Local Government Energy Audit Report

Clayton J. Davenport Primary School

July 11, 2019

Prepared for:

Egg Harbor Township School District

2499 Spruce Avenue

Egg Harbor Township, New Jersey 08234

Prepared by:

TRC Energy Services

900 Route 9 North

Woodbridge, New Jersey 07095

Disclaimer

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

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

TRC bases estimated installation costs on our experience at similar facilities, pricing from local contractors and vendors, and/or cost estimates from RS Means. We encourage the owner of the facility 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.

New Jersey's 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.

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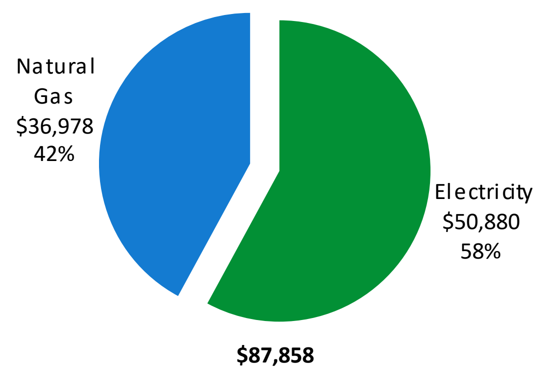
1 Executive Summary

The New Jersey Board of Public Utilities (NJBPU) has sponsored this Local Government Energy Audit (LGEA) report for Clayton J. Davenport Primary 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 to help protect our environment by reducing statewide energy consumption.

BUILDING PERFORMANCE REPORT

Annual Utilities	Costs: $87,858 Electricity: 554,016 kWh Natural Gas: 31,563 Therms	
ENERGY STAR® Benchmarking Score	51 *(1-100 scale)*	This building performs at or below the national average. This report contains suggestions about how to improve building performance and reduce energy costs.

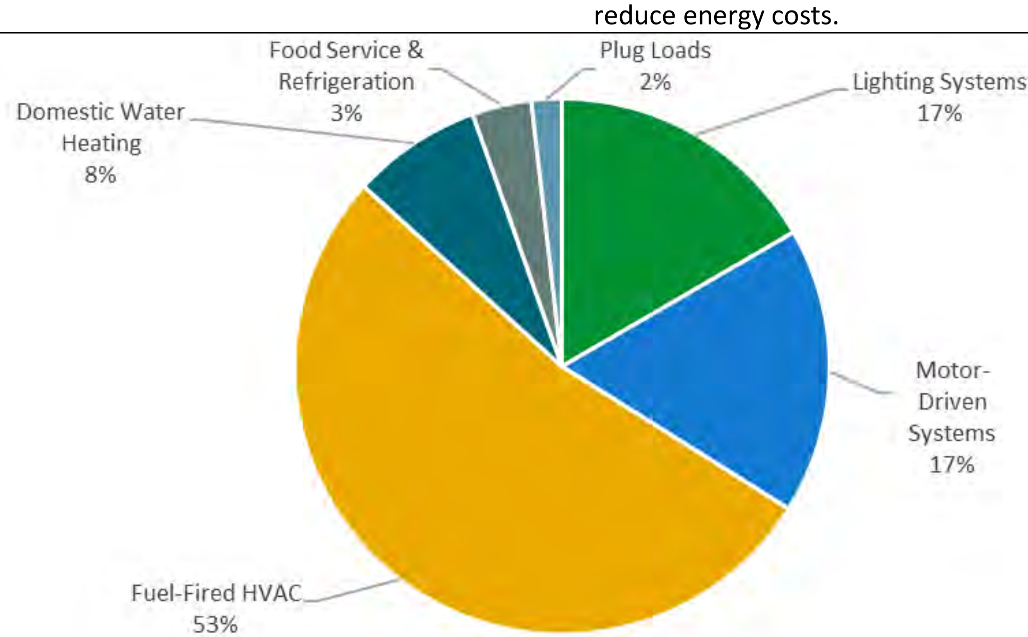


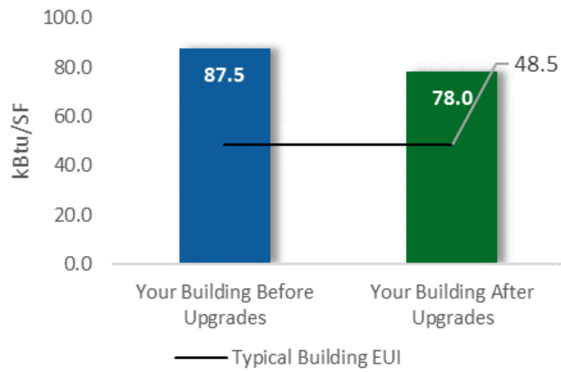
Figure 1 - Energy Use by System

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.

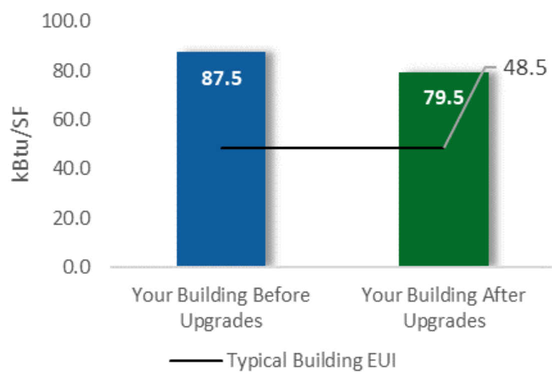
Scenario 1: Full Package (all evaluated measures)

Installation Cost	$130,701
Potential Rebates & Incentives[1]	$17,882
Annual Cost Savings	$14,291
Annual Energy Savings	Electricity: 148,568 kWh Natural Gas: 552 Therms
Greenhouse Gas Emission Savings	78 Tons
Simple Payback	7.9 Years
Site Energy Savings (all utilities)	11%



Scenario 2: Cost Effective Package[2]

Installation Cost	$100,299
Potential Rebates & Incentives	$15,707
Annual Cost Savings	$12,528
Annual Energy Savings	Electricity: 133,664 kWh Natural Gas: 215 Therms
Greenhouse Gas Emission Savings	69 Tons
Simple Payback	6.8 Years
Site Energy Savings (all utilities)	9%



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		**127,702**	**40.7**	**-35**	**$11,313**	**$169,700**	**$86,885**	**$14,757**	**$72,128**	**6.4**	**124,452**
ECM 1	Install LED Fixtures	94,644	28.5	-26	$8,393	$125,895	$58,307	$7,805	$50,502	6.0	92,318
ECM 2	Retrofit Fixtures with LED Lamps	33,059	12.2	-10	$2,920	$43,805	$28,578	$6,952	$21,626	7.4	32,133
Lighting Control Measures		**10,858**	**3.7**	**-4**	**$956**	**$7,648**	**$18,008**	**$2,050**	**$15,958**	**16.7**	**10,522**
	Install Occupancy Sensor Lighting Controls	9,597	3.2	-3	$845	$6,760	$16,008	$2,050	$13,958	16.5	9,300
	Install High/Low Lighting Controls	1,261	0.4	0	$111	$888	$2,000	$0	$2,000	18.0	1,222
Motor Upgrades		**0**	**0.0**	**0**	**$0**	**$0**	**$5,999**	**$0**	**$5,999**	**0.0**	**0**
ECM 3	Premium Efficiency Motors	0	0.0	0	$0	$0	$5,999	$0	$5,999	0.0	0
Variable Frequency Drive (VFD) Measures		**3,400**	**0.4**	**0**	**$312**	**$4,683**	**$5,458**	**$0**	**$5,458**	**17.5**	**3,423**
	Install VFDs on Heating Water Pumps	3,400	0.4	0	$312	$4,683	$5,458	$0	$5,458	17.5	3,423
HVAC System Improvements		**0**	**0.0**	**37**	**$436**	**$6,534**	**$5,438**	**$0**	**$5,438**	**12.5**	**4,353**
	Implement Demand Control Ventilation (DCV)	0	0.0	37	$436	$6,534	$5,438	$0	$5,438	12.5	4,353
Domestic Water Heating Upgrade		**0**	**0.0**	**57**	**$667**	**$6,670**	**$143**	**$0**	**$143**	**0.2**	**6,666**
ECM 4	Install Low-Flow DHW Devices	0	0.0	57	$667	$6,670	$143	$0	$143	0.2	6,666
Food Service & Refrigeration Measures		**2,258**	**0.3**	**0**	**$207**	**$1,452**	**$1,862**	**$175**	**$1,687**	**8.1**	**2,273**
	Replace Refrigeration Equipment	646	0.1	0	$59	$712	$1,632	$125	$1,507	25.4	650
ECM 5	Vending Machine Control	1,612	0.2	0	$148	$740	$230	$50	$180	1.2	1,623
TOTALS		**144,218**	**45.0**	**55**	**$13,892**	**$196,688**	**$123,793**	**$16,982**	**$106,811**	**7.7**	**151,691**

* - All incentives presented in this table are based on NJ SmartStart equipment incentives and assume proposed equipment meets minimum performance criteria for that program.
** - Simple Payback Period is based on net measure costs (i.e. after incentives).

Figure 2 – Evaluated Energy Improvements

For more detail on each evaluated energy improvement and a break out of cost-effective improvements, see **Section 4: Energy Conservation Measures**.

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’s 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
ECM 2	Retrofit Fixtures with LED Lamps	X		X
ECM 3	Premium Efficiency Motors	X		X
ECM 4	Install Low-Flow Domestic Hot Water Devices			X
ECM 5	Vending Machine Control	X		X

Figure 3 – Funding Options

New Jersey's 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. 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.

Individual Measures with SmartStart

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

Turnkey Installation with Direct Install

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

Whole Building Approach with Pay for Performance

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

More Options from Around the State

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

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

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

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

Ongoing Electric Savings with Demand Response

The Demand Response Energy Aggregator program reduces electric loads at commercial facilities when wholesale electricity prices are high or when the reliability of the electric grid is threatened due to peak power demand. By enabling commercial facilities to reduce 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 Clayton J. Davenport Primary School. This report provides information on how your facility uses energy, identifies energy conservation measures (ECMs) that can reduce your energy use, and provides information and assistance to help you implement the ECMs. This report also contains valuable information on financial incentives from New Jersey's Clean Energy Program (NJCEP) for implementing ECMs.

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

2.1 Site Overview

On December 14, 2018, TRC performed an energy audit at Clayton J. Davenport Primary School located in Egg Harbor Township, New Jersey. TRC met with Shawn Braue to review the facility operations and help focus our investigation on specific energy-using systems.

Clayton J. Davenport Primary School is a one-story, 57,650 square foot building built in 2005. Spaces include: classrooms, a gymnasium, offices, a cafeteria, corridors, ballrooms, conference rooms, a commercial kitchen, and mechanical space.

2.2 Building Occupancy

The facility is occupied year-round by admin and maintenance staff; school operates from September through June during a year. Typical weekday occupancy is 95 staff and 381 students.

Summer occupancy includes a summer school program and continuing maintenance activities. There are no weekend activities.

Building Name	Weekday/Weekend	Operating Schedule
Clayton J. Davenport Primary School	Weekday	8:00 AM - 4:00 PM
	Weekend	Unoccupied

Figure 4 - Building Occupancy Schedule

For a detailed list of the locations and recommended energy conservation measures for all inventoried equipment, see **Appendix A: Equipment Inventory & Recommendations**.

