Local Government Energy Audit Report

Walter Hill School

March 11, 2019

Prepared for:

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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 1

1.1 Planning Your Project 4

Pick Your Installation Approach 4
More Options from Around the State 6

2 Existing Conditions 8

2.1 Site Overview 8
2.2 Building Occupancy 8
2.3 Building Envelope 8
2.4 Lighting Systems 9
2.5 Air Handling Systems 10

Packaged Units 10

2.6 Heating Hot Water Systems 11
2.7 Building Energy Management Systems (EMS) 13
2.8 Domestic Hot Water 14
2.9 Food Service Equipment 14
2.10 Refrigeration 15
2.11 Plug Load & Vending Machines 16
2.12 Water-Using Systems 16

3 Energy Use and Costs 17

3.1 Electricity 18
3.2 Natural Gas 19
3.3 Benchmarking 20

Tracking Your Energy Performance 21

4 Energy Conservation Measures 22

4.1 Lighting 25

ECM 1: Install LED Fixtures 25
ECM 2: Retrofit Fixtures with LED Lamps 25

4.2 Lighting Controls 26

ECM 3: Install Occupancy Sensor Lighting Controls 26
ECM 4: Install High/Low Lighting Controls 26

4.3 Motors 27

Premium Efficiency Motors 27

4.4 Variable Frequency Drives (VFD) 28

ECM 5: Install VFD on Variable Air Volume (VAV) Fans 28
ECM 6: Install VFDs on Cooling Tower Fans 28

4.5 Domestic Water Heating 29

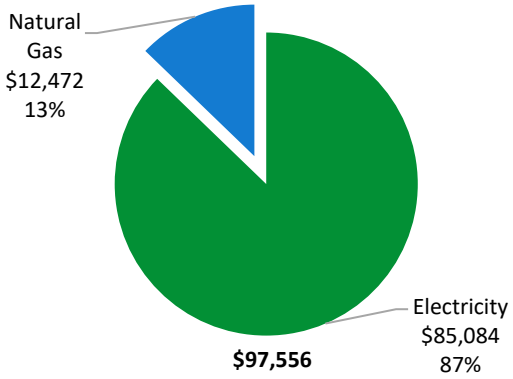
ECM 7: Install Low-Flow DHW Devices 29

4.6 Food Service & Refrigeration Measures 30
ECM 8: Refrigerator/Freezer Case Electrically Commutated Motors 30
ECM 9: Vending Machine Control 30
5 Energy Efficient Best Practices 31
Energy Tracking with ENERGY STAR® Portfolio Manager® 31
Doors and Windows 31
Lighting Maintenance 31
Lighting Controls 31
Motor Maintenance 32
Thermostat Schedules and Temperature Resets 32
AC System Evaporator/Condenser Coil Cleaning 32
HVAC Filter Cleaning and Replacement 32
Boiler Maintenance 32
Furnace Maintenance 32
Water Heater Maintenance 33
Plug Load Controls 33
Computer Power Management Software 33
Water Conservation 34
Procurement Strategies 34
6 On-site Generation 35
6.1 Solar Photovoltaic 35
6.2 Combined Heat and Power 37
7 Project Funding and Incentives 38
7.1 SmartStart 39
7.2 Direct Install 40
7.3 Pay for Performance - Existing Buildings 41
7.4 Energy Savings Improvement Program 42
7.5 SREC Registration Program 43
8 Energy Purchasing and Procurement Strategies 44
8.1 Retail Electric Supply Options 44
8.2 Retail Natural Gas Supply Options 44
Appendix A: Equipment Inventory & Recommendations A-1
Appendix B: ENERGY STAR® Statement of Energy Performance B-1
Appendix C: Glossary C-1

1 EXECUTIVE SUMMARY

The New Jersey Board of Public Utilities (NJBPU) has sponsored this Local Government Energy Audit (LGEA) report for the Walter Hill 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: $97,556 Electricity: 540,829 kWh Natural Gas: 10,284 Therms	
ENERGY STAR® Benchmarking Score	85 *(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.

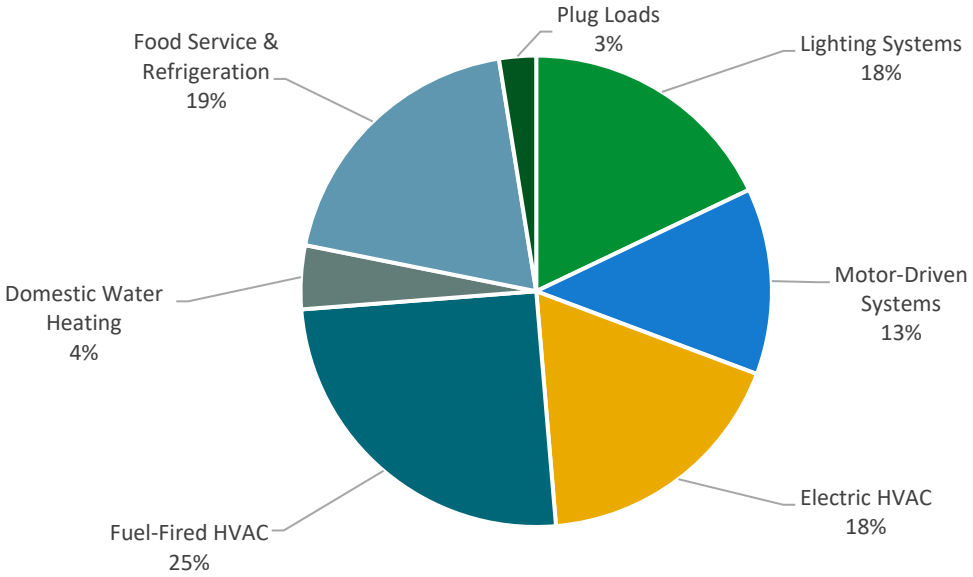


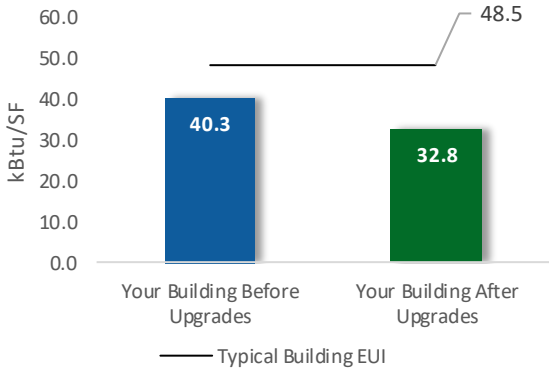
Figure 1 - Energy Use by System

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.

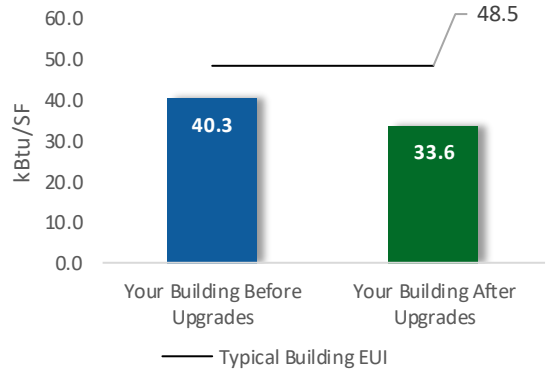
Scenario 1: Full Package (all evaluated measures)

Installation Cost	$124,362
Potential Rebates & Incentives[1]	$13,860
Annual Cost Savings	$20,244
Annual Energy Savings	Electricity: 124,815 kWh Natural Gas: 553 Therms
Greenhouse Gas Emission Savings	66 Tons
Simple Payback	5.4 Years
Site Energy Savings (all utilities)	17%



Scenario 2: Cost Effective Package[2]

Installation Cost	$110,157
Potential Rebates & Incentives	$13,860
Annual Cost Savings	$20,151
Annual Energy Savings	Electricity: 123,825 kWh Natural Gas: 553 Therms
Greenhouse Gas Emission Savings	66 Tons
Simple Payback	4.8 Years
Site Energy Savings (all utilities)	17%



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	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		**77,403**	**24.1**	**-15**	**$11,999**	**$179,978**	**$39,353**	**$8,875**	**$30,478**	**2.5**	**76,220**
ECM 1	Install LED Fixtures	5,243	0.6	0	$825	$12,372	$1,788	$45	$1,743	2.1	5,280
ECM 2	Retrofit Fixtures with LED Lamps	72,160	23.5	-15	$11,174	$167,606	$37,564	$8,830	$28,734	2.6	70,940
Lighting Control Measures		**23,247**	**7.7**	**-5**	**$3,598**	**$28,786**	**$24,420**	**$2,660**	**$21,760**	**6.0**	**22,840**
ECM 3	Install Occupancy Sensor Lighting Controls	21,560	7.1	-5	$3,337	$26,698	$23,420	$2,660	$20,760	6.2	21,183
ECM 4	Install High/Low Lighting Controls	1,686	0.6	0	$261	$2,088	$1,000	$0	$1,000	3.8	1,657
Motor Upgrades		**990**	**0.5**	**0**	**$156**	**$2,335**	**$14,205**	**$0**	**$14,205**	**91.2**	**996**
	Premium Efficiency Motors	990	0.5	0	$156	$2,335	$14,205	$0	$14,205	91.2	996
Variable Frequency Drive (VFD) Measures		**20,807**	**10.4**	**0**	**$3,273**	**$49,100**	**$45,145**	**$2,325**	**$42,820**	**13.1**	**20,952**
ECM 5	Install VFD on Variable Air Volume (VAV) Fans	16,457	10.8	0	$2,589	$38,835	$37,932	$2,325	$35,607	13.8	16,572
ECM 6	Install VFDs on Cooling Tower Fans	4,350	-0.4	0	$684	$10,265	$7,214	$0	$7,214	10.5	4,380
Domestic Water Heating Upgrade		**0**	**0.0**	**75**	**$908**	**$9,078**	**$172**	**$0**	**$172**	**0.2**	**8,764**
ECM 7	Install Low-Flow DHW Devices	0	0.0	75	$908	$9,078	$172	$0	$172	0.2	8,764
Food Service & Refrigeration Measures		**2,369**	**0.3**	**0**	**$373**	**$2,515**	**$1,067**	**$0**	**$1,067**	**2.9**	**2,385**
ECM 8	Refrigerator/Freezer Case Electrically Commutated Motors	414	0.1	0	$65	$978	$607	$0	$607	9.3	417
ECM 9	Vending Machine Control	1,954	0.2	0	$307	$1,537	$460	$0	$460	1.5	1,968
TOTALS		**124,815**	**43.0**	**55**	**$20,306**	**$271,792**	**$124,362**	**$13,860**	**$110,502**	**5.4**	**132,158**

* - All incentives presented in this table are based on NJ SmartStart equipment incentives and assume proposed equipment meets minimum performance criteria for that pro
** - 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 give 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	X
ECM 2	Retrofit Fixtures with LED Lamps	X	X	X
ECM 3	Install Occupancy Sensor Lighting Controls	X	X	X
ECM 4	Install High/Low Lighting Controls		X	X
ECM 5	Install VFD on Variable Air Volume (VAV) HVAC	X	X	X
ECM 6	Install VFDs on Cooling Tower Fans		X	X
ECM 7	Install Low-Flow Domestic Hot Water Devices		X	X
ECM 8	Refrigerator/Freezer Case Electrically Commutated Motors		X	X
ECM 9	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 (ESIP) 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 Walter Hill 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 Energy Services (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 22, 2018, TRC performed an energy audit at the Walter Hill School located in Swedesboro, NJ. TRC met with Anthony Tobin, Facility Representative to review the facility operations and help focus our investigation on specific energy-using systems.

