Local Government Energy Audit Report

Samsel Upper Elementary School

February 8, 2019

Prepared for:

Sayreville Public Schools
298 Ernston Rd
Parlin, NJ 08859

Prepared by:

TRC Energy Services
900 Route 9 North
Woodbridge, NJ 07095

Disclaimer

The goal of this audit report is to identify potential energy efficiency opportunities, help prioritize specific measures for implementation, and provide information about financial incentives that may be available. Most energy conservation measures have received preliminary analysis of feasibility that identifies expected ranges of savings and costs. This level of analysis is usually considered sufficient to establish a basis for further discussion and to help prioritize energy measures.

TRC Energy Services (TRC) reviewed the energy conservation measures and estimates of energy savings were reviewed for technical accuracy. Actual, achieved energy savings depend on behavioral factors and other uncontrollable variables and, therefore, estimates of final energy savings are not guaranteed. TRC and the New Jersey Board of Public Utilities (NJBPU) shall in no event be liable should the actual energy savings vary.

TRC bases estimated installation costs on our experience at similar facilities, pricing from local contractors and vendors, and/or cost estimates from RS Means. We encourage the owner of the facility is encouraged to independently confirm these cost estimates and to obtain multiple estimates when considering measure installations. Actual installation costs can vary widely based on individual measures and conditions. TRC and NJBPU do not guarantee installed cost estimates and shall in no event be held liable should actual installed costs vary from estimates.

The New Jersey Clean Energy Program (NJCEP) incentive values provided in this report are estimates based on program information available at the time of the report. Incentive levels are not guaranteed. The NJBPU reserves the right to extend, modify, or terminate programs without prior notice. Please review all available program incentives and eligibility requirements prior to selecting and installing any energy conservation measures.

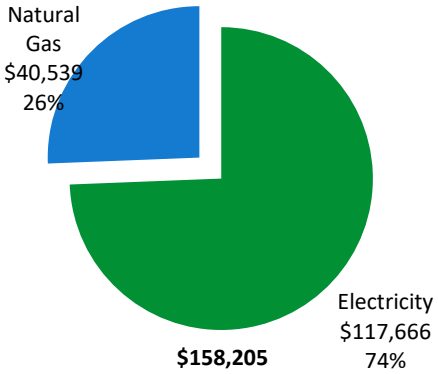
The customer and their respective contractor(s) are responsible to implement energy conservation measures in complete conformance with all applicable local, state and federal requirements.

Table of Contents

1 EXECUTIVE SUMMARY

The New Jersey Board of Public Utilities (NJBPU) has sponsored this Local Government Energy Audit (LGEA) report for Samsuel Upper Elementary School. This report provides you with information about your facility's energy use, identifies energy conservation measures (ECMs) that can reduce your energy use, and provides information and assistance to help make changes in your facility. TRC Energy Services (TRC) conducted this study as part of a comprehensive effort to assist New Jersey school districts and local governments in controlling their energy costs and help protect our environment by reducing statewide energy consumption.

BUILDING PERFORMANCE REPORT

Annual Utilities	Costs: $158,205 Electricity: 944,785 kWh Natural Gas: 46,943 Therms	
ENERGY STAR® Benchmarking Score	71 *(1-100 scale)*	Congratulations, your building performs better than the national average. This report has suggestions about how to keep your building running efficiently, further improve performance and lower your energy bills even more.

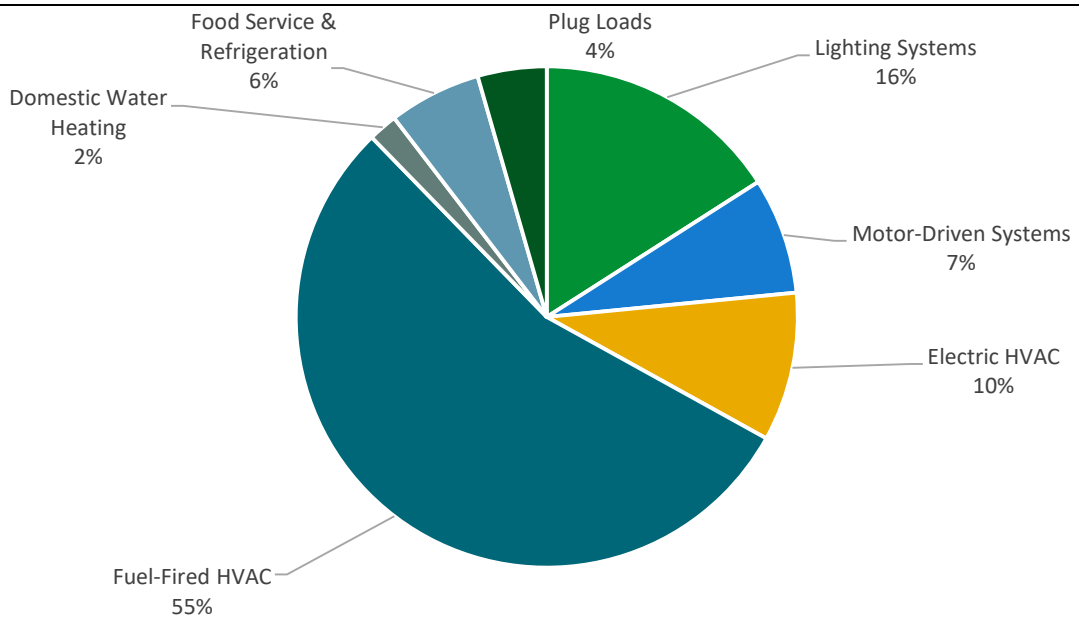


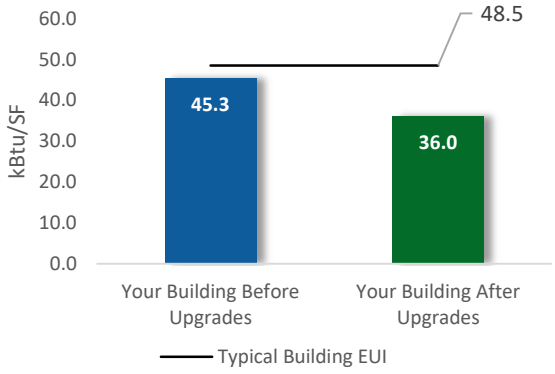
Figure 1 - Energy Use by System

POTENTIAL IMPROVEMENTS

This energy audit considered a range of potential energy improvements in your building. Costs and savings will vary between improvements. Presented below are two potential scopes of work for your consideration.

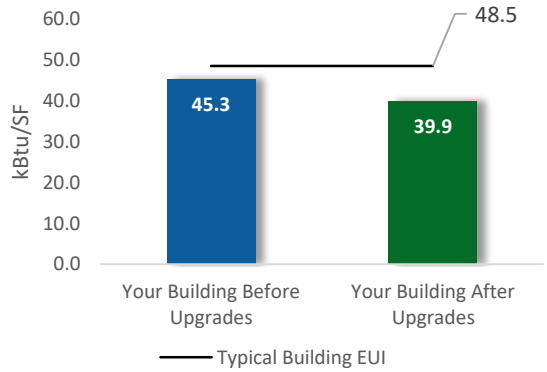
Scenario 1: Full Package (all evaluated measures)

Installation Cost	$855,986
Potential Rebates & Incentives[1]	$71,174
Annual Cost Savings	$53,549
Annual Energy Savings	Electricity: 415,917 kWh Natural Gas: 2,026 Therms
Greenhouse Gas Emission Savings	221 Tons
Simple Payback	14.7 Years
Site Energy Savings (all utilities)	20%



Scenario 2: Cost Effective Package[2]

Installation Cost	$240,933
Potential Rebates & Incentives	$35,053
Annual Cost Savings	$35,420
Annual Energy Savings	Electricity: 287,646 kWh
Greenhouse Gas Emission Savings	142 Tons
Simple Payback	5.8 Years
Site Energy Savings (all utilities)	12%



On-site Generation Potential

Photovoltaic	High
Combined Heat and Power	None

[1] Incentives are based on current SmartStart Prescriptive incentives. Other program incentives may apply.

[2] A cost-effective measure is defined as one where the simple payback does not exceed two-thirds of the expected proposed equipment useful life. Simple payback is based on the net measure cost after potential incentives.

#	Energy Conservation Measure	*Recommend?*	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Lifetime Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)*	Estimated Net Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Lighting Upgrades			**211,013**	**56.8**	**-36**	**$25,973**	**$389,590**	**$166,451**	**$29,103**	**$137,348**	**5.3**	**208,321**
ECM 1	Install LED Fixtures	Yes	40,779	0.0	0	$5,079	$76,181	$36,582	$3,635	$32,947	6.5	41,064
ECM 2	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	Yes	62,298	19.6	-13	$7,646	$114,693	$48,072	$6,990	$41,082	5.4	61,208
ECM 3	Retrofit Fixtures with LED Lamps	Yes	107,936	37.2	-23	$13,248	$198,716	$81,797	$18,478	$63,319	4.8	106,048
Lighting Control Measures			**53,382**	**17.3**	**-11**	**$6,552**	**$52,416**	**$55,520**	**$5,900**	**$49,620**	**7.6**	**52,449**
ECM 4	Install Occupancy Sensor Lighting Controls	Yes	47,777	15.5	-10	$5,864	$46,912	$48,720	$5,900	$42,820	7.3	46,941
ECM 5	Install High/Low Lighting Controls	Yes	5,605	1.8	-1	$688	$5,504	$6,800	$0	$6,800	9.9	5,507
Motor Upgrades			**6,935**	**2.3**	**0**	**$864**	**$12,956**	**$20,293**	**$0**	**$20,293**	**23.5**	**6,984**
	Premium Efficiency Motors	No	6,935	2.3	0	$864	$12,956	$20,293	$0	$20,293	23.5	6,984
Variable Frequency Drive (VFD) Measures			**47,605**	**25.3**	**0**	**$5,929**	**$88,932**	**$50,934**	**$6,713**	**$44,221**	**7.5**	**47,938**
	Install VFD on Variable Air Volume (VAV) Fans	No	4,811	3.3	0	$599	$8,987	$10,159	$2,713	$7,446	12.4	4,844
	Install VFDs on Constant Volume (CV) Fans	No	21,155	14.3	0	$2,635	$39,521	$22,043	$4,000	$18,043	6.8	21,303
ECM 6	Install VFDs on Heating Water Pumps	Yes	21,639	7.7	0	$2,695	$40,424	$18,732	$0	$18,732	7.0	21,790
Electric Unitary HVAC Measures			**95,369**	**26.1**	**0**	**$11,878**	**$178,163**	**$501,827**	**$25,961**	**$475,866**	**40.1**	**96,036**
	Install High Efficiency Air Conditioning Units	No	19,150	17.3	0	$2,385	$35,774	$362,692	$18,896	$343,796	144.2	19,283
	Install High Efficiency Heat Pumps	No	76,220	8.8	0	$9,493	$142,389	$139,134	$7,065	$132,070	13.9	76,753
Domestic Water Heating Upgrade			**0**	**0.0**	**43**	**$375**	**$5,631**	**$19,994**	**$698**	**$19,296**	**51.4**	**5,090**
	Install High Efficiency Gas-Fired Water Heater	No	0	0.0	43	$375	$5,631	$19,994	$698	$19,296	51.4	5,090
Food Service & Refrigeration Measures			**1,612**	**0.2**	**0**	**$201**	**$1,004**	**$230**	**$0**	**$230**	**1.1**	**1,623**
ECM 7	Vending Machine Control	Yes	1,612	0.2	0	$201	$1,004	$230	$50	$180	0.9	1,623
TOTALS			**415,917**	**127.9**	**203**	**$53,549**	**$764,249**	**$855,986**	**$71,174**	**$784,812**	**14.7**	**442,545**

* - All incentives presented in this table are based on NJ SmartStart equipment incentives and assume proposed equipment meets minimum performance criteria for that program.

** - Simple Payback Period is based on net measure costs (i.e. after incentives).

Figure 2 – Evaluated Energy Improvements

1.1 Planning Your Project

Careful planning makes for a successful energy project. When considering this scope of work, you will have some decisions to make, such as:

- How will the project be funded and/or financed?
- Is it best to pursue individual ECMs, groups of ECMs, or use a comprehensive approach where all ECMs are installed together?
- Are there other facility improvements that should happen at the same time?

Pick Your Installation Approach

New Jersey Clean Energy Programs gives you the flexibility to do a little or a lot. Rebates, incentives, and financing are available to help reduce both your installation costs and your energy bills. If you are planning to take advantage of these programs, make sure to review incentive program guidelines before proceeding. This is important because in most cases you will need to submit applications for the incentives before purchasing materials or starting installation.

The potential ECMs identified for this building likely qualify for multiple incentive and funding programs. Based on current program rules and requirements, your measures are likely to qualify for the following programs:

Energy Conservation Measure		SmartStart	Direct Install	Pay For Performance
ECM 1	Install LED Fixtures	x		x
ECM 2	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	x		x
ECM 3	Retrofit Fixtures with LED Lamps	x		x
ECM 4	Install Occupancy Sensor Lighting Controls	x		x
ECM 5	Install High/Low Lighting Controls			x
ECM 6	Install VFDs on Hot Water Pumps			x
ECM 7	Vending Machine Control	x		x

Figure 3 – Funding Options

New Jersey Clean Energy Programs At-A-Glance

	SmartStart Flexibility to install at your own pace	**Direct Install** Turnkey installation	**Pay for Performance** Whole building upgrades
Who should use it?	Buildings installing individual measures or small group of measures.	Small to mid-size facilities that can bundle multiple measures together. Peak demand should be below 200 kW. Not suitable for significant building shell issues.	Mid to large size facilities looking to implement as many measures as possible at one time. Peak demand should be over 200 kW.
How does it work?	Use in-house staff or your preferred contractor.	Pre-approved contractors pass savings along to you via reduced material and labor costs.	Whole-building approach to energy upgrades designed to reduce energy use by at least 15%. The more you save, the higher the incentives.
What are the Incentives?	Fixed incentives for specific energy efficiency measures.	Incentives pay up to 70% of eligible costs, up to $125,000 per project. You pay the remaining 30% directly to the contractor.	Up to 25% of installation cost, calculated based on level of energy savings per square foot.
How do I participate?	Submit an application for the specific equipment to be installed.	Contact a participating contractor in your region.	Contact a pre-qualified partner to develop your energy reduction plan and set your energy savings targets.

Take the next step by visiting **www.njcleanenergy.com** for program details, applications, and to contact a qualified contractor.

Individual Measures with SmartStart

For facilities wishing to pursue only selected individual measures (or planning to phase implementation of selected measures over multiple years), incentives are available through the SmartStart program. To participate, you can use internal resources or an outside firm or contractor to perform the final design of the ECM(s) and install the equipment. Program pre-approval is required for some SmartStart incentives, so only after receiving pre-approval should you proceed with ECM installation.

Turnkey Installation with Direct Install

The Direct Install program provides turnkey installation of multiple measures through an authorized network of participating contractors. This program can provide substantially higher incentives than SmartStart, up to 70% of the cost of selected measures. Direct Install contractors will assess and verify individual measure eligibility and, in most cases, they perform the installation work. The Direct Install program is available to sites with an average peak demand of less than 200 kW.

Whole Building Approach with Pay for Performance

Pay for Performance can be a good option for medium to large sized facilities to achieve deep energy savings. Pay for Performance allows you to install as many measures as possible under a single project as well as address measures that may not qualify for other programs. Many facilities pursuing an Energy Savings Improvement Program loan also use this program. Pay for Performance works for larger customers with a peak demand over 200 kW. The minimum installed scope of work must include at least two unique measures resulting in at least 15% energy savings, where lighting cannot make up the majority of the savings.

More Options from Around the State

Financing and Planning Support with the Energy Savings Improvement Program (ESIP)

For larger facilities with limited capital availability to implement ECMs, project financing may be available through the ESIP. Supported directly by the NJBPU, ESIP provides government agencies with project development, design, and implementation support services, as well as, attractive financing for implementing ECMs. You have already taken the first step as an LGEA customer, because this report is required to participate in ESIP.

Resiliency with Return on Investment through Combined Heat & Power (CHP)

The CHP program provides incentives for combined heat and power (aka cogeneration) and waste heat to power projects. Combined heat and power systems generate power on-site and recover heat from the generation system to meet on-site thermal loads. Waste heat to power systems use waste heat to generate power. You will work with a qualified developer who will design a system that meets your building's heating and cooling needs.

Ongoing Electric Savings with Demand Response

The Demand Response Energy Aggregator program reduces electric loads at commercial facilities when wholesale electricity prices are high or when the reliability of the electric grid is threatened due to peak power demand. By enabling commercial facilities to reduce their electric demand during times of peak demand, the grid is made more reliable and overall transmission costs are reduced for all ratepayers. Curtailment service providers provide regular payments to medium and large consumers of electric power for their participation in demand response (DR) programs. Program participation is voluntary, and facilities receive payments regardless of whether they are called upon to curtail their load during times of peak demand.

2 EXISTING CONDITIONS

The New Jersey Board of Public Utilities (NJBPU) has sponsored this Local Government Energy Audit (LGEA) Report for Samsuel Upper Elementary School. This report provides information on how your facility uses energy, identifies energy conservation measures (ECMs) that can reduce your energy use, and provides information and assistance to help you implement the ECMs. This report also contains valuable information on financial incentives from New Jersey's Clean Energy Program (NJCEP) for implementing ECMs.

TRC conducted this study as part of a comprehensive effort to assist New Jersey educational and local government facilities in controlling energy costs and protecting our environment by offering a wide range of energy management options and advice.

2.1 Site Overview

On August 29, 2018, TRC performed an energy audit at Samsuel Upper Elementary School located in Parlin, NJ. TRC met with Kenny and Barry to review the facility operations and help focus our investigation on specific energy-using systems.

Samsuel Upper Elementary School is a three-story, 174,800 square foot building built in 1952 and renovated in 2004. Spaces include: classrooms, gymnasium, offices, cafeteria, corridors, stairwells, kitchen and basement mechanical space. The building is 100% heated and about 40% cooled. Cooling is mostly provided by roof top units (RTUs) which serve the gymnasium, cafeteria, library and office suites. These main areas of the building are occupied until 5:00 PM on weekdays and sometimes longer for events. There are also split air-conditioning (AC) systems and portable AC units. The building HVAC Systems and equipment are controlled by a Johnson Controls Building Energy Management System (EMS). Space temperatures are generally maintained between 68°F and 72°F. The parking lot lighting is on the main meter and said to be 250-Watt HID lamp, pole mounted fixtures.

Facility concerns include: The main operational and maintenance concerns are inefficient lighting; the lack of replacement parts for the original unit ventilators (UV); and a hot water heater reported to be in poor condition.

2.2 Building Occupancy

The facility is occupied year-round, with the main school year from September through June and summer school in July and August. Typical peak building occupancy includes about 1700 students and 150 staff members. The building is open weekdays between 7:00 AM and 7:00 PM with only rare use for events on the weekends. Summer occupancy includes classroom education as well as continuing maintenance and custodial activities.

Building Name	Weekday/Weekend	Operating Schedule
Normal School Day	Weekday	7:00AM - 3:00PM
	Weekend	Rare Use
After Hours Cleaning	Weekday	3:00AM - 11:00PM
	Weekend	No Use
Summer School (Monday through Thursday)	Weekday	7:00 AM - 3:30PM
	Weekend	Rare Use

Figure 4 - Building Occupancy Schedule

2.3 Building Envelope

Building walls are concrete block with a stone or brick facade. The roof is flat and appears to be in fair condition. Most of the windows are double pane and operable with metal frames. Some windows have wooden frames. These window frame seals are in poor condition which contribute to air infiltration. Exterior doors are metal or glass with metal frames and are in fair condition. A significant amount of exterior doors have worn or missing weather-stripping. Degraded window and door seals increase drafts and outside air infiltration.