2.3 Building Envelope

Building walls are concrete block over structural steel with a decorative concrete masonry unit facade.

Steel trusses support a pitched roof with a metal deck covered with asphalt shingles. The roof encloses conditioned space. The thermal barrier is between this space and the conditioned space below. The gymnasium has a flat roof with a steel deck supported with steel trusses, with an unknown weather barrier.

Windows are double glazed and have aluminum frames with a thermal break. The glass-to-frame seals are in good condition. The operable window weather seals are also in good condition, showing no evidence of excessive wear. Exterior doors have aluminum frames and are in good condition with undamaged door seals.

Exterior Walk-in Units

School Exterior

School Windows

Building Wall

2.4 Lighting Systems

The primary interior lighting system uses 32-Watt linear fluorescent T8 lamps. Additionally, there are some compact fluorescent lamps (CFL), incandescent, metal halide, and LED general purpose lamps. Typically, T8 fluorescent lamps use electronic ballasts.

Fixture types include 2- , 3-, and 4-lamp, 2 and 4-foot long troffers, recessed and surface mounted fixtures, and 2-foot fixtures with linear tube lamps. Most of these fixtures are in good condition.

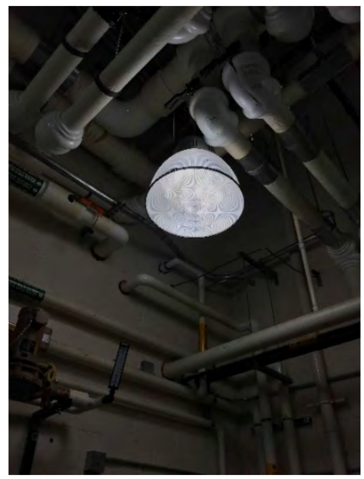
Cafeteria fixtures have 1000-Watt metal halide lamps and are manually controlled.

Library fixtures have decorative pendant metal halide bulbs as well as 2-foot linear fluorescent tubes and are manually controlled.

All exit signs are LED units.

Interior lighting levels were generally sufficient.

Gym Lighting



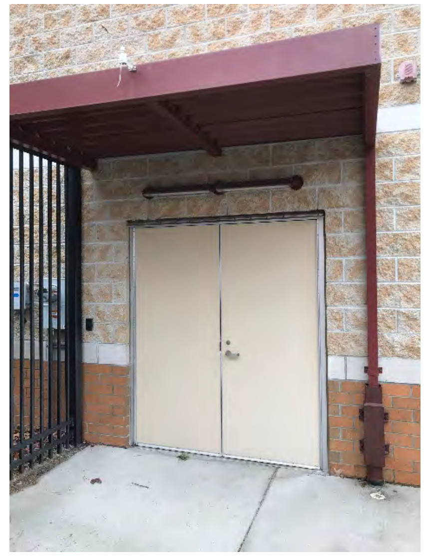
Boiler Room Lighting

Computer Room Lighting

Occupancy Sensor

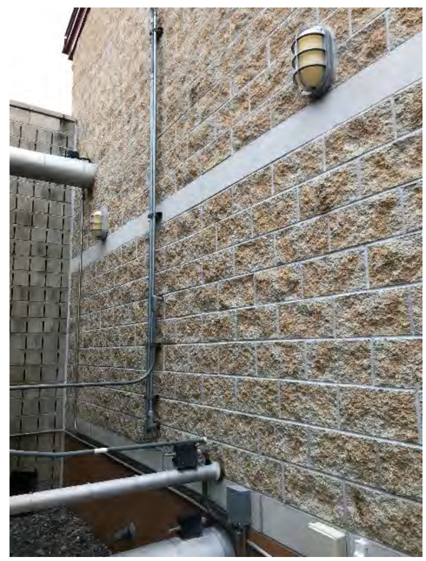
Lighting fixtures in classrooms, restrooms and offices are controlled by occupancy sensors. The remainder fixtures are controlled by wall switches.

Exterior Wall-Mounted Fixture



Door-Mounted Area Fixture

Exterior Fixtures



Exterior Wall Packs

Exterior fixtures include wall-mounted 100-Watt metal halide fixtures, 26-Watt or 42-Watt canopy-mounted can type CFL fixtures, door mounted long U-type CFL fixtures, and 70-Watt area fixtures.

Exterior light fixtures are controlled by photocell.

2.5 Heating and Cooling Distribution Systems

Packaged Units

The building heating and cooling system supplies hot and chilled water to unit ventilators and air handlers throughout the building. There is an attic below the roof containing 20 air handler units (AHU-1 to 20) with hot water and chilled water coils which serve the library, multipurpose room and bathrooms, kitchen, stage and all the classrooms in A, B, C, and D wings of the building. These AHUs have variable speed supply fan ranging in size from 1/8 hp to 10 hp and variable speed return fan ranging in size from 1 hp to 10 hp. Variable frequency drives controls supply and return air fans. All AHUs are monitored and controlled by BMS.

Air Conditioners

Staffroom uses a mini-split air conditioning (AC) unit. The capacity of unit is 0.75 ton and in good condition. Efficiency of this AC unit is 12 EER and ENERGY STAR® labeled.

The HVAC system uses BMS system for control setpoints in each part of school.

Split System AC

Outdoor Condensing Unit

2.6 Chilled Water and Heating Hot Water Systems

The building has one natural gas fired, 215-ton Broad® absorption chiller with a heating capacity of 2525 MBh. The burners are non-modulating with a nominal efficiency of 93.25%. One 746 MBh Lochinvar provides hot water to the absorption chiller. The units provide either heating water or chilled water for unit ventilators and air handlers located throughout the building. The system generally operates in heating mode from mid-October through mid-April and in cooling mode the rest of the year. Heating water is supplied at 160 °F and chilled water is supplied at 45 °F.

The absorption chiller is supplied by two dedicated 15 hp and 20 hp primary pump (P-3 and P-5). The chiller is designed to produce 42°F chilled water.

The system serves a primary/secondary distribution system with two variable speed 10 hp pumps circulating the secondary loop and two constant speed 2 hp primary heating hot water pumps operating in lead/lag fashion on the secondary loop. A three-way valve controls the secondary loop temperature via the EMS.

The absorption chillers are controlled by a Broad AI Control panel and operate in a lead/lag configuration.

Installed in 2009, the system is in good condition and in well condition. There is a service contract in place.

Boiler

Boiler Front

Heating Hot water pumps

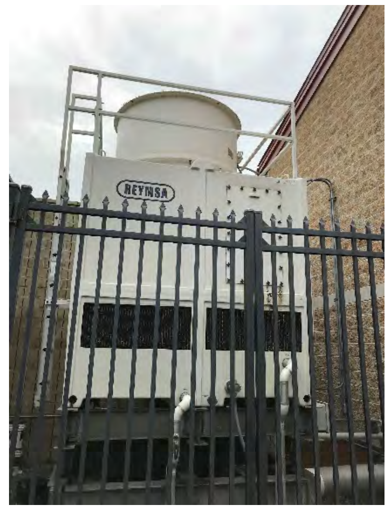
HHWP nameplate

2.7 Condensing Water Systems

Outside of the building there is an open cell Reymsa® cooling tower (CT1) with one variable flow 15 hp fan and one variable flow 15 hp circulation pump. Fan motor is staged based on maintaining basin water temperature. The condenser water temperature is reset with water supplied at 85°F and return water temperature is 95°F.

The fill of the cooling tower was noted in be in good condition. There are no leaks from cooling tower at the time of site visit.

Absorption Chiller



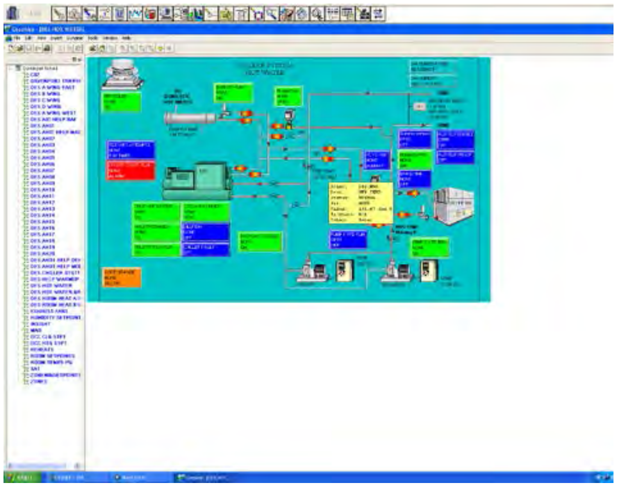
Cooling Tower

Chilled Water Pumps

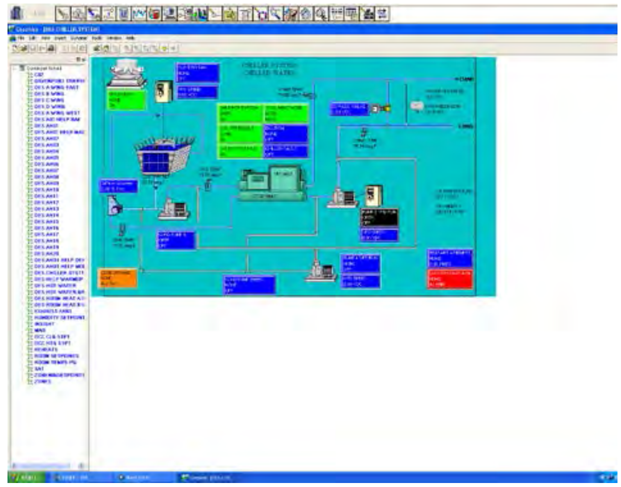
CHWP nameplate

2.8 Building Energy Management Systems (EMS)

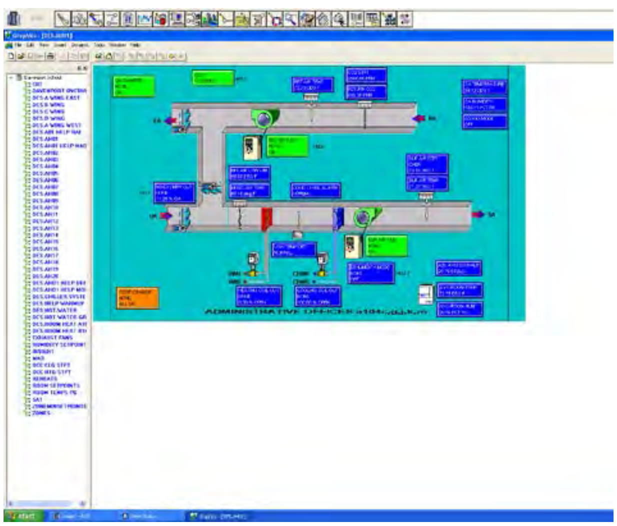
A Siemens Insight® EMS controls the HVAC equipment, hot water system and chilled water system, the air handlers, the package units. The EMS provides equipment scheduling control and monitors and controls space temperatures, supply air temperatures, humidity, heating water loop temperatures and chilled water loop temperatures.



