Local Government Energy Audit:
Energy Audit Report

John Witherspoon Middle School

217 Walnut Lane

Princeton, New Jersey 08540

Princeton Public Schools

January 24, 2019

Final Report by:

TRC Energy Services

Disclaimer

The intent of this energy analysis report is to identify energy savings opportunities and recommend upgrades to the facility's energy using equipment and systems. Approximate savings are included in this report to help make decisions about reducing energy use at the facility. This report, however, is not intended to serve as a detailed engineering design document. Further design and analysis may be necessary in order to implement some of the measures recommended in this report.

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

Estimated installation costs are based on TRC's experience at similar facilities, pricing from local contractors and vendors, and/or cost estimates from *RS Means*. The owner of the facility is encouraged to independently confirm these cost estimates and to obtain multiple estimates when considering measure installations. Since actual installed costs can vary widely for certain 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. The owner of the facility should review available program incentives and eligibility requirements prior to selecting and installing any energy conservation measures.

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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 John Witherspoon Middle School.

The goal of an LGEA report is to provide you with information on how your facility uses energy, identify energy conservation measures (ECMs) that can reduce your energy use, and provide information and assistance to help facilities implement ECMs. The LGEA report also contains valuable information on financial incentives from New Jersey's Clean Energy Program (NJCEP) for implementing ECMs.

This study was conducted by TRC Energy Services (TRC), as part of a comprehensive effort to assist New Jersey school districts in controlling energy costs and protecting our environment by offering a wide range of energy management options and advice.

1.1 Facility Summary

John Witherspoon Middle School is a 148,531 square foot facility comprised of various space types within one building. The school building is two floors and includes classrooms, offices, pool, gym, locker rooms, a sub-basement mechanical space.

Lighting at John Witherspoon Middle School consists of aging and inefficient T8 fixtures and HVAC system in need of replacement with new efficient equipment. Heating is supplied by two hot water boilers in basement also in need of replacement. A thorough description of the facility and our observations are located in Section 2.

1.2 Your Cost Reduction Opportunities

Energy Conservation Measures

TRC evaluated 16 measures and recommends 13 measures which together represent an opportunity for John Witherspoon Middle School to reduce annual energy costs by roughly $105,278 and annual greenhouse gas emissions by 833,359 lbs. CO_2e. We estimate that if all measures were implemented as recommended, the project would pay for itself in 2.9 years. The breakdown of existing and potential utility costs after project implementation are illustrated in Figure 1 and Figure 2, respectively. Together these measures represent an opportunity to reduce John Witherspoon Middle School's annual energy use by 14%.

Figure 1 – Previous 12 Month Utility Costs

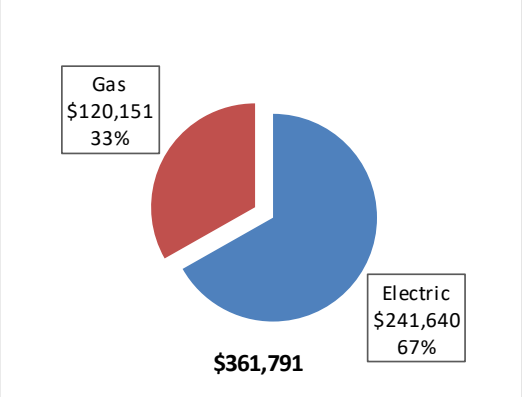
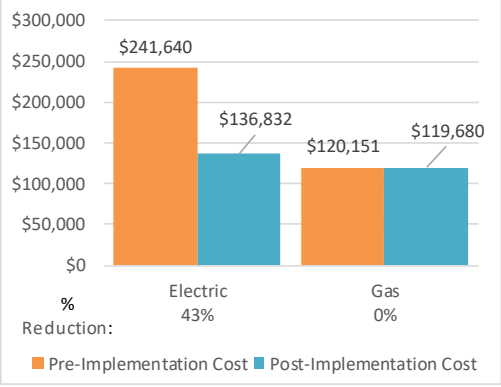


Figure 2 – Potential Post-Implementation Costs



A detailed description of John Witherspoon Middle School's existing energy use can be found in Section 3.

Estimates of the total cost, energy savings, and financial incentives for the proposed energy efficient upgrades are summarized below in Figure 3. A brief description of each category can be found below and a description of savings opportunities can be found in Section 4.

Figure 3 – Summary of Energy Reduction Opportunities

	Energy Conservation Measure	Recommend?	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			**386,507**	**59.5**	**0.0**	**$49,311.23**	**$135,554.59**	**$26,710.00**	**$108,844.59**	**2.2**	**389,210**
ECM 1	Install LED Fixtures	Yes	88,665	13.1	0.0	$11,312.01	$50,308.60	$8,835.00	$41,473.60	3.7	89,285
ECM 2	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	Yes	1,656	0.3	0.0	$211.26	$560.48	$0.00	$560.48	2.7	1,667
ECM 3	Retrofit Fixtures with LED Lamps	Yes	296,186	46.1	0.0	$37,787.96	$84,685.51	$17,875.00	$66,810.51	1.8	298,257
Lighting Control Measures			**84,133**	**12.9**	**0.0**	**$10,733.83**	**$61,320.00**	**$6,945.00**	**$54,375.00**	**5.1**	**84,721**
ECM 4	Install Occupancy Sensor Lighting Controls	Yes	70,356	10.8	0.0	$8,976.16	$57,720.00	$6,945.00	$50,775.00	5.7	70,848
ECM 5	Install High/Low Lighitng Controls	Yes	13,777	2.1	0.0	$1,757.67	$3,600.00	$0.00	$3,600.00	2.0	13,873
Motor Upgrades			**472**	**0.2**	**0.0**	**$60.18**	**$11,646.09**	**$0.00**	**$11,646.09**	**193.5**	**475**
	Premium Efficiency Motors	No	472	0.2	0.0	$60.18	$11,646.09	$0.00	$11,646.09	193.5	475
Variable Frequency Drive (VFD) Measures			**252,076**	**43.9**	**0.0**	**$32,160.31**	**$57,219.15**	**$8,800.00**	**$48,419.15**	**1.5**	**253,839**
ECM 6	Install VFD on Variable Air Volume (VAV) HVAC	Yes	68,917	21.3	0.0	$8,792.61	$18,732.10	$5,200.00	$13,532.10	1.5	69,399
ECM 7	Install VFDs on Hot Water Pumps	Yes	168,304	14.3	0.0	$21,472.48	$28,098.15	$0.00	$28,098.15	1.3	169,481
ECM 8	Install Boiler Draft Fan VFDs	Yes	14,855	8.3	0.0	$1,895.22	$10,388.90	$3,600.00	$6,788.90	3.6	14,959
Electric Unitary HVAC Measures			**81,674**	**48.4**	**0.0**	**$10,420.10**	**$94,326.34**	**$4,960.00**	**$89,366.34**	**8.6**	**82,245**
ECM 9	Install High Efficiency Electric AC	Yes	81,674	48.4	0.0	$10,420.10	$94,326.34	$4,960.00	$89,366.34	8.6	82,245
Gas Heating (HVAC/Process) Replacement			**0**	**0.0**	**814.2**	**$7,328.99**	**$458,815.38**	**$0.00**	**$458,815.38**	**62.6**	**95,331**
	Install High Efficiency Hot Water Boilers	No	0	0.0	814.2	$7,328.99	$458,815.38	$0.00	$458,815.38	62.6	95,331
HVAC System Improvements			**12,571**	**2.8**	**0.0**	**$1,603.78**	**$2,300.00**	**$750.00**	**$1,550.00**	**1.0**	**12,659**
ECM 10	Install Dual Enthalpy Outside Economizer Control	Yes	12,571	2.8	0.0	$1,603.78	$2,300.00	$750.00	$1,550.00	1.0	12,659
Domestic Water Heating Upgrade			**0**	**0.0**	**52.3**	**$470.46**	**$279.63**	**$0.00**	**$279.63**	**0.6**	**6,119**
ECM 11	Install Low-Flow Domestic Hot Water Devices	Yes	0	0.0	52.3	$470.46	$279.63	$0.00	$279.63	0.6	6,119
Food Service Equipment & Refrigeration Measures			**4,465**	**0.2**	**0.0**	**$569.68**	**$4,991.81**	**$250.00**	**$4,741.81**	**8.3**	**4,496**
ECM 12	Refrigerator/Freezer Case Electrically Commutated Motors	Yes	1,311	0.2	0.0	$167.22	$606.60	$0.00	$606.60	3.6	1,320
	Refrigeration Controls	No	3,155	0.1	0.0	$402.46	$4,385.21	$250.00	$4,135.21	10.3	3,177
Plug Load Equipment Control - Vending Machine			**3,224**	**0.0**	**0.0**	**$411.28**	**$460.00**	**$0.00**	**$460.00**	**1.1**	**3,246**
ECM 13	Vending Machine Control	Yes	3,224	0.0	0.0	$411.28	$460.00	$0.00	$460.00	1.1	3,246
TOTALS FOR HIGH PRIORITY MEASURES			**821,495**	**167.7**	**52.3**	**$105,278.21**	**$352,066.31**	**$48,165.00**	**$303,901.31**	**2.9**	**833,359**
TOTALS FOR ALL EVALUATED MEASURES			**825,122**	**167.9**	**866.4**	**$113,069.84**	**$826,912.99**	**$48,415.00**	**$778,497.99**	**6.9**	**932,341**

* - All incentives presented in this table are based on NJ Smart Start Building 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).

Lighting Upgrades generally involve the replacement of existing lighting components such as lamps and ballasts (or the entire fixture) with higher efficiency lighting components. These measures save energy by reducing the power used by the lighting components due to improved electrical efficiency.

Lighting Controls measures generally involve the installation of automated controls to turn off lights or reduce light output when not needed. Automated control reduces reliance on occupant behavior for adjusting lights. These measures save energy by reducing the amount of time lights are on.

Motor Upgrades generally involve replacing older standard efficiency motors with high efficiency standard (NEMA Premium®). Motors replacements generally assume the same size motors, just higher efficiency. Although occasionally additional savings can be achieved by downsizing motors to better meet current load requirements. This measure saves energy by reducing the power used by the motors, due to improved electrical efficiency.

Variable Frequency Drives (VFDs) are motor control devices. These measures control the speed of a motor so that the motor spins at peak efficiency during partial load conditions. Sensors adapt the speed to flow, temperature, or pressure settings which is much more efficient that usage a valve or damper to control flow rates, or running the motor at full speed when only partial power is needed. These measures save energy by controlling motor usage more efficiently.

Electric Unitary HVAC measures generally involve replacing older inefficient air conditioning systems with modern energy efficient systems. New air conditioning systems can provide equivalent cooling to older air condition systems at a reduced energy cost. These measures save energy by reducing the power used by the air conditioning systems, due to improved electrical efficiency.

Gas Heating (HVAC/Process) measures generally involve replacing older inefficient hydronic heating systems with modern energy efficient systems. Gas heating systems can provide equivalent heating compared to older systems at a reduced energy cost. These measures save energy by reducing the fuel demands for heating, due to improved combustion and heat transfer efficiency.

HVAC System Improvements generally involve the installation of automated controls to reduce heating and cooling demand during periods of reduced demand. These measures could encompass changing temperature setpoints, using outside air for free cooling, or limiting excessive outside air during extreme outdoor air temperature conditions. These measures save energy by reducing the demand on HVAC systems and the amount of time systems operate.

Domestic Hot Water upgrade measures generally involve replacing older inefficient domestic water heating systems with modern energy efficient systems. New domestic hot water heating systems can provide equivalent, or greater, water heating capacity compared to older systems at a reduced energy cost. These measures save energy by reducing the fuel used for domestic hot water heating due to improved heating efficiency or reducing standby losses.

Food Service Equipment & Refrigeration measures generally involve improvements in the efficiency of cooking, food service, dishwashing, and food storage equipment. These measures may include more efficient convection ovens, steamers, ice machines, or refrigeration. These measures save energy by reducing the energy usage with more energy efficient equipment.

Plug Load Equipment control measures generally involve installing automated devices that limit the power usage or operation of equipment that is plugged into an electric outlet when not in use.

Energy Efficient Practices

TRC also identified 14 low cost (or no cost) energy efficient practices. A facility's energy performance can be significantly improved by employing certain behavioral or operational adjustments and by performing better routine maintenance on building systems. These practices can extend equipment lifetime, improve occupant comfort, provide better health and safety, as well as reduce annual energy and O&M costs. Potential opportunities identified at John Witherspoon Middle School include:

- Close Doors and Windows
- Develop a Lighting Maintenance Schedule
- Ensure Lighting Controls Are Operating Properly
- Perform Routine Motor Maintenance
- Use Fans to Reduce Cooling Load
- Practice Proper Use of Thermostat Schedules and Temperature Resets
- Ensure Economizers are Functioning Properly
- Clean Evaporator/Condenser Coils on AC Systems
- Clean and/or Replace HVAC Filters
- Repair/Replace Steam Traps
- Perform Proper Boiler Maintenance
- Perform Proper Water Heater Maintenance
- Install Plug Load Controls
- Water Conservation

For details on these energy efficient practices, please refer to Section 5.

On-Site Generation Measures

TRC evaluated the potential for installing on-site generation for John Witherspoon Middle School. Based on the configuration of the site and its loads there is a high potential for installing a photovoltaic (PV) array.

Figure 4 – Photovoltaic Potential

Potential	High	
System Potential	393	kW DC STC
Electric Generation	468,208	kWh/yr
Displaced Cost	$40,730	/yr
Installed Cost	$1,532,700	

For details on our evaluation and on-site generation potential, please refer to Section 6.

1.3 Implementation Planning

To realize the energy savings from the ECMs listed in this report, a project implementation plan must be developed. Available capital must be considered, and decisions need to be made whether it is best to pursue individual ECMs separately, groups of ECMs, or a comprehensive approach where all ECMs are implemented together, possibly in conjunction with other facility upgrades or improvements.

Rebates, incentives, and financing are available from NJCEP, as well as other sources, to help reduce the costs associated with the implementation of energy efficiency projects. Prior to implementing any measure, please review the relevant incentive program guidelines before proceeding. This is important because in most cases you will need to submit applications for the incentives prior to purchasing materials or commencing with installation.

The ECMs outlined in this report may qualify under the following program(s):

- SmartStart
- Pay for Performance - Existing Building (P4P EB)
- SREC (Solar Renewable Energy Certificate) Registration Program (SRP)
- Energy Savings Improvement Program (ESIP)

For facilities wanting 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 in this program you may utilize internal resources, or an outside firm or contractor, to do the final design of the ECM(s) and do the installation. Program pre-approval is required for some SmartStart incentives, so only after receiving pre-approval should you proceed with ECM installation. The incentive estimates listed above in Figure 3 are based on the SmartStart program. More details on this program and others are available in Section 8.

Larger facilities with an interest in a more comprehensive whole building approach to energy conservation should consider participating in the Pay for Performance (P4P) program. Projects eligible for this project program must meet minimum savings requirements. Final incentives are calculated based on actual measured performance achieved at the end of the project. The application process is more involved, and it requires working with a qualified P4P contractor, but the process may result in greater energy savings overall and more lucrative incentives, up to 50% of project's total cost.

For larger facilities with limited capital availability to implement ECMs, project financing may be available through the Energy Savings Improvement Program (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. An LGEA report (or other approved energy audit) is required for participation in ESIP. Please refer to Section 8.4 for additional information on the ESIP Program.

Additional information on relevant incentive programs is located in Section 8. You may also check the following website for more details: www.njcleanenergy.com/ci.

2 FACILITY INFORMATION AND EXISTING CONDITIONS

2.1 Project Contacts

Figure 5 – Project Contacts

Name	Role	E-Mail	Phone #
Customer			
Gary Weisman	Director of Plant Operations	GaryWeisman@princetonk12.org	(609) 203-4534
Peter Vazquez	Operations Manager	PeterVazquez@princetonk12.org	(609) 751-3916
Stephanie Kennedy	Business Administrator	stephaniekennedy@princetonk12.org	(609) 806-4204
TRC Energy Services			
Yagna Otia	Auditor	Yotia@trcsolutions.com	(732) 855-0033

2.2 General Site Information

On July 24, 2018, TRC performed an energy audit at John Witherspoon Middle School located in Princeton, New Jersey. TRC's team met with Hector to review the facility operations and help focus our investigation on specific energy-using systems.

John Witherspoon Middle School is a 148,531 square foot facility comprised of various space types within one building. The school building is two floors and includes classrooms, offices, pool, gym, locker rooms, a sub-basement mechanical space.

The building was constructed in 1965. Over the last several years the facility has replaced all its existing T12 fluorescent fixtures with T8 fluorescent fixtures. The site has a building energy management system (BEMS) which controls the HVAC system except boilers.

2.3 Building Occupancy

The school building is open Monday through Friday. The typical schedule is presented in the table below. The entire facility is used year-round by the community and camps are run throughout the summer. During a typical day, the facility is occupied by approximately 130 staff and 500 students.

Figure 6 - Building Schedule

Building Name	Weekday/Weekend	Operating Schedule
John Witherspoon Middle School	Weekday	6AM-11PM
John Witherspoon Middle School	Weekend	Closed

2.4 Building Envelope

School building is constructed of concrete block and structural steel. The building has flat roofs covered with white membrane that is in good condition. The building has double pane windows which are in good condition and show little sign of excessive infiltration. The exterior doors are constructed of aluminum and in good condition except that the door seals have worn out which increases the level of outside air infiltration.

Image 1 Building Roof & Exterior

2.5 On-Site Generation

John Witherspoon Middle School does not have any on-site electric generation capacity.

2.6 Energy-Using Systems

Please see Appendix A: Equipment Inventory & Recommendations for an inventory of the facility's equipment.

Lighting System

Lighting at the facility is provided mostly by 32-Watt linear fluorescent T8 lamps with electronic ballasts as well as some compact fluorescent lamps (CFL). Most of the fixtures are 2-lamp or 3-lamp, 4-foot long troffers with diffusers. The facility's maintenance technician indicated that the building had a comprehensive T8 retrofit several years ago.