Building Facade

Building Facade

Wooden Window Frame with no Seal

Exterior Door with worn Weather-Stripping

2.4 Lighting Systems

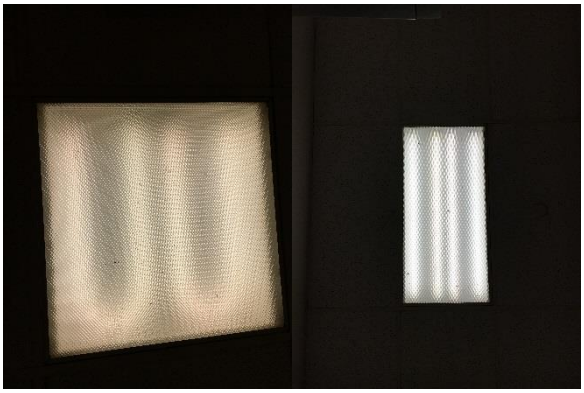
The primary interior lighting system uses 32-Watt linear fluorescent T8 lamps. These are mostly recessed troffer fixtures with prismatic lenses; there are also surface mounted box fixtures and continuous row pendant mounted fixtures. Fixture types include 2- 3- or 4-lamp, 2- or 4-foot long fixtures as well as 2-foot fixtures with U-bend linear T8 tube lamps. The majority of light fixtures are in fair to good condition. The gymnasium and auxiliary gymnasium are recessed 2x2 troffer fixtures with compact fluorescent high output biax lamps and are manually controlled. There are also compact fluorescent plug-in, recessed can fixtures and compact fluorescent biax lamp up-light fixtures. Interior light fixtures are manually controlled by wall switches. All exit signs are LED.

Interior lighting levels were range from generally sufficient to over lit. The majority of classrooms are lit by 3-lamp fixtures and have inboard/outboard bi-level switching. During the energy audit, most classrooms were using 2 of 3 total lamps per fixture. The following light levels were taken:

- 1 Lamp – 19 footcandles (FC)
- 2 Lamp – 40 FC
- 3 Lamp – 50 FC

The minimum light levels required for classroom space by IES standards is 30 FC. However, additional considerations must be investigated during design to determine the cost effectiveness of reducing the number of lamps. With bi-level switching, it is uncertain as to how often these fixtures operate at each level of switching (number of lamps). Reducing the light output would require a level of design, beyond the scope of this energy audit, to determine the feasibility. Options may include upgrading to 1-LED lamp fixtures, 2x4 LED retrofit kits, changing the number of fixtures, etc. The options range too much to provide an analysis and cost would vary drastically on the proposed approach. We recommend that this be investigated further by an electrical contractor if lighting upgrades move forward to implementation.

Typical 32-Watt T8 Lamp



Recessed Troffer Fixtures

Compact Fluorescent High Output Biax Lamp Recessed Troffer Fixture in Gymnasium

Gymnasium Lighting

Hallway Lighting

Cafeteria Lighting

Stage Lighting

Classroom Lighting

Multipurpose Room Lighting

Surface Mounted Box Fixtures

Library Lighting

Continuous Row Up Light Fixtures

Manual Wall Switch

Key Switch

Building mounted exterior fixtures include wall packs and flood fixtures. There are also shoe box pole mounted fixtures in the parking lot areas. These contain metal halide lamps. There are also compact fluorescent lamp wall pack fixtures with yellowed lenses and recessed can fixtures. Exterior light fixtures are controlled by timeclocks which are set to operate 11 hours a day, year-round.

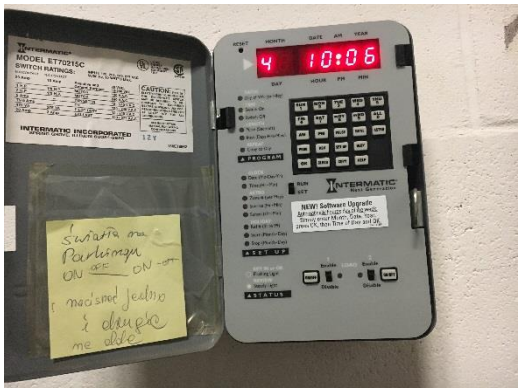
CFL Wall Pack Fixtures

HID Shoe Box Pole Mounted Fixtures

HID Wall Pack Fixture

CFL Recessed Can Fixture

HID Wall Mounted Flood Fixture



Timeclock

2.5 Air Handling Systems

Unit Ventilators

Unit ventilators have fractional horsepower supply fan motors, electronically controlled outside air dampers and zone valves. General building exhaust is provided by power ventilators and exhaust systems which have fractional horsepower fan motors. They are controlled by the building EMS.

Unit Ventilator

Temperature Sensor

Power Ventilator

General Building Exhaust

Air Handling Units (AHUs)

The kitchen, guidance office suite, library, and hallway areas are served by air handling units. There are a few Trane AHUs located in storage and mechanical rooms that are equipped with hot water coils and a supply air fan. These provide heating only. There are a number of packaged air conditioning (AC) units located on the roof that provide cooling only. There is one unit serving the kitchen which is a gas-fired roof top unit (RTU) that provides both heating and cooling. There are three units that serve some classrooms which are high efficiency and provide electric heating. All of these systems are controlled by the EMS. The majority of these were installed in 2003.

AHU with HW Coil

AHU with HW Coil

Packaged AC units with direct expansion (DX) coils provide cooling during the summer months. Some are equipped with economizers; however we were unable to verify the current operational condition of the economizers. For the purposes of this report, the energy efficiency of these units has been de-rated due to the age of the equipment. The packaged roof top units are summarized in the table below:

Unit (Make & Model)	Tag	Size (Tons)	Efficiency (EER)	Heating Capacity
TRANE GRCA20PFKF0L6CN302A0CELNQT56	No Tag	10	9.00	158 MBH
TRANE THC092A4E0A0TD1011B0600	RTU-12 & 13	7.5	10.71	-
TRANE No Tag	RTU-8	7.5	9.00	-
TRANE THC072A4E0A0MD101A10600	RTU-11	6	10.71	-
TRANE THC120A4E0A0Z0	RTU-2	10	10.54	-
TRANE Unreadable	RTU-5	7.5	9.00	-
TRANE TCD181C40CCA	RTU-10	15	9.78	3.6 kW
TRANE TCD181C40CCA	No Tag	15	9.78	3.6 kW
TRANE TCD181C40CCA	No Tag	17.5	9.35	3.6 kW

Packaged RTU

Packaged RTU

Packaged RTU

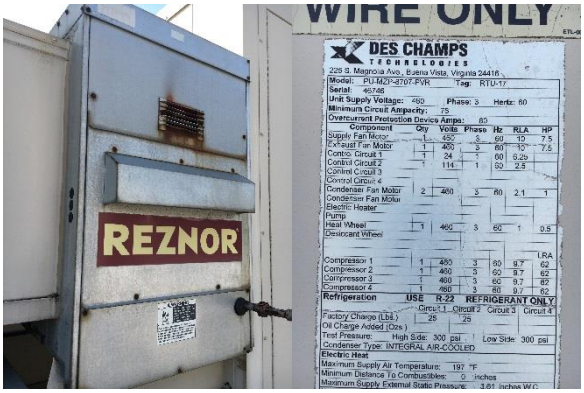
Packaged RTU

Energy Recovery Units (ERUs)

The cafeteria and gymnasium are served by packaged air-to-air energy recovery units. They are custom systems, 15 years old which operate with R22 and Air Cooled Integral Condenser and Reznor Gas Burner for heating. These systems operate up to 25000 SCFM. These systems are controlled by the EMS. They operate to maintain an indoor occupied space temperature of 68°F during the heating season and 70°F during the cooling season. For the purposes of this report, the energy efficiency of these units has been de-rated due to the age of the equipment. The ERUs are summarized in the table below:

Unit (Make & Model)		Tag	Cooling Capacity (Tons per unit)	Efficiency (EER)	Estimated Heating Capacity (MBH per unit)	Supply Fan Motor HP	Exhaust Fan Motor HP	Efficiency (AFUE)
DES CHAMPS	PS-MZP-8704-8-PVR	RTU-1&3	26	9.35	320	10	7.5	70%
DES CHAMPS	PS-MZP-8707-PVR	RTU-16&17	26	9.35	250	7.5	7.5	70%
DES CHAMPS	PS-MZP-8707-PVR	RTU-14&15	26	9.35	250	7.5	7.5	70%

Custom Packaged Air-to-Air Energy Recovery Systems



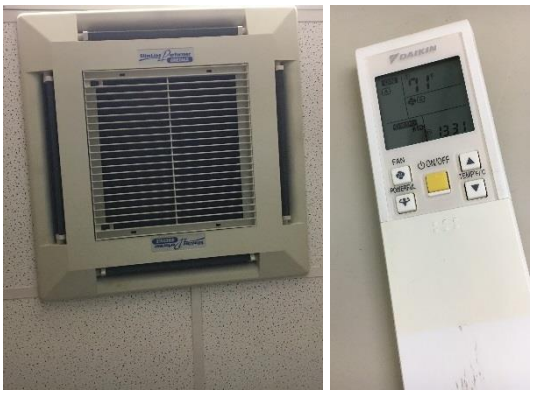
Nameplate for ERU with Air Cooled Integral Condenser and Gas Heater

Split Heat Pump Systems

There are a number of split heat pump systems which serve classrooms on the third floor. These vary in condition and are controlled by remote controllers.

Unit (Make & Model)		Quantity	Cooling Capacity (Tons)	Heating Capacity (MBH)
Daikin	RMXS48LVJU	2	4	28
Goodman	CK24-1B	14	2	14

Split HP System – Outdoor Condensing Unit



Split HP System – Indoor Unit & Remote Control

Split Air Conditioning (AC) Systems

There are a range of split AC systems with outdoor condensing units that are on average two tons. They vary in efficiency, from poor to good condition. Majority are of standard efficiency and within their useful life. These are either controlled manually or are remote controlled.

Unit (Make & Model)	Quantity	Cooling Capacity (Tons)
Airdale Unreadable	1	1.00
TRANE 2TTA2030A3000AA	1	2.50
Airdale SCC12D	2	1.00
Airdale SCC09D	2	0.75
Mitsubishi Mr. Slim	1	2.00
Goodman CK18-1B	4	1.50
Daikin RKS30LVJU	1	2.50
Mitsubishi PU18EF	1	1.50
Mitsubishi PU18EF	1	1.50
TRANE 2TTA2036A3000AA	1	3.00
SANYO C2472	1	2.00
SANYO C1872	1	1.50

Split stems – Outdoor Condensing Units

Split AC Systems – Indoor Units

Split AC Systems – Outdoor Condensing Units

Split AC Systems – Indoor Units

Air Conditioners

There are about 24 classrooms and offices throughout the building that are cooled by window AC units, some of these portable units are stored away in the winter months. These units on average are one ton, standard to low efficiency and in fair condition. These are manually turned on and off, as needed, in the summer months.

Portable AC Unit

Portable AC Units in Storage

2.6 Heating Hot Water System

There are a total of six Patterson Kelly (Model: SNM-2000) 1700 MBH condensing hot water boilers that serve the building heating load. These boilers are 14 years old, in fair condition and high efficiency. The burners are fully modulating with a nominal efficiency of 83%. The boilers are configured in an automated control scheme. The hydronic distribution system is a 2- pipe, heating only system.

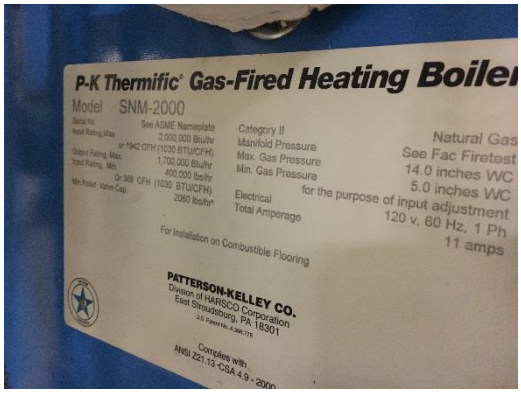
The boilers are configured in a constant flow primary distribution with two 40 HP, constant speed hot water pumps operating with a lead-lag control scheme. The boilers provide hot water to fin tube radiators, unit ventilators and AHUs throughout the building.

Hot water is supplied at 180°F when the outside air temperature is low, and the setpoint is adjusted linearly to 130°F when the outside air is above 55°F. The system is locked out at an outside temperature of 65°F.

Condensing Hot Water Boilers

Heat Timer Controls

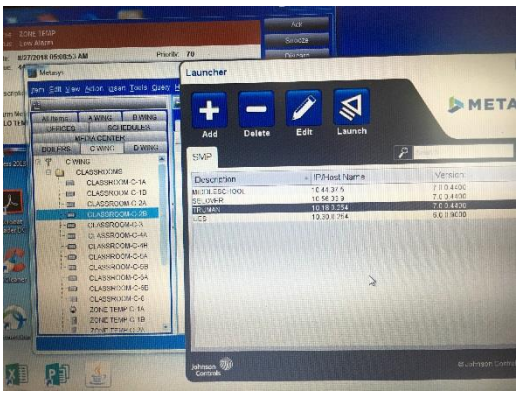
Hot Water Pumps and Motor Nameplate



Boiler Nameplate

2.7 Building Energy Management Systems (EMS)

A Johnson Controls, Metasys building automation system provides control for HVAC equipment. This includes roof top equipment, the hydronic heating system boilers and ventilation equipment. The EMS provides equipment scheduling control and monitors space temperatures, supply air temperatures, humidity and heating water loop temperatures.



Laptop BMS Interface

Temperature Sensor

2.8 Domestic Hot Water

Hot water is produced with a 250-gallon, 399 MBH gas-fired storage tank water heater with a low efficiency. The domestic water heater is a PVI (Model: 500P250A-TP) unit that is beyond its effective useful life and in poor condition. The domestic hot water pipes are insulated and the insulation is in fair condition.

Storage Tank Water Heater

Circulation Pump and Motor

2.9 Food Service Equipment

The kitchen has mixed gas and electric equipment that is used to prepare lunches for students. Most cooking is done using a conventional gas-fired ovens and steamer. Bulk prepared foods are held in several electric holding cabinets. Equipment is high efficiency and is in good condition. The dishwasher is a traditional door type high temperature unit.

Visit https://www.energystar.gov/products/commercial_food_service_equipment for the latest information on high efficiency food service equipment.

Food Service Equipment

Heating/Cooling Insulated Food Storage

Heating/Cooling Food Buffet Tables

Stationary Tank Dishwasher

2.10 Refrigeration

The kitchen has several stand-up refrigerators with solid doors which are high efficiency. There are also a number of refrigeration chests which are standard efficiency. All equipment is in fair to good condition.

There is also a walk-in cooler and walk-in medium temperature freezer. These are cooled by an estimated total compressor capacity of four tons and a total of six electrically commutated evaporator fans. This equipment is in good condition with evaporator fan controls.

Visit https://www.energystar.gov/products/commercial_food_service_equipment for the latest information on high efficiency food service equipment.

Refrigeration Chest

Standup Refrigerators

Walk-in Refrigeration Equipment

Walk-in Refrigeration Evaporator

2.11 Plug Load & Vending Machines

The utility bill analysis indicates that plug loads consume approximately 4.44% percent of total building energy use. This is higher than a typical building. You may wish to consider paying particular attention to minimizing your plug load usage. This report makes suggestions for ECMs in this area as well as Energy Efficient Best Practices.

There are approximately 234 computer work stations throughout the facility and about 20 laptop cart charging racks. Plug loads throughout the building include general café and office equipment. There are classroom typical loads such as smart boards, projectors, and fans. There are several residential style refrigerators throughout the building which vary in condition and efficiency.

There is a refrigerated beverage vending machines which is not equipped with occupancy-based controls.

General Café Equipment and Vending Machine

Residential Refrigerator almost Empty

General Office Equipment

Desktop Computers

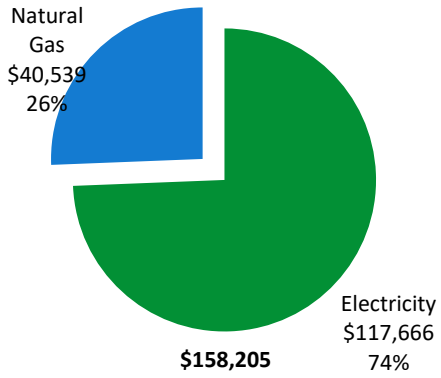
2.12 Water-Using Systems

There are restrooms throughout the building with toilets, urinals, and sinks. Faucets are already equipped with low flow aerators which are rated for 0.5 gallons per minute (gpm).

3 Energy Use and Costs

Twelve months of utility billing data are used to develop annual energy consumption and cost data. This information creates a profile of the annual energy consumption and energy costs.

Utility Summary		
Fuel	**Usage**	**Cost**
Electricity	944,785 kWh	$117,666
Natural Gas	46,943 Therms	$40,539
Total		**$158,205**



An energy balance identifies and quantifies energy use in your various building systems. This can highlight areas with the most potential for improvement. This energy balance was developed using calculated energy use for each of the end uses noted in the figure.

The energy auditor collects information regarding equipment operating hours, capacity, efficiency and other operational parameters from facility staff, drawings, and on-site observations. This information is used as the inputs to calculate the existing conditions energy use for the site. The calculated energy use is then compared to the historical energy use and the initial inputs are revised, as necessary, to balance the calculated energy use to the historical energy use.

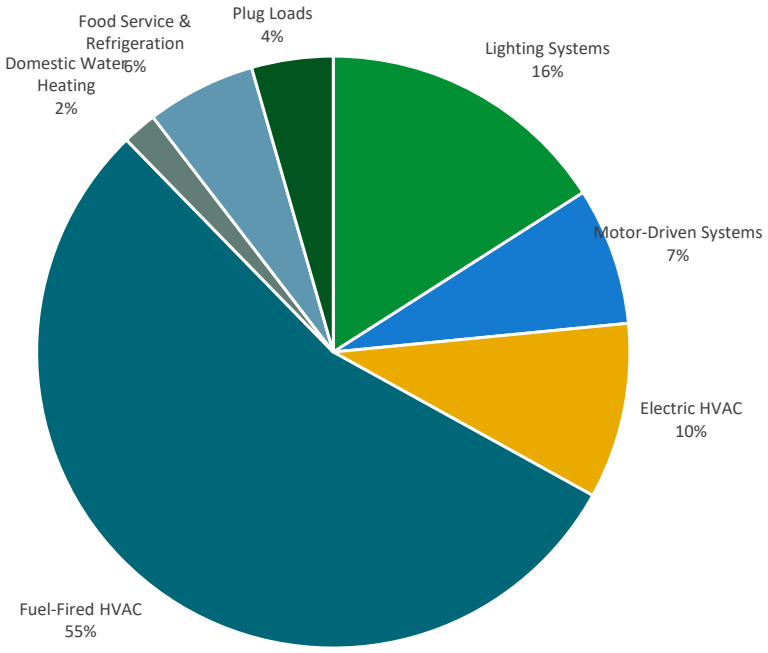
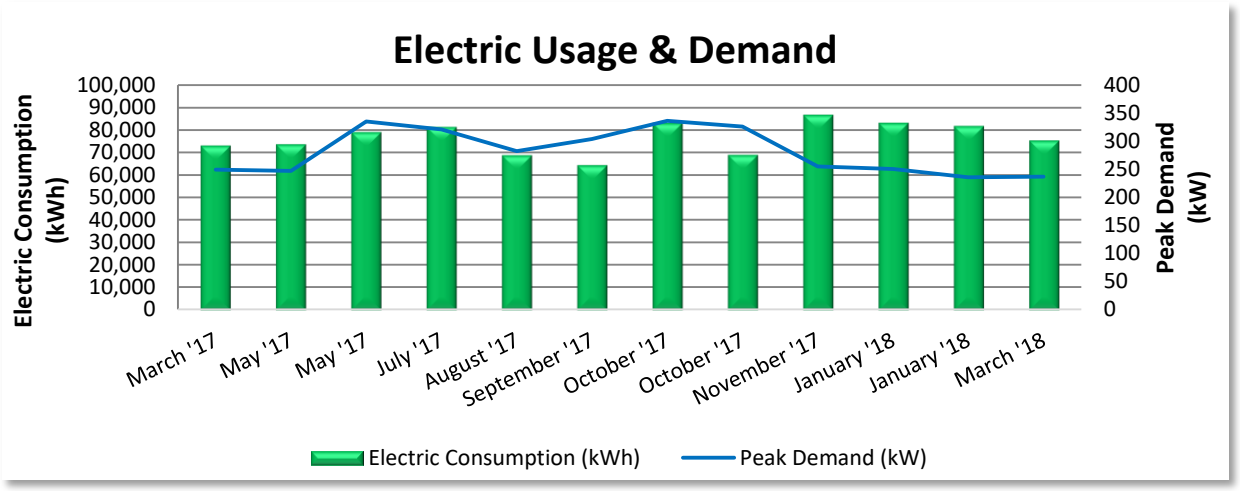


Figure 5 - Energy Balance

3.1 Electricity

JCP&L supplied and delivers electricity under rate class General Service Secondary 3 Phase.