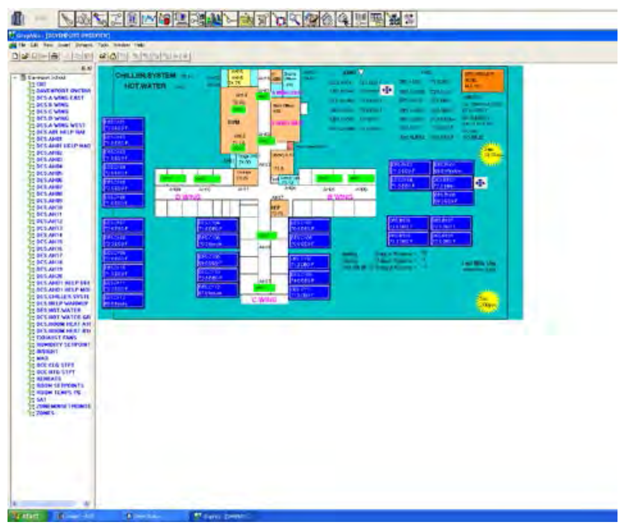
Hot Water System



Chilled Water System



AHU on BMS



Setpoint by area on BMS

2.9 Domestic Hot Water

Hot water is produced with an indirect system from a Lochinvar hot water gas-fired boiler which has a 250-gallon storage tank attached and input capacity of 746 MBh with efficiency of 93.25%. One 0.8 hp domestic hot water pump circulates hot water to kitchen and restroom areas.

At the time of the site visit, the domestic water heaters were set at 134°F.

The domestic hot water pipes are insulated, and the insulation is in good condition.

Indirect Hot Water System

DHW Pipe

DHW Storage Tank

DHW supply Pump

2.10 Food Service Equipment

The kitchen has mixed gas and electric equipment that is used to prepare lunches. Most cooking is done using a one convection electric and one gas fired convection oven. Bulk prepared foods are held in several electric holding cabinets. Equipment is high-efficiency and is in good condition.

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

Kitchen Equipment

Insulated food Cabinet

2.11 Refrigeration

The kitchen has two energy efficient stand-up refrigerators with solid doors. There is also an energy efficient stand-up solid door freezer. There is one chest type cooler used to store milk beverages. All equipment is high-efficiency and in good condition.

The walk-in refrigerator has an estimated 1-ton compressor located outdoor on the unit itself and a two-fan evaporator with evaporator fan control.

The walk-in low temperature freezer has a 1- ton compressor located outdoor on the unit itself and a two-fan 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.

Walk in Freezer and Cooler

Commercial Refrigerator

Milk Cooler

Milk Cooler nameplate

2.12 Plug Load & Vending Machines

The utility bill analysis indicates that plug loads consume approximately 1.83% percent of total building energy use. This is lower than a typical building.

The Davenport PS staff seems to 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 approximately 130 computer work stations throughout the facility. Plug loads throughout the building include general cafeteria and office equipment. There are classroom typical loads such as smart boards, projectors, printers and portable fans.

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

There is one refrigerated beverage vending machine. Vending machine is not equipped with occupancy-based control.

Vending Machine

Refrigerator

Printing Area

Microwave

2.13 Water-Using Systems

There are approximately 22 restrooms with toilets, urinals, and sinks. Faucet flow rates are at 2.2 gallons per minute (gpm) or higher. Toilets are rated at 1.6 gallons per flush (gpf) and urinals are rated at 1.2 gpf.

2.14 On-Site Generation

Davenport Primary School has a 101-kW photovoltaic (PV) array with approximately 429 modules that was installed in 2011. This system provides approximately 15-20% of the electricity used at this facility.

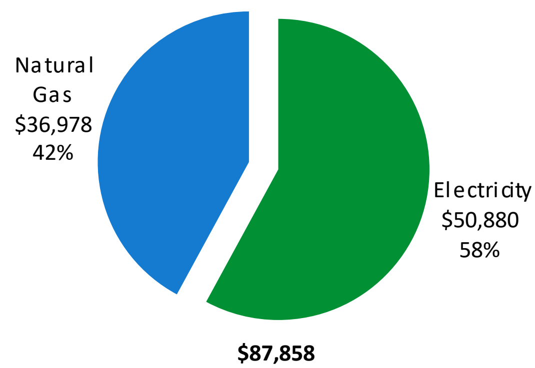
Davenport Primary School has an emergency generator that, in the event of a power outage, serves critical services (lighting, elevator, heating - boiler and pumps) and is only used for emergency needs.

Solar Panels on Roof

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	554,016 kWh	$50,880
Natural Gas	31,563 Therms	$36,978
Total		**$87,858**



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.

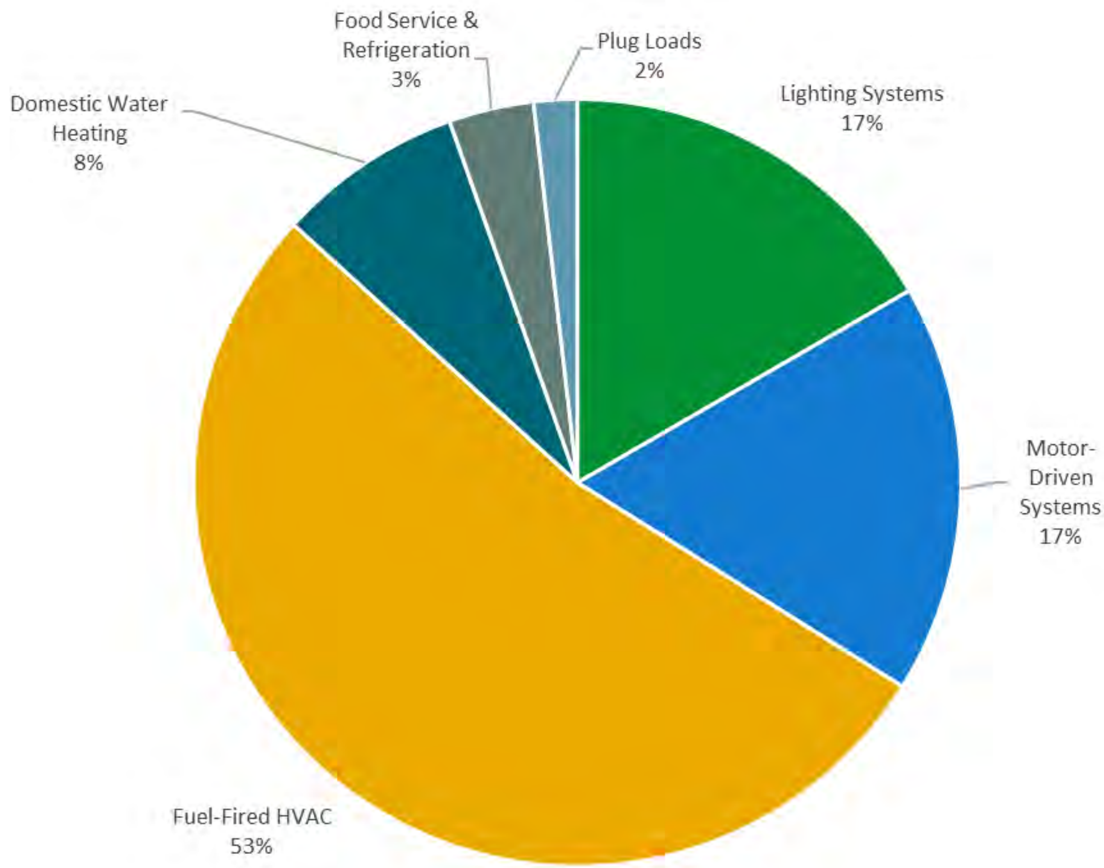
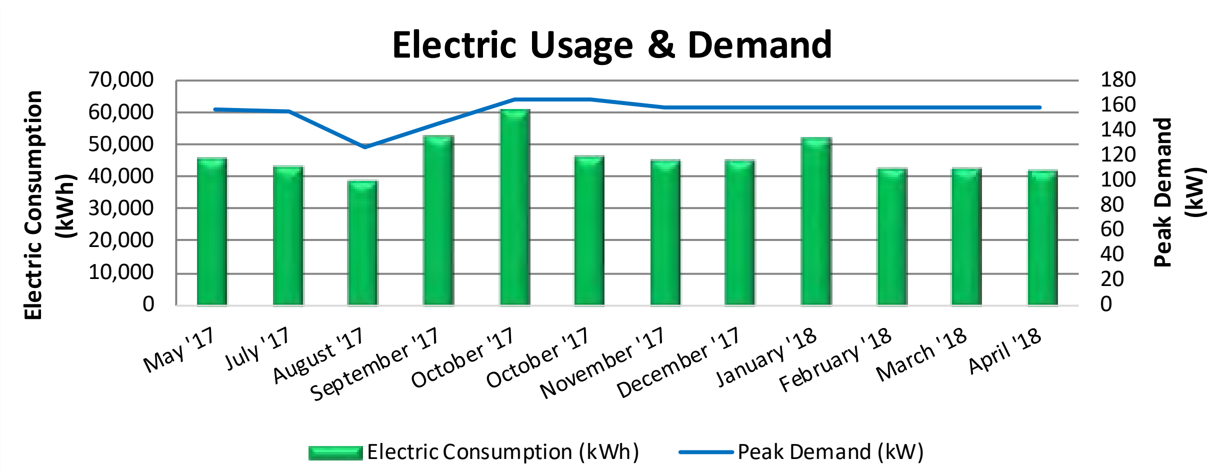


Figure 5 - Energy Balance

3.1 Electricity

Atlantic City Electric delivers electricity under rate class Annual General Service Secondary.



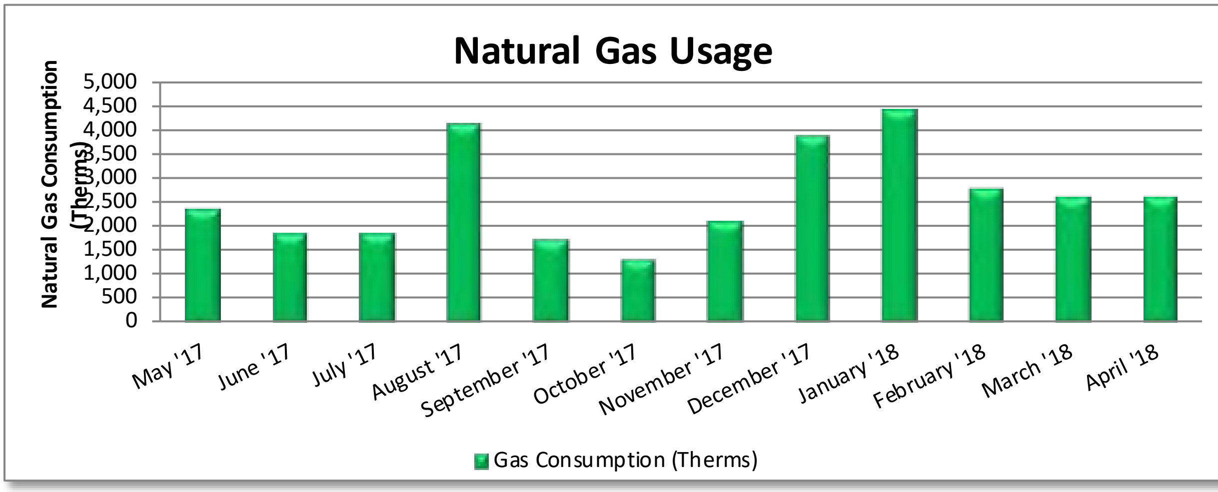
Electric Billing Data						
Period Ending	**Days in Period**	**Electric Usage (kWh)**	**Demand (kW)**	**Demand Cost**	**Total Electric Cost**	**TRC Estimated Usage?**
6/15/17	31	45,622	158	$1,506	$4,772	Yes
7/16/17	31	42,966	156	$1,422	$3,893	No
8/16/17	31	38,481	126	$1,148	$3,655	No
9/16/17	31	52,351	146	$1,234	$4,824	Yes
10/16/17	30	60,621	165	$1,319	$5,993	No
11/15/17	30	46,406	165	$1,773	$5,304	No
12/15/17	30	44,657	159	$1,553	$6,827	No
1/14/18	30	44,907	159	$1,707	$5,695	No
2/13/18	30	51,412	159	$1,447	$2,699	No
3/15/18	30	42,443	159	$1,447	$2,471	No
4/14/18	30	42,242	159	$1,632	$2,547	No
5/15/18	31	41,908	159	$1,401	$2,199	No
Totals	**365**	**554,016**	**165**	**$17,589**	**$50,880**	
Annual	**365**	**554,016**	**165**	**$17,589**	**$50,880**	

Notes:

- Peak demand of 165 kW occurred in October '17.
- The average electric cost over the past 12 months was $0.092/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.
- Some of the electricity generated on-site is used on-site and the remainder is exported to the grid.