The Walter Hill School is a three-story, 71,374 square foot building built in 1922. Spaces include: classrooms, library, multipurpose room, offices, cafeteria, corridors, stairwells, offices, a commercial kitchen and mechanical space.

The school has water source heat pumps which provides heating and cooling to classrooms and packaged air conditioning (AC) with direct expansion (DX) cooling serves corridors, kitchen and multipurpose room.

Over the last several years the facility has replaced its existing T12 fluorescent fixtures with T8 fluorescent fixtures.

2.2 Building Occupancy

The facility is occupied from September through June. Typical weekday occupancy is 60 staff and 250 students. Summer occupancy includes a summer day camp and continuing maintenance activities. There are no weekend activities.

Building Name	Weekday/Weekend	Operating Schedule
Walter Hill School	Weekday	7:00 AM - 4:00 PM
	Weekend	Unoccupied

Figure 4 - Building Occupancy Schedule

2.3 Building Envelope

Building walls are concrete block and structural steel. The roof is flat as well as pitched with asphalt shingles and covered with asphalt tar, and it is in good condition.

The walls are made of concrete masonry units (CMUs) with a brick veneer and gypsum drywall interior finish.

The flat roof is supported with steel trusses and a reinforced concrete deck and finished with an insulated layer and a covering of modified bitumen.

Steel trusses support a pitched roof with a wood deck covered with asphalt shingles. Roof encloses conditioned space. The thermal barrier is between this space and the conditioned space below.

Site staff report the following issues with the building envelope:

Most of the windows are double glazed with low-e glass and have aluminum frames with a thermal break wood frames. The glass-to-frame seals are in good condition. The operable window weather seals are in good condition, showing little evidence of excessive wear. Exterior doors have aluminum frames and are in good condition with undamaged door seals. Degraded window and door seals increase drafts and outside air infiltration.

Image 1 Building Front

Image 2 Building Roof Shingles

Image 3 Building exterior

Image 4 Building roof

2.4 Lighting Systems

The primary interior lighting system uses 32-Watt linear fluorescent T8 lamps. There are also 40-Watt T12 fixtures in elevators. Additionally, there are some compact fluorescent lamps (CFL) and general-purpose lamps. Typically, T8 fluorescent lamps use electronic ballasts and T12 fluorescent lamps use magnetic ballasts.

Fixture types include 2, 3 and 4-lamp with 4-foot long mounted fixtures and 2-foot fixtures with linear tube lamps. Most fixtures are in good condition. Library fixtures have long U-type CFL and linear fluorescent lamps and are manually controlled.

Library has 50-Watt T5 plug-in CFLs with 32-Watt spiral CFL bulbs and are controlled manually by wall switches. Lighting fixtures in restrooms and hallways are 32-Watt U-bend fluorescent with 2 lamps in each fixture and are controlled by wall switches.

Exterior lighting consists mainly of 4-pin, 32-Watt CFL fixtures with wall-mounted 150-Watt metal halide area fixtures and are controlled by photocells.

All exit signs are LED and interior lighting levels were generally sufficient.

Image 5 Sample T8 lamp

Image 6 Sample U bend lamp

Image 7 Sample 18W 4 pin CFL

Image 8 Sample incandescent bulb

Lighting fixtures in school are controlled by wall switches.

Exterior fixtures include wall packs, wall sconces and canopy lights with high intensity discharge (HID) metal halide and CFL lamps. Exterior fixtures are photocell controlled.

2.5 Air Handling Systems

Packaged Units

Classrooms are served with 64 Trane water source heat pumps controlled by the building energy management system (EMS). These heat pumps have heating capacity ranging from 7.40 MBh to 75.60 MBh and cooling capacity ranging from 0.5 ton to 4.72 ton. The EER for heat pumps ranging from 11.90 to 14.10.

Staffrooms, library, offices, restrooms and multipurpose room are served by four 10-ton, one 5-ton, one 8-ton and one 4-ton Aaon DX packaged roof top units (ACs). These units have gas-fired furnace and output heating capacity ranging from 73 MBh to 146 MBh. These units are equipped with economizers that are in good condition. All AC units provide cooling with variable speed supply fans ranging in size from 1 hp to 3 hp.

Twelve Penn ventilator exhaust fans serve restrooms, mechanical room and dishwasher hood. Kitchen hood exhaust fan has 0.3 hp motor.

There are four Heatex make up air units with supply and return fans. Supply fan motor ranging in size from 1.5 hp to 5 hp and return fan motors are ranging in size from 0.5 hp to 3 hp.

School has a 150-ton BAC cooling tower with two 7.5 hp constant speed supply fans which is part of the water source heat pump arrangement and circulates water through the boiler and the tower loop, which act as a heat source or sink depending on the mode of operation. Two 10 hp condenser water pumps circulate the condensate reverse from the loop of condensate water into the HVAC system. One 3-hp circulating pump circulates water in loop for cooling tower and two 25-hp loop pumps circulates water in terminal units.

Image 9 Aaon packaged unit

Image 10 Supply fan and motor

Image 11 Roof exhaust fan

Image 12 Packaged unit interior

Refer to Appendix A for detailed information about each unit.

2.6 Heating Hot Water Systems

Two Smith cast iron 1,254 MBh steam boilers serve the building heating load needs. The burners are non-modulating with a nominal efficiency of 80%. The boilers are configured in a lead-lag control scheme. Both boilers are required under high load conditions. Installed in 2003, they are in fair condition. There is a service contract in place.

The boilers are configured in a variable flow primary distribution with two 20 hp VFD controlled hot water pumps operating in a lead-lag arrangement. The steam from the boilers is converted to hot water via a heat exchanger and supplied to makeup air units and water source heat pumps throughout the building.

Hot water is supplied at 77.4°F when the outside air temperature is low, and the setpoint is adjusted linearly to 78°F when the outside air is above 81°F. The hot water return temperature is typically 86.4°F.

Image 13 Boiler plant

Image 14 Heat exchanger

Image 15 Heating and condenser water pump

Image 16 Domestic cold-water pump

2.7 Building Energy Management Systems (EMS)

A Trane tracer summit EMS controls the HVAC equipment, cooling tower, boilers, make up units and package units. The EMS provides equipment scheduling monitors and controls space temperatures, supply air temperatures, humidity, heating water loop temperatures, and chilled water loop temperatures.

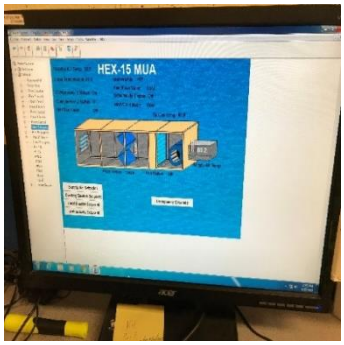


Image 17 Heatex unit graphic

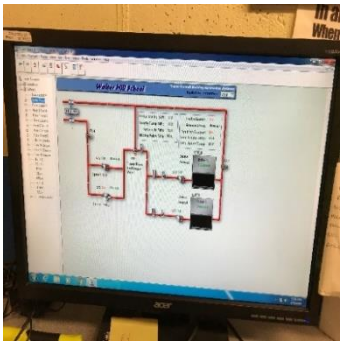


Image 18 Boiler graphic

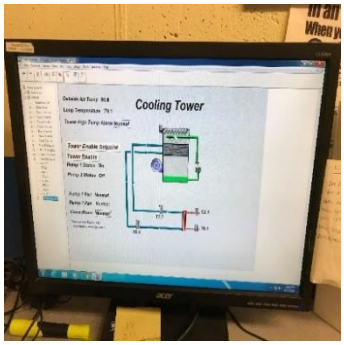


Image 19 Cooling tower graphic

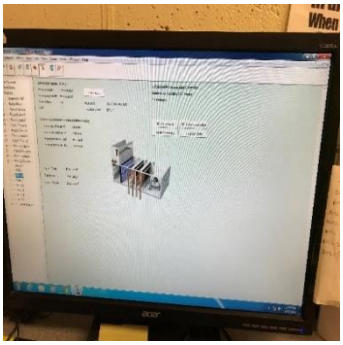


Image 20 EMS layout

2.8 Domestic Hot Water

Hot water is produced with two Bradford White 98 gallon, 200 MBh gas-fired storage water heaters with an 80% efficiency. Two Taco 1/25 hp circulation pumps distribute water to end uses. The circulation pumps operate continuously.

Image 21 Two hot water heaters

Image 22 Taco recirculation pump

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 convection electric oven and a gas-fired combination oven/steam cooker. Bulk prepared foods are held in one full size and four half size electric holding cabinets. Equipment is high efficiency and in good condition.

The dishwasher is a Hobart ENERGY STAR® high temperature, single-tank rack type unit. There is an electric booster to provide high temperature water needs of the dishwasher.

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

Image 23 Gas stove with oven

Image 24 Skillet

Image 25 Cooking equipment

Image 26 Convection oven

2.10 Refrigeration

The kitchen has three stand-up refrigerators with solid doors. All equipment is high efficiency and in good condition. The walk-in refrigerator has an estimated 3.42-ton compressor located on roof and a single fan 1/20 hp evaporator with fan control and electric defrost control. The walk-in low temperature freezer has a 3.42-ton compressor located on roof and a single fan 1/20 hp evaporator with evaporator fan control and electric defrost control.

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

Image 27 Walk in Cooler

Image 28 Walk in freezer

Image 29 Condensing unit on roof

Image 30 Stand up Refrigerators

2.11 Plug Load & Vending Machines

The utility bill analysis indicates that plug loads consume approximately 2.53% of total building energy use. This is lower than a typical building.

You seem to already be doing a great job managing your electrical plug loads. This report makes additional suggestions for ECMs in this area as well as Energy Efficient Best Practices.

There are 73 computer work stations throughout the facility. Plug loads throughout the building include general cafeteria and office equipment. There are classroom typical loads such as printers, computers, projectors, and fans.

There are several residential-style refrigerators throughout the building that are used to store cold beverage and staff lunches. These vary in condition and efficiency.

There is one refrigerated beverage vending machine and one non-refrigerated vending machines. Vending machines are not equipped with occupancy-based controls.

Image 31 Full size food holding cabinets

Image 32 Half size food holding cabinet

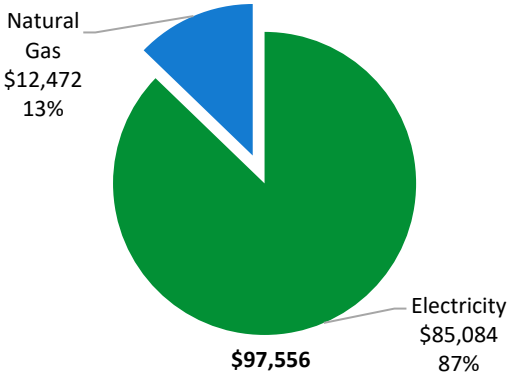
2.12 Water-Using Systems

There are 18 restrooms with toilets, urinals, and sinks. Faucet flow rates are at 2.2 gallons per minute (gpm) or higher. Toilets are rated at 2.5 gallons per flush (gpf) and urinals are rated at 2 gpf.

