KEARNY SCHOOL DISTRICT

ENERGY SAVINGS PLAN

DCO Energy

SUSTAINABLE JERSEY CERTIFIED
A Better Tomorrow, One Community at a Time

SUBMITTED BY:
DCO Energy Efficiency Division
100 Lenox Drive
Lawrenceville, NJ 08648
BPU Approved
2/17/2022

KEARNY SCHOOL DISTRICT

Table of Contents

ENERGY SAVINGS PLAN

SECTION 1 – PROJECT OVERVIEW

Project Overview

The Energy Savings Plan (ESP) is the core of the Energy Savings Improvement Program (ESIP) process. It describes the Kearny School District's preferred Energy Conservation Measures (ECMs), the budget cost for each ECM and the ECM energy savings calculations that self-fund the project via reduced operating costs. The ESP provides the Kearny School District the necessary information to decide which proposed ECMs to implement as part of your (ESIP) project. Working with the School District's staff, your selected ESIP project would:

1. Self-fund a $6,202,317 project
2. Generate $315,324 in annual energy savings – 29% of current utility spend
3. Eligible for $377,337 in rebates and incentives
4. Reduce utility related annual CO2 emissions by 1,452 metric tons – a 31% reduction

NOTE: This submitted ESP doesn't constitute any contractual obligation between the Kearny School District and DCO Energy (DCO). Any contractual obligations will be performed under separate legal documents per mutual signed agreement of the parties involved and subject to the applicable laws and requirements of the ESIP legislation and State of New Jersey.

To ensure conformance with the requirements of Public Finance Notice LFN 2009-11, the ESP must address the following elements:

- *The results of the energy audit (APPENDIX H)*
- *A description of the energy conservation measures that will comprise the program; (Section 3)*
- *An estimate of greenhouse gas reductions resulting from those energy savings; (Section 3)*
- *Identification of all design and compliance issues and identification of who will provide these services; (Section 5)*
- *An assessment of risks involved in the successful implementation of the plan; (Section 5)*
- *Identify the eligibility for, and costs and revenues associated with the PJM Independent System Operator for demand response and curtailable service activities; (Section 3)*
- *Schedules showing calculations of all costs of implementing the proposed energy conservation measures and the projected energy savings; (Section 3)*
- *Maintenance requirements necessary to ensure continued energy savings, and describe how they will be provided; and (Section 6)*

- *If developed by an ESCO, a description of, and cost estimates of a proposed energy savings guarantee. (Section 7)*

In addition, and per LFN 2009-11, the ESP requires several other important elements:

- *The calculations of energy savings must be made in accordance with protocols for their calculation adopted by the BPU. The calculation shall include all applicable State and federal rebates and tax credits, but shall not include the cost of an energy audit and the cost of verifying energy savings. (Section 3)*
- *An independent third party must review the plan and certify that the plan savings were properly calculated pursuant to the BPU protocols.*
- *If an ESCO is used to prepare the plan, the ESCO must provide an estimate of the cost of a guarantee of energy savings. When adopting the plan, the local unit must decide whether or not to accept the guarantee (covered below). (Section 7)*
- *The plan must be verified by an independent third party to ensure that the calculations were made in accordance with the BPU standards and that all required elements of the ESP are covered.*
- *After verification is completed, the governing body must formally adopt the plan. At that point, the plan must be submitted to the Board of Public Utilities where it will be posted on the BPU website. BPU approval is not required. If the contracting unit maintains its own website, the plan must also be posted on that site.*

DCO Energy looks forward to the third-party review of our energy calculations and the Kearny School District's approval of the Energy Savings Plan to implement via the requirements of the ESIP legislation. Your time, effort, and support are appreciated.

Kearny High School

Kearny High School is a four-story, 305,491 square foot building. The facility is split into 2 sides, the North Wing and the South Wing, these spaces include classrooms, a gymnasium, an auditorium, offices, a cafeteria, a library, a theater, an art room, a media center, field houses, a commercial kitchen, and a basement mechanical space. The facility is occupied year-round by 230 staff and 1,734 students, with lighter occupancy during summer. Operating hours are 6:00 AM-11:00 PM on the weekdays and closed on the weekends (school term).

Description of Building HVAC

Each classroom is equipped with a fan coil unit located in the ceiling, served by hot water boilers, and air-cooled chillers. The gym and the locker room are both served by heating ventilation units. There are multiple air handling units located on the roof of the building. All AHU fan motors are equipped with variable frequency drives and are served by the hot water boilers and air-cooled chillers. There are multiples energy recovery units to provide fresh air to the building. The Guidance and Administration areas are served by separate roof top units (RTU's) – 10-ton cooling with 168 MBh natural gas furnaces, equipped with economizers and in good condition.

There are two 4,650 MBh Lochnivar condensing hot water boilers that serve the heating needs of the main building. There are two field houses for the home and away teams, these field houses are equipped with a 256 MBh noncondensing peerless hot water boiler. The culinary class and the kitchen are served by gas fired furnaces. There are two 336-ton Climacool air-cooled scroll chiller located on the roof that are served by three VFD operated chilled water pumps.

Description of Building Lighting

The lighting systems primary include 15-Watt LED, 32-Watt linear fluorescent T8 lamps, and 40-Watt T12 fixtures. Most of the facility lighting fixtures are controlled through occupancy sensors while the rest are controlled manually.

Lincoln Middle School

Lincoln Middle school is a two-story, 101,000 square foot building. This space includes classrooms, a gymnasium, an auditorium, a multipurpose room, locker rooms, offices, a library, and indoor pool, a commercial kitchen, and a basement mechanical space. The facility is occupied 10 months out of the year by 101 staff and 844 students. Operating hours are 6:00 AM-11:00 PM on the weekdays and 6:00AM – 3:00PM on the weekends.

Description of Building HVAC

Each classroom is equipped with a fan coil unit (FCU). There are eight roof mounted air handling units (AHU) that serve the pool, gymnasium, two media centers, hallways, multipurpose room and the auditorium. The facility is served by a hybrid chilled water and hot water plant. The plant consists of a 215 ton, Broad direct-fired absorption chiller. The boiler room is served by a gas fired furnace.

Description of Building Lighting

The primary interior lighting system uses 32-Watt linear fluorescent T8 lamps, 40-Watt T12 fixtures, and 28-Watt T5 fixtures. The Gymnasium lighting is manually controlled with 250-Watt Mercury Vapor fixtures and the auditorium is equipped with linear fluorescent and incandescent fixtures that are manually controlled. The pool room has 300-Watt metal halide and 100-Watt LED ceiling mounted fixtures. Most of the facilities lighting is controlled manually and the remainder is controlled by occupancy sensors.

Franklin Elementary School

Franklin Elementary School is a four-story, 114,854 square foot building built in 1960. The building spaces includes classrooms, gymnasium auditorium, offices, corridors, music room, server room, stairwells, library, kitchen, storage rooms, and basement mechanical space. The facility is occupied 10 months out of the year by 161 staff and 925 students and is closed for summer and winter break. Occupied hours are 6:30 AM-6:30 PM on the weekdays and closed on the weekends.

Description of Building HVAC

Most classrooms are provided heating and ventilation by unit ventilators equipped with supply fans and pneumatically controlled air dampers and steam coil valves. Cooling of most of the classrooms is accomplished by window AC units – either 1-ton or 2-ton units. There are several constant-volume air handler units serving multiple zones in the building, equipped with motors ranging from 1/3 to 5 hp. The new gym is served by (2) packaged rooftop units that have a cooling capacity of 17.5 and 15 tons, both equipped with gas furnaces. 7.5-ton and 5-ton split system ACs serve groups of classrooms. A 60-ton split system AC serves a multizone AHU and is nearing the end of its useful life. There are (2) new EASCO steam boilers that serve most of the buildings heating load. A heat exchanger off the boiler is used to heat the hot water loop that serves the Pre-K area. The building's domestic hot water is served by a new 100 gallon 150 MBh condensing gas-fired storage water heater.

Description of Building Lighting

Franklin Elementary School's primary interior lighting system uses 32-Watt 4' linear T8, 17-Watt 2' linear T8, 59-Watt 8' linear T8, 75-Watt 8' Linear T12, and U-bend T8 fluorescent lamps driven by electronic ballasts. The new gym has high bay 175-Watt metal halide (MH) fixtures. There is an appropriate assortment of recessed, ceiling-mount, wall-mount, and suspended fixtures. Most interior fixtures are in fair condition, controlled manually, and provide sufficient lighting levels.

The building exterior lighting systems include wall- and pole-mounted area lights with 100- and 175-watt MH lamps and are controlled by timeclocks.

Washington Elementary School

Washington Elementary School is a three-story, 86,220 square foot building, built in 1915. This space includes classrooms, an auditorium, offices, a computer lab, a library, a gymnasium, a conference room, locker rooms, and a basement mechanical space. The facility is occupied 10 months out of the year by 94 staff and 514 students and is closed for summer and winter break. Operating hours are 6:30 AM-6:30 PM on the weekdays and closed on the weekends.

Description of Building HVAC

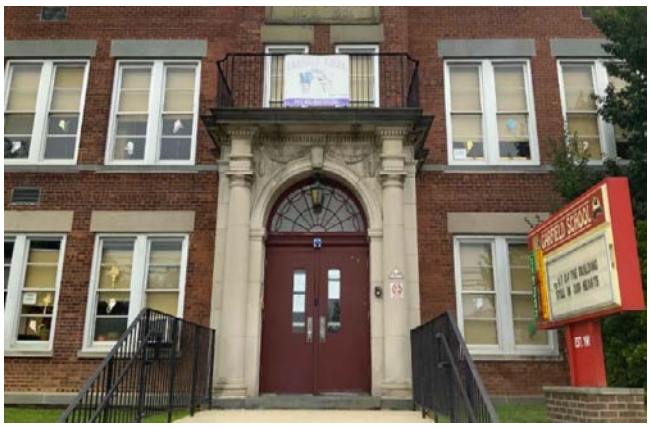
Unit ventilators provide heating to most of the classrooms. There are a few air handler units serving single zones including, Room 107, computer lab 1, computer lab library, and multipurpose room 1. Heating is provided with steam coils that are served by the central heating system. Most classrooms and offices use window air conditioning units (1-ton). The computer lab, computer lab library, rooms 106 and 107, are separately served by (3) 5-ton split system AC units. The conference room and main office/ principals' office are each served by a split system air source heat pump. Two 5,250 MBh Kewanee steam boilers, equipped with modulating burners, serve the building heating load. The buildings domestic hot water is served by a 50 gallon, 40 MBh gas-fired storage water heater.

Description of Building Lighting

The primary interior lighting system uses 32-Watt 4' linear T8, 17-Watt 2' linear T8, 59-Watt 8' linear T8, and U-bend T8 fluorescent lamps. The gymnasium has several 250-Watt metal halide (MH) fixtures. Most fixtures are in fair condition and are controlled manually.

Garfield Elementary School

Garfield Elementary School is a three-story, 63,095 square foot building built in 1901. This facility includes classrooms, library, media center, music room, multipurpose room, offices, corridors, stairwells, and a basement mechanical space. The facility is occupied 10 months out of the year by 63 staff and 507 students and is closed for summer and winter break. Operating hours are 6:30 AM-6:30 PM on the weekdays and closed on the weekends.



Description of Building HVAC

Unit ventilators that are operated by a pneumatic control system, provide heating and ventilation to most classrooms at this facility. Most classrooms and offices are cooled by window air conditioning (AC) units, these units are in fair condition. The heating load for the building is served by two Cleaver Brooks 8,369 MBh steam boilers with modulating burners. A steam distribution system serves the building heating terminals. The domestic hot water heater is a 74-gallon gas-fired heater and is in good working condition.

Description of Building Lighting

Garfield Elementary School's primary interior lighting system uses 32-Watt 4' linear T8, 17-Watt 2' linear T8, 59-Watt 8' linear T8, and U-bend T8 fluorescent lamps driven by electronic ballasts. There are a few fixtures with plug-in and screw-in compact fluorescent (CFL) lamps as well as screw-in incandescent lamps with varying wattages. Most fixtures are in fair condition and are controlled manually. There is no exterior lighting at this facility.

Schuyler Elementary School

Schuyler Elementary School is a multi-story 54,880 square foot building with and old wing (1925) and a new wing (2003). This space includes classrooms, electrical rooms, offices, a gymnasium, restrooms, an auditorium, a kitchen, a library, computer labs, a music room, and a basement mechanical space. The facility is occupied 10 months out of the year by 80 staff and 481 students and is closed for summer and winter break. Operating hours are 6:30 AM-6:30 PM on the weekdays and closed on the weekends.

Description of Building HVAC

Unit ventilators provide heating to most of the classrooms in the old wing. The library offices, library and gymnasium are each served by individual packaged roof top units (RTU's), with cooling capacities of 7.67-, 8.5-, and 40-tons, respectively. Most of the new wing is served by an air handler unit with a 5-hp supply fan. Some classrooms and offices in the old section of the facility are served by window air conditioning units – 1- or 1.25-ton units.

Two 4,148 MBh Cleaver Brooks steam boilers, equipped with modulating burners, serve the old wings heating load. Two 494 MBh Weil McLain hot water boilers, equipped with modulating burners, serve the new wings heating load. A 50-ton air-cooled scroll chiller provides chilled water for the new wing. Hot water for the old wing is produced with a gas-fired storage water heater, the new wing has an 81-gallon gas fired storage water heater.

Description of Building Lighting

The primary interior lighting system uses 32-Watt 4' linear T8, 17-Watt 2' linear T8, 59-Watt 8' linear T8, and U-bend T8 fluorescent lamps. Most fixtures are in fair condition and are controlled manually. The gym in the new wing has several 175-Watt metal halide (MH) lamp fixtures.

Roosevelt Elementary School

Roosevelt Elementary School is a three-story, 43,385 square foot building, built in 1935. This space includes classrooms, gymnasium, offices, library, corridors, stairwells, storage rooms, restrooms, and a basement mechanical space. The facility is occupied 10 months out of the year by 72 staff and 390 students and is closed for summer and winter break. Operating hours are 6:30 AM-6:30 PM on the weekdays and closed on the weekends.

Description of Building HVAC

There are unit ventilators that provide heat to most of the classrooms. Unit ventilators are equipped with supply fan motors, and pneumatically controlled outside air dampers and steam coil valves. The library is served by 10-ton packaged rooftop units (RTU). Most classrooms and offices are cooled by 1.25-ton window air conditioning (AC) units. One of the basement rooms is served by a 1-ton split system AC unit. There is one 3,829 MBh Cliff Steel heating steam boiler and one 3,450 MBh Federal Boiler Co. steam boiler to serve the building. The building's domestic hot water requirements are served by a gas-fired storage water heater (71-gallon, 75 MBh).

Description of Building Lighting

The primary interior lighting system uses 32-Watt 4' linear T8, 17-Watt 2' linear T8, 59-Watt 8' linear T8, U-bend T8 fluorescent lamps, and a few 100-Watt incandescent lamps. Most fixtures are in fair condition and are controlled manually. Interior lighting levels were found to be sufficient.

Exterior fixtures include wall mounted area lights with incandescent and metal halide lamps of varying wattages. Exterior light fixtures are controlled by photocells and wall switches.

Administration Building

The Administration Building is a three-story, 12,000 square foot building. This space includes offices, conference rooms, training centers, a café, storage rooms, and mechanical spaces. The building is occupied year-round, open 7:30 AM – 4:30 PM on the weekdays and closed on the weekends. The typical occupancy is 37 staff.

Description of Building HVAC

The first floor of the building is served by three Bryant air handling units equipped with an outdoor condensing unit and a gas furnace. Each unit has 4-ton cooling capacity and 74-MBh heating capacity, installed in 2006.

The top two floors are served by packaged roof top units (RTU's). The second floor is served with a Trane unit with a 5-ton cooling capacity and a gas furnace of 104 MBh capacity, and a York 12.50-ton unit equipped with 198 MBh capacity furnace. These units were installed in 2013 and 2001, respectively. The third floor is served by a Trane unit with 8.50-ton cooling capacity equipped with a 160 MBh capacity furnace. The server room is equipped with a 1-ton Mitsubishi split system air conditioning unit.

Description of Building Lighting

The building interior lighting systems are primarily 32-Watt linear fluorescent T8 lamps. There are some compact fluorescent lamps (CFL) and incandescent lamps. Included are a variety fixture types – 2-, 3, or 4-lamp, 2-, 3-, or 4-foot-long troffer, recessed and surface-mounted fixtures. The stairs are equipped with 3-foot linear fluorescent T8 fixtures, while vestibules and hallways are equipped with 26 W CFL fixtures. Most fixtures are in fair condition, and generally provide sufficient lighting levels. Most interior lighting fixtures are controlled manually, and the remainder are controlled by occupancy sensors.

The building exterior lighting systems include incandescent lamps in a canopy fixture (estimated at 100-watts) and are controlled by manual wall switches.

ENERGY SAVINGS PLAN

SECTION 2 – ENERGY BASELINE

Total Utility Consumption and Site EUI

The Kearny School District Energy Savings Plan includes 8 buildings: 1 high school, 1 middle school, 5 elementary schools, and 1 administration building. To develop the ESP, DCO Energy was provided with all available utility data (electric, natural gas, fuel oil). DCO Energy tracked and documented this utility data from March 2019 thru February 2020. A listing of the buildings, the total utility consumption, and Energy Usage Index for the 8 sites are detailed below.

BUILDINGS & FACILITIES		
BUILDING #	BUILDING/FACILITY NAME	SQFT
1	**Kearny High School**	**305,491**
2	**Lincoln Middle School**	**101,000**
3	**Franklin Elementary School**	**114,854**
4	**Washington Elementary School**	**86,220**
5	**Garfield Elementary School**	**60,095**
6	**Schuyler Elementary School**	**54,880**
7	**Roosevelt Elementary School**	**43,385**
8	**Administration Building**	**12,000**

Kearny School District - Energy Use Summary

KEARNY BOE BUILDINGS/FACILITIES		ELECTRIC			
BUILDING/FACILITY NAME	SQFT	USAGE kWh	DEMAND kW	USAGE BTU / SQFT	TOTAL COST $$
Kearny High School	305,491	2,489,082	968	27,800	$338,392
Lincoln Middle School	101,000	1,181,617	410	39,918	$156,141
Franklin Elementary School	114,854	532,876	258	15,830	$75,609
Washington Elementary School	86,220	348,320	290	13,784	$49,039
Garfield Elementary School	60,095	211,670	68	12,018	$28,687
Schuyler Elementary School	54,880	390,046	156	24,250	$56,208
Roosevelt Elementary School	43,385	200,498	106	15,768	$29,636
Administration Building	12,000	131,920	50	37,509	$21,972
TOTALS	**777,925**	**5,274,359**	**2,238**	**23,133**	**$726,997**

KEARNY BOE BUILDINGS/FACILITIES		NATURAL GAS		
BUILDING/FACILITY NAME	SQFT	USAGE THERMS	USAGE BTU / SQFT	TOTAL COST $$
Kearny High School	305,491	84,194	27,560	$72,434
Lincoln Middle School	101,000	77,705	76,936	$55,552
Franklin Elementary School	114,854	86,714	75,499	$74,201
Washington Elementary School	86,220	61,537	71,372	$53,635
Garfield Elementary School	60,095	37,293	62,057	$33,150
Schuyler Elementary School	54,880	31,929	58,179	$24,706
Roosevelt Elementary School	43,385	38,780	89,386	$33,956
Administration Building	12,000	2,029	16,907	$1,891
TOTALS	**777,925**	**382,888**	**49,219**	**$316,376**

KEARNY BOE BUILDINGS/FACILITIES		Solar Owned (kWh)		
BUILDING/FACILITY NAME	SQFT	USAGE Solar Owned (kWh)	USAGE BTU / SQFT	TOTAL COST $$
Kearny High School	305,491	183,973	2,055	$0
Lincoln Middle School	101,000	148,258	5,008	$0
Franklin Elementary School	114,854	339,636	10,090	$0
Washington Elementary School	86,220	147,129	5,822	$0
Garfield Elementary School	60,095	55,730	3,164	$0
Schuyler Elementary School	54,880	140,320	8,724	$0
Roosevelt Elementary School	43,385	55,183	4,340	$0
Administration Building	12,000	0	0	$0
TOTALS	**777,925**	**1,070,229**	**4,768**	**$0**

KEARNY BOE BUILDINGS/FACILITIES		Water & Sewer (Gal)	
BUILDING/FACILITY NAME	SQFT	USAGE Water & Sewer (Gal)	TOTAL COST $$
Kearny High School	305,491	2,822,204	$12,233
Lincoln Middle School	101,000	2,265,692	$9,656
Franklin Elementary School	114,854	1,963,500	$7,727
Washington Elementary School	86,220	1,098,064	$5,834
Garfield Elementary School	60,095	2,298,452	$20,791
Schuyler Elementary School	54,880	323,884	$8,943
Roosevelt Elementary School	43,385	597,652	$4,816
Administration Building	12,000	46,376	$1,276
TOTALS	**777,925**	**11,415,824**	**$71,276**

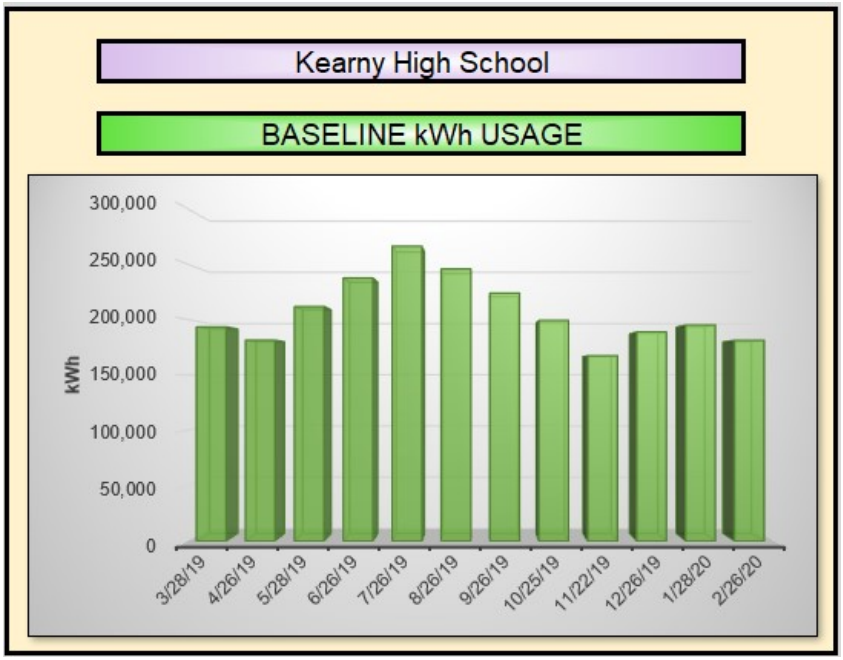
KEARNY BOE BUILDINGS/FACILITIES		SITE ENERGY	SOURCE ENERGY	TOTAL COST
BUILDING/FACILITY NAME	SQFT	USAGE BTUs	USAGE BTUs	$$
Kearny High School	305,491	17,539,837,960	33,247,752,686	$423,058
Lincoln Middle School	101,000	12,308,048,500	19,953,593,217	$221,350
Franklin Elementary School	114,854	11,648,407,934	15,354,691,808	$157,537
Washington Elementary School	86,220	7,844,154,688	10,291,080,935	$108,509
Garfield Elementary School	60,095	4,641,658,000	6,128,114,932	$82,629
Schuyler Elementary School	54,880	5,002,492,992	7,557,643,716	$89,857
Roosevelt Elementary School	43,385	4,750,412,903	6,175,690,665	$68,407
Administration Building	12,000	652,999,440	1,473,343,732	$25,139
TOTALS	**777,925**	**59,746,354,417**	**94,053,796,758**	**$1,093,857**

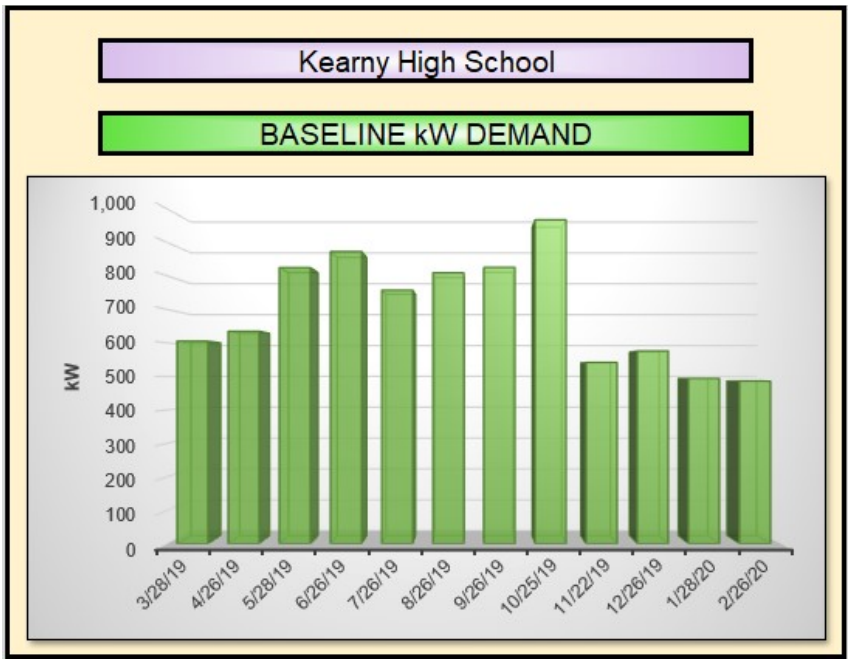
Kearny School District – Energy Use & Cost Index

KEARNY BOE BUILDINGS/FACILITIES		SITE EUI		
BUILDING/FACILITY NAME	SQFT	USAGE BTU / SQFT	NATIONAL MEDIAN BTU / SQFT	NATIONAL MEDIAN +/- %
Kearny High School	305,491	57,415	68,800	17%
Lincoln Middle School	101,000	121,862	68,800	-77%
Franklin Elementary School	114,854	101,419	68,800	-47%
Washington Elementary School	86,220	90,978	68,800	-32%
Garfield Elementary School	60,095	77,239	68,800	-12%
Schuyler Elementary School	54,880	91,153	68,800	-32%
Roosevelt Elementary School	43,385	109,494	68,800	-59%
Administration Building	12,000	54,417	77,800	30%
TOTALS	**777,925**	**82,769**	**68,939**	**-20%**

KEARNY BOE BUILDINGS/FACILITIES		SITE ECI		
BUILDING/FACILITY NAME	SQFT	COST $$ / SQFT	NATIONAL MEDIAN $$ / SQFT	NATIONAL MEDIAN +/- %
Kearny High School	305,491	$1.38	$1.54	10%
Lincoln Middle School	101,000	$2.19	$1.54	-42%
Franklin Elementary School	114,854	$1.37	$1.54	11%
Washington Elementary School	86,220	$1.26	$1.54	18%
Garfield Elementary School	60,095	$1.37	$1.54	11%
Schuyler Elementary School	54,880	$1.64	$1.54	-6%
Roosevelt Elementary School	43,385	$1.58	$1.54	-2%
Administration Building	12,000	$2.09	$1.74	-20%
TOTALS	**777,925**	**$1.51**	**$1.54**	**2%**

Kearny High School Baseline Energy Use

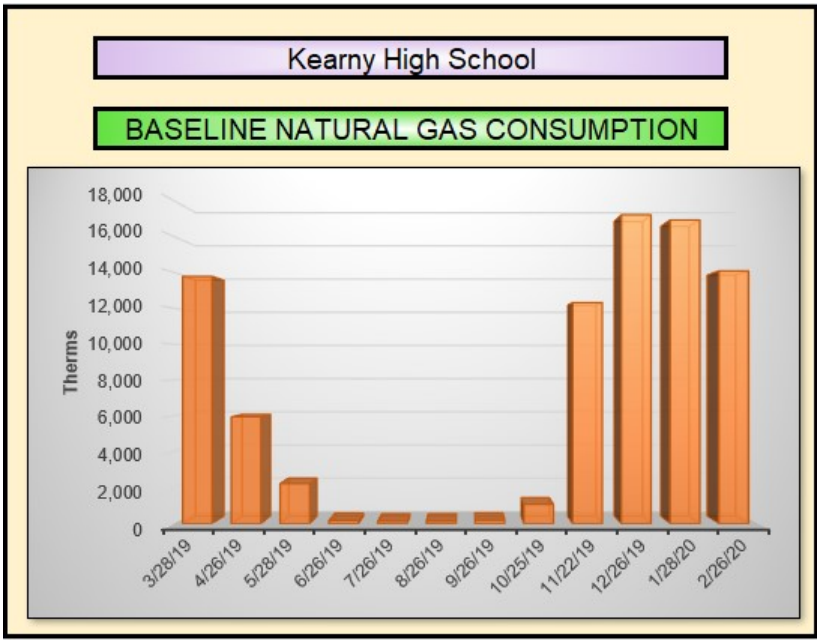




Kearny High School							ELECTRIC METER #1					
Provider:	PSE&G			Account #:	6645472609				Meter #:	286001040		
Commodity:				Commodity:					Rate Tariff:	General Lighting & Power (GLP)		
Billing Period Start Date	Actual Reading	Usage kWh	Demand kW	Electric Delivery Charges	Electric Commodity Charges	Customer Charge	Electric Demand Charges	Total Electric Charges	Marginal Rate $/kWh	Days	Load Factor	BTU
2/27/19	3/28/19	1,368	126	$22	$200	$5	$495	$722	$0.162	30	2%	4,667,616
3/29/19	4/26/19	5,238	158	$89	$329	$9	$622	$1,050	$0.080	29	5%	17,872,056
4/27/19	5/28/19	4,140	81	$84	$356	$5	$318	$763	$0.106	32	7%	14,125,680
5/29/19	6/26/19	2,178	79	$33	$239	$5	$1,091	$1,368	$0.125	29	4%	7,431,336
6/27/19	7/26/19	2,232	66	$35	$148	$5	$902	$1,090	$0.082	30	5%	7,615,584
7/27/19	8/26/19	5,958	143	$93	$362	$9	$1,974	$2,438	$0.076	31	6%	20,328,696
8/27/19	9/26/19	3,672	76	$58	$211	$5	$1,041	$1,315	$0.073	31	7%	12,528,864
9/27/19	10/25/19	6,120	76	$127	$342	$5	$298	$772	$0.077	29	12%	20,881,440
10/26/19	11/22/19	2,070	81	$43	$123	$5	$319	$489	$0.080	28	4%	7,062,840
11/23/19	12/26/19	3,960	72	$82	$227	$5	$282	$596	$0.078	34	7%	13,511,520
12/27/19	1/28/20	1,116	7	$23	$98	$10	$27	$157	$0.108	33	21%	3,807,792
1/29/20	2/26/20	2,574	3	$54	$247	$5	$13	$319	$0.117	29	109%	8,782,488
TOTALS		40,626	158	$743	$2,882	$71	$7,384	$11,080	$0.089	365	3%	138,615,912

Kearny High School							ELECTRIC METER #2					
Provider:	PSE&G			Account #	4200257408				Meter #	9210235		
Commodity:				Account #					Meter #	LPLS		
Billing Period Start Date	Actual Reading	Usage kWh	Demand kW	Electric Delivery Charges	Electric Commodity Charges	Customer Charge	Electric Demand Charges	Total Electric Charges	Marginal Rate $/kWh	Days	Load Factor	BTU
3/1/19	3/31/19	191,847	479	$1,612	$19,417	$371	$1,796	$22,824	$0.110	31	54%	654,581,964
4/1/19	4/30/19	175,958	477	$1,768	$18,714	$371	$1,787	$22,269	$0.116	30	51%	600,368,696
5/1/19	5/31/19	207,345	744	$2,634	$21,576	$371	$2,789	$26,999	$0.117	31	37%	707,461,140
6/1/19	6/30/19	235,102	793	$2,987	$23,179	$371	$10,050	$36,215	$0.111	30	41%	802,168,024
7/1/19	7/31/19	263,717	692	$3,412	$24,424	$371	$8,764	$36,600	$0.106	31	51%	899,802,404
8/1/19	8/31/19	239,436	666	$3,108	$21,134	$371	$8,436	$32,678	$0.101	31	48%	816,955,632
9/1/19	10/1/19	220,000	750	$3,000	$19,419	$371	$8,500	$30,919	$0.102	31	39%	750,640,000
10/2/19	10/31/19	192,915	892	$2,525	$18,711	$371	$3,354	$24,591	$0.110	30	30%	658,225,980
11/1/19	11/30/19	165,126	461	$2,162	$16,825	$371	$1,733	$20,720	$0.115	30	50%	563,409,912
12/1/19	12/31/19	184,630	504	$2,417	$18,671	$371	$1,897	$22,985	$0.114	31	49%	629,957,560
1/1/20	1/31/20	193,827	487	$2,556	$20,508	$371	$1,832	$24,896	$0.119	31	53%	661,337,724
2/1/20	2/29/20	178,553	482	$2,388	$21,413	$371	$1,815	$25,616	$0.133	29	53%	609,222,836
TOTALS		2,448,456	892	$30,568	$243,990		$52,753	$327,311	$0.112	366	31%	8,354,131,872

Kearny High School					
Provider	Owned		Solar Owned (kWh)		
Meter/Acct #					
Billing Period Start Date	Actual Reading	Solar Owned (kWh)	$$	Cost / Unit Checksum	BTU
1/1/19	1/31/19	5,298		$0.000	18,076,776
2/1/19	2/28/19	7,268		$0.000	24,798,416
3/1/19	3/31/19	15,643		$0.000	53,373,916
4/1/19	4/30/19	17,243		$0.000	58,833,116
5/1/19	5/31/19	22,583		$0.000	77,053,196
6/1/19	6/30/19	24,098		$0.000	82,222,376
7/1/19	7/31/19	25,293		$0.000	86,299,716
8/1/19	8/31/19	20,264		$0.000	69,140,768
9/1/19	9/30/19	18,354		$0.000	62,623,848
10/1/19	10/31/19	14,218		$0.000	48,511,816
11/1/19	11/30/19	7,628		$0.000	26,026,736
12/1/19	12/31/19	6,083		$0.000	20,755,196
TOTALS		183,973	$0	$0.000	627,715,876

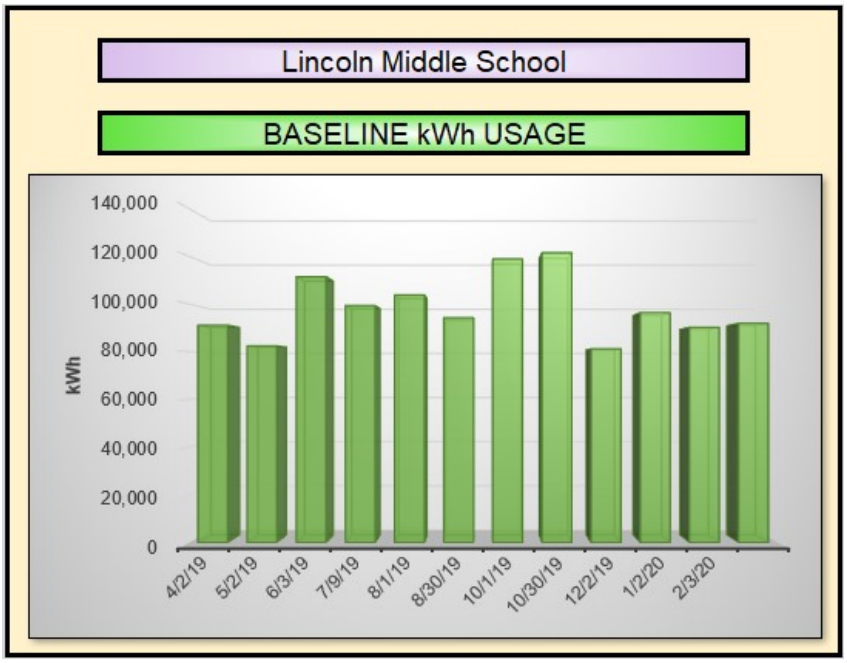


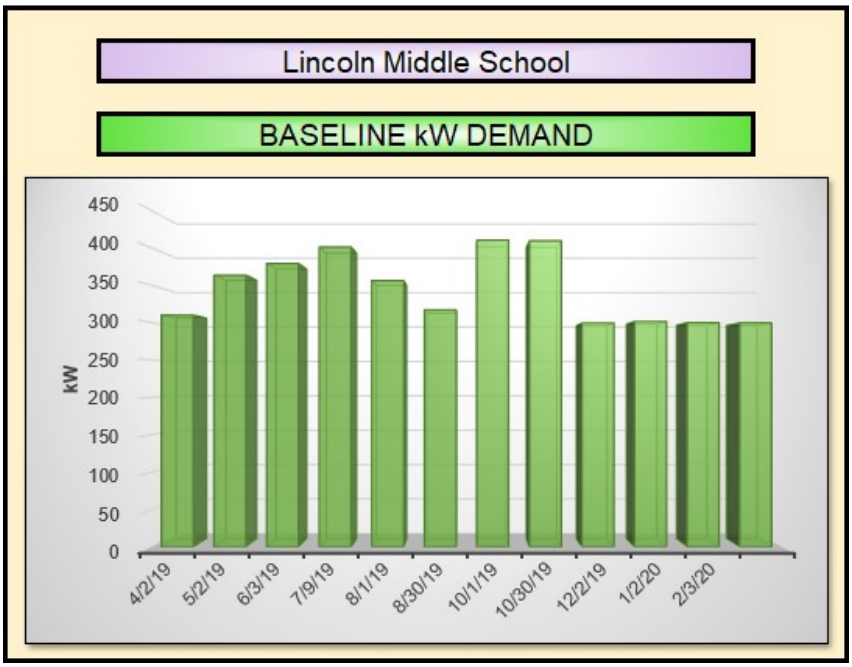
Kearny High School							Natural Gas Meter #1		
Provider	PSE&G		Account #	6645472609			Meter #	Combined	
Commodity			Commodity				Rate Tariff:	GSG (HTG)	
Billing Period Start Date	Actual Reading	Therms	Gas Delivery Charges	Gas Customer Charge	Gas Demand Charge	Gas Commodity Charges	Gas Total Charges	$/Therm Marginal Rate	BTU
2/26/19	3/28/19	680	$255	$15		$358	$629	$0.90	67,990,200
3/29/19	4/26/19	1,149	$390	$31		$605	$1,025	$0.87	114,930,800
4/27/19	5/28/19	469	$134	$15		$247	$396	$0.81	46,910,200
5/29/19	6/26/19	192	$55	$15		$101	$172	$0.81	19,235,400
6/27/19	7/26/19	145	$41	$15		$76	$133	$0.81	14,502,800
7/27/19	8/26/19	147	$42	$31		$77	$150	$0.81	14,711,500
8/27/19	9/26/19	203	$58	$15		$107	$180	$0.81	20,261,100
9/27/19	10/25/19	257	$86	$16		$135	$237	$0.86	25,691,900
10/26/19	11/22/19	486	$175	$16		$256	$447	$0.89	48,621,100
11/23/19	12/26/19	598	$218	$16		$315	$549	$0.89	59,796,700
12/27/19	1/28/20	1,622	$603	$32		$813	$1,448	$0.87	162,222,400
1/29/20	2/26/20	621	$228	$16		$311	$555	$0.87	62,127,000
TOTALS		6,570	$2,285	$235	$0	$3,401	$5,921	$0.87	657,001,100

Kearny High School							Natural Gas Meter #2		
Provider	PSE&G		Account #	4200540703			Meter #	1785513	
Commodity			Commodity				Rate Tariff	LVG	
Billing Period Start Date	Actual Reading	Therms	Gas Delivery Charges	Gas Customer Charge	Gas Demand Charge	Gas Commodity Charges	Gas Total Charges	$/Therm Marginal Rate	BTU
3/1/19	3/31/19	13,086	$823	$137	$4,241	$6,889	$12,090	$0.91	1,308,595,800
4/1/19	4/30/19	4,800	$300	$137		$2,527	$2,964	$0.59	479,968,900
5/1/19	5/31/19	1,764	$108	$137		$929	$1,174	$0.59	176,437,800
6/1/19	6/30/19	1	$0	$137		$1	$138	$0.58	103,800
7/1/19	7/31/19	1	$0	$137		$1	$138	$0.58	114,200
8/1/19	9/1/19	1	$0	$137		$1	$138	$0.58	104,200
9/2/19	9/30/19	0	$0	$137		$0	$137	-	0
10/1/19	10/31/19	834	$130	$140		$439	$708	$0.68	83,366,500
11/1/19	11/30/19	11,821	$1,863	$140	$2,768	$6,223	$10,993	$0.92	1,182,075,900
12/1/19	12/31/19	16,592	$2,612	$144	$2,779	$8,734	$14,270	$0.85	1,659,237,700
1/1/20	1/31/20	15,278	$2,405	$144	$2,329	$7,653	$12,530	$0.81	1,527,781,800
2/1/20	2/29/20	13,446	$2,101	$144	$2,253	$6,735	$11,233	$0.82	1,344,586,600
TOTALS		77,624	$10,341	$1,672	$14,370	$40,130	$66,513	$0.84	7,762,373,200

Kearny High School					
Provider	Kearny Water Department		Water & Sewer (Gal)		
Acct #	00303210000000				
Billing Period Start Date	Actual Reading	Water & Sewer (Gal)	Usage Charges	Cost / Unit Checksum	BTU
12/31/18	1/29/19	221,408	$910	$0.0041	0
1/30/19	2/27/19	220,660	$906	$0.0041	0
2/28/19	4/2/19	265,540	$1,125	$0.0042	0
4/3/19	5/6/19	247,588	$1,043	$0.0042	0
5/7/19	6/4/19	224,400	$924	$0.0041	0
6/5/19	7/2/19	221,408	$910	$0.0041	0
7/3/19	8/1/19	237,116	$1,040	$0.0044	0
8/2/19	9/3/19	243,848	$1,113	$0.0046	0
9/4/19	10/1/19	225,148	$1,013	$0.0045	0
10/2/19	11/1/19	275,264	$1,281	$0.0047	0
11/2/19	11/30/19	205,700	$909	$0.0044	0
12/1/19	1/2/20	234,124	$1,061	$0.0045	0
TOTALS		2,822,204	$12,233	$0.0043	0

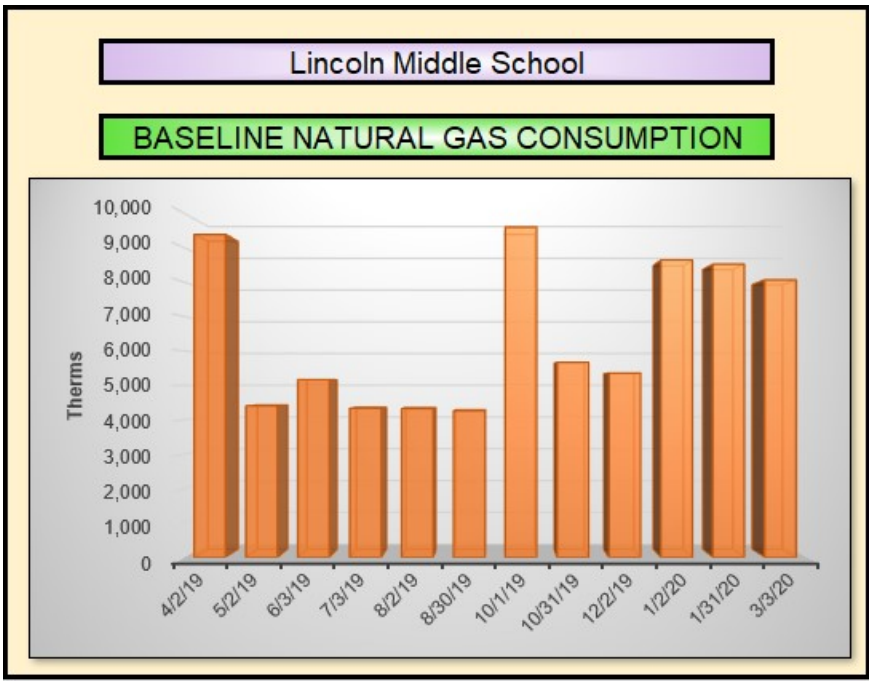
Lincoln Middle School Baseline Energy Use





Lincoln Middle School							ELECTRIC METER #2					
Provider:	PSE&G			Account #	4200217902				Meter #	9210792		
Commodity:				Commodity					Rate Tariff	LPLS		
Billing Period Start Date	Actual Reading	Usage kWh	Demand kW	Electric Delivery Charges	Electric Commodity Charges	Customer Charge	Electric Demand Charges	Total Electric Charges	Marginal Rate $/kWh	Days	Load Factor	BTU
2/27/19	3/27/19	91,066	310	$765	$8,694	$371	$1,162	$10,621	$0.104	29	42%	310,717,192
3/28/19	4/26/19	82,402	363	$787	$7,912	$371	$1,361	$10,060	$0.106	30	32%	281,155,624
4/27/19	5/28/19	111,301	379	$1,414	$10,581	$371	$1,421	$13,416	$0.108	32	38%	379,759,012
5/29/19	6/26/19	99,263	401	$1,261	$9,477	$371	$5,079	$15,817	$0.108	29	36%	338,685,356
6/27/19	7/26/19	103,710	356	$1,340	$9,615	$371	$4,511	$15,465	$0.106	30	40%	353,858,520
7/27/19	8/26/19	94,158	317	$1,222	$8,692	$371	$4,014	$13,928	$0.105	31	40%	321,267,096
8/27/19	9/26/19	118,794	410	$1,553	$10,956	$371	$5,192	$17,701	$0.105	31	39%	405,325,128
9/27/19	10/24/19	121,359	409	$1,589	$11,191	$371	$1,539	$14,318	$0.105	28	44%	414,076,908
10/25/19	11/22/19	81,150	299	$1,062	$8,890	$371	$1,126	$11,078	$0.123	29	39%	276,883,800
11/23/19	12/26/19	96,269	301	$1,260	$9,191	$371	$1,134	$11,585	$0.109	34	39%	328,469,828
12/27/19	1/27/20	90,130	300	$1,188	$8,605	$371	$1,128	$10,920	$0.109	32	39%	307,523,560
1/28/20	2/26/20	91,832	300	$1,226	$8,820	$371	$1,127	$11,173	$0.109	30	43%	313,330,784
TOTALS		1,181,434	410	$14,665	$112,624	$4,450	$28,793	$156,082	$0.108	365	33%	4,031,052,808

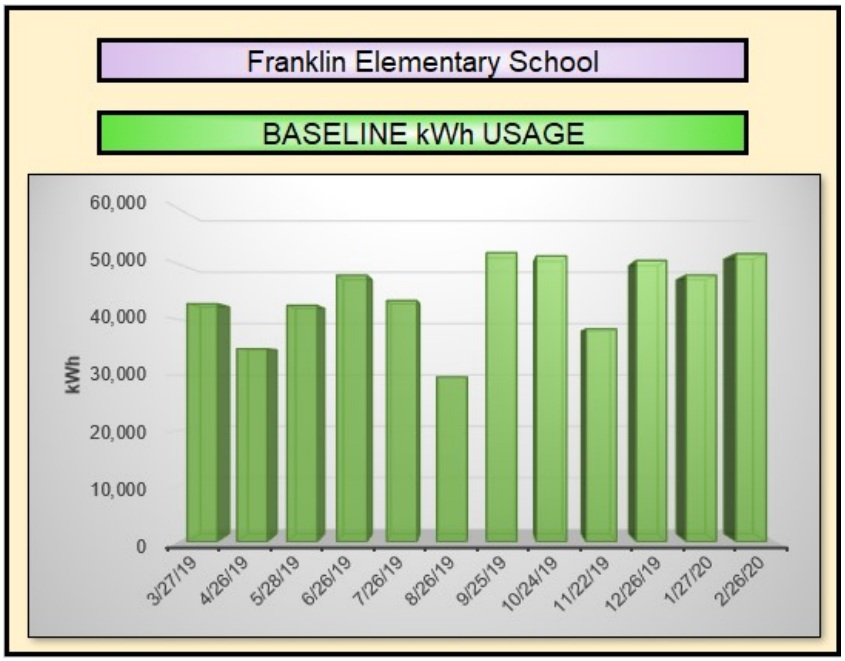
Lincoln Middle School					
Provider	Owned		Solar Owned (kWh)		
Meter/Acct #					
Billing Period Start Date	Actual Reading	Solar Owned (kWh)	$$	Cost / Unit Checksum	BTU
1/1/19	1/31/19	6,985		$0.00	23,832,820
2/1/19	2/28/19	8,943		$0.00	30,513,516
3/1/19	3/31/19	12,976		$0.00	44,274,112
4/1/19	4/30/19	15,137		$0.00	51,647,444
5/1/19	5/31/19	19,101		$0.00	65,172,612
6/1/19	6/30/19	18,967		$0.00	64,715,404
7/1/19	7/31/19	18,598		$0.00	63,456,376
8/1/19	8/31/19	12,854		$0.00	43,857,848
9/1/19	9/30/19	12,564		$0.00	42,868,368
10/1/19	10/31/19	10,831		$0.00	36,955,372
11/1/19	11/30/19	5,839		$0.00	19,922,668
12/1/19	12/31/19	5,463		$0.00	18,639,756
TOTALS		148,258	$0	$0.00	505,856,296

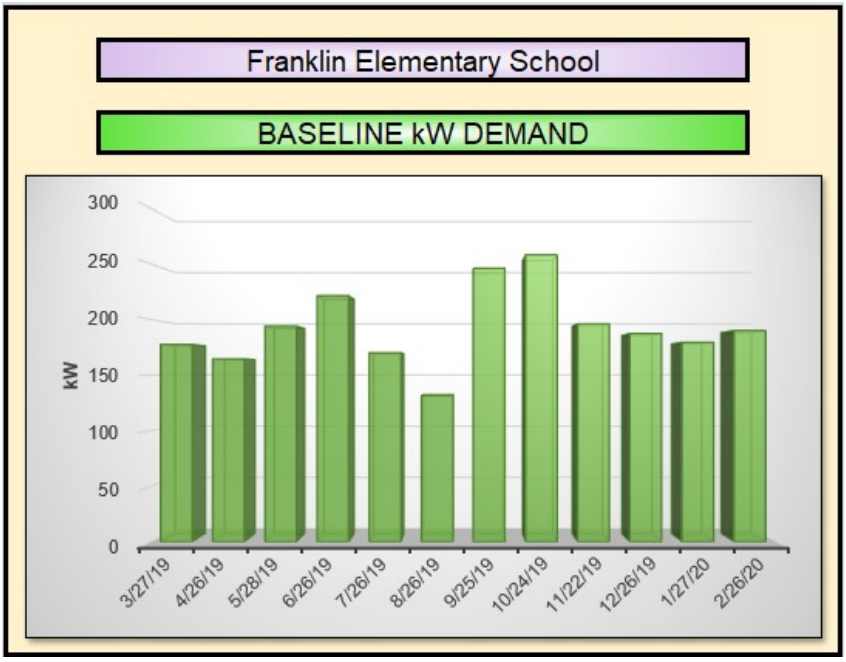


Lincoln Middle School								Natural Gas Meter #1	
Provider	PSE&G		Account #	4200138603				Meter #	3765341
Commodity			Commodity					Rate Tariff:	LVG
Billing Period Start Date	Actual Reading	Therms	Gas Delivery Charges	Gas Customer Charge	Gas Demand Charge	Gas Commodity Charges	Gas Total Charges	$/Therm Marginal Rate	BTU
3/4/19	4/2/19	9,383	$1,159	$137	$1,456	$4,939	$7,692	$0.81	938,289,800
4/3/19	5/2/19	4,400	$274	$137		$2,316	$2,728	$0.59	440,038,600
5/3/19	6/3/19	5,168	$323	$137		$2,720	$3,180	$0.59	516,753,000
6/4/19	7/3/19	4,331	$269	$137		$2,280	$2,686	$0.59	433,100,400
7/4/19	8/2/19	4,323	$256	$137		$2,275	$2,669	$0.59	432,265,800
8/3/19	8/30/19	4,257	$252	$137		$2,241	$2,630	$0.59	425,657,900
8/31/19	10/1/19	9,594	$597	$137		$5,050	$5,785	$0.59	959,403,400
10/2/19	10/31/19	5,672	$367	$140		$2,986	$3,492	$0.59	567,175,700
11/1/19	12/2/19	5,357	$342	$140	$1,461	$2,820	$4,763	$0.86	535,679,200
12/3/19	1/2/20	8,640	$817	$144	$1,466	$4,548	$6,974	$0.79	863,954,600
1/3/20	1/31/20	8,520	$833	$144	$1,466	$4,268	$6,711	$0.77	851,995,500
2/1/20	3/3/20	8,062	$699	$144	$1,362	$4,038	$6,243	$0.76	806,201,100
TOTALS		77,705	$6,188	$1,672	$7,210	$40,482	$55,552	$0.69	7,770,515,000

Lincoln Middle School					
Provider	Kearny Water Department		Water & Sewer (Gal)		
Acct #	00301520000000				
Billing Period Start Date	Actual Reading	Water & Sewer (Gal)	Usage Charges	Cost / Unit Checksum	BTU
12/28/18	1/29/19	173,536	$686	$0.0040	0
1/30/19	2/27/19	160,820	$633	$0.0039	0
2/28/19	4/4/19	249,832	$1,015	$0.0041	0
4/5/19	4/30/19	255,816	$1,077	$0.0042	0
5/1/19	6/5/19	169,048	$659	$0.0039	0
6/6/19	7/2/19	115,192	$441	$0.0038	0
7/3/19	7/31/19	471,988	$2,350	$0.0050	0
8/1/19	9/5/19	127,908	$525	$0.0041	0
9/6/19	9/30/19	102,476	$419	$0.0041	0
10/1/19	10/30/19	153,340	$653	$0.0043	0
10/31/19	11/27/19	136,884	$577	$0.0042	0
11/28/19	1/2/20	148,852	$622	$0.0042	0
TOTALS		2,265,692	$9,656	$0.0043	0

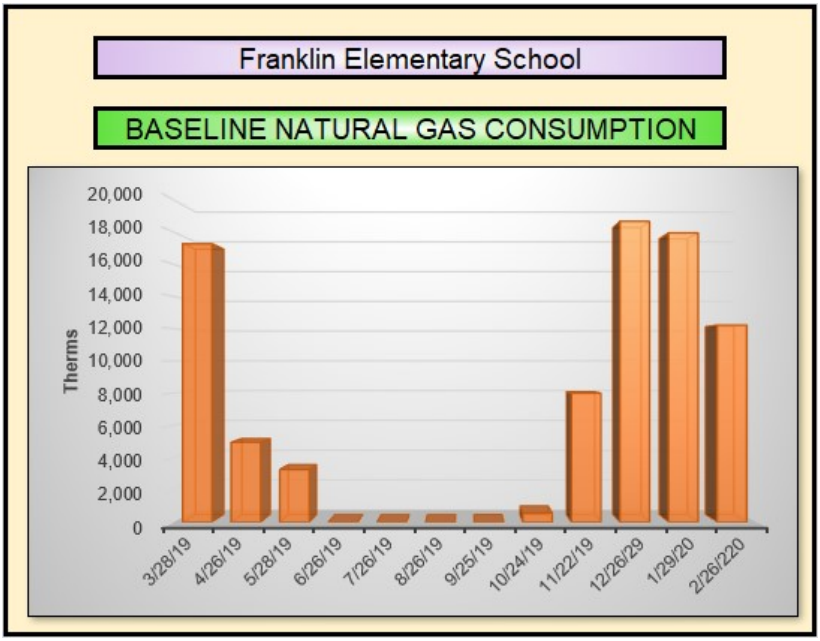
Franklin Elementary School Baseline Energy Use





Franklin Elementary School							ELECTRIC METER #1					
Provider:	PSE&G			Account #	4201113809				Meter #	9221001		
Commodity:				Commodity:					Rate Tariff:	LPLS		
Billing Period Start Date	Actual Reading	Usage kWh	Demand kW	Electric Delivery Charges	Electric Commodity Charges	Customer Charge	Electric Demand Charges	Total Electric Charges	Marginal Rate $/kWh	Days	Load Factor	BTU
2/27/19	3/27/19	42,810	178	$360	$4,094	$371	$665	$5,490	$0.104	29	35%	146,067,720
3/28/19	4/26/19	34,707	165	$319	$3,360	$371	$617	$4,667	$0.106	30	29%	118,420,284
4/27/19	5/28/19	42,504	194	$540	$4,084	$396	$744	$5,764	$0.109	32	29%	145,023,648
5/29/19	6/26/19	47,920	221	$609	$4,574	$371	$2,803	$8,357	$0.108	29	31%	163,503,040
6/27/19	7/26/19	43,369	170	$560	$4,016	$371	$2,153	$7,100	$0.106	30	35%	147,975,028
7/27/19	8/26/19	29,626	132	$385	$2,733	$371	$1,666	$5,154	$0.105	31	30%	101,083,912
8/27/19	9/25/19	51,989	246	$680	$4,782	$371	$2,194	$8,027	$0.105	30	29%	177,386,468
9/26/19	10/24/19	51,391	258	$673	$4,730	$371	$970	$6,744	$0.105	29	29%	175,346,092
10/25/19	11/22/19	38,253	196	$501	$3,521	$371	$738	$5,130	$0.105	29	28%	130,519,236
11/23/19	12/26/19	50,581	187	$662	$4,656	$371	$705	$6,393	$0.105	34	33%	172,582,372
12/27/19	1/27/20	47,938	179	$632	$4,412	$371	$675	$6,090	$0.105	32	35%	163,564,456
1/28/20	2/26/20	51,788	190	$662	$4,964	$371	$698	$6,695	$0.109	30	38%	176,702,246
TOTALS		532,876	258	$6,581	$49,927	$4,474	$14,627	$75,609	$0.106	365	24%	1,818,174,502

Franklin Elementary School					
Provider	Owned		Solar Owned (kWh)		
Meter/Acct #					
Billing Period Start Date	Actual Reading	Solar Owned (kWh)	$$	Cost / Unit Checksum	BTU
1/1/19	1/31/19	17,562		$0.0000	59,921,544
2/1/19	2/28/19	21,831		$0.0000	74,487,372
3/1/19	3/31/19	29,864		$0.0000	101,895,968
4/1/19	4/30/19	32,496		$0.0000	110,876,352
5/1/19	5/31/19	39,883		$0.0000	136,080,796
6/1/19	6/30/19	40,102		$0.0000	136,828,024
7/1/19	7/31/19	36,857		$0.0000	125,756,084
8/1/19	8/31/19	35,892		$0.0000	122,463,504
9/1/19	9/30/19	31,298		$0.0000	106,788,776
10/1/19	10/31/19	24,856		$0.0000	84,808,672
11/1/19	11/30/19	15,839		$0.0000	54,042,668
12/1/19	12/31/19	13,156		$0.0000	44,888,272
TOTALS		339,636	$0	$0.0000	1,158,838,032

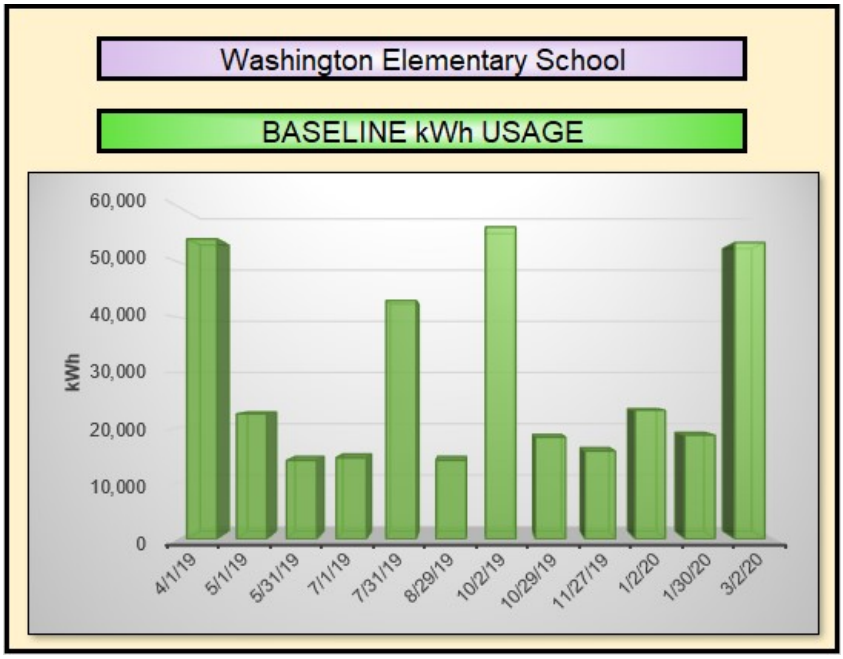


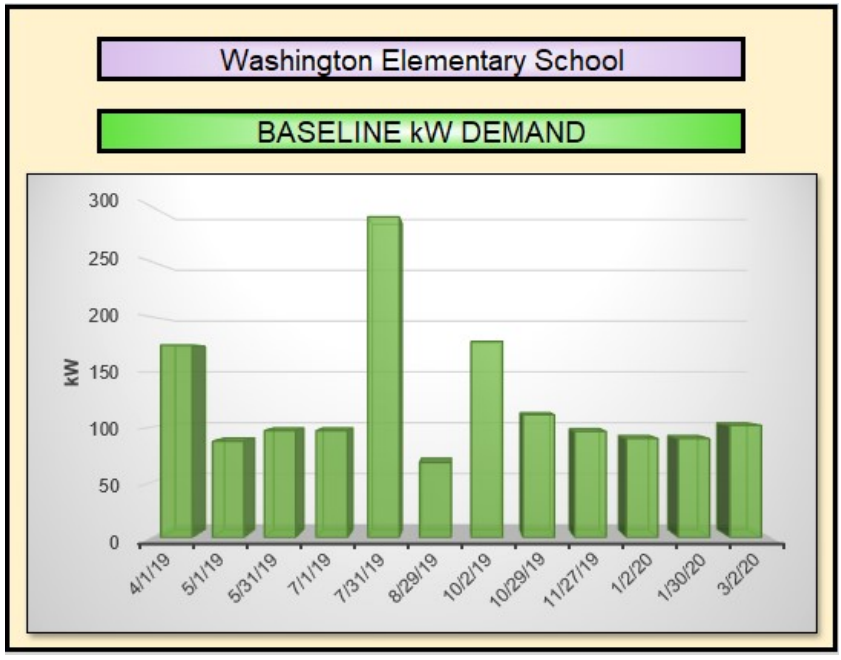
Franklin Elementary School								Natural Gas Meter #1	
Provider	PSE&G		Account #	6671800103				Meter #	3766345
Commodity			Commodity					Rate Tariff:	LVG
Billing Period Start Date	Actual Reading	Therms	Gas Delivery Charges	Gas Customer Charge	Gas Demand Charge	Gas Commodity Charges	Gas Total Charges	$/Therm Marginal Rate	BTU
2/27/19	3/28/19	17,262	$270	$137	$5,576	$9,087	$15,070	$0.87	1,726,216,000
3/29/19	4/26/19	4,955	$309	$137		$2,608	$3,055	$0.59	495,478,000
4/27/19	5/28/19	3,263	$203	$137		$1,717	$2,057	$0.59	326,256,600
5/29/19	6/26/19	0		$137		$0	$137	-	0
6/27/19	7/26/19	0		$137		$0	$137	-	0
7/27/19	8/26/19	0	$0	$137		$0	$137	-	0
8/27/19	9/25/19	1	$0	$137		$1	$138	$0.58	106,700
9/26/19	10/24/19	563	$87	$139		$297	$523	$0.68	56,336,800
10/25/19	11/22/19	7,995	$1,259	$140	$2,814	$4,208	$8,421	$1.04	799,463,200
11/23/19	12/26/29	18,658	$2,938	$143	$2,822	$9,822	$15,725	$0.84	1,865,828,700
12/27/29	1/29/20	17,935	$2,823	$144	$2,747	$8,984	$14,698	$0.81	1,793,499,700
1/30/20	2/26/220	12,224	$1,911	$144	$2,422	$6,123	$10,600	$0.86	1,222,363,100
TOTALS		82,855	$9,801	$1,671	$16,381	$42,847	$70,700	$0.83	8,285,548,800

Franklin Elementary School							Natural Gas Meter #2		
Provider	PSE&G		Account #	6613537403				Meter #	3214625
Commodity			Commodity					Rate Tariff	GSG
Billing Period Start Date	Actual Reading	Therms	Gas Delivery Charges	Gas Customer Charge	Gas Demand Charge	Gas Commodity Charges	Gas Total Charges	$/Therm Marginal Rate	BTU
3/4/19	4/2/19	129	$37	$15		$68	$121	$0.81	12,945,500
4/3/19	5/2/19	143	$41	$15		$75	$132	$0.81	14,313,700
5/3/19	6/4/19	157	$45	$15		$83	$143	$0.81	15,741,700
6/5/19	7/2/19	117	$33	$15		$62	$111	$0.81	11,708,400
7/3/19	8/1/19	82	$23	$15		$43	$82	$0.81	8,242,600
8/2/19	8/30/19	384	$109	$15		$202	$326	$0.81	38,396,100
8/31/19	10/1/19	28	$8	$15		$15	$38	$0.81	2,819,800
10/2/19	10/31/19	530	$189	$16		$279	$483	$0.88	52,950,300
11/1/19	12/2/19	548	$195	$16		$288	$499	$0.88	54,777,000
12/3/19	1/2/20	571	$208	$16		$301	$525	$0.89	57,133,900
1/3/20	2/3/20	150	$44	$16		$75	$136	$0.80	15,021,500
2/4/20	3/3/20	1,018	$379	$16		$510	$905	$0.87	101,796,100
TOTALS		3,858	$1,312	$188	$0	$2,001	$3,501	$0.86	385,846,600

Franklin Elementary School					
Provider	Kearny Water Department	Water & Sewer (Gal)			
Acct #	00304210000000				
Billing Period Start Date	Actual Reading	Water & Sewer (Gal)	Usage Charges	Cost / Unit Checksum	BTU
1/3/19	2/1/19	109,208		$0.0000	0
2/2/19	3/2/19	229,636	$950	$0.0041	0
3/3/19	4/4/19	501,160	$1,970	$0.0039	0
4/5/19	5/2/19	149,600	$585	$0.0039	0
5/3/19	6/5/19	112,948	$432	$0.0038	0
6/6/19	7/1/19	89,760	$376	$0.0042	0
7/2/19	8/1/19	41,888	$376	$0.0090	0
8/2/19	9/3/19	139,876	$591	$0.0042	0
9/4/19	10/1/19	218,416	$898	$0.0041	0
10/2/19	11/1/19	109,208	$450	$0.0041	0
11/2/19	11/30/19	127,908	$536	$0.0042	0
12/1/19	1/2/20	133,892	$564	$0.0042	0
TOTALS		1,963,500	$7,727	$0.0039	0

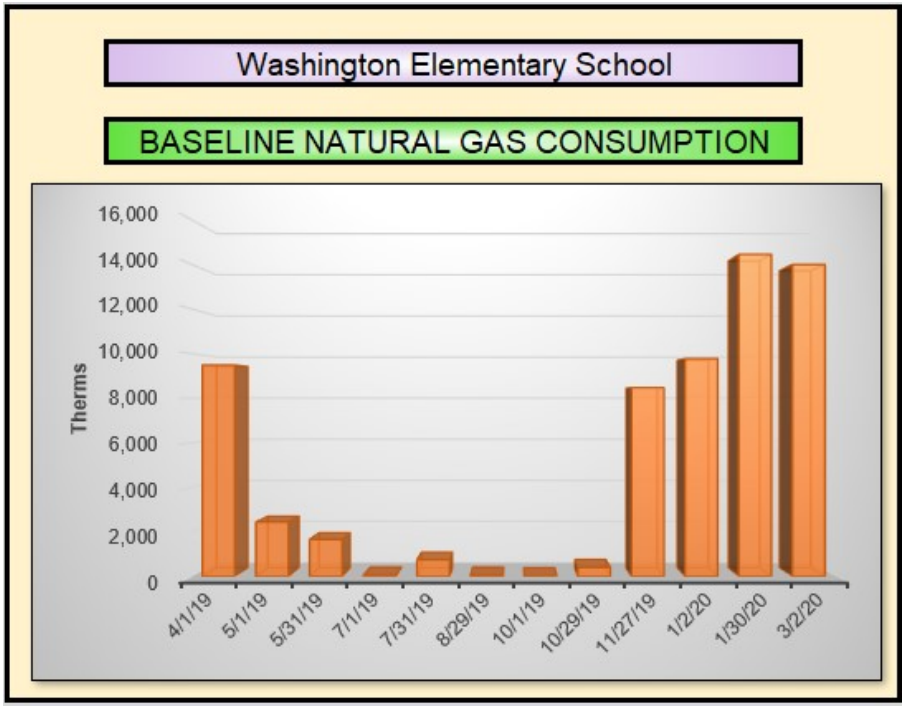
Washington Elementary School Baseline Energy Use





Washington Elementary School							ELECTRIC METER #1					
Provider:	PSE&G			Account #	6628807509				Meter #	9194221		
Commodity:				Commodity:					Rate Tariff:	GLP		
Billing Period Start Date	Actual Reading	Usage kWh	Demand kW	Electric Delivery Charges	Electric Commodity Charges	Customer Charge	Electric Demand Charges	Total Electric Charges	Marginal Rate $/kWh	Days	Load Factor	BTU
2/27/19	4/1/19	54,080	174.4	$867	$5,167	$9	$685	$6,728	$0.112	34	38%	184,520,960
4/2/19	5/1/19	22,560	87.2	$407	$2,068	$5	$342	$2,822	$0.110	30	36%	76,974,720
5/2/19	5/31/19	14,160	96.8	$288	$1,429	$5	$380	$2,102	$0.121	30	20%	48,313,920
6/1/19	7/1/19	14,640	96.8	$225	$1,482	$5	$380	$2,092	$0.117	31	20%	49,951,680
7/2/19	7/31/19	42,960	290.4	$734	$4,197	$14	$3,047	$7,992	$0.115	30	21%	146,579,520
8/1/19	8/29/19	14,160	68.0	$221	$1,286	$5	$937	$2,449	$0.106	29	30%	48,313,920
8/30/19	10/2/19	56,240	177.6	$884	$5,080	$9	$2,447	$8,420	$0.106	34	39%	191,890,880
10/3/19	10/29/19	18,320	111.2	$380	$1,659	$5	$438	$2,482	$0.111	27	25%	62,507,840
10/30/19	11/27/19	15,840	96.0	$329	$1,437	$5	$38	$1,808	$0.111	29	24%	54,046,080
11/28/19	1/2/20	23,200	89.6	$481	$2,104	$5	$353	$2,943	$0.111	36	30%	79,158,400
1/3/20	1/30/20	18,720	89.6	$390	$1,798	$5	$353	$2,546	$0.117	28	31%	63,872,640
1/31/20	3/2/20	53,440	101.6	$1,118	$5,133	$5	$401	$6,657	$0.117	32	68%	182,337,280
TOTALS		348,320	290	$6,324	$32,839	$76	$9,801	$49,039	$0.112	370	14%	1,188,467,840

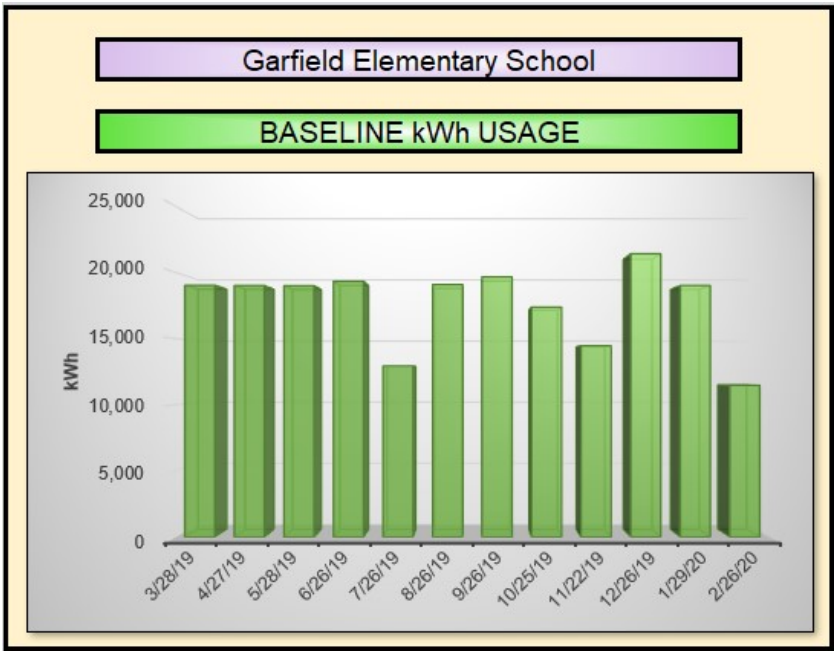
Washington Elementary School					
Provider	Owned		Solar Owned (kWh)		
Meter/Acct #					
Billing Period Start Date	Actual Reading	Solar Owned (kWh)	$$	Cost / Unit Checksum	BTU
1/1/19	1/31/19	6,988		$0.000	23,843,056
2/1/19	2/28/19	8,896		$0.000	30,353,152
3/1/19	3/31/19	13,161		$0.000	44,905,332
4/1/19	4/30/19	15,190		$0.000	51,828,280
5/1/19	5/31/19	17,923		$0.000	61,153,276
6/1/19	6/30/19	17,819		$0.000	60,798,428
7/1/19	7/31/19	17,961		$0.000	61,282,932
8/1/19	8/31/19	14,568		$0.000	49,706,016
9/1/19	9/30/19	12,982		$0.000	44,294,584
10/1/19	10/31/19	10,106		$0.000	34,481,672
11/1/19	11/30/19	6,164		$0.000	21,031,568
12/1/19	12/31/19	5,371		$0.000	18,325,852
TOTALS		147,129	$0	$0.000	502,004,148

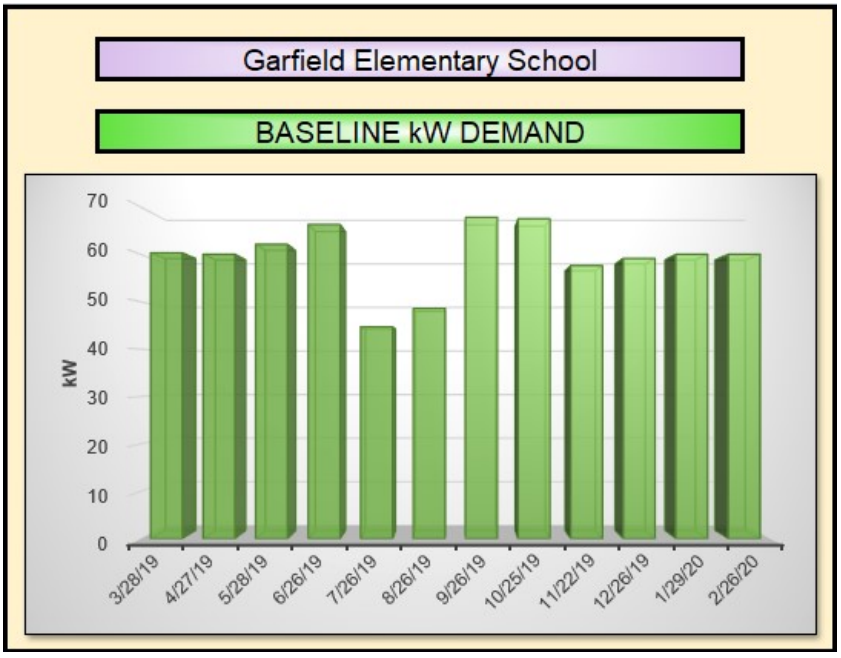


Washington Elementary School								Natural Gas Meter #1	
Provider	PSE&G		Account #	6628807509				Meter #	2600175
Commodity			Account #					Rate Tariff	LVG
Billing Period Start Date	Actual Reading	Therms	Gas Delivery Charges	Gas Customer Charge	Gas Demand Charge	Gas Commodity Charges	Gas Total Charges	$/Therm Marginal Rate	BTU
3/1/19	4/1/19	9,487	$1,662	$137	$2,346	$4,994	$9,139	$0.95	948,732,500
4/2/19	5/1/19	2,446	$151	$137		$1,288	$1,576	$0.59	244,626,300
5/2/19	5/31/19	1,658	$101	$137		$873	$1,111	$0.59	165,826,200
6/1/19	7/1/19	46	$3	$137		$24	$164	$0.59	4,634,500
7/2/19	7/31/19	746	$44	$412		$393	$848	$0.59	74,570,100
8/1/19	8/29/19	44	$2	$137		$23	$163	$0.58	4,405,300
8/30/19	10/1/19	12	$1	$137		$6	$144	$0.58	1,212,100
10/2/19	10/29/19	400	$53	$140		$211	$404	$0.66	40,016,500
10/30/19	11/27/19	8,471	$1,325	$140	$2,352	$4,459	$8,276	$0.96	847,130,900
11/28/19	1/2/20	9,775	$1,527	$143	$2,361	$5,146	$9,177	$0.92	977,499,100
1/3/20	1/30/20	14,454	$2,266	$144	$2,362	$7,240	$12,012	$0.82	1,445,420,700
1/31/20	3/2/20	13,996	$2,177	$144	$1,288	$7,011	$10,620	$0.75	1,399,608,500
TOTALS		61,537	$9,312	$1,946	$10,709	$31,668	$53,635	$0.84	6,153,682,700

Washington Elementary School					
Provider	Kearny Water Department		Water & Sewer (Gal)		
Acct #	00301420000000				
Billing Period Start Date	Actual Reading	Water & Sewer (Gal)	Usage Charges	Cost / Unit Checksum	BTU
12/28/18	1/29/19	204,204	$826	$0.0040	0
1/30/19	2/27/19	144,364	$563	$0.0039	0
2/28/19	4/4/19	120,428	$454	$0.0038	0
4/5/19	4/30/19	44,880	$376	$0.0084	0
5/1/19	6/5/19	116,688	$451	$0.0039	0
6/6/19	7/2/19	71,808	$376	$0.0052	0
7/3/19	7/31/19	5,984	$376	$0.0628	0
8/1/19	9/5/19	40,392	$451	$0.0112	0
9/6/19	9/30/19	79,288	$376	$0.0047	0
10/1/19	10/30/19	69,564	$376	$0.0054	0
10/31/19	11/30/19	99,484	$405	$0.0041	0
12/1/19	1/2/20	100,980	$802	$0.0079	0
TOTALS		1,098,064	$5,834	$0.0053	0

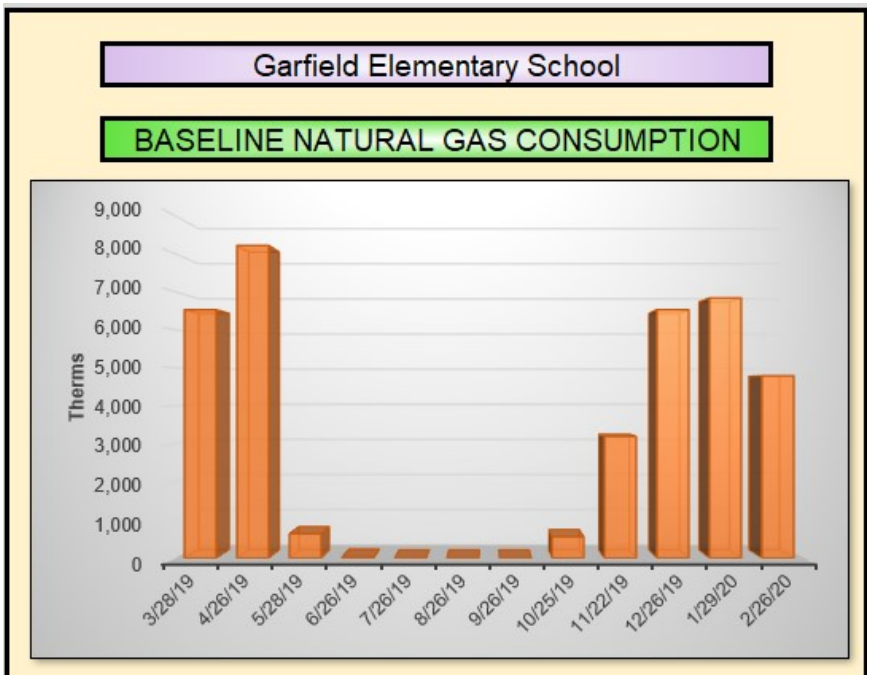
Garfield Elementary School Baseline Energy Use





Garfield Elementary School							ELECTRIC METER #1					
Provider:	PSE&G			Account #	6709220605				Meter #	678003023		
Commodity:				Commodity:					Rate Tariff:	General Lighting & Power (GLP)		
Billing Period Start Date	Actual Reading	Usage kWh	Demand kW	Electric Delivery Charges	Electric Commodity Charges	Customer Charge	Electric Demand Charges	Total Electric Charges	Marginal Rate $/kWh	Days	Load Factor	BTU
2/26/19	3/28/19	19,020	60	$305	$1,823	$5	$237	$2,369	$0.112	31	42%	64,896,240
3/29/19	4/27/19	19,000	60	$305	$1,821	$5	$237	$2,368	$0.112	30	44%	64,828,000
4/28/19	5/28/19	18,990	62	$386	$1,820	$5	$244	$2,455	$0.116	31	41%	64,793,880
5/29/19	6/26/19	19,320	66	$297	$1,847	$5	$913	$3,061	$0.111	29	42%	65,919,840
6/27/19	7/26/19	12,930	45	$201	$1,196	$5	$616	$2,017	$0.108	30	40%	44,117,160
7/27/19	8/26/19	19,080	49	$298	$1,743	$5	$670	$2,716	$0.107	31	53%	65,100,960
8/27/19	9/26/19	19,650	68	$309	$1,795	$5	$934	$3,043	$0.107	31	39%	67,045,800
9/27/19	10/25/19	17,370	68	$360	$1,587	$5	$266	$2,218	$0.112	29	37%	59,266,440
10/26/19	11/22/19	14,460	58	$300	$1,323	$5	$227	$1,855	$0.112	28	37%	49,337,520
11/23/19	12/26/19	21,390	59	$444	$1,954	$5	$233	$2,636	$0.112	34	44%	72,982,680
12/27/19	1/29/20	19,000	60	$305	$1,821	$5	$237	$2,368	$0.112	34	39%	64,828,000
1/30/20	2/26/20	11,460	60	$240	$1,101	$5	$236	$1,582	$0.117	28	28%	39,101,520
TOTALS		211,670	68	$3,750	$19,831	$57	$5,049	$28,687	$0.111	366	36%	722,218,040