A small area of the building and most of the office spaces are primarily lit with 13-Watt or 18-Watt CFL lamps in recessed can ceiling fixtures.

Lighting control in most spaces is provided by wall switches with some areas consist of occupancy sensors. The occupancy sensors are either wall or ceiling mounted depending on the space layout. Stairwells, elevator lobbies and main lobby areas do not contain any occupancy sensors and are on 24 hours per day throughout the year.

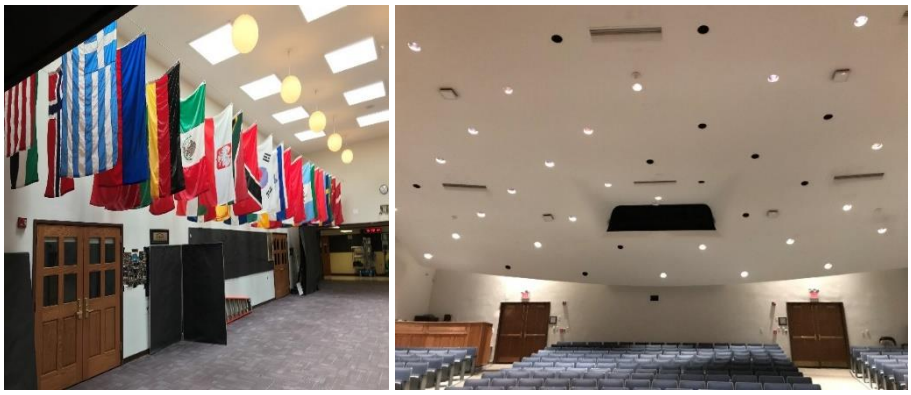


Image 2 School Interior Lighting

The building's exterior lighting consists primarily of efficient metal halide & LED wall pack fixtures that are controlled by photocells.

Image 3 School Exterior Lighting & sample lamp fixture

Hot Water Heating System

The hot water system consists of two York Shipley 13388 kBtu/hr output, hot water boilers (B1 & 2). The boilers have a nominal combustion efficiency of 78%. Each boiler has a 15 hp combustion air fan. The boilers are configured in a constant flow primary distribution with three 40 hp hot water pumps (HHWP1, 2 & 3). The boilers provide hot water to air handlers 1 cafeteria and 2 faculty.

Image 4 Hot water boiler system

The school also has a heated swimming pool located in pool storage area which gets heating water from a single Lochinvar 445 kBtu/hr non-condensing hot water boiler.

The boilers operate in a lead/lag configuration. Both boilers may be required during cold weather. The lead boiler is rotated weekly.

The boilers are in good condition and well maintained.

Direct Expansion Air Conditioning System (DX)

There are approximately 63 window air conditioning (AC) units that provides cooling to classrooms. A 20-ton Aron cooling only packaged unit (AHU-N-1) is used to condition the cafeteria and one 16-ton Aaon cooling only packaged unit (AHU-N-2) is used to condition the faculty area. The cafeteria unit provides variable air volume with a single 10 hp supply fan and a 3 hp return fan. Faculty unit provides variable air volume with a single 5 hp supply fan and 3 hp return fan. The units utilize a scroll compressor and a direct-expansion (DX) coil. In some classrooms, cooling is provided by dedicated Trane split system cooling only units.

Image 5 Air handling units on roof

Image 6 Air Conditioning units and RTUs on roof

The units are controlled from a BEMS in the facility maintenance room. The unit operates on demand to maintain a space temperature setpoint around 75°F (adjustable by staff). The unit may operate when the school is occupied between 7:00 AM and 4:00 PM Monday through Friday.

Building Energy Management System (BEMS)

The majority of the facility HVAC system is controlled with a Siemens building energy management system (BEMS). The BEMS aggregates the DDC points from throughout the building. Roughly 50% of the building zones are DDC and the remainder have pneumatic controls which are not tied into the BEMS. The system is capable of providing trends for individual DDC points for up to one-year of historical data. The Siemens system does not provide control for the boiler plant.

Domestic Hot Water Heating System

The domestic hot water heating system for the facility consists of one 85-gallon A.O. Smith gas-fired hot water heater with an input rating of 740 kBtu/hr each and a nominal efficiency of 80% which provides hot water to kitchen and restrooms. Two 500 W recirculation pumps distribute 120°F water to the entire site. The recirculation pumps operate continuously.

Image 7 DHW Heater

Food Service & Laundry Equipment

The facility has a full commercial kitchen that is used to prepare lunch for the students. Approximately 500 lunches are prepared every weekday. The ovens, range tops and griddle are all gas fired. There is a door type dishwasher with an electric fired booster heater that provides 145°F rinse water. The dishwasher operates from noon to 3:00 PM. Two full size and two half size food warmer cabinets are present to keep food hot during day.

Image 8 School Kitchen & serving area

Image 9 Kitchen Equipment

Image 10 Cooking Equipment

Refrigeration

The facility has two different cold storage areas: a walk-in cooler area and a walk-in freezer. The cooler area is maintained at a constant temperature of 35°F and freezer area is maintained at a constant -5°F. Cooler area is served by one evaporator and freezer area is served by one evaporator each having a single 1/12 hp fan.

Image 11 Refrigeration Equipment

There are three stand up refrigerators with glass doors, one stand up freezer with solid door and a chest freezer for ice cream freezer.

Building Plug Load

There are 292 computer work stations throughout the facility. Roughly 60% of the computers are desktop units with LCD monitors and rest 40% are notebooks in movable cart. There is a centralized PC power management software installed. There are 70 projectors total in classrooms for teaching as well.

There are roughly five server closets scattered throughout the facility. The facility has two refrigerated beverage vending machines.

2.7 Water-Using Systems

There are 28 restrooms at this facility. A sampling of restrooms found that all of the faucets are rated for 2.2 gallons per minute (gpm) or higher, the toilets are rated at 2.5 gallons per flush (gpf) and the urinals are rated at 2 gpf.

3 SITE ENERGY USE AND COSTS

Utility data for electricity and natural gas was analyzed to identify opportunities for savings. In addition, data for electricity and natural gas was evaluated to determine the annual energy performance metrics for the building in energy cost per square foot and energy usage per square foot. These metrics are an estimate of the relative energy efficiency of this building. There are a number of factors that could cause the energy use of this building to vary from the "typical" energy usage profile for facilities with similar characteristics. Local weather conditions, building age and insulation levels, equipment efficiency, daily occupancy hours, changes in occupancy throughout the year, equipment operating hours, and energy efficient behavior of occupants all contribute to benchmarking scores. Please refer to the Benchmarking section within Section 3.4 for additional information.

3.1 Total Cost of Energy

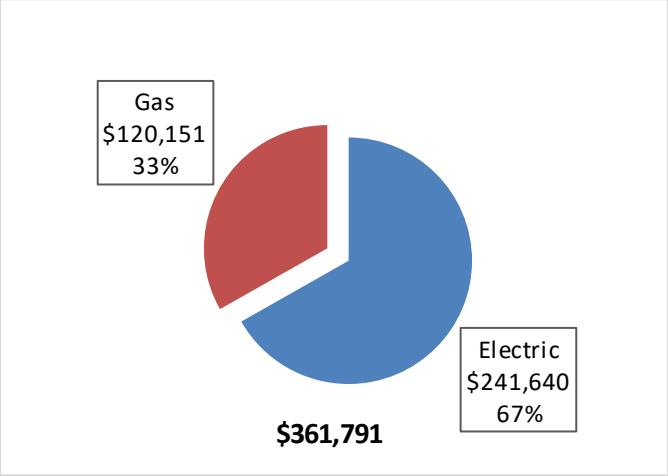
The following energy consumption and cost data is based on the last 12-month period of utility billing data that was provided for each utility. A profile of the annual energy consumption and energy cost of the facility was developed from this information.

Figure 7 - Utility Summary

Utility Summary for John Witherspoon Middle School		
Fuel	**Usage**	**Cost**
Electricity	1,894,003 kWh	$241,640
Natural Gas	133,476 Therms	$120,151
Total		**$361,791**

The current annual energy cost for this facility is $361,791 as shown in the chart below.

Figure 8 - Energy Cost Breakdown



3.2 Electricity Usage

Electricity is provided by PSE&G. The average electric cost over the past 12 months was $0.128/kWh, which is the blended rate that includes energy supply, distribution, and other charges. This rate is used throughout the analyses in this report to assess energy costs and savings. The monthly electricity consumption and peak demand are shown in the chart below.

Figure 9 - Electric Usage & Demand

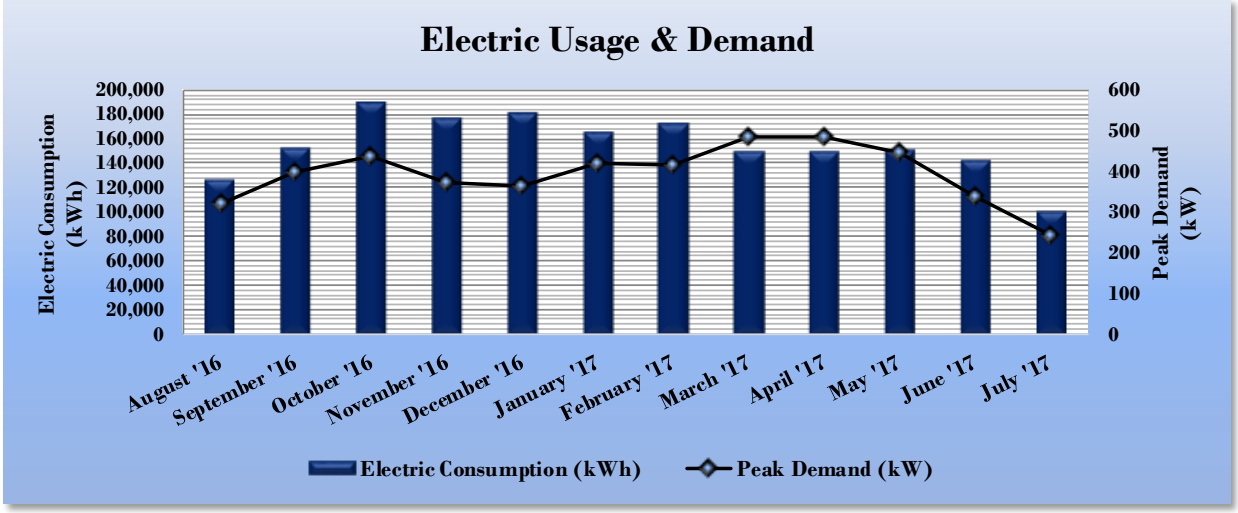


Figure 10 - Electric Usage & Demand

Electric Billing Data for John Witherspoon Middle School						
Period Ending	Days in Period	Electric Usage (kWh)	Demand (kW)	Demand Cost	Total Electric Cost	TRC Estimated Usage?
9/12/16	30	127,559	322		$16,181	Yes
10/10/16	30	153,506	400		$19,329	No
11/8/16	30	190,273	436		$23,648	No
12/9/16	30	177,022	374		$22,201	No
1/11/17	30	182,339	364		$22,753	No
2/9/17	30	166,512	418		$21,129	No
3/13/17	30	173,447	414		$22,357	No
4/11/17	30	150,454	483		$19,897	No
5/12/17	30	150,454	483		$19,897	No
6/13/17	30	151,622	445		$20,095	No
7/14/17	30	143,259	338		$17,955	No
8/11/17	30	101,611	243		$12,889	No
Totals	**360**	**1,868,058**	**482.7**	**$0**	**$238,330**	
Annual	**365**	**1,894,003**	**482.7**	**$0**	**$241,640**	

3.3 Natural Gas Usage

Natural gas is provided by PSE&G. The average gas cost for the past 12 months is $0.900/therm, which is the blended rate used throughout the analyses in this report. The monthly gas consumption is shown in the chart below.

Figure 11 - Natural Gas Usage

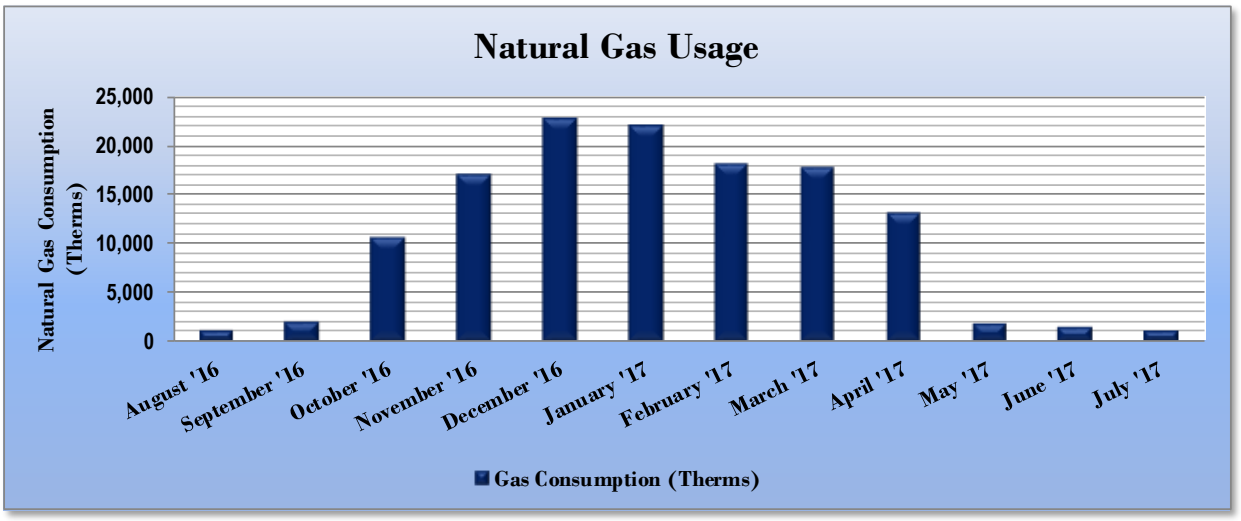


Figure 12 - Natural Gas Usage

Gas Billing Data for John Witherspoon Middle School			
Period Ending	Days in Period	Natural Gas Usage (Therms)	Natural Gas Cost
9/12/16	31	1,124	969
10/10/16	27	2,107	1,592
11/8/16	28	10,607	10,095
12/9/16	30	17,103	14,366
1/11/17	32	22,857	21,338
2/9/17	28	22,192	21,505
3/13/17	32	18,131	16,867
4/11/17	29	17,899	14,952
5/12/17	30	13,196	11,462
6/13/17	31	1,930	1,548
7/14/17	30	1,544	1,254
8/11/17	27	1,130	911
Totals	**355**	**129,820**	**$116,859**
Annual	**365**	**133,476**	**$120,151**

3.4 Benchmarking

This facility was benchmarked using Portfolio Manager®, an online tool created and managed by the United States Environmental Protection Agency (EPA) through the ENERGY STAR® program. Portfolio Manager® analyzes your building's consumption data, cost information, and operational use details and then compares its performance against a national median for similar buildings of its type. Metrics provided by this analysis are Energy Use Intensity (EUI) and an ENERGY STAR® score for select building types.

The EUI is a measure of a facility's energy consumption per square foot, and it is the standard metric for comparing buildings' energy performance. Comparing the EUI of a building with the national median EUI for that building type illustrates whether that building uses more or less energy than similar buildings of its type on a square foot basis. 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.

Figure 13 - Energy Use Intensity Comparison – Existing Conditions

Energy Use Intensity Comparison - Existing Conditions		
	John Witherspoon Middle School	National Median Building Type: School (K-12)
Source Energy Use Intensity (kBtu/ft^2)	231.0	141.4
Site Energy Use Intensity (kBtu/ft^2)	133.4	58.2

Implementation of all recommended measures in this report would improve the building's estimated EUI significantly, as shown in the table below:

Figure 14 - Energy Use Intensity Comparison – Following Installation of Recommended Measures

Energy Use Intensity Comparison - Following Installation of Recommended Measures		
	John Witherspoon Middle School	National Median Building Type: School (K-12)
Source Energy Use Intensity (kBtu/ft^2)	171.3	141.4
Site Energy Use Intensity (kBtu/ft^2)	114.1	58.2

Many types of commercial buildings are also eligible to receive an ENERGY STAR® score. This score is a percentile ranking from 1 to 100. It compares your building's energy performance to similar buildings nationwide. A score of 50 represents median energy performance, while a score of 75 means your building performs better than 75% of all similar buildings nationwide and may be eligible for ENERGY STAR® certification. This facility has a current score of 9.

A Portfolio Manager® Statement of Energy Performance (SEP) was generated for this facility, see Appendix B: ENERGY STAR® Statement of Energy Performance.