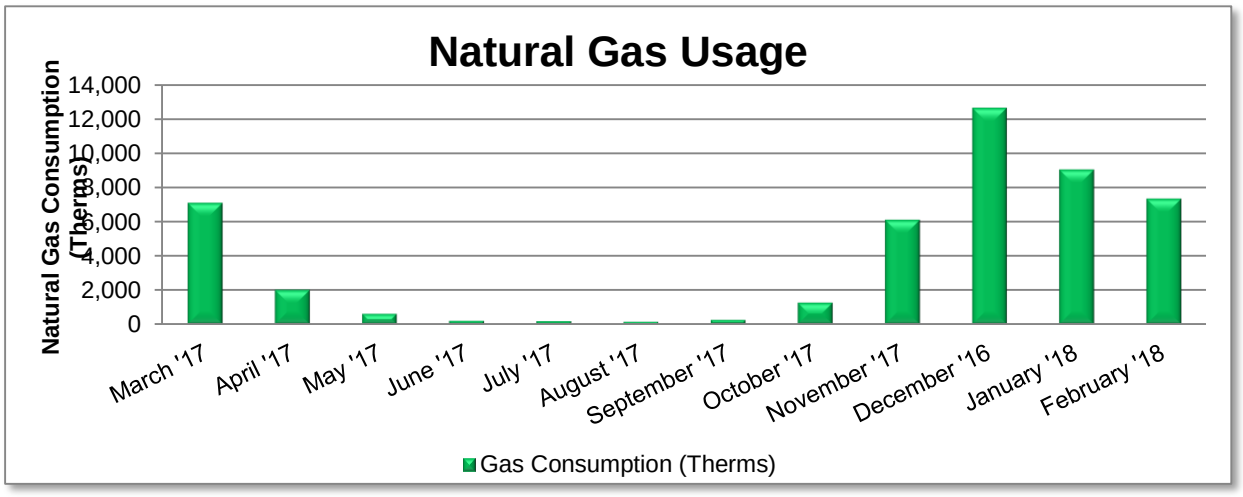
Electric Billing Data					
Period Ending	**Days in Period**	**Electric Usage (kWh)**	**Demand (kW)**	**Demand Cost**	**Total Electric Cost**
4/13/17	27	73,060	249	$1,584	$9,193
5/16/17	32	73,560	247	$1,672	$9,235
6/15/17	29	79,080	335	$2,316	$10,500
7/18/17	32	81,240	321	$2,207	$10,582
8/17/17	31	68,720	283	$1,935	$8,789
9/18/17	31	64,320	304	$2,089	$8,720
10/18/17	29	83,160	337	$2,161	$10,622
11/14/17	26	68,880	326	$2,094	$9,103
12/15/17	30	86,640	255	$1,623	$10,393
1/16/18	31	83,160	251	$1,591	$9,460
2/15/18	29	81,720	236	$1,489	$9,218
3/16/18	28	75,360	237	$1,497	$8,628
Totals	**355**	**918,900**	**337**	**$22,257**	**$114,442**
Annual	**365**	**944,785**	**337**	**$22,884**	**$117,666**

Notes:

- Peak demand of 337 kW occurred in November 2017.
- The average electric cost over the past 12 months was $0.125/kWh, which is the blended rate that includes energy supply, distribution, demand, and other charges. This report uses this blended rate to estimate energy cost savings.

3.2 Natural Gas

PSE&G delivers natural gas under rate class LVG, with natural gas supply provided by Direct Energy, a third-party supplier.



Gas Billing Data			
Period Ending	**Days in Period**	**Natural Gas Usage (Therms)**	**Natural Gas Cost**
4/5/17	29	7,115	$4,557
5/5/17	30	2,018	$1,372
6/6/17	32	622	$500
7/7/17	31	213	$245
8/4/17	28	193	$223
9/5/17	32	160	$209
10/4/17	29	277	$284
11/2/17	29	1,283	$1,217
12/5/17	33	6,116	$5,394
1/8/17	34	12,668	$11,087
2/6/18	29	9,047	$8,405
3/8/18	30	7,358	$7,156
Totals	**366**	**47,071**	**$40,650**
Annual	**365**	**46,943**	**$40,539**

Notes:

- The average gas cost for the past 12 months is $0.864/therm, which is the blended rate used throughout the analysis.

3.3 Benchmarking

Your building was benchmarked using the United States Environmental Protection Agency's Portfolio Manager® software. Benchmarking compares your building's energy use to that of similar buildings across the country, while neutralizing variations due to location, occupancy and operating hours. Some building types can be scored with a 1-100 ranking of a building's energy performance relative to the national building market. A score of 50 represents the national average and a score of 100 is best.

This ENERGY STAR® benchmarking score provides a comprehensive snapshot of your building's energy performance. It assesses the building's physical assets, operations, and occupant behavior, which is compiled into a quick and easy-to-understand score.

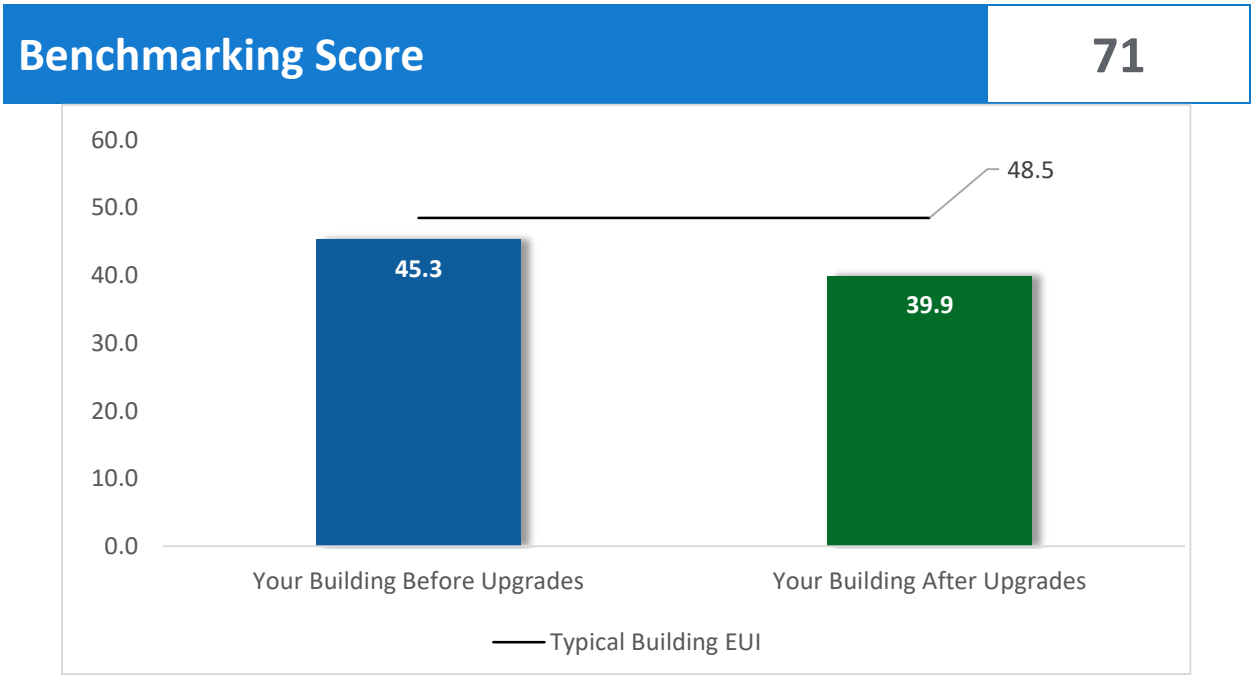


Figure 6 - Energy Use Intensity Comparison

Congratulations, your building performs better than the national average. This report has suggestions about how to keep your building running efficiently, further improve performance, and lower your energy bills even more.

Energy use intensity (EUI) measures energy consumption per square foot and is the standard metric for comparing buildings' energy performance. A lower EUI means better performance and less energy consumed. A number of factors can cause as building to vary from the "typical" energy usage. Local weather conditions, building age and insulation levels, equipment efficiency, daily occupancy hours, changes in occupancy throughout the year, equipment operating hours, and occupant behavior all contribute to a building's energy use and the benchmarking score.

Tracking Your Energy Performance

Keeping track of your energy use on a monthly basis is one of the best ways to keep energy costs in check. Update your utility information in Portfolio Manager® regularly, so that you can keep track of your building's performance.

We have created a Portfolio Manager® account for your facility and we have already entered the monthly utility data shown above for you. Account login information for your account will be sent via email.

Free online training is available to help you use ENERGY STAR® Portfolio Manager® to track your building's performance at: https://www.energystar.gov/buildings/training.

For more information on ENERGY STAR® and Portfolio Manager®, visit their website[3].

[3] https://www.energystar.gov/buildings/facility-owners-and-managers/existing-buildings/earn-recognition/energy-star-certification/how-app-1.

4 Energy Conservation Measures

The goal of this audit report is to identify and evaluate potential energy efficiency improvements, provide information about the cost effectiveness of those improvements, and recognize potential financial incentives from NJBPU. Most energy conservation measures have received preliminary analysis of feasibility which identifies expected ranges of savings and costs. This level of analysis is typically sufficient to demonstrate project cost-effectiveness and help prioritize energy measures.

Calculations of energy use and savings are based on the current version of the *New Jersey Clean Energy Program Protocols to Measure Resource Savings*, which is approved by the NJBPU. Further analysis or investigation may be required to calculate more precise savings based on specific circumstances.

Operation and maintenance costs for the proposed new equipment will generally be lower than the current costs for the existing equipment—especially if the existing equipment is at or past its normal useful life. We have conservatively assumed there to be no impact on overall maintenance costs over the life of the equipment.

Financial incentives are based on the current NJCEP prescriptive SmartStart program. A higher level of investigation may be necessary to support any SmartStart Custom, Pay for Performance, or Direct Install incentive applications. Some measures and proposed upgrades may be eligible for higher incentives than those shown below through other NJCEP programs described in a following section of this report.

Appendix A: Equipment Inventory & Recommendations provides a detailed list of the locations and recommended upgrades for each energy conservation measure.

#	Energy Conservation Measure	*Recommend?*	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Lifetime Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)*	Estimated Net Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Lighting Upgrades			**211,013**	**56.8**	**-36**	**$25,973**	**$389,590**	**$166,451**	**$29,103**	**$137,348**	**5.3**	**208,321**
ECM 1	Install LED Fixtures	Yes	40,779	0.0	0	$5,079	$76,181	$36,582	$3,635	$32,947	6.5	41,064
ECM 2	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	Yes	62,298	19.6	-13	$7,646	$114,693	$48,072	$6,990	$41,082	5.4	61,208
ECM 3	Retrofit Fixtures with LED Lamps	Yes	107,936	37.2	-23	$13,248	$198,716	$81,797	$18,478	$63,319	4.8	106,048
Lighting Control Measures			**53,382**	**17.3**	**-11**	**$6,552**	**$52,416**	**$55,520**	**$5,935**	**$49,585**	**7.6**	**52,449**
ECM 4	Install Occupancy Sensor Lighting Controls	Yes	47,777	15.5	-10	$5,864	$46,912	$48,720	$5,935	$42,785	7.3	46,941
ECM 5	Install High/Low Lighting Controls	Yes	5,605	1.8	-1	$688	$5,504	$6,800	$0	$6,800	9.9	5,507
Motor Upgrades			**6,935**	**2.3**	**0**	**$864**	**$12,956**	**$20,293**	**$0**	**$20,293**	**23.5**	**6,984**
	Premium Efficiency Motors	No	6,935	2.3	0	$864	$12,956	$20,293	$0	$20,293	23.5	6,984
Variable Frequency Drive (VFD) Measures			**47,605**	**25.3**	**0**	**$5,929**	**$88,932**	**$50,934**	**$6,713**	**$44,221**	**7.5**	**47,938**
	Install VFD on Variable Air Volume (VAV) Fans	No	4,811	3.3	0	$599	$8,987	$10,159	$2,713	$7,446	12.4	4,844
	Install VFDs on Constant Volume (CV) Fans	No	21,155	14.3	0	$2,635	$39,521	$22,043	$4,000	$18,043	6.8	21,303
ECM 6	Install VFDs on Heating Water Pumps	Yes	21,639	7.7	0	$2,695	$40,424	$18,732	$0	$18,732	7.0	21,790
Electric Unitary HVAC Measures			**95,369**	**26.1**	**0**	**$11,878**	**$178,163**	**$501,827**	**$25,961**	**$475,866**	**40.1**	**96,036**
	Install High Efficiency Air Conditioning Units	No	19,150	17.3	0	$2,385	$35,774	$362,692	$18,896	$343,796	144.2	19,283
	Install High Efficiency Heat Pumps	No	76,220	8.8	0	$9,493	$142,389	$139,134	$7,065	$132,070	13.9	76,753
Gas Heating (HVAC/Process) Replacement			**0**	**0.0**	**206**	**$1,778**	**$35,557**	**$40,738**	**$2,800**	**$37,938**	**21.3**	**24,105**
	Install High Efficiency Furnaces	No	0	0.0	206	$1,778	$35,557	$40,738	$2,800	$37,938	21.3	24,105
Domestic Water Heating Upgrade			**0**	**0.0**	**43**	**$375**	**$5,631**	**$19,994**	**$698**	**$19,296**	**51.4**	**5,090**
	Install High Efficiency Gas-Fired Water Heater	No	0	0.0	43	$375	$5,631	$19,994	$698	$19,296	51.4	5,090
Food Service & Refrigeration Measures			**1,612**	**0.2**	**0**	**$201**	**$1,004**	**$230**	**$50**	**$180**	**0.9**	**1,623**
ECM 7	Vending Machine Control	Yes	1,612	0.2	0	$201	$1,004	$230	$50	$180	0.9	1,623
TOTALS			**144,586**	**52**	**249**	**20,160**	**309,287**	**613,722**	**36,221**	**577,501**	**121**	**174,791**

* - All incentives presented in this table are based on NJ SmartStart equipment incentives and assume proposed equipment meets minimum performance criteria for that program.

** - Simple Payback Period is based on net measure costs (i.e. after incentives).

Figure 7 – All Evaluated ECMs

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)*	Estimated Net Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Lighting Upgrades		**211,013**	**56.8**	**-36**	**$25,973**	**$166,451**	**$29,103**	**$137,348**	**5.3**	**208,321**
ECM 1	Install LED Fixtures	40,779	0.0	0	$5,079	$36,582	$3,635	$32,947	6.5	41,064
ECM 2	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	62,298	19.6	-13	$7,646	$48,072	$6,990	$41,082	5.4	61,208
ECM 3	Retrofit Fixtures with LED Lamps	107,936	37.2	-23	$13,248	$81,797	$18,478	$63,319	4.8	106,048
Lighting Control Measures		**53,382**	**17.3**	**-11**	**$6,552**	**$55,520**	**$5,900**	**$49,620**	**7.6**	**52,449**
ECM 4	Install Occupancy Sensor Lighting Controls	47,777	15.5	-10	$5,864	$48,720	$5,900	$42,820	7.3	46,941
ECM 5	Install High/Low Lighting Controls	5,605	1.8	-1	$688	$6,800	$0	$6,800	9.9	5,507
Variable Frequency Drive (VFD) Measures		**21,639**	**7.7**	**0**	**$2,695**	**$18,732**	**$0**	**$18,732**	**7.0**	**21,790**
ECM 6	Install VFDs on Heating Water Pumps	21,639	7.7	0	$2,695	$18,732	$0	$18,732	7.0	21,790
Food Service & Refrigeration Measures		**1,612**	**0.2**	**0**	**$201**	**$230**	**$50**	**$180**	**0.9**	**1,623**
ECM 7	Vending Machine Control	1,612	0.2	0	$201	$230	$50	$180	0.9	1,623
TOTALS		**287,646**	**81.9**	**-47**	**$35,420**	**$240,933**	**$35,053**	**$205,880**	**5.8**	**284,183**

* - All incentives presented in this table are based on NJ SmartStart equipment incentives and assume proposed equipment meets minimum performance criteria

** - Simple Payback Period is based on net measure costs (i.e. after incentives).

Figure 8 – Cost Effective ECMs

4.1 Lighting

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)*	Estimated Net Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Lighting Upgrades		**211,013**	**56.8**	**-36**	**$25,973**	**$166,451**	**$29,103**	**$137,348**	**5.3**	**208,321**
ECM 1	Install LED Fixtures	40,779	0.0	0	$5,079	$36,582	$3,635	$32,947	6.5	41,064
ECM 2	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	62,298	19.6	-13	$7,646	$48,072	$6,990	$41,082	5.4	61,208
ECM 3	Retrofit Fixtures with LED Lamps	107,936	37.2	-23	$13,248	$81,797	$18,478	$63,319	4.8	106,048

When considering lighting upgrades, we suggest using a comprehensive design approach that simultaneously upgrades lighting fixtures and controls to maximize energy savings and improve occupant lighting. Comprehensive design will also consider appropriate lighting levels for different space types to make sure that the right amount of light is delivered where needed. If conversion to LED light sources are proposed, we suggest converting all of a specific lighting type (e.g. linear fluorescent) to LED lamps to minimize the number of lamp types in use at the facility, which should help reduce future maintenance costs.

ECM 1: Install LED Fixtures

Replace existing exterior fixtures containing metal halide or compact fluorescent lamps with new LED light fixtures. This measure saves energy by installing LEDs which use less power than other technologies with a comparable light output. In some cases HID fixtures can be retrofit with screw-based LED lamps. Replacing an existing HID fixture with a new LED fixture will generally provide better overall lighting optics; however, replacing the HID lamp with a LED screw-in lamp is typically a less expensive retrofit. We recommend you work with your lighting contractor to determine which retrofit solution is best suited to your needs and will be compatible with the existing fixture(s).

Maintenance savings may also be achieved since LED lamps last longer than other light sources and therefore do not need to be replaced as often.

Affected building areas: exterior fixtures

ECM 2: Retrofit Fluorescent Fixtures with LED Lamps and Drivers

Retrofit fluorescent fixtures that have three or four lamps per fixture by removing the fluorescent tubes and ballasts and replacing them with two LED tubes and LED drivers (if necessary), which are designed to be used in retrofitted fluorescent fixtures.