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	540,829 kWh	$85,084
Natural Gas	10,284 Therms	$12,472
Total		**$97,556**



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.

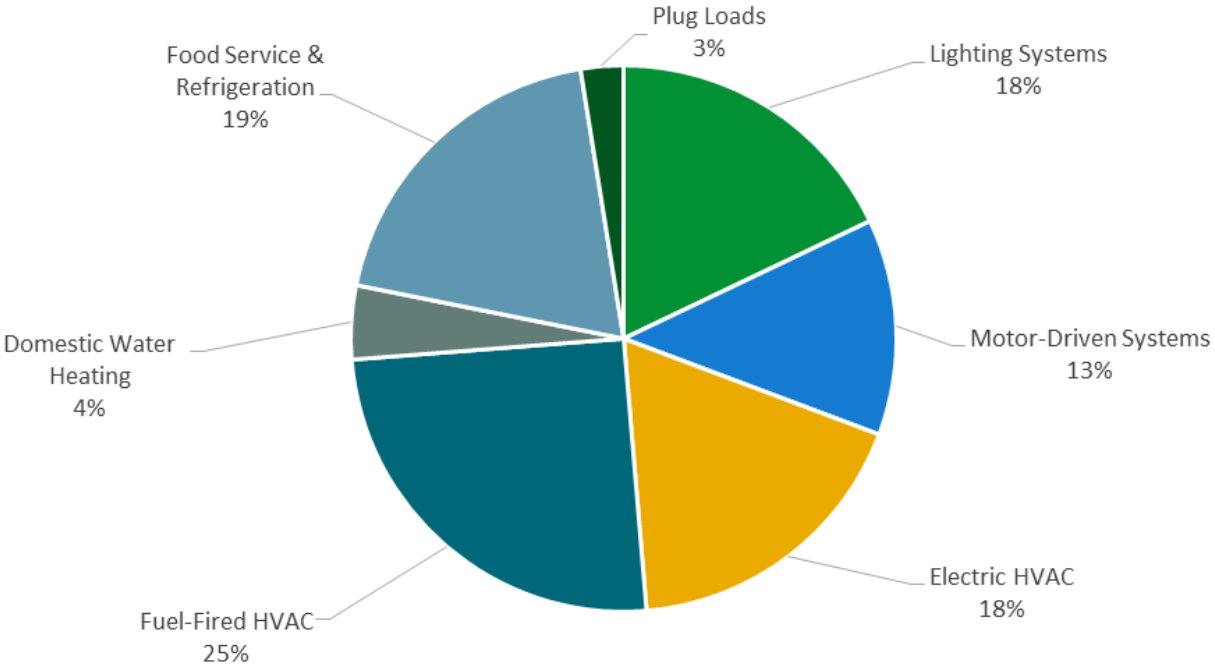
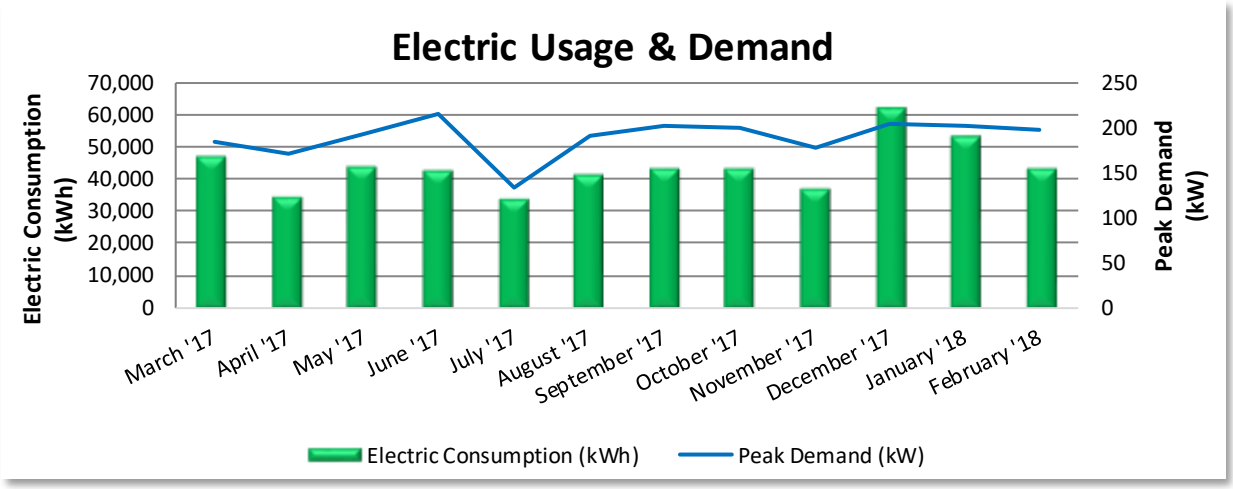


Figure 5 - Energy Balance

3.1 Electricity

Atlantic City Electric delivers electricity under rate class monthly general service secondary.



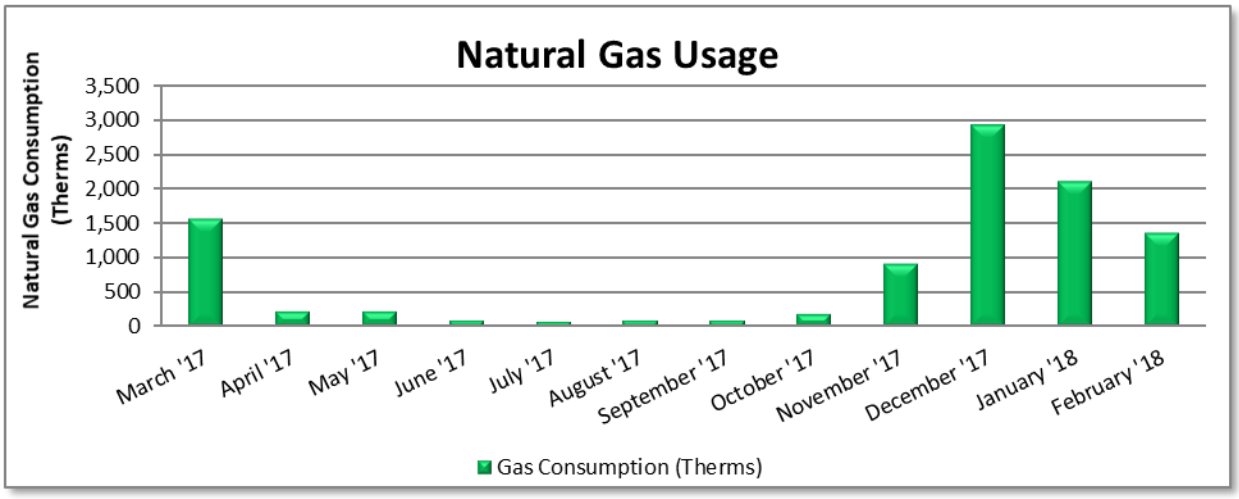
Electric Billing Data					
Period Ending	**Days in Period**	**Electric Usage (kWh)**	**Demand (kW)**	**Demand Cost**	**Total Electric Cost**
4/5/17	29	46,761	186	290	7,958
5/4/17	28	34,327	172	259	5,971
6/6/17	32	43,896	194	74	6,976
7/6/17	29	42,404	215	409	6,683
8/3/17	27	33,533	134	237	5,216
9/7/17	34	41,303	191	424	6,656
10/4/17	26	43,282	202	294	6,799
11/6/17	32	43,142	201	389	6,577
12/5/17	28	36,874	179	299	5,594
1/8/18	33	61,392	205	409	9,173
2/6/18	28	53,023	203	346	8,065
3/6/18	27	43,111	198	326	6,619
Totals	**353**	**523,048**	**215**	**$3,754**	**$82,287**
Annual	**365**	**540,829**	**215**	**$3,882**	**$85,084**

Notes:

- Peak demand of 215 kW occurred in December 2017.
- The average electric cost over the past 12 months was $0.157/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

South Jersey Gas delivers natural gas under rate class general service, with natural gas supply provided by South Jersey Energy, a third-party supplier.



Gas Billing Data			
Period Ending	**Days in Period**	**Natural Gas Usage (Therms)**	**Natural Gas Cost**
4/5/17	29	1,573	1,608
5/4/17	28	239	303
6/6/17	32	222	294
7/6/17	29	101	165
8/3/17	27	78	137
9/7/17	34	101	172
10/4/17	26	109	166
11/6/17	32	193	271
12/5/17	28	917	1,141
1/8/18	33	2,937	3,542
2/6/18	28	2,113	2,561
3/6/18	27	1,364	1,700
Totals	**353**	**9,946**	**$12,062**
Annual	**365**	**10,284**	**$12,472**

Notes:

- The average gas cost for the past 12 months is $1.213/therm, which is the blended rate used throughout the analysis.
- Due to reduced runtime of boiler plant during summer natural gas usage seems quite low.

3.3 Benchmarking

Your building was benchmarked using the United States Environmental Protection Agency's (EPA) *Portfolio Manager®* software. Benchmarking compares your building's energy use to that of similar buildings across the county, 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.