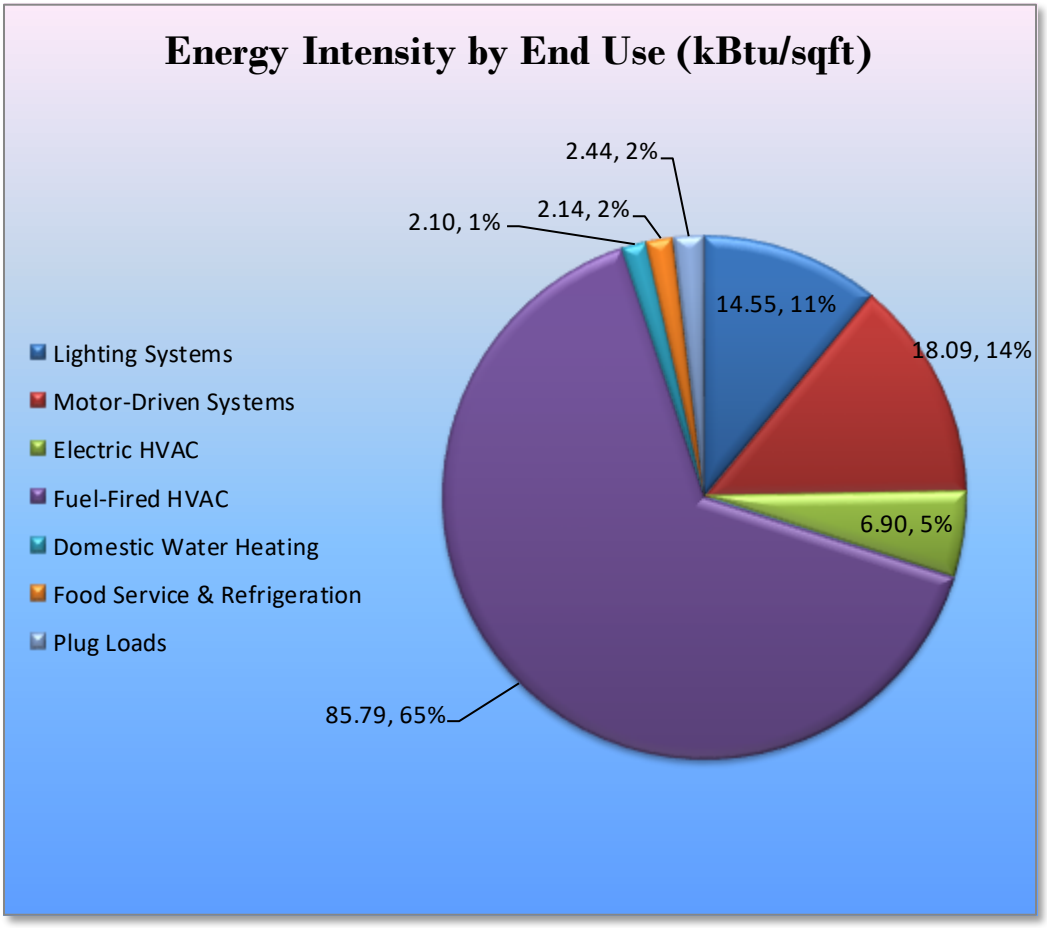
For more information on ENERGY STAR® certification go to: https://www.energystar.gov/buildings/facility-owners-and-managers/existing-buildings/earn-recognition/energy-star-certification/how-app-1.

A Portfolio Manager® account has been created online for your facility and you will be provided with the login information for the account. We encourage you to update your utility information in Portfolio Manager® regularly, so that you can keep track of your building's performance. 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.

3.5 Energy End-Use Breakdown

In order to provide a complete overview of energy consumption across building systems, an energy balance was performed at this facility. An energy balance utilizes standard practice engineering methods to evaluate all components of the various electric and fuel-fired systems found in a building to determine their proportional contribution to overall building energy usage. This chart of energy end uses highlights the relative contribution of each equipment category to total energy usage. This can help determine where the greatest benefits might be found from energy efficiency measures.

Figure 15 - Energy Balance (% and kBtu/SF)



4 ENERGY CONSERVATION MEASURES

The goal of this audit report is to identify potential energy efficiency opportunities, help prioritize specific measures for implementation, and provide information to John Witherspoon Middle School regarding financial incentives for which they may qualify to implement the recommended measures. For this audit report, most measures have received only a preliminary analysis of feasibility which identifies expected ranges of savings and costs. This level of analysis is usually considered sufficient to demonstrate project cost-effectiveness and help prioritize energy measures. Savings are based on the New Jersey Clean Energy Program Protocols to Measure Resource Savings dated June 29, 2016, 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. A higher level of investigation may be necessary to support any custom SmartStart or Pay for Performance, or Direct Install incentive applications. Financial incentives for the ECMs identified in this report have been calculated based the NJCEP prescriptive SmartStart program. Some measures and proposed upgrade projects may be eligible for higher incentives than those shown below through other NJCEP programs as described in Section 8.

The following sections describe the evaluated measures.

4.1 Recommended ECMs

The measures below have been evaluated by the auditor and are recommended for implementation at the facility.

Figure 16 – Summary of Recommended 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		**386,507**	**59.5**	**0.0**	**$49,311.23**	**$135,554.59**	**$26,710.00**	**$108,844.59**	**2.2**	**389,210**
ECM 1	Install LED Fixtures	88,665	13.1	0.0	$11,312.01	$50,308.60	$8,835.00	$41,473.60	3.7	89,285
ECM 2	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	1,656	0.3	0.0	$211.26	$560.48	$0.00	$560.48	2.7	1,667
ECM 3	Retrofit Fixtures with LED Lamps	296,186	46.1	0.0	$37,787.96	$84,685.51	$17,875.00	$66,810.51	1.8	298,257
Lighting Control Measures		**84,133**	**12.9**	**0.0**	**$10,733.83**	**$61,320.00**	**$6,945.00**	**$54,375.00**	**5.1**	**84,721**
ECM 4	Install Occupancy Sensor Lighting Controls	70,356	10.8	0.0	$8,976.16	$57,720.00	$6,945.00	$50,775.00	5.7	70,848
ECM 5	Install High/Low Lighitng Controls	13,777	2.1	0.0	$1,757.67	$3,600.00	$0.00	$3,600.00	2.0	13,873
Variable Frequency Drive (VFD) Measures		**252,076**	**43.9**	**0.0**	**$32,160.31**	**$57,219.15**	**$8,800.00**	**$48,419.15**	**1.5**	**253,839**
ECM 6	Install VFD on Variable Air Volume (VAV) HVAC	68,917	21.3	0.0	$8,792.61	$18,732.10	$5,200.00	$13,532.10	1.5	69,399
ECM 7	Install VFDs on Hot Water Pumps	168,304	14.3	0.0	$21,472.48	$28,098.15	$0.00	$28,098.15	1.3	169,481
ECM 8	Install Boiler Draft Fan VFDs	14,855	8.3	0.0	$1,895.22	$10,388.90	$3,600.00	$6,788.90	3.6	14,959
Electric Unitary HVAC Measures		**81,674**	**48.4**	**0.0**	**$10,420.10**	**$94,326.34**	**$4,960.00**	**$89,366.34**	**8.6**	**82,245**
ECM 9	Install High Efficiency Electric AC	81,674	48.4	0.0	$10,420.10	$94,326.34	$4,960.00	$89,366.34	8.6	82,245
HVAC System Improvements		**12,571**	**2.8**	**0.0**	**$1,603.78**	**$2,300.00**	**$750.00**	**$1,550.00**	**1.0**	**12,659**
ECM 10	Install Dual Enthalpy Outside Economizer Control	12,571	2.8	0.0	$1,603.78	$2,300.00	$750.00	$1,550.00	1.0	12,659
Domestic Water Heating Upgrade		**0**	**0.0**	**52.3**	**$470.46**	**$279.63**	**$0.00**	**$279.63**	**0.6**	**6,119**
ECM 11	Install Low-Flow Domestic Hot Water Devices	0	0.0	52.3	$470.46	$279.63	$0.00	$279.63	0.6	6,119
Food Service Equipment & Refrigeration Measures		**1,311**	**0.2**	**0.0**	**$167.22**	**$606.60**	**$0.00**	**$606.60**	**3.6**	**1,320**
ECM 12	Refrigerator/Freezer Case Electrically Commutated Motors	1,311	0.2	0.0	$167.22	$606.60	$0.00	$606.60	3.6	1,320
Plug Load Equipment Control - Vending Machine		**3,224**	**0.0**	**0.0**	**$411.28**	**$460.00**	**$0.00**	**$460.00**	**1.1**	**3,246**
ECM 13	Vending Machine Control	3,224	0.0	0.0	$411.28	$460.00	$0.00	$460.00	1.1	3,246
TOTALS		**821,495**	**167.7**	**52.3**	**$105,278.21**	**$352,066.31**	**$48,165.00**	**$303,901.31**	**2.9**	**833,359**

* - All incentives presented in this table are based on NJ Smart Start Building 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).

4.1.1 Lighting Upgrades

Our recommendations for upgrades to existing lighting fixtures are summarized in Figure 17 below.

Figure 17 – Summary of Lighting Upgrade 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		**386,507**	**59.5**	**0.0**	**$49,311.23**	**$135,554.59**	**$26,710.00**	**$108,844.59**	**2.2**	**389,210**
ECM 1	Install LED Fixtures	88,665	13.1	0.0	$11,312.01	$50,308.60	$8,835.00	$41,473.60	3.7	89,285
ECM 2	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	1,656	0.3	0.0	$211.26	$560.48	$0.00	$560.48	2.7	1,667
ECM 3	Retrofit Fixtures with LED Lamps	296,186	46.1	0.0	$37,787.96	$84,685.51	$17,875.00	$66,810.51	1.8	298,257

During lighting upgrade planning and design, we recommend a comprehensive approach that considers both the efficiency of the lighting fixtures and how they are controlled.

ECM 1: Install LED Fixtures

Summary of Measure Economics

Interior/ Exterior	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)
Interior	68,945	10.5	0.0	$8,796.12	$44,943.16	$8,700.00	$36,243.16	4.1	69,427
Exterior	19,720	2.6	0.0	$2,515.89	$5,365.44	$135.00	$5,230.44	2.1	19,858

Measure Description

We recommend replacing existing fixtures in offices, restrooms, parking area and storage areas containing T8, U-type fluorescent, CFL, metal halide lamps with new high-performance LED light fixtures. This measure saves energy by installing LEDs which use less power than other technologies with a comparable light output.

Additional savings from lighting maintenance can be anticipated since LEDs have lifetimes which are more than twice that of HID sources such as metal halide and mercury vapor.

ECM 2: Retrofit Fluorescent Fixtures with LED Lamps and Drivers

Summary of Measure Economics

Interior/ Exterior	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)
Interior	1,656	0.3	0.0	$211.26	$560.48	$0.00	$560.48	2.7	1,667
Exterior	0	0.0	0.0	$0.00	$0.00	$0.00	$0.00	0.0	0

Measure Description

We recommend retrofitting existing fluorescent fixtures in hallways, pool area and stairs by removing fluorescent tubes and ballasts and replacing them with LEDs and LED drivers (if necessary), which are designed to be used retrofitted fluorescent fixtures. The measure uses the existing fixture housing but replaces the rest of the components with more efficient lighting technology. This measure saves energy by installing LEDs which use less power than other lighting technologies yet provide equivalent lighting output for the space.

Additional savings from lighting maintenance can be anticipated since LEDs have lifetimes which are more than twice that of a fluorescent tube and more than ten times longer than many incandescent lamps.

ECM 3: Retrofit Fixtures with LED Lamps

Summary of Measure Economics

Interior/ Exterior	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)
Interior	289,934	45.3	0.0	$36,990.33	$83,882.08	$17,855.00	$66,027.08	1.8	291,962
Exterior	6,252	0.8	0.0	$797.63	$803.43	$20.00	$783.43	1.0	6,296

Measure Description

We recommend retrofitting existing incandescent, halogen or other lighting technologies in classrooms, staffrooms and exterior fixtures with LED lamps. Many LED tube lamps are direct replacements for existing fluorescent lamps and can be installed while leaving the fluorescent fixture ballast in place. LED bulbs 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.

Additional savings from lighting maintenance can be anticipated since LEDs have lifetimes which are more than twice that of a fluorescent tube and more than ten times longer than many incandescent lamps.

4.1.2 Lighting Control Measures

Our recommendations for lighting control measures are summarized in Figure 18 below.

Figure 18 – Summary of Lighting Control 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 Control Measures		**84,133**	**12.9**	**0.0**	**$10,733.83**	**$61,320.00**	**$6,945.00**	**$54,375.00**	**5.1**	**84,721**
ECM 4	Install Occupancy Sensor Lighting Controls	70,356	10.8	0.0	$8,976.16	$57,720.00	$6,945.00	$50,775.00	5.7	70,848
ECM 5	Install High/Low Lighitng Controls	13,777	2.1	0.0	$1,757.67	$3,600.00	$0.00	$3,600.00	2.0	13,873

During lighting upgrade planning and design, we recommend a comprehensive approach that considers both the efficiency of the lighting fixtures and how they are controlled.

ECM 4: Install Occupancy Sensor Lighting Controls

Summary of Measure Economics

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)
70,356	10.8	0.0	$8,976.16	$57,720.00	$6,945.00	$50,775.00	5.7	70,848

Measure Description

We recommend installing occupancy sensors to control lighting fixtures that are currently controlled by manual switches in restrooms, storage rooms, classrooms and offices areas. Lighting sensors detect occupancy using ultrasonic and/or infrared sensors. For most spaces, we recommend lighting controls use dual technology sensors, which can eliminate the possibility of any lights turning off unexpectedly. Lighting systems are enabled when an occupant is detected. Fixtures are automatically turned off after an area has been vacant for a preset period. Some controls also provide dimming options and all modern occupancy controls can be easily over-ridden by room occupants to allow them to manually turn fixtures on or off, as desired. Energy savings results from only operating lighting systems when they are required.

Occupancy sensors may be mounted on the wall at existing switch locations, mounted on the ceiling, or in remote locations. In general, wall switch replacement sensors are recommended for single occupant offices and other small rooms. Ceiling-mounted or remote mounted sensors are used in locations without local switching or where wall switches are not in the line-of-sight of the main work area and in large spaces. We recommend a comprehensive approach to lighting design that upgrades both the lighting fixtures and the controls together for maximum energy savings and improved lighting for occupants.

ECM 5: Install High/Low Lighting Controls

Summary of Measure Economics

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)
13,777	2.1	0.0	$1,757.67	$3,600.00	$0.00	$3,600.00	2.0	13,873

Measure Description

We recommend installing 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. Typical areas for such lighting control are stairwells, interior corridors, parking lots, and parking garages.

Lighting fixtures with these controls operate at default low levels when the area is not occupied to provide minimal lighting to meet security or safety requirements. Sensors detect occupancy using ultrasonic and/or infrared sensors. The lighting systems are switched to full lighting levels whenever an occupant is detected. Fixtures are automatically switched back to low level after an area has been vacant for a preset period of time. 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 daylighting. Energy savings results from only providing full lighting levels when it is required.

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

Additional savings from reduced lighting maintenance may also result from this measure, due to reduced lamp operation.

4.1.3 Variable Frequency Drive Measures

Our recommendations for variable frequency drive (VFD) measures are summarized in Figure 19 below.

Figure 19 – Summary of Variable Frequency Drive 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)
Variable Frequency Drive (VFD) Measures		**252,076**	**43.9**	**0.0**	**$32,160.31**	**$57,219.15**	**$8,800.00**	**$48,419.15**	**1.5**	**253,839**
ECM 6	Install VFD on Variable Air Volume (VAV) HVAC	68,917	21.3	0.0	$8,792.61	$18,732.10	$5,200.00	$13,532.10	1.5	69,399
ECM 7	Install VFDs on Hot Water Pumps	168,304	14.3	0.0	$21,472.48	$28,098.15	$0.00	$28,098.15	1.3	169,481
ECM 8	Install Boiler Draft Fan VFDs	14,855	8.3	0.0	$1,895.22	$10,388.90	$3,600.00	$6,788.90	3.6	14,959

ECM 6: Install VFD on Variable Air Volume (VAV) HVAC

Summary of Measure Economics

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)
68,917	21.3	0.0	$8,792.61	$18,732.10	$5,200.00	$13,532.10	1.5	69,399

Measure Description

We recommend replacing existing air volume control devices on 40 hp supply and return fan of pool air handling unit (AHU-P), such as inlet vanes and variable pitch fan blades, with variable frequency drives (VFDs). Inlet guide vanes and variable pitch fan blades are an inefficient means of controlling the air volume compared to VFDs. The existing volume control device would be removed, or permanently disabled, and the control signal would be redirected to the VFD to determine proper fan motor speed. Energy savings results from more efficient control of motor energy usage when fan motors are operated at partial load. The magnitude of energy savings is based on the estimated amount of time that fan motors would be operated at partial load.

Additional maintenance savings may result from this measure as well, since VFDs are solid state electronic device, which generally requires less maintenance than mechanical air volume control devices.

ECM 7: Install VFDs on Hot Water Pumps

Summary of Measure Economics

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)
168,304	14.3	0.0	$21,472.48	$28,098.15	$0.00	$28,098.15	1.3	169,481

Measure Description

We recommend installing a variable frequency drives (VFD) to control three 40 hp hot water pumps. This measure requires that a majority of the hot water coils be served by 2-way valves and that a differential pressure sensor is installed in the hot water loop. As the hot water valves close, the differential pressure increases. The VFD modulates pump speed to maintain a differential pressure setpoint. Energy savings results 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.

ECM 8: Install Boiler Draft Fan VFDs

Summary of Measure Economics

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)
14,855	8.3	0.0	$1,895.22	$10,388.90	$3,600.00	$6,788.90	3.6	14,959

Measure Description

We recommend replacing existing volume control devices on two 15 hp boiler draft fans, such as inlet vanes or dampers, with variable frequency drives (VFD). Inlet vanes or dampers are an inefficient means of controlling the air volume compared to VFDs. he existing volume control device would be removed, or permanently disabled, and the control signal would be redirected to the VFD to determine proper fan motor speed. Energy savings results from more efficient control of motor energy usage when fan motors are operated at partial load. The magnitude of energy savings is based on the estimated amount of time that fan motors would be operated at partial load.

Additional maintenance savings may result from this measure as well, since VFDs are solid state electronic device, which generally requires less maintenance than mechanical air volume control devices.

4.1.4 Electric Unitary HVAC Measures

Our recommendation for unitary HVAC measures is summarized in Figure 20 below.

Figure 20 - Summary of Unitary HVAC 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)
Electric Unitary HVAC Measures		**81,674**	**48.4**	**0.0**	**$10,420.10**	**$94,326.34**	**$4,960.00**	**$89,366.34**	**8.6**	**82,245**
ECM 9	Install High Efficiency Electric AC	81,674	48.4	0.0	$10,420.10	$94,326.34	$4,960.00	$89,366.34	8.6	82,245

ECM 9: Install High Efficiency Air Conditioning Units

Summary of Measure Economics

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)
81,674	48.4	0.0	$10,420.10	$94,326.34	$4,960.00	$89,366.34	8.6	82,245

Measure Description

We recommend replacing standard efficiency packaged air conditioning units with high efficiency packaged air conditioning units. There have been significant improvements in both compressor and fan motor efficiencies over the past several years. Therefore, electricity savings can be achieved by replacing older units with new high efficiency units. A higher EER or SEER rating indicates a more efficient cooling system. The magnitude of energy savings for this measure depends on the relative efficiency of the older unit versus the new high efficiency unit, the average cooling load, and the estimated annual operating hours.

