)	F43ILL/2	90	0.1	occ	1000	90	1	T 38 R LED	RTLED38	38	0.0	none	1,000	38	52	0.1	$ 9.17	$ 236.25	$ -	25.8	25.8
35LED	Faculty Toilet Womens	1	T 32 R F 3 (ELE)	F43ILL/2	90	0.1	occ	1000	90	1	T 38 R LED	RTLED38	38	0.0	none	1,000	38	52	0.1	$ 9.17	$ 236.25	$ -	25.8	25.8
35LED	Corridor	13	T 32 R F 3 (ELE)	F43ILL/2	90	1.2	breaker	2280	2,668	13	T 38 R LED	RTLED38	38	0.5	none	2,280	1,126	1,541	0.7	$ 201.42	$ 3,071.25	$ -	15.2	15.2
35LED	Rm 374	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	occ	2400	2,592	12	T 38 R LED	RTLED38	38	0.5	occ	1,680	766	1,826	0.6	$ 224.23	$ 2,963.25	$ 20	13.2	13.1
35LED	Rm 273	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	occ	2400	2,592	12	T 38 R LED	RTLED38	38	0.5	occ	1,680	766	1,826	0.6	$ 224.23	$ 2,963.25	$ 20	13.2	13.1
35LED	Rm 272	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	occ	2400	2,592	12	T 38 R LED	RTLED38	38	0.5	occ	1,680	766	1,826	0.6	$ 224.23	$ 2,963.25	$ 20	13.2	13.1
35LED	Rm 271	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	occ	2400	2,592	12	T 38 R LED	RTLED38	38	0.5	occ	1,680	766	1,826	0.6	$ 224.23	$ 2,963.25	$ 20	13.2	13.1
35LED	Rm 270	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	occ	2400	2,592	12	T 38 R LED	RTLED38	38	0.5	occ	1,680	766	1,826	0.6	$ 224.23	$ 2,963.25	$ 20	13.2	13.1
35LED	Corridor	2	T 32 R F 3 (ELE)	F43ILL/2	90	0.2	breaker	2280	410	2	T 38 R LED	RTLED38	38	0.1	none	2,280	173	237	0.1	$ 30.99	$ 472.50	$ -	15.2	15.2
121	Corridor	2	W 34 P F 4	F44EE	144	0.3	breaker	2280	657	2	W 28 P F 4	F44SSILL	96	0.2	none	2,280	438	219	0.1	$ 28.60	$ 283.50	$ -	9.9	9.9
121	corridor	2	W 34 P F 4	F44EE	144	0.3	breaker	2280	657	2	W 28 P F 4	F44SSILL	96	0.2	none	2,280	438	219	0.1	$ 28.60	$ 283.50	$ -	9.9	9.9
35LED	Boys toilet	3	T 32 R F 3 (ELE)	F43ILL/2	90	0.3	occ	1000	270	3	T 38 R LED	RTLED38	38	0.1	none	1,000	114	156	0.2	$ 27.51	$ 708.75	$ -	25.8	25.8
35LED	Girls toilet	3	T 32 R F 3 (ELE)	F43ILL/2	90	0.3	occ	1000	270	3	T 38 R LED	RTLED38	38	0.1	none	1,000	114	156	0.2	$ 27.51	$ 708.75	$ -	25.8	25.8
35LED	Custodial closet	1	T 32 R F 3 (ELE)	F43ILL/2	90	0.1	sw	500	45	1	T 38 R LED	RTLED38	38	0.0	none	500	19	26	0.1	$ 6.70	$ 236.25	$ -	35.3	35.3
35LED	Corridor	6	T 32 R F 3 (ELE)	F43ILL/2	90	0.5	breaker	2280	1,231	6	T 38 R LED	RTLED38	38	0.2	none	2,280	520	711	0.3	$ 92.96	$ 1,417.50	$ -	15.2	15.2
35LED	Rm 275	16	T 32 R F 3 (ELE)	F43ILL/2	90	1.4	occ	2400	3,456	16	T 38 R LED	RTLED38	38	0.6	occ	1,680	1,021	2,435	0.8	$ 298.97	$ 3,908.25	$ 20	13.1	13.0
35LED	Rm 276	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	occ	2400	2,592	12	T 38 R LED	RTLED38	38	0.5	occ	1,680	766	1,826	0.6	$ 224.23	$ 2,963.25	$ 20	13.2	13.1
4LED	Stairway	2	2B 34 R F 2 (u) (MAG)	FU2EE	72	0.1	breaker	3200	461	2	2T XX R LED	2RTLED	25	0.1	none	3,200	160	301	0.1	$ 36.22	$ 405.00	$ -	11.2	11.2
35LED	Faculty Toilet Mens	1	T 32 R F 3 (ELE)	F43ILL/2	90	0.1	occ	1000	90	1	T 38 R LED	RTLED38	38	0.0	none	1,000	38	52	0.1	$ 9.17	$ 236.25	$ -	25.8	25.8
35LED	Faculty Toilet Womens	1	T 32 R F 3 (ELE)	F43ILL/2	90	0.1	occ	1000	90	1	T 38 R LED	RTLED38	38	0.0	none	1,000	38	52	0.1	$ 9.17	$ 236.25	$ -	25.8	25.8
35LED	Corridor	13	T 32 R F 3 (ELE)	F43ILL/2	90	1.2	breaker	2280	2,668	13	T 38 R LED	RTLED38	38	0.5	none	2,280	1,126	1,541	0.7	$ 201.42	$ 3,071.25	$ -	15.2	15.2
35LED	Rm 374	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	occ	2400	2,592	12	T 38 R LED	RTLED38	38	0.5	occ	1,680	766	1,826	0.6	$ 224.23	$ 2,963.25	$ 20	13.2	13.1
35LED	Rm 273	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	occ	2400	2,592	12	T 38 R LED	RTLED38	38	0.5	occ	1,680	766	1,826	0.6	$ 224.23	$ 2,963.25	$ 20	13.2	13.1
35LED	Rm 272	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	occ	2400	2,592	12	T 38 R LED	RTLED38	38	0.5	occ	1,680	766	1,826	0.6	$ 224.23	$ 2,963.25	$ 20	13.2	13.1
35LED	Rm 271	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	occ	2400	2,592	12	T 38 R LED	RTLED38	38	0.5	occ	1,680	766	1,826	0.6	$ 224.23	$ 2,963.25	$ 20	13.2	13.1
35LED	Rm 270	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	occ	2400	2,592	12	T 38 R LED	RTLED38	38	0.5	occ	1,680	766	1,826	0.6	$ 224.23	$ 2,963.25	$ 20	13.2	13.1
35LED	Corridor	2	T 32 R F 3 (ELE)	F43ILL/2	90	0.2	breaker	2280	410	2	T 38 R LED	RTLED38	38	0.1	none	2,280	173	237	0.1	$ 30.99	$ 472.50	$ -	15.2	15.2
121	Corridor	2	W 34 P F 4	F44EE	144	0.3	breaker	2280	657	2	W 28 P F 4	F44SSILL	96	0.2	none	2,280	438	219	0.1	$ 28.60	$ 283.50	$ -	9.9	9.9
121	corridor	2	W 34 P F 4	F44EE	144	0.3	breaker	2280	657	2	W 28 P F 4	F44SSILL	96	0.2	none	2,280	438	219	0.1	$ 28.60	$ 283.50	$ -	9.9	9.9
35LED	Boys toilet	3	T 32 R F 3 (ELE)	F43ILL/2	90	0.3	occ	1000	270	3	T 38 R LED	RTLED38	38	0.1	none	1,000	114	156	0.2	$ 27.51	$ 708.75	$ -	25.8	25.8
35LED	Girls toilet	3	T 32 R F 3 (ELE)	F43ILL/2	90	0.3	occ	1000	270	3	T 38 R LED	RTLED38	38	0.1	none	1,000	114	156	0.2	$ 27.51	$ 708.75	$ -	25.8	25.8
35LED	Custodial closet	1	T 32 R F 3 (ELE)	F43ILL/2	90	0.1	sw	500	45	1	T 38 R LED	RTLED38	38	0.0	none	500	19	26	0.1	$ 6.70	$ 236.25	$ -	35.3	35.3
35LED	Corridor	6	T 32 R F 3 (ELE)	F43ILL/2	90	0.5	breaker	2280	1,231	6	T 38 R LED	RTLED38	38	0.2	none	2,280	520	711	0.3	$ 92.96	$ 1,417.50	$ -	15.2	15.2
6LED	classroom 140	36	T 34 R F 4 (MAG)	F44EE	144	5.2	sw	2400	12,442	36	T 50 R LED	RTLED50	50	1.8	occ	1,680	3,024	9,418	3.4	$ 1,169.99	$ 8,633.25	$ 20	7.4	7.4