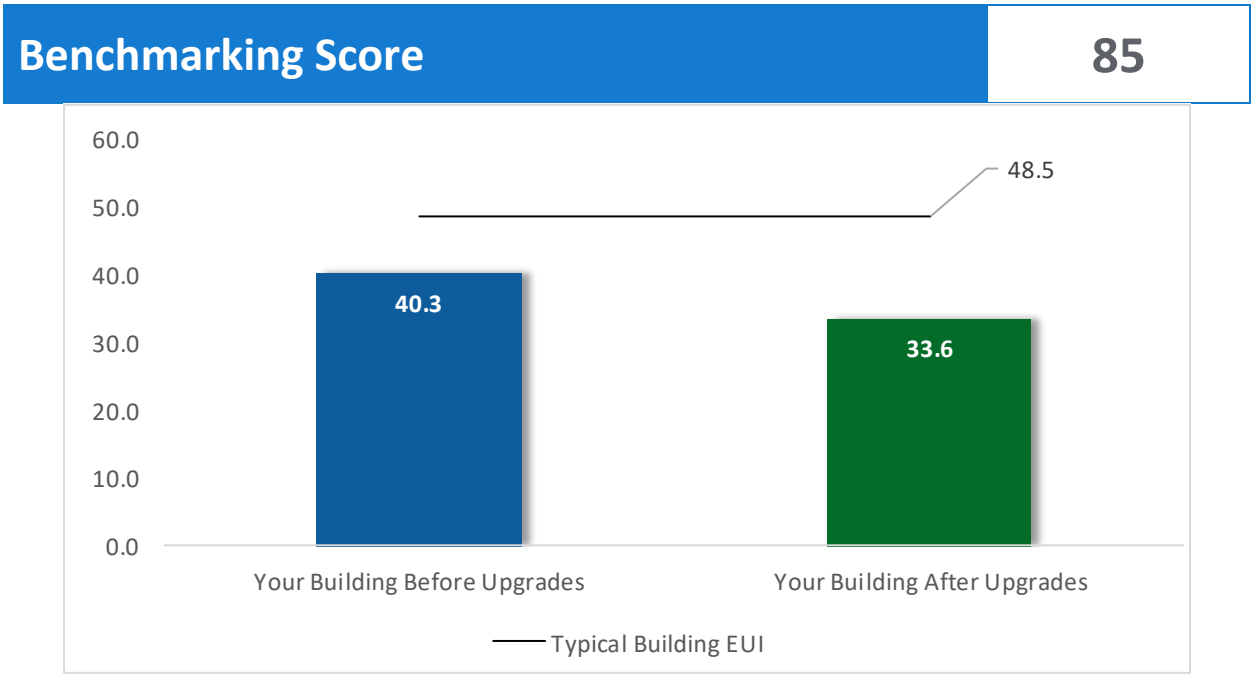


Figure 6 - Energy Use Intensity Comparison

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 a 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	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		**77,403**	**24.1**	**-15**	**$11,999**	**$39,353**	**$8,875**	**$30,478**	**2.5**	**76,220**
ECM 1	Install LED Fixtures	5,243	0.6	0	$825	$1,788	$45	$1,743	2.1	5,280
ECM 2	Retrofit Fixtures with LED Lamps	72,160	23.5	-15	$11,174	$37,564	$8,830	$28,734	2.6	70,940
Lighting Control Measures		**23,247**	**7.7**	**-5**	**$3,598**	**$24,420**	**$2,660**	**$21,760**	**6.0**	**22,840**
ECM 3	Install Occupancy Sensor Lighting Controls	21,560	7.1	-5	$3,337	$23,420	$2,660	$20,760	6.2	21,183
ECM 4	Install High/Low Lighting Controls	1,686	0.6	0	$261	$1,000	$0	$1,000	3.8	1,657
Motor Upgrades		**990**	**0.5**	**0**	**$156**	**$14,205**	**$0**	**$14,205**	**91.2**	**996**
	Premium Efficiency Motors	990	0.5	0	$156	$14,205	$0	$14,205	91.2	996
Variable Frequency Drive (VFD) Measures		**20,807**	**10.4**	**0**	**$3,273**	**$45,145**	**$2,325**	**$42,820**	**13.1**	**20,952**
ECM 5	Install VFD on Variable Air Volume (VAV) Fans	16,457	10.8	0	$2,589	$37,932	$2,325	$35,607	13.8	16,572
ECM 6	Install VFDs on Cooling Tower Fans	4,350	-0.4	0	$684	$7,214	$0	$7,214	10.5	4,380
Domestic Water Heating Upgrade		**0**	**0.0**	**75**	**$908**	**$172**	**$0**	**$172**	**0.2**	**8,764**
ECM 7	Install Low-Flow DHW Devices	0	0.0	75	$908	$172	$0	$172	0.2	8,764
Food Service & Refrigeration Measures		**2,369**	**0.3**	**0**	**$373**	**$1,067**	**$0**	**$1,067**	**2.9**	**2,385**
ECM 8	Refrigerator/Freezer Case Electrically Commutated Motors	414	0.1	0	$65	$607	$0	$607	9.3	417
ECM 9	Vending Machine Control	1,954	0.2	0	$307	$460	$0	$460	1.5	1,968
TOTALS		**124,815**	**43.0**	**55**	**$20,306**	**$124,362**	**$13,860**	**$110,502**	**5.4**	**132,158**

* - 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 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		**77,403**	**24.1**	**-15**	**$11,999**	**$39,353**	**$8,875**	**$30,478**	**2.5**	**76,220**
ECM 1	Install LED Fixtures	5,243	0.6	0	$825	$1,788	$45	$1,743	2.1	5,280
ECM 2	Retrofit Fixtures with LED Lamps	72,160	23.5	-15	$11,174	$37,564	$8,830	$28,734	2.6	70,940
Lighting Control Measures		**23,247**	**7.7**	**-5**	**$3,598**	**$24,420**	**$2,660**	**$21,760**	**6.0**	**22,840**
ECM 3	Install Occupancy Sensor Lighting Controls	21,560	7.1	-5	$3,337	$23,420	$2,660	$20,760	6.2	21,183
ECM 4	Install High/Low Lighting Controls	1,686	0.6	0	$261	$1,000	$0	$1,000	3.8	1,657
Variable Frequency Drive (VFD) Measures		**20,807**	**10.4**	**0**	**$3,273**	**$45,145**	**$2,325**	**$42,820**	**13.1**	**20,952**
ECM 5	Install VFD on Variable Air Volume (VAV) Fans	16,457	10.8	0	$2,589	$37,932	$2,325	$35,607	13.8	16,572
ECM 6	Install VFDs on Cooling Tower Fans	4,350	-0.4	0	$684	$7,214	$0	$7,214	10.5	4,380
Domestic Water Heating Upgrade		**0**	**0.0**	**75**	**$908**	**$172**	**$0**	**$172**	**0.2**	**8,764**
ECM 7	Install Low-Flow DHW Devices	0	0.0	75	$908	$172	$0	$172	0.2	8,764
Food Service & Refrigeration Measures		**2,369**	**0.3**	**0**	**$373**	**$1,067**	**$0**	**$1,067**	**2.9**	**2,385**
ECM 8	Refrigerator/Freezer Case Electrically Commutated Motors	414	0.1	0	$65	$607	$0	$607	9.3	417
ECM 9	Vending Machine Control	1,954	0.2	0	$307	$460	$0	$460	1.5	1,968
TOTALS		**123,825**	**42.5**	**55**	**$20,151**	**$110,157**	**$13,860**	**$96,297**	**4.8**	**131,162**

* - 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		**77,403**	**24.1**	**-15**	**$11,999**	**$39,353**	**$8,875**	**$30,478**	**2.5**	**76,220**
ECM 1	Install LED Fixtures	5,243	0.6	0	$825	$1,788	$45	$1,743	2.1	5,280
ECM 2	Retrofit Fixtures with LED Lamps	72,160	23.5	-15	$11,174	$37,564	$8,830	$28,734	2.6	70,940

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 fixtures containing metal halide 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 retrofitted 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 metal halide fixtures

ECM 2: Retrofit Fixtures with LED Lamps

Replace 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: library, multipurpose room, classrooms, restrooms and all other areas 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		**23,247**	**7.7**	**-5**	**$3,598**	**$24,420**	**$2,660**	**$21,760**	**6.0**	**22,840**
ECM 3	Install Occupancy Sensor Lighting Controls	21,560	7.1	-5	$3,337	$23,420	$2,660	$20,760	6.2	21,183
ECM 4	Install High/Low Lighting Controls	1,686	0.6	0	$261	$1,000	$0	$1,000	3.8	1,657

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 3: 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, multipurpose rooms, classrooms, library, restrooms, and storage rooms

ECM 4: 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. In parking lots and parking garages with significant ambient lighting, this control can sometimes be combined with photocell controls to turn the lights off when there is sufficient daylight.

This measure provides energy savings by reducing the light fixture power draw when reduced light output is appropriate.

Affected building areas: hallways on all three floors

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		**990**	**0.5**	**0**	**$156**	**$14,205**	**$0**	**$14,205**	**91.2**	**996**
	Premium Efficiency Motors	990	0.5	0	$156	$14,205	$0	$14,205	91.2	996

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	Additional Motor Description
Outdoor	Cooling Tower	2	Cooling Tower Fan	7.5	Supply Fan
Roof	Multi Purpose Room	1	Supply Fan	3.0	AC-1
Roof	Multi Purpose Room	1	Supply Fan	3.0	AC-2
Roof	Multi Purpose Room	1	Supply Fan	3.0	AC-3
Roof	Multi Purpose Room	1	Supply Fan	3.0	AC-4
Roof	Stage storage	1	Supply Fan	2.0	AC-5
1st & 2nd Floors	Make Up Air Unit	1	Supply Fan	5.0	MUA-15
1st,2nd & 3rd Floors	Make Up Air Unit	1	Supply Fan	5.0	MUA-16
Music room 138	Make Up Air Unit	1	Supply Fan	1.5	MUA-17
Third Floor	Make Up Air Unit	1	Supply Fan	5.0	MUA-22
1st & 2nd Floors	Make Up Air Unit	1	Return Fan	2.0	MUA-15
1st,2nd & 3rd Floors	Make Up Air Unit	1	Return Fan	3.0	MUA-16
Music room 138	Make Up Air Unit	1	Return Fan	0.5	MUA-17
Third Floor	Make Up Air Unit	1	Return Fan	1.5	MUA-22

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		**20,807**	**10.4**	**0**	**$3,273**	**$45,145**	**$2,325**	**$42,820**	**13.1**	**20,952**
ECM 5	Install VFD on Variable Air Volume (VAV) Fans	16,457	10.8	0	$2,589	$37,932	$2,325	$35,607	13.8	16,572
ECM 6	Install VFDs on Cooling Tower Fans	4,350	-0.4	0	$684	$7,214	$0	$7,214	10.5	4,380

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.

ECM 5: 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.

Affected air handlers: AC-1 to 5 and MUA-15, 16, 17, 22

ECM 6: Install VFDs on Cooling Tower Fans

Install a VFD to control the cooling tower fan motor. The VFD will allow the cooling tower fan to operate at the minimum speed necessary to maintain the temperature of the condenser water returning to the chiller.

Energy savings result from reducing fan speed (and power) when there is a reduced load on the chiller and outside air wet bulb temperatures are depressed. The magnitude of energy savings is based on the estimated amount of time that the system will operate at reduced load.

4.5 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**	**75**	**$908**	**$172**	**$0**	**$172**	**0.2**	**8,764**
ECM 7	Install Low-Flow DHW Devices	0	0.0	75	$908	$172	$0	$172	0.2	8,764

ECM 7: Install Low-Flow DHW Devices

Install low-flow devices to reduce overall hot water demand. The following low flow devices are recommended to reduce hot water usage:

Device	Flow Rate
Faucet aerators (lavatory)	0.5 gpm
Faucet aerator (kitchen)	1.5 gpm
Showerhead	2.0 gpm
Pre-rinse spray valve (kitchen)	1.28 gpm

Low-flow devices reduce the overall water flow from the fixture, while still providing adequate pressure for washing. [Pre-rinse spray valves (PRSVs)—often used in commercial and institutional kitchens—remove food waste from dishes prior to dishwashing.]

Additional cost savings may result from reduced water usage.

4.6 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		**2,369**	**0.3**	**0**	**$373**	**$1,067**	**$0**	**$1,067**	**2.9**	**2,385**
ECM 8	Refrigerator/Freezer Case Electrically Commutated Motors	414	0.1	0	$65	$607	$0	$607	9.3	417
ECM 9	Vending Machine Control	1,954	0.2	0	$307	$460	$0	$460	1.5	1,968

ECM 8: Refrigerator/Freezer Case Electrically Commutated Motors

Replace shaded pole or permanent split capacitor (PSC) motors with electronically commutated (EC) motors in walk-in coolers and freezers. Fractional horsepower EC motors are significantly more efficient than mechanically commutated, brushed motors, particularly at low speeds or partial load. By using variable-speed technology, EC motors can optimize fan usage. Because these motors are brushless and use DC power, losses due to friction and phase shifting are eliminated.

Savings for this measure consider both the increased efficiency of the motor as well as the reduction in refrigeration load due to motor heat loss.

ECM 9: 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.

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.