4.1.5 HVAC System Upgrades

Our recommendation for HVAC system improvement is summarized in Figure 21 below.

Figure 21 - Summary of HVAC System Improvement 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)
HVAC System Improvements		**12,571**	**2.8**	**0.0**	**$1,603.78**	**$2,300.00**	**$750.00**	**$1,550.00**	**1.0**	**12,659**
ECM 10	Install Dual Enthalpy Outside Economizer Control	12,571	2.8	0.0	$1,603.78	$2,300.00	$750.00	$1,550.00	1.0	12,659

ECM 10: Install Dual-Enthalpy Economizers

Summary of Measure Economics

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)
12,571	2.8	0.0	$1,603.78	$2,300.00	$750.00	$1,550.00	1.0	12,659

Measure Description

Dual enthalpy economizers are used to control a ventilation system's outside air intake in order to reduce a facility's total cooling load. A dual-enthalpy economizer monitors the air temperature and humidity of both the outside and return air. The control supplies the lowest energy (temperature and humidity) air to the air handling system. When outside air conditions allow, outside air can be used for cooling instead of running the air handling system's compressor. This reduces the demand on the cooling system, lowering its usage hours and saving energy.

Savings result from using outside air instead of mechanical cooling when outside air conditions permit.

4.1.6 Domestic Hot Water Heating System Upgrades

Our recommendation for domestic water heating system improvements is summarized in Figure 22 below.

Figure 22 - Summary of Domestic Water Heating 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)
Domestic Water Heating Upgrade		**0**	**0.0**	**52.3**	**$470.46**	**$279.63**	**$0.00**	**$279.63**	**0.6**	**6,119**
ECM 11	Install Low-Flow Domestic Hot Water Devices	0	0.0	52.3	$470.46	$279.63	$0.00	$279.63	0.6	6,119

ECM 11: Install Low-Flow DHW Devices

Summary of Measure Economics

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)
0	0.0	52.3	$470.46	$279.63	$0.00	$279.63	0.6	6,119

Measure Description

We recommend installing low-flow domestic hot water devices to reduce overall hot water demand. Energy demand from domestic hot water heating systems can be reduced by reducing water usage in general. Faucet aerators can reduce hot water usage, relative to standard aerators, which saves energy. Low-flow devices reduce the overall water flow from the fixture, while still providing adequate pressure for washing. This reduces the amount of water used per day resulting in energy and water savings.

4.1.7 Food Service Equipment & Refrigeration Measures

Our recommendations for food service and refrigeration measures are summarized in Figure 23 below.

Figure 23 - Summary of Food Service Equipment & Refrigeration 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)
Food Service Equipment & Refrigeration Measures		**1,311**	**0.2**	**0.0**	**$167.22**	**$606.60**	**$0.00**	**$606.60**	**3.6**	**1,320**
ECM 12	Refrigerator/Freezer Case Electrically Commutated Motors	1,311	0.2	0.0	$167.22	$606.60	$0.00	$606.60	3.6	1,320

ECM 12: Refrigerator/Freezer Case Electrically Commutated Motors

Summary of Measure Economics

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)
1,311	0.2	0.0	$167.22	$606.60	$0.00	$606.60	3.6	1,320

Measure Description

We recommend replacing shaded pole or permanent split capacitor (PSC) motors with electronically commutated (EC) motors in existing walk-in coolers and freezers. These fractional horsepower EC motors are significantly more efficient than mechanically commutated, brushed motors, particularly at low speeds or partial load. By employing variable-speed technology, EC motors can optimize fan usage. Because these motors are brushless and utilize DC power, losses due to friction and phase shifting are eliminated. Savings for this measure consider both the increased efficiency of the motor as well as the reduction in refrigeration load due to motor heat loss.

4.1.8 Plug Load Equipment Control - Vending Machines

Our recommendations for plug load equipment control measures are summarized in Figure 24 below.

Figure 24 - Summary of Plug Load Equipment 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)
Plug Load Equipment Control - Vending Machine		**3,224**	**0.0**	**0.0**	**$411.28**	**$460.00**	**$0.00**	**$460.00**	**1.1**	**3,246**
ECM 13	Vending Machine Control	3,224	0.0	0.0	$411.28	$460.00	$0.00	$460.00	1.1	3,246

ECM 13: Vending Machine Control

Summary of Measure Economics

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)
3,224	0.0	0.0	$411.28	$460.00	$0.00	$460.00	1.1	3,246

Measure Description

Vending machines operate continuously, even during non-business hours. We recommend installing occupancy sensor controls to reduce the energy use. These controls power down vending machines when the vending machine area has been vacant for some time, then power up at regular intervals, as needed, to turn machine lights on or keep the product cool. Energy savings are a dependent on vending machine and activity level in the area surrounding the machines.

4.2 ECMs Evaluated but Not Recommended

The measures below have been evaluated by the auditor but are not recommended for implementation at the facility. Reasons for exclusion can be found in each measure description section.

Figure 25 – Summary of Measures Evaluated, But Not Recommended

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	**472**	**0.2**	**0.0**	**$60.18**	**$11,646.09**	**$0.00**	**$11,646.09**	**193.5**	**475**
Premium Efficiency Motors	472	0.2	0.0	$60.18	$11,646.09	$0.00	$11,646.09	193.5	475
Gas Heating (HVAC/Process) Replacement	**0**	**0.0**	**814.2**	**$7,328.99**	**$458,815.38**	**$0.00**	**$458,815.38**	**62.6**	**95,331**
Install High Efficiency Hot Water Boilers	0	0.0	814.2	$7,328.99	$458,815.38	$0.00	$458,815.38	62.6	95,331
Food Service Equipment & Refrigeration Measures	**3,155**	**0.1**	**0.0**	**$402.46**	**$4,385.21**	**$250.00**	**$4,135.21**	**10.3**	**3,177**
Refrigeration Controls	3,155	0.1	0.0	$402.46	$4,385.21	$250.00	$4,135.21	10.3	3,177
TOTALS	**3,626**	**0.3**	**814.2**	**$7,791.63**	**$474,846.68**	**$250.00**	**$474,596.68**	**60.9**	**98,982**

* - All incentives presented in this table are based on NJ Smart Start Building 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).

Premium Efficiency Motors

Summary of Measure Economics

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)
472	0.2	0.0	$60.18	$11,646.09	$0.00	$11,646.09	193.5	475

Measure Description

We recommend replacing standard efficiency motors with NEMA Premium® efficiency motors. Our evaluation assumes that existing motors will be replaced with motors of equivalent size and type. Although occasionally additional savings can be achieved by downsizing motors to better meet the motor's current load requirements. The base case motor efficiencies are estimated from nameplate information and our best estimates of motor run hours. Efficiencies of proposed motor upgrades are obtained from the *New Jersey's Clean Energy Program Protocols to Measure Resource Savings (2016)*. Savings are based on the difference between baseline and proposed efficiencies and the assumed annual operating hours.

Reasons for not Recommending

Replacing existing standard efficiency motors with NEMA Premium® efficiency motors will result in energy savings, however, the cost of installation will outweigh the energy saving advantages resulting in a very long payback. This makes the measure financially not viable therefore not recommended based on energy savings alone.

Install High Efficiency Hot Water Boilers

Summary of Measure Economics

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)
0	0.0	814.2	$7,328.99	$458,815.38	$0.00	$458,815.38	62.6	95,331

Measure Description

We recommend replacing older inefficient hot water boilers with high efficiency hot water boilers. Significant improvements have been made in combustion technology resulting in increased overall boiler efficiency. Energy savings results from improved combustion efficiency and reduced standby losses at low loads.

The most notable efficiency improvement is condensing hydronic boilers that can achieve over 90% efficiency under the proper conditions. Condensing hydronic boilers typically operate at efficiencies between 85% and 87% (comparable to other high efficiency boilers) when the return water temperature is above 130°F. The boiler efficiency increases as the return water temperature drops below 130°F. Therefore, condensing hydronic boilers were only evaluated when the return water temperature is less than 130°F during most of the operating hours. As a result, condensing hydronic boilers are not recommended for this site.

Reasons for not Recommending

Replacing existing hot water boilers with high efficiency hot water boilers will result in energy savings, however, the cost of installation will outweigh the energy saving advantages resulting in a very long payback. This makes the measure financially not viable therefore not recommended based on energy savings alone.

Walk-In Cooler and Freezer Controls

Summary of Measure Economics

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)
3,155	0.1	0.0	$402.46	$4,385.21	$250.00	$4,135.21	10.3	3,177

Measure Description

We recommend the installation of additional controls to optimize the operation of walk-in coolers and freezers.

Defrost controllers can be used to override defrost of evaporator fans when the defrost operation is not necessary, reducing annual energy consumption. This measure is applicable to existing evaporator fans with a traditional electric defrost mechanism.

Many walk-in coolers and freezers have evaporator fans which run continuously. The measure adds a control system feature to automatically shut off evaporator fans when the cooler's thermostat is not calling for cooling.

Energy savings for each of the control measures account for reduction in compressor and fan operating hours as well as reduction in the refrigeration heat load as appropriate.

Energy savings for each of the control measures account for reduction in compressor and fan operating hours as well as reduction in the refrigeration heat load as appropriate.

Reasons for not Recommending

Installing evaporator fan controls and defrost controls in walk-in coolers and freezers will result in energy savings, however, the cost of installation will outweigh the energy saving advantages resulting in a very long payback. This makes the measure financially not viable therefore not recommended based on energy savings alone.

5 ENERGY EFFICIENT PRACTICES

In addition to the quantifiable savings estimated in Section 4, a facility's energy performance can also be improved through application of many low cost or no-cost energy efficiency strategies. By employing certain behavioral and operational changes and performing routine maintenance on building systems, equipment lifetime can be extended; occupant comfort, health and safety can be improved; and energy and O&M costs can be reduced. The recommendations below are provided as a framework for developing a whole building maintenance plan that is customized to your facility. Consult with qualified equipment specialists for details on proper maintenance and system operation.

Close Doors and Windows

Ensure doors and windows are closed in conditioned spaces. Leaving doors and windows open leads to a significant increase in heat transfer between conditioned spaces and the outside air. Reducing a facility's air changes per hour (ACH) can lead to increased occupant comfort as well as significant heating and cooling savings, especially when combined with proper HVAC controls and adequate ventilation.

Develop a Lighting Maintenance Schedule

In addition to routine fixture cleaning, development of a maintenance schedule can both ensure maintenance is performed regularly and can reduce the overall cost of fixture re-lamping and re-ballasting. By re-lamping and re-ballasting fixtures in groups, lighting levels are better maintained and the number of site visits by a lighting technician or contractor can be minimized, decreasing the overall cost of maintenance.

Ensure Lighting Controls Are Operating Properly

Lighting controls are very cost-effective energy efficient devices, when installed and operating correctly. As part of a lighting maintenance schedule, lighting controls should be tested annually to ensure proper functioning. For occupancy sensors, this requires triggering the sensor and verifying that the sensor's timer settings are correct. For daylight sensors, maintenance involves cleaning of sensor lenses and confirming setpoints and sensitivity are appropriately configured.

Perform Routine Motor Maintenance

Motors consist of many moving parts whose collective degradation can contribute to a significant loss of motor efficiency. In order to prevent damage to motor components, routine maintenance should be performed. This maintenance consists of 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.

Use Fans to Reduce Cooling Load

Utilizing ceiling fans to supplement cooling is a low-cost strategy to reduce cooling load considerably. Thermostat settings can be increased by 4°F with no change in overall occupant comfort when the wind chill effect of moving air is employed for cooling.

Practice Proper Use of Thermostat Schedules and Temperature Resets

Ensure thermostats are correctly set back. By employing proper set back temperatures and schedules, facility heating and cooling costs can be reduced dramatically during periods of low or no occupancy. As such, thermostats should be programmed for a setback of 5°F-10°F during low occupancy hours (reduce heating setpoints and increase cooling setpoints). Cooling load can be reduced further 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.

Ensure Economizers are Functioning Properly

Economizers, when properly configured, can be used to significantly reduce mechanical cooling. However, if the outdoor thermostat or enthalpy control is malfunctioning or the damper is stuck or improperly adjusted, benefits from the economizer may not be fully realized. As such, periodic inspection and maintenance is required to ensure proper operation. This maintenance should be scheduled with maintenance of the facility's air conditioning system and 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. A malfunctioning economizer can significantly increase the amount of heating and mechanical cooling required by introducing excess amounts of cold or hot outside air.

Clean Evaporator/Condenser Coils on AC Systems

Dirty evaporators and condensers coils cause a restriction to air flow and restrict heat transfer. This results in increased evaporator and condenser fan load and a decrease in cooling system performance. Keeping the coils clean allows the fans and cooling system to operate more efficiently.

Clean and/or Replace HVAC Filters

Air filters work to reduce the amount of indoor air pollution and increase occupant comfort. Over time, filters become less and less effective as particulate buildup increases. In addition to health concerns related to clogged filters, filters that have reached saturation also restrict air flow through the facility's air conditioning or heat pump system, increasing the load on the distribution fans and decreasing occupant comfort levels. Filters should be checked monthly and cleaned or replaced when appropriate.

Repair/Replace Steam Traps

Properly functioning steam traps ensure that all latent heat in the steam is delivered to the end use by preventing pressurized steam from leaking. Steam traps should be inspected as part of the regular steam system maintenance. Traps that are blocked, venting, or allowing steam to leak through should be repaired or replaced. Repairing or replacing existing steam traps will reduce steam losses.

Perform Proper Boiler Maintenance

Many boiler problems develop slowly over time, so regular inspection and maintenance is essential to retain proper functionality and efficiency of the heating system. Fuel burning equipment should undergo yearly tune-ups to ensure they are operating as safely and efficiently as possible from a combustion standpoint. A tune-up should include a combustion analysis to analyze the exhaust from the boilers and to ensure the boiler is operating safely. Buildup of dirt, dust, or deposits on the internal surfaces of a boiler can greatly affect its heat transfer efficiency. These deposits can accumulate on the water side or fire side of the boiler. Boilers should be cleaned regularly according to the manufacturer's instructions to remove this build up in order to sustain efficiency and equipment life.

Perform Proper Water Heater Maintenance

At least once a year, 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. Once a year check for any leaks or heavy corrosion on the pipes and valves. For gas water heaters, check the draft hood and make sure it is placed properly, with a few inches of air space between the tank and where it connects to the vent. Look for any 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 any 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 over three to four years old have a technician inspect the sacrificial anode annually.

Plug Load Controls

There are a variety of ways to limit the energy use of plug loads including increasing occupant awareness, removing under-utilized equipment, installing hardware controls, and using software controls. Some control steps to take are to enable the most aggressive power settings on existing devices or install load sensing or occupancy sensing (advanced) power strips. For additional information refer to "Plug Load Best Practices Guide" http://www.advancedbuildings.net/plug-load-best-practices-guide-offices.

Water Conservation

Installing low-flow faucets or faucet aerators, low-flow showerheads, and kitchen sink pre-rinse spray valves saves both energy and water. These devices save energy by reducing the overall amount of hot water used hence reducing the energy used to heat the water. The flow ratings for EPA WaterSense™ (http://www3.epa.gov/watersense/products) labeled devices are 1.5 gpm for bathroom faucets, 2.0 gpm for showerheads, and 1.28 gpm for pre-rinse spray valves.

Installing dual flush or low-flow toilets and low-flow or waterless urinals are additional ways to reduce the sites water use, however, these devices do not provide energy savings at the site level. 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. The EPA WaterSense™ ratings for urinals is 0.5 gpf and toilets that use as little as 1.28 gpf (this is lower than the current 1.6 gpf federal standard).

Refer to Section 4.1.6 for any low-flow ECM recommendations.

6 On-Site Generation Measures

On-site generation measure options include both renewable (e.g., solar, wind) and non-renewable (e.g., fuel cells) on-site technologies that generate power to meet all or a portion of the electric energy needs of a facility, often repurposing any waste heat where applicable. Also referred to as distributed generation, these systems contribute to Greenhouse Gas (GHG) emission reductions, demand reductions and reduced customer electricity purchases, resulting in the electric system reliability through improved transmission and distribution system utilization.

The State of New Jersey's Energy Master Plan (EMP) encourages new distributed generation of all forms and specifically focuses on expanding use of combined heat and power (CHP) by reducing financial, regulatory and technical barriers and identifying opportunities for new entries. The EMP also outlines a goal of 70% of the State's electrical needs to be met by renewable sources by 2050.

Preliminary screenings were performed to determine the potential that a generation project could provide a cost-effective solution for your facility. Before making a decision to implement, a feasibility study should be conducted that would take a detailed look at 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.