6LED	classroom 142	24	T 34 R F 4 (MAG)	F44EE	144	3.5	sw	2400	8,294	24	T 50 R LED	RTLED50	50	1.2	occ	1,680	2,016	6,278	2.3	$ 780.00	$ 5,798.25	$ 20	7.4	7.4
6LED	storage	4	T 34 R F 4 (MAG)	F44EE	144	0.6	sw	500	288	4	T 50 R LED	RTLED50	50	0.2	none	500	100	188	0.4	$ 48.45	$ 945.00	$ -	19.5	19.5
35LED	classroom 141	10	T 32 R F 3 (ELE)	F43ILL/2	90	0.9	sw	2400	2,160	10	T 38 R LED	RTLED38	38	0.4	occ	1,680	638	1,522	0.5	$ 186.86	$ 2,490.75	$ 20	13.3	13.2
35LED	classroom 143	18	T 32 R F 3 (ELE)	F43ILL/2	90	1.6	sw	2400	3,888	18	T 38 R LED	RTLED38	38	0.7	occ	1,680	1,149	2,739	0.9	$ 336.35	$ 4,380.75	$ 20	13.0	13.0
41LED	Corridor	10	1B 40 R F 2 (MAG)	F42SS	94	0.9	breaker	2280	2,143	10	4 ft LED Tube	200732x2	30	0.3	none	2,280	684	1,459	0.6	$ 190.69	$ 1,633.50	$ -	8.6	8.6
6LED	Dance Gym	36	T 34 R F 4 (MAG)	F44EE	144	5.2	sw	2400	12,442	36	T 50 R LED	RTLED50	50	1.8	none	2,400	4,320	8,122	3.4	$ 1,046.87	$ 8,505.00	$ -	8.1	8.1
41LED	Dance Gym	6	1B 40 R F 2 (MAG)	F42SS	94	0.6	sw	2400	1,354	6	4 ft LED Tube	200732x2	30	0.2	none	2,400	432	922	0.4	$ 118.79	$ 980.10	$ -	8.3	8.3
40LED	Corridor	9	T 32 R F 2 (ELE)	F42LL	60	0.5	breaker	2280	1,231	9	T 38 R LED	RTLED38	38	0.3	none	2,280	780	451	0.2	$ 59.00	$ 2,126.25	$ -	36.0	36.0
18LED	Rm 137	12	T 32 R F 4 (ELE)	F44ILL	112	1.3	breaker	2400	3,226	12	T 50 R LED	RTLED50	50	0.6	occ	1,680	1,008	2,218	0.7	$ 271.20	$ 2,963.25	$ 20	10.9	10.9
18LED	RM 136	12	T 32 R F 4 (ELE)	F44ILL	112	1.3	sw	2400	3,226	12	T 50 R LED	RTLED50	50	0.6	occ	1,680	1,008	2,218	0.7	$ 271.20	$ 2,963.25	$ 20	10.9	10.9
18LED	Rm 135	12	T 32 R F 4 (ELE)	F44ILL	112	1.3	sw	2400	3,226	12	T 50 R LED	RTLED50	50	0.6	occ	1,680	1,008	2,218	0.7	$ 271.20	$ 2,963.25	$ 20	10.9	10.9
18LED	Rm 134	12	T 32 R F 4 (ELE)	F44ILL	112	1.3	sw	2400	3,226	12	T 50 R LED	RTLED50	50	0.6	occ	1,680	1,008	2,218	0.7	$ 271.20	$ 2,963.25	$ 20	10.9	10.9
18LED	Rm 133	12	T 32 R F 4 (ELE)	F44ILL	112	1.3	sw	2400	3,226	12	T 50 R LED	RTLED50	50	0.6	occ	1,680	1,008	2,218	0.7	$ 271.20	$ 2,963.25	$ 20	10.9	10.9
18LED	Rm 132	12	T 32 R F 4 (ELE)	F44ILL	112	1.3	sw	2400	3,226	12	T 50 R LED	RTLED50	50	0.6	occ	1,680	1,008	2,218	0.7	$ 271.20	$ 2,963.25	$ 20	10.9	10.9
18LED	Rm 131	12	T 32 R F 4 (ELE)	F44ILL	112	1.3	sw	2400	3,226	12	T 50 R LED	RTLED50	50	0.6	occ	1,680	1,008	2,218	0.7	$ 271.20	$ 2,963.25	$ 20	10.9	10.9
18LED	Rm 130	12	T 32 R F 4 (ELE)	F44ILL	112	1.3	sw	2400	3,226	12	T 50 R LED	RTLED50	50	0.6	occ	1,680	1,008	2,218	0.7	$ 271.20	$ 2,963.25	$ 20	10.9	10.9
18LED	Rm 129	12	T 32 R F 4 (ELE)	F44ILL	112	1.3	sw	2400	3,226	12	T 50 R LED	RTLED50	50	0.6	occ	1,680	1,008	2,218	0.7	$ 271.20	$ 2,963.25	$ 20	10.9	10.9
18LED	Rm 232	12	T 32 R F 4 (ELE)	F44ILL	112	1.3	sw	2400	3,226	12	T 50 R LED	RTLED50	50	0.6	occ	1,680	1,008	2,218	0.7	$ 271.20	$ 2,963.25	$ 20	10.9	10.9
18LED	Rm 233	12	T 32 R F 4 (ELE)	F44ILL	112	1.3	sw	2400	3,226	12	T 50 R LED	RTLED50	50	0.6	occ	1,680	1,008	2,218	0.7	$ 271.20	$ 2,963.25	$ 20	10.9	10.9
18LED	Rm 234	12	T 32 R F 4 (ELE)	F44ILL	112	1.3	sw	2400	3,226	12	T 50 R LED	RTLED50	50	0.6	occ	1,680	1,008	2,218	0.7	$ 271.20	$ 2,963.25	$ 20	10.9	10.9
18LED	Rm 235	12	T 32 R F 4 (ELE)	F44ILL	112	1.3	sw	2400	3,226	12	T 50 R LED	RTLED50	50	0.6	occ	1,680	1,008	2,218	0.7	$ 271.20	$ 2,963.25	$ 20	10.9	10.9
18LED	Rm 236	12	T 32 R F 4 (ELE)	F44ILL	112	1.3	sw	2400	3,226	12	T 50 R LED	RTLED50	50	0.6	occ	1,680	1,008	2,218	0.7	$ 271.20	$ 2,963.25	$ 20	10.9	10.9
18LED	Rm 237	12	T 32 R F 4 (ELE)	F44ILL	112	1.3	sw	2400	3,226	12	T 50 R LED	RTLED50	50	0.6	occ	1,680	1,008	2,218	0.7	$ 271.20	$ 2,963.25	$ 20	10.9	10.9
18LED	Rm 238	12	T 32 R F 4 (ELE)	F44ILL	112	1.3	sw	2400	3,226	12	T 50 R LED	RTLED50	50	0.6	occ	1,680	1,008	2,218	0.7	$ 271.20	$ 2,963.25	$ 20	10.9	10.9
18LED	Rm 239	12	T 32 R F 4 (ELE)	F44ILL	112	1.3	sw	2400	3,226	12	T 50 R LED	RTLED50	50	0.6	occ	1,680	1,008	2,218	0.7	$ 271.20	$ 2,963.25	$ 20	10.9	10.9
18LED	Rm 240	12	T 32 R F 4 (ELE)	F44ILL	112	1.3	sw	2400	3,226	12	T 50 R LED	RTLED50	50	0.6	occ	1,680	1,008	2,218	0.7	$ 271.20	$ 2,963.25	$ 20	10.9	10.9
18LED	Rm 241	12	T 32 R F 4 (ELE)	F44ILL	112	1.3	sw	2400	3,226	12	T 50 R LED	RTLED50	50	0.6	occ	1,680	1,008	2,218	0.7	$ 271.20	$ 2,963.25	$ 20	10.9	10.9
18LED	Rm 242	12	T 32 R F 4 (ELE)	F44ILL	112	1.3	sw	2400	3,226	12	T 50 R LED	RTLED50	50	0.6	occ	1,680	1,008	2,218	0.7	$ 271.20	$ 2,963.25	$ 20	10.9	10.9
18LED	Rm 243	12	T 32 R F 4 (ELE)	F44ILL	112	1.3	sw	2400	3,226	12	T 50 R LED	RTLED50	50	0.6	occ	1,680	1,008	2,218	0.7	$ 271.20	$ 2,963.25	$ 20	10.9	10.9
18LED	Boys toilet	3	T 32 R F 4 (ELE)	F44ILL	112	0.3	sw	1000	336	3	T 50 R LED	RTLED50	50	0.2	none	1,000	150	186	0.2	$ 32.80	$ 708.75	$ -	21.6	21.6
18LED	Girls toilet	3	T 32 R F 4 (ELE)	F44ILL	112	0.3	sw	1000	336	3	T 50 R LED	RTLED50	50	0.2	none	1,000	150	186	0.2	$ 32.80	$ 708.75	$ -	21.6	21.6
18LED	Boys toilet	3	T 32 R F 4 (ELE)	F44ILL	112	0.3	sw	1000	336	3	T 50 R LED	RTLED50	50	0.2	none	1,000	150	186	0.2	$ 32.80	$ 708.75	$ -	21.6	21.6
18LED	Girls toilet	3	T 32 R F 4 (ELE)	F44ILL	112	0.3	sw	1000	336	3	T 50 R LED	RTLED50	50	0.2	none	1,000	150	186	0.2	$ 32.80	$ 708.75	$ -	21.6	21.6
41LED	Corridor	12	1B 40 R F 2 (MAG)	F42SS	94	1.1	breaker	2280	2,572	12	4 ft LED Tube	200732x2	30	0.4	none	2,280	821	1,751	0.8	$ 228.83	$ 1,960.20	$ -	8.6	8.6