3.2 Natural Gas

South Jersey Gas delivers natural gas under rate class General Service.



Gas Billing Data			
Period Ending	Days in Period	Natural Gas Usage (Therms)	Natural Gas Cost
5/31/17	31	2,358	$2,492
6/30/17	30	1,856	$1,997
7/31/17	31	1,867	$2,027
8/31/17	31	4,090	$4,407
9/30/17	30	1,742	$1,898
10/31/17	31	1,294	$1,492
11/30/17	30	2,118	$2,627
12/31/17	31	3,849	$4,755
1/31/18	31	4,403	$5,474
2/28/18	28	2,787	$3,494
3/31/18	31	2,590	$3,192
4/30/18	30	2,611	$3,123
Totals	**365**	**31,563**	**$36,978**
Annual	**365**	**31,563**	**$36,978**

Notes:

- The average gas cost for the past 12 months is $1.172/therm, which is the blended rate used throughout the analysis.

3.3 Benchmarking

Your building was benchmarked using the United States Environmental Protection Agency's (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.

Benchmarking Score	**51**

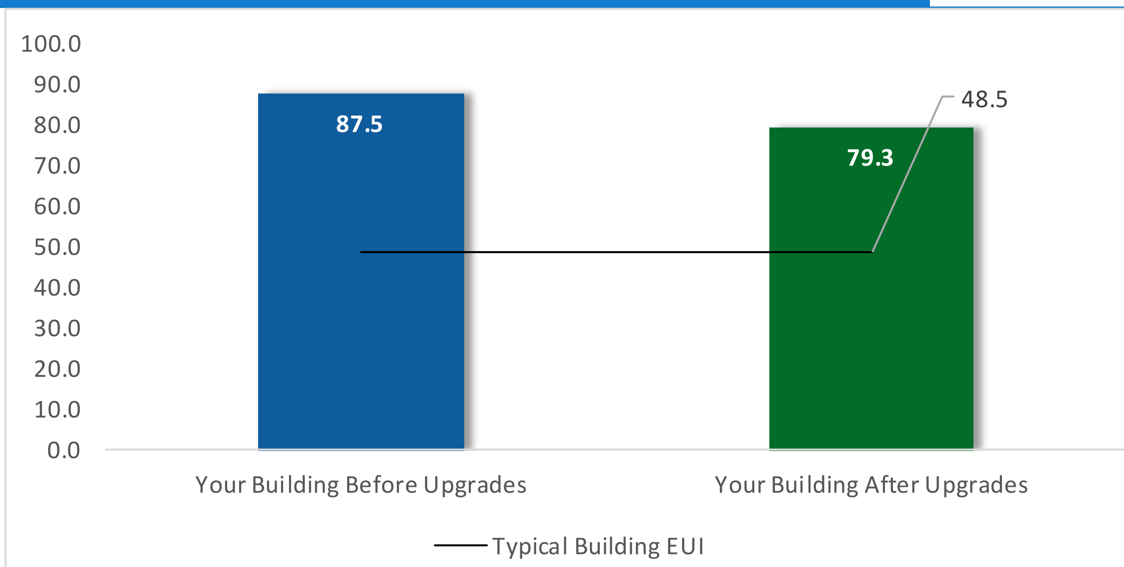


Figure 6 - Energy Use Intensity Comparison

This building performs at the national average. This report contains suggestions about how to improve building performance and reduce energy costs.

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

Tracking Your Energy Performance

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

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

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

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

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

4 Energy Conservation Measures

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

Calculations of energy use and savings are based on the current version of *New Jersey's Clean Energy Program Protocols to Measure Resource Savings*, which is approved by the New Jersey Board of Public Utilities. 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.

#	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		**127,702**	**40.7**	**-35**	**$11,313**	**$86,885**	**$14,757**	**$72,128**	**6.4**	**124,452**
ECM 1	Install LED Fixtures	94,644	28.5	-26	$8,393	$58,307	$7,805	$50,502	6.0	92,318
ECM 2	Retrofit Fixtures with LED Lamps	33,059	12.2	-10	$2,920	$28,578	$6,952	$21,626	7.4	32,133
Lighting Control Measures		**10,858**	**3.7**	**-4**	**$956**	**$18,008**	**$2,050**	**$15,958**	**16.7**	**10,522**
	Install Occupancy Sensor Lighting Controls	9,597	3.2	-3	$845	$16,008	$2,050	$13,958	16.5	9,300
	Install High/Low Lighting Controls	1,261	0.4	0	$111	$2,000	$0	$2,000	18.0	1,222
Motor Upgrades		**0**	**0.0**	**0**	**$0**	**$5,999**	**$0**	**$5,999**	**0.0**	**0**
ECM 3	Premium Efficiency Motors	0	0.0	0	$0	$5,999	$0	$5,999	0.0	0
Variable Frequency Drive (VFD) Measures		**3,400**	**0.4**	**0**	**$312**	**$5,458**	**$0**	**$5,458**	**17.5**	**3,423**
	Install VFDs on Heating Water Pumps	3,400	0.4	0	$312	$5,458	$0	$5,458	17.5	3,423
HVAC System Improvements		**0**	**0.0**	**37**	**$436**	**$5,438**	**$0**	**$5,438**	**12.5**	**4,353**
	Implement Demand Control Ventilation (DCV)	0	0.0	37	$436	$5,438	$0	$5,438	12.5	4,353
Domestic Water Heating Upgrade		**0**	**0.0**	**57**	**$667**	**$143**	**$0**	**$143**	**0.2**	**6,666**
ECM 4	Install Low-Flow DHW Devices	0	0.0	57	$667	$143	$0	$143	0.2	6,666
Food Service & Refrigeration Measures		**2,258**	**0.3**	**0**	**$207**	**$1,862**	**$175**	**$1,687**	**8.1**	**2,273**
	Replace Refrigeration Equipment	646	0.1	0	$59	$1,632	$125	$1,507	25.4	650
ECM 5	Vending Machine Control	1,612	0.2	0	$148	$230	$50	$180	1.2	1,623
TOTALS		**144,218**	**45.0**	**55**	**$13,892**	**$123,793**	**$16,982**	**$106,811**	**7.7**	**151,691**

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

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

Figure 7 – All Evaluated ECMs

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)*	Estimated Net Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Lighting Upgrades		**127,702**	**40.7**	**-35**	**$11,313**	**$86,885**	**$14,757**	**$72,128**	**6.4**	**124,452**
ECM 1	Install LED Fixtures	94,644	28.5	-26	$8,393	$58,307	$7,805	$50,502	6.0	92,318
ECM 2	Retrofit Fixtures with LED Lamps	33,059	12.2	-10	$2,920	$28,578	$6,952	$21,626	7.4	32,133
Motor Upgrades		**0**	**0.0**	**0**	**$0**	**$5,999**	**$0**	**$5,999**	**0.0**	**0**
ECM 3	Premium Efficiency Motors	0	0.0	0	$0	$5,999	$0	$5,999	0.0	0
Domestic Water Heating Upgrade		**0**	**0.0**	**57**	**$667**	**$143**	**$0**	**$143**	**0.2**	**6,666**
ECM 4	Install Low-Flow DHW Devices	0	0.0	57	$667	$143	$0	$143	0.2	6,666
Food Service & Refrigeration Measures		**1,612**	**0.2**	**0**	**$148**	**$230**	**$50**	**$180**	**1.2**	**1,623**
ECM 5	Vending Machine Control	1,612	0.2	0	$148	$230	$50	$180	1.2	1,623
TOTALS		**129,314**	**40.8**	**22**	**$12,128**	**$93,258**	**$14,807**	**$78,451**	**6.5**	**132,741**

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

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

Figure 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		**127,702**	**40.7**	**-35**	**$11,313**	**$86,885**	**$14,757**	**$72,128**	**6.4**	**124,452**
ECM 1	Install LED Fixtures	94,644	28.5	-26	$8,393	$58,307	$7,805	$50,502	6.0	92,318
ECM 2	Retrofit Fixtures with LED Lamps	33,059	12.2	-10	$2,920	$28,578	$6,952	$21,626	7.4	32,133

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 retrofit with screw-based LED lamps. Replacing an existing HID fixture with a new LED fixture will generally provide better overall lighting optics; however, replacing the HID lamp with a LED screw-in lamp is typically a less expensive retrofit. We recommend you work with your lighting contractor to determine which retrofit solution is best suited to your needs and will be compatible with the existing fixtures.

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: cafeteria, library, stage, boiler room, and exterior fixtures.

ECM 2: Retrofit Fixtures with LED Lamps

Replace linear fluorescent, CFLs 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: offices, conference rooms, classrooms, library, restrooms, storage rooms, and all 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		**10,858**	**3.7**	**-4**	**$956**	**$18,008**	**$2,050**	**$15,958**	**16.7**	**10,522**
	Install Occupancy Sensor Lighting Controls	9,597	3.2	-3	$845	$16,008	$2,050	$13,958	16.5	9,300
	Install High/Low Lighting Controls	1,261	0.4	0	$111	$2,000	$0	$2,000	18.0	1,222

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.

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.

Installing occupancy-based lighting controls has a long payback period and may not be justifiable based simply on energy considerations. Typically, the marginal cost of purchasing occupancy controls can be justified by the marginal savings from the improved energy savings.

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

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.

The controller lowers the light level by dimming the fixture output. Therefore, the controlled fixtures need to have a dimmable ballast or driver. This will need to be taken into account when selecting retrofit lamps and bulbs for the areas proposed for high/low control.

Installing high/low lighting controls has a long payback period and may not be justifiable based simply on energy considerations. Typically, the marginal cost of purchasing high/low controls can be justified by the marginal savings from the improved energy savings.

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

Affected building areas: hallways.

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

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		**0**	**0.0**	**0**	**$0**	**$5,999**	**$0**	**$5,999**	**0.0**	**0**
ECM 3	Premium Efficiency Motors	0	0.0	0	$0	$5,999	$0	$5,999	0.0	0

ECM 3: 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.

Premium efficiency motors have been proposed to be installed only in conjunction with proposed variable frequency drive (VFD) motor measures. Non-inverter duty rated motors will need to be replaced when the VFD measure is implemented.