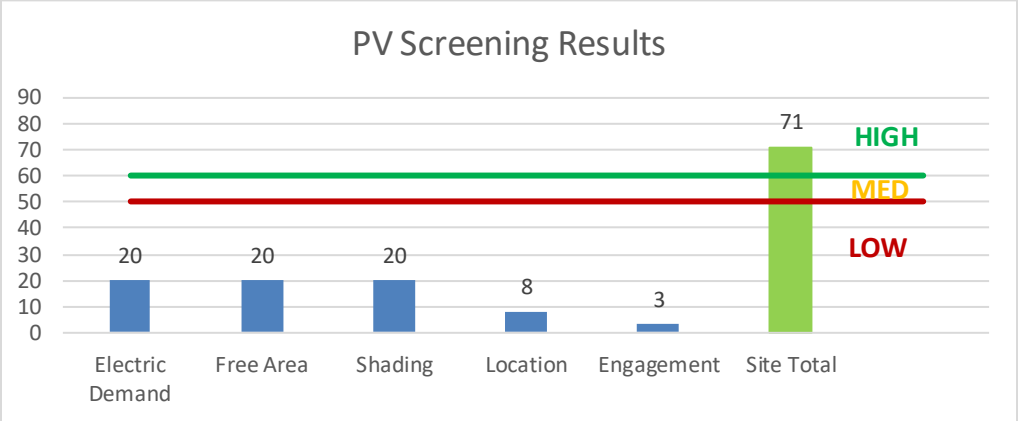
6.1 Photovoltaic

Sunlight can be converted into electricity using photovoltaics (PV) modules. Modules are racked together into an array that produces direct current (DC) electricity. The DC current is converted to alternating current (AC) through an inverter. The inverter is interconnected to the facility's electrical distribution system. The amount of unobstructed area available determines how large of a solar array can be installed. The size of the array combined with the orientation, tilt, and shading elements determines the energy produced.

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

There is 58,600 square feet of free area, ease of installation (roof and parking lot), and the lack of shading elements that contribute to the high potential for PV at this site. A PV array located on the roof of the main building/ground next to the building/over the main parking lot may be feasible. If John Witherspoon Middle School is interested in pursuing the installation of PV, we recommended a full feasibility study be conducted.

Figure 26 - Photovoltaic Screening



Potential	High	
System Potential	393	kW DC STC
Electric Generation	468,208	kWh/yr
Displaced Cost	$40,730	/yr
Installed Cost	$1,532,700	

For more information on solar PV technology and commercial solar markets in New Jersey, or to find a qualified solar installer, who can provide a more detailed assessment of the specific costs and benefits of solar develop of the site, please visit the following links below:

- **Basic Info on Solar PV in NJ**: http://www.njcleanenergy.com/whysolar
- **NJ Solar Market FAQs**: http://www.njcleanenergy.com/renewable-energy/program-updates-and-background-information/solar-transition/solar-market-faqs
- **Approved Solar Installers in the NJ Market**: http://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) is the on-site generation of electricity along with the recovery of heat energy, which is put to beneficial use. Common technologies for CHP include reciprocating engines, microturbines, fuel cells, backpressure steam turbines, and (at large facilities) gas turbines. Electric generation from a CHP system is typically interconnected to local power distribution systems. Heat is recovered from exhaust and ancillary cooling systems and interconnected to the existing hot water (or steam) distribution systems.

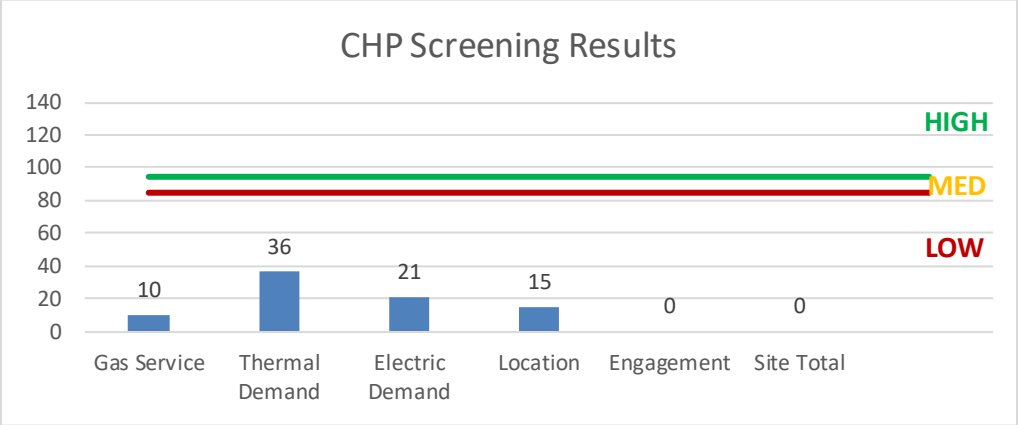
CHP systems are typically used to produce a portion of the electric power used onsite by a facility, with the balance of electric power needs supplied by grid purchases. The heat is used to supplement (or supplant) existing boilers for the purpose of space heating and/or domestic hot water heating. Waste heat can also be routed through absorption chillers for the purpose of space cooling. The key criteria used for screening, however, is the amount of time the system operates at full load and the facility's ability to use the recovered heat. Facilities with continuous use 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 a **no** potential for installing a cost-effective CHP system.

The magnitude, type, and duration of the thermal demand, the coincident electric load, and the ease of interconnection contribute to the potential for CHP at the site. If John Witherspoon Middle School is interested in pursuing the installation of CHP, we recommended a more detailed feasibility study be conducted.

For a list of qualified firms in New Jersey specializing in commercial CHP cost assessment and installation, go to: http://www.njcleanenergy.com/commercial-industrial/programs/nj-smartstart-buildings/tools-and-resources/tradeally/approved_vendorsearch/.

Figure 27 - Combined Heat and Power Screening



7 DEMAND RESPONSE

Demand Response (DR) is a program designed to reduce the electric load of commercial facilities when electric wholesale prices are high or when the reliability of the electric grid is threatened due to peak demand. Demand Response service providers (a.k.a. Curtailment Service Providers) are registered with PJM, the independent system operator (ISO) for mid-Atlantic state region that is charged with maintaining electric grid reliability.

By enabling grid operators to call upon Curtailment Service Providers and commercial facilities to reduce electric usage 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 DR programs. Program participation is voluntary and participants receive payments whether or not their facility is called upon to curtail their electric usage.

Typically an electric customer needs to be capable of reducing their electric demand, within minutes, by at least 100 kW or more in order to participate in a DR program. Customers with a greater capability to quickly curtail their demand during peak hours will receive higher payments. Customers with back-up generators onsite may also receive additional DR payments for their generating capacity if they agree to run the generators for grid support when called upon. Eligible customers who have chosen to participate in a DR programs often find it to be a valuable source of revenue for their facility because the payments can significantly offset annual electric costs.

Participating customers can often quickly reduce their peak load through simple measures, such as temporarily raising temperature set points on thermostats, so that air conditioning units run less frequently, or agreeing to dim or shut off less critical lighting. This usually requires some level of building automation and controls capability to ensure rapid load reduction during a DR curtailment event. DR program participants may need to install smart meters or may need to also sub-meter larger energy-using equipment, such as chillers, in order to demonstrate compliance with DR program requirements.

DR does not include the reduction of electricity consumption based on normal operating practice or behavior. For example, if a company's normal schedule is to close for a holiday, the reduction of electricity due to this closure or scaled-back operation is not considered a demand response activity in most situations.

The first step toward participation in a DR program is to contact a Curtailment Service Provider. A list of these providers is available on PJM's website and it includes contact information for each company, as well as the states where they have active business (http://www.pjm.com/markets-and-operations/demand-response/csps.aspx). PJM also posts training materials that are developed for program members interested in specific rules and requirements regarding DR activity (http://www.pjm.com/training/training%20material.aspx), along with a variety of other DR program information.

Curtailment Service Providers typically offer free assessments to determine a facility's eligibility to participate in a DR program. They will provide details regarding program rules and requirements for metering and controls, assess a facility's ability to temporarily reduce electric load, and provide details on payments to be expected for participation in the program. Providers usually offer multiple options for DR to larger facilities and may also install controls or remote monitoring equipment of their own to help ensure compliance with all terms and conditions of a DR contract.

In our opinion, due to reduced summer operation hours this facility is not a good candidate for DR.

8 PROJECT FUNDING / INCENTIVES

The NJCEP is able to provide the incentive programs described below, and other benefits to ratepayers, because of the Societal Benefits Charge (SBC) Fund. The SBC was created by the State of New Jersey's Electricity Restructuring Law (1999), which requires all customers of investor-owned electric and gas utilities to pay a surcharge on their monthly energy bills. As a customer of a state-regulated electric or gas utility and therefore a contributor to the fund, your organization is eligible to participate in the LGEA program and also eligible to receive incentive payment for qualifying energy efficiency measures. Also available through the NJBPU are some alternative financing programs described later in this section. Please refer to Figure 28 for a list of the eligible programs identified for each recommended ECM.

Figure 28 - ECM Incentive Program Eligibility

Energy Conservation Measure		SmartStart Prescriptive	SmartStart Custom	Direct Install	Pay For Performance Existing Buildings	Large Energy Users Program	Combined Heat & Power and Fuel Cell
ECM 1	Install LED Fixtures	X			X		
ECM 2	Retrofit Fluorescent Fixtures with LED Lamps and Drivers				X		
ECM 3	Retrofit Fixtures with LED Lamps	X			X		
ECM 4	Install Occupancy Sensor Lighting Controls	X			X		
ECM 5	Install High/Low Lighitng Controls				X		
ECM 6	Install VFD on Variable Air Volume (VAV) HVAC	X			X		
ECM 7	Install VFDs on Hot Water Pumps				X		
ECM 8	Install Boiler Draft Fan VFDs	X			X		
ECM 9	Install High Efficiency Electric AC	X			X		
ECM 10	Install Dual Enthalpy Outside Economizer Control	X			X		
ECM 11	Install Low-Flow Domestic Hot Water Devices				X		
ECM 12	Refrigerator/Freezer Case Electrically Commutated Motors				X		
ECM 13	Vending Machine Control				X		

SmartStart is generally well-suited for implementation of individual measures or small group of measures. It provides flexibility to install measures at your own pace using in-house staff or a preferred contractor. Direct Install caters to small to mid-size facilities that can bundle multiple ECMs together. This can greatly simplify participation and may lead to higher incentive amounts but requires the use of pre-approved contractors. The Pay for Performance (P4P) program is a "whole-building" energy improvement program designed for larger facilities. It requires implementation of multiple measures meeting minimum savings thresholds, as well as use of pre-approved consultants. The Large Energy Users Program (LEUP) is available to New Jersey's largest energy users giving them flexibility to install as little or as many measures, in a single facility or several facilities, with incentives capped based on the entity's annual energy consumption. LEUP applicants can use in-house staff or a preferred contractor.

Generally, the incentive values provided throughout the report assume the SmartStart program is utilized because it provides a consistent basis for comparison of available incentives for various measures, though in many cases incentive amounts may be higher through participation in other programs.

Brief descriptions of all relevant financing and incentive programs are located in the sections below. Further information, including most current program availability, requirements, and incentive levels can be found at: www.njcleanenergy.com/ci.

8.1 SmartStart

Overview

The SmartStart program offers incentives for installing prescriptive and custom energy efficiency measures at your facility. Routinely the program adds, removes or modifies incentives from year to year for various energy efficiency equipment based on market trends and new technologies.

Equipment with Prescriptive Incentives Currently Available:

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

Most equipment sizes and types are served by this program. This program provides an effective mechanism for securing incentives for energy efficiency measures installed individually or as part of a package of energy upgrades.

Incentives

The SmartStart prescriptive incentive program provides fixed incentives for specific energy efficiency measures, whereas the custom SmartStart program provides incentives for more unique or specialized technologies or systems that are not addressed through prescriptive incentive offerings for specific devices.

Since your facility is an existing building, only the retrofit incentives have been applied in this report. Custom measure incentives are calculated at $0.16/kWh and $1.60/therm based on estimated annual savings, 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

To participate in the SmartStart program you will need to submit an application for the specific equipment to be installed. Many applications are designed as rebates, although others require application approval prior to installation. Applicants may work with a contractor of their choosing and can also utilize internal personnel, which provides added flexibility to the program. Using internal personnel also helps improve the economics of the ECM by reducing the labor cost that is included in the tables in this report.

Detailed program descriptions, instructions for applying and applications can be found at: www.njcleanenergy.com/SSB.

8.2 Pay for Performance - Existing Buildings

Overview

The Pay for Performance – Existing Buildings (P4P EB) program is designed for larger customers with a peak demand over 200 kW in any of the preceding 12 months. Under this program 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. 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 in order to achieve deep energy savings. This program has an added benefit of evaluating a broad spectrum of measures that may not otherwise qualify under other programs. Many facilities pursuing an Energy Savings Improvement Program (ESIP) loan also utilize the P4P program.

Incentives

Incentives are calculated 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

To participate in the P4B EB program you will need to contact one of the pre-approved consultants and contractors ("Partners"). Under direct contract to you, the Partner will help further evaluate the measures identified in this report through development of the Energy Reduction Plan (ERP), assist you in implementing selected measures, and verify actual savings one year after the installation. At each of these three milestones your Partner will also facilitate securing program incentives.

Approval of the final scope of work is required by the program prior to installation completion. Although installation can be accomplished by a contractor of your choice (some P4P Partners are also contractors) or by internal personnel, the Partner must remain involved to ensure compliance with the program guidelines and requirements.

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

8.3 SREC Registration Program

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

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

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

Electricity suppliers, the primary purchasers of SRECs, are required to pay a Solar Alternative Compliance Payment (SACP) if they do not meet the requirements of New Jersey's Solar RPS. One way they can meet the RPS requirements is by purchasing SRECs. As SRECs are traded in a competitive market, the price may vary significantly. The actual price of an SREC during a trading period can and will fluctuate depending on supply and demand.

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

8.4 Energy Savings Improvement Program

The Energy Savings Improvement Program (ESIP) is an alternate method for New Jersey's government agencies to finance the implementation of energy conservation measures. 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. This is done in a manner that ensures that annual payments are lower than the savings projected from the ECMs, ensuring that ESIP projects are cash flow positive in year one, and every year thereafter. 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 can be leveraged to help further reduce the total project cost of eligible measures.

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 utilized 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. Entities should carefully consider all alternatives to develop an approach that best meets their needs. A detailed program descriptions and application can be found at: www.njcleanenergy.com/ESIP.

Please note that ESIP is a program delivered directly by the NJBPU and is not an NJCEP incentive program. As mentioned above, you may utilize NJCEP incentive programs to help further reduce costs when developing the ESP. You should refer to the ESIP guidelines at the link above for further information and guidance on next steps.

9 ENERGY PURCHASING AND PROCUREMENT STRATEGIES

9.1 Retail Electric Supply Options

In 1999, New Jersey State Legislature passed the Electric Discount & Energy Competition Act (EDECA) to restructure the electric power industry in New Jersey. This law deregulated the retail electric markets, allowing all consumers to shop for service from competitive electric suppliers. The intent was to create a more competitive market for electric power supply in New Jersey. As a result, utilities were allowed to charge Cost of Service and customers were given the ability to choose a third-party (i.e., non-utility) energy supplier.

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 is purchasing electricity from a third-party supplier, review and compare prices at the end of the current contract or every couple years.

A list of third-party electric suppliers, who are licensed by the state to provide service in New Jersey, can be found online at: www.state.nj.us/bpu/commercial/shopping.html.

9.2 Retail Natural Gas Supply Options

The natural gas market in New Jersey has also been deregulated. Most customers that remain with the utility for natural gas service pay rates that are market-based and that fluctuate on a monthly basis. 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 is typically dependent upon whether a customer seeks 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 is not purchasing natural gas from a third-party supplier, consider shopping for a reduced rate from third-party natural gas suppliers. If your facility is purchasing natural gas from a third-party supplier, review and compare prices at the end of the current contract or every couple years.

A list of third-party natural gas suppliers, who are licensed by the state to provide service in New Jersey, can be found online at: 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	Watts per Fixture	Annual Operating Hours	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
G36A	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	3,740	Relamp	No	1	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	3,740	0.02	125	0.0	$15.91	$72.46	$0.00	4.55
G33	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	3,740	Relamp	No	1	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	3,740	0.02	125	0.0	$15.91	$72.46	$0.00	4.55
G12C	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	3,740	Relamp	No	1	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	3,740	0.02	125	0.0	$15.91	$72.46	$0.00	4.55
G Wing Women	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	3,740	Relamp	No	1	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	3,740	0.02	125	0.0	$15.91	$72.46	$0.00	4.55
G Wing Men	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	3,740	Relamp	No	1	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	3,740	0.02	125	0.0	$15.91	$72.46	$0.00	4.55
F21C	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	3,740	Relamp	No	1	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	3,740	0.02	125	0.0	$15.91	$72.46	$0.00	4.55
E28A Bathroom	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	3,740	Relamp	No	1	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	3,740	0.02	125	0.0	$15.91	$72.46	$0.00	4.55
E109 Toilet	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	3,740	Relamp	No	1	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	3,740	0.02	125	0.0	$15.91	$72.46	$0.00	4.55
D Wing Women	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	3,740	Relamp	No	1	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	3,740	0.02	125	0.0	$15.91	$72.46	$0.00	4.55
D Wing Men	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	3,740	Relamp	No	1	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	3,740	0.02	125	0.0	$15.91	$72.46	$0.00	4.55
B203	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	3,740	Relamp	No	1	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	3,740	0.02	125	0.0	$15.91	$72.46	$0.00	4.55
G12 Toilet	2	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	3,740	Relamp	Yes	2	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	2,618	0.05	335	0.0	$42.69	$260.92	$0.00	6.11
G107	2	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	3,740	Relamp	Yes	2	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	2,618	0.05	335	0.0	$42.69	$260.92	$20.00	5.64
G Wing Women	2	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	3,740	Relamp	Yes	2	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	2,618	0.05	335	0.0	$42.69	$260.92	$0.00	6.11
G Wing Toilet	2	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	3,740	Relamp	Yes	2	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	2,618	0.05	335	0.0	$42.69	$260.92	$0.00	6.11
G Wing Men	2	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	3,740	Relamp	Yes	2	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	2,618	0.05	335	0.0	$42.69	$260.92	$0.00	6.11
B202	2	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	3,740	Relamp	Yes	2	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	2,618	0.05	335	0.0	$42.69	$260.92	$20.00	5.64
A101A	2	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Occupancy Sensor	62	2,618	Relamp	No	2	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	2,618	0.04	175	0.0	$22.28	$144.92	$0.00	6.50
G Wing Girls	3	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	3,740	Relamp	Yes	3	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	2,618	0.08	502	0.0	$64.04	$487.38	$35.00	7.06
G Wing Boys	3	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	3,740	Relamp	Yes	3	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	2,618	0.08	502	0.0	$64.04	$487.38	$35.00	7.06
F22A Shower	3	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	3,740	Relamp	Yes	3	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	2,618	0.08	502	0.0	$64.04	$487.38	$35.00	7.06
F21A Shower	3	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	3,740	Relamp	Yes	3	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	2,618	0.08	502	0.0	$64.04	$487.38	$35.00	7.06
F21A Bathroom	3	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	3,740	Relamp	Yes	3	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	2,618	0.08	502	0.0	$64.04	$487.38	$35.00	7.06
G28D	4	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	3,740	Relamp	Yes	4	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	2,618	0.10	669	0.0	$85.38	$559.84	$35.00	6.15
G28A	4	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	3,740	Relamp	Yes	4	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	2,618	0.10	669	0.0	$85.38	$559.84	$35.00	6.15