41LED	Corridor	14	1B 40 R F 2 (MAG)	F42SS	94	1.3	breaker	2280	3,000	14	4 ft LED Tube	200732x2	30	0.4	none	2,280	958	2,043	0.9	$ 266.97	$ 2,286.90	$ -	8.6	8.6
4LED	Stairway	3	2B 34 R F 2 (u) (MAG)	FU2EE	72	0.2	breaker	3200	691	3	2T XX R LED	2RTLED	25	0.1	none	3,200	240	451	0.1	$ 54.34	$ 607.50	$ -	11.2	11.2
4LED	Stairway	3	2B 34 R F 2 (u) (MAG)	FU2EE	72	0.2	breaker	3200	691	3	2T XX R LED	2RTLED	25	0.1	none	3,200	240	451	0.1	$ 54.34	$ 607.50	$ -	11.2	11.2
18LED	classroom 122	12	T 32 R F 4 (ELE)	F44ILL	112	1.3	sw	2400	3,226	12	T 50 R LED	RTLED50	50	0.6	occ	1,680	1,008	2,218	0.7	$ 271.20	$ 2,963.25	$ 20	10.9	10.9
18LED	classroom 123	16	T 32 R F 4 (ELE)	F44ILL	112	1.8	sw	2400	4,301	16	T 50 R LED	RTLED50	50	0.8	occ	1,680	1,344	2,957	1.0	$ 361.61	$ 3,908.25	$ 20	10.8	10.8
18LED	classroom 124	16	T 32 R F 4 (ELE)	F44ILL	112	1.8	sw	2400	4,301	16	T 50 R LED	RTLED50	50	0.8	occ	1,680	1,344	2,957	1.0	$ 361.61	$ 3,908.25	$ 20	10.8	10.8
18LED	classroom 125	12	T 32 R F 4 (ELE)	F44ILL	112	1.3	sw	2400	3,226	12	T 50 R LED	RTLED50	50	0.6	occ	1,680	1,008	2,218	0.7	$ 271.20	$ 2,963.25	$ 20	10.9	10.9
18LED	classroom 126	12	T 32 R F 4 (ELE)	F44ILL	112	1.3	sw	2400	3,226	12	T 50 R LED	RTLED50	50	0.6	occ	1,680	1,008	2,218	0.7	$ 271.20	$ 2,963.25	$ 20	10.9	10.9
18LED	Rm 226	12	T 32 R F 4 (ELE)	F44ILL	112	1.3	sw	2400	3,226	12	T 50 R LED	RTLED50	50	0.6	occ	1,680	1,008	2,218	0.7	$ 271.20	$ 2,963.25	$ 20	10.9	10.9
18LED	Rm 227	12	T 32 R F 4 (ELE)	F44ILL	112	1.3	sw	2400	3,226	12	T 50 R LED	RTLED50	50	0.6	occ	1,680	1,008	2,218	0.7	$ 271.20	$ 2,963.25	$ 20	10.9	10.9
18LED	Rm 228	12	T 32 R F 4 (ELE)	F44ILL	112	1.3	sw	2400	3,226	12	T 50 R LED	RTLED50	50	0.6	occ	1,680	1,008	2,218	0.7	$ 271.20	$ 2,963.25	$ 20	10.9	10.9
18LED	Rm 229	12	T 32 R F 4 (ELE)	F44ILL	112	1.3	sw	2400	3,226	12	T 50 R LED	RTLED50	50	0.6	occ	1,680	1,008	2,218	0.7	$ 271.20	$ 2,963.25	$ 20	10.9	10.9
18LED	Rm 230	12	T 32 R F 4 (ELE)	F44ILL	112	1.3	sw	2400	3,226	12	T 50 R LED	RTLED50	50	0.6	occ	1,680	1,008	2,218	0.7	$ 271.20	$ 2,963.25	$ 20	10.9	10.9
18LED	Rm 231	12	T 32 R F 4 (ELE)	F44ILL	112	1.3	sw	2400	3,226	12	T 50 R LED	RTLED50	50	0.6	occ	1,680	1,008	2,218	0.7	$ 271.20	$ 2,963.25	$ 20	10.9	10.9
9LED	New Gymnasium	24	High Bay MH 200 35 Feet High	MH200/1	232	5.6	sw	2912	16,214	24	FXLED78	FXLED78/1	78	1.9	none	2,912	5,451	10,763	3.7	$ 1,323.17	$ 20,260.69	$ 3,600	15.3	12.6
41LED	Corridor	15	1B 40 R F 2 (MAG)	F42SS	94	1.4	breaker	2280	3,215	15	4 ft LED Tube	200732x2	30	0.5	none	2,280	1,026	2,189	1.0	$ 286.04	$ 2,450.25	$ -	8.6	8.6
35LED	classroom 115	9	T 32 R F 3 (ELE)	F43ILL/2	90	0.8	sw	2400	1,944	9	T 38 R LED	RTLED38	38	0.3	occ	1,680	575	1,369	0.5	$ 168.17	$ 2,254.50	$ 20	13.4	13.3
35LED	classroom 117	16	T 32 R F 3 (ELE)	F43ILL/2	90	1.4	sw	2400	3,456	16	T 38 R LED	RTLED38	38	0.6	occ	1,680	1,021	2,435	0.8	$ 298.97	$ 3,908.25	$ 20	13.1	13.0
35LED	classroom 118	16	T 32 R F 3 (ELE)	F43ILL/2	90	1.4	sw	2400	3,456	16	T 38 R LED	RTLED38	38	0.6	occ	1,680	1,021	2,435	0.8	$ 298.97	$ 3,908.25	$ 20	13.1	13.0
35LED	classroom 119	16	T 32 R F 3 (ELE)	F43ILL/2	90	1.4	sw	2400	3,456	16	T 38 R LED	RTLED38	38	0.6	occ	1,680	1,021	2,435	0.8	$ 298.97	$ 3,908.25	$ 20	13.1	13.0
35LED	classroom 121	16	T 32 R F 3 (ELE)	F43ILL/2	90	1.4	sw	2400	3,456	16	T 38 R LED	RTLED38	38	0.6	occ	1,680	1,021	2,435	0.8	$ 298.97	$ 3,908.25	$ 20	13.1	13.0
35LED	classroom 120	16	T 32 R F 3 (ELE)	F43ILL/2	90	1.4	sw	2400	3,456	16	T 38 R LED	RTLED38	38	0.6	occ	1,680	1,021	2,435	0.8	$ 298.97	$ 3,908.25	$ 20	13.1	13.0
6LED	storage	1	T 34 R F 4 (MAG)	F44EE	144	0.1	sw	500	72	1	T 50 R LED	RTLED50	50	0.1	none	500	25	47	0.1	$ 12.11	$ 236.25	$ -	19.5	19.5
35LED	office	2	T 32 R F 3 (ELE)	F43ILL/2	90	0.2	sw	2400	432	2	T 38 R LED	RTLED38	38	0.1	occ	2,000	152	280	0.1	$ 35.06	$ 600.75	$ 20	17.1	16.6
35LED	office	3	T 32 R F 3 (ELE)	F43ILL/2	90	0.3	sw	2400	648	3	T 38 R LED	RTLED38	38	0.1	occ	2,000	228	420	0.2	$ 52.59	$ 837.00	$ 20	15.9	15.5
35LED	office	2	T 32 R F 3 (ELE)	F43ILL/2	90	0.2	sw	2400	432	2	T 38 R LED	RTLED38	38	0.1	occ	2,000	152	280	0.1	$ 35.06	$ 600.75	$ 20	17.1	16.6
35LED	Cafeteria	64	T 32 R F 3 (ELE)	F43ILL/2	90	5.8	sw	1600	9,216	64	T 38 R LED	RTLED38	38	2.4	none	1,600	3,891	5,325	3.3	$ 776.62	$ 15,120.00	$ -	19.5	19.5
24LED	Weight Rm	24	1B 32 P F 2 (ELE)	F42LL	60	1.4	sw	2912	4,193	24	4 ft LED Tube	200732x2	30	0.7	none	2,912	2,097	2,097	0.7	$ 257.76	$ 3,920.40	$ -	15.2	15.2
41LED	Media Center	48	1B 40 R F 2 (MAG)	F42SS	94	4.5	sw	2400	10,829	48	4 ft LED Tube	200732x2	30	1.4	occ	1,680	2,419	8,410	3.1	$ 1,048.85	$ 7,969.05	$ 20	7.6	7.6
24LED	Boys Locker Rm	16	1B 32 P F 2 (ELE)	F42LL	60	1.0	sw	2800	2,688	16	4 ft LED Tube	200732x2	30	0.5	occ	2,400	1,152	1,536	0.5	$ 184.97	$ 2,741.85	$ 20	14.8	14.7
24LED	Girls Locker Rm	16	1B 32 P F 2 (ELE)	F42LL	60	1.0	sw	2800	2,688	16	4 ft LED Tube	200732x2	30	0.5	occ	2,400	1,152	1,536	0.5	$ 184.97	$ 2,741.85	$ 20	14.8	14.7
35LED	Music 101	18	T 32 R F 3 (ELE)	F43ILL/2	90	1.6	occ	2400	3,888	18	T 38 R LED	RTLED38	38	0.7	none	2,400	1,642	2,246	0.9	$ 289.56	$ 4,252.50	$ -	14.7	14.7
35LED	Music 100	22	T 32 R F 3 (ELE)	F43ILL/2	90	2.0	occ	2400	4,752	22	T 38 R LED	RTLED38	38	0.8	none	2,400	2,006	2,746	1.1	$ 353.91	$ 5,197.50	$ -	14.7	14.7