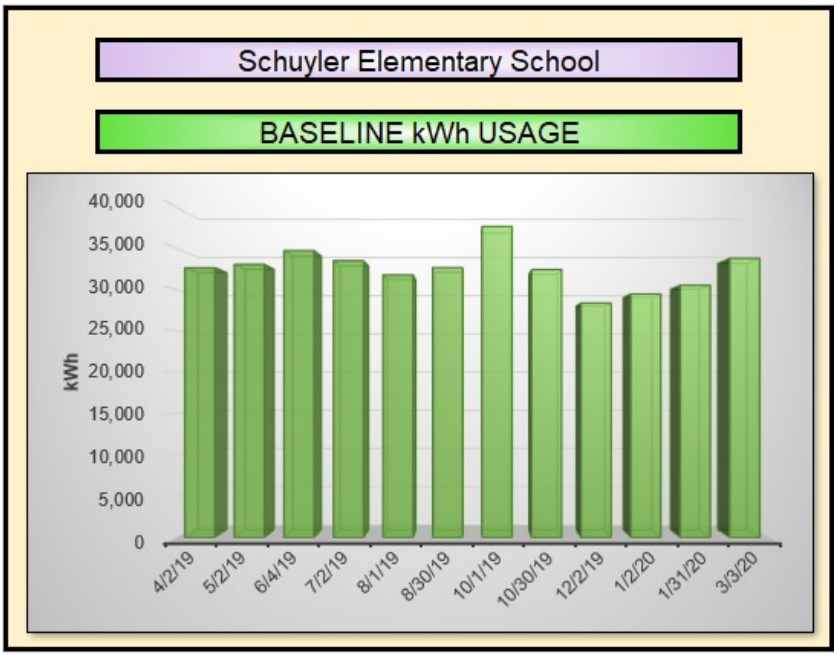
Garfield Elementary School					
Provider	Owned		Solar Owned (kWh)		
Meter/Acct #					
Billing Period Start Date	Actual Reading	Solar Owned (kWh)	$$	Cost / Unit Checksum	BTU
1/1/19	1/31/19	2,483		$0.00	8,471,996
2/1/19	2/28/19	3,397		$0.00	11,590,564
3/1/19	3/31/19	4,895		$0.00	16,701,740
4/1/19	4/30/19	5,469		$0.00	18,660,228
5/1/19	5/31/19	6,659		$0.00	22,720,508
6/1/19	6/30/19	6,811		$0.00	23,239,132
7/1/19	7/31/19	7,064		$0.00	24,102,368
8/1/19	8/31/19	5,903		$0.00	20,141,036
9/1/19	9/30/19	4,983		$0.00	17,001,996
10/1/19	10/31/19	3,962		$0.00	13,518,344
11/1/19	11/30/19	2,109		$0.00	7,195,908
12/1/19	12/31/19	1,995		$0.00	6,806,940
TOTALS		55,730	$0	$0.00	190,150,760

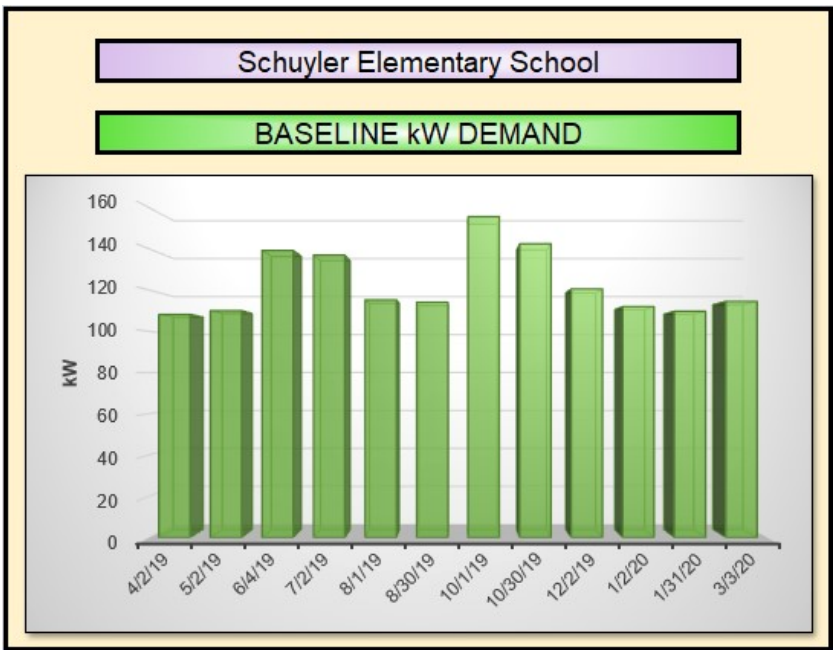


Garfield Elementary School								Natural Gas Meter #1	
Provider	PSE&G		Account #	6709220605				Meter #	3861888
Commodity			Account #					Meter #	
Billing Period Start Date	Actual Reading	Therms	Gas Delivery Charges	Gas Customer Charge	Gas Demand Charge	Gas Commodity Charges	Gas Total Charges	$/Therm Marginal Rate	BTU
2/26/19	3/28/19	6,521	$1,119	$137	$1,066	$3,433	$5,755	$0.86	652,114,700
3/29/19	4/26/19	8,210	$1,222	$275	$1,066	$4,322	$6,884	$0.81	820,975,800
4/27/19	5/28/19	642	$38	$137		$338	$514	$0.59	64,248,000
5/29/19	6/26/19	22	$1	$137		$12	$150	$0.59	2,206,900
6/27/19	7/26/19	0	$0	$137		$0	$137	-	0
7/27/19	8/26/19	0	$0	$137		$0	$137	-	0
8/27/19	9/26/19	0	$0	$137		$0	$137	-	0
9/27/19	10/25/19	562	$87	$139		$296	$522	$0.68	56,221,500
10/26/19	11/22/19	3,194	$501	$140	$1,069	$1,681	$3,391	$1.02	319,381,100
11/23/19	12/26/19	6,521	$1,026	$143	$1,072	$3,433	$5,674	$0.85	652,139,300
12/27/19	1/29/20	6,832	$1,075	$144	$1,001	$3,423	$5,643	$0.80	683,243,800
1/30/20	2/26/20	4,788	$748	$144	$915	$2,398	$4,205	$0.85	478,758,100
TOTALS		37,293	$5,818	$1,808	$6,189	$19,335	$33,150	$0.84	3,729,289,200

Garfield Elementary School					
Provider	Kearny Water Department		Water & Sewer (Gal)		
Acct #	00306220000000, 00307220000000, & 00308220000000				
Billing Period Start Date	Actual Reading	Water & Sewer (Gal)	Usage Charges	Cost / Unit Checksum	BTU
12/28/18	1/29/19	60,588	$860	$0.0142	0
1/30/19	2/27/19	46,376	$853	$0.0184	0
2/28/19	4/2/19	45,628	$949	$0.0208	0
4/3/19	5/6/19	23,936	$853	$0.0357	0
5/7/19	6/5/19	51,612	$949	$0.0184	0
6/6/19	7/2/19	36,652	$853	$0.0233	0
7/3/19	8/1/19	25,432	$1,179	$0.0464	0
8/2/19	9/5/19	18,700	$1,726	$0.0923	0
9/6/19	10/1/19	31,416	$853	$0.0272	0
10/2/19	10/30/19	48,620	$853	$0.0176	0
10/31/19	11/27/19	781,660	$4,752	$0.0061	0
11/28/19	1/2/20	1,127,832	$6,110	$0.0054	0
TOTALS		2,298,452	$20,791	$0.0090	0

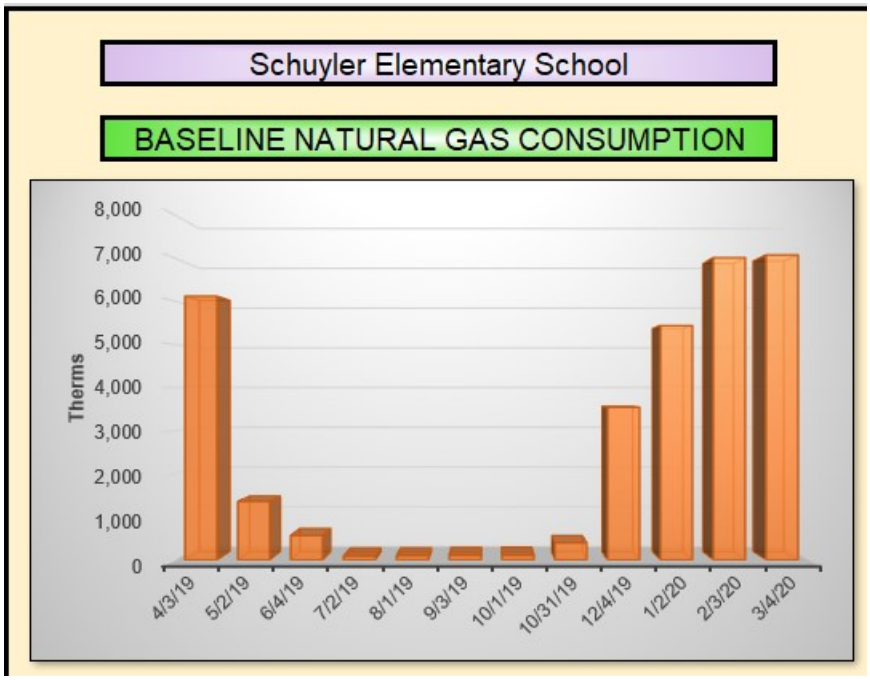
Schuyler Elementary School Baseline Energy Use





Schuyler Elementary School							ELECTRIC METER #1					
Provider:	PSE&G			Account #	4204203507				Meter #	9205086		
Commodity:				Commodity:					Rate Tariff:	LPLS		
Billing Period Start Date	Actual Reading	Usage kWh	Demand kW	Electric Delivery Charges	Electric Commodity Charges	Customer Charge	Electric Demand Charges	Total Electric Charges	Marginal Rate $/kWh	Days	Load Factor	BTU
3/5/19	4/2/19	32,591	108.2	$273.8	$3,108	$371	$406	$4,158	$0.104	29	43%	111,200,492
4/3/19	5/2/19	33,000	110.0	$285.0	$3,152	$371	$410	$4,218	$0.104	30	42%	112,596,000
5/3/19	6/4/19	34,677	139.2	$440.5	$3,312	$371	$522	$4,645	$0.108	33	31%	118,317,924
6/5/19	7/2/19	33,445	136.9	$425.3	$3,194	$371	$1,734	$5,724	$0.108	28	36%	114,114,340
7/3/19	8/1/19	31,735	115.2	$410.8	$2,929	$371	$1,459	$5,170	$0.105	30	38%	108,279,820
8/2/19	8/30/19	32,626	114.1	$423.5	$3,010	$371	$1,445	$5,250	$0.105	29	41%	111,319,912
8/31/19	10/1/19	37,590	155.5	$492.1	$3,468	$371	$1,970	$6,300	$0.105	32	31%	128,257,080
10/2/19	10/30/19	32,376	142.4	$423.8	$2,987	$371	$536	$4,318	$0.105	29	33%	110,466,912
10/31/19	12/2/19	28,341	120.5	$371.0	$2,618	$371	$453	$3,813	$0.105	33	30%	96,699,492
12/3/19	1/2/20	29,435	112.0	$385.5	$2,827	$371	$421	$4,005	$0.109	31	35%	100,432,220
1/3/20	1/31/20	30,487	109.7	$402.0	$2,928	$371	$413	$4,114	$0.109	29	40%	104,021,644
2/1/20	3/3/20	33,743	114.5	$451.4	$3,241	$371	$431	$4,494	$0.109	32	38%	115,131,116
TOTALS		390,046	156	$4,785	$36,774	$4,450	$10,199	$56,208	$0.107	365	29%	1,330,836,952

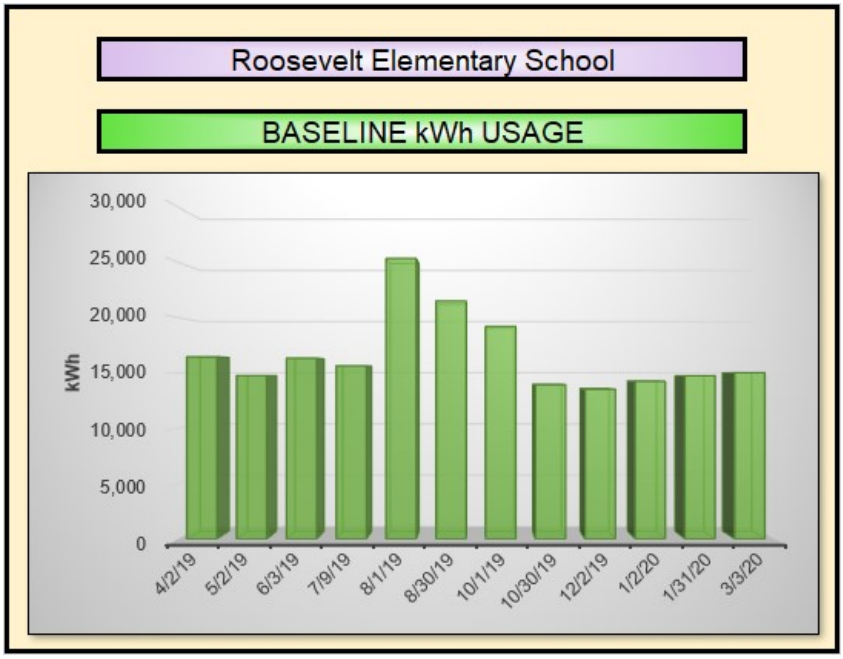
Schuyler Elementary School						
Provider	Owned		Solar Owned (kWh)			
Meter/Acct #						
Billing Period Start Date	Actual Reading	Solar Owned (kWh)	$$	Cost / Unit Checksum	BTU	
1/1/19	1/31/19	6,164		$0.00	21,031,568	
2/1/19	2/28/19	8,492		$0.00	28,974,704	
3/1/19	3/31/19	12,289		$0.00	41,930,068	
4/1/19	4/30/19	14,589		$0.00	49,777,668	
5/1/19	5/31/19	17,098		$0.00	58,338,376	
6/1/19	6/30/19	16,983		$0.00	57,945,996	
7/1/19	7/31/19	16,992		$0.00	57,976,704	
8/1/19	8/31/19	14,985		$0.00	51,128,820	
9/1/19	9/30/19	12,087		$0.00	41,240,844	
10/1/19	10/31/19	9,793		$0.00	33,413,716	
11/1/19	11/30/19	5,862		$0.00	20,001,144	
12/1/19	12/31/19	4,986		$0.00	17,012,232	
TOTALS		140,320	$0	$0.00	478,771,840	

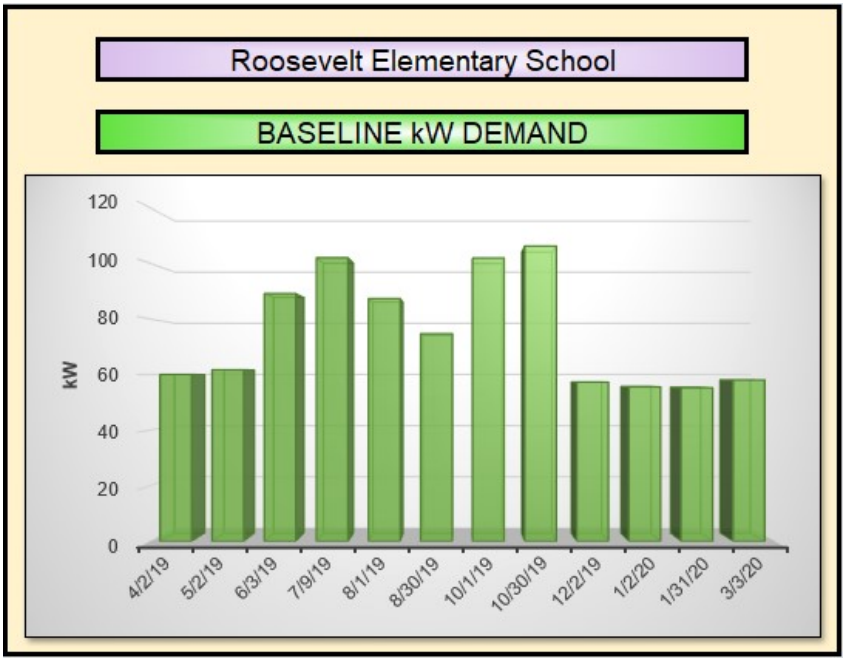


Schuyler Elementary School							Natural Gas Meter #1		
Provider	PSE&G		Account #	4204203507			Meter #	2600225	
Commodity			Commodity				Rate Tariff:	LVG	
Billing Period Start Date	Actual Reading	Therms	Gas Delivery Charges	Gas Customer Charge	Gas Demand Charge	Gas Commodity Charges	Gas Total Charges	$/Therm Marginal Rate	BTU
3/4/19	4/3/19	6,118	$1,064	$137		$3,279	$4,480	$0.71	611,788,000
4/4/19	5/2/19	1,358	$82	$137		$713	$932	$0.59	135,755,400
5/3/19	6/4/19	569	$34	$137		$290	$462	$0.57	56,937,000
6/5/19	7/2/19	94	$6	$137		$48	$191	$0.57	9,379,300
7/3/19	8/1/19	101	$6	$137		$49	$192	$0.54	10,132,100
8/2/19	9/3/19	111	$6	$137		$52	$195	$0.52	11,123,300
9/4/19	10/1/19	112	$7	$137		$54	$198	$0.54	11,244,300
10/2/19	10/31/19	398	$52	$140		$197	$389	$0.63	39,796,000
11/1/19	12/4/19	3,543	$545	$150	$31	$1,812	$2,538	$0.67	354,271,100
12/5/19	1/2/20	5,436	$847	$144	$789	$2,737	$4,516	$0.80	543,644,200
1/3/20	2/3/20	7,012	$1,093	$144	$789	$3,298	$5,323	$0.74	701,199,800
2/4/20	3/4/20	7,076	$1,096	$144	$956	$3,094	$5,290	$0.73	707,613,700
TOTALS		31,929	$4,837	$1,682	$2,565	$15,622	$24,706	$0.72	3,192,884,200

Schuyler Elementary School					
Provider	Kearny Water Department		Water & Sewer (Gal)		
Acct #	00309551000000 & 00301750000000				
Billing Period Start Date	Actual Reading	Water & Sewer (Gal)	Usage Charges	Cost / Unit Checksum	BTU
1/2/19	2/1/19	44,880	$621	$0.0138	0
2/2/19	2/27/19	41,888	$621	$0.0148	0
2/28/19	4/4/19	34,408	$1,811	$0.0526	0
4/5/19	4/30/19	11,220	$621	$0.0554	0
5/1/19	6/5/19	23,936	$746	$0.0311	0
6/6/19	7/2/19	14,212	$621	$0.0437	0
7/3/19	7/31/19	3,740	$621	$0.1661	0
8/1/19	9/3/19	24,684	$670	$0.0272	0
9/4/19	10/1/19	11,968	$621	$0.0519	0
10/2/19	11/1/19	50,116	$621	$0.0124	0
11/2/19	11/27/19	46,376	$621	$0.0134	0
11/28/19	1/2/20	16,456	$746	$0.0453	0
TOTALS		323,884	$8,943	$0.0276	0

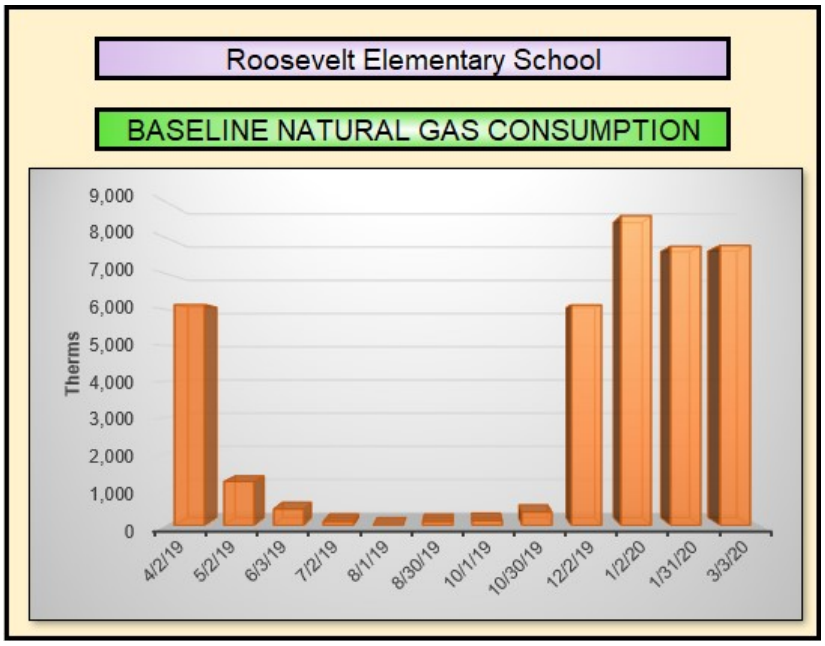
Roosevelt Elementary School Baseline Energy Use





Roosevelt Elementary School							ELECTRIC METER #1					
Provider:	PSE&G			Account #	4207701001				Meter #	9209679		
Commodity:				Commodity:					Rate Tariff:	GLP		
Billing Period Start Date	Actual Reading	Usage kWh	Demand kW	Electric Delivery Charges	Electric Commodity Charges	Customer Charge	Electric Demand Charges	Total Electric Charges	Marginal Rate $/kWh	Days	Load Factor	BTU
3/5/19	4/2/19	16,445	60	$264	$1,582	$5	$236	$2,086	$0.112	29	39%	56,110,340
4/3/19	5/2/19	14,739	62	$264	$1,418	$5	$242	$1,929	$0.114	30	33%	50,289,468
5/3/19	6/3/19	16,324	89	$332	$1,582	$5	$350	$2,268	$0.117	32	24%	55,697,488
6/4/19	7/9/19	15,631	102	$240	$1,510	$5	$1,405	$3,161	$0.112	36	18%	53,332,972
7/10/19	8/1/19	25,313	87	$395	$2,292	$5	$1,203	$3,894	$0.106	23	53%	86,367,956
8/2/19	8/30/19	21,474	75	$336	$1,945	$5	$1,029	$3,315	$0.106	29	41%	73,269,288
8/31/19	10/1/19	19,187	102	$302	$1,740	$5	$1,404	$3,451	$0.106	32	25%	65,466,044
10/2/19	10/30/19	13,916	106	$289	$1,264	$5	$418	$1,976	$0.112	29	19%	47,481,392
10/31/19	12/2/19	13,511	57	$280	$1,229	$5	$225	$1,739	$0.112	33	30%	46,099,532
12/3/19	1/2/20	14,231	56	$295	$1,367	$5	$219	$1,886	$0.117	31	34%	48,556,172
1/3/20	1/31/20	14,727	55	$307	$1,414	$5	$217	$1,944	$0.117	29	38%	50,247,255
2/1/20	3/3/20	15,000	58	$315	$1,443	$5	$225	$1,988	$0.117	32	34%	51,180,000
TOTALS		200,498	106	$3,619	$18,787	$57	$7,173	$29,636	$0.112	365	22%	684,097,907

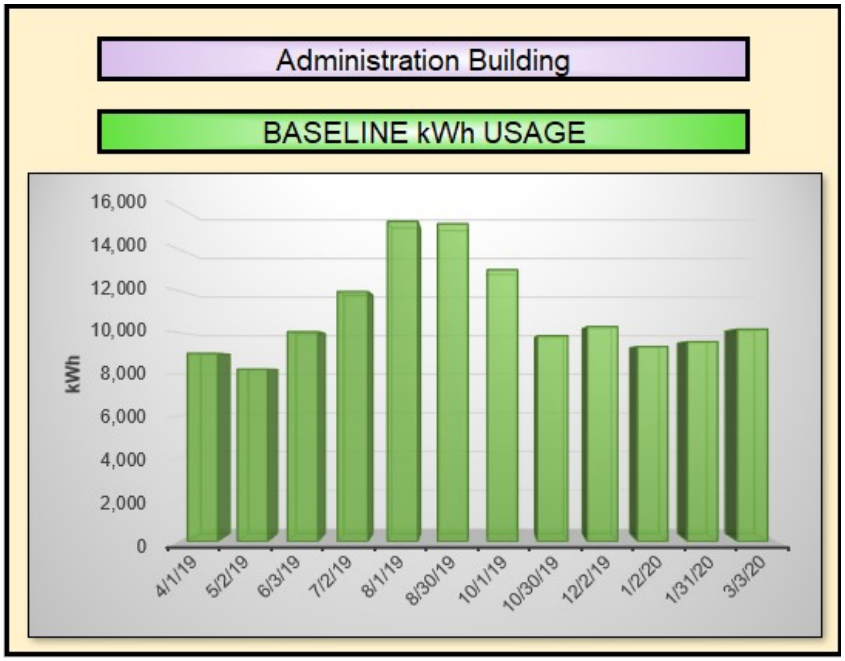
Roosevelt Elementary School					
Provider	Owned		Solar Owned (kWh)		
Meter/Acct #					
Billing Period Start Date	Actual Reading	Solar Owned (kWh)	$$	Cost / Unit Checksum	BTU
1/1/19	1/31/19	2,269		$0.00	7,741,828
2/1/19	2/28/19	3,108		$0.00	10,604,496
3/1/19	3/31/19	4,539		$0.00	15,487,068
4/1/19	4/30/19	5,484		$0.00	18,711,408
5/1/19	5/31/19	6,987		$0.00	23,839,644
6/1/19	6/30/19	7,135		$0.00	24,344,620
7/1/19	7/31/19	7,083		$0.00	24,167,196
8/1/19	8/31/19	5,946		$0.00	20,287,752
9/1/19	9/30/19	5,098		$0.00	17,394,376
10/1/19	10/31/19	3,837		$0.00	13,091,844
11/1/19	11/30/19	1,934		$0.00	6,598,808
12/1/19	12/31/19	1,763		$0.00	6,015,356
TOTALS		55,183	$0	$0.00	188,284,396

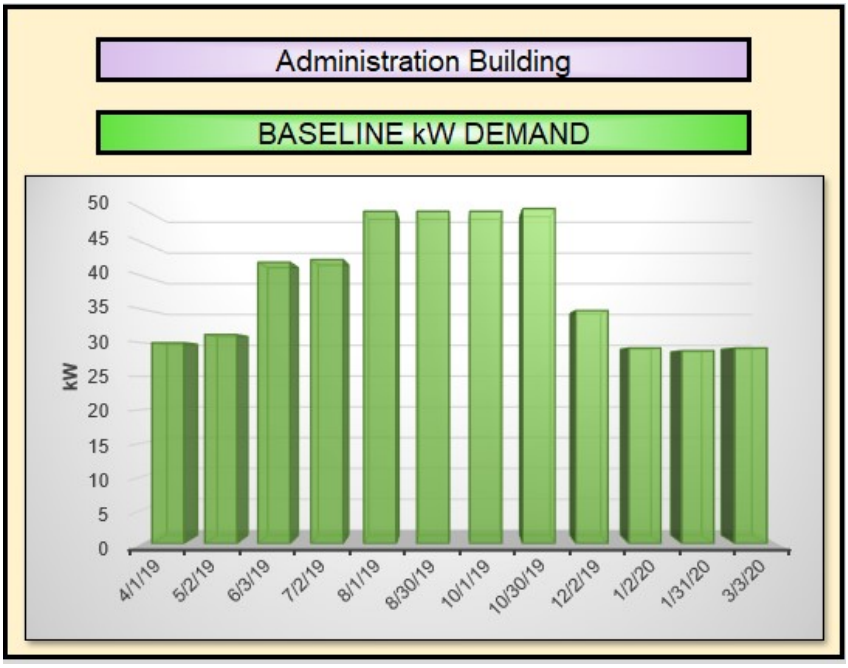


Roosevelt Elementary School								Natural Gas Meter #1	
Provider	PSE&G		Account #	4207701001				Meter #	2600228
Commodity			Commodity					Rate Tariff:	LVG
Billing Period Start Date	Actual Reading	Therms	Gas Delivery Charges	Gas Customer Charge	Gas Demand Charge	Gas Commodity Charges	Gas Total Charges	$/Therm Marginal Rate	BTU
3/4/19	4/2/19	6,133	$1,062	$137	$1,329	$3,229	$5,757	$0.92	613,343,300
4/3/19	5/2/19	1,220	$73	$137		$642	$853	$0.59	121,979,900
5/3/19	6/3/19	455	$27	$137		$240	$404	$0.59	45,527,400
6/4/19	7/2/19	110	$7	$137		$58	$202	$0.59	11,034,500
7/3/19	8/1/19					$0	$0	-	0
8/2/19	8/30/19	109	$6	$137		$57	$201	$0.58	10,903,000
8/31/19	10/1/19	133	$8	$137		$70	$215	$0.59	13,338,800
10/2/19	10/30/19	376	$48	$140		$198	$386	$0.66	37,591,200
10/31/19	12/2/19	6,122	$952	$140	$1,333	$3,223	$5,648	$0.90	612,220,600
12/3/19	1/2/20	8,599	$1,343	$144	$1,338	$4,526	$7,351	$0.84	859,867,900
1/3/20	1/31/20	7,750	$1,210	$144	$1,338	$3,882	$6,574	$0.83	775,045,300
2/1/20	3/3/20	7,772	$1,203	$144	$1,125	$3,893	$6,365	$0.80	777,178,700
TOTALS		38,780	$5,941	$1,535	$6,462	$20,019	$33,956	$0.84	3,878,030,600

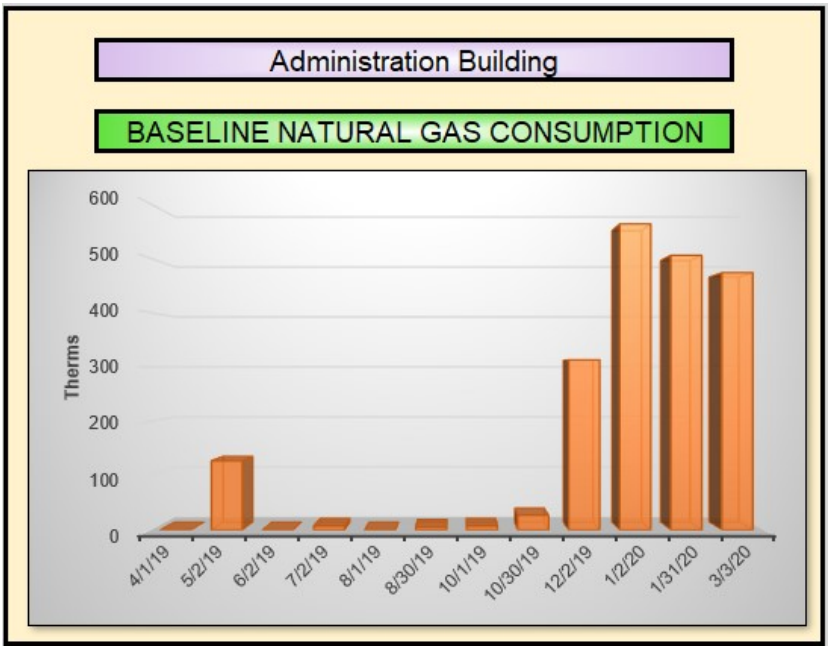
Roosevelt Elementary School					
Provider	Kearny Water Department		Water & Sewer (Gal)		
Acct #	00305520000000				
Billing Period Start Date	Actual Reading	Water & Sewer (Gal)	Usage Charges	Cost / Unit Checksum	BTU
12/28/18	1/29/19	91,256	$376	$0.0041	0
1/30/19	2/27/19	81,532	$376	$0.0046	0
2/28/19	4/4/19	80,784	$451	$0.0056	0
4/5/19	4/30/19	26,928	$376	$0.0140	0
5/1/19	6/5/19	45,628	$451	$0.0099	0
6/6/19	7/2/19	25,432	$376	$0.0148	0
7/3/19	7/31/19	7,480	$376	$0.0503	0
8/1/19	9/5/19	12,716	$453	$0.0356	0
9/6/19	9/30/19	39,644	$376	$0.0095	0
10/1/19	10/30/19	51,612	$376	$0.0073	0
10/31/19	11/27/19	47,124	$376	$0.0080	0
11/28/19	1/2/20	87,516	$451	$0.0052	0
TOTALS		597,652	$4,816	$0.0081	0

Administration Building Baseline Energy Use





Administration Building							ELECTRIC METER #1					
Provider:	PSE&G			Account #	6939538518				Meter #	9201346		
Commodity:				Commodity:					Rate Tariff:	GLP		
Billing Period Start Date	Actual Reading	Usage kWh	Demand kW	Electric Delivery Charges	Electric Commodity Charges	Customer Charge	Electric Demand Charges	Total Electric Charges	Marginal Rate $/kWh	Days	Load Factor	BTU
2/27/19	4/1/19	9,000	30.0	$150	$1,312	$5	$120	$1,587	$0.162	34	37%	30,708,000
4/2/19	5/2/19	8,240	31.2	$150	$1,331	$5	$123	$1,608	$0.180	31	35%	28,114,880
5/3/19	6/3/19	10,040	42.0	$204	$1,464	$5	$165	$1,838	$0.166	32	31%	34,256,480
6/4/19	7/2/19	11,960	42.4	$184	$1,423	$5	$584	$2,196	$0.134	29	41%	40,807,520
7/3/19	8/1/19	15,320	49.6	$239	$1,554	$5	$683	$2,481	$0.117	30	43%	52,271,840
8/2/19	8/30/19	15,200	49.6	$238	$1,437	$5	$683	$2,363	$0.110	29	44%	51,862,400
8/31/19	10/1/19	13,000	49.6	$205	$1,285	$5	$683	$2,177	$0.115	32	34%	44,356,000
10/2/19	10/30/19	9,840	50.0	$204	$1,173	$5	$197	$1,579	$0.140	29	28%	33,574,080
10/31/19	12/2/19	10,280	34.8	$213	$1,169	$5	$137	$1,524	$0.134	33	37%	35,075,360
12/3/19	1/2/20	9,320	29.2	$193	$1,171	$5	$115	$1,484	$0.146	31	43%	31,799,840
1/3/20	1/31/20	9,560	28.8	$199	$1,161	$5	$113	$1,478	$0.142	29	48%	32,618,720
2/1/20	3/3/20	10,160	29.2	$213	$1,324	$5	$115	$1,657	$0.151	32	45%	34,665,920
TOTALS		131,920	50	$2,392	$15,805	$57	$3,719	$21,972	$0.138	371	30%	450,111,040



Administration Building							Natural Gas Meter #1		
Provider	PSE&G		Account #	6939538518			Meter #		
Commodity			Account #				Meter #		
Billing Period Start Date	Actual Reading	Therms	Gas Delivery Charges	Gas Customer Charge	Gas Delivery Constant	Gas Commodity Charges	Gas Total Charges	$/Therm Marginal Rate	BTU
2/27/19	4/1/19						$0	-	0
4/2/19	5/2/19	127	$36	$15		$67	$119	$0.81	12,735,000
5/3/19	6/2/19						$0	-	0
6/3/19	7/2/19	7	$2	$15		$3	$21	$0.76	730,400
7/3/19	8/1/19						$0	-	0
8/2/19	8/30/19	5	$1	$15		$2	$19	$0.75	521,700
8/31/19	10/1/19	7	$2	$15		$4	$21	$0.76	731,100
10/2/19	10/30/19	27	$10	$16		$13	$39	$0.86	2,715,400
10/31/19	12/2/19	313	$120	$16		$161	$297	$0.90	31,301,200
12/3/19	1/2/20	563	$219	$16		$283	$518	$0.89	56,296,800
1/3/20	1/31/20	505	$196	$16		$239	$451	$0.86	50,526,900
2/1/20	3/3/20	473	$182	$16		$207	$405	$0.82	47,329,900
TOTALS		2,029	$768	$142	$0	$981	$1,891	$0.86	202,888,400

Administration Building					
Provider	Kearny Water Department		Water & Sewer (Gal)		
Acct #	00307520000000				
Billing Period Start Date	Actual Reading	Water & Sewer (Gal)	Usage Charges	Cost / Unit Checksum	BTU
12/28/18	1/29/19	748	$101	$0.1354	0
1/30/19	2/27/19	1,496	$101	$0.0677	0
2/28/19	4/4/19	9,724	$122	$0.0125	0
4/5/19	5/2/19	10,472	$101	$0.0097	0
5/3/19	6/5/19	9,724	$122	$0.0125	0
6/6/19	7/2/19	4,488	$101	$0.0226	0
7/3/19	7/31/19	0	$101	$0.00	0
8/1/19	9/5/19	2,992	$122	$0.0406	0
9/6/19	9/30/19	2,244	$101	$0.0451	0
10/1/19	10/30/19	2,992	$101	$0.0338	0
10/31/19	11/27/19	748	$101	$0.1354	0
11/28/19	1/2/20	748	$101	$0.1354	0
TOTALS		46,376	$1,276	$0.0275	0

Energy Savings Utility Rates

DCO Energy used the following marginal rates to calculate energy cost savings:

CALCULATED UTILITY RATES - MARGINAL RATES USED FOR SAVINGS				
BUILDING/FACILITY	ELECTRIC		NATURAL GAS	Water & Sewer (Gal)
	$ / kW	$ / kWh Marginal Rate	$ / Therm Marginal Rate	$ / Gal Marginal Rate
Kearny High School	$7.163	$0.112	$0.838	$0.0043
Lincoln Middle School	$6.945	$0.108	$0.693	$0.0043
Franklin Elementary School	$6.317	$0.106	$0.834	$0.0039
Washington Elementary School	$6.626	$0.112	$0.840	$0.0053
Garfield Elementary School	$7.071	$0.111	$0.840	$0.0090
Schuyler Elementary School	$6.900	$0.107	$0.721	$0.0276
Roosevelt Elementary School	$7.893	$0.112	$0.836	$0.0081
Administration Building	$7.974	$0.138	$0.862	$0.0275

ENERGY SAVINGS PLAN

SECTION 3 – ENERGY CONSERVATION MEASURES

Energy Conservation Measure Breakdown by Building

The matrix below details which ECMs were applied and evaluated by building.

KEARNY BOE

✔ Measure evaluated but not included
✔ Measure included in the project

MEASURE #	MEASURE DESCRIPTION	Kearny High School	Lincoln Middle School	Franklin Elementary School	Washington Elementary School	Garfield Elementary School	Schuyler Elementary School	Roosevelt Elementary School	Administration Building
ECM-1	LED Lighting	✔	✔	✔	✔	✔	✔	✔	✔
ECM-2	Energy Management System			✔	✔	✔	✔	✔	
ECM-3	Boiler Replacement				✔		✔	✔	
ECM-4	Steam Trap Replacement			✔	✔	✔	✔	✔	
ECM-5	Chiller Replacement						✔		
ECM-6	Rooftop Unit Replacement							✔	✔
ECM-7	AHU / Split System Replacement				✔				✔
ECM-8	Electronic Fuel-Use Economizer								✔
ECM-9	Pipe and Valve Insulation		✔	✔		✔		✔	✔
ECM-10	Building Envelope Weatherization	✔	✔	✔	✔	✔	✔	✔	✔
ECM-11	High Efficiency Transformers	✔	✔						
ECM-12	Water Conservation	✔	✔	✔	✔	✔	✔	✔	✔
ECM-13	Plug Load Controls	✔	✔	✔	✔	✔	✔	✔	✔
ECM-14	Combined Heat & Power Unit		✔						
ECM-15a	Window Replacement							✔	
ECM-15b	Window Refurbishment							✔	
ECM-16	Retrocommissioning	✔	✔						
Non ECM-17	Asbestos Abatement				✔		✔	✔	

ECM Breakdown by Cost & Savings

KEARNY BOE		INCLUDED IN PROJECT	INSTALLED COST	ANNUAL ELECTRIC COST SAVINGS	ANNUAL NATURAL GAS COST SAVINGS	ANNUAL Water & Sewer (Gal) COST SAVINGS	ANNUAL ENERGY COST SAVINGS	ANNUAL O&M COST SAVINGS	TOTAL ANNUAL COST SAVINGS	ESTIMATED INCENTIVE AMOUNT	SIMPLE PAYBACK WITH INCENTIVES
ECM #	MEASURE DESCRIPTION	"Y" OR "N"	$	$	$	$	$	$	$	$	YEARS
ECM-1	LED Lighting	Y	$904,958	$163,050	($3,435)	$0	$159,615	$17,579	$177,194	$41,584	4.9
ECM-2	Energy Management System	Y	$0	$4,476	$17,650	$0	$22,126	$6,664	$28,790	$0	0.0
ECM-3	Boiler Replacement	Y	$1,591,858	$0	$7,814	$0	$7,814	$4,306	$12,121	$15,912	130.0
ECM-4	Steam Trap Replacement	Y	$312,144	$0	$27,025	$0	$27,025	$3,932	$30,957	$0	10.1
ECM-5	Chiller Replacement	Y	$109,326	$1,122	$0	$0	$1,122	$500	$1,622	$0	67.4
ECM-6	Rooftop Unit Replacement	Y	$131,303	$2,045	$157	$0	$2,203	$1,000	$3,203	$0	41.0
ECM-7	AHU / Split System Replacement	Y	$40,617	$344	$113	$0	$457	$400	$857	$0	47.4
ECM-8	Electronic Fuel-Use Economizer	Y	$1,657	$0	$275	$0	$275	$0	$275	$0	6.0
ECM-9	Pipe and Valve Insulation	Y	$25,526	$0	$3,167	$0	$3,167	$0	$3,167	$0	8.1
ECM-10	Building Envelope Weatherization	Y	$170,706	$3,753	$12,245	$0	$15,998	$0	$15,998	$0	10.7
ECM-11	High Efficiency Transformers	Y	$61,000	$4,866	$0	$0	$4,866	$0	$4,866	$0	12.5
ECM-12	Water Conservation	Y	$9,094	$0	$7,405	$4,703	$12,108	$0	$12,108	$0	0.8
ECM-13	Plug Load Controls	Y	$55,512	$4,232	$0	$0	$4,232	$0	$4,232	$2,445	12.5
ECM-14	Combined Heat & Power Unit	Y	$388,506	$25,491	($5,439)	$0	$20,052	$0	$20,052	$0	19.4
ECM-15a	Window Replacement	N	$0	$0	$0	$0	$0	$0	$0	$0	0.0
ECM-15b	Window Refurbishment	Y	$189,278	$1,389	$4,505	$0	$5,894	$0	$5,894	$0	32.1
ECM-16	Retrocommissioning	Y	$322,000	$22,150	$6,220	$0	$28,371	$0	$28,371	$0	11.3
Non ECM-17	Asbestos Abatement	Y	$100,000	$0	$0	$0	$0	$0	$0	$0	0.0
TOTALS			$4,413,484	$232,919	$77,702	$4,703	$315,324	$34,381	$349,705	$59,941	12.4

ECM Breakdown by Greenhouse Gas Reduction

KEARNY BOE		INCLUDED IN PROJECT	Reduction of CO_2	Reduction of Nox	Reduction of SO_2	Reduction of Hg
ECM #	MEASURE DESCRIPTION	"Y" OR "N"	LBS	LBS	LBS	LBS
ECM-1	LED Lighting	Y	1,327,193	1,150	2,769	5,826
ECM-2	Energy Management System	Y	297,444	237	90	189.9
ECM-3	Boiler Replacement	Y	126,806	100	0	0
ECM-4	Steam Trap Replacement	Y	384,708	303	0	0
ECM-5	Chiller Replacement	Y	6,955	6	14	29
ECM-6	Rooftop Unit Replacement	Y	15,247	13	26	55
ECM-7	AHU / Split System Replacement	Y	3,766	3	4	9
ECM-8	Electronic Fuel-Use Economizer	Y	3,737	3	0	0.0
ECM-9	Pipe and Valve Insulation	Y	52,016	41	0	0.0
ECM-10	Building Envelope Weatherization	Y	217,067	174	75	159
ECM-11	High Efficiency Transformers	Y	48,322	42	97	204.3
ECM-12	Water Conservation	Y	107,297	84	0	0.0
ECM-13	Plug Load Controls	Y	41,777	36	84	177
ECM-14	Combined Heat & Power Unit	Y	178,229	101	140	0
ECM-15a	Window Replacement	N	0	0	0	0
ECM-15b	Window Refurbishment	Y	76,686	61	27	58
ECM-16	Retrocommissioning	Y	314,872	265	442	931
Non ECM-17	Asbestos Abatement	Y	0	0	0	0.0
TOTALS			3,202,121	2,619	3,770	7,638

Note: Factors used to calculate Greenhouse Gas Reductions are as follows.

	UTILITIES		
	ELECTRIC	NATURAL GAS	OTHER ENERGY #2
UNITS	kW & kWh	Therms	Solar Owned (kWh)
BTU MULTIPLIER	3,412	100,000	3,412
CO2 EMISSION FACTOR (LB CO2/UNIT FUEL)	1.10	11.70	0.00
SITE-SOURCE MULTIPLIER	2.80	1.05	1.00

- ***NOx = (0.00095*kWh Savings) + (0.0092*Therm Savings)***
- ***SO2 = (0.00221*kWh Savings)***
- ***Hg = (0.00465*kWh Savings)***

See Combined Heat and Power ECM for emission calculation per NJ BPU Protocols.

ECM Breakdown by Building

Please see Appendix F for ECM Breakdown by Building.

ECM Budgeting Narrative

Detailed plans, schematics and specifications for Kearny School District were not available to deliver a cost estimate for each ECM. The budgetary costs carried in the project are based on good faith estimates, contractor supplied budgets for similar ECMs on other recent projects and a database of actual installed costs for various ECMs.

KEARNY BOE		INCLUDED IN PROJECT	INSTALLED COST
ECM #	MEASURE DESCRIPTION	"Y" OR "N"	$
ECM-1	LED Lighting	Y	$904,958
ECM-2	Energy Management System	Y	$0
ECM-3	Boiler Replacement	Y	$1,591,858
ECM-4	Steam Trap Replacement	Y	$312,144
ECM-5	Chiller Replacement	Y	$109,326
ECM-6	Rooftop Unit Replacement	Y	$131,303
ECM-7	AHU / Split System Replacement	Y	$40,617
ECM-8	Electronic Fuel-Use Economizer	Y	$1,657
ECM-9	Pipe and Valve Insulation	Y	$25,526
ECM-10	Building Envelope Weatherization	Y	$170,706
ECM-11	High Efficiency Transformers	Y	$61,000
ECM-12	Water Conservation	Y	$9,094
ECM-13	Plug Load Controls	Y	$55,512
ECM-14	Combined Heat & Power Unit	Y	$388,506
ECM-15a	Window Replacement	N	$0
ECM-15b	Window Refurbishment	Y	$189,278
ECM-16	Retrocommissioning	Y	$322,000
Non ECM-17	Asbestos Abatement	Y	$100,000
TOTALS			$4,413,484

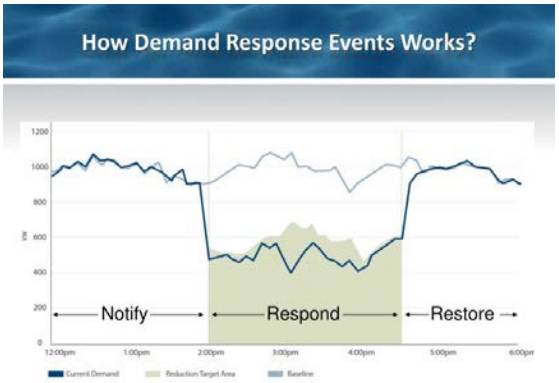
Demand Response & Project Incentives Analysis

Demand Response

Demand Response (DR) is a voluntary Pennsylvania-Jersey-Maryland (PJM) Interconnection program that allows end use customers to reduce their electricity usage during periods of higher power prices. In exchange, end-use customers are compensated through PJM members known as Curtailment Service Providers (CSPs) for decreasing their electricity use when requested by PJM.

Common reduction strategies used in Demand Response include:

- Manual or automatic load drop
- Energy management systems
- Load shedding strategies
- Lighting control strategies
- Backup generation
- Ice storage systems



Benefits of the program include:

- Significant source of new revenue
- Helps to ensure local grid reliability
- Reduces the need for new environmentally taxing energy generation

In the base product, customers commit to reducing their load at the direction of PJM during emergency conditions during the summer months. In the Capacity Performance product, the customer will need to be able to reduce load when directed during the entire year.

Direct Install

Note: *As of July 1, 2021, all of former NJ Clean Energy Program incentive programs transitioned over to the investor-owned gas and electric utility companies. Subsequently, the BPU is requiring that all ESIP projects consult with the DCA and follow all DCA guidance regarding the procurement of all subcontractors.*

Created specifically for existing small to mid-sized facilities, Direct Install is a turnkey project solution that makes it easy and affordable to upgrade to high-efficiency equipment. The program provides a free energy assessment and a participating contractor will work with you to cut your facility's energy costs by replacing lighting, HVAC and other outdated operational equipment with energy efficient alternatives.

The DI Program is open to all eligible commercial and industrial customers whose *average* demand did not exceed 200 kW in any of the preceding twelve months, have their gas or electricity provided by one of New Jersey's Investor Owned Utilities (IOUs), and pay into the Societal Benefits Charge (SBC).

To dramatically improve your payback on the project, the program pays up to 80% of retrofit costs to facilities within an Urban Enterprise Zone, Opportunity Zone, owned or operated by a local government, K-12 public school, or designated as affordable housing. Other types of facilities receive an incentive up to 70% of retrofit costs.

In 2019 the Direct Install program surpassed $200 million in incentives provided since its inception.

Systems and Equipment Addressed by the Program:

- Lighting & Lighting Controls
- Heating, Cooling & Ventilation (HVAC) and HVAC Controls
- Refrigeration
- Motors
- Variable Frequency Drives
- Hot Water Conservation Measures

Combined Heat & Power

One of the goals of the State of New Jersey is to enhance energy efficiency through on-site power generation with recovery and productive use of waste heat, and to reduce existing and new demands to the electric power grid. The Board of Public Utilities seeks to accomplish this goal by providing generous financial incentives for Combined Heat & Power (CHP) and Fuel Cell (FC) installations.

Eligible CHP or Waste Heat to Power (WHP) projects must achieve an annual system efficiency of at least 60% (Higher Heating Value - HHV), based on total energy input and total utilized energy output. Mechanical energy may be included in the efficiency evaluation.

In order to qualify for incentives, systems must operate a minimum of 5,000 full-load equivalent hours per year (i.e. run at least 5,000 hours per year at full rated kW output). The Office of Clean Energy (OCE) may grant exceptions to this minimum operating hours requirement for Critical Facilities, provided the proposed system operates a minimum of 3,500 full-load equivalent hours per year and is equipped with blackstart and islanding capability. For this program, a Critical Facility is defined as any:

(a) public facility, including any federal, state, county, or municipal facility,

(b) non-profit and/or private facility, including any hospital, police station, fire station, water/wastewater treatment facility, school, multifamily building, or similar facility that:

(A) is determined to be either Tier 1 or critical infrastructure by the New Jersey Office of Emergency Management or the State Office of Homeland Security and Preparedness or

(B) could serve as a Shelter during a power outage. A Shelter is a facility able to provide food, sleeping arrangements, and other amenities to its residents and the community.

The CHP, FC, or WHP system must have a ten (10) year all-inclusive warranty. The warranty must cover the major components of the system eligible for the incentive, to protect against breakdown or degradation in electrical output of more than ten percent from the originally rated electrical output. The warranty shall cover the full cost of repair or replacement of defective components or systems, including coverage for labor costs to remove and reinstall defective components or systems. In the event the system warranty does not meet program requirements, customer must purchase an extended warranty or a ten (10) year maintenance/service contract. The cost of the ten (10) year warranty or service contract may be considered as part of the cost of the project. Notwithstanding the foregoing, public entities that are prohibited from entering into agreements for the full ten (10) years may comply with the 10-year requirement by:

(a) providing an agreement for the longest lawful term,
(b) committing the entity to purchase an agreement for the remaining years, and
(c) either:
(i) providing the vendor's commitment for specific pricing for those remaining years, or
(ii) assuming the pricing for the remaining years will increase by 2.5% each year

Incentive Structure:

Eligible Technologies	Size (Installed Rated Capacity)	Incentive ($/kW)	% of Total Cost Cap per project[3]	$ Cap per project[3]
Powered by non-renewable or renewable fuel source, or combination[4]: Gas Internal Combustion Engine	≤500 kW	$2,000	30-40%[2]	$2 million
	>500 kW - 1 MW	$1,000		
Gas Combustion Turbine Microturbine	> 1 MW - 3 MW	$550	30%	$3 million
Fuel Cells with Heat Recovery (FCHR)	>3 MW	$350		
Fuel Cell without Heat Recover (FCwoHR)	Same as above(1)	Applicable amount above	30%	$1 million
Waste Heat to Power	≤ 1MW	$1,000	30%	$2 million
	> 1MW	$500		$3 million

Footnotes:

(1) Incentives are tiered, which means the incentive levels vary based upon the installed rated capacity, as listed in the chart above. For example, a 4 MW CHP system would receive $2.00/watt for the first 500 kW, $1.00/watt for the second 500 kW, $0.55/watt for the next 2 MW and $0.35/watt for the last 1 MW (up to the caps listed).

(2) The maximum incentive will be limited to 30% of total project. For CHP-FC projects up to 1 MW, this cap will be increased to 40% where a cooling application is used or included with the CHP system (e.g. absorption chiller).

(3) Projects will be eligible for incentives shown above, not to exceed the lesser of % of total project cost per project cap or maximum $ per project cap. Projects installing CHP or FC with WHP will be eligible for incentive shown above, not to exceed the lesser caps of the CHP or FC incentive. Minimum efficiency will be calculated based on annual total electricity generated, utilized waste heat at the host site (i.e. not lost/rejected), and energy input.

(4) Systems fueled by a Class 1 Renewable Fuel Source, as defined by N.J.A.C. 14:8-2.5, are eligible for a 30% incentive bonus. If the fuel is mixed, the bonus will be prorated accordingly. For example, if the mix is 60/40 (60% being a Class 1 renewable), the bonus will be 18%. This bonus will be included in the final performance incentive payment, based on system performance and fuel mix consumption data. Total incentive, inclusive of bonus, shall not exceed above stipulated caps.

(5) CHP or FC systems located at Critical Facility and incorporating blackstart and islanding technology are eligible for a 25% incentive bonus. This bonus incentive will be paid with the second/Installation incentive payment. Total incentive, inclusive of bonus, shall not exceed above stipulated caps.

Incentive Payment Schedule

The total incentive is divided into three partial payments. Each stage of payment requires additional documentation and/or has conditions that must be met. At approval, the maximum incentive partial payment amounts are calculated by multiplying the total incentive by the ratios listed in the following table.

Purchase	Installation	Acceptance of 12 months post-installation performance data
30%	50%	20%

(e.g., for the purpose of calculating a payback period)

Incentive Calculations

Estimated incentive values were calculated in accordance with the PSE&G Rebate Program Guidelines. The total incentive amount was calculated to be $377,337 in rebates and incentives - $59,941 of which have been applied to project financing. The Direct Install rebate program covers $317,396 (39%) of the installed cost of the improvements with the remainder included in the ESIP. Please see below, Appendix E and Appendix F for building-by-building details.

Incentive Totals

BUILDING	INCENTIVE TYPE	SOURCE	NOTES	QUANTITY	UNITS	INCENTIVE $/UNIT	INSTALL INCENTIVE	YEAR 1 INCENTIVE	SUBTOTAL	TOTAL
KEARNY BOE	Prescriptive	PSE&G		Various	Various	Various	$0	$59,941	$59,941	$377,337
	Direct Install	PSE&G		$317,396	$	39%	$317,396	$0	$317,396	
						TOTALS	$317,396	$59,941	$377,337	

Incentive Data

BUILDING	INCENTIVE TYPE	SOURCE	ECM	QUANTITY	UNITS	INCENTIVE $/UNIT	INSTALL INCENTIV	YEAR 1 INCENTIV	SUBTOTAL	TOTAL
Kearny High School	Prescriptive	PSE&G	LED Lighting	Various	Various	Various		$18,993	$18,993	$19,758
Kearny High School	Prescriptive	PSE&G	Plug Load Controls	103	EA	$5.00		$515	$515	
Kearny High School	Prescriptive	PSE&G	Plug Load Controls	2	EA	$125.00		$250	$250	
Lincoln Middle School	Prescriptive	PSE&G	LED Lighting	Various	Various	Various		$22,591	$22,591	$22,866
Lincoln Middle School	Prescriptive	PSE&G	Plug Load Controls	55	Ea	$5.00		$275	$275	
Franklin Elementary School	Prescriptive	PSE&G	Plug Load Controls	86	EA	$5.00		$430	$430	$93,891
Franklin Elementary School	Direct Install	PSE&G	Various	$93,461	$	56%	$93,461		$93,461	
Washington Elementary School	Prescriptive	PSE&G	Plug Load Controls	40	EA	$5.00		$200	$200	$39,139
Washington Elementary School	Direct Install	PSE&G	Various	$38,939	$	40%	$38,939		$38,939	
Garfield Elementary School	Prescriptive	PSE&G	Plug Load Controls	32	EA	$5.00		$160	$160	$29,279
Garfield Elementary School	Direct Install	PSE&G	Various	$29,119	$	42%	$29,119		$29,119	
Schuyler Elementary School	Prescriptive	PSE&G	Plug Load Controls	39	EA	$5.00		$195	$195	$109,449
Schuyler Elementary School	Direct Install	PSE&G	Various	$93,342	$	36%	$93,342		$93,342	
Schuyler Elementary School	Prescriptive	PSE&G	Boiler Replacement	7,956	MBH	$2.00		$15,912	$15,912	
Roosevelt Elementary School	Prescriptive	PSE&G	Plug Load Controls	44	EA	$5.00		$220	$220	$16,847
Roosevelt Elementary School	Prescriptive	PSE&G	Plug Load Controls	1	EA	$125.00		$125	$125	
Roosevelt Elementary School	Direct Install	PSE&G	Various	$16,502	$	29%	$16,502		$16,502	
Administration Building	Prescriptive	PSE&G	Plug Load Controls	15	EA	$5.00		$75	$75	$46,107
Administration Building	Direct Install	PSE&G	Various	$46,032	$	26%	$46,032		$46,032	

No implied and/or written guarantee is being made with respective to the receipt of incentives. All incentives estimates carry inherent risks that may jeopardize the receipt of them. Therefore, Kearny School District acknowledges and accepts that any project proposed should not rely on the receipt of incentives as a reason to implement it.

ECM 1 – LED Lighting

KEARNY BOE

✔	ECM evaluated but not included
✔	ECM included in the project

ECM #	ECM DESCRIPTION	Kearny High School	Lincoln Middle School	Franklin Elementary School	Washington Elementary School	Garfield Elementary School	Schuyler Elementary School	Roosevelt Elementary School	Administration Building
1	LED Lighting	✔	✔	✔	✔	✔	✔	✔	✔

Lighting retrofits can greatly reduce energy consumption and lower energy bills, while maintaining lighting levels and quality by upgrading lighting components to more efficient and advanced technologies. Upgrading technologies can also offer employees greater control over lighting, allowing for additional energy savings

Improvements in lighting technologies have led to increased lifetimes for components that will result in fewer failures and lengthen the time between maintenance activities.

The implementation of a routine maintenance program in addition to the lighting retrofit will greatly simplify the maintenance practices and reduce the operational costs.

Existing Conditions

Existing interior lighting at Franklin and Garfield Elementary Schools

Scope of Work

Retrofit or replace existing interior and exterior fixtures with LED bulbs/fixtures as proposed in the line-by-lines in Appendix G. The new LED tubes do not require the existing fluorescent ballasts to operate. The elementary schools and Administration Building will be implemented through the PSE&G Direct Install program.

ECM Calculations

BPU Protocols were used to calculate LED lighting savings. A coincidence factor is applied to estimate peak demand savings. The impact on the HVAC systems is captured as well. See Appendix G for Lighting Line-by-Lines. The proposed LED fixtures are shown in the Direct Install documents in Appendix E for qualifying buildings.

LED Lighting Replacement Savings													
BUILDING	SQFT	SPACE	kW_b	kW_q	ΔkW	CF	Hours per Year	HVACd	HVACe	HVACg	Peak Demand Savings (kW)	Energy Savings (kWh)	Fuel Savings (therms)
Kearny High School	305,491	INTERIOR	104.53	34.22	70.31	0.50	2,575	0.44	0.10	-0.001075	50.62	199,153	-1,946
Kearny High School		EXTERIOR	9.66	2.93	6.73	0.50	3,940				3.37	26,516	0
Kearny High School		CONTROLS			0.00						0.00	0	0
Lincoln Middle School	101,000	INTERIOR	196.53	61.05	135.48	0.50	2,575	0.44	0.10	-0.001075	97.55	383,747	-3,750
Lincoln Middle School		EXTERIOR	1.54	0.63	0.91	0.50	3,940				0.46	3,585	0
Lincoln Middle School		CONTROLS			0.00						0.00	0	0
Franklin Elementary School	114,854	INTERIOR	171.84	64.52	107.33	0.50	2,575	0.44	0.10	-0.001075	77.27	304,001	-2,971
Franklin Elementary School		EXTERIOR									0.00	0	0
Franklin Elementary School		CONTROLS			0.14	0.50	2,575				0.07	361	0
Washington Elementary School	86,220	INTERIOR	62.95	27.17	35.78	0.50	2,575	0.44	0.10	-0.001075	25.76	101,344	-990
Washington Elementary School		EXTERIOR									0.00	0	0
Washington Elementary School		CONTROLS			0.66	0.50	2,575				0.33	1,700	0
Garfield Elementary School	60,095	INTERIOR	43.50	18.21	25.29	0.50	2,575	0.44	0.10	-0.001075	18.21	71,634	-700
Garfield Elementary School		EXTERIOR			0.00						0.00	0	0
Garfield Elementary School		CONTROLS			0.59	0.50	2,575				0.30	1,519	0
Schuyler Elementary School	54,880	INTERIOR	52.13	20.17	31.96	0.50	2,575	0.44	0.10	-0.001075	23.01	90,513	-885
Schuyler Elementary School		EXTERIOR			0.00						0.00	0	0
Schuyler Elementary School		CONTROLS			0.51	0.50	2,575				0.26	1,313	0
Roosevelt Elementary School	43,385	INTERIOR	29.11	13.29	15.82	0.50	2,575	0.44	0.10	-0.001075	11.39	44,821	-438
Roosevelt Elementary School		EXTERIOR			0.00						0.00	0	0
Roosevelt Elementary School		CONTROLS			0.41	0.50	2,575				0.21	1,056	0
Administration Building	12,000	INTERIOR	15.25	7.37	7.89	0.67	2,950	0.35	0.10	-0.001075	7.13	25,587	-250
Administration Building		EXTERIOR			0.00						0.00	0	0
Administration Building		CONTROLS			0.00						0.00	0	0

Algorithms

$$\text{DkW} = (\#\ of\ replaced\ fixtures) * (Watts_b) - (\#\ of\ fixtures\ installed) * (Watts_q) = (LPD_b - LPD_q) * (\text{SF})$$

$$\text{Energy Savings}\left(\frac{\text{kWh}}{\text{yr}}\right) = (\Delta\text{kW}) * (\text{Hrs}) * (1 + HVAC_e)$$

$$\text{Peak Demand Savings (kW)} = (\Delta\text{kW}) * (\text{CF}) * (1 + HVAC_d)$$

$$\text{Fuel Savings}\left(\frac{\text{MMBtu}}{\text{yr}}\right) = (\Delta\text{kW}) * (\text{Hrs}) * (\text{HVAC}_g)$$

Definition of Variables

ΔkW	= Change in connected load from baseline to efficient lighting
$\text{Watts}_{b,q}$	= Wattage of existing baseline and qualifying equipment
LPD_b	= Baseline lighting power density in Watt per square foot of space floor area
LPD_q	= Lighting power density of qualified fixtures, equal to the sum of installed fixture wattage divided by floor area of the space where the fixtures are installed.
SF	= Space floor area, in square feet
CF	= Coincidence factor
Hrs	= Annual operating hours
HVAC_d	= HVAC Interactive Factor for peak demand savings
HVAC_e	= HVAC Interactive Factor for annual energy savings
HVAC_g	= HVAC Interactive Factor for annual energy savings

Summary of Inputs

Lighting Verification Performance Lighting

Component	Type	Value	Source
$\text{Watts}_{b,q}$	Variable	See NGrid Fixture Wattage Table Fixture counts and types, space type, floor area from customer application.	1
SF	Variable	From Customer Application	Application
CF	Fixed	See Table by Building Type	4
Hrs	Fixed	See Table by Building Type	4
HVAC_d	Fixed	See Table by Building Type	3, 5
HVAC_e	Fixed	See Table by Building Type	3, 5
HVAC_g	Fixed	See Table by Building Type	6
LPD_b	Variable	Lighting Power Density for, W/SF	2
LPD_q	Variable	Lighting Power Density, W/SF	Application

Hours of Operation and Coincidence Factor by Building Type

Building Type	Sector	CF	Hours
Grocery	Large Commercial/Industrial & Small Commercial	0.96	7,134
Medical - Clinic	Large Commercial/Industrial & Small Commercial	0.8	3,909
Medical - Hospital	Large Commercial/Industrial & Small Commercial	0.8	8,760[54]
Office	Large Commercial/Industrial	0.7	2,969
	Small Commercial	0.67	2,950
Other	Large Commercial/Industrial & Small Commercial	0.66	4,573
Retail	Large Commercial/Industrial	0.96	4,920
	Small Commercial	0.86	4,926
School	Large Commercial/Industrial & Small Commercial	0.50	2,575
Warehouse/ Industrial	Large Commercial/Industrial	0.7	4,116
	Small Commercial	0.68	3,799

- Typical exterior lighting fixtures should be modeled as lit twelve (12) hours per day on average.

Building Type	Sector	CF	Hours
Multifamily – Common Areas[55]	Multifamily	0.86	5,950
Multifamily – In-Unit[36]	Multifamily	0.59	679
Multifamily – Exterior[36]	Multifamily	0.00	3,338

HVAC Interactive Effects

Building Type	Demand Waste Heat Factor ($HVAC_d$)		Annual Energy Waste Heat Factor by Cooling/Heating Type ($HVAC_e$)			
	AC (Utility)	AC (PJM)	AC/ NonElec	AC/ ElecRes	Heat Pump	NoAC/ ElecRes
Office	0.35	0.32	0.10	-0.15	-0.06	-0.25
Retail	0.27	0.26	0.06	-0.17	-0.05	-0.23
Education	0.44	0.44	0.10	-0.19	-0.04	-0.29
Warehouse	0.22	0.23	0.02	-0.25	-0.11	-0.27
Other[56]	0.34	0.32	0.08	-0.18	-0.07	-0.26

Interactive Factor (HVACg) for Annual Fuel Savings

Project Type	Fuel Type	Impact (MMBtu/ΔkWh)
Large Retrofit (> 200 kW)	C&I Gas Heat	-0.00023
Large Retrofit (> 200 kW)	Oil	-0.00046
Small Retrofit (≤ 200 kW)	Gas Heat	-0.001075
Small Retrofit (> 200 kW)	Oil Heat	-0.000120

Sources

1. Device Codes and Rated Lighting System Wattage Table Retrofit Program, National Grid, January 13, 2015. https://www1.nationalgridus.com/files/AddedPDF/POA/RILightingRetrofit1.pdf

ECM 2 – Energy Management System

KEARNY BOE	Kearny High School	Lincoln Middle School	Franklin Elementary School	Washington Elementary School	Garfield Elementary School	Schuyler Elementary School	Roosevelt Elementary School	Administration Building
✔ ECM evaluated but not included								
✔ ECM included in the project								
ECM # / ECM DESCRIPTION								
2 Energy Management System			✔	✔	✔	✔	✔	

Background & Existing Conditions

A direct digital controls (DDC) building automation systems (BAS) is an intelligent network of sensors, operators, processors, and a web-based user interface that controls and monitors electrical and mechanical building systems. Such systems provide automated control and monitoring of the heating, ventilation, lighting and other needs of a building or group of buildings. An effective BAS can provide facilities with monitoring and reporting of all utility consumption data.

Web Based Building Automation Interface

By being able to monitor building systems from a central location, the operator is able to receive alerts and anticipate problems when a failure or troublesome condition occurs. Also, the data obtained from the BAS can then be used to produce a trend analysis and annual consumption forecasts. From these trends, energy saving strategies can be developed. Consumption can be managed through advanced control strategies such as time scheduling, optimum start and stop, night set-back, demand controlled ventilation, and peak demand limiting. Once trained, Operators are able to use the BAS to diagnose current building system problems as well as tailor specific energy savings strategies that utilize the full capability of the given BAS.

Existing pneumatic controls at Franklin Elementary School

The existing pneumatic controls were observed to be non-functional. Building temperatures are maintained by operating the boilers to provide sufficient heat without individual space control. As a result, windows are opened to prevent overheating in certain spaces. The lack of existing temperature controls does not allow for temperature setbacks during unoccupied hours.

Scope of Work

This measure involves replacing pneumatic controls with an open-protocol, web-based Energy Management system. This will include installing control valves with DDC for heating equipment, outdoor air dampers, start up and shut down of existing equipment and sensors for controlling these devices. The implementation of the controls upgrades are included in a project outside of the ESIP.

ECM Calculations

Energy Savings from the replacement of pneumatic controls were calculated using the BPU protocols. The proposed controls maintain the occupied setpoint of 70F during occupied hours and 65F setpoint during unoccupied hours. To be conservative with savings estimates, DCO is claiming savings on 5F setback temperatures during unoccupied hours – typically setbacks greater than 5F are achievable. The calculations are shown below.

EMS Savings						
BUILDING	**SQFT**	**Weekly Occupied Hours [H]**	**Boiler Heating (Btu/hr) [CAPboiler]**	**Boiler Heating Efficiency (%) [AFUEh]**	**ELFHh**	**Boiler Heating Energy Savings (therms)**
Franklin Elementary School	114,854	60	3,950,000	81.0%	840	3,767
Franklin Elementary School						0
Franklin Elementary School						0
Washington Elementary School	86,220	60	5,250,000	72.4%	840	5,602
Washington Elementary School						0
Washington Elementary School						0
Garfield Elementary School	60,095	60	4,148,000	72.4%	840	4,426
Garfield Elementary School						0
Garfield Elementary School						0
Schuyler Elementary School	54,880	60	3,978,000	83.0%	840	3,702
Schuyler Elementary School						0
Schuyler Elementary School						0
Roosevelt Elementary School	43,385	60	3,829,000	72.4%	840	4,086
Roosevelt Elementary School						0
Roosevelt Elementary School						0

Occupancy Controlled Thermostat Savings Calculation	
Th (F)	70
Tc (F)	72
Sh (F)	65
Sc (F)	77
H (hrs per week)	Varies
EFLHc (hrs per year)	Varies
EFLHh (hrs per year)	Varies
Ph (%)	3%
Pc (%)	6%

NJ BPU FY 2020 Protocols - Occupancy Controlled Thermostats

Algorithms

Cooling Energy Savings (kWh/yr) = $(((T_c * (H+5) + S_c * (168 - (H+5)))/168) - T_c) * (P_c * Cap_{hp} * 12 * EFLH_c/EER_{hp})$

Heating Energy Savings (kWh/yr) = $(T_h - ((T_h * (H+5) + S_h * (168 - (H+5)))/168)) * (P_h * Cap_{hp} * 12 * EFLH_h/EER_{hp})$

Heating Energy Savings (Therms/yr) = $(T_h - ((T_h * (H+5) + S_h * (168 - (H+5)))/168) * (P_h * Cap_h * EFLH_h/AFUE_h/100{,}000)$

Definition of Variables

T_h = Heating Season Facility Temp. (°F)
T_c = Cooling Season Facility Temp. (°F)
S_h = Heating Season Setback Temp. (°F)
S_c = Cooling Season Setup Temp. (°F)
H = Weekly Occupied Hours
Cap_{hp} = Connected load capacity of heat pump/AC (Tons) – Provided on Application.
Cap_h = Connected heating load capacity (Btu/hr) – Provided on Application.
$EFLH_c$ = Equivalent full load cooling hours
$EFLH_h$ = Equivalent full load heating hours
P_h = Heating season percent savings per degree setback
P_c = Cooling season percent savings per degree setup
$AFUE_h$ = Heating equipment efficiency – Provided on Application.
EER_{hp} = Heat pump/AC equipment efficiency – Provided on Application

12 = Conversion factor from Tons to kBtu/hr to acquire consumption in kWh.

168 = Hours per week.

7 = Assumed weekly hours for setback/setup adjustment period (based on 1 setback/setup per day, 7 days per week).

Summary of Inputs

Occupancy Controlled Thermostats

Component	Type	Value	Source
T_h	Variable		Application
T_c	Variable		Application
S_h	Fixed	T_h-5°	
S_c	Fixed	T_c+5°	
H	Variable		Application; Default of 84 hrs/week
Cap_{hp}	Variable		Application
Cap_h	Variable		Application
$EFLH_{c,h}$	Variable	See Table Below	1
P_h	Fixed	3%	2
P_c	Fixed	6%	2
$AFUE_h$	Variable		Application
EER_{hp}	Variable		Application

EFLH Table

Facility Type	Heating $EFLH_h$	Cooling $EFLH_c$
Assembly	603	669
Auto repair	1910	426
Dormitory	465	800
Hospital	3366	1424
Light industrial	714	549
Lodging – Hotel	1077	2918
Lodging – Motel	619	1233
Office – large	2034	720
Office – small	431	955
Other	681	736
Religious worship	722	279
Restaurant – fast food	813	645
Restaurant – full service	821	574

Facility Type	Heating $EFLH_h$	Cooling $EFLH_c$
Retail – big box	191	1279
Retail – Grocery	191	1279
Retail – small	545	882
Retail – large	2101	1068
School – Community college	1431	846
School – postsecondary	1191	1208
School – primary	840	394
School – secondary	901	466
Warehouse	452	400

Multi-family EFLH by Vintage

Facility Type	Prior to 1979	From 1979 to 2006	From 2007 through Present
Low-rise, Cooling	507	550	562
Low-rise, Heating	757	723	503
High-rise, Cooling	793	843	954
High-rise, Heating	526	395	219

ECM 3 – Boiler Replacement

KEARNY BOE

✔	ECM evaluated but not included
✔	ECM included in the project

ECM #	ECM DESCRIPTION	Kearny High School	Lincoln Middle School	Franklin Elementary School	Washington Elementary School	Garfield Elementary School	Schuyler Elementary School	Roosevelt Elementary School	Administration Building
3	Boiler Replacement				✔		✔	✔	

Background & Existing Conditions

Old, oversized boiler systems have efficiencies in the range of 56%–75%. A high-efficiency steam boiler heating system can achieve efficiencies as high as 85%, converting nearly all the fuel to useful heat. The proposed cast iron sectional boiler is designed to provide high combustion and thermal efficiencies with forced draft firing.

The proposed boilers are constructed with rugged, cast-iron, wet-base sections for durability and top performance. Hi-temperature, flexible, graphite port connectors, and short, individual draw rods assure a tight fit between sections and simplify installation.

Existing Conditions

Two 4,148 MBh Cleaver Brooks steam boilers, equipped with modulating burners, serve the old wings heating load. Two 484 MBh Weil McLain hot water boilers, equipped with modulating burners, serve the new wings heating load.

Existing steam and hot water boilers at Schuyler Elementary School

Scope of Work #1

- Demolish existing 4,148 MBH steam boiler
- Install (2) 3,978 MBH steam boilers
- New boiler plant – re-pipe, flues, pads, feedwater, blowdowns, etc.
- Electrical tie-in

Scope of Work #2 (PSE&G Direct Install program)

- Remove (2) existing 494 MBH hot water boiler
- Install (2) 494 MBH condensing hot water boilers
- Electrical tie-in
- Trane Tracer integration

ECM Calculations

Energy Savings from the installation of a high efficiency boilers were calculated using the BPU protocols. Existing steam boilers are from 1973 and derated to 72.4% efficient. The proposed steam boilers are minimum of 83% efficient. The existing hot water boilers are derated to 77.2% efficient. The proposed hot water condensing boilers will operate at a minimum of 87% efficiency with higher efficiency achievable at lower return water temperatures.

Boiler Replacement Savings						
BUILDING	Input Plant Capacity (mbh) [CAPin]	Equivalent Full Load Hours [EFLHh]	Boiler Baseline Efficiency [EFFb]	Boiler Proposed Efficiency [EFFq]	Proposed Plant Rated Output MBH	Calculated Annual Fuel Savings (Th)
Schuyler Elementary School	7,956	840	72.4%	83%	6,444	9,785
Schuyler Elementary School	988	840	77.2%	87%	860	1,054

Algorithms

Fuel Savings (MMBtu/yr) = Cap_{in} * $EFLH_h$ * ((Eff_q/Eff_b)-1) / 1000 kBtu/MMBtu

Definition of Variables

Cap_{in} = Input capacity of qualifying unit in kBtu/hr

$EFLH_h$ = The Equivalent Full Load Hours of operation for the average unit during the heating season in hours

Eff_b = Boiler Baseline Efficiency

Eff_q = Boiler Proposed Efficiency

1000 = Conversion from kBtu to MMBtu

Summary of Inputs

Prescriptive Boilers

Component	Type	Value	Source
Cap_{in}	Variable		Application
$EFLH_h$	Fixed	See Table Below	1
Eff_b	Variable	See Table Below	2
Eff_q	Variable		Application

$EFLH_h$ Table

Facility Type	Heating EFLH
Assembly	603
Auto repair	1910
Dormitory	465
Hospital	3366
Light industrial	714
Lodging – Hotel	1077
Lodging – Motel	619
Office – large	2034
Office – small	431
Other	681
Religious worship	722

Facility Type	Heating EFLH
Restaurant – fast food	813
Restaurant – full service	821
Retail – big box	191
Retail – Grocery	191
Retail – small	545
Retail – large	2101
School – Community college	1431
School – postsecondary	1191
School – primary	840
School – secondary	901
Warehouse	452

Multi-family EFLH by Vintage

Facility Type	Prior to 1979	From 1979 to 2006	From 2007 through Present
Low-rise, Heating	757	723	503
High-rise, Heating	526	395	219

Baseline Boiler Efficiencies (Eff_b)

Boiler Type	Size Category (kBtu input)	Standard 90.1-2016
Hot Water – Gas fired	< 300 ≥ 300 and ≤ 2,500 > 2,500	82% AFUE 80% Et 82% Ec
Hot Water – Oil fired	< 300 ≥ 300 and ≤ 2,500 > 2,500	84% AFUE 82% Et 84% Ec
Steam – Gas fired	< 300	80% AFUE
Steam – Gas fired, all except natural draft	≥ 300 and ≤ 2,500	79% Et
Steam – Gas fired, all except	> 2,500	79% Ec

Boiler Type	Size Category (kBtu input)	Standard 90.1-2016
Steam – Gas fired, natural draft	≥ 300 and ≤ 2,500	79% Et
Steam – Gas fired, natural draft	> 2,500	79% Ec
Steam – Oil fired	< 300 ≥ 300 and ≤ 2,500 > 2,500	82% AFUE 81% Et 81% Ec

Sources

1. New York State Joint Utilities, *New York Standard Approach for Estimating Energy Savings from Energy Efficiency Programs*, V7, April 2019. Appendix G – Equivalent Full-Load Hours (EFLH), For Heating and Cooling. P. 675-680. EFLH values for NYC due to proximity to NJ.
2. ASHRAE Standards 90.1-2016. *Energy Standard for Buildings Except Low Rise Residential Buildings*; available at: https://www.ashrae.org/standards-research--technology/standards--guidelines. Table 6.8.1-6

ECM 4 – Steam Trap Replacement

KEARNY BOE		Kearny High School	Lincoln Middle School	Franklin Elementary School	Washington Elementary School	Garfield Elementary School	Schuyler Elementary School	Roosevelt Elementary School	Administration Building
✓ ECM evaluated but not included									
✓ ECM included in the project									
ECM #	ECM DESCRIPTION								
4	Steam Trap Replacement			✓	✓	✓	✓	✓	

Background & Existing Conditions

Mechanical traps are prone to failure as they age, resulting in large steam losses and requiring substantial maintenance. Steam traps separate the steam system from the condensate system. Traditional steam traps can fail in the open or closed position. When a steam trap fails in the open or leaking-by position, some or all of the energy that was added at the boiler is lost into the condensate return system. The energy contained in steam is only utilized when it condenses in a heat exchanger (radiator, convector, hot water heater, AHU coil, etc.) and releases its latent heat to the process. It is at this point the steam trap should allow this condensate into the condensate return system to return to the boiler.

As mentioned above, a leaking trap still allows steam to flow through the heat exchange device it serves and will typically not affect its heating capacity. For this reason, leaking traps are rarely discovered without performing specific tests on the trap. Conversely, a steam trap that fails in the closed position does not allow the condensate to enter the condensate return system. As a result, condensate backs up into the heat exchange device it serves, thereby first reducing, then eliminating, its heating capacity. Plugged traps are often identified through “cold calls” and repaired. Replacing or repairing failed traps will improve the efficiency of the steam distribution system and save energy.