	Existing Conditions					Proposed Conditions							Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	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
2Nd Fl Pool Area	4	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	3,740	Relamp	Yes	4	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	2,618	0.10	669	0.0	$85.38	$559.84	$35.00	6.15
F22B	5	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	3,740	Relamp	Yes	5	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	2,618	0.13	837	0.0	$106.73	$632.30	$35.00	5.60
F21B	5	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	3,740	Relamp	Yes	5	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	2,618	0.13	837	0.0	$106.73	$632.30	$35.00	5.60
G28B	6	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	3,740	Relamp	Yes	6	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	2,618	0.15	1,004	0.0	$128.07	$704.76	$35.00	5.23
A17	6	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	3,740	Relamp	Yes	6	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	2,618	0.15	1,004	0.0	$128.07	$704.76	$35.00	5.23
G29	8	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	3,740	Relamp	Yes	8	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	2,618	0.20	1,338	0.0	$170.76	$849.68	$35.00	4.77
G28C	8	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	3,740	Relamp	Yes	8	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	2,618	0.20	1,338	0.0	$170.76	$849.68	$35.00	4.77
A16	8	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	3,740	Relamp	Yes	8	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	2,618	0.20	1,338	0.0	$170.76	$849.68	$35.00	4.77
G28	9	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	3,740	Relamp	Yes	9	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	2,618	0.23	1,506	0.0	$192.11	$922.14	$35.00	4.62
D Wing 2Nd Fl.	10	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	3,740	Relamp	Yes	10	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	2,618	0.25	1,673	0.0	$213.46	$994.60	$0.00	4.66
C 2Nd Fl Hallway	10	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	3,740	Relamp	Yes	10	LED - Linear Tubes: (2) U-Lamp	High/Low Control	33	2,618	0.25	1,673	0.0	$213.46	$924.60	$0.00	4.33
Pool Hallway	15	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	3,740	Relamp	Yes	15	LED - Linear Tubes: (2) U-Lamp	High/Low Control	33	2,618	0.38	2,510	0.0	$320.18	$1,286.90	$0.00	4.02
E Wing Men's Room	2	U-Bend Fluorescent - T8: U T8 (32W) - 1L	Wall Switch	39	3,740	Relamp	No	2	LED - Linear Tubes: (1) U-Lamp	Wall Switch	17	3,740	0.03	194	0.0	$24.69	$72.46	$0.00	2.93
E Wing Women's Room	3	U-Bend Fluorescent - T8: U T8 (32W) - 1L	Wall Switch	39	3,740	Relamp	Yes	3	LED - Linear Tubes: (1) U-Lamp	Occupancy Sensor	17	2,618	0.05	354	0.0	$45.19	$224.69	$0.00	4.97
E Wing Girls	3	U-Bend Fluorescent - T8: U T8 (32W) - 1L	Wall Switch	39	3,740	Relamp	Yes	3	LED - Linear Tubes: (1) U-Lamp	Occupancy Sensor	17	2,618	0.05	354	0.0	$45.19	$224.69	$20.00	4.53
E Wing Boys	3	U-Bend Fluorescent - T8: U T8 (32W) - 1L	Wall Switch	39	3,740	Relamp	Yes	3	LED - Linear Tubes: (1) U-Lamp	Occupancy Sensor	17	2,618	0.05	354	0.0	$45.19	$224.69	$20.00	4.53
F Wing Men	4	U-Bend Fluorescent - T8: U T8 (32W) - 1L	Wall Switch	39	3,740	Relamp	Yes	4	LED - Linear Tubes: (1) U-Lamp	Occupancy Sensor	17	2,618	0.07	472	0.0	$60.25	$260.92	$0.00	4.33
F Wing Girls	4	U-Bend Fluorescent - T8: U T8 (32W) - 1L	Wall Switch	39	3,740	Relamp	Yes	4	LED - Linear Tubes: (1) U-Lamp	Occupancy Sensor	17	2,618	0.07	472	0.0	$60.25	$260.92	$20.00	4.00
D Wing Hallway	4	Metal Halide: (1) 150W Lamp	Wall Switch	190	3,740	Fixture Replacement	Yes	4	LED - Fixtures: High-Bay	High/Low Control	45	2,618	0.42	2,727	0.0	$347.89	$3,299.53	$600.00	7.76
E S1 Stair	8	Metal Halide: (1) 150W Lamp	Wall Switch	190	3,740	Fixture Replacement	Yes	8	LED - Fixtures: High-Bay	Occupancy Sensor	45	2,618	0.83	5,454	0.0	$695.79	$6,399.06	$1,200.00	7.47
F S1 Stair	10	Metal Halide: (1) 150W Lamp	Wall Switch	190	3,740	Fixture Replacement	Yes	10	LED - Fixtures: High-Bay	Occupancy Sensor	45	2,618	1.04	6,817	0.0	$869.74	$7,948.82	$1,500.00	7.41
F S2 Stair	12	Metal Halide: (1) 150W Lamp	Wall Switch	190	3,740	Fixture Replacement	Yes	12	LED - Fixtures: High-Bay	Occupancy Sensor	45	2,618	1.25	8,181	0.0	$1,043.68	$9,498.59	$1,800.00	7.38
E S2 Stair	12	Metal Halide: (1) 150W Lamp	Wall Switch	190	3,740	Fixture Replacement	Yes	12	LED - Fixtures: High-Bay	Occupancy Sensor	45	2,618	1.25	8,181	0.0	$1,043.68	$9,498.59	$1,800.00	7.38
Exterior	27	Metal Halide: (1) 150W Lamp	Daylight Dimming	190	4,380	Fixture Replacement	No	27	LED - Fixtures: Other	Daylight Dimming	45	4,380	2.57	19,720	0.0	$2,515.89	$5,365.44	$135.00	2.08
Pool Lights	12	Metal Halide: (1) 1000W Lamp	Wall Switch	1,080	3,740	Fixture Replacement	Yes	12	LED - Fixtures: High-Bay	Occupancy Sensor	300	2,618	6.84	44,902	0.0	$5,728.73	$9,738.59	$1,870.00	1.37

	Existing Conditions					Proposed Conditions							Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	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
G Security	2	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	3,740	Relamp	Yes	2	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,618	0.10	631	0.0	$80.55	$416.06	$75.00	4.23
G32	3	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	3,740	Relamp	Yes	3	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,618	0.14	947	0.0	$120.83	$489.09	$95.00	3.26
C105	5	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	3,740	Relamp	Yes	5	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,618	0.24	1,578	0.0	$201.38	$635.15	$135.00	2.48
C105B	6	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	3,740	Relamp	Yes	6	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,618	0.29	1,894	0.0	$241.66	$708.18	$155.00	2.29
Kitchen Storage	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	1,320	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	1,320	0.03	75	0.0	$9.59	$54.77	$15.00	4.15
G24	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,740	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	3,740	0.03	213	0.0	$27.16	$54.77	$15.00	1.46
G107	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,740	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	3,740	0.03	213	0.0	$27.16	$54.77	$15.00	1.46
Drama Storage	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	1,320	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	1,320	0.03	75	0.0	$9.59	$54.77	$15.00	4.15
B101 Storage	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	1,320	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	1,320	0.03	75	0.0	$9.59	$54.77	$15.00	4.15
B Wing Women	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,740	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	3,740	0.03	213	0.0	$27.16	$54.77	$15.00	1.46
B Wing Men	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,740	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	3,740	0.03	213	0.0	$27.16	$54.77	$15.00	1.46
Pool Storage	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	1,320	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	924	0.08	190	0.0	$24.23	$225.55	$30.00	8.07
G105A	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,740	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,618	0.08	538	0.0	$68.65	$379.55	$65.00	4.58
E211	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,740	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,618	0.08	538	0.0	$68.65	$379.55	$65.00	4.58
E21	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,740	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,618	0.08	538	0.0	$68.65	$379.55	$65.00	4.58
E209	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,740	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,618	0.08	538	0.0	$68.65	$379.55	$65.00	4.58
E111	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,740	Relamp	No	2	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	3,740	0.06	426	0.0	$54.32	$109.55	$30.00	1.46
D Wing Girls	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,740	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,618	0.08	538	0.0	$68.65	$379.55	$65.00	4.58
D Wing Boys	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,740	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,618	0.08	538	0.0	$68.65	$379.55	$65.00	4.58
D 2Nd Fl. Boys	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,740	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,618	0.08	538	0.0	$68.65	$379.55	$65.00	4.58
D 2Nd Fl Girls	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,740	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,618	0.08	538	0.0	$68.65	$379.55	$65.00	4.58
C14	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,740	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,618	0.08	538	0.0	$68.65	$379.55	$65.00	4.58
C Wing Girls	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,740	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,618	0.08	538	0.0	$68.65	$379.55	$65.00	4.58
C Wing Boys	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,740	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,618	0.08	538	0.0	$68.65	$379.55	$65.00	4.58
C 2Nd Fl Hallway	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,740	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	High/Low Control	44	2,618	0.08	538	0.0	$68.65	$309.55	$30.00	4.07

	Existing Conditions					Proposed Conditions							Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	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
B Wing Girls	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,740	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,618	0.08	538	0.0	$68.65	$379.55	$65.00	4.58
B Wing Boys	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,740	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,618	0.08	538	0.0	$68.65	$379.55	$65.00	4.58
G11B	3	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,740	Relamp	Yes	3	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,618	0.12	807	0.0	$102.97	$434.32	$80.00	3.44
G11A	3	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,740	Relamp	Yes	3	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,618	0.12	807	0.0	$102.97	$434.32	$80.00	3.44
G106C	3	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,740	Relamp	Yes	3	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,618	0.12	807	0.0	$102.97	$434.32	$80.00	3.44
G106B	3	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,740	Relamp	Yes	3	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,618	0.12	807	0.0	$102.97	$434.32	$80.00	3.44
D23	3	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,740	Relamp	Yes	3	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,618	0.12	807	0.0	$102.97	$434.32	$80.00	3.44
D S2 Stair	3	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,740	Relamp	Yes	3	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,618	0.12	807	0.0	$102.97	$434.32	$45.00	3.78
D S1 Stair	3	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,740	Relamp	Yes	3	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,618	0.12	807	0.0	$102.97	$434.32	$45.00	3.78
C25	3	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,740	Relamp	Yes	3	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,618	0.12	807	0.0	$102.97	$434.32	$80.00	3.44
C S2 Stair	3	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,740	Relamp	Yes	3	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,618	0.12	807	0.0	$102.97	$434.32	$45.00	3.78
C S1 Stair	3	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,740	Relamp	Yes	3	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,618	0.12	807	0.0	$102.97	$434.32	$45.00	3.78
C 2Nd Fl Girls	3	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,740	Relamp	Yes	3	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,618	0.12	807	0.0	$102.97	$434.32	$80.00	3.44
C 2Nd Fl Boys	3	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,740	Relamp	Yes	3	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,618	0.12	807	0.0	$102.97	$434.32	$80.00	3.44
B24	3	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,740	Relamp	Yes	3	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,618	0.12	807	0.0	$102.97	$434.32	$80.00	3.44
B22	3	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,740	Relamp	Yes	3	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,618	0.12	807	0.0	$102.97	$434.32	$80.00	3.44
B S2 Stair	3	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,740	Relamp	Yes	3	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,618	0.12	807	0.0	$102.97	$434.32	$45.00	3.78
B S1 Stair	3	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,740	Relamp	Yes	3	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,618	0.12	807	0.0	$102.97	$434.32	$45.00	3.78
G107C	4	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,740	Relamp	Yes	4	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,618	0.16	1,076	0.0	$137.29	$489.09	$95.00	2.87
G05	4	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,740	Relamp	Yes	4	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,618	0.16	1,076	0.0	$137.29	$489.09	$95.00	2.87
G04	4	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,740	Relamp	Yes	4	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,618	0.16	1,076	0.0	$137.29	$489.09	$95.00	2.87
G03	4	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,740	Relamp	Yes	4	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,618	0.16	1,076	0.0	$137.29	$489.09	$95.00	2.87
G02	4	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,740	Relamp	Yes	4	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,618	0.16	1,076	0.0	$137.29	$489.09	$95.00	2.87
G01A	4	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,740	Relamp	Yes	4	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,618	0.16	1,076	0.0	$137.29	$489.09	$95.00	2.87
E29	4	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,740	Relamp	Yes	4	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,618	0.16	1,076	0.0	$137.29	$489.09	$95.00	2.87

	Existing Conditions					Proposed Conditions							Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	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
E213	4	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,740	Relamp	Yes	4	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,618	0.16	1,076	0.0	$137.29	$489.09	$95.00	2.87
E212	4	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,740	Relamp	Yes	4	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,618	0.16	1,076	0.0	$137.29	$489.09	$95.00	2.87
E18	4	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,740	Relamp	Yes	4	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,618	0.16	1,076	0.0	$137.29	$489.09	$95.00	2.87
D26	4	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,740	Relamp	Yes	4	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,618	0.16	1,076	0.0	$137.29	$489.09	$95.00	2.87
D14	4	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,740	Relamp	Yes	4	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,618	0.16	1,076	0.0	$137.29	$489.09	$95.00	2.87
D Wing 2Nd Fl.	4	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,740	Relamp	Yes	4	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,618	0.16	1,076	0.0	$137.29	$489.09	$95.00	2.87
G12	6	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,740	Relamp	Yes	6	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,618	0.25	1,614	0.0	$205.94	$598.64	$125.00	2.30
E208	6	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,740	Relamp	Yes	6	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,618	0.25	1,614	0.0	$205.94	$598.64	$125.00	2.30
E207	6	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,740	Relamp	Yes	6	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,618	0.25	1,614	0.0	$205.94	$598.64	$125.00	2.30
E108	6	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,740	Relamp	Yes	6	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,618	0.25	1,614	0.0	$205.94	$598.64	$125.00	2.30
E107	6	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,740	Relamp	Yes	6	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,618	0.25	1,614	0.0	$205.94	$598.64	$125.00	2.30
C102B	6	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,740	Relamp	Yes	6	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,618	0.25	1,614	0.0	$205.94	$598.64	$125.00	2.30
C102	6	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,740	Relamp	Yes	6	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,618	0.25	1,614	0.0	$205.94	$598.64	$125.00	2.30
E28A	8	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,740	Relamp	Yes	8	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,618	0.33	2,152	0.0	$274.58	$708.18	$155.00	2.01
E204	8	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,740	Relamp	Yes	8	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,618	0.33	2,152	0.0	$274.58	$708.18	$155.00	2.01
E203	8	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,740	Relamp	Yes	8	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,618	0.33	2,152	0.0	$274.58	$708.18	$155.00	2.01
E104	8	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,740	Relamp	Yes	8	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,618	0.33	2,152	0.0	$274.58	$708.18	$155.00	2.01
E103	8	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,740	Relamp	Yes	8	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,618	0.33	2,152	0.0	$274.58	$708.18	$155.00	2.01
Auditorium	8	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,740	Relamp	Yes	8	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,618	0.33	2,152	0.0	$274.58	$708.18	$155.00	2.01
G102	9	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,740	Relamp	Yes	9	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,618	0.37	2,421	0.0	$308.91	$762.95	$170.00	1.92
E210	9	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,740	Relamp	Yes	9	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,618	0.37	2,421	0.0	$308.91	$762.95	$170.00	1.92
E206	9	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,740	Relamp	Yes	9	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,618	0.37	2,421	0.0	$308.91	$762.95	$170.00	1.92
E205	9	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,740	Relamp	Yes	9	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,618	0.37	2,421	0.0	$308.91	$762.95	$170.00	1.92
E202	9	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,740	Relamp	Yes	9	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,618	0.37	2,421	0.0	$308.91	$762.95	$170.00	1.92
E201	9	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,740	Relamp	Yes	9	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,618	0.37	2,421	0.0	$308.91	$762.95	$170.00	1.92