The measure uses the existing fixture housing but replaces the electric components with more efficient lighting technology which use less power than other lighting technologies but provides equivalent lighting output. Maintenance savings may also be achieved since LED tubes last longer than fluorescent tubes and therefore do not need to be replaced as often.

Affected building areas: classrooms and offices

ECM 3: Retrofit Fixtures with LED Lamps

Replace linear and U-bend T8 fluorescent, compact fluorescent and incandescent lamps with LED lamps. Many LED tubes are direct replacements for existing fluorescent tubes and can be installed while leaving the fluorescent fixture ballast in place. LED lamps can be used in existing fixtures as a direct replacement for most other lighting technologies.

This measure saves energy by installing LEDs which use less power than other lighting technologies yet provide equivalent lighting output for the space. Maintenance savings may also be available, as longer-lasting LEDs lamps will not need to be replaced as often as the existing lamps.

Affected building areas: all areas sufficiently lit with fluorescent fixtures with T8 tubes

4.2 Lighting Controls

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)*	Estimated Net Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Lighting Control Measures		**53,382**	**17.3**	**-11**	**$6,552**	**$55,520**	**$5,900**	**$49,620**	**7.6**	**52,449**
ECM 4	Install Occupancy Sensor Lighting Controls	47,777	15.5	-10	$5,864	$48,720	$5,900	$42,820	7.3	46,941
ECM 5	Install High/Low Lighting Controls	5,605	1.8	-1	$688	$6,800	$0	$6,800	9.9	5,507

Lighting controls reduce energy use by turning off or lowering, lighting fixture power levels when not in use. A comprehensive approach to lighting design should upgrade the lighting fixtures and the controls together for maximum energy savings and improved lighting for occupants.

ECM 4: Install Occupancy Sensor Lighting Controls

Install occupancy sensors to control lighting fixtures in areas that are frequently unoccupied, even for short periods. For most spaces, we recommend lighting controls use dual technology sensors, which reduce the possibility of lights turning off unexpectedly.

Occupancy sensors detect occupancy using ultrasonic and/or infrared sensors. When an occupant enters the space, the lighting fixtures switch to full lighting levels. Most occupancy sensor lighting controls allow users to manually turn fixtures on/off, as needed. Some controls can also provide dimming options.

Occupancy sensors can be mounted on the wall at existing switch locations, mounted on the ceiling, or in remote locations. In general, wall switch replacement sensors are best suited to single occupant offices and other small rooms. Ceiling-mounted or remote mounted sensors are used in large spaces, locations without local switching, and where wall switches are not in the line-of-sight of the main work area.

This measure provides energy savings by reducing the lighting operating hours.

Affected building areas: offices, conference rooms, classrooms, gymnasium, cafeteria, library, restrooms, and storage rooms

ECM 5: Install High/Low Lighting Controls

Install occupancy sensors to provide dual level lighting control for lighting fixtures in spaces that are infrequently occupied but may require some level of continuous lighting for safety or security reasons.

Lighting fixtures with these controls operate at default low levels when the area is unoccupied to provide minimal lighting to meet security or safety requirements. Sensors detect occupancy using ultrasonic and/or infrared sensors. When an occupant enters the space, the lighting fixtures switch to full lighting levels. Fixtures automatically switch back to low level after a predefined period of vacancy. This measure provides energy savings by reducing the light fixture power draw when reduced light output is appropriate.

Affected building areas: hallways

For this type of measure the occupancy sensors will generally be ceiling or fixture mounted. Sufficient sensor coverage must be provided to ensure that lights turn on in each area as an occupant approaches.

4.3 Motors

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)*	Estimated Net Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Motor Upgrades		**6,935**	**2.3**	**0**	**$864**	**$20,293**	**$0**	**$20,293**	**23.5**	**6,984**
	Premium Efficiency Motors	6,935	2.3	0	$864	$20,293	$0	$20,293	23.5	6,984

Premium Efficiency Motors

Replace standard efficiency motors with IHP 2014 efficiency motors. This evaluation assumes that existing motors will be replaced with motors of equivalent size and type. In some cases, additional savings may be possible by downsizing motors to better meet the motor's current load requirements.

Affected motors:

Location	Area(s)/System(s) Served	Motor Quantity	Motor Application	HP Per Motor
Boiler Room	Hydronic Heating	2	Heating Hot Water Pump	40.0
Roof Above Café	RTU-1 & 3	2	Supply Fan	10.0
Roof Above Café	RTU-1 & 3	2	Exhaust Fan	7.5
Roof Above Gym	RTU-14,15,16,17	4	Supply Fan	7.5
Roof	RTU w/Electric Heat	2	Supply Fan	5.0
Roof	RTU w/Electric Heat	1	Supply Fan	7.5

Savings are based on the difference between baseline and proposed efficiencies and the assumed annual operating hours. The base case motor energy consumption is estimated using the efficiencies found on nameplates or estimated based on the age of the motor and our best estimates of motor run hours. Efficiencies of proposed motor upgrades are obtained from the current *New Jersey's Clean Energy Program Protocols to Measure Resource Savings*.

4.4 Variable Frequency Drives (VFD)

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)*	Estimated Net Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Variable Frequency Drive (VFD) Measures		**47,605**	**25.3**	**0**	**$5,929**	**$50,934**	**$6,713**	**$44,221**	**7.5**	**47,938**
	Install VFD on Variable Air Volume (VAV) Fans	4,811	3.3	0	$599	$10,159	$2,713	$7,446	12.4	4,844
	Install VFDs on Constant Volume (CV) Fans	21,155	14.3	0	$2,635	$22,043	$4,000	$18,043	6.8	21,303
ECM 6	Install VFDs on Heating Water Pumps	21,639	7.7	0	$2,695	$18,732	$0	$18,732	7.0	21,790

Variable frequency drives control motors for fans, pumps, and process equipment based on the actual output required of the driven equipment. Energy savings result from more efficient control of motor energy usage when equipment operates at partial load. The magnitude of energy savings depends on the estimated amount of time that the motor would operate at partial load. For equipment with proposed VFDs, we have included replacing the controlled motor with a new motor —unless the existing motor meets or exceeds IHP 2014 standards—to conservatively account for the cost of an inverter duty rated motor. The savings and cost associated with the new motor are presented with the Premium Efficiency Motor measures. If the proposed VFD measure is not selected for implementation the motor replacement should be reevaluated.

Install VFD on Variable Air Volume (VAV) Fans

Replace existing air volume control devices on variable volume fans, such as inlet vanes and variable pitch fan blades, with VFDs. Inlet guide vanes and variable pitch fan blades are an inefficient means of controlling the air volume compared to VFDs. The existing volume control device will be removed or permanently disabled, and the control signal will be redirected to the VFD to determine proper fan motor speed.

Energy savings result from using a more efficient control device to regulate the air flow provided by the fan. Additional maintenance savings may result from this measure. VFDs are solid state electronic devices, which generally requires less maintenance than mechanical air volume control devices.

Sensitivities: For conversion of RTUs to variable air volume, there is a need for further investigation. A signal would be required to control the VFD and if there are multiple zones, this can significantly impact the installation costs. This may require adding wireless thermostat controls in the zones and costs would therefore increase by at least $250 per zone and the labor costs associated with BMS programing.

This measure is part of a measure to replace motors and as such must be considered in combination with Section 4.3 Premium Efficiency Motors.

Install VFDs on Constant Volume (CV) Fans

Install VFDs to control constant volume fan motor speeds. This converts a constant-volume, single-zone air handling system into a variable-air-volume (VAV) system. A separate VFD is usually required to control the return fan motor or dedicated exhaust fan motor, if the air handler has one.

Zone thermostats signal the VFD to adjust fan speed to maintain the appropriate temperature in the zone, while maintaining a constant supply air temperature.

VAV system controls should not raise the supply air temperature at the expense of the fan power. A common mistake is to reset the supply air temperature to achieve chiller energy savings, which can lead to additional air flow requirements. Supply air temperature should be kept low (e.g. 55°F) until the minimum fan speed (typically about 50%) is met. At this point, it is efficient to raise the supply air temperature as the load decreases, but not such that additional air flow and thus fan energy is required.

For air handlers with direct expansion (DX) cooling systems, the minimum air flow across the cooling coil required to prevent the coil from freezing must be determined during the final project design. The control system programming should maintain the minimum air flow whenever the compressor is operating.

Energy savings result from reducing the fan speed (and power) when conditions allow for reduced air flow.

This measure is part of a measure to replace motors and as such must be considered in combination with Section 4.3 Premium Efficiency Motors.

ECM 6: Install VFDs on Heating Water Pumps

Install variable frequency drives (VFD) to control heating water pumps. Two-way valves must serve the hot water coils and the hot water loop must have a differential pressure sensor installed. If three-way valves or a bypass leg are used in the hot water distribution they will need to be modified when this measure is implemented. As the hot water valves close, the differential pressure increases and the VFD modulates the pump speed to maintain a differential pressure setpoint.

Energy savings result from reducing pump motor speed (and power) as hot water valves close. The magnitude of energy savings is based on the estimated amount of time that the system will operate at reduced load.

This measure is part of a measure to replace motors and as such must be considered in combination with Section 4.3 Premium Efficiency Motors.

4.5 Electric Unitary HVAC

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)*	Estimated Net Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Electric Unitary HVAC Measures		**95,369**	**26.1**	**0**	**$11,878**	**$501,827**	**$25,961**	**$475,866**	**40.1**	**96,036**
	Install High Efficiency Air Conditioning Units	19,150	17.3	0	$2,385	$362,692	$18,896	$343,796	144.2	19,283
	Install High Efficiency Heat Pumps	76,220	8.8	0	$9,493	$139,134	$7,065	$132,070	13.9	76,753

Replacing the unitary HVAC units has a long payback period and may not be justifiable based simply on energy considerations. However, most of the units at this facility are nearing or have reached the end of their normal useful life. Typically, the marginal cost of purchasing a high efficiency unit can be justified by the marginal savings from the improved efficiency. When the RTUs and heat pump systems are eventually replaced, consider purchasing equipment that exceeds the minimum efficiency required by building codes.

Install High Efficiency Air Conditioning Units

Replace standard efficiency packaged air conditioning units with high efficiency packaged air conditioning units. The magnitude of energy savings for this measure depends on the relative efficiency of the older unit versus the new high efficiency unit, the average cooling load, and the estimated annual operating hours.

Install High Efficiency Heat Pumps

Replace standard efficiency heat pumps with high efficiency heat pumps. A higher EER or SEER rating indicates a more efficient cooling system and a higher HPSF rating indicates more efficient heating mode. The magnitude of energy savings for this measure depends on the relative efficiency of the older unit versus the new high efficiency unit, the average heating and cooling loads, and the estimated annual operating hours.

4.6 Gas-Fired Heating

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)*	Estimated Net Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Gas Heating (HVAC/Process) Replacement		**0**	**0.0**	**206**	**$1,778**	**$40,738**	**$2,800**	**$37,938**	**21.3**	**24,105**
	Install High Efficiency Furnaces	0	0.0	206	$1,778	$40,738	$2,800	$37,938	21.3	24,105

Replacing the RTU, which is modeled as a furnace, has a long payback and may not be justifiable based simply on energy considerations. However, the RTU is has reached the end of its normal useful life. Typically, the marginal cost of purchasing high efficiency RTUs can be justified by the marginal savings from the improved efficiency. When the RTU is eventually replaced, consider purchasing equipment that exceeds the minimum efficiency required by building energy codes.

ECM 7: Install High Efficiency Furnaces

Replace standard efficiency furnaces with condensing furnaces. Improved combustion technology and heat exchanger design optimize heat recovery from the combustion gases which can significantly improve furnace efficiency. Savings result from improved system efficiency.

Note: these units produce acidic condensate that requires proper drainage.

4.7 Domestic Water Heating

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)*	Estimated Net Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Domestic Water Heating Upgrade		**0**	**0.0**	**43**	**$375**	**$19,994**	**$698**	**$19,296**	**51.4**	**5,090**
	Install High Efficiency Gas-Fired Water Heater	0	0.0	43	$375	$19,994	$698	$19,296	51.4	5,090

Replacing the water heater has a long payback and may not be justifiable based simply on energy considerations. However, the water heater is beyond its normal useful life and is in poor condition. Typically, the marginal cost of purchasing high efficiency water heaters can be justified by the marginal savings from the improved efficiency. When the water heater is eventually replaced, consider purchasing equipment that exceeds the minimum efficiency required by building energy codes.

Install High Efficiency Gas-Fired Water Heater

Replace the existing tank water heater with a high efficiency gas-fired condensing storage tank hot water heater. Energy savings result from the increased efficiency of the unit, which uses less gas to heat water, and fewer operating hours to maintain the tank water temperature.

4.8 Food Service & Refrigeration Measures

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)*	Estimated Net Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Food Service & Refrigeration Measures		**1,612**	**0.2**	**0**	**$201**	**$230**	**$0**	**$230**	**1.1**	**1,623**
ECM 7	Vending Machine Control	1,612	0.2	0	$201	$230	$50	$180	0.9	1,623

ECM 7: Vending Machine Control

Vending machines operate continuously, even during unoccupied hours. Install occupancy sensor controls to reduce energy use. These controls power down vending machines when the vending machine area has been vacant for some time, and, they power up the machines at necessary regular intervals or when the surrounding area is occupied. Energy savings are dependent on the vending machine and activity level in the area surrounding the machines.

5 Energy Efficient Best Practices

A whole building maintenance plan will extend equipment life; improve occupant comfort, health, and safety; and reduce energy and maintenance costs. You may already be doing some of these things— see our list below for potential additions to your maintenance plan. Be sure to consult with qualified equipment specialists for details on proper maintenance and system operation.

Energy Tracking with ENERGY STAR® Portfolio Manager®

You've heard it before - you can't manage what you don't measure. ENERGY STAR® Portfolio Manager® is an online tool that you can use to measure and track energy and water consumption, as well as greenhouse gas emissions.[4] Your account has already been established. Now you can continue to keep tabs on your energy performance every month.

Weatherization

Caulk or weather strip leaky doors and windows to reduce drafts and loss of heated or cooled air. Sealing cracks and openings can reduce heating and cooling costs, improve building durability, and create a healthier indoor environment.

Doors and Windows

Close exterior doors and windows in heated and cooled areas. Leaving doors and windows open leads to a loss of heat during the winter and chilled air during the summer. Reducing air changes per hour (ACH) can lead to increased occupant comfort as well as heating and cooling savings, especially when combined with proper HVAC controls and adequate ventilation.

Window Treatments/Coverings

Use high-reflectivity films or cover windows with shades or shutters to reduce solar heat gain and reduce the load on cooling and heating systems. Older, single pane windows and east or west-facing windows are especially prone to solar heat gain. In addition, use shades or shutters at night during cold weather to reduce heat loss.

Lighting Controls

As part of a lighting maintenance schedule, test lighting controls to ensure proper functioning. For occupancy sensors, this requires triggering the sensor and verifying that the sensor's timer settings are correct. For daylight and photocell sensors, maintenance involves cleaning sensor lenses and confirming that setpoints and sensitivity are configured properly.

[4] https://www.energystar.gov/buildings/facility-owners-and-managers/existing-buildings/use-portfolio-manager.

Motor Maintenance

Motors have many moving parts. As these parts degrade over time, the efficiency of the motor is reduced. Routine maintenance prevents damage to motor components. Routine maintenance should include cleaning surfaces and ventilation openings on motors to prevent overheating, lubricating moving parts to reduce friction, inspecting belts and pulleys for wear and to ensure they are at proper alignment and tension, and cleaning and lubricating bearings. Consult a licensed technician to assess these and other motor maintenance strategies.

Fans to Reduce Cooling Load

Install ceiling fans to supplement your cooling system. Thermostat settings can typically be increased by 4°F with no change in overall occupant comfort due to the wind chill effect of moving air.

Destratification Fans

For areas with high ceilings, destratification fans f air balance the air temperature from floor to ceiling. They help reduce the recovery time needed to warm the space after nightly temperature setbacks and will increase occupants' the comfort level.

Areas with high ceilings require the heating system to heat a larger volume of space than that which is occupied. As the warm air rises, the warmest space is at the ceiling level, rather than floor level. Higher temperatures at the ceiling accelerate heat loss through the roof, which requires additional energy consumption by the heating equipment to compensate for this accelerated heat transfer.

Thermostat Schedules and Temperature Resets

Use thermostat setback temperatures and schedules to reduce heating and cooling energy use during periods of low or no occupancy. Thermostats should be programmed for a setback of 5-10°F during low occupancy hours (reduce heating setpoints and increase cooling setpoints). Cooling load can be reduced by increasing the facility's occupied setpoint temperature. In general, during the cooling season, thermostats should be set as high as possible without sacrificing occupant comfort.

Economizer Maintenance

Economizers can significantly reduce cooling system load. A malfunctioning economizer can increase the amount of heating and mechanical cooling required by introducing excess amounts of cold or hot outside air. Common economizer malfunctions include broken outdoor thermostat or enthalpy control, or dampers that are stuck or improperly adjusted.

Periodic inspection and maintenance will keep economizers working in sync with the heating and cooling system. This maintenance should be part of annual system maintenance, and it should include proper setting of the outdoor thermostat/enthalpy control, inspection of control and damper operation, lubrication of damper connections, and adjustment of minimum damper position.

AC System Evaporator/Condenser Coil Cleaning

Dirty evaporator and condenser coils restrict air flow and restrict heat transfer. This increases the loads on the evaporator and condenser fan, and decreases overall cooling system performance. Keeping the coils clean allows the fans and cooling system to operate more efficiently.

HVAC Filter Cleaning and Replacement

Air filters should be checked regularly (often monthly) and cleaned or replaced when appropriate. Air filters reduce indoor air pollution, increase occupant comfort, and help keep equipment operating efficiently. If the building has a building management system, consider installing a differential pressure switch across filters to send an alarm about premature fouling or overdue filter replacement. Over time, filters become less and less effective as particulate buildup increases. Dirty filters also restrict air flow through the air conditioning or heat pump system, which increases the load on the distribution fans.

Duct Sealing

Duct leakage in commercial buildings can account for five to twenty-five percent of the supply airflow. In the case of rooftop air handlers, duct leakage can occur to the outside of the building wasting conditioned air. Eliminating duct leaks can improve ventilation system performance and reduce heating and cooling system operation.

Boiler Maintenance

Many boiler problems develop slowly over time, so regular inspection and maintenance is essential to keeping the heating system running efficiently and preventing expensive repairs. Annual tune-ups should include a combustion analysis to analyze the exhaust from the boilers and to ensure the boiler is operating safely. Boilers should be cleaned according to the manufacturer's instructions to remove soot and scale from the water side or fire side of the boiler.

Furnace Maintenance

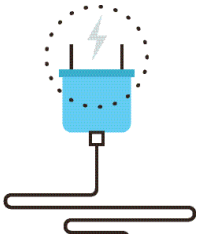
Preventative maintenance can extend the life of the system, maintain energy efficiency, and ensure safe operation. Following the manufacturer's instructions, a yearly tune-up should: check for gas / carbon monoxide leaks; change the air and fuel filters; check components for cracks, corrosion, dirt, or debris build-up; ensure the ignition system is working properly; test and adjust operation and safety controls; inspect electrical connections; and lubricate motors and bearings.