Lighting Maintenance

Clean lamps, reflectors and lenses of dirt, dust, oil, and smoke buildup every six to twelve months. Light levels decrease over time due to lamp aging, lamp and ballast failure, and buildup of dirt and dust. Together, this can reduce total light output by up to 60% while still drawing full power.

In addition to routine cleaning, developing a maintenance schedule can ensure that maintenance is performed regularly, and it can reduce the overall cost of fixture re-lamping and re-ballasting. Group re-lamping and re-ballasting maintains lighting levels and minimizes the number of site visits by a lighting technician or contractor, decreasing the overall cost of maintenance.

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.

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°F-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.

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.

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

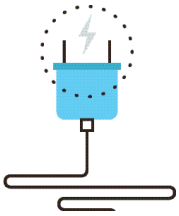
Preventative maintenance can extend the life of the system, maintain energy efficiency, and ensure safe operation. Following the manufacturer's instructions, a yearly tune-up should: check for gas/carbon monoxide leaks; change the air and fuel filters; check components for cracks, corrosion, dirt, or 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 Power Management Software

Many computers consume power during nights, weekends, and holidays. Screen savers are commonly confused as a power management strategy. This contributes to avoidable, excessive electrical energy consumption. There are innovative power management software packages available that are designed to deliver significant energy saving and provide ongoing tracking measurements. A central power management platform helps enforce energy savings policies as well as identify and eliminate underutilized devices.

[5] For additional information refer to "Assessing and Reducing Plug and Process Load in Office Buildings" https://www.nrel.gov/docs/fy13osti/54175.pdf or "Plug Load Best Practices Guide" http://www.advancedbuildings.net/plug-load-best-practices-guide-offices.

Water Conservation

Installing dual flush or low-flow toilets and low-flow/waterless urinals are ways to reduce water use. The EPA WaterSense™ ratings for urinals is 0.5 gpf and for flush valve toilets is 1.28 gpf (this is lower than the current 1.6 gpf federal standard).

For more information regarding water conservation go to the EPA's WaterSense™ website[6] or download a copy of EPA's "WaterSense at Work: Best Management Practices for Commercial and Institutional Facilities"[7] to get ideas for creating a water management plan and best practices for a wide range of water using systems.

Water conservation devices that do not reduce hot water consumption will not provide energy savings at the site level, but they may significantly affect your water and sewer usage costs. Any reduction in water use does however ultimately reduce grid-level electricity use since a significant amount of electricity is used to deliver water from reservoirs to end users.

If the facility has detached buildings with a master water meter for the entire campus, check for unnatural wet areas in the lawn or water seeping in the foundation at water pipe penetrations through the foundation. Periodically check overnight meter readings when the facility is unoccupied, and there is no other scheduled water usage.

Manage irrigation systems to use water more effectively outside the building. Adjust spray patterns so that water lands on intended lawns and plantings and not on pavement and walls. Consider installing an evapotranspiration irrigation controller that will prevent over-watering.

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.

[6] https://www.epa.gov/watersense.

[7] https://www.epa.gov/watersense/watersense-work-0.

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 **high** potential for installing a PV array.

The amount of free area, ease of installation (roof and parking lot), 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.

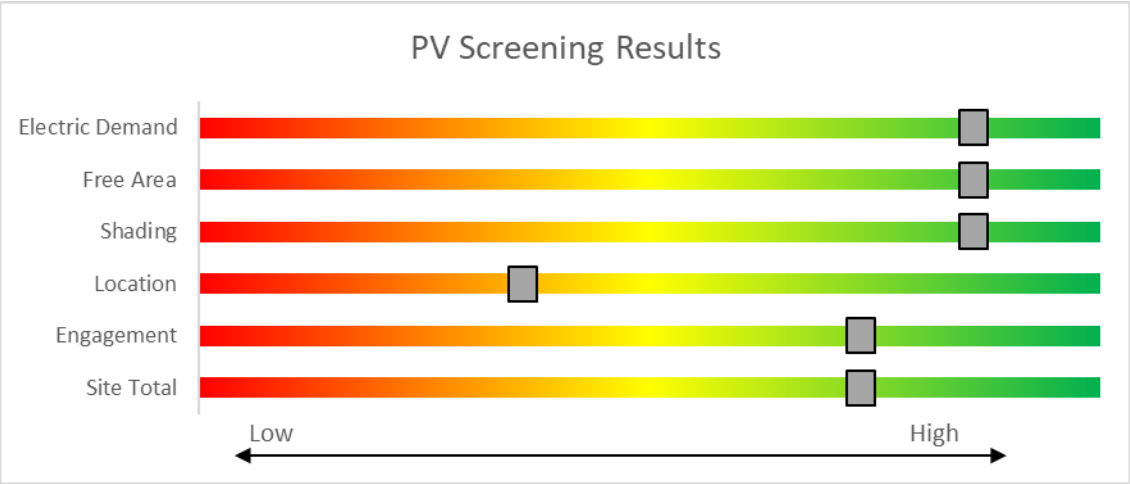


Figure 9 - Photovoltaic Screening

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 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.

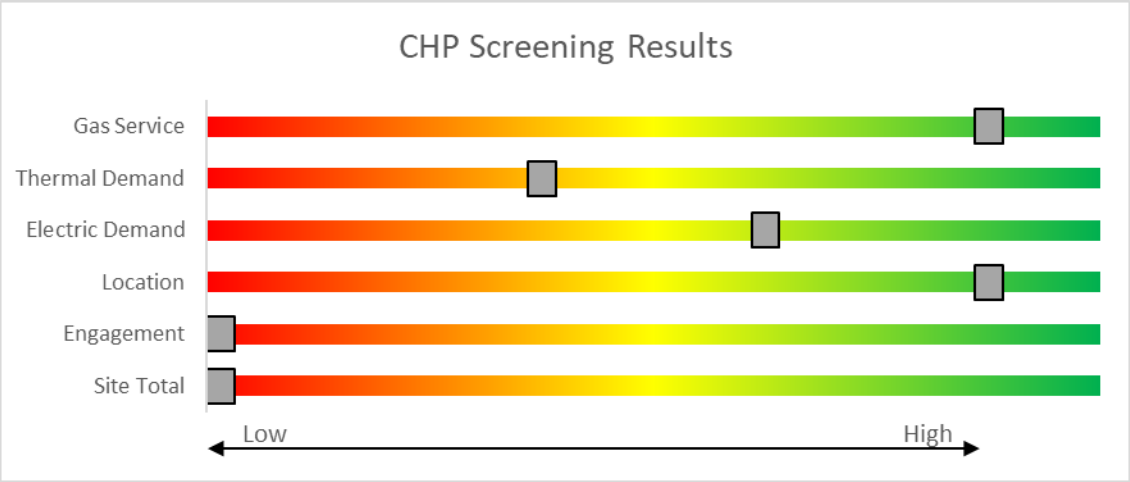


Figure 10 - Combined Heat and Power Screening

Find a qualified firm that specializes in commercial CHP cost assessment and installation: http://www.njcleanenergy.com/commercial-industrial/programs/nj-smartstart-buildings/tools-and-resources/tradeally/approved_vendorsearch/.

7 PROJECT FUNDING AND INCENTIVES

Ready to improve your building's performance? New Jersey 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 New Jersey 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 Direct Install

Direct Install is a turnkey program available to existing small to medium-sized facilities with an average peak electric demand that does not exceed 200 kW over the recent 12-month period. You work directly with a pre-approved contractor who will perform a free energy assessment at your facility, identify specific eligible measures, and provide a clear scope of work for installation of selected measures. Energy efficiency measures may include lighting and lighting controls, refrigeration, HVAC, motors, variable speed drives and controls.

Incentives

The program pays up to 70% of the total installed cost of eligible measures, up to $125,000 per project. Each entity is limited to incentives up to $250,000 per fiscal year.

How to Participate

To participate in Direct Install, you will need to contact the participating contractor assigned to the region of the state where your facility is located. A complete list of Direct Install program partners is provided on the Direct Install website linked below. The contractor will be paid the measure incentives directly by the program which will pass on to you in the form of reduced material and implementation costs. This means up to 70% of eligible costs are covered by the program, subject to program caps and eligibility, while the remaining 30% of the cost is paid to the contractor by the customer.

Detailed program descriptions and applications can be found at: www.njcleanenergy.com/DI.

7.3 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.

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.

7.4 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.

7.5 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. SRECs 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 SRECs 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.[8]

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.[9]

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

[9] 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
213 Bathroom	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	S	62	1,980	2	Relamp	No	1	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	1,980	0.0	63	0	$10	$72	$10	6.4
112 Bathroom	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	S	62	1,980	2	Relamp	No	1	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	1,980	0.0	63	0	$10	$72	$10	6.4
119 Restroom	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	S	62	1,980	2	Relamp	No	1	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	1,980	0.0	63	0	$10	$72	$10	6.4
Restroom	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	S	62	1,980	2	Relamp	No	1	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	1,980	0.0	63	0	$10	$72	$10	6.4
Restroom	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	S	62	1,980	2	Relamp	No	1	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	1,980	0.0	63	0	$10	$72	$10	6.4
Boys	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	S	62	1,980	2	Relamp	No	1	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	1,980	0.0	63	0	$10	$72	$10	6.4
Girls	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	S	62	1,980	2	Relamp	No	1	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	1,980	0.0	63	0	$10	$72	$10	6.4
Restroom	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	S	62	1,980	2	Relamp	No	1	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	1,980	0.0	63	0	$10	$72	$10	6.4
Room 203	2	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	S	62	1,980	2, 3	Relamp	Yes	2	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	1,366	0.1	171	0	$26	$261	$20	9.1
143 Storage	3	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	S	62	1,980	2, 3	Relamp	Yes	3	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	1,366	0.1	256	0	$40	$333	$30	7.6
Hallway	4	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	S	62	1,980	2, 4	Relamp	Yes	4	LED - Linear Tubes: (2) U-Lamp	High/Low Control	33	1,366	0.1	342	0	$53	$490	$40	8.5
Room 115	4	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	S	62	1,980	2, 3	Relamp	Yes	4	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	1,366	0.1	342	0	$53	$560	$75	9.2
2nd Fl Hall	16	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	S	62	1,980	2, 4	Relamp	Yes	16	LED - Linear Tubes: (2) U-Lamp	High/Low Control	33	1,366	0.5	1,367	0	$212	$1,359	$160	5.7
3rd Fl. Hall	19	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	S	62	1,980	2, 4	Relamp	Yes	19	LED - Linear Tubes: (2) U-Lamp	High/Low Control	33	1,366	0.5	1,623	0	$251	$1,577	$190	5.5
1st Fl Hallway	36	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	S	62	1,980	2, 4	Relamp	Yes	36	LED - Linear Tubes: (2) U-Lamp	High/Low Control	33	1,366	1.0	3,076	-1	$476	$2,809	$360	5.1
Exterior	9	Metal Halide: (1) 150W Lamp	Photocell	S	190	4,380	1	Fixture Replacement	No	9	LED - Fixtures: Other	Photocell	57	4,380	0.6	5,243	0	$825	$1,788	$45	2.1
Maintenance	3	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	1,980	2, 3	Relamp	Yes	3	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,366	0.2	483	0	$75	$489	$95	5.3
Stairs 6	3	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	1,980	2, 3	Relamp	Yes	3	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,366	0.2	483	0	$75	$335	$60	3.7
Stairs 4	4	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	1,980	2, 3	Relamp	Yes	4	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,366	0.2	645	0	$100	$408	$80	3.3
Stairs 2	4	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	1,980	2, 3	Relamp	Yes	4	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,366	0.2	645	0	$100	$408	$80	3.3
Stairs 1	4	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	1,980	2, 3	Relamp	Yes	4	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,366	0.2	645	0	$100	$408	$80	3.3
Library	5	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	1,980	2, 3	Relamp	Yes	5	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,366	0.3	806	0	$125	$635	$135	4.0
Staris 5	6	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	1,980	2, 3	Relamp	Yes	6	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,366	0.3	967	0	$150	$708	$155	3.7
Stairs 2	6	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	1,980	2, 3	Relamp	Yes	6	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,366	0.3	967	0	$150	$554	$120	2.9
Stairs 1	7	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	1,980	2, 3	Relamp	Yes	7	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,366	0.4	1,128	0	$175	$627	$140	2.8