Scope of Work

Steam Trap Scope			
BUILDING	**SQFT**	**CATEGORY**	**QUANTITY**
Franklin Elementary School	114,854	(30) FT & (186) TS	216
		P&P Bond	1
Washington Elementary School	86,220	(25) FT & (172) TS	197
		P&P Bond	1
Garfield Elementary School	60,095	(12) FT & (146) TS	158
		P&P Bond	1
Schuyler Elementary School	54,880	(7) FT & (92) TS	99
		P&P Bond	1
Roosevelt Elementary School	43,385	(4) FT & (120) TS	124
		P&P Bond	1

ECM Calculations

Energy Savings from the replacement and/or repair of failed steam traps were calculated using the engineering best practices.

Steam Trap Fuel Savings							
BUILDING NAME	**Steam Traps**						
	Number of Traps	**Boiler Efficiency**	**Steam Pressure at Trap (psig)**	**Total Steam Leak Rate (lbs/hr)**	**Boiler Load (MBH)**	**Typical Operations (hrs/yr)**	**Fuel Savings (Therms)**
Franklin Elementary School	218	81.0%	5.0	537.44	663.51	1,538	10,202
Washington Elementary School	197	72.4%	5.0	390.49	539.35	1,532	8,263
Garfield Elementary School	167	72.4%	5.0	270.89	374.16	1,325	4,958
Schuyler Elementary School	117	72.4%	5.0	174.12	240.50	1,794	4,316
Roosevelt Elementary School	124	72.4%	5.0	294.92	407.35	1,262	5,142

ECM 5 – Chiller Replacement

KEARNY BOE	Kearny High School	Lincoln Middle School	Franklin Elementary School	Washington Elementary School	Garfield Elementary School	Schuyler Elementary School	Roosevelt Elementary School	Administration Building
✓ ECM evaluated but not included								
✓ ECM included in the project								
ECM # / ECM DESCRIPTION								
5 Chiller Replacement						✓		

A chiller is one of the most energy-intensive units in any facility. Technology has made leaps and bounds in the past several years in making these machines more efficient. Chiller efficiency is rated by how much electrical energy is used to produce an amount of cooling. This is expressed in kilo-watts per ton of cooling (kW/ton). An older machine may be as high as 1.5 kW/ton, whereas a new chiller may be as low as 1 kW/ton or even less. A new machine uses less electrical power to produce the same amount of cooling. The efficiency of the chiller can vary widely depending on whether the model is air-cooled, or water cooled.

Existing Conditions

Schuyler Elementary School has (1) 50-ton Trane air-cooled scroll chiller. Existing equipment to be replaced with (1) 50-ton high efficiency air-cooled chiller. This chiller conditions a chilled water loop which serves an air handler cooling the new wing.

Existing chiller at Schuyler Elementary School

Scope of Work (PSE&G Direct Install program)

- Remove existing 50-ton air-cooled scroll chiller
- Install new 50-ton air-cooled scroll chiller
- Structural Analysis (if required by code official)
- Electrical Tie-in
- Trane Tracer Integration

ECM Calculations

Energy Savings from the installation of a high efficiency air-cooled chiller were calculated using the BPU protocols. Existing chiller efficiency is derated to 1.364 kW/ton full load and 0.938 kW/ton at part load.

Chiller Replacement Savings								
BUILDING	Qty	Baseline Tons	Proposed Tons	EFLH	FLVb (kW/ton)	FLVq (kW/ton)	IPLVb (kW/ton)	IPLVq (kW/ton)
Schuyler Elementary School	1	50.0	50.0	394	1.364	1.188	0.938	0.792

Chiller Replacement Savings							
BUILDING	PDC	FLV Demand Savings (kW)	FLV Energy Savings (kWh)	IPLV Demand Savings (kW)	IPLV Energy Savings (kWh)	Peak Demand Savings (kW)	Total Energy Savings (kWh)
Schuyler Elementary School	67%	5.9	3,458	4.9	2,865	10.8	6,322

Electric Chillers

The measurement of energy and demand savings for C&I chillers is based on algorithms with key variables.

This measure applies to new construction, replacement of failed equipment, or end of useful life. The baseline unit is a code compliant unit with an efficiency as required by ASHRAE Std. 90.1 – 2016, which is the current code adopted by the state of New Jersey.

Algorithms

For IPLV:

Energy Savings (kWh/yr) = N * Tons * EFLH * ($IPLV_b$ – $IPLV_q$)

Peak Demand Savings (kW) = N * Tons * PDC * ($IPLV_b$ – $IPLV_q$)

For FLV:

Energy Savings (kWh/yr) = N * Tons * EFLH * (FLV_b – FLV_q)

Peak Demand Savings (kW) = N * Tons * PDC * (FLV_b – FLV_q)

Definition of Variables

N = Number of units

Tons = Rated capacity of coolling equipment.

EFLH = Equivalent Full Load Hours – This represents a measure of energy use by season during the on-peak and off peak periods.

PDC = Peak Duty Cycle: fraction of time the compressor runs during peak hours

$IPLV_b$ = Integrated Part Load Value of baseline equipment, kW/Ton. The efficiency of the chiller under partial-load conditions.

$IPLV_q$ = Integrated Part Load Value of qualifying equipment, kW/ efficiency of the chiller under partial-load conditions.

FLV_b = Full Load Value of baseline equipment, kW/Ton. The eff chiller under full-load conditions.

FLV_q = Full Load Value of qualifying equipment, kW/Ton. The the chiller under full-load conditions.

Summary of Inputs

Electric Chiller Assumptions

Electric Chillers Component	Type	Situation
Tons	Rated Capacity, Tons	All
$IPLV_b$ (kW/ton)	Variable	See table below

Electric Chillers Component	Type	Situation
$IPLV_q$ (kW/ton)	Variable	All
FLV_b (kW/ton)	Variable	See table below
FLV_q (kW/ton)	Variable	All
PDC	Fixed	All
EFLH	Variable	All

Electric Chillers – New Construction

Type	Capacity	ASHRAE 90.1 2016 Table 6.8.1-3) Path A Full Load kW/ton	Path A IPLV kW/ton	Path B Full Load kW/ton	Path B IPLV kW/ton
Air Cooled	tons < 150	*10.1* 1.188	*13.7* 0.876	*9.7* 1.237	*15.8* 0.759
	tons ≥ 150	*10.1* 1.188	*14.0* 0.857	*9.7* 1.237	*16.1* 0.745
Water Cooled Positive Displacement (rotary screw and scroll)	tons < 75	0.750	0.600	0.780	0.500
	75 ≤ tons < 150	0.720	0.560	0.750	0.490
	150 ≤ tons < 300	0.660	0.540	0.680	0.440
	300 ≤ tons < 600	0.610	0.520	0.625	0.410
	tons ≥ 600	0.560	0.500	0.585	0.380
Water Cooled Centrifugal	tons < 150	0.610	0.550	0.695	0.440
	150 ≤ tons < 300	0.610	0.550	0.635	0.400
	300 ≤ tons < 400	0.560	0.520	0.595	0.390
	400 ≤ tons < 600	0.560	0.500	0.585	0.380
	tons ≥ 600	0.560	0.500	0.585	0.380

a – Values in italics are EERs.

EFLH Table

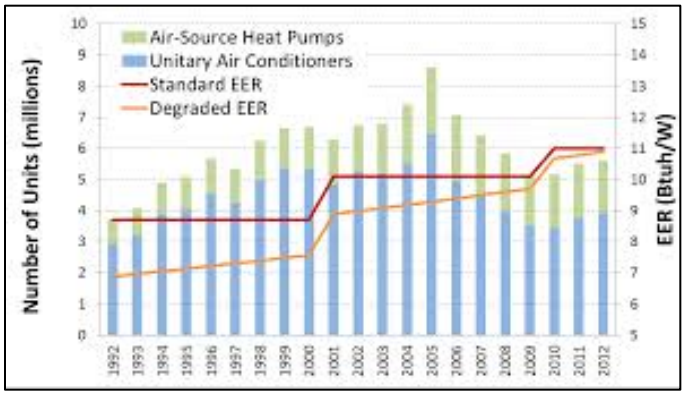
Facility Type	Cooling EFLH
Assembly	669
Auto repair	426
Dormitory	800
Hospital	1424
Light industrial	549
Lodging – Hotel	2918
Lodging – Motel	1233
Office – large	720
Office – small	955
Other	736
Religious worship	279
Restaurant – fast food	645
Restaurant – full service	574
Retail – big box	1279
Retail – Grocery	1279
Retail – small	882
Retail – large	1068
School – Community college	846
School – postsecondary	1208
School – primary	394
School – secondary	466
Warehouse	400

ECM 6 – Rooftop Unit Replacement

KEARNY BOE

✔	ECM evaluated but not included
✔	ECM included in the project

ECM #	ECM DESCRIPTION	Kearny High School	Lincoln Middle School	Franklin Elementary School	Washington Elementary School	Garfield Elementary School	Schuyler Elementary School	Roosevelt Elementary School	Administration Building
6	Rooftop Unit Replacement							✔	✔



Many commercial buildings are operating with older and inefficient HVAC systems. The average life expectancy of commercial HVAC RTU equipment is 10 to 15 years—which means that many commercial buildings are ready for new natural gas rooftop units. Technology improvements and demand have led to greater energy efficiency and more choices in systems. Installing new, higher efficiency units will provide energy savings as well as deliver enhanced technology and controls of the RTUs when compared to the existing units.

Existing Conditions

Existing roof top units at the Administration Building

Scope of Work

The following RTUs will be replaced through the PSE&G Direct Install program with high efficiency constant volume units:

RTU Replacement Estimate					
BUILDING	SQFT	INSTALL? (Y/N)	CATEGORY	AREA SERVED	QUANTITY
Roosevelt Elementary School	43,385	Y	RTU Replacement	FSG - DI Total Cost	
		Y	Packaged RTU - 10 Tons	Rebate %	29.3%
		Y		Client Cost	1
Administration Building	12,000	Y	RTU Replacement	FSG - DI Total Cost	
		Y	Replace (7) units	Rebate %	26.3%
		Y		Client Cost	1

ECM Calculations

Energy Savings from the installation of high efficiency rooftop units were calculated using BPU protocols. The calculations are shown below.

RTU Replacement - Cooling Savings						
BUILDING	SYSTEM	Existing Description	Existing Qty	Tons Per Unit	Total Existing Tons	EERb / SEERb
Roosevelt Elementary School	Packaged RTU - 10 Tons	York - DM120C00N2AAA1A	1	10	10	8.3
Administration Building	Packaged RTU (Gas Heating) - 12.5 Tons	York - DL-12N24NTAAA1A	1	12.5	12.5	8.6
	Packaged RTU (Gas Heating) - 5 Tons	Trane - YHC060E3RZAF	1	5	5	13.6
	Packaged RTU (Gas Heating) - 8.5 Tons	Trane - YHC102F3RZA16AF	1	8.5	8.5	11.9

RTU Replacement - Cooling Savings								
BUILDING	Proposed Qty	Tons Per Unit	Total Proposed Tons	EERq / SEERq	CF	EFLH Cooling	Demand Savings (kW)	Energy Savings (kWh)
Roosevelt Elementary School	1	10	10	12	0.5	394	2	1,756
Administration Building	1	12.5	12.5	12	0.5	955	2	4,719
	1	5	5	14	0.5	955	0	120
	1	8.5	8.5	12	0.5	955	0	68

Algorithms

Air Conditioning Algorithms:

$$\text{Energy Savings (kWh/yr)} = N * \text{Tons} * 12\ \text{kBtuh/Ton} * (1/EER_b - 1/EER_q) * EFLH_c$$

$$\text{Peak Demand Savings (kW)} = N * \text{Tons} * 12\ \text{kBtuh/Ton} * (1/EER_b - 1/EER_q) * CF$$

Definition of Variables

N = Number of units

Tons = Rated cooling capacity of unit.This value comes from ARI/AHRI or AHAM rating or manufacturer data.

EER_b = Energy Efficiency Ratio of the baseline unit. This data is found in the HVAC and Heat Pumps table below. For units < 65,000 BtuH (5.4 tons), SEER should be used in place of EER.

COP_b = Coefficient of Performance of the baseline unit. This data is found in the HVAC and Heat Pumps table below. For units < 65,000 BtuH (5.4 tons), SEER and HSPF/3.412 should be used in place of COP * 3.412 for cooling and heating savings, respectively.

EER_q = Energy Efficiency Ratio of the high efficiency unit. This value comes from the ARI/AHRI or AHAM directories or manufacturer data. For units < 65,000 (5.4 tons) BtuH, SEER should be used in place of EER.

COP_q = Coefficient of Performance of the high efficiency unit. This value comes from the ARI/AHRI or AHAM directories or manufacturer data. For units < 65,000 BtuH (5.4 tons), SEER and HSPF/3.412 should be used in place of COP * 3.412 for cooling and heating savings, respectively.

CF = Coincidence Factor – This value represents the percentage of the total load which is on during electric system's Peak Window. This value is based on existing measured usage and determined as the average number of operating hours during the peak window period.

$EFLH_{c\ or\ h}$ = Equivalent Full Load Hours – This represents a measure of energy use by season during the on-peak and off-peak periods.

Summary of Inputs

HVAC and Heat Pumps

Component	Type	Value	Source
Tons	Variable	Rated Capacity, Tons	Application
EER_b	Variable	See Table below	1
EER_q	Variable	ARI/AHRI or AHAM Values	Application
CF	Fixed	50%	2
$EFLH_{(c\ or\ h)}$	Variable	See Tables below	3

HVAC Baseline Efficiencies Table – New Construction/EUL/RoF

Equipment Type	Baseline = ASHRAE Std. 90.1 – 2016
Unitary HVAC/Split Systems and Single Package, Air Cooled	
<=5.4 tons, split	14 SEER
<=5.4 tons, single	14 SEER
>5.4 to 11.25 tons	11.0 EER, 12.7 IEER
>11.25 to 20 tons	10.8 EER, 12.2 IEER
> 21 to 63 tons	9.8 EER, 11.4 IEER
>63 Tons	9.5 EER, 11.0 IEER
Air Cooled Heat Pump Systems, Split System and Single Package	
<=5.4 tons, split	14 SEER, 8.2 HSPF
<=5.4 tons, single	14 SEER, 8.0 HSPF
>5.4 to 11.25 tons	10.8 EER, 12 IEER, 3.3 heating COP
>11.25 to 20 tons	10.4 EER, 11.4 IEER, 3.2 heating COP
>= 21	9.3 EER, 10.4 IEER, 3.2 heating COP

Equipment Type	Baseline = ASHRAE Std. 90.1 – 2016
Water Source Heat Pumps (water to air, water loop)	
<=1.4 tons	12.2 EER, 4.3 heating COP
>1.4 to 5.4 tons	13.0 EER, 4.3 heating COP
>5.4 to 11.25 tons	13.0 EER, 4.3 heating COP
Ground Water Source Heat Pumps <=11.25 tons	18.0 EER, 3.7 heating COP
Ground Source Heat Pumps (brine to air, ground loop) <=11.25 tons	14.1 EER, 3.2 heating COP
Package Terminal Air Conditioners[27]	14.0 – (0.300 * Cap/1,000), EER
Package Terminal Heat Pumps	14.0 – (0.300 * Cap/1,000), EER 3.7 – (0.052 * Cap/1,000), heating COP
Single Package Vertical Air Conditioners	
<=5.4 tons	10.0 EER
>5.4 to 11.25 tons	10.0 EER
>11.25 to 20 tons	10.0 EER
Single Package Vertical Heat Pumps	
<=5.4 tons	10.0 EER, 3.0 heating COP
>5.4 to 11.25 tons	10.0 EER, 3.0 heating COP
>11.25 to 20 tons	10.0 EER, 3.0 heating COP

EFLH Table

Facility Type	Heating $EFLH_h$	Cooling $EFLH_c$
Assembly	603	669
Auto repair	1910	426
Dormitory	465	800
Hospital	3366	1424
Light industrial	714	549
Lodging – Hotel	1077	2918
Lodging – Motel	619	1233
Office – large	2034	720
Office – small	431	955
Other	681	736
Religious worship	722	279
Restaurant – fast food	813	645
Restaurant – full service	821	574
Retail – big box	191	1279
Retail – Grocery	191	1279
Retail – small	545	882
Retail – large	2101	1068
School – Community college	1431	846
School – postsecondary	1191	1208
School – primary	840	394
School – secondary	901	466
Warehouse	452	400

RTU Replacement - Economizer Savings								
BUILDING	SQFT	SYSTEM	Areas Served	QUANTITY	Cap (Tons)	D^kwh/ton	Demand Savings (kW)	Energy Savings (kWh)
Roosevelt Elementary School	43,385	Packaged RTU - 10 Tons	York - DM120C00N2AAA1A	1	10	42	0.0	420
		0	0	0	0		0	0
		0	0	0	0		0	0
Administration Building	12,000	Packaged RTU (Gas Heating) - 12.5 Tons	York - DL-12N24NTAAA1A	1	12.5	186	0.0	2,325
		Packaged RTU (Gas Heating) - 5 Tons	Trane - YHC060E3RZAF	1	5	186	0.0	930
		Packaged RTU (Gas Heating) - 8.5 Tons	Trane - YHC102F3RZA16AF	1	8.5	186	0.0	1581

Dual Enthalpy Economizers

The following algorithm details savings for dual enthalpy economizers. They are to be used to determine electric energy savings between baseline standard units and the high efficiency units promoted in the program. The baseline condition is assumed to be a rooftop unit with fixed outside air (no economizer). The high efficiency units are equipped with sensors that monitor the enthalpy of outside air and return air and modulate the outside air damper to optimize energy performance.

Algorithms

Electric energy savings (kWh/yr) = N * Tons * (ΔkWh/ton)

Peak Demand Savings (kW) = 0^{38} kW

Definition of Variables

N = Number of units

Tons = Rated capacity of the cooling system retrofitted with an economizer

ΔkWh/ton = Stipulated per building type electricity energy savings per ton of cooling system retrofitted with an economizer

Summary of Inputs

Dual Enthalpy Economizers

Component	Type	Value	Source
N	Variable		Application
Tons	Variable	Rated Capacity, Tons	Application
ΔkWh/ton	Fixed	See Table Below	1

Savings per Ton of Cooling System

Building Type	Savings (ΔkWh/ton)
Assembly	27
Big Box Retail	152
Fast Food Restaurant	39
Full Service Restaurant	31
Light Industrial	25
Primary School	42
Small Office	186
Small Retail	95
Religious	6
Warehouse	2
Other	61

RTU Replacement - Heating Savings						
BUILDING NAME	SYSTEM	Areas Served	Qty	Estimated Existing Efficiency (COPb)	Efficiency Units	Baseline Plant Rated Input MBH (CAPYbi)
Administration Building	Packaged RTU (Gas Heating) - 12.5 Tons	York - DL-12N24NTAAA1A	1	74.2%	%AFUE	240
	Packaged RTU (Gas Heating) - 5 Tons	Trane - YHC060E3RZAF	1	76.5%	%AFUE	130
	Packaged RTU (Gas Heating) - 8.5 Tons	Trane - YHC102F3RZA16AF	1	76.5%	%AFUE	200

RTU Replacement - Heating Savings								
BUILDING NAME	Qualifying RTU Efficiency (COPq)	Efficiency Units	EFLH	Conversion of BTU to kWh	Conversion of BTU to therms	Baseline Gas Use (Therms)	Proposed Gas Use (Therms)	Annual Gas Savings (Therms)
Administration Building	80%	%AFUE	431	3,412	100,000	1,394	1,293	101
	80%	%AFUE	431	3,412	100,000	732	700	32
	80%	%AFUE	431	3,412	100,000	1,127	1,078	49

Algorithms

Fuel Savings (MMBtu/yr) = Cap_{in} * $EFLH_h$ * ((Eff_q/Eff_b)-1) / 1000 kBtu/MMBtu

Definition of Variables

Cap_{in} = Input capacity of qualifying unit in kBtu/hr

$EFLH_h$ = The Equivalent Full Load Hours of operation for the average unit during the heating season in hours

Eff_b = Furnace Baseline Efficiency

Eff_q = Furnace Proposed Efficiency

1000 = Conversion from kBtu to MMBtu

Summary of Inputs

Prescriptive Furnaces

Component	Type	Value	Source
Cap_{in}	Variable		Application
$EFLH_h$	Fixed	See Table Below	1
Eff_q	Variable		Application
Eff_b	Fixed	See Table Below	2

$EFLH_h$ Table

Facility Type	Heating EFLH
Assembly	603
Auto repair	1910
Dormitory	465
Hospital	3366
Light industrial	714
Lodging – Hotel	1077
Lodging – Motel	619
Office – large	2034
Office – small	431
Other	681
Religious worship	722

Facility Type	Heating EFLH
Restaurant – fast food	813
Restaurant – full service	821
Retail – big box	191
Retail – Grocery	191
Retail – small	545
Retail – large	2101
School – Community college	1431
School – postsecondary	1191
School – primary	840
School – secondary	901
Warehouse	452

Multi-family EFLH by Vintage

Facility Type	Prior to 1979	From 1979 to 2006	From 2007 through Present
Low-rise, Heating	757	723	503
High-rise, Heating	526	395	219

Baseline Furnace Efficiencies (Eff_b)

Furnace Type	Size Category (kBtu input)	Standard 90.1-2016
Gas Fired	< 225 ≥ 225	78% AFUE or 80% Et 80% Et
Oil Fired	< 225 ≥ 225	78% AFUE 81% Et

RTU Replacement - Total Savings

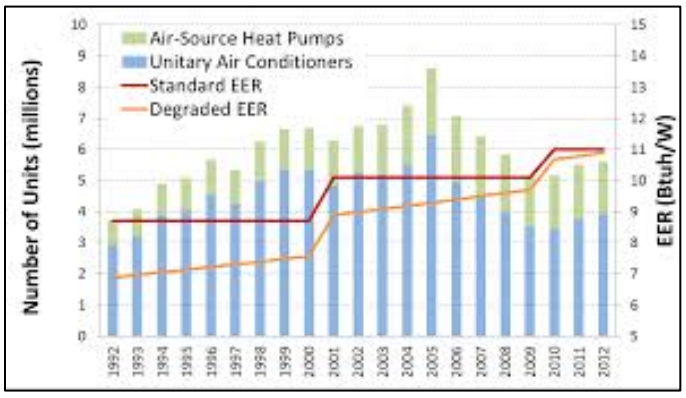
BUILDING NAME	SYSTEM	Annual Electric Savings (kWh)	Total Electric Savings (kWh)	Annual Demand Savings (kW)	Total Demand Savings (kW)	Annual Gas Savings (Therms)	Total Gas Savings (Therms)
Roosevelt Elementary School	Packaged RTU - 10 Tons	2,176	2,176	2	2	-	-
Administration Building	Packaged RTU (Gas Heating) - 12.5 Tons	7,044	9,744	2	3	101	182
	Packaged RTU (Gas Heating) - 5 Tons	1,050		0		32	
	Packaged RTU (Gas Heating) - 8.5 Tons	1,649		0		49	

ECM 7 – AHU / Split System Replacement

KEARNY BOE

✔	ECM evaluated but not included
✔	ECM included in the project

ECM #	ECM DESCRIPTION	Kearny High School	Lincoln Middle School	Franklin Elementary School	Washington Elementary School	Garfield Elementary School	Schuyler Elementary School	Roosevelt Elementary School	Administration Building
7	AHU / Split System Replacement				✔				✔



Many commercial buildings are operating with older and inefficient HVAC systems. The average life expectancy of commercial HVAC Split System equipment is 10 to 15 years—which means that many commercial buildings are ready for new natural gas rooftop units. Technology improvements and demand have led to greater energy efficiency and more choices in systems. Installing new, higher efficiency units will provide energy savings as well as deliver enhanced technology and controls of the RTUs when compared to the existing units.

Existing Conditions


Existing split system AC units at the Administration Building

Scope of Work

The following AHU / Split Systems will be replaced through the PSE&G Direct Install program with high efficiency units:

Split System Replacement - Cooling Savings					
BUILDING	SQFT	SYSTEM	Areas Served	Existing Qty	Tons Per Unit
Washington Elementary School	86,220	Daikin - 3MXS24JVJU	Air-Air Cooled Heat Pump	1	2.0
		Daikin - RXN24KEVJU	Air-Air Cooled Heat Pump	1	2.0
Administration Building	12,000	Bryant	Split System AC / Gas Furnace	3	3.5
		Mitsubishi	PUY-A12NHA4	1	1

ECM Calculations

Energy Savings from the installation of high efficiency AHU / Split Systems were calculated using BPU protocols. The calculations are shown below.

Split System Replacement - Cooling Savings						
BUILDING	SYSTEM	Areas Served	Existing Qty	Tons Per Unit	Total Existing Tons	EERb / SEERb
Washington Elementary School	Daikin - 3MXS24JVJU	Air-Air Cooled Heat Pump	1	2.0	2	15.8
	Daikin - RXN24KEVJU	Air-Air Cooled Heat Pump	1	2.0	2	17.1
					0	
Administration Building	Bryant	Split System AC / Gas Furnace	3	3.5	10.5	12.1
	Mitsubishi	PUY-A12NHA4	1	1	1	14.5
					0	

Split System Replacement - Cooling Savings								
BUILDING	Proposed Qty	Tons Per Unit	Total Proposed Tons	EERq / SEERq	CF	EFLH Cooling	Demand Savings (kW)	Energy Savings (kWh)
Washington Elementary School	1	2.0	2	19	0.50	394	0	101
	1	2.0	2	19	0.50	394	0	55
			0		0.50	394	0	0
Administration Building	3	4	10.5	14	0.50	955	1	1,350
	1	1	1	19	0.50	955	0	187
			0		0.50	955	0	0

Algorithms

Air Conditioning Algorithms:

Energy Savings (kWh/yr) = N * Tons * 12 kBtuh/Ton * $(1/EER_b - 1/EER_q) * EFLH_c$

Peak Demand Savings (kW) = N * Tons * 12 kBtuh/Ton * $(1/EER_b - 1/EER_q) * CF$

Definition of Variables

N = Number of units

Tons = Rated cooling capacity of unit.This value comes from ARI/AHRI or AHAM rating or manufacturer data.

EER_b = Energy Efficiency Ratio of the baseline unit. This data is found in the HVAC and Heat Pumps table below. For units < 65,000 BtuH (5.4 tons), SEER should be used in place of EER.

COP_b = Coefficient of Performance of the baseline unit. This data is found in the HVAC and Heat Pumps table below. For units < 65,000 BtuH (5.4 tons), SEER and HSPF/3.412 should be used in place of COP * 3.412 for cooling and heating savings, respectively.

EER_q = Energy Efficiency Ratio of the high efficiency unit. This value comes from the ARI/AHRI or AHAM directories or manufacturer data. For units < 65,000 (5.4 tons) BtuH, SEER should be used in place of EER.

COP_q = Coefficient of Performance of the high efficiency unit. This value comes from the ARI/AHRI or AHAM directories or manufacturer data. For units < 65,000 BtuH

(5.4 tons), SEER and HSPF/3.412 should be used in place of COP * 3.412 for cooling and heating savings, respectively.

CF = Coincidence Factor – This value represents the percentage of the total load which is on during electric system's Peak Window. This value is based on existing measured usage and determined as the average number of operating hours during the peak window period.

$EFLH_{c\ or\ h}$ = Equivalent Full Load Hours – This represents a measure of energy use by season during the on-peak and off-peak periods.

Summary of Inputs

HVAC and Heat Pumps

Component	Type	Value	Source
Tons	Variable	Rated Capacity, Tons	Application
EER_b	Variable	See Table below	1
EER_q	Variable	ARI/AHRI or AHAM Values	Application
CF	Fixed	50%	2
$EFLH_{(c\ or\ h)}$	Variable	See Tables below	3

HVAC Baseline Efficiencies Table – New Construction/EUL/RoF

Equipment Type	Baseline = ASHRAE Std. 90.1 – 2016
Unitary HVAC/Split Systems and Single Package, Air Cooled	
<=5.4 tons, split	14 SEER
<=5.4 tons, single	14 SEER
>5.4 to 11.25 tons	11.0 EER, 12.7 IEER
>11.25 to 20 tons	10.8 EER, 12.2 IEER
> 21 to 63 tons	9.8 EER, 11.4 IEER
>63 Tons	9.5 EER, 11.0 IEER
Air Cooled Heat Pump Systems, Split System and Single Package	
<=5.4 tons, split	14 SEER, 8.2 HSPF
<=5.4 tons, single	14 SEER, 8.0 HSPF
>5.4 to 11.25 tons	10.8 EER, 12 IEER, 3.3 heating COP
>11.25 to 20 tons	10.4 EER, 11.4 IEER, 3.2 heating COP
>= 21	9.3 EER, 10.4 IEER, 3.2 heating COP

Equipment Type	Baseline = ASHRAE Std. 90.1 – 2016
Water Source Heat Pumps (water to air, water loop)	
<=1.4 tons	12.2 EER, 4.3 heating COP
>1.4 to 5.4 tons	13.0 EER, 4.3 heating COP
>5.4 to 11.25 tons	13.0 EER, 4.3 heating COP
Ground Water Source Heat Pumps <=11.25 tons	18.0 EER, 3.7 heating COP
Ground Source Heat Pumps (brine to air, ground loop) <=11.25 tons	14.1 EER, 3.2 heating COP
Package Terminal Air Conditioners[57]	14.0 – (0.300 * Cap/1,000), EER
Package Terminal Heat Pumps	14.0 – (0.300 * Cap/1,000), EER 3.7 – (0.052 * Cap/1,000), heating COP
Single Package Vertical Air Conditioners	
<=5.4 tons	10.0 EER
>5.4 to 11.25 tons	10.0 EER
>11.25 to 20 tons	10.0 EER
Single Package Vertical Heat Pumps	
<=5.4 tons	10.0 EER, 3.0 heating COP
>5.4 to 11.25 tons	10.0 EER, 3.0 heating COP
>11.25 to 20 tons	10.0 EER, 3.0 heating COP

EFLH Table

Facility Type	Heating $EFLH_h$	Cooling $EFLH_c$
Assembly	603	669
Auto repair	1910	426
Dormitory	465	800
Hospital	3366	1424
Light industrial	714	549
Lodging – Hotel	1077	2918
Lodging – Motel	619	1233
Office – large	2034	720
Office – small	431	955
Other	681	736
Religious worship	722	279
Restaurant – fast food	813	645
Restaurant – full service	821	574
Retail – big box	191	1279
Retail – Grocery	191	1279
Retail – small	545	882
Retail – large	2101	1068
School – Community college	1431	846
School – postsecondary	1191	1208
School – primary	840	394
School – secondary	901	466
Warehouse	452	400

Split System Replacement - Heating Savings							
BUILDING NAME	SYSTEM	Areas Served	Qty	Estimated Existing Efficiency (COPb)	Efficiency Units	Baseline RTU Rated Input MBH	Baseline Plant Rated Input MBH (CAPYbi)
Washington Elementary School	Daikin - 3MXS24JVJU	Air-Air Cooled Heat Pump	1	2.52	COP	23	23
	Daikin - RXN24KEVJU	Air-Air Cooled Heat Pump	1	2.37	COP	23	23
Administration Building	Bryant	Split System AC / Gas Furnace	3	85.6%	%AFUE	80	240
	Mitsubishi	PUY-A12NHA4	1				0

Split System Replacement - Heating Savings									
BUILDING NAME	Qualifying RTU Capacity MBH	Qualifying Plant Capacity (CAPYqi)	Qualifying RTU Efficiency (COPq)	Efficiency Units	EFLH	Conversion of BTU to kWh	Conversion of BTU to therms	Annual Electric Savings (kWh)	Annual Gas Savings (Therms)
Washington Elementary School	23	23	2.64	COP	840	3,412	100,000	100	
	23	23	2.64	COP	840	3,412	100,000	239	
Administration Building	80	240	96%	%AFUE	431	3,412	100,000	-	131
		0		%AFUE	431	3,412	100,000	-	-

Algorithms

Fuel Savings (MMBtu/yr) = Cap_{in} * $EFLH_h$ * ((Eff_q/Eff_b)-1) / 1000 kBtu/MMBtu

Definition of Variables

Cap_{in} = Input capacity of qualifying unit in kBtu/hr

$EFLH_h$ = The Equivalent Full Load Hours of operation for the average unit during the heating season in hours

Eff_b = Furnace Baseline Efficiency

Eff_q = Furnace Proposed Efficiency

1000 = Conversion from kBtu to MMBtu

Summary of Inputs

Prescriptive Furnaces

Component	Type	Value	Source
Cap_{in}	Variable		Application
$EFLH_h$	Fixed	See Table Below	1
Eff_q	Variable		Application
Eff_b	Fixed	See Table Below	2

$EFLH_h$ Table

Facility Type	Heating EFLH
Assembly	603
Auto repair	1910
Dormitory	465
Hospital	3366
Light industrial	714
Lodging – Hotel	1077
Lodging – Motel	619
Office – large	2034
Office – small	431
Other	681
Religious worship	722

Facility Type	Heating EFLH
Restaurant – fast food	813
Restaurant – full service	821
Retail – big box	191
Retail – Grocery	191
Retail – small	545
Retail – large	2101
School – Community college	1431
School – postsecondary	1191
School – primary	840
School – secondary	901
Warehouse	452

Multi-family EFLH by Vintage

Facility Type	Prior to 1979	From 1979 to 2006	From 2007 through Present
Low-rise, Heating	757	723	503
High-rise, Heating	526	395	219

Baseline Furnace Efficiencies (Eff_b)

Furnace Type	Size Category (kBtu input)	Standard 90.1-2016
Gas Fired	< 225 ≥ 225	78% AFUE or 80% Et 80% Et
Oil Fired	< 225 ≥ 225	78% AFUE 81% Et

Split System Replacement - Total Savings

BUILDING NAME	SYSTEM	Areas Served	Annual Electric Savings (kWh)	Total Electric Savings (kWh)	Annual Demand Savings (kW)	Total Demand Savings (kW)	Annual Gas Savings (Therms)	Total Gas Savings (Therms)
Washington Elementary School	Daikin - 3MXS24JVJU	Air-Air Cooled Heat Pump	101	156	0	0	-	-
Washington Elementary School	Daikin - RXN24KEVJU	Air-Air Cooled Heat Pump	55		0		-	
Administration Building	Bryant	Split System AC / Gas Furnace	1,350	1,537	1	1	131	131
Administration Building	Mitsubishi	PUY-A12NHA4	187		0		-	

ECM 8 – Electronic Fuel-Use Economizer

KEARNY BOE

✔ ECM evaluated but not included

✔ ECM included in the project

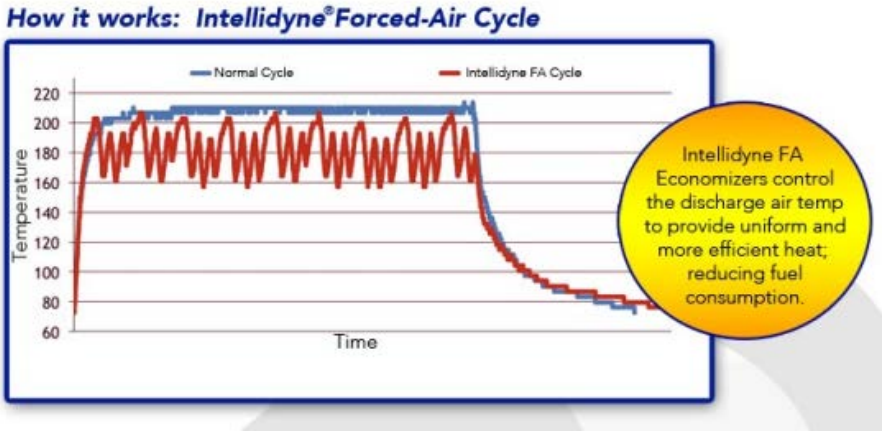
ECM #	ECM DESCRIPTION	Kearny High School	Lincoln Middle School	Franklin Elementary School	Washington Elementary School	Garfield Elementary School	Schuyler Elementary School	Roosevelt Elementary School	Administration Building
8	Electronic Fuel-Use Economizer								✔

Most forced-air heating systems are 50% to 100% larger than necessary to maintain a comfortable temperature on average days. This excess capacity causes the burner to cycle on and off continuously to prevent the furnace from overheating.

The Intellidyne FA saves energy by adjusting the burner run pattern to match the system's heat load. The FA analyzes the system's load by monitoring the discharge air temperature and number of burner cycles. The FA then optimizes the running cycle for maintaining the desired heat level calculated as opposed to the simplistic on/off control action of the thermostat.

Existing gas fired RTU at the Administration Building

Intellidyne FA reduces fuel consumption by 10-20%. Installation is easily done by a qualified service technician and requires no follow-up maintenance.



Scope of Work

Electronic fuel use economizers will be installed on the new RTUs at the Administration building. The measure is included in the PSE&G Direct Install program.

Electronic Fuel Use Economizer	
BUILDING	**System**
Administration Building	Replacement RTU for Trane YHC060E3RZAF
Administration Building	Replacement RTU for York DL-12N24NT
Administration Building	Replacement RTU for Trane YHC102F3RZA16AF

ECM Calculations

Heating energy use is reduced by 13% by using an electronic fuel use economizer. The BPU gas heating calculation has been modified by making the proposed capacity zero to calculate gas use instead of gas savings.

Electronic Fuel Use Economizer								
BUILDING	**System**	**Qty**	**CAPb (Btu/hr)**	**AFUEb**	**EFLHh**	**Annual Fuel Usage**	**Gas Savings %**	**Gas Savings (therms)**
Administration Building	Replacement RTU for Trane YHC060E3RZAF	1	130,000	80%	431	560	13%	319
Administration Building	Replacement RTU for York DL-12N24NT	1	240,000	80%	431	1,034	13%	
Administration Building	Replacement RTU for Trane YHC102F3RZA16AF	1	200,000	80%	431	862	13%	

Algorithms

Fuel Savings (MMBtu/yr) = Cap_{in} * $EFLH_h$ * ((Eff_q/Eff_b)-1) / 1000 kBtu/MMBtu

Definition of Variables

Cap_{in} = Input capacity of qualifying unit in kBtu/hr

$EFLH_h$ = The Equivalent Full Load Hours of operation for the average unit during the heating season in hours

Eff_b = Furnace Baseline Efficiency

Eff_q = Furnace Proposed Efficiency

1000 = Conversion from kBtu to MMBtu

Summary of Inputs

Prescriptive Furnaces

Component	Type	Value	Source
Cap_{in}	Variable		Application
$EFLH_h$	Fixed	See Table Below	1
Eff_q	Variable		Application
Eff_b	Fixed	See Table Below	2

$EFLH_h$ Table

Facility Type	Heating EFLH
Assembly	603
Auto repair	1910
Dormitory	465
Hospital	3366
Light industrial	714
Lodging – Hotel	1077
Lodging – Motel	619
Office – large	2034
Office – small	431
Other	681
Religious worship	722

Facility Type	Heating EFLH
Restaurant – fast food	813
Restaurant – full service	821
Retail – big box	191
Retail – Grocery	191
Retail – small	545
Retail – large	2101
School – Community college	1431
School – postsecondary	1191
School – primary	840
School – secondary	901
Warehouse	452

Multi-family EFLH by Vintage

Facility Type	Prior to 1979	From 1979 to 2006	From 2007 through Present
Low-rise, Heating	757	723	503
High-rise, Heating	526	395	219

Baseline Furnace Efficiencies (Eff_b)

Furnace Type	Size Category (kBtu input)	Standard 90.1-2016
Gas Fired	< 225 ≥ 225	78% AFUE or 80% Et 80% Et
Oil Fired	< 225 ≥ 225	78% AFUE 81% Et

Electronic Fuel-Use Economizers

Algorithms

Electric Savings (kWh) = (AEU * 0.13)

Fuel Savings (MMBtu) = (AFU * 0.13)

Definition of Variables

AEU = Annual Electric Usage for an uncontrolled AC or refrigeration unit (kWh)

AFU = Annual Fuel Usage for an uncontrolled (gas, oil, propane) HVAC unit (MMBtu or gallons)

Notes:

(1) Some examples of the different types of fuel-use economizer controls available on the market can be found at: http://www.intellidynellc.com/02_prods.htm

ECM 9 – Pipe and Valve Insulation

KEARNY BOE		Kearny High School	Lincoln Middle School	Franklin Elementary School	Washington Elementary School	Garfield Elementary School	Schuyler Elementary School	Roosevelt Elementary School	Administration Building
✔ ECM evaluated but not included									
✔ ECM included in the project									
ECM #	ECM DESCRIPTION								
9	Pipe and Valve Insulation		✔	✔		✔		✔	✔

Piping insulation is a critical part of energy management. It controls condensation, pipe freezing, and noise amongst other things. A percentage of heating (or cooling) can be lost through conduction if a pipe is not properly insulated.

Higher operational costs are a direct result of this for both heating and cooling systems. This ECM entails wrapping the existing bare metal pipe with an approved high-performance fiberglass insulation jacketing material.

Uninsulated hot water piping

Uninsulated pipe and valve insulation at Lincoln Middle School

Scope of Work

Pipe and Valve Insulation Estimate			
BUILDING	**CATEGORY**	**NOTES**	**QUANTITY**
Lincoln Middle School	Dual Temp Boiler Room Piping	BE Retrofit	1
	Domestic Hot Water	BE Retrofit	1
	Payment & Performance Bond	BE Retrofit	1%
Franklin Elementary School	Pipewrap - 120' from boilers	FSG - DI Total Cost	
		Rebate %	55.5%
		Client Cost	1
Garfield Elementary School	Pipewrap - 28' from domestic water heater	FSG - DI Total Cost	
		Rebate %	41.7%
		Client Cost	1
Roosevelt Elementary School	Pipewrap - 40' from domestic water heater	FSG - DI Total Cost	
		Rebate %	29.3%
		Client Cost	1
Administration Building	Pipewrap - 15' from domestic water heater	FSG - DI Total Cost	
		Rebate %	26.3%
		Client Cost	1

Insulation will be installed on exposed pipes and valves. Failed insulation will be replaced. Poorly insulated pipes in the dual temperature heating and cooling distribution system is leading to unnecessary distribution losses and wasted energy. The scope of work will include

- Installation of pipe insulation to meet the insulation requirements of the fluid temperature in the pipe
- Utilize and install pipe wrap covering and jackets to protect the insulation material as required in the work area
- Materials will vary by the application and workspace
    - Fiberglass
    - Mineral wool
    - Foamglass
    - Styrofoam
    - Urethane
    - Closed cell rubber

ECM Calculations

Hot water pipe insulation is calculated using NJ BPU Protocols. Chilled water pipe insulation savings are calculated using ASHRAE guidelines. Calculations are shown below.

Pipe and Valve Insulation Savings (Hot Water Piping)

BUILDING	DESCRIPTION	QTY	UNITS	NOMINAL PIPE SIZE (IN)	EQUIVALENT LINEAR FEET	INSULATION (IN)	EXISTING % INSULATED (0% for bare piping)
Lincoln Middle School	Med Temp HW Piping	6.0	EA	2.00	27.3	1.50	0%
Lincoln Middle School	Med Temp HW Piping	12.0	EA	3.00	41.3	1.50	0%
Lincoln Middle School	Med Temp HW Piping	9.0	FITTINGS	4.00	13.4	2.00	0%
Lincoln Middle School	Med Temp HW Piping	34.0	LF	4.00	34.0	2.00	0%
Lincoln Middle School	Med Temp HW Piping	10.0	EA	4.00	92.2	1.50	0%
Lincoln Middle School	Med Temp HW Piping	4.0	EA	6.00	54.6	1.50	0%
Lincoln Middle School	Med Temp HW Piping	4.0	EA	8.00	15.6	2.00	0%
Lincoln Middle School	Med Temp HW Piping	1.0	EA	8.00	1.8	1.50	0%
Lincoln Middle School	Med Temp HW Piping	32.0	LF	8.00	32.0	2.00	0%
Lincoln Middle School	DHW Piping	3	EA	2.00	38.6	1.50	0%
Lincoln Middle School	DHW Piping	5	LF	2.00	5.0	1.50	0%
Lincoln Middle School	DHW Piping	1	EA	4.00	4.8	1.50	0%
Lincoln Middle School	DHW Piping	4	LF	4.00	4.0	1.50	0%
Franklin Elementary School	DHW Piping	60	LF	1.00	60.0	1.00	0%
Franklin Elementary School	DHW Piping	60	LF	3.00	60.0	2.00	0%
Garfield Elementary School	DHW Piping	12	LF	1.00	12.0	1.00	0%
Garfield Elementary School	DHW Piping	16	LF	1.50	16.0	1.50	0%
Roosevelt Elementary School	DHW Piping	40	LF	1.00	40.0	1.00	0%
Administration Building	DHW Piping	15	LF	3.00	15.0	1.50	0%

Pipe and Valve Insulation Savings (Hot Water Piping)

BUILDING	SAVINGS FACTOR (BTU/HR-FT)	ADJUSTED SAVINGS FACTOR (BTU/HR-FT)	HEATING EFFICIENCY (%)	HEATING HOURS PER YEAR	PIPING SPACE TEMP (F)	FLUID TEMP (F)	SCALING FACTOR	ENERGY SAVINGS (THERMS)
Lincoln Middle School	148.0	148.0	74.0%	4,282	67.5	185	0.904	46.4
Lincoln Middle School	230.0	230.0	74.0%	4,282	67.5	185	0.904	144.4
Lincoln Middle School	281.0	281.0	74.0%	4,282	67.5	185	0.904	132.3
Lincoln Middle School	281.0	281.0	74.0%	4,282	67.5	185	0.904	499.7
Lincoln Middle School	274.0	274.0	74.0%	4,282	67.5	185	0.904	143.3
Lincoln Middle School	411.0	411.0	74.0%	4,282	67.5	185	0.904	86.0
Lincoln Middle School	562.0	562.0	74.0%	4,282	67.5	185	0.904	117.6
Lincoln Middle School	548.0	548.0	74.0%	4,282	67.5	185	0.904	28.7
Lincoln Middle School	562.0	562.0	74.0%	4,282	67.5	185	0.904	940.6
Lincoln Middle School	148.0	148.0	80.0%	4,282	67.5	125	0.442	10.5
Lincoln Middle School	148.0	148.0	80.0%	4,282	67.5	125	0.442	17.5
Lincoln Middle School	274.0	274.0	80.0%	4,282	67.5	125	0.442	6.5
Lincoln Middle School	274.0	274.0	80.0%	4,282	67.5	125	0.442	25.9
Franklin Elementary School	82.0	82.0	80.0%	4,282	70.0	120	0.385	101.3
Franklin Elementary School	236.0	236.0	80.0%	4,282	70.0	120	0.385	291.5
Garfield Elementary School	82.0	82.0	80.0%	4,282	70.0	120	0.385	20.3
Garfield Elementary School	120.0	120.0	80.0%	4,282	70.0	120	0.385	39.5
Roosevelt Elementary School	82.0	82.0	80.0%	4,282	70.0	120	0.385	67.5
Administration Building	230.0	230.0	80.0%	4,282	70.0	120	0.385	71.0

Algorithms

Fossil Fuel Source:

Fuel Savings (MMBtu/yr) = SF * L * Oper Hrs / EFF

Electric Source:

Energy Savings (kWh/yr) = SF * L * Oper Hrs / EFF / C

Scaling: Only applicable if differential between the fluid temperature and space temperature is significantly different than 130°F. If this is the case, the fuel or electric savings calculated with the above formulas should be multiplied by the resulting scaling factor deroived as:

Scaling Factor (unitless) = (FT – ST)/130

Fuel or electric savinsg calculated using the derived savings factors should be multiplied by the acaling factor.

Scaled Savings (MMBtu/year or kWh/yr) = Calculated Savings * Savings Factor

Definition of Variables

SF = Savings factor derived from #E Plus Version 4.1 tool, Btu/hr-ft see table below

L = Length of pipe from water heating source to hot water application, ft

Oper Hrs = hours per year fluid flows in pipe, hours

EFF = Efficiency of equipment providing heat to the fluid

C (kWh) = Conversion factor from Btu to kWh = 3,413 for electric water heating

FT = Fluid Temperature (°F)

ST = Space temperature (°F)

Summary of Inputs

Pipe Insulation

Component	Type	Value	Source
SF	Fixed	See Table Below	1
L	Variable		Application
Oper Hrs	Fixed	4,282 hrs/year (default value reflects average heating season hours)	2
EFF	Fixed	98% electric 80% natural gas	3
FT	Variable		Application
ST	Variable		Application

Savings Factor

	Savings, Btu/hr-ft			
Nominal Pipe Size, Inches	0.5" Insulation	1.0" Insulation	1.5" Insulation	2.0" Insulation
0.50	47	53	56	57
0.75	58	64	68	70
1.00	72	82	85	87
1.25	89	100	107	108
1.50	100	115	120	125
2.00	128	143	148	153
2.50	153	171	182	185
3.00	195	221	230	236
3.50	224	241	248	253
4.00	232	263	274	281

Pipe and Valve Insulation Savings (Chilled Water)									
BUILDING	DESCRIPTION	QTY	UNITS	NOMINAL PIPE SIZE (IN)	EQUIVALENT LINEAR FEET	INSULATION (IN)	BARE EMITTANCE	INSULATION EMITTANCE	EXISTING % INSULATED (0% for bare piping)
Lincoln Middle School	Dual Temp CHW Piping	2	EA	3.00	19.5	1.50	0.8	0.9	0%
Lincoln Middle School	Dual Temp CHW Piping	5	EA	4.00	44.7	1.50	0.8	0.9	0%
Lincoln Middle School	Dual Temp CHW Piping	14	LF	8.00	14.0	1.00	0.8	0.9	0%
Lincoln Middle School	Dual Temp CHW Piping	1	EA	8.00	7.2	1.00	0.8	0.9	0%

Pipe and Valve Insulation Savings (Chilled Water)						
BUILDING	HOURS PER YEAR	COOLING EFFICIENCY (COP)	SPACE TEMP (F)	FLUID TEMP (F)	Natural Convection Heat Transfer Coefficient (BTU/hr-ft2-F)	BARE PIPE OUTSIDE DIAMETER (in)
Lincoln Middle School	3,391	0.849	85.0	42.0	1.20	2.375
Lincoln Middle School	3,391	0.849	85.0	42.0	1.20	2.375
Lincoln Middle School	3,391	0.849	85.0	42.0	1.20	1.900
Lincoln Middle School	3,391	0.849	85.0	42.0	1.20	1.900

Pipe and Valve Insulation Savings (Chilled Water)						
BUILDING	BARE SURFACE TEMPERTURE (F)	Bare Convection h_c (BTU/hr-ft2-F)	Bare Radiation h_r (BTU/hr-ft2-F)	Bare Heat Transfer Coefficient (BTU/hr-ft2-F)	PROPOSED PIPE OUTSIDE DIAMETER (in)	PROPOSED INSULATION THERMAL COND. (Btu*in/hr *F*ft^2)
Lincoln Middle School	42.0	0.818	0.788	1.606	3.500	0.27
Lincoln Middle School	42.0	0.818	0.788	1.606	4.500	0.27
Lincoln Middle School	42.0	0.865	0.788	1.653	8.625	0.27
Lincoln Middle School	42.0	0.865	0.788	1.653	8.625	0.27

Pipe and Valve Insulation Savings (Chilled Water)				
BUILDING	PROPOSED INSULATION SURFACE TEMPERTURE (F)	Proposed Convection h_c (BTU/hr-ft2-F)	Proposed Radiation h_r (BTU/hr-ft2-F)	Proposed Total Heat Transfer Coefficient (BTU/hr-ft2-F)
Lincoln Middle School	79.4	0.446	0.128	0.574
Lincoln Middle School	79.4	0.419	0.128	0.547
Lincoln Middle School	77.1	0.388	0.180	0.567
Lincoln Middle School	77.1	0.388	0.180	0.567

Pipe and Valve Insulation Savings (Chilled Water)							
BUILDING	BARE HEAT GAIN (btu/h/ln.ft)	EXISTING HEAT GAIN (btu/hr)	EXISTING COOLING LOSS (Therm/year)	INSULATED HEAT GAIN (btu/h/ln.ft)	PROPOSED HEAT GAIN (btu/hr)	INSULATED COOLING LOSS (Therm/year)	ENERGY SAVINGS (Therm)
Lincoln Middle School	515.3	10,047	401	4.5	88	3	397.8
Lincoln Middle School	515.3	23,032	920	5.8	260	10	909.5
Lincoln Middle School	424.2	5,939	237	13.2	185	7	229.8
Lincoln Middle School	424.2	3,055	122	13.2	95	4	118.2

Mechanical Insulation Savings Calculations

This section describes our methodology for calculating energy savings. We use standard heat transfer methods to compute heat loss from bare and insulated mechanical systems (piping, valves, fittings, tanks, and ductwork). The difference in heat loss is the energy savings, as follows:

Energy Savings = [Existing Heat Loss] – [Insulated Heat Loss]

Methodology

We use standard heat transfer methods to compute radiation, convection, and conduction heat loss from (or gain to, for cold systems) bare and insulated systems. Key parameters that affect the heat transfer rate include: temperature of fluid (e.g. steam, hot water, chilled water, etc.); surface temperature of the component (e.g. pipe, fitting, tank, ductwork); temperature of environment; emissivity of surface; average wind speed where applicable; percentage of existing component covered with insulation; and condition of existing insulation, where applicable.

Energy Use

Existing and proposed energy use are computed as follows:

Pipes & Fittings

Heat Loss (Btu/h) = (Heat Loss / lin.ft. bare pipe) * (lin.ft. of pipe) * [1 – (%insulated)] +
(Heat Loss / lin.ft. insulated pipe) * (lin.ft. of pipe) * (%insulated)

Fuel Loss (MMBTU/yr) = (Heat Loss Btu/h) * (heating hrs/year) ÷ (efficiency)
Electric Loss (kWh/yr) = (Heat Loss Btu/h) * (cooling hrs/year) ÷ (12,000 Btu/ton-hr) x (cooling kW/ton)

Energy Savings

Energy savings are the difference between existing and proposed heat loss:

Fuel Savings (MMBTU/yr) = (Existing Fuel Loss) – (Proposed Fuel Loss)
Electric Savings (MMBTU/yr) = (Existing Electric Loss) – (Proposed Electric Loss)
Cost Savings ($/yr) = (Fuel Savings MMBTU/yr) * (Fuel Rate $/MMBTU) + (Electric Savings kWh/yr) * (Electric Rate $/kWh)

Heat Transfer: Bare Systems

Bare systems are subject to convection and radiation heat transfer. We ignore conductive heat transfer through the pipe/fitting material (e.g. steel, copper, PVC etc.) as this is negligible as compared to heat transfer through insulation and air convection.

Pipes & Fittings

This section describes the heat transfer calculations for pipes and fittings for indoor systems subject to natural convection (no wind). The calculations for outdoor systems subject to forced convection (wind) are similar except that the formulas are more complicated. These methods are presented following this section.

For fittings (valves, elbows, strainers, etc.), we estimate heat loss based on equivalent length of straight pipe, which is the ratio of the area of the fitting to the area of 1 linear foot of pipe of the same size (fitting equivalent length = Area of fitting, ft^2 / Area of pipe of equivalent diameter, ft^2).

$$q_{pipe} = \frac{2 * \pi * \Delta T}{\frac{1}{h * \left(D_{outer}/_2\right)}}$$

Where:

q_{pipe} = *heat loss per linear foot = Btu/h/lin.ft.*

$h = total\ convective\ heat\ transfer\ factor = h_{convection} + h_{radiation}$

$$h_{convection} = 0.213 * \left(\frac{\Delta T}{D}\right)^{\left(\frac{1}{4}\right)}$$ [ASHRAE 2005, Ch. 3, Eq. T10.16]

$\Delta T = T_{surface} - T_{air}$

$\Delta T = T_{surface} - T_{air}$

D = Outer diameter

$$h_{radiation} = \varepsilon * \sigma * \left(T_{surface}^4 - T_{air}^4\right) / \left(T_{surface} - T_{air}\right)$$

e = emissivity of surface

s = Stefan-Boltzmann constant = 0.1714 x 10-8 Btu / (hr-ft^2-°R^4)

$T_{surface}$ = *Temperature of surface*

T_{air} = *Average ambient air temperature*

Heat Transfer: Insulated Systems

Insulated systems are subject to convection, radiation, and conductive heat transfer. We ignore conductive heat transfer through the pipe/fitting material (e.g. steel, copper, PVC etc.) as this is negligible when compared to heat transfer through insulation and air convection.

$$q_{pipe} = \frac{2 * \pi * \Delta T}{\frac{ln\left(D_{outer}/D_{inner}\right)}{k} + \frac{1}{h * \left(D_{outer}/2\right)}}$$

Where:

q_{pipe} = *heat loss per linear foot = Btu/h/lin.ft.*

$$h_{convection} = 0.213 * \left(\frac{\Delta T}{D}\right)^{\left(\frac{1}{4}\right)}$$ [ASHRAE 2005, Ch. 3, Eq. T10.16]

$T = T_{surface} - T_{air}$

$\Delta T = T_{surface} - T_{air}$

D = Outer diameter

$$h_{radiation} = \varepsilon * \sigma * \left(T_{surface}^4 - T_{air}^4\right) / \left(T_{surface} - T_{air}\right)$$

e = emissivity of surface

s = Stefan-Boltzmann constant = 0.1714 x 10-8 Btu / (hr-ft^2-°R^4)

$T_{surface}$ = *Temperature of surface*

T_{air} = *Average ambient air temperature*

L = Pipe length or fitting equivalent length

The temperature at any interface location "x" can be calculated from:

$$\frac{R_x}{R_{total}} = \frac{\left(T_{inside} - T_x\right)}{T_{inside} - T_{outside}}$$

$$T_x = T_{inside} - \frac{R_x}{R_{total}}\left(T_{inside} - T_{outside}\right)$$

ECM 10 – Building Envelope Weatherization

KEARNY BOE		Kearny High School	Lincoln Middle School	Franklin Elementary School	Washington Elementary School	Garfield Elementary School	Schuyler Elementary School	Roosevelt Elementary School	Administration Building
✔ ECM evaluated but not included									
✔ ECM included in the project									
ECM #	ECM DESCRIPTION								
10	Building Envelope Weatherization	✔	✔	✔	✔	✔	✔	✔	✔

An on-site survey of the existing air barrier continuity was conducted at all eight Kearny School District buildings. During the on-site inspection, several areas of the facilities were inspected for effective air barriers at the building envelope. Temperature, relative humidity, CO2 levels, smoke pencil testing and Infrared imaging was used to determine areas of uncontrolled air leakage into and out of the buildings.

Each of these facilities had varying degrees of uncontrolled air leakage into and out of the buildings. Typically, the exterior doors were found to have failed, missing or worn weather-seals and in some cases the exterior caulking had failed. Many of the facilities had insulation materials installed at the exterior roof/wall intersections. This can increase thermal values, however, the air leakage around the insulation and through the roof/wall joint was significant and results in increased energy costs.

Existing Conditions at the Administration Building

Scope of Work

Building Envelope Estimate					
BUILDING	Type	CATEGORY	UNITS	NOTES	QUANTITY
Kearny High School	Door Weather Stripping	Double Door - Sweep, Center	UT	BE Retrofit	2
		Double Door - Sides, Top, Sweep, Center	UT		4
		Install Door Jamb Spacer	UT		4
		Single Door - Sides, Sweep	UT		21
		Single Door - Sides, Top, Sweep	UT		3
		Single Door - Sweep	UT		2
	Buck Frame Air Sealing	Seal	LF		70
	Garage Door Weather Stripping	Roll-Up Door Weather Strip - Sides, Top	UT		1
	Roof-Wall Intersection Air Sealing	Seal	LF		137
	Wall Air Sealing	Block, Seal Firestop	SF		543
		P&P Bond			1%
Lincoln Middle School	Door Weather Stripping	Double Door - Sides, Sweep, Center	UT	BE Retrofit	10
		Double Door - Sides, Top, Sweep, Center	UT		1
		Double Door - Sweep, Center	UT		3
		Single Door - Sides, Sweep	UT		5
	Roof-Wall Intersection Air Sealing	Block, Seal	LF		135
		Seal	LF		147
		Seal Exposed	LF		23
	Buck Frame Air Sealing	Seal	LF		20
		P&P Bond			1%
Franklin Elementary School	Door Weather Stripping	Double Door - Sides, Sweep, Center	UT	BE Retrofit	8
		Double Door - Sides, Top, Sweep, Center	UT		11
		Install Door Jamb Spacer	UT		4
		Single Door - Sides, Sweep	UT		16
		Single Door - Sides, Top, Sweep	UT		23
		P&P Bond			1%
Washington Elementary School	Door Weather Stripping	Double Door - Sides, Sweep, Center	UT	BE Retrofit	2
		Double Door - Sides, Top, Sweep, Center	UT		3
		Single Door - Sides, Sweep	UT		7
		Single Door - Sides, Top, Sweep	UT		1
	Caulking	Interior Seal (Type B)	LF		660
		Interior Seal (Type A)	LF		28061
	AC Unit Weatherization	Retrofit Meeting Rail Air Barrier	UT		14
		P&P Bond			1%
Garfield Elementary School	Door Weather Stripping	Double Door - Sides, Top, Sweep, Center	UT	BE Retrofit	2
		Single Door - Sides, Sweep	UT		8
		Single Door - Sides, Top, Sweep	UT		2
		P&P Bond			1%
Schuyler Elementary School	Door Weather Stripping	Double Door - Sides, Sweep, Center	UT	BE Retrofit	4
		Double Door - Sides, Top, Sweep, Center	UT		1
		Single Door - Sides, Sweep	UT		16
	Caulking	Interior Seal	LF		8030
		P&P Bond			1%
Roosevelt Elementary School	Door Weather Stripping	Single Door - Sides, Sweep	UT	BE Retrofit	9
		Single Door - Sides, Top, Sweep	UT		1
	Window Restoration	Custom Window Restoration A	UT		291
		Custom Window Restoration B	UT		291
		P&P Bond			1%
Administration Building	Door Weather Stripping	Single Door - Sides, Top, Sweep	UT	BE Retrofit	1
		Single Door - Sweep	UT		3
		P&P Bond			1%

- Attic Air Barrier Retrofit
- Attic Bypass Sealing
    - Weather strip and insulate the attic hatch to provide an air tight seal with permanently fixed insulation to prevent thermal heat gain and loss consistent with the surrounding attic recommendations.
- Attic Flat Insulation
    - Install 12 inches of cellulose across the attic flat
- Door Weather Stripping

- Overhead Door Weather Stripping/Roll-up Door Weather Stripping
    - Install heavy-duty aluminum carrier with oversized vinyl insert gasket at the sides and top.
- Roof Air Barrier Retrofit
    - Install Thermax and appropriate sheathing tapes and/or air sealing foam to ensure an air tight seal.
    - Install Hatch – weather strip and insulate consistent with the Roof Air Barrier Retrofit to ensure a removable but air tight roof hatch assembly.
- Roof Insulation
- Roof Wall Intersection Air Sealing

ECM Calculations

Energy Savings from the installation of building envelope improvements are calculated on the following pages:

Building Envelope - Heating Savings									
BUILDING	SUBTYPE	INFILTRATION REDUCTION (CFM)	HEATING FUEL	HEATING EFFICIENCY (%)	SENSIABLE HEAT CONSTANT	HOURS (HR/DAY)	HEAT EFFICIENCY FACTOR	HEATING DEGREE DAYS	TOTAL HEATING SAVINGS (THERM)
Kearny High School	Double Door - Sweep, Center	30	Natural Gas	91.6%	1.08	24.00	3,534	4,843	41
Kearny High School	Double Door - Sides, Top, Sweep, Center	155	Natural Gas	91.6%	1.08	24.00	3,534	4,843	212
Kearny High School	Install Door Jamb Spacer	0	Natural Gas	91.6%	1.08	24.00	3,534	4,843	0
Kearny High School	Single Door - Sides, Sweep	418	Natural Gas	91.6%	1.08	24.00	3,534	4,843	573
Kearny High School	Single Door - Sides, Top, Sweep	70	Natural Gas	91.6%	1.08	24.00	3,534	4,843	96
Kearny High School	Single Door - Sweep	7	Natural Gas	91.6%	1.08	24.00	3,534	4,843	10
Kearny High School	Seal	41	Natural Gas	91.6%	1.08	24.00	3,534	4,843	56
Kearny High School	Roll-Up Door Weather Strip - Sides, Top	13	Natural Gas	91.6%	1.08	24.00	3,534	4,843	18
Kearny High School	Seal	107	Natural Gas	91.6%	1.08	24.00	3,534	4,843	147
Kearny High School	Block, Seal Firestop	159	Natural Gas	91.6%	1.08	24.00	3,534	4,843	218
Lincoln Middle School	Double Door - Sides, Sweep, Center	316	Natural Gas	74.0%	1.08	24.00	2,855	4,843	536
Lincoln Middle School	Double Door - Sides, Top, Sweep, Center	39	Natural Gas	74.0%	1.08	24.00	2,855	4,843	66
Lincoln Middle School	Double Door - Sweep, Center	46	Natural Gas	74.0%	1.08	24.00	2,855	4,843	78
Lincoln Middle School	Single Door - Sides, Sweep	99	Natural Gas	74.0%	1.08	24.00	2,855	4,843	168
Lincoln Middle School	Block, Seal	211	Natural Gas	74.0%	1.08	24.00	2,855	4,843	358
Lincoln Middle School	Seal	115	Natural Gas	74.0%	1.08	24.00	2,855	4,843	195
Lincoln Middle School	Seal Exposed	18	Natural Gas	74.0%	1.08	24.00	2,855	4,843	31
Lincoln Middle School	Seal	12	Natural Gas	74.0%	1.08	24.00	2,855	4,843	20
Franklin Elementary School	Double Door - Sides, Sweep, Center□	253	Natural Gas	81.0%	1.08	24.00	3,125	4,843	392
Franklin Elementary School	Double Door - Sides, Top, Sweep, Center	425	Natural Gas	81.0%	1.08	24.00	3,125	4,843	659
Franklin Elementary School	Install Door Jamb Spacer	0	Natural Gas	81.0%	1.08	24.00	3,125	4,843	0
Franklin Elementary School	Single Door - Sides, Sweep	318	Natural Gas	81.0%	1.08	24.00	3,125	4,843	493
Franklin Elementary School	Single Door - Sides, Top, Sweep	538	Natural Gas	81.0%	1.08	24.00	3,125	4,843	834
Washington Elementary School	Double Door - Sides, Sweep, Center□	63	Natural Gas	72.4%	1.08	24.00	2,793	4,843	109
Washington Elementary School	Double Door - Sides, Top, Sweep, Center	116	Natural Gas	72.4%	1.08	24.00	2,793	4,843	201
Washington Elementary School	Single Door - Sides, Sweep	139	Natural Gas	72.4%	1.08	24.00	2,793	4,843	241
Washington Elementary School	Single Door - Sides, Top, Sweep	23	Natural Gas	72.4%	1.08	24.00	2,793	4,843	40
Washington Elementary School	Interior Seal (Type B)	129	Natural Gas	72.4%	1.08	24.00	2,793	4,843	224
Washington Elementary School	Interior Seal (Type A)	2,737	Natural Gas	72.4%	1.08	24.00	2,793	4,843	4,746
Washington Elementary School	Retrofit Meeting Rail Air Barrier	197	Natural Gas	72.4%	1.08	24.00	2,793	4,843	342
Garfield Elementary School	Double Door - Sides, Top, Sweep, Center	77	Natural Gas	72.4%	1.08	24.00	2,793	4,843	134
Garfield Elementary School	Single Door - Sides, Sweep	159	Natural Gas	72.4%	1.08	24.00	2,793	4,843	276
Garfield Elementary School	Single Door - Sides, Top, Sweep	47	Natural Gas	72.4%	1.08	24.00	2,793	4,843	81
Schuyler Elementary School	Double Door - Sides, Sweep, Center	126	Natural Gas	83.0%	1.08	24.00	3,202	4,843	191
Schuyler Elementary School	Double Door - Sides, Top, Sweep, Center	39	Natural Gas	83.0%	1.08	24.00	3,202	4,843	59
Schuyler Elementary School	Single Door - Sides, Sweep	318	Natural Gas	83.0%	1.08	24.00	3,202	4,843	481
Schuyler Elementary School	Interior Seal	1,410	Natural Gas	83.0%	1.08	24.00	3,202	4,843	2,133
Roosevelt Elementary School	Single Door - Sides, Sweep	179	Natural Gas	72.4%	1.08	24.00	2,793	4,843	310
Roosevelt Elementary School	Single Door - Sides, Top, Sweep	23	Natural Gas	72.4%	1.08	24.00	2,793	4,843	40
Administration Building	Single Door - Sides, Top, Sweep	23	Natural Gas	80.0%	1.08	24.00	3,086	4,843	36
Administration Building	Single Door - Sweep	11	Natural Gas	80.0%	1.08	24.00	3,086	4,843	17

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Heat Efficiency Factor

The derivation of the Efficiency Factor is based on sensible heat constant (1.08 * 24 Hours per Day) and an assumed efficiency percentage for the heating plant in the building. The efficiency of the heating plant is captured as a percentage of the total energy output of the heating system.

Calculation is = 1.08 * 24 hours per day = 25.92; in order to get the Efficiency Factor in the denominator and account for system efficiency = 1/ (25.92 / (1,000,000 Btus * **Heating** Plant Efficiency Percent).

Infiltration Heating Savings (therm) = Infiltration Reduction (CFM) * Heating Degree Days (HDD) / Heat Efficiency Factor

Thermal Insulation Savings (therm) = Existing Heat Loss (therm) - Proposed Heat Loss (therm)

Existing Heat Loss (therm) = (Existing U-Value * (Hours/Day * Heating Degree Days (HDD)) * Surface Area (Sqft)) / Heating Efficiency (%) / 100,000 Btu/Therm

Proposed Heat Loss (therm) = (Proposed U-Value * (Hours/Day * Heating Degree Days (HDD)) * Surface Area (Sqft)) / Heating Efficiency (%) / 100,000 Btu/Therm

Building Envelope Savings - Cooling Savings						
BUILDING	TYPE	SUBTYPE	INFILTRATION REDUCTION (CFM)	TOTAL HEAT CONSTANT	INTERIOR DRY BULB TEMP (F)	EXTERIOR DRY BULB TEMP (F)
Kearny High School	Door Weather Stripping	Double Door - Sweep, Center	30	4.5	72.0	75.0
		Double Door - Sides, Top, Sweep, Center	155	4.5	72.0	75.0
		Install Door Jamb Spacer	0	4.5	72.0	75.0
		Single Door - Sides, Sweep	418	4.5	72.0	75.0
		Single Door - Sides, Top, Sweep	70	4.5	72.0	75.0
		Single Door - Sweep	7	4.5	72.0	75.0
	Buck Frame Air Sealing	Seal	41	4.5	72.0	75.0
	Garage Door Weather Stripping	Roll-Up Door Weather Strip - Sides, Top	13	4.5	72.0	75.0
	Roof-Wall Intersection Air Sealing	Seal	107	4.5	72.0	75.0
	Wall Air Sealing	Block, Seal Firestop	159	4.5	72.0	75.0
Lincoln Middle School	Door Weather Stripping	Double Door - Sides, Sweep, Center	316	4.5	72.0	75.0
		Double Door - Sides, Top, Sweep, Center	39	4.5	72.0	75.0
		Double Door - Sweep, Center	46	4.5	72.0	75.0
		Single Door - Sides, Sweep	99	4.5	72.0	75.0
	Roof-Wall Intersection Air Sealing	Block, Seal	211	4.5	72.0	75.0
		Seal	115	4.5	72.0	75.0
		Seal Exposed	18	4.5	72.0	75.0
	Buck Frame Air Sealing	Seal	12	4.5	72.0	75.0
Franklin Elementary School	Door Weather Stripping	Double Door - Sides, Sweep, Center	253	4.5	72.0	75.0
		Double Door - Sides, Top, Sweep, Center	425	4.5	72.0	75.0
		Install Door Jamb Spacer	0	4.5	72.0	75.0
		Single Door - Sides, Sweep	318	4.5	72.0	75.0
		Single Door - Sides, Top, Sweep	538	4.5	72.0	75.0
Washington Elementary School	Door Weather Stripping	Double Door - Sides, Sweep, Center	63	4.5	72.0	75.0
		Double Door - Sides, Top, Sweep, Center	116	4.5	72.0	75.0
		Single Door - Sides, Sweep	139	4.5	72.0	75.0
		Single Door - Sides, Top, Sweep	23	4.5	72.0	75.0
	Caulking	Interior Seal (Type B)	129	4.5	72.0	75.0
		Interior Seal (Type A)	2,737	4.5	72.0	75.0
	AC Unit Weatherization	Retrofit Meeting Rail Air Barrier	197	4.5	72.0	75.0
Garfield Elementary School	Door Weather Stripping	Double Door - Sides, Top, Sweep, Center	77	4.5	72.0	75.0
		Single Door - Sides, Sweep	159	4.5	72.0	75.0
		Single Door - Sides, Top, Sweep	47	4.5	72.0	75.0
Schuyler Elementary School	Door Weather Stripping	Double Door - Sides, Sweep, Center	126	4.5	72.0	75.0
		Double Door - Sides, Top, Sweep, Center	39	4.5	72.0	75.0
		Single Door - Sides, Sweep	318	4.5	72.0	75.0
	Caulking	Interior Seal	1,410	4.5	72.0	75.0
Roosevelt Elementary School	Door Weather Stripping	Single Door - Sides, Sweep	179	4.5	72.0	75.0
		Single Door - Sides, Top, Sweep	23	4.5	72.0	75.0
Administration Building	Door Weather Stripping	Single Door - Sides, Top, Sweep	23	4.5	72.0	75.0
		Single Door - Sweep	11	4.5	72.0	75.0

Building Envelope Savings - Cooling Savings								
BUILDING	TYPE	SUBTYPE	INTERIOR DRY RELATIVE HUMIDITY (%)	EXTERIOR RELATIVE HUMIDITY (%)	INTERIOR ENTHALPY (SUMMER)	EXTERIOR ENTHALPY (SUMMER)	ENTHALPY DIFFERENCE	TONS OF COOLING SAVED
Kearny High School	Door Weather Stripping	Double Door - Sweep, Center	40.0	75.0	24.55	33.27	8.72	0.10
		Double Door - Sides, Top, Sweep, Center	40.0	75.0	24.55	33.27	8.72	0.51
		Install Door Jamb Spacer	40.0	75.0	24.55	33.27	8.72	0.00
		Single Door - Sides, Sweep	40.0	75.0	24.55	33.27	8.72	1.37
		Single Door - Sides, Top, Sweep	40.0	75.0	24.55	33.27	8.72	0.23
		Single Door - Sweep	40.0	75.0	24.55	33.27	8.72	0.02
	Buck Frame Air Sealing	Seal	40.0	75.0	24.55	33.27	8.72	0.13
	Garage Door Weather Stripping	Roll-Up Door Weather Strip - Sides, Top	40.0	75.0	24.55	33.27	8.72	0.04
	Roof-Wall Intersection Air Sealing	Seal	40.0	75.0	24.55	33.27	8.72	0.35
	Wall Air Sealing	Block, Seal Firestop	40.0	75.0	24.55	33.27	8.72	0.52
Lincoln Middle School	Door Weather Stripping	Double Door - Sides, Sweep, Center	40.0	75.0	24.55	33.27	8.72	1.03
		Double Door - Sides, Top, Sweep, Center	40.0	75.0	24.55	33.27	8.72	0.13
		Double Door - Sweep, Center	40.0	75.0	24.55	33.27	8.72	0.15
		Single Door - Sides, Sweep	40.0	75.0	24.55	33.27	8.72	0.32
	Roof-Wall Intersection Air Sealing	Block, Seal	40.0	75.0	24.55	33.27	8.72	0.69
		Seal	40.0	75.0	24.55	33.27	8.72	0.38
		Seal Exposed	40.0	75.0	24.55	33.27	8.72	0.06
	Buck Frame Air Sealing	Seal	40.0	75.0	24.55	33.27	8.72	0.04
Franklin Elementary School	Door Weather Stripping	Double Door - Sides, Sweep, Center□	40.0	75.0	24.55	33.27	8.72	0.83
		Double Door - Sides, Top, Sweep, Center	40.0	75.0	24.55	33.27	8.72	1.39
		Install Door Jamb Spacer	40.0	75.0	24.55	33.27	8.72	0.00
		Single Door - Sides, Sweep	40.0	75.0	24.55	33.27	8.72	1.04
		Single Door - Sides, Top, Sweep	40.0	75.0	24.55	33.27	8.72	1.76
Washington Elementary School	Door Weather Stripping	Double Door - Sides, Sweep, Center□	40.0	75.0	24.55	33.27	8.72	0.21
		Double Door - Sides, Top, Sweep, Center	40.0	75.0	24.55	33.27	8.72	0.38
		Single Door - Sides, Sweep	40.0	75.0	24.55	33.27	8.72	0.45
		Single Door - Sides, Top, Sweep	40.0	75.0	24.55	33.27	8.72	0.08
	Caulking	Interior Seal (Type B)	40.0	75.0	24.55	33.27	8.72	0.42
		Interior Seal (Type A)	40.0	75.0	24.55	33.27	8.72	8.95
	AC Unit Weatherization	Retrofit Meeting Rail Air Barrier	40.0	75.0	24.55	33.27	8.72	0.64
Garfield Elementary School	Door Weather Stripping	Double Door - Sides, Top, Sweep, Center	40.0	75.0	24.55	33.27	8.72	0.25
		Single Door - Sides, Sweep	40.0	75.0	24.55	33.27	8.72	0.52
		Single Door - Sides, Top, Sweep	40.0	75.0	24.55	33.27	8.72	0.15
Schuyler Elementary School	Door Weather Stripping	Double Door - Sides, Sweep, Center	40.0	75.0	24.55	33.27	8.72	0.41
		Double Door - Sides, Top, Sweep, Center	40.0	75.0	24.55	33.27	8.72	0.13
		Single Door - Sides, Sweep	40.0	75.0	24.55	33.27	8.72	1.04
	Caulking	Interior Seal	40.0	75.0	24.55	33.27	8.72	4.61
Roosevelt Elementary School	Door Weather Stripping	Single Door - Sides, Sweep	40.0	75.0	24.55	33.27	8.72	0.59
		Single Door - Sides, Top, Sweep	40.0	75.0	24.55	33.27	8.72	0.08
Administration Building	Door Weather Stripping	Single Door - Sides, Top, Sweep	40.0	75.0	24.55	33.27	8.72	0.08
		Single Door - Sweep	40.0	75.0	24.55	33.27	8.72	0.04

Enthalpy
Based on Interior Relative Humidity of 40% and temperature of 72 degrees F = 24.55 btu/lb. Exterior Enthalpy based on outside relative humidity estimate of 75% and the below NOAA summer temperature data.

Building Envelope Savings - Cooling Savings

BUILDING	TYPE	SUBTYPE	EFFICIENCY (kW/TON)	EFFICIENCY (COP)	COOLING HOURS	INFILTRATION ELECTRIC SAVINGS (kWh)	INFILTRATION GAS SAVINGS (Therms)
Kearny High School	Door Weather Stripping	Double Door - Sweep, Center	1.212		1,220	145	
		Double Door - Sides, Top, Sweep, Center	1.212		1,220	749	
		Install Door Jamb Spacer	1.212		1,220	0	
		Single Door - Sides, Sweep	1.212		1,220	2,021	
		Single Door - Sides, Top, Sweep	1.212		1,220	338	
		Single Door - Sweep	1.212		1,220	34	
	Buck Frame Air Sealing	Seal	1.212		1,220	198	
	Garage Door Weather Stripping	Roll-Up Door Weather Strip - Sides, Top	1.212		1,220	63	
	Roof-Wall Intersection Air Sealing	Seal	1.212		1,220	517	
	Wall Air Sealing	Block, Seal Firestop	1.212		1,220	769	
Lincoln Middle School	Door Weather Stripping	Double Door - Sides, Sweep, Center		0.849	1,220		178
		Double Door - Sides, Top, Sweep, Center		0.849	1,220		22
		Double Door - Sweep, Center		0.849	1,220		26
		Single Door - Sides, Sweep		0.849	1,220		56
	Roof-Wall Intersection Air Sealing	Block, Seal		0.849	1,220		119
		Seal		0.849	1,220		65
		Seal Exposed		0.849	1,220		10
	Buck Frame Air Sealing	Seal		0.849	1,220		7
Franklin Elementary School	Door Weather Stripping	Double Door - Sides, Sweep, Center	1.00		1,220	1,009	
		Double Door - Sides, Top, Sweep, Center	1.00		1,220	1,695	
		Install Door Jamb Spacer	1.00		1,220	0	
		Single Door - Sides, Sweep	1.00		1,220	1,268	
		Single Door - Sides, Top, Sweep	1.00		1,220	2,146	
Washington Elementary School	Door Weather Stripping	Double Door - Sides, Sweep, Center	1.00		1,220	251	
		Double Door - Sides, Top, Sweep, Center	1.00		1,220	463	
		Single Door - Sides, Sweep	1.00		1,220	554	
		Single Door - Sides, Top, Sweep	1.00		1,220	92	
	Caulking	Interior Seal (Type B)	1.00		1,220	515	
		Interior Seal (Type A)	1.00		1,220	10,917	
	AC Unit Weatherization	Retrofit Meeting Rail Air Barrier	1.00		1,220	786	
Garfield Elementary School	Door Weather Stripping	Double Door - Sides, Top, Sweep, Center	1.00		1,220	307	
		Single Door - Sides, Sweep	1.00		1,220	634	
		Single Door - Sides, Top, Sweep	1.00		1,220	187	
Schuyler Elementary School	Door Weather Stripping	Double Door - Sides, Sweep, Center	1.00		1,220	503	
		Double Door - Sides, Top, Sweep, Center	1.00		1,220	156	
		Single Door - Sides, Sweep	1.00		1,220	1,268	
	Caulking	Interior Seal	1.00		1,220	5,624	
Roosevelt Elementary School	Door Weather Stripping	Single Door - Sides, Sweep	1.00		1,220	714	
		Single Door - Sides, Top, Sweep	1.00		1,220	92	
Administration Building	Door Weather Stripping	Single Door - Sides, Top, Sweep	1.00		1,220	92	
		Single Door - Sweep	1.00		1,220	44	

Infiltration Cooling Savings (kWh) = Tons * Efficiency (kW/ton) *Cooling Degree Days (CDD)*12000 btu/hr *0.000293071

Tons = Inflitration Reduction (CFM) * Total Heat Constant * Enthalpy / 12,0000 Btu/hr

Insulation Savings (kWh) = Existing Cooling Loss (kWh) - Proposed Cooling Loss (kWh)

Existing Cooling Loss (kWh) = (Existing U-Value) * (Hours/Day) * (Cooling Degree Days (CDD)) * (Surface Area (Sqft)) * (Cooling Efficiency (kWh/ton-hr)) * (1 Ton-hr/12,000 Btu)

Proposed Cooling Loss (kWh) = (Proposed U-Value) * (Hours/Day) * (Cooling Degree Days (CDD)) * (Surface Area (Sqft)) * (Cooling Efficiency (kWh/ton-hr)) * (1 Ton-hr/12,000 Btu)

ECM 11 – High Efficiency Transformers

KEARNY BOE

✔	ECM evaluated but not included
✔	ECM included in the project

ECM #	ECM DESCRIPTION	Kearny High School	Lincoln Middle School	Franklin Elementary School	Washington Elementary School	Garfield Elementary School	Schuyler Elementary School	Roosevelt Elementary School	Administration Building
11	High Efficiency Transformers	✔	✔						

The primary goal of this ECM is increased energy savings through replacement of old, inefficient transformers with new, ultra-high efficiency transformers. While facilities are unique, electrical infrastructure is almost always based on U.S. industry standard transformers. Transformers are typically purchased as part of a total electrical distribution package, installed, and forgotten for 40-50 years. Most of these transformers are operating at a small fraction of their nameplate capacity, resulting in very low efficiency, and are producing large amounts of excess heat, resulting in energy losses and higher utility costs.