Water Heater Maintenance

Preventative maintenance can extend the life of the system, maintain energy efficiency, and ensure safe operation. At least once a year, follow manufacturer instructions to drain a few gallons out of the water heater using the drain valve. If there is a lot of sediment or debris, then a full flush is recommended. Turn the temperature down and then completely drain the tank. Annual checks should include checks for:

- Leaks or heavy corrosion on the pipes and valves.
- Corrosion or wear on the gas line and on the piping. If you noticed any black residue, soot, or charred metal, this is a sign you may be having combustion issues and you should have the unit serviced by a professional.
- For electric water heaters, look for signs of leaking such as rust streaks or residue around the upper and lower panels covering the electrical components on the tank.
- For water heaters more than three years old, have a technician inspect the sacrificial anode annually.

Plug Load Controls



Reducing plug loads is a common way to decrease your electrical use. Limiting the energy use of plug loads can include increasing occupant awareness, removing under-used equipment, installing hardware controls, and using software controls. Consider enabling the most aggressive power settings on existing devices or install load sensing or occupancy sensing (advanced) power strips[5]. Your local utility may offer incentives or rebates for this equipment.

Computer Monitor Replacement

ENERGY STAR® labeled computer monitors can be up to 25% more efficient than standard monitors. ENERGY STAR® rated monitors have power consumption requirements for different operating modes such as on, idle, and sleep.

Procurement Strategies

Purchasing efficient products reduces energy costs without compromising quality. Consider modifying your procurement policies and language to require ENERGY STAR® or WaterSense™ products where available.

[5] For additional information refer to "Plug Load Best Practices Guide" http://www.advancedbuildings.net/plug-load-best-practices-guide-offices.

6 On-site Generation

You don't have to look far in New Jersey to see one of the thousands of solar electric systems providing clean power to homes, businesses, schools, and government buildings. On-site generation includes both renewable (e.g., solar, wind) and non-renewable (e.g., fuel cells) technologies that generate power to meet all or a portion of the facility's electric energy needs. Also referred to as distributed generation, these systems contribute to greenhouse gas (GHG) emission reductions, demand reductions and reduced customer electricity purchases reduction, which results in improved electric grid reliability through better use of transmission and distribution systems.

Preliminary screenings were performed to determine if an on-site generation measure could be a cost-effective solution for your facility. Before deciding to install an on-site generation system, we recommend conducting a feasibility study to analyze existing energy profiles, siting, interconnection, and the costs associated with the generation project including interconnection costs, departing load charges, and any additional special facilities charges.

6.1 Solar Photovoltaic

Photovoltaic (PV) panels convert sunlight into electricity. Individual panels are combined into an array that produces direct current (DC) electricity. The DC is converted to alternating current (AC) through an inverter. The inverter is then connected to the building's electrical distribution system.

A preliminary screening based on the facility's electric demand, size and location of free area, and shading elements shows that the facility has a **high** potential for installing a PV array.

The amount of free area, ease of installation (location), and the lack of shading elements contribute to the high potential. A PV array located on the roof may be feasible. If you are interested in pursuing the installation of PV, we recommend conducting a full feasibility study.

The graphic below displays the results of the PV potential screening conducted as a part of this audit. The position of each slider indicates the potential (potential increases to the right) that each factor contributes to the overall site potential.

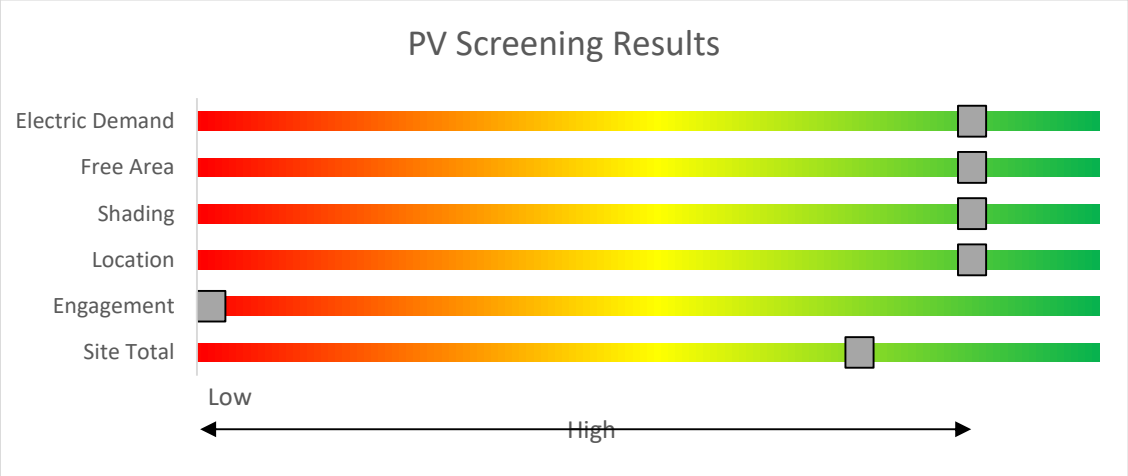


Figure 9 - Photovoltaic Screening

Solar Renewable Energy Certificate (SREC) Registration Program (SRP)

Rebates are not available for solar projects, but owners of solar projects MUST register their projects in the SREC Registration Program (SRP) before starting construction. Once your PV system is up and running, you periodically earn credits, which can then be sold on the open market for up to 15 years.

If you are considering installing solar photovoltaics on your building, visit www.njcleanenergy.com/srec for more information about the SREC Registration Program.

Get more information about solar power in New Jersey or find a qualified solar installer who can help you decide if solar is right for your building:

- **Basic Info on Solar PV in NJ**: www.njcleanenergy.com/whysolar
- **NJ Solar Market FAQs**: www.njcleanenergy.com/renewable-energy/program-updates-and-background-information/solar-transition/solar-market-faqs
- **Approved Solar Installers in the NJ Market**: www.njcleanenergy.com/commercial-industrial/programs/nj-smartstart-buildings/tools-and-resources/tradeally/approved_vendorsearch/?id=60&start=1

6.2 Combined Heat and Power

Combined heat and power (CHP) generates electricity at the facility and puts waste heat energy to good use. Common types of CHP systems are reciprocating engines, microturbines, fuel cells, backpressure steam turbines, and (at large facilities) gas turbines.

CHP systems typically produce a portion of the electric power used on-site, with the balance of electric power needs supplied by the local utility company. The heat is used to supplement (or replace) existing boilers and provide space heating and/or domestic hot water heating. Waste heat can also be routed through absorption chillers for space cooling.

The key criteria used for screening is the amount of time that the CHP system would operate at full load and the facility's ability to use the recovered heat. Facilities with a continuous need for large quantities of waste heat are the best candidates for CHP.

A preliminary screening based on heating and electrical demand, siting, and interconnection shows that the facility has **no potential** for installing a cost-effective CHP system.

Based on a preliminary analysis, the facility does not appear to meet the minimum requirements for a cost-effective CHP installation. The lack of gas service, low or infrequent thermal load, and lack of space for siting the equipment are the most significant factors contributing to the lack of CHP potential.

The graphic below displays the results of the CHP potential screening conducted as a part of this audit. The position of each slider indicates the potential (potential increases to the right) that each factor contributes to the overall site potential.

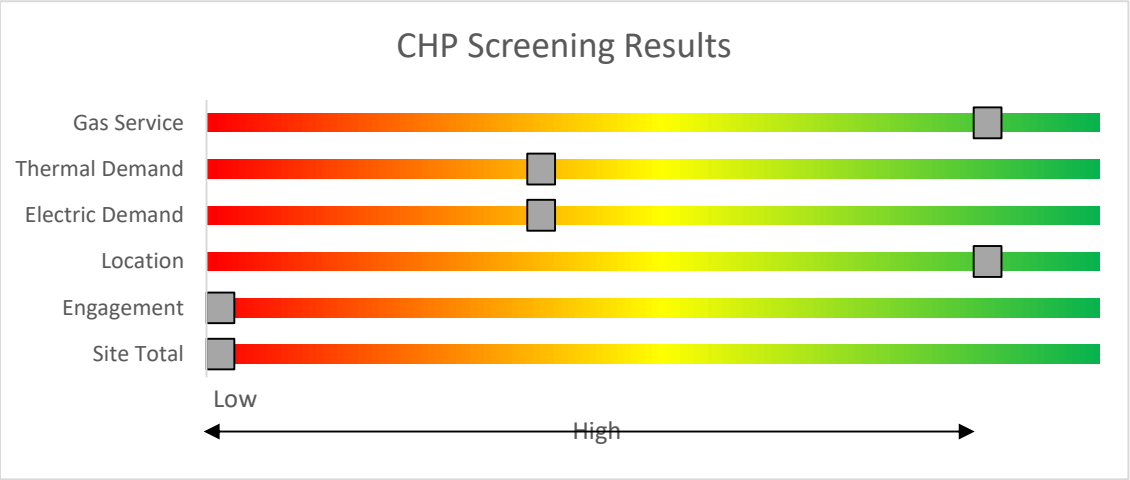


Figure 10 - Combined Heat and Power Screening

7 Project Funding and Incentives

Ready to improve your building's performance? NJ Clean Energy Programs can help. Pick the program that works best for you. Incentive programs that may apply to this facility are identified in the Executive Summary. This section provides an overview of currently available in NJ Clean Energy Programs.

	SmartStart *Flexibility to install at your own pace*	**Direct Install** *Turnkey installation*	**Pay for Performance** *Whole building upgrades*
Who should use it?	Buildings installing individual measures or small group of measures.	Small to mid-size facilities that can bundle multiple measures together. Average peak demand should be below 200 kW. Not suitable for significant building shell issues.	Mid to large size facilities looking to implement as many measures as possible at one time. Peak demand should be over 200 kW.
How does it work?	Use in-house staff or your preferred contractor.	Pre-approved contractors pass savings along to you via reduced material and labor costs.	Whole-building approach to energy upgrades designed to reduce energy use by at least 15%. The more you save, the higher the incentives.
What are the Incentives?	Fixed incentives for specific energy efficiency measures.	Incentives pay up to 70% of eligible costs, up to $125,000 per project. You pay the remaining 30% directly to the contractor.	Up to 25% of installation cost, calculated based on level of energy savings per square foot.
How do I participate?	Submit an application for the specific equipment to be installed.	Contact a participating contractor in your region.	Contact a pre-qualified Partner to develop your Energy Reduction Plan and set your energy savings targets.
Take the next step by visiting **www.njcleanenergy.com** for program details, applications, and to contact a qualified contractor.			

7.1 SmartStart

SmartStart offers incentives for installing prescriptive and custom energy efficiency measures at your facility. This program provides an effective mechanism for securing incentives for energy efficiency measures installed individually or as part of a package of energy upgrades. This program serves most common equipment types and sizes.

SmartStart routinely adds, removes, or modifies incentives from year-to-year for various energy efficiency equipment based on market trends and new technologies.

Equipment with Prescriptive Incentives Currently Available:

Electric Chillers
Electric Unitary HVAC
Gas Cooling
Gas Heating
Gas Water Heating
Ground Source Heat Pumps
Lighting
Lighting Controls
Refrigeration Doors
Refrigeration Controls
Refrigerator/Freezer Motors
Food Service Equipment
Variable Frequency Drives

Incentives

The SmartStart Prescriptive program provides fixed incentives for specific energy efficiency measures. Prescriptive incentives vary by equipment type.

SmartStart Custom provides incentives for more unique or specialized technologies or systems that are not addressed through prescriptive incentives. Custom incentives are calculated at $0.16/kWh and $1.60/therm based on estimated annual savings. Incentives are capped at 50% of the total installed incremental project cost, or a project cost buy down to a one-year payback (whichever is less). Program incentives are capped at $500,000 per electric account and $500,000 per natural gas account, per fiscal year.

How to Participate

Submit an application for the specific equipment to be installed. Many applications are designed as rebates, although others require application approval prior to installation. You can work with your preferred contractor or use internal staff to install measures.

Visit www.njcleanenergy.com/SSB for a detailed program description, instructions for applying, and applications.

7.2 Pay for Performance - Existing Buildings

Pay for Performance works for larger customers with a peak demand over 200 kW. The minimum installed scope of work must include at least two unique measures that results in at least 15% source energy savings, and lighting cannot make up the majority of the savings. P4P is a generally a good option for medium-to-large sized facilities looking to implement as many measures as possible under a single project to achieve deep energy savings. This program has an added benefit of addressing measures that may not qualify for other programs. Many facilities pursuing an Energy Savings Improvement Program loan also use this program.

The recommended scope of work presented in this audit report does not quite meet the requirements of the current P4P program. The scope of work represented in a project inclusive of all evaluated measures may. However, due to the size of the facility and existing conditions, should additional measures be identified at a later point in time, for example through further evaluation or the ESIP process, this facility could potentially meet the requirements necessary to participate in the P4P program.

Incentives

Incentives are based on estimated and achieved energy savings ranging from $0.18-$0.22/kWh and $1.80-$2.50/therm, capped at the lesser of 50% total project cost, or $1 million per electric account and $1 million per natural gas account, per fiscal year, not to exceed $2 million per project. An incentive of $0.15/square foot is also available to offset the cost of developing the Energy Reduction Plan (see below) contingent on the project moving forward with measure installation.

How to Participate

Contact one of the pre-approved consultants and contractors ("Partners"). Under direct contract to you, they will help further evaluate the measures identified in this report through development of the energy reduction plan), assist you in implementing selected measures, and verify actual savings one year after the installation. Your Partner will also help you apply for incentives.

Approval of the final scope of work is required by the program prior to installation. Installation can be done by the contractor of your choice (some P4P Partners are also contractors) or by internal staff, but the Partner remains involved throughout construction to ensure compliance with the program requirements.

Detailed program descriptions, instructions for applying, applications and list of Partners can be found at: www.njcleanenergy.com/P4P.

7.3 Energy Savings Improvement Program

The Energy Savings Improvement Program (ESIP) serves New Jersey's government agencies by financing energy projects. An ESIP is a type of performance contract, whereby school districts, counties, municipalities, housing authorities and other public and state entities enter in to contracts to help finance building energy upgrades. Annual payments are lower than the savings projected from the ECMs, ensuring that ESIP projects are cash flow positive for the life of the contract.

ESIP provides government agencies in New Jersey with a flexible tool to improve and reduce energy usage with minimal expenditure of new financial resources. NJCEP incentive programs described above can also be used to help further reduce the total project cost of eligible measures.

How to Participate

This LGEA report is the first step to participating in ESIP. Next, you will need to select an approach for implementing the desired ECMs:

(1) Use an energy services company or "ESCO."

(2) Use independent engineers and other specialists, or your own qualified staff, to provide and manage the requirements of the program through bonds or lease obligations.

(3) Use a hybrid approach of the two options described above where the ESCO is used for some services and independent engineers, or other specialists or qualified staff, are used to deliver other requirements of the program.

After adopting a resolution with a chosen implementation approach, the development of the energy savings plan (ESP) can begin. The ESP demonstrates that the total project costs of the ECMs are offset by the energy savings over the financing term, not to exceed 15 years. The verified savings will then be used to pay for the financing.

The ESIP approach may not be appropriate for all energy conservation and energy efficiency improvements. Carefully consider all alternatives to develop an approach that best meets your needs. A detailed program descriptions and application can be found at: www.njcleanenergy.com/ESIP.

ESIP is a program delivered directly by the NJBPU and is not an NJCEP incentive program. As mentioned above, you can use NJCEP incentive programs to help further reduce costs when developing the energy savings plan. Refer to the ESIP guidelines at the link above for further information and guidance on next steps.

7.4 SREC Registration Program

The SREC (Solar Renewable Energy Certificate) Registration Program (SRP) is used to register the intent to install solar projects in New Jersey. Rebates are not available for solar projects, but owners of solar projects *must* register their projects prior to the start of construction to establish the project's eligibility to earn SRECs. Registration of the intent to participate in New Jersey's solar marketplace provides market participants with information about the pipeline of anticipated new solar capacity and insight into future SREC pricing.

After the registration is accepted, construction is complete, and final paperwork has been submitted and is deemed complete, the project is issued a New Jersey certification number, which enables it to generate New Jersey SRECs. SREC's are generated once the solar project has been authorized to be energized by the Electric Distribution Company (EDC).

Each time a solar installation generates 1,000 kilowatt-hours (kWh) of electricity, an SREC is earned. Solar project owners report the energy production to the SREC Tracking System. This reporting allows SREC's to be placed in the customer's electronic account. SRECs can then be sold on the SREC Tracking System, providing revenue for the first 15 years of the project's life.

Electricity suppliers, the primary purchasers of SRECs, are required to pay a Solar Alternative Compliance Payment (SACP) if they do not meet the requirements of New Jersey's Solar Renewable Portfolio Standard. Purchasing SRECs can help them meet those requirements. As SRECs are traded in a competitive market, the price may vary significantly. The actual price of an SREC during a trading period fluctuates depending on supply and demand.

Information about the SRP can be found at: www.njcleanenergy.com/srec.

8 Energy Purchasing and Procurement Strategies

8.1 Retail Electric Supply Options

Energy deregulation in New Jersey has increased energy buyers' options by separating the function of electricity distribution from that of electricity supply. So, though you may choose a different company from which to buy your electric power, responsibility for your facility's interconnection to the grid and repair to local power distribution will still reside with the traditional utility company serving your region.

If your facility is not purchasing electricity from a third-party supplier, consider shopping for a reduced rate from third-party electric suppliers. If your facility already buys electricity from a third-party supplier, review and compare prices at the end of each contract year.

A list of licensed third-party electric suppliers is available at the NJBPU website[6].

8.2 Retail Natural Gas Supply Options

The natural gas market in New Jersey is also deregulated. Most customers that remain with the utility for natural gas service pay rates that are market-based and that fluctuate monthly. The utility provides basic gas supply service (BGSS) to customers who choose not to buy from a third-party supplier for natural gas commodity.

A customer's decision about whether to buy natural gas from a retail supplier typically depends on whether a customer prefers budget certainty and/or longer-term rate stability. Customers can secure longer-term fixed prices by signing up for service through a third-party retail natural gas supplier. Many larger natural gas customers may seek the assistance of a professional consultant to assist in their procurement process.

If your facility does not already purchase natural gas from a third-party supplier, consider shopping for a reduced rate from third-party natural gas suppliers. If your facility already purchases natural gas from a third-party supplier, review and compare prices at the end of each contract year.

A list of licensed third-party natural gas suppliers is available at the NJBPU website[7].

[6] www.state.nj.us/bpu/commercial/shopping.html.

[7] www.state.nj.us/bpu/commercial/shopping.html.