Affected motors:

Location	Area(s)/System(s) Served	Motor Quantity	Motor Application	HP Per Motor	Additional Motor Description
Boiler Room	P-3	1	Chilled Water Pump	20.0	CHW motor
Boiler Room	P-2	1	Heating Hot Water Pump	10.0	HHW motor
Boiler Room	P-1	1	Heating Hot Water Pump	10.0	HHW motor
Boiler Room	Secondary HHW Pump	1	Heating Hot Water Pump	2.0	HHW motor
Boiler Room	Secondary HHW Pump	1	Heating Hot Water Pump	2.0	HHW motor
Outdoor	Cooling Tower	1	Cooling Tower Fan	15.0	Cooling tower fan motor

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		**3,400**	**0.4**	**0**	**$312**	**$5,458**	**$0**	**$5,458**	**17.5**	**3,423**
	Install VFDs on Heating Water Pumps	3,400	0.4	0	$312	$5,458	$0	$5,458	17.5	3,423

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

Install VFDs on Heating Water Pumps

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

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

Installing VFD on VAV fans has a long payback period and may not be justifiable based simply on energy considerations.

Affected pumps: Secondary Heating Hot Water pumps.

4.5 HVAC

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)*	Estimated Net Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
HVAC System Improvements		**0**	**0.0**	**37**	**$436**	**$5,438**	**$0**	**$5,438**	**12.5**	**4,353**
	Implement Demand Control Ventilation (DCV)	0	0.0	37	$436	$5,438	$0	$5,438	12.5	4,353

Implement Demand Control Ventilation (DCV)

Demand control ventilation (DCV) monitors the indoor air's carbon dioxide (CO_2) content to measure room occupancy. This data is used to regulate the amount of outdoor air provided to the space for ventilation.

Standard ventilation systems often provide outside air based on a space's estimated maximum occupancy but not actual occupancy. During low occupancy periods, the space may then be over ventilated. This wastes energy through heating and cooling the excess outside air flow. DCV reduces unnecessary outdoor air intake by regulating ventilation based on actual occupancy levels. DCV is most suited for facilities where occupancy levels vary significantly from hour to hour and day to day.

Energy savings associated with DCV are based on hours of operation, space occupancy, outside air reduction, and other factors. Energy savings results from eliminating unnecessary ventilation and space conditioning.

Installing demand control ventilation system has a long payback period and may not be justifiable based simply on energy considerations. Typically, the marginal cost of installing DCV can be justified by the marginal savings from the improved efficiency. When DCV will eventually implement, consider system that exceeds the minimum efficiency required by building codes.

Affected building areas: multipurpose room.

4.6 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**	**57**	**$667**	**$143**	**$0**	**$143**	**0.2**	**6,666**
ECM 4	Install Low-Flow DHW Devices	0	0.0	57	$667	$143	$0	$143	0.2	6,666

ECM 4: 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.

4.7 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		**2,258**	**0.3**	**0**	**$207**	**$1,862**	**$175**	**$1,687**	**8.1**	**2,273**
	Replace Refrigeration Equipment	646	0.1	0	$59	$1,632	$125	$1,507	25.4	650
ECM 5	Vending Machine Control	1,612	0.2	0	$148	$230	$50	$180	1.2	1,623

Replace Refrigeration Equipment

Replace existing commercial stand up refrigerators with new ENERGY STAR® rated equipment. The energy savings associated with this measure come from reduced energy usage, due to more efficient technology, and reduced run times.

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

ECM 5: 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.

Window Treatments/Coverings

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

Lighting 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.

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

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.

Motor Controls

Electric motors often run unnecessarily, and this is an overlooked opportunity to save energy. These motors should be identified and turned off when appropriate. For example, exhaust fans often run unnecessarily when ventilation requirements are already met. Whenever possible, use automatic devices such as twist timers or occupancy sensors to turn off motors when they are not needed.

Motor Short Cycling Reduction

Frequent stopping and starting of motors places substantial stress on rotors and other parts. This leads to wear and tear, lower efficiency, and higher maintenance costs. Adjust the load on the motor to limit the amount of unnecessary stopping and starting to improve motor performance.

Motor Maintenance

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

Fans to Reduce Cooling Load

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

Destratification Fans

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

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

Thermostat Schedules and Temperature Resets

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

Economizer Maintenance

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

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

Chiller Maintenance

Service chillers regularly to keep them operating properly. Chillers are responsible for a substantial portion of a commercial building's overall energy usage and when they do not work well, there is usually a noticeable increase in energy bills and increased occupant complaints. Regular diagnostics and service can save five to ten percent of the cost of operating your chiller. If you already have a maintenance contract in place, your existing service company should be able to provide these services.

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

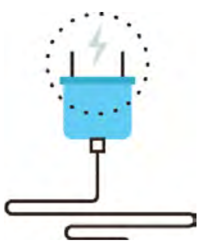
Many boiler problems develop slowly over time, so regular inspection and maintenance is essential to keeping the heating system running efficiently and preventing expensive repairs. Annual tune-ups should include a combustion analysis to analyze the exhaust from the boilers and to ensure the boiler is 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.

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 Loads in Office Buildings" http://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 gallons per flush (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, 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 current 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 none potential for installing a PV array.

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

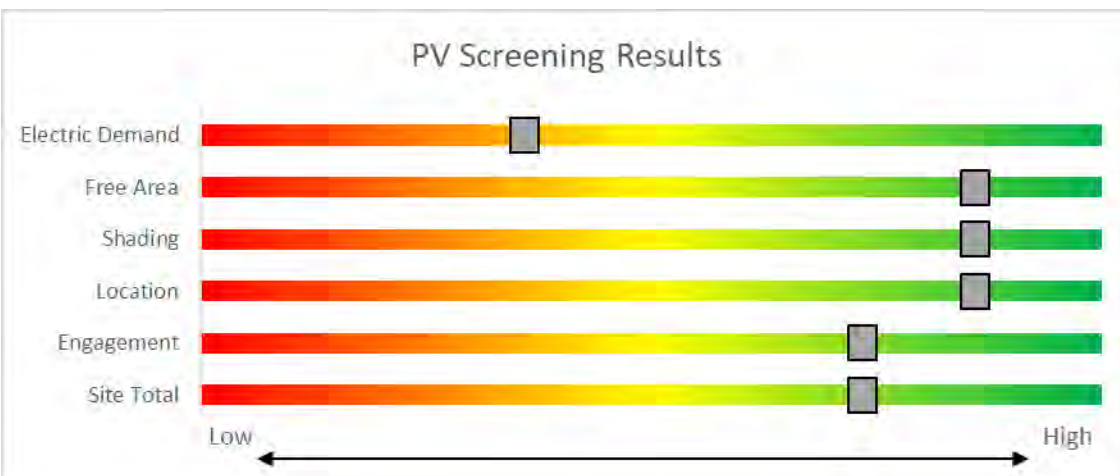


Figure 9 - Photovoltaic Screening

Solar Renewable Energy Credit (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 New Jersey**: www.njcleanenergy.com/whysolar
- **New Jersey Solar Market FAQs**: www.njcleanenergy.com/renewable-energy/program-updates-and-background-information/solar-transition/solar-market-faqs
- **Approved Solar Installers in the New Jersey 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) generate 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.

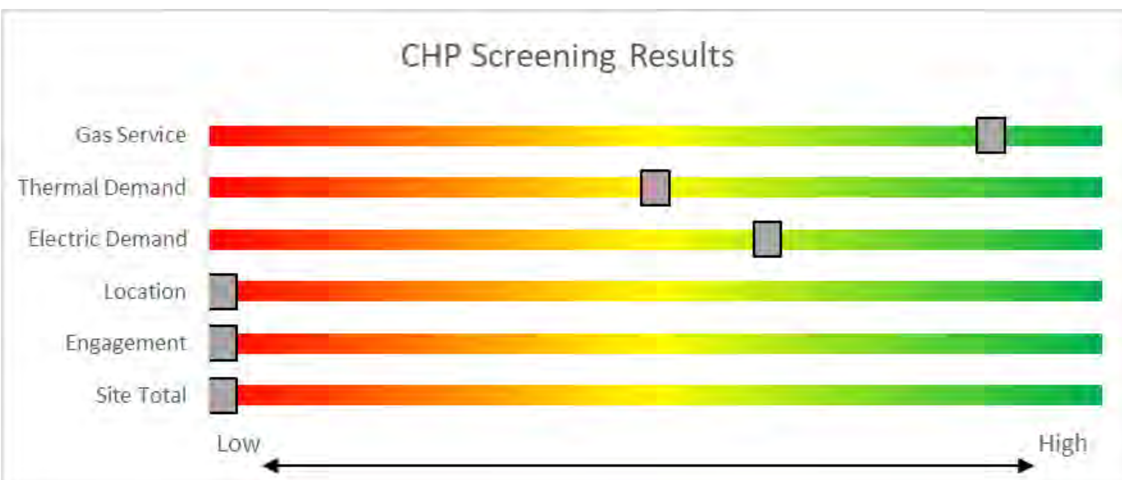


Figure 10 - Combined Heat and Power Screening

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? 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 New Jersey's 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 efficient equipment based on market trends and new technologies.

<u>Equipment with Prescriptive Incentives Currently Available</u>:

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

Incentives

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

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

How to Participate

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

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

7.2 Pay for Performance - Existing Buildings

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

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

Incentives

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

How to Participate

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

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

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

7.3 Energy Savings Improvement Program

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

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

How to Participate

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

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

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

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

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

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

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

7.4 SREC Registration Program

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

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

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

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

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

8 Energy Purchasing and Procurement Strategies

8.1 Retail Electric Supply Options

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

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

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

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[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
Refrigerator Case	4	Refrigerated Case Lighting - LED: Bulb	Wall Switch	S	9	6,205		None	No	4	Refrigerated Case Lighting - LED: Bulb	Wall Switch	9	6,205	0.0	0	0	$0	$0	$0	0.0
Boiler Room	10	Metal Halide: Pendant Fixture (42W) - 8L	Wall Switch	S	336	2,080	1, NR	Fixture Replacement	Yes	10	LED - Fixtures: Decorative Pendant	Occupancy Sensor	101	1,435	1.3	3,935	-1	$346	$3,582	$135	9.9
Boiler Room	3	Exit Signs: LED - 2 W Lamp	None		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
Storage	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,080	2, NR	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,435	0.1	186	0	$16	$226	$30	11.9
Storage	1	Exit Signs: LED - 2 W Lamp	None		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
A106D Office	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	2,080	2, NR	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	0.1	186	0	$16	$380	$65	19.2
Boys	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,080	2, NR	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,435	0.1	186	0	$16	$380	$65	19.2
Cafeteria	48	Metal Halide: (1) 1000W Lamp	Wall Switch	S	1,080	2,080	1, NR	Fixture Replacement	Yes	48	LED - Fixtures: High-Bay (Prismatic Reflector)	Occupancy Sensor	160	1,435	23.3	68,731	-22	$6,051	$38,217	$7,340	5.1
Cafeteria	3	Exit Signs: LED - 2 W Lamp	None		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
Girls	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,080	2, NR	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,435	0.1	186	0	$16	$380	$65	19.2
A106B	7	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	2,080	2, NR	Relamp	Yes	7	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,435	0.3	765	0	$67	$781	$175	9.0
Restroom	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	1,435	2	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,435	0.0	34	0	$3	$37	$10	9.0
Custodian	1	Compact Fluorescent: Spiral Bulb	Wall Switch	S	26	2,080	2	Relamp	No	1	LED Screw-In Lamps: Bulb - 1L	Wall Switch	18	2,080	0.0	12	0	$1	$17	$1	16.0
Custodian	1	Exit Signs: LED - 2 W Lamp	None		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
Restroom	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,080	2	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,080	0.0	49	0	$4	$37	$10	6.2
A104A Office	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,080	2, NR	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,435	0.0	124	0	$11	$189	$20	15.5
A104A Office	16	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	2,080	2, NR	Relamp	Yes	16	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	0.5	1,488	0	$131	$1,416	$310	8.4
A104C Conference Room	4	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	2,080	2, NR	Relamp	Yes	4	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	0.1	372	0	$33	$489	$95	12.0
A104C Conference Room	8	Compact Fluorescent: Cane Fixture	Wall Switch	S	32	2,080	2, NR	Relamp	Yes	8	LED - Fixtures: Ceiling Mount	Occupancy Sensor	22	1,435	0.1	195	0	$17	$708	$35	39.1
A104M Office	4	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	2,080	2, NR	Relamp	Yes	4	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	0.1	372	0	$33	$489	$95	12.0
A104B	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	1,435	2	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,435	0.0	34	0	$3	$37	$10	9.0
A104K	4	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	2,080	2, NR	Relamp	Yes	4	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	0.1	372	0	$33	$489	$95	12.0
A104J	4	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	2,080	2, NR	Relamp	Yes	4	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	0.1	372	0	$33	$489	$95	12.0
A104	3	Exit Signs: LED - 2 W Lamp	None		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
A104H	2	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Occupancy Sensor	S	114	1,435	2	Relamp	No	2	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,435	0.1	114	0	$10	$146	$40	10.6

	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
A104G	4	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	1,435	2	Relamp	No	4	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	0.1	202	0	$18	$219	$60	9.0
A104F	9	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	1,435	2	Relamp	No	9	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	0.2	454	0	$40	$493	$135	9.0
A102B	3	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	1,435	2	Relamp	No	3	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	0.1	151	0	$13	$164	$45	9.0
A102D	4	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	1,435	2	Relamp	No	4	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	0.1	202	0	$18	$219	$60	9.0
A102C	3	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	1,435	2	Relamp	No	3	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	0.1	151	0	$13	$164	$45	9.0
Restroom	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	1,435	2	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,435	0.0	34	0	$3	$37	$10	9.0
A102 Hall	1	Compact Fluorescent: Long U type fixture (50W) - 1L	Wall Switch	S	50	2,080	2	Relamp	No	1	LED - Fixtures: Other	Wall Switch	35	2,080	0.0	22	0	$2	$37	$0	18.7
A102 Hall	7	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	2,080	2, NR	Relamp	Yes	7	LED - Linear Tubes: (3) 4' Lamps	High/Low Control	44	1,435	0.2	651	0	$57	$783	$105	11.8
Work Room	3	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	2,080	2, NR	Relamp	Yes	3	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	0.1	279	0	$25	$434	$80	14.4
A102E	4	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	2,080	2, NR	Relamp	Yes	4	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	0.1	372	0	$33	$489	$95	12.0
A102E	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,080	2, NR	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,435	0.1	248	0	$22	$416	$75	15.6
A103 Nurse	6	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	2,080	2, NR	Relamp	Yes	6	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	0.2	558	0	$49	$599	$125	9.6
A103 Nurse	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,080	2, NR	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,435	0.1	186	0	$16	$380	$65	19.2
A103 Nurse	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	2,080	2, NR	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	0.1	186	0	$16	$380	$65	19.2
Restroom	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,080	2	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,080	0.0	49	0	$4	$37	$10	6.2
A107C	11	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	1,435	2	Relamp	No	11	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,435	0.2	370	0	$33	$402	$110	9.0
B101	4	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	1,435	2	Relamp	No	4	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	0.1	202	0	$18	$219	$60	9.0
B101	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	1,435	2	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,435	0.0	67	0	$6	$73	$20	9.0
B103	3	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Occupancy Sensor	S	114	1,435	2	Relamp	No	3	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,435	0.1	171	0	$15	$219	$60	10.6
B102	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	1,435	2	Relamp	No	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	0.0	101	0	$9	$110	$30	9.0
B102	12	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	1,435	2	Relamp	No	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,435	0.2	404	0	$36	$438	$120	9.0
B102 Restroom	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	1,435	2	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,435	0.0	34	0	$3	$37	$10	9.0
B104	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	1,435	2	Relamp	No	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	0.0	101	0	$9	$110	$30	9.0
B104	12	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	1,435	2	Relamp	No	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,435	0.2	404	0	$36	$438	$120	9.0
B104 Restroom	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	1,435	2	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,435	0.0	34	0	$3	$37	$10	9.0

	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
B105	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	1,435	2	Relamp	No	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	0.0	101	0	$9	$110	$30	9.0
B105	12	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	1,435	2	Relamp	No	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,435	0.2	404	0	$36	$438	$120	9.0
B105 Restroom	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	1,435	2	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,435	0.0	34	0	$3	$37	$10	9.0
B107	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	1,435	2	Relamp	No	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	0.0	101	0	$9	$110	$30	9.0
B107	12	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	1,435	2	Relamp	No	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,435	0.2	404	0	$36	$438	$120	9.0
B107 Restroom	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	1,435	2	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,435	0.0	34	0	$3	$37	$10	9.0
B106	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	1,435	2	Relamp	No	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	0.0	101	0	$9	$110	$30	9.0
B106	12	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	1,435	2	Relamp	No	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,435	0.2	404	0	$36	$438	$120	9.0
B106 Restroom	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	1,435	2	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,435	0.0	34	0	$3	$37	$10	9.0
B108	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	1,435	2	Relamp	No	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	0.0	101	0	$9	$110	$30	9.0
B108	12	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	1,435	2	Relamp	No	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,435	0.2	404	0	$36	$438	$120	9.0
B108 Restroom	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	1,435	2	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,435	0.0	34	0	$3	$37	$10	9.0
B109	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	1,435	2	Relamp	No	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	0.0	101	0	$9	$110	$30	9.0
B109	12	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	1,435	2	Relamp	No	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,435	0.2	404	0	$36	$438	$120	9.0
B109 Restroom	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	1,435	2	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,435	0.0	34	0	$3	$37	$10	9.0
Boys	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	1,435	2	Relamp	No	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,435	0.0	101	0	$9	$110	$30	9.0
Girls	3	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	1,435	2	Relamp	No	3	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	0.1	151	0	$13	$164	$45	9.0
C103	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	1,435	2	Relamp	No	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	0.0	101	0	$9	$110	$30	9.0
C103	10	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	1,435	2	Relamp	No	10	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,435	0.2	336	0	$30	$365	$100	9.0
C103 Restroom	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	1,435	2	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,435	0.0	34	0	$3	$37	$10	9.0
C104	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	1,435	2	Relamp	No	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	0.0	101	0	$9	$110	$30	9.0
Restroom	1	Incandescent: Bulb (60W) - 1L	Wall Switch		60	2,080	2	Relamp	No	1	LED Screw-In Lamps: Bulb - 1L	Wall Switch	9	2,080	0.0	75	0	$7	$17	$1	2.4
Cafeteria	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
Stage	9	Halogen Incandescent: Spots	Wall Switch	S	50	2,080	2, NR	Relamp	Yes	9	LED - Fixtures: Ceiling Mount	Occupancy Sensor	8	1,435	0.2	596	0	$52	$425	$35	7.4
Stage	8	Metal Halide: Pendant Fixture (42W) - 8L	Wall Switch	S	336	2,080	1, NR	Fixture Replacement	Yes	8	LED - Fixtures: Decorative Pendant	Occupancy Sensor	101	1,435	1.1	3,148	-1	$277	$2,919	$115	10.1

	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
Stage	3	Exit Signs: LED - 2 W Lamp	None		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
A109 Storage	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	1,435	2	Relamp	No	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,435	0.1	135	0	$12	$146	$40	9.0
A109A	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	1,435	2	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,435	0.0	34	0	$3	$37	$10	9.0
A107 Library	21	Metal Halide: Pendant Fixture (42W) - 8L	Wall Switch	S	336	2,080	1, NR	Fixture Replacement	Yes	21	LED - Fixtures: Decorative Pendant	Occupancy Sensor	101	1,435	2.8	8,259	-3	$727	$7,494	$280	9.9
A107 Library	4	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	S	33	2,080	2, NR	Relamp	Yes	4	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	1,435	0.0	126	0	$11	$246	$44	18.3
A107D Supply	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,080	2	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,080	0.0	49	0	$4	$37	$10	6.2
A107A Office	3	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	1,435	2	Relamp	No	3	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	0.1	151	0	$13	$164	$45	9.0
A107B	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	1,435	2	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,435	0.0	34	0	$3	$37	$10	9.0
A107B	3	Exit Signs: LED - 2 W Lamp	None		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
Restroom	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,080	2	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,080	0.0	49	0	$4	$37	$10	6.2
C100B MDF	1	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	S	33	2,080	2	Relamp	No	1	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	2,080	0.0	24	0	$2	$33	$6	12.7
A100D	2	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	2,080	2, NR	Relamp	Yes	2	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,435	0.1	219	0	$19	$416	$75	17.7
A107 Computer Room	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	2,080	2, NR	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	0.1	186	0	$16	$380	$65	19.2
C104	6	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,080	2, NR	Relamp	Yes	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,435	0.1	372	0	$33	$489	$95	12.0
C105	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	2,080	2, NR	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	0.1	186	0	$16	$380	$65	19.2
C105	9	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,080	2, NR	Relamp	Yes	9	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,435	0.2	558	0	$49	$599	$125	9.6
C105 Restroom	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,080	2	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,080	0.0	49	0	$4	$37	$10	6.2
C106	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	2,080	2, NR	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	0.1	186	0	$16	$380	$65	19.2
C106	10	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,080	2, NR	Relamp	Yes	10	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,435	0.2	620	0	$55	$635	$135	9.2
C106 Restroom	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,080	2	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,080	0.0	49	0	$4	$37	$10	6.2
C108	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	2,080	2, NR	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	0.1	186	0	$16	$380	$65	19.2
C108	10	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,080	2, NR	Relamp	Yes	10	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,435	0.2	620	0	$55	$635	$135	9.2
C108 Restroom	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,080	2	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,080	0.0	49	0	$4	$37	$10	6.2
C107	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	2,080	2, NR	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	0.1	186	0	$16	$380	$65	19.2
C107	10	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,080	2, NR	Relamp	Yes	10	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,435	0.2	620	0	$55	$635	$135	9.2