Energy Audit of Millburn High School
CHA Project No. 28330
ECM-L3 Lighting Replacements with Occupancy Sensors

		EXISTING CONDITIONS								RETROFIT CONDITIONS								COST & SAVINGS ANALYSIS						
	Area Description	No. of Fixtures	Standard Fixture Code	Fixture Code	Watts per Fixture	kW/Space	Exist Control	Annual Hours	Annual kWh	Number of Fixtures	Standard Fixture Code	Fixture Code	Watts per Fixture	kW/Space	Retrofit Control	Annual Hours	Annual kWh	Annual kWh Saved	Annual kW Saved	Annual $ Saved	Retrofit Cost	NJ Smart Start Lighting Incentive	Simple Payback With Out Incentive	Simple Payback
Field Code	Unique description of the location - Room number/Room name: Floor number (if applicable)	No. of fixtures before the retrofit	Lighting Fixture Code	Code from Table of Standard Fixture Wattages	Value from Table of Standard Fixture Wattages	(Watts/Fixt) * (Fixt No.)	Pre-inst. control device	Estimated daily hours for the usage group	(kW/space) * (Annual Hours)	No. of fixtures after the retrofit	Lighting Fixture Code	Code from Table of Standard Fixture Wattages	Value from Table of Standard Fixture Wattages	(Watts/Fixt) * (Number of Fixtures)	Retrofit control device	Estimated annual hours for the usage group	(kW/space) * (Annual Hours)	(Original Annual kWh) - (Retrofit Annual kWh)	(Original Annual kW) - (Retrofit Annual kW)	(kWh Saved) * ($/kWh)	Cost for renovations to lighting system	Prescriptive Lighting Measures	Length of time for renovations cost to be recovered	Length of time for renovations cost to be recovered
35LED	Classroom 102	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	occ	2400	2,592	12	T 38 R LED	RTLED38	38	0.5	none	2,400	1,094	1,498	0.6	$ 193.04	$ 2,835.00	$ -	14.7	14.7
35LED	Classroom 103	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	occ	2400	2,592	12	T 38 R LED	RTLED38	38	0.5	none	2,400	1,094	1,498	0.6	$ 193.04	$ 2,835.00	$ -	14.7	14.7
24LED	Corridor	17	1B 32 P F 2 (ELE)	F42LL	60	1.0	breaker	2280	2,326	17	4 ft LED Tube	200732x2	30	0.5	none	2,280	1,163	1,163	0.5	$ 151.96	$ 2,776.95	$ -	18.3	18.3
24LED	classroom 208	14	1B 32 P F 2 (ELE)	F42LL	60	0.8	sw	2400	2,016	14	4 ft LED Tube	200732x2	30	0.4	occ	1,680	706	1,310	0.4	$ 158.66	$ 2,415.15	$ 20	15.2	15.1
24LED	classroom 209	14	1B 32 P F 2 (ELE)	F42LL	60	0.8	sw	2400	2,016	14	4 ft LED Tube	200732x2	30	0.4	occ	1,680	706	1,310	0.4	$ 158.66	$ 2,415.15	$ 20	15.2	15.1
24LED	classroom 210	14	1B 32 P F 2 (ELE)	F42LL	60	0.8	sw	2400	2,016	14	4 ft LED Tube	200732x2	30	0.4	occ	1,680	706	1,310	0.4	$ 158.66	$ 2,415.15	$ 20	15.2	15.1
24LED	classroom 211	14	1B 32 P F 2 (ELE)	F42LL	60	0.8	sw	2400	2,016	14	4 ft LED Tube	200732x2	30	0.4	occ	1,680	706	1,310	0.4	$ 158.66	$ 2,415.15	$ 20	15.2	15.1
24LED	classroom 207	14	1B 32 P F 2 (ELE)	F42LL	60	0.8	sw	2400	2,016	14	4 ft LED Tube	200732x2	30	0.4	occ	1,680	706	1,310	0.4	$ 158.66	$ 2,415.15	$ 20	15.2	15.1
18LED	Boys Rm	4	T 32 R F 4 (ELE)	F44ILL	112	0.4	sw	1000	448	4	T 50 R LED	RTLED50	50	0.2	none	1,000	200	248	0.2	$ 43.74	$ 945.00	$ -	21.6	21.6
18LED	Girls Rm	4	T 32 R F 4 (ELE)	F44ILL	112	0.4	sw	1000	448	4	T 50 R LED	RTLED50	50	0.2	none	1,000	200	248	0.2	$ 43.74	$ 945.00	$ -	21.6	21.6
4LED	Stairway	2	2B 34 R F 2 (u) (MAG)	FU2EE	72	0.1	breaker	3200	461	2	2T XX R LED	2RTLED	25	0.1	none	3,200	160	301	0.1	$ 36.22	$ 405.00	$ -	11.2	11.2
18LED	Toilet rm	3	T 32 R F 4 (ELE)	F44ILL	112	0.3	sw	1000	336	3	T 50 R LED	RTLED50	50	0.2	none	1,000	150	186	0.2	$ 32.80	$ 708.75	$ -	21.6	21.6
18LED	Toilet rm	3	T 32 R F 4 (ELE)	F44ILL	112	0.3	sw	1000	336	3	T 50 R LED	RTLED50	50	0.2	none	1,000	150	186	0.2	$ 32.80	$ 708.75	$ -	21.6	21.6
262	front vestibule	18	B CF 36 W	CFT36/1	51	0.9	breaker	2280	2,093	18	B CF 36 W	CFT36/1	51	0.9	none	2,280	2,093	-	0.0	$ -	$ -	$ -		
261LED	Auditorium	48	PAR 38 SP	H100/1	100	4.8	sw	1820	8,736	48	EVO35/10	EVO35/10	39	1.9	none	1,820	3,407	5,329	2.9	$ 744.47	$ 21,060.00	$ -	28.3	28.3
261LED	Auditorium	15	PAR 38 SP	H100/1	100	1.5	sw	1820	2,730	15	EVO35/10	EVO35/10	39	0.6	none	1,820	1,065	1,665	0.9	$ 232.65	$ 6,581.25	$ -	28.3	28.3
1	Auditorium	30	SQ 13 W CF 2 (MAG)	CFQ13/2	31	0.9	sw	1820	1,693	30	SQ 13 W CF 2 (MAG)	CFQ13/2	31	0.9	none	1,820	1,693	-	0.0	$ -	$ -	$ -		
18LED	Stage	16	T 32 R F 4 (ELE)	F44ILL	112	1.8	sw	1820	3,261	16	T 50 R LED	RTLED50	50	0.8	none	1,820	1,456	1,805	1.0	$ 252.23	$ 3,780.00	$ -	15.0	15.0
35LED	Music classroom 202	18	T 32 R F 3 (ELE)	F43ILL/2	90	1.6	sw	2400	3,888	18	T 38 R LED	RTLED38	38	0.7	occ	1,680	1,149	2,739	0.9	$ 336.35	$ 4,380.75	$ 20	13.0	13.0
35LED	Music classroom 201	20	T 32 R F 3 (ELE)	F43ILL/2	90	1.8	sw	2400	4,320	20	T 38 R LED	RTLED38	38	0.8	occ	1,680	1,277	3,043	1.0	$ 373.72	$ 4,853.25	$ 20	13.0	12.9
18LED	Storage	4	T 32 R F 4 (ELE)	F44ILL	112	0.4	sw	500	224	4	T 50 R LED	RTLED50	50	0.2	none	500	100	124	0.2	$ 31.96	$ 945.00	$ -	29.6	29.6
35LED	Corridor	10	T 32 R F 3 (ELE)	F43ILL/2	90	0.9	breaker	2280	2,052	10	T 38 R LED	RTLED38	38	0.4	none	2,280	866	1,186	0.5	$ 154.94	$ 2,362.50	$ -	15.2	15.2
9LED	Old Gymnasium	32	High Bay MH 200 35 Feet High	MH200/1	232	7.4	sw	2912	21,619	32	FXLED78	FXLED78/1	78	2.5	none	2,912	7,268	14,350	4.9	$ 1,764.22	$ 27,014.26	$ 4,800	15.3	12.6
40LED	Old Girls Locker Rm	28	T 32 R F 2 (ELE)	F42LL	60	1.7	sw	2800	4,704	28	T 38 R LED	RTLED38	38	1.1	none	2,800	2,979	1,725	0.6	$ 213.97	$ 6,615.00	$ -	30.9	30.9
40LED	Old Boys Locker Rm	32	T 32 R F 2 (ELE)	F42LL	60	1.9	sw	2800	5,376	32	T 38 R LED	RTLED38	38	1.2	none	2,800	3,405	1,971	0.7	$ 244.54	$ 7,560.00	$ -	30.9	30.9
40LED	New Girls Locker rm	20	T 32 R F 2 (ELE)	F42LL	60	1.2	sw	2800	3,360	20	T 38 R LED	RTLED38	38	0.8	none	2,800	2,128	1,232	0.4	$ 152.84	$ 4,725.00	$ -	30.9	30.9
40LED	New Boys Locker rm	20	T 32 R F 2 (ELE)	F42LL	60	1.2	sw	2800	3,360	20	T 38 R LED	RTLED38	38	0.8	none	2,800	2,128	1,232	0.4	$ 152.84	$ 4,725.00	$ -	30.9	30.9
40LED	Training Rm	8	T 32 R F 2 (ELE)	F42LL	60	0.5	sw	2800	1,344	8	T 38 R LED	RTLED38	38	0.3	none	2,800	851	493	0.2	$ 61.14	$ 1,890.00	$ -	30.9	30.9
24LED	Corridor	36	1B 32 P F 2 (ELE)	F42LL	60	2.2	breaker	2280	4,925	36	4 ft LED Tube	200732x2	30	1.1	none	2,280	2,462	2,462	1.1	$ 321.80	$ 5,880.60	$ -	18.3	18.3
1	Vestibules	12	SQ 13 W CF 2 (MAG)	CFQ13/2	31	0.4	breaker	2280	848	12	SQ 13 W CF 2 (MAG)	CFQ13/2	31	0.4	none	2,280	848	-	0.0	$ -	$ -	$ -		
40LED	Gym storage	4	T 32 R F 2 (ELE)	F42LL	60	0.2	sw	500	120	4	T 38 R LED	RTLED38	38	0.2	none	500	76	44	0.1	$ 11.34	$ 945.00	$ -	83.3	83.3
20LED	Boys Rm	6	S 32 C F 1 (ELE)	F41LL	32	0.2	sw	1000	192	6	4 ft LED Tube	200732x1	15	0.1	none	1,000	90	102	0.1	$ 17.99	$ 490.05	$ -	27.2	27.2
20LED	Girls Rm	6	S 32 C F 1 (ELE)	F41LL	32	0.2	sw	1000	192	6	4 ft LED Tube	200732x1	15	0.1	none	1,000	90	102	0.1	$ 17.99	$ 490.05	$ -	27.2	27.2
35LED	Principals office	4	T 32 R F 3 (ELE)	F43ILL/2	90	0.4	sw	2400	864	4	T 38 R LED	RTLED38	38	0.2	none	2,400	365	499	0.2	$ 64.35	$ 945.00	$ -	14.7	14.7
35LED	Asst principals office	4	T 32 R F 3 (ELE)	F43ILL/2	90	0.4	sw	2400	864	4	T 38 R LED	RTLED38	38	0.2	none	2,400	365	499	0.2	$ 64.35	$ 945.00	$ -	14.7	14.7
35LED	Conference Rm	3	T 32 R F 3 (ELE)	F43ILL/2	90	0.3	sw	1200	324	3	T 38 R LED	RTLED38	38	0.1	occ	1,000	114	210	0.2	$ 32.64	$ 837.00	$ 20	25.6	25.0
4LED	Stairway	2	2B 34 R F 2 (u) (MAG)	FU2EE	72	0.1	breaker	3200	461	2	2T XX R LED	2RTLED	25	0.1	none	3,200	160	301	0.1	$ 36.22	$ 405.00	$ -	11.2	11.2
24LED	Health classroom	16	1B 32 P F 2 (ELE)	F42LL	60	1.0	sw	2400	2,304	16	4 ft LED Tube	200732x2	30	0.5	occ	1,680	806	1,498	0.5	$ 181.32	$ 2,741.85	$ 20	15.1	15.0
24LED	Team Rm	14	1B 32 P F 2 (ELE)	F42LL	60	0.8	sw	2800	2,352	14	4 ft LED Tube	200732x2	30	0.4	none	2,800	1,176	1,176	0.4	$ 145.89	$ 2,286.90	$ -	15.7	15.7
18LED	Storage	3	T 32 R F 4 (ELE)	F44ILL	112	0.3	sw	500	168	3	T 50 R LED	RTLED50	50	0.2	none	500	75	93	0.2	$ 23.97	$ 708.75	$ -	29.6	29.6
40LED	Training Rm	4	T 32 R F 2 (ELE)	F42LL	60	0.2	sw	2800	672	4	T 38 R LED	RTLED38	38	0.2	none	2,800	426	246	0.1	$ 30.57	$ 945.00	$ -	30.9	30.9
18LED	Storage	3	T 32 R F 4 (ELE)	F44ILL	112	0.3	sw	500	168	3	T 50 R LED	RTLED50	50	0.2	none	500	75	93	0.2	$ 23.97	$ 708.75	$ -	29.6	29.6
117	Exterior	12	CF 23	CFS23/1	23	0.3	breaker	4368	1,206	12	CF 23	CFS23/1	23	0.3	none	4,368	1,206	-	0.0	$ -	$ -	$ -		
227LED	Exterior	13	70 W MH Wall Pack	MH70/1	95	1.2	breaker	4368	5,394	13	FXLED18	FXLED18/1	18	0.2	none	4,368	1,022	4,372	1.0	$ 496.82	$ 5,501.93	$ 1,300	11.1	8.5
142LED	Exterior	3	MH 100	MH100/1	128	0.4	breaker	4368	1,677	3	FXLED39	FXLED39/1	39	0.1	none	4,368	511	1,166	0.3	$ 132.52	$ 1,668.60	$ 300	12.6	10.3
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S	**Total**	**1,896**				**180.7**			**425,079**	**1,896**				**78.1**			**151,864**		**102.6**	**34,304**	**464,980**	**$11,590**		
S																	**Demand Savings**			**102.6**	**$8,348**			
S																	**kWh Savings**			**273,215**	**$25,955**			
S																	**Total Savings**				**$34,304**		**13.6**	**13.2**