APPENDIX A: EQUIPMENT INVENTORY & RECOMMENDATIONS

Lighting Inventory & Recommendations

	Existing Conditions						Proposed Conditions								Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Boiler Room	22	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,000	3	Relamp	No	22	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,000	0.5	799	0	$98	$803	$220	6.0
Electric Room	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,000	3	Relamp	No	4	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,000	0.1	145	0	$18	$146	$40	6.0
Cafeteria	75	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	2,080	3, 4	Relamp	Yes	75	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	3.4	10,808	-2	$1,327	$5,458	$1,300	3.1
Cafeteria	8	Compact Fluorescent: Plug in Lamps	Wall Switch	S	14	2,080	3	Relamp	No	8	LED - Linear Tubes: Plug in Lamps	Wall Switch	10	2,080	0.0	73	0	$9	$90	$0	10.0
Serving Area	5	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	S	62	2,080	3	Relamp	No	5	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	2,080	0.1	332	0	$41	$362	$50	7.7
Kitchen	13	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	2,080	3	Relamp	No	13	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	58	2,080	0.5	1,666	0	$204	$949	$260	3.4
Dishwashing	2	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	2,080	3, 4	Relamp	Yes	2	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,435	0.1	339	0	$42	$262	$60	4.9
Back Hallway	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,080	3, 5	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	1,435	0.1	192	0	$24	$273	$20	10.7
Office	1	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	88	1,000	3	Relamp	No	1	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	58	1,000	0.0	33	0	$4	$73	$20	13.1
Restroom	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,000	3	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,000	0.0	36	0	$4	$37	$10	6.0
Pantry	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,000	3	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,000	0.0	36	0	$4	$37	$10	6.0
Mop Closet	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	S	62	1,000	3	Relamp	No	1	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	1,000	0.0	32	0	$4	$72	$10	16.0
Faculty Dining	9	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	63	2,080	3, 4	Relamp	Yes	9	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	0.2	679	0	$83	$763	$170	7.1
Restroom	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	S	62	2,080	3	Relamp	No	1	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	2,080	0.0	66	0	$8	$72	$10	7.7
Restroom	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	S	62	2,080	3	Relamp	No	1	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	2,080	0.0	66	0	$8	$72	$10	7.7
Storage	6	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,080	3, 4	Relamp	Yes	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,435	0.2	576	0	$71	$489	$60	6.1
Elevator Room	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,000	3	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,000	0.0	36	0	$4	$37	$10	6.0
Lower Level Hallway	35	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,080	3, 5	Relamp	Yes	35	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	1,435	1.1	3,363	-1	$413	$2,078	$350	4.2
Lower Level Hallway	2	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	S	62	2,080	3, 5	Relamp	Yes	2	LED - Linear Tubes: (2) U-Lamp	High/Low Control	33	1,435	0.1	180	0	$22	$345	$20	14.7
Stage Access	3	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	2,080	3	Relamp	No	3	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	2,080	0.1	340	0	$42	$164	$45	2.9
Gym Hallway	1	Compact Fluorescent: Biax Lamps	Wall Switch	S	160	2,080	3	Relamp	No	1	LED - Linear Tubes: Biax Lamps	Wall Switch	88	2,080	0.1	165	0	$20	$150	$0	7.4
Stage Access	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,080	3	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,080	0.0	151	0	$19	$73	$20	2.9
Gym	36	Compact Fluorescent: High Output Biax Lamps	Wall Switch	S	216	2,080	3, 4	Relamp	Yes	36	LED - Linear Tubes: High Output Biax Lamps	Occupancy Sensor	156	1,435	2.8	8,925	-2	$1,095	$10,653	$140	9.6
Stage	8	Halogen Incandescent: Cylindrical Fixtures	Wall Switch	S	150	1,000	3	Relamp	No	8	LED Screw-In Lamps: Screw in Lamps	Wall Switch	23	1,000	0.7	1,122	0	$138	$186	$8	1.3
Stage	10	Halogen Incandescent: Spot Light Fixtures	Wall Switch	S	45	1,000	3	Relamp	No	10	LED Screw-In Lamps: Screw in Lamps	Wall Switch	7	1,000	0.3	421	0	$52	$232	$10	4.3

	Existing Conditions						Proposed Conditions								Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Music Suite Hallway	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,080	3	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,080	0.0	151	0	$19	$73	$20	2.9
Practice Room 103	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	1,000	3, 4	Relamp	Yes	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	690	0.5	831	0	$102	$773	$200	5.6
Practice Room 104	18	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	1,000	3, 4	Relamp	Yes	18	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	690	0.8	1,247	0	$153	$1,102	$290	5.3
Practice Room 105	18	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	1,000	3, 4	Relamp	Yes	18	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	690	0.8	1,247	0	$153	$1,102	$290	5.3
Storage Rooms (2 Total)	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,000	3	Relamp	No	4	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,000	0.1	145	0	$18	$146	$40	6.0
Private Room (2 Total)	2	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	2,080	3	Relamp	No	2	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	58	2,080	0.1	256	0	$31	$146	$40	3.4
Office	6	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	2,080	3, 4	Relamp	Yes	6	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,435	0.3	1,016	0	$125	$554	$140	3.3
Storage Room 101	6	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,080	3, 4	Relamp	Yes	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,435	0.2	576	0	$71	$489	$60	6.1
Storage Room 102	6	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,080	3, 4	Relamp	Yes	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,435	0.2	576	0	$71	$489	$60	6.1
Restroom	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,080	3, 4	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,435	0.1	288	0	$35	$380	$65	8.9
Restroom	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	S	62	2,080	3, 4	Relamp	Yes	1	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	1,435	0.0	90	0	$11	$72	$10	5.7
Restroom	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,080	3, 4	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,435	0.1	288	0	$35	$380	$65	8.9
Restroom	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	S	62	2,080	3, 4	Relamp	Yes	1	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	1,435	0.0	90	0	$11	$72	$10	5.7
Closet	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,000	3	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,000	0.0	73	0	$9	$73	$20	6.0
Storage Room 107	6	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,080	3, 4	Relamp	Yes	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,435	0.2	576	0	$71	$489	$60	6.1
Classroom 108	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	2,080	2, 4	Relamp & Reballast	Yes	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,435	0.6	2,004	0	$246	$1,095	$155	3.8
Classroom 109	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	65	2,080	2, 4	Relamp & Reballast	Yes	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,435	0.4	1,235	0	$152	$1,095	$155	6.2
Classroom 110	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	65	2,080	2, 4	Relamp & Reballast	Yes	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,435	0.4	1,235	0	$152	$1,095	$155	6.2
Classroom 111	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	65	2,080	2, 4	Relamp & Reballast	Yes	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,435	0.4	1,235	0	$152	$1,095	$155	6.2
Classroom 112	16	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	65	2,080	2, 4	Relamp & Reballast	Yes	16	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,435	0.5	1,647	0	$202	$1,370	$195	5.8
Classroom 113	16	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	65	2,080	2, 4	Relamp & Reballast	Yes	16	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,435	0.5	1,647	0	$202	$1,370	$195	5.8
Classroom 114	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	65	2,080	2, 4	Relamp & Reballast	Yes	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,435	0.4	1,235	0	$152	$1,095	$155	6.2
Classroom 115	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	65	2,080	2, 4	Relamp & Reballast	Yes	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,435	0.4	1,235	0	$152	$1,095	$155	6.2
Classroom 116	16	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	65	2,080	2, 4	Relamp & Reballast	Yes	16	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,435	0.5	1,647	0	$202	$1,370	$195	5.8
Classroom 117	16	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	65	2,080	2, 4	Relamp & Reballast	Yes	16	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,435	0.5	1,647	0	$202	$1,370	$195	5.8

	Existing Conditions						Proposed Conditions								Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Classroom 118	16	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	65	2,080	2, 4	Relamp & Reballast	Yes	16	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,435	0.5	1,647	0	$202	$1,370	$195	5.8
Stairwell	8	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,080	3	Relamp	No	8	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,080	0.2	604	0	$74	$292	$80	2.9
Stairwell	1	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	S	32	2,080	3	Relamp	No	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	2,080	0.0	40	0	$5	$18	$5	2.7
Stairwell	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	2,080	3	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	2,080	0.0	113	0	$14	$55	$15	2.9
2nd Floor Hallway	46	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	2,080	3, 5	Relamp	Yes	46	LED - Linear Tubes: (3) 4' Lamps	High/Low Control	44	1,435	2.1	6,629	-1	$814	$4,120	$690	4.2
2nd Floor Hallway	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	S	62	2,080	3, 5	Relamp	Yes	1	LED - Linear Tubes: (2) U-Lamp	High/Low Control	33	1,435	0.0	90	0	$11	$72	$10	5.7
Classroom 224	15	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	62	2,080	3, 4	Relamp	Yes	15	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	0.3	1,098	0	$135	$1,362	$295	7.9
Classroom 224	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	S	62	2,080	3, 4	Relamp	Yes	1	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	1,435	0.0	90	0	$11	$72	$10	5.7
Classroom 225	15	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	62	2,080	3, 4	Relamp	Yes	15	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	0.3	1,098	0	$135	$1,362	$295	7.9
Classroom 225	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	S	62	2,080	3, 4	Relamp	Yes	1	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	1,435	0.0	90	0	$11	$72	$10	5.7
Computer Classroom 226	19	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	2,080	3, 4	Relamp	Yes	19	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	0.9	2,738	-1	$336	$1,581	$355	3.6
Restroom	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,080	3, 4	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,435	0.1	288	0	$35	$380	$65	8.9
Restroom	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	S	62	2,080	3, 4	Relamp	Yes	1	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	1,435	0.0	90	0	$11	$72	$10	5.7
Restroom	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,080	3, 4	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,435	0.1	288	0	$35	$380	$65	8.9
Restroom	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	S	62	2,080	3, 4	Relamp	Yes	1	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	1,435	0.0	90	0	$11	$72	$10	5.7
Closet	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,000	3	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,000	0.0	36	0	$4	$37	$10	6.0
Closet	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	S	62	1,000	3	Relamp	No	1	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	1,000	0.0	32	0	$4	$72	$10	16.0
Classroom 204	15	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	65	2,080	3, 4	Relamp	Yes	15	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	0.4	1,201	0	$147	$1,362	$295	7.2
Classroom 204	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	S	62	2,080	3, 4	Relamp	Yes	1	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	1,435	0.0	90	0	$11	$72	$10	5.7
Classroom 206	15	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	65	2,080	3, 4	Relamp	Yes	15	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	0.4	1,201	0	$147	$1,362	$295	7.2
Classroom 206	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	S	62	2,080	3, 4	Relamp	Yes	1	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	1,435	0.0	90	0	$11	$72	$10	5.7
Classroom 208	15	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	65	2,080	3, 4	Relamp	Yes	15	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	0.4	1,201	0	$147	$1,362	$295	7.2
Classroom 208	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	S	62	2,080	3, 4	Relamp	Yes	1	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	1,435	0.0	90	0	$11	$72	$10	5.7
Classroom 213	15	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	65	2,080	3, 4	Relamp	Yes	15	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	0.4	1,201	0	$147	$1,362	$295	7.2

	Existing Conditions						Proposed Conditions								Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Classroom 213	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	S	62	2,080	3, 4	Relamp	Yes	1	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	1,435	0.0	90	0	$11	$72	$10	5.7
Classroom 215	15	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	65	2,080	3, 4	Relamp	Yes	15	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	0.4	1,201	0	$147	$1,362	$295	7.2
Classroom 215	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	S	62	2,080	3, 4	Relamp	Yes	1	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	1,435	0.0	90	0	$11	$72	$10	5.7
Classroom 218	15	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	65	2,080	3, 4	Relamp	Yes	15	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	0.4	1,201	0	$147	$1,362	$295	7.2
Classroom 218	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	S	62	2,080	3, 4	Relamp	Yes	1	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	1,435	0.0	90	0	$11	$72	$10	5.7
Classroom 223	15	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	65	2,080	3, 4	Relamp	Yes	15	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	0.4	1,201	0	$147	$1,362	$295	7.2
Classroom 223	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	S	62	2,080	3, 4	Relamp	Yes	1	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	1,435	0.0	90	0	$11	$72	$10	5.7
Classroom 222	15	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	65	2,080	3, 4	Relamp	Yes	15	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	0.4	1,201	0	$147	$1,362	$295	7.2
Classroom 222	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	S	62	2,080	3, 4	Relamp	Yes	1	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	1,435	0.0	90	0	$11	$72	$10	5.7
Classroom 221	7	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	65	2,080	3, 4	Relamp	Yes	7	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	0.2	560	0	$69	$923	$175	10.9
Classroom 221	1	Compact Fluorescent: Biax Lamps	Wall Switch	S	120	2,080	3, 4	Relamp	Yes	1	LED - Linear Tubes: Biax Lamps	Occupancy Sensor	88	1,435	0.0	136	0	$17	$150	$0	9.0
Classroom 217	7	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	65	2,080	3, 4	Relamp	Yes	7	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	0.2	560	0	$69	$923	$175	10.9
Classroom 217	1	Compact Fluorescent: Biax Lamps	Wall Switch	S	120	2,080	3, 4	Relamp	Yes	1	LED - Linear Tubes: Biax Lamps	Occupancy Sensor	88	1,435	0.0	136	0	$17	$150	$0	9.0
Classroom 202	7	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	65	2,080	3, 4	Relamp	Yes	7	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	0.2	560	0	$69	$923	$175	10.9
Classroom 202	1	Compact Fluorescent: Biax Lamps	Wall Switch	S	120	2,080	3, 4	Relamp	Yes	1	LED - Linear Tubes: Biax Lamps	Occupancy Sensor	88	1,435	0.0	136	0	$17	$150	$0	9.0
Classroom 220	8	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	65	2,080	3, 4	Relamp	Yes	8	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	0.2	640	0	$79	$708	$155	7.0
Classroom 201	8	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	65	2,080	3, 4	Relamp	Yes	8	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	0.2	640	0	$79	$708	$155	7.0
Classroom 219	8	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	65	2,080	3, 4	Relamp	Yes	8	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	0.2	640	0	$79	$708	$155	7.0
Classroom 216	8	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	65	2,080	3, 4	Relamp	Yes	8	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	0.2	640	0	$79	$708	$155	7.0
Art Classroom 212	20	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	65	2,080	3, 4	Relamp	Yes	20	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	0.5	1,601	0	$196	$1,635	$370	6.4
Art Classroom 214	20	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	65	2,080	3, 4	Relamp	Yes	20	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	0.5	1,601	0	$196	$1,635	$370	6.4
Supply Room	9	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	65	1,000	3, 4	Relamp	Yes	9	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	690	0.2	346	0	$43	$763	$135	14.8
Storage Room 238	6	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,000	3, 4	Relamp	Yes	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	690	0.2	277	0	$34	$489	$60	12.6
MDF Room 239	6	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,000	3	Relamp	No	6	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,000	0.1	218	0	$27	$219	$60	6.0
Storage Room 240	12	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,000	3, 4	Relamp	Yes	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	690	0.4	554	0	$68	$708	$120	8.6

	Existing Conditions						Proposed Conditions								Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Storage Room 203	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,000	3, 4	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	690	0.1	139	0	$17	$380	$30	20.6
Storage Room 210	12	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,000	3, 4	Relamp	Yes	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	690	0.4	554	0	$68	$708	$120	8.6
Classroom 205	10	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	65	2,080	3, 4	Relamp	Yes	10	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	0.3	800	0	$98	$818	$185	6.4
Classroom 205	2	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	S	62	2,080	3, 4	Relamp	Yes	2	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	1,435	0.1	180	0	$22	$145	$20	5.7
Classroom 207	10	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	65	2,080	3, 4	Relamp	Yes	10	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	0.3	800	0	$98	$818	$185	6.4
Classroom 207	2	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	S	62	2,080	3, 4	Relamp	Yes	2	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	1,435	0.1	180	0	$22	$145	$20	5.7
Classroom 209	13	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	65	2,080	3, 4	Relamp	Yes	13	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	0.3	1,041	0	$128	$982	$230	5.9
Classroom 209	2	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	S	62	2,080	3, 4	Relamp	Yes	2	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	1,435	0.1	180	0	$22	$145	$20	5.7
Classroom 211	13	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	65	2,080	3, 4	Relamp	Yes	13	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	0.3	1,041	0	$128	$982	$230	5.9
Classroom 211	2	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	S	62	2,080	3, 4	Relamp	Yes	2	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	1,435	0.1	180	0	$22	$145	$20	5.7
Guidance Office 227	3	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	65	2,080	2, 4	Relamp & Reballast	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,435	0.1	309	0	$38	$322	$50	7.2
Office	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	65	2,080	2, 4	Relamp & Reballast	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,435	0.1	206	0	$25	$254	$40	8.5
Office	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	65	2,080	2, 4	Relamp & Reballast	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,435	0.1	206	0	$25	$254	$40	8.5
Counselor Office 228	6	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	65	2,080	2, 4	Relamp & Reballast	Yes	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,435	0.2	618	0	$76	$529	$80	5.9
Faculty Room 229	10	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	65	2,080	2, 4	Relamp & Reballast	Yes	10	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,435	0.3	1,029	0	$126	$958	$135	6.5
Restroom	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	S	62	2,080	3	Relamp	No	1	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	2,080	0.0	66	0	$8	$72	$10	7.7
Restroom	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	S	62	2,080	3	Relamp	No	1	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	2,080	0.0	66	0	$8	$72	$10	7.7
Childs Study Room 230	9	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	65	2,080	2, 4	Relamp & Reballast	Yes	9	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,435	0.3	926	0	$114	$889	$125	6.7
Nurses Office 231	9	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	65	2,080	2	Relamp & Reballast	No	9	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,080	0.2	741	0	$91	$619	$90	5.8
Nurses Office 231	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	65	2,080	2	Relamp & Reballast	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,080	0.1	165	0	$20	$138	$20	5.8
Restroom	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	S	62	2,080	3	Relamp	No	1	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	2,080	0.0	66	0	$8	$72	$10	7.7
Main Lobby	6	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	S	62	2,080	3, 5	Relamp	Yes	6	LED - Linear Tubes: (2) U-Lamp	High/Low Control	33	1,435	0.2	539	0	$66	$635	$60	8.7
Vestibule	2	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	S	62	2,080	3	Relamp	No	2	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	2,080	0.0	133	0	$16	$145	$20	7.7
Main Office 232	5	Compact Fluorescent: Plug in Lamps	Wall Switch	S	14	2,080	3, 4	Relamp	Yes	5	LED - Linear Tubes: Plug in Lamps	Occupancy Sensor	10	1,435	0.0	81	0	$10	$326	$35	29.2
Main Office 232	5	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	S	62	2,080	3, 4	Relamp	Yes	5	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	1,435	0.1	449	0	$55	$632	$85	9.9

	Existing Conditions						Proposed Conditions								Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Main Office 232	6	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	65	2,080	3, 4	Relamp	Yes	6	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	0.2	480	0	$59	$599	$125	8.0
Copy Room	4	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	65	2,080	3, 4	Relamp	Yes	4	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	0.1	320	0	$39	$335	$80	6.5
Hallway	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,080	3, 5	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	1,435	0.1	384	0	$47	$346	$40	6.5
Office	4	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	65	2,080	3, 4	Relamp	Yes	4	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	0.1	320	0	$39	$335	$80	6.5
Conference Room	4	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	65	2,080	3, 4	Relamp	Yes	4	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	0.1	320	0	$39	$335	$80	6.5
Restroom	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	S	62	2,080	3	Relamp	No	1	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	2,080	0.0	66	0	$8	$72	$10	7.7
Restroom	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	S	62	2,080	3	Relamp	No	1	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	2,080	0.0	66	0	$8	$72	$10	7.7
Office VP	4	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	65	2,080	3, 4	Relamp	Yes	4	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	0.1	320	0	$39	$335	$80	6.5
Office Principal	4	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	65	2,080	3, 4	Relamp	Yes	4	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	0.1	320	0	$39	$335	$80	6.5
Hallway	13	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,080	3, 5	Relamp	Yes	13	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	1,435	0.4	1,249	0	$153	$875	$130	4.9
Classroom 234	12	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	88	2,080	2, 4	Relamp & Reballast	Yes	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,435	0.6	1,867	0	$229	$1,095	$155	4.1
Closets	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,000	3	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,000	0.0	73	0	$9	$73	$20	6.0
Kitchenette	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	S	62	1,000	3	Relamp	No	1	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	1,000	0.0	32	0	$4	$72	$10	16.0
Restroom	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	S	62	2,080	3	Relamp	No	1	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	2,080	0.0	66	0	$8	$72	$10	7.7
Classroom 233	12	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	2,080	2, 4	Relamp & Reballast	Yes	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,435	0.8	2,581	-1	$317	$1,095	$155	3.0
Closets	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,000	3	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,000	0.0	73	0	$9	$73	$20	6.0
Kitchenette	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	S	62	1,000	3	Relamp	No	1	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	1,000	0.0	32	0	$4	$72	$10	16.0
Restroom	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	S	62	2,080	3	Relamp	No	1	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	2,080	0.0	66	0	$8	$72	$10	7.7
Classroom 235	12	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	2,080	2, 4	Relamp & Reballast	Yes	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,435	0.8	2,581	-1	$317	$1,095	$155	3.0
Closets	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,000	3	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,000	0.0	73	0	$9	$73	$20	6.0
Kitchenette	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	S	62	1,000	3	Relamp	No	1	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	1,000	0.0	32	0	$4	$72	$10	16.0
Restroom	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	S	62	2,080	3	Relamp	No	1	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	2,080	0.0	66	0	$8	$72	$10	7.7
Classroom 236	12	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	88	2,080	2, 4	Relamp & Reballast	Yes	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,435	0.6	1,867	0	$229	$1,095	$155	4.1
Closets	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,000	3	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,000	0.0	73	0	$9	$73	$20	6.0
Kitchenette	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	S	62	1,000	3	Relamp	No	1	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	1,000	0.0	32	0	$4	$72	$10	16.0