	Existing Conditions					Proposed Conditions							Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	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
E115	9	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,740	Relamp	Yes	9	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,618	0.37	2,421	0.0	$308.91	$762.95	$170.00	1.92
E114	9	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,740	Relamp	Yes	9	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,618	0.37	2,421	0.0	$308.91	$762.95	$170.00	1.92
E113	9	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,740	Relamp	Yes	9	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,618	0.37	2,421	0.0	$308.91	$762.95	$170.00	1.92
E110	9	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,740	Relamp	Yes	9	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,618	0.37	2,421	0.0	$308.91	$762.95	$170.00	1.92
E109	9	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,740	Relamp	Yes	9	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,618	0.37	2,421	0.0	$308.91	$762.95	$170.00	1.92
E106	9	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,740	Relamp	Yes	9	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,618	0.37	2,421	0.0	$308.91	$762.95	$170.00	1.92
E105	9	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,740	Relamp	Yes	9	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,618	0.37	2,421	0.0	$308.91	$762.95	$170.00	1.92
E102	9	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,740	Relamp	Yes	9	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,618	0.37	2,421	0.0	$308.91	$762.95	$170.00	1.92
E101	9	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,740	Relamp	Yes	9	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,618	0.37	2,421	0.0	$308.91	$762.95	$170.00	1.92
D104	9	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,740	Relamp	Yes	9	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,618	0.37	2,421	0.0	$308.91	$762.95	$170.00	1.92
B102	9	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,740	Relamp	Yes	9	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,618	0.37	2,421	0.0	$308.91	$762.95	$170.00	1.92
G101	10	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,740	Relamp	Yes	10	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,618	0.41	2,690	0.0	$343.23	$817.73	$185.00	1.84
2Nd Fl Pool Area	10	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,740	Relamp	Yes	10	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,618	0.41	2,690	0.0	$343.23	$817.73	$185.00	1.84
G104	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,740	Relamp	Yes	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,618	0.49	3,228	0.0	$411.88	$1,197.27	$250.00	2.30
E214	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,740	Relamp	Yes	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,618	0.49	3,228	0.0	$411.88	$1,197.27	$250.00	2.30
D Wing Hallway	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,740	Relamp	No	12	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	3,740	0.39	2,555	0.0	$325.94	$657.27	$180.00	1.46
Cafeteria	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,740	Relamp	Yes	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,618	0.49	3,228	0.0	$411.88	$1,197.27	$250.00	2.30
B104	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,740	Relamp	Yes	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,618	0.49	3,228	0.0	$411.88	$1,197.27	$250.00	2.30
G103	13	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,740	Relamp	Yes	13	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,618	0.53	3,497	0.0	$446.20	$1,252.04	$265.00	2.21
D21	13	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,740	Relamp	Yes	13	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,618	0.53	3,497	0.0	$446.20	$1,252.04	$265.00	2.21
D205	13	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,740	Relamp	Yes	13	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,618	0.53	3,497	0.0	$446.20	$1,252.04	$265.00	2.21
D203	13	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,740	Relamp	Yes	13	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,618	0.53	3,497	0.0	$446.20	$1,252.04	$265.00	2.21
D202	13	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,740	Relamp	Yes	13	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,618	0.53	3,497	0.0	$446.20	$1,252.04	$265.00	2.21
D201	13	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,740	Relamp	Yes	13	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,618	0.53	3,497	0.0	$446.20	$1,252.04	$265.00	2.21
C206	13	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,740	Relamp	Yes	13	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,618	0.53	3,497	0.0	$446.20	$1,252.04	$265.00	2.21

	Existing Conditions					Proposed Conditions							Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	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
C205	13	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,740	Relamp	Yes	13	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,618	0.53	3,497	0.0	$446.20	$1,252.04	$265.00	2.21
C204	13	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,740	Relamp	Yes	13	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,618	0.53	3,497	0.0	$446.20	$1,252.04	$265.00	2.21
C203	13	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,740	Relamp	Yes	13	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,618	0.53	3,497	0.0	$446.20	$1,252.04	$265.00	2.21
C202	13	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,740	Relamp	Yes	13	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,618	0.53	3,497	0.0	$446.20	$1,252.04	$265.00	2.21
C201	13	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,740	Relamp	Yes	13	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,618	0.53	3,497	0.0	$446.20	$1,252.04	$265.00	2.21
B204	13	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,740	Relamp	Yes	13	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,618	0.53	3,497	0.0	$446.20	$1,252.04	$265.00	2.21
B201	13	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,740	Relamp	Yes	13	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,618	0.53	3,497	0.0	$446.20	$1,252.04	$265.00	2.21
B202	14	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,740	Relamp	Yes	14	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,618	0.57	3,766	0.0	$480.52	$1,306.82	$280.00	2.14
E112	15	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,740	Relamp	Yes	15	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,618	0.62	4,035	0.0	$514.84	$1,361.59	$295.00	2.07
E111	15	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,740	Relamp	Yes	15	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,618	0.62	4,035	0.0	$514.84	$1,361.59	$295.00	2.07
B203	17	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,740	Relamp	Yes	17	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,618	0.70	4,573	0.0	$583.49	$1,471.13	$325.00	1.96
B101	20	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,740	Relamp	Yes	20	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,618	0.82	5,381	0.0	$686.46	$1,635.45	$370.00	1.84
D Wing Hallway	28	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,740	Relamp	Yes	28	LED - Linear Tubes: (3) 4' Lamps	High/Low Control	44	2,618	1.15	7,533	0.0	$961.04	$1,733.63	$420.00	1.37
B Wing Hallway	28	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,740	Relamp	Yes	28	LED - Linear Tubes: (3) 4' Lamps	High/Low Control	44	2,618	1.15	7,533	0.0	$961.04	$1,733.63	$420.00	1.37
C Wing Hallway	30	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,740	Relamp	Yes	30	LED - Linear Tubes: (3) 4' Lamps	High/Low Control	44	2,618	1.23	8,071	0.0	$1,029.69	$1,843.18	$450.00	1.35
Kitchen Office	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,740	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,740	0.02	142	0.0	$18.11	$36.52	$10.00	1.46
Kitchen	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,740	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,740	0.02	142	0.0	$18.11	$36.52	$10.00	1.46
G22	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,740	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,740	0.02	142	0.0	$18.11	$36.52	$10.00	1.46
G21	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,740	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,740	0.02	142	0.0	$18.11	$36.52	$10.00	1.46
G20	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,740	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,740	0.02	142	0.0	$18.11	$36.52	$10.00	1.46
G101	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,740	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,740	0.02	142	0.0	$18.11	$36.52	$10.00	1.46
G Security	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,740	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,740	0.02	142	0.0	$18.11	$36.52	$10.00	1.46
F23	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,740	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,740	0.02	142	0.0	$18.11	$36.52	$10.00	1.46
F21F	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,740	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,740	0.02	142	0.0	$18.11	$36.52	$10.00	1.46
F14	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	2,618	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,618	0.02	99	0.0	$12.68	$36.52	$10.00	2.09

	Existing Conditions					Proposed Conditions							Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	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
E13	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,740	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,740	0.02	142	0.0	$18.11	$36.52	$10.00	1.46
C105 Ee	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,740	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,740	0.02	142	0.0	$18.11	$36.52	$10.00	1.46
B202A	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,740	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,740	0.02	142	0.0	$18.11	$36.52	$10.00	1.46
Auditorium	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,740	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,740	0.02	142	0.0	$18.11	$36.52	$10.00	1.46
Icemaker Room	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,740	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,740	0.04	284	0.0	$36.22	$73.03	$20.00	1.46
G39	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,740	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,618	0.05	359	0.0	$45.76	$189.03	$40.00	3.26
G30	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,740	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,618	0.05	359	0.0	$45.76	$189.03	$40.00	3.26
G23	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,740	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,618	0.05	359	0.0	$45.76	$189.03	$40.00	3.26
B203B	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,740	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,618	0.05	359	0.0	$45.76	$189.03	$40.00	3.26
B203A	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,740	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,618	0.05	359	0.0	$45.76	$189.03	$40.00	3.26
B202B	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,740	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,618	0.05	359	0.0	$45.76	$189.03	$40.00	3.26
B103A	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,740	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,618	0.05	359	0.0	$45.76	$189.03	$40.00	3.26
B101 Laundry	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,740	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,618	0.05	359	0.0	$45.76	$189.03	$40.00	3.26
B 2Nd Fl Girls	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,740	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,618	0.05	359	0.0	$45.76	$189.03	$40.00	3.26
B 2Nd Fl Boys	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,740	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,618	0.05	359	0.0	$45.76	$189.03	$40.00	3.26
A12	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,740	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,618	0.05	359	0.0	$45.76	$189.03	$40.00	3.26
Security Storage	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,320	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	924	0.08	190	0.0	$24.23	$225.55	$30.00	8.07
F22A Girls	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,740	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,618	0.08	538	0.0	$68.65	$379.55	$65.00	4.58
G31	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,740	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,618	0.11	717	0.0	$91.53	$416.06	$75.00	3.73
G15	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,740	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,618	0.11	717	0.0	$91.53	$416.06	$75.00	3.73
D13	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,740	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,618	0.11	717	0.0	$91.53	$416.06	$75.00	3.73
Pool Storage	5	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,320	Relamp	Yes	5	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	924	0.14	317	0.0	$40.38	$298.58	$50.00	6.16
F21A	6	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,740	Relamp	Yes	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,618	0.16	1,076	0.0	$137.29	$489.09	$95.00	2.87
F22A	7	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,740	Relamp	Yes	7	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,618	0.19	1,255	0.0	$160.17	$525.61	$105.00	2.63
F22A Locker Room	9	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,740	Relamp	Yes	9	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,618	0.25	1,614	0.0	$205.94	$598.64	$125.00	2.30

	Existing Conditions					Proposed Conditions							Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	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
G105	10	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,740	Relamp	Yes	10	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,618	0.27	1,794	0.0	$228.82	$635.15	$135.00	2.19
Stage Hallway	11	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,740	Relamp	Yes	11	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	2,618	0.30	1,973	0.0	$251.70	$601.67	$110.00	1.95
Pool Storage 2	12	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,320	Relamp	Yes	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	924	0.33	760	0.0	$96.91	$978.18	$120.00	8.86
A104	13	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,740	Relamp	Yes	13	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,618	0.36	2,332	0.0	$297.47	$1,014.70	$200.00	2.74
B103	17	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,740	Relamp	Yes	17	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,618	0.46	3,049	0.0	$388.99	$1,160.76	$240.00	2.37
D103	20	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,740	Relamp	Yes	20	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,618	0.55	3,587	0.0	$457.64	$1,270.30	$270.00	2.19
D101	20	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,740	Relamp	Yes	20	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,618	0.55	3,587	0.0	$457.64	$1,270.30	$270.00	2.19
C106	20	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,740	Relamp	Yes	20	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,618	0.55	3,587	0.0	$457.64	$1,270.30	$270.00	2.19
C104	20	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,740	Relamp	Yes	20	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,618	0.55	3,587	0.0	$457.64	$1,270.30	$270.00	2.19
C103	20	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,740	Relamp	Yes	20	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,618	0.55	3,587	0.0	$457.64	$1,270.30	$270.00	2.19
C101	20	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,740	Relamp	Yes	20	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,618	0.55	3,587	0.0	$457.64	$1,270.30	$270.00	2.19
A103	20	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,740	Relamp	Yes	20	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,618	0.55	3,587	0.0	$457.64	$1,270.30	$270.00	2.19
A102	20	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,740	Relamp	Yes	20	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,618	0.55	3,587	0.0	$457.64	$1,270.30	$270.00	2.19
G Wing Hallway	23	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,740	Relamp	Yes	23	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	2,618	0.63	4,125	0.0	$526.29	$1,039.85	$230.00	1.54
D105	24	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,740	Relamp	Yes	24	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,618	0.66	4,304	0.0	$549.17	$1,416.36	$310.00	2.01
A101	24	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,740	Relamp	Yes	24	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,618	0.66	4,304	0.0	$549.17	$1,416.36	$310.00	2.01
Boiler Room	33	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,740	Relamp	No	33	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,740	0.71	4,684	0.0	$597.57	$1,205.00	$330.00	1.46
E Wing Hallway	47	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,740	Relamp	Yes	47	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	2,618	1.28	8,430	0.0	$1,075.45	$1,916.21	$470.00	1.34
G Wing Girls	2	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	3,740	Relamp	Yes	2	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	2,618	0.03	188	0.0	$23.98	$152.52	$30.00	5.11
G Wing Boys	2	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	3,740	Relamp	Yes	2	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	2,618	0.03	188	0.0	$23.98	$152.52	$30.00	5.11
G Wing Women	3	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	3,740	Relamp	Yes	3	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	2,618	0.04	282	0.0	$35.97	$170.77	$15.00	4.33
Exterior	4	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Daylight Dimming	32	4,380	Relamp	No	4	LED - Linear Tubes: (1) 4' Lamp	Daylight Dimming	15	4,380	0.05	353	0.0	$44.98	$73.03	$20.00	1.18
E Wing Girls	4	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	3,740	Relamp	Yes	4	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	2,618	0.06	376	0.0	$47.96	$189.03	$40.00	3.11
E Wing Boys	4	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	3,740	Relamp	Yes	4	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	2,618	0.06	376	0.0	$47.96	$189.03	$40.00	3.11
F Wing Men	5	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	3,740	Relamp	Yes	5	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	2,618	0.07	470	0.0	$59.95	$207.29	$25.00	3.04

	Existing Conditions					Proposed Conditions							Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	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
F Wing Girls	5	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	3,740	Relamp	Yes	5	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	2,618	0.07	470	0.0	$59.95	$207.29	$45.00	2.71
D Wing Hallway	9	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	3,740	Relamp	Yes	9	LED - Linear Tubes: (1) 4' Lamp	High/Low Control	15	2,618	0.13	846	0.0	$107.91	$364.32	$45.00	2.96
D 2Nd Fl. Hallway	9	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	3,740	Relamp	Yes	9	LED - Linear Tubes: (1) 4' Lamp	High/Low Control	15	2,618	0.13	846	0.0	$107.91	$364.32	$45.00	2.96
E Wing 2Nd Fl. Hallway	43	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	3,740	Relamp	Yes	43	LED - Linear Tubes: (1) 4' Lamp	High/Low Control	15	2,618	0.62	4,041	0.0	$515.56	$985.07	$215.00	1.49
Cafeteria	56	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	3,740	Relamp	Yes	56	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	2,618	0.80	5,263	0.0	$671.42	$2,102.42	$420.00	2.51
Kitchen	1	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	33	3,740	Relamp	No	1	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	3,740	0.01	69	0.0	$8.78	$32.52	$10.00	2.56
G16	2	Linear Fluorescent - T12: 8' T12 (75W) - 2L	Wall Switch	158	3,740	Relamp & Reballast	Yes	2	LED - Linear Tubes: (2) 8' Lamps	Occupancy Sensor	72	2,618	0.14	926	0.0	$118.09	$527.39	$35.00	4.17
Elevator 4	3	Linear Fluorescent - T12: 3' T12 (30W) - 1L	Wall Switch	46	3,740	Relamp & Reballast	Yes	3	LED - Linear Tubes: (1) 3' Lamp	Occupancy Sensor	11	2,618	0.08	499	0.0	$63.63	$267.55	$20.00	3.89
Elevator 3	3	Linear Fluorescent - T12: 3' T12 (30W) - 1L	Wall Switch	46	3,740	Relamp & Reballast	Yes	3	LED - Linear Tubes: (1) 3' Lamp	Occupancy Sensor	11	2,618	0.08	499	0.0	$63.63	$267.55	$20.00	3.89
A-B Passage	12	LED Screw-In Lamps: LED Bulb	High/Low Control	17	2,618	None	No	12	LED Screw-In Lamps: LED Bulb	High/Low Control	17	2,618	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Kitchen	11	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	35	3,740	None	No	11	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	35	3,740	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Kitchen	3	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	3,740	None	No	3	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	3,740	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Library	21	LED - Fixtures: Wall Sconces	Occupancy Sensor	40	2,618	None	No	21	LED - Fixtures: Wall Sconces	Occupancy Sensor	40	2,618	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Exterior	8	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Daylight Dimming	60	4,380	None	No	8	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Daylight Dimming	60	4,380	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Library	40	LED - Fixtures: Decorative Pendant	Occupancy Sensor	95	2,618	None	No	40	LED - Fixtures: Decorative Pendant	Occupancy Sensor	95	2,618	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Library	3	LED - Fixtures: Close to Ceiling Mount	Occupancy Sensor	170	2,618	None	No	3	LED - Fixtures: Close to Ceiling Mount	Occupancy Sensor	170	2,618	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Library	7	LED - Fixtures: Ambient - 6' - Indirect Fixture	Occupancy Sensor	100	2,618	None	No	7	LED - Fixtures: Ambient - 6' - Indirect Fixture	Occupancy Sensor	100	2,618	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Library Office	3	LED - Fixtures: Ambient - 4' - Indirect/Direct Fixture	Occupancy Sensor	50	2,618	None	No	3	LED - Fixtures: Ambient - 4' - Indirect/Direct Fixture	Occupancy Sensor	50	2,618	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Library Room	14	LED - Fixtures: Ambient - 4' - Indirect/Direct Fixture	Occupancy Sensor	35	2,618	None	No	14	LED - Fixtures: Ambient - 4' - Indirect/Direct Fixture	Occupancy Sensor	35	2,618	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
F101 Gym	20	LED - Fixtures: Ambient - 4' - Indirect Fixture	Occupancy Sensor	152	2,618	None	No	20	LED - Fixtures: Ambient - 4' - Indirect Fixture	Occupancy Sensor	152	2,618	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Acc Room	24	LED - Fixtures: Ambient - 4' - Direct Fixture	Wall Switch	38	3,740	None	Yes	24	LED - Fixtures: Ambient - 4' - Direct Fixture	Occupancy Sensor	38	2,618	0.18	1,177	0.0	$150.13	$540.00	$70.00	3.13
Room 23	2	LED - Fixtures: Ambient - 2' - Direct Fixture	Wall Switch	33	3,740	None	Yes	2	LED - Fixtures: Ambient - 2' - Direct Fixture	Occupancy Sensor	33	2,618	0.01	85	0.0	$10.86	$116.00	$20.00	8.84
Room 22	2	LED - Fixtures: Ambient - 2' - Direct Fixture	Wall Switch	33	3,740	None	Yes	2	LED - Fixtures: Ambient - 2' - Direct Fixture	Occupancy Sensor	33	2,618	0.01	85	0.0	$10.86	$116.00	$20.00	8.84
G28D	2	LED - Fixtures: Ambient - 2' - Direct Fixture	Wall Switch	33	3,740	None	Yes	2	LED - Fixtures: Ambient - 2' - Direct Fixture	Occupancy Sensor	33	2,618	0.01	85	0.0	$10.86	$116.00	$20.00	8.84
Acc Room	16	LED - Fixtures: Ambient - 2' - Direct Fixture	Wall Switch	33	3,740	None	Yes	16	LED - Fixtures: Ambient - 2' - Direct Fixture	Occupancy Sensor	33	2,618	0.10	681	0.0	$86.92	$540.00	$70.00	5.41