APPENDIX D

New Jersey Board of Public Utilities Incentives

i. **Smart Start**

ii. **Direct Install**

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

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

I. SMART START

NJ SmartStart Buildings

Program Overview

With New Jersey SmartStart Buildings ...

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

Special Notice

Enhanced incentives are available for NJ SmartStart Building upgrades in buildings im Hurricane Sandy. Eligible projects receive an additional 50% and new incentives have added for high efficiency food service equipment.

Visit the Sandy web page for details and important links.

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

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

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

Getting Started

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

PAST PROGRAMS

TOOLS AND RESOURCES

PROGRAM UPDATES

CONTACT US

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

Support for Custom Energy-Efficiency Measures

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

Incentives for Qualifying Equipment and Projects

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

Find out more about equipment incentives

For specific details on equipment requirements and financial incentives, including ince equipment not listed here, contact a program representative. Fiscal year financial incent be limited to a maximum of $500,000 per customer utility account and are available as f permits.

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COMMERCIAL, INDUSTRIAL AND LOCAL GOVERNMENT

HURRICANE SANDY

PROGRAMS

NJ SMARTSTART BUILDINGS

EQUIPMENT INCENTIVES

FOOD SERVICE EQUIPMENT

APPLICATION FORMS

TOOLS AND RESOURCES

PAY FOR PERFORMANCE

COMBINED HEAT & POWER AND FUEL CELLS

LOCAL GOVERNMENT ENERGY AUDIT

LARGE ENERGY USERS PROGRAM

ENERGY SAVINGS IMPROVEMENT PROGRAM

DIRECT INSTALL

ENERGY BENCHMARKING

OIL, PROPANE & MUNICIPAL ELECTRIC CUSTOMERS

EDA PROGRAMS

SBC CREDIT PROGRAM

Home » Commercial & Industrial » Programs » NJ SmartStart Buildings

Equipment Incentives

Special Notice

Enhanced incentives are available for NJ SmartStart Building upgrades in buildings im Hurricane Sandy. Eligible projects receive an additional 50% and new incentives have added for high efficiency food service equipment.

Visit the Sandy web page for details and important links.

More reasons for a smart start on your next project!

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

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

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

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

Electric Chillers

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

Gas Cooling

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

PAST PROGRAMS

TOOLS AND RESOURCES

PROGRAM UPDATES

CONTACT US

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

Electric Unitary HVAC

Unitary AC and split systems ($73 - $92 per ton)
Air-to-air heat pumps ($73 - $92 per ton)
Water-source heat pumps ($81 per ton)
Packaged terminal AC & HP ($65 per ton)
Central DX AC Systems ($40 - $72 per ton)
Dual Enthalpy Economizer Controls ($250)
Occupancy Controlled Thermostats ($75 each)
A/C Economizing Controls ($85 - $170 each)

Ground Source Heat Pumps

Closed Loop ($450-750 per ton)

Gas Heating

Gas-fired boilers < 300 MBH ($300 per unit)
Gas-fired boilers ≥ 300 MBH - 1500 MBH ($1.75 per MBH)
Gas-fired boilers ≥ 1500 MBH - ≤ 4000 MBH ($1.00 per MBH)
Gas-fired boilers > 4000 MBH (Calculated through Custom Measur
Gas furnaces ($300-$400 per unit)
Gas infrared heaters - indoor only ($300 - $500 per unit)
Boiler economizing controls ($1,200 - $2,700 per unit)

Variable Frequency Drives

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

Natural Gas Water Heating

Gas water heaters ≤ 50 gallons ($50 per unit)
Gas-fired water heaters > 50 gallons ($1.00 - $2.00 per MBH)
Tankless water heaters replacing a free standing water heater > 82 energy factor ($300 per heater)
Gas-fired booster water heaters ($17 - $35 per MBH)

Premium Motors

Three-phase motors ($45 - $700 per motor) **(Incentive was discor effective March 1, 2013 except for buildings impacted by Hurri Sandy. Approved applications will have the standard timefram year from the program commitment date to complete the instal**

Refrigerator/Freezer Case Premium Efficiency Motors (ECM)

Fractional (< 1 HP) Electronic Commutated Motors (ECM) ($40 per for replacement of existing shaded-pole motor in refrigerated/freeze

Prescriptive Lighting

New Linear Fluorescent

- T-12, HID and Incandescent to T-5 and T-8 ($25 - $200 p fixture) **(Note: T12 replacements are only available for buildings impacted by Hurricane Sandy)**
- New Induction ($70 per replaced HID fixture)
- New LED
  - Screw-in/Plug-in ($10 - $20 per lamp)
  - Refrigerator/Freezer Case ($30 - $65 per fixture)
  - Outdoor pole/arm/wall-mounted luminaires ($100 - $175 p fixture)
  - Display case ($30 per case)
  - Shelf-mounted display and task ($15 per linear foot)
  - Wall-wash, desk, recessed ($20 - $35 per fixture)
  - Parking garage luminaires ($100 per fixture)
  - Track or Mono-Point directional ($50 per fixture)
  - Stairwell and Passageway luminaires ($40 per fixture)
  - High-Bay, Low-Bay ($150 per fixture)
  - Bollard ($50 per fixture)
  - luminaires for Ambient Lighting of Interior Commercial Spa *Linear panels ($50 per fixture)*
  - Fuel pump canopy ($100 per fixture)
  - LED retrofit kits (custom measures)
- New Pulse-Start Metal Hallide ($25 per fixture)
- Linear Fluorescent Retrofit ($10 - $20 per fixture)
- Induction Retrofit ($50 per retrofitted HID fixture)
- New Construction/Complete Renovation (performance-based)

Note: Incentives for T-12 to T-5 and T-8 lamps with electronic ballast in facilities ($10 per fixture, 1-4 lamps) and T-5/T-8 high bay fixtures ($16 - per fixture) were discontinued effective March 1, 2013 for T-12 retrofits replacements except for buildings impacted by Hurricane Sandy. Appr applications will have the standard timeframe of one year from the pro commitment date to complete the installation

Lighting Controls

- Occupancy Sensors
  - Wall mounted ($20 per control)
  - Remote mounted ($35 per control)
  - Daylight dimmers ($25 per fixture controlled, $50 per fixtu office applications only)
  - Occupancy controlled hi-low fluorescent controls ($25 per controlled)
- HID or Fluorescent Hi-Bay Controls
  - Occupancy hi-low ($35 per fixture controlled)
  - Daylight dimming ($45 per fixture controlled)

Refrigeration

- Covers and Doors
  - Energy-Efficient doors for open refrigerated doors/covers per door)
  - Aluminum Night Curtains for open refrigerated cases ($3.5 linear foot)
- Controls
  - Door Heater Control ($50 per control)
  - Electric Defrost Control ($50 per control)
  - Evaporator Fan Control ($75 per control)
  - Novelty Cooler Shutoff ($50 per control)

Food Service Equipment

Cooking
- Combination Electric Oven/Steamer ($1,000 per oven)
- Combination Gas Oven/Steamer ($750 per oven)
- Electric Convection Oven ($350 per oven)
- Gas Convection Oven ($500 per oven)
- Gas Rack Oven ($1,000 single, $2,000 double)
- Gas Conveyor Oven ($500 small deck, $750 large deck)
- Electric Fryer ($200 per vat)
- Gas Fryer ($749 per vat)
- Electric Large Vat Fryer ($200 per vat)
- Gas Large Vat Fryer ($500 per vat)
- Electric Griddle ($300 per griddle)
- Gas Griddle ($125 per griddle)
- Electric Steam Cooker ($1,250 per steamer)
- Gas Steam Cooker ($2,000 per steamer)

Holding
- Full Size Insulated Cabinets ($300 per cabinet)
- Three Quarter Size Insulated Cabinets ($250 per cabinet)
- Half Size Insulated Cabinets ($200 per cabinet)

Cooling
- Glass Door Refrigerators ($75 - $150 per unit)
- Solid Door Refrigerators ($50 - $200 per unit)
- Glass Door Freezers ($200 - $1,000 per unit)
- Solid Door Freezers ($100 - $600 per unit)
- Ice Machines ($50 - $500 per unit)

Cleaning
- Dishwashers ($400 - $1,500 per unit)

Other Equipment Incentives*

- Performance Lighting ($1.00 per watt per square foot below prograi incentive threshold, currently 5% more energy efficient than ASHR/ 2007 for New Construction only.)
- Custom electric and gas equipment incentives (not prescriptive)

*Equipment incentives are calculated based on type, efficiency, size, and ap and are evaluated on a case-by-case basis. Contact us for details.