High-efficiency Transformer

Scope of Work

Existing transformers within the facilities will retrofit with high efficiency transformers.

High Efficiency Transformer Estimate				
BUILDING	SQFT	CATEGORY	KVA	QUANTITY
Kearny High School	305,491	PowerSmith E-Saver-80R	750	1
		PowerSmith E-Saver-80R	30	1
Lincoln Middle School	101,000	PowerSmith E-Saver-80R	225.0	1

ECM Calculations

Savings estimates are derived from actively measured load profiles and losses for low voltage transformer retrofits in k-12 applications. Specified transformers are optimized for light loads feeding electronic equipment and average an 80% reduction in losses. Fuel savings associated with transformer replacement is calculated accepted best practices:

BUILDING NAME	Location ID or Room #	Proposed Powersmiths OPAL	Baseline kVA	Replacement kVA	Replace
Kearny High School	Switch Gear	E-Saver-80R	750	750	1
Kearny High School	Pnl EMRP	E-Saver-80R	30	30	1
Lincoln Middle School	Switch Gear	E-Saver-80R	225	225	1

BUILDING NAME	Adjustments					
	Bseline % Load During Normal Operating Hours	Baseline % Load Outside Operating Hours	Powersmiths % Load During Normal Operating Hours	Powersmiths % Load Outside Operating Hours	Equipment Operating hrs/ day	Equipment Operating days/yr
Kearny High School	9.6%	2.0%	9.6%	2.0%	13	185
Kearny High School	19.3%	14.0%	19.3%	14.0%	13	185
Lincoln Middle School	7.6%	3.0%	7.6%	3.0%	12	185

BUILDING NAME	Baseline Transformer Losses		
	Baseline Transformer kW Losses (Normal Operation)	Baseline Transformer kW Losses (Outside Op. hrs)	Baseline Annual kWh Losses from Transformers
Kearny High School	3.940	3.835	33,847
Kearny High School	0.505	0.487	4,313
Lincoln Middle School	1.897	1.867	16,419

BUILDING NAME	Powersmiths Transformer Losses		
	Powersmiths Transformer kW Losses (Normal Operation)	Powersmiths Transformer kW Losses (Outside Op. hrs)	Powersmiths Annual kWh Losses from Transformers
Kearny High School	0.868	0.774	7,007
Kearny High School	0.104	0.082	772
Lincoln Middle School	0.342	0.323	2,869

BUILDING NAME	Annual Savings	
	Total kW Reduction During Normal Op. Hrs. (Peak)	Total kWh Savings
Kearny High School	3.07	26,839
Kearny High School	0.40	3,540
Lincoln Middle School	1.55	13,550

Transformer Loading:

kVA	ON % Loading	OFF % Loading
9	13.2%	8.0%
10	14.5%	9.0%
15	13.2%	8.0%
20	14.5%	9.0%
25	10.2%	5.0%
30	19.3%	14.0%
37.5	3.2%	1.0%
45	9.7%	4.0%
50	8.6%	4.0%
63	10.2%	5.0%
75	0.2%	0.2%
100	28.8%	20.0%
112.5	2.4%	1.0%
150	3.3%	1.0%
167	10.5%	5.0%
225	7.6%	3.0%
300	9.6%	5.0%
500	7.6%	2.0%
750	9.6%	2.0%

Transformer Losses:

Baseline		
kVA	No Load Losses (W)	Full Load Losses (W)
9	249	1072
10	261	1072
15	313	1182
20	451	1275
25	398	1369
30	468	1462
37.5	550	1832
45	641	2202
50	567	2393
63	1553	2889
75	867	3347
100	782	3963
112.5	1200	4271
125	1306	4695
150	1517	5544
167	1472	6121
200	1746	7240
225	1861	8088
250	2088	8256
300	2541	8592
400	2827	10194
500	3466	11796
750	3830	15800

E-Saver-80R		
Aluminum, K-7, 130C Rise		
kVA	No Load Losses (W)	Full Load Losses (W)
10	34	434
15	35	775
20	48	1157
25	57	674
30	57	1332
37.5	65	1025
45	78	1725
50	79	1309
63	100	2130
75	111	2537
100	125	2227
112.5	164	3313
125	186	3470
150	203	3945
167	167	4010
200	288	4462
225	319	4317
250	356	4853
300	371	6229
400	465	7324
500	558	8419
750	770	11377

ECM 12 – Water Conservation

KEARNY BOE

✔ ECM evaluated but not included
✔ ECM included in the project

ECM #	ECM DESCRIPTION	Kearny High School	Lincoln Middle School	Franklin Elementary School	Washington Elementary School	Garfield Elementary School	Schuyler Elementary School	Roosevelt Elementary School	Administration Building
12	Water Conservation	✔	✔	✔	✔	✔	✔	✔	✔

It takes a considerable amount of energy to deliver and treat the water you use every day. For example, letting your faucet run for five minutes uses about as much energy as letting a 60-watt light bulb run for 22 hours. Pump and water heating energy is required to deliver hot water to the end user. Installing new fixtures and aerators can conserve substantial energy while reducing water consumption as well.

New low flow fixtures are rated at 0.5 gallons per minute and can be fitted with time based automatic shut-offs.

Fixture with aerator

Scope of Work

Existing faucets within the facilities will retrofit with high efficiency aerators.

Low Flow Aerator Scope				
BUILDING	**SQFT**	**CATEGORY**	**NOTES**	**QUANTITY**
Kearny High School	305,491	64 faucet aerators	H2O Applied Technologies	1
		P&P Bond		1
Lincoln Middle School	101,000	41 faucet aerators	H2O Applied Technologies	1
		P&P Bond		1
Franklin Elementary School	114,854	78 bathroom sinks	FSG - DI Total Cost	
		9 kitchen sinks	Rebate %	55.5%
			Client Cost	1
Washington Elementary School	86,220	21 bathroom sinks	FSG - DI Total Cost	
			Rebate %	40.1%
			Client Cost	1
Garfield Elementary School	60,095	9 bathroom sinks	FSG - DI Total Cost	
			Rebate %	41.7%
			Client Cost	1
Schuyler Elementary School	54,880	8 bathroom sinks	FSG - DI Total Cost	
		8 kitchen sinks	Rebate %	36.4%
			Client Cost	1
Roosevelt Elementary School	43,385	8 bathroom sinks	FSG - DI Total Cost	
		1 kitchen sink	Rebate %	29.3%
			Client Cost	1
Administration Building	12,000	6 bathroom sinks	FSG - DI Total Cost	
			Rebate %	26.3%
			Client Cost	1

ECM Calculations

Fuel savings associated with water conservation from faucet aerators is calculated using NJ BPU Protocols:

Water Conservation Fuel Savings										
BUILDING NAME		Public Restroom Faucets								
	DHW Type	Number of Fixtures	Existing (GPM)	Proposed (GPM)	Duration (Min)	Days per year	dT (F)	EFF	Electric Savings (kWh)	Fuel Savings (Therms)
Kearny High School	Natural Gas	64	2.2	0.5	30.0	260	27.40	80%	0	2,421
Lincoln Middle School	Natural Gas	41	2.2	0.5	30.0	260	27.40	80%	0	1,551
Franklin Elementary School	Natural Gas	78	2.2	0.5	30.0	260	27.40	80%	0	2,951
Washington Elementary School	Natural Gas	21	2.2	0.5	30.0	260	27.40	80%	0	794
Garfield Elementary School	Natural Gas	9	2.2	0.5	30.0	260	27.40	80%	0	340
Schuyler Elementary School	Natural Gas	8	2.2	0.5	30.0	260	27.40	80%	0	303
Roosevelt Elementary School	Natural Gas	8	2.2	0.5	30.0	260	27.40	80%	0	303
Administration Building	Natural Gas	6	2.2	0.5	30.0	260	27.40	80%	0	227

Water Conservation Fuel Savings										
BUILDING NAME		Kitchen Faucets								
	DHW Type	Number of Fixtures	Existing (GPM)	Proposed (GPM)	Duration (Min)	Days per year	dT (F)	% HW	Electric Savings (kWh)	Fuel Savings (Therms)
Kearny High School	Natural Gas		2.2	1.5	30.00	260.00	27.40	80%	0	0
Lincoln Middle School	Natural Gas		2.2	1.5	30.00	260.00	27.40	80%	0	0
Franklin Elementary School	Natural Gas	9	2.2	1.5	30.00	260.00	27.40	80%	0	140
Washington Elementary School	Natural Gas		2.2	1.5	30.00	260.00	27.40	80%	0	0
Garfield Elementary School	Natural Gas		2.2	1.5	30.00	260.00	27.40	80%	0	0
Schuyler Elementary School	Natural Gas	8	2.2	1.5	30.00	260.00	27.40	80%	0	125
Roosevelt Elementary School	Natural Gas	1	2.2	1.5	30.00	260.00	27.40	80%	0	16
Administration Building	Natural Gas		2.2	1.5	30.00	260.00	27.40	80%	0	0

Water Conservation Fuel Savings				
BUILDING NAME		Total Savings		
	DHW Type	Total Aerators	Total Electrtic Savings (kWh)	Total Fuel Savings (Therms)
Kearny High School	Natural Gas	64	0	2,421
Lincoln Middle School	Natural Gas	41	0	1,551
Franklin Elementary School	Natural Gas	87	0	3,091
Washington Elementary School	Natural Gas	21	0	794
Garfield Elementary School	Natural Gas	9	0	340
Schuyler Elementary School	Natural Gas	16	0	427
Roosevelt Elementary School	Natural Gas	9	0	318
Administration Building	Natural Gas	6	0	227

2021 NJ BPU Protocols:

Low Flow Faucet Aerators and Showerheads

Algorithm

Therm or kWh Fuel Savings/yr = N * M * D * (F_b – F_q) * (8.33 * DT / EFF)/ C

Definition of Variables

N = Number of fixtures

M = Minutes per day of device usage

D = Days per year of device usage

F_b = Baseline device flow rate (gal/m)

F_q = Low flow device flow rate (gal/m)

8.33 = Heat content of water (Btu/gal/°F)

DT = Difference in temperature (°F) between cold intake and output

EFF = Efficiency of water heating equipment

C = Conversion factor from Btu to therms or kWh = (100,000 for gas water heating (Therms), 3,413 for electric water heating (kWh)

Summary of Inputs

Low Flow Faucet Aerators and Showerheads

Component	Type	Value	Source
N	Variable		Application
M	Fixed	Aerators 30 minutes	1
		Shower heads 20 minutes	
D	Fixed	Aerators 260 days	1
		Shower heads 365 days	
F_b	Fixed	Aerators 2.2 gpm	
		Showerhead 2.5 gpm	
F_q	Fixed	Aerators <=1.5 gpm (kitchen) <=0.5 gpm (public restroom) <=1.5 gpm (private restroom)	2,3,4
		Showerheads <=2 gpm	4
DT	Fixed	Aerators 27.4°F	5
		Showerheads 44.4°F	6
EFF	Fixed	98% electric 80% natural gas	7,8

Water Conservation Savings

BUILDING NAME	Water Usage (Gal/Yr) Existing	Saving per aerator (gal)	Aerators Installed	Water Savings (gal)
Kearny High School	2,822,204	4,359	64	279,000
Lincoln Middle School	2,265,692	3,732	41	153,000
Franklin Elementary School	1,963,500	750	87	65,250
Washington Elementary School	1,098,064	3,500	21	73,500
Garfield Elementary School	2,298,452	3,500	9	31,500
Schuyler Elementary School	323,884	3,000	16	48,000
Roosevelt Elementary School	597,652	3,500	9	31,500
Administration Building	46,376	2,000	6	12,000

ECM 13 – Plug Load Controls

KEARNY BOE		Kearny High School	Lincoln Middle School	Franklin Elementary School	Washington Elementary School	Garfield Elementary School	Schuyler Elementary School	Roosevelt Elementary School	Administration Building
✔ ECM evaluated but not included									
✔ ECM included in the project									
ECM #	ECM DESCRIPTION								
13	Plug Load Controls	✔	✔	✔	✔	✔	✔	✔	✔

Plug loads are often used for a small portion of the day. Left unmanaged, these loads can add a significant usage and cost to a buildings electric load. Plug load controls utilize specialty sockets from BERT that have software to track real-time usage of your appliances. The software also allows the user to use a web browser to view this usage and automatically turn on/off all appliances plugged into these outlets.

Scope of Work

Existing wall plugs within the facilities will be retrofit with specialty controllable wall plugs.

Plug Load Controller Estimate				
BUILDING	SQFT	CATEGORY	NOTES	QUANTITY
Kearny High School	305,491	Bert 110X	Network Verification Units	1
		Bert 110X		105
		Extended Maintenance	3 years extended software maintenance	105
		Bert Threshold Vend Software	Threshold Vend Software License Fee	68
		Extended Maint.	3 years extended software maintenance	68
		Bert Harness	Bert Harness	11
		Installation	Install Bert Harness - assumes no prevailing wage	11
		Device Sticker		105
		Instructions		105
		Set up	Preload SSID and Passphrase - plug in	105
		Set up	Preload SSID and Passphrase - inline	105
		Program	Name, Group and Schedule Berts	105
		Test	Verify Network Communication and Final Test	105
		Training	Remote Software Training/Customer Signoff	1
		Installation	Install Berts and record MAC Address - plug in units only. Assumes no prevailing wage	105
		Travel	Travel expenses	1
		Shipping charges	FedEx Ground	1
Lincoln Middle School	101,000	Bert 110X	Network Verification Units	1
		Bert 110X		55
		Extended Maintenance	3 years extended software maintenance	55
		Bert Threshold Vend Software	Threshold Vend Software License Fee	41
		Extended Maint.	3 years extended software maintenance	41
		Bert 2401 Inline		0
		Extended Maintenance	3 years extended software maintenance	0
		Device Sticker		55
		Instructions		55
		Set up	Preload SSID and Passphrase - plug in	55
		Set up	Preload SSID and Passphrase - inline	0
		Program	Name, Group and Schedule Berts	55
		Test	Verify Network Communication and Final Test	55
		Training	Remote Software Training/Customer Signoff	0
		Installation	Install Berts and record MAC Address - plug in units only. Assumes no prevailing wage	55
		Travel	Travel expenses	0
		Shipping charges	FedEx Ground	0

Plug Load Controller Estimate				
BUILDING	SQFT	CATEGORY	NOTES	QUANTITY
Franklin Elementary School	114,854	Bert 110X	Network Verification Units	0
		Bert 110X		65
		Extended Maintenance	3 years extended software maintenance	65
		Bert Threshold Vend Software	Threshold Vend Software License Fee	55
		Extended Maint.	3 years extended software maintenance	55
		Bert 2401 Inline		21
		Extended Maintenance	3 years extended software maintenance	21
		Device Sticker		65
		Instructions		86
		Set up	Preload SSID and Passphrase - plug in	65
		Set up	Preload SSID and Passphrase - inline	21
		Program	Name, Group and Schedule Berts	86
		Test	Verify Network Communication and Final Test	86
		Training	Remote Software Training/Customer Signoff	0
		Installation	Install Berts and record MAC Address - plug in units only. Assumes no prevailing wage	65
		Travel	Travel expenses	0
		Shipping charges	FedEx Ground	0
Washington Elementary School	86,220	Bert 110X	Network Verification Units	0
		Bert 110X		40
		Extended Maintenance	3 years extended software maintenance	40
		Bert Threshold Vend Software	Threshold Vend Software License Fee	25
		Extended Maint.	3 years extended software maintenance	25
		Bert 2401 Inline		0
		Extended Maintenance	3 years extended software maintenance	0
		Device Sticker		40
		Instructions		40
		Set up	Preload SSID and Passphrase - plug in	40
		Set up	Preload SSID and Passphrase - inline	0
		Program	Name, Group and Schedule Berts	40
		Test	Verify Network Communication and Final Test	40
		Training	Remote Software Training/Customer Signoff	0
		Installation	Install Berts and record MAC Address - plug in units only. Assumes no prevailing wage	40
		Travel	Travel expenses	0
		Shipping charges	FedEx Ground	0

Plug Load Controller Estimate				
BUILDING	**SQFT**	**CATEGORY**	**NOTES**	**QUANTITY**
Garfield Elementary School	60,095	Bert 110X	Network Verification Units	0
		Bert 110X		32
		Extended Maintenance	3 years extended software maintenance	32
		Bert Threshold Vend Software	Threshold Vend Software License Fee	21
		Extended Maint.	3 years extended software maintenance	21
		Bert 2401 Inline		0
		Extended Maintenance	3 years extended software maintenance	0
		Device Sticker		32
		Instructions		32
		Set up	Preload SSID and Passphrase - plug in	32
		Set up	Preload SSID and Passphrase - inline	0
		Program	Name, Group and Schedule Berts	32
		Test	Verify Network Communication and Final Test	32
		Training	Remote Software Training/Customer Signoff	0
		Installation	Install Berts and re-card MAC Address - plug in units only. Assumes no prevailing wage	32
		Travel	Travel expenses	0
		Shipping charges	FedEx Ground	0
Schuyler Elementary School	54,880	Bert 110X	Network Verification Units	0
		Bert 110X		39
		Extended Maintenance	3 years extended software maintenance	39
		Bert Threshold Vend Software	Threshold Vend Software License Fee	26
		Extended Maint.	3 years extended software maintenance	26
		Bert 2401 Inline		0
		Extended Maintenance	3 years extended software maintenance	0
		Device Sticker		39
		Instructions		39
		Set up	Preload SSID and Passphrase - plug in	39
		Set up	Preload SSID and Passphrase - inline	0
		Program	Name, Group and Schedule Berts	39
		Test	Verify Network Communication and Final Test	39
		Training	Remote Software Training/Customer Signoff	0
		Installation	Install Berts and re-card MAC Address - plug in units only. Assumes no prevailing wage	39
		Travel	Travel expenses	0
		Shipping charges	FedEx Ground	0

Plug Load Controller Estimate				
BUILDING	**SQFT**	**CATEGORY**	**NOTES**	**QUANTITY**
Roosevelt Elementary School	43,385	Bert 110X	Network Verification Units	0
		Bert 110X		26
		Extended Maintenance	3 years extended software maintenance	26
		Bert Threshold Vend Software	Threshold Vend Software License Fee	20
		Extended Maint.	3 years extended software maintenance	20
		Bert 2401 Inline		19
		Extended Maintenance	3 years extended software maintenance	19
		Device Sticker		26
		Instructions		45
		Set up	Preload SSID and Passphrase - plug in	26
		Set up	Preload SSID and Passphrase - inline	19
		Program	Name, Group and Schedule Berts	45
		Test	Verify Network Communication and Final Test	45
		Training	Remote Software Training/Customer Signoff	0
		Installation	Install Berts and re-card MAC Address - plug in units only. Assumes no prevailing wage	26
		Travel	Travel expenses	0
		Shipping charges	FedEx Ground	0
Administration Building	12,000	Bert 110X	Network Verification Units	0
		Bert 110X		15
		Extended Maintenance	3 years extended software maintenance	15
		Bert Threshold Vend Software	Threshold Vend Software License Fee	2
		Extended Maint.	3 years extended software maintenance	2
		Bert 2401 Inline		0
		Extended Maintenance	3 years extended software maintenance	0
		Device Sticker		15
		Instructions		15
		Set up	Preload SSID and Passphrase - plug in	15
		Set up	Preload SSID and Passphrase - inline	0
		Program	Name, Group and Schedule Berts	15
		Test	Verify Network Communication and Final Test	15
		Training	Remote Software Training/Customer Signoff	0
		Installation	Install Berts and re-card MAC Address - plug in units only. Assumes no prevailing wage	15
		Travel	Travel expenses	0
		Shipping charges	FedEx Ground	0

ECM Calculations

Energy savings are calculated by multiplying the equipment Standby Power Draw (W) by the number of hours the plug load will shut the equipment off completely:

Plug Load Controller Savings								
BUILDING NAME	Device Type	Plug Load Type	Quantity	Standby Power Draw (W)	Controller Hours Scheduled ON per Year	Controller Hours Scheduled OFF per Year	Annual Energy Savings (kWh)	Total Annual Energy Savings (kWh)
Kearny High School	Projector	Bert 110X	18	8	2,405	6,355	915	11,433
Kearny High School	Smartboard TV	Bert 110X	9	8	2,405	6,355	458	
Kearny High School	Projector/Smartboard	Bert 110X	41	10	2,405	6,355	2,606	
Kearny High School	Charging Cart	Bert 110X	1	37	2,405	6,355	235	
Kearny High School	Printer	Bert 110X	25	15	2,405	6,355	2,383	
Kearny High School	TV	Bert 110X	2	6	2,405	6,355	76	
Kearny High School	Soda Vending	Bert 110X	2	320	2,405	6,355	4,067	
Kearny High School	H/C Water Disp.	Bert 110X	1	61	2,405	6,355	388	
Kearny High School	AC - 110V (15A)	Bert 110X	6	8	2,405	6,355	305	
Lincoln Middle School	Projector	Bert 110X	12	8	2,220	6,540	628	4,244
Lincoln Middle School	Smartboard TV	Bert 110X	8	8	2,220	6,540	419	
Lincoln Middle School	Projector/Smartboard	Bert 110X	21	10	2,220	6,540	1,373	
Lincoln Middle School	Charging Cart	Bert 110X	2	37	2,220	6,540	484	
Lincoln Middle School	Printer	Bert 110X	11	15	2,220	6,540	1,079	
Lincoln Middle School	Large Copy Machine	Bert 110X	1	40	2,220	6,540	262	
Franklin Elementary School	Projector	Bert 110X	14	8	2,035	6,725	753	6,315
Franklin Elementary School	Smartboard TV	Bert 110X	1	8	2,035	6,725	54	
Franklin Elementary School	Projector/Smartboard	Bert 110X	40	10	2,035	6,725	2,690	
Franklin Elementary School	Charging Cart	Bert 110X	2	37	2,035	6,725	498	
Franklin Elementary School	Printer	Bert 110X	4	15	2,035	6,725	404	
Franklin Elementary School	Large Copy Machine	Bert 110X	1	40	2,035	6,725	269	
Franklin Elementary School	H/C Water Disp.	Bert 110X	1	61	2,035	6,725	410	
Franklin Elementary School	AC - 110V (15A)	Bert 110X	2	8	2,035	6,725	108	
Franklin Elementary School	AC - 110V (20A)	Bert 240I Inline	21	8	2,035	6,725	1,130	
Washington Elementary School	Projector	Bert 110X	19	8	2,035	6,725	1,022	2,979
Washington Elementary School	Projector/Smartboard	Bert 110X	6	10	2,035	6,725	404	
Washington Elementary School	Charging Cart	Bert 110X	2	37	2,035	6,725	498	
Washington Elementary School	Printer	Bert 110X	3	15	2,035	6,725	303	
Washington Elementary School	Large Copy Machine	Bert 110X	1	40	2,035	6,725	269	
Washington Elementary School	AC - 110V (15A)	Bert 110X	9	8	2,035	6,725	484	
Garfield Elementary School	Projector	Bert 110X	13	8	2,035	6,725	699	2,905
Garfield Elementary School	Smartboard TV	Bert 110X	3	8	2,035	6,725	161	
Garfield Elementary School	Projector/Smartboard	Bert 110X	5	10	2,035	6,725	336	
Garfield Elementary School	Printer	Bert 110X	6	15	2,035	6,725	605	
Garfield Elementary School	Large Copy Machine	Bert 110X	1	40	2,035	6,725	269	
Garfield Elementary School	AC - 110V (15A)	Bert 110X	3	8	2,035	6,725	161	
Garfield Elementary School	Exhaust Fan - 110V	Bert 110X	1	100	2,035	6,725	673	
Schuyler Elementary School	Projector	Bert 110X	19	8	2,035	6,725	1,022	3,262
Schuyler Elementary School	Smartboard TV	Bert 110X	1	8	2,035	6,725	54	
Schuyler Elementary School	Projector/Smartboard	Bert 110X	6	10	2,035	6,725	404	
Schuyler Elementary School	Charging Cart	Bert 110X	3	37	2,035	6,725	746	
Schuyler Elementary School	Printer	Bert 110X	6	15	2,035	6,725	605	
Schuyler Elementary School	Large Copy Machine	Bert 110X	1	40	2,035	6,725	269	
Schuyler Elementary School	AC - 110V (15A)	Bert 110X	3	8	2,035	6,725	161	
Roosevelt Elementary School	Projector	Bert 110X	14	8	2,035	6,725	753	4,822
Roosevelt Elementary School	Smartboard TV	Bert 110X	1	8	2,035	6,725	54	
Roosevelt Elementary School	Projector/Smartboard	Bert 110X	5	10	2,035	6,725	336	
Roosevelt Elementary School	Printer	Bert 110X	5	15	2,035	6,725	504	
Roosevelt Elementary School	Soda Vending	Bert 110X	1	320	2,035	6,725	2,152	
Roosevelt Elementary School	AC - 110V (20A)	Bert 240I Inline	19	8	2,035	6,725	1,022	
Administration Building	Projector/Smartboard	Bert 110X	2	10	3,120	5,640	113	2,019
Administration Building	Charging Cart	Bert 110X	1	37	3,120	5,640	209	
Administration Building	Printer	Bert 110X	8	15	3,120	5,640	677	
Administration Building	Large Copy Machine	Bert 110X	3	40	3,120	5,640	677	
Administration Building	H/C Water Disp.	Bert 110X	1	61	3,120	5,640	344	

ECM 14 – Combined Heat & Power

KEARNY BOE

✔ ECM evaluated but not included

✔ ECM included in the project

ECM #	ECM DESCRIPTION	Kearny High School	Lincoln Middle School	Franklin Elementary School	Washington Elementary School	Garfield Elementary School	Schuyler Elementary School	Roosevelt Elementary School	Administration Building
14	Combined Heat & Power Unit		✔						

CHP offers energy and environmental benefits over electric-only and thermal-only systems in both central and distributed power generation applications. CHP systems have the potential for a wide range of applications and the higher efficiencies result in lower emissions than separate heat and power generation.

The simultaneous production of useful thermal and electrical energy in CHP systems lead to increased fuel efficiency. CHP units can be strategically located at the point of energy use. Such onsite generation avoids the transmission and distribution losses associated with electricity purchased via the grid from central stations. CHP is versatile and can be coupled with existing and planned technologies for many different applications in the industrial, commercial, and residential sectors.

The following CHP will be installed at Lincoln Middle School.

BUILDING	CATEGORY
Lincoln Middle School	Yanmar CP35D1-TNUW - Non-Black Start Capable, Radiator-LESS
	Thermal Load Module to interface with building's space heating and pool heating systems

ECM Calculations

The CHP will act as the first stage of heating for the hot water heating loop and pool heating loop. The CHP is estimated to run at full load for over 5,900 hours per year. Run hours were verified to be achievable using eQuest simulations where a 35 kW CHP was proposed at a similar building. eQuest conservatively estimates run hours because it accounts for heating and electric loads on an hourly basis, which limits the run hours. There are certain hours during colder months where the CHP will not meet the entire heating load. eQuest accounts for this and requires the boilers to fire to meet the remaining load. Non-displaceable gas use is associated with other gas loads at the building - (kitchen appliances, gas-fired RTUs, etc. The remaining load is available for the CHP. The installed CHP will be available year-round and will be designed to run the CHP when full electric and heat loads exist simultaneously.

CHP Input Data		
Number of units	1	
Electrical output	35	kW
Thermal output	204,040	BTU/hr
Gas input (HHV)	407,144	Btu/hr
Overall efficiency	79.4%	

Runtime Analysis	
Run hours	5,972
Full load heat and electric hours	5,972
% Boiler load displaced by CHP	45%

		Fuel Usage Without CHP					
Month	Days	Post ECMs (Baseline reduced by 15%)	Existing Boiler Efficiency	Displaceable Gas Therms - Percentage of total building gas	Non-Displaceable Gas Therms	Displaceable Gas Therms	Displaceable Heat Therms
Jan	31	7,242	74%	10%	724	6,518	4,823
Feb	28	6,853	74%	10%	685	6,167	4,564
Mar	31	7,975	74%	10%	798	7,178	5,312
Apr	30	3,740	74%	50%	1,870	1,870	1,384
May	31	4,392	74%	75%	3,294	1,098	813
Jun	30	3,681	74%	81%	2,981	700	518
Jul	31	3,674	74%	81%	2,974	700	518
Aug	31	3,618	74%	81%	2,918	700	518
Sep	30	8,155	74%	91%	7,455	700	518
Oct	31	4,821	74%	75%	3,616	1,205	892
Nov	30	4,553	74%	25%	1,138	3,415	2,527
Dec	31	7,344	74%	10%	734	6,609	4,891
Total:	**365**	**66,049**			**29,189**	**36,861**	**27,277**

		35 kW Cogen Plant Thermal Operation				
Month	Days	Combined Cogen Run Hours	Utilized Cogen Heat Therms	Avoided Boiler Gas Therms	Full Load Run Hours	System Operating Efficiency
Jan	31	707	1,442	1,949	707	79%
Feb	28	638	1,303	1,760	638	79%
Mar	31	707	1,442	1,949	707	79%
Apr	30	678	1,384	1,870	678	79%
May	31	398	813	1,098	398	79%
Jun	30	254	518	700	254	79%
Jul	31	254	518	700	254	79%
Aug	31	254	518	700	254	79%
Sep	30	254	518	700	254	79%
Oct	31	437	892	1,205	437	79%
Nov	30	684	1,396	1,886	684	79%
Dec	31	707	1,442	1,949	707	79%
Total:	**365**	**5,972**	**12,185**	**16,466**	**5,972**	**79%**

		Fuel Usage With CHP			Electric Savings With CHP			
Month	Days	Supplemental Boiler Gas Therms	Cogen Gas Therms	Total Gas	Run Hours	Avg Cogen Plant kW Output	kW Demand Savings	Cogen Electric Generation kWh
Jan	31	4,569	2,878	8,171	707	35	35	24,738
Feb	28	4,407	2,599	7,692	638	35	35	22,344
Mar	31	5,229	2,878	8,904	707	35	35	24,738
Apr	30	0	2,761	4,632	678	35	35	23,739
May	31	0	1,621	4,916	398	35	35	13,939
Jun	30	0	1,034	4,015	254	35	35	8,886
Jul	31	0	1,034	4,008	254	35	35	8,886
Aug	31	0	1,034	3,952	254	35	35	8,886
Sep	30	0	1,034	8,489	254	35	35	8,886
Oct	31	0	1,780	5,395	437	35	35	15,299
Nov	30	1,529	2,785	5,452	684	35	35	23,940
Dec	31	4,660	2,878	8,272	707	35	35	24,738
Total:	**365**	**20,395**	**24,314**	**73,897**	**5,972**		**35**	**209,017**

The NJ Protocol is to follow the National Renewable Energy Laboratory's Combined Heat and Power, The Uniform Methods Project: Methods for Determining Energy-Efficiency Savings for Specific Measures [1]. The product should be all of the below outputs, as applicable:

a. Annual energy input to the generator, HHV basis (MMBtu/yr)
b. Annual electricity generated, net of all parasitic loads (kWh/yr)
c. Annual fossil fuel energy savings from heat recovery (MMBtu/yr)
d. Annual electric energy savings from heat recovery, including absorption chiller sourced savings if chiller installation is included as part of the system installation (kWh/yr)
e. Annual overall CHP fuel conversion efficiency, HHV basis (%)
f. Annual electric conversion efficiency, net of parasitics, HHV basis (%)

CHP Emissions Reduction Associated with PJM Grid

(Assuming that the useful thermal output will displace natural gas)

Algorithms

$$CO_2\ ER\ (lbs) = (CO_2\ EF_{elec} - CO_2\ EF_{CHP}) * Net\ Electricity\ Generation\ (MWh) + CO_2\ EF_{elec} * Electric\ Energy\ Savings\ (MWh) + CO_2\ EF_{NG} * Gas\ Energy\ Savings\ (MMBtu) * 10$$

$$NO_x\ ER\ (tons) = (NO_x\ EF_{elec} - NO_x\ EF_{CHP}) * Net\ Electricity\ Generation\ (MWh) + NO_x\ EF_{elec} * Electric\ Energy\ Savings\ (MWh) + NO_x\ EF_{NG} * Gas\ Energy\ Savings\ (MMBtu) * 10$$

SO_2 ER (lbs) = (SO_2 EF_{elec} – SO_2 EF_{CHP}) * Net Electricity Generation (MWh) + SO_2 EF_{elec} * Electric Energy Savings (MWh)

Hg (grams) = (Electric Energy Savings (MWh) * Hg EF_{elec})/1,000

Definition of Variables

CO_2 EF_{elec} = CO_2 Electric Emissions Factor – see emissions tables summarized in Introduction section of Protocols

NO_x EF_{elec} = NO_x Electric Emissions Factor – see emissions tables summarized in Introduction section of Protocols

SO_2 EF_{elec} = SO_2 Electric Emissions Factor – see emissions tables summarized in Introduction section of Protocols

Hg EF_{elec} = Hg Electric Emissions Factor – see emissions tables summarized in Introduction section of Protocols

CO_2 EF_{CHP} = CO_2 Emissions Factor of the CHP system (in lbs/MWh), which will vary with different projects based on the types of prime movers and emission control devices used

NO_x EF_{CHP} = NO_x Emissions Factor of the CHP system (in lbs/MWh), which will vary with different projects based on the types of prime movers and emission control devices used

SO_2 EF_{CHP} = SO_2 Emissions Factor of the CHP system (in lbs/MWh), which will vary with different projects based on the types of prime movers and emission control devices used

CO_2 EF_{NG} = CO_2 Natural Gas Emissions Factor associated with boiler fuel displacement – see emissions tables summarized in Introduction section of Protocols

NO_x EF_{NG} = NO_x Natural Gas Emissions Factor associated with boiler fuel displacement – see emissions tables summarized in Introduction section of Protocols

10 = Conversion from MMBtu to therms (1 MMBtu = 10 therms)

Calculation of Clean Air Impacts

The amount of air emission reductions resulting from the energy savings is calculated using the energy savings at the system level and multiplying them by factors provided by the New Jersey Department of Environmental Protection, Office of Air and Energy Advisor, on June 25, 2019.

Using Weighted Average of 2018 PJM On-Peak and Off-Peak annual data:

Electric Emission Factors

Emissions Product	Pounds per MWh[7]
CO_2	1,292
NOx	0.83
SO_2	0.67
Hg	1.1 mg/MWh[8]

Natural Gas Emission Factors

Emissions Product	Current
CO_2	11.7 lbs per therm saved
NOx	0.0092 lbs per therm saved

Combined Heat & Power Emission Reduction					
BUILDING	kW	Equivalent Full Load Electric Hours	NET GENERATION MWh	FUEL INPUT MMBTU	FOSSIL FUEL SAVINGS FROM HEAT RECOVERY MMBTU
Lincoln Middle School	35	5,972	209.0	2,431.4	1,646.6

Combined Heat & Power Emission Reduction				
BUILDING	CO2 EF ELECTRIC	CO2 EF CHP	CO2 EF GAS	CO2 EMISSION REDUCTION LBS
Lincoln Middle School	1,292.0	1,361.0	117.0	178,228.9

Combined Heat & Power Emission Reduction				
BUILDING	NOx EF ELECTRIC	NOx EF CHP	NOx EF GAS	NOx EMISSION REDUCTION LBS
Lincoln Middle School	0.83	1.07	0.092	101.3

Combined Heat & Power Emission Reduction					
BUILDING	SO2 EF ELECTRIC	SO2 EF CHP	SO2 EMISSION REDUCTION LBS	Hg EF ELECTRIC	Hg EMISSION REDUCTION LBS
Lincoln Middle School	0.67	0.00	140.0	0.67	0.0

Note: CHP emission factors for CO2 and NOx were calculated using nameplate electric generation and natural gas input capacity as seen in the ECM calculation. Per BPU Protocols, natural gas does not require SO2 or Hg emission factors.

ECM 15a – Window Replacement

KEARNY BOE		Kearny High School	Lincoln Middle School	Franklin Elementary School	Washington Elementary School	Garfield Elementary School	Schuyler Elementary School	Roosevelt Elementary School	Administration Building
✔	ECM evaluated but not included								
✔	ECM included in the project								
ECM #	ECM DESCRIPTION								
15a	Window Replacement							✔	

Background & Existing Conditions

The hardware has failed at the Casement Windows; as a result, the windows do not close properly and allow excessive infiltration/ exfiltration. Windows inspected were double pane, wood framed windows with weather stripping still in good condition and would be effective with proper hardware installed.

Existing windows at Roosevelt Elementary School

Scope of Work

Replace the existing double pane windows at Roosevelt Elementary School with new double pane windows.

ECM Calculations

Energy savings protocols for window replacement are below.

BUILDING	SUBTYPE	INFILTRATION REDUCTION (CFM)	HEATING FUEL	HEATING EFFICIENCY (%)	SENSIABLE HEAT CONSTANT	HOURS (HR/DAY)	HEAT EFFICIENCY FACTOR	HEATING DEGREE DAYS	TOTAL HEATING SAVINGS (THERM)
Roosevelt Elementary School	Custom Window Restoration A	2,072	Natural Gas	72.4%	1.08	24.00	2,793	4,843	3,593
Roosevelt Elementary School	Custom Window Restoration B	1,036	Natural Gas	72.4%	1.08	24.00	2,793	4,843	1,796

Heat Efficiency Factor
The derivation of the Efficiency Factor is based on sensible heat constant (1.08 * 24 Hours per Day) and an assumed efficiency percentage for the heating plant in the building. The efficiency of the heating plant is captured as a percentage of the total energy output of the heating system.

Calculation is = 1.08 * 24 hours per day = 25.92; in order to get the Efficiency Factor in the denominator and account for system efficiency = 1/ (25.92 / (1,000,000 Btus * **Heating** Plant Efficiency Percent).

Infiltration Heating Savings (therm) = Infiltration Reduction (CFM) * Heating Degree Days (HDD) / Heat Efficiency Factor

Thermal Insulation Savings (therm) = Existing Heat Loss (therm) - Proposed Heat Loss (therm)

Existing Heat Loss (therm) = (Existing U-Value * (Hours/Day * Heating Degree Days (HDD)) * Surface Area (Sqft)) / Heating Efficiency (%) / 100,000 Btu/Therm

Proposed Heat Loss (therm) = (Proposed U-Value * (Hours/Day * Heating Degree Days (HDD)) * Surface Area (Sqft)) / Heating Efficiency (%) / 100,000 Btu/Therm

BUILDING	SUBTYPE	INFILTRATION REDUCTION (CFM)	TOTAL HEAT CONSTANT	INTERIOR DRY BULB TEMP (F)	EXTERIOR DRY BULB TEMP (F)	INTERIOR DRY RELATIVE HUMIDITY (%)	EXTERIOR RELATIVE HUMIDITY (%)
Roosevelt Elementary School	Custom Window Restoration A	2,072	4.5	72.0	75.0	40.0	75.0
	Custom Window Restoration B	1,036	4.5	72.0	75.0	40.0	75.0

BUILDING	SUBTYPE	INTERIOR ENTHALPY (SUMMER)	EXTERIOR ENTHALPY (SUMMER)	ENTHALPY DIFFERENCE	TONS OF COOLING SAVED	EFFICIENCY (kW/TON)	COOLING HOURS	INFILTRATION ELECTRIC SAVINGS (kWh)
Roosevelt Elementary School	Custom Window Restoration A	24.55	33.27	8.72	6.77	1.00	1,220	8,265
	Custom Window Restoration B	24.55	33.27	8.72	3.39	1.00	1,220	4,132

Enthalpy
Based on Interior Relative Humidity of 40% and temperature of 72 degrees F = 24.55 btu/lb. Exterior Enthalpy based on outside relative humidity estimate of 75% and the below NOAA summer temperature data.

Infiltration Cooling Savings (kWh) = Tons * Efficiency (kW/ton) * Cooling Hours

Tons = Inflitration Reduction (CFM) * Total Heat Constant * Enthalpy / 12,0000 Btu/hr

Insulation Savings (kWh) = Existing Cooling Loss (kWh) - Proposed Cooling Loss (kWh)

Existing Cooling Loss (kWh) = (Existing U-Value) * (Surface Area (Sqft)) * (Delta T) * (Cooling Efficiency (kWh/ton-hr)) * (1 Ton-hr/12,000 Btu) * (Cooling Hours)

Proposed Cooling Loss (kWh) = (Proposed U-Value) * (Surface Area (Sqft)) * (Delta T) * (Cooling Efficiency (kWh/ton-hr)) * (1 Ton-hr/12,000 Btu) * (Cooling Hours)

ECM 15b – Window Refurbishment

KEARNY BOE

✔	ECM evaluated but not included
✔	ECM included in the project

ECM #	ECM DESCRIPTION	Kearny High School	Lincoln Middle School	Franklin Elementary School	Washington Elementary School	Garfield Elementary School	Schuyler Elementary School	Roosevelt Elementary School	Administration Building
15b	Window Refurbishment							✔	

Background & Existing Conditions

The hardware has failed at the Casement Windows; as a result, the windows do not close properly and allow excessive infiltration/ exfiltration. Windows inspected were double pane, wood framed windows with weather stripping still in good condition and would be effective with proper hardware installed.

Existing windows at Roosevelt Elementary School

Scope of Work

- Casement Window Roto-Operator and Lock Restoration (Roosevelt ES) – remove existing roto operator and locks to be replaced with new in-kind roto-operators and locks.
- Casement Window Hinge Restoration (Roosevelt ES) – remove existing vent and hinges to be replaced with new in-kind hinge; re-install vent.

ECM Calculations

Energy savings protocols for window refurbishment are below.

BUILDING	SUBTYPE	INFILTRATION REDUCTION (CFM)	HEATING FUEL	HEATING EFFICIENCY (%)	SENSIABLE HEAT CONSTANT	HOURS (HR/DAY)	HEAT EFFICIENCY FACTOR	HEATING DEGREE DAYS	TOTAL HEATING SAVINGS (THERM)
Roosevelt Elementary School	Custom Window Restoration A	2,072	Natural Gas	72.4%	1.08	24.00	2,793	4,843	3,593
Roosevelt Elementary School	Custom Window Restoration B	1,036	Natural Gas	72.4%	1.08	24.00	2,793	4,843	1,796

Heat Efficiency Factor
The derivation of the Efficiency Factor is based on sensible heat constant (1.08 * 24 Hours per Day) and an assumed efficiency percentage for the heating plant in the building. The efficiency of the heating plant is captured as a percentage of the total energy output of the heating system.

Calculation is = 1.08 * 24 hours per day = 25.92; in order to get the Efficiency Factor in the denominator and account for system efficiency = 1/ (25.92 / (1,000,000 Btus * **Heating** Plant Efficiency Percent).

Infiltration Heating Savings (therm) = Infiltration Reduction (CFM) * Heating Degree Days (HDD) / Heat Efficiency Factor

Thermal Insulation Savings (therm) = Existing Heat Loss (therm) - Proposed Heat Loss (therm)

Existing Heat Loss (therm) = (Existing U-Value * (Hours/Day * Heating Degree Days (HDD)) * Surface Area (Sqft)) / Heating Efficiency (%) / 100,000 Btu/Therm

Proposed Heat Loss (therm) = (Proposed U-Value * (Hours/Day * Heating Degree Days (HDD)) * Surface Area (Sqft)) / Heating Efficiency (%) / 100,000 Btu/Therm

BUILDING	SUBTYPE	INFILTRATION REDUCTION (CFM)	TOTAL HEAT CONSTANT	INTERIOR DRY BULB TEMP (F)	EXTERIOR DRY BULB TEMP (F)	INTERIOR DRY RELATIVE HUMIDITY (%)	EXTERIOR RELATIVE HUMIDITY (%)
Roosevelt Elementary School	Custom Window Restoration A	2,072	4.5	72.0	75.0	40.0	75.0
	Custom Window Restoration B	1,036	4.5	72.0	75.0	40.0	75.0

BUILDING	SUBTYPE	INTERIOR ENTHALPY (SUMMER)	EXTERIOR ENTHALPY (SUMMER)	ENTHALPY DIFFERENCE	TONS OF COOLING SAVED	EFFICIENCY (kW/TON)	COOLING HOURS	INFILTRATION ELECTRIC SAVINGS (kWh)
Roosevelt Elementary School	Custom Window Restoration A	24.55	33.27	8.72	6.77	1.00	1,220	8,265
	Custom Window Restoration B	24.55	33.27	8.72	3.39	1.00	1,220	4,132

Enthalpy
Based on Interior Relative Humidity of 40% and temperature of 72 degrees F = 24.55 btu/lb. Exterior Enthalpy based on outside relative humidity estimate of 75% and the below NOAA summer temperature data.

Infiltration Cooling Savings (kWh) = Tons * Efficiency (kW/ton) * Cooling Hours

Tons = Inflitration Reduction (CFM) * Total Heat Constant * Enthalpy / 12,0000 Btu/hr

Insulation Savings (kWh) = Existing Cooling Loss (kWh) - Proposed Cooling Loss (kWh)

Existing Cooling Loss (kWh) = (Existing U-Value) * (Surface Area (Sqft)) * (Delta T) * (Cooling Efficiency (kWh/ton-hr)) * (1 Ton-hr/12,000 Btu) * (Cooling Hours)

Proposed Cooling Loss (kWh) = (Proposed U-Value) * (Surface Area (Sqft)) * (Delta T) * (Cooling Efficiency (kWh/ton-hr)) * (1 Ton-hr/12,000 Btu) * (Cooling Hours)

ECM 16 – Retro-commissioning

KEARNY BOE

✔	ECM evaluated but not included
✔	ECM included in the project

ECM #	ECM DESCRIPTION	Kearny High School	Lincoln Middle School	Franklin Elementary School	Washington Elementary School	Garfield Elementary School	Schuyler Elementary School	Roosevelt Elementary School	Administration Building
16	Retrocommissioning	✔	✔						

Scope of Work

Due to the complexity of today's HVAC systems and controls, it is likely for systems to be operating incorrectly or not as efficiently as they could be. Retro-commissioning studies reveal hidden deficiencies and highlights operational & maintenance (O&M) issues that could have been avoided as well as exposes hidden control system problems. There are valuable benefits to retro-commissioning in existing buildings. It is a detailed and specialized process that reviews how an HVAC system is controlled and designed to operate. Applying retro-commissioning to existing facilities includes planning, discovering root causes of inefficiencies, development of a cost-effective project delivery and a focus on optimizing value to the building owner. The study includes functional system testing under various modes, such as heating or cooling loads, occupied and unoccupied modes, varying outside air temperature and space temperatures.

This is a systematic process to ensure that the building energy systems perform interactively according to the original design intent and the current operational needs of the facility. Retro-commissioning is a common practice recommended by the American Society of Heating Refrigeration and Energy (ASHRAE) to be revisited every couple of years. We recommend that an engineering firm who specializes in energy control systems and retro-commissioning be contacted for a detailed evaluation and implementation costs. Facility operations personnel would work with the engineers to develop goals and objectives. During on-site testing, the qualified personnel conducting the study would immediately make any no/low cost improvements as identified. Furthermore, any suggested corrective actions which require the

purchase of material, a contractor who specializes in that scope of work would be contacted to implement the remaining improvements.

Energy Savings Calculations

According to a Lawrence Berkeley National Laboratory study, *The Cost-Effectiveness of Commercial Buildings Commissioning*, "For existing buildings, we found median commissioning costs of $0.27/ft2, whole-building energy savings of 15 percent, and payback times of 0.7 years." Savings are conservatively estimated to be 5% of existing site electric and natural gas use:

Retro-Commissioning Savings						
BUILDING	EXISTING SITE kWh	% ELECTRIC SAVINGS	kWh SAVINGS	EXISTING SITE THERMS	% THERM SAVINGS	THERMS SAVINGS
Kearny High School	2,673,055	5%	133,653	84,194	5%	4,210
Lincoln Middle School	1,329,875	5%	66,494	77,705	5%	3,885

Non-ECM 17 – Asbestos Abatement

KEARNY BOE

✔	Measure evaluated but not included
✔	Measure included in the project

MEASURE #	MEASURE DESCRIPTION	Kearny High School	Lincoln Middle School	Franklin Elementary School	Washington Elementary School	Garfield Elementary School	Schuyler Elementary School	Roosevelt Elementary School	Administration Building
Non ECM-17	Asbestos Abatement				✔		✔	✔	

Scope of Work

Asbestos abatement has been included given the age of Schuyler Elementary Schools boiler room and scope of work proposed. The following locations have been identified for asbestos abatement according to previous site testing:

- Boiler breeching
- Header
- Pipe fittings
- Pipe gaskets

Energy Savings Calculations

There are no energy savings associated with this measure.

ENERGY SAVINGS PLAN

SECTION 4 – FINANCIAL ANALYSIS

Form V – ESCO Construction and Service Fees

FORM V		
ESCO's ENERGY SAVINGS PLAN (ESP): ESCOs PROPOSED FINAL PROJECT COST FORM KEARNY BOE ENERGY SAVING IMPROVEMENT PROGRAM		
ESCO Name: DCO Energy PROPOSED CONSTRUCTION FEES:		
Fee Category	**Fees [1] Dollar ($) Value**	**Percentage of Hard Costs**
Estimated Value of Hard Costs [2]	$ 4,413,484	N/A
ECM Contingency	$ 447,815	
Total Value of Hard Costs	$ 4,861,299	
Project Service Fees		
Investment Grade Energy Audit	$ 82,642	1.70%
Design Engineering Fees	$ 340,291	7.00%
Construction Management & Project Administration	$ 347,583	7.15%
System Commissioning	$ 31,598	0.65%
Equipment Initial Training Fees	$ 48,613	1.00%
ESCO Overhead	$ 145,839	3.00%
ESCO Profit	$ 194,452	4.00%
Project Service Fees Sub Total	$ 850,727	17.50%
TOTAL FINANCED PROJECT COSTS:	$ 6,052,317	24.50%
PROPOSED ANNUAL SERVICE FEES		
First Year Annual Service Fees	**Fees [1] Dollar ($) Value**	**Percentage of Hard Costs**
SAVINGS GUARANTEE *(OPTION)*	$0	0.00%
Measurement & Verification *(Associated w/ Savings Guarantee Option)*	$18,473	0.38%
ENERGY STAR Services *(optional)*	$0	0.00%
Post Construction Services *(if applicable)*	$0	0.00%
Performance Monitoring	w/ M&V	0.00%
On-going Training Services	w/ M&V	0.00%
Verification Reports	w/ M&V	0.00%
TOTAL FIRST YEAR ANNUAL SERVICES	$0	0.00%

DCO Energy Efficiency Division
100 Lenox Drive
Lawrenceville, NJ 08648

Form VI – Project Cash Flow Analysis

FORM VI

ESCO's ENERGY SAVINGS PLAN (ESP):
ESCO's ANNUAL CASH FLOW ANALYSIS FORM
KEARNY BOE - ENERGY SAVING IMPROVEMENT PROGRAM

ESCO Name: DCO Energy

Note: Respondents must use the following assumptions in all financial calculations:
(a) The cost of all types of energy should be assumed to inflate at **2.4% gas, 2.2%** electric per year and
1. Term of Agreement: **20**
2. Construction Period [2] (months): 12 Months
3. Cash Flow Analysis Format:

Miscellaneous Costs Financed:	
Cost of Issuance	$150,000
Total	$150,000

Project Cost[1]: **$6,052,317**
Miscellaneous Costs Financed: **$150,000**
Financed Amount: **$6,202,317**
Direct Install Rebate Applied[4]: **$317,396**

Interest Rate: **2.50%**

Year	Annual Energy Savings	Annual Operational Savings	Energy Rebates / Incentives[4]	Total Annual Savings	Annual Project Costs	Board Costs[3]	Net Cash-Flow to Client	Cumulative Cash Flow
Installation	$ -	$ -		$ -			$ -	$ -
Year 1	$ 395,132	$ 34,381	$ 59,941	$ 489,454	$ (480,154)	$ (6,900)	$ 2,400	$ 2,400
Year 2	$ 322,313	$ 34,381		$ 356,694	$ (354,294)		$ 2,400	$ 4,800
Year 3	$ 329,460	$ 17,579		$ 347,039	$ (344,639)		$ 2,400	$ 7,200
Year 4	$ 336,767	$ 17,579		$ 354,346	$ (351,946)		$ 2,400	$ 9,600
Year 5	$ 344,240	$ 17,579		$ 361,819	$ (359,419)		$ 2,400	$ 12,000
Year 6	$ 351,880			$ 351,880	$ (349,480)		$ 2,400	$ 14,400
Year 7	$ 359,693			$ 359,693	$ (357,293)		$ 2,400	$ 16,800
Year 8	$ 367,682			$ 367,682	$ (365,282)		$ 2,400	$ 19,200
Year 9	$ 375,851			$ 375,851	$ (373,451)		$ 2,400	$ 21,600
Year 10	$ 384,204			$ 384,204	$ (381,804)		$ 2,400	$ 24,000
Year 11	$ 392,746			$ 392,746	$ (390,346)		$ 2,400	$ 26,400
Year 12	$ 401,480			$ 401,480	$ (399,080)		$ 2,400	$ 28,800
Year 13	$ 410,410			$ 410,410	$ (408,010)		$ 2,400	$ 31,200
Year 14	$ 419,542			$ 419,542	$ (417,142)		$ 2,400	$ 33,600
Year 15	$ 428,880			$ 428,880	$ (426,480)		$ 2,400	$ 36,000
Year 16	$ 438,429			$ 438,429	$ (436,029)		$ 2,400	$ 38,400
Year 17	$ 448,193			$ 448,193	$ (445,793)		$ 2,400	$ 40,800
Year 18	$ 458,177			$ 458,177	$ (455,777)		$ 2,400	$ 43,200
Year 19	$ 468,386			$ 468,386	$ (465,986)		$ 2,400	$ 45,600
Year 20	$ 478,825			$ 478,825	$ (476,425)		$ 2,400	$ 48,000
Totals	$ 7,912,289	$ 121,499	$ 59,941	$ 8,093,729	$ (8,038,829)	$ (6,900)	$ 48,000	

NOTES:
(1) Includes: Hard costs and project service fees defined in ESCO's PROPOSED "FORM V"
(2) No payments are made by Kearny BOE during the construction period.
(3) Board Costs represent reimbursement for Third-Party engineering review
(4) As of July 1, 2021, all of former NJ Clean Energy Program incentive programs transitioned over to the investor-owned gas and electric utility companies. Subsequently, the BPU is requiring that all ESIP projects consult with the DCA and follow all DCA guidance regarding the procurement of all subcontractors.

Utility Inflation Details

Per Form VI, the annual inflation rate is 2.2% for electric and 2.4% for natural gas.

Utility Inflation Worksheet				
Year	TOTAL ANNUAL ELECTRIC COST SAVINGS	ANNUAL NATURAL GAS COST SAVINGS	ANNUAL Water & Sewer (Gal) COST SAVINGS	Total
2	$238,042.84	$79,567.34	$4,702.89	$322,313.07
3	$243,279.78	$81,476.96	$4,702.89	$329,459.63
4	$248,631.94	$83,432.40	$4,702.89	$336,767.23
5	$254,101.84	$85,434.78	$4,702.89	$344,239.51
6	$259,692.08	$87,485.22	$4,702.89	$351,880.19
7	$265,405.31	$89,584.86	$4,702.89	$359,693.06
8	$271,244.22	$91,734.90	$4,702.89	$367,682.01
9	$277,211.60	$93,936.53	$4,702.89	$375,851.02
10	$283,310.25	$96,191.01	$4,702.89	$384,204.15
11	$289,543.08	$98,499.60	$4,702.89	$392,745.56
12	$295,913.02	$100,863.59	$4,702.89	$401,479.50
13	$302,423.11	$103,284.31	$4,702.89	$410,410.31
14	$309,076.42	$105,763.14	$4,702.89	$419,542.45
15	$315,876.10	$108,301.45	$4,702.89	$428,880.44
16	$322,825.37	$110,900.69	$4,702.89	$438,428.95
17	$329,927.53	$113,562.30	$4,702.89	$448,192.73
18	$337,185.94	$116,287.80	$4,702.89	$458,176.63
19	$344,604.03	$119,078.70	$4,702.89	$468,385.62
20	$352,185.32	$121,936.59	$4,702.89	$478,824.80

ENERGY SAVINGS PLAN

SECTION 5 – RISK, DESIGN, & COMPLIANCE

Assessment of Risks, Design & Compliance Issues

Moving from a conceptual design to engineered documents DCO has identified areas of the project that could change during the detailed design. The table below represents potential conceptual areas of concern that will need to be investigated further with a corresponding party responsible for the compliance of each item.

Issue	Category	Responsible Party
Alteration of expected Maintenance and Operational Savings	Risk	Kearny School District
Disposition of Abandoned Equipment (Steam Piping, Condensate Piping, Oil Tanks, etc.)	Risk	Kearny School District
New Natural Gas Distribution	Risk	Kearny School District
Integrity of re-used Infrastructure	Risk	Kearny School District
Life Safety System Coordination	Risk	Kearny School District
Coordination with Kearny School District Information Technology Department	Risk	Kearny School District
Ventilation Compliance with Code	Compliance	Consulting Engineer
Temperature, Humidity and Air Change Compliance with Code	Compliance	Consulting Engineer
Boiler Capacity and Turndown	Design	Consulting Engineer
Natural Gas Regulator Compliance with Code	Compliance	Consulting Engineer
Undocumented Underground Utilities	Risk	Consulting Engineer
Code Compliance of Existing Electrical Infrastructure	Compliance	Consulting Engineer
Lighting Levels	Compliance	Consulting Engineer
Design Light Consortium rating for bulbs	Compliance	Consulting Engineer

Underwriters Laboratory Testing for retrofitted LED Lighting Systems	Compliance	Consulting Engineer
Lighting Retrofits within hard ceilings for fixtures and occupancy sensors	Risk	Consulting Engineer
Street/Parking Lot Pole Structural Integrity	Risk	Consulting Engineer
Unrealized Energy Savings 1. Energy Modeling 2. Performance Monitoring 3. Capacity of Equipment 4. Efficiency of Equipment 5. Run Hours of Equipment	Risk	DCO/ Consulting Engineer 1. DCO 2. DCO 3. Consulting Engineer / Basis of Design Vendor 4. Consulting Engineer / Basis of Design Vendor 5. Kearny School District
Existing Plumbing Infrastructure with New Low Flow Devices	Design	Consulting Engineer
Adaptation to New RTUs (Curb, Electric, Ductwork, Condensate)	Design	Consulting Engineer / Basis of Design Manufacture
Structural Loads for Rooftop Equipment Replacement	Design	Consulting Engineer
Transformer Loading	Risk	Consulting Engineer
Site Work for Equipment	Design	Consulting Engineer
Condition of Roof Under Units	Risk	Consulting Engineer
Adequate Crane Lifts & Clearances	Design	Consulting Engineer / Rigger
Physical Space Constraints and Clearance for Equipment Replacement	Design	Consulting Engineer
Refrigerant Reclaim / Refrigerant Disposal	Compliance	Contractor
Existing Tie in Locations	Design	Consulting Engineer

Schedule Oversight	Risk	DCO Energy
Impact of Boiler Flue	Design	Consulting Engineer
Impact of Space Usage During Construction	Risk	Consulting Engineer & Kearny School District
Scope changes relating to requests by Authorities Having Jurisdiction.	Risk	Kearny School District (via contingency)
Department of Environmental Protection Permitting	Risk	Consulting Engineer
Modifications of Energy Saving Control Sequences and Setpoints impacting Energy Savings and Incentives	Risk	Kearny School District
Post Construction Calibration of Sensors, Meters, & Safety Devices	Risk	Kearny School District
Adequate time and access for bidding contractor site surveys	Risk	Kearny School District
Utility Interconnection approval for the CHP Unit	Risk	Kearny School District

Measurement & Verification (M&V) Plan

Our approach to M&V of energy savings aligns with the International Performance Measurement & Verification Protocol. More detailed information may be found below. It's most cost-effective to perform M&V using the least costly option that still adequately documents system performance and permits analysis of savings. This approach lowers the total cost of the program leaving more dollars available to perform more facility improvements. Depending upon which ECMs are implemented by Kearny School District, the M&V plan proposed by DCO would incorporate one or more of the following options which outlines the four most common approaches for M&V:

Option A – Retrofit Isolation with Key Parameter Measurement	This option is based on a combination of measured and estimated factors when variations in factors are not expected. Measurements are spot or short-term and are taken at the component or system level, both in the baseline and post-installation cases. Measurements should include the key performance parameter(s) which define the energy use of the ECM. Estimated factors are supported by historical or manufacturer's data. Savings are determined by means of engineering calculations of baseline and post-installation energy use based on measured and estimated values.	Direct measurements and estimated values, engineering calculations and/or component or system models often developed through regression analysis. Adjustments to models are not typically required.
Option B – Retrofit Isolation with Parameter Measurement	This option is based on periodic or continuous measurements of energy use taken at the component or system level when variations in factors are expected. Energy or proxies of energy use are measured continuously. Periodic spot or short-term measurements may suffice when variations in factors are not expected. Savings are determined form analysis of baseline and reporting period energy use of proxies of energy use.	Direct measurements, engineering calculations, and/or component or system models often developed through regression analysis. Adjustments to models may be required.
Option C – Utility Data Analysis	This option is based on long-term, continuous, whole-building utility meter, facility level, or sub-meter energy (or water) data. Savings are determined from analysis of baseline and reporting period energy data. Typically, regression analysis is conducted to correlate with and adjust energy use to independent variables such as weather, but simple comparisons may also be used.	Based on regression analysis of utility meter data to account for factors that drive energy use. Adjustments to models are typically required.
Option D – Calibrated	Computer simulation software is used to model energy performance of a whole-facility (or sub-facility). Models must be calibrated with actual hourly or monthly billing data from the facility. Implementation of simulation modeling requires	Based on computer simulation model calibrated with whole-building or end-use

Computer Simulation	engineering expertise. Inputs to the model include facility characteristics; performance specifications of new and existing equipment or systems; engineering estimates, spot-, short-term, or long-term measurements of system components; and long-term whole-building utility meter data. After the model has been calibrated, savings are determined by comparing a simulation of the baseline with either a simulation of the performance period or actual utility data	metered data or both. Adjustments to models are required.

Each of the options can be used for a wide array of energy efficiency upgrades and each has different costs and complexities associated with it. When selecting an M&V approach, the following general rule of thumb can be applied:

OPTION A

- When magnitude of savings is low for the entire project or a portion of the project
- The risk for not achieving savings is low

OPTION B

- For simple equipment replacement projects
- When energy savings values per individual measure are desired
- When interactive effects are to be ignored or are estimated using estimating methods that do not involve long term measurements
- When sub-meters already exist that record the energy use of subsystems under consideration

OPTION C

- For complex equipment replacement and controls projects
- When predicted energy savings are in excess of 10 to 20 percent as compared with the record energy use
- When energy savings per individual measure are not desired
- When interactive effects are to be included
- When the independent variables that affect energy, use are complex and excessively difficult or expensive

OPTION D

- When new construction projects are involved
- When energy savings values per measure are desired
- When Option C tools cannot cost effectively evaluate particular measures or their interactions with the building when complex baseline adjustments are anticipated

DCO will perform measurement and verification of the energy units savings at the conclusion of each month in the first year of the energy units guarantee. After the first year, M&V will be performed and presented within 30 days of year end. Kearny School District will work with DCO to provide necessary information and provide access to any buildings to allow DCO to properly verify and measure energy savings. DCO's energy guarantee will be based on units of energy saved as determined from the baseline provided in the RFP, or adjusted baseline if original baseline is determined by both parties to be inaccurate.

Adjustments to the baseline and associated savings will be taken for weather, hours of operation, building usage, utility rate increases, code or statute changes, requirements listed in Table 1, and any other actions that adversely affect the savings beyond the control of DCO. Any savings discrepancies will be resolved to the satisfaction of both the Kearny School District and DCO in a timely manner.

As part of the optional energy guarantee, DCO uses weather normalization procedures to correct for the effect of weather variance on energy savings in subsequent years. Baseline energy and weather data are used to establish an algorithm to predict how the baseline building uses energy as a function of weather. The algorithm is then applied to subsequent years to correct for the impact weather may have on future building energy use. The weather normalization procedure and algorithms will be covered in detail as part of the optional energy guarantee contract provided to Kearny School District.

Maintenance Plan

Owner Tasks and Responsibilities:

As a general statement, Kearny School District or its 3rd party service providers shall be responsible for providing ongoing maintenance through the duration of the M&V period. DCO will review operational procedures and schedules associated with such things as the building automation/control upgrades as well as the manufacturers' published requirements for all installed equipment be it: quarterly, semi-annually or annually. In most cases, Kearny School District is already aware of or self-implementing similar maintenance practices on campus or has contracted a 3rd party for such services. Failure to properly maintain the equipment may cause energy savings goals to fall short.

Specific Areas of Consideration:

In order to sustain energy savings Kearny School District's Staff will be required to implement new maintenance tasks and even modify existing policies and practices. Outlined are two examples of specific instances.

Example 1. Advanced Building Operations Programming:

Kearny School District will be given specific training on the changes and advancements in the environmental operations and energy savings strategies. Kearny School District will be responsible for following the agreed upon guidelines associated with programmed schedules and any use of override functions.

Example 2. Verification of Proper Operations: Mechanical Equipment

Kearny School District will be required to assure that proper mechanical maintenance continues to be implemented on its mechanical equipment. Example: outside air dampers will require proper operation with the appropriate seals in order to maintain ECM(s) such as demand ventilation. DCO will periodically spot check system operations to verify the Owner or its 3rd party representative is implementing proper maintenance. Any deficiencies that may be identified will be brought to Kearny School District's attention for correction.

KEARNY SCHOOL DISTRICT

ENERGY SAVINGS PLAN

SECTION 6 – OPERATION & MAINTENANCE

It is critical to the success of achieving continued energy savings that Kearny School District develop and implement an Operation and Maintenance Plan. In this section are some recommendations for Kearny School District and/or 3rd party maintenance contractors.

Air Handling Units

Comprehensive Annual Inspection

1. Record and report abnormal conditions, measurements taken, etc.
2. Review logs for operational problems and trends.
3. General Assembly
   a) Inspect the unit for cleanliness.
   b) Inspect the fan wheel and shaft for wear and clearance.
   c) Check the sheaves and pulleys for wear and alignment.
   d) Check the belts for tension, wear, cracks, and glazing.
   e) Verify tight bolts, set screws, and locking collars.
   f) Check dampers for wear, security and linkage adjustment.
   g) Verify clean condensate pan.
   h) Verify proper operation of the condensate drain.
   i) Verify clean air filters.
   j) Verify clean coils.
   k) Verify proper operation of the spray pump, if applicable.
   l) Verify smooth fan operation.
   m) Log operating conditions after system has stabilized.
   n) Provide a written report of completed work, operating log, and indicate any uncorrected deficiencies detected.
4. Lubrication
   a) Lubricate the fan shaft bearings, if applicable.
   b) Lubricate the motor bearings, if applicable.
5. Controls and Safeties
   a) Test the operation of the low temperature safety device, if applicable.
   b) Test the operation of the high static pressure safety device, if applicable.
   c) Test the operation of the low static pressure safety device, if applicable.
   d) Check the thermal cutout on electric heaters, if applicable.
   e) Check the step controller, if applicable.

f) Check and record supply air and control air pressure, if applicable.
g) Verify the operation of the control system and dampers while the fan is operating.

6. Motor and Starter
   a) Clean the starter and cabinet.
   b) Inspect the wiring and connections for tightness and signs of overheating and discoloration. This includes wiring to the electric heat, if applicable.
   c) Check the condition of the contacts for wear and pitting.
   d) Check the contactors for free and smooth operation.
   e) Meg the motor and record readings.

Heating Inspection

1. Gas Heat Option
   a) Visually inspect the heat exchanger.
   b) Inspect the combustion air blower fan, and clean, if required.
   c) Lubricate the combustion air blower fan motor, if applicable.
   d) Verify the operation of the combustion air flow-proving device.
   e) Test the operation of the high gas pressure safety device, if applicable. Calibrate, if necessary.
   f) Test the operation of the low gas pressure safety device, if applicable. Calibrate, if necessary.
   g) Verify the operation of the flame detection device.
   h) Test the operation of the high temperature limit switch.
   i) Verify the integrity of the flue system.
   j) Verify the operation of the operating controls.
   k) Verify the burner sequence of operation.
   l) Verify proper gas pressure to the unit and/or at the manifold, if applicable.
   m) Perform combustion test. Make adjustments as necessary.
2. Electric Heat Option
   a) Inspect wiring and connections for tightness and signs of overheating and discoloration.
   b) Check and calibrate operating and safety controls, if applicable.
   c) Verify the operation of the heating elements.
   d) Check voltage and amperage and compare readings with the watt rating on the heater.
3. Hot Water / Steam Heat Option
   a) Inspect control valves and traps.
   b) Check and calibrate all operating and safety controls.
   c) Verify the operation of the heating coils.
   d) Verify the operation of the unit low temperature safety device.

Scheduled Running Inspection

1. Check the general condition of the fan.
2. Verify smooth fan operation.
3. Check and record supply and control air pressure, if applicable.
4. Verify the operation of the control system.
5. Log the operating conditions after the system has stabilized.
6. Review operating procedures with operating personnel.
7. Provide a written report of completed work, operating log, and indicate uncorrected deficiencies detected.

Oil Sample/Spectrographic Analysis

1. Pull oil sample for spectrographic analysis

Refrigerant Sample/Analysis

1. Pull refrigerant sample for spectrographic analysis for contaminants (oil, water, and acid), using approved containers

Boilers

Comprehensive Annual Inspection

1. Record and report abnormal conditions, measurements taken, etc.
2. Review logs for operational problems and trends.
3. General Assembly
   a) Secure and drain the boiler.
   b) Open the fire and water side for cleaning and inspection.
   c) Check heating surfaces and water side for corrosion, pitting, scale, blisters, bulges, and soot.
   d) Inspect refractory.
   e) Clean fire inspection glass.
   f) Check blow-down valve packing, and lubricate.
   g) Check and test boiler blow-down valve.

h) Perform hydrostatic test, if required.
i) Verify proper operation of the level float.
j) Gas Train Burner Assembly
    1. Check the gas train isolation valves for leaks.
    2. Check the gas supply piping for leaks.
    3. Check the gas pilot solenoid valve for wear and leaks.
    4. Check the main gas and the pilot gas regulators for wear and leaks.
    5. Test the low gas pressure switch. Calibrate and record setting.
    6. Test the high gas pressure switch. Calibrate and record setting.
    7. Verify the operation of the burner fan air flow switch.
    8. Inspect and clean the burner assembly.
    9. Inspect and clean the pilot igniter assembly.
    10. Inspect and clean the burner fan.
    11. Run the fan and check for vibration.
    12. Inspect the flue and flue damper.
    13. Burner Control Panel:
        a) Inspect the panel for cleanliness.
        b) Inspect wiring and connections for tightness and signs of overheating and discoloration.
k) Clean burner fan wheel and air dampers. Check fan for vibration.
l) Verify tightness on linkage set screws.
m) Check gas valves for leakage (where test cocks are provided).
n) Verify proper operation of the feed water pump.
o) Verify proper operation of the feed water treating equipment.

4. Controls and Safeties
    a) Disassemble and inspect low water cutoff safety device.
    b) Reassemble boiler low water cutoff safety device with new gaskets.
    c) Clean contacts in program timer, if applicable.
    d) Check the operation of the low water cutoff safety device and feed controls.
    e) Verify the setting and test the operation of the operating and limit controls.
    f) Verify the operation of the water level control.

Startup/Checkout Procedure

1. Verify proper water level in the boiler
2. Test the safety/relief valve after startup (full pressure test).
3. Clean or replace fuel filters.

4. Clean fuel nozzles.
5. Inspect clean, and functionally test the flame scanner and flame safeguard relay.
6. Clean and adjust the ignition electrode.
7. Replace the vacuum tube in the flame safeguard control, if applicable.
8. Perform pilot turn down test.
9. Verify proper steam pressure.
10. Perform combustion test and adjust the burner for maximum efficiency.
11. Test the following items:
    a) Firing rate
    b) Fuel/air ratio
    c) CO2
    d) CO
    e) NOX
    f) Perform smoke test.
12. Review operating procedures
13. Provide a written report of completed work, operating log, and indicate any uncorrected deficiencies detected.

Mid-Season Running Inspection

1. Check the general condition of the unit.
2. Inspect the burner.
3. Adjust the burner controls to obtain proper combustion.
4. Check the operation of the pressure relief valve.
5. Check the operation of the low water cutoff and feed controls.
6. Check the setting and test the operation of the operating and limit controls.
7. Check the operation of the modulating motor.
8. Lift the safety/relief valves with at least 70% of rated pressure.
9. Blow down and try gauge cocks to confirm glass water level.
10. Check and test boiler blow down valve.
11. Log operating conditions after the system has stabilized.
12. Review operating procedures
13. Provide a written report of completed work, operating log, and indicate uncorrected deficiencies detected.

Seasonal Shut-down Procedure

1. Shut down boiler at boiler controls.
2. Shut off fuel lines at main valves.
3. Review operating procedures
4. Provide a written report of completed work, operating log, and indicate any uncorrected deficiencies detected.

Burners

Gas Train

1. Check the gas train isolation valves for leaks.
2. Check the gas supply piping for leaks.
3. Check the gas pilot solenoid valve for wear and leaks.
4. Check the main gas and the pilot gas regulators for wear and leaks.
5. Test the low gas pressure switch. Calibrate and record setting.
6. Test the high gas pressure switch. Calibrate and record setting.
7. Verify the operation of the burner fan air flow switch.
8. Inspect and clean the burner assembly.
9. Inspect and clean the pilot ignitor assembly.
10. Inspect and clean the burner fan.
11. Run the fan and check for vibration.
12. Inspect the flue and flue damper.
13. Burner Control Panel:
    a) Inspect the panel for cleanliness.
    b) Inspect wiring and connections for tightness and signs of overheating.
14. Clean burner fan wheel and air dampers. Check the fan for vibration.
15. Verify tightness of the linkage set screws.
16. Check the gas valves against leakage (where test cocks are provided

Oil Train

1. Check the gas train isolation valves for leaks.
2. Check the gas supply piping for leaks.
3. Check the gas pilot solenoid valve for wear and leaks.
4. Check the main gas and the pilot gas regulators for wear and leaks.

5. Test the low gas pressure switch. Calibrate and record setting.
6. Test the high gas pressure switch. Calibrate and record setting.
7. Verify the operation of the burner fan air flow switch.
8. Inspect and clean the burner assembly.
9. Inspect and clean the pilot ignitor assembly.
10. Inspect and clean the burner fan.
11. Run the fan and check for vibration.
12. Inspect the flue and flue damper.
13. Burner Control Panel:
    a) Inspect the panel for cleanliness.
    b) Inspect wiring and connections for tightness and signs of overheating.
14. Clean burner fan wheel and air dampers. Check the fan for vibration.
15. Verify tightness of the linkage set screws.
16. Check the gas valves against leakage (where test cocks are provided).

Dual Fuel Train

1. Check the gas train isolation valves for leaks.
2. Check the gas supply piping for leaks.
3. Check the gas pilot solenoid valve for wear and leaks.
4. Check the main gas and the pilot gas regulators for wear and leaks.
5. Test the low gas pressure switch. Calibrate and record setting.
6. Test the high gas pressure switch. Calibrate and record setting.
7. Verify the operation of the burner fan air flow switch.
8. Inspect and clean the burner assembly.
9. Inspect and clean the pilot ignitor assembly.
10. Inspect and clean the burner fan.
11. Run the fan and check for vibration.
12. Inspect the flue and flue damper.
13. Burner Control Panel:
    a) Inspect the panel for cleanliness.
    b) Inspect wiring and connections for tightness and signs of overheating.
14. Clean burner fan wheel and air dampers. Check the fan for vibration.
15. Verify tightness of the linkage set screws.
16. Check the gas valves against leakage (where test cocks are provided)

Cooling Towers

Startup/Checkout Procedure

1. Fill the basin and verify the float level.
2. Verify the operation of the basin heaters
3. Verify the operation, setpoint, and sensitivity of the basin heater temperature control device.
4. Start the condenser water pumps.
5. Verify the balance of the return water through the distribution boxes.
6. Verify proper operation of the bypass valve(s), if applicable.
7. Operate fan and verify smooth operation.
8. Log operation after system has stabilized.
9. Review operating procedures
10. Provide a written report of completed work, operating log, and indicate uncorrected deficiencies detected.

Comprehensive Bi-Annual Inspection

1. Perform following inspection and cleaning before starting the tower for the cooling season and during shutdown at end of season.
2. Record and report abnormal conditions, measurements taken, etc.
3. Review logs for operational problems and trends.
4. General Assembly
   a) Structure
      1. Disassemble all screens and access panels for inspection.
      2. Inspect the conditions of the slats, if applicable.
      3. Inspect the condition of the tower fill.
      4. Inspect the condition of the support structure.
      5. Inspect the condition of the basins (upper and lower) and/or spray nozzles.
      6. Verify clean basins and strainer(s).
      7. Verify the condition and operation of the basin fill valve system.
   b) Mechanical
      1. Inspect belts for wear, cracks, and glazing.
      2. Verify correct belt tension. Adjust the tension as necessary.
      3. Inspect sheaves and pulleys for wear, condition, and alignment.

4. Inspect fan shaft and bearings for condition.
5. Inspect fan assembly for condition, security, and clearances. (e.g. blade tip clearance).

4. Lubrication System
   a) Lubricate motor bearings.
   b) Lubricate fan shaft bearings.
5. Motor And Starter
   a) Clean the starter and cabinet.
   b) Inspect wiring and connections for tightness and signs of overheating and discoloration.
   c) Check the condition of the contacts for wear and pitting.
   d) Check the contactor(s) for free and smooth operation.
   e) Meg the motor(s) and record readings.
   f) Check disconnect terminal block for wear, tightness and signs of overheating and discoloration.
   g) Check the condition and operation of the basin heater contactor(s).

Shut-Down Procedure

1. Check the general condition of the tower.
2. Turn off electrical power to basin heaters, tower fans, and pipe heaters as necessary.
3. Drain tower and condenser water piping.
4. Review operating procedures
5. Provide a written report of completed work, operating log, and indicate any uncorrected deficiencies detected.

Energy Management System

Maintenance Inspection

1. Review reports for operational problems and trends.
2. Make a back-up copy of the BAS program.
3. Check for loose or damaged parts or wiring.
4. Check for any accumulation of dirt or moisture. Clean if required.
5. Verify proper electrical grounding.

6. Verify control panel power supplies for proper output voltages.
7. Inspect interconnecting cables and electrical connections.
8. Verify that manual override switches are in the desired positions.
9. Check the operation of all binary and analog outputs, if applicable.
10. Calibrate control devices, if applicable.
11. Verify the correct time and date.
12. Check and update the holiday schedules and daylight savings time.
13. Via terminal mode, view the event log and input/output points for any unusual status or override conditions.
14. Clean the external surfaces of the panel enclosure.
15. Review operating program and parameters.
16. Check cable connections for security.
17. Review operating procedures
18. Provide a written report of completed work, and indicate any uncorrected deficiencies detected.