	Existing Conditions						Proposed Conditions								Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Restroom	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	S	62	2,080	3	Relamp	No	1	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	2,080	0.0	66	0	$8	$72	$10	7.7
Garage Room 237	12	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,080	3, 4	Relamp	Yes	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,435	0.4	1,153	0	$142	$708	$155	3.9
Stairwell	3	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	2,080	3	Relamp	No	3	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	2,080	0.1	340	0	$42	$164	$45	2.9
Vestibule	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,080	3	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,080	0.0	76	0	$9	$37	$10	2.9
3rd Floor Hallway	26	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,080	3, 5	Relamp	Yes	26	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	1,435	0.8	2,498	-1	$307	$1,749	$260	4.9
Classroom 340	9	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	65	2,080	3, 4	Relamp	Yes	9	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	0.2	720	0	$88	$763	$170	6.7
Classroom 341	9	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	65	2,080	3, 4	Relamp	Yes	9	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	0.2	720	0	$88	$763	$170	6.7
OP/TP Room 342	9	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	65	2,080	3, 4	Relamp	Yes	9	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	0.2	720	0	$88	$763	$170	6.7
Office Room 343	6	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	65	2,080	3, 4	Relamp	Yes	6	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	0.2	480	0	$59	$445	$110	5.7
Storage Room 344	6	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,080	3, 4	Relamp	Yes	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,435	0.2	576	0	$71	$489	$60	6.1
Restroom	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	S	62	2,080	3	Relamp	No	1	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	2,080	0.0	66	0	$8	$72	$10	7.7
Restroom	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	S	62	2,080	3	Relamp	No	1	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	2,080	0.0	66	0	$8	$72	$10	7.7
Closets	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,000	3	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,000	0.0	73	0	$9	$73	$20	6.0
Aux Gym (Pre-K)	16	Compact Fluorescent: High Output Biax Lamps	Wall Switch	S	216	2,080	3, 4	Relamp	Yes	16	LED - Linear Tubes: High Output Biax Lamps	Occupancy Sensor	156	1,435	1.2	3,967	-1	$487	$720	$70	1.3
Storage	6	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,000	3, 4	Relamp	Yes	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	690	0.2	277	0	$34	$489	$60	12.6
Storage	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,000	3	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,000	0.0	73	0	$9	$73	$20	6.0
Classroom 333	15	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	2,080	3, 4	Relamp	Yes	15	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	0.7	2,162	0	$265	$1,362	$295	4.0
Classroom 334	15	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	2,080	3, 4	Relamp	Yes	15	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	0.7	2,162	0	$265	$1,362	$295	4.0
Classroom 335	15	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	2,080	3, 4	Relamp	Yes	15	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	0.7	2,162	0	$265	$1,362	$295	4.0
Classroom 336	15	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	2,080	3, 4	Relamp	Yes	15	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	0.7	2,162	0	$265	$1,362	$295	4.0
Classroom 337	15	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	2,080	3, 4	Relamp	Yes	15	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	0.7	2,162	0	$265	$1,362	$295	4.0
Classroom 338	15	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	2,080	3, 4	Relamp	Yes	15	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	0.7	2,162	0	$265	$1,362	$295	4.0
Classroom 345	15	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	2,080	3, 4	Relamp	Yes	15	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	0.7	2,162	0	$265	$1,362	$295	4.0
Classroom 346	15	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	2,080	3, 4	Relamp	Yes	15	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	0.7	2,162	0	$265	$1,362	$295	4.0
Classroom 347	15	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	2,080	3, 4	Relamp	Yes	15	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	0.7	2,162	0	$265	$1,362	$295	4.0

	Existing Conditions						Proposed Conditions								Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Classroom 348	15	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	2,080	3, 4	Relamp	Yes	15	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	0.7	2,162	0	$265	$1,362	$295	4.0
Classroom 349	15	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	2,080	3, 4	Relamp	Yes	15	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	0.7	2,162	0	$265	$1,362	$295	4.0
Classroom 350	15	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	2,080	3, 4	Relamp	Yes	15	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	0.7	2,162	0	$265	$1,362	$295	4.0
Hallway	74	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	2,080	3, 5	Relamp	Yes	74	LED - Linear Tubes: (3) 4' Lamps	High/Low Control	44	1,435	3.4	10,664	-2	$1,309	$6,453	$1,110	4.1
Hallway	2	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	S	62	2,080	3, 5	Relamp	Yes	2	LED - Linear Tubes: (2) U-Lamp	High/Low Control	33	1,435	0.1	180	0	$22	$145	$20	5.7
Storage Room 330	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,000	3, 4	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	690	0.1	185	0	$23	$416	$40	16.6
Storage Room 332	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,000	3, 4	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	690	0.1	185	0	$23	$416	$40	16.6
Classroom 331	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	65	2,080	2, 4	Relamp & Reballast	Yes	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,435	0.4	1,235	0	$152	$1,365	$190	7.8
Classroom 305	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	65	2,080	2, 4	Relamp & Reballast	Yes	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,435	0.4	1,235	0	$152	$1,095	$155	6.2
Classroom 306	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	65	2,080	2, 4	Relamp & Reballast	Yes	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,435	0.4	1,235	0	$152	$1,095	$155	6.2
Classroom 307	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	65	2,080	2, 4	Relamp & Reballast	Yes	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,435	0.4	1,235	0	$152	$1,095	$155	6.2
Classroom 311	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	65	2,080	2, 4	Relamp & Reballast	Yes	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,435	0.4	1,235	0	$152	$1,095	$155	6.2
Classroom 324	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	65	2,080	2, 4	Relamp & Reballast	Yes	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,435	0.4	1,235	0	$152	$1,095	$155	6.2
Classroom 313	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	65	2,080	2, 4	Relamp & Reballast	Yes	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,435	0.4	1,235	0	$152	$1,095	$155	6.2
Classroom 314	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	65	2,080	2, 4	Relamp & Reballast	Yes	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,435	0.4	1,235	0	$152	$1,095	$155	6.2
Classroom 315	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	65	2,080	2, 4	Relamp & Reballast	Yes	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,435	0.4	1,235	0	$152	$1,095	$155	6.2
Classroom 316	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	65	2,080	2, 4	Relamp & Reballast	Yes	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,435	0.4	1,235	0	$152	$1,095	$155	6.2
Classroom 321	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	65	2,080	2, 4	Relamp & Reballast	Yes	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,435	0.4	1,235	0	$152	$1,095	$155	6.2
Classroom 327	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	65	2,080	2, 4	Relamp & Reballast	Yes	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,435	0.4	1,235	0	$152	$1,095	$155	6.2
Classroom 328	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	65	2,080	2, 4	Relamp & Reballast	Yes	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,435	0.4	1,235	0	$152	$1,095	$155	6.2
Classroom 329	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	65	2,080	2, 4	Relamp & Reballast	Yes	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,435	0.4	1,235	0	$152	$1,095	$155	6.2
Classroom 360	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	65	2,080	2, 4	Relamp & Reballast	Yes	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,435	0.4	1,235	0	$152	$1,095	$155	6.2
Classroom 361	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	65	2,080	2, 4	Relamp & Reballast	Yes	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,435	0.4	1,235	0	$152	$1,095	$155	6.2
Classroom 362	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	65	2,080	2, 4	Relamp & Reballast	Yes	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,435	0.4	1,235	0	$152	$1,095	$155	6.2
Classroom 363	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	65	2,080	2, 4	Relamp & Reballast	Yes	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,435	0.4	1,235	0	$152	$1,095	$155	6.2

	Existing Conditions						Proposed Conditions								Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Classroom 366	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	65	2,080	2, 4	Relamp & Reballast	Yes	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,435	0.4	1,235	0	$152	$1,095	$155	6.2
Classroom 367	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	65	2,080	2, 4	Relamp & Reballast	Yes	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,435	0.4	1,235	0	$152	$1,095	$155	6.2
Classroom 370	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	65	2,080	2, 4	Relamp & Reballast	Yes	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,435	0.4	1,235	0	$152	$1,095	$155	6.2
Classroom 371	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	65	2,080	2, 4	Relamp & Reballast	Yes	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,435	0.4	1,235	0	$152	$1,095	$155	6.2
Classroom 372	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	65	2,080	2, 4	Relamp & Reballast	Yes	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,435	0.4	1,235	0	$152	$1,095	$155	6.2
Classroom 373	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	65	2,080	2, 4	Relamp & Reballast	Yes	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,435	0.4	1,235	0	$152	$1,095	$155	6.2
Classroom 374	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	65	2,080	2, 4	Relamp & Reballast	Yes	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,435	0.4	1,235	0	$152	$1,095	$155	6.2
Classroom 302	8	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	65	2,080	2, 4	Relamp & Reballast	Yes	8	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,435	0.3	823	0	$101	$820	$115	7.0
Classroom 303	8	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	65	2,080	2, 4	Relamp & Reballast	Yes	8	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,435	0.3	823	0	$101	$820	$115	7.0
Classroom 319	8	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	65	2,080	2, 4	Relamp & Reballast	Yes	8	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,435	0.3	823	0	$101	$820	$115	7.0
Classroom 320	8	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	65	2,080	2, 4	Relamp & Reballast	Yes	8	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,435	0.3	823	0	$101	$820	$115	7.0
Classroom 322	8	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	65	2,080	2, 4	Relamp & Reballast	Yes	8	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,435	0.3	823	0	$101	$820	$115	7.0
Classroom 323	8	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	65	2,080	2, 4	Relamp & Reballast	Yes	8	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,435	0.3	823	0	$101	$820	$115	7.0
Classroom 324	8	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	65	2,080	2, 4	Relamp & Reballast	Yes	8	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,435	0.3	823	0	$101	$820	$115	7.0
Classroom 325	8	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	65	2,080	2, 4	Relamp & Reballast	Yes	8	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,435	0.3	823	0	$101	$820	$115	7.0
Classroom 326	8	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	65	2,080	2, 4	Relamp & Reballast	Yes	8	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,435	0.3	823	0	$101	$820	$115	7.0
Classroom 375	8	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	65	2,080	2, 4	Relamp & Reballast	Yes	8	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,435	0.3	823	0	$101	$820	$115	7.0
Faculty Room 317	12	Linear Fluorescent - T8: 2' T8 (17W) - 3L	Wall Switch	S	53	2,080	3, 4	Relamp	Yes	12	LED - Linear Tubes: (3) 2' Lamps	Occupancy Sensor	26	1,435	0.3	972	0	$119	$855	$143	6.0
Restroom	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	S	62	2,080	3	Relamp	No	1	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	2,080	0.0	66	0	$8	$72	$10	7.7
Restroom	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	S	62	2,080	3	Relamp	No	1	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	2,080	0.0	66	0	$8	$72	$10	7.7
IDF Room 316	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,000	3	Relamp	No	4	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,000	0.1	145	0	$18	$146	$40	6.0
IDF Room 379	4	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	65	1,000	3	Relamp	No	4	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	1,000	0.1	95	0	$12	$219	$60	13.7
Computer Room	21	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	65	2,080	3, 4	Relamp	Yes	21	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	0.5	1,681	0	$206	$1,690	$385	6.3
Library	50	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	65	2,080	3, 4	Relamp	Yes	50	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	1.3	4,002	-1	$491	$3,549	$855	5.5
Library	15	Compact Fluorescent: Plug in Lamps	Wall Switch	S	14	2,080	3, 4	Relamp	Yes	15	LED - Linear Tubes: Plug in Lamps	Occupancy Sensor	10	1,435	0.1	244	0	$30	$439	$35	13.5

	Existing Conditions						Proposed Conditions								Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Library	2	Compact Fluorescent: Biax Lamps	Wall Switch	S	120	2,080	3, 4	Relamp	Yes	2	LED - Linear Tubes: Biax Lamps	Occupancy Sensor	88	1,435	0.1	271	0	$33	$570	$35	16.1
Room 304	9	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	2,080	3, 4	Relamp	Yes	9	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	0.4	1,297	0	$159	$763	$170	3.7
Room 304	3	Linear Fluorescent - T8: 2' T8 (17W) - 3L	Wall Switch	S	53	2,080	3, 4	Relamp	Yes	3	LED - Linear Tubes: (3) 2' Lamps	Occupancy Sensor	26	1,435	0.1	243	0	$30	$281	$45	7.9
Room 304	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,080	3, 4	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,435	0.1	192	0	$24	$208	$38	7.2
Room 304	2	Compact Fluorescent: Plug in Lamps	Wall Switch	S	14	2,080	3, 4	Relamp	Yes	2	LED - Linear Tubes: Plug in Lamps	Occupancy Sensor	10	1,435	0.0	32	0	$4	$23	$0	5.6
Storage	5	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	1,000	3, 4	Relamp	Yes	5	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	690	0.2	346	0	$43	$544	$75	11.0
Storage	1	Compact Fluorescent: Biax Lamps	Wall Switch	S	120	1,000	3	Relamp	No	1	LED - Linear Tubes: Biax Lamps	Wall Switch	10	1,000	0.1	121	0	$15	$11	$0	0.8
Faculty Room 377	8	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	2,080	3, 4	Relamp	Yes	8	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	0.4	1,153	0	$142	$708	$155	3.9
Restroom	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	S	62	2,080	3	Relamp	No	1	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	2,080	0.0	66	0	$8	$72	$10	7.7
Restroom	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	S	62	2,080	3	Relamp	No	1	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	2,080	0.0	66	0	$8	$72	$10	7.7
Meh/Storage 376	12	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,000	3	Relamp	No	12	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,000	0.3	436	0	$53	$438	$120	6.0
Restroom	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	S	62	2,080	3	Relamp	No	1	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	2,080	0.0	66	0	$8	$72	$10	7.7
Restroom	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	S	62	2,080	3	Relamp	No	1	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	2,080	0.0	66	0	$8	$72	$10	7.7
Closets	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,000	3	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,000	0.0	73	0	$9	$73	$20	6.0
Restroom	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	S	62	2,080	3	Relamp	No	1	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	2,080	0.0	66	0	$8	$72	$10	7.7
Restroom	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	S	62	2,080	3	Relamp	No	1	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	2,080	0.0	66	0	$8	$72	$10	7.7
Computer Room 337	16	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	65	2,080	3, 4	Relamp	Yes	16	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	0.4	1,281	0	$157	$1,146	$275	5.5
Computer Room 359	16	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	65	2,080	3, 4	Relamp	Yes	16	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	0.4	1,281	0	$157	$1,146	$275	5.5
Classroom 358	16	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	65	2,080	2, 4	Relamp & Reballast	Yes	16	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,435	0.5	1,647	0	$202	$1,370	$195	5.8
Classroom 358	2	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	S	62	2,080	3, 4	Relamp	Yes	2	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	1,435	0.1	180	0	$22	$145	$20	5.7
Classroom 357	16	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	65	2,080	2, 4	Relamp & Reballast	Yes	16	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,435	0.5	1,647	0	$202	$1,370	$195	5.8
Classroom 357	2	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	S	62	2,080	3, 4	Relamp	Yes	2	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	1,435	0.1	180	0	$22	$145	$20	5.7
Classroom 353	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	65	2,080	2, 4	Relamp & Reballast	Yes	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,435	0.4	1,235	0	$152	$1,095	$155	6.2
Classroom 354	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	65	2,080	3, 4	Relamp	Yes	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	0.3	961	0	$118	$927	$215	6.0
Classroom 355	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	65	2,080	2, 4	Relamp & Reballast	Yes	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,435	0.4	1,235	0	$152	$1,095	$155	6.2

	Existing Conditions						Proposed Conditions								Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Classroom 356	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	65	2,080	2, 4	Relamp & Reballast	Yes	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,435	0.4	1,235	0	$152	$1,095	$155	6.2
Copy Room	8	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	65	2,080	2, 4	Relamp & Reballast	Yes	8	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,435	0.3	823	0	$101	$820	$115	7.0
Server Room	6	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,080	3	Relamp	No	6	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,080	0.1	453	0	$56	$219	$60	2.9
Exterior	22	Compact Fluorescent: Plug in Lamps	Timeclock	S	14	4,015	1	Fixture Replacement	No	22	LED - Fixtures: Other	Timeclock	10	4,015	0.0	353	0	$44	$2,186	$110	47.2
Exterior	6	Metal Halide: (1) 70W Lamp	Timeclock	S	95	4,015	1	Fixture Replacement	No	6	LED - Fixtures: Other	Timeclock	29	4,015	0.0	1,602	0	$200	$1,192	$30	5.8
Exterior	12	Metal Halide: (1) 250W Lamp	Timeclock	S	295	4,015	1	Fixture Replacement	No	12	LED - Fixtures: Outdoor Pole/Arm-Mounted Area/Roadway Fixture	Timeclock	89	4,015	0.0	9,949	0	$1,239	$11,167	$1,200	8.0
Exterior	22	Metal Halide: (1) 400W Lamp	Timeclock	S	458	4,015	1	Fixture Replacement	No	22	LED - Fixtures: Outdoor Pole/Arm-Mounted Area/Roadway Fixture	Timeclock	137	4,015	0.0	28,319	0	$3,527	$20,472	$2,200	5.2
Exterior	1	Metal Halide: (1) 70W Lamp	Timeclock	S	95	4,015	1	Fixture Replacement	No	1	LED - Fixtures: Other	Timeclock	29	4,015	0.0	267	0	$33	$199	$5	5.8
Exterior	18	Compact Fluorescent: Plug in Lamps	Timeclock	S	14	4,015	1	Fixture Replacement	No	18	LED - Fixtures: Downlight Recessed	Timeclock	10	4,015	0.0	289	0	$36	$1,366	$90	35.4