	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
Room 315	10	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	1,980	2, 3	Relamp	Yes	10	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,366	0.5	1,611	0	$249	$1,000	$235	3.1
Kitchen	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	1,980	2	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	1,980	0.0	108	0	$17	$55	$15	2.4
Room 216	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	1,980	2, 3	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,366	0.1	274	0	$42	$380	$65	7.4
Room 203	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	1,980	2, 3	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,366	0.1	274	0	$42	$380	$65	7.4
Sec. Office	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	1,980	2, 3	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,366	0.1	274	0	$42	$380	$65	7.4
Room 140	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	1,980	2, 3	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,366	0.1	274	0	$42	$380	$65	7.4
Room 152	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	1,980	2, 3	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,366	0.1	274	0	$42	$380	$65	7.4
Room 157	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	1,980	2, 3	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,366	0.1	274	0	$42	$380	$65	7.4
Room 159	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	1,980	2, 3	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,366	0.1	274	0	$42	$380	$65	7.4
Room 154	3	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	1,980	2, 3	Relamp	Yes	3	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,366	0.1	412	0	$64	$434	$80	5.6
Room 220	4	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	1,980	2, 3	Relamp	Yes	4	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,366	0.2	549	0	$85	$489	$95	4.6
Room 205	4	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	1,980	2, 3	Relamp	Yes	4	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,366	0.2	549	0	$85	$489	$95	4.6
Principal	4	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	1,980	2, 3	Relamp	Yes	4	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,366	0.2	549	0	$85	$489	$95	4.6
Room 114	4	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	1,980	2, 3	Relamp	Yes	4	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,366	0.2	549	0	$85	$489	$95	4.6
Room 116	4	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	1,980	2, 3	Relamp	Yes	4	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,366	0.2	549	0	$85	$489	$95	4.6
Room 226	5	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	1,980	2, 3	Relamp	Yes	5	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,366	0.2	686	0	$106	$544	$110	4.1
Room 312	6	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	1,980	2, 3	Relamp	Yes	6	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,366	0.3	823	0	$127	$599	$125	3.7
Room 217	6	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	1,980	2, 3	Relamp	Yes	6	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,366	0.3	823	0	$127	$599	$125	3.7
Room 111	6	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	1,980	2, 3	Relamp	Yes	6	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,366	0.3	823	0	$127	$599	$125	3.7
Room 215	7	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	1,980	2, 3	Relamp	Yes	7	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,366	0.3	960	0	$149	$653	$140	3.5
213 Nurse	8	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	1,980	2, 3	Relamp	Yes	8	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,366	0.4	1,097	0	$170	$708	$155	3.3
Room 119	8	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	1,980	2, 3	Relamp	Yes	8	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,366	0.4	1,097	0	$170	$708	$155	3.3
Room 121	8	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	1,980	2, 3	Relamp	Yes	8	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,366	0.4	1,097	0	$170	$708	$155	3.3
Room 326	9	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	1,980	2, 3	Relamp	Yes	9	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,366	0.4	1,235	0	$191	$763	$170	3.1
Room 322	9	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	1,980	2, 3	Relamp	Yes	9	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,366	0.4	1,235	0	$191	$763	$170	3.1

	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
Room 202	10	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	1,980	2, 3	Relamp	Yes	10	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,366	0.5	1,372	0	$212	$818	$185	3.0
Room 324	11	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	1,980	2, 3	Relamp	Yes	11	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,366	0.5	1,509	0	$234	$872	$200	2.9
Room 323	11	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	1,980	2, 3	Relamp	Yes	11	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,366	0.5	1,509	0	$234	$872	$200	2.9
Room 212	11	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	1,980	2, 3	Relamp	Yes	11	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,366	0.5	1,509	0	$234	$872	$200	2.9
Room 112	11	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	1,980	2, 3	Relamp	Yes	11	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,366	0.5	1,509	0	$234	$872	$200	2.9
Room 325	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	1,980	2, 3	Relamp	Yes	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,366	0.5	1,646	0	$255	$927	$215	2.8
Room 317	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	1,980	2, 3	Relamp	Yes	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,366	0.5	1,646	0	$255	$927	$215	2.8
Room 231	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	1,980	2, 3	Relamp	Yes	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,366	0.5	1,646	0	$255	$927	$215	2.8
Room 230	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	1,980	2, 3	Relamp	Yes	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,366	0.5	1,646	0	$255	$927	$215	2.8
Room 229	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	1,980	2, 3	Relamp	Yes	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,366	0.5	1,646	0	$255	$927	$215	2.8
Room 225	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	1,980	2, 3	Relamp	Yes	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,366	0.5	1,646	0	$255	$927	$215	2.8
Room 134	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	1,980	2, 3	Relamp	Yes	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,366	0.5	1,646	0	$255	$927	$215	2.8
Room 129	13	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	1,980	2, 3	Relamp	Yes	13	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,366	0.6	1,783	0	$276	$982	$230	2.7
Room 132	13	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	1,980	2, 3	Relamp	Yes	13	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,366	0.6	1,783	0	$276	$982	$230	2.7
Room 313	15	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	1,980	2, 3	Relamp	Yes	15	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,366	0.7	2,058	0	$319	$1,092	$260	2.6
Room 138	16	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	1,980	2, 3	Relamp	Yes	16	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,366	0.7	2,195	0	$340	$1,146	$275	2.6
Room 302	18	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	1,980	2, 3	Relamp	Yes	18	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,366	0.8	2,469	-1	$382	$1,256	$305	2.5
Custodian	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,980	2	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,980	0.0	72	0	$11	$37	$10	2.4
Maintenance	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,980	2	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,980	0.0	72	0	$11	$37	$10	2.4
Restroom	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,980	2	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,980	0.0	72	0	$11	$37	$10	2.4
228 Storage	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,980	2	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,980	0.0	72	0	$11	$37	$10	2.4
Restroom	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,980	2	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,980	0.0	72	0	$11	$37	$10	2.4
Storage	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,980	2	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,980	0.0	72	0	$11	$37	$10	2.4
Storage 2	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,980	2	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,980	0.0	72	0	$11	$37	$10	2.4
Storage 3	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,980	2	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,980	0.0	72	0	$11	$37	$10	2.4

	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
Elevator 2	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,980	2	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,980	0.0	72	0	$11	$37	$10	2.4
Storage	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,980	2	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,980	0.0	72	0	$11	$37	$10	2.4
Storage	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,980	2	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,980	0.0	72	0	$11	$37	$10	2.4
Storage	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,980	2	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,980	0.0	72	0	$11	$37	$10	2.4
Closet	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,980	2	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,980	0.0	72	0	$11	$37	$10	2.4
Closet	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,980	2	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,980	0.0	72	0	$11	$37	$10	2.4
Room 134	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,980	2	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,980	0.0	72	0	$11	$37	$10	2.4
Room 150	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,980	2	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,980	0.0	72	0	$11	$37	$10	2.4
Women	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,980	2, 3	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,366	0.1	183	0	$28	$189	$20	6.0
Girls	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,980	2, 3	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,366	0.1	183	0	$28	$189	$20	6.0
Boys	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,980	2, 3	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,366	0.1	183	0	$28	$189	$20	6.0
Girls	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,980	2, 3	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,366	0.1	183	0	$28	$189	$20	6.0
Boys	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,980	2, 3	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,366	0.1	183	0	$28	$189	$20	6.0
Restroom	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,980	2, 3	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,366	0.1	183	0	$28	$189	$20	6.0
Restroom	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,980	2, 3	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,366	0.1	183	0	$28	$189	$20	6.0
013 Elevator Room	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,980	2, 3	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,366	0.1	183	0	$28	$189	$20	6.0
Room 139	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,980	2, 3	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,366	0.1	183	0	$28	$189	$20	6.0
Room 154	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,980	2, 3	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,366	0.1	183	0	$28	$189	$20	6.0
142 Mechanical Room	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,980	2, 3	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,366	0.1	274	0	$42	$380	$65	7.4
310 Storage	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,980	2, 3	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,366	0.1	274	0	$42	$226	$30	4.6
305 Storage	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,980	2, 3	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,366	0.1	274	0	$42	$226	$30	4.6
Room 302	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,980	2, 3	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,366	0.1	274	0	$42	$380	$65	7.4
Room 304	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,980	2, 3	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,366	0.1	274	0	$42	$380	$65	7.4
Room 003	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,980	2, 3	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,366	0.1	274	0	$42	$380	$65	7.4
Storage 007	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,980	2, 3	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,366	0.1	274	0	$42	$226	$30	4.6

	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
Boys	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,980	2, 3	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,366	0.1	366	0	$57	$416	$75	6.0
Girls	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,980	2, 3	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,366	0.1	366	0	$57	$416	$75	6.0
Maintenance	6	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,980	2, 3	Relamp	Yes	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,366	0.2	549	0	$85	$489	$95	4.6
Main Office	11	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,980	2, 3	Relamp	Yes	11	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,366	0.3	1,006	0	$156	$672	$145	3.4
153 Mech Room	12	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,980	2, 3	Relamp	Yes	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,366	0.4	1,097	0	$170	$708	$155	3.3
Basement	12	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,980	2, 3	Relamp	Yes	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,366	0.4	1,097	0	$170	$708	$155	3.3
Kitchen	14	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,980	2, 3	Relamp	Yes	14	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,366	0.4	1,280	0	$198	$781	$175	3.1
Room 156	16	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,980	2, 3	Relamp	Yes	16	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,366	0.5	1,463	0	$226	$1,124	$230	3.9
Library	28	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,980	2, 3	Relamp	Yes	28	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,366	0.8	2,561	-1	$396	$1,832	$385	3.7
Room 002	28	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,980	2, 3	Relamp	Yes	28	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,366	0.8	2,561	-1	$396	$1,832	$385	3.7
Main Office	5	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	S	32	1,980	2, 3	Relamp	Yes	5	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,366	0.1	240	0	$37	$207	$25	4.9
Main Office	12	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	S	32	1,980	2, 3	Relamp	Yes	12	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,366	0.2	575	0	$89	$759	$130	7.1
Elevator 1	2	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	S	88	1,980	2	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,980	0.1	257	0	$40	$73	$20	1.3
Kitchen	1	Exit Signs: LED - 2 W Lamp	None	S	6	8,760		None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Maintenance	1	Exit Signs: LED - 2 W Lamp	None	S	6	8,760		None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Stairs 6	1	Exit Signs: LED - 2 W Lamp	None	S	6	8,760		None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Vestibule	1	Exit Signs: LED - 2 W Lamp	None	S	6	8,760		None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Stairs 1	1	Exit Signs: LED - 2 W Lamp	None	S	6	8,760		None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Room 129	1	Exit Signs: LED - 2 W Lamp	None	S	6	8,760		None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Room 134	1	Exit Signs: LED - 2 W Lamp	None	S	6	8,760		None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Room 132	1	Exit Signs: LED - 2 W Lamp	None	S	6	8,760		None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Room 138	1	Exit Signs: LED - 2 W Lamp	None	S	6	8,760		None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Basement	1	Exit Signs: LED - 2 W Lamp	None	S	6	8,760		None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
153 Mech Room	2	Exit Signs: LED - 2 W Lamp	None	S	6	8,760		None	No	2	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Stairs 4	2	Exit Signs: LED - 2 W Lamp	None	S	6	8,760		None	No	2	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0