II. DIRECT INSTALL

COMMERCIAL, INDUSTRIAL AND LOCAL GOVERNMENT

HURRICANE SANDY

PROGRAMS

NJ SMARTSTART BUILDINGS

PAY FOR PERFORMANCE

COMBINED HEAT & POWER AND FUEL CELLS

LOCAL GOVERNMENT ENERGY AUDIT

LARGE ENERGY USERS PROGRAM

ENERGY SAVINGS IMPROVEMENT PROGRAM

DIRECT INSTALL

PARTICIPATION STEPS

PARTICIPATING CONTRACTORS

SUSTAINABLE JERSEY

ENERGY BENCHMARKING

OIL, PROPANE & MUNICIPAL ELECTRIC CUSTOMERS

EDA PROGRAMS

SBC CREDIT PROGRAM

Direct Install

NEW JERSEY'S CLEAN ENERGY PROGRAM
DIRECT Install

Let us pay up to 70% of your energy efficiency upgrade.

Sometimes, the biggest challenge to improving energy efficiency is knowing where t and how to get through the process. Created specifically for existing small to mediun facilities, Direct Install is a turnkey solution that makes it easy and affordable to upgr high efficiency equipment. Direct Install is designed to cut your facility's energy costs replacing lighting, HVAC and other outdated operational equipment with energy effic alternatives. The program pays up to 70% of retrofit costs, dramatically improving yo payback on the project. There is a $125,000 incentive cap on each project.

ELIGIBILITY

Existing small to mid-sized commercial and industrial f with a peak electric demand that did not exceed 200 k any of the preceding 12 months are eligible to participa Direct Install. Applicants will submit the last 12 months electric utility bills indicating that they are below the de threshold and have occupied the building during that ti Buildings must be located in New Jersey and served b the state's public, regulated electric or natural gas utilit companies.

SYSTEMS & EQUIPMENT ADDRESSED BY THE PROGRAM

- Lighting
- Heating, Cooling & Ventilation (HVAC)
- Refrigeration
- Motors
- Natural Gas
- Variable Frequency Drives

Measures eligible for Direct Install are limited to specific equipment categories, type capacities. Boilers may not exceed 500,000 Btuh and furnaces may not exceed 140,

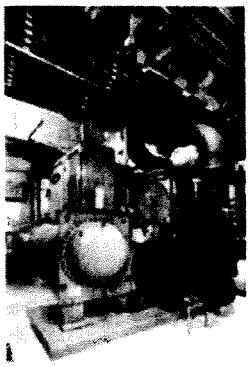
III. PAY FOR PERFORMANCE (P4P)

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 facilit earn incentives that are directly linked to your savings. Pay for Performance relies on a program partners who provide technical services under direct you. Acting as your energy expert, your partner will develop a reduction plan for each project with a whole-building technica component of a traditional energy audit, a financial plan for fu energy efficient measures and a construction schedule for ins



Eligibility

Existing commercial, industrial and institutional buildings with demand over 100 kW for any of the preceding twelve months to participate including hotels and casinos, large office buildir family buildings, supermarkets, manufacturing facilities, scho shopping malls and restaurants. Buildings that fall into the fol customer classes are not required to meet the 100 kW dema to participate in the program: hospitals, public colleges and universities, 501(c)(3) non-p affordable multifamily housing, and local governmental entities. Your energy reduction p 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, manuf water treatment and datacenter building types whose annual energy consumption is hea weighted on process loads. Details are available in the high energy intensity section of t 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 ir facilities and comparing it to similar buildings. That can be a big help in locating opportu cost-justified energy efficiency upgrades. And, based on our findings, you may be invite participate in the Building Performance with ENERGY STAR initiative and receive speci recognition as an industry leader in energy efficiency.

Incentives

OIL, PROPANE & MUNICIPAL ELECTRIC CUSTOMERS

EDA PROGRAMS

SBC CREDIT PROGRAM

PAST PROGRAMS

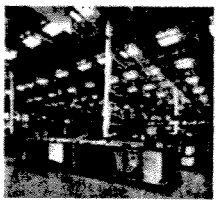
TOOLS AND RESOURCES

PROGRAM UPDATES

CONTACT US

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

Incentive #1 - Submittal of complete energy reduction plan prepared by an app program partner - Contingent on moving forward, incentives will be between $5 $50,000 based on approximately $.10 per square foot, not to exceed 50% of th 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 based on actual savings, provided that the minimum performance threshold of savings has been achieved.

A detailed Incentive Structure document is available on the applications and form

Steps to Participation

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

Home | Residential | Commercial & Industrial | Renewable Energy
About Us | Press Room | Library | FAQs | Calendar | Newsletters | Contact Us | Site

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

BPU

PAY FOR PERFORMANCE APPLICATION FORM

July 1, 2013 - June 30, 2014

Utility Serving Applicant: ☐ Atlantic City Electric ☐ Jersey Central Power & Light ☐ PSE&G
☐ New Jersey Natural Gas ☐ Elizabethtown Gas ☐ Rockland Electric Co. ☐ South Jersey Gas
☐ Other Electric Service Provider (please specify): _____
☐ Other Fuel Provider: _____ ☐ Oil: _____ ☐ Other (Please specify): _____

Instructions

1. Read the program material to determine project qualification.
2. Read the Participation Agreement and sign where indicated.
3. Fill out all applicable spaces on this form.
4. Provide a copy of the customer's company W-9 form.
5. Provide the most recent consecutive 12 month period of utility bills for the project.
6. Provide brief description of facility.
7. Partner must submit the application package via e-mail, mail or fax DIRECTLY to the Market Manager – see back of this form.

Approval of this Application is not an approval of the project's scope of work. Scope of work is only approved upon approval of the Energy Reduction Plan. See application and program guidelines for more information.

Customer/Owner Information (payment will be made to entity entered here)

Company Name		Project Contact/Title	
Company Address	City	State	Zip
Phone/Fax	E-mail	Federal ID/SSN	

Partner Information

Company Name		Project Contact/Title	
Company Address	City	State	Zip
Phone	Fax	E-mail	

Project Information

Project Name			
Building Address	City	State	Zip
Utility Account Number(s): Electric		Gas	
* Note: Please use the back of this page for additional utility accounts if quantity exceeds space allotment.			
Annual Peak kW Demand	Building Type		Number of Buildings
Size of Building(s) (gross sq/ft)	Direct, Master or Sub Metered		

Funding

❑ Check the box if an Energy Savings Improvement Program (ESIP) will be a source of funding. ESIP allows government agencies to pay for energy related improvements using the value of the resulting energy savings.

Do you expect to receive funding under any other efficiency programs? ☐ No ☐ Yes If Yes, please specify below:

Utility Program #1 – Utility: _____ Program Name: _____
Utility Program #2 – Utility: _____ Program Name: _____
Federal Program #1 – Organization: _____ Program Name: _____
Federal Program #2 – Organization: _____ Program Name: _____
Other Program – Organization: _____ Program Name: _____

Additional Project information

Additional Utility Account(s)

Account type	Account number
Account type	Account number
Account type	Account number
Account type	Account number
Account type	Account number
Account type	Account number
Account type	Account number
Account type	Account number
Account type	Account number
Account type	Account number
Account type	Account number
Account type	Account number

Additional Comments:

Complete this application form and send it directly to the Commercial/Industrial Market Manager by e-mail, mail or fax.

New Jersey's Clean Energy Program
c/o TRC Energy Services-P4P
900 Route 9 North, Suite 404 • Woodbridge, NJ 07095

Phone: 866-657-6278 • Fax: 732-855-0422
E-mail: P4P@NJCleanEnergy.com

Visit our website: NJCleanEnergy.com/P4P

*Incentives/Requirements subject to change.

Pay For Performance-Existing Buildings

Participation Agreement

Definitions:

Design Incentives – Incentives that may be offered to design professionals by the Program.

Design Services – Services that may be offered to design professionals under the Program.

Energy-Efficient Measures – Any device eligible to receive a Program Incentive payment through the NJ Clean Energy Commercial and Industrial Program (New Jersey SmartStart Buildings).

New Jersey Utilities – The regulated electric and/or gas utilities in the State of New Jersey. They are: Atlantic City Electric, Jersey Central Power & Light, Rockland Electric Company, New Jersey Natural Gas, Elizabethtown Gas, PSE&G, and South Jersey Gas.

Administrator – New Jersey Board of Public Utilities, Office of Clean Energy

Participating Customers – Those non-residential electric and/or gas service customers of the New Jersey Utilities who participate in this Program.

Product Installation or Equipment Installation – Installation of the Energy-Efficient Measures.