Motor Inventory & Recommendations

		Existing Conditions							Proposed Conditions					Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	Motor Quantity	Motor Application	HP Per Motor	Full Load Efficiency	VFD Control?	Remaining Useful Life	Annual Operating Hours	ECM #	Install High Efficiency Motors?	Full Load Efficiency	Install VFDs?	Number of VFDs	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Boiler Room	Hydronic Heating	2	Heating Hot Water Pump	40.0	94.5%	No	N	914	NR, 6	Yes	94.5%	Yes	2	7.7	21,639	0	$2,695	$26,744	$0	9.9
Boiler Room	Boiler Circulators	6	Boiler Feed Water Pump	1.0	82.5%	No	W	609		No	82.5%	No		0.0	0	0	$0	$0	$0	0.0
Boiler Room	Boiler Burners	6	Boiler Feed Water Pump	0.8	74.0%	No	W	609		No	74.0%	No		0.0	0	0	$0	$0	$0	0.0
Boiler Room	Boiler Exhaust	6	Combustion Air Fan	0.3	74.0%	No	W	609		No	74.0%	No		0.0	0	0	$0	$0	$0	0.0
Boiler Room	DHW Circulator	1	Water Supply Pump	0.8	74.0%	No	B	1,373		No	74.0%	No		0.0	0	0	$0	$0	$0	0.0
Boiler Room	DHW Burner	1	Water Supply Pump	0.3	74.0%	No	B	1,373		No	74.0%	No		0.0	0	0	$0	$0	$0	0.0
Elevator	Elevator	2	Other	75.0	70.0%	No	B	110		No	70.0%	No		0.0	0	0	$0	$0	$0	0.0
Roof Above Café	RTU-1 & 3	2	Supply Fan	10.0	80.6%	No	W	1,218	NR, NR	Yes	91.7%	Yes	2	6.3	10,314	0	$1,285	$10,303	$1,600	6.8
Roof Above Café	RTU-1 & 3	2	Exhaust Fan	7.5	80.6%	No	W	1,218	NR	Yes	91.7%	No		0.5	1,543	0	$192	$2,308	$0	12.0
Roof Above Café	RTU-1 & 3	2	Other	0.1	74.0%	No	W	1,218		No	74.0%	No		0.0	0	0	$0	$0	$0	0.0
Roof Above Café	EF-3	1	Exhaust Fan	0.8	74.0%	No	W	1,373		No	74.0%	No		0.0	0	0	$0	$0	$0	0.0
Roof Above Gym	RTU-14,15,16,17	4	Supply Fan	7.5	80.6%	No	W	1,218	NR, NR	Yes	91.0%	Yes	4	9.4	15,317	0	$1,908	$18,953	$2,400	8.7
Roof Above Gym	RTU-14,15,16,17	4	Exhaust Fan	7.5	80.6%	No	W	1,218		No	80.6%	No		0.0	0	0	$0	$0	$0	0.0
Roof Above Gym	RTU-14,15,16,17	4	Other	0.5	74.0%	No	W	1,218		No	74.0%	No		0.0	0	0	$0	$0	$0	0.0
Main Roof	General Building Exhaust	48	Exhaust Fan	0.2	74.0%	No	W	1,373		No	74.0%	No		0.0	0	0	$0	$0	$0	0.0
Roof	RTU w/Electric Heat	2	Supply Fan	5.0	78.8%	No	W	1,218	NR, NR	Yes	88.5%	Yes	2	2.2	3,743	0	$466	$8,260	$1,550	14.4
Roof	RTU w/Electric Heat	1	Supply Fan	7.5	88.5%	No	W	1,218	NR, NR	Yes	89.5%	Yes	1	1.4	1,984	0	$247	$4,660	$1,163	14.2
Roof	RTU-12&13	2	Supply Fan	2.0	84.0%	Yes	W	1,218		No	84.0%	No		0.0	0	0	$0	$0	$0	0.0
Roof	RTU-2&11	2	Supply Fan	3.8	84.0%	Yes	W	1,218		No	84.0%	No		0.0	0	0	$0	$0	$0	0.0
Mechanical Rooms	AHU-1-6	6	Supply Fan	1.0	74.0%	Yes	W	1,218		No	74.0%	No		0.0	0	0	$0	$0	$0	0.0

Electric HVAC Inventory & Recommendations

		Existing Conditions					Proposed Conditions								Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	System Quantity	System Type	Cooling Capacity per Unit (Tons)	Heating Capacity per Unit (MBh)	Remaining Useful Life	ECM #	Install High Efficiency System?	System Quantity	System Type	Cooling Capacity per Unit (Tons)	Heating Capacity per Unit (MBh)	Cooling Mode Efficiency (SEER/EER)	Heating Mode Efficiency (COP)	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Roof Above Café	RTU-1&3	2	Packaged AC	26.00		B	NR	Yes	2	Packaged AC	26.00		12.00		3.7	4,090	0	$509	$73,244	$4,108	135.7
Roof Above Café	RTU-10	1	Packaged Air-Source HP	15.00	122.94	B	NR	Yes	1	Packaged Air-Source HP	15.00	122.94	13.00	3.60	1.1	19,671	0	$2,450	$24,714	$1,185	9.6
Roof Above Café	No Tag	1	Packaged AC	10.00		B	NR	Yes	1	Packaged AC	10.00		11.50		0.7	804	0	$100	$14,241	$730	134.9
Roof Above Café	Split AC Outdoor Condensing Units (ODCs)	1	Split-System AC	1.00		B	NR	Yes	1	Split-System AC	1.00		14.00		0.1	132	0	$16	$1,496	$92	85.3
Roof Above Gym	RTU-16&17	2	Packaged AC	26.00		B	NR	Yes	2	Packaged AC	26.00		12.00		3.7	4,090	0	$509	$76,416	$4,108	142.0
Roof Above Gym	RTU-14&15	2	Packaged AC	26.00		B	NR	Yes	2	Packaged AC	26.00		12.00		3.7	4,090	0	$509	$76,416	$4,108	142.0
Roof Above Gym	Split AC Outdoor Condensing Units (ODCs)	1	Split-System AC	2.50		B	NR	Yes	1	Split-System AC	2.50		14.00		0.2	222	0	$28	$3,741	$230	127.2
Roof Above Gym	Split AC Outdoor Condensing Units (ODCs)	2	Split-System AC	1.00		B	NR	Yes	2	Split-System AC	1.00		14.00		0.2	264	0	$33	$2,992	$184	85.3
Roof Above Gym	Split AC Outdoor Condensing Units (ODCs)	2	Split-System AC	0.75		B	NR	Yes	2	Split-System AC	0.75		14.00		0.2	198	0	$25	$2,244	$138	85.3
Main Roof	Above Classroom Wing 359-375	2	Split-System Air-Source HP	4.00	28.00	N	NR	Yes	2	Split-System Air-Source HP	4.00	28.00	14.00	3.80	0.5	2,107	0	$262	$13,527	$736	48.7
Main Roof	Above Classroom Wing 359-375	1	Packaged Air-Source HP	15.00	122.94	B	NR	Yes	1	Packaged Air-Source HP	15.00	122.94	13.00	3.60	1.1	19,671	0	$2,450	$24,714	$1,185	9.6
Main Roof	Split AC Outdoor Condensing Units (ODCs)	1	Split-System AC	2.00		B	NR	Yes	1	Split-System AC	2.00		14.00		0.2	225	0	$28	$2,992	$184	100.1
Main Roof	RTU-12 & 13 Serve the Guidance Office	2	Packaged AC	7.50		B	NR	Yes	2	Packaged AC	7.50		12.00		0.5	501	0	$62	$26,732	$1,095	410.6
Main Roof	Above Classroom Wing 359-375 & 305-315	14	Split-System Air-Source HP	2.00	14.00	B	NR	Yes	14	Split-System Air-Source HP	2.00	14.00	14.00	3.80	4.5	14,617	0	$1,820	$47,345	$2,576	24.6
Main Roof	Above Classroom Wing 359-375 & 305-315	4	Split-System AC	1.50		B	NR	Yes	4	Split-System AC	1.50		14.00		1.0	1,070	0	$133	$8,977	$552	63.2
Main Roof	Above Classroom Wing 359-375 & 305-315	1	Split-System AC	2.50		W	NR	Yes	1	Split-System AC	2.50		14.00		0.2	224	0	$28	$3,741	$230	126.1
Main Roof	At Corner Junction near Faculty Room 317	1	Split-System AC	1.50		B	NR	Yes	1	Split-System AC	1.50		14.00		0.2	231	0	$29	$2,244	$138	73.3
Main Roof	Above Classroom Wing 318-329	1	Split-System AC	1.50		B	NR	Yes	1	Split-System AC	1.50		14.00		0.2	231	0	$29	$2,244	$138	73.3
Main Roof	RTU-8 Serves Library Area	1	Packaged AC	7.50		B	NR	Yes	1	Packaged AC	7.50		12.00		0.6	694	0	$86	$13,366	$548	148.4
Main Roof	Split AC Outdoor Condensing Units (ODCs)	1	Split-System AC	3.00		B	NR	Yes	1	Split-System AC	3.00		14.00		0.2	266	0	$33	$4,489	$276	127.2

		Existing Conditions					Proposed Conditions								Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	System Quantity	System Type	Cooling Capacity per Unit (Tons)	Heating Capacity per Unit (kBtu/hr)	Remaining Useful Life	ECM #	Install High Efficiency System?	System Quantity	System Type	Cooling Capacity per Unit (Tons)	Heating Capacity per Unit (kBtu/hr)	Cooling Mode Efficiency (SEER/EER)	Heating Mode Efficiency (COP)	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Main Roof	RTU-11	1	Packaged AC	6.00		B	NR	Yes	1	Packaged AC	6.00		12.00		0.2	201	0	$25	$10,693	$438	410.6
Main Roof	No Tag	1	Packaged Air-Source HP	17.50	122.94	B	NR	Yes	1	Packaged Air-Source HP	17.50	122.94	13.00	3.60	1.6	20,153	0	$2,510	$28,834	$1,383	10.9
Main Roof	RTU-2	1	Packaged AC	10.00		B	NR	Yes	1	Packaged AC	10.00		12.00		0.3	384	0	$48	$17,821	$730	357.0
Main Roof	RTU-5	1	Packaged AC	7.50		B	NR	Yes	1	Packaged AC	7.50		12.00		0.6	694	0	$86	$13,366	$548	148.4
Main Roof	Split AC Outdoor Condensing Units (ODCs)	1	Split-System AC	2.00		W	NR	Yes	1	Split-System AC	2.00		14.00		0.3	308	0	$38	$2,992	$184	73.3
Main Roof	Split AC Outdoor Condensing Units (ODCs)	1	Split-System AC	1.50		W	NR	Yes	1	Split-System AC	1.50		14.00		0.2	231	0	$29	$2,244	$138	73.3
Classrooms & Offices	Classrooms & Offices	24	Window AC	1.00		W		No							0.0	0	0	$0	$0	$0	0.0

Fuel Heating Inventory & Recommendations

		Existing Conditions				Proposed Conditions							Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	System Quantity	System Type	Output Capacity per Unit (MBh)	Remaining Useful Life	ECM #	Install High Efficiency System?	System Quantity	System Type	Output Capacity per Unit (MBh)	Heating Efficiency	Heating Efficiency Units	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Boiler Room	Hydronic Heating	2	Condensing Hot Water Boiler	######	W		No						0.0	0	0	$0	$0	$0	0.0
Boiler Room	Hydronic Heating	2	Condensing Hot Water Boiler	######	W		No						0.0	0	0	$0	$0	$0	0.0
Boiler Room	Hydronic Heating	2	Condensing Hot Water Boiler	######	W		No						0.0	0	0	$0	$0	$0	0.0
Roof Above Café	RTU-1 & 3	2	Furnace	320.00	B	NR	Yes	2	Furnace	320.00	95.00%	AFUE	0.0	0	73	$633	$14,501	$800	21.6
Roof Above Gym	RTU-14&15	2	Furnace	250.00	B	NR	Yes	2	Furnace	250.00	95.00%	AFUE	0.0	0	57	$494	$11,329	$800	21.3
Roof Above Gym	RTU-16&17	2	Furnace	250.00	B	NR	Yes	2	Furnace	250.00	95.00%	AFUE	0.0	0	57	$494	$11,329	$800	21.3
Roof Above Café	No Tag	1	Furnace	158.00	B	NR	Yes	1	Furnace	158.00	95.00%	AFUE	0.0	0	18	$156	$3,580	$400	20.4

DHW Inventory & Recommendations

		Existing Conditions			Proposed Conditions							Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	System Quantity	System Type	Remaining Useful Life	ECM #	Replace?	System Quantity	System Type	Fuel Type	System Efficiency	Efficiency Units	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Boiler Room	Whole Building	1	Storage Tank Water Heater (> 50 Gal)	B	NR	Yes	1	Storage Tank Water Heater (> 50 Gal)	Natural Gas	95.00%	Et	0.0	0	43	$375	$19,994	$698	51.4

Walk-In Cooler/Freezer Inventory & Recommendations

	Existing Conditions		Proposed Conditions				Energy Impact & Financial Analysis						
Location	Cooler/ Freezer Quantity	Case Type/Temperature	ECM #	Install EC Evaporator Fan Motors?	Install Electric Defrost Control?	Install Evaporator Fan Control?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Kitchen	1	Cooler (35F to 55F)		No	No	No	0.0	0	0	$0	$0	$0	0.0
Kitchen	1	Medium Temp Freezer (0F to 30F)		No	No	No	0.0	0	0	$0	$0	$0	0.0

Commercial Refrigerator/Freezer Inventory & Recommendations

	Existing Conditions			Proposed Conditions		Energy Impact & Financial Analysis						
Location	Quantity	Refrigerator/ Freezer Type	ENERGY STAR Qualified?	ECM #	Install ENERGY STAR Equipment?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Kitchen	3	Refrigerator Chest	No		No	0.0	0	0	$0	$0	$0	0.0
Kitchen	2	Refrigerator Chest	No		No	0.0	0	0	$0	$0	$0	0.0
Kitchen	2	Stand-Up Refrigerator, Solid Door (16 - 30 cu. ft.)	Yes		No	0.0	0	0	$0	$0	$0	0.0
Kitchen	1	Stand-Up Refrigerator, Solid Door (31 - 50 cu. ft.)	Yes		No	0.0	0	0	$0	$0	$0	0.0

Cooking Equipment Inventory & Recommendations

	Existing Conditions			Proposed Conditions		Energy Impact & Financial Analysis						
Location	Quantity	Equipment Type	High Efficiency Equipement?	ECM #	Install High Efficiency Equipment?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Kitchen	3	Insulated Food Holding Cabinet (1/2 Size)	Yes		No	0.0	0	0	$0	$0	$0	0.0
Kitchen	1	Insulated Food Holding Cabinet (1/2 Size)	Yes		No	0.0	0	0	$0	$0	$0	0.0
Kitchen	2	Gas Combination Oven/Steam Cooker (<15 Pans)	Yes		No	0.0	0	0	$0	$0	$0	0.0
Kitchen	1	Gas Convection Oven (Half Size)	Yes		No	0.0	0	0	$0	$0	$0	0.0
Kitchen	1	Gas Steamer	Yes		No	0.0	0	0	$0	$0	$0	0.0

Dishwasher Inventory & Recommendations

	Existing Conditions					Proposed Conditions		Energy Impact & Financial Analysis						
Location	Quantity	Dishwasher Type	Water Heater Fuel Type	Booster Heater Fuel Type	ENERGY STAR Qualified?	ECM #	Install ENERGY STAR Equipment?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Payback w/ Incentives in Years
Kitchen	1	Door Type (High Temp)	Natural Gas	Electric	No		No	0.0	0	0	$0	$0	$0	0.0

Plug Load Inventory

	Existing Conditions			
Location	Quantity	Equipment Description	Energy Rate (W)	ENERGY STAR Qualified?
Upper Elementary	234	Desktop Computer	120.0	
Upper Elementary	20	Laptop Cart	2,160.0	
Upper Elementary	70	Fan	100.0	
Upper Elementary	95	TV	150.0	
Upper Elementary	82	Smart Board / Projector	300.0	
Upper Elementary	21	Small Office Printers	50.0	
Upper Elementary	4	Large Xerox- Type Printers	515.0	
Upper Elementary	3	Coffee Maker	400.0	
Upper Elementary	25	Microwave	1,100.0	
Upper Elementary	7	Residential Refrigerator	690.0	
Upper Elementary	17	Medium Sized Refrigerator	450.0	
Upper Elementary	4	Mini Fridge	260.0	
Upper Elementary	4	Water Dispenser	300.0	
Upper Elementary	1	Wheelchair Elevator	600.0	
Upper Elementary	3	Large Floor Fans	185.0	
Upper Elementary	1	Kiln	11,000.0	
Upper Elementary	6	Speakers	100.0	
Upper Elementary	4	Large Speakers	500.0	
Upper Elementary	1	Misc. Sound Equipment	3,500.0	
Upper Elementary	1	Misc. IT Equipment	4,500.0	
Upper Elementary	1	Misc Shop Equipment	5,500.0	
Upper Elementary	1	Electric Stove	1,500.0	

Vending Machine Inventory & Recommendations

	Existing Conditions		Proposed Conditions		Energy Impact & Financial Analysis						
Location	Quantity	Vending Machine Type	ECM #	Install Controls?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Faculty Dining	1	Refrigerated	7	Yes	0.2	1,612	0	$201	$230	$50	0.9

APPENDIX B: ENERGY STAR® STATEMENT OF ENERGY PERFORMANCE

EUI is presented in terms of *site energy* and *source energy*. Site energy is the amount of fuel and electricity consumed by a building as reflected in utility bills. Source energy includes fuel consumed to generate electricity consumed at the site, factoring in electric production and distribution losses for the region.

ENERGY STAR® Statement of Energy Performance

LEARN MORE AT energystar.gov

71

ENERGY STAR® Score[1]

Samsuel Upper Elementary School

Primary Property Type: K-12 School
Gross Floor Area (ft²): 174,800
Built: 1960

For Year Ending: February 28, 2018
Date Generated: October 02, 2018

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

Property & Contact Information

Property Address	Property Owner	Primary Contact
Samsuel Upper Elementary School 298 Emston Road Parlin, New Jersey 08859	Sayreville Board of Education 3198 Washington Rd Sayreville, NJ 08871 (____)____-_____	Erin Hill 3198 Washington Rd Sayreville, NJ 08871 732-525-5204 Erin.Hill@sayrevillek12.net

Property ID: 6563196

Energy Consumption and Energy Use Intensity (EUI)

Site EUI
44.7 kBtu/ft²

Source EUI
78.4 kBtu/ft²

Annual Energy by Fuel	
Natural Gas (kBtu)	4,679,003 (60%)
Electric - Grid (kBtu)	3,136,868 (40%)

National Median Comparison	
National Median Site EUI (kBtu/ft²)	56.1
National Median Source EUI (kBtu/ft²)	98.2
% Diff from National Median Source EUI	-20%
Annual Emissions	
Greenhouse Gas Emissions (Metric Tons CO2e/year)	566

Signature & Stamp of Verifying Professional

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

Signature: _____ Date: _____

Licensed Professional

____ _____
:
(____)____-_____
_____

Professional Engineer Stamp (if applicable)

APPENDIX C: GLOSSARY

TERM	DEFINITION
Blended Rate	Used to calculate financial savings. The blended rate is calculated by dividing the amount of your bill by the total energy use. For example, if your bill is $22,217.22, and you used 266,400 kilowatt-hours, your blended rate is 8.3 cents per kilowatt-hour.
BTU	A British thermal unit is the amount of heat required to increase the temperature of one pound water by one-degree Fahrenheit. Commonly used to measure natural gas consumption.
Demand Response	Demand response reduces or shifts electricity usage at or among participating buildings/sites during peak energy use periods in response to time-based rates or other forms of financial incentives.
Energy Efficiency	Reducing the amount of energy necessary to provide comfort and service to a building/area. Achieved through the installation of new equipment and/or optimizing energy management systems.
Generation	The process of generating electric power from sources of primary energy (e.g., natural gas, the sun, oil).
HVAC	Heating, ventilation, and air conditioning.
kW	Kilowatt. Equal to 1,000 Watts.
Load	The total amount of power used by a building system at any given time.
Measure	A single activity, or installation of a single type of equipment, that is implemented in a building system to reduce total energy consumption.
MMBtu	One million British thermal units.
psig	Pounds per square inch.
Plug Load	Refers to the amount of energy used in a space by products that are powered by means of an ordinary AC plug.
Simple Payback	The amount of time needed to recoup the funds expended in an investment, or to reach the break-even point.
Temperature Setpoint	The temperature at which a temperature regulating device (thermostat, for example) has been set.
Turnkey	Provision of a complete product or service that is ready for immediate use
Watt (W)	Unit of power commonly used to measure electricity use.