	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
Room 002	2	Exit Signs: LED - 2 W Lamp	None	S	6	8,760		None	No	2	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Stairs 2	2	Exit Signs: LED - 2 W Lamp	None	S	6	8,760		None	No	2	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Hallway	2	Exit Signs: LED - 2 W Lamp	None	S	6	8,760		None	No	2	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
156 Stage	2	Exit Signs: LED - 2 W Lamp	None	S	6	8,760		None	No	2	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Library	3	Exit Signs: LED - 2 W Lamp	None	S	6	8,760		None	No	3	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
2nd Fl Hall	5	Exit Signs: LED - 2 W Lamp	None	S	6	8,760		None	No	5	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
158 Multi Purpose Room	5	Exit Signs: LED - 2 W Lamp	None	S	6	8,760		None	No	5	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
3rd Fl. Hall	8	Exit Signs: LED - 2 W Lamp	None	S	6	8,760		None	No	8	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
1st Fl Hallway	12	Exit Signs: LED - 2 W Lamp	None	S	6	8,760		None	No	12	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Library	8	Compact Fluorescent: U-type Long CFL (50W) - 3L	Wall Switch	S	150	1,980	2, 3	Relamp	Yes	8	LED - Fixtures: Other	Occupancy Sensor	105	1,366	0.4	1,351	0	$209	$408	$35	1.8
Exterior	2	Compact Fluorescent: Spiral Bulb (42W) - 1L	Photocell	S	42	4,380	2	Relamp	No	2	LED - Fixtures: Other	Photocell	29	4,380	0.0	110	0	$17	$34	$0	2.0
Library	8	Compact Fluorescent: Spiral Bulb (32W) - 1L	Wall Switch	S	32	1,980	2, 3	Relamp	Yes	8	LED - Fixtures: Other	Occupancy Sensor	22	1,366	0.1	288	0	$45	$408	$35	8.4
Room 156	16	Compact Fluorescent: CFL Floods (13W) - 2L	Wall Switch	S	26	1,980	2, 3	Relamp	Yes	16	LED - Fixtures: Other	Occupancy Sensor	18	1,366	0.2	468	0	$73	$816	$70	10.3
158 Multi Purpose Room	24	Compact Fluorescent: 4 Pin CFL (42W) - 8L	Wall Switch	S	336	1,980	2, 3	Relamp	Yes	24	LED - Fixtures: Other	Occupancy Sensor	235	1,366	3.0	9,080	-2	$1,405	$1,223	$105	0.8
Library	24	Compact Fluorescent: 4 Pin CFL (42W) - 3L	Wall Switch	S	126	1,980	2, 3	Relamp	Yes	24	LED - Fixtures: Other	Occupancy Sensor	88	1,366	1.1	3,405	-1	$527	$1,223	$105	2.1
Exterior	17	Compact Fluorescent: 4 Pin CFL (32W) - 2L	Photocell	S	64	4,380	2	Relamp	No	17	LED - Fixtures: Other	Photocell	45	4,380	0.2	1,430	0	$225	$293	$0	1.3
Boys	1	Compact Fluorescent: 4 Pin CFL (32W) - 1L	Wall Switch	S	32	1,980	2	Relamp	No	1	LED - Fixtures: Other	Wall Switch	22	1,980	0.0	21	0	$3	$17	$0	5.3
Boys	1	Compact Fluorescent: 4 Pin CFL (32W) - 1L	Wall Switch	S	32	1,980	2	Relamp	No	1	LED - Fixtures: Other	Wall Switch	22	1,980	0.0	21	0	$3	$17	$0	5.3
Restroom	1	Compact Fluorescent: 4 Pin CFL (32W) - 1L	Wall Switch	S	32	1,980	2	Relamp	No	1	LED - Fixtures: Other	Wall Switch	22	1,980	0.0	21	0	$3	$17	$0	5.3
Boys	1	Compact Fluorescent: 4 Pin CFL (32W) - 1L	Wall Switch	S	32	1,980	2	Relamp	No	1	LED - Fixtures: Other	Wall Switch	22	1,980	0.0	21	0	$3	$17	$0	5.3
Girls	1	Compact Fluorescent: 4 Pin CFL (32W) - 1L	Wall Switch	S	32	1,980	2	Relamp	No	1	LED - Fixtures: Other	Wall Switch	22	1,980	0.0	21	0	$3	$17	$0	5.3
1st Fl Hallway	1	Compact Fluorescent: 4 Pin CFL (32W) - 1L	Wall Switch	S	32	1,980	2, 4	Relamp	Yes	1	LED - Fixtures: Other	High/Low Control	22	1,366	0.0	36	0	$6	$217	$0	38.9
Girls	2	Compact Fluorescent: 4 Pin CFL (32W) - 1L	Wall Switch	S	32	1,980	2, 3	Relamp	Yes	2	LED - Fixtures: Other	Occupancy Sensor	22	1,366	0.0	72	0	$11	$150	$0	13.5
Girls	2	Compact Fluorescent: 4 Pin CFL (32W) - 1L	Wall Switch	S	32	1,980	2, 3	Relamp	Yes	2	LED - Fixtures: Other	Occupancy Sensor	22	1,366	0.0	72	0	$11	$150	$0	13.5
Exterior	4	Compact Fluorescent: 4 Pin CFL (32W) - 1L	Photocell	S	32	4,380	2	Relamp	No	4	LED - Fixtures: Other	Photocell	22	4,380	0.0	168	0	$26	$69	$0	2.6

	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
Vestibule	4	Compact Fluorescent: 4 Pin CFL (18W) - 2L	Wall Switch	S	36	1,980	2, 3	Relamp	Yes	4	LED - Fixtures: Other	Occupancy Sensor	25	1,366	0.1	162	0	$25	$185	$0	7.4

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
Outdoor	Cooling Tower	2	Cooling Tower Fan	7.5	88.5%	No	W	1,696	NR, 6	Yes	91.7%	Yes	2	-0.2	4,855	0	$764	$9,521	$0	12.5
Outdoor	Cooling Tower	1	Other	3.0	86.5%	No	W	1,760		No	86.5%	No		0.0	0	0	$0	$0	$0	0.0
Roof	Kitchen Hood Supply air Fan	1	Kitchen Hood Exhaust Fan	0.3	68.0%	No	W	1,760		No	68.0%	No		0.0	0	50	$0	$0	$0	0.0
Roof	Mech Room 308	1	Exhaust Fan	0.1	60.0%	No	W	1,760		No	60.0%	No		0.0	0	0	$0	$0	$0	0.0
Roof	Mech Room 308	1	Exhaust Fan	0.3	65.0%	No	W	1,760		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Roof	Kitchen Hood	1	Exhaust Fan	1.0	82.0%	No	W	1,760		No	82.0%	No		0.0	0	0	$0	$0	$0	0.0
Roof	Dish washer hood	1	Exhaust Fan	0.1	60.0%	No	W	1,760		No	60.0%	No		0.0	0	0	$0	$0	$0	0.0
Roof	Exhaust Fan for Mech Room 153	1	Exhaust Fan	0.3	65.0%	No	W	1,760		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Roof	Toilet Room Exhaust Fan	1	Exhaust Fan	0.3	65.0%	No	W	1,760		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Roof	Toilet Room Exhaust Fan	1	Exhaust Fan	0.2	62.0%	No	W	1,760		No	62.0%	No		0.0	0	0	$0	$0	$0	0.0
Roof	Toilet Room Exhaust Fan	1	Exhaust Fan	0.3	65.0%	No	W	1,760		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Roof	Toilet Room Exhaust Fan	1	Exhaust Fan	0.8	68.0%	No	W	1,760		No	68.0%	No		0.0	0	0	$0	$0	$0	0.0
Roof	Elec Room Exhaust Fan	1	Exhaust Fan	0.3	62.0%	No	W	1,760		No	62.0%	No		0.0	0	0	$0	$0	$0	0.0
Roof	Storage room Exhaust	1	Exhaust Fan	0.3	62.0%	No	W	1,760		No	62.0%	No		0.0	0	0	$0	$0	$0	0.0
Roof	Storage room 011	1	Exhaust Fan	0.3	62.0%	No	W	1,760		No	62.0%	No		0.0	0	0	$0	$0	$0	0.0
Mech Room	Boiler	1	Heating Hot Water Pump	20.0	91.0%	Yes	W	1,696		No	91.0%	No		0.0	0	0	$0	$0	$0	0.0
Mech Room	Boiler	1	Heating Hot Water Pump	20.0	91.0%	Yes	W	0		No	91.0%	No		0.0	0	0	$0	$0	$0	0.0
Mech Room	Cooling Tower	1	Condenser Water Pump	10.0	91.7%	No	W	1,696		No	91.7%	No		0.0	0	0	$0	$0	$0	0.0
Mech Room	Cooling Tower	1	Condenser Water Pump	10.0	91.7%	No	W	0		No	91.7%	No		0.0	0	0	$0	$0	$0	0.0
Mech Room	Boiler	1	Boiler Feed Water Pump	1.0	82.0%	No	W	1,373		No	82.0%	No		0.0	0	0	$0	$0	$0	0.0