	Existing Conditions						Proposed Conditions								Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
C110	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	2,080	2, NR	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	0.1	186	0	$16	$380	$65	19.2
C110	10	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,080	2, NR	Relamp	Yes	10	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,435	0.2	620	0	$55	$635	$135	9.2
C109	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	2,080	2, NR	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	0.1	186	0	$16	$380	$65	19.2
C109	10	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,080	2, NR	Relamp	Yes	10	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,435	0.2	620	0	$55	$635	$135	9.2
C109 Restroom	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,080	2	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,080	0.0	49	0	$4	$37	$10	6.2
C112	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	2,080	2, NR	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	0.1	186	0	$16	$380	$65	19.2
C112	10	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,080	2, NR	Relamp	Yes	10	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,435	0.2	620	0	$55	$635	$135	9.2
C112 Restroom	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,080	2	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,080	0.0	49	0	$4	$37	$10	6.2
C111	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	2,080	2, NR	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	0.1	186	0	$16	$380	$65	19.2
C111 Restroom	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,080	2	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,080	0.0	49	0	$4	$37	$10	6.2
C111	10	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,080	2, NR	Relamp	Yes	10	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,435	0.2	620	0	$55	$635	$135	9.2
C100A	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	1,435	2	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,435	0.0	34	0	$3	$37	$10	9.0
A110	5	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Occupancy Sensor	S	114	1,435	2	Relamp	No	5	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,435	0.1	285	0	$25	$365	$100	10.6
D102	10	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	1,435	2	Relamp	No	10	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	0.2	504	0	$44	$548	$150	9.0
D103	10	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	1,435	2	Relamp	No	10	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	0.2	504	0	$44	$548	$150	9.0
D104	10	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	1,435	2	Relamp	No	10	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	0.2	504	0	$44	$548	$150	9.0
D101	15	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	1,435	2	Relamp	No	15	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	0.4	757	0	$67	$822	$225	9.0
D101B	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	1,435	2	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,435	0.0	67	0	$6	$73	$20	9.0
D101A	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	1,435	2	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,435	0.0	67	0	$6	$73	$20	9.0
D106	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	1,435	2	Relamp	No	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	0.0	101	0	$9	$110	$30	9.0
D106	10	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	1,435	2	Relamp	No	10	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,435	0.2	336	0	$30	$365	$100	9.0
D106 Restroom	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	1,435	2	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,435	0.0	34	0	$3	$37	$10	9.0
D105	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	2,080	2, NR	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	0.1	186	0	$16	$380	$65	19.2
D105	10	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,080	2, NR	Relamp	Yes	10	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,435	0.2	620	0	$55	$635	$135	9.2
D105 Restroom	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,080	2	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,080	0.0	49	0	$4	$37	$10	6.2

	Existing Conditions						Proposed Conditions								Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
D107	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	2,080	2, NR	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	0.1	186	0	$16	$380	$65	19.2
D107	10	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,080	2, NR	Relamp	Yes	10	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,435	0.2	620	0	$55	$635	$135	9.2
D107 Restroom	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,080	2	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,080	0.0	49	0	$4	$37	$10	6.2
D108	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	2,080	2, NR	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	0.1	186	0	$16	$380	$65	19.2
D108	10	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,080	2, NR	Relamp	Yes	10	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,435	0.2	620	0	$55	$635	$135	9.2
D108 Restroom	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,080	2	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,080	0.0	49	0	$4	$37	$10	6.2
D109	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	2,080	2, NR	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	0.1	186	0	$16	$380	$65	19.2
D109	10	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,080	2, NR	Relamp	Yes	10	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,435	0.2	620	0	$55	$635	$135	9.2
D109 Restroom	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,080	2	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,080	0.0	49	0	$4	$37	$10	6.2
D111	12	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,080	2, NR	Relamp	Yes	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,435	0.3	744	0	$66	$708	$155	8.4
D111 Restroom	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,080	2	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,080	0.0	49	0	$4	$37	$10	6.2
D112	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	2,080	2, NR	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	0.1	186	0	$16	$380	$65	19.2
D112	10	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,080	2, NR	Relamp	Yes	10	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,435	0.2	620	0	$55	$635	$135	9.2
D112 Restroom	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,080	2	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,080	0.0	49	0	$4	$37	$10	6.2
D110	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	2,080	2, NR	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	0.1	186	0	$16	$380	$65	19.2
D110	10	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,080	2, NR	Relamp	Yes	10	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,435	0.2	620	0	$55	$635	$135	9.2
D110 Restroom	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,080	2	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,080	0.0	49	0	$4	$37	$10	6.2
Hallway	28	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	2,080	2, NR	Relamp	Yes	28	LED - Linear Tubes: (3) 4' Lamps	High/Low Control	44	1,435	0.9	2,604	-1	$229	$2,467	$420	8.9
Hallway	22	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	22	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Hallway	16	Compact Fluorescent: Long U type fixture (55W) - 2L	Wall Switch	S	110	2,080	2, NR	Relamp	Yes	16	LED - Fixtures: Other	High/Low Control	77	1,435	0.5	1,344	0	$118	$1,410	$0	11.9
Restroom	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,080	2	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,080	0.0	49	0	$4	$37	$10	6.2
Exterior	39	Metal Halide: (1) 100W Lamp	Photocell		128	4,380	1	Fixture Replacement	No	39	LED - Fixtures: Downlight Surface Mount	Photocell	38	4,380	1.7	15,305	0	$1,406	$7,801	$195	5.4
Exterior	6	Compact Fluorescent: Long U type fixture (55W) - 2L	Photocell		110	4,380	2	Relamp	No	6	LED - Fixtures: Other	Photocell	77	4,380	0.1	867	0	$80	$329	$0	4.1
Exterior	11	Compact Fluorescent: Cane Fixture	Photocell		26	4,380	2	Relamp	No	11	LED - Fixtures: Ceiling Mount	Photocell	18	4,380	0.0	376	0	$35	$402	$0	11.6
Exterior	24	Compact Fluorescent: Cane Fixture	Photocell		42	4,380	2	Relamp	No	24	LED - Fixtures: Ceiling Mount	Photocell	29	4,380	0.2	1,325	0	$122	$876	$0	7.2

	Existing Conditions						Proposed Conditions								Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Exterior	2	Metal Halide: (1) 70W Lamp	Photocell		95	4,380	1	Fixture Replacement	No	2	LED - Fixtures: Wall Sconces	Photocell	29	4,380	0.1	583	0	$53	$453	$20	8.1

Motor Inventory & Recommendations

		Existing Conditions							Proposed Conditions					Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	Motor Quantity	Motor Application	HP Per Motor	Full Load Efficiency	VFD Control?	Remaining Useful Life	Annual Operating Hours	ECM #	Install High Efficiency Motors?	Full Load Efficiency	Install VFDs?	Number of VFDs	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Boiler Room	Boiler	1	Combustion Air Fan	2.0	86.5%	No	W	2,745		No	86.5%	No		0.0	0	0	$0	$0	$0	0.0
Boiler Room	P-5	1	Chilled Water Pump	15.0	93.0%	Yes	B	3,066		No	93.0%	No		0.0	0	0	$0	$0	$0	0.0
Boiler Room	P-3	1	Chilled Water Pump	20.0	93.0%	Yes	W	3,066	3	Yes	93.0%	No		0.0	0	0	$0	$2,248	$0	0.0
Boiler Room	P-2	1	Heating Hot Water Pump	10.0	91.7%	Yes	B	3,066	3	Yes	91.7%	No		0.0	0	0	$0	$1,344	$0	0.0
Boiler Room	P-1	1	Heating Hot Water Pump	10.0	91.7%	Yes	B	3,066	3	Yes	91.7%	No		0.0	0	0	$0	$1,344	$0	0.0
Boiler Room	DHW Pump	1	Water Supply Pump	0.8	68.0%	No	W	2,190		No	68.0%	No		0.0	0	0	$0	$0	$0	0.0
Boiler Room	Secondary HHW Pump	1	Heating Hot Water Pump	2.0	86.5%	No	W	3,066	3, NR	Yes	86.5%	Yes	1	0.2	1,983	0	$182	$3,261	$0	17.9
Boiler Room	Secondary HHW Pump	1	Heating Hot Water Pump	2.0	86.5%	No	W	2,190	3, NR	Yes	86.5%	Yes	1	0.2	1,417	0	$130	$3,261	$0	25.1
Admin Office	AHU-1	1	Supply Fan	3.0	86.5%	Yes	W	2,600		No	86.5%	No		0.0	0	0	$0	$0	$0	0.0
Admin Office	AHU-1	1	Return Fan	1.5	84.0%	Yes	W	2,600		No	84.0%	No		0.0	0	0	$0	$0	$0	0.0
School Offices	AHU-2	1	Supply Fan	3.0	86.5%	Yes	W	2,600		No	86.5%	No		0.0	0	0	$0	$0	$0	0.0
School Offices	AHU-2	1	Return Fan	1.0	82.5%	Yes	W	2,600		No	82.5%	No		0.0	0	0	$0	$0	$0	0.0
Library	AHU-3	1	Supply Fan	3.0	86.5%	Yes	W	2,600		No	86.5%	No		0.0	0	0	$0	$0	$0	0.0
Library	AHU-3	1	Return Fan	1.5	84.0%	Yes	W	2,600		No	84.0%	No		0.0	0	0	$0	$0	$0	0.0
Com Lab/A100D	AHU-4	1	Supply Fan	1.0	82.5%	No	W	2,600		No	82.5%	No		0.0	0	0	$0	$0	$0	0.0
B wing	AHU-5	1	Supply Fan	5.0	87.5%	Yes	W	2,600		No	87.5%	No		0.0	0	0	$0	$0	$0	0.0
B wing	AHU-5	1	Return Fan	2.0	86.5%	Yes	W	2,600		No	86.5%	No		0.0	0	0	$0	$0	$0	0.0
B wing	AHU-6	1	Supply Fan	5.0	87.5%	Yes	W	2,600		No	87.5%	No		0.0	0	0	$0	$0	$0	0.0
B wing	AHU-6	1	Return Fan	2.0	86.5%	Yes	W	2,600		No	86.5%	No		0.0	0	0	$0	$0	$0	0.0
C wing	AHU-7	1	Supply Fan	10.0	89.5%	Yes	W	2,600		No	89.5%	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
C wing	AHU-7	1	Return Fan	5.0	87.5%	Yes	W	2,600		No	87.5%	No		0.0	0	0	$0	$0	$0	0.0
C wing	AHU-8	1	Supply Fan	5.0	87.5%	Yes	W	2,600		No	87.5%	No		0.0	0	0	$0	$0	$0	0.0
C wing	AHU-8	1	Return Fan	2.0	86.5%	Yes	W	2,600		No	86.5%	No		0.0	0	0	$0	$0	$0	0.0
D wing	AHU-9	1	Supply Fan	10.0	89.5%	Yes	W	2,600		No	89.5%	No		0.0	0	0	$0	$0	$0	0.0
D wing	AHU-9	1	Return Fan	5.0	87.5%	Yes	W	2,600		No	87.5%	No		0.0	0	0	$0	$0	$0	0.0
D wing	AHU-10	1	Supply Fan	5.0	87.5%	Yes	W	2,600		No	87.5%	No		0.0	0	0	$0	$0	$0	0.0
D wing	AHU-10	1	Return Fan	3.0	86.5%	Yes	W	2,600		No	86.5%	No		0.0	0	0	$0	$0	$0	0.0
Faculty Room	AHU-11	1	Supply Fan	0.5	76.2%	No	W	2,600		No	76.2%	No		0.0	0	0	$0	$0	$0	0.0
Stage	AHU-12	1	Supply Fan	0.5	76.2%	No	W	2,600		No	76.2%	No		0.0	0	0	$0	$0	$0	0.0
Multipurpose Room South	AHU-13	1	Supply Fan	10.0	89.5%	Yes	W	2,600		No	89.5%	No		0.0	0	0	$0	$0	$0	0.0
Multipurpose Room South	AHU-13	1	Return Fan	5.0	87.5%	Yes	W	2,600		No	87.5%	No		0.0	0	0	$0	$0	$0	0.0
Multipurpose Room North	AHU-14	1	Supply Fan	10.0	89.5%	Yes	W	2,600		No	89.5%	No		0.0	0	0	$0	$0	$0	0.0
Multipurpose Room North	AHU-14	1	Return Fan	5.0	87.5%	Yes	W	2,600		No	87.5%	No		0.0	0	0	$0	$0	$0	0.0
Kitchen	AHU-15	1	Supply Fan	0.3	72.4%	No	W	2,600		No	72.4%	No		0.0	0	0	$0	$0	$0	0.0
Kitchen Exhaust Make up Unit	AHU-16	1	Supply Fan	0.5	76.2%	No	W	2,600		No	76.2%	No		0.0	0	0	$0	$0	$0	0.0
MDF/C100B	AHU-17	1	Supply Fan	0.5	76.2%	No	W	2,600		No	76.2%	No		0.0	0	0	$0	$0	$0	0.0
Room 104F	AHU-18	1	Supply Fan	0.3	72.4%	No	W	2,600		No	72.4%	No		0.0	0	0	$0	$0	$0	0.0
Room A104H	AHU-19	1	Supply Fan	0.1	68.5%	No	W	2,600		No	68.5%	No		0.0	0	0	$0	$0	$0	0.0
Multipurpose Room bathrooms	AHU-20	1	Supply Fan	0.3	68.0%	No	W	2,600		No	68.0%	No		0.0	0	0	$0	$0	$0	0.0
Outdoor	Cooling Tower	1	Cooling Tower Fan	15.0	93.0%	Yes	W	3,391		No	93.0%	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
Staffroom	Staffroom	1	Ductless Mini-Split AC	0.75		W		No							0.0	0	0	$0	$0	$0	0.0