Maintenance Inspection (Control Panels)

1. Control Panel
   a) Verify secure connections on all internal wiring, LAN, and communication links.
   b) Check for loose or damaged parts or wiring.
   c) Check for any accumulation of dirt or moisture. Clean if required.
   d) Remove excessive dust from heat sink surfaces
   e) Verify proper system electrical grounding.
   f) Verify proper output voltages on control panel power supplies.
   g) Check LED Indications to verify proper operation
   h) Verify LAN communications
   i) Verify that cards are seated and secured.
   j) Check wiring trunks and check for possible Error Code Indications
   k) Check voltage level of
   l) Verify the proper operation of critical control processes and points associated with this unit an make adjustments if necessary.
   m) Check Volatile memory available
   n) Cheek Non volatile memory available
   o) Check Processor idle time
   p) Clean external surfaces of the panel enclosure.
   q) Check modem operation, if applicable.

r) View the event log and input/output points for any unusual status or override conditions.
s) Verify correct time and date.
t) Check and update holiday schedules, if applicable, and daylight savings time.
u) Review operating procedures with operating personnel.
v) Provide a written report of completed work, and indicate any uncorrected deficiencies detected.

Maintenance Inspection (EMS - Sequence of Operations)

Central Plant

In order to assure effective environmental conditioning while minimizing the cost to operate the equipment, technicians will review operating sequences and practices for the chiller plant. An initial survey of current equipment operating parameters will be conducted within the first 60 days of the contract term during cooling season. This survey will include:

1. Chiller(s) operation
2. Cooling tower(s) operation
3. Pump(s) operation
4. Economizer operation (where applicable)
5. Environmental safety

A detailed report of findings and recommendations for changes, if any, will be made. Agreed upon operational changes which require only adjustment of controls or programming will be made during regularly scheduled maintenance visits as part of this agreement at no additional cost. Any recommended alterations that require addition of devices or equipment will be accompanied by a guaranteed cost proposal reflecting the applicable discounts determined by this agreement.

Building Systems

In order to assure effective environmental conditioning while minimizing the cost to operate the equipment, technicians will review operating sequences and practices for covered airside systems. An initial survey of current systems operating parameters will be conducted within the first 60 days of the contract term, except seasonally operated systems, which will be surveyed during the appropriate operating season. This survey will include:

1. Time schedule(s)

2. Reset schedule(s)
3. Economizer changeover (where applicable)
4. Setpoints
5. Energy Management routines

A detailed report of findings and recommendations for changes, if any, will be made. Agreed upon operational changes which require only adjustment of controls or programming will be made during regularly scheduled maintenance visits as part of this agreement at no additional cost. Any recommended alterations that require addition of devices or equipment will be accompanied by a guaranteed cost proposal reflecting the applicable discounts determined by this agreement.

Fans

Maintenance Procedure

1. Record and report abnormal conditions, measurements taken, etc.
2. Review logs for operational problems and trends.
3. General Assembly
   a) Check the general condition of the unit.
   b) Verify tightness of the fan, fan guards, louvers, etc.
   c) Verify clean burner assembly.
   d) Check sheaves and pulleys for wear and alignment, if applicable.
   e) Check belts for tension, wear, cracks, and/or glazing.
4. Lubrication
   a) Lubricate the fan motor, if applicable.
   b) Lubricate the fan bearings as necessary.
5. Controls and Safeties
   a) Verify proper operation of the temperature control device.
   b) Verify proper operation of the high temperature control device.
   c) Verify proper operation of the fan switch.
   d) Verify proper operation of the pilot safety device, if applicable.
6. Electrical
   a) Inspect wiring and connections for tightness and signs of overheating and discoloration.
7. Startup and Checkout

a) Start the unit.
b) Verify proper combustion air to the burner.
c) Verify proper gas pressure to the burner.
d) Check the flame for proper combustion.

Comprehensive Annual Inspection

1. Record and report abnormal conditions, measurements taken, etc.
2. Review logs for operational problems and trends.
3. General Assembly
   a) Disassemble all screens and panels necessary to gain access to the fan mechanism.
   b) Disassemble the control mechanism (AVPB only).
   c) Clean all accessible rotor components to include control pitch mechanism (AVPB only).
   d) Inspect blades for wear.
   e) Inspect blade arms for wear (AVPB only).
   f) Check blade tip clearance.
   g) Check for oil leak on the blade bearing housing (AVPB only).
   h) Clean motor and fan housing.
   i) Reassemble all removed screens and plates.
4. Lubrication
   a) Lubricate the motor bearings.
   b) Lubricate the shaft bearings (AVPA only).
5. Controls and Safeties
   a) Test the operation of the high static safety device. Calibrate and record setting.
   b) Test the operation of the low static safety device. Calibrate and record setting.
   c) Test the operation of the vibration safety device. Calibrate and record setting.
   d) Verify the operation of the phase monitor, if applicable.
   e) Inspect pneumatic and electrical controls for condition and calibration.
   f) Verify proper operation.
6. Motor and Starter
   a) Clean the starter and cabinet.
   b) Clean the disconnect switch and cabinet at the fan, if applicable.
   c) Inspect the wiring and connections for tightness and signs of overheating and discoloration.
   d) Check the condition of the contacts for wear and pitting.
   e) Check the contactors for free and smooth operation.
   f) Meg the motor and record readings.

7. Startup / Checkout Procedure
   a) Start the fan.
   b) Verify the operation of the starter.
   c) Check and record supply and control air pressure.
   d) Verify the operation of the control system while the fan is operating.
   e) Log the operating conditions after the system has stabilized.
   f) Review operating procedures with operating personnel.
   g) Provide a written report of completed work, operating log, and indicate any uncorrected deficiencies detected.

Scheduled Running Inspection (fans)

1. Check the general operation of the fan.
2. Check and record supply and control air pressure.
3. Verify the operation of the control system.
4. Log the operating conditions after the system has stabilized.
5. Review operating procedures with operating personnel.
6. Provide a written report of completed work, operating log, and indicate any uncorrected deficiencies detected.

Comprehensive Annual Inspection (fans)

1. Record and report abnormal conditions, measurements taken, etc.
2. Review logs for operational problems and trends.
3. General Assembly
   a) Verify tight bolts, set screws, and locking collars.
   b) Inspect sheaves and pulleys for wear and alignment.
   c) Inspect belts for tension, wear, cracks, and glazing.
   d) Inspect dampers for wear, security, and clearances, if applicable.
   e) Verify clean air filters.
   f) Provide a written report of completed work, operating log, and indicate any uncorrected deficiencies detected.
4. Lubrication
   a) Lubricate fan bearings.
   b) Lubricate motor bearings, if applicable.
5. Controls and Safeties
   a) Verify the operation of the control system while the fan is operating.

b) Verify the setting of the low temperature safety device, if applicable.
c) Verify the operation of the pre-heat control device, if applicable.
d) Verify the operation of the cooling control device, if applicable.
e) Verify the operation of the re-heat control device, if applicable.
f) Verify the operation of the humidity control device, if applicable.

6. Motor and Starter
   a) Clean the starter and cabinet.
   b) Inspect the wiring and connections for tightness and signs of overheating and discoloration.
   c) Check the condition of the contacts for wear and pitting.
   d) Check the contactors for free and smooth operation.
   e) Meg the motor and record readings.
   f) Check volts and amps of the motor.

Lubricate/Grease Bearings

1. Lubricate and/or grease bearings according to manufacturer's specifications

MEG Motor

1. Check the integrity of the insulation on the motor windings and the motor leads, using a megohm meter.

Coils

Maintenance Procedure

1. Record and report abnormal conditions.
2. Visually inspect the coil for leaks.
3. Inspect the coil for cleanliness.

Pumps

Annual Inspection

1. Record and report abnormal conditions, measurements taken, etc.
2. Review logs for operational problems and trends.
3. General Assembly
   a) Check motor shaft and pump shaft for alignment, if applicable.
   b) Inspect the coupling for wear.
   c) Verify that the shaft guard is in place and tight, if applicable.
   d) Verify water flow through the pump.
   e) Check for leaks on the mechanical pump seals, if applicable.
   f) Verify proper drip rate on the pump seal packing, if applicable.
   g) Verify smooth operation of the pump.
   h) Provide a written report of completed work, operating log, and indicate any uncorrected deficiencies detected.
4. Lubrication
   a) Lubricate the motor bearings as necessary.
   b) Lubricate the pump bearings as necessary.
5. Motor and Starter
   a) Clean the starter and cabinet.
   b) Inspect wiring and connections for tightness and signs of overheating and discoloration.
   c) Meg the motor.
   d) Verify tight connections on the motor terminals.
   e) Check the condition of the contacts for wear and pitting, if applicable.
   f) Check the contactors for free and smooth operation.
   g) Verify proper volts and amps.

Pump Run Inspection

1. Verify smooth operation of the pump.
2. Check for leaks on the mechanical pump seals, if applicable.
3. Verify proper drip rate on the pump seal packing, if applicable.
4. Provide a written report of completed work, operating log, and indicate any uncorrected deficiencies detected.

Comprehensive Annual Maintenance

1. Clean the starter and cabinet.
2. Inspect wiring and connections for tightness and signs of overheating and discoloration.
3. Check condition of the contacts for wear and pitting.
4. Check contactors for free and smooth operation.
5. Check the mechanical linkages for wear, security, and clearances.
6. Verify the overload settings.

VFD Starters

Comprehensive Annual Maintenance

1. Clean the starter and cabinet.
2. Inspect wiring and connections for tightness and signs of overheating and discoloration.
3. Check the tightness of the motor terminal connections.
4. Verify the operation of the cooling loop.
5. Verify proper operation of the frequency drive.

Rooftop Units

Comprehensive Annual Maintenance

1. Record and report abnormal conditions, measurements taken, etc.
2. Review logs for operational problems and trends.
3. General Assembly
   a) Inspect for leaks and report results.
   b) Calculate refrigerant loss rate and report to the customer.
   c) Repair minor leaks as required (e.g. valve packing, flare nuts).
   d) Visually inspect condenser tubes for cleanliness.
4. Controls and Safeties
   a) Inspect the control panel for cleanliness.
   b) Inspect wiring and connections for tightness and signs of overheating and discoloration.

c) Verify the working condition of all indicator/alarm lights, if applicable.
d) Test the low water temperature control device. Calibrate and record setting.
e) Test the low evaporator pressure safety device. Calibrate and record setting.
f) Test the oil pressure safety device. Calibrate and record setting, if applicable.
g) Check programmed parameters of RCM control, if applicable.

5. Lubrication System
   a) Check oil level in the compressor.
   b) Test oil for acid content and discoloration. Make recommendations to the customer based on the results of the test.
   c) Verify the operation of the oil heater. Measure amps and compare reading with the watt rating of the heater.

6. Motor and Starter
   a) Clean the starter and cabinet.
   b) Inspect wiring and connections for tightness and signs of overheating and discoloration.
   c) Check condition of the contacts for wear and pitting.
   d) Check the contactors for free and smooth operation.
   e) Check the tightness of the motor terminal connections.
   f) Meg the motor and record readings.
   g) Verify the operation of the electrical interlocks.
   h) Measure voltage and record. Voltage should be nominal voltage ± 10%.

Comprehensive Maintenance Inspection (RTU Heating Cycle)

1. Perform heating inspection/maintenance applicable to the unit (steam/hot water, gas, electric).
2. Verify smooth operation of the fans.
3. Check the belts for tension, wear, cracks, and glazing.
4. Verify clean air filters.
5. Gas Heat Option
   a) Visually inspect the heat exchanger.
   b) Inspect the combustion air blower fan, and clean, if required.
   c) Lubricate the combustion air blower fan motor, if applicable.
   d) Verify the operation of the combustion air flow-proving device.
   e) Test the operation of the high gas pressure safety device, if applicable. Calibrate, if necessary.

f) Test the operation of the low gas pressure safety device, if applicable. Calibrate, if necessary.
g) Verify the operation of the flame detection device.
h) Test the operation of the high temperature limit switch. i.. Verify the integrity of the flue system.
i) Verify the operation of the operating controls.
j) Verify the burner sequence of operation.
k) Verify proper gas pressure to the unit and/or at the manifold, if applicable.
l) Perform combustion test. Make adjustments as necessary.

6. Electric Heat Option
   a) Inspect wiring and connections for tightness and signs of overheating and discoloration.
   b) Check and calibrate operating and safety controls, if applicable.
   c) Verify the operation of the heating elements.
   d) Check voltage and amperage and compare readings with the watt rating on the heater.

7. Hot Water / Steam Heat Option
   a) Inspect control valves and traps.
   b) Check and calibrate all operating and safety controls.
   c) Verify the operation of the heating coils.
   d) Verify the operation of the unit low temperature safety device.

Mid-Season Cooling Inspection (RTU)

1. Check the general condition of the unit.
2. Log the operating condition after system has stabilized.
3. Verify the operation of the control circuits.
4. Analyze the recorded data. Compare the data to the original design conditions.
5. Review operating procedures with operating personnel.
6. Provide a written report of completed work, operating log, and indicate any uncorrected deficiencies detected.

Comprehensive Maintenance Inspection (RTU - Cooling Cycle)

1. Record and report abnormal conditions, measurements taken, etc.
2. Review logs for operational problems and trends.
3. General Assembly
   a) Inspect for leaks and report results.

b) Calculate refrigerant loss rate and report to the customer.
c) Repair minor leaks as required (e.g. valve packing, flare nuts).
d) Check pulleys and sheaves for wear and alignment.
e) Check belts for tension, wear, cracks, and glazing.
f) Verify clean evaporator coil, blower wheel, and condensate pan.
g) Verify clean air filters.
h) Verify proper operation of the condensate drain.
i) Verify proper operation of the dampers and/or inlet guide vanes, if applicable.

4. Controls and Safeties
   a) Inspect the control panel for cleanliness.
   b) Inspect wiring and connections for tightness and signs of overheating and discoloration.
   c) Verify the working condition of all indicator/alarm lights, if applicable.
   d) Test the low evaporator pressure safety device. Calibrate and record setting, if applicable.
   e) Test the high condenser pressure safety device. Calibrate and record setting, applicable.
   f) Test the oil pressure safety device, if applicable. Calibrate and record setting.
   g) Test the high static pressure safety device, if applicable. Calibrate and record setting.
   h) Verify the operation of the static pressure control device, if applicable.
5. Lubrication
   a) Verify the operation of the oil heater, if applicable.
   b) Lubricate the fan bearings as required.
   c) Lubricate the fan motor bearings as required.
   d) Lubricate the damper bearings, if applicable.
6. Motor and Starter
   a) Clean the starter and cabinet.
   b) Inspect wiring and connections for tightness and signs of overheating and discoloration.
   c) Check the condition of the contacts for wear and pitting.
   d) Check the contactors for free and smooth operation.
7. Startup /Checkout Procedure
   a) Verify the operation of the oil heater.
   b) Verify full water system, including the cooling tower and the condenser.
   c) Verify clean cooling tower and strainers.
   d) Test all flow-proving devices on the condenser water circuit.
   e) Start the condenser water pump and the cooling tower fan(s).
   f) Verify flow rate through the condenser.
   g) Start the unit.

h) Verify smooth operation of the compressor(s) and fan(s).
i) Check the setpoint and sensitivity of the temperature control device.
j) Verify the operation of the condenser water temperature control device.
k) Verify clean condenser using pressure and temperature.
l) Check operation and setup of the Unit Control Module.
m) Check the superheat and subcooling on the refrigeration circuit(s).
n) Log the operating conditions after the system has stabilized.
o) Review operating procedures with operating personnel.
p) Provide a written report of completed work, operating log, and indicate any uncorrected deficiencies detected.

ENERGY SAVINGS PLAN

SECTION 7 – OPTIONAL ENERGY GUARANTEE

OPTIONAL ENERGY GUARANTEE OVERVIEW

NOTE: *The following is meant only to serve as a description of an optional energy guarantee and does not constitute any contractual obligations between the Kearny School District and DCO. If Kearny School District chooses to implement an energy guarantee contract, a separate document will be used based on mutual agreement and acceptance of all parties of its terms and conditions.*

A successful energy project consists of a partnership between an ESCO and Owner. Both parties have defined roles and accept their individual responsibilities as well as support any joint initiatives of the program as defined in this document. Both DCO and the Kearny School District will have a role in ongoing maintenance and operations as defined in the agreed-upon energy guarantee contractual documents. Both parties will be required to meet their obligations for the guaranteed energy units savings (referred to as “guarantee or savings”) to be achieved and to ensure the guarantee stays intact.

DCO will guarantee Kearny School District will achieve 100% of the total energy units savings per the provisions of the agreed-upon energy guarantee contractual documents based on the final selection of ECMs and their associated energy savings as measured and verified by the Owner’s third-party, independent firm. The energy savings will be in energy units, not dollars as DCO has no control over the costs of utilities. The energy units guarantee contract shall commence thirty (30) days after the start-up and commissioning of the last Energy Conservation Measure (ECM) and be enforced for a period of one (1) year or until terminated by Kearny School District.

SAVINGS VERIFICATION

There are events that cause energy savings to change. Kearny School District and DCO will agree to baseline energy consumption that represents the facility’s energy use and cost prior to the date of any Agreement (the “Base Year”) and parameters, which affect the energy usage and cost of the facility, including but not limited to, utility rates, local weather profile, facility square footage, environmental conditions, schedules (e.g., lighting, HVAC) and an inventory of equipment in the facility. Energy savings are determined by comparing measured energy use or demand before and after implementation of an energy savings program.

ECM ENERGY SAVINGS = BASELINE ENERGY USE – POST INSTALLATION ENERGY USE +/- ADJUSTMENTS

Changes in estimated energy savings fall into two categories. These categories are Routine Adjustments and Non-Routine Adjustments. Routine Adjustments are expected changes during the savings reporting period to energy governing factors (e.g. weather). DCO uses IPMVP approved mathematical techniques to determine adjustments. Non-Routine Adjustments include energy-governing factors which are not usually expected to change, such as the facility size, the design and operation of installed equipment, occupancy and the type of occupants or any physical changes to the building or equipment that impact the facilities' utility use. These factors will be monitored for change throughout the reporting period.

DCO will perform monthly utility bill analysis and audit reports which compare the current year with base year energy consumption and costs. DCO will perform periodic on-site analysis to determine whether mechanical and electrical systems are operating at optimal efficiency and to assess the occupancy and operational schedules of the buildings.

As part of the optional energy guarantee, DCO uses weather normalization procedures to correct for the effect of weather variance on energy savings in subsequent years. Baseline energy and weather data are used to establish an algorithm to predict how the baseline building uses energy as a function of weather. The algorithm is then applied to subsequent years to correct for the impact weather may have on future building energy use. The weather normalization procedure and algorithms will be covered in detail as part of the optional energy guarantee contract provided to Kearny School District.

ENERGY SAVINGS PLAN

APPENDICIES

APPENDIX LIST	
APPENDIX A	Construction Contingency Allowance
APPENDIX B	Design Bid Build Procedures
APPENDIX C	Operations & Maintenance Savings
APPENDIX D	Project Changes in Financing
APPENDIX E	Incentives in Debt Service
APPENDIX F	ECM Breakdown by Building
APPENDIX G	Lighting Line-by-Line
APPENDIX H	Local Government Energy Audits

ENERGY SAVINGS PLAN

APPENDIX A – CONSTRUCTION CONTINGENCY ALLOWANCE

Appendix A – Construction Contingency Allowance

Experience shows that during the construction phase there are four major categories of potential change of scope issues that benefit from having an appropriate Construction Contingency Allowance (CCA).

- Unknown conditions
- Building inspector's modifications
- Project owner requested changes
- Design clarifications or modifications

Unknown Conditions

Renovations to older facilities have greater potential for revealing unknown. Missing or inaccurate Blueprints, deviations from the original blue prints by the original builder and unknown or undocumented modifications during the life of the facility.

Areas such as behind a wall/roof/equipment or under the slab can bring unforeseen conditions which can delay the new construction and change the anticipated scope of the work. Therefore, it is advisable to dedicate a CCA that is higher than that for new construction.

Building Inspection Modifications

A plan review for the local building jurisdiction reviews the construction documents prior to issuing a building permit. However, there remains the likelihood that the building inspector will request modifications to the plans based upon experience and their interpretation of the applicable building code.

While we can ask for code review and documentation, if you hope to get a Certificate of Occupancy under a tight schedule from this same inspector requested modifications will need to be implemented as successfully appeals take time.

Whether it is adding an extra exit sign, smoke detector or fire extinguisher, or whether it is something more significant, it may require more work from the contractor, thus added expense. The CCA is intended to be the source of funds necessary for these requested modifications.

Project Owner Requested Changes

It is nearly impossible to express your every desire during the design phase. You will always see something during construction that you would like to change.

There is nothing necessarily wrong with that.

The CCA is intended to be the source of funds necessary for these requested changes.

Design Clarifications or Modifications

No designer has ever developed the perfect set of construction documents.

There are always items that can be detailed better or more clearly. The design intent should be adequately reflected in the drawings and specifications so that the contractor can bid and build the ECM to meet the design intent.

However, there will be times during construction when the builder will not be readily able to identify the exact intent of particular details or systems. At that time the builder will submit a Request for Information (RFI) to the designer for clarification or more information. The designer will issue clarifications or directives so that the builder can continue to meet the design intent.

On occasion, the RFI will reveal that something more than was shown in the construction documents is necessary to fulfill the design intent. The clarification or modification may impact the scope of the work to a degree that additional construction costs become necessary.

As long as the design omission is not negligent, the CCA is intended to be the source of funds necessary for these design clarifications or modifications.

Allowance Method

Detailed plans, schematics and specifications for Kearny School District were not available to deliver a cost estimate for each ECM. The budgetary costs carried in the project are based on good faith estimates, contractor supplied budgets for similar ECMs on other recent projects and a database of actual installed costs for various ECMs.

a. Allowance Amount (10.1% of Hard Costs)

BID PACKAGE ALLOWANCE SCHEDULE	
ECM	**CONTINGENCY AMOUNT**
LED Lighting	$91,822
Retrocommissioning	$32,672
Steam Trap Replacement	$31,672
Energy Management System	$0
Combined Heat & Power Unit	$39,420
Building Envelope Weatherization	$17,321
Water Conservation	$923
Boiler Replacement	$161,518
Window Refurbishment	$19,205
Plug Load Controls	$5,633
Pipe and Valve Insulation	$2,590
High Efficiency Transformers	$6,189
Rooftop Unit Replacement	$13,323
Chiller Replacement	$11,093
AHU / Split System Replacement	$4,121
Electronic Fuel-Use Economizer	$168
Asbestos Abatement	$10,147
TOTAL	**$447,815**

Project total construction contingency allowance amount is 10.1% of estimated hard costs and is agreed upon.

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ENERGY SAVINGS PLAN

APPENDIX B – DESIGN BID BUILD

Appendix B – Design Bid Build Procedures

Design–bid–build (or **design/bid/build**, and abbreviated **D–B–B** or **D/B/B** accordingly), also known as **Design–tender** (or "design/tender") **traditional method** or **hard bid** is the method of delivery for this project.

Design–bid–build is the traditional method for project delivery and differs in several substantial aspects from design–build.

There are three main sequential phases to the design–bid–build delivery method:

- The design phase
- The bidding (or tender) phase
- The construction phase

Design Phase

In this phase DCO will design and produce bid documents, including construction drawings and technical specifications, on which various contractors will in turn bid to construct the project.

The Energy Savings Plan (ESP) is intended to document owner's project requirements and provide a conceptual and/or schematic design and good faith estimates.

With the ESP DCO will bring in other design professionals including mechanical, electrical, and plumbing engineers (MEP specifications engineers), a fire protection engineer, structural engineer, sometimes a civil engineer and a landscape architect to help complete the construction drawings and technical.

The design document should reflect the intent of the energy savings plan for scope, price, savings, operations & maintenance savings, incentive and schedule.

The finished bid documents are coordinated by the DCO and owner for issuance to contractors during the bid phase.

Bid (or tender) phase

Bidding is according to NJ Public Bid Law and is "open", in which any qualified bidder may participate.

The various contractors bidding obtain bid documents, and then put them out to multiple subcontractors for bids on sub-components of the project.

Questions may arise during the bid period, and DCO will issue clarifications or corrections to the bid documents in the form of addenda.

From these elements, the contractor compiles a complete bid for submission by the established closing date and time bid date.

Bids are to be based on a base bid lump sum plus alternates, bid requirements and alternates are elucidated within the bid documents.

Once bids are received, DCO reviews the bids, seeks any clarifications required of the bidders, investigates contractor qualifications, ensures all documentation is in order (including bonding if required), and advises the owner as to the ranking of the bids.

If the bids fall in a range acceptable to the owner, the project is awarded to the contractor with the lowest reasonable bid.

In the event that all of the bids do not satisfy the needs of the owner the following options become available to DCO:

- Re-bid the construction of the project on a future when monies become available and/or construction costs go down.
- Revise the design of that ECM (at no cost to the client) so as to make the project smaller or reduce features or elements of the project to bring the cost down. The revised bid documents can then be issued again for bid.
    - DCO will provide guidance on energy savings, operation and maintenance savings and incentives to ensure the project is self-funding.
- Revise the design of future ECM(s) (at no cost to the client) so as to make the project smaller or reduce features or elements of the project to bring the cost down. The current bid package can then be contracted
    - DCO will provide guidance on energy savings, operation and maintenance savings and incentives to ensure the project is self-funding.

Construction phase

Once the construction of the project has been awarded to the contractor, the bid documents (e.g., approved construction drawings and technical specifications) may not be altered.

The necessary permits (for example, a building permit) must be achieved from all jurisdictional authorities in order for the construction process to begin.

Should design changes be necessary during construction, whether initiated by the contractor, owner, or as discovered by the architect, DCO will issue sketches or written clarifications and handle the project through allowance (See Appendix A).

The contractor may be required to document "as built" conditions to the owner.

Bidding Method

1. To achieve energy savings and fund debt service payments as rapidly as possible the bid packages will be bid in the following order:

BID METHOD SCHEDULE		
ECM	COST + ALLOWANC	SAVINGS
LED Lighting	$996,780	$159,615
Retrocommissioning	$354,672	$28,371
Steam Trap Replacement	$343,816	$27,025
Energy Management System	$0	$22,126
Combined Heat & Power Unit	$427,926	$20,052
Building Envelope Weatherization	$188,026	$15,998
Water Conservation	$10,016	$12,108
Boiler Replacement	$1,753,376	$7,814
Window Refurbishment	$208,483	$5,894
Plug Load Controls	$61,145	$4,232
Pipe and Valve Insulation	$28,116	$3,167
High Efficiency Transformers	$67,189	$4,866
Rooftop Unit Replacement	$144,626	$2,203
Chiller Replacement	$120,419	$1,122
AHU / Split System Replacement	$44,738	$457
Electronic Fuel-Use Economizer	$1,826	$275
Asbestos Abatement	$110,147	$0
TOTAL	**$4,861,299**	**$315,324**

2. Bids in group 1 (Green) are within 15% of budget value they will be awarded.
3. Bids in group 2 (Yellow) may be value engineered from the project to meet budget
    a. DCO will provide the impact of ECMs value engineered:
        i. Energy Savings
        ii. Operations and Maintenance Savings
        iii. Incentive
4. Bids in group 3 (Red) may be value engineered **or removed** from the project to meet budget
    a. DCO will provide the impact of ECMs value engineered or removed:
        i. Energy Savings
        ii. Operations and Maintenance Savings
        iii. Incentive
5. As per ESIP law DCO fee will be applied to the ECM hard cost.
    a. DCO will receive no compensation for bids that are under budget
    b. DCO will receive no penalty for bids that are over budget
6. If the budget overruns make savings unachievable at the current budget, DCO will provide additional ECMs above the budget to meet the required energy savings

Project bidding strategy is agreed upon.

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ENERGY SAVINGS PLAN

APPENDIX C – OPERATIONS AND MAINTENANCE SAVINGS

Appendix C – Operation & Maintenance Savings

Operations and Maintenance and other non-energy-related cost savings are allowable in NJ ESIPs, and are defined as reduction in expenses (other than energy cost savings) related to energy and water consuming equipment:

Energy-related cost savings can result from avoided expenditures for operations, maintenance, equipment repair, or equipment replacement due to the ESIP project.

Sources of O&M savings include:

- Termination of service personnel
- Lower maintenance service contract costs
- Decrease in repair costs
    - Avoided repair and replacement costs as a result of replacing old and unreliable equipment
    - Material savings due to new equipment warranties
    - Material savings due to the longer life items not needing replacement
        - In particular, reduction in florescent bulbs due to LED

Termination of service personnel

As a result of the ESIP, a number of the client's maintenance staff members may no longer be required. If there will be a reduction in the government's maintenance staff, O&M savings can be claimed.

A problem could arise if the maintenance staff is not reduced. Then it would be necessary to determine what new O&M responsibilities the facility has taken on, or savings should not be claimed. For example, it could be that a new building was constructed. During the performance period, it is important to establish that any increased maintenance was not due to the equipment installed under the ESIP

Lower maintenance service contract costs

Prior to the implementation of the ESIP mechanical and electrical equipment was maintained by a third party under a maintenance contract. The ESIP replaces the aging equipment with newer, more efficient equipment, which can reduce the service costs to the client.

Decrease in repair costs

The client is responsible for maintenance both before and after the equipment installation. Although there is no reduction in staff for which to claim labor savings, there will be cost savings on replacement materials.

Material-related savings frequently result from lighting and lighting controls projects.

For this project, lighting maintenance savings will result from the following:

1. Reduced material requirements (e.g., lamps)
2. Reduced operating time — Control measures increase equipment life by reducing the burn time of lamps and ballasts
3. Warranty-related savings — newly installed lamps, and fixtures come with a manufacturer warranty of 10 years.

Year 1 O&M Savings

KEARNY BOE		ANNUAL O&M COST SAVINGS
ECM #	ENERGY CONSERVATION MEASURE	$
1	LED Lighting	$17,579
2	Energy Management System	$6,664
3	Boiler Replacement	$4,306
4	Steam Trap Replacement	$3,932
5	Chiller Replacement	$500
6	Rooftop Unit Replacement	$1,000
7	AHU / Split System Replacement	$400
	TOTALS	$34,381

Project O&M Savings strategy is agreed upon.

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KEARNY SCHOOL DISTRICT

ENERGY SAVINGS PLAN

APPENDIX D – PROJECT CHANGES IN FINANCING

Appendix D – Project Changes in Financing

The Energy savings plan has been approved using:

Interest rate of:..... 2.5%
Term: ..... 20 Years
Construction Term..... 12 Months
Construction Interest Only Payment of ..... TBD by Kearny School District financial advisor
Annual Surplus of no less than..... $2,400

During financing DCO will provide assistance but does not guarantee the timing of savings or incentives.

While beneficial to the client financing changes are the responsibility of the client, bond counsel and/or financial advisor. DCO represents in no way advice on these financial items

Financial items may include but are not limited to:

- Timing of payments
- Splitting payments into bi-annual, tri-annual, etc.
- Coordination with the client's fiscal year
- Local finance board material, forms and presentations
- Multiple tiered interest rates

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KEARNY SCHOOL DISTRICT

ENERGY SAVINGS PLAN

APPENDIX E – INCENTIVES IN DEBT SERVICE

Appendix E – Incentives in Debt Service

Estimated incentive values were calculated in accordance with the PSE&G Rebate Program Guidelines. The total incentive amount was calculated to be $377,337 in rebates and incentives - $59,941 of which have been applied to project financing. The Direct Install rebate program covers $317,396 (39%) of the installed cost of the improvements with the remainder included in the ESIP. Please see below, Appendix E and Appendix F for building-by-building details.

Incentive Totals

BUILDING	INCENTIVE TYPE	SOURCE	NOTES	QUANTITY	UNITS	INCENTIVE $/UNIT	INSTALL INCENTIVE	YEAR 1 INCENTIVE	SUBTOTAL	TOTAL
KEARNY BOE	Prescriptive	PSE&G		Various	Various	Various	$0	$59,941	$59,941	$377,337
	Direct Install	PSE&G		$317,396	$	39%	$317,396	$0	$317,396	
						TOTALS	$317,396	$59,941	$377,337	

Incentive Data

BUILDING	INCENTIVE TYPE	SOURCE	ECM	QUANTITY	UNITS	INCENTIVE $/UNIT	INSTALL INCENTIV	YEAR 1 INCENTIV	SUBTOTAL	TOTAL
Kearny High School	Prescriptive	PSE&G	LED Lighting	Various	Various	Various		$18,993	$18,993	$19,758
Kearny High School	Prescriptive	PSE&G	Plug Load Controls	103	EA	$5.00		$515	$515	
Kearny High School	Prescriptive	PSE&G	Plug Load Controls	2	EA	$125.00		$250	$250	
Lincoln Middle School	Prescriptive	PSE&G	LED Lighting	Various	Various	Various		$22,591	$22,591	$22,866
Lincoln Middle School	Prescriptive	PSE&G	Plug Load Controls	55	Ea	$5.00		$275	$275	
Franklin Elementary School	Prescriptive	PSE&G	Plug Load Controls	86	EA	$5.00		$430	$430	$93,891
Franklin Elementary School	Direct Install	PSE&G	Various	$93,461	$	56%	$93,461		$93,461	
Washington Elementary School	Prescriptive	PSE&G	Plug Load Controls	40	EA	$5.00		$200	$200	$39,139
Washington Elementary School	Direct Install	PSE&G	Various	$38,939	$	40%	$38,939		$38,939	
Garfield Elementary School	Prescriptive	PSE&G	Plug Load Controls	32	EA	$5.00		$160	$160	$29,279
Garfield Elementary School	Direct Install	PSE&G	Various	$29,119	$	42%	$29,119		$29,119	
Schuyler Elementary School	Prescriptive	PSE&G	Plug Load Controls	39	EA	$5.00		$195	$195	$109,449
Schuyler Elementary School	Direct Install	PSE&G	Various	$93,342	$	36%	$93,342		$93,342	
Schuyler Elementary School	Prescriptive	PSE&G	Boiler Replacement	7,956	MBH	$2.00		$15,912	$15,912	
Roosevelt Elementary School	Prescriptive	PSE&G	Plug Load Controls	44	EA	$5.00		$220	$220	$16,847
Roosevelt Elementary School	Prescriptive	PSE&G	Plug Load Controls	1	EA	$125.00		$125	$125	
Roosevelt Elementary School	Direct Install	PSE&G	Various	$16,502	$	29%	$16,502		$16,502	
Administration Building	Prescriptive	PSE&G	Plug Load Controls	15	EA	$5.00		$75	$75	$46,107
Administration Building	Direct Install	PSE&G	Various	$46,032	$	26%	$46,032		$46,032	

No implied and/or written guarantee is being made with respective to the receipt of incentives. All incentives estimates carry inherent risks that may jeopardize the receipt of them. Therefore, Kearny School District acknowledges and accepts that any project proposed should not rely on the receipt of incentives as a reason to implement it.

PSE&G Energy Saver Program

Energy Efficiency Upgrade Proposal

Prepared For:

Customer Name: KEARNY BOARD OF ED

174 MIDLAND AVE
ADMIN BUILDING

Phone Number: 201-955-5000

Project Number: 00000386404

Vendor Tracking Number: A085897

Customer Name: KEARNY BOARD OF ED
174 MIDLAND AVE
201-955-5000

Estimated Retail Energy Savings

Electric	Lighting	Non-Lighting	Total
Existing kW Load	15.253	-	15.253
Proposed kW Load	7.368	-	7.368
kW Load Savings	7.885	1.653	9.538
Electric			
Existing kWh Load	34,969.86	-	34,969.86
Proposed kWh Load	16,707.36	-	16,707.36
kWh Load Savings	18,262.5	8,737.871	27,000.371
Gas			
Existing Therm Load	-	-	0
Proposed Therm Load	-	-	0
Therm Savings	-	556.8	556.8

Estimated Retail Energy Cost Savings

	Lighting	Non-Lighting	Total
Existing Electric Cost	$5,245.48	-	$5,245.48
Proposed Electric Cost	$2,506.10	-	$2,506.10
Electric Cost Savings	$2,739.38	$1,310.68	$4,050.06
Existing Gas Cost	-	-	$0
Proposed Gas Cost	-	-	$0
Gas Cost Savings	-	$782.65	$782.65

Total Project Cost Breakdown

Costs	Lighting	Non-Lighting	Total
Total Project Cost	$20,240.10	$154,517.77	$174,757.87
PSE&G Contribution (26.3%)	-	-	$46,031.96
Net Project After Rebate	-	-	$128,725.92
Monthly Payment (60 Months at 0% Interest)	**-**	**-**	**$2,145.43**

Cash Flow Analysis

	Lighting	Non-Lighting	Total
Total Monthly Savings	$228.28	$174.44	$402.73
Customer Monthly Payment (60 months at 0% Interest)	-	-	$2,145.43
Monthly Cash Flow (60 months)	-	-	($1,742.70)

Customer Name: KEARNY BOARD OF ED
174 MIDLAND AVE
201-955-5000

Projected Five Year Monthly Cash Flow

Month	Customer Payments	Monthly Savings	Cumulative Cash Flow
1	$2,145.43	$402.73	($1,742.70)
2	$2,145.43	$402.73	($3,485.41)
3	$2,145.43	$402.73	($5,228.11)
4	$2,145.43	$402.73	($6,970.82)
5	$2,145.43	$402.73	($8,713.52)
6	$2,145.43	$402.73	($10,456.23)
7	$2,145.43	$402.73	($12,198.93)
8	$2,145.43	$402.73	($13,941.64)
9	$2,145.43	$402.73	($15,684.34)
10	$2,145.43	$402.73	($17,427.05)
11	$2,145.43	$402.73	($19,169.75)
12	$2,145.43	$402.73	($20,912.46)
13	$2,145.43	$402.73	($22,655.16)
14	$2,145.43	$402.73	($24,397.87)
15	$2,145.43	$402.73	($26,140.57)
16	$2,145.43	$402.73	($27,883.28)
17	$2,145.43	$402.73	($29,625.98)
18	$2,145.43	$402.73	($31,368.69)
19	$2,145.43	$402.73	($33,111.39)
20	$2,145.43	$402.73	($34,854.10)
21	$2,145.43	$402.73	($36,596.80)
22	$2,145.43	$402.73	($38,339.51)
23	$2,145.43	$402.73	($40,082.21)
24	$2,145.43	$402.73	($41,824.92)
25	$2,145.43	$402.73	($43,567.62)
26	$2,145.43	$402.73	($45,310.33)
27	$2,145.43	$402.73	($47,053.03)
28	$2,145.43	$402.73	($48,795.74)
29	$2,145.43	$402.73	($50,538.44)
30	$2,145.43	$402.73	($52,281.15)
31	$2,145.43	$402.73	($54,023.85)
32	$2,145.43	$402.73	($55,766.56)
33	$2,145.43	$402.73	($57,509.26)
34	$2,145.43	$402.73	($59,251.97)
35	$2,145.43	$402.73	($60,994.67)
36	$2,145.43	$402.73	($62,737.38)
37	$2,145.43	$402.73	($64,480.08)
38	$2,145.43	$402.73	($66,222.79)
39	$2,145.43	$402.73	($67,965.49)
40	$2,145.43	$402.73	($69,708.20)

41	$2,145.43	$402.73	($73,193.61)
42	$2,145.43	$402.73	($73,193.61)
43	$2,145.43	$402.73	($74,936.31)
44	$2,145.43	$402.73	($76,679.02)
45	$2,145.43	$402.73	($78,421.72)
46	$2,145.43	$402.73	($80,164.43)
47	$2,145.43	$402.73	($81,907.13)
48	$2,145.43	$402.73	($83,649.84)
49	$2,145.43	$402.73	($85,392.54)
50	$2,145.43	$402.73	($87,135.25)
51	$2,145.43	$402.73	($88,877.95)
52	$2,145.43	$402.73	($90,620.66)
53	$2,145.43	$402.73	($92,363.36)
54	$2,145.43	$402.73	($94,106.07)
55	$2,145.43	$402.73	($97,591.48)
57	$2,145.43	$402.73	($99,334.18)
58	$2,145.43	$402.73	($101,076.89)
59	$2,145.43	$402.73	($102,819.59)
60	$2,145.55	$402.73	($104,562.42)
TOTALS	**$128,725.92**	**$24,163.50**	**($104,562.42)**

Customer Name: KEARNY BOARD OF ED
174 MIDLAND AVE
201-955-5000

Projected Five Year Cash Flow

Year	Customer Payments	Yearly Savings	Cumulative Cash Flow
1	$25,745.16	$4,832.70	($20,912.46)
2	$25,745.16	$4,832.70	($41,824.92)
3	$25,745.16	$4,832.70	($62,737.38)
4	$25,745.16	$4,832.70	($83,649.84)
5	$25,745.28	$4,832.70	($104,562.42)
TOTALS	**$128,725.92**	**$24,163.50**	**($104,562.42)**

Customer Name: KEARNY BOARD OF ED
174 MIDLAND AVE
201-955-5000

Proposal Notes:

The predominant operating hours for this analysis provided by Customer are: 2,500

An electric rate of $0.15 per kWh was utilized to generate this proposal.

A gas rate of $0.97 per Therm was utilized to generate this proposal.

This is a turnkey Proposal and includes, but is not limited to, all labor, permits, and material costs.

Project costs do not include New Jersey sales tax. For capital improvement projects, customer must complete and submit a ST-8 form for tax exemption.

Recycling of all lamps is included in the scope of work for this project.

Project installation labor is warranted for a period of one (1) year - see the contract for more information.

New Jersey Clean Energy Program Protocols 2020 were utilized to evaluate this Project Proposal. The estimated energy savings and environmental impacts in this proposal are based on the New Jersey Clean Energy Program Protocols 2020. Among other items, these Protocols utilize predetermined run hours which may be different than the predominant operating hours provided by the Customer. The Company does not guarantee the proposed energy savings measures will, in fact, save any level of energy or result in a lowering of Customer's energy bills. However, based on the represented predominant run hours, it is expected that the actual energy savings will be near the estimates provided in this Project Proposal.

The information provided in this proposal is for informational purposes only and Customer's actual energy savings may vary based on numerous determining factors including but not limited to weather, changes to Customer utility rates, facility use and facility operating hours.

Customer Name: KEARNY BOARD OF ED
174 MIDLAND AVE
201-955-5000

Environmental Impact Statement

According to the EPA, for each kWh saved, approximately 1.52 pound of Carbon Dioxide (CO2), .0065 pounds of Sulfur Dioxide (SO2), and .0028 pounds of Nitrogen Oxides (NOx) are eliminated from future power plant emissions into our atmosphere annually.

CO2 is a "Greenhouse Gas" while SO2 contributes to acid rain formation and NOx contributes to the atmosphere ozone formation (Smog) and estuarial damage.

The Annual Pollution Reduction Impact of Your Project

Chemical Compound	Annual Reduction lbs.
Carbon Dioxide	41,040.56
Nitrogen Oxides	75.6
Sulfur Dioxide	175.5

For every 10,000 Kilowatt Hours saved the EPA has estimated the savings to be equivalent to planting 2.9 acres of trees annually or equivalent to removing 1.4 cars from our roads annually.

Your Project's Local Impact

Acres of Trees Planted:	7.83
Cars Removed	3.78

Energy Savings Calculator: How We Derive Your Energy Savings

$$\frac{\text{Watts Saved} \times \text{Operating Hours}}{\text{1,000 w per kW}} \times \text{kWh rate}$$

We save you electric energy (kilowatt-hours) by updating your lighting equipment with advanced, highly efficient technology products that provide more capability while using less electricity.

While your cost per kilowatt-hour is fixed, your operating hours are variable as they are in your control. As long as operating hours are as represented, your electrical savings should be in line with the projected energy savings.

For more information please visit www.epa.gov

Enrolled Lighting Measures

Measure Line Item	Area Description /Location	Floor	Exist. Measure	Count of existing	Proposed Measure	Proposed Measure Count	Watts Saved
1	Conference Room-126	1	1I0052	8		8	0
2	Elevator Hallway-120	1	1I0052	6		6	0
3	Fire Alarm Foyer-119	1	1I0052	7		7	0
4	Curriculum Hallway-110	1	3F32SSE	8	Relamp: Direct Line LED - 3-Lamp - 4-Foot 12.5w	8	365.418
5	Special Service-115	1	3F32SSE	8	Relamp: Direct Line LED - 3-Lamp - 4-Foot 12.5w	8	365.418
6	CST Office-118	1	3F32SSE	3	Relamp: Direct Line LED - 3-Lamp - 4-Foot 12.5w	3	137.032
7	Midlane St. Office-117	1	3F32SSE	3	Relamp: Direct Line LED - 3-Lamp - 4-Foot 12.5w	3	137.032
8	Curriculum Office #1-108	1	3F32SSE	4	Relamp: Direct Line LED - 3-Lamp - 4-Foot 12.5w	4	182.709
9	Curriculum Office #2-107	1	3F32SSE	2	Relamp: Direct Line LED - 3-Lamp - 4-Foot 12.5w	2	91.354
10	Curriculum Office #3-106	1	3F32SSE	2	Relamp: Direct Line LED - 3-Lamp - 4-Foot 12.5w	2	91.354
11	Basement Foyer-001	B	2F32SSE	2	Relamp: Direct Line LED - 2-Lamp -U-Bend-15.5W	2	80.5

12	Basement File-003-004	B	4F32SSE	9	Relamp: Direct Line LED - 4-Lamp - 4-Foot 12.5w	9	504.711
13	Brooks Office-11	B	4F32SSE	2	Relamp: Direct Line LED - 4-Lamp - 4-Foot 12.5w	2	112.158
14	Print Storage-13	B	4F32SSE	3	Relamp: Direct Line LED - 4-Lamp - 4-Foot 12.5w	3	168.237
15	Map Office-12	B	4F32SSE	2	Relamp: Direct Line LED - 4-Lamp - 4-Foot 12.5w	2	112.158
16	Map Office-12	B	2F32SSE	2	Relamp: Direct Line LED - 2-Lamp -U-Bend-15.5W	2	80.5
17	Reading Center-006	B	4F32SSE	13	Relamp: Direct Line LED - 4-Lamp - 4-Foot 12.5w	13	729.027
18	Reading Center Bathroom-006T	B	2F32SSE	1	Relamp: Direct Line LED - 2-Lamp -U-Bend-15.5W	1	40.25
19	House Center-005	B	4F32SSE	12	Relamp: Direct Line LED - 4-Lamp - 4-Foot 12.5w	12	672.948
20	House Center-005	B	2F32SSE	1	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	1	31.658
21	House Center Bathroom-005T	B	2F32SSE	1	Relamp: Direct Line LED - 2-Lamp -U-Bend-15.5W	1	40.25
22	Stair from B->1-121/009	B	4F32SSE	1	Relamp: Direct Line LED - 4-Lamp - 4-Foot 12.5w	1	56.079

23	Maintance Storage-002	B	4F32SSE	1	Relamp: Direct Line LED - 4-Lamp - 4-Foot 12.5w	1	56.079
24	Open Office #1-215	2	3F32SSE	6	Relamp: Direct Line LED - 3-Lamp - 4-Foot 12.5w	6	274.064
25	Open Office #1-215	2	3F32SSE	3	Relamp: Direct Line LED - 3-Lamp - 4-Foot 12.5w	3	137.032
26	Mens Room-212	2	2F25SSE	1	Relamp: Direct Line LED - 2-Lamp - 3-Foot 12w	1	20.804
27	Womans Room-211	2	2F25SSE	1	Relamp: Direct Line LED - 2-Lamp - 3-Foot 12w	1	20.804
28	Storage #1-1	2	1I0025	1		1	0
29	Open Office #2-208	2	3F32SSE	6	Relamp: Direct Line LED - 3-Lamp - 4-Foot 12.5w	6	274.064
30	Open Office #2-208	2	3F32SSE	3	Relamp: Direct Line LED - 3-Lamp - 4-Foot 12.5w	3	137.032
31	Stairs From 1->2-120	2	2F25SSE	3	Relamp: Direct Line LED - 2-Lamp - 3-Foot 12w	3	62.41
32	Server Room-204	2	2F32SSE	1	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	1	31.658
33	Office #1-214	2	2F32SSE	3	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	3	94.972
34	Office #1 Bathroom-214T	2	2F17SSE	1	Relamp: Direct Line LED - 2-Lamp - 2-Foot 9w	1	17.186

35	Office #2-213	2	2F32SSE	3	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	3	94.972
36	Office #2 Bathroom-213T	2	2F17SSE	1	Relamp: Direct Line LED - 2-Lamp - 2-Foot 9w	1	17.186
37	Office #3-202	2	4F32SSE	2	Relamp: Direct Line LED - 4-Lamp - 4-Foot 12.5w	2	112.158
38	Conference Room-205	2	2F32SSE	5	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	5	158.288
39	Kitchen-206	2	2F32SSE	1	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	1	31.658
40	Print Room-209	2	2F32SSE	3	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	3	94.972
41	Sprinkler Room-113	1	4F32SSE	1	Relamp: Direct Line LED - 4-Lamp - 4-Foot 12.5w	1	56.079
42	Custodian Room-114	1	4F32SSE	1	Relamp: Direct Line LED - 4-Lamp - 4-Foot 12.5w	1	56.079
43	Mens Room-112	1	3F32SSE	3	Relamp: Direct Line LED - 3-Lamp - 4-Foot 12.5w	3	137.032
44	Womans Room-111	1	3F32SSE	3	Relamp: Direct Line LED - 3-Lamp - 4-Foot 12.5w	3	137.032
45	Back File Storage-105	1	2F32SSE	2	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	2	63.315

46	Back Office-104	1	2F32SSE	2	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	2	63.315
47	Nurse -124	1	2F32SSE	1	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	1	31.658
48	Nurse Closet-125	1	2F32SSE	1	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	1	31.658
49	Front Door Foyer-122	1	2F32SSE	5	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	5	158.288
50	Front Door Conference-126	1	2F32SSE	9	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	9	284.918
51	Stairs From 1->B-101 /001	1	2F25SSE	3	Relamp: Direct Line LED - 2-Lamp - 3-Foot 12w	3	62.41
52	Stairs from 2->1-201	1	2F25SSE	3	Relamp: Direct Line LED - 2-Lamp - 3-Foot 12w	3	62.41
53	Office #3 Bathroom-202T	2	2F17SSE	1	Relamp: Direct Line LED - 2-Lamp - 2-Foot 9w	1	17.186
54	Maintance Storage-007	B	4F32SSE	1	Relamp: Direct Line LED - 4-Lamp - 4-Foot 12.5w	1	56.079
55	Maintance Storage-008	B	4F32SSE	1	Relamp: Direct Line LED - 4-Lamp - 4-Foot 12.5w	1	56.079
56	Meeting Room-203	B	4F32SSE	4	Relamp: Direct Line LED - 4-Lamp - 4-Foot 12.5w	4	224.316
57	Entire Office	1	1L005	48	Emergency Light Kit	48	0

Enrolled Non-Lighting Measures

Measure Line Item	Exist. Measure	Count of existing	Proposed Measure	Proposed Measure Count	Watts Saved	Therms
Water Savings	TBD TBD	1	TBD TBD	1	0	207.105
Water Heating		1	TBD TBD	1	0	56.819
Fuel Use Economizer - Furnace or Boiler	Intelligent Controls Systems ICS-3330	1		1	0	67.236
Fuel Use Economizer - Furnace or Boiler	intelligent Controls Systems ICS-3330	1		1	0	134.472
Fuel Use Economizer - Furnace or Boiler	Intelligent Controls Systems ICS-3330	1		1	0	112.06
HVAC - AC	Trane YHC060E3RZAF	1	TBD TBD	1	164.835	0
HVAC - AC	York DL-12N24NTAAA1A	1	TBD TBD	1	694.444	0
HVAC - AC	Trane YHC102F3RZA16AF	1	TBD TBD	1	386.364	0
HVAC - AC	Mitsubishi PUY-A12NHA4	1	TBD TBD	1	61.538	0
HVAC - AC	Bryant	1	TBD TBD	1	115.385	0
HVAC - AC	Bryant	1	TBD TBD	1	115.385	0
HVAC - AC	Bryant	1	TBD TBD	1	115.385	0
C&I HVAC		1	TBD TBD	1	0	0
C&I HVAC		1	TBD TBD	1	0	0
C&I HVAC		1	TBD TBD	1	0	0
Gas Furnace - Boiler Replacement	Bryant 340AAV048080	1	TBD TBD	1	0	76.386
Gas Furnace - Boiler Replacement	Bryant 340AAV048080	1	TBD TBD	1	0	76.386

Gas Furnace - Boiler Replacement	Bryant 340AAV048080	1	TBD TBD	1	0	76.386

PSE&G Energy Saver Program

Energy Efficiency Upgrade Proposal

Prepared For:

Customer Name: KEARNY BOARD OF ED

100 DAVIS AVE

FRANKLIN

Phone Number: 201-955-5008

Project Number: 00000385905

Vendor Tracking Number: A085892

Customer Name: KEARNY BOARD OF ED
100 DAVIS AVE
FRANKLIN
201-955-5008

Estimated Retail Energy Savings

Electric	Lighting	Non-Lighting	Total
Existing kW Load	171.841	-	171.841
Proposed kW Load	64.515	-	64.515
kW Load Savings	107.326	0	107.326
Electric			
Existing kWh Load	439,041.72	-	439,041.72
Proposed kWh Load	162,841.089	-	162,841.089
kWh Load Savings	276,200.631	0	276,200.631
Gas			
Existing Therm Load	-	-	0
Proposed Therm Load	-	-	0
Therm Savings	-	163.58	163.58

Estimated Retail Energy Cost Savings

	Lighting	Non-Lighting	Total
Existing Electric Cost	$65,856.26	-	$65,856.26
Proposed Electric Cost	$24,426.16	-	$24,426.16
Electric Cost Savings	$41,430.09	$0.00	$41,430.09
Existing Gas Cost	-	-	$0
Proposed Gas Cost	-	-	$0
Gas Cost Savings	-	$3,040.48	$3,040.48

Total Project Cost Breakdown

Costs	Lighting	Non-Lighting	Total
Total Project Cost	$164,949.79	$3,423.24	$168,373.03
PSE&G Contribution (55.5%)	-	-	$93,460.98
Net Project After Rebate	-	-	$74,912.05
Monthly Payment (60 Months at 0% Interest)	**-**	**-**	**$1,248.53**

Cash Flow Analysis

	Lighting	Non-Lighting	Total
Total Monthly Savings	$3,452.51	$253.37	$3,705.88
Customer Monthly Payment (60 months at 0% Interest)	-	-	$1,248.53
Monthly Cash Flow (60 months)	-	-	$2,457.35

Customer Name: KEARNY BOARD OF ED
100 DAVIS AVE
FRANKLIN
201-955-5008

Projected Five Year Monthly Cash Flow

Month	Customer Payments	Monthly Savings	Cumulative Cash Flow
1	$1,248.53	$3,705.88	$2,457.35
2	$1,248.53	$3,705.88	$4,914.70
3	$1,248.53	$3,705.88	$7,372.05
4	$1,248.53	$3,705.88	$9,829.40
5	$1,248.53	$3,705.88	$12,286.75
6	$1,248.53	$3,705.88	$14,744.10
7	$1,248.53	$3,705.88	$17,201.46
8	$1,248.53	$3,705.88	$19,658.81
9	$1,248.53	$3,705.88	$22,116.16
10	$1,248.53	$3,705.88	$24,573.51
11	$1,248.53	$3,705.88	$27,030.86
12	$1,248.53	$3,705.88	$29,488.21
13	$1,248.53	$3,705.88	$31,945.56
14	$1,248.53	$3,705.88	$34,402.91
15	$1,248.53	$3,705.88	$36,860.26
16	$1,248.53	$3,705.88	$39,317.61
17	$1,248.53	$3,705.88	$41,774.96
18	$1,248.53	$3,705.88	$44,232.31
19	$1,248.53	$3,705.88	$46,689.67
20	$1,248.53	$3,705.88	$49,147.02
21	$1,248.53	$3,705.88	$51,604.37
22	$1,248.53	$3,705.88	$54,061.72
23	$1,248.53	$3,705.88	$56,519.07
24	$1,248.53	$3,705.88	$58,976.42
25	$1,248.53	$3,705.88	$61,433.77
26	$1,248.53	$3,705.88	$63,891.12
27	$1,248.53	$3,705.88	$66,348.47
28	$1,248.53	$3,705.88	$68,805.82
29	$1,248.53	$3,705.88	$71,263.17
30	$1,248.53	$3,705.88	$73,720.52
31	$1,248.53	$3,705.88	$76,177.88
32	$1,248.53	$3,705.88	$78,635.23
33	$1,248.53	$3,705.88	$81,092.58
34	$1,248.53	$3,705.88	$83,549.93
35	$1,248.53	$3,705.88	$86,007.28
36	$1,248.53	$3,705.88	$88,464.63
37	$1,248.53	$3,705.88	$90,921.98
38	$1,248.53	$3,705.88	$93,379.33
39	$1,248.53	$3,705.88	$95,836.68
40	$1,248.53	$3,705.88	$98,294.03

41	$1,248.53	$3,705.88	$103,208.73
42	$1,248.53	$3,705.88	$103,208.73
43	$1,248.53	$3,705.88	$105,666.09
44	$1,248.53	$3,705.88	$108,123.44
45	$1,248.53	$3,705.88	$110,580.79
46	$1,248.53	$3,705.88	$113,038.14
47	$1,248.53	$3,705.88	$115,495.49
48	$1,248.53	$3,705.88	$117,952.84
49	$1,248.53	$3,705.88	$120,410.19
50	$1,248.53	$3,705.88	$122,867.54
51	$1,248.53	$3,705.88	$125,324.89
52	$1,248.53	$3,705.88	$127,782.24
53	$1,248.53	$3,705.88	$130,239.59
54	$1,248.53	$3,705.88	$132,696.94
55	$1,248.53	$3,705.88	$137,611.65
57	$1,248.53	$3,705.88	$140,069.00
58	$1,248.53	$3,705.88	$142,526.35
59	$1,248.53	$3,705.88	$144,983.70
60	$1,248.78	$3,705.88	$147,440.80
TOTALS	**$74,912.05**	**$222,352.85**	**$147,440.80**

Customer Name: KEARNY BOARD OF ED
100 DAVIS AVE
FRANKLIN
201-955-5008

Projected Five Year Cash Flow

Year	Customer Payments	Yearly Savings	Cumulative Cash Flow
1	$14,982.36	$44,470.57	$29,488.21
2	$14,982.36	$44,470.57	$58,976.42
3	$14,982.36	$44,470.57	$88,464.63
4	$14,982.36	$44,470.57	$117,952.84
5	$14,982.61	$44,470.57	$147,440.80
TOTALS	**$74,912.05**	**$222,352.85**	**$147,440.80**

Customer Name: KEARNY BOARD OF ED
100 DAVIS AVE
FRANKLIN
201-955-5008

Proposal Notes:

The predominant operating hours for this analysis provided by Customer are: 2,500

An electric rate of $0.15 per kWh was utilized to generate this proposal.

A gas rate of $0.97 per Therm was utilized to generate this proposal.

This is a turnkey Proposal and includes, but is not limited to, all labor, permits, and material costs.

Project costs do not include New Jersey sales tax. For capital improvement projects, customer must complete and submit a ST-8 form for tax exemption.

Recycling of all lamps is included in the scope of work for this project.

Project installation labor is warranted for a period of one (1) year - see the contract for more information.

New Jersey Clean Energy Program Protocols 2020 were utilized to evaluate this Project Proposal. The estimated energy savings and environmental impacts in this proposal are based on the New Jersey Clean Energy Program Protocols 2020. Among other items, these Protocols utilize predetermined run hours which may be different than the predominant operating hours provided by the Customer. The Company does not guarantee the proposed energy savings measures will, in fact, save any level of energy or result in a lowering of Customer's energy bills. However, based on the represented predominant run hours, it is expected that the actual energy savings will be near the estimates provided in this Project Proposal.

The information provided in this proposal is for informational purposes only and Customer's actual energy savings may vary based on numerous determining factors including but not limited to weather, changes to Customer utility rates, facility use and facility operating hours.

Customer Name: KEARNY BOARD OF ED
100 DAVIS AVE
FRANKLIN
201-955-5008

Environmental Impact Statement

According to the EPA, for each kWh saved, approximately 1.52 pound of Carbon Dioxide (CO2), .0065 pounds of Sulfur Dioxide (SO2), and .0028 pounds of Nitrogen Oxides (NOx) are eliminated from future power plant emissions into our atmosphere annually.

CO2 is a "Greenhouse Gas" while SO2 contributes to acid rain formation and NOx contributes to the atmosphere ozone formation (Smog) and estuarial damage.

The Annual Pollution Reduction Impact of Your Project

Chemical Compound	Annual Reduction lbs.
Carbon Dioxide	419,824.96
Nitrogen Oxides	773.36
Sulfur Dioxide	1,795.3

For every 10,000 Kilowatt Hours saved the EPA has estimated the savings to be equivalent to planting 2.9 acres of trees annually or equivalent to removing 1.4 cars from our roads annually.

Your Project's Local Impact

Acres of Trees Planted:	80.1
Cars Removed	38.67

Energy Savings Calculator:
How We Derive Your Energy Savings

$$\frac{\text{Watts Saved x Operating Hours}}{\text{1,000 w per kW}} \times \text{kWh rate}$$

We save you electric energy (kilowatt-hours) by updating your lighting equipment with advanced, highly efficient technology products that provide more capability while using less electricity.

While your cost per kilowatt-hour is fixed, your operating hours are variable as they are in your control. As long as operating hours are as represented, your electrical savings should be in line with the projected energy savings.

For more information please visit www.epa.gov

Enrolled Lighting Measures

Measure Line Item	Area Description /Location	Floor	Exist. Measure	Count of existing	Proposed Measure	Proposed Measure Count	Watts Saved
1	Main Lobby-1	4	1F32SSE	36	Relamp: Direct Line LED - 1-Lamp - 4-Foot 12.5w	36	453.6
2	Hallway-2	4	1F32SSE	8	Relamp: Direct Line LED - 1-Lamp - 4-Foot 12.5w	8	100.8
3	Principle Office	3	2F32SSE	3	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	3	75.6
4	Closet	3	1I0015	1	Relamp: LED - A-Lamp 9w	1	4.32
5	Restroom	3	1I0060	1	Relamp: LED - A-Lamp 9w	1	36.72
6	Hall	3	1L030	1		1	0
7	Copy Room	3	2F32SSE	1	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	1	25.2
8	Copy Room	3	2F32SSE	2	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	2	50.4
9	Office	3	4F32SSE	2	Relamp: Direct Line LED - 4-Lamp - 4-Foot 12.5w	2	89.28
10	Hallway	3	1F32SSE	10	Relamp: Direct Line LED - 1-Lamp - 4-Foot 12.5w	10	126
11	CST Room 420	3	1L030	5		5	0

12	RR in 420	3	1I0060	1	Relamp: LED - A-Lamp 9w	1	36.72
13	Nurse 422	3	2F32SSE	8	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	8	201.6
14	Nurse 422	3	4F32SSE	1	Relamp: Direct Line LED - 4-Lamp - 4-Foot 12.5w	1	44.64
15	Nurse 422	3	1I0060	1	Relamp: LED - A-Lamp 9w	1	36.72
16	Restroom	3	1I0060	1	Relamp: LED - A-Lamp 9w	1	36.72
17	422B	3	2F32SSE	1	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	1	25.2
18	Office	3	2F32SSE	2	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	2	50.4
19	Isolation Room	3	2F32SSE	1	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	1	25.2
20	Mens Room	3	1I0060	6	Relamp: LED - A-Lamp 9w	6	220.32
21	Mens Room	3	2F32SSE	1	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	1	25.2
22	Closet	3	1I0060	1	Relamp: LED - A-Lamp 9w	1	36.72
23	Storage	3	1I0060	2	Relamp: LED - A-Lamp 9w	2	73.44
24	Hallway (Kitchen-Ladies	3	2F32SSE	2	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	2	50.4
25	Woman	3	1L030	2		2	0

26	Woman	3	1I0060	2	Relamp: LED - A-Lamp 9w	2	73.44
27	Faculity Room	3	2F32SSE	1	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	1	25.2
28	Faculity Closet	4	2F32SSE	1	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	1	25.2
29	Storage	4	2F32SSE	1	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	1	25.2
30	CR 223	4	2F32SSE	4	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	4	100.8
31	CR 223	4	2F32SSE	3	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	3	75.6
32	Hallway (424-426)	4	4F32SSE	1	Relamp: Direct Line LED - 4-Lamp - 4-Foot 12.5w	1	44.64
33	CR 424	4	4F32SSE	8	Relamp: Direct Line LED - 4-Lamp - 4-Foot 12.5w	8	357.12
34	CR 424	4	2F32SSE	1	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	1	25.2
35	CR 426	4	4F32SSE	8	Relamp: Direct Line LED - 4-Lamp - 4-Foot 12.5w	8	357.12
36	Display Case	4	1F32SSE	1	Relamp: Direct Line LED - 1-Lamp - 4-Foot 12.5w	1	12.6

37	CR 428	4	4F32SSE	2	Relamp: Direct Line LED - 4-Lamp - 4-Foot 12.5w	2	89.28
38	CR 430	4	4F32SSE	8	Relamp: Direct Line LED - 4-Lamp - 4-Foot 12.5w	8	357.12
39	CR 430	4	2F32SSE	2	Relamp: Direct Line LED - 2-Lamp -U-Bend-15.5W	2	64.08
40	Hallway	4	1F32SSE	8	Relamp: Direct Line LED - 1-Lamp - 4-Foot 12.5w	8	100.8
41	Hallway	4	1F32SSE	4	Relamp: Direct Line LED - 1-Lamp - 4-Foot 12.5w	4	50.4
42	Library	4	2F32SSE	16	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	16	403.2
43	Library	4	2F32SSE	12	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	12	302.4
44	CR 414B	4	4F32SSE	6	Relamp: Direct Line LED - 4-Lamp - 4-Foot 12.5w	6	267.84
45	CR 414B	4	2F32SSE	1	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	1	25.2
46	CR 431	4	4F32SSE	8	Relamp: Direct Line LED - 4-Lamp - 4-Foot 12.5w	8	357.12
47	Closet 431	4	1I0060	1	Relamp: LED - A-Lamp 9w	1	36.72
48	RR 431	4	1I0060	1	Relamp: LED - A-Lamp 9w	1	36.72

49	Hallway (431-433)	4	3F17SSE	10	Relamp: Direct Line LED - 3-Lamp - 2-Foot 9w	10	187.2
50	Hallway (431-433)	4	4F32SSE	2	Relamp: Direct Line LED - 4-Lamp - 4-Foot 12.5w	2	89.28
51	CR 432	4	4F32SSE	10	Relamp: Direct Line LED - 4-Lamp - 4-Foot 12.5w	10	446.4
52	Closet 432	4	2F32SSE	1	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	1	25.2
53	Storage 432	4	4F32SSE	1	Relamp: Direct Line LED - 4-Lamp - 4-Foot 12.5w	1	44.64
54	RR 432	4	1I0060	1	Relamp: LED - A-Lamp 9w	1	36.72
55	CR	4	4F32SSE	8	Relamp: Direct Line LED - 4-Lamp - 4-Foot 12.5w	8	357.12
56	Exit Sign	4	1I0040	2	Fixture Replacement: Exit Sign	2	54.893
57	Vestibule	4	1I0060	2	Relamp: LED - A-Lamp 9w	2	73.44
58	CR 434	4	2F32SSE	24	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	24	604.8
59	Storage (No Access)	4	2F32SSE	1	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	1	25.2
60	CR 435	4	4F32SSE	1	Relamp: Direct Line LED - 4-Lamp - 4-Foot 12.5w	1	44.64

61	CR 435	4	2F32SSE	2	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	2	50.4
62	Stairs	4	1I0060	3	Relamp: LED - A-Lamp 9w	3	110.16
63	CR 349	3	2F32SSE	27	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	27	680.4
64	CR 349 RR	3	1I0060	2	Relamp: LED - A-Lamp 9w	2	73.44
65	Janitor 352	3	1I0060	2	Relamp: LED - A-Lamp 9w	2	73.44
66	Hallway	3	1F32SSE	18	Relamp: Direct Line LED - 1-Lamp - 4-Foot 12.5w	18	226.8
67	CR 354	3	2F32SSE	16	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	16	403.2
68	CR 354	3	2F32SSE	7	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	7	176.4
69	CR 354 RR	3	1I0060	1	Relamp: LED - A-Lamp 9w	1	36.72
70	CR 354 RR	3	1I0060	1	Relamp: LED - A-Lamp 9w	1	36.72
71	Hall (354-356)	3	1F32SSE	8	Relamp: Direct Line LED - 1-Lamp - 4-Foot 12.5w	8	100.8
72	CR 356	3	2F32SSE	16	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	16	403.2
73	CR 356	3	2F32SSE	7	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	7	176.4

74	CR 356 RR	3	1I0060	1	Relamp: LED - A-Lamp 9w	1	36.72
75	CR 356 RR	3	1I0060	1	Relamp: LED - A-Lamp 9w	1	36.72
76	Hall	3	1F32SSE	20	Relamp: Direct Line LED - 1-Lamp - 4-Foot 12.5w	20	252
77	Exit Sign	3	1I0040	2	Fixture Replacement: Exit Sign	2	54.893
78	CR 358	3	2F32SSE	18	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	18	453.6
79	CR 358	3	2F32SSE	7	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	7	176.4
80	CR 358 RR	3	1I0060	1	Relamp: LED - A-Lamp 9w	1	36.72
81	CR 358 RR	3	1I0060	1	Relamp: LED - A-Lamp 9w	1	36.72
82	Books 302	3	1I0065	9	Relamp: LED - BR30 11w	9	349.92
83	CR 311	3	2F32SSE	27	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	27	680.4
84	CR 311 RR	3	1I0060	1	Relamp: LED - A-Lamp 9w	1	36.72
85	CR 311 RR	3	1I0060	1	Relamp: LED - A-Lamp 9w	1	36.72
86	Hall (309-Teacher Lounge)	3	1F32SSE	9	Relamp: Direct Line LED - 1-Lamp - 4-Foot 12.5w	9	113.4
87	Copy Room	3	4F32SSE	1	Relamp: Direct Line LED - 4-Lamp - 4-Foot 12.5w	1	44.64

88	Copy Room	3	2F32SSE	1	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	1	25.2
89	Staff RR	3	4F32SSE	2	Relamp: Direct Line LED - 4-Lamp - 4-Foot 12.5w	2	89.28
90	Staff RR	3	2F32SSE	1	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	1	25.2
91	Room 309	3	2F32SSE	1	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	1	25.2
92	Tech 307	3	2F32SSE	1	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	1	25.2
93	Room 305	3	4F32SSE	2	Relamp: Direct Line LED - 4-Lamp - 4-Foot 12.5w	2	89.28
94	Room 303	3	4F32SSE	4	Relamp: Direct Line LED - 4-Lamp - 4-Foot 12.5w	4	178.56
95	Stairs	3	1I0060	2	Relamp: LED - A-Lamp 9w	2	73.44
96	Stairs	3	4F32SSE	1	Relamp: Direct Line LED - 4-Lamp - 4-Foot 12.5w	1	44.64
97	Stairs	3	2F32SSE	1	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	1	25.2
98	CR 301	3	4F32SSE	3	Relamp: Direct Line LED - 4-Lamp - 4-Foot 12.5w	3	133.92

99	Mech Room	3	2F32SSE	2	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	2	50.4
100	Hallway by 350	3	4F32SSE	2	Relamp: Direct Line LED - 4-Lamp - 4-Foot 12.5w	2	89.28
101	Exit Sign	3	1I0040	2	Fixture Replacement: Exit Sign	2	54.893
102	CR 350	3	2F32SSE	4	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	4	100.8
103	Breezeway	3	1I0060	6	Relamp: LED - A-Lamp 9w	6	220.32
104	Exit Sign	3	1I0040	4	Fixture Replacement: Exit Sign	4	109.786
105	Hall/Stair	3	1F32SSE	2	Relamp: Direct Line LED - 1-Lamp - 4-Foot 12.5w	2	25.2
106	Hall/Stair	3	1F32SSE	5	Relamp: Direct Line LED - 1-Lamp - 4-Foot 12.5w	5	63
107	CR 348	3	2F32SSE	18	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	18	453.6
108	CR 348	3	2F32SSE	7	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	7	176.4
109	CR 348 RR	3	1I0060	1	Relamp: LED - A-Lamp 9w	1	36.72
110	CR 348 RR	3	1I0060	1	Relamp: LED - A-Lamp 9w	1	36.72
111	Hall/Stairs	3	1F32SSE	1	Relamp: Direct Line LED - 1-Lamp - 4-Foot 12.5w	1	12.6

112	Hall/Stairs	3	2F32SSE	7	Relamp: Direct Line LED - 2-Lamp - 4-Foot 7 12.5w	176.4
113	CR 346	3	2F32SSE	18	Relamp: Direct Line LED - 2-Lamp - 4-Foot 18 12.5w	453.6
114	CR 346	3	2F32SSE	7	Relamp: Direct Line LED - 2-Lamp - 4-Foot 7 12.5w	176.4
115	CR 347	3	2F32SSE	16	Relamp: Direct Line LED - 2-Lamp - 4-Foot 16 12.5w	403.2
116	CR 347	3	2F32SSE	2	Relamp: Direct Line LED - 2-Lamp - 4-Foot 2 12.5w	50.4
117	CR 347	3	1F32SSE	5	Relamp: Direct Line LED - 1-Lamp - 4-Foot 5 12.5w	63
118	CR 347 RR	3	2F32SSE	2	Relamp: Direct Line LED - 2-Lamp - 4-Foot 2 12.5w	50.4
119	CR 345	3	2F32SSE	16	Relamp: Direct Line LED - 2-Lamp - 4-Foot 16 12.5w	403.2
120	CR 345	3	2F32SSE	2	Relamp: Direct Line LED - 2-Lamp - 4-Foot 2 12.5w	50.4
121	CR 345	3	1F32SSE	5	Relamp: Direct Line LED - 1-Lamp - 4-Foot 5 12.5w	63
122	CR 345 RR	3	2F32SSE	2	Relamp: Direct Line LED - 2-Lamp - 4-Foot 2 12.5w	50.4

123	Hall/Stairs	3	1F32SSE	1	Relamp: Direct Line LED - 1-Lamp - 4-Foot 1 12.5w	12.6
124	Hall/Stairs	3	2F32SSE	7	Relamp: Direct Line LED - 2-Lamp - 4-Foot 7 12.5w	176.4
125	CR 344	3	2F32SSE	18	Relamp: Direct Line LED - 2-Lamp - 4-Foot 18 12.5w	453.6
126	CR 344	3	2F32SSE	7	Relamp: Direct Line LED - 2-Lamp - 4-Foot 7 12.5w	176.4
127	Hall/Stairs	3	1F32SSE	1	Relamp: Direct Line LED - 1-Lamp - 4-Foot 1 12.5w	12.6
128	Hall/Stairs	3	2F32SSE	7	Relamp: Direct Line LED - 2-Lamp - 4-Foot 7 12.5w	176.4
129	CR 342	3	2F32SSE	18	Relamp: Direct Line LED - 2-Lamp - 4-Foot 18 12.5w	453.6
130	CR 342	3	2F32SSE	7	Relamp: Direct Line LED - 2-Lamp - 4-Foot 7 12.5w	176.4
131	Hall/Stairs	3	1F32SSE	1	Relamp: Direct Line LED - 1-Lamp - 4-Foot 1 12.5w	12.6
132	Hall/Stairs	3	2F32SSE	6	Relamp: Direct Line LED - 2-Lamp - 4-Foot 6 12.5w	151.2
133	CR 340	3	2F32SSE	18	Relamp: Direct Line LED - 2-Lamp - 4-Foot 18 12.5w	453.6

134	CR 340	3	2F32SSE	7	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	7	176.4
135	CR 343	3	2F32SSE	18	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	18	453.6
136	CR 343 RR	3	1I0060	1	Relamp: LED - A-Lamp 9w	1	36.72
137	CR 343 RR	3	1I0060	1	Relamp: LED - A-Lamp 9w	1	36.72
138	CR 341	3	2F32SSE	18	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	18	453.6
139	CR 341 RR	3	1I0060	1	Relamp: LED - A-Lamp 9w	1	36.72
140	CR 341 RR	3	1I0060	1	Relamp: LED - A-Lamp 9w	1	36.72
141	Hall/Stairs	3	4F32SSE	1	Relamp: Direct Line LED - 4-Lamp - 4-Foot 12.5w	1	44.64
142	Hall by 332, 334, 336	3	2F32SSE	11	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	11	277.2
143	Faculty Room	3	1F32SSE	4	Relamp: Direct Line LED - 1-Lamp - 4-Foot 12.5w	4	50.4
144	Faculty Room	3	2F32SSE	2	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	2	50.4
145	Closet	3	1I0060	1	Relamp: LED - A-Lamp 9w	1	36.72
146	CR 332	3	4F32SSE	17	Relamp: Direct Line LED - 4-Lamp - 4-Foot 12.5w	17	758.88

147	CR 332 Closet	3	1I0060	1	Relamp: LED - A-Lamp 9w	1	36.72
148	CR 332 RR	3	1I0060	1	Relamp: LED - A-Lamp 9w	1	36.72
149	CR 332 Cubby	3	4F32SSE	1	Relamp: Direct Line LED - 4-Lamp - 4-Foot 12.5w	1	44.64
150	CR 334	3	4F32SSE	17	Relamp: Direct Line LED - 4-Lamp - 4-Foot 12.5w	17	758.88
151	CR 334 Closet	3	1I0060	1	Relamp: LED - A-Lamp 9w	1	36.72
152	CR 334 RR	3	1I0060	1	Relamp: LED - A-Lamp 9w	1	36.72
153	CR 334 Cubby	3	4F32SSE	1	Relamp: Direct Line LED - 4-Lamp - 4-Foot 12.5w	1	44.64
154	CR 336	3	4F32SSE	17	Relamp: Direct Line LED - 4-Lamp - 4-Foot 12.5w	17	758.88
155	CR 336 Closet	3	1I0060	1	Relamp: LED - A-Lamp 9w	1	36.72
156	CR 336 RR	3	1I0060	1	Relamp: LED - A-Lamp 9w	1	36.72
157	CR 336 Cubby	3	4F32SSE	1	Relamp: Direct Line LED - 4-Lamp - 4-Foot 12.5w	1	44.64
158	Copy Room	3	1I0060	1	Relamp: LED - A-Lamp 9w	1	36.72
159	RR BY 332	3	1I0060	1	Relamp: LED - A-Lamp 9w	1	36.72
160	HVAC Room	1	1I0065	1	Relamp: LED - BR30 11w	1	38.88

161	Elevator	1	1I0025	11		11	0
162	Hall by Multi	1	2F32SSE	7	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	7	176.4
163	Multipupose	1	1M0400S	17	Relamp: LED - Repl for High-Bay Lumin: 116W	17	4,145.688
164	Closet (No Access)	1	1I0060	1	Relamp: LED - A-Lamp 9w	1	36.72
165	Closet (No Access)	1	1I0060	1	Relamp: LED - A-Lamp 9w	1	36.72
166	Hall by Multi RR's	1	1I0025	14		14	0
167	Phys Ed Office	1	4F32SSE	2	Relamp: Direct Line LED - 4-Lamp - 4-Foot 12.5w	2	89.28
168	Gym Storage	1	2F32SSE	2	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	2	50.4
169	Boys RR	1	2F40BXE	3	RL: Direct Line LED - 2-Lamp - Biax 2G11 Base	3	82.08
170	Hallway	1	2F32SSE	6	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	6	151.2
171	Hall (102-101)	1	2F96SSE	1	Relamp: Direct Line LED - 2-Lamp - 8-Foot 25w	1	60.48
172	Office 101	1	4F32SSE	2	Relamp: Direct Line LED - 4-Lamp - 4-Foot 12.5w	2	89.28
173	Storage in 101	1	2F96SSE	1	Relamp: Direct Line LED - 2-Lamp - 8-Foot 25w	1	60.48

174	Storage (No Access)	1	2F32SSE	1	Relamp: Direct Line LED - 2-Lamp - 4-Foot 1 12.5w	25.2
175	Womans RR	1	2F32SSE	2	Relamp: Direct Line LED - 2-Lamp - 4-Foot 2 12.5w	50.4
176	Body Student	1	2F96SSE	1	Relamp: Direct Line LED - 2-Lamp - 8-Foot 1 25w	60.48
177	Hall	1	4F32SSE	8	Relamp: Direct Line LED - 4-Lamp - 4-Foot 8 12.5w	357.12
178	CR 102	1	2F96SSE	6	Relamp: Direct Line LED - 2-Lamp - 8-Foot 6 25w	362.88
179	CR 105 B	1	4F32SSE	6	Relamp: Direct Line LED - 4-Lamp - 4-Foot 6 12.5w	267.84
180	CR 105 A	1	4F32SSE	6	Relamp: Direct Line LED - 4-Lamp - 4-Foot 6 12.5w	267.84
181	Sprinkler Shut Off	1	2F96SSE	1	Relamp: Direct Line LED - 2-Lamp - 8-Foot 1 25w	60.48
182	Sprinkler Shut Off	1	2F32SSE	3	Relamp: Direct Line LED - 2-Lamp - 4-Foot 3 12.5w	75.6
183	Sprinkler Shut Off	1	4F32SSE	1	Relamp: Direct Line LED - 4-Lamp - 4-Foot 1 12.5w	44.64
184	CR 103 B	1	2F96SSE	5	Relamp: Direct Line LED - 2-Lamp - 8-Foot 5 25w	302.4

185	Hall by 103 A	1	2F32SSE	1	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	1	25.2
186	CR 103 A	1	2F96SSE	3	Relamp: Direct Line LED - 2-Lamp - 8-Foot 25w	3	181.44
187	Hall by 104	1	1F32SSE	18	Relamp: Direct Line LED - 1-Lamp - 4-Foot 12.5w	18	226.8
188	Stairs	1	1I0060	6	Relamp: LED - A-Lamp 9w	6	220.32
189	Stairs	1	1I0060	8	Relamp: LED - A-Lamp 9w	8	293.76
190	Stairs	1	1I0060	2	Relamp: LED - A-Lamp 9w	2	73.44
191	CR 104	1	2F32SSE	15	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	15	378
192	CR 104 RR	1	1I0060	1	Relamp: LED - A-Lamp 9w	1	36.72
193	CR 104 RR	1	1I0060	1	Relamp: LED - A-Lamp 9w	1	36.72
194	CR 106	1	4F32SSE	14	Relamp: Direct Line LED - 4-Lamp - 4-Foot 12.5w	14	624.96
195	CR 106 RR	1	1I0060	1	Relamp: LED - A-Lamp 9w	1	36.72
196	Maintenance Shop	1	2F32SSE	4	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	4	100.8
197	Maintenance Shop	1	2F32SSE	2	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	2	50.4