	Existing Conditions					Proposed Conditions							Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	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
G12A Toilet	1	Incandescent: Sceen In	Wall Switch	60	3,740	Relamp	No	1	LED Screw-In Lamps: LED Bulb (9W) - 1L	Wall Switch	9	3,740	0.03	219	0.0	$27.99	$17.23	$5.00	0.44
G107D	1	Incandescent: Sceen In	Wall Switch	60	3,740	Relamp	No	1	LED Screw-In Lamps: LED Bulb (9W) - 1L	Wall Switch	9	3,740	0.03	219	0.0	$27.99	$17.23	$5.00	0.44
Kitchen Bathroom	2	Incandescent: BULB	Wall Switch	60	3,740	Relamp	Yes	2	LED Screw-In Lamps: LED Bulb (9W) - 1L	Occupancy Sensor	9	2,618	0.07	462	0.0	$58.93	$150.45	$30.00	2.04
Elevator 2	6	Halogen Incandescent: Bulb	Wall Switch	20	3,740	Relamp	Yes	6	LED - Fixtures: High-Bay	Occupancy Sensor	3	2,618	0.07	462	0.0	$58.93	$300.00	$900.00	-10.18
Elevator 1	6	Halogen Incandescent: Bulb	Wall Switch	20	3,740	Relamp	Yes	6	LED - Fixtures: High-Bay	Occupancy Sensor	3	2,618	0.07	462	0.0	$58.93	$300.00	$900.00	-10.18
Exterior	8	Halogen Incandescent: 1 Bulb	Daylight Dimming	150	4,380	Relamp	No	8	LED - Fixtures: High-Bay	Daylight Dimming	23	4,380	0.67	5,138	0.0	$655.48	$292.16	$0.00	0.45
Auditorium	74	Halogen Incandescent: 1 Bulb	Occupancy Sensor	70	2,618	Relamp	No	74	LED - Fixtures: Other	Occupancy Sensor	21	2,618	2.38	10,917	0.0	$1,392.78	$2,220.00	$0.00	1.59
F22A Locker Room	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
D S2 Stair	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
D S1 Stair	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
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	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Library Office	4	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	4	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Cafeteria	4	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	4	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
C Wing Hallway	4	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	4	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Acc Room	4	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	4	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
E Wing Hallway	5	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	5	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Auditorium	5	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	5	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Stage Hallway	4	Compact Fluorescent: 4 PIN CFL	Occupancy Sensor	42	2,618	Relamp	Yes	4	LED - Fixtures: Ceiling Mount	High/Low Control	29	1,833	0.06	258	0.0	$32.91	$346.08	$0.00	10.52
2Nd Fl Pool Area	5	Compact Fluorescent: 4 PIN CFL	Occupancy Sensor	42	2,618	Relamp	No	5	LED - Fixtures: Close to Ceiling Mount	Occupancy Sensor	29	2,618	0.04	190	0.0	$24.20	$182.60	$0.00	7.55
G Wing Hallway	6	Compact Fluorescent: 4 PIN CFL	Wall Switch	42	3,740	Relamp	Yes	6	LED - Fixtures: Ceiling Mount	High/Low Control	29	2,618	0.08	553	0.0	$70.52	$419.12	$0.00	5.94
Exterior	12	Compact Fluorescent: 4 PIN CFL	Daylight Dimming	42	4,380	Relamp	No	12	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Daylight Dimming	29	4,380	0.10	762	0.0	$97.17	$438.24	$0.00	4.51
Kitchen	14	Compact Fluorescent: 4 PIN CFL	Wall Switch	42	3,740	Relamp	Yes	14	LED - Fixtures: Ceiling Mount	Occupancy Sensor	29	2,618	0.20	1,290	0.0	$164.55	$1,051.28	$70.00	5.96
F102	14	Compact Fluorescent: 4 PIN CFL	Wall Switch	42	3,740	Relamp	Yes	14	LED - Fixtures: Ceiling Mount	Occupancy Sensor	29	2,618	0.20	1,290	0.0	$164.55	$1,051.28	$70.00	5.96
E Wing Hallway	17	Compact Fluorescent: 4 PIN CFL	Wall Switch	42	3,740	Relamp	Yes	17	LED - Fixtures: Ceiling Mount	High/Low Control	29	2,618	0.24	1,566	0.0	$199.81	$820.84	$0.00	4.11
Cafeteria	23	Compact Fluorescent: 4 PIN CFL	Wall Switch	42	3,740	Relamp	Yes	23	LED - Fixtures: Ceiling Mount	Occupancy Sensor	29	2,618	0.32	2,119	0.0	$270.34	$1,379.96	$70.00	4.85

	Existing Conditions					Proposed Conditions							Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	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
E Wing 2Nd Fl. Hallway	27	Compact Fluorescent: 4 PIN CFL	Wall Switch	42	3,740	Relamp	Yes	27	LED - Fixtures: Ceiling Mount	High/Low Control	29	2,618	0.38	2,487	0.0	$317.35	$1,186.04	$0.00	3.74
Pool Hallway	36	Compact Fluorescent: 4 PIN CFL	Wall Switch	42	3,740	Relamp	Yes	36	LED - Fixtures: Ceiling Mount	High/Low Control	29	2,618	0.51	3,317	0.0	$423.14	$1,514.72	$0.00	3.58
Kitchen Storage	2	Compact Fluorescent: 2 PIN CFL	Wall Switch	23	1,320	Relamp	No	2	LED - Fixtures: Other	Wall Switch	16	1,320	0.01	21	0.0	$2.67	$30.00	$0.00	11.22
E S2 Stair	4	Compact Fluorescent: 2 PIN CFL	Wall Switch	42	3,740	Relamp	Yes	4	LED - Fixtures: Ceiling Mount	Occupancy Sensor	29	2,618	0.06	369	0.0	$47.02	$262.08	$0.00	5.57
E S1 Stair	4	Compact Fluorescent: 2 PIN CFL	Wall Switch	42	3,740	Relamp	Yes	4	LED - Fixtures: Ceiling Mount	Occupancy Sensor	29	2,618	0.06	369	0.0	$47.02	$262.08	$0.00	5.57

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?	Annual Operating Hours	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	P-1	1	Heating Hot Water Pump	40.0	94.1%	No	4,067	No	94.1%	Yes	1	4.78	56,101	0.0	$7,157.49	$9,366.05	$0.00	1.31
Boiler Room	P-2	1	Heating Hot Water Pump	40.0	94.1%	No	4,067	No	94.1%	Yes	1	4.78	56,101	0.0	$7,157.49	$9,366.05	$0.00	1.31
Boiler Room	P-3	1	Heating Hot Water Pump	40.0	94.1%	No	4,067	No	94.1%	Yes	1	4.78	56,101	0.0	$7,157.49	$9,366.05	$0.00	1.31
Boiler Room	Hot Water Heater	1	Other	0.3	68.0%	No	2,745	No	68.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Pool Storage	Pool Heater	2	Other	0.3	68.0%	No	2,745	No	68.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	Restrooms, Kitchen, Hallway	22	Exhaust Fan	0.3	68.0%	No	2,745	No	68.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	Restrooms, Kitchen, Hallway	15	Exhaust Fan	0.5	68.0%	No	2,745	No	68.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	Restrooms, Kitchen, Hallway	3	Exhaust Fan	0.8	68.0%	No	2,745	No	68.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	Commercial Dehumidifier	1	Process Blower	30.0	92.4%	No	4,067	No	92.4%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	Commercial Dehumidifier	6	Process Blower	1.5	84.0%	No	2,745	No	84.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	Commercial Dehumidifier	7	Process Blower	1.5	84.0%	No	2,745	No	84.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Locker Room Roof	AHU-P Pool Dehumidifier	1	Supply Fan	40.0	94.1%	No	2,034	Yes	94.1%	Yes	1	10.65	22,972	0.0	$2,930.87	$13,572.95	$2,600.00	3.74
Locker Room Roof	AHU-P Pool Dehumidifier	1	Return Fan	40.0	94.1%	No	4,067	Yes	94.1%	Yes	1	10.65	45,945	0.0	$5,861.74	$13,572.95	$2,600.00	1.87
Roof	AHU-N-1 Cafeteria	1	Supply Fan	10.0	91.7%	Yes	3,391	No	91.7%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	AHU-N-1 Cafeteria	1	Return Fan	3.0	89.5%	Yes	2,745	No	89.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	AHU-N-2 Faculty	1	Supply Fan	5.0	89.5%	Yes	2,745	No	89.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	AHU-N-2 Faculty	1	Return Fan	3.0	89.5%	Yes	2,745	No	89.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Locker Room Roof	HVN-1	1	Other	15.0	93.0%	Yes	3,391	No	93.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Locker Room Roof	HVN-1	1	Other	7.5	91.0%	Yes	3,391	No	91.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Existing Gym Ceiling	HVN-7	1	Supply Fan	5.0	89.5%	Yes	2,745	No	89.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00

		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?	Annual Operating Hours	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
Existing Gym Ceiling	HVN-8	1	Supply Fan	5.0	89.5%	Yes	2,745	No	89.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Locker Room Roof	HVN-C1	1	Supply Fan	7.5	91.0%	Yes	3,391	No	91.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Locker Room Roof	HVN-L1	1	Supply Fan	5.0	89.5%	Yes	2,745	No	89.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Locker Room Roof	HVN-L2	1	Supply Fan	5.0	89.5%	Yes	2,745	No	89.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	Exhaust Fan	3	Exhaust Fan	1.5	84.0%	No	2,745	No	84.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Boiler Room	Boiler	2	Combustion Air Fan	15.0	89.5%	No	1,696	Yes	91.0%	Yes	2	8.47	15,327	0.0	$1,955.40	$13,621.19	$3,600.00	5.12
Pool Storage	Pool Heater	1	Other	15.0	93.0%	No	3,391	No	93.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00

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 (kBtu/hr)	Install High Efficiency System?	System Quantity	System Type	Cooling Capacity per Unit (Tons)	Heating Capacity per Unit (kBtu/hr)	Cooling Mode Efficiency (SEER/EER)	Heating Mode Efficiency (COP)	Install Dual Enthalpy Economizer?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Roof	Commercial Dehumidifier	1	Packaged AC	60.00		Yes	1	Packaged AC	5.00		14.00		Yes	44.33	75,847	0.0	$9,676.73	$11,844.80	$710.00	1.15
Classrooms	Classrooms	4	Split-System AC	1.50		Yes	4	Split-System AC	1.50		14.00		No	0.94	1,586	0.0	$202.39	$8,977.32	$552.00	41.63
Roof	Classrooms	4	Split-System AC	3.00		Yes	4	Split-System AC	3.00		14.00		No	1.88	3,173	0.0	$404.78	$17,954.64	$1,104.00	41.63
Roof	Classrooms	4	Split-System AC	0.75		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Classrooms	Classrooms	63	Window AC	2.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	AHU-N-1 Cafeteria	1	Packaged AC	20.00		Yes	1	Packaged AC	20.00		10.50		Yes	1.72	6,822	0.0	$870.36	$34,647.98	$1,830.00	37.71
Roof	AHU-N-2 Faculty	1	Packaged AC	16.00		Yes	1	Packaged AC	16.00		11.50		Yes	2.34	6,816	0.0	$869.63	$23,201.60	$1,514.00	24.94
Pool Observation	AC-1	1	Split-System AC	1.25		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Pool Office	AC-2	1	Split-System AC	1.25		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
PE Office	AC-3	1	Split-System AC	1.25		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00

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)	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	School	1	Non-Condensing Hot Water Boiler	13,388.00	Yes	1	Non-Condensing Hot Water Boiler	13,388.00	85.00%	Ec	0.00	0	407.1	$3,664.49	$229,407.69	$0.00	62.60
Boiler Room	School	1	Non-Condensing Hot Water Boiler	13,388.00	Yes	1	Non-Condensing Hot Water Boiler	13,388.00	85.00%	Ec	0.00	0	407.1	$3,664.49	$229,407.69	$0.00	62.60
Pool Storage	Swimming Pool	1	Condensing Hot Water Boiler	445.00	No						0.00	0	0.0	$0.00	$0.00	$0.00	0.00

DHW Inventory & Recommendations

		Existing Conditions		Proposed Conditions						Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	System Quantity	System Type	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	Kitchen & Restrooms	1	Storage Tank Water Heater (> 50 Gal)	No						0.00	0	0.0	$0.00	$0.00	$0.00	0.00

Low-Flow Device Recommendations

	Recommedation Inputs				Energy Impact & Financial Analysis						
Location	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	13	Faucet Aerator (Lavatory)	2.50	1.00	0.00	0	20.1	$180.94	$93.21	$0.00	0.52
Restrooms	26	Faucet Aerator (Lavatory)	2.20	1.00	0.00	0	32.2	$289.51	$186.42	$0.00	0.64

Walk-In Cooler/Freezer Inventory & Recommendations

	Existing Conditions		Proposed Conditions			Energy Impact & Financial Analysis						
Location	Cooler/ Freezer Quantity	Case Type/Temperature	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
Cafeteria Kitchen	1	Low Temp Freezer (-35F to -5F)	Yes	Yes	Yes	0.11	2,151	0.0	$274.39	$2,495.90	$125.00	8.64
Cafeteria Kitchen	1	Cooler (35F to 55F)	Yes	Yes	Yes	0.11	2,315	0.0	$295.29	$2,495.90	$125.00	8.03

Commercial Refrigerator/Freezer Inventory & Recommendations

	Existing Conditions			Proposed Condi	Energy Impact & Financial Analysis						
Location	Quantity	Refrigerator/ Freezer Type	ENERGY STAR Qualified?	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
Cafeteria Kitchen	3	Stand-Up Refrigerator, Glass Door (>50 cu. ft.)	Yes	No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Cafeteria Kitchen	1	Stand-Up Freezer, Solid Door (>50 cu. ft.)	Yes	No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Cafeteria Kitchen	1	Freezer Chest	Yes	No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00

Commercial Ice Maker Inventory & Recommendations

	Existing Conditions			Proposed Condi	Energy Impact & Financial Analysis						
Location	Quantity	Ice Maker Type	ENERGY STAR Qualified?	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
Cafeteria Kitchen	1	Ice Making Head (<450 lbs/day), Batch	Yes	No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00

Cooking Equipment Inventory & Recommendations

	Existing Conditions			Proposed Conditions	Energy Impact & Financial Analysis						
Location	Quantity	Equipment Type	High Efficiency Equipement?	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
Cafeteria Kitchen	2	Insulated Food Holding Cabinet (1/2 Size)	Yes	No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Cafeteria Kitchen	2	Insulated Food Holding Cabinet (Full Size)	Yes	No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Cafeteria Kitchen	1	Gas Combination Oven/Steam Cooker (<15 Pans)	No	No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Cafeteria Kitchen	1	Electric Steamer	Yes	No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Cafeteria Kitchen	1	Gas Steamer	Yes	No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00

Dishwasher Inventory & Recommendations

	Existing Conditions					Proposed Conditions	Energy Impact & Financial Analysis						
Location	Quantity	Dishwasher Type	Water Heater Fuel Type	Booster Heater Fuel Type	ENERGY STAR Qualified?	Install ENERGY STAR Equipment?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Payback w/ Incentives in Years
Cafeteria Kitchen	1	Door Type (High Temp)	Electric	Electric	Yes	No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00

Plug Load Inventory

	Existing Conditions			
Location	Quantity	Equipment Description	Energy Rate (W)	ENERGY STAR Qualified?
Classrooms	70	Projectors	120.0	Yes
Classrooms	292	Computers	120.0	Yes
Classrooms	104	Wall Fan	100.0	No
Classrooms	78	Small Printer	46.0	Yes
Classrooms	19	Small Refrigerator	120.0	No
Staff Room/Pantry	14	Microwave	800.0	No
Staff Room/Pantry	14	Big Refrigerator	255.0	Yes
Music Room/Hallway	14	TV	244.0	No
Mail Room	8	Copy Machine	600.0	Yes
Media Room	7	3D Printer	55.0	Yes
Laundry	3	Washer & Dryer	800.0	Yes
Wood Workshop	10	Workshop Equipment	600.0	No
Main Office	3	Security Cameras	60.0	No
Photography Studio	6	Studio Lights	55.0	No
Pantry	4	Coffee Maker	300.0	No
Staffroom	1	Electric Heater	600.0	No
Main Office	3	Paper Shredder	60.0	No

Vending Machine Inventory & Recommendations

	Existing Conditions		Proposed Conditions	Energy Impact & Financial Analysis						
Location	Quantity	Vending Machine Type	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
Cafeteria	2	Refrigerated	Yes	0.00	3,224	0.0	$411.28	$460.00	$0.00	1.12

Appendix B: ENERGY STAR® Statement of Energy Performance

ENERGY STAR® Statement of Energy Performance

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ENERGY STAR® Score[1]

John Witherspoon Middle School

Primary Property Type: K-12 School
Gross Floor Area (ft²): 148,531
Built: 1965

For Year Ending: July 31, 2017
Date Generated: October 29, 2018

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

Property & Contact Information

Property Address	Property Owner	Primary Contact
John Witherspoon Middle School 217 Walnut Lane Princeton, New Jersey 08540	Princeton Public Schools 25 Valley Road Princeton, NJ 08540 (609) 806-4204	Stephanie Kennedy 25 Valley Road Princeton, NJ 08540 (609) 806-4204 stephaniekennedy@princetonk12.org

Property ID: 6564207

Energy Consumption and Energy Use Intensity (EUI)

Site EUI
130.2 kBtu/ft²

Source EUI
211.8 kBtu/ft²

Annual Energy by Fuel	
Natural Gas (kBtu)	12,968,045 (67%)
Electric - Grid (kBtu)	6,373,813 (33%)

National Median Comparison	
National Median Site EUI (kBtu/ft²)	90
National Median Source EUI (kBtu/ft²)	146.5
% Diff from National Median Source EUI	45%
Annual Emissions	
Greenhouse Gas Emissions (Metric Tons CO2e/year)	1,334

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)