Projects with a contract threshold of $14,187 (increasing to $15,444 effective July 1, 2014) are required to pay no less than prevailing wage rate to workers employed in the performance of any construction undertaken in connection with Board of Public Utilities financial assistance, or undertaken to fulfill any condition of receiving Board of Public Utilities financial assistance, including the performance of any contract to construct, renovate or otherwise prepare a facility, the operations of which are necessary for the receipt of Board of Public Utilities financial assistance. By submitting an application, or accepting program incentives, applicant agrees to adhere to New Jersey Prevailing Wage requirements, as applicable.

Program – The Commercial and Industrial Energy-Efficient Construction Program (New Jersey SmartStart Buildings) offered herein by the New Jersey Board of Public Utilities, Office of Clean Energy pursuant to state regulatory approval under the New Jersey Electric Discount and Energy Competition Act, NJSA 48:3-49, et seq.

Program Incentives – Refers to the amount or level of incentive that the Program provides to Participating Customers pursuant to the Program offered herein (see description under "Incentive Amount" heading).

Program Offer – Program Incentives are available to non-residential retail electric and/or gas service customers of the New Jersey Utilities identified above.

Program Manager – TRC Energy Services.

Application and Eligibility Process – The Program pays incentives after the installation of qualified energy-efficient measures that were pre-approved (for exceptions to this condition, please refer to "Exceptions for Approval".) In order to be eligible for Program Incentives, a Customer, or an agent (contractor/vendor) authorized by a Customer, must submit a properly completed application package. The package must include an application signed by the customer; a complete (current) utility bill; and technology worksheet and manufacturer's cut sheets (where appropriate). This information must be submitted to the Program Manager before equipment is installed. Applications for measures that are self installed by customers must be submitted by the customer and not the sales vendor of the measure, however, the customer may elect to assign payment of the incentive to the sales vendor. This application package must be received by the Program Manager on or before June 30, 2014 in order to be eligible for the fiscal year July 1, 2013-June 30, 2014 incentives. The Program Manager will review the application package to determine if the project is eligible for a Program Incentive. If eligible, the Customer will receive an approval letter with the estimated authorized incentive amount and the date by which the equipment must be installed in order for the approval to remain in effect. Upon receipt of an approval letter, the Customer may then proceed to install the equipment listed on the approved application. Equipment installed prior to the date of the Program Manager's approval letter is not eligible for an incentive. The Program Manager reserves the right to conduct a pre-inspection of the facility prior to the installation of equipment. This will be done prior to the issuance of the approval letter. All equipment must be purchased within 12 months of date of application. **Any Customer and/ or agent who purchases equipment prior to the receipt of an incentive approval letter does so at his/her own risk.**

Exceptions for Approval – The Application and Eligibility Process pertains to all projects except for those involving either Gas Heating, Unitary HVAC or Motors having an incentive amount less than $5,000 that were installed within 12 months of receipt of the application. These measures, at this incentive level, may be installed without prior approval. In addition, but at the sole discretion of the Program Manager, emergency replacement of equipment may not require a prior approval determination and letter. **In such cases, please notify the Program Manager of such emergencies as early as possible, that an application will soon be sent in that was not pre-approved.**

Post-Installation Approval – After installation is completed, the Customer, or an agent authorized by the Customer, must finalize and submit an invoice for the purchase of the equipment (material cost must be broken out from labor costs), and any other required documentation as specified on the equipment application or in the Program Manager's initial approval letter.

Please refer to the program guide on the NJCleanEnergy.com/ssb website for the complete Application and Eligibility Process.

The Program Manager reserves the right to verify sales transactions and to have reasonable access to Participating Customer's facility to inspect both pre-existing product or equipment (if applicable) and the Energy-Efficient Measures

installed under this Program, either prior to issuing incentives or at a later time.

Energy-Efficient Measures must be installed in buildings located within a New Jersey Utilities' service territory and designated on the Participating Customer's incentive application. Program Incentives are available for qualified Energy-Efficient Measures as listed and described in the Program materials and incentive applications. The Participating Customer must ultimately own the equipment, either through an up-front purchase or at the end of a short-term lease. Design Incentives are available to design professionals as described in the Program materials and applications. A different and separate agreement must be executed by participating design professionals to be eligible for this type of incentive. The design professional does not need to be based in New Jersey.

Equipment procured by Participating Customers through another program offered by New Jersey's Clean Energy Program or the New Jersey Utilities, as applicable, is not eligible for incentives through this program. Customers who have not contributed to the Societal Benefits Charge of the applicable New Jersey Utility are not be eligible for incentives offered through this program.

Incentive Amount – Program Incentives will equal either: a) the approved Program Incentive amount, or b) the actual equipment cost of the Energy-Efficient Measure, whichever is less, as determined by the Program Manager. Products offered at no direct cost to the customer are ineligible. Incomplete application submissions, applications requiring inspections and unanticipated high volume of activities may cause processing delays. Program Incentives are limited to $500,000 per utility account in a calendar year. Contact the Program Manager regarding any questions.

Tax Liability – The Program Manager will not be responsible for any tax liability that may be imposed on any Participating Customer as a result of the payment of Program Incentives. All Participating Customers must supply their federal tax identification number or social security number to the Program Manager on the application form in order to receive a Program Incentive. In addition, Participating Customers must also provide a Tax Clearance Form (entitled "Business Assistance or Incentive Clearance Certificate") that is dated within 90 days of equipment installation.

Endorsement – The Program Manager and Administrator do not endorse, support or recommend any particular manufacturer, product or system design in promoting this Program.

Warranties – THE PROGRAM MANAGER AND ADMINISTRATOR DO NOT WARRANT THE PERFORMANCE OF INSTALLED EQUIPMENT, AND/OR SERVICES RENDERED AS PART OF THIS PROGRAM, EITHER EXPRESSLY OR IMPLICITLY. NO WARRANTIES OR REPRESENTATIONS OF ANY KIND, WHETHER STATUTORY, EXPRESSED, OR IMPLIED, INCLUDING, WITHOUT LIMITATIONS, WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE REGARDING EQUIPMENT OR SERVICES PROVIDED BY A MANUFACTURER OR VENDOR. CONTACT YOUR VENDOR/SERVICES PROVIDER FOR DETAILS REGARDING PERFORMANCE AND WARRANTIES.

Limitation of Liability – By virtue of participating in this Program, Participating Customers agree to waive any and all claims or damages against the Program Manager or the Administrator, except the receipt of the Program Incentive. Participating Customers agree that the Program Manager's and Administrator's liability, in connection with this Program, is limited to paying the Program Incentive specified. Under no circumstances shall the Program Manager, its representatives, or subcontractors, or the Administrator, be liable for any lost profits, special, punitive, consequential or incidental damages or for any other damages or claims connected with or resulting from participation in this Program. Further, any liability attributed to the Program Manager under this Program shall be individual, and not joint and/or several.

Assignment – The Participating Customer may assign Program Incentive payments to a specified vendor.

Participating Customer's Certification – Participating Customer certifies that he/she purchased and installed the equipment listed in their application at their defined New Jersey location. Participating Customer agrees that all information is true and that he/she has conformed to all of the Program and equipment requirements listed in the application.

Termination – The New Jersey Board of Public Utilities reserves the right to extend, modify (this includes modification of Program Incentive levels) or terminate this Program without prior or further notice.

Acknowledgement – I have read, understood and am in compliance with all rules and regulations concerning this incentive program. I certify that all information provided is correct to the best of my knowledge, and I give the Program Manager permission to share my records with the New Jersey Board of Public Utilities, and contractors it selects to manage, coordinate or evaluate the NJ SmartStart Buildings Program. Additionally, I allow reasonable access to my property to inspect the installation and performance of the technologies and installations that are eligible for incentives under the guidelines of New Jersey's Clean Energy Program.

CUSTOMER'S SIGNATURE
PARTNER SIGNATURE
By signing, I certify that I have read, understand and agree to the Participation Agreement listed above.

IV. ENERGY SAVINGS IMPROVEMENT PLAN (ESIP)

COMMERCIAL, INDUSTRIAL AND LOCAL GOVERNMENT

HURRICANE SANDY

PROGRAMS

NJ SMARTSTART BUILDINGS

PAY FOR PERFORMANCE

COMBINED HEAT & POWER AND FUEL CELLS

LOCAL GOVERNMENT ENERGY AUDIT

LARGE ENERGY USERS PROGRAM

ENERGY SAVINGS IMPROVEMENT PROGRAM

DIRECT INSTALL

ENERGY BENCHMARKING

OIL, PROPANE & MUNICIPAL ELECTRIC CUSTOMERS

EDA PROGRAMS

SBC CREDIT PROGRAM

PAST PROGRAMS

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CONTACT US

Home » Commercial & Industrial » Programs

Energy Savings Improvement Program

A new State law allows government agencies to make energy related improvements to t facilities and pay for the costs using the value of energy savings that result from the imp Under 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 and reduce energy usage with minimal expenditure of new financial resources.

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

Local Government
School Districts (K-12)

All RFPs must be submitted to the Board for approval at ESIP@bpu.state.nj.us.

The Board also adopted protocols to measure energy savings:

Measuring Energy Savings
Procedures for Implementation

The ESIP approach may not be appropriate for all energy conservation and energy effic improvements. Local units should carefully consider all alternatives to develop an appro best meets their needs. Local units considering an ESIP should carefully review the Loc Notice, the law, and consult with qualified professionals to determine how they should a task.

The NJ Board of Public Utilities sponsored Sustainable Jersey in the creation of an ESIF Guidebook that explains how to implement the program. The guidebook also includes ca of successful projects and a list of helpful resources.

FIRST STEP – ENERGY AUDIT

For local governments interested in pursuing an ESIP, the first step is to perform an ene as prescribed in P.L.2012 c.55.

ENERGY REDUCTION PLANS

If you have an ESIP plan that needs to be submitted to the Board of Public Utilities, plea 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)*

ESIP PROGRAM

Final version 42413

BPU RULES

1. Public Entity must decide if they will use an ESCO or DIY method or Hybrid thereof prior to issuing the RFP and the RFP must state the intended method. A change in the project procurement model after the RFP closing date will be cause for immediate rejection and disqualification of potential Clean Energy program incentives.