198	Janitor	1	1I0060	1	Relamp: LED - A-Lamp 9w	1	36.72
199	Switch (N/A)	1	1I0065	6	Relamp: LED - BR30 11w	6	233.28
200	CR 108	1	2F32SSE	12	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	12	302.4
201	CR 108	1	2F32SSE	5	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	5	126
202	CR 108 RR	1	1I0060	1	Relamp: LED - A-Lamp 9w	1	36.72
203	Nurse 110	1	4F32SSE	1	Relamp: Direct Line LED - 4-Lamp - 4-Foot 12.5w	1	44.64
204	Hall by 112	1	2F32SSE	12	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	12	302.4
205	CR 112	1	2F32SSE	12	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	12	302.4
206	CR 112	1	1I0052	3		3	0
207	CR 112 RR	1	2F32SSE	1	Relamp: Direct Line LED - 2-Lamp -U-Bend-15.5W	1	32.04
208	CR 114	1	2F32SSE	12	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	12	302.4
209	CR 114	1	2F32SSE	2	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	2	50.4
210	CR 114	1	1I0052	8		8	0

211	CR 114 RR	1	2F32SSE	1	Relamp: Direct Line LED - 2-Lamp -U-Bend-15.5W	1	32.04
212	Stairs	1	1I0060	4	Relamp: LED - A-Lamp 9w	4	146.88
213	Stairs	1	1I0060	2	Relamp: LED - A-Lamp 9w	2	73.44
214	Breezeway	1	1I0060	24	Relamp: LED - A-Lamp 9w	24	881.28
215	Exit Sign	1	1I0040	2	Fixture Replacement: Exit Sign	2	54.893
216	Hall by Gym	1	1F32SSE	26	Relamp: Direct Line LED - 1-Lamp - 4-Foot 12.5w	26	327.6
217	Exit Sign	1	1I0040	2	Fixture Replacement: Exit Sign	2	54.893
218	Gym	1	1M0400S	24	Relamp: LED - Repl for High-Bay Lumin: 116W	24	5,852.736
219	Phys Ed Equip	1	2F32SSE	2	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	2	50.4
220	Showers/RR	1	1F32SSE	1		1	0
221	Lockers	1	1I0060	4	Relamp: LED - A-Lamp 9w	4	146.88
222	RR 1	1	1I0060	2	Relamp: LED - A-Lamp 9w	2	73.44
223	RR 2	1	2F32SSE	1	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	1	25.2
224	Gym Office 1	1	2F32SSE	1	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	1	25.2

225	RR	1	1I0060	1	Relamp: LED - A-Lamp 9w	1	36.72
226	Gym Office 2	1	2F32SSE	1	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	1	25.2
227	RR	1	1I0060	1	Relamp: LED - A-Lamp 9w	1	36.72
228	Boys Lockers	1	2F32SSE	4	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	4	100.8
229	Boys RR	1	2F32SSE	2	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	2	50.4
230	Showers	1	1I0060	2	Relamp: LED - A-Lamp 9w	2	73.44
231	Kitchen	1	1I0060	2	Relamp: LED - A-Lamp 9w	2	73.44
232	Facullty Womans RR	1	1I0060	2	Relamp: LED - A-Lamp 9w	2	73.44
233	Hall by Faculty Mens	1	1I0060	5	Relamp: LED - A-Lamp 9w	5	183.6
234	Exit Sign	1	1I0040	4	Fixture Replacement: Exit Sign	4	109.786
235	Faculty Mens	1	1I0060	4	Relamp: LED - A-Lamp 9w	4	146.88
236	Vestibule	1	1I0060	4	Relamp: LED - A-Lamp 9w	4	146.88
237	Storage Room 135	1	1I0060	1	Relamp: LED - A-Lamp 9w	1	36.72
238	Slop Sink	1	1I0060	1	Relamp: LED - A-Lamp 9w	1	36.72
239	First Aid	1	1I0060	1	Relamp: LED - A-Lamp 9w	1	36.72

240	Hall (First Aid to 131)	1	2F32SSE	8	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	8	201.6
241	Hall in 131	1	2F32SSE	2	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	2	50.4
242	Stage Closet	1	1I0060	1	Relamp: LED - A-Lamp 9w	1	36.72
243	Stage Closet	1	1I0060	1	Relamp: LED - A-Lamp 9w	1	36.72
244	Stage Equip	1	1I0060	4	Relamp: LED - A-Lamp 9w	4	146.88
245	Hallway by Books	3	4F32SSE	5	Relamp: Direct Line LED - 4-Lamp - 4-Foot 12.5w	5	223.2
246	Hallway by Books	3	2F32SSE	2	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	2	50.4
247	Exit Sign	3	1I0040	1	Fixture Replacement: Exit Sign	1	27.446
248	Books 302	3	1I0065	9	Relamp: LED - BR30 11w	9	349.92
249	CR 313	3	2F32SSE	24	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	24	604.8
250	CR 312	3	2F32SSE	24	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	24	604.8
251	Hall	3	1F32SSE	61	Relamp: Direct Line LED - 1-Lamp - 4-Foot 12.5w	61	768.6
252	Exit Sign	3	1I0040	6	Fixture Replacement: Exit Sign Combo	6	151.2

253	CR 315	3	2F32SSE	24	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	24	604.8
254	CR 314	3	2F32SSE	24	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	24	604.8
255	CR 317	3	2F32SSE	24	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	24	604.8
256	CR 316	3	2F32SSE	24	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	24	604.8
257	CR 319	3	2F32SSE	24	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	24	604.8
258	CR 318	3	2F32SSE	24	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	24	604.8
259	Halls by Boys	3	1I0060	1	Relamp: LED - A-Lamp 9w	1	36.72
260	Boys RR	3	2F32SSE	2	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	2	50.4
261	Stairs	3	1I0060	2	Relamp: LED - A-Lamp 9w	2	73.44
262	Stairs	3	1I0060	2	Relamp: LED - A-Lamp 9w	2	73.44
263	Stairs	3	1I0060	1	Relamp: LED - A-Lamp 9w	1	36.72
264	Stairs	3	4F32SSE	1	Relamp: Direct Line LED - 4-Lamp - 4-Foot 12.5w	1	44.64
265	Janitor	3	1I0060	1	Relamp: LED - A-Lamp 9w	1	36.72

266	Girls RR	3	1L030	1		1	0
267	Girls RR	3	2F32SSE	2	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	2	50.4
268	CR 327	3	2F32SSE	24	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	24	604.8
269	CR 320	3	2F32SSE	24	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	24	604.8
270	CR 329	3	2F32SSE	24	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	24	604.8
271	CR 322	3	2F32SSE	24	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	24	604.8
272	CR 324	3	2F32SSE	24	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	24	604.8
273	CR 331	3	2F32SSE	2	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	2	50.4
274	Faculity Room	3	2F32SSE	2	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	2	50.4
275	Stairs	3	1I0060	6	Relamp: LED - A-Lamp 9w	6	220.32
276	Stairs	3	1I0060	8	Relamp: LED - A-Lamp 9w	8	293.76
277	Hall (218-207)	2	1F32SSE	52	Relamp: Direct Line LED - 1-Lamp - 4-Foot 12.5w	52	655.2
278	Exit Sign	2	1I0040	4	Fixture Replacement: Exit Sign	4	109.786

279	Office 218	2	4F32SSE	1	Relamp: Direct Line LED - 4-Lamp - 4-Foot 1 12.5w	44.64
280	Office 218	2	4F32SSE	2	Relamp: Direct Line LED - 4-Lamp - 4-Foot 2 12.5w	89.28
281	CR 217	2	2F32SSE	2	Relamp: Direct Line LED - 2-Lamp - 4-Foot 2 12.5w	50.4
282	CR 216	2	2F32SSE	21	Relamp: Direct Line LED - 2-Lamp - 4-Foot 21 12.5w	529.2
283	CR 215	2	2F32SSE	21	Relamp: Direct Line LED - 2-Lamp - 4-Foot 21 12.5w	529.2
284	CR 214	2	2F32SSE	21	Relamp: Direct Line LED - 2-Lamp - 4-Foot 21 12.5w	529.2
285	CR 213	2	2F32SSE	21	Relamp: Direct Line LED - 2-Lamp - 4-Foot 21 12.5w	529.2
286	CR 212	2	2F32SSE	21	Relamp: Direct Line LED - 2-Lamp - 4-Foot 21 12.5w	529.2
287	CR 211	2	2F32SSE	21	Relamp: Direct Line LED - 2-Lamp - 4-Foot 21 12.5w	529.2
288	Science 210	2	2F32SSE	22	Relamp: Direct Line LED - 2-Lamp - 4-Foot 22 12.5w	554.4
289	Science 210	2	2F32SSE	8	Relamp: Direct Line LED - 2-Lamp - 4-Foot 8 12.5w	201.6

290	Science 210	2	2F32SSE	2	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	2	50.4
291	Closet 210A	2	1I0060	1	Relamp: LED - A-Lamp 9w	1	36.72
292	CR 209	2	2F32SSE	24	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	24	604.8
293	CR 208	2	2F32SSE	9	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	9	226.8
294	CR 207	2	2F32SSE	24	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	24	604.8
295	CR 206	2	2F32SSE	30	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	30	756
296	Girls RR	2	2F32SSE	3	Relamp: Direct Line LED - 2-Lamp -U-Bend-15.5W	3	96.12
297	Girls RR	2	2F32SSE	2	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	2	50.4
298	Janitor	2	1L030	1		1	0
299	Boys RR	2	1L030	1		1	0
300	Boys RR	2	2F32SSE	1	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	1	25.2
301	Boys RR	2	1L030	1		1	0
302	Closet in Boys	2	1I0060	1	Relamp: LED - A-Lamp 9w	1	36.72
303	Hall (Faculity to Womans RR)	2	1I0034	8		8	0

304	Hall (Faculity to Womans RR)	2	2F32SSE	16	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	16	403.2
305	Womans RR	2	1F32SSE	5	Relamp: Direct Line LED - 1-Lamp - 4-Foot 12.5w	5	63
306	Womans RR	2	2F32SSE	3	Relamp: Direct Line LED - 2-Lamp -U-Bend-15.5W	3	96.12
307	Womans RR	2	1I0034	1		1	0
308	CR 204	2	2F32SSE	24	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	24	604.8
309	CR 205	2	2F32SSE	24	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	24	604.8
310	CR 202	2	2F32SSE	18	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	18	453.6
311	CR 203	2	2F32SSE	24	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	24	604.8
312	CR 201	2	2F32SSE	9	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	9	226.8
313	CR 200	2	2F32SSE	24	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	24	604.8
314	CR 114	1	2F32SSE	12	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	12	302.4
315	CR 114	1	1I0052	8		8	0

316	CR 114	1	2F32SSE	2	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	2	50.4
317	CR 114 RR	1	2F32SSE	1	Relamp: Direct Line LED - 2-Lamp -U-Bend-15.5W	1	32.04
318	Hall by CR 114	1	2F32SSE	12	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	12	302.4
319	Hall by CR 114	1	2F32SSE	2	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	2	50.4
320	Boiler Room	1	1L030	14		14	0
321	Hall by CR 110	1	2F96SSE	2	Relamp: Direct Line LED - 2-Lamp - 8-Foot 25w	2	120.96
322	Hall (CR 110-CR 108)	1	1F32SSE	16	Relamp: Direct Line LED - 1-Lamp - 4-Foot 12.5w	16	201.6
323	CR 108	1	2F32SSE	12	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	12	302.4
324	CR 108	1	2F32SSE	5	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	5	126
325	Switch	1	1I0065	6	Relamp: LED - BR30 11w	6	233.28
326	Janitor	1	1I0100	1	Relamp: LED - A-Lamp 15w	1	61.2
327	Exterior Doors 31A-31B	1	1M0050S	2	Fixture Replacement: LED Outdoor Wall Mount 60w	2	7.2
328	Exterior Door 30	1	1I0060	1	Relamp: LED - A-Lamp 9w	1	36.72

329	Exterior Doors 28B	1	1I0100	1		1	0
330	Exterior Doors 26/ARC	1	1I0060	2	Relamp: LED - A-Lamp 9w	2	73.44
331	Exterior Doors 25	1	1T0100	1	Fixture Replacement: LED Architectural Flood/Spot 80w	1	18
332	Exterior Doors 23ABC	1	1I0060	6	Relamp: LED - A-Lamp 9w	6	220.32
333	Exterior Doors 17ABCD	1	1I0060	8	Relamp: LED - A-Lamp 9w	8	293.76
334	Exterior Doors 16ABCD	1	1I0060	8	Relamp: LED - A-Lamp 9w	8	293.76
335	Vestibule by Audit	1	4F32SSE	1	Relamp: Direct Line LED - 4-Lamp - 4-Foot 12.5w	1	44.64
336	Lobby Hall	1	1M0400S	14	Relamp: LED - Repl for High-Bay Lumin: 116W	14	3,414.096
337	Vestibule #2	1	1I0060	4	Relamp: LED - A-Lamp 9w	4	146.88
338	Auditorium	1	3F20SSS	24	Relamp: Direct Line LED - 3-Lamp - 2-Foot 9w	24	881.28
339	Auditorium	1	3F32SSE	12	Relamp: Direct Line LED - 3-Lamp - 4-Foot 12.5w	12	436.32
340	Auditorium	1	1L030	7		7	0
341	Auditorium	1	1I0090	30	Relamp: LED - PAR38 13w	30	1,663.2
342	Auditorium	1	1I0060	8	Relamp: LED - A-Lamp 9w	8	293.76
343	Stairs Side	1	1I0060	2	Relamp: LED - A-Lamp 9w	2	73.44

344	Strip Cove	1	1F32SSE	10	Relamp: Direct Line LED - 1-Lamp - 4-Foot 12.5w	10	126
345	Hall by Audit	1	1I0060	8	Relamp: LED - A-Lamp 9w	8	293.76
346	Hall by Audit	1	2F32SSE	1	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	1	25.2
347	Storage	1	1I0060	2	Relamp: LED - A-Lamp 9w	2	73.44
348	RR	1	1I0060	8	Relamp: LED - A-Lamp 9w	8	293.76
349	RR	1	2F32SSE	1	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	1	25.2
350	Hall (RR to Stage	1	1F32SSE	6	Relamp: Direct Line LED - 1-Lamp - 4-Foot 12.5w	6	75.6
351	Hall (RR to Stage	1	1F32SSE	4	Relamp: Direct Line LED - 1-Lamp - 4-Foot 12.5w	4	50.4
352	Hall (RR to Stage	1	1F32SSE	15	Relamp: Direct Line LED - 1-Lamp - 4-Foot 12.5w	15	189
353	Side Audit Enterance	1	1I0060	4	Relamp: LED - A-Lamp 9w	4	146.88
354	Music 141	1	2F32SSE	12	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	12	302.4
355	Music 141	1	2F32SSE	7	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	7	176.4

356	Music 141	1	2F32SSE	7	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	7	176.4
357	Music 141	1	2F32SSE	6	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	6	151.2
358	Music 141	1	2F32SSE	4	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	4	100.8
359	Closet 141A	1	2F32SSE	1	Relamp: Direct Line LED - 2-Lamp -U-Bend-15.5W	1	32.04
360	Closet 141B	1	2F32SSE	1	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	1	25.2
361	Closet 141B	1	4F32SSE	1	Relamp: Direct Line LED - 4-Lamp - 4-Foot 12.5w	1	44.64
362	Art Lab 139	1	4F32SSE	12	Relamp: Direct Line LED - 4-Lamp - 4-Foot 12.5w	12	535.68
363	Closet 139A	1	2F32SSE	1	Relamp: Direct Line LED - 2-Lamp -U-Bend-15.5W	1	32.04
364	Kitchen 139B	1	2F32SSE	1	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	1	25.2
365	Art Supply	1	1I0060	1	Relamp: LED - A-Lamp 9w	1	36.72
366	Exterior Door 5A-5B	1	1I0065	1	Relamp: LED - BR30 11w	1	38.88
367	Exterior Door 3A-3B	1	1I0065	1	Relamp: LED - BR30 11w	1	38.88

368	Exterior Door 2	1	1I0065	1	Relamp: LED - BR30 11w	1	38.88
369	Exterior Front Door	1	1M0100S	3	Relamp: LED - Repl for Out Pole/Arm-Mnt Lum: 96W	3	51.624

Enrolled Non-Lighting Measures

Measure Line Item	Exist. Measure	Count of existing	Proposed Measure	Proposed Measure Count	Watts Saved	Therms
Water Savings	TBD TBD	1	TBD TBD	1	0	127.918
Water Heating		1	TBD TBD	1	0	81.029
Water Heating		1	TBD TBD	1	0	233.204
Water Savings	TBD TBD	1	TBD TBD	1	0	2,692.36

PSE&G Energy Saver Program

Energy Efficiency Upgrade Proposal

Prepared For:

Customer Name: KEARNY BOARD OF ED

360 BELGROVE DR

GARFIELD

Phone Number: 201-955-5008

Project Number: 00000386201

Vendor Tracking Number: A085895

Customer Name: KEARNY BOARD OF ED
360 BELGROVE DR
GARFIELD
201-955-5008

Estimated Retail Energy Savings

Electric	Lighting	Non-Lighting	Total
Existing kW Load	43.502	-	43.502
Proposed kW Load	18.212	-	18.212
kW Load Savings	25.29	0	25.29
Electric			
Existing kWh Load	104,661	-	104,661
Proposed kWh Load	43,056	-	43,056
kWh Load Savings	61,605	0	61,605
Gas			
Existing Therm Load	-	-	0
Proposed Therm Load	-	-	0
Therm Savings	-	-524.31	-524.31

Estimated Retail Energy Cost Savings

	Lighting	Non-Lighting	Total
Existing Electric Cost	$15,699.15	-	$15,699.15
Proposed Electric Cost	$6,458.40	-	$6,458.40
Electric Cost Savings	$9,240.75	$0.00	$9,240.75
Existing Gas Cost	-	-	$0
Proposed Gas Cost	-	-	$0
Gas Cost Savings	-	$170.47	$170.47

Total Project Cost Breakdown

Costs	Lighting	Non-Lighting	Total
Total Project Cost	$69,208.34	$581.64	$69,789.98
PSE&G Contribution (41.7%)	-	-	$29,118.88
Net Project After Rebate	-	-	$40,671.10
Monthly Payment (60 Months at 0% Interest)	**-**	**-**	**$677.85**

Cash Flow Analysis

	Lighting	Non-Lighting	Total
Total Monthly Savings	$770.06	$14.21	$784.27
Customer Monthly Payment (60 months at 0% Interest)	-	-	$677.85
Monthly Cash Flow (60 months)	-	-	$106.42

Customer Name: KEARNY BOARD OF ED
360 BELGROVE DR
GARFIELD
201-955-5008

Projected Five Year Monthly Cash Flow

Month	Customer Payments	Monthly Savings	Cumulative Cash Flow
1	$677.85	$784.27	$106.42
2	$677.85	$784.27	$212.84
3	$677.85	$784.27	$319.26
4	$677.85	$784.27	$425.67
5	$677.85	$784.27	$532.09
6	$677.85	$784.27	$638.51
7	$677.85	$784.27	$744.93
8	$677.85	$784.27	$851.35
9	$677.85	$784.27	$957.77
10	$677.85	$784.27	$1,064.18
11	$677.85	$784.27	$1,170.60
12	$677.85	$784.27	$1,277.02
13	$677.85	$784.27	$1,383.44
14	$677.85	$784.27	$1,489.86
15	$677.85	$784.27	$1,596.28
16	$677.85	$784.27	$1,702.70
17	$677.85	$784.27	$1,809.11
18	$677.85	$784.27	$1,915.53
19	$677.85	$784.27	$2,021.95
20	$677.85	$784.27	$2,128.37
21	$677.85	$784.27	$2,234.79
22	$677.85	$784.27	$2,341.21
23	$677.85	$784.27	$2,447.63
24	$677.85	$784.27	$2,554.04
25	$677.85	$784.27	$2,660.46
26	$677.85	$784.27	$2,766.88
27	$677.85	$784.27	$2,873.30
28	$677.85	$784.27	$2,979.72
29	$677.85	$784.27	$3,086.14
30	$677.85	$784.27	$3,192.55
31	$677.85	$784.27	$3,298.97
32	$677.85	$784.27	$3,405.39
33	$677.85	$784.27	$3,511.81
34	$677.85	$784.27	$3,618.23
35	$677.85	$784.27	$3,724.65
36	$677.85	$784.27	$3,831.07
37	$677.85	$784.27	$3,937.48
38	$677.85	$784.27	$4,043.90
39	$677.85	$784.27	$4,150.32
40	$677.85	$784.27	$4,256.74

41	$677.85	$784.27	$4,469.58
42	$677.85	$784.27	$4,469.58
43	$677.85	$784.27	$4,576.00
44	$677.85	$784.27	$4,682.41
45	$677.85	$784.27	$4,788.83
46	$677.85	$784.27	$4,895.25
47	$677.85	$784.27	$5,001.67
48	$677.85	$784.27	$5,108.09
49	$677.85	$784.27	$5,214.51
50	$677.85	$784.27	$5,320.92
51	$677.85	$784.27	$5,427.34
52	$677.85	$784.27	$5,533.76
53	$677.85	$784.27	$5,640.18
54	$677.85	$784.27	$5,746.60
55	$677.85	$784.27	$5,959.44
57	$677.85	$784.27	$6,065.85
58	$677.85	$784.27	$6,172.27
59	$677.85	$784.27	$6,278.69
60	$677.95	$784.27	$6,385.01
TOTALS	**$40,671.10**	**$47,056.11**	**$6,385.01**

Customer Name: KEARNY BOARD OF ED
360 BELGROVE DR
GARFIELD
201-955-5008

Projected Five Year Cash Flow

Year	Customer Payments	Yearly Savings	Cumulative Cash Flow
1	$8,134.20	$9,411.22	$1,277.02
2	$8,134.20	$9,411.22	$2,554.04
3	$8,134.20	$9,411.22	$3,831.07
4	$8,134.20	$9,411.22	$5,108.09
5	$8,134.30	$9,411.22	$6,385.01
TOTALS	**$40,671.10**	**$47,056.11**	**$6,385.01**

Customer Name: KEARNY BOARD OF ED
360 BELGROVE DR
GARFIELD
201-955-5008

Proposal Notes:

The predominant operating hours for this analysis provided by Customer are: 2,500

An electric rate of $0.15 per kWh was utilized to generate this proposal.

A gas rate of $0.97 per Therm was utilized to generate this proposal.

This is a turnkey Proposal and includes, but is not limited to, all labor, permits, and material costs.

Project costs do not include New Jersey sales tax. For capital improvement projects, customer must complete and submit a ST-8 form for tax exemption.

Recycling of all lamps is included in the scope of work for this project.

Project installation labor is warranted for a period of one (1) year - see the contract for more information.

New Jersey Clean Energy Program Protocols 2020 were utilized to evaluate this Project Proposal. The estimated energy savings and environmental impacts in this proposal are based on the New Jersey Clean Energy Program Protocols 2020. Among other items, these Protocols utilize predetermined run hours which may be different than the predominant operating hours provided by the Customer. The Company does not guarantee the proposed energy savings measures will, in fact, save any level of energy or result in a lowering of Customer's energy bills. However, based on the represented predominant run hours, it is expected that the actual energy savings will be near the estimates provided in this Project Proposal.

The information provided in this proposal is for informational purposes only and Customer's actual energy savings may vary based on numerous determining factors including but not limited to weather, changes to Customer utility rates, facility use and facility operating hours.

Customer Name: KEARNY BOARD OF ED
360 BELGROVE DR
GARFIELD
201-955-5008

Environmental Impact Statement

According to the EPA, for each kWh saved, approximately 1.52 pound of Carbon Dioxide (CO2), .0065 pounds of Sulfur Dioxide (SO2), and .0028 pounds of Nitrogen Oxides (NOx) are eliminated from future power plant emissions into our atmosphere annually.

CO2 is a "Greenhouse Gas" while SO2 contributes to acid rain formation and NOx contributes to the atmosphere ozone formation (Smog) and estuarial damage.

The Annual Pollution Reduction Impact of Your Project

Chemical Compound	Annual Reduction lbs.
Carbon Dioxide	93,639.6
Nitrogen Oxides	172.49
Sulfur Dioxide	400.43

For every 10,000 Kilowatt Hours saved the EPA has estimated the savings to be equivalent to planting 2.9 acres of trees annually or equivalent to removing 1.4 cars from our roads annually.

Your Project's Local Impact

Acres of Trees Planted:	17.87
Cars Removed	8.62

Energy Savings Calculator:
How We Derive Your Energy Savings

$$\frac{\text{Watts Saved} \times \text{Operating Hours}}{\text{1,000 w per kW}} \times \text{kWh rate}$$

We save you electric energy (kilowatt-hours) by updating your lighting equipment with advanced, highly efficient technology products that provide more capability while using less electricity.

While your cost per kilowatt-hour is fixed, your operating hours are variable as they are in your control. As long as operating hours are as represented, your electrical savings should be in line with the projected energy savings.

For more information please visit www.epa.gov

Enrolled Lighting Measures

Measure Line Item	Area Description /Location	Floor	Exist. Measure	Count of existing	Proposed Measure	Proposed Measure Count	Watts Saved
1	Library 302	3	2F32SSE	12	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	12	302.4
2	Library 303	3	2F32SSE	8	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	8	201.6
3	Closet in 303	3	1I0060	1	Relamp: LED - A-Lamp 9w	1	36.72
4	Library Office	3	4F32SSE	2	Relamp: Direct Line LED - 4-Lamp - 4-Foot 12.5w	2	89.28
5	Class 301	3	2F32SSE	12	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	12	302.4
6	Class 312	3	2F32SSE	12	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	12	302.4
7	Closet in 312	3	2F32SSE	2	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	2	50.4
8	Class 313	3	2F32SSE	12	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	12	302.4
9	Closet in 313	3	2F32SSE	1	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	1	25.2

10	Class 316	3	2F32SSE	12	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	12	302.4
11	Closet in 316	3	2F32SSE	1	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	1	25.2
12	Hall by Roof Access	3	4F32SSE	4	Relamp: Direct Line LED - 4-Lamp - 4-Foot 12.5w	4	178.56
13	Restroom	3	1I0060	1	Relamp: LED - A-Lamp 9w	1	36.72
14	Class 315	3	2F32SSE	10	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	10	252
15	Class 314	3	2F32SSE	10	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	10	252
16	Closet in 314	3	1I0060	1	Relamp: LED - A-Lamp 9w	1	36.72
17	Hallway by 313	3	2F96SSE	2	Relamp: Direct Line LED - 2-Lamp - 8-Foot 25w	2	120.96
18	Class 317	3	2F32SSE	12	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	12	302.4
19	Class 311	3	2F32SSE	12	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	12	302.4
20	Hallway by 311	3	2F32SSE	2	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	2	50.4
21	Hallway by 311	3	2F96SSE	8	Relamp: Direct Line LED - 2-Lamp - 8-Foot 25w	8	483.84

22	Class 310	3	2F32SSE	12	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	12	302.4
23	Class 301	3	2F32SSE	12	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	12	302.4
24	Class 309	3	2F32SSE	12	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	12	302.4
25	Class 308	3	2F32SSE	12	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	12	302.4
26	Class 307	3	2F32SSE	12	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	12	302.4
27	Boys RR	3	2F32SSE	2	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	2	50.4
28	Class 400	4	4F32SSE	1	Relamp: Direct Line LED - 4-Lamp - 4-Foot 12.5w	1	44.64
29	Class 306	3	2F32SSE	12	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	12	302.4
30	Class 304	3	2F32SSE	12	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	12	302.4
31	Class 305	3	2F32SSE	2	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	2	50.4
32	Staircase 2	3	2F32SSE	6	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	6	151.2

33	Class 203	2	2F32SSE	12	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	12	302.4
34	Teachers 201	2	2F32SSE	12	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	12	302.4
35	RR in 201	2	1I0060	1	Relamp: LED - A-Lamp 9w	1	36.72
36	Closet (N/A)	2	2F32SSE	1	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	1	25.2
37	Janitor	2	1I0060	1	Relamp: LED - A-Lamp 9w	1	36.72
38	Girls RR	2	2F32SSE	2	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	2	50.4
39	Class 204	2	2F32SSE	12	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	12	302.4
40	Hallway (203)	2	2F96SSE	8	Relamp: Direct Line LED - 2-Lamp - 8-Foot 25w	8	483.84
41	Hallway (203)	2	2F32SSE	4	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	4	100.8
42	Class 205	2	2F32SSE	12	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	12	302.4
43	Class 206	2	2F32SSE	12	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	12	302.4
44	Class 207	2	2F32SSE	12	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	12	302.4

45	Class 208	2	2F32SSE	12	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	12	302.4
46	Staircase	2	1L030	1		1	0
47	Class 209	2	2F32SSE	12	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	12	302.4
48	Closet	2	2F32SSE	2	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	2	50.4
49	Class 210	2	2F32SSE	12	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	12	302.4
50	Class 214	2	2F32SSE	12	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	12	302.4
51	Hall by 212	2	2F32SSE	3	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	3	75.6
52	Class 213	2	2F32SSE	12	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	12	302.4
53	Slop Sink	2	1I0015	1	Relamp: LED - A-Lamp 9w	1	4.32
54	Class 212	2	2F32SSE	12	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	12	302.4
55	Closet in 212	2	2F32SSE	1	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	1	25.2
56	Class 211	2	2F32SSE	12	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	12	302.4

57	Closet in 211	2	2F32SSE	2	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	2	50.4
58	Staircase 2	2	2F32SSE	1	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	1	25.2
59	Gym/Auditorium	1	2F96SSE	36	Relamp: Direct Line LED - 2-Lamp - 8-Foot 25w	36	2,177.28
60	Gym Storage	1	4F32SSE	1	Relamp: Direct Line LED - 4-Lamp - 4-Foot 12.5w	1	44.64
61	Stage	1	2F32SSE	2	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	2	50.4
62	Closet in Stage	1	2F32SSE	1	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	1	25.2
63	Side Stage	1	4F32SSE	1	Relamp: Direct Line LED - 4-Lamp - 4-Foot 12.5w	1	44.64
64	Closet Stage Steps	1	2F32SSE	1	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	1	25.2
65	Boiler	B	2F32SSE	8	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	8	201.6
66	Boiler Closet	B	2F32SSE	1	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	1	25.2
67	Boiler Storage	B	2F32SSE	2	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	2	50.4

68	Café	1	4F32SSE	6	Relamp: Direct Line LED - 4-Lamp - 4-Foot 12.5w	6	267.84
69	Girls RR	1	2F32SSE	2	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	2	50.4
70	Girls Court 109	1	2F32SSE	1	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	1	25.2
71	Hallway	1	4F32SSE	6	Relamp: Direct Line LED - 4-Lamp - 4-Foot 12.5w	6	267.84
72	Hall by door 6	1	2F32SSE	1	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	1	25.2
73	Janitor	1	2F17SSE	1	Relamp: Direct Line LED - 2-Lamp - 2-Foot 9w	1	13.68
74	Nurse 112	1	4F32SSE	2	Relamp: Direct Line LED - 4-Lamp - 4-Foot 12.5w	2	89.28
75	Supply Closet	1	1I0060	1	Relamp: LED - A-Lamp 9w	1	36.72
76	Maintenace Shop	1	2F32SSE	4	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	4	100.8
77	Nurse Office	1	4F32SSE	3	Relamp: Direct Line LED - 4-Lamp - 4-Foot 12.5w	3	133.92
78	Exam Room	1	2F32SSE	1	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	1	25.2

79	Boys Court	1	4F32SSE	6	Relamp: Direct Line LED - 4-Lamp - 4-Foot 12.5w	6	267.84
80	Boys RR	1	2F32SSE	2	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	2	50.4
81	Mens RR	1	2F32SSE	1	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	1	25.2
82	Hallway (Principle /Vestibule)	1	2F96SSE	8	Relamp: Direct Line LED - 2-Lamp - 8-Foot 25w	8	483.84
83	Hallway (Principle /Vestibule)	1	2F32SSE	1	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	1	25.2
84	Principle Office	1	1L030	2		2	0
85	Principle Office	1	1L030	1		1	0
86	Main Office	1	4F32SSE	4	Relamp: Direct Line LED - 4-Lamp - 4-Foot 12.5w	4	178.56
87	Office	1	1L030	2		2	0
88	Class 107	1	2F32SSE	6	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	6	151.2
89	Class 107	1	2F32SSE	5	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	5	126
90	RR in Class 107	1	2F32SSE	1	Relamp: Direct Line LED - 2-Lamp -U-Bend-15.5W	1	32.04
91	Closet by Stairs	1	2F32SSE	1	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	1	25.2

92	Class 106	1	2F32SSE	6	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	6	151.2
93	Class 106	1	2F32SSE	5	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	5	126
94	Class 105	1	2F32SSE	6	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	6	151.2
95	Class 105	1	2F32SSE	5	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	5	126
96	Class 104	1	2F32SSE	12	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	12	302.4
97	RR in Class 104	1	2F32SSE	1	Relamp: Direct Line LED - 2-Lamp -U-Bend-15.5W	1	32.04
98	Class 101	1	2F32SSE	10	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	10	252
99	Closet in Class 101	1	2F32SSE	1	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	1	25.2
100	RR in Class 101	1	1I0060	1	Relamp: LED - A-Lamp 9w	1	36.72
101	Class 103	1	2F32SSE	12	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	12	302.4
102	RR in Class 103	1	1L030	1		1	0
103	Class 102	1	2F32SSE	12	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	12	302.4

104	RR in Class 102	1	2F32SSE	1	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	1	25.2
105	RR in Class 106	1	2F32SSE	1	Relamp: Direct Line LED - 2-Lamp -U-Bend-15.5W	1	32.04
106	RR in Class 105	1	2F32SSE	1	Relamp: Direct Line LED - 2-Lamp -U-Bend-15.5W	1	32.04
107	Emergency Ballast throughout	321	1L005	120	Emergency Light Kit	120	0

Enrolled Non-Lighting Measures

Measure Line Item	Exist. Measure	Count of existing	Proposed Measure	Proposed Measure Count	Watts Saved	Therms
Water Savings	TBD TBD	1	TBD TBD	1	0	127.918
Water Heating		1	TBD TBD	1	0	16.206
Water Heating		1	TBD TBD	1	0	31.621

PSE&G Energy Saver Program

Energy Efficiency Upgrade Proposal

Prepared For:

Customer Name: KEARNY BOARD OF ED

733 KEARNY AVE

ROOSEVELT

Phone Number: 201-955-5008

Project Number: 00000386105

Vendor Tracking Number: A085894

Customer Name: KEARNY BOARD OF ED
733 KEARNY AVE
ROOSEVELT
201-955-5008

Estimated Retail Energy Savings

Electric	Lighting	Non-Lighting	Total
Existing kW Load	29.11	-	29.11
Proposed kW Load	13.286	-	13.286
kW Load Savings	15.824	0.455	16.279
Electric			
Existing kWh Load	78,144.03	-	78,144.03
Proposed kWh Load	35,907.711	-	35,907.711
kWh Load Savings	42,236.319	1,033.636	43,269.955
Gas			
Existing Therm Load	-	-	0
Proposed Therm Load	-	-	0
Therm Savings	-	-93.67	-93.67

Estimated Retail Energy Cost Savings

	Lighting	Non-Lighting	Total
Existing Electric Cost	$11,721.60	-	$11,721.60
Proposed Electric Cost	$5,386.16	-	$5,386.16
Electric Cost Savings	$6,335.45	$155.05	$6,490.49
Existing Gas Cost	-	-	$0
Proposed Gas Cost	-	-	$0
Gas Cost Savings	-	$334.04	$334.04

Total Project Cost Breakdown

Costs	Lighting	Non-Lighting	Total
Total Project Cost	$30,422.64	$25,978.60	$56,401.24
PSE&G Contribution (29.3%)	-	-	$16,502.27
Net Project After Rebate	-	-	$39,898.97
Monthly Payment (60 Months at 0% Interest)	**-**	**-**	**$664.98**

Cash Flow Analysis

	Lighting	Non-Lighting	Total
Total Monthly Savings	$527.95	$40.76	$568.71
Customer Monthly Payment (60 months at 0% Interest)	-	-	$664.98
Monthly Cash Flow (60 months)	-	-	($96.27)

Customer Name: KEARNY BOARD OF ED
733 KEARNY AVE
ROOSEVELT
201-955-5008

Projected Five Year Monthly Cash Flow

Month	Customer Payments	Monthly Savings	Cumulative Cash Flow
1	$664.98	$568.71	($96.27)
2	$664.98	$568.71	($192.54)
3	$664.98	$568.71	($288.81)
4	$664.98	$568.71	($385.08)
5	$664.98	$568.71	($481.34)
6	$664.98	$568.71	($577.61)
7	$664.98	$568.71	($673.88)
8	$664.98	$568.71	($770.15)
9	$664.98	$568.71	($866.42)
10	$664.98	$568.71	($962.69)
11	$664.98	$568.71	($1,058.96)
12	$664.98	$568.71	($1,155.23)
13	$664.98	$568.71	($1,251.50)
14	$664.98	$568.71	($1,347.76)
15	$664.98	$568.71	($1,444.03)
16	$664.98	$568.71	($1,540.30)
17	$664.98	$568.71	($1,636.57)
18	$664.98	$568.71	($1,732.84)
19	$664.98	$568.71	($1,829.11)
20	$664.98	$568.71	($1,925.38)
21	$664.98	$568.71	($2,021.65)
22	$664.98	$568.71	($2,117.91)
23	$664.98	$568.71	($2,214.18)
24	$664.98	$568.71	($2,310.45)
25	$664.98	$568.71	($2,406.72)
26	$664.98	$568.71	($2,502.99)
27	$664.98	$568.71	($2,599.26)
28	$664.98	$568.71	($2,695.53)
29	$664.98	$568.71	($2,791.80)
30	$664.98	$568.71	($2,888.07)
31	$664.98	$568.71	($2,984.33)
32	$664.98	$568.71	($3,080.60)
33	$664.98	$568.71	($3,176.87)
34	$664.98	$568.71	($3,273.14)
35	$664.98	$568.71	($3,369.41)
36	$664.98	$568.71	($3,465.68)
37	$664.98	$568.71	($3,561.95)
38	$664.98	$568.71	($3,658.22)
39	$664.98	$568.71	($3,754.49)
40	$664.98	$568.71	($3,850.75)

41	$664.98	$568.71	($4,043.29)
42	$664.98	$568.71	($4,043.29)
43	$664.98	$568.71	($4,139.56)
44	$664.98	$568.71	($4,235.83)
45	$664.98	$568.71	($4,332.10)
46	$664.98	$568.71	($4,428.37)
47	$664.98	$568.71	($4,524.64)
48	$664.98	$568.71	($4,620.90)
49	$664.98	$568.71	($4,717.17)
50	$664.98	$568.71	($4,813.44)
51	$664.98	$568.71	($4,909.71)
52	$664.98	$568.71	($5,005.98)
53	$664.98	$568.71	($5,102.25)
54	$664.98	$568.71	($5,198.52)
55	$664.98	$568.71	($5,391.06)
57	$664.98	$568.71	($5,487.32)
58	$664.98	$568.71	($5,583.59)
59	$664.98	$568.71	($5,679.86)
60	$665.15	$568.71	($5,776.30)
TOTALS	**$39,898.97**	**$34,122.67**	**($5,776.30)**

Customer Name: KEARNY BOARD OF ED
733 KEARNY AVE
ROOSEVELT
201-955-5008

Projected Five Year Cash Flow

Year	Customer Payments	Yearly Savings	Cumulative Cash Flow
1	$7,979.76	$6,824.53	($1,155.23)
2	$7,979.76	$6,824.53	($2,310.45)
3	$7,979.76	$6,824.53	($3,465.68)
4	$7,979.76	$6,824.53	($4,620.90)
5	$7,979.93	$6,824.53	($5,776.30)
TOTALS	**$39,898.97**	**$34,122.67**	**($5,776.30)**

Customer Name: KEARNY BOARD OF ED
733 KEARNY AVE
ROOSEVELT
201-955-5008

Proposal Notes:

The predominant operating hours for this analysis provided by Customer are: 2,750

An electric rate of $0.15 per kWh was utilized to generate this proposal.

A gas rate of $0.97 per Therm was utilized to generate this proposal.

This is a turnkey Proposal and includes, but is not limited to, all labor, permits, and material costs.

Project costs do not include New Jersey sales tax. For capital improvement projects, customer must complete and submit a ST-8 form for tax exemption.

Recycling of all lamps is included in the scope of work for this project.

Project installation labor is warranted for a period of one (1) year - see the contract for more information.

New Jersey Clean Energy Program Protocols 2020 were utilized to evaluate this Project Proposal. The estimated energy savings and environmental impacts in this proposal are based on the New Jersey Clean Energy Program Protocols 2020. Among other items, these Protocols utilize predetermined run hours which may be different than the predominant operating hours provided by the Customer. The Company does not guarantee the proposed energy savings measures will, in fact, save any level of energy or result in a lowering of Customer's energy bills. However, based on the represented predominant run hours, it is expected that the actual energy savings will be near the estimates provided in this Project Proposal.

The information provided in this proposal is for informational purposes only and Customer's actual energy savings may vary based on numerous determining factors including but not limited to weather, changes to Customer utility rates, facility use and facility operating hours.

Customer Name: KEARNY BOARD OF ED
733 KEARNY AVE
ROOSEVELT
201-955-5008

Environmental Impact Statement

According to the EPA, for each kWh saved, approximately 1.52 pound of Carbon Dioxide (CO2), .0065 pounds of Sulfur Dioxide (SO2), and .0028 pounds of Nitrogen Oxides (NOx) are eliminated from future power plant emissions into our atmosphere annually.

CO2 is a "Greenhouse Gas" while SO2 contributes to acid rain formation and NOx contributes to the atmosphere ozone formation (Smog) and estuarial damage.

The Annual Pollution Reduction Impact of Your Project

Chemical Compound	Annual Reduction lbs.
Carbon Dioxide	65,770.33
Nitrogen Oxides	121.16
Sulfur Dioxide	281.25

For every 10,000 Kilowatt Hours saved the EPA has estimated the savings to be equivalent to planting 2.9 acres of trees annually or equivalent to removing 1.4 cars from our roads annually.

Your Project's Local Impact

Acres of Trees Planted:	12.55
Cars Removed	6.06

Energy Savings Calculator:
How We Derive Your Energy Savings

$$\frac{\text{Watts Saved} \times \text{Operating Hours}}{\text{1,000 w per kW}} \times \text{kWh rate}$$

We save you electric energy (kilowatt-hours) by updating your lighting equipment with advanced, highly efficient technology products that provide more capability while using less electricity.

While your cost per kilowatt-hour is fixed, your operating hours are variable as they are in your control. As long as operating hours are as represented, your electrical savings should be in line with the projected energy savings.

For more information please visit www.epa.gov

Enrolled Lighting Measures

Measure Line Item	Area Description /Location	Floor	Exist. Measure	Count of existing	Proposed Measure	Proposed Measure Count	Watts Saved
1	Library24 - 24	3	4F32SSE	6	Relamp: Direct Line LED - 4-Lamp - 4-Foot 12.5w	6	267.84
2	Classroom 23 - 23	3	1L033	6		6	0
3	Classroom 22 - 22	3	4F32SSE	6	Relamp: Direct Line LED - 4-Lamp - 4-Foot 12.5w	6	267.84
4	Music Room In Stairs - 96	3	4F32SSE	1	Relamp: Direct Line LED - 4-Lamp - 4-Foot 12.5w	1	44.64
5	Roof Access - 96	3	1L008	1		1	0
6	Central Stair Landing - 99	3	1F17SSE	1	Relamp: Direct Line LED - 1-Lamp - 2-Foot 9w	1	5.76
7	Central Stair Landing - 99	3	2F59SSE	2	Relamp: Direct Line LED - 2-Lamp - 8-Foot 25w	2	84.96
8	Classroom 21 - 21	3	4F32SSE	6	Relamp: Direct Line LED - 4-Lamp - 4-Foot 12.5w	6	267.84
9	Classroom 20 - 20	3	4F32SSE	6	Relamp: Direct Line LED - 4-Lamp - 4-Foot 12.5w	6	267.84
10	Classroom 19 - 19	3	4F32SSE	6	Relamp: Direct Line LED - 4-Lamp - 4-Foot 12.5w	6	267.84

11	Side Stairwell Storage - 95	3	2F32SSE	1	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	1	25.2
12	Side Stairwell by CR 19 - 95	3	2F32SSE	2	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	2	50.4
13	Classroom 13 - 13	3	4F32SSE	6	Relamp: Direct Line LED - 4-Lamp - 4-Foot 12.5w	6	267.84
14	Classroom 14 - 14	3	4F32SSE	6	Relamp: Direct Line LED - 4-Lamp - 4-Foot 12.5w	6	267.84
15	Janitor Closet - 94	3	2F17SSE	1	Relamp: Direct Line LED - 2-Lamp - 2-Foot 9w	1	13.68
16	Boy's Bathroom - 97	3	2F59SSE	2	Relamp: Direct Line LED - 2-Lamp - 8-Foot 25w	2	84.96
17	Classroom 15 - 15	3	4F32SSE	6	Relamp: Direct Line LED - 4-Lamp - 4-Foot 12.5w	6	267.84
18	Classroom 16 - 16	3	4F32SSE	6	Relamp: Direct Line LED - 4-Lamp - 4-Foot 12.5w	6	267.84
19	Girl's Bathroom - 98	3	2F59SSE	2	Relamp: Direct Line LED - 2-Lamp - 8-Foot 25w	2	84.96
20	Classroom 17 - 17	3	4F32SSE	6	Relamp: Direct Line LED - 4-Lamp - 4-Foot 12.5w	6	267.84
21	Classroom 18 - 18	3	4F32SSE	6	Relamp: Direct Line LED - 4-Lamp - 4-Foot 12.5w	6	267.84

22	Server Room in Stairwell by CR 18 - 93	3	2F17SSE	1	Relamp: Direct Line LED - 2-Lamp - 2-Foot 9w	1	13.68
23	Stairwell by CR 18 - 93	3	2F32SSE	2	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	2	50.4
24	Hallway Floor 3 - 92	3	2F59SSE	7	Relamp: Direct Line LED - 2-Lamp - 8-Foot 25w	7	297.36
25	Classroom 12 - 12	2	4F32SSE	6	Relamp: Direct Line LED - 4-Lamp - 4-Foot 12.5w	6	267.84
26	Classroom 11 - 11	2	4F32SSE	6	Relamp: Direct Line LED - 4-Lamp - 4-Foot 12.5w	6	267.84
27	Classroom 10 - 10	2	4F32SSE	6	Relamp: Direct Line LED - 4-Lamp - 4-Foot 12.5w	6	267.84
28	Central Stair Landing - 91	2	2F59SSE	2	Relamp: Direct Line LED - 2-Lamp - 8-Foot 25w	2	84.96
29	Classroom 9 - 9	2	4F32SSE	6	Relamp: Direct Line LED - 4-Lamp - 4-Foot 12.5w	6	267.84
30	Classroom 8 - 8	2	4F32SSE	6	Relamp: Direct Line LED - 4-Lamp - 4-Foot 12.5w	6	267.84
31	Classroom 7 - 7	2	4F32SSE	6	Relamp: Direct Line LED - 4-Lamp - 4-Foot 12.5w	6	267.84
32	Stairwell by Classroom 7 - 90	2	2F32SSE	2	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	2	50.4

33	Classroom 3 - 3	2	4F32SSE	6	Relamp: Direct Line LED - 4-Lamp - 4-Foot 12.5w	6	267.84
34	Classroom 4 - 4	2	4F32SSE	6	Relamp: Direct Line LED - 4-Lamp - 4-Foot 12.5w	6	267.84
35	Auditorium Balcony - 89	2	4F32SSE	3	Relamp: Direct Line LED - 4-Lamp - 4-Foot 12.5w	3	133.92
36	Janitor Closet Floor 2 - 88	2	2F17SSE	1	Relamp: Direct Line LED - 2-Lamp - 2-Foot 9w	1	13.68
37	Classroom 5 - 5	2	4F32SSE	6	Relamp: Direct Line LED - 4-Lamp - 4-Foot 12.5w	6	267.84
38	Classroom 6 - 6	2	4F32SSE	6	Relamp: Direct Line LED - 4-Lamp - 4-Foot 12.5w	6	267.84
39	Stairwell by Classroom 6 - 87	2	2F32SSE	2	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	2	50.4
40	Hallway Floor 2 - 86	2	2F59SSE	7	Relamp: Direct Line LED - 2-Lamp - 8-Foot 25w	7	297.36
41	Boy's Court 30 - 30	1	4F32SSE	8	Relamp: Direct Line LED - 4-Lamp - 4-Foot 12.5w	8	357.12
42	Girl's Bathroom - 85	1	2F59SSE	1	Relamp: Direct Line LED - 2-Lamp - 8-Foot 25w	1	42.48
43	Boy's Bathroom - 84	1	2F59SSE	1	Relamp: Direct Line LED - 2-Lamp - 8-Foot 25w	1	42.48

44	Nurse Entry - 33	1	2F32SSE	1	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	1	25.2
45	Nurse's Office - 33	1	4F32SSE	1	Relamp: Direct Line LED - 4-Lamp - 4-Foot 12.5w	1	44.64
46	Nurse's Office - 33	1	4F32SSE	1	Relamp: Direct Line LED - 4-Lamp - 4-Foot 12.5w	1	44.64
47	Nurse's Office - 33	1	1L033	1		1	0
48	Janitor Closet Floor 1 - 83	1	2F17SSE	1	Relamp: Direct Line LED - 2-Lamp - 2-Foot 9w	1	13.68
49	Faculty Room - 82	1	2F59SSE	1	Relamp: Direct Line LED - 2-Lamp - 8-Foot 25w	1	42.48
50	Faculty Toilet - 82	1	1F17SSE	1	Relamp: Direct Line LED - 1-Lamp - 2-Foot 9w	1	5.76
51	Central Stairway Landings - 81	1	2F59SSE	2	Relamp: Direct Line LED - 2-Lamp - 8-Foot 25w	2	84.96
52	Main Office - 80	1	4F32SSE	3	Relamp: Direct Line LED - 4-Lamp - 4-Foot 12.5w	3	133.92
53	Principal - 79	1	1L033	3		3	0
54	Bathroom A by Principal - 78	1	2F59SSE	1	Relamp: Direct Line LED - 2-Lamp - 8-Foot 25w	1	42.48
55	(estimate) Bathroom B by Principal - 77	1	2F59SSE	1	Relamp: Direct Line LED - 2-Lamp - 8-Foot 25w	1	42.48

56	Teachers Lounge 29 - 29	1	4F32SSE	4	Relamp: Direct Line LED - 4-Lamp - 4-Foot 12.5w	4	178.56
57	Teachers Lounge 29 - 29	1	4F32SSE	2	Relamp: Direct Line LED - 4-Lamp - 4-Foot 12.5w	2	89.28
58	Teachers Lounge Entry 29 - 29	1	4F32SSE	1	Relamp: Direct Line LED - 4-Lamp - 4-Foot 12.5w	1	44.64
59	Classroom 27 - 27	1	4F32SSE	6	Relamp: Direct Line LED - 4-Lamp - 4-Foot 12.5w	6	267.84
60	Stairwell by Classroom 27 - 76	1	2F32SSE	2	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	2	50.4
61	Classroom 25 - 25	1	2F59SSE	6	Relamp: Direct Line LED - 2-Lamp - 8-Foot 25w	6	254.88
62	Bathroom in CR 25 - 25	1	1F17SSE	1	Relamp: Direct Line LED - 1-Lamp - 2-Foot 9w	1	5.76
63	Classroom 26 - 26	1	2F59SSE	9	Relamp: Direct Line LED - 2-Lamp - 8-Foot 25w	9	382.32
64	Bathroom in CR 26 - 26	1	2F32SSE	1	Relamp: Direct Line LED - 2-Lamp -U-Bend-15.5W	1	32.04
65	Kitchen & Storage - 75	1	2F59SSE	1	Relamp: Direct Line LED - 2-Lamp - 8-Foot 25w	1	42.48
66	Kitchen & Storage - 75	1	2F59SSE	1	Relamp: Direct Line LED - 2-Lamp - 8-Foot 25w	1	42.48

67	Auditorium / Gym - 74	1	4F32SSE	12	Relamp: Direct Line LED - 4-Lamp - 4-Foot 12.5w	12	535.68
68	Stage Office Left - 73	1	2F32SSE	1	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	1	25.2
69	Stage - 73	1	2F32SSE	2	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	2	50.4
70	Stage Storage Right - 73	1	2F32SSE	1	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	1	25.2
71	Stage Storage Right - 73	1	4F32SSE	1	Relamp: Direct Line LED - 4-Lamp - 4-Foot 12.5w	1	44.64
72	Classroom 1 - 1	1	4F32SSE	5	Relamp: Direct Line LED - 4-Lamp - 4-Foot 12.5w	5	223.2
73	Classroom 1 - 1	1	2F32SSE	1	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	1	25.2
74	Bathroom in CR 1 - 1	1	2F32SSE	1	Relamp: Direct Line LED - 2-Lamp -U-Bend-15.5W	1	32.04
75	Classroom 2 - 2	1	4F32SSE	5	Relamp: Direct Line LED - 4-Lamp - 4-Foot 12.5w	5	223.2
76	Classroom 2 - 2	1	2F32SSE	1	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	1	25.2
77	Bathroom in CR 2 - 2	1	2F32SSE	1	Relamp: Direct Line LED - 2-Lamp -U-Bend-15.5W	1	32.04

78	Stairwell by CR 2 - 72	1	2F32SSE	2	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	2	50.4
79	Hallway Floor 1 - 71	1	2F59SSE	7	Relamp: Direct Line LED - 2-Lamp - 8-Foot 25w	7	297.36
80	Basement Stairs - 64	1	2F32SSE	1	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	1	25.2
81	"Solar Disconnect" Door - 65	1	1L008	2		2	0
82	Electrical Room - 63	1	1I0060	1	Relamp: LED - A-Lamp 9w	1	36.72
83	Basement Corridor - 62	1	2F32SSE	2	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	2	50.4
84	Custodian Office - 66	1	4F32SSE	1	Relamp: Direct Line LED - 4-Lamp - 4-Foot 12.5w	1	44.64
85	Custodian Office - 66	1	2F32SSE	2	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	2	50.4
86	Basement Bathroom - 67	1	2F32SSE	1	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	1	25.2
87	Basement Stock Room - 69	1	2F32SSE	1	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	1	25.2
88	Boiler Room - 68	1	2F32SSE	4	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	4	100.8
89	Boiler Room - 68	1	2F32SSE	1	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	1	25.2

90	Wall Packs Bronze 8'	EXT	1H0050S	5	Fixture Replacement: LED Outdoor Wall Mount 80w	5	18
91	Par 38 Single Stalk Spot Lights	EXT	1I0045	3	Relamp: LED - A-Lamp 9w	3	77.76

Enrolled Non-Lighting Measures

Measure Line Item	Exist. Measure	Count of existing	Proposed Measure	Proposed Measure Count	Watts Saved	Therms
HVAC - AC	YORK DM120C00N2AAA1A	1	YORK TBD	1	454.545	0
Water Savings	TBD TBD	1	TBD TBD	1	0	276.14
Water Heating		1	TBD TBD	1	0	54.019
C&I HVAC		1	York TBD	1	0	0
Water Savings	TBD TBD	1	TBD TBD	1	0	14.213

PSE&G Energy Saver Program

Energy Efficiency Upgrade Proposal

Prepared For:

Customer Name: KEARNY BOARD OF ED

644 FOREST ST

SCHUYLER

Phone Number: 201-955-5008

Project Number: 00000386007

Vendor Tracking Number: A085893

Customer Name: KEARNY BOARD OF ED
644 FOREST ST
SCHUYLER
201-955-5008

Estimated Retail Energy Savings

Electric	Lighting	Non-Lighting	Total
Existing kW Load	52.129	-	52.129
Proposed kW Load	20.174	-	20.174
kW Load Savings	31.955	0	31.955
Electric			
Existing kWh Load	125,273.7	-	125,273.7
Proposed kWh Load	47,540.5	-	47,540.5
kWh Load Savings	77,733.2	0	77,733.2
Gas			
Existing Therm Load	-	-	0
Proposed Therm Load	-	-	0
Therm Savings	-	-884.55	-884.55

Estimated Retail Energy Cost Savings

	Lighting	Non-Lighting	Total
Existing Electric Cost	$18,791.06	-	$18,791.06
Proposed Electric Cost	$7,131.08	-	$7,131.08
Electric Cost Savings	$11,659.98	$0.00	$11,659.98
Existing Gas Cost	-	-	$0
Proposed Gas Cost	-	-	$0
Gas Cost Savings	-	$0.00	$0.00

Total Project Cost Breakdown

Costs	Lighting	Non-Lighting	Total
Total Project Cost	$72,075.59	$0.00	$72,075.59
PSE&G Contribution (45.0%)	-	-	$32,434.02
Net Project After Rebate	-	-	$39,641.57
Monthly Payment (60 Months at 0% Interest)	**-**	**-**	**$660.69**

Cash Flow Analysis

	Lighting	Non-Lighting	Total
Total Monthly Savings	$971.66	$.00	$971.66
Customer Monthly Payment (60 months at 0% Interest)	-	-	$660.69
Monthly Cash Flow (60 months)	-	-	$310.98

Customer Name: KEARNY BOARD OF ED
644 FOREST ST
SCHUYLER
201-955-5008

Projected Five Year Monthly Cash Flow

Month	Customer Payments	Monthly Savings	Cumulative Cash Flow
1	$660.69	$971.66	$310.98
2	$660.69	$971.66	$621.95
3	$660.69	$971.66	$932.92
4	$660.69	$971.66	$1,243.90
5	$660.69	$971.66	$1,554.88
6	$660.69	$971.66	$1,865.85
7	$660.69	$971.66	$2,176.82
8	$660.69	$971.66	$2,487.80
9	$660.69	$971.66	$2,798.78
10	$660.69	$971.66	$3,109.75
11	$660.69	$971.66	$3,420.72
12	$660.69	$971.66	$3,731.70
13	$660.69	$971.66	$4,042.68
14	$660.69	$971.66	$4,353.65
15	$660.69	$971.66	$4,664.62
16	$660.69	$971.66	$4,975.60
17	$660.69	$971.66	$5,286.58
18	$660.69	$971.66	$5,597.55
19	$660.69	$971.66	$5,908.52
20	$660.69	$971.66	$6,219.50
21	$660.69	$971.66	$6,530.48
22	$660.69	$971.66	$6,841.45
23	$660.69	$971.66	$7,152.42
24	$660.69	$971.66	$7,463.40
25	$660.69	$971.66	$7,774.38
26	$660.69	$971.66	$8,085.35
27	$660.69	$971.66	$8,396.32
28	$660.69	$971.66	$8,707.30
29	$660.69	$971.66	$9,018.28
30	$660.69	$971.66	$9,329.25
31	$660.69	$971.66	$9,640.22
32	$660.69	$971.66	$9,951.20
33	$660.69	$971.66	$10,262.18
34	$660.69	$971.66	$10,573.15
35	$660.69	$971.66	$10,884.12
36	$660.69	$971.66	$11,195.10
37	$660.69	$971.66	$11,506.08
38	$660.69	$971.66	$11,817.05
39	$660.69	$971.66	$12,128.02
40	$660.69	$971.66	$12,439.00

41	$660.69	$971.66	$13,060.95
42	$660.69	$971.66	$13,060.95
43	$660.69	$971.66	$13,371.92
44	$660.69	$971.66	$13,682.90
45	$660.69	$971.66	$13,993.88
46	$660.69	$971.66	$14,304.85
47	$660.69	$971.66	$14,615.82
48	$660.69	$971.66	$14,926.80
49	$660.69	$971.66	$15,237.78
50	$660.69	$971.66	$15,548.75
51	$660.69	$971.66	$15,859.72
52	$660.69	$971.66	$16,170.70
53	$660.69	$971.66	$16,481.68
54	$660.69	$971.66	$16,792.65
55	$660.69	$971.66	$17,414.60
57	$660.69	$971.66	$17,725.58
58	$660.69	$971.66	$18,036.55
59	$660.69	$971.66	$18,347.52
60	$660.86	$971.66	$18,658.33
TOTALS	**$39,641.57**	**$58,299.90**	**$18,658.33**

Customer Name: KEARNY BOARD OF ED
644 FOREST ST
SCHUYLER
201-955-5008

Projected Five Year Cash Flow

Year	Customer Payments	Yearly Savings	Cumulative Cash Flow
1	$7,928.28	$11,659.98	$3,731.70
2	$7,928.28	$11,659.98	$7,463.40
3	$7,928.28	$11,659.98	$11,195.10
4	$7,928.28	$11,659.98	$14,926.80
5	$7,928.45	$11,659.98	$18,658.33
TOTALS	**$39,641.57**	**$58,299.90**	**$18,658.33**

Customer Name: KEARNY BOARD OF ED
644 FOREST ST
SCHUYLER
201-955-5008

Proposal Notes:

The predominant operating hours for this analysis provided by Customer are: 2,500

An electric rate of $0.15 per kWh was utilized to generate this proposal.

A gas rate of $0.97 per Therm was utilized to generate this proposal.

This is a turnkey Proposal and includes, but is not limited to, all labor, permits, and material costs.

Project costs do not include New Jersey sales tax. For capital improvement projects, customer must complete and submit a ST-8 form for tax exemption.

Recycling of all lamps is included in the scope of work for this project.

Project installation labor is warranted for a period of one (1) year - see the contract for more information.

New Jersey Clean Energy Program Protocols 2020 were utilized to evaluate this Project Proposal. The estimated energy savings and environmental impacts in this proposal are based on the New Jersey Clean Energy Program Protocols 2020. Among other items, these Protocols utilize predetermined run hours which may be different than the predominant operating hours provided by the Customer. The Company does not guarantee the proposed energy savings measures will, in fact, save any level of energy or result in a lowering of Customer's energy bills. However, based on the represented predominant run hours, it is expected that the actual energy savings will be near the estimates provided in this Project Proposal.

The information provided in this proposal is for informational purposes only and Customer's actual energy savings may vary based on numerous determining factors including but not limited to weather, changes to Customer utility rates, facility use and facility operating hours.

Customer Name: KEARNY BOARD OF ED
644 FOREST ST
SCHUYLER
201-955-5008

Environmental Impact Statement

According to the EPA, for each kWh saved, approximately 1.52 pound of Carbon Dioxide (CO2), .0065 pounds of Sulfur Dioxide (SO2), and .0028 pounds of Nitrogen Oxides (NOx) are eliminated from future power plant emissions into our atmosphere annually.

CO2 is a "Greenhouse Gas" while SO2 contributes to acid rain formation and NOx contributes to the atmosphere ozone formation (Smog) and estuarial damage.

The Annual Pollution Reduction Impact of Your Project

Chemical Compound	Annual Reduction lbs.
Carbon Dioxide	118,154.46
Nitrogen Oxides	217.65
Sulfur Dioxide	505.27

For every 10,000 Kilowatt Hours saved the EPA has estimated the savings to be equivalent to planting 2.9 acres of trees annually or equivalent to removing 1.4 cars from our roads annually.

Your Project's Local Impact

Acres of Trees Planted:	22.54
Cars Removed	10.88

Energy Savings Calculator:
How We Derive Your Energy Savings

$$\frac{\text{Watts Saved} \times \text{Operating Hours}}{\text{1,000 w per kW}} \times \text{kWh rate}$$

We save you electric energy (kilowatt-hours) by updating your lighting equipment with advanced, highly efficient technology products that provide more capability while using less electricity.

While your cost per kilowatt-hour is fixed, your operating hours are variable as they are in your control. As long as operating hours are as represented, your electrical savings should be in line with the projected energy savings.

For more information please visit www.epa.gov

Enrolled Lighting Measures

Measure Line Item	Area Description /Location	Floor	Exist. Measure	Count of existing	Proposed Measure	Proposed Measure Count	Watts Saved
1	Front Foyer-1	1	2F32SSE	1	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	1	25.2
2	Conference Room-2	1	2F32SSE	2	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	2	50.4
3	Principle-3	1	4F32SSE	2	Relamp: Direct Line LED - 4-Lamp - 4-Foot 12.5w	2	89.28
4	Print Hall-4	1	4F17SSE	1	Relamp: Direct Line LED - 4-Lamp - 2-Foot 9w	1	18.72
5	Office BR-5	1	1I0060	1	Relamp: LED - A-Lamp 9w	1	36.72
6	Reception Foyer-6	1	2F32SSE	2	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	2	50.4
7	Receptist-6	1	2F32SSE	2	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	2	50.4
8	Reception Closet-6	1	1I0060	1	Relamp: LED - A-Lamp 9w	1	36.72
9	Hallway CR 1-Main Enterance-7	1	4F32SSE	5	Relamp: Direct Line LED - 4-Lamp - 4-Foot 12.5w	5	223.2
10	CR 3-8	1	2F32SSE	12	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	12	302.4

11	CR 2-9	1	2F32SSE	12	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	12	302.4
12	CR 2 Bathroom #1-10	1	2F32SSE	1	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	1	25.2
13	CR 2 Bathroom #2-11	1	2F32SSE	1	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	1	25.2
14	CR 1-12	1	2F32SSE	12	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	12	302.4
15	CR 1 BR-13	1	1I0060	1	Relamp: LED - A-Lamp 9w	1	36.72
16	CR 1 Closet-14	1	1I0060	2	Relamp: LED - A-Lamp 9w	2	73.44
17	Faculity Room-15	1	2F32SSE	6	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	6	151.2
18	Janitor Room-16	1	2F17SSE	2	Relamp: Direct Line LED - 2-Lamp - 2-Foot 9w	2	27.36
19	Staff BR Landing-17	1	2F32SSE	2	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	2	50.4
20	Staff BR-18	1	2F17SSE	2	Relamp: Direct Line LED - 2-Lamp - 2-Foot 9w	2	27.36
21	Main Office-CR 1-19	1	1I0015	3	Fixture Replacement: Exit Sign	3	28.339
22	Main Office-CR 1-19	1	1I0015	2	Fixture Replacement: 2 Head Emergency Light	2	20.376

23	Gym Office-20	1	2F32SSE	1	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	1	25.2
24	Hallway 5-7-21	1	4F32SSE	4	Relamp: Direct Line LED - 4-Lamp - 4-Foot 12.5w	4	178.56
25	CR 5-22	1	2F32SSE	12	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	12	302.4
26	CR 6-23	1	2F32SSE	12	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	12	302.4
27	CR 7-24	1	2F32SSE	12	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	12	302.4
28	CR 5 BR-25	1	2F32SSE	1	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	1	25.2
29	Display Case-26	1	1F17SSE	1	Relamp: Direct Line LED - 1-Lamp - 2-Foot 9w	1	5.76
30	Auditorium-22	1	6F54HSE	30	Relamp: Dir Line LED-3-Lamp-4-Foot-T5HO 25w	30	5,961.6
31	Auditorium Exit-22	1	1I0015	4	Fixture Replacement: Exit Sign	4	37.786
32	Auditorium E-Light-22	1	1I0015	2	Fixture Replacement: 2 Head Emergency Light	2	20.376
33	Hallway CR 8-11-24	1	1I0015	5	Fixture Replacement: Exit Sign	5	47.232
34	Side Enterance-24	1	1I0015	1	Fixture Replacement: 2 Head Emergency Light	1	10.188

35	CR 9-25	1	2F32SSE	12	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	12	302.4
36	CR 10A-26	1	4F32SSE	4	Relamp: Direct Line LED - 4-Lamp - 4-Foot 12.5w	4	178.56
37	CR 10B-27	1	2F32SSE	12	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	12	302.4
38	CR 11-28	1	2F32SSE	12	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	12	302.4
39	CR 11 BR-28	1	2F17SSE	2	Relamp: Direct Line LED - 2-Lamp - 2-Foot 9w	2	27.36
40	Hallway-Storage-201-29	1	4F32SSE	3	Relamp: Direct Line LED - 4-Lamp - 4-Foot 12.5w	3	133.92
41	Hallway-Storage-201-29	1	2F32SSE	7	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	7	176.4
42	CR 202-30	1	3F32SSE	12	Relamp: Direct Line LED - 3-Lamp - 4-Foot 12.5w	12	436.32
43	CR 202-30	1	1I0052	4	Fixture Replacement: LED Recessed Downlight - 8": 22w	4	86.4
44	CR 204-31	1	3F32SSE	12	Relamp: Direct Line LED - 3-Lamp - 4-Foot 12.5w	12	436.32
45	CR 204-31	1	1I0052	4	Fixture Replacement: LED Recessed Downlight - 8": 22w	4	86.4

46	Mrs Prill Office-Mechanical Hallway-32	1	1I0052	5	Fixture Replacement: LED Recessed Downlight - 8": 22w	5	108
47	Mechanical-33	1	2F32SSE	2	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	2	50.4
48	Mrs Prill Office-34	1	4F32SSE	2	Relamp: Direct Line LED - 4-Lamp - 4-Foot 12.5w	2	89.28
49	Nurse Office-35	1	3F32SSE	5	Relamp: Direct Line LED - 3-Lamp - 4-Foot 12.5w	5	181.8
50	Womans Room-36	1	2F32SSE	1	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	1	25.2
51	Men Room-37	1	2F32SSE	1	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	1	25.2
52	Storage Room-38	1	2F32SSE	4	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	4	100.8
53	Sprinkler Room-39	1	1L030	1		1	0
54	Mechanical-40	1	1L030	1		1	0
55	CR 201 Exit-41	1	1I0052	1	Fixture Replacement: LED Recessed Downlight - 8": 22w	1	21.6
56	CR 201-42	1	3F32SSE	16	Relamp: Direct Line LED - 3-Lamp - 4-Foot 12.5w	16	581.76
57	CR 201-42	1	1I0052	5	Fixture Replacement: LED Recessed Downlight - 8": 22w	5	108

58	CR 201 Prep-42	1	3F32SSE	4	Relamp: Direct Line LED - 3-Lamp - 4-Foot 12.5w	4	145.44
59	Exit by Elevator	1	1I0052	11	Fixture Replacement: LED Recessed Downlight - 8": 22w	11	237.6
60	Mrs Alves-1	B	2F32SSE	3	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	3	75.6
61	Gym Boys BR-2	B	2F32SSE	6	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	6	151.2
62	Gym Girls-BR-2A	B	2F32SSE	6	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	6	151.2
63	Janitor Closet-3	B	2F32SSE	1	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	1	25.2
64	CR 103-4	B	3F32SSE	8	Relamp: Direct Line LED - 3-Lamp - 4-Foot 12.5w	8	290.88
65	CR 101-5	B	3F32SSE	16	Relamp: Direct Line LED - 3-Lamp - 4-Foot 12.5w	16	581.76
66	CR 102-6	B	3F32SSE	12	Relamp: Direct Line LED - 3-Lamp - 4-Foot 12.5w	12	436.32
67	CR 102-6	B	1I0052	4	Fixture Replacement: LED Recessed Downlight - 8": 22w	4	86.4
68	CR 104-7	B	3F32SSE	12	Relamp: Direct Line LED - 3-Lamp - 4-Foot 12.5w	12	436.32

69	CR 104-7	B	1I0052	4	Fixture Replacement: LED Recessed Downlight - 8": 22w	4	86.4
70	Hallway 102-Gym-8	B	2F32SSE	5	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	5	126
71	Hallway 102-Gym-8	B	1I0015	2	Fixture Replacement: Exit Sign	2	18.893
72	Hallway 102-Gym-8	B	1I0015	3	Fixture Replacement: 2 Head Emergency Light	3	30.564
73	Hallway 102-Gym-8	B	1I0052	1	Fixture Replacement: LED Recessed Downlight - 8": 22w	1	21.6
74	Gym BR -9	B	2F32SSE	4	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	4	100.8
75	Gym BR -9	B	1I0052	4	Fixture Replacement: LED Recessed Downlight - 8": 22w	4	86.4
76	Gym GR-10	B	2F32SSE	6	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	6	151.2
77	Gym GR-10	B	1I0052	1	Fixture Replacement: LED Recessed Downlight - 8": 22w	1	21.6
78	Electrical Room-11	B	2F32SSE	6	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	6	151.2
79	Coach Office-12	B	3F32SSE	4	Relamp: Direct Line LED - 3-Lamp - 4-Foot 12.5w	4	145.44

80	Coahc Office BR-13	B	2F32SSE	1	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	1	25.2
81	Kitchen-14	B	4F32SSE	12	Relamp: Direct Line LED - 4-Lamp - 4-Foot 12.5w	12	535.68
82	Kitchen Hood-14	B	1I0060	2	Relamp: LED - A-Lamp 9w	2	73.44
83	Storage by Kitchen-15	B	2F32SSE	6	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	6	151.2
84	Main Sprinkler-16	B	2F32SSE	3	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	3	75.6
85	Girls Locker-17	B	2F32SSE	6	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	6	151.2
86	Boys Locker-18	B	2F32SSE	6	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	6	151.2
87	Mechanical-19	B	2F32SSE	1	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	1	25.2
88	Stairs by 11-20	B	2F32SSE	3	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	3	75.6
89	Stairs by 11-20	B	2F17SSE	2	Relamp: Direct Line LED - 2-Lamp - 2-Foot 9w	2	27.36
90	CR 22-1	2	2F32SSE	12	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	12	302.4

91	CR 21-2	2	2F32SSE	12	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12 12.5w	302.4
92	CR 20-3	2	2F32SSE	12	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12 12.5w	302.4
93	Hallway 22-18A-4	2	4F32SSE	4	Relamp: Direct Line LED - 4-Lamp - 4-Foot 4 12.5w	178.56
94	CR 19-5	2	2F32SSE	12	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12 12.5w	302.4
95	CR 18A-6	2	2F32SSE	2	Relamp: Direct Line LED - 2-Lamp - 4-Foot 2 12.5w	50.4
96	Hallway 18-16-7	2	4F32SSE	4	Relamp: Direct Line LED - 4-Lamp - 4-Foot 4 12.5w	178.56
97	CR 18-8	2	2F32SSE	12	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12 12.5w	302.4
98	CR 17-9	2	2F32SSE	12	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12 12.5w	302.4
99	CR 16-10	2	4F32SSE	9	Relamp: Direct Line LED - 4-Lamp - 4-Foot 9 12.5w	401.76
100	Hallway 15A-12-11	2	4F32SSE	4	Relamp: Direct Line LED - 4-Lamp - 4-Foot 4 12.5w	178.56
101	CR 15A-12	2	2F59SSE	2	Relamp: Direct Line LED - 4-Lamp - 8-Foot 2 25w	12.96

102	CR 15-13	2	2F32SSE	12	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12 12.5w	302.4
103	CR 14-14	2	2F32SSE	12	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12 12.5w	302.4
104	CR 13-15	2	2F32SSE	12	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12 12.5w	302.4
105	CR 12-16	2	2F32SSE	12	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12 12.5w	302.4
106	Stair by 12-17	2	2F32SSE	3	Relamp: Direct Line LED - 2-Lamp - 4-Foot 3 12.5w	75.6
107	GR-18	2	2F32SSE	1	Relamp: Direct Line LED - 2-Lamp - 4-Foot 1 12.5w	25.2
108	Storage-19	2	2F17SSE	2	Relamp: Direct Line LED - 2-Lamp - 2-Foot 2 9w	27.36
109	CR 14A-20	2	1F32SSE	3	Relamp: Direct Line LED - 1-Lamp - 4-Foot 3 12.5w	37.8
110	Stair by 15-21	2	2F32SSE	3	Relamp: Direct Line LED - 2-Lamp - 4-Foot 3 12.5w	75.6
111	Stair by 19-22	2	2F32SSE	3	Relamp: Direct Line LED - 2-Lamp - 4-Foot 3 12.5w	75.6
112	BR-23	2	2F32SSE	1	Relamp: Direct Line LED - 2-Lamp - 4-Foot 1 12.5w	25.2

113	Media Center-24	2	2F32SSE	1	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	1	25.2
114	Media Center Foyer-25	2	2F32SSE	1	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	1	25.2
115	CR 27-26	2	2F32SSE	12	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	12	302.4
116	CR 23 Lobby-27	2	2F32SSE	1	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	1	25.2
117	Janitor Office-28	2	2F32SSE	4	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	4	100.8
118	BR-29	2	2F32SSE	1	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	1	25.2
119	CR 23-30	2	2F32SSE	12	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	12	302.4
120	Storage-31	2	2F32SSE	2	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	2	50.4
121	E-Ballasts throughout the building	21B	1L005	120	Emergency Light Kit	120	0

Enrolled Non-Lighting Measures

Measure Line Item	Exist. Measure	Count of existing	Proposed Measure	Proposed Measure Count	Watts Saved	Therms

PSE&G Energy Saver Program

Energy Efficiency Upgrade Proposal

Prepared For:

Customer Name: KEARNY BOARD OF ED

80 BELGROVE DR

WASHINGTON

Phone Number: 201-955-5008

Project Number: 00000386308

Vendor Tracking Number: A085696

Customer Name: KEARNY BOARD OF ED
80 BELGROVE DR
WASHINGTON
201-955-5008

Estimated Retail Energy Savings

Electric	Lighting	Non-Lighting	Total
Existing kW Load	62.945	-	62.945
Proposed kW Load	27.166	-	27.166
kW Load Savings	35.779	0.583	36.362
Electric			
Existing kWh Load	124,303	-	124,303
Proposed kWh Load	53,704.2	-	53,704.2
kWh Load Savings	70,598.8	1,663.764	72,262.564
Gas			
Existing Therm Load	-	-	0
Proposed Therm Load	-	-	0
Therm Savings	-	-691.94	-691.94

Estimated Retail Energy Cost Savings

	Lighting	Non-Lighting	Total
Existing Electric Cost	$18,645.45	-	$18,645.45
Proposed Electric Cost	$8,055.63	-	$8,055.63
Electric Cost Savings	$10,589.82	$249.56	$10,839.38
Existing Gas Cost	-	-	$0
Proposed Gas Cost	-	-	$0
Gas Cost Savings	-	$289.52	$289.52

Total Project Cost Breakdown

Costs	Lighting	Non-Lighting	Total
Total Project Cost	$77,715.27	$19,294.02	$97,009.29
PSE&G Contribution (40.1%)	-	-	$38,939.12
Net Project After Rebate	-	-	$58,070.17
Monthly Payment (60 Months at 0% Interest)	**-**	**-**	**$967.84**

Cash Flow Analysis

	Lighting	Non-Lighting	Total
Total Monthly Savings	$882.48	$44.92	$927.41
Customer Monthly Payment (60 months at 0% Interest)	-	-	$967.84
Monthly Cash Flow (60 months)	-	-	($40.43)

Customer Name: KEARNY BOARD OF ED
80 BELGROVE DR
WASHINGTON
201-955-5008

Projected Five Year Monthly Cash Flow

Month	Customer Payments	Monthly Savings	Cumulative Cash Flow
1	$967.84	$927.41	($40.43)
2	$967.84	$927.41	($80.86)
3	$967.84	$927.41	($121.29)
4	$967.84	$927.41	($161.73)
5	$967.84	$927.41	($202.16)
6	$967.84	$927.41	($242.59)
7	$967.84	$927.41	($283.02)
8	$967.84	$927.41	($323.45)
9	$967.84	$927.41	($363.88)
10	$967.84	$927.41	($404.31)
11	$967.84	$927.41	($444.74)
12	$967.84	$927.41	($485.18)
13	$967.84	$927.41	($525.61)
14	$967.84	$927.41	($566.04)
15	$967.84	$927.41	($606.47)
16	$967.84	$927.41	($646.90)
17	$967.84	$927.41	($687.33)
18	$967.84	$927.41	($727.76)
19	$967.84	$927.41	($768.19)
20	$967.84	$927.41	($808.63)
21	$967.84	$927.41	($849.06)
22	$967.84	$927.41	($889.49)
23	$967.84	$927.41	($929.92)
24	$967.84	$927.41	($970.35)
25	$967.84	$927.41	($1,010.78)
26	$967.84	$927.41	($1,051.21)
27	$967.84	$927.41	($1,091.64)
28	$967.84	$927.41	($1,132.08)
29	$967.84	$927.41	($1,172.51)
30	$967.84	$927.41	($1,212.94)
31	$967.84	$927.41	($1,253.37)
32	$967.84	$927.41	($1,293.80)
33	$967.84	$927.41	($1,334.23)
34	$967.84	$927.41	($1,374.66)
35	$967.84	$927.41	($1,415.09)
36	$967.84	$927.41	($1,455.53)
37	$967.84	$927.41	($1,495.96)
38	$967.84	$927.41	($1,536.39)
39	$967.84	$927.41	($1,576.82)
40	$967.84	$927.41	($1,617.25)

41	$967.84	$927.41	($1,698.11)
42	$967.84	$927.41	($1,698.11)
43	$967.84	$927.41	($1,738.54)
44	$967.84	$927.41	($1,778.98)
45	$967.84	$927.41	($1,819.41)
46	$967.84	$927.41	($1,859.84)
47	$967.84	$927.41	($1,900.27)
48	$967.84	$927.41	($1,940.70)
49	$967.84	$927.41	($1,981.13)
50	$967.84	$927.41	($2,021.56)
51	$967.84	$927.41	($2,061.99)
52	$967.84	$927.41	($2,102.43)
53	$967.84	$927.41	($2,142.86)
54	$967.84	$927.41	($2,183.29)
55	$967.84	$927.41	($2,264.15)
57	$967.84	$927.41	($2,304.58)
58	$967.84	$927.41	($2,345.01)
59	$967.84	$927.41	($2,385.44)
60	$967.61	$927.41	($2,425.65)
TOTALS	**$58,070.17**	**$55,644.52**	**($2,425.65)**

Customer Name: KEARNY BOARD OF ED
80 BELGROVE DR
WASHINGTON
201-955-5008

Projected Five Year Cash Flow

Year	Customer Payments	Yearly Savings	Cumulative Cash Flow
1	$11,614.08	$11,128.90	($485.18)
2	$11,614.08	$11,128.90	($970.35)
3	$11,614.08	$11,128.90	($1,455.53)
4	$11,614.08	$11,128.90	($1,940.70)
5	$11,613.85	$11,128.90	($2,425.65)
TOTALS	**$58,070.17**	**$55,644.52**	**($2,425.65)**

Customer Name: KEARNY BOARD OF ED
80 BELGROVE DR
WASHINGTON
201-955-5008

Proposal Notes:

The predominant operating hours for this analysis provided by Customer are: 2,000

An electric rate of $0.15 per kWh was utilized to generate this proposal.