Fuel Heating Inventory & Recommendations

		Existing Conditions				Proposed Conditions							Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	System Quantity	System Type	Output Capacity per Unit (MBh)	Remaining Useful Life	ECM #	Install High Efficiency System?	System Quantity	System Type	Output Capacity per Unit (MBh)	Heating Efficiency	Heating Efficiency Units	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Boiler Room	Absorption Chiller	1	Furnace	######	W		No						0.0	0	0	$0	$0	$0	0.0

Demand Control Ventilation Recommendations

		Recommendation Inputs					Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Affected	ECM #	Number of Zones	Cooling Capacity of Controlled System (Tons)	Electric Heating Capacity of Controlled System (kBtu/hr)	Output Heating Capacity of Controlled System (MBh)	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
Multipurpose Room South	AHU-13	NR	2.00	0.00		345.30	0.0	0	19	$218	$2,719	$0	12.5
Multipurpose Room North	AHU-14	NR	2.00	0.00		345.30	0.0	0	19	$218	$2,719	$0	12.5

DHW Inventory & Recommendations

		Existing Conditions			Proposed Conditions							Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	System Quantity	System Type	Remaining Useful Life	ECM #	Replace?	System Quantity	System Type	Fuel Type	System Efficiency	Efficiency Units	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Boiler Room	Boiler	1	Indirect System	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	5	20	Faucet Aerator (Lavatory)	2.20	0.50	0.0	0	57	$667	$143	$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
Outdoor	1	Cooler (35F to 55F)		No	No	No	0.0	0	0	$0	$0	$0	0.0
Outdoor	1	Low Temp Freezer (-35F to -5F)		No	No	No	0.0	0	0	$0	$0	$0	0.0

Commercial Refrigerator/Freezer Inventory & Recommendations

	Existing Conditions			Proposed Conditions		Energy Impact & Financial Analysis						
Location	Quantity	Refrigerator/ Freezer Type	ENERGY STAR Qualified?	ECM #	Install ENERGY STAR Equipment?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Kitchen	1	Stand-Up Refrigerator, Solid Door (31 - 50 cu. ft.)	Yes		No	0.0	0	0	$0	$0	$0	0.0
Kitchen	1	Stand-Up Freezer, Solid Door (31 - 50 cu. ft.)	Yes		No	0.0	0	0	$0	$0	$0	0.0
Kitchen	1	Stand-Up Refrigerator, Solid Door (31 - 50 cu. ft.)	No	NR	Yes	0.1	646	0	$59	$1,632	$125	25.4
Kitchen	1	Refrigerator Chest	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	Electric Convection Oven (Half Size)	Yes		No	0.0	0	0	$0	$0	$0	0.0
Kitchen	1	Gas Convection Oven (Half Size)	Yes		No	0.0	0	0	$0	$0	$0	0.0
Kitchen	1	Insulated Food Holding Cabinet (Full Size)	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	130	Computers	120.0	Yes
Office	1	Laptop	30.0	Yes
Classrooms	26	Small Printer	55.0	Yes
Staffrooms	7	Medium Printer	60.0	Yes
Copy room	4	Big Printer	600.0	Yes
Office	1	Paper Shredder	80.0	No
Classrooms	28	Projectors	120.0	Yes
Classroom & offices	11	Microwave	800.0	Yes
Classrooms	12	Small Refrigerator	120.0	No
Break room	5	Large Refrigerator	255.0	Yes
Break room	6	Coffee Machine	300.0	No
Break room	1	Toaster	300.0	No
Break room	2	Toaster Oven	500.0	No
Office	3	Portable Fan	45.0	No
Break room	1	Dishwasher	120.0	Yes
Classroom	5	CRT Tv	244.0	No
Lounge	2	LCD Tv	120.0	No
Kitchen	1	Steam Table	120.0	Yes

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
Staffroom	1	Refrigerated	6	Yes	0.2	1,612	0	$148	$230	$50	1.2

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.

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ENERGY STAR® Statement of Energy Performance

51

ENERGY STAR® Score[1]

Clayton J Davenport Primary

Primary Property Type: K-12 School
Gross Floor Area (ft²): 57,650
Built: 2005

For Year Ending: April 30, 2018
Date Generated: February 01, 2019

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
Clayton J Davenport Primary 2499 Spruce Avenue Egg Harbor Township, New Jersey 08234	________________ , (___)___-_____	____ _______ , (___)___-_____ ________________

Property ID: 6628370

Energy Consumption and Energy Use Intensity (EUI)

Site EUI
87.6 kBtu/ft²

Source EUI
149.5 kBtu/ft²

Annual Energy by Fuel	
Natural Gas (kBtu)	3,156,312 (62%)
Electric - Solar (kBtu)	533,962 (11%)
Electric - Grid (kBtu)	1,359,935 (27%)

National Median Comparison	
National Median Site EUI (kBtu/ft²)	89.1
National Median Source EUI (kBtu/ft²)	152.1
% Diff from National Median Source EUI	-2%
Annual Emissions	
Greenhouse Gas Emissions (Metric Tons CO2e/year)	360

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 fiscal savings associated with measures. 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	*British thermal unit*: a unit of energy equal to the amount of heat required to increase the temperature of one pound of water by one-degree Fahrenheit.
CHP	*Combined heat and power*. Also referred to as cogeneration.
COP	*Coefficient of performance*: a measure of efficiency in terms of useful energy delivered divided by total energy input.
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.
DCV	*Demand control ventilation*: a control strategy to limit the amount of outside air introduced to the conditioned space based on actual occupancy need.
US DOE	*United States Department of Energy*
EC Motor	*Electronically commutated motor*
ECM	*Energy conservation measure*
EER	*Energy efficiency ratio*: a measure of efficiency in terms of cooling energy provided divided by electric input.
EUI	*Energy Use Intensity:* measures energy consumption per square foot and is a standard metric for comparing buildings' energy performance.
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 the operation of energy use systems. Unlike conservation, which involves some reduction of service, energy efficiency provides energy reductions without sacrifice of service.
ENERGY STAR®	ENERGY STAR® is the government-backed symbol for energy efficiency. The ENERGY STAR® program is managed by the EPA.
EPA	*United States Environmental Protection Agency*
Generation	The process of generating electric power from sources of primary energy (e.g., natural gas, the sun, oil).
GHG	*Greenhouse gas:* gases that are transparent to solar (short-wave) radiation but opaque to long-wave (infrared) radiation, thus preventing long-wave radiant energy from leaving Earth's atmosphere. The net effect is a trapping of absorbed radiation and a tendency to warm the planet's surface.
gpf	*Gallons per flush*

gpm	*Gallon per minute*
HID	*High intensity discharge:* high-output lighting lamps such as high-pressure sodium, metal halide, and mercury vapor.
hp	*Horsepower*
HPS	*High-pressure sodium*: a type of HID lamp.
HSPF	*Heating seasonal performance factor:* a measure of efficiency typically applied to heat pumps. Heating energy provided divided by seasonal energy input.
HVAC	*Heating, ventilating, and air conditioning*
IHP 2014	US DOE Integral Horsepower rule. The current ruling regarding required electric motor efficiency.
IPLV	*Integrated part load value:* a measure of the part load efficiency usually applied to chillers.
kBtu	One thousand British thermal units
kW	*Kilowatt*: equal to 1,000 Watts.
kWh	*Kilowatt-hour*: 1,000 Watts of power expended over one hour.
LED	*Light emitting diode*: a high-efficiency source of light with a long lamp life.
LGEA	*Local Government Energy Audit*
Load	The total power a building or system is using 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.
MH	*Metal halide*: a type of HID lamp.
MBh	*Thousand Btu per hour*
MBtu	*One thousand British thermal units*
MMBtu	*One million British thermal units*
MV	*Mercury Vapor:* a type of HID lamp.
NJBPU	*New Jersey Board of Public Utilities*
NJCEP	*New Jersey's Clean Energy Program:* NJCEP is a statewide program that offers financial incentives, programs and services for New Jersey residents, business owners and local governments to help them save energy, money and the environment.
psig	Pounds per square inch gauge
Plug Load	Refers to the amount of power used in a space by products that are powered by means of an ordinary AC plug.
PV	*Photovoltaic:* refers to an electronic device capable of converting incident light directly into electricity (direct current).

SEER	*Seasonal energy efficiency ratio:* a measure of efficiency in terms of annual cooling energy provided divided by total electric input.
SEP	*Statement of energy performance:* a summary document from the ENERGY STAR® Portfolio Manager®.
Simple Payback	The amount of time needed to recoup the funds expended in an investment or to reach the break-even point between investment and savings.
SREC	*Solar renewable energy credit*: a credit you can earn from the state for energy produced from a photovoltaic array.
T5, T8, T12	A reference to a linear lamp diameter. The number represents increments of 1/8th of an inch.
Temperature Setpoint	The temperature at which a temperature regulating device (thermostat, for example) has been set.
therm	100,000 Btu. Typically used as a measure of natural gas consumption.
tons	A unit of cooling capacity equal to 12,000 Btu/hr.
Turnkey	Provision of a complete product or service that is ready for immediate use
VAV	*Variable air volume*
VFD	*Variable frequency drive*: a controller used to vary the speed of an electric motor.
WaterSense™	The symbol for water efficiency. The WaterSense™ program is managed by the EPA.
Watt (W)	Unit of power commonly used to measure electricity use.