2. RFP procedures shall be adhered to as per the legislation, including the use of BPU approved forms. Any alteration of the forms, without prior approval from the BPU shall be grounds for rejection.

3. RFP must include copy of an audit (ASHRAE Level II w/Level III for lighting) and audit must be prepared by a firm classified by DPMC in the 036 discipline.

4. All firms, including professional services, whether using ESCO or DIY model, must be DPMC classified.

5. If an Architect is engaged by the public entity, the architectural fees are the responsibility of the public entity and must be paid directly to the firm. These fees may be included in the energy cost savings analysis and payback.

   ESCO's may contract directly with an architectural firm, in which case the architectural firm serves as a subcontractor to the ESCO and the project related service costs may be included within the project's economic model.

6. Public entity shall conduct pre-bid meetings and site visits per existing statutes.

   In the interest of open public bidding transparency, it is a requirement of the BPU that all proposers must attend the pre-proposal bid meeting.

7. There shall be no negative cash flow in any year of the program.
   section 7 (1)(a)
   > "the energy savings resulting from the program will be sufficient to cover the cost of the program's energy conservation measures."

8. SREC values are not permitted to be used in the energy cost savings calculations.

9. Capital cost avoidance values are not to be used in the energy savings calculations.

10. Operational and Maintenance (O&M) cost savings may be permitted in the cost savings calculations, but only with supporting documentation.

11. Blended utility rates shall not be permitted. Use the actual utility tariff or local contracted rates if there is a third party supplier.

    For the RFP proposals, the public entity shall define the utility rates in the RFP

12. Contracted third party utility rates may only be used for the term of the contract (5 yr. maximum) Subsequent years are to be projected at the utility tariff rates plus the annual BPU escalation rates.

13. Public entity shall conduct M&V (measurement and verification) at the one (1) year operational date and shall provide a copy of the M&V report to the Board of Public Utilities.

    For the RFP proposals, the ESCO shall provide the cost for the one (1) year M&V only. For comparative purposes, the one year M&V pricing shall be indicated on the proposal Form VI, under the "Annual Service Costs" column. Additional M&V costs are at the discretion of the local unit and are not to be included in the proposal.

14. The decisions made by BPU staff regarding compliance or other issues that arise in connection with the RFP procurement process shall be considered a final decision of the BPU. Any appeal will need to be through the New Jersey Superior Court, Appellate Division.

15. For the RFP proposals only, Demand Response (DR) revenues claimed by ESCO's can only be projected for a maximum period of three (3) years. DR revenue projections beyond three years will not be permitted. DR revenues must be included and presented under the "Energy Rebates/Incentives" column of FORM VI.

16. ESCO "fees" proposed during the RFP phase of the project cannot increase post-award. ESCO's are required to maintain the fee percentages through final contract negotiations and construction of the Board approved Energy Savings Plan

17. Public Bid openings shall be held on the due date of the proposal submissions. The public entity shall announce the name of the bidder and the total dollar amount. After award of a contract, all proposals received will be made available by the owner for public inspection

18. Rejection of bids by the public entity shall be conducted in accordance with the appropriate sections of the applicable legislation, as stated in Title 40A:11-13.2. Additionally all proposals must be returned to the respective ESCO's upon rejection.

19. Field changes that exceed 5% of the project cost require BPU approval.

20. Energy Savings Plans (ESP) that is dependent upon incentives from the Clean Energy Program must review the current program requirements, at the time of application, for each incentive to insure eligibility. If any program incentive is denied, resubmission of all ESIP related forms will be necessary to remain ESIP qualified.

APPENDIX E

Photovoltaic Analysis

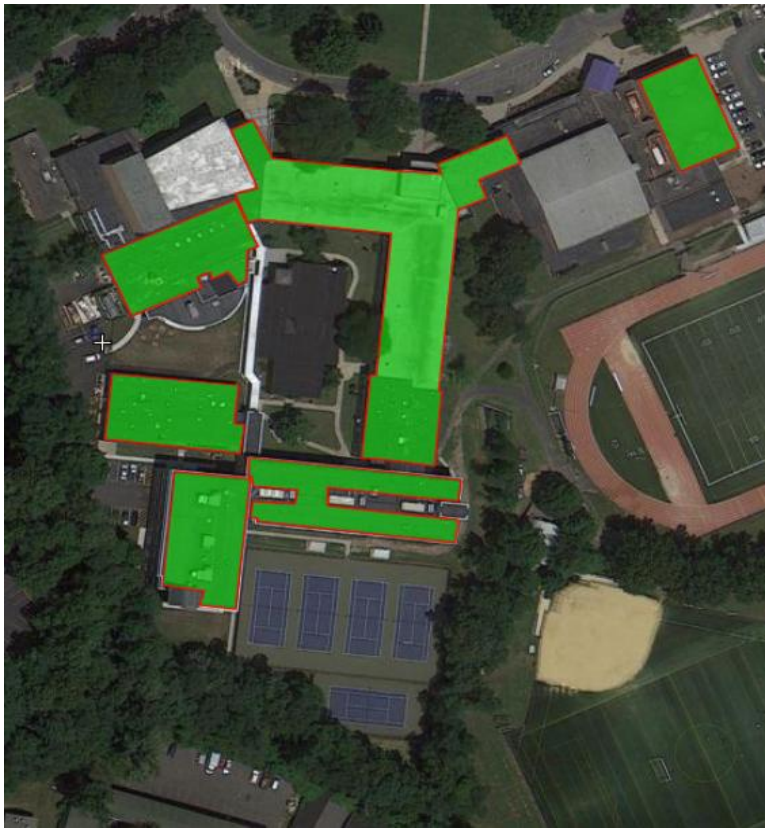
Millburn Township Public School District
Millburn High School

Cost of Electricity	$0.120	/kWh
Electricity Usage	2,220,800	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
$1,080,000	**270.0**	**351,900**	**0**	**$42,192**	**0**	**$42,192**	**$0**	**$61,583**	**25.6**	**10.4**

** Estimated Solar Renewable Energy Certificate Program (SREC) SREC for 15 Years= $175 /1000kwh



Area Output*
7,333 m2
78,935 ft2

Perimeter Output*
1,173 m
3,849 ft

Available Roof Space for PV:
(Area Output - 10 ft x Perimeter) x 85%
34,375 ft2

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

8	watt/ft2	
274,998	DC watts	
270	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	07041	Enter into PV Watts
DC/AC Derate Factor	0.83	Enter info PV Watts

PV Watts Output
351,900 annual kWh calculated in PV Watts program

% Offset Calc

Usage	2,220,800	(from utilities)
PV Generation	351,900	(generated using PV Watts)
% offset	16%	

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

AC Energy & Cost Savings

Cautions for Interpreting the Results

(Type comments here to appear on printout; maximum 1 row of 90 characters.)

Station Identification

Cell ID:	0268370
State:	New Jersey
Latitude:	40.9 ° N
Longitude:	74.2 ° W

PV System Specifications

DC Rating:	270.0 kW
DC to AC Derate Factor:	0.830
AC Rating:	224.1 kW
Array Type:	Fixed Tilt
Array Tilt:	20.0 °
Array Azimuth:	180.0 °

Energy Specifications

Cost of Electricity:	12.0 ¢/kWh

Results

Month	Solar Radiation (kWh/m²/day)	AC Energy (kWh)	Energy Value ($)
1	2.65	18862	2263.44
2	3.47	22339	2680.68
3	4.83	33154	3978.48
4	5.28	33983	4077.96
5	5.93	38773	4652.76
6	6.32	38931	4671.72
7	5.87	36645	4397.40
8	5.55	34886	4186.32
9	5.04	31226	3747.12
10	4.14	27459	3295.08
11	2.82	18441	2212.92
12	2.46	17202	2064.24
Year	4.54	351900	42228.00

Output Hourly Performance Data

(Gridded data is monthly, hourly output not available.)

Output Results as Text

Saving Text from a Browser

Run PVWATTS v.2 for another location

Run PVWATTS v.1

Please send questions and comments to Webmaster

Disclaimer and copyright notice.

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

APPENDIX F

Photos

1: Millburn High School front exterior

2: Trane rooftop unit vintage 1996

3: Kitchen hood

4: Vending machines

5: Window AC unit Industrial Arts wing

APPENDIX G

EPA Portfolio Manager

ENERGY STAR® Statement of Energy Performance

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ENERGY STAR® Score[1]

Millburn High School

Primary Property Function: K-12 School
Gross Floor Area (ft²): 201,858
Built: 1955

For Year Ending: February 28, 2014
Date Generated: May 22, 2014

1. The ENERGY STAR score is a 1-100 assessment of a building's energy efficiency as compared with similar buildings nationwide, adjusting for climate and business activity.

Property & Contact Information

Property Address	Property Owner	Primary Contact
Millburn High School 462 Millburn Avenue Millburn, New Jersey 07041	Millburn Township Public Schools 434 Millburn Avenue Millburn, NJ 07041 (____)____-_____	____ _____ , (____)____-_____ _____

Property ID: 4057215

Energy Consumption and Energy Use Intensity (EUI)

Site EUI
76.3 kBtu/ft²

Source EUI
158.6 kBtu/ft²

Annual Energy by Fuel	
Electric - Grid (kBtu)	7,577,370 (49%)
Natural Gas (kBtu)	7,833,100 (51%)

National Median Comparison	
National Median Site EUI (kBtu/ft²)	72.1
National Median Source EUI (kBtu/ft²)	149.9
% Diff from National Median Source EUI	6%
Annual Emissions	
Greenhouse Gas Emissions (Metric Tons CO2e/year)	1,375

Signature & Stamp of Verifying Professional

I _____ (Name) verify that the above information is true and correct to the best of my knowledge.

Signature: _____Date: _____

Licensed Professional

____ _____
,
(____)____-_____
_____

Professional Engineer Stamp
(if applicable)