A gas rate of $0.97 per Therm was utilized to generate this proposal.

This is a turnkey Proposal and includes, but is not limited to, all labor, permits, and material costs.

Project costs do not include New Jersey sales tax. For capital improvement projects, customer must complete and submit a ST-8 form for tax exemption.

Recycling of all lamps is included in the scope of work for this project.

Project installation labor is warranted for a period of one (1) year - see the contract for more information.

New Jersey Clean Energy Program Protocols 2020 were utilized to evaluate this Project Proposal. The estimated energy savings and environmental impacts in this proposal are based on the New Jersey Clean Energy Program Protocols 2020. Among other items, these Protocols utilize predetermined run hours which may be different than the predominant operating hours provided by the Customer. The Company does not guarantee the proposed energy savings measures will, in fact, save any level of energy or result in a lowering of Customer's energy bills. However, based on the represented predominant run hours, it is expected that the actual energy savings will be near the estimates provided in this Project Proposal.

The information provided in this proposal is for informational purposes only and Customer's actual energy savings may vary based on numerous determining factors including but not limited to weather, changes to Customer utility rates, facility use and facility operating hours.

Customer Name: KEARNY BOARD OF ED
80 BELGROVE DR
WASHINGTON
201-955-5008

Environmental Impact Statement

According to the EPA, for each kWh saved, approximately 1.52 pound of Carbon Dioxide (CO2), .0065 pounds of Sulfur Dioxide (SO2), and .0028 pounds of Nitrogen Oxides (NOx) are eliminated from future power plant emissions into our atmosphere annually.

CO2 is a "Greenhouse Gas" while SO2 contributes to acid rain formation and NOx contributes to the atmosphere ozone formation (Smog) and estuarial damage.

The Annual Pollution Reduction Impact of Your Project

Chemical Compound	Annual Reduction lbs.
Carbon Dioxide	109,839.1
Nitrogen Oxides	202.34
Sulfur Dioxide	469.71

For every 10,000 Kilowatt Hours saved the EPA has estimated the savings to be equivalent to planting 2.9 acres of trees annually or equivalent to removing 1.4 cars from our roads annually.

Your Project's Local Impact

Acres of Trees Planted:	20.96
Cars Removed	10.12

Energy Savings Calculator:
How We Derive Your Energy Savings

$$\frac{\text{Watts Saved} \times \text{Operating Hours}}{\text{1,000 w per kW}} \times \text{kWh rate}$$

We save you electric energy (kilowatt-hours) by updating your lighting equipment with advanced, highly efficient technology products that provide more capability while using less electricity.

While your cost per kilowatt-hour is fixed, your operating hours are variable as they are in your control. As long as operating hours are as represented, your electrical savings should be in line with the projected energy savings.

For more information please visit www.epa.gov

Enrolled Lighting Measures

Measure Line Item	Area Description /Location	Floor	Exist. Measure	Count of existing	Proposed Measure	Proposed Measure Count	Watts Saved
1	CR 307	3	4F32SSE	9	Relamp: Direct Line LED - 4-Lamp - 4-Foot 12.5w	9	401.76
2	CR 307 Closet	3	2F32SSE	1	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	1	25.2
3	CR 306	3	2F32SSE	4	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	4	100.8
4	Hallway (306-Lobby)	3	4F32SSE	3	Relamp: Direct Line LED - 4-Lamp - 4-Foot 12.5w	3	133.92
5	CR 308	3	2F32SSE	12	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	12	302.4
6	CR 308 Closet	3	2F32SSE	1	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	1	25.2
7	CR 308 Closet	3	2F59SSE	1	Relamp: Direct Line LED - 2-Lamp - 8-Foot 25w	1	42.48
8	BR-Men	3	4F32SSE	1	Relamp: Direct Line LED - 4-Lamp - 4-Foot 12.5w	1	44.64
9	CR 309	3	2F32SSE	12	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	12	302.4

10	CR 309 Closet	3	2F32SSE	1	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	1	25.2
11	Audit 314	3	3F32SSE	30	Relamp: Direct Line LED - 3-Lamp - 4-Foot 12.5w	30	1,090.8
12	Side Audit L	3	4F32SSE	1	Relamp: Direct Line LED - 4-Lamp - 4-Foot 12.5w	1	44.64
13	Stage	3	4F32SSE	3	Relamp: Direct Line LED - 4-Lamp - 4-Foot 12.5w	3	133.92
14	Side Audit R	3	4F32SSE	1	Relamp: Direct Line LED - 4-Lamp - 4-Foot 12.5w	1	44.64
15	CR 312	3	4F32SSE	4	Relamp: Direct Line LED - 4-Lamp - 4-Foot 12.5w	4	178.56
16	CR 305	3	2F32SSE	12	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	12	302.4
17	Hallway (CR 312-Lobby)	3	4F32SSE	3	Relamp: Direct Line LED - 4-Lamp - 4-Foot 12.5w	3	133.92
18	BR-Woman	3	4F32SSE	1	Relamp: Direct Line LED - 4-Lamp - 4-Foot 12.5w	1	44.64
19	CR 310A	3	4F32SSE	2	Relamp: Direct Line LED - 4-Lamp - 4-Foot 12.5w	2	89.28
20	CR 310	3	4F32SSE	9	Relamp: Direct Line LED - 4-Lamp - 4-Foot 12.5w	9	401.76

21	CR 311	3	4F32SSE	5	Relamp: Direct Line LED - 4-Lamp - 4-Foot 12.5w	5	223.2
22	CR 311	3	2F32SSE	2	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	2	50.4
23	Hallway (305-Roof Access)	3	2F32SSE	3	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	3	75.6
24	BR-Boys	3	2F32SSE	1	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	1	25.2
25	Roof Access	3	1I0060	1	Relamp: LED - A-Lamp 9w	1	36.72
26	BR-Girls	3	2F32SSE	1	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	1	25.2
27	Hallway Exit 2-Exit 1	3	2F32SSE	5	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	5	126
28	CR 301	3	2F59SSE	6	Relamp: Direct Line LED - 2-Lamp - 8-Foot 25w	6	254.88
29	Display	3	1I0060	9	Relamp: LED - A-Lamp 9w	9	330.48
30	CR 302	3	4F32SSE	9	Relamp: Direct Line LED - 4-Lamp - 4-Foot 12.5w	9	401.76
31	CR 303	3	2F59SSE	6	Relamp: Direct Line LED - 2-Lamp - 8-Foot 25w	6	254.88
32	CR 304	3	2F59SSE	6	Relamp: Direct Line LED - 2-Lamp - 8-Foot 25w	6	254.88

33	Stairs (304-104)	3	2F32SSE	4	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	4	100.8
34	Stairs (301-101)	3	2F32SSE	4	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	4	100.8
35	Stairs by 312	3	2F32SSE	2	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	2	50.4
36	Stairs by 312	3	1F17SSE	1	Relamp: Direct Line LED - 1-Lamp - 2-Foot 9w	1	5.76
37	Stairs by 308	3	2F32SSE	2	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	2	50.4
38	Stairs by 308	3	1F17SSE	1	Relamp: Direct Line LED - 1-Lamp - 2-Foot 9w	1	5.76
39	CR 209A	2	2F32SSE	3	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	3	75.6
40	CR 209	2	4F32SSE	9	Relamp: Direct Line LED - 4-Lamp - 4-Foot 12.5w	9	401.76
41	209B-Print	2	4F32SSE	2	Relamp: Direct Line LED - 4-Lamp - 4-Foot 12.5w	2	89.28
42	BR-Men	2	4F32SSE	1	Relamp: Direct Line LED - 4-Lamp - 4-Foot 12.5w	1	44.64
43	209B-Hallway	2	4F32SSE	1	Relamp: Direct Line LED - 4-Lamp - 4-Foot 12.5w	1	44.64

44	CR 208	2	2F32SSE	12	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	12	302.4
45	Hallway 208-215	2	2F59SSE	5	Relamp: Direct Line LED - 2-Lamp - 8-Foot 25w	5	212.4
46	CR 215	2	1L030	1		1	0
47	CR 214	2	1L030	1		1	0
48	CR 216 Foyer	2	1I0060	2	Relamp: LED - A-Lamp 9w	2	73.44
49	CR 216	2	2F32SSE	4	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	4	100.8
50	CR 216	2	2F32SSE	1	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	1	25.2
51	CR 216 BR	2	1I0060	2	Relamp: LED - A-Lamp 9w	2	73.44
52	218 Gym	2	1H0250S	32	Relamp: LED - Repl for High-Bay Lumin: 116W	32	4,117.248
53	Hallway 217-218	2	2F32SSE	5	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	5	126
54	CR 217	2	2F32SSE	1	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	1	25.2
55	Left Gym Doors	2	2F32SSE	3	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	3	75.6
56	Display	2	1I0060	9	Relamp: LED - A-Lamp 9w	9	330.48

57	221A-Kitchen	2	2F32SSE	4	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	4	100.8
58	220 Foyer	2	1I0060	2	Relamp: LED - A-Lamp 9w	2	73.44
59	220 Office	2	2F32SSE	1	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	1	25.2
60	Exit by 220	2	2F32SSE	2	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	2	50.4
61	Foyer 221	2	1I0060	2	Relamp: LED - A-Lamp 9w	2	73.44
62	CR 221	2	2F32SSE	1	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	1	25.2
63	Storage by 221	2	2F32SSE	1	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	1	25.2
64	Exit by 221	2	2F32SSE	2	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	2	50.4
65	Exit by 216	2	2F32SSE	4	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	4	100.8
66	Stair 6	2	2F32SSE	2	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	2	50.4
67	CR 207A	2	4F32SSE	2	Relamp: Direct Line LED - 4-Lamp - 4-Foot 12.5w	2	89.28
68	CR 207	2	2F32SSE	12	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	12	302.4

69	Main Foyer	2	1I0060	4	Relamp: LED - BR30 11w	4	141.12
70	CR 206	2	4F32SSE	8	Relamp: Direct Line LED - 4-Lamp - 4-Foot 12.5w	8	357.12
71	CR 205	2	4F32SSE	9	Relamp: Direct Line LED - 4-Lamp - 4-Foot 12.5w	9	401.76
72	CR 205 Closet	2	2F32SSE	1	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	1	25.2
73	CR 205 BR	2	2F32SSE	1	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	1	25.2
74	CR 204	2	2F59SSE	6	Relamp: Direct Line LED - 2-Lamp - 8-Foot 25w	6	254.88
75	CR 203	2	2F59SSE	6	Relamp: Direct Line LED - 2-Lamp - 8-Foot 25w	6	254.88
76	CR 202	2	2F59SSE	6	Relamp: Direct Line LED - 2-Lamp - 8-Foot 25w	6	254.88
77	CR 201	2	2F59SSE	6	Relamp: Direct Line LED - 2-Lamp - 8-Foot 25w	6	254.88
78	Hallway 201-204	2	2F32SSE	5	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	5	126
79	Girls by 201	2	2F32SSE	1	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	1	25.2

80	Boys by 201	2	2F32SSE	1	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	1	25.2
81	Hallway 202-213	2	4F32SSE	3	Relamp: Direct Line LED - 4-Lamp - 4-Foot 12.5w	3	133.92
82	Hallway 213	2	4F32SSE	1	Relamp: Direct Line LED - 4-Lamp - 4-Foot 12.5w	1	44.64
83	CR 213	2	4F32SSE	6	Relamp: Direct Line LED - 4-Lamp - 4-Foot 12.5w	6	267.84
84	CR 212A	2	4F32SSE	2	Relamp: Direct Line LED - 4-Lamp - 4-Foot 12.5w	2	89.28
85	CR 212	2	4F32SSE	9	Relamp: Direct Line LED - 4-Lamp - 4-Foot 12.5w	9	401.76
86	RR by 212	2	4F32SSE	1	Relamp: Direct Line LED - 4-Lamp - 4-Foot 12.5w	1	44.64
87	CR 211	2	4F32SSE	9	Relamp: Direct Line LED - 4-Lamp - 4-Foot 12.5w	9	401.76
88	Janitor by Main	2	1I0060	1	Relamp: LED - A-Lamp 9w	1	36.72
89	Main Office	2	3F32SSE	2	Relamp: Direct Line LED - 3-Lamp - 4-Foot 12.5w	2	72.72
90	Main Office	2	2F32SSE	7	Relamp: Direct Line LED - 2-Lamp -U-Bend-15.5W	7	224.28

91	Principle	2	3F32SSE	2	Relamp: Direct Line LED - 3-Lamp - 4-Foot 12.5w	2	72.72
92	VP	2	3F32SSE	1	Relamp: Direct Line LED - 3-Lamp - 4-Foot 12.5w	1	36.36
93	Main Office Closet	2	1I0060	1	Relamp: LED - A-Lamp 9w	1	36.72
94	Main Office Storage	2	2F32SSE	1	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	1	25.2
95	CR 210	2	4F32SSE	8	Relamp: Direct Line LED - 4-Lamp - 4-Foot 12.5w	8	357.12
96	CR 210 Prep Room	2	2F32SSE	1	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	1	25.2
97	CR 110A	1	4F32SSE	2	Relamp: Direct Line LED - 4-Lamp - 4-Foot 12.5w	2	89.28
98	CR 110	1	2F59SSE	4	Relamp: Direct Line LED - 2-Lamp - 8-Foot 25w	4	169.92
99	CR 119	1	2F32SSE	1	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	1	25.2
100	CR 119	1	2F32SSE	3	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	3	75.6
101	CR 119	1	2F32SSE	8	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	8	201.6

102	CR 111	1	2F32SSE	6	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	6	151.2
103	Hallway 122	1	2F32SSE	3	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	3	75.6
104	CR 122	1	2F32SSE	15	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	15	378
105	BR 122	1	2F32SSE	2	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	2	50.4
106	CR 112	1	2F32SSE	4	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	4	100.8
107	CR 112A	1	2F32SSE	4	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	4	100.8
108	Hallway-118	1	2F32SSE	5	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	5	126
109	CR 120	1	2F32SSE	18	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	18	453.6
110	BR 120	1	2F32SSE	2	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	2	50.4
111	CR 120 Closet	1	2F32SSE	1	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	1	25.2
112	Sink 120	1	1I0052	8		8	0
113	Exit 120	1	4F32SSE	1	Relamp: Direct Line LED - 4-Lamp - 4-Foot 12.5w	1	44.64

114	CR 121	1	2F32SSE	18	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	18	453.6
115	BR 121	1	2F32SSE	2	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	2	50.4
116	CR 121 Closet	1	2F32SSE	1	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	1	25.2
117	Sink 121	1	1I0052	8		8	0
118	Exit 121	1	4F32SSE	1	Relamp: Direct Line LED - 4-Lamp - 4-Foot 12.5w	1	44.64
119	109-Library	1	2F32SSE	24	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	24	604.8
120	108A Back Library	1	2F32SSE	10	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	10	252
121	113-Storage	1	2F32SSE	3	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	3	75.6
122	Hallway to 113	1	2F59SSE	1	Relamp: Direct Line LED - 2-Lamp - 8-Foot 25w	1	42.48
123	Hallway 110A-118	1	4F32SSE	7	Relamp: Direct Line LED - 4-Lamp - 4-Foot 12.5w	7	312.48
124	CR 106	1	2F32SSE	2	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	2	50.4
125	CR 106	1	4F32SSE	1	Relamp: Direct Line LED - 4-Lamp - 4-Foot 12.5w	1	44.64

126	CR 106C	1	2F32SSE	4	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	4	100.8
127	CR 106B	1	2F32SSE	8	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	8	201.6
128	CR 106	1	2F32SSE	4	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	4	100.8
129	CR 101	1	2F59SSE	6	Relamp: Direct Line LED - 2-Lamp - 8-Foot 25w	6	254.88
130	Girls by 101	1	2F32SSE	1	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	1	25.2
131	Hallway 101-104	1	2F32SSE	5	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	5	126
132	CR 102	1	2F59SSE	6	Relamp: Direct Line LED - 2-Lamp - 8-Foot 25w	6	254.88
133	CR 103	1	2F59SSE	6	Relamp: Direct Line LED - 2-Lamp - 8-Foot 25w	6	254.88
134	CR 104	1	2F59SSE	6	Relamp: Direct Line LED - 2-Lamp - 8-Foot 25w	6	254.88
135	Hallway GR-106	1	2F32SSE	3	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	3	75.6
136	Bathroom	1	2F32SSE	1	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	1	25.2

137	106 Lobby	1	2F32SSE	4	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	4	100.8
138	106 Lobby	1	1F17SSE	1	Relamp: Direct Line LED - 1-Lamp - 2-Foot 9w	1	5.76
139	CR 105 (No Access)	1	2F32SSE	2	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	2	50.4
140	BR by 106	1	2F32SSE	2	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	2	50.4
141	Little Gym	1	4F32SSE	13	Relamp: Direct Line LED - 4-Lamp - 4-Foot 12.5w	13	580.32
142	Boiler Room	1	2F59SSE	4	Relamp: Direct Line LED - 2-Lamp - 8-Foot 25w	4	169.92
143	Boiler Room	1	2F32SSE	1	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	1	25.2
144	Boiler Room	1	1F96SSE	1	Relamp: Direct Line LED - 1-Lamp - 8-Foot 25w	1	32.4
145	Boiler Storage	1	2F59SSE	1	Relamp: Direct Line LED - 2-Lamp - 8-Foot 25w	1	42.48
146	Boiler Storage	1	2F32SSE	1	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	1	25.2
147	Little Gym Storage	1	1I0060	1	Relamp: LED - A-Lamp 9w	1	36.72

148	CR 107 A Lobby	1	2F59SSE	1	Relamp: Direct Line LED - 2-Lamp - 8-Foot 25w	1	42.48
149	CR 108	1	4F32SSE	6	Relamp: Direct Line LED - 4-Lamp - 4-Foot 12.5w	6	267.84
150	CR 107A	1	2F32SSE	12	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	12	302.4
151	CR 107	1	4F32SSE	12	Relamp: Direct Line LED - 4-Lamp - 4-Foot 12.5w	12	535.68
152	Emergency Throughout	321	1L005	93	Emergency Light Kit	93	0

Enrolled Non-Lighting Measures

Measure Line Item	Exist. Measure	Count of existing	Proposed Measure	Proposed Measure Count	Watts Saved	Therms
HVAC - Heat Pump	Daikin 3MXS24JVJU	1	Daikin TBD	1	291.498	0
HVAC - Heat Pump	Daikin RXN24KEVJU	1	Daikin TBD	1	291.498	0
Water Savings	TBD TBD	1	TBD TBD	1	0	298.474

PSE&G Energy Saver Program

Energy Efficiency Upgrade Proposal

Prepared For:

Customer Name: KEARNY BOARD OF ED

644 FOREST ST

SCHUYLER

Phone Number: 201-955-5008

Project Number: 00000386007

Vendor Tracking Number: A085893

Account Number:

Customer Name: KEARNY BOARD OF ED
644 FOREST ST
SCHUYLER
201-955-5008

Estimated Retail Energy Savings

Electric	Lighting	Non-Lighting	Total
Existing kW Load	54.405	-	54.405
Proposed kW Load	21.745	-	21.745
kW Load Savings	31.955	13.525	45.48
Electric			
Existing kWh Load	130,260.95	-	130,260.95
Proposed kWh Load	50,981.702	-	50,981.702
kWh Load Savings	79,279.248	17,373.903	96,653.15
Gas			
Existing Therm Load	-	-	0
Proposed Therm Load	-	-	0
Therm Savings	-	1,018.05	1,018.05

Estimated Retail Energy Cost Savings

	Lighting	Non-Lighting	Total
Existing Electric Cost	$19,539.14	-	$19,539.14
Proposed Electric Cost	$7,647.26	-	$7,647.26
Electric Cost Savings	$11,891.89	$2,606.09	$14,497.97
Existing Gas Cost	-	-	$0
Proposed Gas Cost	-	-	$0
Gas Cost Savings	-	$1,864.47	$1,864.47

Total Project Cost Breakdown

Costs	Lighting	Non-Lighting	Total
Total Project Cost	$72,075.59	$184,416.51	$256,492.10
PSE&G Contribution (36.4%)	-	-	$93,342.33
Net Project After Rebate	-	-	$163,149.77
Monthly Payment (60 Months at 0% Interest)	**-**	**-**	**$2,719.16**

Cash Flow Analysis

	Lighting	Non-Lighting	Total
Total Monthly Savings	$990.99	$372.55	$1,363.54
Customer Monthly Payment (60 months at 0% Interest)	-	-	$2,719.16
Monthly Cash Flow (60 months)	-	-	($1,355.62)

Customer Name: KEARNY BOARD OF ED
644 FOREST ST
SCHUYLER
201-955-5008

Projected Five Year Monthly Cash Flow

Month	Customer Payments	Monthly Savings	Cumulative Cash Flow
1	$2,719.16	$1,363.54	($1,355.62)
2	$2,719.16	$1,363.54	($2,711.25)
3	$2,719.16	$1,363.54	($4,066.87)
4	$2,719.16	$1,363.54	($5,422.49)
5	$2,719.16	$1,363.54	($6,778.12)
6	$2,719.16	$1,363.54	($8,133.74)
7	$2,719.16	$1,363.54	($9,489.36)
8	$2,719.16	$1,363.54	($10,844.99)
9	$2,719.16	$1,363.54	($12,200.61)
10	$2,719.16	$1,363.54	($13,556.23)
11	$2,719.16	$1,363.54	($14,911.85)
12	$2,719.16	$1,363.54	($16,267.48)
13	$2,719.16	$1,363.54	($17,623.10)
14	$2,719.16	$1,363.54	($18,978.72)
15	$2,719.16	$1,363.54	($20,334.35)
16	$2,719.16	$1,363.54	($21,689.97)
17	$2,719.16	$1,363.54	($23,045.59)
18	$2,719.16	$1,363.54	($24,401.22)
19	$2,719.16	$1,363.54	($25,756.84)
20	$2,719.16	$1,363.54	($27,112.46)
21	$2,719.16	$1,363.54	($28,468.09)
22	$2,719.16	$1,363.54	($29,823.71)
23	$2,719.16	$1,363.54	($31,179.33)
24	$2,719.16	$1,363.54	($32,534.96)
25	$2,719.16	$1,363.54	($33,890.58)
26	$2,719.16	$1,363.54	($35,246.20)
27	$2,719.16	$1,363.54	($36,601.83)
28	$2,719.16	$1,363.54	($37,957.45)
29	$2,719.16	$1,363.54	($39,313.07)
30	$2,719.16	$1,363.54	($40,668.70)
31	$2,719.16	$1,363.54	($42,024.32)
32	$2,719.16	$1,363.54	($43,379.94)
33	$2,719.16	$1,363.54	($44,735.56)
34	$2,719.16	$1,363.54	($46,091.19)
35	$2,719.16	$1,363.54	($47,446.81)
36	$2,719.16	$1,363.54	($48,802.43)
37	$2,719.16	$1,363.54	($50,158.06)
38	$2,719.16	$1,363.54	($51,513.68)
39	$2,719.16	$1,363.54	($52,869.30)
40	$2,719.16	$1,363.54	($54,224.93)

41	$2,719.16	$1,363.54	($56,936.17)
42	$2,719.16	$1,363.54	($56,936.17)
43	$2,719.16	$1,363.54	($58,291.80)
44	$2,719.16	$1,363.54	($59,647.42)
45	$2,719.16	$1,363.54	($61,003.04)
46	$2,719.16	$1,363.54	($62,358.67)
47	$2,719.16	$1,363.54	($63,714.29)
48	$2,719.16	$1,363.54	($65,069.91)
49	$2,719.16	$1,363.54	($66,425.54)
50	$2,719.16	$1,363.54	($67,781.16)
51	$2,719.16	$1,363.54	($69,136.78)
52	$2,719.16	$1,363.54	($70,492.41)
53	$2,719.16	$1,363.54	($71,848.03)
54	$2,719.16	$1,363.54	($73,203.65)
55	$2,719.16	$1,363.54	($75,914.90)
57	$2,719.16	$1,363.54	($77,270.52)
58	$2,719.16	$1,363.54	($78,626.14)
59	$2,719.16	$1,363.54	($79,981.77)
60	$2,719.33	$1,363.54	($81,337.56)
TOTALS	**$163,149.77**	**$81,812.21**	**($81,337.56)**

Customer Name: KEARNY BOARD OF ED
644 FOREST ST
SCHUYLER
201-955-5008

Projected Five Year Cash Flow

Year	Customer Payments	Yearly Savings	Cumulative Cash Flow
1	$32,629.92	$16,362.44	($16,267.48)
2	$32,629.92	$16,362.44	($32,534.96)
3	$32,629.92	$16,362.44	($48,802.43)
4	$32,629.92	$16,362.44	($65,069.91)
5	$32,630.09	$16,362.44	($81,337.56)
TOTALS	**$163,149.77**	**$81,812.21**	**($81,337.56)**

Customer Name: KEARNY BOARD OF ED
644 FOREST ST
SCHUYLER
201-955-5008

Proposal Notes:

The predominant operating hours for this analysis provided by Customer are: 2,500

An electric rate of $0.15 per kWh was utilized to generate this proposal.

A gas rate of $0.97 per Therm was utilized to generate this proposal.

This is a turnkey Proposal and includes, but is not limited to, all labor, permits, and material costs.

Project costs do not include New Jersey sales tax. For capital improvement projects, customer must complete and submit a ST-8 form for tax exemption.

Recycling of all lamps is included in the scope of work for this project.

Project installation labor is warranted for a period of one (1) year - see the contract for more information.

New Jersey Clean Energy Program Protocols 2020 were utilized to evaluate this Project Proposal. The estimated energy savings and environmental impacts in this proposal are based on the New Jersey Clean Energy Program Protocols 2020. Among other items, these Protocols utilize predetermined run hours which may be different than the predominant operating hours provided by the Customer. The Company does not guarantee the proposed energy savings measures will, in fact, save any level of energy or result in a lowering of Customer's energy bills. However, based on the represented predominant run hours, it is expected that the actual energy savings will be near the estimates provided in this Project Proposal.

The information provided in this proposal is for informational purposes only and Customer's actual energy savings may vary based on numerous determining factors including but not limited to weather, changes to Customer utility rates, facility use and facility operating hours.

Customer Name: KEARNY BOARD OF ED
644 FOREST ST
SCHUYLER
201-955-5008

Environmental Impact Statement

According to the EPA, for each kWh saved, approximately 1.52 pound of Carbon Dioxide (CO2), .0065 pounds of Sulfur Dioxide (SO2), and .0028 pounds of Nitrogen Oxides (NOx) are eliminated from future power plant emissions into our atmosphere annually.

CO2 is a "Greenhouse Gas" while SO2 contributes to acid rain formation and NOx contributes to the atmosphere ozone formation (Smog) and estuarial damage.

The Annual Pollution Reduction Impact of Your Project

Chemical Compound	Annual Reduction lbs.
Carbon Dioxide	146,912.79
Nitrogen Oxides	270.63
Sulfur Dioxide	628.25

For every 10,000 Kilowatt Hours saved the EPA has estimated the savings to be equivalent to planting 2.9 acres of trees annually or equivalent to removing 1.4 cars from our roads annually.

Your Project's Local Impact

Acres of Trees Planted:	28.03
Cars Removed	13.53

Energy Savings Calculator:
How We Derive Your Energy Savings

$$\frac{\text{Watts Saved} \times \text{Operating Hours}}{\text{1,000 w per kW}} \times \text{kWh rate}$$

We save you electric energy (kilowatt-hours) by updating your lighting equipment with advanced, highly efficient technology products that provide more capability while using less electricity.

While your cost per kilowatt-hour is fixed, your operating hours are variable as they are in your control. As long as operating hours are as represented, your electrical savings should be in line with the projected energy savings.

For more information please visit www.epa.gov

Enrolled Lighting Measures

Measure Line Item	Area Description /Location	Floor	Exist. Measure	Count of existing	Proposed Measure	Proposed Measure Count	Watts Saved
1	Front Foyer-1	1	2F32SSE	1	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	1	30.78
2	Conference Room-2	1	2F32SSE	2	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	2	61.56
3	Principle-3	1	4F32SSE	2	Relamp: Direct Line LED - 4-Lamp - 4-Foot 12.5w	2	111.6
4	Print Hall-4	1	4F17SSE	1	Relamp: Direct Line LED - 4-Lamp - 2-Foot 9w	1	26.755
5	Office BR-5	1	1I0060	1	Relamp: LED - A-Lamp 9w	1	38.729
6	Reception Foyer-6	1	2F32SSE	2	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	2	50.4
7	Receptist-6	1	2F32SSE	2	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	2	50.4
8	Reception Closet-6	1	1I0060	1	Relamp: LED - A-Lamp 9w	1	38.729
9	Hallway CR 1-Main Enterance-7	1	4F32SSE	5	Relamp: Direct Line LED - 4-Lamp - 4-Foot 12.5w	5	223.2
10	CR 3-8	1	2F32SSE	12	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	12	302.4

11	CR 2-9	1	2F32SSE	12	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	12	302.4
12	CR 2 Bathroom #1-10	1	2F32SSE	1	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	1	30.78
13	CR 2 Bathroom #2-11	1	2F32SSE	1	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	1	30.78
14	CR 1-12	1	2F32SSE	12	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	12	302.4
15	CR 1 BR-13	1	1I0060	1	Relamp: LED - A-Lamp 9w	1	38.729
16	CR 1 Closet-14	1	1I0060	2	Relamp: LED - A-Lamp 9w	2	77.458
17	Faculity Room-15	1	2F32SSE	6	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	6	151.2
18	Janitor Room-16	1	2F17SSE	2	Relamp: Direct Line LED - 2-Lamp - 2-Foot 9w	2	35.395
19	Staff BR Landing-17	1	2F32SSE	2	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	2	61.56
20	Staff BR-18	1	2F17SSE	2	Relamp: Direct Line LED - 2-Lamp - 2-Foot 9w	2	35.395
21	Main Office-CR 1-19	1	1I0015	3	Fixture Replacement: Exit Sign	3	28.339
22	Main Office-CR 1-19	1	1I0015	2	Fixture Replacement: 2 Head Emergency Light	2	20.376

23	Gym Office-20	1	2F32SSE	1	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	1	25.2
24	Hallway 5-7-21	1	4F32SSE	4	Relamp: Direct Line LED - 4-Lamp - 4-Foot 12.5w	4	178.56
25	CR 5-22	1	2F32SSE	12	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	12	302.4
26	CR 6-23	1	2F32SSE	12	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	12	302.4
27	CR 7-24	1	2F32SSE	12	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	12	302.4
28	CR 5 BR-25	1	2F32SSE	1	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	1	30.78
29	Display Case-26	1	1F17SSE	1	Relamp: Direct Line LED - 1-Lamp - 2-Foot 9w	1	5.76
30	Auditorium-22	1	6F54HSE	30	Relamp: Dir Line LED-3-Lamp-4-Foot-T5HO 25w	30	5,961.6
31	Auditorium Exit-22	1	1I0015	4	Fixture Replacement: Exit Sign	4	37.786
32	Auditorium E-Light-22	1	1I0015	2	Fixture Replacement: 2 Head Emergency Light	2	20.376
33	Hallway CR 8-11-24	1	1I0015	5	Fixture Replacement: Exit Sign	5	47.232
34	Side Enterance-24	1	1I0015	1	Fixture Replacement: 2 Head Emergency Light	1	10.188

35	CR 9-25	1	2F32SSE	12	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	12	302.4
36	CR 10A-26	1	4F32SSE	4	Relamp: Direct Line LED - 4-Lamp - 4-Foot 12.5w	4	223.2
37	CR 10B-27	1	2F32SSE	12	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	12	302.4
38	CR 11-28	1	2F32SSE	12	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	12	302.4
39	CR 11 BR-28	1	2F17SSE	2	Relamp: Direct Line LED - 2-Lamp - 2-Foot 9w	2	35.395
40	Hallway-Storage-201-29	1	4F32SSE	3	Relamp: Direct Line LED - 4-Lamp - 4-Foot 12.5w	3	167.4
41	Hallway-Storage-201-29	1	2F32SSE	7	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	7	176.4
42	CR 202-30	1	3F32SSE	12	Relamp: Direct Line LED - 3-Lamp - 4-Foot 12.5w	12	436.32
43	CR 202-30	1	1I0052	4	Fixture Replacement: LED Recessed Downlight - 8": 22w	4	86.4
44	CR 204-31	1	3F32SSE	12	Relamp: Direct Line LED - 3-Lamp - 4-Foot 12.5w	12	436.32
45	CR 204-31	1	1I0052	4	Fixture Replacement: LED Recessed Downlight - 8": 22w	4	86.4

46	Mrs Prill Office-Mechanical Hallway-32	1	1I0052	5	Fixture Replacement: LED Recessed Downlight - 8": 22w	5	108
47	Mechanical-33	1	2F32SSE	2	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	2	61.56
48	Mrs Prill Office-34	1	4F32SSE	2	Relamp: Direct Line LED - 4-Lamp - 4-Foot 12.5w	2	111.6
49	Nurse Office-35	1	3F32SSE	5	Relamp: Direct Line LED - 3-Lamp - 4-Foot 12.5w	5	181.8
50	Womans Room-36	1	2F32SSE	1	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	1	30.78
51	Men Room-37	1	2F32SSE	1	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	1	30.78
52	Storage Room-38	1	2F32SSE	4	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	4	123.12
53	Sprinkler Room-39	1	1L030	1		1	0
54	Mechanical-40	1	1L030	1		1	0
55	CR 201 Exit-41	1	1I0052	1	Fixture Replacement: LED Recessed Downlight - 8": 22w	1	21.6
56	CR 201-42	1	3F32SSE	16	Relamp: Direct Line LED - 3-Lamp - 4-Foot 12.5w	16	581.76
57	CR 201-42	1	1I0052	5	Fixture Replacement: LED Recessed Downlight - 8": 22w	5	108

58	CR 201 Prep-42	1	3F32SSE	4	Relamp: Direct Line LED - 3-Lamp - 4-Foot 12.5w	4	178.92
59	Exit by Elevator	1	1I0052	11	Fixture Replacement: LED Recessed Downlight - 8": 22w	11	237.6
60	Mrs Alves-1	B	2F32SSE	3	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	3	92.34
61	Gym Boys BR-2	B	2F32SSE	6	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	6	151.2
62	Gym Girls-BR-2A	B	2F32SSE	6	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	6	151.2
63	Janitor Closet-3	B	2F32SSE	1	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	1	30.78
64	CR 103-4	B	3F32SSE	8	Relamp: Direct Line LED - 3-Lamp - 4-Foot 12.5w	8	290.88
65	CR 101-5	B	3F32SSE	16	Relamp: Direct Line LED - 3-Lamp - 4-Foot 12.5w	16	581.76
66	CR 102-6	B	3F32SSE	12	Relamp: Direct Line LED - 3-Lamp - 4-Foot 12.5w	12	436.32
67	CR 102-6	B	1I0052	4	Fixture Replacement: LED Recessed Downlight - 8": 22w	4	86.4
68	CR 104-7	B	3F32SSE	12	Relamp: Direct Line LED - 3-Lamp - 4-Foot 12.5w	12	436.32

69	CR 104-7	B	1I0052	4	Fixture Replacement: LED Recessed Downlight - 8": 22w	4	86.4
70	Hallway 102-Gym-8	B	2F32SSE	5	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	5	126
71	Hallway 102-Gym-8	B	1I0015	2	Fixture Replacement: Exit Sign	2	18.893
72	Hallway 102-Gym-8	B	1I0015	3	Fixture Replacement: 2 Head Emergency Light	3	30.564
73	Hallway 102-Gym-8	B	1I0052	1	Fixture Replacement: LED Recessed Downlight - 8": 22w	1	21.6
74	Gym BR -9	B	2F32SSE	4	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	4	123.12
75	Gym BR -9	B	1I0052	4	Fixture Replacement: LED Recessed Downlight - 8": 22w	4	86.4
76	Gym GR-10	B	2F32SSE	6	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	6	151.2
77	Gym GR-10	B	1I0052	1	Fixture Replacement: LED Recessed Downlight - 8": 22w	1	21.6
78	Electrical Room-11	B	2F32SSE	6	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	6	151.2
79	Coach Office-12	B	3F32SSE	4	Relamp: Direct Line LED - 3-Lamp - 4-Foot 12.5w	4	178.92

80	Coahc Office BR-13	B	2F32SSE	1	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	1	30.78
81	Kitchen-14	B	4F32SSE	12	Relamp: Direct Line LED - 4-Lamp - 4-Foot 12.5w	12	535.68
82	Kitchen Hood-14	B	1I0060	2	Relamp: LED - A-Lamp 9w	2	73.44
83	Storage by Kitchen-15	B	2F32SSE	6	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	6	151.2
84	Main Sprinkler-16	B	2F32SSE	3	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	3	92.34
85	Girls Locker-17	B	2F32SSE	6	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	6	151.2
86	Boys Locker-18	B	2F32SSE	6	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	6	151.2
87	Mechanical-19	B	2F32SSE	1	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	1	30.78
88	Stairs by 11-20	B	2F32SSE	3	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	3	75.6
89	Stairs by 11-20	B	2F17SSE	2	Relamp: Direct Line LED - 2-Lamp - 2-Foot 9w	2	27.36
90	CR 22-1	2	2F32SSE	12	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	12	302.4

91	CR 21-2	2	2F32SSE	12	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12 12.5w	302.4
92	CR 20-3	2	2F32SSE	12	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12 12.5w	302.4
93	Hallway 22-18A-4	2	4F32SSE	4	Relamp: Direct Line LED - 4-Lamp - 4-Foot 4 12.5w	178.56
94	CR 19-5	2	2F32SSE	12	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12 12.5w	302.4
95	CR 18A-6	2	2F32SSE	2	Relamp: Direct Line LED - 2-Lamp - 4-Foot 2 12.5w	61.56
96	Hallway 18-16-7	2	4F32SSE	4	Relamp: Direct Line LED - 4-Lamp - 4-Foot 4 12.5w	178.56
97	CR 18-8	2	2F32SSE	12	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12 12.5w	302.4
98	CR 17-9	2	2F32SSE	12	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12 12.5w	302.4
99	CR 16-10	2	4F32SSE	9	Relamp: Direct Line LED - 4-Lamp - 4-Foot 9 12.5w	401.76
100	Hallway 15A-12-11	2	4F32SSE	4	Relamp: Direct Line LED - 4-Lamp - 4-Foot 4 12.5w	178.56
101	CR 15A-12	2	2F59SSE	2	Relamp: Direct Line LED - 4-Lamp - 8-Foot 2 25w	57.6

102	CR 15-13	2	2F32SSE	12	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12 12.5w	302.4
103	CR 14-14	2	2F32SSE	12	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12 12.5w	302.4
104	CR 13-15	2	2F32SSE	12	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12 12.5w	302.4
105	CR 12-16	2	2F32SSE	12	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12 12.5w	302.4
106	Stair by 12-17	2	2F32SSE	3	Relamp: Direct Line LED - 2-Lamp - 4-Foot 3 12.5w	75.6
107	GR-18	2	2F32SSE	1	Relamp: Direct Line LED - 2-Lamp - 4-Foot 1 12.5w	30.78
108	Storage-19	2	2F17SSE	2	Relamp: Direct Line LED - 2-Lamp - 2-Foot 2 9w	27.36
109	CR 14A-20	2	1F32SSE	3	Relamp: Direct Line LED - 1-Lamp - 4-Foot 3 12.5w	46.17
110	Stair by 15-21	2	2F32SSE	3	Relamp: Direct Line LED - 2-Lamp - 4-Foot 3 12.5w	75.6
111	Stair by 19-22	2	2F32SSE	3	Relamp: Direct Line LED - 2-Lamp - 4-Foot 3 12.5w	75.6
112	BR-23	2	2F32SSE	1	Relamp: Direct Line LED - 2-Lamp - 4-Foot 1 12.5w	30.78

113	Media Center-24	2	2F32SSE	1	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	1	25.2
114	Media Center Foyer-25	2	2F32SSE	1	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	1	25.2
115	CR 27-26	2	2F32SSE	12	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	12	302.4
116	CR 23 Lobby-27	2	2F32SSE	1	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	1	25.2
117	Janitor Office-28	2	2F32SSE	4	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	4	123.12
118	BR-29	2	2F32SSE	1	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	1	30.78
119	CR 23-30	2	2F32SSE	12	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	12	302.4
120	Storage-31	2	2F32SSE	2	Relamp: Direct Line LED - 2-Lamp - 4-Foot 12.5w	2	61.56
121	E-Ballasts throughout the building	21B	1L005	120	Emergency Light Kit	120	0

Enrolled Non-Lighting Measures

Measure Line Item	Exist. Measure	Count of existing	Proposed Measure	Proposed Measure Count	Watts Saved	Therms
Gas Furnace - Boiler Replacement	Weil McClain 478	1	TBD TBD	1	0	961.067
Gas Furnace - Boiler Replacement	Weil McClain 478	1	TBD TBD	1	0	961.067
Water Savings	TBD TBD	1	TBD TBD	1	0	0
Water Savings	TBD TBD	1	TBD TBD	1	0	0
Elec Chillers - FLV		1		1	13,524.864	0

DCO

- Josh Costell
- Executive Vice President and General Manager
- DCO Energy Efficiency Division
- 100 Lenox Drive
- Lawrenceville, NJ 08648

Kearny

- Kearny

KEARNY SCHOOL DISTRICT

ENERGY SAVINGS PLAN

APPENDIX F – ECM BREAKDOWN BY BUILDING

KEARNY BOE % SAVINGS BY BUILDING (T.O.R.)

KEARNY BOE BUILDINGS/FACILITIES		UTILITY ELECTRIC CONSUMPTION SAVINGS	ELECTRIC DEMAND SAVINGS	ONSITE ELECTRIC SAVINGS	NATURAL GAS SAVINGS	ONSITE NATURAL GAS SAVINGS	Water & Sewer (Gal) SAVINGS
BUILDING/FACILITY NAME	SQFT	kWh	kW	kWh	THERMS	THERMS	Water & Sewer (Gal)
Kearny High School	305,491	16.3%	5.6%	15.2%	9.0%	9.0%	9.9%
Lincoln Middle School	101,000	57.6%	32.4%	51.2%	3.3%	13.4%	6.8%
Franklin Elementary School	114,854	60.9%	30.0%	37.2%	22.1%	22.1%	3.3%
Washington Elementary School	86,220	36.3%	8.9%	25.5%	33.1%	33.1%	6.7%
Garfield Elementary School	60,095	39.6%	26.9%	31.4%	25.7%	25.7%	1.4%
Schuyler Elementary School	54,880	30.2%	22.0%	22.2%	66.5%	66.5%	14.8%
Roosevelt Elementary School	43,385	36.5%	12.8%	28.6%	38.5%	38.5%	5.3%
Administration Building	12,000	29.6%	21.0%	29.6%	36.2%	36.2%	25.9%
TOTALS	**777,925**	**35.1%**	**16.4%**	**29.2%**	**25.1%**	**27.2%**	**6.1%**

KEARNY BOE SAVINGS BY BUILDING BY UTILITY FROM SMART SELECT

KEARNY BOE BUILDINGS/FACILITIES		ELECTRIC CONSUMPTION SAVINGS	ELECTRIC DEMAND SAVINGS	ONSITE ELECTRIC SAVINGS	NATURAL GAS SAVINGS	ONSITE NATURAL GAS SAVINGS	Water & Sewer (Gal) SAVINGS
BUILDING/FACILITY NAME	SQFT	kWh	kW	kWh	THERMS	THERMS	Water & Sewer (Gal)
Kearny High School	305,491	405,969	54	405,969	7,585	7,585	279,000
Lincoln Middle School	101,000	680,637	133	680,637	2,575	10,423	153,000
Franklin Elementary School	114,854	324,603	77	324,603	19,194	19,194	65,250
Washington Elementary School	86,220	126,564	26	126,564	20,350	20,350	73,500
Garfield Elementary School	60,095	83,837	18	83,837	9,575	9,575	31,500
Schuyler Elementary School	54,880	117,813	34	117,813	21,242	21,242	48,000
Roosevelt Elementary School	43,385	73,191	14	73,191	14,915	14,915	31,500
Administration Building	12,000	39,022	11	39,022	734	734	12,000
TOTALS	**777,925**	**1,851,638**	**367**	**1,851,638**	**96,170**	**104,018**	**693,750**

KEARNY BOE			INCLUDED IN PROJECT	INSTALLED COST	ANNUAL ELECTRIC COST SAVINGS	ANNUAL NATURAL GAS COST SAVINGS	ANNUAL Water & Sewer (Gal) COST SAVINGS	ANNUAL ENERGY COST SAVINGS	ANNUAL O&M COST SAVINGS	TOTAL ANNUAL COST SAVINGS	ELECTRIC CONSUMPTION SAVINGS	ELECTRIC DEMAND SAVINGS	NATURAL GAS SAVINGS	Water & Sewer (Gal) SAVINGS	TOTAL SITE ENERGY SAVINGS	TOTAL SOURCE ENERGY SAVINGS	Reduction of CO_2	Reduction of NO_x	Reduction of SO_2	Reduction of Hg	TYPE OF INCENTIVE	ESTIMATED INCENTIVE AMOUNT	SIMPLE PAYBACK WITH INCENTIVES
ECM #	BUILDING/FACILITY	ENERGY CONSERVATION MEASURE	"Y" OR "N"	$	$	$	$	$	$	$	kWh	kW	THERMS	Water & Sewer (Gal)	MMBTU	MMBTU	LBS	LBS	LBS	LBS	SELECT	$$	YEARS
1	Kearny High School	LED Lighting	Y	$215,569	$29,916	($349)	$0	$29,567	$3,166	$32,733	225,669	54.0	-416	0	728	2,112	243,364	211	499	1,049	PRESCRIPTIVE	$18,993	6.0
10	Kearny High School	Building Envelope Weatherization	Y	$20,167	$542	$1,148	$0	$1,690	$0	$1,690	4,835	0.0	1,370	0	154	190	21,352	17	11	22		$0	11.9
11	Kearny High School	High Efficiency Transformers	Y	$41,000	$3,402	$0	$0	$3,402	$0	$3,402	30,379	0	0	0	104	290	33,417	29	67	141		$0	12.0
12	Kearny High School	Water Conservation	Y	$4,975	$0	$2,029	$1,209	$3,238	$0	$3,238	0	0.0	2,421	279,000	242	254	28,328	22	0	0		$0	1.5
13	Kearny High School	Plug Load Controls	Y	$16,284	$1,280	$0	$0	$1,280	$0	$1,280	11,433	0.0	0	0	39	109	12,576	11	25	53	PRESCRIPTIVE	$765	12.1
16	Kearny High School	Retrocommissioning	Y	$242,000	$14,969	$3,528	$0	$18,497	$0	$18,497	133,653	0	4,210	0	877	1,719	196,271	166	295	621		$0	13.1
1	Lincoln Middle School	LED Lighting	Y	$446,871	$49,999	($556)	$0	$49,443	$5,435	$54,878	387,333	98.0	-802	0	1,241	3,616	416,678	361	856	1,801	PRESCRIPTIVE	$22,591	7.7
9	Lincoln Middle School	Pipe and Valve Insulation	Y	$23,742	$0	$2,671	$0	$2,671	$0	$2,671	0	0.0	3,855	0	385	405	45,099	35	0	0		$0	8.9
10	Lincoln Middle School	Building Envelope Weatherization	Y	$11,682	$0	$1,341	$0	$1,341	$0	$1,341	0	0.0	1,935	0	193	203	22,636	18	0	0		$0	8.7
11	Lincoln Middle School	High Efficiency Transformers	Y	$20,000	$1,463	$0	$0	$1,463	$0	$1,463	13,550	0	0	0	46	129	14,905	13	30	63		$0	13.7
12	Lincoln Middle School	Water Conservation	Y	$3,095	$0	$1,075	$652	$1,727	$0	$1,727	0	0.0	1,551	153,000	155	163	18,148	14	0	0		$0	1.8
13	Lincoln Middle School	Plug Load Controls	Y	$6,960	$458	$0	$0	$458	$0	$458	4,244	0.0	0	0	14	41	4,669	4	9	20	PRESCRIPTIVE	$275	14.6
14	Lincoln Middle School	Combined Heat & Power Unit	Y	$388,506	$25,491	($5,439)	$0	$20,052	$0	$20,052	209,017	35	-7,848	0	-72	1,173	178,229	101	140	0		$0	19.4
16	Lincoln Middle School	Retrocommissioning	Y	$80,000	$7,181	$2,692	$0	$9,874	$0	$9,874	66,494	0	3,885	0	615	1,043	118,601	99	147	309		$0	8.1
1	Franklin Elementary School	LED Lighting	Y	$73,389	$38,082	($530)	$0	$37,552	$4,265	$41,817	304,001	77.3	-636	0	974	2,838	326,964	283	672	1,414	DIRECT INSTALL		1.8
2	Franklin Elementary School	Energy Management System	Y	$0	$866	$3,142	$0	$4,008	$1,163	$5,171	8,169	0.0	3,767	0	405	474	53,061	42	18	38		$0	0.0
4	Franklin Elementary School	Steam Trap Replacement	Y	$98,109	$0	$8,508	$0	$8,508	$1,220	$9,728	0	0.0	10,202	0	1,020	1,071	119,362	94	0	0		$0	10.1
9	Franklin Elementary School	Pipe and Valve Insulation	Y	$1,007	$0	$328	$0	$328	$0	$328	0	0.0	393	0	39	41	4,596	4	0	0	DIRECT INSTALL		3.1
10	Franklin Elementary School	Building Envelope Weatherization	Y	$20,940	$649	$1,983	$0	$2,631	$0	$2,631	6,119	0.0	2,377	0	259	308	34,546	28	14	28		$0	8.0
12	Franklin Elementary School	Water Conservation	Y	$516	$0	$2,578	$257	$2,835	$0	$2,835	0	0.0	3,091	65,250	309	325	36,165	28	0	0	DIRECT INSTALL		0.2
13	Franklin Elementary School	Plug Load Controls	Y	$10,940	$669	$0	$0	$669	$0	$669	6,315	0.0	0	0	22	60	6,946	6	14	29	PRESCRIPTIVE	$430	15.7
1	Washington Elementary School	LED Lighting	Y	$46,521	$13,399	($178)	$0	$13,221	$1,422	$14,643	101,344	25.8	-212	0	325	946	108,999	94	224	471	DIRECT INSTALL		3.2
2	Washington Elementary School	Energy Management System	Y	$0	$915	$4,705	$0	$5,620	$1,729	$7,350	8,169	0.0	5,602	0	588	666	74,525	59	18	38		$0	0.0
3	Washington Elementary School	Boiler Replacement	N	$0	$0	$0	$0	$0	$0	$0	0	0.0	0	0	0	0	0	0	0	0	PRESCRIPTIVE		0.0
4	Washington Elementary School	Steam Trap Replacement	Y	$78,947	$0	$6,941	$0	$6,941	$988	$7,930	0	0.0	8,263	0	826	868	96,683	76	0	0		$0	10.0
7	Washington Elementary School	AHU / Split System Replacement	Y	$13,851	$55	$0	$0	$55	$100	$155	494	0.0	0	0	2	5	544	0	1	2	DIRECT INSTALL		89.1
10	Washington Elementary School	Building Envelope Weatherization	Y	$81,493	$1,521	$4,958	$0	$6,478	$0	$6,478	13,578	0.0	5,902	0	637	749	83,989	67	30	63		$0	12.6
12	Washington Elementary School	Water Conservation	Y	$167	$0	$667	$391	$1,058	$0	$1,058	0	0.0	794	73,500	79	83	9,295	7	0	0	DIRECT INSTALL		0.2
13	Washington Elementary School	Plug Load Controls	Y	$4,954	$334	$0	$0	$334	$0	$334	2,979	0.0	0	0	10	28	3,277	3	7	14	PRESCRIPTIVE	$200	14.2
17	Washington Elementary School	Asbestos Abatement	N	$0	$0	$0	$0	$0	$0	$0	0	0.0	0	0	0	0	0	0	0	0			0.0
1	Garfield Elementary School	LED Lighting	Y	$40,332	$9,496	($588)	$0	$8,908	$1,005	$9,913	71,634	18.2	-700	0	174	611	70,607	62	158	333	DIRECT INSTALL		4.1
2	Garfield Elementary School	Energy Management System	Y	$0	$907	$3,718	$0	$4,624	$1,366	$5,991	8,169	0.0	4,426	0	470	543	60,768	48	18	38		$0	0.0
4	Garfield Elementary School	Steam Trap Replacement	Y	$58,180	$0	$4,165	$0	$4,165	$593	$4,758	0	0.0	4,958	0	496	521	58,007	46	0	0		$0	12.2
9	Garfield Elementary School	Pipe and Valve Insulation	Y	$269	$0	$50	$0	$50	$0	$50	0	0.0	60	0	6	6	699	1	0	0	DIRECT INSTALL		5.4
10	Garfield Elementary School	Building Envelope Weatherization	Y	$3,483	$125	$412	$0	$537	$0	$537	1,129	0.0	491	0	53	62	6,983	6	2	5		$0	6.5
12	Garfield Elementary School	Water Conservation	Y	$70	$0	$286	$285	$571	$0	$571	0	0.0	340	31,500	34	36	3,984	3	0	0	DIRECT INSTALL		0.1
13	Garfield Elementary School	Plug Load Controls	Y	$3,971	$322	$0	$0	$322	$0	$322	2,905	0.0	0	0	10	28	3,196	3	6	14	PRESCRIPTIVE	$160	11.8
1	Schuyler Elementary School	LED Lighting	Y	$45,846	$11,846	($652)	$0	$11,194	$1,298	$12,492	92,509	23.5	-904	0	225	789	91,183	80	204	430	DIRECT INSTALL		3.7
2	Schuyler Elementary School	Energy Management System	Y	$0	$874	$2,669	$0	$3,543	$1,143	$4,687	8,169	0.0	3,702	0	398	467	52,304	42	18	38		$0	0.0
3	Schuyler Elementary School	Boiler Replacement	Y	$1,591,858	$0	$7,814	$0	$7,814	$4,306	$12,121	0	0.0	10,838	0	1,084	1,138	126,806	100	0	0	PRESCRIPTIVE	$15,912	130.0
4	Schuyler Elementary School	Steam Trap Replacement	Y	$36,248	$0	$3,112	$0	$3,112	$516	$3,628	0	0.0	4,316	0	432	453	50,493	40	0	0		$0	10.0
5	Schuyler Elementary School	Chiller Replacement	Y	$109,326	$1,122	$0	$0	$1,122	$500	$1,622	6,322	10.8	0	0	22	60	6,955	6	14	29	DIRECT INSTALL		67.4
10	Schuyler Elementary School	Building Envelope Weatherization	Y	$25,394	$808	$2,064	$0	$2,872	$0	$2,872	7,551	0.0	2,863	0	312	373	41,803	34	17	35		$0	8.8
12	Schuyler Elementary School	Water Conservation	Y	$136	$0	$308	$1,325	$1,633	$0	$1,633	0	0.0	427	48,000	43	45	4,999	4	0	0	DIRECT INSTALL		0.1
13	Schuyler Elementary School	Plug Load Controls	Y	$4,843	$349	$0	$0	$349	$0	$349	3,262	0.0	0	0	11	31	3,588	3	7	15	PRESCRIPTIVE	$195	13.3
17	Schuyler Elementary School	Asbestos Abatement	Y	$100,000	$0	$0	$0	$0	$0	$0	0	0.0	0	0	0	0	0	0	0	0		$0	0.0
1	Roosevelt Elementary School	LED Lighting	Y	$21,521	$6,099	($366)	$0	$5,733	$629	$6,362	44,821	11.4	-438	0	109	382	44,179	39	99	208	DIRECT INSTALL		3.4
2	Roosevelt Elementary School	Energy Management System	Y	$0	$915	$3,415	$0	$4,330	$1,261	$5,592	8,169	0.0	4,086	0	436	507	56,786	45	18	38		$0	0.0
3	Roosevelt Elementary School	Boiler Replacement	N	$0	$0	$0	$0	$0	$0	$0	0	0.0	0	0	0	0	0	0	0	0	PRESCRIPTIVE		0.0
4	Roosevelt Elementary School	Steam Trap Replacement	Y	$40,660	$0	$4,299	$0	$4,299	$615	$4,914	0	0.0	5,142	0	514	540	60,165	47	0	0		$0	8.3
6	Roosevelt Elementary School	Rooftop Unit Replacement	Y	$21,840	$455	$0	$0	$455	$250	$705	2,176	2.2	0	0	7	21	2,394	2	5	10	DIRECT INSTALL		31.0
9	Roosevelt Elementary School	Pipe and Valve Insulation	Y	$354	$0	$56	$0	$56	$0	$56	0	0.0	68	0	7	7	790	1	0	0	DIRECT INSTALL		6.3
10	Roosevelt Elementary School	Building Envelope Weatherization	Y	$5,988	$90	$293	$0	$383	$0	$383	806	0.0	350	0	38	44	4,984	4	2	4		$0	15.6
12	Roosevelt Elementary School	Water Conservation	Y	$76	$0	$266	$254	$520	$0	$520	0	0.0	318	31,500	32	33	3,723	3	0	0	DIRECT INSTALL		0.1
13	Roosevelt Elementary School	Plug Load Controls	Y	$5,761	$540	$0	$0	$540	$0	$540	4,822	0.0	0	0	16	46	5,304	5	11	22	PRESCRIPTIVE	$345	10.0
15a	Roosevelt Elementary School	Window Replacement	N	$0	$0	$0	$0	$0	$0	$0	0	0.0	0	0	0	0	0	0	0	0			0.0
15b	Roosevelt Elementary School	Window Refurbishment	Y	$189,278	$1,389	$4,505	$0	$5,894	$0	$5,894	12,397	0.0	5,389	0	581	684	76,686	61	27	58		$0	32.1
17	Roosevelt Elementary School	Asbestos Abatement	N	$0	$0	$0	$0	$0	$0	$0	0	0.0	0	0	0	0	0	0	0	0			0.0
1	Administration Building	LED Lighting	Y	$14,909	$4,213	($216)	$0	$3,998	$359	$4,357	25,587	7.1	-250	0	62	218	25,220	22	57	119	DIRECT INSTALL		3.4
6	Administration Building	Rooftop Unit Replacement	Y	$109,463	$1,591	$157	$0	$1,748	$750	$2,498	9,744	2.6	182	0	51	112	12,853	11	22	45	DIRECT INSTALL		43.8
7	Administration Building	AHU / Split System Replacement	Y	$26,766	$289	$113	$0	$402	$300	$702	1,537	0.8	131	0	18	28	3,222	3	3	7	DIRECT INSTALL		38.1
8	Administration Building	Electronic Fuel-Use Economizer	Y	$1,657	$0	$275	$0	$275	$0	$275	0	0.0	319	0	32	34	3,737	3	0	0	DIRECT INSTALL		6.0
9	Administration Building	Pipe and Valve Insulation	Y	$153	$0	$61	$0	$61	$0	$61	0	0.0	71	0	7	7	831	1	0	0	DIRECT INSTALL		2.5
10	Administration Building	Building Envelope Weatherization	Y	$1,558	$19	$46	$0	$65	$0	$65	136	0.0	53	0	6	7	773	1	0	1		$0	24.1
12	Administration Building	Water Conservation	Y	$59	$0	$196	$330	$526	$0	$526	0	0.0	227	12,000	23	24	2,656	2	0	0	DIRECT INSTALL		0.1
13	Administration Building	Plug Load Controls	Y	$1,799	$279	$0	$0	$279	$0	$279	2,019	0.0	0	0	7	19	2,221	2	4	9	PRESCRIPTIVE	$75	6.2
		TOTALS		$4,413,484	$232,919	$77,702	$4,703	$315,324	$34,381	$349,705	1,851,638	366.6	96,170	693,750	15,935	27,788	3,202,121	2,619	3,770	7,638		$59,941	12.4

ECMs evaluated but not included.

KEARNY BOE			INSTALLED COST	ANNUAL ELECTRIC COST SAVINGS	ANNUAL NATURAL GAS COST SAVINGS	ANNUAL Water & Sewer (Gal) COST SAVINGS	ANNUAL ENERGY COST SAVINGS	ANNUAL O&M COST SAVINGS	TOTAL ANNUAL COST SAVINGS	ELECTRIC CONSUMPTION SAVINGS	ELECTRIC DEMAND SAVINGS	NATURAL GAS SAVINGS	Water & Sewer (Gal) SAVINGS	TOTAL SITE ENERGY SAVINGS	TOTAL SOURCE ENERGY SAVINGS	Reduction of CO_2	Reduction of No_x	Reduction of SO_2	Reduction of Hg	TYPE OF INCENTIVE	ESTIMATED INCENTIVE AMOUNT	SIMPLE PAYBACK WITH INCENTIVES
ECM #	BUILDING/FACILITY	ENERGY CONSERVATION MEASURE	$	$	$	$	$	$	$	kWh	kW	THERMS	Water & Sewer (Gal)	MMBTU	MMBTU	LBS	LBS	LBS	LBS	SELECT	$$	YEARS
3	Washington Elementary School	Boiler Replacement	$1,608,448	$0	$8,801	$0	$8,801	$4,163	$12,963	0	0.0	10,477	0	1,048	1,100	122,579	96	0	0	PRESCRIPTIVE	$16,000	122.8
17	Washington Elementary School	Asbestos Abatement	$100,000	$0	$0	$0	$0	$0	$0	0	0.0	0	0	0	0	0	0	0	0		$0	0.0
3	Roosevelt Elementary School	Boiler Replacement	$1,481,298	$0	$6,388	$0	$6,388	$3,036	$9,424	0	0.0	7,641	0	764	802	89,401	70	0	0	PRESCRIPTIVE	$15,316	155.6
15a	Roosevelt Elementary School	Window Replacement	$1,414,000	$1,389	$4,505	$0	$5,894	$0	$5,894	12,397	0.0	5,389	0	581	684	76,686	61	27	58		$0	239.9
17	Roosevelt Elementary School	Asbestos Abatement	$100,000	$0	$0	$0	$0	$0	$0	0	0.0	0	0	0	0	0	0	0	0		$0	0.0
		TOTALS	$4,703,745	$1,389	$19,693	$0	$21,082	$7,199	$28,281	12,397	0.0	23,507	0	2,393	2,587	466,894	329	167	58		$31,316	165.2

KEARNY SCHOOL DISTRICT

ENERGY SAVINGS PLAN

APPENDIX G – LIGHTING LINE BY LINE

CUSTOMER: Kearny School Dis
LOCATION:
City, State, Zip Code: Kearny, NJ 07032

GreenTech Energy Services
LIGHTING CONTROL

	LOCATION:		EXISTING						PROPOSED				SAVINGS			
Line Ref	Building	Location	Existing Hrs. per Year	Existing QTY	Existing Lighting Description	Existing WATT / Fixture	Existing KWH Usage	Existing KW Usage	Proposed QTY	Proposed Lighting Description	Proposed WATT / Fixture	Proposed KWH Usage	Proposed Kw Usage	KWH Saved	Total KWH Saved	KW Saved	EXISTING CONTROL
	Kearny High School	**336 Devon Street, Kerny, NJ 07032**															
1	Kearny High School	Stairs (7)	8,760	70	2L 4' F32 T8 ELE N BALLAST	60	36,792	4.20	70	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	12,877	1.47	23,915	23,915	2.73	
2	Kearny High School	Crossover Hall	4,380	3	2L 4' F32 U TUBE T8 ELE N BALLAST	60	788	0.18	3	RETROFIT 4' 2L LED U-TUBE /SELF BALLAST	32	420	0.10	368	368	0.08	
3	Kearny High School	3rd Floor Halls	4,380	21	2L 4' F32 T8 ELE N BALLAST	60	5,519	1.26	21	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	1,932	0.44	3,587	3,587	0.82	
4	Kearny High School	3rd Floor Halls	4,380	14	COMPACT FLUORESCENT 32W HW	32	1,962	0.45	14	RETROFIT HIGH HAT 19 W LED 8 INCH	15	920	0.21	1,042	1,042	0.24	
5	Kearny High School	Boys Room	3,198	5	2L 4' F32 T8 ELE N BALLAST	60	959	0.30	5	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	336	0.11	624	624	0.20	Sensored
6	Kearny High School	Boys Room	3,900	2	2L 4' F32 T8 ELE N BALLAST	60	468	0.12	2	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	164	0.04	304	304	0.08	
7	Kearny High School	Boys Room	3,900	1	COMPACT FLUORESCENT 32W HW	32	125	0.03	1	RETROFIT HIGH HAT 19 W LED 8 INCH	15	59	0.02	66	66	0.02	
8	Kearny High School	Art Storage	800	12	2L 4' F32 T8 ELE N BALLAST	60	576	0.72	12	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	202	0.25	374	374	0.47	
9	Kearny High School	Closet	656	1	2L 3' F25 ELE N BALLAST	45	30	0.05	1	RETROFIT 3' 2L LED TUBE /SELF BALLAST	20	13	0.02	16	16	0.03	Sensored
10	Kearny High School	Girls Room	3,198	4	2L 4' F32 T8 ELE N BALLAST	60	768	0.24	4	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	269	0.08	499	499	0.16	Sensored
11	Kearny High School	Girls Room	3,900	2	2L 4' F32 T8 ELE N BALLAST	60	468	0.12	2	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	164	0.04	304	304	0.08	
12	Kearny High School	Girls Room	3,900	1	COMPACT FLUORESCENT 32W HW	32	125	0.03	1	RETROFIT HIGH HAT 19 W LED 8 INCH	15	59	0.02	66	66	0.02	
13	Kearny High School	Class 306N	1,640	23	2L 4' F32 T8 ELE N BALLAST	60	2,263	1.38	23	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	792	0.48	1,471	1,471	0.90	Sensored
14	Kearny High School	Class 306N	2,000	3	2L 4' F32 T8 ELE N BALLAST BAT BACKUP	60	360	0.18	3	RETROFIT 4' 2L LED TUBE /SELF BALLAST / BAT BACKUP	21	126	0.06	234	234	0.12	
15	Kearny High School	Clay Room	1,640	1	2L 4' F32 T8 ELE N BALLAST	60	98	0.06	1	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	34	0.02	64	64	0.04	Sensored
16	Kearny High School	Paint Storage	656	1	2L 4' F32 T8 ELE N BALLAST	60	39	0.06	1	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	14	0.02	26	26	0.04	Sensored
17	Kearny High School	Class 312N	1,640	26	2L 4' F32 T8 ELE N BALLAST	60	2,558	1.56	26	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	895	0.55	1,663	1,663	1.01	Sensored
18	Kearny High School	Class 312N	2,000	2	2L 4' F32 T8 ELE N BALLAST	60	240	0.12	2	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	84	0.04	156	156	0.08	
19	Kearny High School	Class 312N	2,000	3	2L 4' F32 T8 ELE N BALLAST BAT BACKUP	60	360	0.18	3	RETROFIT 4' 2L LED TUBE /SELF BALLAST / BAT BACKUP	21	126	0.06	234	234	0.12	
20	Kearny High School	Class 311N	2,000	11	1 LAMP 8FT F96HO T12 EE / STD	125	2,750	1.38	11	RETROFIT 8' 1L LED TUBE / SELF BALLAST	11	231	0.12	2,519	2,519	1.26	Two Gang Switch
21	Kearny High School	Class 311N	2,000	4	2L 4' F32 T8 ELE N BALLAST	60	480	0.24	4	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	168	0.08	312	312	0.16	
22	Kearny High School	Storage Rooms (2)	800	8	2L 4' F32 T8 ELE N BALLAST	60	384	0.48	8	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	134	0.17	250	250	0.31	
23	Kearny High School	Entry's	4,380	2	COMPACT FLUORESCENT 13W S/I	13	114	0.03	2	RELAMP 9 WATT LED A LAMP S/I	9	79	0.02	35	35	0.01	
24	Kearny High School	Music Hall	4,380	2	2L 4' F32 T8 ELE N BALLAST	60	526	0.12	2	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	184	0.04	342	342	0.08	
25	Kearny High School	Practice Rooms	1,640	4	2L 4' F32 T8 ELE N BALLAST	60	394	0.24	4	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	138	0.08	256	256	0.16	Sensored
26	Kearny High School	Music Office	2,460	3	2L 4' F28T5 ELE N BALLAST	62	458	0.19	3	RETROFIT 4' 2L LED TUBE /SELF BALLAST T5HE	26	192	0.08	266	266	0.11	Sensored
27	Kearny High School	Music Office	3,000	3	COMPACT FLUORESCENT 32W HW	32	288	0.10	3	RETROFIT HIGH HAT 19 W LED 8 INCH	15	135	0.05	153	153	0.05	
28	Kearny High School	Class 326N	2,000	3	1 LAMP 8FT F96HO T12 EE / STD	125	750	0.38	3	RETROFIT 8' 1L LED TUBE / SELF BALLAST	11	63	0.03	687	687	0.34	
29	Kearny High School	Pantry	656	1	2L 4' F32 T8 ELE N BALLAST	60	39	0.06	1	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	14	0.02	26	26	0.04	Sensored
30	Kearny High School	Office	2,460	2	2L 4' F28T5 ELE N BALLAST	62	305	0.12	2	RETROFIT 4' 2L LED TUBE /SELF BALLAST T5HE	26	128	0.05	177	177	0.07	Sensored
31	Kearny High School	Entry's (2)	4,380	2	COMPACT FLUORESCENT 13W S/I	13	114	0.03	2	RELAMP 9 WATT LED A LAMP S/I	9	79	0.02	35	35	0.01	
32	Kearny High School	Class 327N	1,640	15	2L 4' F32 T8 ELE N BALLAST	60	1,476	0.90	15	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	517	0.32	959	959	0.59	Sensored
33	Kearny High School	Class 327N	2,000	2	2L 4' F32 T8 ELE N BALLAST BAT BACKUP	60	240	0.12	2	RETROFIT 4' 2L LED TUBE /SELF BALLAST / BAT BACKUP	21	84	0.04	156	156	0.08	
34	Kearny High School	Class 327N	2,000	3	2L 4' F32 T8 ELE N BALLAST	60	360	0.18	3	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	126	0.06	234	234	0.12	
35	Kearny High School	Class 329N	1,640	15	2L 4' F32 T8 ELE N BALLAST	60	1,476	0.90	15	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	517	0.32	959	959	0.59	Sensored
36	Kearny High School	Class 329N	2,000	2	2L 4' F32 T8 ELE N BALLAST BAT BACKUP	60	240	0.12	2	RETROFIT 4' 2L LED TUBE /SELF BALLAST / BAT BACKUP	21	84	0.04	156	156	0.08	
37	Kearny High School	Class 328N	2,000	29	2L 4' F32 T8 ELE N BALLAST	60	3,480	1.74	19	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	798	0.40	2,682	2,682	1.34	
38	Kearny High School	Class 328N	2,000	3	2L 4' F32 T8 ELE N BALLAST BAT BACKUP	60	360	0.18	3	RETROFIT 4' 2L LED TUBE /SELF BALLAST / BAT BACKUP	21	126	0.06	234	234	0.12	
39	Kearny High School	Cross Over Hall	4,380	3	2L 4' F32 U TUBE T8 ELE N BALLAST	60	788	0.18	3	RETROFIT 4' 2L LED U-TUBE /SELF BALLAST	32	420	0.10	368	368	0.08	
40	Kearny High School	End Stairs	8,760	12	LED SCREW IN	9			12	NO CHANGE							
41	Kearny High School	2nd Floor Halls	4,380	21	2L 4' F32 T8 ELE N BALLAST	60	5,519	1.26	21	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	1,932	0.44	3,587	3,587	0.82	
42	Kearny High School	2nd Floor Halls	4,380	18	COMPACT FLUORESCENT 32W HW	32	2,523	0.58	18	RETROFIT HIGH HAT 19 W LED 8 INCH	15	1,183	0.27	1,340	1,340	0.31	
43	Kearny High School	2nd Floor Halls	4,380	6	2L 4' F32 U TUBE T8 ELE N BALLAST	60	1,577	0.36	6	RETROFIT 4' 2L LED U-TUBE /SELF BALLAST	32	841	0.19	736	736	0.17	
44	Kearny High School	Fan Room	3,000	5	2L 4' F32 T8 ELE N BALLAST	60	900	0.30	5	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	315	0.11	585	585	0.20	Single Gang Switch
45	Kearny High School	Book Room	3,000	6	2L 4' F32 T8 ELE N BALLAST	60	1,080	0.36	6	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	378	0.13	702	702	0.23	
46	Kearny High School	Office 223NB	2,460	4	2L 4' F28T5 ELE N BALLAST	62	610	0.25	4	RETROFIT 4' 2L LED TUBE /SELF BALLAST T5HE	26	256	0.10	354	354	0.14	Sensored
47	Kearny High School	Office 223N	2,460	9	2L 4' F32 T8 ELE N BALLAST	60	1,328	0.54	9	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	465	0.19	863	863	0.35	Sensored
48	Kearny High School	Office 221N	2,460	2	2L 4' F28T5 ELE N BALLAST	62	305	0.12	2	RETROFIT 4' 2L LED TUBE /SELF BALLAST T5HE	26	128	0.05	177	177	0.07	Sensored
49	Kearny High School	Office 221N	2,460	2	2L 4' F32 T8 ELE N BALLAST	60	295	0.12	2	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	103	0.04	192	192	0.08	Sensored
50	Kearny High School	Class 220N	1,640	15	2L 4' F32 T8 ELE N BALLAST	60	1,476	0.90	15	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	517	0.32	959	959	0.59	Sensored
51	Kearny High School	Class 217N	1,640	18	2L 4' F32 T8 ELE N BALLAST	60	1,771	1.08	18	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	620	0.38	1,151	1,151	0.70	Sensored
52	Kearny High School	Class 215N	1,640	18	2L 4' F32 T8 ELE N BALLAST	60	1,771	1.08	18	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	620	0.38	1,151	1,151	0.70	Sensored
53	Kearny High School	Offices 225N	2,460	12	2L 4' F32 T8 ELE N BALLAST	60	1,771	0.72	12	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	620	0.25	1,151	1,151	0.47	Sensored
54	Kearny High School	Offices 225N	2,460	6	2L 4' F28T5 ELE N BALLAST	62	915	0.37	6	RETROFIT 4' 2L LED TUBE /SELF BALLAST T5HE	26	384	0.16	531	531	0.22	Sensored
55	Kearny High School	Offices 225N	3,000	10	COMPACT FLUORESCENT 32W HW	32	960	0.32	10	RETROFIT HIGH HAT 19 W LED 8 INCH	15	450	0.15	510	510	0.17	
56	Kearny High School	Bathrooms (2)	3,900	6	2L 3' F25 ELE N BALLAST	45	1,053	0.27	6	RETROFIT 3' 2L LED TUBE /SELF BALLAST	20	468	0.12	585	585	0.15	
57	Kearny High School	Bathrooms (2)	3,900	8	COMPACT FLUORESCENT 32W HW	32	998	0.26	8	RETROFIT HIGH HAT 19 W LED 8 INCH	15	468	0.12	530	530	0.14	
58	Kearny High School	Closet	800	1	2L 3' F25 ELE N BALLAST	45	36	0.05	1	RETROFIT 3' 2L LED TUBE /SELF BALLAST	20	16	0.02	20	20	0.03	
59	Kearny High School	Fan Room #2	3,000	5	2L 8' T8 F96 ELE L BALLAST	95	1,425	0.48	5	RETROFIT 8' 1L TO 4' 2 LED TUBE /SELF BALLAST STRIP KIT	21	315	0.11	1,110	1,110	0.37	
60	Kearny High School	Hall Closet	800	6	2L 4' F32 T8 ELE N BALLAST	60	288	0.36	6	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	101	0.13	187	187	0.23	
61	Kearny High School	Stairs #2	8,760	12	LED SCREW IN	9			12	NO CHANGE							
62	Kearny High School	1st Floor Halls	4,380	3	4L 4' F32 T8 ELE N BALLAST	112	1,472	0.34	3	RETROFIT 4' 4L LED TUBE /SELF BALLAST	42	552	0.13	920	920	0.21	
63	Kearny High School	1st Floor Halls	4,380	20	2L 4' F32 T8 ELE N BALLAST	60	5,256	1.20	20	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	1,840	0.42	3,416	3,416	0.78	
64	Kearny High School	1st Floor Halls	4,380	10	COMPACT FLUORESCENT 32W HW	32	1,402	0.32	10	RETROFIT HIGH HAT 19 W LED 8 INCH	15	657	0.15	745	745	0.17	
65	Kearny High School	Trophy Cases	4,380	12	LED SCREW IN	9			12	NO CHANGE							
66	Kearny High School	Bathrooms (2)	3,198	4	2L 4' F32 T8 ELE N BALLAST	60	768	0.24	4	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	269	0.08	499	499	0.16	Sensored
67	Kearny High School	Bathrooms (2)	3,900	8	2L 4' F32 T8 ELE N BALLAST	60	1,872	0.48	8	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	655	0.17	1,217	1,217	0.31	
68	Kearny High School	Bathrooms (2)	3,900	2	COMPACT FLUORESCENT 32W HW	32	250	0.06	2	RETROFIT HIGH HAT 19 W LED 8 INCH	15	117	0.03	133	133	0.03	
69	Kearny High School	Closet	656	1	2L 3' F25 ELE N BALLAST	45	30	0.05	1	RETROFIT 3' 2L LED TUBE /SELF BALLAST	20	13	0.02	16	16	0.03	Sensored
70	Kearny High School	Mens PE Office	2,460	7	2L 4' F32 T8 ELE N BALLAST	60	1,033	0.42	7	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	362	0.15	672	672	0.27	Sensored
71	Kearny High School	Mens PE Office	2,460	4	2L 4' F32 T8 ELE N BALLAST	60	590	0.24	4	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	207	0.08	384	384	0.16	Sensored
72	Kearny High School	Mens PE Office	3,000	6	COMPACT FLUORESCENT 32W HW	32	576	0.19	6	RETROFIT HIGH HAT 19 W LED 8 INCH	15	270	0.09	306	306	0.10	
73	Kearny High School	Nurses Office	3,000	18	2L 4' F32 T8 ELE N BALLAST	60	3,240	1.08	18	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	1,134	0.38	2,106	2,106	0.70	
74	Kearny High School	Nurses Office	3,000	1	2L 4' F32 T8 ELE N BALLAST	60	180	0.06	1	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	63	0.02	117	117	0.04	
75	Kearny High School	Nurses Office	3,000	2	4L 4' F32 T8 ELE N BALLAST	112	672	0.22	2	RETROFIT 4' 4L LED TUBE /SELF BALLAST	42	252	0.08	420	420	0.14	
76	Kearny High School	Nurses Office	3,000	3	COMPACT FLUORESCENT 32W HW	32	288	0.10	3	RETROFIT HIGH HAT 19 W LED 8 INCH	15	135	0.05	153	153	0.05	
77	Kearny High School	Hall Storage	800	8	2L 4' F32 T8 ELE N BALLAST	60	384	0.48	8	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	134	0.17	250	250	0.31	
78	Kearny High School	Offices 126N	2,460	20	2L 4' F32 T8 ELE N BALLAST	60	2,952	1.20	20	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	1,033	0.42	1,919	1,919	0.78	Sensored
79	Kearny High School	Girls PE Office	2,460	10	2L 4' F28T5 ELE N BALLAST	62	1,525	0.62	10	RETROFIT 4' 2L LED TUBE /SELF BALLAST T5HE	26	640	0.26	886	886	0.36	Sensored
80	Kearny High School	Girls PE Office	2,460	2	2L 4' F32 T8 ELE N BALLAST	60	295	0.12	2	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	103	0.04	192	192	0.08	Sensored
81	Kearny High School	Girls PE Office	2,460	1	2L 4' F32 T8 ELE N BALLAST	60	148	0.06	1	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	52	0.02	96	96	0.04	Sensored
82	Kearny High School	Girls PE Office	2,460	5	COMPACT FLUORESCENT 32W HW	32	394	0.16	5	RETROFIT HIGH HAT 19 W LED 8 INCH	15	185	0.08	209	209	0.09	Sensored
83	Kearny High School	Main Gyms	2,000	32	400 WATT MH HIGH BAY	465	29,760	14.88	32	NEW LED HIGH BAY 150 W	152	9,728	4.86	20,032	20,032	10.02	
84	Kearny High School	Main Gyms	2,000	21	1,000 WATT MH HIGH BAY	1,080	45,360	22.68	21	NEW LED HIGH BAY 280 W	280	11,760	5.88	33,600	33,600	16.80	
85	Kearny High School	Main Gyms	2,000	15	400 WATT MH HIGH BAY	465	13,950	6.98	15	NEW RECESSED LED HIGH BAY 150 W	152	4,560	2.28	9,390	9,390	4.70	
86	Kearny High School	Storage Rooms	800	9	2L 4' F32 T8 ELE N BALLAST	60	432	0.54	9	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	151	0.19	281	281	0.35	
87	Kearny High School	Stairs to Lockers	8,760	8	2L 4' F32 T8 ELE N BALLAST	60	4,205	0.48	8	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	1,472	0.17	2,733	2,733	0.31	
88	Kearny High School	Stairs to Lockers	8,760	4	LED SCREW IN	9			4	NO CHANGE							
89	Kearny High School	Boys Locker Room	3,198	48	2L 4' F32 T8 ELE N BALLAST	60	9,210	2.88	48	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	3,224	1.01	5,987	5,987	1.87	Sensored
90	Kearny High School	Boys Locker Room	3,198	4	2L 4' F32 T8 ELE N BALLAST	60	768	0.24	4	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	269	0.08	499	499	0.16	Sensored
91	Kearny High School	Boys Locker Room	3,198	16	COMPACT FLUORESCENT 13W S/I	13	665	0.21	16	RELAMP 9 WATT LED A LAMP S/I	9	461	0.14	205	205	0.06	Sensored
92	Kearny High School	Boys Locker Room	3,198	3	2L 4' F32 T8 ELE N BALLAST	60	576	0.18	3	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	201	0.06	374	374	0.12	Sensored
93	Kearny High School	Boys Locker Room	3,198	2	COMPACT FLUORESCENT 32W HW	32	205	0.06	2	RETROFIT HIGH HAT 19 W LED 8 INCH	15	96	0.03	109	109	0.03	Sensored
94	Kearny High School	Boys Locker Room	3,198	2	2L 4' F32 T8 ELE N BALLAST	60	384	0.12	2	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	134	0.04	249	249	0.08	Sensored
95	Kearny High School	Boys Locker Room	3,198	4	2L 3' F25 ELE N BALLAST	45	576	0.18	4	RETROFIT 3' 2L LED TUBE /SELF BALLAST	20	256	0.08	320	320	0.10	Sensored
96	Kearny High School	Storage Rooms (2)	656	24	2L 4' F32 T8 ELE N BALLAST	60	945	1.44	24	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	331	0.50	614	614	0.94	Sensored
97	Kearny High School	Girls Locker Room	3,198	48	2L 4' F32 T8 ELE N BALLAST	60	9,210	2.88	48	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	3,224	1.01	5,987	5,987	1.87	Sensored
98	Kearny High School	Girls Locker Room	3,198	4	2L 4' F32 T8 ELE N BALLAST	60	768	0.24	4	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	269	0.08	499	499	0.16	Sensored
99	Kearny High School	Girls Locker Room	3,198	16	COMPACT FLUORESCENT 13W S/I	13	665	0.21	16	RELAMP 9 WATT LED A LAMP S/I	9	461	0.14	205	205	0.06	Sensored
100	Kearny High School	Girls Locker Room	3,198	3	2L 4' F32 T8 ELE N BALLAST	60	576	0.18	3	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	201	0.06	374	374	0.12	Sensored
101	Kearny High School	Girls Locker Room	3,198	2	COMPACT FLUORESCENT 32W HW	32	205	0.06	2	RETROFIT HIGH HAT 19 W LED 8 INCH	15	96	0.03	109	109	0.03	Sensored
102	Kearny High School	Girls Locker Room	3,198	2	2L 4' F32 T8 ELE N BALLAST	60	384	0.12	2	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	134	0.04	249	249	0.08	Sensored
103	Kearny High School	Girls Locker Room	3,198	4	2L 3' F25 ELE N BALLAST	45	576	0.18	4	RETROFIT 3' 2L LED TUBE /SELF BALLAST	20	256	0.08	320	320	0.10	Sensored
104	Kearny High School	Storage Rooms (2)	656	24	2L 4' F32 T8 ELE N BALLAST	60	945	1.44	24	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	331	0.50	614	614	0.94	Sensored
105	Kearny High School	Ground Floor Hall	4,380	13	2L 4' F32 T8 ELE N BALLAST	60	3,416	0.78	13	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	1,196	0.27	2,221	2,221	0.51	
106	Kearny High School	Ground Floor Hall	4,380	16	COMPACT FLUORESCENT 32W HW	32	2,243	0.51	16	RETROFIT HIGH HAT 19 W LED 8 INCH	15	1,051	0.24	1,191	1,191	0.27	
107	Kearny High School	Hall Storage	800	20	2L 4' F32 T8 ELE N BALLAST	60	960	1.20	20	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	336	0.42	624	624	0.78	