		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
Mech Room	Boiler	1	Boiler Feed Water Pump	1.0	82.0%	No	W	0		No	82.0%	No		0.0	0	0	$0	$0	$0	0.0
Roof	Multi Purpose Room	1	Supply Fan	3.0	89.5%	No	W	1,373	NR, 5	Yes	89.5%	Yes	1	0.9	1,287	0	$202	$4,076	$0	20.1
Roof	Multi Purpose Room	1	Supply Fan	3.0	89.5%	No	W	1,373	NR, 5	Yes	89.5%	Yes	1	0.9	1,287	0	$202	$4,076	$0	20.1
Roof	Multi Purpose Room	1	Supply Fan	3.0	89.5%	No	W	1,373	NR, 5	Yes	89.5%	Yes	1	0.9	1,287	0	$202	$4,076	$0	20.1
Roof	Multi Purpose Room	1	Supply Fan	3.0	89.5%	No	W	1,373	NR, 5	Yes	89.5%	Yes	1	0.9	1,287	0	$202	$4,076	$0	20.1
Roof	Stage storage	1	Supply Fan	2.0	86.5%	No	W	1,373	NR, 5	Yes	86.5%	Yes	1	0.6	888	0	$140	$3,623	$0	25.9
Roof	Kitchen	1	Supply Fan	1.0	82.0%	No	W	1,373		No	82.0%	No		0.0	0	0	$0	$0	$0	0.0
Roof	Corridor	1	Supply Fan	1.0	82.0%	No	W	1,373		No	82.0%	No		0.0	0	0	$0	$0	$0	0.0
1st & 2nd Floors	Make Up Air Unit	1	Supply Fan	5.0	87.5%	No	W	1,373	NR, 5	Yes	89.5%	Yes	1	1.5	2,282	0	$359	$4,197	$775	9.5
1st,2nd & 3rd Floors	Make Up Air Unit	1	Supply Fan	5.0	87.5%	No	W	1,373	NR, 5	Yes	89.5%	Yes	1	1.5	2,282	0	$359	$4,197	$775	9.5
Music room 138	Make Up Air Unit	1	Supply Fan	1.5	84.0%	No	W	1,373	NR, 5	Yes	87.5%	Yes	1	0.5	735	0	$116	$3,391	$0	29.3
Third Floor	Make Up Air Unit	1	Supply Fan	5.0	87.5%	No	W	1,373	NR, 5	Yes	89.5%	Yes	1	1.5	2,282	0	$359	$4,197	$775	9.5
1st & 2nd Floors	Make Up Air Unit	1	Return Fan	2.0	85.5%	No	W	1,373	NR, 5	Yes	88.5%	Yes	1	0.6	953	0	$150	$3,493	$0	23.3
1st,2nd & 3rd Floors	Make Up Air Unit	1	Return Fan	3.0	89.5%	No	W	1,373	NR, 5	Yes	89.5%	Yes	1	0.9	1,287	0	$202	$4,076	$0	20.1
Music room 138	Make Up Air Unit	1	Return Fan	0.5	68.0%	No	W	1,373	NR, 5	Yes	78.2%	Yes	1	0.2	349	0	$55	$2,958	$0	53.9
Third Floor	Make Up Air Unit	1	Return Fan	1.5	84.0%	No	W	1,373	NR, 5	Yes	87.5%	Yes	1	0.5	735	0	$116	$3,391	$0	29.3
Mech Room	DCW Pump	1	Other	3.0	76.6%	No	W	880		No	76.6%	No		0.0	0	0	$0	$0	$0	0.0
Mech Room	DCW Pump	1	Other	3.0	76.6%	No	W	880		No	76.6%	No		0.0	0	0	$0	$0	$0	0.0
Mech Room	Sprinkler Pump	1	Process Pump	50.0	92.4%	No	W	440		No	92.4%	No		0.0	0	0	$0	$0	$0	0.0
Mech Room	Boiler	2	Combustion Air Fan	0.5	68.0%	No	W	1,373		No	68.0%	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
Room 316	HP-1	3	Water Source HP	0.58	9.20	W		No							0.0	0	0	$0	$0	$0	0.0
Room 107	HP-2	1	Water Source HP	0.67	10.65	W		No							0.0	0	0	$0	$0	$0	0.0
Various Areas	HP-3	3	Water Source HP	0.99	13.60	W		No							0.0	0	0	$0	$0	$0	0.0
Various Areas	HP-4	3	Water Source HP	1.09	16.90	W		No							0.0	0	0	$0	$0	$0	0.0
Various Areas	HP-5	3	Water Source HP	1.52	22.20	W		No							0.0	0	0	$0	$0	$0	0.0
Various Areas	HP-6	9	Water Source HP	1.98	30.30	W		No							0.0	0	0	$0	$0	$0	0.0
Various Areas	HP-7	8	Water Source HP	2.18	32.00	W		No							0.0	0	0	$0	$0	$0	0.0
Various Areas	HP-8	3	Water Source HP	3.09	46.60	W		No							0.0	0	0	$0	$0	$0	0.0
Various Areas	HP-9	9	Water Source HP	0.58	8.00	W		No							0.0	0	0	$0	$0	$0	0.0
Various Areas	HP-10	1	Water Source HP	0.60	8.00	W		No							0.0	0	0	$0	$0	$0	0.0
Various Areas	HP-11	3	Water Source HP	0.55	7.40	W		No							0.0	0	0	$0	$0	$0	0.0
Various Areas	HP-12	2	Water Source HP	0.68	10.50	W		No							0.0	0	0	$0	$0	$0	0.0
Room 201	HP-13	1	Water Source HP	0.99	13.60	W		No							0.0	0	0	$0	$0	$0	0.0
Various Areas	HP-14	5	Water Source HP	1.09	17.00	W		No							0.0	0	0	$0	$0	$0	0.0
Room 308	HP-18	2	Water Source HP	3.98	57.70	W		No							0.0	0	0	$0	$0	$0	0.0
Various Areas	HP-19	2	Water Source HP	3.81	58.20	W		No							0.0	0	0	$0	$0	$0	0.0
Room 308	HP-20	1	Water Source HP	4.72	75.60	W		No							0.0	0	0	$0	$0	$0	0.0
Room 012	HP-21	5	Water Source HP	2.83	43.10	W		No							0.0	0	0	$0	$0	$0	0.0
Roof	AC-1	1	Packaged AC	10.00		W		No							0.0	0	0	$0	$0	$0	0.0
Roof	AC-2	1	Packaged AC	10.00		W		No							0.0	0	0	$0	$0	$0	0.0

		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
Roof	AC-3	1	Packaged AC	10.00		W		No							0.0	0	0	$0	$0	$0	0.0
Roof	AC-4	1	Packaged AC	10.00		W		No							0.0	0	0	$0	$0	$0	0.0
Roof	AC-5	1	Packaged AC	5.00		W		No							0.0	0	0	$0	$0	$0	0.0
Roof	AC-6	1	Packaged AC	8.00		W		No							0.0	0	0	$0	$0	$0	0.0
Roof	AC-7	1	Packaged AC	4.00		W		No							0.0	0	0	$0	$0	$0	0.0
Roof access room	Unit Heater	1	Electric Resistance Heat		10.24	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
Mech Room	B-1 School	1	Natural Draft Steam Boiler	######	W		No						0.0	0	0	$0	$0	$0	0.0
Mech Room	B-2 School	1	Natural Draft Steam Boiler	######	W		No						0.0	0	0	$0	$0	$0	0.0
Roof	AC-1	1	Furnace	146.00	W		No						0.0	0	0	$0	$0	$0	0.0
Roof	AC-2	1	Furnace	146.00	W		No						0.0	0	0	$0	$0	$0	0.0
Roof	AC-3	1	Furnace	146.00	W		No						0.0	0	0	$0	$0	$0	0.0
Roof	AC-4	1	Furnace	146.00	W		No						0.0	0	0	$0	$0	$0	0.0
Roof	AC-5	1	Furnace	73.00	W		No						0.0	0	0	$0	$0	$0	0.0
Roof	AC-6	1	Furnace	146.00	W		No						0.0	0	0	$0	$0	$0	0.0
Roof	AC-7	1	Furnace	73.00	W		No						0.0	0	0	$0	$0	$0	0.0

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
Mech Room	Kitchen & Restrooms	2	Storage Tank Water Heater (> 50 Gal)	W		No						0.0	0	0	$0	$0	$0	0.0

Low-Flow Device Recommendations

	Recommedation Inputs					Energy Impact & Financial Analysis						
Location	ECM #	Device Quantity	Device Type	Existing Flow Rate (gpm)	Proposed Flow Rate (gpm)	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
Restrooms	7	11	Faucet Aerator (Lavatory)	2.20	0.50	0.0	0	31	$380	$79	$0	0.2
Restrooms	7	13	Faucet Aerator (Lavatory)	2.50	0.50	0.0	0	44	$528	$93	$0	0.2

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)	8	Yes	No	No	0.0	207	0	$33	$303	$0	9.3
Kitchen	1	Low Temp Freezer (-35F to -5F)	8	Yes	No	No	0.0	207	0	$33	$303	$0	9.3

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	Stand-Up Refrigerator, Solid Door (16 - 30 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	1	Insulated Food Holding Cabinet (Full Size)	No		No	0.0	0	0	$0	$0	$0	0.0
Kitchen	1	Electric Convection Oven (Full Size)	Yes		No	0.0	0	0	$0	$0	$0	0.0
Kitchen	1	Gas Combination Oven/Steam Cooker (15 - 28 Pans)	Yes		No	0.0	0	0	$0	$0	$0	0.0
Kitchen	1	Gas Griddle (3 Feet Width)	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
Kitchen	1	Insulated Food Holding Cabinet (1/2 Size)	No		No	0.0	0	0	$0	$0	$0	0.0
Kitchen	1	Insulated Food Holding Cabinet (1/2 Size)	No		No	0.0	0	0	$0	$0	$0	0.0
Kitchen	2	Insulated Food Holding Cabinet (1/2 Size)	No		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	Single Tank Conveyor (High Temp)	Electric	Electric	Yes		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?
Classrooms	73	Computer	120.0	No
Staffrooms	3	Laptop	55.0	Yes
Classrooms	20	Small Printer	46.0	Yes
Staffrooms	5	Medium Printer	55.0	Yes
Copy room	5	Copy Machine	600.0	Yes
Staffrooms	1	Paper Shredder	46.0	No
Classrooms	24	Projector	120.0	Yes
Kitchen	2	Microwave	800.0	No
Kitchen	4	Small Refrigerator	120.0	No
Pantry	2	Medium Refrigerator	145.0	Yes
Kitchen	1	Large Refrigerator	255.0	Yes
Kitchen	3	Coffee Machine	1,500.0	No
Kitchen	1	Toaster	300.0	No
Classrooms	5	CRT Tv	244.0	No
Lobby	1	Plasma Tv	150.0	No
Lobby	1	LED Tv	120.0	Yes
Staffrooms	2	Space Heater	600.0	No

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
Lobby	1	Non-Refrigerated	9	Yes	0.0	343	0	$54	$230	$0	4.3
Lobby	1	Refrigerated	9	Yes	0.2	1,612	0	$254	$230	$0	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.

LEARN MORE AT energystar.gov

ENERGY STAR® Statement of Energy Performance

85

ENERGY STAR® Score[1]

Walter Hill School

Primary Property Type: K-12 School
Gross Floor Area (ft²): 71,374
Built: 1922

For Year Ending: January 31, 2018
Date Generated: October 22, 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
Walter Hill School 1815 Kings Hwy. Swedesboro, New Jersey 08085	SWEDESBORO-WOOLWICH BOARD OF EDUCATION 15 Fredrick Boulevard Woolwich Twp, NJ 08085 (____)____-_____	Christopher DeStratis 15 Fredrick Boulevard Woolwich Twp, NJ 08085 856-241-1552 x 1008 cdestratis@swsdk6.com

Property ID: 6571001

Energy Consumption and Energy Use Intensity (EUI)

Site EUI
39.3 kBtu/ft²

Source EUI
84.9 kBtu/ft²

Annual Energy by Fuel	
Natural Gas (kBtu)	1,023,837 (36%)
Electric - Grid (kBtu)	1,779,814 (64%)

National Median Comparison	
National Median Site EUI (kBtu/ft²)	59
National Median Source EUI (kBtu/ft²)	127.4
% Diff from National Median Source EUI	-33%
Annual Emissions	
Greenhouse Gas Emissions (Metric Tons CO2e/year)	235

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.