	EXISTING LIGHTING CONTROL				PROPOSED LIGHTING CONTROLS				
Line Ref	Existing Hrs. per Year	Lighting Qty	LIGHTING DESCRIPTION	WATT / Fixture	Control QTY	Control Description	Control Hours Reduced	New Hrs. (controlled)	KWH Saved from controls
1	8,760	70	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21					
2	4,380	3	RETROFIT 4' 2L LED U-TUBE /SELF BALLAST	32					
3	4,380	21	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21					
4	4,380	14	RETROFIT HIGH HAT 19 W LED 8 INCH	15					
5	3,198	5	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21					
6	3,900	2	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21					
7	3,900	1	RETROFIT HIGH HAT 19 W LED 8 INCH	15					
8	800	12	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21					
9	656	1	RETROFIT 3' 2L LED TUBE /SELF BALLAST	20					
10	3,198	4	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21					
11	3,900	2	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21					
12	3,900	1	RETROFIT HIGH HAT 19 W LED 8 INCH	15					
13	1,640	23	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21					
14	2,000	3	RETROFIT 4' 2L LED TUBE /SELF BALLAST / BAT BACKUP	21					
15	1,640	1	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21					
16	656	1	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21					
17	1,640	26	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21					
18	2,000	2	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21					
19	2,000	3	RETROFIT 4' 2L LED TUBE /SELF BALLAST / BAT BACKUP	21					
20	2,000	11	RETROFIT 8' 1L LED TUBE / SELF BALLAST	11					
21	2,000	4	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21					
22	800	8	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21					
23	4,380	2	RELAMP 9 WATT LED A LAMP S/I	9					
24	4,380	2	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21					
25	1,640	4	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21					
26	2,460	3	RETROFIT 4' 2L LED TUBE /SELF BALLAST T5HE	26					
27	3,000	3	RETROFIT HIGH HAT 19 W LED 8 INCH	15					
28	2,000	3	RETROFIT 8' 1L LED TUBE / SELF BALLAST	11					
29	656	1	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21					
30	2,460	2	RETROFIT 4' 2L LED TUBE /SELF BALLAST T5HE	26					
31	4,380	2	RELAMP 9 WATT LED A LAMP S/I	9					
32	1,640	15	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21					
33	2,000	2	RETROFIT 4' 2L LED TUBE /SELF BALLAST / BAT BACKUP	21					
34	2,000	3	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21					
35	1,640	15	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21					
36	2,000	2	RETROFIT 4' 2L LED TUBE /SELF BALLAST / BAT BACKUP	21					
37	2,000	19	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21					
38	2,000	3	RETROFIT 4' 2L LED TUBE /SELF BALLAST / BAT BACKUP	21					
39	4,380	3	RETROFIT 4' 2L LED U-TUBE /SELF BALLAST	32					
40	8,760	12	LED SCREW IN	9					
41	4,380	21	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21					
42	4,380	18	RETROFIT HIGH HAT 19 W LED 8 INCH	15					
43	4,380	6	RETROFIT 4' 2L LED U-TUBE /SELF BALLAST	32					
44	3,000	5	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21					
45	3,000	6	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21					
46	2,460	4	RETROFIT 4' 2L LED TUBE /SELF BALLAST T5HE	26					
47	2,460	9	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21					
48	2,460	2	RETROFIT 4' 2L LED TUBE /SELF BALLAST T5HE	26					
49	2,460	2	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21					
50	1,640	15	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21					
51	1,640	18	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21					
52	1,640	18	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21					
53	2,460	12	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21					
54	2,460	6	RETROFIT 4' 2L LED TUBE /SELF BALLAST T5HE	26					
55	3,000	10	RETROFIT HIGH HAT 19 W LED 8 INCH	15					
56	3,900	6	RETROFIT 3' 2L LED TUBE /SELF BALLAST	20					
57	3,900	8	RETROFIT HIGH HAT 19 W LED 8 INCH	15					
58	800	1	RETROFIT 3' 2L LED TUBE /SELF BALLAST	20					
59	3,000	5	RETROFIT 8' 1L TO 4' 2 LED TUBE /SELF BALLAST STRIP KIT	21					
60	800	6	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21					
61	8,760	12	LED SCREW IN	9					
62	4,380	3	RETROFIT 4' 4L LED TUBE /SELF BALLAST	42					
63	4,380	20	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21					
64	4,380	10	RETROFIT HIGH HAT 19 W LED 8 INCH	15					
65	4,380	12	LED SCREW IN	9					
66	3,198	4	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21					
67	3,900	8	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21					
68	3,900	2	RETROFIT HIGH HAT 19 W LED 8 INCH	15					
69	656	1	RETROFIT 3' 2L LED TUBE /SELF BALLAST	20					
70	2,460	7	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21					
71	2,460	4	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21					
72	3,000	6	RETROFIT HIGH HAT 19 W LED 8 INCH	15					
73	3,000	18	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21					
74	3,000	1	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21					
75	3,000	2	RETROFIT 4' 4L LED TUBE /SELF BALLAST	42					
76	3,000	3	RETROFIT HIGH HAT 19 W LED 8 INCH	15					
77	800	8	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21					
78	2,460	20	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21					
79	2,460	10	RETROFIT 4' 2L LED TUBE /SELF BALLAST T5HE	26					
80	2,460	2	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21					
81	2,460	1	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21					
82	2,460	5	RETROFIT HIGH HAT 19 W LED 8 INCH	15					
83	2,000	32	NEW LED HIGH BAY 150 W	152					
84	2,000	21	NEW LED HIGH BAY 280 W	280					
85	2,000	15	NEW RECESSED LED HIGH BAY 150 W	152					
86	800	9	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21					
87	8,760	8	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21					
88	8,760	4	LED SCREW IN	9					
89	3,198	48	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21					
90	3,198	4	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21					
91	3,198	16	RELAMP 9 WATT LED A LAMP S/I	9					
92	3,198	3	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21					
93	3,198	2	RETROFIT HIGH HAT 19 W LED 8 INCH	15					
94	3,198	2	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21					
95	3,198	4	RETROFIT 3' 2L LED TUBE /SELF BALLAST	20					
96	656	24	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21					
97	3,198	48	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21					
98	3,198	4	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21					
99	3,198	16	RELAMP 9 WATT LED A LAMP S/I	9					
100	3,198	3	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21					
101	3,198	2	RETROFIT HIGH HAT 19 W LED 8 INCH	15					
102	3,198	2	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21					
103	3,198	4	RETROFIT 3' 2L LED TUBE /SELF BALLAST	20					
104	656	24	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21					
105	4,380	13	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21					
106	4,380	16	RETROFIT HIGH HAT 19 W LED 8 INCH	15					
107	800	20	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21					

CUSTOMER: Kearny School Dis
LOCATION:
City, State, Zip Code: Kearny, NJ 07032

GreenTech Energy Services
LIGHTING CONTROL

	LOCATION:		EXISTING						PROPOSED						SAVINGS			EXISTING LIGHTING CONTROL					PROPOSED LIGHTING CONTROLS					
Line Ref	Building	Location	Existing Hrs. per Year	Existing QTY	Existing Lighting Description	Existing WATT / Fixture	Existing KWH Usage	Existing KW Usage	Proposed QTY	Proposed Lighting Description	Proposed WATT / Fixture	Proposed KWH Usage	Proposed Kw Usage	KWH Saved	Total KWH Saved	KW Saved	EXISTING CONTROL	Existing Hrs. per Year	Lighting Qty	LIGHTING DESCRIPTION	WATT / Fixture	Control QTY	Control Description	Control Hours Reduced	New Hrs. (controlled)	KWH Saved from controls
108	Kearny High School	Weight Room	2,000	40	2L 4' F32 T8 ELE N BALLAST	60	4,800	2.40	40	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	1,680	0.84	3,120	3,120	1.56		2,000	40	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21					
109	Kearny High School	Weight Room	2,000	8	2L 4' F32 T8 ELE N BALLAST BAT BACKUP	60	960	0.48	8	RETROFIT 4' 2L LED TUBE /SELF BALLAST / BAT BACKUP	21	336	0.17	624	624	0.31		2,000	8	RETROFIT 4' 2L LED TUBE /SELF BALLAST / BAT BACKUP	21					
110	Kearny High School	Weight Room	2,000	6	2L 4' F28T5 ELE N BALLAST	62	744	0.37	6	RETROFIT 4' 2L LED TUBE /SELF BALLAST T5HE	26	312	0.16	432	432	0.22		2,000	6	RETROFIT 4' 2L LED TUBE /SELF BALLAST T5HE	26					
111	Kearny High School	Hall Storage/IT	800	40	2L 4' F32 T8 ELE N BALLAST	60	1,920	2.40	40	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	672	0.84	1,248	1,248	1.56		800	40	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21					
112	Kearny High School	Closet	800	1	2L 3' F25 ELE N BALLAST	45	36	0.05	1	RETROFIT 3' 2L LED TUBE /SELF BALLAST	20	16	0.02	20	20	0.03		800	1	RETROFIT 3' 2L LED TUBE /SELF BALLAST	20					
113	Kearny High School	Auth. Office	3,000	6	2L 4' F28T5 ELE N BALLAST	62	1,116	0.37	6	RETROFIT 4' 2L LED TUBE /SELF BALLAST T5HE	26	468	0.16	648	648	0.22		3,000	6	RETROFIT 4' 2L LED TUBE /SELF BALLAST T5HE	26					
114	Kearny High School	Class 19N	2,000	18	2L 4' F32 T8 ELE N BALLAST	60	2,160	1.08	18	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	756	0.38	1,404	1,404	0.70		2,000	18	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	1	CORNER MOUNT SENSOR 1, SWITCH 3 WI	18%	1,640	136
115	Kearny High School	Class 19N	2,000	3	2L 4' F32 T8 ELE N BALLAST BAT BACKUP	60	360	0.18	3	RETROFIT 4' 2L LED TUBE /SELF BALLAST / BAT BACKUP	21	126	0.06	234	234	0.12		2,000	3	RETROFIT 4' 2L LED TUBE /SELF BALLAST / BAT BACKUP	21					
116	Kearny High School	Boiiler Room	3,900	12	2L 4' F32 T8 ELE N BALLAST	60	2,808	0.72	12	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	983	0.25	1,825	1,825	0.47		3,900	12	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21					
117	Kearny High School	Parking Garage	4,380	25	2L 4' F32 T8 ELE N BALLAST	60	6,570	1.50	25	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	2,300	0.53	4,271	4,271			4,380	25	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21					
118		**Exterior**																									
119	Kearny High School	Courtyard Canopy	4,380	28	COMPACT FLUORESCENT 13W S/I	13	1,594	0.36	28	RELAMP 9 WATT LED A LAMP S/I	9	1,104	0.25	491	491			4,380	28	RELAMP 9 WATT LED A LAMP S/I	9					
120	Kearny High School	Roof Top Floods	4,380	5	400 WATT MH FLOOD	465	10,184	2.33	5	NEW LED FLOOD LOT 140 W ADJ KNUCKLE	140	3,066	0.70	7,118	7,118			4,380	5	NEW LED FLOOD LOT 140 W ADJ KNUCKLE	140					
121	Kearny High School	Full Face Wallpacks	4,380	10	70 WATT MH WALL PACK	92	4,030	0.92	10	NEW LED WALL PACK 35 W	35	1,533	0.35	2,497	2,497			4,380	10	NEW LED WALL PACK 35 W	35					
122	Kearny High School	Canopys	4,380	20	150 WATT INCAN FLOOD	150	13,140	3.00	20	20 WATT LED PAR 38	20	1,752	0.40	11,388	11,388			4,380	20	20 WATT LED PAR 38	20					
123	Kearny High School	Outside Football Locke	3,900	9	4L 4' F32 T8 ELE N BALLAST	112	3,931	1.01	9	RETROFIT 4' 4L LED TUBE /SELF BALLAST	42	1,474	0.38	2,457	2,457	0.63		3,900	9	RETROFIT 4' 4L LED TUBE /SELF BALLAST	42					
124	Kearny High School	Outside Football Locke	3,900	6	2L 4' F32 T8 ELE N BALLAST	60	1,404	0.36	6	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	491	0.13	913	913	0.23		3,900	6	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21					
125	Kearny High School	Outside Football Locke	3,900	12	COMPACT FLUORESCENT 13W S/I	13	608	0.16	12	RELAMP 9 WATT LED A LAMP S/I	9	421	0.11	187	187	0.05		3,900	12	RELAMP 9 WATT LED A LAMP S/I	9					
126	Kearny High School	Outside Girls Lockers	3,900	9	4L 4' F32 T8 ELE N BALLAST	112	3,931	1.01	9	RETROFIT 4' 4L LED TUBE /SELF BALLAST	42	1,474	0.38	2,457	2,457	0.63		3,900	9	RETROFIT 4' 4L LED TUBE /SELF BALLAST	42					
127	Kearny High School	Outside Girls Lockers	3,900	6	2L 4' F32 T8 ELE N BALLAST	60	1,404	0.36	6	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	491	0.13	913	913	0.23		3,900	6	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21					
128	Kearny High School	Outside Girls Lockers	3,900	12	COMPACT FLUORESCENT 13W S/I	13	608	0.16	12	RELAMP 9 WATT LED A LAMP S/I	9	421	0.11	187	187	0.05		3,900	12	RELAMP 9 WATT LED A LAMP S/I	9					
141	**Total: Kearny High School**			**1,281**			**308,737**	**114.19**	**1,271**			**102,622**	**37.15**	**206,114**	**206,114**	**71.16**	**Total: Kearny High School**		**1,271**			**1**			**1,640**	**136**

	LOCATION:		EXISTING						PROPOSED					SAVINGS			EXISTING LIGHTING CONTROL					PROPOSED LIGHTING CONTROLS				
Line Ref	Building	Location	Existing Hrs. per Year	Existing QTY	Existing Lighting Description	Existing WATT / Fixture	Existing KWH Usage	Existing KW Usage	Proposed QTY	Proposed Lighting Description	Proposed WATT / Fixture	Proposed KWH Usage	Proposed Kw Usage	KWH Saved	Total KWH Saved	KW Saved	EXISTING CONTROL	Existing Hrs. per Year	Lighting Qty	LIGHTING DESCRIPTION	WATT / Fixture	Control QTY	Control Description	Control Hours Reduced	New Hrs. (controlled)	KWH Saved from controls
142	**Lincoln Middle School 121 Beech Street, Kearny, NJ 07032**																									
143	Lincoln Middle School	2nd Floor Halls	4,380	164	2L 4' F28T5 ELE N BALLAST	62	44,536	10.17	164	RETROFIT 4' 2L LED TUBE /SELF BALLAST T5HE	26	18,676	4.26	25,860	25,860	5.90		4,380	164	RETROFIT 4' 2L LED TUBE /SELF BALLAST T5HE	26					
144	Lincoln Middle School	2nd Floor Halls	4,380	28	2L 4' F28T5 ELE N BALLAST BAT BACKUP	62	7,604	1.74	28	RETROFIT 4' 2L LED TUBE /SELF BALLAST T5HE BAT BACKUP	26	3,189	0.73	4,415	4,415	1.01		4,380	28	RETROFIT 4' 2L LED TUBE /SELF BALLAST T5HE BAT BACKUP	26					
145	Lincoln Middle School	2nd Floor Halls	4,380	2	2L 4' F32 T8 ELE N BALLAST	60	526	0.12	2	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	184	0.04	342	342	0.08		4,380	2	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21					
146	Lincoln Middle School	Displays	4,380	15	60 WATT INCANDESCENT	60	3,942	0.90	15	RELAMP 9 WATT LED A LAMP S/I	9	591	0.14	3,351	3,351	0.77		4,380	15	RELAMP 9 WATT LED A LAMP S/I	9					
147	Lincoln Middle School	Class 211	2,000	18	2L 4' F32 T8 ELE N BALLAST	60	2,160	1.08	18	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	756	0.38	1,404	1,404	0.70	Three Gang Switch	2,000	18	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	1	CORNER MOUNT SENSOR 1, SWITCH 3 WL	18%	1,640	136
148	Lincoln Middle School	Ladies Faculty Bath	3,900	2	1L 4' F32 T8 ELE N BALLAST	28	218	0.06	2	RETROFIT 4' 1L LED TUBE /SELF BALLAST	11	82	0.02	137	137	0.04	Single Gang Switch	3,900	2	RETROFIT 4' 1L LED TUBE /SELF BALLAST	11					
149	Lincoln Middle School	Ladies Faculty Bath	3,900	2	LED SCREW IN	9			2	NO CHANGE							Single Gang Switch	3,900	2	LED SCREW IN	9					
150	Lincoln Middle School	Ladies Faculty Bath	3,900	1	2L 4' F32 T8 ELE N BALLAST	60	234	0.06	1	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	82	0.02	152	152	0.04		3,900	1	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21					
151	Lincoln Middle School	Mens Faculty Bath	3,900	3	2L 4' F32 T8 ELE N BALLAST	60	702	0.18	3	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	246	0.06	456	456	0.12	Single Gang Switch	3,900	3	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21					
152	Lincoln Middle School	Mens Faculty Bath	3,900	1	2L 2' F17 ELE N BALLAST	34	133	0.03	1	RETROFIT 2' 2L LED TUBE /SELF BALLAST	14	55	0.01	78	78	0.02		3,900	1	RETROFIT 2' 2L LED TUBE /SELF BALLAST	14					
153	Lincoln Middle School	Mens Faculty Bath	3,900	4	COMPACT FLUORESCENT 23W HW (2)	46	718	0.18	4	RETROFIT HIGH HAT 15 W LED 6 INCH	15	234	0.06	484	484	0.12		3,900	4	RETROFIT HIGH HAT 15 W LED 6 INCH	15					
154	Lincoln Middle School	Class 209	2,000	15	2L 4' F32 T8 ELE N BALLAST	60	1,800	0.90	15	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	630	0.32	1,170	1,170	0.59	Three Gang Switch	2,000	15	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	1	CORNER MOUNT SENSOR 1, SWITCH 3 WL	18%	1,640	113
155	Lincoln Middle School	Class 206	2,000	18	2L 4' F32 T8 ELE N BALLAST	60	2,160	1.08	18	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	756	0.38	1,404	1,404	0.70	Three Gang Switch	2,000	18	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	1	CORNER MOUNT SENSOR 1, SWITCH 3 WL	18%	1,640	136
156	Lincoln Middle School	Stairwell #2	8,760	1	4L 4' F32 T8 ELE N BALLAST	112	981	0.11	1	RETROFIT 4' 4L LED TUBE /SELF BALLAST	42	368	0.04	613	613	0.07		8,760	1	RETROFIT 4' 4L LED TUBE /SELF BALLAST	42					
157	Lincoln Middle School	Stairwell #2	8,760	2	2L 4' F32 T8 ELE N BALLAST	60	1,051	0.12	2	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	368	0.04	683	683	0.08		8,760	2	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21					
158	Lincoln Middle School	Stairwell #2	8,760	1	LED SCREW IN	9			1	NO CHANGE								8,760	1	LED SCREW IN	9					
159	Lincoln Middle School	Class 207	2,000	18	2L 4' F32 T8 ELE N BALLAST	60	2,160	1.08	18	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	756	0.38	1,404	1,404	0.70	Three Gang Switch	2,000	18	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	1	CORNER MOUNT SENSOR 1, SWITCH 3 WL	18%	1,640	136
160	Lincoln Middle School	Class 204	2,000	18	2L 4' F32 T8 ELE N BALLAST	60	2,160	1.08	18	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	756	0.38	1,404	1,404	0.70	Three Gang Switch	2,000	18	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	1	CORNER MOUNT SENSOR 1, SWITCH 3 WL	18%	1,640	136
161	Lincoln Middle School	Class 205	2,000	18	2L 4' F32 T8 ELE N BALLAST	60	2,160	1.08	18	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	756	0.38	1,404	1,404	0.70	Three Gang Switch	2,000	18	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	1	CORNER MOUNT SENSOR 1, SWITCH 3 WL	18%	1,640	136
162	Lincoln Middle School	Class 202	2,000	18	2L 4' F32 T8 ELE N BALLAST	60	2,160	1.08	18	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	756	0.38	1,404	1,404	0.70	Three Gang Switch	2,000	18	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	1	CORNER MOUNT SENSOR 1, SWITCH 3 WL	18%	1,640	136
163	Lincoln Middle School	Class 203	2,000	15	2L 4' F32 T8 ELE N BALLAST	60	1,800	0.90	15	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	630	0.32	1,170	1,170	0.59	Three Gang Switch	2,000	15	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	1	CORNER MOUNT SENSOR 1, SWITCH 3 WL	18%	1,640	113
164	Lincoln Middle School	Girls Room	3,900	9	2L 4' F32 T8 ELE N BALLAST	60	2,106	0.54	9	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	737	0.19	1,369	1,369	0.35	Single Gang Switch	3,900	9	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	1	CEILING MOUNT SENSOR 1, SWITCH 1 WL	18%	3,198	133
165	Lincoln Middle School	Girls Room	3,900	4	COMPACT FLUORESCENT 23W HW (2)	46	718	0.18	4	RETROFIT HIGH HAT 15 W LED 6 INCH	15	234	0.06	484	484	0.12		3,900	4	RETROFIT HIGH HAT 15 W LED 6 INCH	15					
166	Lincoln Middle School	Class 201	2,000	18	2L 4' F32 T8 ELE N BALLAST	60	2,160	1.08	18	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	756	0.38	1,404	1,404	0.70	Three Gang Switch	2,000	18	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	1	CORNER MOUNT SENSOR 1, SWITCH 3 WL	18%	1,640	136
167	Lincoln Middle School	Boys Lockers	3,900	24	1L 4' F32 T8 ELE N BALLAST	28	2,621	0.67	24	RETROFIT 4' 1L LED TUBE /SELF BALLAST	11	983	0.25	1,638	1,638	0.42		3,900	24	RETROFIT 4' 1L LED TUBE /SELF BALLAST	11					
168	Lincoln Middle School	Boys Lockers	3,900	1	2L 4' F32 T8 ELE N BALLAST	60	234	0.06	1	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	82	0.02	152	152	0.04		3,900	1	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21					
169	Lincoln Middle School	Boys Lockers	3,900	4	LED SCREW IN	9			4	NO CHANGE								3,900	4	LED SCREW IN	9					
170	Lincoln Middle School	Girls Lockers	3,900	24	1L 4' F32 T8 ELE N BALLAST	28	2,621	0.67	24	RETROFIT 4' 1L LED TUBE /SELF BALLAST	11	983	0.25	1,638	1,638	0.42		3,900	24	RETROFIT 4' 1L LED TUBE /SELF BALLAST	11					
171	Lincoln Middle School	Girls Lockers	3,900	1	2L 4' F32 T8 ELE N BALLAST	60	234	0.06	1	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	82	0.02	152	152	0.04		3,900	1	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21					
172	Lincoln Middle School	Girls Lockers	3,900	4	LED SCREW IN	9			4	NO CHANGE								3,900	4	LED SCREW IN	9					
173	Lincoln Middle School	Stairwell #1	8,760	3	2L 4' F32 T8 ELE N BALLAST	60	1,577	0.18	3	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	552	0.06	1,025	1,025	0.12		8,760	3	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21					
174	Lincoln Middle School	Electrical Closet	800	1	2L 4' F32 T8 ELE N BALLAST	60	48	0.06	1	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	17	0.02	31	31	0.04	Single Gang Switch	800	1	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21					
175	Lincoln Middle School	Boys Room	3,900	6	2L 4' F32 T8 ELE N BALLAST	60	1,404	0.36	6	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	491	0.13	913	913	0.23	Single Gang Switch	3,900	6	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	1	CEILING MOUNT SENSOR 1, SWITCH 1 WL	18%	3,198	88
176	Lincoln Middle School	Boys Room	3,900	3	COMPACT FLUORESCENT 32W HW (2)	64	749	0.19	3	RETROFIT HIGH HAT 15 W LED 6 INCH	15	176	0.05	573	573	0.15		3,900	3	RETROFIT HIGH HAT 15 W LED 6 INCH	15					
177	Lincoln Middle School	Class 226	1,640	8	2L 4' F32 T8 ELE N BALLAST	60	787	0.48	8	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	276	0.17	512	512	0.31	Sensored	1,640	8	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21					
178	Lincoln Middle School	Class 224	2,000	18	3L 4' F32 T8 ELE N BALLAST	85	3,060	1.53	18	RETROFIT 4' 3L LED TUBE /SELF BALLAST	32	1,134	0.57	1,926	1,926	0.96		2,000	18	RETROFIT 4' 3L LED TUBE /SELF BALLAST	32	1	CORNER MOUNT SENSOR 1, SWITCH 2 WL	18%	1,640	204
179	Lincoln Middle School	Library 227	2,000	36	2L 4' F32 T8 ELE N BALLAST	60	4,320	2.16	36	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	1,512	0.76	2,808	2,808	1.40		2,000	36	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21					
180	Lincoln Middle School	Library 227	2,000	36	2L 4' F32 T8 ELE N BALLAST BAT BACKUP	60	4,320	2.16	36	RETROFIT 4' 2L LED TUBE /SELF BALLAST / BAT BACKUP	21	1,512	0.76	2,808	2,808	1.40		2,000	36	RETROFIT 4' 2L LED TUBE /SELF BALLAST / BAT BACKUP	21					
181	Lincoln Middle School	Library 227	2,000	17	3L 4' F32 T8 ELE N BALLAST	85	2,890	1.45	17	RETROFIT 4' 3L LED TUBE /SELF BALLAST	32	1,071	0.54	1,819	1,819	0.91		2,000	17	RETROFIT 4' 3L LED TUBE /SELF BALLAST	32					
182	Lincoln Middle School	Library Office	3,000	2	3L 4' F32 T8 ELE N BALLAST	85	510	0.17	2	RETROFIT 4' 3L LED TUBE /SELF BALLAST	32	189	0.06	321	321	0.11	Single Gang Switch	3,000	2	RETROFIT 4' 3L LED TUBE /SELF BALLAST	32					
183	Lincoln Middle School	Server Room	800	2	3L 4' F32 T8 ELE N BALLAST	85	136	0.17	2	RETROFIT 4' 3L LED TUBE /SELF BALLAST	32	50	0.06	86	86	0.11	Single Gang Switch	800	2	RETROFIT 4' 3L LED TUBE /SELF BALLAST	32					
184	Lincoln Middle School	Computer Class	2,000	14	3L 4' F32 T8 ELE N BALLAST	85	2,380	1.19	14	RETROFIT 4' 3L LED TUBE /SELF BALLAST	32	882	0.44	1,498	1,498	0.75		2,000	14	RETROFIT 4' 3L LED TUBE /SELF BALLAST	32					
185	Lincoln Middle School	Computer Class	2,000	14	3L 4' F32 T8 ELE N BALLAST BAT BACKUP	85	2,380	1.19	14	RETROFIT 4' 3L LED TUBE /SELF BALLAST / BAT BACKUP	32	882	0.44	1,498	1,498	0.75		2,000	14	RETROFIT 4' 3L LED TUBE /SELF BALLAST / BAT BACKUP	32					
186	Lincoln Middle School	End Office	3,000	4	2L 4' F32 T8 ELE N BALLAST	60	720	0.24	4	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	252	0.08	468	468	0.16	Two Gang Switch	3,000	4	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21					
187	Lincoln Middle School	Cust. Closet	800	1	2L 4' F32 T8 ELE N BALLAST	60	48	0.06	1	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	17	0.02	31	31	0.04		800	1	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21					
188	Lincoln Middle School	Girls Room	3,900	6	2L 4' F32 T8 ELE N BALLAST	60	1,404	0.36	6	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	491	0.13	913	913	0.23	Single Gang Switch	3,900	6	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	1	CEILING MOUNT SENSOR 1, SWITCH 1 WL	18%	3,198	88
189	Lincoln Middle School	Girls Room	3,900	3	COMPACT FLUORESCENT 23W HW (2)	46	538	0.14	3	RETROFIT HIGH HAT 15 W LED 6 INCH	15	176	0.05	363	363	0.09		3,900	3	RETROFIT HIGH HAT 15 W LED 6 INCH	15					
190	Lincoln Middle School	Stairwell #5	8,760	1	2L 4' F32 T8 ELE N BALLAST	60	526	0.06	1	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	184	0.02	342	342	0.04		8,760	1	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21					
191	Lincoln Middle School	Stairwell #5	8,760	2	LED HIGH BAY	150			2	NO CHANGE								8,760	2	LED HIGH BAY	150					
192	Lincoln Middle School	Class 225	1,640	12	3L 4' F32 T8 ELE N BALLAST	85	1,673	1.02	12	RETROFIT 4' 3L LED TUBE /SELF BALLAST	32	620	0.38	1,053	1,053	0.64	Sensored	1,640	12	RETROFIT 4' 3L LED TUBE /SELF BALLAST	32					
193	Lincoln Middle School	Class 222	1,640	12	3L 4' F32 T8 ELE N BALLAST	85	1,673	1.02	12	RETROFIT 4' 3L LED TUBE /SELF BALLAST	32	620	0.38	1,053	1,053	0.64	Sensored	1,640	12	RETROFIT 4' 3L LED TUBE /SELF BALLAST	32					
194	Lincoln Middle School	Class 223	1,640	12	3L 4' F32 T8 ELE N BALLAST	85	1,673	1.02	12	RETROFIT 4' 3L LED TUBE /SELF BALLAST	32	620	0.38	1,053	1,053	0.64	Sensored	1,640	12	RETROFIT 4' 3L LED TUBE /SELF BALLAST	32					
195	Lincoln Middle School	Class 220N	1,640	12	3L 4' F32 T8 ELE N BALLAST	85	1,673	1.02	12	RETROFIT 4' 3L LED TUBE /SELF BALLAST	32	620	0.38	1,053	1,053	0.64	Sensored	1,640	12	RETROFIT 4' 3L LED TUBE /SELF BALLAST	32					
196	Lincoln Middle School	Stairwell #4	8,760	3	2L 4' F32 T8 ELE N BALLAST	60	1,577	0.18	3	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	552	0.06	1,025	1,025	0.12		8,760	3	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21					
197	Lincoln Middle School	Class 218	2,000	18	2L 4' F32 T8 ELE N BALLAST	60	2,160	1.08	18	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	756	0.38	1,404	1,404	0.70	Two Gang Switch	2,000	18	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	1	CORNER MOUNT SENSOR 1, SWITCH 2 WL	18%	1,640	136
198	Lincoln Middle School	Class 221	2,000	18	2L 4' F32 T8 ELE N BALLAST	60	2,160	1.08	18	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	756	0.38	1,404	1,404	0.70	Two Gang Switch	2,000	18	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	1	CORNER MOUNT SENSOR 1, SWITCH 2 WL	18%	1,640	136
199	Lincoln Middle School	Class 1216	2,000	18	2L 4' F32 T8 ELE N BALLAST	60	2,160	1.08	18	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	756	0.38	1,404	1,404	0.70	Two Gang Switch	2,000	18	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	1	CORNER MOUNT SENSOR 1, SWITCH 2 WL	18%	1,640	136
200	Lincoln Middle School	Class 219	2,000	18	2L 4' F32 T8 ELE N BALLAST	60	2,160	1.08	18	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	756	0.38	1,404	1,404	0.70	Two Gang Switch	2,000	18	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	1	CORNER MOUNT SENSOR 1, SWITCH 2 WL	18%	1,640	136
201	Lincoln Middle School	Hall Storage	800	12	2L 4' F32 T8 ELE N BALLAST	60	576	0.72	12	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	202	0.25	374	374	0.47		800	12	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21					
202	Lincoln Middle School	Class 217N	2,000	18	2L 4' F32 T8 ELE N BALLAST	60	2,160	1.08	18	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	756	0.38	1,404	1,404	0.70	Two Gang Switch	2,000	18	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	1	CORNER MOUNT SENSOR 1, SWITCH 2 WL	18%	1,640	136
203	Lincoln Middle School	Stairwell #3	8,760	2	2L 4' F32 T8 ELE N BALLAST	60	1,051	0.12	2	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	368	0.04	683	683	0.08		8,760	2	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21					
204	Lincoln Middle School	Stairwell #3	8,760	1	4L 4' F32 T8 ELE N BALLAST	112	981	0.11	1	RETROFIT 4' 4L LED TUBE /SELF BALLAST	42	368	0.04	613	613	0.07		8,760	1	RETROFIT 4' 4L LED TUBE /SELF BALLAST	42					
205	Lincoln Middle School	Stairwell #3	8,760	1	LED SCREW IN	9			1	NO CHANGE								8,760	1	LED SCREW IN	9					
206	Lincoln Middle School	Class 214	2,000	5	3L 4' F32 T8 ELE N BALLAST	85	850	0.43	5	RETROFIT 4' 3L LED TUBE /SELF BALLAST	32	315	0.16	535	535	0.27	Two Gang Switch	2,000	5	RETROFIT 4' 3L LED TUBE /SELF BALLAST	32	1	CORNER MOUNT SENSOR 1, SWITCH 2 WL	18%	1,640	57
207	Lincoln Middle School	Girls Room	3,900	4	2L 4' F32 T8 ELE N BALLAST	60	936	0.24	4	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	328	0.08	608	608	0.16	Single Gang Switch	3,900	4	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	1	CEILING MOUNT SENSOR 1, SWITCH 1 WL	18%	3,198	59
208	Lincoln Middle School	Girls Room	3,900	4	COMPACT FLUORESCENT 23W HW (2)	46	718	0.18	4	RETROFIT HIGH HAT 15 W LED 6 INCH	15	234	0.06	484	484	0.12		3,900	4	RETROFIT HIGH HAT 15 W LED 6 INCH	15					
209	Lincoln Middle School	Cust. Closet	800	1	60 WATT INCANDESCENT	60	48	0.06	1	RELAMP 9 WATT LED A LAMP S/I	9	7	0.01	41	41	0.05	Single Gang Switch	800	1	RELAMP 9 WATT LED A LAMP S/I	9					
210	Lincoln Middle School	Boys Room	3,900	5	2L 4' F32 T8 ELE N BALLAST	60	1,170	0.30	5	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	410	0.11	761	761	0.20		3,900	5	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	1	CEILING MOUNT SENSOR 1, SWITCH 1 WL	18%	3,198	74
211	Lincoln Middle School	Boys Room	3,900	6	COMPACT FLUORESCENT 23W HW (2)	46	1,076	0.28	6	RETROFIT HIGH HAT 15 W LED 6 INCH	15	351	0.09	725	725	0.19		3,900	6	RETROFIT HIGH HAT 15 W LED 6 INCH	15					
212	Lincoln Middle School	Faculty Ladies Room	3,900	1	2L 4' F32 T8 ELE N BALLAST	60	234	0.06	1	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	82	0.02	152	152	0.04	Single Gang Switch	3,900	1	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21					
213	Lincoln Middle School	Faculty Ladies Room	3,900	1	2L 2' F17 ELE N BALLAST	34	133	0.03	1	RETROFIT 2' 2L LED TUBE /SELF BALLAST	14	55	0.01	78	78	0.02		3,900	1	RETROFIT 2' 2L LED TUBE /SELF BALLAST	14					
214	Lincoln Middle School	Faculty Ladies Room	3,900	1	COMPACT FLUORESCENT 23W HW (2)	46	179	0.05	1	RETROFIT HIGH HAT 15 W LED 6 INCH	15	59	0.02	121	121	0.03		3,900	1	RETROFIT HIGH HAT 15 W LED 6 INCH	15					
215	Lincoln Middle School	Hall Office	3,000	2	4L 4' F32 T8 ELE N BALLAST	112	672	0.22	2	RETROFIT 4' 4L LED TUBE /SELF BALLAST	42	252	0.08	420	420	0.14	Single Gang Switch	3,000	2	RETROFIT 4' 4L LED TUBE /SELF BALLAST	42	1	WALL SENSOR	18%	2,460	45
216	Lincoln Middle School	Elevator	8,760	1	2L 4' F32 T8 ELE N BALLAST	60	526	0.06	1	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	184	0.02	342	342	0.04		8,760	1	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21					
217	Lincoln Middle School	Class 212	2,000	18	2L 4' F32 T8 ELE N BALLAST	60	2,160	1.08	18	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	756	0.38	1,404	1,404	0.70	Three Gang Switch	2,000	18	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	1	CORNER MOUNT SENSOR 1, SWITCH 3 WL	18%	1,640	136
218	Lincoln Middle School	Class 210	2,000	18	2L 4' F32 T8 ELE N BALLAST	60	2,160	1.08	18	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	756	0.38	1,404	1,404	0.70	Three Gang Switch	2,000	18	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	1	CORNER MOUNT SENSOR 1, SWITCH 3 WL	18%	1,640	136
219	Lincoln Middle School	Class 215	2,000	21	2L 4' F32 T8 ELE N BALLAST	60	2,520	1.26	21	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	882	0.44	1,638	1,638	0.82	Three Gang Switch	2,000	21	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	1	CORNER MOUNT SENSOR 1, SWITCH 3 WL	18%	1,640	159
220	Lincoln Middle School	Class 208	2,000	32	2L 4' F32 T8 ELE N BALLAST	60	3,840	1.92	32	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	1,344	0.67	2,496	2,496	1.25	Three Gang Switch	2,000	32	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	1	CORNER MOUNT SENSOR 1, SWITCH 3 WL	18%	1,640	242
221	Lincoln Middle School	Class 213	2,000	18	2L 4' F32 T8 ELE N BALLAST	60	2,160	1.08	18	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	756	0.38	1,404	1,404	0.70	Three Gang Switch	2,000	18	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	1	CORNER MOUNT SENSOR 1, SWITCH 3 WL	18%	1,640	136
222	Lincoln Middle School	Storage Rooms 213	800	12	2L 4' F32 T8 ELE N BALLAST	60	576	0.72	12	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	202	0.25	374	374	0.47		800	12	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21					
223	Lincoln Middle School	Hall Storage	800	6	2L 4' F32 T8 ELE N BALLAST	60	288	0.36	6	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	101	0.13	187	187	0.23		800	6	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21					
224	Lincoln Middle School	1st Floor Halls	4,380	170	2L 4' F28T5 ELE N BALLAST	62	46,165	10.54	170	RETROFIT 4' 2L LED TUBE /SELF BALLAST T5HE	26	19,360	4.42	26,806	26,806	6.12		4,380	170	RETROFIT 4' 2L LED TUBE /SELF BALLAST T5HE	26					
225	Lincoln Middle School	1st Floor Halls	4,380	40	2L 4' F28T5 ELE N BALLAST BAT BACKUP	62	10,862	2.48	40	RETROFIT 4' 2L LED TUBE /SELF BALLAST T5HE BAT BACKUP	26	4,555	1.04	6,307	6,307	1.44		4,380	40	RETROFIT 4' 2L LED TUBE /SELF BALLAST T5HE BAT BACKUP	26					
226	Lincoln Middle School	1st Floor Halls	4,380	15	2L 4' F32 T8 ELE N BALLAST	60	3,942	0.90	15	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	1,380	0.32	2,562	2,562	0.59		4,380	15	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21					
227	Lincoln Middle School	1st Floor Halls	4,380	4	COMPACT FLUORESCENT 23W HW (2)	46	806	0.18	4	RETROFIT HIGH HAT 15 W LED 6 INCH	15	263	0.06	543	543	0.12		4,380	4	RETROFIT HIGH HAT 15 W LED 6 INCH	15					
228	Lincoln Middle School	Class 111	2,000	14	2L 4' F32 T8 ELE N BALLAST	60	1,680	0.84	14	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	588	0.29	1,092	1,092	0.55	Three Gang Switch	2,000	14	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	1	CORNER MOUNT SENSOR 1, SWITCH 3 WL	18%	1,640	106
229	Lincoln Middle School	Class 111	2,000	1	60 WATT INCANDESCENT	60	120	0.06	1	RELAMP 9 WATT LED A LAMP S/I	9	18	0.01	102	102	0.05	Single Gang Switch	2,000	1	RELAMP 9 WATT LED A LAMP S/I	9					
230	Lincoln Middle School	Hall Office	3,000	2	3L 4' F32 T8 ELE N BALLAST	85	510	0.17	2	RETROFIT 4' 3L LED TUBE /SELF BALLAST	32	189	0.06	321	321	0.11	Single Gang Switch	3,000	2	RETROFIT 4' 3L LED TUBE /SELF BALLAST	32	1	WALL SENSOR	18%	2,460	34
231	Lincoln Middle School	Mens Room	3,900	3	1L 4' F32 T8 ELE N BALLAST	28	328	0.08	3	RETROFIT 4' 1L LED TUBE /SELF BALLAST	11	123	0.03	205	205	0.05		3,900	3	RETROFIT 4' 1L LED TUBE /SELF BALLAST	11					
232	Lincoln Middle School	Mens Room	3,900	1	2L 4' F32 T8 ELE N BALLAST	60	234	0.06	1	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	82	0.02	152	152	0.04		3,900	1	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21					
233	Lincoln Middle School	Mens Room	3,900	2	LED SCREW IN	9			2	NO CHANGE								3,900	2	LED SCREW IN	9					
234	Lincoln Middle School	Class 109	2,000	8	2L 4' F32 T8 ELE N BALLAST	60	960	0.48	8	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	336	0.17	624	624	0.31	Single Gang Switch	2,000	8	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	1	WALL SENSOR	18%	1,640	60
235	Lincoln Middle School	Class 106	2,000	18	2L 4' F32 T8 ELE N BALLAST	60	2,160	1.08	18	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	756	0.38	1,404	1,404	0.70	Three Gang Switch	2,000	18	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	1	CORNER MOUNT SENSOR 1, SWITCH 3 WL	18%	1,640	136
236	Lincoln Middle School	Faculty 107	3,000	3	LED FLAT PANEL	35			3	NO CHANGE							Single Gang Switch	3,000	3	LED FLAT PANEL	35					
237	Lincoln Middle School	Class 104	2,000	18	2L 4' F32 T8 ELE N BALLAST	60	2,160	1.08	18	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	756	0.38	1,404	1,404	0.70	Three Gang Switch	2,000	18	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	1	CORNER MOUNT SENSOR 1, SWITCH 3 WL	18%	1,640	136
238	Lincoln Middle School	Class 105	2,000	18	2L 4' F32 T8 ELE N BALLAST	60	2,160	1.08	18	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	756	0.38	1,404	1,404	0.70	Three Gang Switch	2,000	18	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	1	CORNER MOUNT SENSOR 1, SWITCH 3 WL	18%	1,640	136
239	Lincoln Middle School	Class 102	2,000	18	2L 4' F32 T8 ELE N BALLAST	60	2,160	1.08	18	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	756	0.38	1,404	1,404	0.70	Three Gang Switch	2,000	18	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	1	CORNER MOUNT SENSOR 1, SWITCH 3 WL	18%	1,640	136
240	Lincoln Middle School	Class 103	2,000	21	2L 4' F32 T8 ELE N BALLAST	60	2,520	1.26	21	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	882	0.44	1,638	1,638	0.82	Three Gang Switch	2,000	21	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	1	CORNER MOUNT SENSOR 1, SWITCH 3 WL	18%	1,640	159
241	Lincoln Middle School	Hall Storage	800	12	2L 4' F32 T8 ELE N BALLAST	60	576	0.72	12	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	202	0.25	374	374	0.47		800	12	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21					
242	Lincoln Middle School	Girls Room	3,900	4	3L 4' F32 T8 ELE N BALLAST	85	1,326	0.34	4	RETROFIT 4' 3L LED TUBE /SELF BALLAST	32	491	0.13	835	835	0.21	Single Gang Switch	3,900	4	RETROFIT 4' 3L LED TUBE /SELF BALLAST	32	1	CEILING MOUNT SENSOR 1, SWITCH 1 WL	18%	3,198	88
243	Lincoln Middle School	Girls Room	3,900	1	2L 4' F32 T8 ELE N BALLAST	60	234	0.06	1	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	82	0.02	152	152	0.04		3,900	1	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21					
244	Lincoln Middle School	Girls Room	3,900	1	2L 2' F17 ELE N BALLAST	34	133	0.03	1	RETROFIT 2' 2L LED TUBE /SELF BALLAST	14	55	0.01	78	78	0.02		3,900	1	RETROFIT 2' 2L LED TUBE /SELF BALLAST	14					
245	Lincoln Middle School	Side Entry	4,380	2	6L 2' F17 ELE N BALLAST	90	788	0.18	2	RETROFIT 2' 6L LED TUBE /SELF BALLAST	42	368	0.08	420	420	0.10		4,380	2	RETROFIT 2' 6L LED TUBE /SELF BALLAST	42					
246	Lincoln Middle School	Cust. Closet	800	1	2L 4' F28T5 ELE N BALLAST	62	50	0.06	1	RETROFIT 4' 2L LED TUBE /SELF BALLAST T5HE	26	21	0.03	29	29	0.04		800	1	RETROFIT 4' 2L LED TUBE /SELF BALLAST T5HE	26					
247	Lincoln Middle School	Hall Displays	4,380	12	60 WATT INCANDESCENT	60	3,154	0.72	12	RELAMP 9 WATT LED A LAMP S/I	9	473	0.11	2,681	2,681	0.61		4,380	12	RELAMP 9 WATT LED A LAMP S/I	9					
248	Lincoln Middle School	Nurses Office	3,000	8	3L 4' F32 T8 ELE N BALLAST	85	2,040	0.68	8	RETROFIT 4' 3L LED TUBE /SELF BALLAST	32	756	0.25	1,284	1,284	0.43		3,000	8	RETROFIT 4' 3L LED TUBE /SELF BALLAST	32					
249	Lincoln Middle School	Nurses Office	3,000	2	2L 4' F32 T8 ELE N BALLAST	60	360	0.12	2	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	126	0.04	234	234	0.08		3,000	2	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21					
250	Lincoln Middle School	Nurses Office	3,000	2	2L 2' F17 ELE N BALLAST	34	204	0.07	2	RETROFIT 2' 2L LED TUBE /SELF BALLAST	14	84	0.03	120	120	0.04		3,000	2	RETROFIT 2' 2L LED TUBE /SELF BALLAST	14					
251	Lincoln Middle School	Nurses Office	3,000	3	COMPACT FLUORESCENT 23W HW (2)	46	414	0.14	3	RETROFIT HIGH HAT 15 W LED 6 INCH	15	135	0.05	279	279	0.09		3,000	3	RETROFIT HIGH HAT 15 W LED 6 INCH	15					
252	Lincoln Middle School	Gym 13	2,000	32	400 WATT MH HIGH BAY	465	29,760	14.88	32	NEW RECESSED LED HIGH BAY 150 W	152	9,728	4.86	20,032	20,032	10.02		2,000	32	NEW RECESSED LED HIGH BAY 150 W	152					
253	Lincoln Middle School	Boys/Girls Steps	3,900	14	LED SCREW IN	9			14	NO CHANGE								3,900	14	LED SCREW IN	9					
254	Lincoln Middle School	Gym Office	3,000	4	3L 4' F32 T8 ELE N BALLAST	85	1,020	0.34	4	RETROFIT 4' 3L LED TUBE /SELF BALLAST	32	378	0.13	642	642	0.21		3,000	4	RETROFIT 4' 3L LED TUBE /SELF BALLAST	32					
255	Lincoln Middle School	Gym Office	3,000	1	2L 4' F32 T8 ELE N BALLAST	60	180	0.06	1	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	63	0.02	117	117	0.04		3,000	1	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21					
256	Lincoln Middle School	Gym Office	3,000	1	2L 2' F17 ELE N BALLAST	34	102	0.03	1	RETROFIT 2' 2L LED TUBE /SELF BALLAST	14	42	0.01	60	60	0.02		3,000	1	RETROFIT 2' 2L LED TUBE /SELF BALLAST	14					
257	Lincoln Middle School	Gym Office	3,000	1	COMPACT FLUORESCENT 23W HW (2)	46	138	0.05	1	RETROFIT HIGH HAT 15 W LED 6 INCH	15	45	0.02	93	93	0.03		3,000	1	RETROFIT HIGH HAT 15 W LED 6 INCH	15					
258	Lincoln Middle School	Gym Storage	800	4	2L 4' F32 T8 ELE N BALLAST	60	192	0.24	4	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	67	0.08	125	125	0.16	Single Gang Switch	800	4	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21					
259	Lincoln Middle School	Gym Side Entry	2,000	5	1L 4' F32 T8 ELE N BALLAST	28	280	0.14	5	RETROFIT 4' 1L LED TUBE /SELF BALLAST	11	105	0.05	175	175	0.09		2,000	5	RETROFIT 4' 1L LED TUBE /SELF BALLAST	11					
260	Lincoln Middle School	Boys Office	3,000	3	3L 4' F32 T8 ELE N BALLAST	85	765	0.26	3	RETROFIT 4' 3L LED TUBE /SELF BALLAST	32	284	0.09	482	482	0.16	Single Gang Switch	3,000	3	RETROFIT 4' 3L LED TUBE /SELF BALLAST	32					
261	Lincoln Middle School	Boys Office	3,000	1	2L 4' F32 T8 ELE N BALLAST	60	180	0.06	1	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	63	0.02	117	117	0.04	Single Gang Switch	3,000	1	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21					
262	Lincoln Middle School	Boys Office	3,000	1	2L 2' F17 ELE N BALLAST	34	102	0.03	1	RETROFIT 2' 2L LED TUBE /SELF BALLAST	14	42	0.01	60	60	0.02		3,000	1	RETROFIT 2' 2L LED TUBE /SELF BALLAST	14					
263	Lincoln Middle School	Boys Office	3,000	1	COMPACT FLUORESCENT 23W HW (2)	46	138	0.05	1	RETROFIT HIGH HAT 15 W LED 6 INCH	15	45	0.02	93	93	0.03		3,000	1	RETROFIT HIGH HAT 15 W LED 6 INCH	15					
264	Lincoln Middle School	Table Storage	800	1	2L 4' F32 T8 ELE N BALLAST	60	48	0.06	1	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	17	0.02	31	31	0.04		800	1	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21					
265	Lincoln Middle School	Table Storage	800	1	60 WATT INCANDESCENT	60	48	0.06	1	RELAMP 9 WATT LED A LAMP S/I	9	7	0.01	41	41	0.05		800	1	RELAMP 9 WATT LED A LAMP S/I	9					
266	Lincoln Middle School	Stairs	8,760	6	LED SCREW IN	9			6	NO CHANGE								8,760	6	LED SCREW IN	9					
267	Lincoln Middle School	Electrical Closet	800	1	2L 4' F32 T8 ELE N BALLAST	60	48	0.06	1	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	17	0.02	31	31	0.04	Single Gang Switch	800	1	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21					
268	Lincoln Middle School	Boys Room	3,900	6	2L 4' F32 T8 ELE N BALLAST	60	1,404	0.36	6	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	491	0.13	913	913	0.23		3,900	6	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	1	CEILING MOUNT SENSOR 1, SWITCH 1 WL	18%	3,198	88

CUSTOMER: Kearny School Dis
LOCATION:
City, State, Zip Code: Kearny, NJ 07032

GreenTech Energy Services
LIGHTING CONTROL

LOCATION / EXISTING / PROPOSED / SAVINGS

Line Ref	Building	Location	Existing Hrs. per Year	Existing QTY	Existing Lighting Description	Existing WATT / Fixture	Existing KWH Usage	Existing KW Usage	Proposed QTY	Proposed Lighting Description	Proposed WATT / Fixture	Proposed KWH Usage	Proposed Kw Usage	KWH Saved	Total KWH Saved	KW Saved
269	Lincoln Middle School	Pool Equipment	3,900	24	4L 4' F32 T8 ELE N BALLAST	112	10,483	2.69	24	RETROFIT 4' 4L LED TUBE /SELF BALLAST	42	3,931	1.01	6,552	6,552	1.68
270	Lincoln Middle School	Pool Entry	4,380	4	2L 4' F28T5 ELE N BALLAST	62	1,086	0.25	4	RETROFIT 4' 2L LED TUBE /SELF BALLAST T5HE	26	456	0.10	631	631	0.14
271	Lincoln Middle School	Pool Entry	4,380	2	2L 4' F28T5 ELE N BALLAST BAT BACKUP	62	543	0.12	2	RETROFIT 4' 2L LED TUBE /SELF BALLAST T5HE BAT BACKUP	26	228	0.05	315	315	0.07
272	Lincoln Middle School	Class 124	1,640	12	3L 4' F32 T8 ELE N BALLAST	85	1,673	1.02	12	RETROFIT 4' 3L LED TUBE /SELF BALLAST	32	620	0.38	1,053	1,053	0.64
273	Lincoln Middle School	Class 135	1,640	8	3L 4' F32 T8 ELE N BALLAST	85	1,115	0.68	8	RETROFIT 4' 3L LED TUBE /SELF BALLAST	32	413	0.25	702	702	0.43
274	Lincoln Middle School	Class 133	1,640	8	3L 4' F32 T8 ELE N BALLAST	85	1,115	0.68	8	RETROFIT 4' 3L LED TUBE /SELF BALLAST	32	413	0.25	702	702	0.43
275	Lincoln Middle School	Class 131	1,640	8	3L 4' F32 T8 ELE N BALLAST	85	1,115	0.68	8	RETROFIT 4' 3L LED TUBE /SELF BALLAST	32	413	0.25	702	702	0.43
276	Lincoln Middle School	Class 122	1,640	14	3L 4' F32 T8 ELE N BALLAST	85	1,952	1.19	14	RETROFIT 4' 3L LED TUBE /SELF BALLAST	32	723	0.44	1,228	1,228	0.75
277	Lincoln Middle School	Cust. Closet	800	1	2L 4' F32 T8 ELE N BALLAST	60	48	0.06	1	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	17	0.02	31	31	0.04
278	Lincoln Middle School	Class 129	1,640	14	3L 4' F32 T8 ELE N BALLAST	85	1,952	1.19	14	RETROFIT 4' 3L LED TUBE /SELF BALLAST	32	723	0.44	1,228	1,228	0.75
279	Lincoln Middle School	Class 127	1,640	14	3L 4' F32 T8 ELE N BALLAST	85	1,952	1.19	14	RETROFIT 4' 3L LED TUBE /SELF BALLAST	32	723	0.44	1,228	1,228	0.75
280	Lincoln Middle School	Class 120	2,000	20	2L 4' F32 T8 ELE N BALLAST	60	2,400	1.20	20	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	840	0.42	1,560	1,560	0.78
281	Lincoln Middle School	Class 120	2,000	1	2L 4' F32 T8 ELE N BALLAST	60	120	0.06	1	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	42	0.02	78	78	0.04
282	Lincoln Middle School	Class 120	2,000	1	COMPACT FLUORESCENT 23W HW (2)	46	92	0.05	1	RETROFIT HIGH HAT 15 W LED 6 INCH	15	30	0.02	62	62	0.03
283	Lincoln Middle School	Class 125	2,000	20	2L 4' F32 T8 ELE N BALLAST	60	2,400	1.20	20	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	840	0.42	1,560	1,560	0.78
284	Lincoln Middle School	Class 125	2,000	1	2L 4' F32 T8 ELE N BALLAST	60	120	0.06	1	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	42	0.02	78	78	0.04
285	Lincoln Middle School	Class 125	2,000	1	COMPACT FLUORESCENT 23W HW (2)	46	92	0.05	1	RETROFIT HIGH HAT 15 W LED 6 INCH	15	30	0.02	62	62	0.03
286	Lincoln Middle School	Class 118	2,000	8	2L 4' F32 T8 ELE N BALLAST	60	960	0.48	8	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	336	0.17	624	624	0.31
287	Lincoln Middle School	Class 123	2,000	18	2L 4' F32 T8 ELE N BALLAST	60	2,160	1.08	18	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	756	0.38	1,404	1,404	0.70
288	Lincoln Middle School	Class 116	2,000	20	2L 4' F32 T8 ELE N BALLAST	60	2,400	1.20	20	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	840	0.42	1,560	1,560	0.78
289	Lincoln Middle School	Class 116	2,000	2	COMPACT FLUORESCENT 23W HW (2)	46	184	0.09	2	RETROFIT HIGH HAT 15 W LED 6 INCH	15	60	0.03	124	124	0.06
290	Lincoln Middle School	Class 21	2,000	18	2L 4' F32 T8 ELE N BALLAST	60	2,160	1.08	18	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	756	0.38	1,404	1,404	0.70
291	Lincoln Middle School	Ladies Room	3,900	3	2L 4' F32 T8 ELE N BALLAST	60	702	0.18	3	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	246	0.06	456	456	0.12
292	Lincoln Middle School	Ladies Room	3,900	3	COMPACT FLUORESCENT 23W HW (2)	46	538	0.14	3	RETROFIT HIGH HAT 15 W LED 6 INCH	15	176	0.05	363	363	0.09
293	Lincoln Middle School	Electrical Room	3,900	6	2L 4' F32 T8 ELE N BALLAST	60	1,404	0.36	6	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	491	0.13	913	913	0.23
294	Lincoln Middle School	Class 119	2,000	18	2L 4' F32 T8 ELE N BALLAST	60	2,160	1.08	18	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	756	0.38	1,404	1,404	0.70
295	Lincoln Middle School	Office 114	3,000	2	3L 4' F32 T8 ELE N BALLAST	85	510	0.17	2	RETROFIT 4' 3L LED TUBE /SELF BALLAST	32	189	0.06	321	321	0.11
296	Lincoln Middle School	Girls Room	3,900	4	2L 4' F32 T8 ELE N BALLAST	60	936	0.24	4	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	328	0.08	608	608	0.16
297	Lincoln Middle School	Girls Room	3,900	3	COMPACT FLUORESCENT 23W HW (2)	46	538	0.14	3	RETROFIT HIGH HAT 15 W LED 6 INCH	15	176	0.05	363	363	0.09
298	Lincoln Middle School	Closet	800	1	2L 4' F32 T8 ELE N BALLAST	60	48	0.06	1	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	17	0.02	31	31	0.04
299	Lincoln Middle School	Boys Room	3,900	5	2L 4' F32 T8 ELE N BALLAST	60	1,170	0.30	5	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	410	0.11	761	761	0.20
300	Lincoln Middle School	Boys Room	3,900	6	COMPACT FLUORESCENT 23W HW (2)	46	1,076	0.28	6	RETROFIT HIGH HAT 15 W LED 6 INCH	15	351	0.09	725	725	0.19
301	Lincoln Middle School	Mechanical Room	3,900	2	2L 4' F32 T8 ELE N BALLAST	60	468	0.12	2	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	164	0.04	304	304	0.08
302	Lincoln Middle School	Office 112	3,000	4	3L 4' F32 T8 ELE N BALLAST	85	1,020	0.34	4	RETROFIT 4' 3L LED TUBE /SELF BALLAST	32	378	0.13	642	642	0.21
303	Lincoln Middle School	Class 110	2,000	18	2L 4' F32 T8 ELE N BALLAST	60	2,160	1.08	18	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	756	0.38	1,404	1,404	0.70
304	Lincoln Middle School	Class 110	2,000	4	LED SCREW IN	9			4	NO CHANGE						
305	Lincoln Middle School	Class 117	2,000	6	2L 4' F32 T8 ELE N BALLAST	60	720	0.36	6	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	252	0.13	468	468	0.23
306	Lincoln Middle School	Class 108	2,000	15	2L 4' F32 T8 ELE N BALLAST	60	1,800	0.90	15	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	630	0.32	1,170	1,170	0.59
307	Lincoln Middle School	Class 108	2,000	4	LED SCREW IN	9			4	NO CHANGE						
308	Lincoln Middle School	Principal	3,000	8	2L 4' F32 T8 ELE N BALLAST	60	1,440	0.48	8	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	504	0.17	936	936	0.31
309	Lincoln Middle School	Main Offices	3,000	13	3L 4' F32 T8 ELE N BALLAST	85	3,315	1.11	13	RETROFIT 4' 3L LED TUBE /SELF BALLAST	32	1,229	0.41	2,087	2,087	0.70
310	Lincoln Middle School	Main Offices	3,000	2	2L 4' F32 T8 ELE N BALLAST	60	360	0.12	2	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	126	0.04	234	234	0.08
311	Lincoln Middle School	Main Offices	3,000	1	COMPACT FLUORESCENT 23W HW (2)	46	138	0.05	1	RETROFIT HIGH HAT 15 W LED 6 INCH	15	45	0.02	93	93	0.03
312	Lincoln Middle School	Hall Closet	800	1	2L 4' F32 T8 ELE N BALLAST	60	48	0.06	1	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	17	0.02	31	31	0.04
313	Lincoln Middle School	Hall Office	3,000	3	3L 4' F32 T8 ELE N BALLAST	85	765	0.26	3	RETROFIT 4' 3L LED TUBE /SELF BALLAST	32	284	0.09	482	482	0.16
314	Lincoln Middle School	Storage/Bath	800	3	2L 4' F32 T8 ELE N BALLAST	60	144	0.18	3	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	50	0.06	94	94	0.12
315	Lincoln Middle School	Storage/Bath	800	8	COMPACT FLUORESCENT 23W HW (2)	46	294	0.37	8	RETROFIT HIGH HAT 15 W LED 6 INCH	15	96	0.12	198	198	0.25
316	Lincoln Middle School	Closets (2)	800	1	3L 4' F32 T8 ELE N BALLAST	85	68	0.09	1	RETROFIT 4' 3L LED TUBE /SELF BALLAST	32	25	0.03	43	43	0.05
317	Lincoln Middle School	Closets (2)	800	1	2L 4' F28T5 ELE N BALLAST	62	50	0.06	1	RETROFIT 4' 2L LED TUBE /SELF BALLAST T5HE	26	21	0.03	29	29	0.04
318	Lincoln Middle School	Music Entry	2,000	5	1L 4' F32 T8 ELE N BALLAST	28	280	0.14	5	RETROFIT 4' 1L LED TUBE /SELF BALLAST	11	105	0.05	175	175	0.09
319	Lincoln Middle School	Class 113	2,000	25	2L 4' F32 T8 ELE N BALLAST	60	3,000	1.50	25	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	1,050	0.53	1,950	1,950	0.98
320	Lincoln Middle School	Class 113	2,000	1	2L 8' T8 F96 ELE L BALLAST	95	190	0.10	1	RETROFIT 8' 2L LED TUBE / SELF BALLAST	21	42	0.02	148	148	0.07
321	Lincoln Middle School	Stage Hall	4,380	10	LED SCREW IN	9			10	NO CHANGE						
322	Lincoln Middle School	Stage Hall	4,380	2	1L 4' F32 T8 ELE N BALLAST	28	245	0.06	2	RETROFIT 4' 1L LED TUBE /SELF BALLAST	11	92	0.02	153	153	0.04
323	Lincoln Middle School	Stage Hall	4,380	2	2L 2' F17 ELE N BALLAST	34	298	0.07	2	RETROFIT 2' 2L LED TUBE /SELF BALLAST	14	123	0.03	175	175	0.04
324	Lincoln Middle School	Stage Area	2,000	8	500 WATT INCANDESCENT	500	8,000	4.00	8	CANTO R500 AUDITORIUM RETROFIT	49	784	0.39	7,216	7,216	3.61
325	Lincoln Middle School	Stage Area	2,000	12	2L 4' F32 T8 ELE N BALLAST	60	1,440	0.72	12	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	504	0.25	936	936	0.47
326	Lincoln Middle School	Stage Area	2,000	12	LED SCREW IN	9			12	NO CHANGE						
327	Lincoln Middle School	Kitchen Hall	4,380	6	1L 4' F32 T8 ELE N BALLAST	28	736	0.17	6	RETROFIT 4' 1L LED TUBE /SELF BALLAST	11	276	0.06	460	460	0.11
328	Lincoln Middle School	Caf/Kitchen Areas	3,900	52	2L 4' F32 T8 ELE N BALLAST	60	12,168	3.12	52	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	4,259	1.09	7,909	7,909	2.03
329	Lincoln Middle School	Caf/Kitchen Areas	3,900	1	4L 4' F32 T8 ELE N BALLAST	112	437	0.11	1	RETROFIT 4' 4L LED TUBE /SELF BALLAST	42	164	0.04	273	273	0.07
330	Lincoln Middle School	Storage Room	800	12	2L 4' F32 T8 ELE N BALLAST	60	576	0.72	12	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	202	0.25	374	374	0.47
331	Lincoln Middle School	Auditorium	2,000	5	4L 2' F17 ELE N BALLAST	60	600	0.30	5	RETROFIT 2' 4L LED TUBE /SELF BALLAST	28	280	0.14	320	320	0.16
332	Lincoln Middle School	Auditorium	2,000	36	2L 4' F32 T8 ELE N BALLAST	60	4,320	2.16	36	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	1,512	0.76	2,808	2,808	1.40
333	Lincoln Middle School	Auditorium	2,000	4	2L 2' F17 ELE N BALLAST	34	272	0.14	4	RETROFIT 2' 2L LED TUBE /SELF BALLAST	14	112	0.06	160	160	0.08
334	Lincoln Middle School	Auditorium	2,000	40	300 WATT INCANDESCENT	300	24,000	12.00	40	CANTO R300 AUDITORIUM RETROFIT	32	2,560	1.28	21,440	21,440	10.72
335	Lincoln Middle School	Pool	2,000	82	500 WATT INCANDESCENT	500	82,000	41.00	82	110W LED CORN LAMP	110	18,040	9.02	63,960	63,960	31.98
336	Lincoln Middle School	Pool Office	3,000	2	4L 4' F32 T8 ELE N BALLAST	112	672	0.22	2	RETROFIT 4' 4L LED TUBE /SELF BALLAST	42	252	0.08	420	420	0.14
337	Lincoln Middle School	Storage #2	800	2	2L 4' F32 T8 ELE N BALLAST	60	96	0.12	2	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	34	0.04	62	62	0.08
338	Lincoln Middle School	Storage #2	800	12	2L 4' F32 T8 ELE N BALLAST	60	576	0.72	12	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	202	0.25	374	374	0.47
339	Lincoln Middle School	Storage #4	800	12	2L 4' F32 T8 ELE N BALLAST	60	576	0.72	12	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	202	0.25	374	374	0.47
340	Lincoln Middle School	Boys Lockers	3,900	10	2L 4' F32 T8 ELE N BALLAST	60	2,340	0.60	10	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	819	0.21	1,521	1,521	0.39
341	Lincoln Middle School	Boys Lockers	3,900	4	COMPACT FLUORESCENT 13W S/I	13	203	0.05	4	RELAMP 9 WATT LED A LAMP S/I	9	140	0.04	62	62	0.02
342	Lincoln Middle School	Center Hallway	4,380	3	2L 4' F28T5 ELE N BALLAST	62	815	0.19	3	RETROFIT 4' 2L LED TUBE /SELF BALLAST T5HE	26	342	0.08	473	473	0.11
343	Lincoln Middle School	Center Hallway	4,380	1	2L 4' F28T5 ELE N BALLAST BAT BACKUP	62	272	0.06	1	RETROFIT 4' 2L LED TUBE /SELF BALLAST T5HE BAT BACKUP	26	114	0.03	158	158	0.04
344	Lincoln Middle School	Bathrooms (2)	3,900	2	2L 4' F32 T8 ELE N BALLAST	60	468	0.12	2	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	164	0.04	304	304	0.08
345	Lincoln Middle School	Bathrooms (2)	3,900	2	LED SCREW IN	9			2	NO CHANGE						
346	Lincoln Middle School	Girls Lockers	3,900	6	4L 4' F32 T8 ELE N BALLAST	112	2,621	0.67	6	RETROFIT 4' 4L LED TUBE /SELF BALLAST	42	983	0.25	1,638	1,638	0.42
347	Lincoln Middle School	Girls Lockers	3,900	2	2L 4' F32 T8 ELE N BALLAST	60	468	0.12	2	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	164	0.04	304	304	0.08
348	Lincoln Middle School	Girls Lockers	3,900	7	LED SCREW IN	9			7	NO CHANGE						
349	Lincoln Middle School	Exits	8,760	12	EXIT SGN (2) 20 WATT INCANDESCENT	40	4,205	0.48	12	NEW EXIT SIGN 2 WATT BAT BACK	2	210	0.02	3,995	3,995	0.46
350	Lincoln Middle School	Boiler Steps	3,900	3	LED SCREW IN	9			3	NO CHANGE						
351	Lincoln Middle School	Maintenance Area	3,900	15	2L 4' F32 T8 ELE N BALLAST	60	3,510	0.90	15	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	1,229	0.32	2,282	2,282	0.59
352	Lincoln Middle School	Maintenance Area	3,900	2	4L 4' F32 T8 ELE N BALLAST	112	874	0.22	2	RETROFIT 4' 4L LED TUBE /SELF BALLAST	42	328	0.08	546	546	0.14
353	Lincoln Middle School	Boiler Room	3,900	28	2L 4' F32 T8 ELE N BALLAST	60	6,552	1.68	28	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	2,293	0.59	4,259	4,259	1.09
354		**Exterior**														
355	Lincoln Middle School	Full Face Wallpacks	4,380	3	100 WATT HPS WALLPACK	120	1,577	0.36	3	NEW LED WALL PACK 35 W	35	460	0.11	1,117	1,117	
356	Lincoln Middle School	1x1 Canopy Boxes	4,380	4	COMPACT FLUORESCENT 32W HW (2)	64	1,121	0.26	4	NEW LED CANOPY 44 W	44	771	0.18	350	350	
357	Lincoln Middle School	Cutoff Wallpacks	3,000	10	70 WATT MH WALLPACK	92	2,760	0.92	10	NEW LED WALL PACK 35 W	35	1,050	0.35	1,710	1,710	0.57
368	**Total: Lincoln Middle School**			**2,251**			**504,327**	**198.07**	**2,251**			**164,201**	**61.68**	**340,126**	**340,126**	**136.05**

EXISTING LIGHTING CONTROL / PROPOSED LIGHTING CONTROLS

Line Ref	EXISTING CONTROL	Existing Hrs. per Year	Lighting Qty	LIGHTING DESCRIPTION	WATT / Fixture	Control QTY	Control Description	Control Hours Reduced	New Hrs. (controlled)	KWH Saved from controls
269		3,900	24	RETROFIT 4' 4L LED TUBE /SELF BALLAST	42					
270		4,380	4	RETROFIT 4' 2L LED TUBE /SELF BALLAST T5HE	26					
271		4,380	2	RETROFIT 4' 2L LED TUBE /SELF BALLAST T5HE BAT BACKUP	26					
272	Sensored	1,640	12	RETROFIT 4' 3L LED TUBE /SELF BALLAST	32					
273	Sensored	1,640	8	RETROFIT 4' 3L LED TUBE /SELF BALLAST	32					
274	Sensored	1,640	8	RETROFIT 4' 3L LED TUBE /SELF BALLAST	32					
275	Sensored	1,640	8	RETROFIT 4' 3L LED TUBE /SELF BALLAST	32					
276	Sensored	1,640	14	RETROFIT 4' 3L LED TUBE /SELF BALLAST	32					
277	Single Gang Switch	800	1	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21					
278	Sensored	1,640	14	RETROFIT 4' 3L LED TUBE /SELF BALLAST	32					
279	Sensored	1,640	14	RETROFIT 4' 3L LED TUBE /SELF BALLAST	32					
280		2,000	20	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	2	CORNER MOUNT SENSOR 1, SWITCH 1 WL	18%	1,640	151
281		2,000	1	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21					
282		2,000	1	RETROFIT HIGH HAT 15 W LED 6 INCH	15					
283		2,000	20	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	2	CORNER MOUNT SENSOR 1, SWITCH 2 WL	18%	1,640	151
284		2,000	1	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21					
285		2,000	1	RETROFIT HIGH HAT 15 W LED 6 INCH	15					
286	Two Gang Switch	2,000	8	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	1	CORNER MOUNT SENSOR 1, SWITCH 2 WL	18%	1,640	60
287	Two Gang Switch	2,000	18	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	1	CORNER MOUNT SENSOR 1, SWITCH 2 WL	18%	1,640	136
288		2,000	20	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	1	CORNER MOUNT SENSOR 1, SWITCH 2 WL	18%	1,640	151
289	Single Gang Switch	2,000	2	RETROFIT HIGH HAT 15 W LED 6 INCH	15					
290	Two Gang Switch	2,000	18	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	1	CORNER MOUNT SENSOR 1, SWITCH 2 WL	18%	1,640	136
291	Single Gang Switch	3,900	3	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	1	CEILING MOUNT SENSOR 1, SWITCH 1 WL	18%	3,198	44
292		3,900	3	RETROFIT HIGH HAT 15 W LED 6 INCH	15					
293		3,900	6	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21					
294	Two Gang Switch	2,000	18	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21					
295	Single Gang Switch	3,000	2	RETROFIT 4' 3L LED TUBE /SELF BALLAST	32	1	WALL SENSOR	18%	2,460	34
296		3,900	4	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	1	CEILING MOUNT SENSOR 1, SWITCH 1 WL	18%	3,198	59
297		3,900	3	RETROFIT HIGH HAT 15 W LED 6 INCH	15					
298	Single Gang Switch	800	1	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21					
299		3,900	5	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	1	CEILING MOUNT SENSOR 1, SWITCH 1 WL	18%	3,198	74
300		3,900	6	RETROFIT HIGH HAT 15 W LED 6 INCH	15					
301		3,900	2	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21					
302		3,000	4	RETROFIT 4' 3L LED TUBE /SELF BALLAST	32					
303	Three Gang Switch	2,000	18	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	1	CORNER MOUNT SENSOR 1, SWITCH 3 WL	18%	1,640	136
304	Three Gang Switch	2,000	4	LED SCREW IN	9	1	CORNER MOUNT SENSOR 1, SWITCH 3 WL	18%	1,640	13
305	Single Gang Switch	2,000	6	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	1	CORNER MOUNT SENSOR 1, SWITCH 1 WL	18%	1,640	45
306	Two Gang Switch	2,000	15	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	1	CORNER MOUNT SENSOR 1, SWITCH 2 WL	18%	1,640	113
307	Two Gang Switch	2,000	4	LED SCREW IN	9					
308	Two Gang Switch	3,000	8	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21					
309		3,000	13	RETROFIT 4' 3L LED TUBE /SELF BALLAST	32					
310	Single Gang Switch	3,000	2	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21					
311	Single Gang Switch	3,000	1	RETROFIT HIGH HAT 15 W LED 6 INCH	15					
312	Single Gang Switch	800	1	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21					
313	Single Gang Switch	3,000	3	RETROFIT 4' 3L LED TUBE /SELF BALLAST	32					
314		800	3	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21					
315	Single Gang Switch	800	8	RETROFIT HIGH HAT 15 W LED 6 INCH	15					
316	Single Gang Switch	800	1	RETROFIT 4' 3L LED TUBE /SELF BALLAST	32					
317		800	1	RETROFIT 4' 2L LED TUBE /SELF BALLAST T5HE	26					
318		2,000	5	RETROFIT 4' 1L LED TUBE /SELF BALLAST	11					
319	Three Gang Switch	2,000	25	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21	1	CORNER MOUNT SENSOR 1, SWITCH 3 WL	18%	1,640	189
320	Single Gang Switch	2,000	1	RETROFIT 8' 2L LED TUBE / SELF BALLAST	21					
321		4,380	10	LED SCREW IN	9					
322		4,380	2	RETROFIT 4' 1L LED TUBE /SELF BALLAST	11					
323		4,380	2	RETROFIT 2' 2L LED TUBE /SELF BALLAST	14					
324		2,000	8	CANTO R500 AUDITORIUM RETROFIT	49					
325		2,000	12	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21					
326		2,000	12	LED SCREW IN	9					
327		4,380	6	RETROFIT 4' 1L LED TUBE /SELF BALLAST	11					
328		3,900	52	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21					
329		3,900	1	RETROFIT 4' 4L LED TUBE /SELF BALLAST	42					
330		800	12	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21					
331		2,000	5	RETROFIT 2' 4L LED TUBE /SELF BALLAST	28					
332		2,000	36	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21					
333		2,000	4	RETROFIT 2' 2L LED TUBE /SELF BALLAST	14					
334		2,000	40	CANTO R300 AUDITORIUM RETROFIT	32					
335		2,000	82	110W LED CORN LAMP	110					
336	Single Gang Switch	3,000	2	RETROFIT 4' 4L LED TUBE /SELF BALLAST	42	1	WALL SENSOR	18%	2,460	45
337		800	2	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21					
338		800	12	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21					
339		800	12	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21					
340		3,900	10	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21					
341		3,900	4	RELAMP 9 WATT LED A LAMP S/I	9					
342		4,380	3	RETROFIT 4' 2L LED TUBE /SELF BALLAST T5HE	26					
343		4,380	1	RETROFIT 4' 2L LED TUBE /SELF BALLAST T5HE BAT BACKUP	26					
344		3,900	2	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21					
345		3,900	2	LED SCREW IN	9					
346		3,900	6	RETROFIT 4' 4L LED TUBE /SELF BALLAST	42					
347		3,900	2	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21					
348		3,900	7	LED SCREW IN	9					
349		8,760	12	NEW EXIT SIGN 2 WATT BAT BACK	2					
350		3,900	3	LED SCREW IN	9					
351		3,900	15	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21					
352		3,900	2	RETROFIT 4' 4L LED TUBE /SELF BALLAST	42					
353		3,900	28	RETROFIT 4' 2L LED TUBE /SELF BALLAST	21					
354										
355		4,380	3	NEW LED WALL PACK 35 W	35					
356		4,380	4	NEW LED CANOPY 44 W	44					
357		3,000	10	NEW LED WALL PACK 35 W	35					
368	**Total: Lincoln Middle School**		**2,251**			**55**			**105,780**	**6,037**

See appendix E for additional line-by-lines.

KEARNY SCHOOL DISTRICT

ENERGY SAVINGS PLAN

APPENDIX H – LOCAL GOVERNMENT ENERGY AUDITS